Lakeside County Water & Sewer District

WASTEWATER TREATEMENT FACILITY PLAN

Lakeside, Montana

September 2025

RPA

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Helena, MT 59601

LAKESIDE
WATER & SEWER

253 Bierney Creek Rd
Lakeside, MT 59922

Lakeside County Water and Sewer District
Wastewater Treatment Facility Plan - 2025

Prepared For: Lakeside County Water and Sewer District, Montana

September 2025

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CHAPTER 0: EXECUTIVE SUMMARY

0.1. INTRODUCTION AND BACKGROUND

The Lakeside County Water & Sewer District (LCWSD) owns, operates, and maintains the wastewater system that serves the community of Lakeside and surrounding areas. This includes gravity sewer mains, force mains, lift stations, and the wastewater treatment facility (WWTF). The system was originally constructed in 1987 using EPA funding to protect Flathead Lake. At the time, the northwest corner of Flathead Lake primarily relied on individual septic systems. Due to their proximity to the lake, there were concerns about nutrient runoff, particularly nitrogen and phosphorus, which can contribute to algal blooms. These blooms negatively affect aquatic ecosystems by depleting oxygen, harming wildlife, and creating unsafe conditions for recreation and drinking water. The centralized wastewater treatment system addressed these concerns by eliminating most on-site treatment systems and conveying wastewater away from the lake for treatment.

In 1994, the Somers County Water and Sewer District (SCWSD) constructed an additional storage pond at the LCWSD WWTF and contracted with LCWSD for treatment services. SCWSD wastewater enters the system at Lift Station #1, where it is pumped along with Lakeside wastewater to the WWTF. LCWSD is only responsible for treating wastewater from SCWSD that enters at Lift Station #1; it does not manage the SCWSD collection system.

In 2010, LCWSD completed upgrades to the WWTF, including the construction of a headworks building to provide mechanical screening of influent and reduce inorganic load accumulation in the first treatment cell.

Due to the aging wastewater system, the treatment facility requires an upgrade to ensure the District can continue effectively treating wastewater and protecting Flathead Lake from nutrient pollution. These upgrades will continue LCWSD's long-standing commitment to preserving and protecting Flathead Lake.

This Facility Plan will primarily focus on Phase II of the treatment system upgrades, as Phase I which includes a new headworks, septage receiving facility, and various other facility improvements is currently under construction.

0.2. PROBLEM DEFINITION

LCWSD's Wastewater Treatment Facility has reached the end of its design life, and the primary treatment process needs to be upgraded to ensure proper and effective wastewater treatment. Due to growth within the District and surrounding areas, the current WWTF is operating near its capacity. This situation has prompted LCWSD to evaluate and initiate necessary upgrades to the facility.

In addition to the WWTF reaching the end of its design life and nearing capacity, Flathead County approached the District with a proposal to accept and treat septage at the facility, contingent on the County funding a significant portion of the treatment facility improvements. As a result, LCWSD entered into an agreement with the County to accept and treat septage.

The upgraded facility will need to enhance the existing infrastructure to continue treating wastewater effectively, protect Flathead Lake, and accommodate increased volumes of domestic wastewater and septage from Flathead County.

0.3. ALTERNATIVES CONSIDERED

This facility explores alternatives for effluent disposal, secondary treatment and treatment. These alternatives listed below are explored in further detail in **Chapter 2**, **Chapter4**, and **Chapter 5**.

Effluent Disposal

- Groundwater Discharge

Treatment System Alternatives

- Oxidation Ditch with Secondary Clarifiers
- Sequencing Batch Reactor (SBR)
- Membrane Bioreactor (MBR)

Sludge Storage

- Concrete Sludge Storage Basins
- Sludge Storage Pond

Solids Dewatering

- Mechanical Dewater by Screw Press
- Sludge Drying beds

0.4. RECOMMENDED PROJECT

A more detailed review of the recommended project can be found in **Chapter 6** of this facility plan. In summary the recommended project includes the following improvements:

- Septage Flow Equalization Basin
- Sequencing Batch Reactor
- Concrete Sludge Storage Basins
- Mechanical Dewater of Solids by Screw Press
- Expanded Effluent Disposal by Groundwater Discharge

The alternatives described above were evaluated based on a 20-year design flow of approximately 0.9 million gallons per day (MGD). However, considering the cost of the proposed improvements and the fact that the District currently has the capacity to discharge only about 0.54 MGD, it was determined that it would be more practical to initially design the secondary treatment process for the 10-year design flow, or approximately 0.6 MGD.

An exception to this is the septage load, which will be accounted for using the 20-year design flow to meet contractual obligations with Flathead County. Additionally, due to the high solids concentration in the septage, the solids handling process is recommended to be designed for the 20-year load, as a significant portion of solids will be generated from septage.

The secondary treatment process will be designed to allow for future expansion by adding additional basin(s) in a later phase. By sequencing construction in this manner, LCWSD can reduce the initial capital investment required to complete the project.

0.5. PROJECT COSTS AND BUDGET

The total project cost for Phase II of the Wastewater Treatment Improvements are summarized in **Table 0.5**. The cost summary includes total construction cost, The total project cost (includes the construction, contingency, engineering, administration), and O&M costs. O&M costs include solids disposal at full build out which is a large cost that initially will not be realized by the district. Detailed cost estimates are located in Appendix G.

Table 0.5 – Cost Summary for Phase II of Wastewater Treatment Improvements

Total Construction Cost	$24,862,200
Total Project Cost	$33,006,700
Total Annual Operation and Maintenance Cost	$625,600

CHAPTER 1 – FLOW AND LOAD PROJECTIONS

1.1. SERVICE AREA

The Lakeside County Water & Sewer District (LCWSD) owns, operates, and maintains the wastewater system that serves the community of Lakeside and surrounding areas. This includes gravity sewer mains, force mains, lift stations, and the wastewater treatment facility (WWTF). The system was originally constructed in 1987 using EPA funding to protect Flathead Lake. At the time, the northwest corner of Flathead Lake primarily relied on individual septic systems. Due to their proximity to the lake, there were concerns about nutrient runoff, particularly nitrogen and phosphorus, which can contribute to algal blooms. These blooms negatively affect aquatic ecosystems by depleting oxygen, harming wildlife, and creating unsafe conditions for recreation and drinking water. The centralized wastewater treatment system addressed these concerns by eliminating most on-site treatment systems and conveying wastewater away from the lake for treatment.

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In 2010, LCWSD completed upgrades to the WWTF, including the construction of a headworks building to provide mechanical screening of influent and reduce inorganic load accumulation in the first treatment cell.

Figure 1.1 illustrates the extent of the existing wastewater system and its current service area.

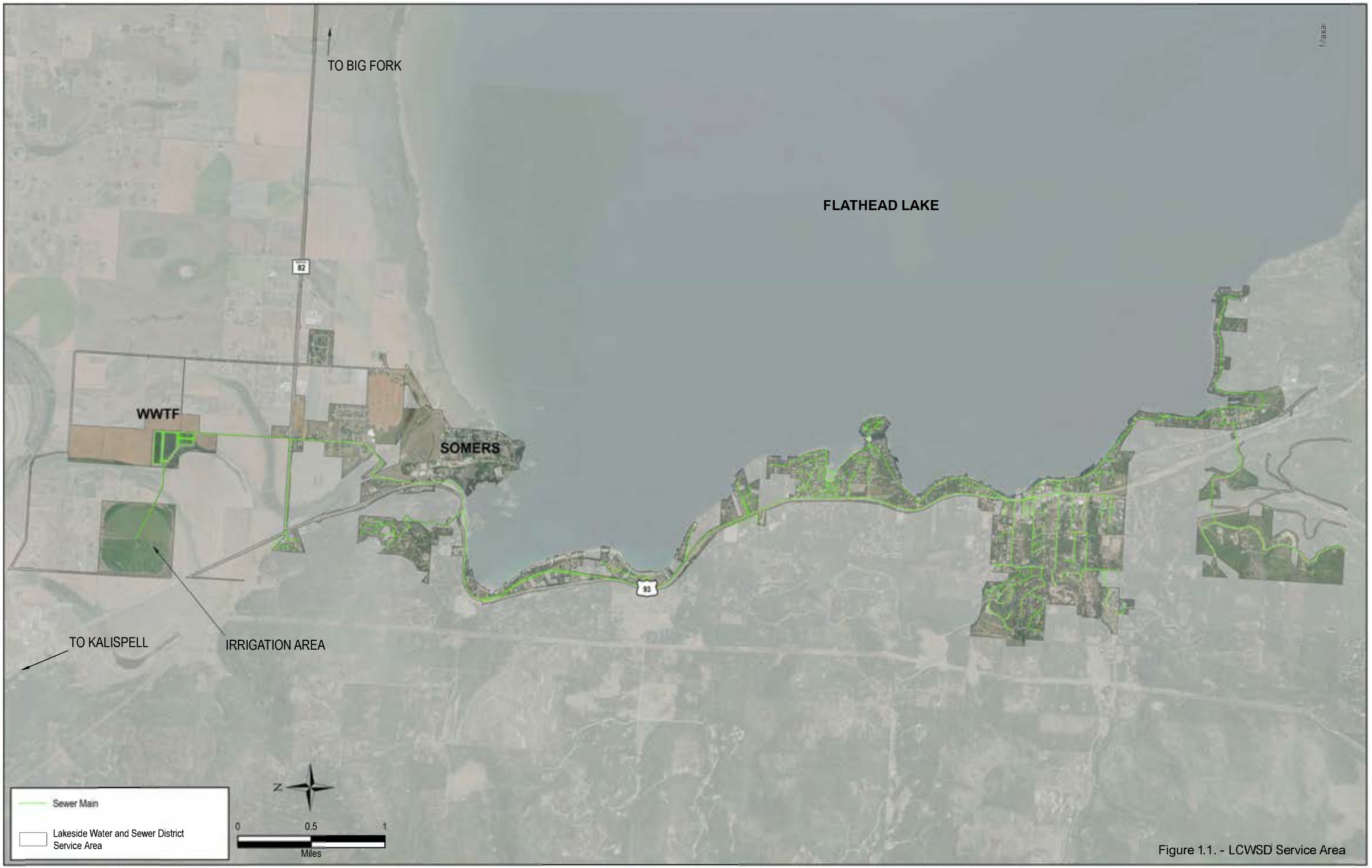


Figure 1.1. - LCWSD Service Area

1.2. WASTEWATER FLOWS

1.2.1. HISTORIC INFLUENT FLOWS

Influent flows at the WWTF are measured by an electromagnetic flow meter located at Lift Station #1A. These measurements include flows from SCWSD but exclude White Oak Service Center, whose minimal contribution does not materially impact overall flow.

From 2021 to 2024, the average daily flow at the WWTF was approximately 245,630 gallons per day (gpd). A peaking factor of 3.4 was applied to estimate a peak hourly flow of 859,705 gpd, or 597 gallons per minute (gpm). Although peak hourly flows are around 580 gpm, the system's current pump capacity to the WWTF is 1,100 gpm. It is anticipated that influent flow rates will increase with continued development.

Table 1.2.1 presents influent flow data from 2021 through 2024.

Table 1.2.1*: Influent Wastewater Flows 2021 – 2024*

Year	Average Daily Flow (gpd)	Max Month Flow (gpd)	Peak Hour (gpm)	EDU's	Flow per EDU (gpd)
2021	236,448	282,355	558	1447	163
2022	248,153	328,289	586	1505	165
2023	253,770	315,988	599	1566	162
2024	244,148	332,116	576	1591	153
Average	**245,630**	**314,687**	**580**	**1,527**	**161**

The average flow per Equivalent Dwelling Unit (EDU) is 161 gallons per day (gpd). According to the capacity analysis conducted by the Montana Department of Environmental Quality (MDEQ), the flow per EDU should be based on the year with the highest recorded inflow, which is 162 gpd (see Appendix A). This value 162 gpd per EDU will be used to represent existing demands moving forward.

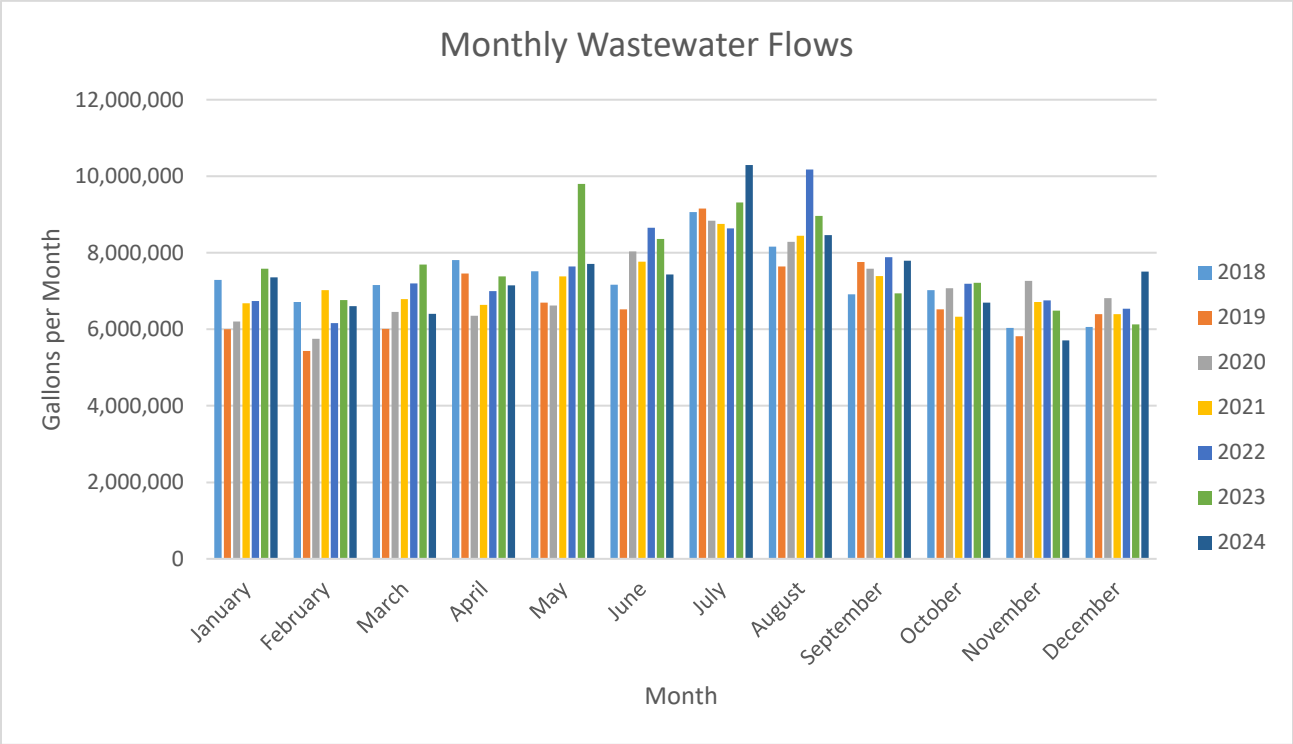
Assuming an average of 2.3 people per EDU, the resulting per capita flow rate over this four-year period was approximately 70 gallons per capita per day (gpcd). This is significantly lower than the typical per capita wastewater flow rate of 100 gpcd. The reduced rate is likely attributable to several factors, including the seasonal use of many homes in the area, a higher proportion of retirement homes without children, and a relatively new collection system with minimal inflow and infiltration.

New developments in the district are expected to house more full-time residents and families, likely increasing the per capita demand. For planning purposes, future growth will assume 2.3 people per EDU and a per capita flow of 100 gpcd, resulting in an average

of 230 gpd per EDU. The district has chosen to allocate this flow rate for all future developments. This projection of 230 gpd per EDU has been confirmed by the MDEQ's capacity analysis, as detailed in **Appendix A**.

Monthly wastewater flow data from 2018 to 2024 are presented in **Figure 1.2.1**, showing notable seasonal variability, with peak flows typically occurring in July and August. As more full-time residents move into the district, this seasonal fluctuation is expected to decrease.

Figure 1.2.1: Monthly Influent Wastewater Flows 2018 - 2024



1.2.2. INFLOW AND INFILTRATION

Inflow is typically stormwater that enters the collection system from above-ground sources. Infiltration is excess water that enters the collection system through damaged and unsealed pipes and joints and is typically groundwater or water from saturated soils after snow melt or a storm event. Excessive inflow and infiltration (I & I) can significantly increase the operations and maintenance of a wastewater treatment plant and decrease the plant's hydraulic capacity. This "clean water" inhibits biological treatment, especially when the volume of clean water is not constant.

I&I typically peaks in April, May, and June with the increase precipitation and high groundwater levels. As shown in **Figure 1.2.1**, flows to the WWTF remain relatively consistent throughout the year with a slight increase in flows during July and August.

Typically, July and August would have low levels of I&I as those months typically have the lowest levels of precipitation and lower groundwater elevation. The increase in wastewater flows received at the LCWSD WWTF is a result of increased population due to lakeshore tourism within the communities of Lakeside and Somers.

I&I typically occurs in older collection systems that have had minimal improvements. The Lakeside collection system is less than 40 years old, which is relatively new compared to many collection systems. I&I does not appear to be a major issue with the collection system.

1.2.3. GROWTH/POPULATION PROJECTIONS

Planned developments within the District and Somers are expected to increase the volume of wastewater received at the WWTF. To estimate the timing of this growth and the corresponding wastewater flow, community expansion has been projected over three time periods: 0–5 years, 5–10 years, and 10–20 years.

Currently, there are 1,591 Equivalent Dwelling Units (EDUs) in the District and Somers combined. This number is expected to rise as more land is developed. As shown in **Figure 1.2.3**, areas projected for development within the next five years are highlighted in green, those expected in five to ten years are in orange, and areas planned for development in ten to twenty years are shown in yellow.

Over the next 20 years, the number of EDUs is projected to grow to 4,092. Estimated growth rates for each period are provided in **Table 1.2.3**. As development progresses.

Table 1.2.3: LCWSD Wastewater User Growth

Year	EDUs	Average Yearly Increase
December 2024	1,591	-
2029 – 5 Year	2,462	9%
2034 – 10 Year	2,957	4%
2044 – 20 Year	4,092	7%

Path: F:\water\21733 - Lakeside Wastewater Improvements - 2022\GIS\Lakeside_PRO\Lakeside_PRO.aprx 7/1/2025 7:25 AM: Layout-Figure 1.2.3

Lakeside 20-Year Anticipated Development

	Map Label	EDUs
(0-5 Years)	2	30
	3	40
	5	45
	6	65
	8A	90
	10	36
	13	40
	15	400
	16	125
		871
(5-10 Years)	4	50
	8B	85
	9A	60
	11A	300
		495
(10-20 Years)	Additional Growth	440
	7	20
	8C	75
	9B	60
	11B	500
	14	40
		1,135

* Assumes Other Areas Will Be Developed

11A (300 EDUs) (5-10 Years)

11B (500 EDUs) (10-20 Years)

10 (36 EDUs)

9A (60 EDUs) (5-10 Years)

9B (60 EDUs) (10-20 Years)

8A (90 EDUs) (0-5 Years)

8B (85 EDUs) (5-10 Years)

8C (75 EDUs) (10-20 Years)

7 (20 EDUs)

13 (40 EDUs)

14 (40 EDUs)

6 (65 EDUs)

5 (45 EDUs)

3 (40 EDUs)

4 (50 EDUs)

2 (30 EDUs)

15 (400 EDUs)

16 (125 EDUs)

82

93

Legend

Subdivision Boundaries

Proposed 20-Year Scenario

- 0 - 5 Years
- 5 - 10 Years
- 10 - 20 Years
- Lakeside WSD Boundary
- Parcel Boundary
- Wastewater Piping

N

0 2,000 4,000

Feet

Service Layer Credits: World Imagery: Maxar

Figure 1.2.3 - 20-Year Anticipated Development

1.2.4. DESIGN FLOWS

Once population growth and land development areas were projected, wastewater flow estimates were developed. For residential areas, the estimated number of EDUs was based on typical housing densities and input from planning meetings with developers and the District. EDU totals were then determined for each planning period.

An average daily flow of 162 gallons per day (gpd) per EDU was used for existing units, as accepted by the Montana Department of Environmental Quality (MDEQ). For all future growth, a flow rate of 230 gpd per EDU was applied.

Due to the variability in wastewater flows from summer to winter to max month, each time period has a flow factor, which reflects the average variability in flow. These factors are expected to gradually decrease as the population grows and flows becomes more consistent. A peak hour peaking factor, based on population, is also applied starting at 3.4 and decreasing to 3.0 as the population increases.

Table 1.2.4 below summarizes the design criteria that will guide the sizing of future upgrades at the WWTF.

Table 1.2.4: Wastewater Design Flows

Year	EDU's	Average Daily Flow (gpd)	Winter Flow Factor	Average Daily Winter Flow (gpd)	Summer Flow Factor	Average Daily Summer Flow (gpd)	Max Month Peaking Factor	Max Month Flow (GPD)	Peaking Factor	Peak Hour (gpm)
2024	1,591	257,742	0.91	234,545	1.09	280,938.78	1.28	329,910	3.4	603
2029	2,462	458,072	0.92	421,426	1.08	494,717.76	1.21	556,176	3.2	1,016
2034	2,957	571,922	0.93	531,887	1.07	611,956.54	1.19	677,930	3.1	1,239
2044	4,092	832,972	0.95	791,323	1.05	874,620.60	1.13	943,716	3.0	1,724

1.3. WASTEWATER LOADS

There are two wastewater load streams that will enter the WWTF: regular domestic wastewater and septage. The District has agreed to receive and treat septage from Flathead County. In March 2024, LCWSD entered into an agreement with Flathead County to accept and treat septage from county residents in exchange for the County funding a significant portion of the WWTF.

Both wastewater sources domestic and septage must be accounted for in order to determine the total loading at the WWTF.

1.3.1. HISTORIC DOMESTIC INFLUENT LOADS

Currently the LCWSD is not required to test influent and effluent at the WWTF. The district does however collect influent and effluent samples in the fall and in the spring each year. **Table 1.3.1.A** shows the samples collected.

Table 1.3.1.A: Wastewater Influent Loading

Influent Samples				
Time	**BOD (mg/l)**	**TSS (mg/l)**	**TKN (mg/l)**	**Total Phosphorus (mg/l)**
Spring 2017	285	195	-	5.14
Fall 2017	432	416	-	6.91
Spring 2018	274	181	49.3	5.99
Spring 2019	420	230	15.3	9.63
Fall 2019	340	260	56.8	13.5
Spring 2020	486	249	64.1	7.54
Fall 2020	590	533	65	9.93
Spring 2021	448	346	66.2	7.82
Fall 2021	508	221	55.1	6.12
Spring 2022	514	299	68.5	7.71
Fall 2022	365	263	62	7.29
Spring 2023	119	140	30.1	3.63
Fall 2023	508	277	56.4	6.2
Spring 2024	166	-	-	-
Spring 2024	122	-	-	-
Fall 2024	256	143	53.4	6.14
Average	**365**	**268**	**54**	**7**

The average existing influent loading is higher than typical domestic wastewater. **Table 1.3.1.B** summaries average loading for domestic wastewater.

Table 1.3.1.B: Wastewater Influent Typical Domestic Loading

Typical Wastewater Influent Loading			
BOD (mg/l)	TSS (mg/l)	TKN (mg/l)	TP (mg/l)
200 to 300	250	25 to 35	6 to 8

When comparing typical domestic influent loadings to Lakeside's average influent loadings, it is evident that Lakeside experiences relatively high-strength domestic wastewater. Biological Oxygen Demand (BOD) and Total Kjeldahl Nitrogen (TKN) concentrations are significantly higher than typical domestic values. Total Phosphorus (TP) and Total Suspended

Solids (TSS) are also at the upper end of the typical range. Several factors may contribute to these elevated concentrations, including minimal inflow and infiltration (I&I), seasonal usage patterns, and high-strength wastewater discharge from a brewery connected to the collection system.

I&I refers to clean water entering the collection system either through stormwater (inflow) or through groundwater infiltration. This clean water dilutes the wastewater, lowering influent concentrations. Most wastewater systems have some degree of I&I, which reduces overall pollutant concentrations. However, Lakeside's collection system experiences minimal I&I, which could explain its higher influent concentrations.

A significant portion of Lakeside's flow originates from part-time residents or second homes. It is possible that wastewater generated from these properties is more concentrated than typical domestic wastewater. As the District continues to grow and more full-time residents move into the area, this trend is expected to shift toward more typical domestic loading characteristics.

Another potential contributor to the high influent loading is the Tamarack Brewery, located in Lakeside. Brewery wastewater is typically very high in BOD and nitrogen, particularly TKN. The Tamarack Brewery is one of the largest users in the District, and its discharge can significantly impact influent wastewater concentrations. The District became aware of the high loadings in the fall of 2023 and has since begun working with the brewery to reduce the strength of its wastewater. Based on sample results shown in **Table 1.3.1.B**, modifications made to the brewery's discharge process appear to have successfully reduced BOD concentrations. However, nitrogen levels remain unaffected, as nitrogen is more difficult to remove from the wastewater stream. The District plans to continue working with the brewery to further reduce the strength of its discharge.

As population growth continues, it is anticipated that the brewery's contribution will represent a smaller proportion of the overall wastewater flow, which should result in a decrease in influent concentrations. Current influent flow data and recent test results indicate that average BOD concentrations have decreased after measures were put in place. Furthermore, as the District's demographics shift and the brewery's impact diminishes, a continued reduction in concentration levels is expected.

For these reasons, future wastewater system design will be based on the following influent concentrations in **Table 1.3.1.C**:

Table 1.3.1.C: Design Influent Wastewater Loading

Design Influent Wastewater Loading			
BOD (mg/l)	TSS (mg/l)	TKN (mg/l)	TP (mg/l)
350	268	54	7

1.3.2. SEPTAGE LOADS

As noted above, the District has agreed to accept and treat septage from Flathead County residents at the Lakeside WWTF. Treating septage presents several challenges that make it significantly more difficult to manage than regular municipal wastewater. The primary concern is that septage contains very high concentrations of BOD, TSS, nitrogen, and phosphorus. Additionally, the strength of septage can be extremely variable, leading to inconsistent loading conditions.

This variability can create significant operational challenges, as WWTFs generally perform best when influent flow and concentrations are consistent and without large fluctuations. To mitigate the impact of septage loading on the treatment process, all future improvements at the WWTF will include a septage flow equalization (EQ) basin. The EQ basin will be designed to hold septage and allow it to be gradually introduced into the influent stream at a rate proportional to the domestic wastewater flow, helping to maintain more stable loading conditions.

Septage load estimates were derived from the *Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report*, completed by HDR Engineering. HDR conducted sampling from local septage haulers to determine a representative median septage load. The results of that sampling are presented in **Table 1.3.2.A**.

Table 1.3.2.A: Septage Loading

Parameter	Textbook Value	Local Septage Lab Results (Median Value)	Local Septage Lab Results (Range)
Total Suspended Solids (mg/L)	15,000	8,400	1,620 - 26,600
5-day Biochemical Oxygen Demand (mg/L)	7,000	5,400	3,300 - 7,700
Ammonia as N (mg/L)	150	128	67 – 8,000
Total Kjeldahl Nitrogen (mg/L)	700	806	292 - 3860
Total Phosphorous (mg/L)	250	118	39 - 511

Based on the results presented in **Table 1.3.2.A**, it is evident that septage characteristics are highly variable. This variability will be mitigated by the implementation of a septage equalization (EQ) basin, which will allow for more uniform loading that better reflects the median values shown in **Table 1.3.2.A**.

Given the significant fluctuations in constituent concentrations, several of the design values have been conservatively adjusted. Total Suspended Solids (TSS) showed a wide range of variability, with the median value falling well below typical textbook values. Therefore, the design TSS concentration was increased to 10,000 mg/L to account for potential peaks. In contrast, Biological Oxygen Demand (BOD) exhibited less variability,

and its median value was close to standard references, so the median value will be used for design purposes.

For Total Kjeldahl Nitrogen (TKN), the median concentration exceeded textbook values and will be used as the design value. However, the median value for Total Phosphorus (TP) was substantially lower than the typical reference value, so the design value has been increased to 200 mg/L to provide a conservative buffer.

Table 1.3.2.B summarizes the final septage design loading values based on these assumptions.

Table 1.3.2.B: Design Septage Loading

Parameter	Design Septage Values
Total Suspended Solids (mg/L)	10,000
5-day Biochemical Oxygen Demand (mg/L)	5,400
Ammonia as N (mg/L)	150
Total Kjeldahl Nitrogen (mg/L)	806
Total Phosphorous (mg/L)	200

1.3.3. SEPTAGE FLOW RATES

The *Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report* also establishes a 20-year design flow projection. According to the report, Flathead County is expected to generate 10 million gallons of septage annually by the end of the 20-year planning period. It is assumed that 95% of this volume approximately 9.5 million gallons per year will be received at the septage receiving facility.

The report further assumes that 50% more septage will be received during the summer months compared to the winter months. Based on this seasonal variation, it is projected that 3.8 million gallons will be received during the winter, and 5.7 million gallons during the summer.

Septage will only be received during normal working hours. There are approximately 143 working days in the winter season (October through April) and 107 working days in the summer season (May through September). Based on these assumptions, it is estimated that the facility will receive an average of 30,000 gallons per day (gpd) of septage in the winter and 53,250 gpd in the summer.

This seasonal variability in septage flow has a direct impact on WWTF operations. Biological treatment processes are more efficient at higher temperatures, and warmer

wastewater is less viscous, which improves oxygen transfer and settling characteristics. As a result, separate summer and winter design conditions will be required to account for these operational differences.

As previously noted, a septage EQ basin will be necessary to provide consistent loading to the WWTF. The EQ basin must be sized to buffer daily septage deliveries and distribute the load evenly across the entire week. Septage will be introduced proportionally to the influent domestic wastewater flow to maintain stable operating conditions.

Table 1.3.2.B presents the projected winter septage flows, while **Table 1.3.2.C** summarizes the projected summer flows.

Table 1.3.2.B: Winter Septage Flow Rates

Day	Septage Received (gpd)	Septage Flow to Process (gpd)	EQ Volume (gals)
Monday	30,000	21,429	8,571
Tuesday	30,000	21,429	17,143
Wednesday	30,000	21,429	25,714
Thursday	30,000	21,429	34,286
Friday	30,000	21,429	42,857
Saturday	0	21,429	21,429
Sunday	0	21,429	0

Table 1.3.2.C: Summer Septage Flow Rates

Day	Septage Received (gpd)	Septage Flow to Process (gpd)	EQ Volume (gals)
Monday	53,250	38,036	15,214
Tuesday	53,250	38,036	30,429
Wednesday	53,250	38,036	45,643
Thursday	53,250	38,036	60,857
Friday	53,250	38,036	76,071
Saturday	0	38,036	38,036
Sunday	0	38,036	0

1.4. INFLUENT DESIGN CRITERIA SUMMARY

With the domestic and septage load design criteria established, the combined design criteria can be determined and used for sizing the WWTF. As discussed in Section 1.3.3, there is significant variability between septage loads in the summer and winter. This

variability must be considered when determining design loads for the treatment process. Additionally, as mentioned earlier, the septage load must be introduced into the wastewater stream proportionally to the influent flow to prevent overloading or shock-loading the treatment process.

Based on these criteria, the summer design parameters are summarized in **Table 1.4.A** and **Table 1.4.B**.

Table 1.4.A: Summer Design Criteria

Constituent	Year	Domestic Load		Septage Load		Combined (Collection and Septage)		
		gpd	mg/L	gpd	mg/l	gpd	lbs/day	mg/l
BOD	2029*	495,000	350	19,018	5,400	514,018	2,301	537
	2034**	612,000	350	26,625	5,400	638,625	2,986	561
	2044***	875,000	350	38,036	5,400	913,036	4,267	560
TSS	2029*	495,000	268	19,018	10,000	514,018	2,692	628
	2034**	612,000	268	26,625	10,000	638,625	3,588	674
	2044***	875,000	268	38,036	10,000	913,036	5,128	673
Nitrogen	2029*	495,000	54	19,018	806	514,018	351	82
	2034**	612,000	54	26,625	806	638,625	455	85
	2044***	875,000	54	38,036	806	913,036	650	85
Phosphorus	2029*	495,000	7	19,018	200	514,018	61	14
	2034**	612,000	7	26,625	200	638,625	80	15
	2044***	875,000	7	38,036	200	913,036	115	15

**Assumes 50% percent of the total Septage Flow will be received per the Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report completed by HDR Engineering*

***Assumes 70% percent of the total Septage Flow will be received per the Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report completed by HDR Engineering*

****Assumes 95% percent of the total Septage Flow will be received per the Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report completed by HDR Engineering*

Table 1.4.B: Winter Design Criteria

Constituent	Year	Domestic Load		Septage Load		Combined (Collection and Septage)		
		gpd	mg/L	gpd	mg/l	gpd	lbs/day	mg/l
BOD	2029*	421,000	350	10,714	5,400	431,714	1,711	475
	2034**	532,000	350	15,000	5,400	547,000	2,228	488
	2044***	791,000	350	21,429	5,400	812,429	3,274	483
TSS	2029*	421,000	268	10,714	10,000	431,714	1,835	510
	2034**	532,000	268	15,000	10,000	547,000	2,440	535
	2044***	791,000	268	21,429	10,000	812,429	3,555	525
Nitrogen	2029*	421,000	54	10,714	806	431,714	262	73
	2034**	532,000	54	15,000	806	547,000	340	75
	2044***	791,000	54	21,429	806	812,429	500	74
Phosphorus	2029*	421,000	7	10,714	200	431,714	42	12
	2034**	532,000	7	15,000	200	547,000	56	12
	2044***	791,000	7	21,429	200	812,429	82	12

**Assumes 50% percent of the total Septage Flow will be received per the Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report completed by HDR Engineering*

***Assumes 70% percent of the total Septage Flow will be received per the Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report completed by HDR Engineering*

****Assumes 95% percent of the total Septage Flow will be received per the Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report completed by HDR Engineering*

Tables 1.4.A and **1.4.B** summarize the average daily flow and loading for both winter and summer. In addition to the average daily flow, the maximum monthly flow must also be determined to ensure that the treatment facility can provide adequate treatment throughout the year. As shown in **Figure 1.2.1**, the maximum month occurs in July, which coincides with the period when summertime septage loads need to be considered. **Table 1.4.C** presents the maximum month design criteria.

Table 1.4.C: Maximum Month Criteria

Constituent	Year	Domestic Load		Septage Load		Combined (Collection and Septage)		
		gpd	mg/L	gpd	mg/l	gpd	lbs/day	mg/l
BOD	2029*	556,000	350	19,018	5,400	575,018	2,479	517
	2034**	678,000	350	26,625	5,400	704,625	3,178	541
	2044***	944,000	350	38,036	5,400	982,036	4,469	546
TSS	2029*	556,000	268	19,018	10,000	575,018	2,829	590
	2034**	678,000	268	26,625	10,000	704,625	3,736	636
	2044***	944,000	268	38,036	10,000	982,036	5,282	645
Nitrogen	2029*	556,000	54	19,018	806	575,018	378	79
	2034**	678,000	54	26,625	806	704,625	484	82
	2044***	944,000	54	38,036	806	982,036	681	83
Phosphorus	2029*	556,000	7	19,018	200	575,018	64	13
	2034**	678,000	7	26,625	200	704,625	84	14
	2044***	944,000	7	38,036	200	982,036	119	14

**Assumes 50% percent of the total Septage Flow will be received per the Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report completed by HDR Engineering*

***Assumes 70% percent of the total Septage Flow will be received per the Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report completed by HDR Engineering*

****Assumes 95% percent of the total Septage Flow will be received per the Flathead County Septage Treatment & Biosolids Composting Facility Basis of Design Report completed by HDR Engineering*

The Design Criteria in **Table 1.4.A**, **1.4.B**, and **1.4.C** will be used for any future WWTF.

CHAPTER 2 – EFFLUENT LIMITATIONS AND DISPOSAL EVALUATION

Regulatory requirements for WWTF effluent discharge are crucial in determining the most cost-effective and user-friendly treatment system. This chapter summarizes the current and projected effluent limitations for the Lakeside County Water and Sewer District WWTF. Based on these requirements, effluent design criteria can be developed.

The existing WWTF receives raw wastewater from the District's collection system. Influent flow is pumped into the headworks building, where debris is removed using mechanical screens. The flow then enters two treatment ponds equipped with surface aerators. Two additional storage ponds serve as a buffer throughout the winter. Treated water is land-applied during the summer by a center pivot irrigation system, which is currently the District's sole method of effluent disposal.

2.1. EXISTING EFFLUENT DISPOSAL

The existing WWTF is designed to treat wastewater to Class D standards. According to Table 121-1 in Montana Department of Environmental Quality (MDEQ) Circular 2, Class D reclaimed wastewater must always be oxidized and settled. Lakeside's existing secondary treatment includes two aerated ponds for oxidizing wastewater. Treated wastewater flows from these ponds into storage ponds, where it is stored during winter before being land-applied during the summer irrigation season, typically from May to September. During this season, treated water is pumped from the storage ponds to the District-owned alfalfa field (approximately 190 acres). The two storage ponds have a combined capacity of approximately 316,500 gallons per day.

The effluent land application capacity is determined by land area, storage volume, and the required hydraulic loading rate. Currently, the facility's disposal capacity is constrained by storage volume. According to the *Lakeside Wastewater Treatment System Capacity Analysis* (EQ# 25-2193), issued by MDEQ on March 28, 2025, the average winter inflow is 228,797 gallons per day. With an additional committed flow of 33,280 gallons per day, only 54,423 gallons per day of treatment capacity remains available at the current facility. The system capacity analysis can be seen in **Appendix A**.

2.2. EFFLUENT DISPOSAL EVALUATION

Projected growth within the District, along with the decision to accept septage from Flathead County, requires expanded treatment and disposal capacity.

The Facility Plan outlines one alternative for additional effluent disposal, this was priorly determined by LCWSD. The study has been cmpleted and groundwater discharge permit has been granted:

2.3. GROUNDWATER DISCHARGE

The Lakeside Water and Sewer District has applied for a new Montana Ground Water Pollution Control System (MGWPCS) permit from MDEQ which would allow a portion of their treated effluent to be disposed of into the groundwater aquifer below the WWTF site. MDEQ received the final application of May 9, 2024. The MGWPCS Permit was granted on April 28, 2025.

The MGWPCS Permit is included in Appendix B.

2.3.1. PROCESS OVERVIEW

The LCWSD has identified groundwater discharge as an alternative for increasing disposal capacity at the facility. This method will supplement the existing land application system. The proposed groundwater discharge facility will include three rapid infiltration basins (RIBs), a treated effluent equalization basin/pump station. Treated effluent will be divided between land application and groundwater disposal, maintaining the existing land application disposal capacity. This option will increase the available storage capacity for the land application system by being able to discharge treated effluent in the winter providing a more efficient storage scenario. It is a minimal increase of approximately 26,000 gallons per day of storage, but this is an additional benefit.

RIBs facilitate the controlled application of treated wastewater to groundwater, allowing for year-round discharge. As treated wastewater is released from the treatment system, it will be stored in the treated effluent equalization basin. A pump station will then transfer the water to each RIB through buried piping. Actuated valves will be programmed to direct the flow to the designated RIB.

Figure 2.3.1 illustrates the proposed groundwater discharge layout.

LCWSD

Groundwater
Discharge Ponds

LEGEND

Piping

Existing Building

RIB

Flow Distribution Building

N

Figure 2.3.1: Groundwater Discharge Layout

2.3.2. PRELIMINARY DESIGN

The District owns approximately 110 acres adjacent to the existing treatment facility, suitable for a potential groundwater discharge facility. A geotechnical investigation conducted in April 2021 assessed the soil's physical characteristics and the feasibility of constructing Rapid Infiltration Basins (RIBs) on this property. The report by Alpine Geotechnical examined the lithology, chemical properties, and infiltration rate of the soil. The upper layer of topsoil will need to be removed and replaced with well-graded pervious gravel material to facilitate the RIBs.

To supplement the MGWPCS Permit application, the District engaged Water & Environmental Technologies (WET) to collect hydrogeologic data and perform modeling to evaluate the impacts of discharging treated effluent. WET gathered groundwater levels, collected water quality samples, and conducted slug pump testing. This data verified the thickness, hydraulic gradient, hydraulic conductivity, and effective porosity of the groundwater aquifer. WET's analysis, including groundwater modeling, assessed pathogen removal, nitrate sensitivity, and phosphorus breakthrough based on future effluent quality and hydrogeologic conditions. Detailed analysis can be found in the Fact Sheet in **Appendix C**.

Based on WET's study 3 RIBs were permitted for groundwater discharge. The RIB's are named 1 through 3. Based on the Fact Sheet produced with the permit each basin has a specific this specific size is based on the groundwater mounting and mixing zone required. Based on initial estimates of the infiltration rates these ponds are oversized for infiltration, but will be conservatively sized based on Fact Sheet.

2.3.3. DESIGN CRITERIA

The MGWPCS Permit places limitations of nutrient discharge for total nitrogen and total phosphorus. The WWTF Effluent Design Criteria is detailed in **Table 2.3.3.A** below.

Table 2.3.3.A: Lakeside WWTF Effluent Design Criteria

Parameter	*Units*	*GW Discharge*
Total Nitrogen		
RIB #1	lb/day	5.4
RIB #2	lb/day	4.3
RIB #3	lb/day	4.5
Total Phosphorus		
RIB #1	lb/year	291
RIB #2	lb/year	337
RIB #3	lb/year	-

The Permit does not specify flow limits, the Fact Sheet with the permit assigns a flowrate to each RIB. **Table 2.3.3.B** below outlines the allowable concentration of total nitrogen effluent concentrations.

Table 2.3.3.B: Total Nitrogen Concentration Impact on Discharge Capacity

Discharge Location	Flow (gpd)	Total Nitrogen Effluent Concentration (mg/L)
RIB #1	80,000	8.1
RIB #2	60,000	8.6
RIB #3	60,000	9.0

Based on **Table 2.3.3.B.**, the target total nitrogen concentration should be approximately 8 mg/L. The permit does not define a flow limit, so if effluent concentration is greater than 8 mg/L, the amount of effluent being discharged would need to be reduced, to ensure the loading rate of the permit is not exceeded.

Similarly, to the nitrogen limits in **Table 2.3.3.B** Phosphorous concentrations can be estimated bases on the assigned flow rates in the Permit Fact Sheets. **Table 2.3.3.C** below outlines the allowable total phosphorus concentrations based on the RIBs flowrate. For RIB #3, there is no phosphorous limit.

Table 2.3.3.C: Total Phosphorus Concentration Impact on Discharge Capacity

Discharge Location	Flow (gpd)	Total Phosphorous Effluent Concentration (mg/L)
RIB #1	80,000	1.2
RIB #2	60,000	1.8
RIB #3	60,000	N/A

Based on **Table 2.3.3.C**, the target total phosphorous concentration should be approximately 1.2 mg/L. As with Total Nitrogen if the concentration is not met, the discharge volume will need to be reduced to the RIBs.

2.3.4. OPERATIONAL AND ENERGY REQUIREMENTS

An effluent pump station will transport treated effluent to the RIBs. Assuming a flow rate of 200,000 gallons per day, the pump flow rate will be approximately 140 gallons per minute. The power consumption for pumping treated water will be approximately 36,000 kWh per year, with an operational cost of around $3,600 per year.

2.3.5. AREA REQUIREMENTS

The three proposed RIBs, including the flow distribution building, would occupy approximately 8 acres. The district already owns this land and no new land is required for this alternative.

2.3.6. CONSTRUCTION CONSIDERATIONS

To construct a robust RIB, several factors must be considered. First, the basin floor must be scarified to prevent plugging, which would eliminate disposal capacity. Water should be evenly distributed along the basin bottom to ensure uniform filling. Additionally, erosion control measures should be implemented to maintain the integrity of each RIB.

2.3.7. COST ESTIMATE

Table 2.3.7: Cost Estimate for Groundwater Disposal Alternative

Total Construction Cost	$2,896,100
Total Annual Operation and Maintenance Cost	$12.883

A 5% inflation factor has been included to account for the time between funding application submission and project construction. This adjustment reflects the historical volatility of the construction market. A detailed cost estimate is provided in **Appendix D**.

2.4. EFFLUENT DESIGN CRITERIA SUMMARY

2.4.1. RECOMMENDED ALTERNATIVE

The District received an MGWPCS permit on April 28, 2025, effective from June 1, 2025, to May 31, 2030, authorizing groundwater discharge. This approach involves constructing three infiltration/percolation (I/P) cells to manage a portion of the treated effluent. The existing land application system will handle the additional treated effluent.

Due to groundwater discharge being the preferred alternative all secondary treatment processes will be evaluated on the limits set forth in the groundwater discharge permit.

2.4.2. SUMMARY OF LIMITS

The MGWPCS permit issued on April 28, 2025, imposes restrictions on nitrogen and phosphorus with a total maximum daily load (TMDL) for groundwater application. Total nitrogen will be reported as a quarterly average in pounds per day (lbs/day), while total phosphorus will be reported as an annual average in pounds per year (lbs/year). **Table 2.5.2** summarizes the design requirements for the groundwater discharge that will be used for design criteria of the secondary treatment process.

Table 2.5.2: Lakeside WWTF Effluent Design Criteria

Discharge Location	***Flow (gpd)***	***Total Nitrogen (lbs/day)***	***Total Phosphorous (lbs/day)***
RIB #1	80,000	5.4	291
RIB #2	60,000	4.3	337
RIB #3	60,000	4.5	
Target Effluent Flow and Concentrations			
GW Discharge Flow Rate		200,000	gals/day
Existing Land Application Flow Rate		342,950	gals/day
Total Available Effluent Flow Rate		542,950	gals/day
BOD Concentration		10	mg/L
TSS Concentration		10	mg/L
Total Nitrogen Concentration		8	mg/L
Total Phosphorous		1.2	mg/L

Table 2.5.2 will provide the target effluent levels that must be achieved in the secondary treatment process to fully utilize the RIBs. This will also provide better treatment for the land application system and allow the district to apply more treated wastewater since there is a lower amount of nitrogen in the effluent. Unfortunately, the land application system is storage limited.

2.4.3. OPTIONS FOR FUTURE DISPOSAL

Assuming a groundwater discharge of 200,000 gallons per day (gpd) and the existing land application capacity of 342,950 gpd due to the slight storage capacity increase due to groundwater discharge, the District's total discharge capacity would be 542,950 gpd. This is significantly less than the needed discharge of approximately of 900,000 gpd in 20 years, necessitating further planning for additional effluent disposal capacity. Future effluent disposal will need to be evaluated at a later time so the district can determine the most efficient and environmentally conscious way.

CHAPTER 3 – PRELIMINARY TREATMENT OVERVIEW

Construction of Phase I of the Wastewater Treatment Facility (WWTF) Improvements project commenced in spring 2025. This phase includes several key infrastructure upgrades aimed at enhancing the facility's efficiency and capacity. Major components of the project include:

- New Headworks Building: This facility will house screening and grit removal systems, a non-potable water pump station, and a plant lift station. It will replace the existing Headworks Building, which will be decommissioned upon completion.

- Septage Receiving Facility: Designed to handle septage waste, this facility will include a screening and grit removal system, a septage lift station, and a small lift station for domestic waste and process drain water.

- Irrigation Building Improvements: A new structure will be constructed to enclose the existing irrigation pump and a temporary non-potable water pump used for screen wash water.

- Lift Station #10 Upgrades: Enhancements include a new valve building, installation of new submersible sewage pumps, and the addition of a backup generator to ensure operational reliability.

- Additional Minor Upgrades: Various other improvements will be made throughout the WWTF to support the transition and optimize operations.

Construction is expected to span approximately a year and a half. The Phase I project components listed above are analyzed in greater detail in the following sections. All construction activities will take place on district-owned property.

3.1. SCREENING SYSTEM

3.1.1. PROCESS SUMMARY

Unscreened wastewater will be pumped from Lift Station #1A through an existing 10-inch force main to the new Headworks Building, where it will enter the rotating drum screens. Upon completion of Phase II of the WWTF Improvements project, septage will also be pumped from the flow equalization basin into the drum screens for preliminary treatment.

The screening system will consist of three drum screens two duty units and one standby unit. During normal operation, the influent flow will be evenly split between the two duty screens, while the third screen remains on standby for redundancy. The drum screens are designed to remove large solids, rags, and floating debris, thereby protecting downstream treatment processes.

Captured screenings from each drum screen will be discharged into individual washer/compactors, where they will be cleaned and dewatered before being deposited into trash receptacles for disposal.

Design criteria for the screening system are provided in **Table 3.1.1**.

Table 3.1.1: Screening System Design Criteria

Parameter	Value
Number of Units	3
Type of Screen	Rotating Drum
Influent Pipe Size	14 inch
Effluent Pipe Size	16 inch
Wash Water Demand	40 gpm @ 80 psi
Screen Opening Size	4 mm
Motor Size, each	1 HP
Rated Capacity, each	1,600 gpm @ 4mm

The ventilation system for the new Headworks Building is designed to include a heat recovery ventilator (HRV) capable of delivering 12 complete air changes per hour. This ventilation rate supports classification of the electrical and control equipment associated with the screening system as suitable for a Class I, Division 2, Group D hazardous location. Air processed through the HRV will travel to a biofilter to reduce odors. The biofilter is sized to provide odor control for the headworks building and the future septage EQ basin. These processes are expected to produce odorous air.

To ensure durability in the corrosive headworks environment, all metal components of the screening system will be constructed from stainless steel (where practical). In the event of a power outage, the screening system will remain operational through emergency power supplied by the standby generator located at the new Headworks Building.

Process control for the screening system will be managed by a manufacturer-supplied control panel installed in the electrical room of the new Headworks Building. Additional local operator stations (LOSs) will be wall-mounted near the equipment for on-site control. The screen control panel will automate wash water cycles for both internal and external spray nozzles on each screen. Screened water will pass through the system, while solids will be conveyed into the washer/compactor for further processing.

3.1.2. WASHER/COMPACTOR

The washer/compactor is designed to reduce organic content, minimize odors, and dewater the screenings to reduce weight and volume of waste that is hauled to the landfill. The biodegradable organic material washed from the screenings is drained to the plant lift station and is eventually pumped into the influent piping and treated. The washing is performed by a spray manifold in the main housing that uses non-potable water when the unit is operating. The washer/compactor has a drainage trough beneath the main housing with 3/16-inch perforations to keep screenings separate from wash water. Collected liquid is drained from the unit and piped to the plant lift station. Nonbiodegradable material, such as rags, flushable wipes, and other floating debris, are retained, dewatered, and compacted through the discharge tube and into a trash receptacle. The unit is designed to produce a material with a dry solids content of 40% and to reduce the volume of the screenings by 50%. The design criteria for the washer/compactor are listed in **Table 3.1.2** below.

Table 3.1.2: Washer/Compactor Design Criteria

Parameter	Value
Number of Units	3
Wash Water Demand	10 gpm
Volume Reduction	50%
Organic Removal	70%
Motor Size, each	3 HP

3.2. GRIT REMOVAL SYSTEM

3.2.1. PROCESS SUMMARY

Screened wastewater will flow from the rotating drum screens into the grit removal system. Grit includes sand, gravel, and other solid material that is heavier than the organic biodegradable solids in the wastewater. Removal of grit reduces wear on downstream equipment and accumulation of grit in process basins. One vortex grit chamber, flooded suction grit pump, and one grit washer will be installed to remove grit from the influent wastewater. Settled grit from the grit chamber is pumped to a grit washer where it will be washed and dewatered prior to being discharged into a trash receptacle. The screened wastewater piping will be equipped with plug valves to allow for bypassing the grit removal system if maintenance is needed. The grit system is located next to the rotating drum screens and the area will be service by the same HRV as described in Section 3.1.1.

Overall process control for the grit removal system will be provided by a manufacturer supplied control panel, located in the new Headworks Building electrical room, and local operator stations (LOSs) mounted near the equipment. In addition, a small air compressor control panel will be located in the electrical room to supply the grit washer with high-pressure air. The grit removal

system control panel will automatically operate the equipment in cycles (typically every 30 minutes) based on operator-adjustable inputs. The grit chamber paddle will run continuously by using a selector switch on the control panel. The grit pump will be called to run (typically for 3 minutes) by the control panel along with the scour water solenoid that fluidizes the grit in the bottom of the grit hopper. The grit washer will initiate an air scour and spray wash cycle shortly after the grit pump starts. After a set time, the drain valve will open allowing degritted wastewater and organic material to flow into the headworks channel for further treatment. A sonic depth sensor in the grit washer detects the level of grit and activates the auger to transport the washed and dewatered grit into a trash receptacle. Additionally, the operator can initiate a complete cycle of the grit pump and grit washer by pressing a system start button on the control panel.

3.2.2. VORTEX GRIT CHAMBER

The vortex grit chamber consists of a stainless steel cylindrical tank inside the new Headworks Building. The flow enters the circular grit chamber in a tangential, downward direction. The flow path into the chamber along with the rotating paddle motor enables the grit to settle into the lower hopper while the remainder of the flow escapes out of the top of the selector switch on the control panel. The grit that settles into the hopper is fluidized by a non-potable water connection and then removed by a self-priming grit pump. The de-gritted wastewater will flow through the effluent piping to the downstream secondary treatment process. The design criteria for the vortex grit chamber are listed in **Table 3.2.2** below.

Table 3.2.2: Vortex Grit Chamber Design Criteria

Parameter	Value
Number of Units	1
Type	Vortex
Chamber Diameter	8 feet
Chamber Configuration	180 degree
Hopper Diameter	3 feet
Grit Pump Duty Point	250 gpm @ 20 ft TDH
Motor Size, each	1.0 HP
Peak Capacity	4.0 mgd

3.2.3. FLOODED SUCTION GRIT PUMP

Grit will be removed from the vortex grit chamber hopper by a flooded suction grit pump. The bottom of the grit chamber has a 4” flanged outlet that the grit pump will connect to. Paddles mounted on the shaft stir the grit and keep it fluidized. A non-potable water line is connected to the grit pump inlet piping and will enable water scouring to further fluidize the grit prior to a pumping cycle. Grit is pumped from the bottom of the hopper to the grit washer at a constant

flow in periodic cycles. The grit pump includes discharge pressures gauges for observation during pump operation and also for troubleshooting. The design criteria for the grit pump is listed in **Table 3.2.3** below.

Table 3.2.3: Flooded Suction Grit Pump Design Criteria

Parameter	Value
Number of Units	1
Type of Pump	Flooded Suction
Rated Capacity	250 gpm
Static Suction Lift	6 feet
Total Head	20 feet
Operating Speed	1,185 rpm
Motor Size	5 hp

3.2.4. GRIT WASHER

Grit enters the grit washer through a grit concentrator that spins the pumped grit slurry. Similar to the vortex grit chamber, the concentrator drops the heavier grit into the washer while overflowing a portion of liquid back to the headworks piping to be recycled through the Vortex Grit Chamber. In the grit washer, the heavier grit particles will go through an air scour and wash cycle to remove organic material that flow back through the Vortex Grit Chamber. An auger moves the washed grit up a tube allowing it to dewater further prior to discharging into a trash receptacle. The design criteria for the grit washer are listed in **Table 3.2.4** below.

Table 3.2.4: Grit Washer Design Criteria

Parameter	Value
Number of Units	1
Wash Water Demand	20 gpm
Hydraulic Feed Rate	250 gpm
Motor Size, each	3.0 HP
Organics Removal	95%

3.3. NON-POTABLE WATER AND IRRIGATION SYSTEM

3.3.1. PROCESS SUMMARY

The Headworks Building will use non-potable water to suit wash water needs for equipment including screens, washer compactor, and grit chamber. The source of the non-potable water will be treated plant water. In the short term, water will be pumped out of the treatment lagoons into the NPW wet well. Once Phase Two of the project is completed, treated plant water will then be used as the NPW source. The estimated NPW maximum demand at full plant buildout is 450 gpm.

3.3.2. NON-POTABLE WATER PUMPS

Two pumps capable of pumping 225 gpm each will sit above the wet well and pump into the NPW system upon a pressure signal. Water will go through a 200-micron automatic self-cleaning filter to remove anything that may plug spray nozzles. After the self-cleaning filter non-potable water will be disinfected by medium pressure UV vessels. Two UV Vessels have been provided for full redundancy of the system. Two 1056-gallon hydropneumatic pressure tanks with an operating range of 80-100 psi will store water for the NPW system.

3.4. PLANT LIFT STATION

3.4.1. SUMMARY

The Plant Lift Station in the Headworks Building will collect wastewater from the plant floor drains, future process and equipment drains, and biofilter. Wastewater will flow into a collection system and eventually the wet well before being pumped into the headworks influent line to be screened. Wastewater will be pumped with self-priming sewage pumps through 4" ductile iron to connect to the influent piping.

Collected wastewater will be stored in concrete wet well location below the Mechanical Room floor slab. The pumps and piping for the Plant Lift Station will be located in the Headworks Mechanical Room. The suction piping for each pump will penetrate the floor slab and draw water out of the wet well. The discharge piping for each pump will include an air release, check valve, and plug valve for isolation and maintenance. The design criteria for the Plant Lift Station are listed in **Table 3.4.1** below.

Table 3.4.1: Plant Lift Station Design Criteria

Parameter	Value
Number of Pumps	2
Type of Pump	Self-Priming Sewage
Pump Duty Point	300 gpm @ 40 ft TDH
Fluid Velocity	6.95 fps
Maximum Solids Size	3.0 inch
Motor Size	10.0 HP
Peak Returned Flow	300 gpm
Average Return Flow	150 gpm
Wet Well Size	1,800 gallons
Discharge Piping	4" Ductile Iron

3.5. SEPTAGE RECEIVING FACILITY

3.5.1. PROCESS SUMMARY

Phase 1 includes the construction of the septage receiving facility and pump station, although they won't become operational until phase 2 is completed. Septage, which can significantly impact wastewater treatment processes and negatively affect effluent quality, has been carefully addressed in the design phase to ensure integration without compromising subsequent wastewater treatment processes.

The septage receiving facility will be built on LCWSD's existing property, adjacent to the land application site, which will remain unaffected. The facility will be situated outside the 200-foot buffer zone and will feature the capability for two trucks to unload. It will be equipped with a packaged, automated unit combining screening and grit removal. The ¼" screen in this unit compacts and dewaters captured screenings to a solids content of 40 percent, with rotating rake teeth preventing clogging from grease and debris. Grit settles in the aerated chamber and is removed by transport and dewatering screws. Treated septage will be collected in the new pump station that will eventually connect to the treatment plant.

To mitigate its strong odor, both the septage receiving facility and headworks facility will be equipped with biofilters using soil media beds to neutralize odors before release into the atmosphere. These biofilters are part of the phase 1 improvements, also include sufficient headworks facility capacity to connect to the flow equalization basin.

3.5.2. PRELIMINARY SEPTAGE TREATMENT SYSTEM

A concrete surface will be utilized for an impermeable surface the haul trucks can unload. The unloading ramp is sloped to provide containment of any spillage and washing of the haul tank, connector hoses, and fittings. The ramp has a trench drain that directs all water to the septage site lift station that will pump to the preliminary septage treatment processes in the receiving facility. Each truck connection is equipped with quick connect couplings to provide direct connection from the haul truck outlet to minimize spillage and help control odors. Truck washdown water will be provided by the new water well and backflow prevention will be provided by an RPZ. The septage receiving station is equipped with a keypad capable of recording the source of septage and billing for the septage unloaded. The septage receiving station is equipped with a pH meter that will shut down the flow stream if the pH of the septage is out of range. The site is planned to be manned, and the operator may test individual loads from each truck prior to unloading. As previously mentioned, the septage will be pumped to a flow equalization basin at the headworks that will be constructed in Phase 2. The operator will have the ability to test the septage for strength and toxicity at the Septage wet well or flow equalization basin prior to mixing with the wastewater stream as part of phase 2 improvements. Septage will be proportional dosed to the influent wastewater stream to eliminate the chances of shock loading.

Once septage haulers unload, flow will enter the building through 4" stainless steel piping before transitioning to ductile iron. Flow from each unloading station is diverted through a combined septage preliminary treatment unit. The fully automated unit combines screening and grit removal into one self-contained unit. The screening unit is a cylindrical fine screen, which compacts and dewaters the captured screenings to a solids content of 40 percent.
The screen has rotating rake teeth that fully penetrate the cylindrical screen bars and prevent blinding of the screen. Grit is then settled out in an aerated grit chamber and is removed by the grit transport and dewatering screws. Once flow has completed primary treatment, flow will be conveyed from the pump station to the future equalization basin. The design criteria for the Septage Receiving Equipment are listed in Table 3.3.2 below.

Table 3.5.2: Septage Receiving Equipment Design Criteria

Parameter	Value
Hydraulic Capacity (3% Solids)	400 gpm
Clean Water Hydraulic Capacity	2,061 gpm
Bar Spacing	¼"
Wash Water Demand	25 gpm @ 60 psi
Screen Drive Motor Size	2.0 HP
Grit Removal Blower Air Flow	9 cfm
Blower Motor Size	2.0 HP
Grit Horizontal Screw Motor Size	1.0 HP
Grit Dewater Screw Motor Size	2.0 HP

3.5.3. SEPTAGE LIFT STATION

Once septage has been screened and degritted, flow will enter a wet well to be pumped to the future flow equalization basin before entering the headworks building for further treatment. Using rotary lobe pumps, flow will be pumped through a 6" magnetic flowmeter and force main. The design criteria for the Septage Pump Station are listed in Table 3.3.3 below.

Table 3.5.3: Septage Pump Station Design Criteria

Parameter	Value
Number of Pumps	2
Type of Pump	Rotary Lobe
Pump Duty Point	280 gpm @ 137 ft TDH
Fluid Velocity	4 fps
Maximum Solids Size	2.5 inch
Motor Size	15.0 HP
Wet Well Size	6,000 gallons
Force Main Details	6" HDPE DR11

The ventilation system design for the dry pit and mechanical room will provide at least 6 air exchanges per hour to the dry well pumping room. Rotary lobe pumps have been specified for this application since they are positive displacement and are able to handle changes in total dynamic head due to different solids concentrations in septage. The pumps can only pass a 2.5" sphere, but all wastewater will pass through ¼" screening prior to the lift station.

3.5.4. SEPTAGE BUILDING VENTILATION

The process area of the septage building is equipped with a heat recovery ventilator (HRV) that provides a minimum of 12 air exchanges per hour. All air handled by the HRV is subsequently treated through a biofilter to reduce odors associated with septage.

Additionally, the septage wet well is ventilated using a positive ventilation system, with the exhausted air also routed through the biofilter to eliminate odors.

The biofilter consists of a fan that pushes air through a soil media bed, which absorbs the odorous compounds present in the septage.

CHAPTER 4 – SECONDARY TREATMENT EVALUATION

4.1. GENERAL INFORMATION AND TREATMENT REQUIREMENTS

4.1.1. EXISTING TREATMENT SYSTEM OVERVIEW

The Lakeside County Water and Sewer District (LCWSD) Wastewater Treatment Facility (WWTF) is located north of Somers and Highway 82, approximately one mile east of Highway 93. The existing facility includes an influent headworks, two partially aerated treatment ponds, two treated water storage ponds for use during the winter and non-irrigation months, and a land application system for effluent disposal.

Originally constructed in 1987, the facility included the primary treatment ponds, a storage pond, the land application system, and a control building. As the Somers area experienced growth, the need to expand treatment capacity became evident. An agreement was reached between Somers and the District, under which Lakeside would accept all of Somers's wastewater—necessitating an increase in Lakeside's treatment capacity. In response, a 26.5-million-gallon storage pond was added north of the original storage pond in 1993.

Over time, non-organic materials such as plastics and ropes began to interfere with treatment processes, particularly by disrupting the aerators in the treatment cells. To address this issue, mechanical screening was installed ahead of the primary ponds in 2010 to remove such debris.

The existing (WWTF) does not include a dedicated solids handling process. In the current aerated lagoon system, solids primarily settle in the primary cells, with a smaller portion accumulating in the storage ponds. Periodic solids removal is required and typically performed using a floating dredge. However, no solids have been removed from the ponds to date, and the primary cells are now due for biosolids removal.

Current estimates indicate that biosolids have accumulated to a depth of approximately 2 to 3 feet in the primary ponds, while the storage ponds contain an estimated 6 inches or less. Although removal from the primary ponds is necessary, it will be most cost-effective to defer this work until after the new WWTF is constructed. At that time, the primary ponds can be drained and biosolids removed using mechanical methods.

The sludge levels in the storage ponds remain within acceptable limits and are not expected to require removal for several years. However, LCWSD should continue to monitor solids accumulation to ensure it does not impact storage capacity. Once the new WWTF is operational, minimal to no additional solids accumulation is expected in the storage ponds.

The existing WWTF is nearing capacity and portions of the treatment process have exceeded their design life. To accommodate for increased flows to the WWTF, a system upgrade is necessary. Also, since the current facility lacks a solids handling system, Phase II of the WWTF Improvements project will need to incorporate a comprehensive solids handling process as part of its design. See **Chapter 5** for solids handling alternatives.
Construction of Phase I of the WWTF Improvements project as detailed in **Chapter 3,** began in the Spring of 2025. Phase I improvements include construction of a new Headworks Building and Septage Receiving Facility, Irrigation Building improvements, Lift Station #10 improvements, and other minor upgrades to the treatment facility to decommission the existing Headworks Building.

4.1.2. PROPOSED SECONDARY TREATMENT OVERVIEW

This chapter evaluates three secondary treatment alternatives proposed to replace the existing partially aerated treatment ponds at the WWTF. Each alternative offers a different treatment process; however, all are designed to meet or exceed the effluent limits outlined in **Table 4.1.2**.

Table 4.1.2: Minimum Secondary Treatment Effluent Criteria

Effluent Criteria	Value
BOD	10 mg/L
TSS	10 mg/L
Ammonia	1 gm/L
Nitrate	6 mg/L
TN	8 mg/L
TP	1.2 mg/L

All three secondary treatment alternatives evaluated in the following sections incorporate a septage equalization (EQ) basin and a Main Process Building. The EQ basin is designed to store up to 100,000 gallons of septage, exceeding the peak flow anticipated at the Septage Receiving Facility under full-capacity operation. To maintain optimal conditions, the basin will be fully mixed to keep solids in suspension and covered to control odors. Air from the EQ basin will be vented through a biofilter located east of the Headworks Building. The biofilter, which is included in Phase I of the WWTF Improvements project, is sized to treat air from both the Headworks Building and the septage EQ basin.

Septage will be introduced into the main wastewater stream at a controlled rate to prevent disruptions to the treatment process. Pumps will transfer septage from the EQ basin to the Headworks Building, where it will be combined with other wastewater for screening.

The Main Process Building will house several essential facilities which may include an office, conference room, laboratory, electrical room, blower room, and a secondary pump station. The specific layout and components within the Main Process Building may vary depending on the secondary treatment process ultimately selected.

Upon completion of Phases I and II of the WWTF Improvements, the wastewater treatment process flow will follow the configuration illustrated in **Figure 4.1.2**.

PROCESS FLOW DIAGRAM PHASE I & PHASE II

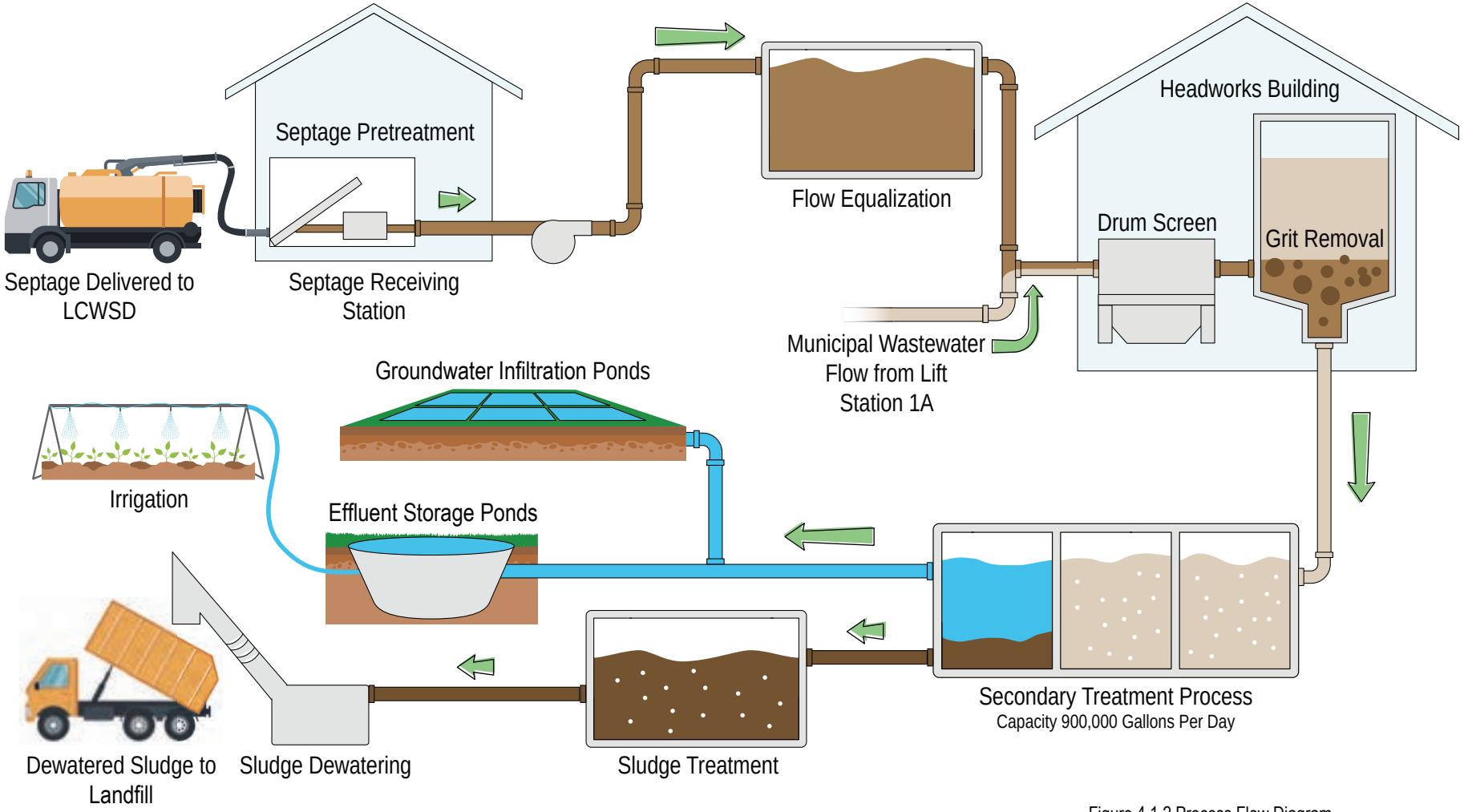


Figure 4.1.2 Process Flow Diagram

4.2. OXIDATION DITCH WITH SECONDARY CLARIFIERS

4.2.1. PROCESS OVERVIEW

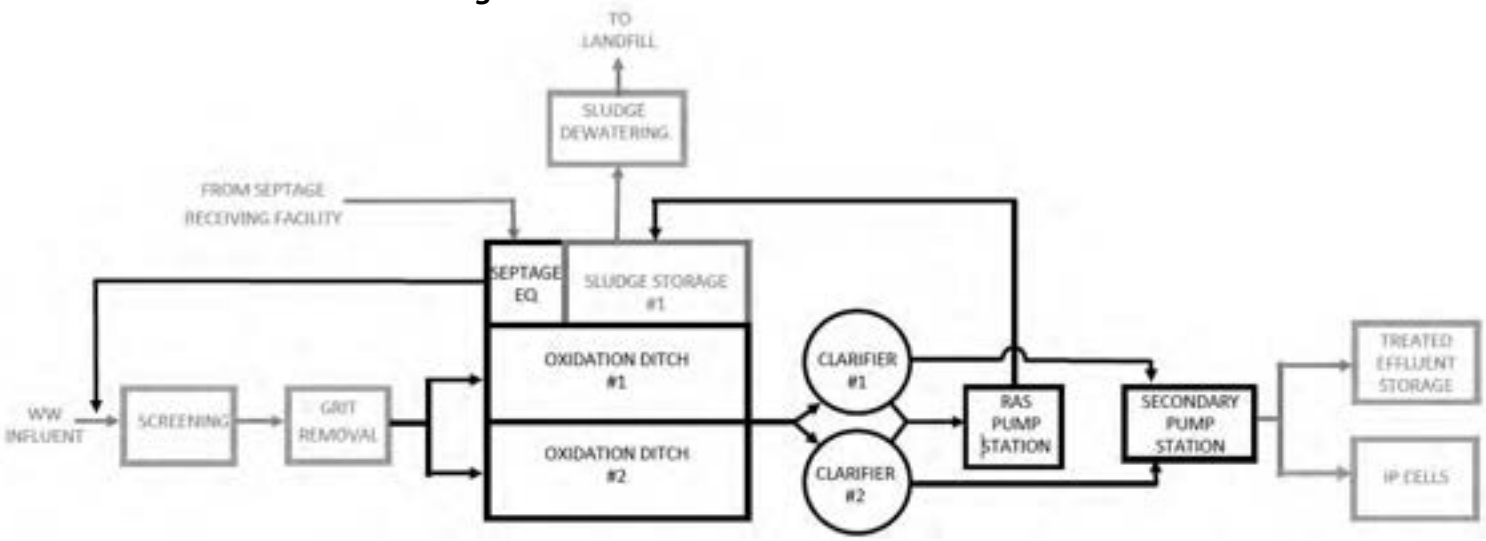
An oxidation ditch is an activated sludge treatment and biological nutrient removal wastewater treatment process. The oxidation ditch treatment process uses concentric, oval-shaped concrete channels and mechanical aerators to treat municipal wastewater while utilizing a longer solids retention time as compared to other biological treatment processes as a way to effectively remove biodegradable organics present in wastewater. Horizontally or vertically mounted aerators provide circulation, oxygen transfer, and aeration in the ditch.

Typically, oxidation ditches are completely mixed systems; however, an oxidation ditch may be modified to operate in a plug flow state. If plug flow conditions are achieved diffused air must be introduced as mixing alone will not provide sufficient air. The oxidation ditch can be modified to biologically remove nutrients by creating anaerobic, anoxic, and aerobic stages in select channels.

Since return activated sludge (RAS) is utilized in the oxidation ditch process, the cost of the RAS lift station is included in this alternative. The oxidation ditch process discussed in this facility plan is based on the Carrousel® System designed by Ovivo. Additionally, secondary clarification is used as part of this alternative and is therefore included in this treatment alternative analysis.

A general flow diagram of the Oxidation Ditch treatment process is shown in **Figure 4.2.1**. All items shown in black will be included in this alternative Improvements project as part of the secondary treatment process. All Items shown in gray are included in Phase

Figure 4.2.1: Oxidation Ditch Flow Path



I of the WWTF Improvements project or are included in the solids handling or treated effluent disposal processes, which are discussed in depth in **Chapter 2** and **Chapter 5**.

4.2.2. PRELIMINARY DESIGN

After passing through the influent screen and grit removal system both of which are located in the headworks building, wastewater will flow to the oxidation ditch. This design consists of two oxidation ditches that will normally operate in parallel. Wastewater enters the outermost channel of the ditch and travels through each channel toward the center of the oxidation ditch. Aerators will be used to circulate and aerate the wastewater in the channels. The aerators will maintain a wastewater velocity of 1 ft/s in the channels to keep the suspended solids from settling out in the oxidation ditch. The anoxic zones created in the two outer channels are used to biologically remove phosphorous and nitrogen. The inner channel of the oxidation ditch is used to remove any remaining BOD and ammonia prior to discharge. Effluent from the oxidation ditch is sent to the secondary clarifiers for settling. Sludge that settles on the bottom of the secondary clarifiers is returned to the outermost channel of the oxidation ditch or wasted to the anaerobic digesters. See **Figure 4.2.2** for a schematic layout of the oxidation ditch process.

As mentioned in **Section 4.1.2** above, the oxidation ditch treatment alternative will include a septage EQ basin and a Main Process Building. The EQ basin will be sized to store up to 100,000 gallons of septage, which exceeds the 53,250 gpd peak flow anticipated at the Septage Receiving Facility under full-capacity operation. Septage will be pumped from the septage EQ basin to the Headworks Building where it will mix with domestic wastewater received at the WWTF prior to screening. The Main Process Building will be located east of the oxidation ditches and secondary clarifiers and will house pump, aeration and mixing equipment, the secondary pump station, a lab, an electrical room, conference room, office, and conference room. Ground improvements similar to those installed as part of the Phase I WWTF Improvements will be required for all structural components of this treatment alternative.

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RPA

SYM	REVISION	BY	APPR.	DATE

A. WARGO — DESIGNED BY
APRIL 2025 — DATE
AJW — DRAWN BY
21733 — PROJECT NO.
BK — CHECKED BY
OXID-DITCH-CLARIFIERS_recover — FILE

PROJECT TITLE
Lakeside Wastewater Improvements
Lakeside, Montana

SHEET TITLE
OXIDATION DITCH WITH SECONDARY CLARIFIERS

SHEET

OF

EXST PRIMARY POND

EXST PRIMARY POND

LARKIN AVE

SOLIDS HANDLING BUILDING & BLOWER BUILDING

TO SOLIDS BUILDING

SEPTAGE EQ BASIN

SLUDGE STORAGE 1

SLUDGE STORAGE 2

TREATED EFFLUENT

MAIN PROCESS BUILDING:
OFFICE
LAB
BATHROOM
SHOP
EFFLUENT PUMPS

RAS/WAS PUMP STATION

OXIDATION DITCH 1

OXIDATION DITCH 2

CLARIFIER 1

CLARIFIER 2

EFFLUENT

RAS

HEADWORKS BUILDING

BLOWER BUILDING

BIOFILTER

FM NPW SEPT WAS SYAS SS D

N

40 0 40 80
(SCALE IN FEET)

FIGURE 4.2.2: OXIDATION DITCH WITH SECONDARY CLARIFIERS TREATMENT ALTERNATIVES (1)

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4.2.3. DESIGN CRITERIA

The requirements of Circular DEQ-2, Design Standards for Public Sewage Systems (2018) would be followed during the design and construction of this alternative. Specific design criteria for this alternative are shown below in **Table 4.2.3**.

Table 4.2.3: Oxidation Ditch Design Criteria

Design Parameter	Value
General Design Parameters	
Design Year	2044
Average Daily Flow	0.812 MGD (Winter)/0.913 MGD (Summer)
Maximum Monthly Flow	0.982 MGD
Peak Hourly Flow	2.74 MGD
Number of Basins	2
Volume Per Basin	2.26 MG (includes main process basin, and anaerobic and anoxic cells)
Solids Retention Time (SRT)	15 days
Mixed Liquor Suspended Solids (MLSS)	4,000 mg/L
Cycle Time	4 - 12 hours
Aeration Time	2 - 6 hours (within cycle time)
Decanting Time	0.5 - 1 hour
WAS Rate	4,092 ppd
Number of Secondary Clarifiers	2
Clarifier Type	Spiral Blade
Diameter	60 feet
Side Water Depth	18 feet
Aeration Design Parameters	
Number of Aerators	4
Horsepower Per Aerator	125
Dissolved Oxygen	2 mg/L
Effluent Quality Parameter	
BOD	10 mg/L
TSS	10 mg/L
TN	8 mg/L
TP	1.2 mg/L

4.2.4. OPERATIONAL AND ENERGY REQUIREMENTS

The primary energy consumption in oxidation ditches is due to aeration. Aerators or diffusers require significant power to maintain adequate dissolved oxygen levels for microbial activity. Energy is also required for pumping return activated sludge and for any additional recirculation processes. Additionally, continuous mixing is necessary to keep solids in suspension and ensure proper contact between microorganisms and wastewater also consumes energy

The controls for the oxidation ditch would be completely automated. Variable frequency drives will be used to control the aerators and to maintain the proper amount of oxygen in each of the oxidation channels. Alarms would be configured to warn operators of a drive failure or other mechanical problems. The oxidation ditch would require a daily inspection to verify correct operation and routine greasing of the bearings.

4.2.5. AREA REQUIREMENTS

The land north of the headworks building (included in Phase I of the WWTF improvements project) is owned by the Lakeside County Water and Sewer District and would serve as an adequate location for the oxidation ditch, secondary clarifiers, and all other equipment and structures necessary for this treatment process.

This alternative includes two oxidation ditches with a common wall connecting both ditches. The total oxidation ditch dimensions, which includes both ditches, would be approximately 215 long and 120 feet wide and the two secondary clarifiers would be 90 feet in diameter each.

4.2.6. CONSTRUCTION CONSIDERATIONS

Construction sequencing should minimize disruption to existing treatment processes if the ditch is being added to an operational facility. Proper planning and adherence to engineering standards are essential to ensure the oxidation ditch performs reliably over its intended lifespan.

As with all enhancements included in Phase I of the WWTF Improvements project, ground improvements will be required beneath the oxidation ditches, secondary clarifiers, septage equalization (EQ) basin, Main Process Building, and all other structures associated with Phase II. These improvements are necessary to address the presence of liquefiable soils at the treatment site. Depending on the depth of each structure relative to existing ground levels, dewatering may be necessary to facilitate proper installation of the improvements.

4.2.7. COST ESTIMATE

Table 4.2.7 below summarizes the cost estimate for the oxidation ditch with secondary clarifier treatment included as part of this alternative. The total construction cost includes oxidation ditches, secondary clarifiers, septage EQ basin, Main Process Building, process piping, and site work. Detailed cost estimates for this alternative are included in **Appendix E**.

Table 4.2.7: Cost Estimate for Oxidation Ditch Treatment Alternative

Total Construction Cost	$28,776,500.00
Total Annual Operation and Maintenance (O&M) Cost	$177,587.58

This cost estimate includes the construction expenses associated with the oxidation ditch treatment alternative, incorporating an annual inflation factor of 5% to account for the time lapse between funding application submission and actual project construction. This inflation rate reflects the historical volatility of the construction market. The total annual O&M cost is based on full-capacity operations projected for the design year 2044 at the WWTF. Estimates for construction contingency, administrative expenses, and engineering costs will be developed once a secondary treatment alternative is selected.

4.3. SEQUENCE BATCH REACTOR (SBR)

4.3.1. PROCESS OVERVIEW

A Sequencing Batch Reactor (SBR) is a type of activated sludge process used for wastewater treatment that operates in time-sequenced phases within a single reactor basin. The SBR process is highly adaptable and can be configured to include anaerobic and anoxic phases, enabling biological nutrient removal in addition to conventional wastewater treatment.

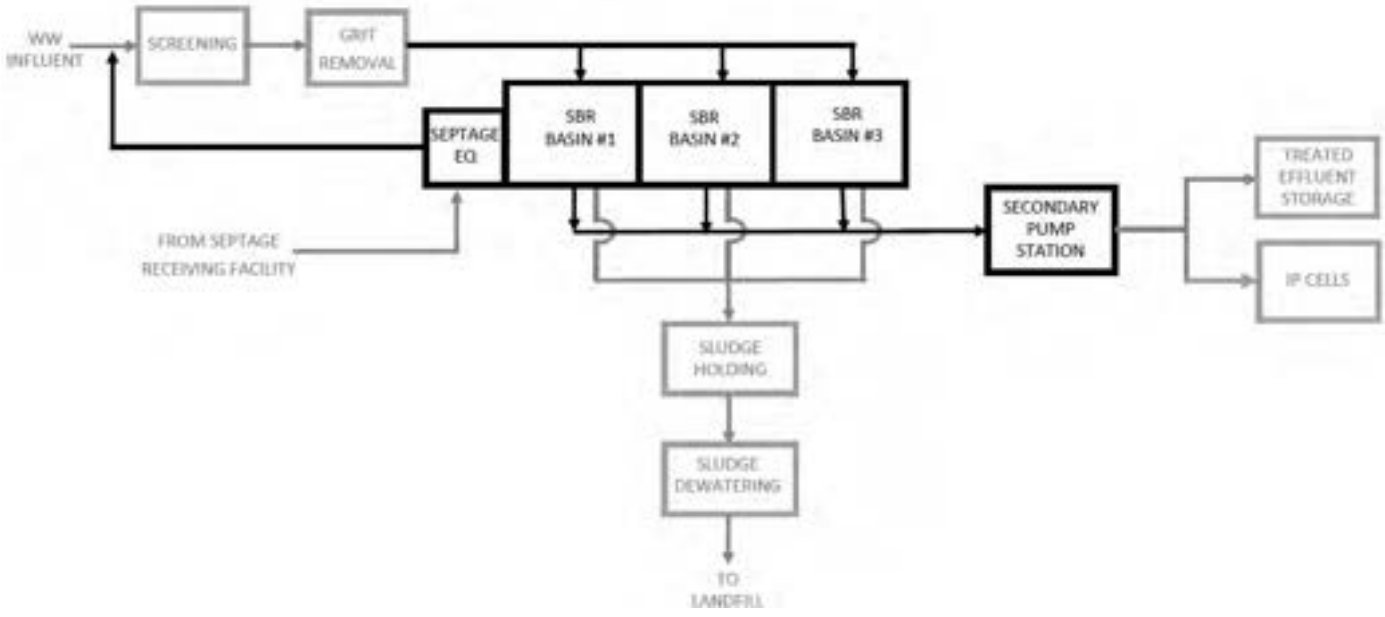
The treatment cycle begins with the fill phase, during which influent wastewater enters the reactor basin. Depending on the system design, this phase may be anaerobic—lacking both oxygen and nitrate—to promote the release of phosphorus, or anoxic—lacking oxygen but containing nitrate—to facilitate denitrification, where nitrate is converted to nitrogen gas by denitrifying bacteria. In some configurations, the fill phase may also be aerobic, initiating the breakdown of organic matter and ammonia.

Following the fill phase, the system enters the aeration phase, where air is supplied to support aerobic microorganisms that degrade BOD, COD, and ammonia. This phase is essential for nitrification, the biological conversion of ammonia to nitrate. After sufficient aeration, the system transitions to the settling phase, during which aeration stops and solids are allowed to settle. The activated sludge forms a blanket at the bottom of the tank, while clarified water, or supernatant, remains at the top. In the subsequent decant phase, this treated supernatant is removed for discharge or further treatment, such as

disinfection. The cycle concludes with a brief idle or draw phase, during which excess sludge may be wasted or recycled to maintain a balanced microbial population before the next cycle begins.

SBR systems are particularly advantageous due to their compact footprint, as all treatment stages occur within a single reactor basin. This makes them ideal for municipal pplications, especially in areas with limited land availability. Their operational flexibility allows them to handle varying flow rates and contaminant loads effectively. As illustrated in **Figure 4.3.1**, components shown in black will be implemented in Phase II of the WWTF Improvements project as part of the SBR secondary treatment system. Items shown in gray are part of Phase I Improvement project or pertain to solids handling and treated effluent disposal, which are discussed in detail in **Chapters 2** and **5**.

Figure 4.3.1: SBR Flow Path



4.3.2. PRELIMINARY DESIGN

For this alternative, the SBR configuration will involve a system of three basins that operate in discrete cycles, consisting of filling, aeration, settling, decanting, and idle phases. During the fill phase, influent wastewater is introduced into the reactor, preparing it for treatment. In the subsequent aeration phase, air is supplied to the tank through a diffused aeration system, providing oxygen for aerobic microorganisms to break down organic pollutants such as BOD, COD, and ammonia. The aeration process typically lasts several hours, depending on wastewater composition and treatment goals. After aeration, the reactor enters the settling phase, during which aeration is stopped,

and the mixed liquor is allowed to settle, with activated sludge sinking to the bottom of the tank and leaving the clarified water at the top. In the decanting phase, the treated effluent, or supernatant, is removed using a decanter, which may be either mechanical or gravity-based, to ensure only the top layer of clarified water is taken. After decanting, the system moves to the idle phase, where excess sludge may be wasted, or some of the settled sludge may be recycled back into the reactor to maintain an optimal microbial population. Throughout these phases, automated control systems and sensors are used to monitor and adjust parameters such as dissolved oxygen (DO), pH, flow rates, and temperature, ensuring efficient operation.

The aeration system, typically equipped with diffused aeration and variable frequency drives (VFDs), is adjusted dynamically based on oxygen demand to optimize energy usage. To ensure continuous treatment, multiple SBR tanks are often used in parallel, with each tank operating in different phases of the cycle. Overall, the SBR process is designed to treat wastewater efficiently while allowing for operational flexibility and automation, with an integrated approach to sludge handling, effluent removal, and system monitoring. As mentioned in **Section 4.1.2** above, the SBR treatment alternative will include a septage EQ basin and a Main Process Building. The EQ basin will be sized to store up to 100,000 gallons of septage, exceeding the 53,250 gpd peak flow anticipated at the Septage Receiving Facility under full-capacity operation. Septage will be pumped from the septage EQ basin to the Headworks Building where it will mix with domestic wastewater received at the WWTF prior to screening. The Main Process Building will be located adjacent to the SBR basins and will house septage pumps, aeration equipment, the secondary pump station, a lab, an electrical room, conference room, office, and conference room. See **Figure 4.2.2** for a schematic layout of the SBR treatment process alternative.

4.3.3. DESIGN CRITERIA

The requirements of Circular DEQ-2, Design Standards for Public Sewage Systems (2018) would be followed during the design and construction of this alternative. Specific design criteria for this alternative are shown below in **Table 4.3.3**.

Table 4.3.3: SBR Design Criteria

Design Parameter	Value
General Design Parameters	
Design Year	2044
Average Daily Flow	0.812 MGD (Winter)/0.913 MGD (Summer)
Maximum Monthly Flow	0.982 MGD
Peak Hourly Flow	2.74 MGD
Number of Basins	3
Volume Per Basin	0.706 MG at HWL
Basin Dimension (LxWxH)	67 feet x 67 feet x 23 feet (2 feet of freeboard)
Solids Retention Time (SRT)	15.3 days
Hydraulic Retention Time (HRT)	1.558 at AWL
Mixed Liquor Suspended Solids (MLSS)	4,500 mg/L at LWL
Number of Cycles	4 per day/basin
Cycle Duration	6 hours
Aeration Time	2 - 6 hours (within cycle time)
Decanting Time	0.5 - 1 hour
WAS Rate	4,092 ppd
Decant Flow Rate	3,250 gpm
Sludge Yield	1.013 lb WAS/lb BOD
Air Flowrate Per Basin	1 SCFM
Oxygen Required	6,703 lbs/day
Effluent Quality Parameter	
BOD	10 mg/L
TSS	10 mg/L
TN	8 mg/L
TP	1.2 mg/L

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RPA

SYM	REVISION	BY	APPR.	DATE

EXST PRIMARY POND

EXST PRIMARY POND

PWR

OHPWR

NPW

FM

SS

TO STORAGE PONDS

TO RIB'S

LARKIN AVE

SEPTAGE EQ BASIN

SOLIDS HANDLING BUILDING

REACTOR BASIN #1

REACTOR BASIN #2

REACTOR BASIN #3

SLUDGE BASIN #1

SLUDGE BASIN #2

PROCESS BUILDING

N

50 0 50 100
(SCALE IN FEET)

FIGURE 4.3.2: SBR Treatment Alternative 1

DESIGNED BY	A. WARGO
DRAWN BY	AJW
CHECKED BY	BK
DATE	APRIL 2025
PROJECT NO.	21733
FILE	Treatment Site_SBR

PROJECT TITLE

Lakeside Wastewater Improvements
Lakeside, Montana

SHEET TITLE

SBR TREATMENT ALTERNATIVE

SHEET

OF

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4.3.4. OPERATIONAL AND ENERGY REQUIREMENTS

Operationally, an SBR requires several key components: aeration systems (such as blowers and diffusers), mixers for non-aerated phases, decanting mechanisms, sludge removal systems, and a control system (often automated with PLC or SCADA). Sensors for monitoring dissolved oxygen, pH, temperature, and water levels are also essential for efficient operation.

Energy consumption in an SBR is primarily driven by the aeration phase, which can account for 50–70% of the total energy use. Aeration energy requirements typically range from 0.3 to 0.8 kWh per cubic meter of treated wastewater. Mixing consumes less energy, usually between 0.05 and 0.1 kWh/m³. Additional energy is used for pumping and decanting, ³, while control and instrumentation systems require minimal power. Overall, the total energy consumption for an SBR system typically falls between 0.4 and 1.0 kWh/m³, depending on factors such as influent characteristics, treatment goals, reactor design, and operational strategy.

4.3.5. AREA REQUIREMENTS

The land north of the headworks building (included in Phase 1 of the WWTF improvements project) is owned by the district and would serve as an adequate location for the SBR, secondary clarifiers, Main Process Building, and all other equipment and structures necessary for this treatment process. The Main Process Building would house equipment such as blowers, pumps, and control panels.

This alternative includes three reaction basins with a common wall between each of the basins. The basin dimensions for a 0.9 MGD average design flow treatment system would be approximately 67 feet long by 67 feet wide per basin.

4.3.6. CONSTRUCTION CONSIDERATIONS

As with all enhancements included in Phase I of the WWTF Improvements project, ground improvements will be required beneath the SBR Basins, septage equalization (EQ) basin, Main Process Building, and all other structures associated with Phase II. These improvements are necessary to address the presence of liquefiable soils at the treatment site. Depending on the depth of each structure relative to existing ground levels, dewatering may be necessary to facilitate proper installation of the improvements.

4.3.7. COST ESTIMATE

Table 4.3.7 below summarizes the cost estimate for the SBR secondary treatment alternative. The total construction cost includes the SBR, septage EQ basin, Main Process

Building, process piping, and site work. Detailed cost estimates for this alternative are included in **Appendix E**.

Table 4.3.7: Cost Estimate for SBR Alternative

Total Construction Cost	$18,745,100.00
Total Annual Operation and Maintenance Cost	$192,634.31

This cost estimate includes the construction expenses associated with the SBR treatment alternative, incorporating an annual inflation factor of 5% to account for the time lapse between funding application submission and actual project construction. This inflation rate reflects the historical volatility of the construction market. The total annual O&M cost is based on full-capacity operations projected for the design year 2044 at the WWTF. Estimates for construction contingency, administrative expenses, and engineering costs will be developed once a secondary treatment alternative is selected.

4.4. MEMBRANE BIOREACTOR (MBR)

4.4.1. PROCESS OVERVIEW

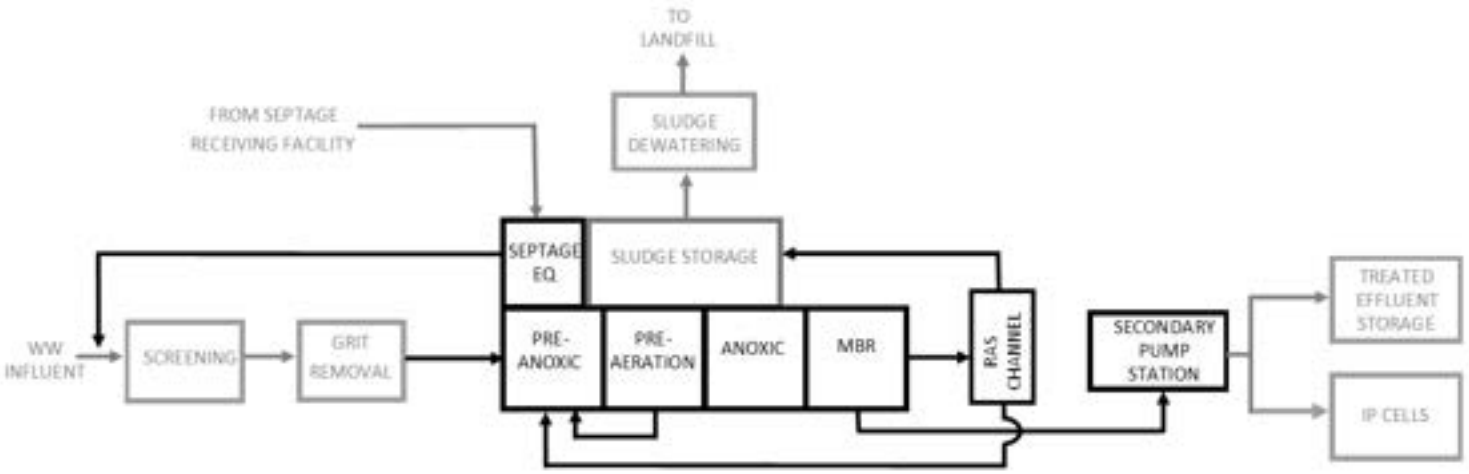
The membrane bioreactor (MBR) process for wastewater treatment combines traditional biological treatment with advanced membrane filtration to produce high-quality effluent suitable for discharge or reuse. The process begins with preliminary treatment, where incoming wastewater is screened to remove large solids, debris, and grit. This step protects downstream equipment, especially the delicate membrane components. The screened wastewater then enters an aeration tank, also known as the bioreactor, where microorganisms break down organic matter and nutrients such as nitrogen and phosphorus. Aeration is continuously supplied to maintain optimal oxygen levels, supporting aerobic microbial activity that effectively treats the wastewater.

After biological treatment, the mixed liquor—a combination of water and biomass—flows into the membrane tank. Here, membrane modules, typically consisting of ultrafiltration or microfiltration membranes, separate suspended solids, bacteria, and other contaminants from the treated water. This membrane filtration step effectively replaces the secondary clarifier used in conventional treatment systems. In submerged MBR systems, the membranes are placed directly in the bioreactor, while in sidestream systems, the mixed liquor is pumped through external membrane units.

The clean water, known as permeate, is then drawn through the membranes and collected for discharge or for further treatment such as disinfection or reverse osmosis, especially in water reuse applications. To maintain the health and balance of the microbial population, excess sludge is periodically wasted from the bioreactor. Regular maintenance of the membrane system is also essential; this includes routine backwashing

and chemical cleaning (Clean-in-Place, or CIP) to manage membrane fouling. Aeration in the membrane tank also serves a dual purpose by scouring the membrane surfaces to reduce buildup. Overall, the MBR process offers a compact, efficient, and high-performing solution for modern wastewater treatment needs.

Figure 4.4.1: MBR Flow Path



4.4.2. PRELIMINARY DESIGN

For this alternative, the MBR configuration will involve a continuous-flow system with integrated biological treatment and membrane filtration. The process includes a pre-anoxic tank for denitrification, a pre-aeration tank for initial BOD and ammonia removal, an anoxic tank for further denitrification, followed by MBR tank for final biological treatment and solid-liquid separation.

Influent wastewater is introduced into the pre-anoxic, followed by the pre-aeration and anoxic tanks/zones, where microorganisms metabolize organic pollutants such as BOD, COD, and ammonia. Submersible mixers are supplied in both the pre-anoxic and anoxic tanks to maintain solids suspension. Air is supplied to the pre-aeration tank through a fine-bubble diffused aeration system, with oxygen levels dynamically controlled based on real-time monitoring of dissolved oxygen (DO) and ammonia concentrations.

Instead of relying on gravity settling, the MBR uses microfiltration to physically separate solids from the treated effluent. The membranes are flat sheet and are submerged in the membrane tank. Treated water is drawn through the membranes using suction pumps, while solids and biomass are retained in the bioreactor, allowing for high mixed liquor suspended solids (MLSS) concentrations and extended solids retention times (SRT).

Membrane fouling is managed through periodic air scouring and chemical cleaning is performed as needed to restore permeability. Automated control systems and sensors monitor key parameters such as DO, transmembrane pressure (TMP), pH, temperature, and flow rates to ensure optimal performance and energy efficiency.

The aeration system, equipped with variable frequency drives (VFDs), adjusts airflow based on oxygen demand and membrane cleaning requirements.

As mentioned in **Section 4.1.2** above, the MBR treatment alternative will include a septage EQ basin and a Main Process Building. The septage EQ basin will be sized to store up to 100,000 gallons of septage, exceeding the 53,250 gpd peak flow anticipated at the Septage Receiving Facility under full-capacity operation. Septage will be pumped from the septage EQ basin into the headworks upstream of the MBR system for controlled blending and treatment. The Main Process Building will be located adjacent to the SBR basins and will house septage pumps, aeration equipment, the secondary pump station, a lab, an electrical room, conference room, office, and conference room. See **Figure 4.4.2** for a schematic layout of the SBR treatment process alternative.

4.4.3. DESIGN CRITERIA

Table 4.4.3: MBR Design Criteria

Design Parameter	Value
General Design Parameters	
Design Year	2044
Average Daily Flow	0.812 MGD (Winter)/0.913 MGD (Summer)
Maximum Monthly Flow	0.982 MGD
Peak Hourly Flow	2.74 MGD
Hydraulic Retention Time (HRT)	4 – 8 hours
Solids Retention Time (SRT)	15 – 30 days
Mixed Liquor Suspended Solids (MLSS)	12,000 mg/L
Membrane Type	Microfiltration (0.1–0.4 µm)
Membrane Configuration	Flat sheet
Air Scour Rate	0.2 – 0.4 $Nm^3/hr/m^2$ membrane surface area
Sludge Recirculation Ratio (RAS)	4:1
Fouling Control	Air scouring, chemical cleaning (CIP)
Permeate Pump Suction Pressure	Typically −0.05 to −0.6 bar (for submerged membranes)
Cleaning Frequency	Physical: daily or continuous Chemical (CIP): every 1–3 months
Treated Effluent Quality	
BOD	< 5mg/L
TSS	<1 mg/L
Pathogens	Typically Non-Detect

4.4.4. OPERATIONAL AND ENERGY REQUIREMENTS

Operationally, MBRs require continuous monitoring and control of key parameters such as TMP, DO, flow rates, and membrane performance. Most systems are equipped with automated controls to manage aeration, membrane cleaning cycles, and backwashing, helping to maintain efficiency and prolong membrane life. Routine maintenance is essential and includes servicing blowers, pumps, sensors, and membrane modules. Membranes must be cleaned regularly, both physically through air scouring and backwashing, and chemically via Clean-in-Place (CIP) procedures using cleaning agents like sodium

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RPA

SYM	REVISION	BY	APPR.	DATE

EXST PRIMARY POND

EXST PRIMARY POND

PWR

OHPWR

FM

NPW

LARKIN AVE

RAS CHANNEL
MEMBRANE BASIN #1
MEMBRANE BASIN #2
POST–ANOXIC BASIN #1
POST–ANOXIC BASIN #2

SOLIDS HANDLING BUILDING

PRE–ANOXIC BASIN #1

PRE–ANOXIC BASIN #2

SLUDGE BASIN #1

SLUDGE BASIN #2

PRE–AERATION BASIN #1

PRE–AERATION BASIN #2

PROCESS BUILDING

SEPTAGE EQ BASIN

SS

FIGURE 4.4.2: MBR Treatment Alternative (1)

50 0 50 100
(SCALE IN FEET)

N

A. WARGO	DESIGNED BY
AJW	DRAWN BY
BK	CHECKED BY
APRIL 2025	DATE
21733	PROJECT NO.
MBR	FILE

PROJECT TITLE
Lakeside Wastewater Improvements
Lakeside, Montana

SHEET TITLE
MBR TREATMENT ALTERNATIVE

SHEET

OF

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hypochlorite, citric acid, or alkaline solutions. These cleaning activities typically occur every few weeks to months, depending on fouling rates and influent quality.

Sludge management is another key operational requirement. MBRs typically operate at higher MLSS concentrations—usually between 8,000 and 12,000 mg/L—compared to conventional systems. This reduces the volume of excess sludge but increases viscosity and aeration demand. Waste activated sludge (WAS) must be periodically removed to maintain microbial balance within the bioreactor. Additionally, some systems may require pH adjustment or nutrient supplementation depending on the characteristics of the incoming wastewater.

In terms of energy consumption, MBRs generally require more energy than conventional activated sludge systems. The largest share of this energy—often 40 to 70 percent—is consumed by aeration, which serves both the biological process and membrane scouring. Other significant energy demands come from permeate pumps, sludge recirculation pumps, and control systems. Energy efficiency can be improved through the use of VFDs, energy-efficient blowers, and smart process control strategies, such as intermittent aeration and real-time flux adjustments.

Overall, while MBRs offer excellent effluent quality and a compact footprint, they require higher levels of operational oversight and energy input. However, with thoughtful design and management, these systems can deliver reliable treatment, particularly in applications where space is limited or water reuse is a priority.

4.4.5. AREA REQUIREMENTS

Generally, MBR systems require significantly less space compared to conventional activated sludge systems—typically 25–50% less—because they eliminate the need for secondary clarifiers and offer greater process efficiency. On average, MBR systems require around 0.08 to 0.20 square feet per gallon per day of treatment capacity, although this can vary.

Several factors influence the overall footprint, including the flow rate (or treatment capacity), the type of membranes used (e.g., hollow fiber vs. flat sheet), and whether the system uses a submerged or side stream configuration. Additionally, the characteristics of the wastewater—such as solids content—can affect the tank volume required. Modern MBR systems that incorporate advanced automation or modular integration tend to be more space-efficient

The land north of the headworks building (included in Phase 1 of the WWTF improvements project) is owned by the district and would serve as an adequate location for the MBR, Main Process Building, and all other equipment and structures necessary for this treatment process. The Main Process Building would house equipment such as blowers, pumps, and control panels.

This alternative analysis is based on the Kubota MBR design for a 0.9 MGD average design flow treatment system. Preliminary tank sizing was performed using Kubota standard design parameters. Sizing was based on the minimum temperature, and the maximum monthly flow and loading. A summary of the preliminary tank sizes is included below.

Table 4.4.5: MBR Tank Sizing

Tank Name	Dimensions (ft)	Tank Volume (gal)	Number of Tanks	Total Volume (gal)	HRT at Max Monthly Flow (hrs)
Pre-Anoxic	18.5 x 30	74,242	2	148,484	3.05
Pre-Aeration	122.5 x 30	467,185	2	934,370	19.17
Anoxic	15.75 x 30	56,311	2	112,622	2.31
MBR	22 x 30	74,090	2	148,180	3.04
Total	-	-	-	1,343,656	27.56

4.4.6. CONSTRUCTION CONSIDERATIONS

When constructing a MBR system, several critical factors must be taken into account to ensure efficiency, durability, and ease of operation. One of the primary considerations is the civil and structural design of the tank. MBR tanks must be constructed to accommodate both biological treatment and membrane filtration processes, often using materials such as reinforced concrete or high-density polyethylene (HDPE). Despite MBR systems being more compact than conventional systems, adequate space must be allocated for membrane modules, aeration systems, chemical cleaning equipment, and future expansion. The hydraulic profile should also be carefully planned to minimize pumping requirements and facilitate smooth gravity flow between process stages.

In terms of equipment installation, membrane modules require sturdy, corrosion-resistant support structures, along with sufficient clearance for easy removal and maintenance. Effective aeration is essential to minimize membrane fouling, which means installing properly sized blowers and diffuser systems in the membrane tank. From a mechanical standpoint, the piping layout must support efficient flow distribution and avoid dead zones, typically using corrosion-resistant materials like PVC, HDPE, or stainless steel. Pumps must be carefully selected to handle both sludge and permeate flows without causing damage to the membranes, while control systems should include flow meters, pressure sensors, and transmembrane pressure (TMP) monitoring to optimize performance.

Electrical and automation systems are another key aspect, requiring a stable power supply and potentially backup systems for critical components like aeration blowers. Modern MBRs typically rely on advanced automation for membrane operation, cleaning

cycles, and real-time monitoring. Environmental and safety considerations are also important; odor control measures, noise reduction around equipment like blowers and pumps, and appropriate safety features such as railings, non-slip surfaces, and confined space entry provisions should be incorporated into the design. Lastly, ease of maintenance should be prioritized by including clean-in-place (CIP) systems for membrane cleaning and providing infrastructure for handling waste streams from backwashing and chemical cleaning processes.
Over

4.4.7. COST ESTIMATE

Table 4.3.7 below summarizes the cost estimate for the oxidation ditch with secondary clarifier treatment alternative. Detailed cost estimates for this alternative are included in **Appendix E**.

Table 4.4.7: Cost Estimate for MBR Alternative

Total Project Cost	$26,311,900.00
Total Annual Operation and Maintenance Cost	$467,171.03

This cost estimate includes the construction expenses associated with the MBR treatment alternative, incorporating an annual inflation factor of 5% to account for the time lapse between funding application submission and actual project construction. This inflation rate reflects the historical volatility of the construction market. The total annual O&M cost is based on full-capacity operations projected for the design year 2044 at the WWTF. Estimates for construction contingency, administrative expenses, and engineering costs will be developed once a secondary treatment alternative is selected.

CHAPTER 5 – SOLIDS HANDLING AND DISPOSAL EVALUATION

5.1. GENERAL INFORMATION AND DISPOSAL REQUIREMENTS

During the secondary treatment process at a wastewater treatment facility (WWTF), solids are generated through biological processes managing the amount of solids is critical in treatment. Wastewater is introduced into the reactor and aerated to stimulate the growth of microorganisms that break down organic pollutants. As these microbes metabolize the waste, they reproduce and form biological flocs, resulting in the formation of activated sludge. Following the treatment phases, the contents are allowed to settle, effectively separating the treated effluent from the solid biomass. The clarified effluent is then decanted, leaving behind waste activated sludge (WAS). A controlled portion of this sludge is withdrawn to maintain appropriate biomass concentrations, making it a primary solid byproduct of secondary treatment.

To support this process, the WWTF must be equipped to store, treat, and ultimately dispose of the solids generated. Effective solids handling is essential for the stable and efficient operation of the facility, as it ensures proper biomass levels are maintained within the activated sludge process. The following section will examine various options for solids handling at the WWTF.

5.2. EXISTING SOLIDS HANDLING AND DISPOSAL OVERVIEW

The current wastewater treatment facility (WWTF) does not include a solids handling process. In the existing aerated lagoon system, solids primarily settle in the primary cells, with a smaller amount settling in the storage ponds. Periodically, these ponds require solids removal, which is typically performed using a floating dredge. To date, no solids have been removed from the existing ponds, and the primary cells are now in need of biosolids removal. Current biosolids accumulation in the primary ponds is estimated to be between 2 to 3 feet, while the storage ponds have an estimated accumulation of 6 inches or less.

Although biosolids removal from the primary ponds is necessary, it will be most cost-effective to complete this work after the new WWTF is constructed. At that time, the primary ponds can be drained, and biosolids can be removed using mechanical methods. The current level of sludge in the storage ponds is within acceptable limits and is not expected to require removal for several years. However, LCWSD should continue to monitor solids levels in the storage ponds to ensure they do not accumulate to a point that reduces storage capacity. Once the new WWTF is operational, minimal to no additional solids accumulation is expected in the storage cells.

Since, the existing facility lacks a solids handling system, a new solids handling process will need to be implemented as part of the new WWTF.

5.3. BIOSOLIDS CLASSIFICATIONS

In selecting the appropriate methods for sludge processing, reuse, and disposal, it is essential to consider the applicable regulations. In the United States, the Code of Federal Regulations (40 CFR Part 503) was established in 1993 by the Environmental Protection Agency (EPA) to set pollutant numerical limits, treatment standards, and management practices for the reuse and disposal of sludge generated from municipal wastewater treatment and septage processing. These regulations were designed to protect public health and the environment from any reasonably anticipated adverse effects of pollutants contained in biosolids.

Biosolids are categorized based on the level of treatment they receive, specifically in terms of pathogen reduction and vector attraction. Class A biosolids undergo extensive treatment to eliminate pathogens to non-detectable levels. This is achieved through methods such as high-temperature thermal treatment, composting, lime stabilization, and advanced digestion processes. Because of the stringent treatment process, Class A biosolids can be safely used without restrictions for applications such as fertilizer for home gardens, parks, and agricultural lands.

Class B biosolids, while still treated to reduce pathogens, retain detectable levels of microorganisms. These biosolids must be applied with site restrictions to minimize human and animal exposure. Regulations require specific waiting periods before crops can be harvested or livestock can graze on land where Class B biosolids have been applied. This category is often used for large-scale agricultural operations, forestry, and land reclamation projects, where its nutrient content benefits soil fertility while ensuring controlled exposure to the remaining microorganisms.

Unclassified biosolids refer to untreated or insufficiently treated sewage sludge that does not meet the standards for Class A or Class B classification. Due to their high concentrations of pathogens, heavy metals, and other contaminants, these biosolids are not suitable for land application. Instead, they are typically disposed of in landfills or incinerated to prevent environmental contamination and public health risks.

5.3.1. PREFERRED BIOSOLIDS CLASSIFICATION

Before evaluating biosolids handling alternatives, it is necessary to first determine the target biosolids classification. Class A biosolids, while unrestricted in terms of disposal and reuse, are extremely costly and labor-intensive to produce. At this time, it is not financially

feasible for LCWSD to pursue Class A biosolids due to the significant capital investment required, as well as the ongoing operations and maintenance (O&M) costs.

Class B biosolids require a lower capital investment compared to Class A and are more achievable under current budgetary constraints. To meet Class B requirements through aerobic digestion, sludge must be aerated for a minimum of 40 days at 20°C (68°F), or 60 days at 15°C (59°F). While alternative methods for achieving Class B certification exist, these temperature and time-based standards would serve as the design basis for a new system. However, this approach necessitates large aerobic digesters, which result in high energy consumption due to extended aeration requirements.

To reduce the required volume of the digesters, waste activated sludge (WAS) can be thickened to increase solids concentration before digestion. However, sludge thickening introduces additional capital costs, including the purchase of specialized equipment and the construction of dedicated building space.

The primary benefit of achieving Class B biosolids certification is the ability to land-apply the treated solids. While LCWSD does own property, most of it is currently allocated for wastewater land application or groundwater discharge. As a result, there is insufficient available land for the application of biosolids. Furthermore, at present, there are no surrounding landowners who have expressed interest in accepting biosolids for land application.

Given the lack of available land and the associated capital and operational costs, pursuing a Class B biosolids classification does not appear to be a financially viable option for LCWSD at this time.

Unclassified biosolids are typically disposed of in a landfill. Due to an agreement between Flathead County, owner of the local landfill, and LCWSD for the acceptance of septage, the landfill has also agreed to accept biosolids. A significant portion of the biosolids generated at the WWTF will originate from the septage being received. Currently, producing unclassified biosolids represents the lowest capital and operational and maintenance expenses for handling biosolids at the WWTF. All future solids analysis will be based on the production and disposal of unclassified biosolids.

5.4. GENERAL DESIGN CRITERIA

Since biosolids are considered unclassified, solids handling design criteria must be developed accordingly. While dewatered biosolids can be sent directly to a landfill, this approach is operationally challenging. To provide operators with greater flexibility, sludge storage basins should be included to allow WAS to be held until dewatering can occur.

Operators typically prefer enough storage capacity to avoid dewatering on weekends, holidays, or during unexpected equipment downtime. Therefore, it is recommended that the sludge storage basins provide a minimum of 14 days of storage. Ideally, two basins should be provided to allow one to be taken out of service for maintenance.

To determine the required basin volume, the amount of solids produced must first be estimated. As a general rule of thumb for activated sludge secondary treatment processes, solids production is approximately 0.75 pounds of solids per pound of BOD removed. Additionally, alum is expected to be added for phosphorus removal, which contributes to further solids production. Approximately 1.2 pounds of solids are generated per pound of phosphorus removed. A certain amount of biological phosphorus removal will also occur and should be estimated at this stage. Estimated solids production is summarized in **Table 5.4.1**

Table 5.4.1*: Solids Production*

2044 Design Flow	BOD lbs/day	Phosphorous lbs/day	Assumed Biological Phosphorous Removal	WAS lbs/day	Percent Solids	WAS Flow Rate gals/day
Summer	4,136	112	75%	3,136	0.75%	50,129
Winter	3,388	84	75%	2,566	0.75%	41,026
Max Month	4,457	118	75%	3,378	0.75%	54,007

Table 5.4.1 assumes that the WAS has a solids concentration of 0.75%, resulting in a summer WAS flow rate of 50,129 gallons per day. This summer flow rate is considered the most appropriate value for designing the sludge storage basins. While storage during the maximum month may fall slightly short of 14 days, winter conditions will result in slightly longer storage times. Using the summer WAS flow rate as the design basis provides a conservative estimate without unnecessarily oversizing the storage basins and increasing costs.

It is important to note that solids production varies among different secondary treatment processes, as shown in the design summaries from various manufacturers. Reported solids production ranges from 3,000 to 4,200 pounds per day, with corresponding WAS flow rates ranging from 30,000 to 51,000 gallons per day. This variation is primarily due to differences in assumed WAS solids concentration and the estimated solids produced per pound of BOD removed.

Given this variability, design criteria will be based on the most conservative values. A WAS flow rate of 51,000 gallons per day closely matching the summer estimate in **Table 5.4.1** will be used. Additionally, a solids load of 4,200 pounds per day will be used for planning purposes, exceeding the estimated 3,100 pounds per day, to ensure sufficient capacity. The design criteria for the solids handling system are summarized in **Table 5.4.2**

Table 5.4.2*: Solids Handling Design Criteria*

Solids Handling Design Criteria		
Sludge Storage	14	Days
Basins	2	
WAS Flow Rate	51,000	gals/day
Solids Production	4,200	lbs/day

Based on the design criteria shown in **Table 5.4.2** alternatives for Sludge Storage and Solids Dewatering can be analyzed.

5.5. CONCRETE SLUDGE STORAGE BASINS – UNCLASSIFIED BIOSOLIDS

5.5.1. PROCESS OVERVIEW

Waste Activated Sludge WAS will be pumped from the secondary treatment system into concrete sludge storage basins. The WAS will be held, aerated, and mixed until it can be dewatered.

5.5.2. PRELIMINARY DESIGN

The sludge storage system will consist of two concrete basins to provide operational flexibility and ensure continued solids processing even when one basin is taken offline for maintenance or dewatering. The configuration of the basins will vary depending on the secondary treatment process:

For SBR or MBR, the sludge storage basins will share a common wall with the reactor basins to reduce construction costs and optimize space.

For oxidation ditch systems, a shared wall is not feasible due to the shallow depth of the ditch, which would increase construction complexity and costs and reduce mixing efficiency.

Each basin will be equipped with a telescoping valve to allow operators to manually thicken the WAS. Periodically, aeration and mixing will be shut off to allow solids to settle. Once settled, operators can decant the clarified supernatant (“clean water”) from the top, returning it to the head of the plant. It is conservatively estimated that solids can be thickened to approximately 1.5%, and potentially more with diligent operation.
Aeration will be provided to maintain a minimum dissolved oxygen (DO) concentration of 2 mg/L during active aeration periods. Submersible mixers will also be installed in each basin, allowing the system to remain fully mixed when aeration is off. This enables the

basin to enter an anoxic state, promoting a limited degree of nitrogen removal. This can help reduce the nitrogen load in the decant and dewatering return streams, although the extent of nitrogen removal may be limited by the low carbon content in the sludge.

5.5.3. DESIGN CRITERIA

Design criteria for this alternative can be seen in **Table 5.5.3.**

Table 5.5.3*: Concrete Sludge Storage Basin Design Criteria*

Concrete Sludge Storage Basin Design Criteria		
Sludge Storage	14	Days
Basins	2	
WAS Flow Rate	51,000	gals/day
Solids Production	4,200	lbs/day
WAS Percent Solids	1%	
Estimated Percent Solids after Decanting	1.5%	
Storage Basin Volume (Total)	476,000	gallons
Storage Volume per Basin	238,000	gallons

5.5.4. OPERATIONAL AND ENERGY REQUIREMENTS

The primary energy demands for the sludge storage system are associated with aeration and mixing. Aeration is essential to maintain aerobic conditions, control odors, and prevent the development of septic conditions. It also supports biological stabilization by sustaining microbial activity. Mixing ensures even distribution of solids, prevents settling, and promotes consistent sludge quality for downstream processing. Together, these systems represent the majority of the storage basin's energy consumption.

5.5.5. AREA REQUIREMENTS

The space requirement for this system is relatively modest. Assuming a side water depth of 21 feet, the total area needed is approximately 3,100 square feet. The LCWSD has ample land available to accommodate this alternative.

5.5.6. CONSTRUCTION CONSIDERATIONS

As with other site improvements, ground improvements will be necessary to address liquefiable soils found at the treatment plant site. Depending on the structure's depth below the existing ground surface, temporary dewatering may be required during construction to facilitate proper installation of foundation and structural elements.

5.5.7. COST ESTIMATE

The cost estimate for this alternative is shown in **Table 5.5.7**.

Table 5.5.7: Sludge Storage Basin Cost Estimate

Total Construction Cost	$2,467,100
Total Annual Operation and Maintenance Cost	$32,300

This cost estimate assumes common wall construction with the SBR reactor basins. Actual costs may vary slightly depending on the selected secondary treatment process. A detailed cost estimate is included in **Appendix F.**

5.6. SLUDGE STORAGE POND – UNCLASSIFIED BIOSOLIDS

5.6.1. PROCESS OVERVIEW

Waste Activated Sludge (WAS) would be pumped from the secondary treatment system into a lined sludge storage pond. The WAS would then be held, aerated, and mixed until it can be dewatered.

5.6.2. PRELIMINARY DESIGN

The sludge storage pond would be constructed with a liner to contain the WAS and prevent seepage. Like a concrete sludge storage basin, the pond would require both aeration and mixing to maintain proper sludge conditions. To prevent interaction with the groundwater table, the pond would need to remain relatively shallow—no more than 8 feet below the existing ground surface. This constraint would result in a shallow pond with a significantly larger footprint.

Given the site's liquefiable soils, ground improvements would be required beneath the pond to prevent the uncontrolled release of biosolids in the event of an earthquake. Due to the need for extensive ground improvements and the large land area required, this alternative was eliminated from further consideration.

5.7. SOLIDS DEWATERING – SCREW PRESS

5.7.1. PROCESS OVERVIEW

Waste Activated Sludge (WAS) generated from the secondary treatment process must be dewatered and properly disposed of. In the screw press dewatering alternative, WAS will be pumped from the sludge holding basins to a screw press system.

In this process, WAS is first pumped through a magnetic flow meter to measure flow rate. Downstream of the flow meter, polymer is introduced into the sludge stream using polymer blending units. While screw press designs vary by manufacturer, they generally consist of a mixing tank and a flocculation tank. After flocculation, the sludge flows into the screw press, where water is mechanically separated from the solids, forming a dewatered sludge cake. The separated water (filtrate) is returned to the headworks of the treatment plant, and the sludge cake is discharged into a receiving vessel for hauling and final disposal.

This process is suitable for both Class B and unclassified biosolids. Class B biosolids can be land-applied, while unclassified biosolids must be disposed of at a landfill.

5.7.2. PRELIMINARY DESIGN

Waste Activated Sludge (WAS) generated from the secondary treatment process must be dewatered and properly disposed of. In the screw press dewatering alternative, WAS will be pumped from the sludge holding basins to a screw press system.

In this process, WAS is first pumped through a magnetic flow meter to measure flow rate. Downstream of the flow meter, polymer is introduced into the sludge stream using polymer blending units. While screw press designs vary by manufacturer, they generally consist of a mixing tank and a flocculation tank. After flocculation, the sludge flows into the screw press, where water is mechanically separated from the solids, forming a dewatered sludge cake. The separated water (filtrate) is returned to the headworks of the treatment plant, and the sludge cake is discharged into a receiving vessel for hauling and final disposal.

This process is suitable for both Class B and unclassified biosolids. Class B biosolids can be land-applied, while unclassified biosolids must be disposed of at a landfill. At some point the LCWSD may want to produce Class B Biosolids if land becomes available for land application.

5.7.3. DESIGN CRITERIA

The screw press system is expected to meet the following design criteria shown in **Table 5.7.3**

Table 5.7.3*: Solids Dewater Screw Press Design Criteria*

Dewatering Time	35	hrs/week
Dewater Volume	238,000	Gallons
Dewatering Feed Rate	113	gpm
Percent Solids Dewatered	18%	
Dewatered Solids Volume	20	CYDS per week day
Air Exchanges in Solids Handling Building	6	per hour

5.7.4. OPERATIONAL AND ENERGY REQUIREMENTS

At full buildout, operating the screw press system will require approximately 35 hours per week. This may require dedicating the majority of one operator's time to solids handling. Initially, operator time will be minimal, but will increase as flows and solids production grow.

At full capacity, approximately 20 cubic yards of dewatered solids will be produced each workday. This will necessitate either LCWSD managing solids hauling directly or contracting a third-party service for biosolids disposal.

Energy demands for this system are relatively low. The sludge pumps will each be under 10 horsepower, and the screw press system, including motors and components, is expected to consume less than 15 horsepower total. Ventilation system energy use must also be accounted for to maintain air quality and meet NFPA 820 requirements.

5.7.5. AREA REQUIREMENTS

This alternative has minimal space requirements. The primary footprint is for the solids handling building, estimated at 48 feet by 48 feet. Sufficient land is available at the treatment plant site to accommodate this facility

5.7.6. CONSTRUCTION CONSIDERATIONS

As with other improvements at the treatment site, ground improvements will be required beneath the solids handling building due to liquefiable soils present at the location. No other significant construction constraints are anticipated for this alternative.

5.7.7. COST ESTIMATE

Table 5.7.7 shows the summarized cost estimate for this alternative including the solids handling building.

Table 5.7.7: Preferred Project Cost Estimate

Total Construction Cost	$2,734,000
Total Annual Operation and Maintenance Cost	$295,400

O&M Costs include sludge hauling and disposal, which is approximated at $210,000 per year at full build out. This number has been used for alternative comparisons. Initially sludge hauling and disposal will be significantly less. A detailed cost estimate is included in **Appendix F.**

5.8. SOLIDS DEWATERING – DRYING BEDS

Drying beds are a common method of solids dewatering. MDEQ Circular 2, Section 88.2 outlines the requirements for their use and recommends drying beds only for well-digested sludge. However, with only 14 days of sludge storage provided in aerated storage basins, the sludge is unlikely to be well digested.

In addition, drying beds require a large footprint, as the maximum sludge depth should not exceed 8 inches. Due to the presence of liquefiable soils at the site, ground improvements would be necessary beneath the beds, significantly increasing construction costs.

Another major concern is the climate in the Flathead Valley, which is generally wetter and more humid. These conditions reduce the efficiency of sludge drying, further limiting the viability of this method.

Given the combination of insufficient sludge digestion, high land and construction requirements, and climate-related limitations, drying beds are not considered a viable alternative for solids dewatering at this site.

CHAPTER 6 – PREFERRED ALTERNATIVE SELECTION

This chapter provides a detailed comparison of the alternatives identified as potentially feasible and cost-effective in Chapters 2, 4, and 5. Chapter 2 includes effluent disposal alternatives, Chapter 4 includes secondary treatment alternatives, and Chapter 5 includes solids handling alternatives. The focus is on analyzing the proposed improvements for the Lakeside County Water and Sewer District (LCWSD) Wastewater Treatment Facility (WWTF). For a more comprehensive discussion of the alternatives evaluated here, please refer to Chapter 2, Chapter 4, and Chapter 5.

6.1. LIFE CYCLE COST ANALYSIS

The life cycle cost analysis provides an economic comparison of the developed alternatives by evaluating total project costs, annual operation and maintenance (O&M) expenses, and the estimated salvage value of infrastructure over a 20-year period. This analysis serves as the primary tool for assessing cost-effectiveness when multiple alternatives are under consideration.

However, in cases where alternatives are not being directly compared, the life cycle cost analysis is not applicable. Instead, decisions will be based on total construction cost and other relevant factors.

Detailed cost estimates including total project cost, O&M costs, and salvage value for each alternative are provided in **Appendix D, Appendix E, and Appendix F**. **Table 6.1.4** summarizes the life cycle cost analysis for the alternatives discussed in Chapter 2, Chapter 4, and Chapter 5.

6.1.1. TOTAL CONSTRUCTION COST

Total construction cost estimates were developed using actual material and equipment proposals, as well as pricing from comparable projects whenever available. Capital costs include labor and materials required to construct the proposed facilities, along with allowances for contractor mobilization, bonding and insurance, and general requirements such as submittal preparation.

Installation costs are calculated as a percentage of equipment costs, with the percentage varying based on project complexity. Additionally, costs for administration and engineering services estimated as percentages of the construction cost are included in the total construction cost.

6.1.2. OPERATION AND MAINTENANCE COSTS

Economic evaluations of the alternatives consider both capital costs and annual operation and maintenance (O&M) expenses. O&M costs include expenditures for chemicals, materials and supplies, energy, labor, and equipment replacement funds for specific systems. Maintenance costs for new facilities are estimated as a percentage of the initial equipment cost, varying by equipment type and usage. Energy costs are based on projected average requirements for each unit process and typical utility rates in Montana communities.

As influent flows to the Wastewater Treatment Facility (WWTF) increase, corresponding O&M costs are expected to rise. If new treatment processes or structures are added at the WWTF, O&M costs will likely increase due to higher manpower and energy demands associated with operating additional equipment and heating new structures. However, the use of high-efficiency equipment—such as modern blowers—may offset some of the increased energy consumption, potentially resulting in overall energy savings.

The O&M costs presented in this document exclude incremental costs associated with population growth. Instead, they focus on changes to the system itself, such as extensions to buried piping.

6.1.3. INFLATION

An inflation factor of 5% annually was included in the cost estimate due to the historic volatility of the construction market and the time between funding application submittals and the actual construction of the project. Construction is expected to occur in 2 years, therefore, a 5% inflation rate over 2 years was used.

6.1.4. PRESENT WORTH ANALYSIS

A present worth analysis has been conducted for each alternative to evaluate long-term cost-effectiveness. This analysis incorporates the total project cost, estimated annual O&M costs, and the projected salvage value at the end of a 20-year planning period. Unless otherwise noted, the salvage value assumes a 20-year service life for mechanical equipment.

The present worth represents the amount that would need to be invested in 2025 dollars to cover the total construction cost and annual O&M expenses over 20 years, discounted at an interest rate of 3.0%, and adjusted for the salvage value at the end of the period.

Table 6.1.4: Present Worth Analysis of Treatment Alternatives

Alternative	Total Construction Cost	Annul O&M Cost	Salvage Value	Total Present Worth
Secondary Treatment Alternatives				
Secondary Treatment Alternative #1 – Oxidation Ditch and Secondary Clarifiers	$28,776,500	$288,100	$9,768,800	$27,654,100
Secondary Treatment Alternative #2 – Sequence Batch Reactor (SBR)	$18,754,100	$314,600	$5,943,800	$20,142,900
Secondary Treatment Alternative #3 – Membrane Bioreactor (MBR)	$26,311,900	$567,900	$6,807,800	$30,991,300

6.2. NON-MONETARY FACTORS

The following sections present non-monetary comparisons for each of the Lakeside Wastewater system improvement alternatives. Each alternative is rated on a scale from 1 to 5 in each category, with 1 representing the lowest rating and 5 the highest. These ratings are then multiplied by a weight assigned to each criterion, ranging from 1 to 3, where 3 indicates the highest level of importance. The maximum possible score for any category is 15. The ranking table incorporates both monetary and non-monetary criteria to provide an overall evaluation of the alternatives.

6.2.1. SECONDARY TREATMENT ALTERNATIVES

Table 6.2.1 presents a comparative ranking of the secondary treatment alternatives across several evaluation categories.

Table 6.2.1: Comparison of Secondary Treatment Alternatives

Criteria	Criteria Weight	Alternative 1 Oxidation Ditch		Alternative 2 SBR		Alternative 3 MBR	
Technical Feasibility	2	5	10	5	10	3	6
Longevity/Reliability	1	5	5	4	5	2	2
Water Quality	2	4	8	4	8	5	10
Regulatory Compliance	2	5	10	5	10	5	10
Constructability	1	5	5	5	5	4	4
Environmental Impacts	1	5	5	5	5	5	5
Financial Feasibility	3	2	6	5	15	3	9
Operation and Maintenance	2	5	10	3	6	1	2
Public Health and Safety	3	5	15	5	15	5	15
Land Impact/Availability	1	3	3	4	4	4	4
Total			**77**		**83**		**67**

As shown in **Table 6.2.1**, among the three secondary treatment alternatives, the SBR and Oxidation Ditch rank the highest, while the MBR ranks the lowest. The MBR's lower ranking is primarily due to its higher operation and maintenance requirements and the limited longevity of its membranes. Based on non-monetary factors, the Oxidation Ditch and SBR are very comparable. However, when life cycle analysis is taken into account, the SBR is significantly more cost-effective, mainly due to the high capital cost associated with the Oxidation Ditch. Therefore, based on this analysis, the SBR is the preferred alternative.

6.2.2. SOLIDS HANDLING ALTERNATIVES

Chapter 5 identifies two alternatives for sludge storage and two for solids dewatering. However, the analysis in Chapter 5 determined that only one alternative for each was viable. As a result, no further comparison of these alternatives is necessary. The preferred solids handling approach is to construct concrete sludge storage basins and dewater the solids using a screw press or other mechanical method. The dewatered solids will then be transported to the Flathead County landfill. Since the biosolids are being landfilled, they are considered unclassified and do not need to meet Class A or B standards.

6.2.3. EFFLUENT DISPOSAL ALTERNATIVES

As discussed in **Chapter 2**, the district previously decided to dispose of effluent through groundwater discharge. This option was evaluated during earlier planning to confirm that it was the most cost-effective approach. The district has since obtained a groundwater discharge permit and must comply with the permit limits. Therefore, the preferred effluent disposal method is groundwater discharge.

6.3. PREFERRED PROJECT

Based on the analysis completed in Sections 6.1 and 6.2 the preferred project consists of:

- Secondary Treatment
  - Alternative 2 - SBR
- Effluent Disposal
  - Groundwater Discharge and Existing Land Application System
- Sludge Storage
  - Concrete Aerated Storage Basins
- Sludge Dewatering
  - Mechanical Screw Press

6.3.1. WASTEWATER TREATMENT CAPACITY AND RECOMMENDED IMPROVEMENTS

All alternatives have been evaluated based on the 20-year design flow, which is approximately 0.9 million gallons per day (MGD). However, the available effluent disposal capacity is only about 543,000 gallons per day—roughly equivalent to the 10-year design flow of 0.6 MGD.

Given this limited disposal capacity and the significant capital cost, it may not be financially prudent to construct the full buildout capacity initially. Instead, it would be more cost-effective to build to the 10-year design flow of approximately 0.6 MGD as the first phase of the secondary treatment process upgrade. Any improvements should be designed to allow for future expansion to meet the full 20-year design flow.
The evaluation process for the alternatives remains valid, as the only change is the scale of the project. The monetary and non-monetary analyses of the alternatives are still applicable at the reduced capacity.

However, if the system is initially built to the 10-year design flow, LCWSD will still be contractually obligated to accommodate the full buildout capacity for septage. Therefore, septage loading must be designed for the 20-year flow projections. As a result, the secondary treatment system must be sized to handle the flow rates and loadings outlined in **Table 6.3.1**.

Table 6.3.1: Secondary Treatment Requirements at 0.6 MGD

Season	Constituent	Domestic Load		Septage Load		Combined (Collection and Septage)		
		gpd	mg/L	gpd	mg/l	gpd	lbs/day	mg/l
Winter	BOD	532,000	350	21,429	5,400	553,429	2,518	546
	TSS	532,000	268	21,429	10,000	553,429	2,976	645
	Nitrogen	532,000	54	21,429	806	553,429	384	83
	Phosphorous	532,000	7	21,429	200	553,429	67	14
Summer	BOD	612,000	350	38,036	5,400	650,036	3,499	645
	TSS	612,000	268	38,036	10,000	650,036	4,540	837
	Nitrogen	612,000	54	38,036	806	650,036	531	98
	Phosphorous	612,000	7	38,036	200	650,036	99	18
Max Month	BOD	678,000	350	38,036	5,400	716,036	3,692	618
	TSS	678,000	268	38,036	10,000	716,036	4,688	785
	Nitrogen	678,000	54	38,036	806	716,036	561	94
	Phosphorous	678,000	7	38,036	200	716,036	103	17

There are no changes to the effluent disposal alternatives when designing the facility for the 10-year design flow rate. Effluent disposal remains the limiting factor of the treatment system. However, it should be noted that LCWSD can discharge more wastewater during the summer months when flows are higher, due to the land application system being storage-limited. In the summer, storage is not required because effluent can be applied directly to land, provided that the crops grown do not exceed nitrogen or hydraulic loading limits. A water balance analysis supporting this has been included in **Appendix H**.

The existing land application system can handle approximately 2,000,000 gallons per day during the summer if nitrogen levels are treated to 8 mg/L, while still allowing for drawdown of the storage ponds in preparation for the following winter. Conveniently, this aligns with the increased flows experienced during the summer and peak month. The 10-year winter flow rate closely matches the winter disposal capacity, further supporting the phased approach.

Solids handling alternatives should still be designed for the 20-year design flow rate, as a significant portion of solids generated by the secondary treatment process comes from septage loading. Additionally, it is less cost-effective to expand solids handling capacity later. Mechanical dewatering systems would require two smaller units to allow for scalability, rather than installing a single larger unit from the outset. This would increase building size and provide minimal cost savings. Furthermore, designing solids handling to full buildout now presents no disadvantages, as lower flows would simply reduce operator workload during dewatering.

Based on the reduced flow of approximately 0.6 million gallons per day, the preliminary treatment system site plan can be found in
Figure 6.3.1

6.3.2. COST ESTIMATE

Table 6.3.2 below summarizes the cost estimate for the 0.6 million gallon per day WWTF. The total construction cost includes the 0.6 million gallon per day SBR, septage EQ basin, Main Process Building, process piping, site work, sludge storage basin solids handling building, and groundwater discharge IP Cells. Detailed cost estimates for this alternative are included in **Appendix G**, which includes all improvements in the recommended project.

Table 6.3.2: Recommended Project Cost Estimate

Total Construction Cost	$24,862,200
Total Project Cost	$33,006,700
Total Annual Operation and Maintenance Cost	$625,600

This cost estimate includes the construction cost for the SBR treatment alternative along with an inflation factor of 5% per year for the additional time between facility plan and actual construction of the project. This inflation is due to the historic volatility of the construction market. The total project cost includes construction contingency estimate at 10%, engineering costs estimated at 18%, and administrative/financial costs 5%. O&M Costs include solids disposal at full buildout. This cost will be significantly less at initial start up of the WWTF.

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RPA

SYM	REVISION	BY	APPR.	DATE

EXST PRIMARY POND

EXST PRIMARY POND

PWR

OHPWR

FM

NPW

SS

TO STORAGE PONDS

TO RIB'S

LARKIN AVE

SOLIDS HANDLING BUILDING

SEPTAGE EQ BASIN

SLUDGE BASIN #1

SLUDGE BASIN #2

REACTOR BASIN #1

REACTOR BASIN #2

REACTOR BASIN #3

FUTURE REACTOR BASIN #4

PROCESS BUILDING

N

50 0 50 100

(SCALE IN FEET)

FIGURE 6.3.1: RECOMMENDED WWTF SITE PLAN 1

DESIGNED BY	A. WARGO
DRAWN BY	AJW
CHECKED BY	BK
DATE	APRIL 2025
PROJECT NO.	21733
FILE	Treatment Site0_6_SB

PROJECT TITLE

Lakeside Wastewater Improvements

Lakeside, Montana

SHEET TITLE

0.6 MGD TREATMENT SITE PLAN

SHEET

OF

F:\water\21733 — Lakeside Wastewater Improvements — 2022\2024 LCWSD Facility Plan\Figures\Figures for Meeting\Treatment Site0_6_SBR.dwg Jul 17, 2025

CHAPTER 7 - ENVIRONMENTAL AND OTHER CONSIDERATIONS

7.1. LONG TERM ENVIRONMENTAL CONCERNS

The LCWSD was originally established to protect the environment and water quality of Flathead Lake, which remains the District's primary concern. Before the District was formed, the northwest corner of Flathead Lake primarily relied on individual septic systems. These systems, especially those located near the lake's shoreline, raised significant concerns about nutrient runoff, particularly nitrogen and phosphorus, which can lead to algal blooms.

Algal blooms degrade aquatic ecosystems by depleting oxygen, harming wildlife, and creating unsafe conditions for recreation and drinking water. The construction of a centralized wastewater treatment system significantly mitigated these risks by replacing most on-site systems and conveying wastewater away from the lake for proper treatment.

The current centralized treatment facility has served LCWSD effectively for nearly 40 years, playing a vital role in protecting the lake. However, the system is now approaching the end of its design life and is nearly at capacity. To continue fulfilling its mission of protecting Flathead Lake, the District must expand and upgrade the WWTF.

LCWSD is the only provider of centralized wastewater treatment in the area. If the WWTF is not expanded, the only remaining option for wastewater treatment would be a return to on-site systems near Flathead Lake a scenario that could be detrimental to the lake's water quality. Avoiding this outcome is the District's highest priority.

As part of the WWTF upgrades, it is essential to enhance the overall level of treatment across the entire system. **Table 7.1.1** presents a comparison between the existing and proposed treatment system loadings, illustrating the improvements and benefits expected from the upgraded facility.

Table 7.1.1: Treatment Comparison

Existing Treatment System			
	Concentration (mg/L)	**Treatment Capacity (gals/day)**	**Daily Loading (lbs/day)**
BOD	28.0	316,500	73.9
Total Suspended Solids	35.4	316,500	93.5
Total Nitrogen	20.6	316,500	54.4
Total Phosphorus	5.4	316,500	14.2
WWTF Design Criteria			
BOD	10	600,000	50.0
Total Suspended Solids	10	600,000	50.0
Total Nitrogen	8	600,000	40.0
Total Phosphorus	1.2	600,000	6.0
BOD	10	900,000	75.1
Total Suspended Solids	10	900,000	75.1
Total Nitrogen	8	900,000	60.0
Total Phosphorus	1.2	900,000	9.0

As shown in **Table 7.1.1**, the proposed levels of treatment at the new wastewater treatment facility (WWTF) are significantly higher than those of the existing system. At a flow of 600,000 gallons per day (GPD), the pollutant load is substantially lower than that of the current system, and even at 900,000 GPD, the load is nearly equivalent to the current facility.

It is important to note that LCWSD currently has disposal capacity for approximately 600,000 GPD, through a combination of groundwater discharge and land application. To accommodate flows up to 900,000 GPD, additional disposal methods will need to be identified and implemented.

While the comparison illustrates the superior treatment performance of the proposed WWTF, it should be recognized that the existing system uses land application, which includes nutrient uptake by irrigated alfalfa. As such, the comparison is not a true "apples-to-apples" evaluation, but it still offers valuable insight into the improved effluent quality expected from the proposed system.

If treatment capacity is not expanded, property owners in the area would need to rely on individual septic systems for wastewater management. The impact of this shift is difficult to quantify, as the number of potential septic systems is unknown. However, **Table 7.1.2** shows average nutrient concentrations in septic tank effluent, clearly indicating that

nutrient loads from widespread on-site treatment would be significantly higher than those from the proposed centralized system. Over time, a portion of these nutrients would likely reach Flathead Lake, posing a risk to its water quality.

Table 7.1.2: Septic Tank Effluent Concentrations

Septic Tank Effluent Concentration Ranges	
	Concentration (mg/L)
BOD	100-300
Total Suspended Solids	40-100
Total Nitrogen	35-90
Total Phosphorus	4-15

Based on this information, the proposed improvements to the WWTF are environmentally beneficial, continuing LCWSD's longstanding commitment to protecting Flathead Lake and reducing nutrient loading to surface waters.

7.2. SHORT TERM ENVIRONMENTAL CONCERNS

As with any large construction project, there are short-term environmental concerns. These primarily include noise pollution, dust generation, sediment-laden stormwater runoff, and temporary dewatering required for construction.

Noise pollution will be limited to the construction phase and is expected to have minimal impact, as the site is located away from major population centers. Impacts can be further reduced by restricting construction activities to normal working hours.
Dust pollution is a common concern for large-scale construction. Dust will be mitigated through the application of dust abatement measures on haul roads. In addition, water will be applied to disturbed areas to control airborne dust.

Sediment in stormwater runoff is another potential issue. The contractor will be required to obtain a Storm Water Pollution Prevention Plan (SWPPP) permit and implement appropriate Best Management Practices (BMPs) to prevent sediment discharge. This concern is short-term and poses no long-term environmental risks.

Dewatering may be necessary to install the lower sections of the proposed infrastructure. Any dewatering will be temporary, and all water will be settled or treated to remove sediment prior to discharge.

Overall, these short-term environmental concerns will be effectively mitigated through standard construction practices and proper management measures. The temporary impacts are far outweighed by the long-term environmental benefits associated with the proposed WWTF improvements.

7.3. REGULATORY COMPLIANCE PERMITS

LCWSD is currently subject to a single discharge permit: MTX000307 – Authorization to Discharge Under the Montana Ground Water Pollution Control System. This permit establishes the groundwater discharge limits as well as the monitoring and reporting requirements.

LCWSD's other method of effluent disposal is through its land application system, which is not currently permitted. At the time of installation, land application systems were not required to have a nutrient management plan. However, with the planned upgrades to the WWTF, it is likely that Montana DEQ will require the development of a nutrient management plan for continued use of land application.

This nutrient management plan would provide guidance and requirements for crop selection and management, land management practices, application rates, and best management practices to prevent nutrient runoff and protect water quality. This plan will be completed if necessary with this phase of the project.

7.4. AGENCY COMMENTS

As part of Phase I of the Wastewater Improvements Project, agency comments were solicited. Additional comments will be requested once the scope of Phase II is more clearly defined. However, since the improvements will occur on the same site, it is anticipated that the agency feedback will remain largely unchanged. The comments received during Phase I are included in **Appendix I**.

7.5. FUNDING STRATEGY

LCWSD has an established funding strategy, initially defined in Phase I and continuing into Phase II. All design services for Phase II have been included in the Phase I budget. Phase II of the project including the design services from Phase I will utilize the following funding sources:

Water Pollution Control State Revolving Fund Program (WPCSRF)
Administered by the Montana Department of Environmental Quality (MDEQ), this loan program provides below-market financing for public wastewater system improvements that support public health. Currently, there is no cap on SRF loan amounts. However, if demand exceeds available funding at any time, individual project loan amounts may be limited—though such limits have not yet been imposed.

The program also offers loan forgiveness, though the amount for this project is currently unknown. It is anticipated that the project will qualify for some level of forgiveness.

Local Funds
LCWSD has taken a proactive approach to infrastructure planning and management by implementing plant investment fees, which are charged for all new connections to the system. These fees are intended to offset infrastructure costs incurred by current customers as a result of system expansion. LCWSD plans to use these fees to help fund Phase II of the project.

Flathead County ARPA Funds
Because LCWSD has agreed to accept septage from Flathead County residents, the County has allocated a portion of its ARPA Local Fiscal Recovery Funds to support the project. These funds will directly contribute to Phase II.

Western Montana Conservation Commission Grant
This grant program is focused on reducing toxins from septic leachate. Flathead County received funding under this program due to the establishment of a regional septage receiving facility. These funds will be used to offset project costs associated with LCWSD's acceptance of septage.

Flathead County Funds
In recognition of LCWSD's role in accepting septage at the WWTF, Flathead County has committed additional funding from County sources to support the project.

As the scope of Phase II is further refined, a detailed budget will be developed, specifying the amount and use of each funding source. The budget will be updated as necessary to reflect any changes in project scope.

7.6. IMPLEMENTATION SCHEDULE

See **Table 7.6.1** below for the proposed project improvements schedule.

Table 7.6.1: Implementation Schedule for the Recommended Alternatives

TASK	2025				2026				2027				2028				2029			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Adopt Wastewater Treatment Facility Plan			X																	
Advertise Preselection for Equipment Manufacturer			X																	
Award Preselection			X																	
PROJECT DESIGN																				
Preliminary Design				X	X															
Final Design						X														
MDEQ Plan Review and Approval							X													
PROJECT BIDDING AND AWARD OF IMPROVEMENTS																				
Public Bid Advertisement								X												
Open Bids and Examine Proposals								X												
Select Contractor and Award Bid									X											
PROJECT CONSTRUCTION OF IMPROVEMENTS																				
Conduct Pre-Construction Meeting										X										
Issue Contractor Notice to Proceed										X										
Begin Construction											X									
Monitor Engineer & Contractor											X	X	X	X	X	X	X	X		
Submit Drawdowns and Progress Reports												X	X	X	X	X	X	X		
Hold Construction Progress Meetings												X	X	X	X	X	X	X		
Final Inspection																			X	
PROJECT CLOSE OUT OF IMPROVEMENTS																				
Submit Final Drawdown																				X
Project Completion Report																				X
Local Government Audit																				X

7.7. PUBLIC INVOLVEMENT

Public participation has been a key component of the proposed project. In addition to regular LCWSD Board meetings, which are open to the public, the District has held two open houses specifically focused on the project. Additional open houses will be scheduled as needed to ensure the community remains informed about the project's purpose, progress, and benefits.

These meetings have served as a forum to gather public input on the wastewater improvement project, address any environmental concerns, and provide information about project funding. Documentation from the open houses including presentation materials and attendee sign-in sheets can be found in **Appendix J**.

In addition, to the open houses the facility plan was presented at a board meeting. Public comments were received at the meeting and community members were given the opportunity to comment on the proposed treatment alternatives. The board reviewed the public comments and accepted the recommendation of the facility plan. The presentation is included in **Appendix J**.

Appendix A: LCWSD Wastewater Treatment System Capacity Analysis

March 28, 2025

Marc Liechti, District President
Lakeside Water & Sewer District
235 Bierney Creek Road
Lakeside, MT 59922

RE: Lakeside Wastewater Treatment System Capacity Analysis: EQ# 25-2193
Planning Document Comments

Dear Mr. Liechti:
Based on the capacity memo provided to the department on February 24, 2025, and subsequent email correspondence, the department concurs with the following regarding the current capacity of the existing Lakeside District wastewater treatment facility.

1. Per DEQ-2 Section 11.243.a. the district provided supporting documentation to show that the existing connections in the district produce wastewater at a rate of 162 gallons per day per EDU. The district has proposed to use a value of 230 gallons per day per EDU for future capacity allocation.

2. The capacity of the treatment system is limited by the storage lagoons. Based on water balance calculations performed, the storage lagoons have a capacity of 316,500 gallons per day.

3. Since the storage lagoons are predominantly used to store treated wastewater when land application cannot be performed, the capacity must be based on winter inflows to the plant. Based on monthly influent data provided by the district for 2018 through 2024, the average influent for the months of October through March is 217,543 gallons per day. To maintain conservatism and consistency with previous methodology, the maximum winter flow rate for the period provided will be used as the existing system winter influent flow rate. In 2023, winter inflows to the plant were 228,797 gallons per day.

4. Based on the current storage lagoon capacity, and current winter inflows, the wastewater treatment system has a remaining capacity of 87,703 gallons per day.

5. Per the provided capacity memo, and a per EDU flow rate of 230 gallons per day, the district has current commitments in place of 33,280 gallons per day.

6. Based on the current system inflows and existing commitments, the district has a remaining capacity of 54,423 gallons per day. At 230 gallons per day per EDU, this results in 228 additional EDUs capacity.

The department requests that the district provide a capacity summary follow-up one year after the date of this memo. In that summary, please include the number of active EDUs, average annual influent and winter influent (October – March), and an update on district capacity commitments.

If you have any questions regarding this, please feel free to contact me at (406) 444-5368 or Steven.Lipetzky@mt.gov.

Sincerely,

Steve Lipetzky, PE
DEQ Engineering Bureau

Cc (email): Rodney Olson, General Manager – Lakeside W&S District
Brad Koenig, PE, RPA
Rachel Clark, DEQ
file

Appendix B: MGWPCS Permit

Permit No.: MTX000307

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

AUTHORIZATION TO DISCHARGE UNDER THE
MONTANA GROUND WATER POLLUTION CONTROL SYSTEM

In compliance with Montana Water Quality Act, Title 75, Chapter 5, Montana Code Annotated (MCA) and the Administrative Rules of Montana (ARM) 17.30 Subchapter 5, Subchapter 7, and Subchapter 10 *et seq.*,

Lakeside County Water & Sewer District

is authorized to discharge from **Lakeside County Water & Sewer District (LCWSD) Rapid Infiltration System**; Township 27N, Range 21W, Section 11N; Flathead County; to receiving waters, **Class I ground water,** in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein. Authorization for discharge is limited to those outfalls specifically listed in the permit. The numeric effluent limits, water quality standards, and special conditions specified herein support the protection of the affected receiving water.

This permit shall become effective: **June 1, 2025.**

This permit and the authorization to discharge shall expire at midnight, **May 31, 2030.**

FOR THE MONTANA DEPARTMENT OF
ENVIRONMENTAL QUALITY

Tatiana Davila, Chief
Water Protection Bureau

Issue Date: 04/28/2025

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I. EFFLUENT LIMITS, MONITORING REQUIREMENTS & OTHER CONDITIONS

A. Description of Discharge Points and Mixing Zones

The authorization to discharge provided under this permit is limited to the outfalls specially designated below as discharge locations. Discharges at any location not authorized under a MGWPCS permit is a violation of the Montana Water Quality Act and could subject the person(s) responsible for such discharge to penalties under the Act. Knowingly discharging from an unauthorized location or failing to report an unauthorized discharge within a reasonable time from first learning of an unauthorized discharge could subject such person to criminal penalties as provided under Part 75-5-632 of the Montana Water Quality Act.

Outfall	Description
001	**Location:** Rapid infiltration basin: 48.114901° North Latitude and 114.225956° West Longitude; Township 27 North, Range 21 West, Section 11 North; Flathead County. **Mixing Zone:** The Department authorizes a source specific ground water mixing zone (305 foot length, 15 foot depth, radially around infiltration basin) for nitrogen. **Treatment Works:** A wastewater treatment plan utilizing sequencing batch reactor technology with biochemical nutrient reduction.
002	**Location:** Rapid infiltration basin: 48.112962° North Latitude and 114.225929° West Longitude; Township 27 North, Range 21 West, Section 11 North; Flathead County. **Mixing Zone:** The Department authorizes a source specific ground water mixing zone (305 foot length, 15 foot depth, radially around infiltration basin) for nitrogen. **Treatment Works:** A wastewater treatment plan utilizing sequencing batch reactor technology with biochemical nutrient reduction.
003	**Location:** Rapid infiltration basin: 48.10735° North Latitude and 114.223019° West Longitude; Township 27 North, Range 21 West, Section 11 North; Flathead County.

Mixing Zone: The Department authorizes a source specific ground water mixing zone (305 foot length, 15 foot depth, radially around infiltration basin) for nitrogen.

Treatment Works: A wastewater treatment plan utilizing sequencing batch reactor technology with biochemical nutrient reduction.

B. Effluent Limitations and Prohibitions

Upon the effective date of the permit and lasting until the term of the permit; the quality of effluent discharged must, as a minimum, meet the limitations set forth in Table 1.

Table 1: Final Effluent Limitations

Outfall	Parameter	Units	Quarterly Average	Annual Average
001	Nitrogen, Total (as N)	lbs/day	5.4	-
	Phosphorus, Total (as P)	lbs/year	-	291
002	Nitrogen, Total (as N)	lbs/day	4.3	-
	Phosphorus, Total (as P)	lbs/year	-	337
003	Nitrogen, Total (as N)	lbs/day	4.5	-
	Phosphorus, Total (as P)	lbs/year	-	-

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

C. Effluent Monitoring and Reporting Requirements

- Samples representative of effluent quality must be collected after the secondary treatment system but prior to the splitter valve that sends effluent to the different RIBs.
  - EFF-00A: Effluent samples representative of all outfalls.
  - EFF-001: Reported load-based parameters from Outfall 001 (RIB #1)
  - EFF-002: Reported load-based parameters from Outfall 002 (RIB #2)
  - EFF-003: Reported load-based parameters from Outfall 003 (RIB #3)

- Effluent samples must be representative of the nature of the monitored discharge.

- Effluent sampling requirements are listed in Table 2. The required sample type, sampling frequency, reporting requirements, and reporting frequency is listed in Table 2.

- Wastewater samples must be collected and reported if the respective outfall was active at any time during each monitoring period.

- Parameter analytical methods must be in accordance with the Code of Federal Regulations, Title 40, Part 136, unless specified or otherwise approved by the Department.

- Submittal of electronic discharge monitoring reports (DMRs) are required regardless of the operational status of the facility. The reporting of no discharge is allowed only if discharge or overflow did not occur at any time during the respective monitoring period. Bench records need to support this activity status.

- Effluent flow rate measurements must be collected from the splitter that divides wastewater between the RIBs and irrigation ponds. One effluent flow meter will capture effluent flows to all three RIB cells.
  - FM-001: Reported flows to Outfall 001 (RIB #1)
  - FM-002: Reported flows to Outfall 002 (RIB #2)
  - FM-003: Reported flows to Outfall 003 (RIB #3)

- Effluent flow rate measurements must be representative of the volume of the monitored discharge.

- Effluent flow monitoring and reporting requirements are listed in Table 2.

Table 2: Influent and Effluent Monitoring and Reporting Requirements

Analyte/Measurement	Monitor Location	Units	Sample Type[1]	Minimum Sample Frequency	Reporting Requirements[1][2]	Report Frequency
Escherichia coli Bacteria	INF-00A EFF-00A	CFU/100ml	Grab	1/Month	Monthly Average[3]	Monthly
Flow Rate, Effluent[4]	FM-001 FM-002 FM-003	gal/day	Contin-uous	Contin-uous	Daily Maximum Monthly Average[5]	Monthly
	FM-001 FM-002 FM-003	gal/month	Contin-uous	Contin-uous	Monthly Total	Monthly
	FM-001 FM-002 FM-003	gal/year	Contin-uous	Contin-uous	Annual Total	Annually[9]
Nitrogen, Nitrite+Nitrate [as N]	INF-00A EFF-00A	mg/L	Grab	1/Month	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Ammonia [as N]	INF-00A EFF-00A	mg/L	Grab	1/Month	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Kjeldahl (TKN)[as N]	INF-00A EFF-00A	mg/L	Grab	1/Month	Daily Maximum Monthly Average	Monthly
Nitrogen, Total [as N][6]	INF-00A EFF-00A	mg/L	Calculate	1/Month	Daily Maximum Monthly Average	Monthly
	EFF-001 EFF-002 EFF-003	lbs/day[7]	Calculate	1/Month	Daily Maximum Monthly Average	Monthly
Phosphorus, Total [as P]	INF-00A EFF-00A	mg/L	Grab	1/Month	Daily Maximum Monthly Average	Monthly
	EFF-001	lbs/day[7]	Calculate	1/Month	Monthly Average	Monthly
	EFF-002 EFF-003	lbs/year[8]	Calculate	1/Month	Annual Average	Annually[9]

Footnotes:

See Section 1.C of the Permit for a description of the different monitoring locations.

CFU = Colony Forming Units

If no discharge occurs throughout the reporting period, "no discharge" shall be recorded on the wastewater Discharge Monitoring Report (DMR) report forms.

Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above or within a deviation authorized by DEQ.

(1) See definitions in Part V of the permit unless defined within this table or by a permit condition.

(2) Monthly Average: The average of all individual daily concentrations (mg/L) analyzed during the monthly reporting period.

(3) The geometric mean must be reported if multiple samples are taken during a reporting period.

(4) Requires recording device and/or totalizing meter. Equipment must be capable of recording daily, quarterly, and annual effluent volumes.

(5) Monthly Average Flows: determine total flows (gal/month) that occurred during the month reporting period. Divide total flow by the number of calendar days in the monthly reporting period to get a unit of daily flow (gal/day).

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

(7) Monthly Load Calculation. Determine concentration (mg/L): use the average of all individual daily concentrations (mg/L) analyzed during the monthly reporting period. Determine totalized monthly flows (gal/month): total flow that occurred during the monthly reporting period. Convert to a daily flow average (gal/day): divide the total quarterly flow (gal/month) by the total calendar days (days) of the monthly reporting period. Calculate monthly load (lbs/day): concentration (mg/L) x flow (gal/day) x $[8.34 \times 10^{-6}]$.

(8) Annual Load Calculation. Determine concentration (mg/L): use the average of all reported daily concentrations (mg/L) reported during the annual reporting period. Determine totalized annual flows (gal/year): total flow that occurred during the annual reporting period. Convert to daily flows (gal/day): divide the total annual flow (gal/year) by the total calendar days (days) of the reporting annual period. Calculate annual load (lbs/year): = concentration (mg/L) x flow (gal/day) x $[8.34 \times 10^{-6}]$ x 365 (days/year).

(9) Annual average load and annual flows shall be reported (DMR) on an annual basis (due January 28 each year of the permit cycle).

D. Special Conditions – Ground Water Monitoring and Reporting Requirements

- Ground Water Monitoring and Reporting is required for monitoring wells: MW-1, MW-2, MW-3, MW-4, MW-5, MW-6, and MW-7. These wells must be individually sampled at the frequency and with the type of measurement respectively listed in Table 4. Samples must include, but not be limited to, the respective parameters listed in Table 4 for each listed monitoring well. The reporting requirements and reporting frequencies are listed in Table 4.

- Monitoring well sampling and reporting requirements are listed in Table 3.

- Monitoring and reporting must be completed in accordance with a Ground Water Monitoring, Analysis, and Reporting Operational Manual. The manual shall provide for the consistent identification, development, monitoring, sampling, calculating, recording, and reporting of each monitoring well.

- Monitoring wells must not be sampled until after they are properly purged. The purge volumes and procedures for each well must be determined within the Ground Water Monitoring, Analysis, and Reporting Operational Manual. Monitoring well development records need to be maintained on-site that document the proper development of the wells for each monitoring event.

- The permittee shall document the methodology and equipment used to sample monitoring wells for each event. Self-monitoring records shall be maintained on-site.

- Monitoring must take place even when the facility is nonoperational.

- Analytical methods must be in accordance with CFR Title 40, Part 136, unless specified or otherwise approved by the Department.

- If any of the monitoring wells are abandoned, destroyed, decommissioned or non-viable; or are no longer able to be sampled due to fluctuations in the ground water table; the permittee shall install (or rehab) a new well to replace the abandoned, destroyed, decommissioned, or non-viable well.

- All wells, piezometers, and boreholes that can create preferential subsurface flows and are located in or near the drainfield shall be properly plugged and abandoned prior to construction of the drainfield. Shallow monitoring of the vadose zone for operation and maintenance purposes may be approved by the Department.

Table 3: Ground Water Monitoring and Reporting Requirements

Analyte/Measurement	Monitor Location	Units	Sample Type[1]	Minimum Sampling Frequency	Reporting[2] Requirements	Report Frequency
Chloride [as Cl]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	mg/L	Grab	1/Month	Monthly Average	Monthly
Escherichia coli Bacteria	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	CFU/100ml	Grab	1/Month	Monthly Average[3]	Monthly
Nitrogen, Nitrite + Nitrate [as N]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total Ammonia [as N]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total Kjeldahl (TKN)[as N]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total [as N][4]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	mg/L	Calculate	1/Month	Monthly Average	Monthly
Specific Conductivity @ 25°C	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	µS/cm	Grab or Instant-aneous	1/Month	Monthly Average	Monthly
Temperature	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	°C	Instant-aneous	1/Month	Monthly Average	Monthly
Static Water Level (SWL)[5]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	ft-bmp	Instant-aneous	1/Month	Monthly Average	Monthly

Well Depth[5]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	ft-bmp	Instant-aneous	1/Month	Monthly Average	Monthly

Footnotes:
CFU = Colony Forming Units
ft-bmp = feet below measuring point
Monitoring for MW-1, MW-2, MW-3, and MW-4 commences upon the permit effective date.
Monitoring for MW-6 and MW-7 shall commence on the Completion Date listed in the Compliance Table.
A description of each monitoring well can be found in **Table 2** of the Fact Sheet.
At no time shall the permittee mark or state "no discharge" on any monitoring well DMR form.
Each monitor well to be individually monitored and sampled for the analyte and measurements respectively listed.
If any monitoring well(s) are abandoned, destroyed or decommissioned, or are no longer able to be sampled due to fluctuations in the ground water table; the permittee shall install a new well to replace the abandoned, destroyed, decommissioned, or non-viable well(s).
Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above.
Samples must not be collected until after the well casing is properly purged as determined by the DEQ approved Ground Water Monitoring Operational Manual.
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) See definitions in Part V of the permit unless defined within this table or by a permit condition.
(2) Monthly Average: The average of all individual daily concentrations (mg/L) analyzed during the monthly reporting period.
(3) The geometric mean must be reported if more than one sample is taken during a reporting period.
(4) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
(5) Measuring point (point of reference) for SWL measurements shall be from top of inner casing or as established by the Operational Manual and measured to within 1/100th of one foot.

E. Special Conditions – Other

1. **Septage Handling and Treatment Operation Manual**
   The permittee shall use best management practices (BMPs) in developing standard operating procedures (SOPs) for handling and treating high-strength influent from septage pumpers. The manual needs to be site-specific and maintained at the facility at all times. The manual must include procedures for:
   - Handling and treating the septage.
   - Ensuring that there are no unexpected wastes in the septage, including: industrial wastes, chemicals or chemical dumping, or any other wastes that may be injurious to the treatment system and/or receiving water.
   - Equalizing the high-strength septage into the residential-strength municipal waste stream.
   - General safety for operational personnel.

   The completion and submittal date for the manual is listed in Table 4. The manual must be reviewed and approved by DEQ prior to implementation. Influent monitoring requirements are detailed in Table 2. All subsequent amended manuals must be reported to DEQ within 30 calendar days.

2. **Wastewater Sampling, Analysis, and Reporting Operational Manual – Community System**
   The permittee shall use BMPs in developing SOPs for sampling, analyzing, and reporting wastewater characteristics from the wastewater system. The

manual needs to be site-specific and result in monitoring and reporting that is representative of the nature of the wastewater streams. The manual must be used as a guide in:

- Equipment calibration.
- Preparing and collecting wastewater influent (INF-00A) and effluent (EFF-00A) wastewater samples.
- Analyte calculations (Table 2).
- Recording and reporting wastewater characteristics.
- Recording and reporting wastewater flows (FM-001, FM-002, FM-003)
- Calculating and reporting wastewater loads (EFF-001, EFF-001, EFF-003).

The completion and submittal date for the manual is listed in Table 4. The manual must be reviewed and approved by DEQ prior to implementation. The permittee shall maintain a copy of the operational manual, sampling, and calibration records at the facility at all times. Wastewater monitoring requirements are detailed in Table 2. All subsequent amended manuals must be reported to DEQ within 30 calendar days.

3. **Ground Water Monitoring, Analysis, and Reporting Operational Manual**
The permittee shall use Best Management Practices (BMPs) in developing SOPs (Standard Operating Procedures) for monitoring and reporting ground water characteristics. These SOPs must be fully described in an SOP manual provided to DEQ. The SOP manual must be site-specific and result in monitoring and reporting that is representative of the nature of the shallow ground water bearing zones. The manual must provide for consistent identification, development, monitoring, sampling, calculating, recording, and reporting of the monitoring wells. The manual must provide for guidance on: determining and documenting dry-well occurrences; and determining well viability.

   The completion and submittal date of the manual is listed in Table 4. The manual must be reviewed and approved by DEQ prior to implementation. The permittee shall maintain a copy of the manual, monitoring well development records, dry well occurrence records, sampling records, and calibration records at the facility at all times. All subsequent amended manuals must be reported to DEQ.

4. **Monitoring Well Installation Plan**
Submit for approval an installation plan for a minimum of two additional monitoring wells. At least one monitoring well (MW-6) must be built on or near the downgradient boundary of the proposed mixing zone between RIB #2 and Pond 4. At least one monitoring well (MW-7) must be built on or near the downgradient boundary of the proposed mixing zone extending from RIB #3 in the direction of Pond 7. Well locations should take setbacks into account.

The well must be constructed to be representative of ground water occurring in the top twenty feet of the shallow aquifer or as otherwise approved.

The plan needs to be approved prior to installation of the monitoring well(s). All monitoring wells must be secured, maintained, labeled, and monitored for long-term viability. The completion and submittal date of the plan is listed in Table 4.

The installation date for the additional monitoring wells is also provided in Table 4. A post construction report documenting lithology, drilling and construction techniques, well construction information and diagram, surveyed spatial location and measuring point is due two months after installation. All new wells must be reported to the Montana Bureau of Mining and Geology's Ground Water Information Center.

Installation and post construction reports are required for all subsequent well installation and modification actions.

DEQ recognizes the challenges faced with well installation efforts in the field. Upon approval, modification to the plan can be made when challenging field conditions occur.

5. **Monitoring Well Viability**
   The permittee shall monitor and collect representative ground water samples from the shallow water bearing zones. If any of the monitoring wells are abandoned, destroyed, decommissioned, or non-viable; or are no longer able to be monitored due to obstructions or fluctuations in the ground water table; the permittee shall rehab the non-viable well or replace with the installation of a new well.

6. **Monitoring Well Replacement, Rehabilitation, and Abandonment**
   If for any reason a monitoring well needs to be replaced, rehabilitated, or abandoned, the permittee shall submit a plan to DEQ for approval prior to the action taking place. The plan must document existing site-specifics and the reasoning behind the proposed action. The plan must detail the specific steps to take place during deconstruction, drilling, workover, and/or construction of the respective wells.

   Written permission from DEQ is needed prior to the abandonment of any monitoring well. At minimum, monitoring well abandonment activities must be done in accordance with ARM 36.21.810(2-5). If the monitoring well is located in or around any collection, storage, treatment, disposal, land application, and/or mixing zone workings (or similar) additional actions may be required to prevent preferential subsurface flows, cross contamination, and to mitigate against any unauthorized wastewater releases. All new well installations must have detailed drilling, lithology, geospatial, and well

construction information. A follow-up report summarizing all actions and details must be submitted to DEQ within 30 calendar days.

F. Compliance Schedule

Table 4: Compliance Schedule

Action	Frequency	Completion Date of Action	Reporting Due Date
Develop and implement a **Septage Handling and Treatment Operation Manual**.	Single event	Within one (1) year of the effective date of the permit or upon finalizing the WWTP design, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Develop and implement a **Wastewater Sampling, Analysis, and Reporting Operation Manual.**	Single event	Within one (1) year of the effective date of the permit or upon finalizing the WWTP design, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Develop and implement a **Ground Water Monitoring, Analysis, and Reporting Operational Manual.**	Single event	Within one (1) year of the effective date of the permit or upon finalizing the WWTP design, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Complete a **Monitoring Well Installation Plan**.	Single event	Within one (1) year of the effective date of the permit or upon finalizing the WWTP design, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Complete the installation of the monitoring well(s).	Single event	Within two (2) years of the effective date of the permit or prior to finalizing the WWTP construction, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Commence monitoring and reporting of the newly installed monitoring well(s).	Single event	Within two (2) years of the effective date of the permit or prior to commencing discharge, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Complete a **Monitoring Well Installation Report**.	Single event	Within two (2) years of the effective date of the permit or prior to commencing discharge, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Complete a **Well Abandonment Report.**	Single event	Within two (2) years of the effective date of the	Due on or before the 28th day of the month

		permit or prior to finalizing the WWTP construction, whichever is sooner.	following the completion date.

II. MONITORING, RECORDING AND REPORTING REQUIREMENTS

A. Representative Sampling

Samples taken in compliance with the monitoring requirements established under Part I of the permit must be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements must be representative of the volume and nature of the monitored discharge.

B. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under Part 136, Title 40 of the Code of Federal Regulations, unless other test procedures have been specified in this permit. All flow-measuring and flow-recording devices used in obtaining the data submitted in self-monitoring reports must indicate values within 10 percent of the actual flow being measured.

C. Penalties for Tampering

The Montana Water Quality Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate, any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $25,000, or by imprisonment for not more than six months, or by both.

D. Reporting

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 occurs during the entire reporting period, "No Discharge" must be reported within the respective DMR. Monitoring reports must be electronically signed and certified in accordance with Part IV.G. "Signatory Requirements" of this permit.

All other reports (e.g. special conditions, compliance actions) must be submitted in accordance to the reporting requirements of Part I of this permit. Unless otherwise approved by DEQ, all reports required herein, must be signed and certified in accordance with Part IV.G. "Signatory Requirements" of this permit and submitted to DEQ at the following address:

Montana Department of Environmental Quality
Water Protection Bureau
PO Box 200901
Helena, Montana 59620-0901

E. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any Compliance Schedule of this permit shall be submitted to the Department in either electronic or paper format and be postmarked no later than 14 days following each schedule date unless otherwise specified in this permit.

F. Additional Monitoring by the Permittee

If the permittee monitors any additional parameters or any parameter more frequently than required by this permit using approved analytical methods as specified in this permit, the results of this monitoring shall be included in the analysis and reporting of the data submitted in the Discharge Monitoring Report. Such increased frequency shall also be indicated.

G. Records Contents

Records of monitoring information must include:

1. The date, exact place, and time of sampling or measurements;

2. The initials or name(s) of the individual(s) who performed the sampling or measurements;

3. The date(s) analyses were performed;

4. The time analyses were initiated;

5. The initials or name(s) of individual(s) who performed the analyses;

6. References and written procedures, when available, for the analytical techniques or methods used; and

7. The results of such analyses, including the bench sheets, instrument readouts, computer disks or tapes, etc., used to determine these results.

H. Retention of Records

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report, or application. This period may be extended by the request of the Department at any time. Data collected on site, copies of Discharge Monitoring Reports, and a copy of this MGWPCS permit must be maintained on site during the duration of activity at the permitted location.

I. Twenty-four Hour Notice of Noncompliance Reporting

1. The permittee shall report any serious incidents of noncompliance affecting the environment as soon as possible, but no later than twenty-four (24) hours from the time the permittee first became aware of the circumstances. The report shall be made to the Water Protection Bureau at (406) 444-5546 or the Office of Disaster and Emergency Services at (406) 324-4777. The following examples are considered serious incidents:

   a. Any noncompliance which may seriously endanger health or the environment; or

   b. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part III.G. of this permit, "Bypass of Treatment Facilities").

2. A written submission shall also be provided within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times;

   c. The estimated time noncompliance is expected to continue if it has not been corrected; and

   d. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

3. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the Water Protection Bureau, by phone, at (406) 444-5546.

4. Reports must be submitted to the addresses in Part II.D. of this permit, "Reporting of Monitoring Results."

J. Other Noncompliance Reporting

Instances of noncompliance not required to be reported within 24 hours must be reported at the time that monitoring reports for Part II.D. of this permit are submitted. The reports must contain the information listed in Part II.I.2. of this permit.

K. Inspection and Entry

The permittee shall allow the head of the Department, the Director, or an authorized representative thereof, upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance, any substances or parameters at any location.

III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Montana Water Quality Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application. The permittee shall give the Department advance notice of any planned changes at the permitted facility or of an activity which may result in permit noncompliance.

B. Penalties for Violations of Permit Conditions

The Montana Water Quality Act provides that any person who violates a permit condition of the Act is subject to civil or criminal penalties not to exceed $25,000 per day or one year in prison, or both, for the first conviction, and $50,000 per day of violation or by imprisonment for not more than two years, or both, for subsequent convictions. MCA 75-5-611(9)(a) also provides for administrative penalties not to exceed $10,000 for each day of violation and up to a maximum not to exceed $100,000 for any related series of violations. Except as provided in Part III.G. of this permit, "Bypass of Treatment Facilities," nothing in this permit shall be construed to relieve the permittee of the civil or criminal penalties for noncompliance.

C. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit. However, the permittee shall operate, as a minimum, one complete set of each main line unit treatment process whether or not this process is needed to achieve permit effluent compliance.

F. Removed Substances

Collected screenings, grit, solids, sludge, or other pollutants removed in the course of treatment must be disposed of in such a manner so as to prevent any pollutant from entering any waters of the state or creating a health hazard.

G. Bypass of Treatment Facilities

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts III.G.2. and III.G.3. of this permit.

2. Notice:

   a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible, at least 10 days before the date of the bypass.

   b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required under Part II.I. of this permit, "Twenty-four Hour Reporting."

3. Prohibition of bypass:

   a. Bypass is prohibited and the Department may take enforcement action against a permittee for a bypass, unless:

      1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

      2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

      3) The permittee submitted notices as required under Part III.G.2. of this permit.

   b. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the three conditions listed above in Part III.G.3.a. of this permit.

IV. GENERAL REQUIREMENTS

A. Planned Changes

The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

1. The alteration or addition could significantly change the nature or increase the quantity of pollutant discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit; or

2. There are any planned substantial changes to the existing sewage sludge management practices of storage and disposal. The permittee shall give the Department notice of any planned changes at least 180 days prior to their implementation.

B. Anticipated Noncompliance

The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

C. Permit Actions

This permit may be revoked, modified and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

D. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee shall apply for and obtain a new permit. The application must be submitted at least 180 days before the expiration date of this permit.

E. Duty to Provide Information

The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for revoking, modifying and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Department, upon request, copies of records required to be kept by this permit.

F. Other Information

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Department, it shall promptly submit such facts or information with a narrative explanation of the circumstances of the omission or incorrect submittal and why they weren't supplied earlier.

G. Signatory Requirements

All applications, reports or information submitted to the Department must be signed and certified.

1. All permit applications shall be signed as follows:

   a. For a corporation: by a responsible corporate officer:

   b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

   c. For a municipality, State, Federal, or other public agency: by either a principal executive officer or ranking elected official.

2. All reports required by the permit and other information requested by the Department shall be signed by a person described above or by a duly authorized representative of that person. A person is considered a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Department; and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters (a duly authorized representative may thus be either a named individual or an individual occupying a named position).

3. Changes to authorization. If an authorization under Part IV.G.2. of this permit is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part IV.G.2. of this permit must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.

4. Certification. Any person signing a document under this section shall make the following certification:

   > "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for

gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

H. Penalties for Falsification of Reports

The Montana Water Quality Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction be punished by a fine of not more than $25,000 per violation, or by imprisonment for not more than six months per violation, or by both.

I. Availability of Reports

All reports prepared in accordance with the terms of this permit must be available for public inspection at the offices of the Department and the EPA. Permit applications, permits and effluent data must not be considered confidential and must also be available for public inspection.

J. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Clean Water Act.

K. Property or Water Rights

The issuance of this permit does not convey any property or water rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property, any invasion of personal rights, or any infringement of federal, state or local laws or regulations.

L. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, must not be affected thereby.

M. Transfers

This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Department at least 30 days in advance of the proposed transfer date;

2. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them;

3. The Department does not notify the existing permittee and the proposed new permittee of the intent to revoke or modify and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Part IV.M.2. of this permit; and

4. Required annual and application fees have been paid.

N. Fees

The permittee is required to submit payment of an annual fee as set forth in ARM 17.30.201. If the permittee fails to pay the annual fee within 90 days after the due date for the payment, the Department may:

1. Impose additional fee assessment(s) computed at the rates established under ARM 17.30.201; and

2. Suspend the processing of the application for a permit or authorization or, if the nonpayment involves an annual permit fee, suspend the permit, certificate or authorization for which the fee is required. The Department may lift suspension at any time up to one year after the suspension occurs if the holder has paid all outstanding fees, including all penalties, assessments and interest imposed under this sub-section. Suspensions are limited to one year, after which the permit will be terminated.

O. Reopener Provisions

This permit may be reopened and modified (following proper administrative procedures) to include the appropriate effluent limitations (and compliance schedule, if necessary), or other appropriate requirements if one or more of the following events occurs:

1. Water Quality Standards: The water quality standards of the receiving water(s) to which the permittee discharges are modified in such a manner as to require different effluent limits than contained in this permit; or

2. Water Quality Standards are Exceeded: If it is found that water quality standards or trigger values, excluding mixing zones designated by ARM 17.30.501-518, for parameters included in the permit or others, the department may modify the effluent limits or water management plan.

V. DEFINITIONS

1. **"30-day (and Monthly) Average"** other than for *E. coli* bacteria, means the arithmetic average of all individual daily discharge measurements during a consecutive 30-day period or calendar month, whichever is applicable (see Daily Discharge). The arithmetic average must not include any individual daily measurements collected on days in which discharge did not occur (e.g. flow measurements). Geometric means must be calculated for the *E. coli* bacteria parameter.

2. **"90-day (and Quarterly) Average"** other than for *E. coli* bacteria, means the arithmetic average of all individual daily discharge measurements during a consecutive 90-day period or calendar quarter, whichever is applicable (see Daily Discharge). The arithmetic average must not include any individual daily measurements collected on days in which discharge did not occur (e.g. flow measurements). Geometric means must be calculated for the *E. coli* bacteria parameter.

3. **"180-day (and Six-Month or Semi-Annual) Average"** other than for *E. coli* bacteria, means the arithmetic average of all individual daily discharge measurements collected during a consecutive 180-day period or calendar half-year, whichever is applicable (see Daily Discharge). The arithmetic average must not include any individual daily measurements collected on days in which discharge did not occur (e.g. flow measurements). Geometric means must be calculated for the *E. coli* bacteria parameter.

4. **"Act"** means the Montana Water Quality Act, Title 75, chapter 5, MCA.

5. **"Annual Average Load"** means the arithmetic mean of all calculated individual daily average loads (lbs/day) recorded during the calendar year, multiplied by 365 (days/year) for a monitored parameter.

6. **"Annual Maximum Limit"** means the maximum allowable discharge of a parameter during a calendar year (or defined 365 day period).

7. **"Best management practices" ("BMPs")** means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of state waters. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

8. **"BOD_5"** means the five-day measure of the biochemical oxygen demand parameter.

9. **"Bypass"** means the intentional diversion of waste streams from any portion of a treatment facility.

10. **"Composite Sample"** means a sample that consists of two or more discrete aliquots. Composite samples must be flow proportioned. The composite sample must, as a minimum, contain at least four (4) samples collected over the compositing period. Unless otherwise specified, the time between the collection of the first sample and the last sample must not be less than six (6) hours nor more than 24 hours. Acceptable methods for preparation of composite samples are as follows:

    a. Constant time interval between samples, sample volume proportional to flow rate at time of sampling;

    b. Constant time interval between samples, sample volume proportional to total flow (volume) since last sample. For the first sample, the flow rate at the time the sample was collected may be used;

    c. Constant sample volume, time interval between samples proportional to flow (i.e. sample taken every "X" gallons of flow); and,

    d. Continuous collection of sample, with sample collection rate proportional to flow rate.

11. **"CFR"** means Code of Federal Regulations.

12. **"CFU"** means Colony Forming Units.

13. **"Continuous"** means a measurement occurring without interruption throughout the operating hours of the facility, except for infrequent shutdowns for maintenance process changes, or other similar activities.

14. **"Daily Discharge"** means the discharge of a parameter (or pollutant) measured during a calendar day (or any 24-hour period that reasonably represents the calendar day for purposes of sampling). For parameters with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the parameter discharged over the day. For parameters with limitations expressed in other units of measurement, the daily discharge is calculated as the arithmetic average of all measurements (or samples) collected over the day.

15. **"Daily Maximum"** means the highest individual measured daily value occurring in a defined reporting period (see Daily Discharge).

16. **"Daily Maximum Limit"** means the maximum allowable discharge of a parameter for any calendar day (see Daily Discharge).

17. **"DEQ"** means the Montana Department of Environmental Quality.

18. **"Department"** means the Montana Department of Environmental Quality.

19. **"Discharge"** means the injection, deposit, dumping, spilling, leaking, placing, or failing to remove any pollutant so that it or any constituent thereof may enter into state waters, including ground water.

20. **"Grab Sample"** means a sample which is taken from a waste stream on a one-time basis without consideration of flow rate of the effluent or without consideration for time.

21. **"Instantaneous"** means a single reading, observation, or measurement.

22. **"Load Limits"** are mass-based discharge limits expressed in units such as lbs/day.

23. **"Mixing Zone"** means a limited area of a surface water body or ground water bearing zone where initial dilution of a discharge takes place and where certain water quality standards may be exceeded.

24. **"Nondegradation"** means the prevention of a significant change in water quality that lowers the quality of high quality water for one or more parameters. Also, the prohibition of any increase in discharge that exceeds the design capacity or limitations established under or determined from a permit or approval issued by the Department prior to April 29, 1993.

25. **"RRV"** means Required Reporting Values (DEQ Circular 7).

26. **"Severe Property Damage"** means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

27. **"TSS"** means the total suspended solids parameter.

28. **"Total Inorganic Nitrogen (TIN)"** means the arithmetic sum of Nitrate + Nitrite and Ammonia.

29. **"Total Nitrogen (TN)"** means the arithmetic sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.

Appendix C: WET Groundwater Analysis

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

PERMIT FACT SHEET
Montana Ground Water Pollution Control System (MGWPCS)

Permittee:	Lakeside County Water & Sewer District
Permit Number:	MTX000307
Permit Type:	Domestic wastewater
Application Type:	New
Facility Name:	LCWSD Rapid Infiltration System
Facility Location:	T 27N, R 21W, S 11N Flathead County Latitude: 48.1127610° Longitude: -114.225111°
Facility Address:	Wiley Dike Rd, Kalispell, MT 59901
Facility Contact:	Rodney Olson, General Manager
Treatment Type:	Advanced
Receiving Water:	Class I Ground Water
Number of Outfalls:	One (for fee purposes only)
Outfall / Type:	001 / Rapid infiltration basin #1 002 / Rapid infiltration basin #2 003 / Rapid infiltration basin #3
Effluent Type:	Domestic strength wastewater
Mixing Zone:	Source-specific
Effluent Limit Type:	WQBEL
Effluent Limits:	001 Total nitrogen: 5.4 lbs/day Total phosphorus: 291 lbs/year 002 Total nitrogen: 4.3 lbs/day Total phosphorus: 337 lbs/year 003 Total nitrogen: 4.5 lbs/day
Flow Rate:	Design maximum: 200,000 gpd Design average: 200,000 gpd
Wastewater sampling:	Monthly: effluent, influent, and flows.
Ground water sampling:	Monthly: MW-1, MW-2, MW-3, MW-4, MW-5, MW-6
Fact Sheet Date:	July 31, 2024
Prepared by:	Melinda Horne

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1.0 PERMIT INFORMATION

The following fact sheet outlines the basis for issuing a new Montana Ground Water Pollution Control System (MGWPCS) wastewater discharge permit to Lakeside County Water and Sewer District (Permittee) for the Lakeside County Water and Sewer District Rapid Infiltration System. 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.

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

1.1 APPLICATION

DEQ received an application for the permit on August 8, 2023 with sufficient fees. DEQ reviewed the submittal and sent a Notice of Deficiency on September 8, 2023. The applicant submitted a final report on May 9, 2024. DEQ determined the application to be complete on May 13, 2024.

1.2 SEWER DISTRICT

Lakeside County Water and Sewer District (LCWSD) formed in 1988 and provides sewage disposal for the town of Lakeside, Montana and surrounding area residents. The collection system is 100% sanitary sewer. LCWSD serves a population of 1860, 810 households, and 18 business connections. The district also operates and maintains four drinking water systems.

The current wastewater treatment system includes lagoon treatment and disposal via land application. The proposed treatment system will replace the lagoons with a mechanical treatment plant and add disposal to ground water in addition to land-applying during the summer months.

2.0 FACILITY INFORMATION

2.1 LOCATION

The LCWSD Rapid Infiltration System is located in the southwest portion of the Flathead Valley close to the town of Somers, between Flathead Lake and the Flathead River (**Figure 1**)

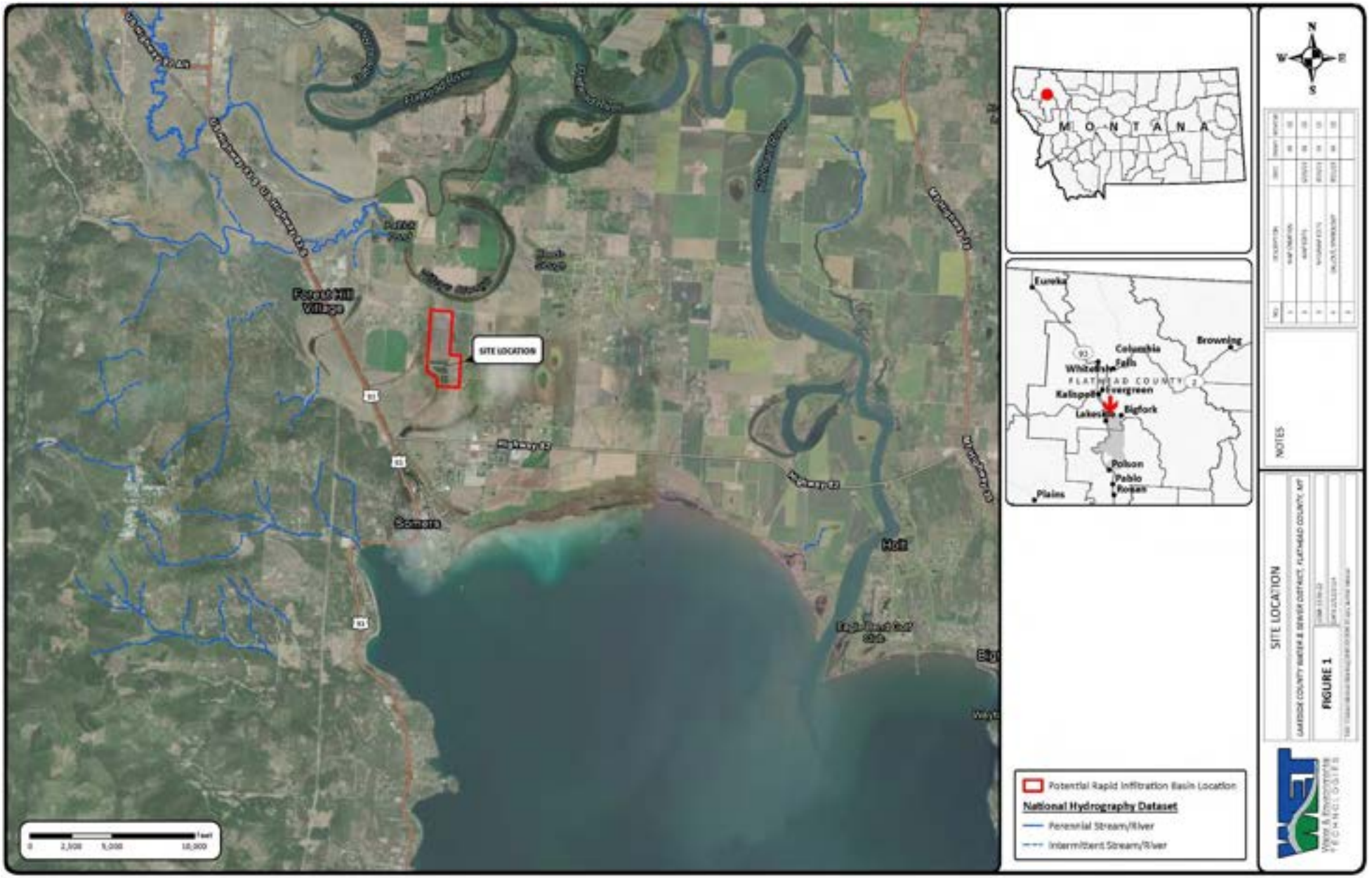

Figure 1: Location of the LCWSD Rapid Infiltration System.

2.2 OPERATIONS

The current wastewater treatment system includes a collection system, lift stations, a seven-mile-long force transmission main from Lakeside to the disposal site, aerated lagoon treatment, and land application disposal.

On March 19, 2024, LCWSD signed an interlocal agreement with Flathead County to accept, treat, and handle wastewater and biosolids from septage pumpers. This engineering design was combined with existing plans to update LCWSD's wastewater treatment facility. **Figure 2** displays the geographic locations of the proposed septage unloading facility and wastewater treatment plant, and the existing wastewater treatment facility and land application.

Figure 2: Locations of current and proposed operations.

The septage will be unloaded into the septage receiving facility. It will be mechanically screened and have grit removal prior to being pumped to an aerated flow equalization tank, where it can be inspected and be probed for water chemistry. If the septage is found to be irregular, it will be pumped back into a truck and not go to the WWTP. Industrial wastes will not be accepted.

Septage will be mixed into the county's municipal wastewater at a fixed rate to maintain a steady state. Influent samples will be taken at this point after mixing. It will then flow into the facility's headworks building, where it will undergo more screening and grit removal. From there, the combined waste flows will go into the secondary wastewater treatment facility, which will have a design treatment capacity of 900,000 gpd. The wastewater treatment facility will be a mechanical treatment plant utilizing sequencing batch reactor technology with biochemical nutrient reduction capabilities.

Following treatment, the effluent will be split into two paths. In the summer months, effluent will be pumped to a storage pond and land applied at the existing land application site and possibly other sites. Land application is regulated by DEQ's engineering department and DEQ Circular 2. Year round, effluent will also be pumped to the rapid infiltration basins (RIBs) proposed. Effluent will be applied to one RIB at

a time until it meets capacity, and then a splitter valve will automatically shut flow to that RIB and send the effluent to the next RIB. The treatment plant's sludge will be dewatered with a press; the resulting water will be rerouted into the WWTP and the dewatered sludge will be disposed of at a landfill.

System operations are summarized below in **Table 1**. **Figure 3** displays the layout and dimensions of the proposed RIBs. **Figure 4** displays the outfall locations. **Figure 5** is a line drawing of the collection, treatment, and disposal process.

This permitting action is for the disposal of domestic-in-nature, residential strength wastewaters to ground water. The permittee is responsible for ensuring that all effluent accepted is domestic in nature, and properly equalized to residential strength. The permittee is required to develop and submit an operations manual for receiving and handling septage (**Section 7.1**). The permittee must comply with the effluent limits and general conditions of the permit.

Table 1: Operations Summary

Sources

Contributing Sources of Wastewater: Domestic-in-Nature, Residential Strength
Number of connections: 18 businesses (listed below) and 810 households

Wastewater connection SIC Code	Average Daily Flow (gpd)	Wastewater connection SIC Code	Average Daily Flow (gpd)
Blacktail Grocery 5411	1933	Sliters Hardware 5251	433
Mavericks Bar 5812	1933	Spinnaker Bar & Casino 5812, 7999	1000
Homestead Café 5812	700	Spirit Fire Hotel 7011	5000
Lakeside Business Center 6022, 6531, 2499	400	Tamarack Brew Pub 2082, 5812	7167
Lakeside Dental 8021	133	Treasure State Coffee 5812	300
Lakeside Marina 5812	1567	White Oak 5541	933
Lakeside Mercantile 6531, 5812	267	Youth With a Mission 8249	22167
Lakeside School 8211	767	Short Branch Saloon 5812, 7999	400
Pure West Real Estate 6531	33	FH Gaming 7999, 5541	533

Treatment

Treatment System: Mechanical treatment using sequencing batch reactor technologies with biochemical nutrient reduction capabilities.
Location of System:
Township 27N, Range 21W, Section 11N
Latitude: 48.1127610, Longitude: -114.225111
Flathead County

Sampling/Monitoring

Wastewater System:
Influent sampling:
The influent wastewater sample point will be located after the equalization tank and prior to the drum screens/grit removal tank.

INF-00A: Influent sample representative of all outfalls.

Effluent sampling:

The effluent wastewater sample point will be located after the secondary treatment system but prior to the splitter valve that sends effluent to the different RIBs. The effluent samples are representative of all outfalls.

EFF-00A: Effluent sample representative of all outfalls.

EFF-001: Reported load-based parameters from Outfall 001 (RIB #1)

EFF-002: Reported load-based parameters from Outfall 002 (RIB #2)

EFF-003: Reported load-based parameters from Outfall 003 (RIB #3)

Flow meters:

The effluent flow meter will be located at the splitter that divides wastewater between the RIBs and irrigation ponds. One effluent flow meter will capture effluent flows to all three RIB cells.

FM-001: Reported flows to Outfall 001 (RIB #1)

FM-002: Reported flows to Outfall 002 (RIB #2)

FM-003: Reported flows to Outfall 003 (RIB #3)

The permittee is required to develop and implement a Wastewater Sampling, Analysis, and Reporting Plan for their community system (**Section 7.0**).

Disposal Operation

Outfall 001 - Rapid infiltration basin 1
Method of Disposal: Infiltration/percolation
Design capacity (gpd): 80,000
Location: Township 27N, Range 21W, Section 11N
Latitude: 48.114901, Longitude: -114.225956

Outfall 002 - Rapid infiltration basin 2
Method of Disposal: Infiltration/percolation
Design Capacity (gpd): 60,000
Location: Township 27N, Range 21W, Section 11N
Latitude: 48.112962, Longitude: -114.225929

Outfall 003 - Rapid infiltration basin 3
Method of Disposal: Infiltration/percolation
Design Capacity (gpd): 60,000
Location: Township 27N, Range 21W, Section 11N
Latitude: 48.10735, Longitude: -114.223019

Design Capacity (Total):
Average Daily Flow (gpd): 200,000
Maximum Daily Flow (gpd): 200,000

Figure 3: Facility site layout with monitoring wells and proposed RIBs. The mechanical treatment plant will replace lagoons present.

Figure 4: Outfall locations map.

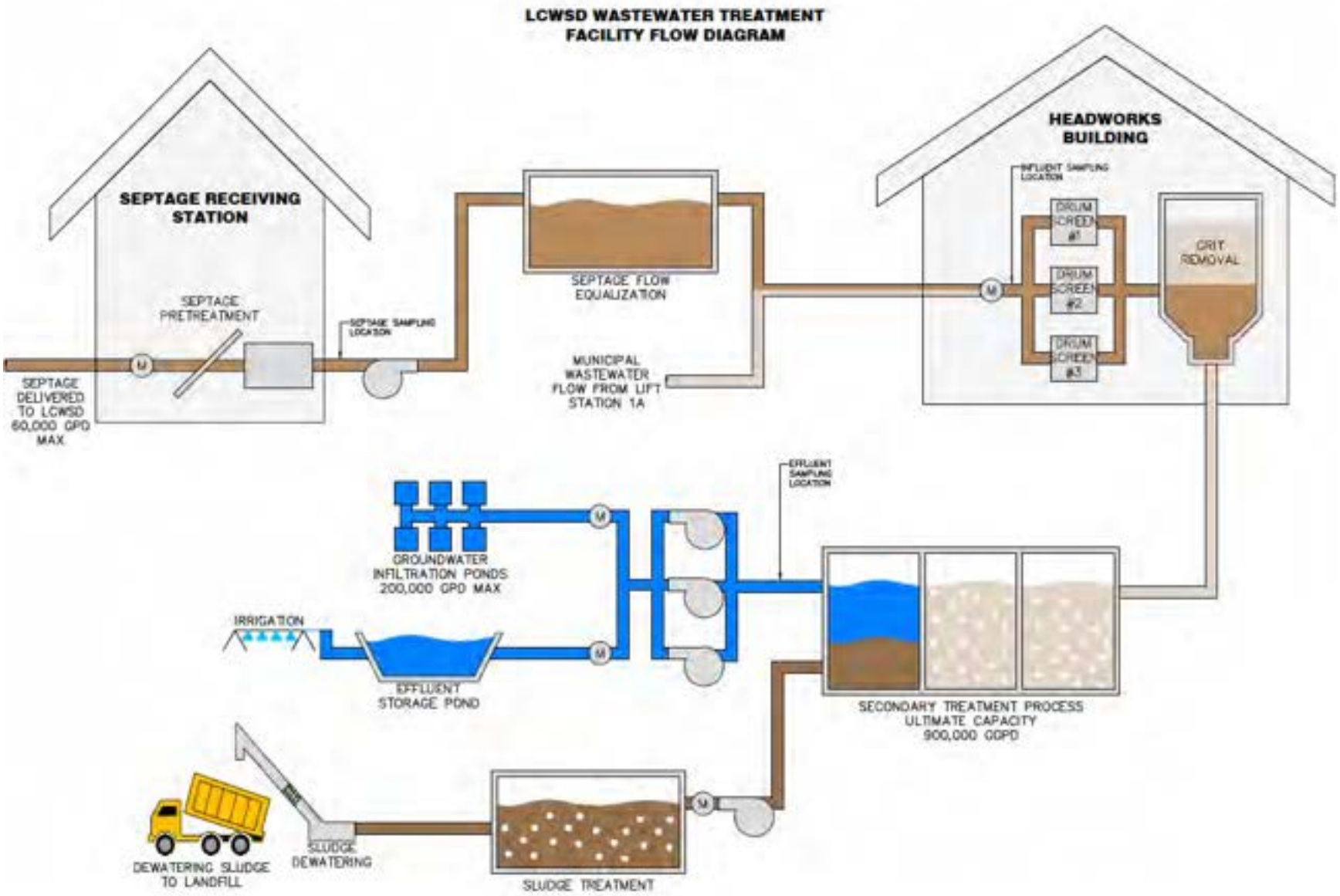

Figure 5: Wastewater treatment system flow diagram with design flow, flow meters (M), and effluent/influent monitoring locations.

2.3 GEOLOGY

The Flathead Valley is located at the southern end of the Rocky Mountain Trench, which extends over 1,000 miles north into the Yukon Territory. The trench formed from extensional tectonics that created a series of closely spaced normal faults along this length, causing a near-continuous valley structure. The Flathead valley is bounded by the normal Swan-Whitefish fault located at the base of the Swan Mountains to the east and the Salish mountains to the west (Harrison et al., 1992).

In the Flathead Valley, the basement is made up of the Belt Supergroup, a huge sequence of metasedamentary rocks 1.4-1.5 billion years in age. The valley fill overlying the basement is thought to be more than 3,000 feet thick in places, comprised of poorly lithified sedimentary rocks ranging from Tertiary to Quaternary in age, and alluvial, fluvial, and glacial in origin (LaFave et al., 2004). A geologic map is provided as **Figure 6A**, with a cross sectional view of the lower Flathead Valley hydrogeologic units in **Figure 6B**.

The facility is located between a large meander in Flathead River and Flathead Lake. In this area, the landscape is marked by ancestral oxbows and flowpaths created by the Flathead River. The landscape and geology show the Flathead River used to flow into the lake near Somers, Montana before migrating eastward as a result of fault movement dropping the eastern side of the basin lower. These processes left behind aggrading fluvial and deltaic deposits (Noble & Sanford, 1986).

At the facility site, five soil borings were drilled and completed as monitoring wells between September 6 and September 8, 2022. The results show poorly graded silty sand between five and 33 to 39 feet below ground surface, which is typical of the deltaic deposits left from the Flathead River flowing into Flathead Lake. See **Appendix A – Attachment B** for more information and the monitoring well drill logs.

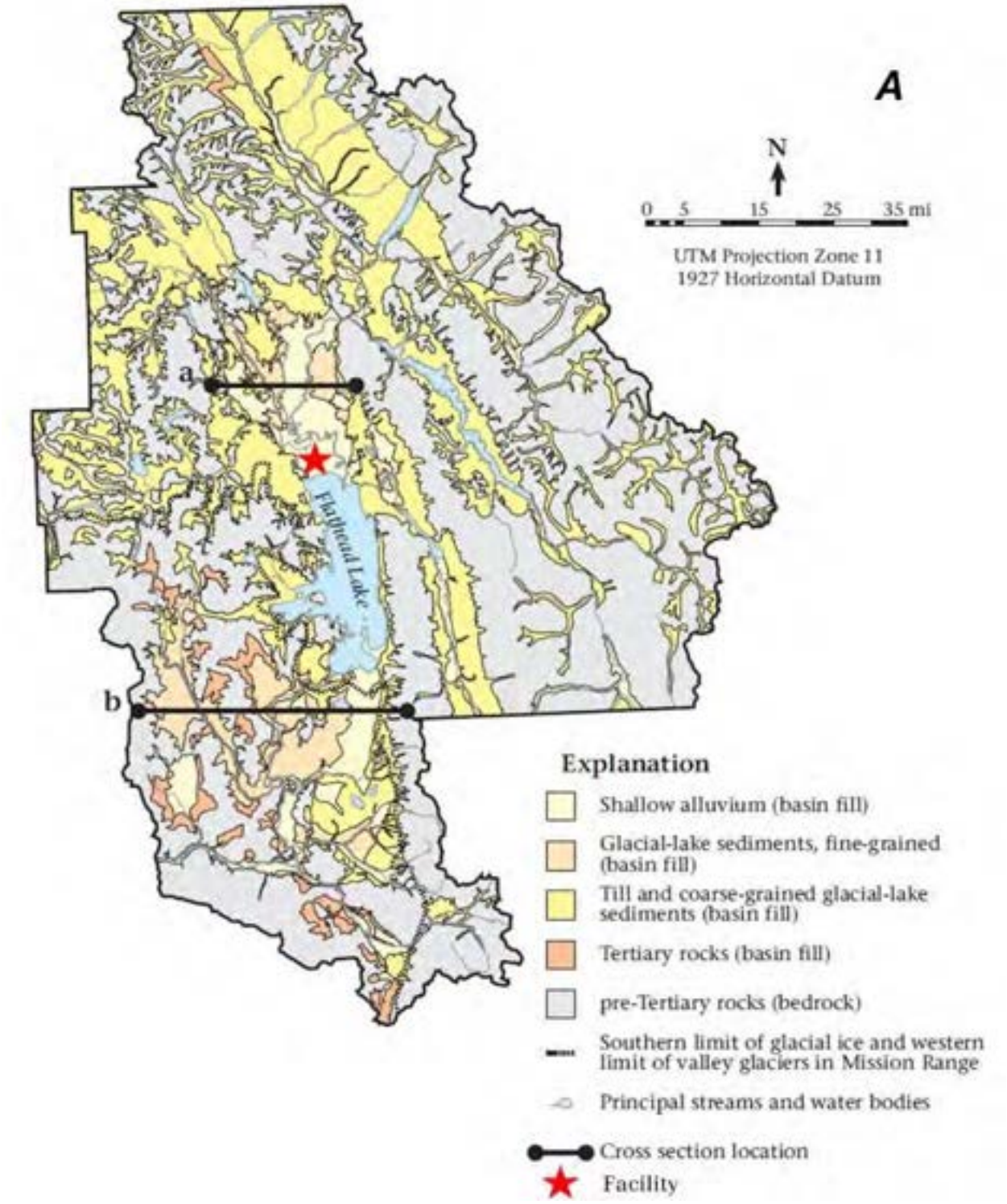

Figure 6A: Simplified Geologic map from LaFave et al., 2004.

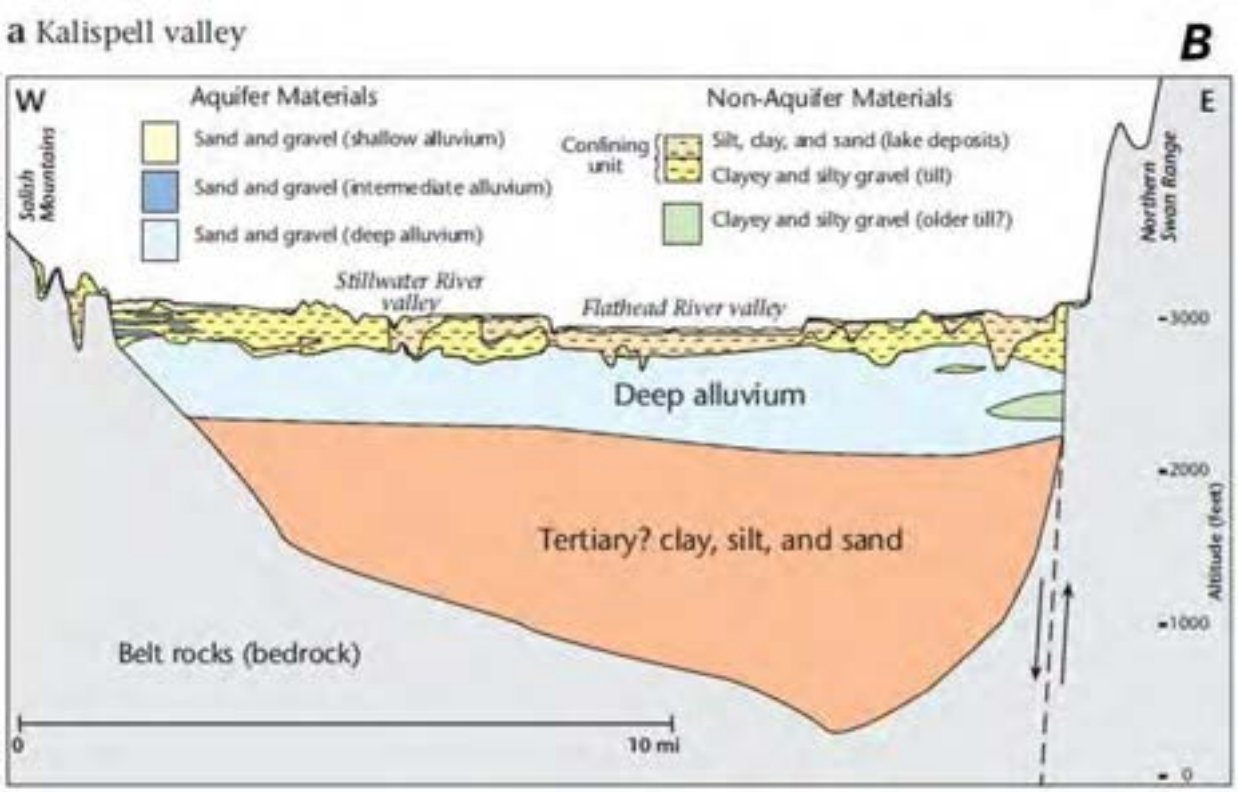

Figure 6B: Simplified geologic cross section from LaFave et al., 2004.

2.4 HYDROGEOLOGY

The hydrogeologic framework of the Flathead Valley includes shallow aquifers in recent alluvium, intermediate saturated confining units, and deep aquifers in pre-glacial gravels (LaFave et al., 2004; **Figure 6B**). In the vicinity of the facility, production wells are usually 100-200 feet deep to tap into the deep alluvial aquifer, which is located in pre-glacial sand and gravel deposits (LaFave et al., 2004). The deep alluvial aquifer is primarily recharged from snowmelt infiltration in the surrounding mountain ranges, and the flow direction is from west to east (from margin toward center of the valley) at a gradient of approximately 0.004 feet/feet (LaFave, 2000).

The receiving water underlying the facility is the Delta aquifer, which is well-studied. The Delta aquifer is a shallow unconfined aquifer found in the lower Flathead Valley between the Flathead River and Flathead Lake. The Delta aquifer (McDonald and LaFave, 2004; LaFave et al., 2004) is also recognized as the “sand aquifer” (Konizeski et al., 1968) and the “Deltaic sand aquifer” (Noble and Stanford, 1986). This aquifer is hydrologically connected to surface waters, including Flathead Lake and the Flathead River, but is thought to be hydrologically separated from other shallow aquifers to the north and east, and also the deeper aquifer by a confining unit comprised of glacial lake deposits.

The Delta aquifer consists of fine to medium grain sand and silt deposits due to the deltaic depositional environment it formed in. This results in a relatively low permeability, and therefore a lower transmissivity than other aquifers in the area (Noble and Sanford, 1986). This limited movement in turn creates a lower water quality caused by ions dissolved during longer residence times. Noble and Sanford (1986) found the water chemistry to be either magnesium bicarbonate or sodium bicarbonate, with

zoning that indicates low horizontal permeability causes limited or slow ground water – surface water interactions.

The Delta aquifer has a median depth to water of 16 feet and median well depth of 26 feet (LaFave et al., 2004). Water levels rise about 2 feet March-June, and then fall 2 feet in July for the rest of the year (LaFave et al., 2004; Noble and Sanford, 1986). Ground water flow directions vary greatly depending on proximity to surface water and season (Noble and Sanford, 1986; Konizeski et al., 1968).

Noble and Sandford (1986) created quarterly potentiometric maps in the Delta aquifer that show that ground water flows towards the Flathead River and Lake when those surface waters have low stages (February and April), and that ground water flows away from surface waters during high stage (June and August).

Noble and Sanford (1986) concluded the following of the Delta aquifer:

> The aquifer is seasonally mounded, inhibiting down-gradient flow, and correspondingly, there is minimal ground water inflow along the north shore of Flathead Lake. We conclude that the deltatic sand aquifer has no measurable impact on the nutrient mass balance of the lake, and, hence, is not contributing to the eutrophication problem.

Figure 7 displays the shallow aquifers identified by LaFave at al., 2004, and **Figure 8** displays the Delta aquifer potentiometric map from Konizeski et al., 1968.

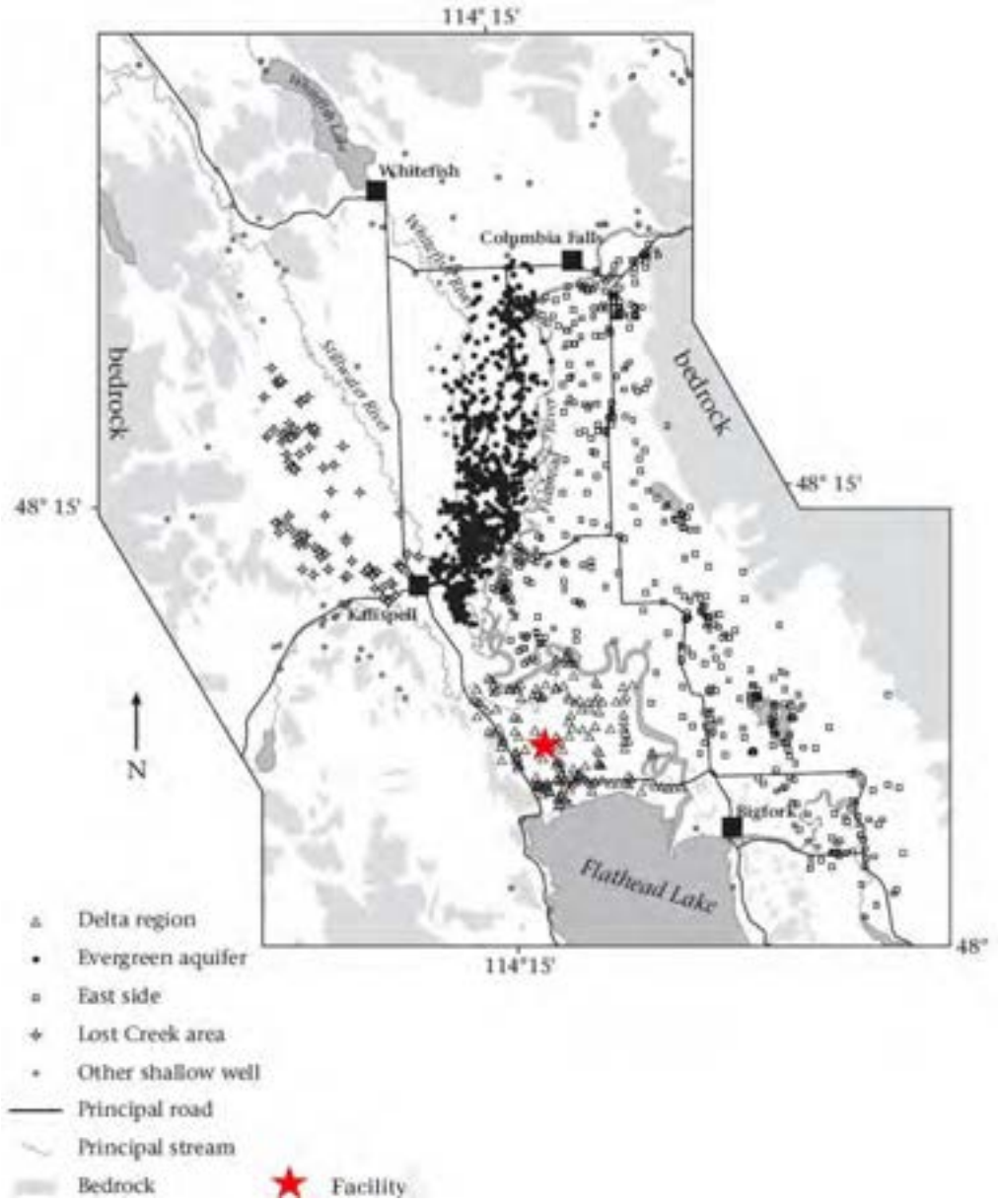

Figure 7: Shallow aquifers of the Flathead Valley from LaFave et al., 2004.

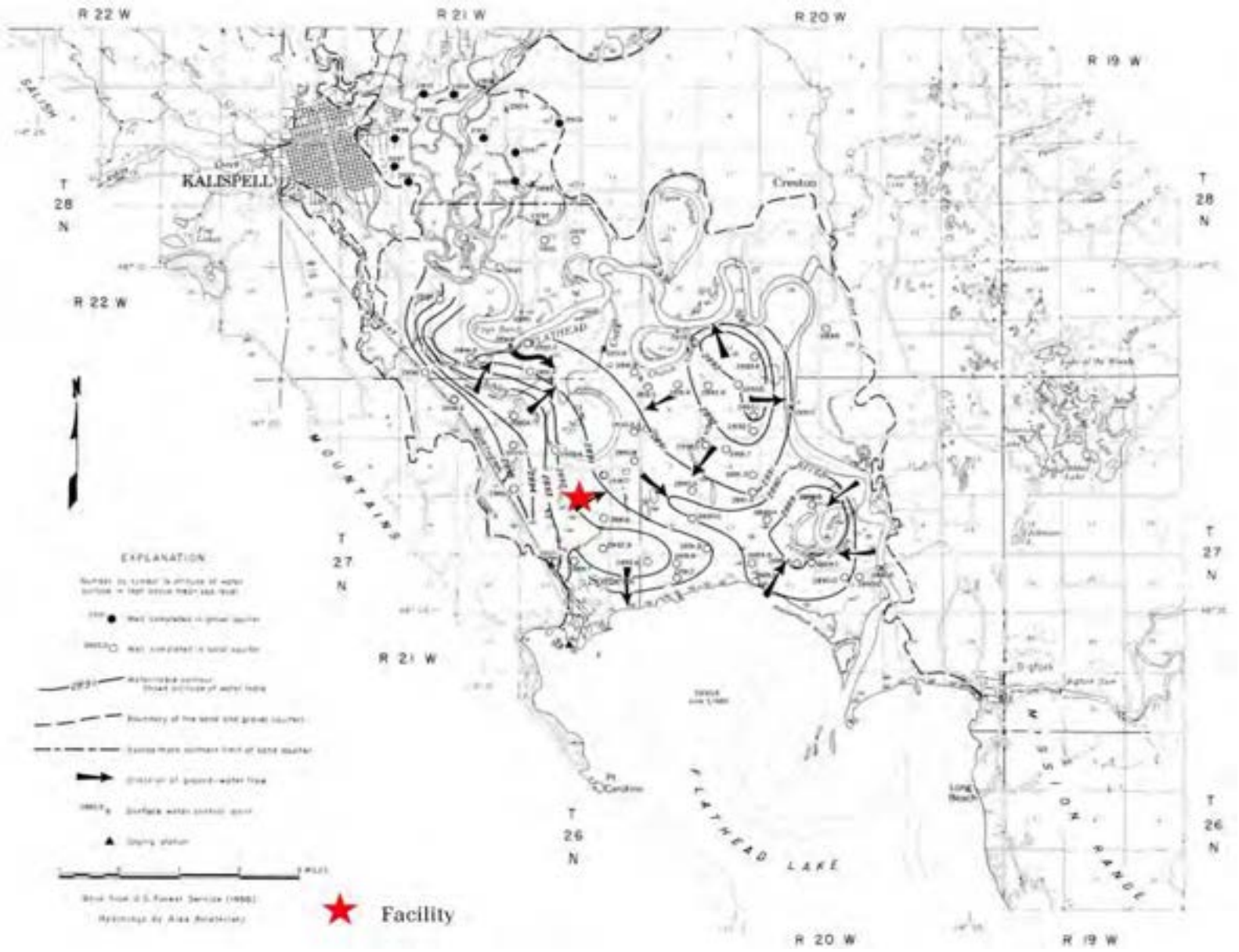

Figure 8: Potentiometric map of the Delta aquifer from Konizeski et al., 1968.

2.5 GROUND WATER DATA & MONITORING NETWORK

Given the complexities of ground water flow in the area, it was important to collect a thorough suite of site specific hydrogeologic data to develop this permit. Five monitoring wells were installed at the site and hydrogeological characteristics were collected by Water & Environmental Technologies (WET). See **Figure 3** for monitoring well locations, and **Table 2** for well details, and **Appendix A – Attachment B** for drill logs.

Ground water elevations were sampled monthly between September 2022 and July 2023, and the results show that the groundwater flow direction rotated between approximately S60°E in September to N60°E in April. The hydraulic gradient was flattest at 0.0002 ft/ft in June 2023, corresponding to peak stages of Flathead Lake and the Flathead River. The steepest gradient calculated was 0.003 ft/ft. **Figure 9** contains monthly potentiometric maps that display this seasonal variation. These results are consistent with the quarterly potentiometric maps created by Noble and Sanford (1986) and the potentiometric map created by Konizeski et al. (1968) of the Delta aquifer.

Three slug tests were completed in each well and an average hydraulic conductivity of 122 ft/day was calculated. Using an estimated aquifer thickness of 10 feet (from the wells' screen length), the transmissivity value of 1,2240 ft^2/d falls within the middle range of transmissivities found by Noble and Sanford (1986) in the Delta aquifer (1-3,700 ft^2/d) . WET used AQTESOLV, by HydroSOLV, Inc., and the Bouwer-Rice solution to analyze the slug test data. See **Appendix A – Attachment G** for the slug test solutions.

Ambient ground water characteristics were collected from MW-5 and the results are summarized in **Table 4**. The ambient average nitrate+nitrite concentration was calculated to be 0.11 mg/L.

Appendix A contains the details of all hydrogeologic work completed at the facility site. Additional wells will be required for long term aquifer monitoring as part of this permit's Special Conditions (**Section 7.0**).

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

Table 2: Monitoring Well Summary
Monitoring Well: MW-1
MBMG GWIC #: -
Use: Monitoring of the shallow unconfined aquifer.
Permit Status: Active. Constructed on September 6, 2022.
Location: Near northwest corner of the property, just south of Wiley Dike Rd. Latitude: 48.11680 Longitude: -11422756
Representation: This well represents shallow ground water. It will used to monitor water quality near the end of the northern mixing zone at Outfall 001/RIB #1.
Monitoring Well: MW-2
MBMG GWIC #: -
Use: Monitoring of the shallow unconfined aquifer.
Permit Status: Active. Constructed on September 6, 2022.
Location: Near northeast corner of the property, just south of Wiley Dike Rd. Latitude: 48.11689 Longitude: -114.22363

Representation: This well represents shallow ground water. It will be used to monitor water quality near the end of the northern mixing zone at Outfall 001/RIB #1.
Monitoring Well: MW-3
MBMG GWIC #: -
Use: Monitoring of the shallow unconfined aquifer.
Permit Status: Active. Constructed on September 7, 2022.
Location: On western border of property, near northwest corner of existing lagoons. Latitude: 48.10997 Longitude: -114.22375
Representation: This well represents shallow ground water. It is not located within a mixing zone so it may be used for additional or ambient water quality at the site.
Monitoring Well: MW-4
MBMG GWIC #: -
Use: Monitoring of the shallow unconfined aquifer.
Permit Status: Active. Constructed on September 7, 2022.
Location: On western border of property, near northeast corner of existing lagoons. Latitude: 48.10999 Longitude: -114.22870
Representation: This well represents shallow ground water. It will used to monitor water quality near the end of the southern mixing zone at Outfall 001/RIB #2.
Monitoring Well: MW-5
MBMG GWIC #: -
Use: Monitoring of the shallow unconfined aquifer.
Permit Status: Active. Constructed on September 8, 2022.
Location: Center of the facility site. Latitude: 48.11323 Longitude: -114.22598
Representation: This well was used to provide ambient aquifer characteristics. It will likely need to be decommissioned to make way for RIB #2.

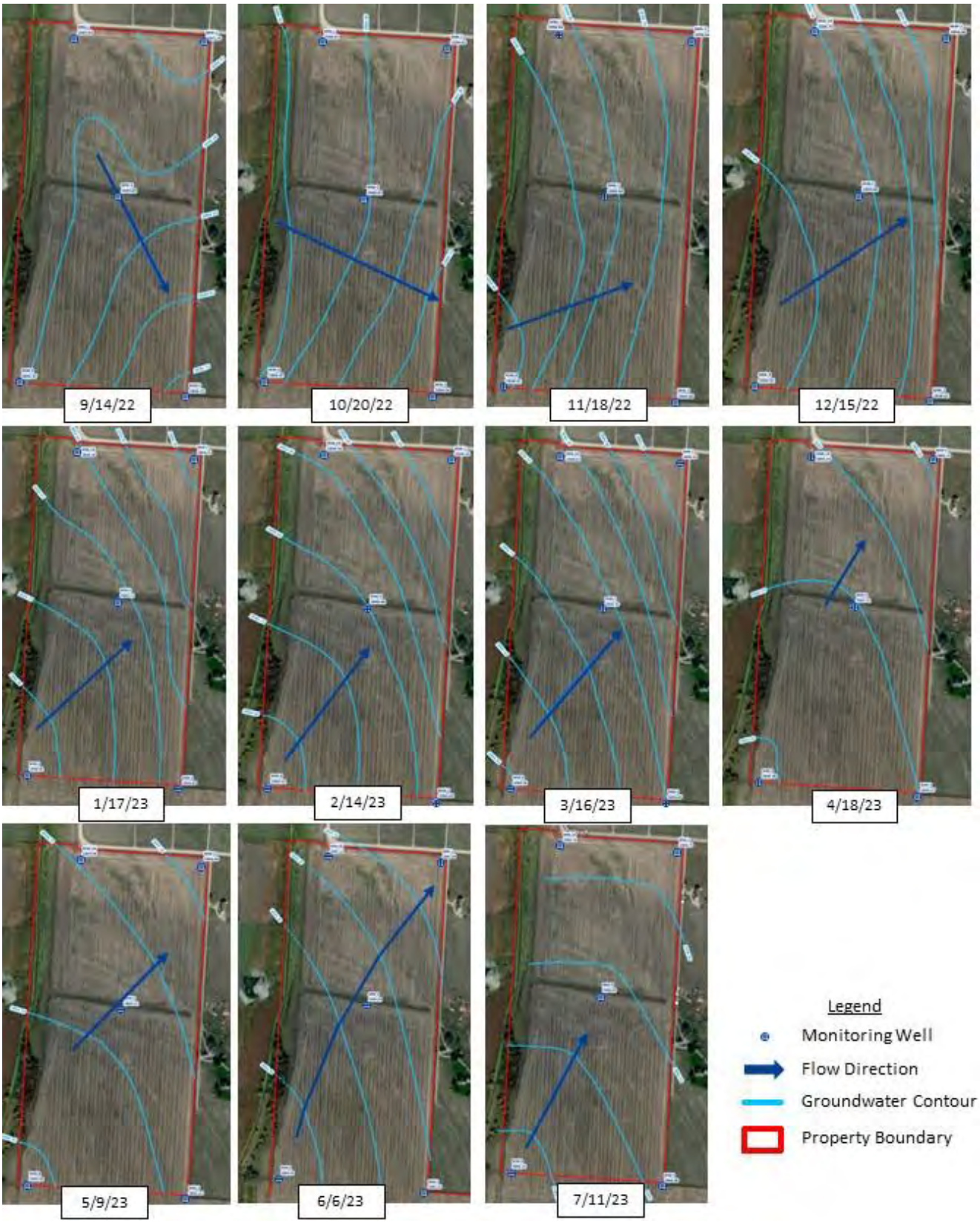

Figure 9: Groundwater flow maps from the facility's five monitoring wells from WET, 2024 (Appendix A).

2.6 SURFACE WATERS

The Delta aquifer is hydrologically connected to surface waters. There are many surface waters within a one-mile radius of the facility (**Figure 10**). The nearest surface waters are Wiley's Slough ¼ mile to the north from the property boundary, a wetland/pond immediately to the east within the property boundary (called "Pond 4" in this document), and a wetland/pond ½ mile to the southeast from the property boundary (called "Pond 7").

The water table maps in **Figure 9** demonstrate that under ambient conditions, ground water will flow from the facility site to Wiley's Slough and Pond 7 depending on the season. However, because the water table gradient is small and the discharge from this facility will be great, water table mounding will occur, pushing effluent out radially in all directions, including to Pond 4.

Pond 4 was sampled on 10/23/23. The results of the surface water quality are in **Table 4**. The surface waters in the vicinity of the facility are expected to have high nutrient and total organic carbon concentrations, especially during the summer months.

Wiley Slough is connected to lower Ashley Creek. Lower Ashley Creek (HUC 1700208, assessment MT76O002_030) is within the Columbia basin, Pend Oreille watershed, Northern Rockies ecosystem, and the Flathead-Stillwater Total Maximum Daily Load (TMDL) planning area. It has a use-class of C-2, and the corresponding beneficial uses are: bathing, swimming, and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

This segment of Ashley Creek was found to be impaired for aquatic life and primary contact recreation (2020 303(d) list). See **Table 3** for the probable causes and sources of these impairments.

Pollutants associated with the proposed facility are nitrate + nitrite, total nitrogen, and total phosphorus. The Flathead-Stillwater Planning Area Nutrient, Sediment, and Temperature TMDLs and Water Quality Improvement Plan (Montana DEQ, 2014) identified an allowable load for nonpoint sources and natural background of 13.98 lbs/day total nitrogen (91% reduction) and 1.27 lbs/day total phosphorus (66% reduction). The TMDL does not break out load allocations by each nonpoint source, intending to give stakeholders flexibility in identifying reduction measures.

The facility's proposed system will be able to take on more wastewater connections, thereby improving nonpoint source loading because the proposed advanced treatment system will produce considerably cleaner effluent than conventional treatment systems. The results of the nitrogen attenuation and phosphorus breakthrough analyses in **Section 3.3** and the reasonable potential analyses in **Section 3.4** demonstrate that the effluent discharge should have no impact on the nutrient loading in lower Ashley Creek.

The Flathead River, from the headwaters to Flathead Lake, has not been assessed for impairments.

Table 3: Ashley Creek (Kalispell Airport Road to mouth) impairment information

Probable Causes	Probable Sources	TMDL Completed
Alteration in stream-side or littoral vegetative covers	Crop production (irrigated)	N
Chlorophyll-a	Crop production (irrigated) Municipal point source discharges	N
Dissolved Oxygen	Discharges from Municipal Separate Storm Sewer Systems (MS4) Municipal point source discharges	Y
Sedimentation/Siltation	Channelization Crop production (irrigated) Upstream source	Y
Temperature	Discharges from Municipal Separate Storm Sewer Systems (MS4) Loss of riparian habitat Upstream Source	Y
Nitrate/Nitrite	Crop production (irrigated) Municipal point source discharges Upstream source	Y
Total Nitrogen	Crop production (irrigated) Municipal point source discharges Upstream source	Y
Total Phosphorus	Crop production (irrigated) Municipal point source discharges Upstream source	Y

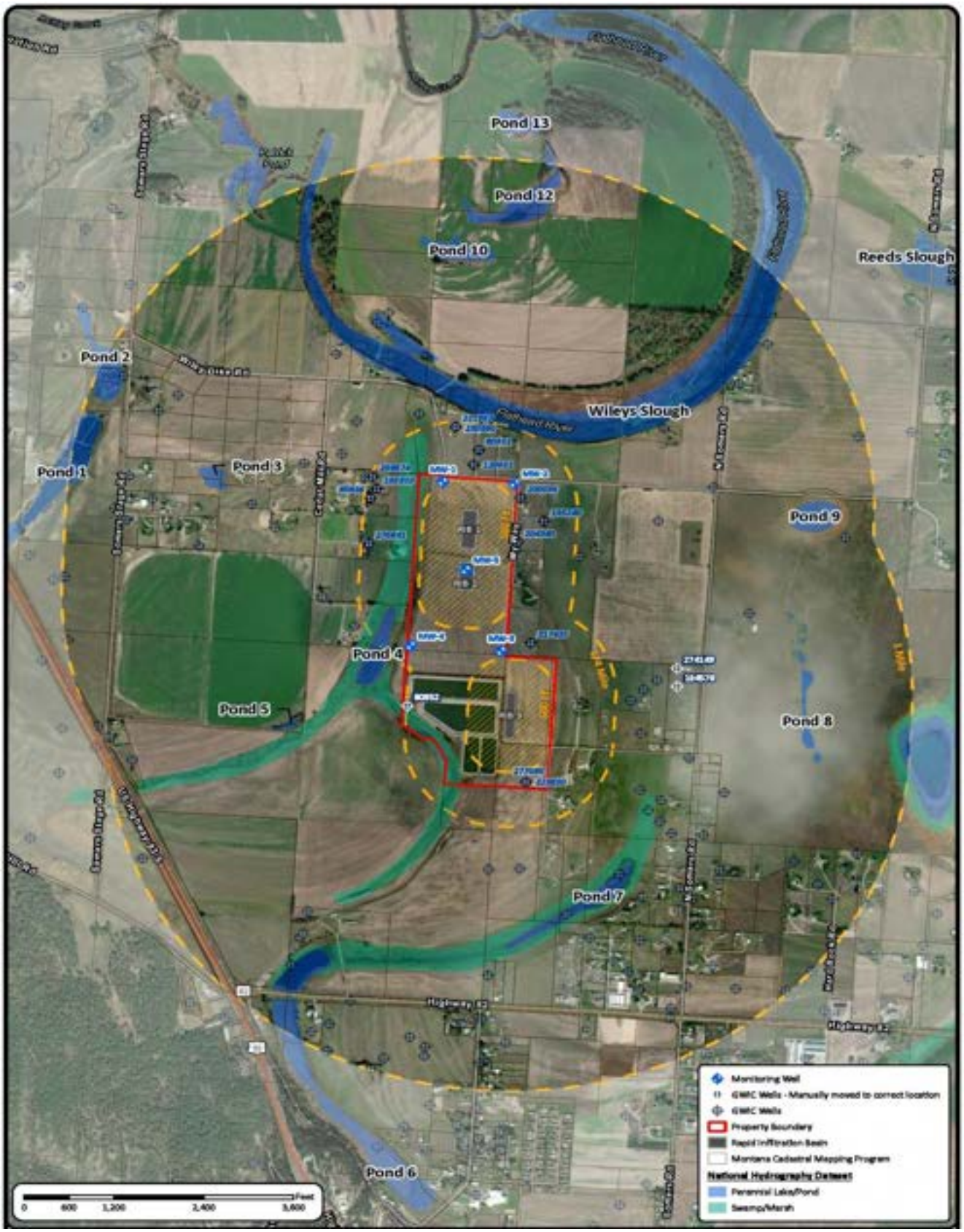

Figure 10: Locations of wells and surface waters near to the facility site, including setbacks.

2.7 QUALITY INFORMATION

The Sewer District has proposed an advanced wastewater treatment system capable of removing 80% of the total nitrogen load, 70% of the total phosphorus load, 70% of the pathogens, and 95% of the 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS) loads. Biochemical nutrient reduction technology will be used to achieve total phosphorus concentrations of 1.5 mg/L. The proposed mechanical treatment plant is estimated to reduce the total nitrogen concentration output of the system by 73% compared to the existing lagoon treatment. This is also 85% reduction when compared to conventional septic treatment.

Ambient ground water data collected from MW-5 shows an average Nitrate + Nitrite value in the receiving water of 0.11 mg/L. Based on the 595 microsiemens per centimeter (µS/cm) specific conductance, the receiving water is Class I ground water.

Table 4 contains a summary of the effluent quality of the existing and proposed treatment systems, the water quality standards that apply to this facility, and the ambient water quality for ground and surface waters. Lab reports for the MW-5 and Pond 4 samples are located in **Appendix A – Attachment D.**

Table 4: Quality Summary

Analyte/Measurement	units	Treated Wastewater Design Criteria		Ground Water Quality Standards	Ambient Water Quality	
		Existing System (Lagoon[1])	Proposed Treatment System (Advanced[2])		Ground Water (MW-5[3])	Surface Water (Pond 4[4])
Biochemical Oxygen Demand (BOD_5)	mg/L	30	10			
	% removal	85	95			
Escherichia coli Bacteria	CFU/100ml		2400	<1	<1	
Chloride [as Cl]	mg/L		248		8	179
Nitrogen, Kjeldahl, total [as N]	mg/L				<0.05	2.8
Nitrogen, Nitrite + Nitrate [as N]	mg/L			10	0.11	0.02
Nitrogen, Total [as N]	mg/L	30	8		<0.05	2.8
	lbs/day		13[5]			
	% removal	Negligible	80			
Organic Carbon, Total	mg/L				3.5	15.6
pH	s.u.		7		7.4	7.4
Phosphorus, Total [as P]	mg/L	8	1.5	**Table 6**		0.26
	lbs/day					
	% removal	Negligible	75			
Specific Conductivity [SC] @ 25°C	µS/cm		1770		595	1190
Solids, Total Dissolved (TDS)	mg/L		600		337	690
Sulfate	mg/L				6	2

Footnotes:
CFU = Colony Forming Units
s.u.: standard units
Empty cells represent constituents not provided (if design criteria) or not analyzed (if water quality data).
(1) The existing effluent characteristics are the design criteria for the facility's aerated lagoon system.
(2) Proposed effluent characteristics from a mechanical treatment plant using SBR technology with BNR capabilities. Prior to dilution within an authorized mixing zone.
(3) Averages from samples taken from MW-5 on 9/22/22, 11/17/22, 3/15/23, and 5/1/23.
(4) One sample taken from Pond 4 on 10/23/23.
(5) Load based on the average design flow of 200,000 gpd.

2.8 GROUND WATER MOUNDING MODEL

To demonstrate that the surface waters adjacent to the facility will not be affected by the effluent discharge, the permittee was asked to complete a fate and transport study of total nitrogen and pathogens. Using MOUNDSOLV, created by HydroSOLVE, Inc., WET developed a model of the effluent mound. MOUDSOLV uses Zlotnick et al.'s (2017) analytical steady state solution for a rectangular recharge source overlying horizontal or uniformly sloping unconfined aquifers.

See **Appendix A** for full details of the ground water mounding model with higher-resolution figures, and including **Attachments I and J** for MOUNDSOLV documentation.

2.8.1 Model Inputs

Figure 11 displays the input parameters used for the model, including measured hydrogeologic characteristics and proposed RIB dimensions and discharge rate. RIB #1 has a modeled recharge of 80,000 gpd, RIBs #2 and #3 are modeled with 60,000 gpd each. Each RIB is sized so that the average discharge rate is 0.59 gpd per square foot. A forward solution was performed for five years, at which time, due to the constant head boundary of the Flathead River and Flathead Lake, the system is believed to achieve stabilized conditions.

Aquifer Data

Property	Value	
Horizontal hydraulic conductivity, *K* (ft/d)	122.4	
Specific yield, *Sy*	0.27	
Initial saturated thickness, h_0 (ft)	14.7	
Maximum allowable water-table rise, σ (ft)	0	
Dip, *i* (ft/ft)	-0.0002	
Slope rotation from x axis, *y* (°)	17.7	or -61

Recharge Sources

Property	Source 1	Source 2	Source 3
X coordinate at center, *X* (ft)	1161	1127	1669
Y coordinate at center, *Y* (ft)	1784	1077	-1025
Dimension along x* axis, *L* (ft)	225	225	145
Dimension along y* axis, *W* (ft)	600	450	700
Rotation from slope direction, ϕ (°)	-17.7	-17.7	-17.7
Recharge rate, *Q* (ft³/d)	10694	8021	8021
Infiltration rate, *q* (ft/d)	0.07921481481	0.07921975309	0.07902463054

Figure 11: MOUNDSOLV input parameters.

Two scenarios were considered with the mound model: ambient ground water flows to the south-east and to the north-east (Slope rotation from x axis, y(°) = 17.7 and -61). The purpose of having the two scenarios was to incorporate the changing head boundaries that occur seasonally in the lower Flathead Valley, as discussed in **Section 2.4**, and see if the natural flow variations affect the predicted effluent mound.

Figure 12 displays that the modeled water table pre-effluent disposal reasonably matches the measured water table (in the NE ground water flow direction scenario). As such, the model is believed to adequately represent the development of a groundwater mound beneath the proposed RI basins at the site.

2.8.2 Predicted Water Table Changes

Figure 13 is the resulting water table with a full 200,000 gpd discharge from the three RIBs, including the two water flow direction scenarios. Blue lines represent the predominant ground water flow direction to the NE, and purple lines represent the flow direction towards Flathead Lake to the SE. Note that both purple and blue lines have the same 1-ft contours. **Figure 13** illustrates that the seasonal variation in ground water flow direction will be dominated by the effluent mound; mounding will force the effluent

to flow radially, rather than specifically NE or SE. The two mounding scenarios confirm that the location of the RI basins, relatively flat hydraulic gradient, and hydraulic conductivity of the Delta aquifer ultimately control the size and shape of the mound developing beneath the proposed RI basin areas at the Site, and thus the fate and transport of phosphorous, pathogens, and nitrogen.

Figure 14 is a set of graphs that show the water table rise predicted by the model. Under RIBs #1 and #2, the water table is expected to rise 4.99 ft, leaving an unsaturated zone of approximately 9 ft. Under RIB #3, the water table is expected to rise 3.65 ft, leaving an unsaturated zone of 7.8 ft. To be conservative, an unsaturated thickness of 4 ft was used for phosphorus breakthroughs and pathogen reduction.

Understanding that the proposed discharge will cause an elevated water table, the depth to ground water for the immediate vicinity was predicted using the MOUNDSOLV model and the land surface elevation (**Figure 15**). This model scenario considered the seasonal high ground water data collected June 6, 2023. This figure shows that water levels near the boundary of the facility site are predicted to be between 2,897.5 and 2,898.5 ft above mean sea level (amsl), representing an approximate increase of 2.5 ft in the on-site monitoring wells. The water level rise predicted by the modeled mound decreases with distance, and the maximum predicted water level rise off the facility site is approximately 3.5 ft, occurring immediately east of RI basin #1 and #2. Modeled depth to water is predicted to exceed 10 ft in all but the low-lying areas associated with historic channels of the Flathead River, where depth to ground water is typically near surface under current conditions.

Figure 12: Modeled water table initial conditions (NE ground water flow scenario).

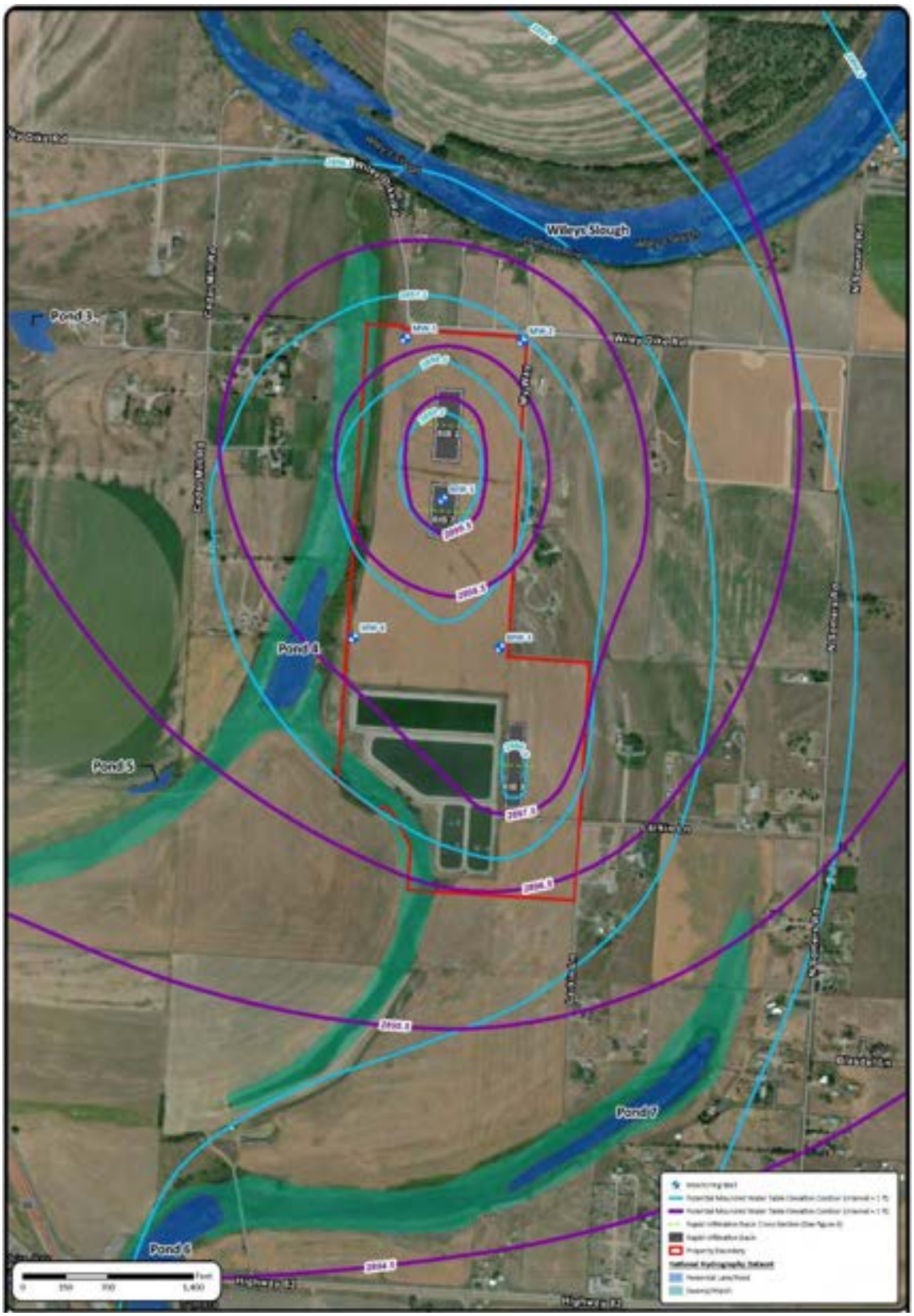

Figure 13: Modeled water table results after incorporating the proposed discharge. Purple lines represent the water table when flow is to the SE, blue lines represent flow to the NE.

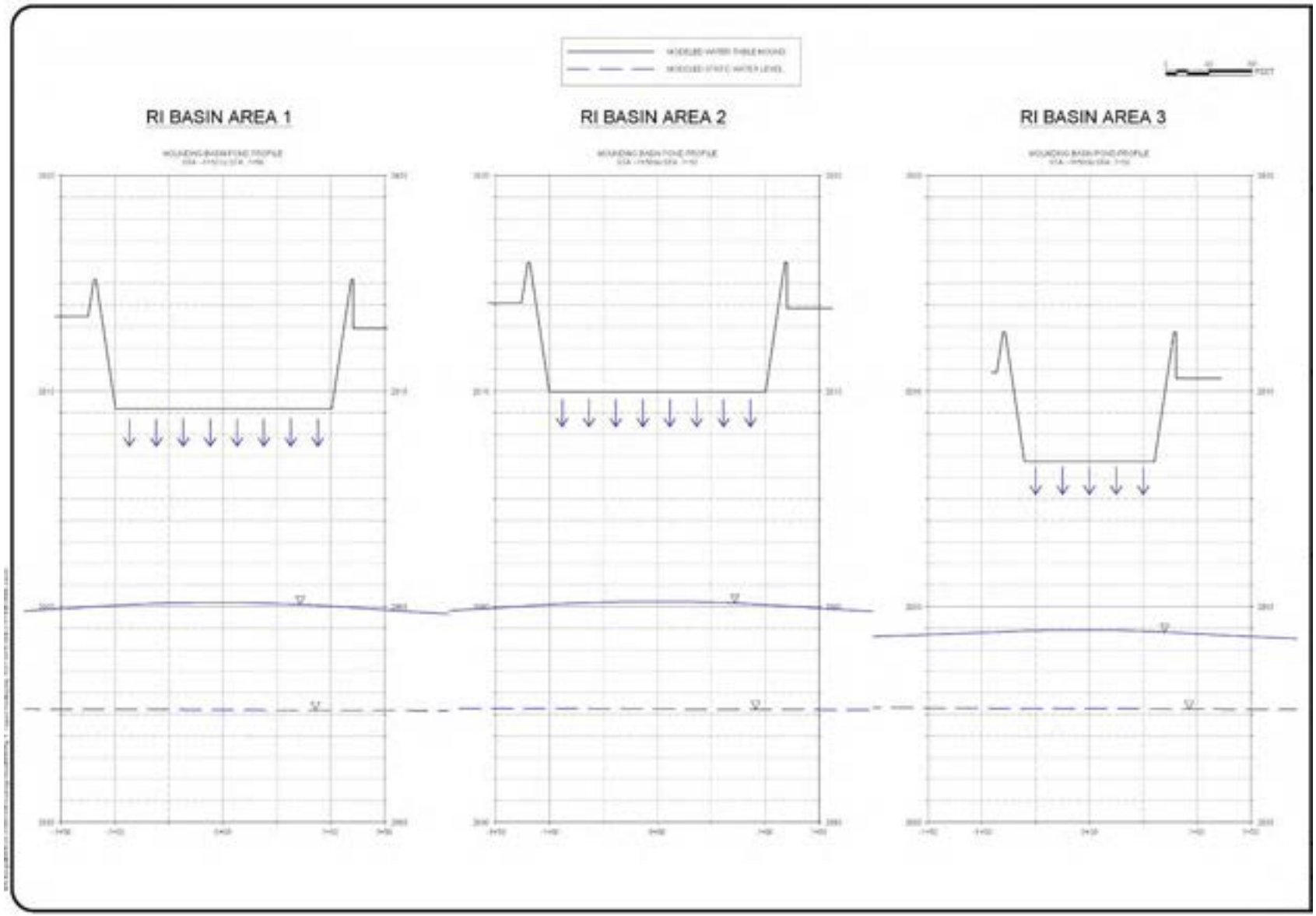

Figure 14: Predicted water table rise underneath the RIBs.

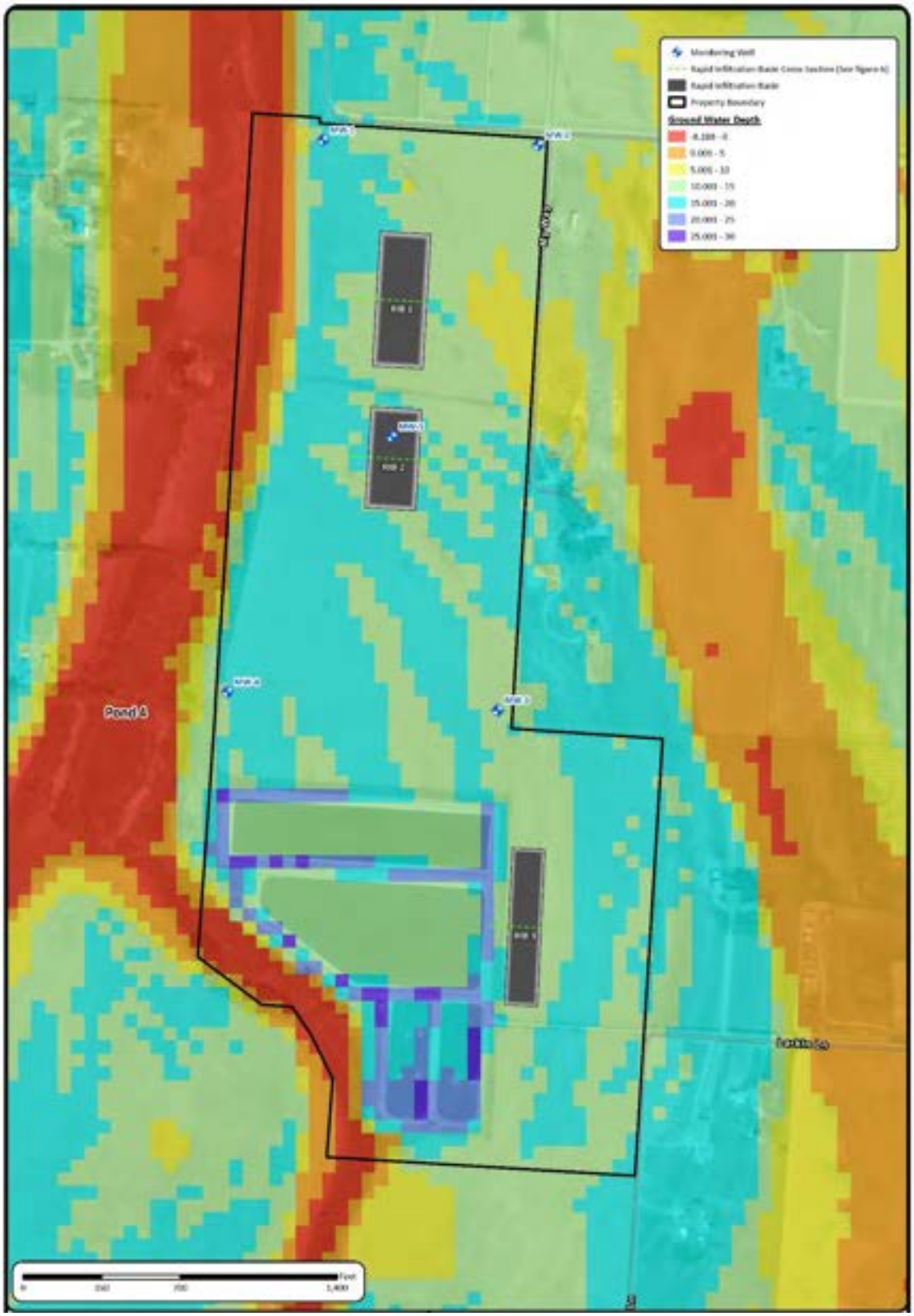

Figure 15: Predicted depth to ground water in the vicinity of the facility, using the ground water mounding model output for high ground water conditions.

2.8.3 Pollutant Fate and Transport

In addition to modeling the predicted impacts the discharge will have on the water table elevation and flow directions, the ground water mounding model was used to determine the fate and transport of pollutants from the proposed facility.

The dashed yellow areas featured in **Figure 16** display the possible effluent flow paths from each RIB to the nearest surface water bodies. The dashed orange line represents the shortest flow path a particle of water may take to the surface water along the steepest ground water gradient produced by the mounding. The direction and distances represented by the orange line were used for the nonsignificance analyses and mixing zone designations (**Table 5**; **Sections 3.3** and **4.0**).

Table 5: Effluent Flowpaths to the Nearest Surface Water

Location	RIB #1 to Wiley Slough	RIB #2 to Pond 4	RIB #3 to Pond 7
Distance (ft)	1335	1160	2540
Direction (bearing)	N 15° E	S 50° W	S 40° E

WET calculated phosphorus breakthroughs with the above information and the RIB dimensions. The results of these breakthroughs are found to be greater than 50 years and therefore nonsignificant (**Section 3.3**); however, to be conservative, total phosphorus effluent limits were developed (**Section 5.2**). See **Appendix D** for phosphorus breakthrough calculations.

The impacts of pathogens on downgradient drinking water wells were also assessed. Using the same aquifer characteristics as the mounding analysis, WET used DEQ's Pathogen Transport Model spreadsheet which utilizes both vertical and horizontal travel to calculate pathogen removal. A conservative four-foot unsaturated zone was assumed beneath the RI basin areas. A volumetric soil moisture content of 0.1 mL/cm^3 was assumed for the unsaturated soil, which is the default value of the spreadsheet.

The results of the pathogen transport spreadsheet showed that 4-log microbiological attenuation typically occurs within 200 days. A small amount of virus inactivation occurs in the short travel time (5.8 days) between the bottom of the RI basin areas and the top of the water table mound (0.11 logs). However, even at the steepest gradients occurring immediately adjacent to the water table mound (0.003 feet or 0.9 feet/300 feet), 4-log microbial inactivation or removal of 99.99-percent of virus is achieved within 305 feet of each RIB. No wells are within 500 feet of the proposed RIBs. As such, LCWSD requested a source specific mixing zone of 305 feet, which is the minimum required distance to achieve 4-log microbial inactivation (**Figure 17**). See **Appendix A – Attachment H** for pathogen transport model results.

Finally, WET addressed nitrogen reductions via denitrification. The steepest hydraulic gradient of 0.003 was utilized to calculate the time of travel required for denitrification processes to result in a nitrate concentration of 7.5 mg/L. Utilizing the hydraulic gradient near the edges of the mound, the average groundwater flow velocity is 1.36 ft/day and nitrate concentrations are calculated to be below 7.5 mg/L within 110 feet of each RIB. Nitrate concentrations are calculated to be below 5.0 mg/L within 335 to 670 feet from the proposed RIB and are estimated to reach near background conditions of 0.11 mg/L

within 640-1,200 feet of the proposed RIBs. See **Section 3.3** for discussion of the nitrate nonsignificance determination for each RIB, and **Appendix A** for the reported results.

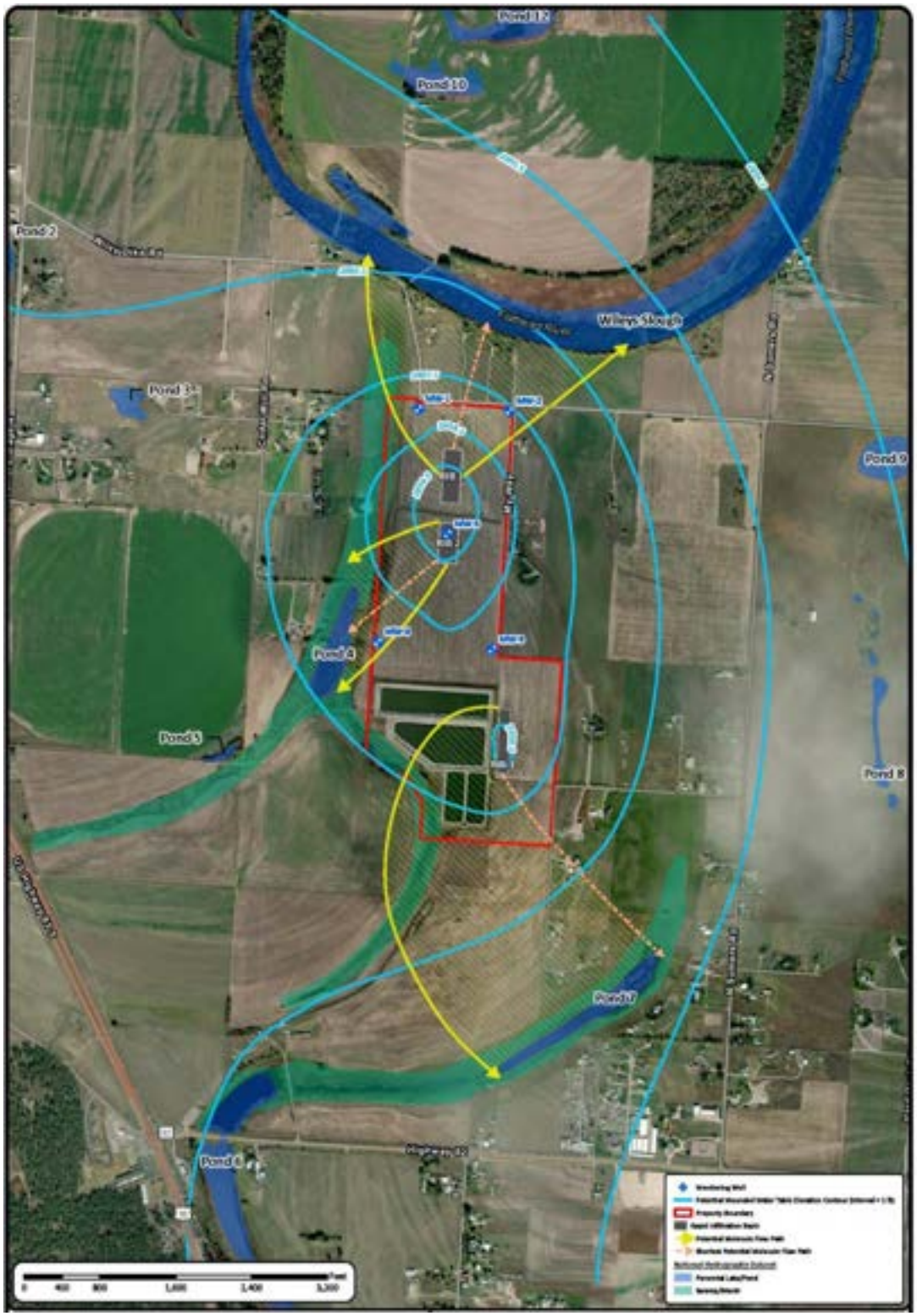

Figure 16: Predicted flow paths from each RIB to the nearest surface water body used in phosphorus and nitrogen nonsignificance calculations.

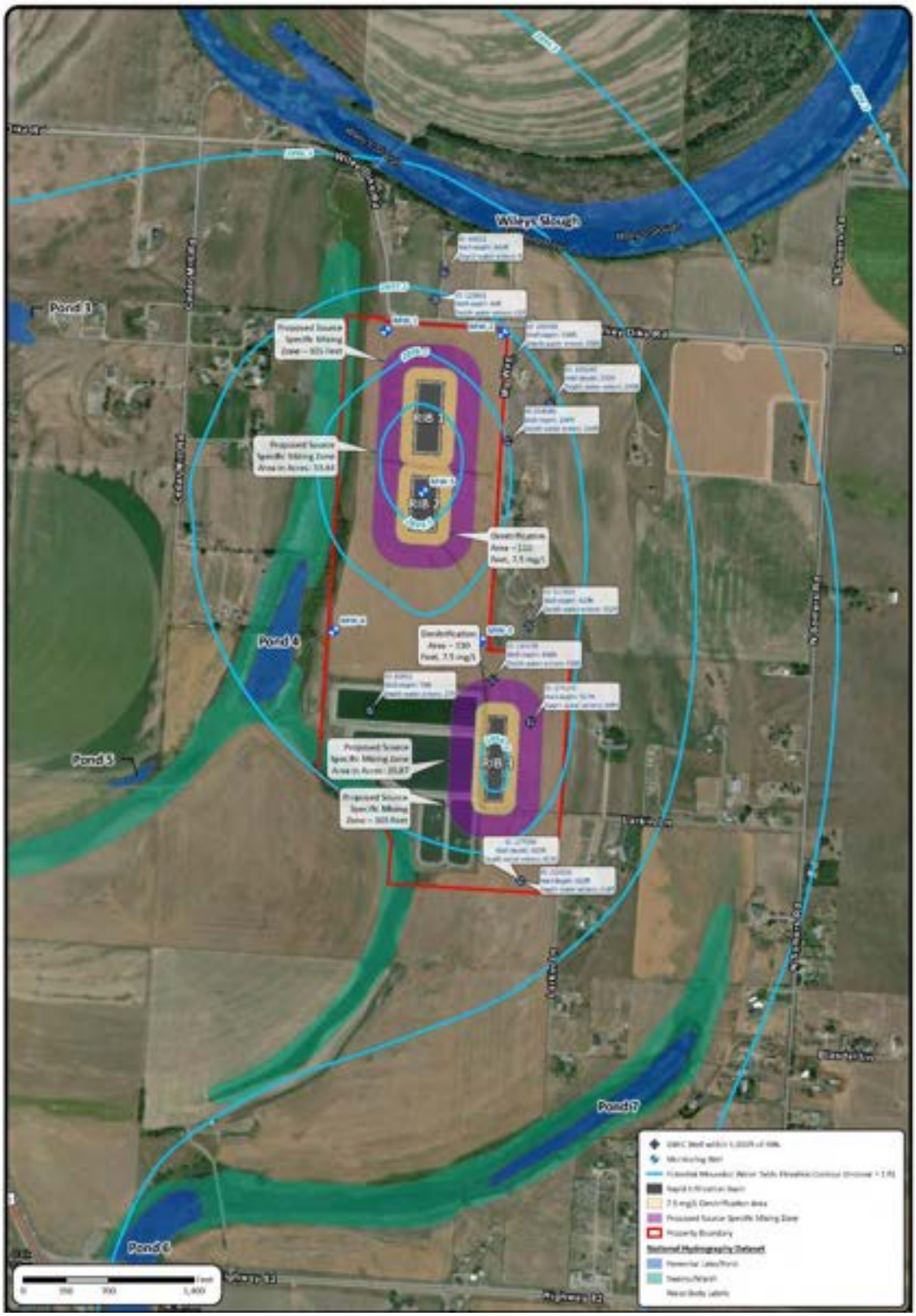

Figure 17: Proposed source specific mixing zone dimensions. Purple zones are the extent at which 4-log microbial deactivation is achieved, tan zones are the distance at which 7.5 mg/L total nitrogen is achieved. Also pictured are nearby wells with depth and screen interval labeled.

3.0 WATER QUALITY STANDARDS

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

3.1 BENEFICIAL USES

The receiving state water is Class I ground water which is a high quality water of the state. The current and future beneficial uses of the aquifer will be protected.

The beneficial uses of Class I ground waters are:

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

Water quality standards are established to protect these beneficial uses. The water quality standards include:

- Ground water human health;
- Harmful, detrimental, or injurious activity; and,
- Nondegradation provisions.

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

Table 6: Water Quality Standards

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

Footnotes:
CFU = Colony Forming Unit
These standards establish the allowable changes in ground water quality and are the basis for limiting discharges to ground water.
(1) The list includes identified parameters of interest.
(2) Circular DEQ-7: Carcinogen (C), Harmful (H), and Toxic (T) parameter. Toxic pollutant with a Bioconcentrator (B) factor.
(3) Criteria indicates threshold for a significant activity that may lead to degradation.

(4) DEQ conservatively assumes all forms of nitrogen will convert to nitrates within the aquifer. DEQ recognizes that other nitrogen forms may be harmful to the beneficial uses therefore will use Total Nitrogen for projecting impacts and in formulation of compliance efforts (limitations).
(5) Changes in receiving ground water quality are not significant if water quality protection practices approved by the DEQ have been fully implemented and if the listed nonsignificance criteria is met.

3.2 NONDEGRADATION

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

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

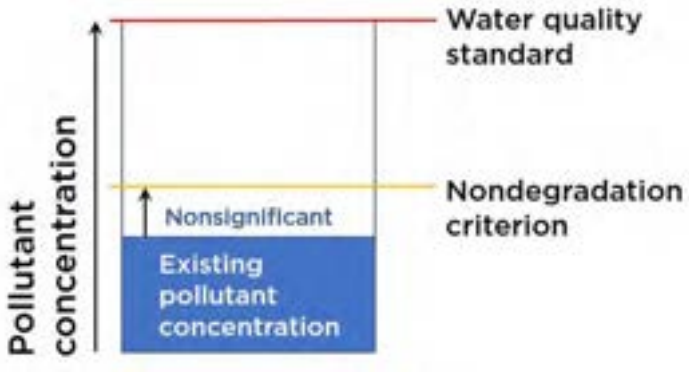

Figure 18: Nonsignificance schematic

DEQ performed a significance determination analysis for the proposed project and found that it is not a significant activity.

3.3 SIGNIFICANCE CRITERIA AND DETERMINATION

3.3.1 Nitrogen

Changes of nitrate as nitrogen in ground water are nonsignificant if the discharge will not cause degradation of surface water and the predicted concentration of nitrate as nitrogen at the boundary of the ground water mixing zone does not exceed 7.5 mg/L. Using the nonsignificance criterion of 7.5 mg/L, DEQ will establish effluent limitations and long-term monitoring requirements for compliance at the end of the mixing zone (**Sections 5.0 and 6.0**).

The proposed SBR treatment alone is nearly capable of meeting the nonsignificance criteria for nitrogen. DEQ did however perform a significance determination in predicting nitrate values downgradient of the proposed discharge structure. The new wastewater system design along with on-site ground water characteristics (**Section 2.7**), dilution estimates (**Section 4.0**), and attenuation estimates (**Appendix C**) were used in these projections.

If we look at dilution alone, the proposed mixing zones will result in nitrogen concentrations lower than the nonsignificance criteria of 7.5 (**Appendix B**). The nitrate concentrations at the end of a 305-ft mixing zone are: 7.45 mg/L for RIB #1, 7.04 mg/L for RIB #2, and 6.65 mg/L for RIB #3. The volume of ground water available for dilution is based on only a portion of the 305-ft radial mixing zone. See **Section 4.0** for a discussion of available dilution.

DEQ also considered natural nitrogen losses in the subsurface. Nitrogen attenuation will result in nitrate degradation to 0.9 mg/L at the end of the 305-ft mixing zone, which is well below the 7.5 mg/L nonsignificance criteria. Additionally, the surface water standard (0.275 mg/L) will be achieved at 469 ft away from the RIBs, and non-detect levels (0.01 mg/L) will be achieved at 930 ft away from the RIBs. The attenuation estimate used first-order denitrification rates of the aquifer to determine nitrogen losses. These results are consistent with WET's nitrate attenuation calculations (**Appendix A**). The attenuation estimates demonstrate that the discharge likely will not affect the nearby surface waters.

To be conservative, the proposed total nitrogen effluent limit will be calculated solely on the predicted amount of dilution from a portion of the 305-ft radial source specific mixing zone, and not on attenuation or the total mixing zone area. Additional attenuation sources may include a 25% reduction in the vadose zone for the designed RIBs and hyporheic losses within riparian zones of the nearby surface waters. Between all of these denitrification zones, we consider the Water Quality Based Effluent Limit to be protective and unlikely to lead to exceedances of surface water nonsignificance criteria in nearby water bodies.

Ongoing monitoring will be used to quantify the attenuation projections to ensure that any permitted future increase in wastewater loading will meet significance criteria at the end of the mixing zone.

3.3.2 Phosphorus

For phosphorus, a surface water breakthrough time of greater than 50 years is a nonsignificant change in water quality. The phosphorus criterion requires an analysis to determine a breakthrough time based on the adsorption capacity of the soil. Breakthrough occurs when the subsurface soils lose their capability to adsorb any more phosphorus, and it has a potential to reach surface water.

WET conducted a phosphorus breakthrough analysis as part of the 2024 Technical Memo (**Appendix A – Attachment K**). They assumed that half of the discharge from each RIB will flow to the nearest surface water due to the radial flow that will result from the ground water mounding. They used an effluent discharge of 40,000 gpd for RIB #1 and found a breakthrough of 60 years, 30,000 gpd for RIB#2 and found a breakthrough of 92 years, and 30,000 gpd for RIB #3 and found a breakthrough of 300 years.

To be conservative, DEQ assumed all the effluent will flow to the nearest surface water. Using the full design capacities of each RIB in **Table 1**, RIB dimensions provided by WET, and distances to nearest surface water in **Table 5**, DEQ calculated a breakthrough of 30 years for RIB #1, 46 years for RIB #2, and 150 years for RIB #3. See **Appendix D** for these projections.

Because breakthrough times less than 50 years are considered significant, DEQ developed total phosphorus limits for Outfalls 001 and 002 based on a projected 50-year breakthrough. This will prevent degradation of downgradient surface water to ensure that changes in water quality are nonsignificant. Limit development is discussed in **Section 5.2**. The discharge permit requires that the permittee complies with these established limitations on a long-term basis.

3.4 REASONABLE POTENTIAL

The phosphorus breakthrough analysis is based upon distance and time to nearest surface water, inherently addressing the potential for degradation of surface water. Therefore, the analysis of reasonable potential for surface water degradation in this section is limited to nitrogen.

DEQ recognizes that ground water and surface waters are hydraulically connected in the lower Flathead Valley. See **Sections 2.4 and 2.6** for further discussion of ground water and surface water interactions near the facility. DEQ evaluated the fate of nitrogen (in the form of nitrate) associated with the discharge of wastewater from the proposed facility.

DEQ performed attenuation calculations to determine potential losses of nitrogen due to naturally occurring denitrifying conditions in the subsurface. The result of the evaluation is as follows. Using Darcy's Law, the ground water velocity ranges between 0.32 and 1.49 ft/day, with an average of 0.9 ft/day. Given this velocity, it will take approximately 337 days for the discharge to reach the end of a 305 ft mixing zone. Using the distances from **Table 5**, it will take on average 4 years for ground water to flow from RIB #1 to Wiley Slough, 3.5 years for ground water from RIB #2 to reach Pond 4, and 7.7 years for ground water from RIB #3 to reach Pond 7. During that time, nitrate naturally decays from biogeochemical processes that occur in the aquifer (McCray, 2005).

The results show that nitrate may decay to the numeric surface water quality standard (0.275 mg/L) at an average distance of 469 feet away from the RIBs. Furthermore, nitrate will decay to minimum detection levels (0.01 mg/L) at an average distance of 930 ft away from the RIBs, which is still several hundred feet from the nearest surface water from each RIB. At the end of the 305 ft mixing zone, nitrate will decay down to 0.9 mg/L. These projections demonstrate that the nitrogen discharged to ground water may not result in measurable impacts to surface water.

The nitrogen attenuation projections are located in **Appendix C**. DEQ was conservative in these projections. Additional sources of attenuation not used may include a 25% reduction in the vadose zone for the designed rapid infiltration basins (outfall), and hyporheic losses within riparian zones of nearby wetlands. DEQ will require monitoring within the next permit cycle to quantify these reductions.

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

3.5 CUMULATIVE EFFECTS

As discussed in **Section 3.4**, DEQ evaluated the fate of nitrogen (in the form of nitrate) associated with the discharge of wastewater from the proposed facility. DEQ predicts that nitrate will decay to the surface water quality standard within 469 feet of the outfalls, and to non-detect levels within 930 feet of the outfalls. This is still several hundred feet from each outfall to the nearest surface water (**Table 5**). DEQ was conservative in these predictions as it did not include additional reduction that may occur in the vadose and hyporheic zones. These projections are included in **Appendix C.**

There are approximately five houses located between Outfall 001 and Wiley Slough, zero houses between Outfall 002 and Pond 4, and six houses between Outfall 003 and Pond 7. Aquifer impacts from the discharge of these septic systems within this large area are seen as negligible due to dilution and natural attenuation. In addition, impacts from any potential upgradient source may also be negligible as ambient nitrate concentrations are very low (0.11 mg/L; **Table 4**).

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

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

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

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

Testing of the aquifer was completed to determine the existing impacts of all upgradient discharge sources. The resulting ambient nitrogen levels were used to determine the assimilative capacity to ensure limitations were achieved that factors in these existing sources.

A ground water monitoring network has been established that will provide for long-term monitoring of the aquifer both upgradient and downgradient of the discharge. The ground water data collected will provide continual monitoring of the aquifer including the cumulative impacts of any nutrient source upgradient and downgradient of the permitted dischargers. These data are available to the public and used by DEQ to update future permit limitations. In addition, any update to limitations, including cumulative effect analyses, will be noticed to the public and will undergo public comment. Long-term monitoring, reporting, renewed analysis and updates of permit conditions, and public notice and comment procedures is a public benefit to having a system that is covered under a pollution control system permit.

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

4.0 MIXING ZONE

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

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

$$Q_{gw} = KIA$$

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

The applicant requested a source specific mixing zone for this discharge. The source specific mixing zone extends from each RIB by 305 feet. The radial source specific mixing zone accounts for the radial flow resulting from the ground water mound and will ensure setbacks are maintained at an appropriate distance from the mound.

However, only a portion of the source specific mixing zone will be used for dilution purposes; the portion that demonstrably flows to surface water. This is protective because it assumes that the entire discharge will flow to surface water and uses overall less dilution, leading to more stringent effluent limits. Biotic processes and attenuation are not considered as part of the effluent limit calculation.

A schematic of the proposed mixing zone is provided in **Figure 19**. The volume of available dilution is represented by the red outline.

Figure 19: Mixing zone schematic. The yellow rectangle is a RIB, and the blue cylinder is the source specific mixing zone extending from the RIB with a radius of 305 ft. The red box *A* is the cross-sectional area of a downgradient slice of aquifer, where *b* is the aquifer thickness and *w* is an estimate of the width of the mixing zone that will travel to surface water.

The cross-sectional area is found by multiplying the downgradient width of the mixing zone, which is typically the width of the source in the direction of ground water flow plus the tangent of the dispersion angle on both sides, by the aquifer thickness. A standard dispersion angle of 5 degrees was used for 002

and 003, but WET found a dispersion angle of 12.5 degrees to be more appropriate for 001 (**Table 7**; **Appendix A**).

A summary of aquifer characteristics, mixing zone dimensions, and dilution calculations are provided in **Table 7**. See **Figure 20** for the dilution area illustrated over the source-specific mixing zone. The aquifer test information is provided in **Appendix A.**

Required ground water monitoring will lead to more information regarding the effects the mound will have on dilution and effluent concentrations downgradient. Future permits may address the suitability of the circular source specific mixing zone and reevaluate the geometry of the portion used for dilution.

Modern drainfield systems are designed to minimize the likelihood of the subsurface transport of pathogenic bacteria. Pathogens are a direct existential threat to public and environmental health. In general, DEQ recognizes that replacement of older drainfields with a newly designed one may have environmental benefits.

Table 7: Hydrogeologic and Mixing Zone Information		
All Outfalls		
Parameter	**Units**	**Value**
Mixing Zone Type	-	Source Specific
Authorized Parameters	-	Total Nitrogen
Ambient Ground Water Concentrations, Nitrate + Nitrite	mg/L	0.11
Hydraulic Conductivity (K)	feet/day	49.0
Hydraulic Gradient (I)	ft/ft	0.0030
Outfall 001		
Ground Water Flow Direction	azimuth/bearing	N 15° E
Length of Mixing Zone	feet	305
Thickness of Mixing Zone	feet	15
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	225
Dispersion angle	degrees	12.5
Width of Mixing Zone at Down Gradient Boundary	feet	360
Cross Sectional Area of Mixing Zone (A)	ft^2	5,404
Volume of Ground Water Available for Mixing (Q_{gw})	ft^3/day	794
Outfall 002		
Ground Water Flow Direction	azimuth/bearing	S 50° W
Length of Mixing Zone	feet	305
Thickness of Mixing Zone	feet	15
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	450
Dispersion angle	degrees	5
Width of Mixing Zone at Down Gradient Boundary	feet	503
Cross Sectional Area of Mixing Zone (A)	ft^2	7,551
Volume of Ground Water Available for Mixing (Q_{gw})	ft^3/day	1,110
Outfall 003		
Ground Water Flow Direction	azimuth/bearing	S 40° W
Length of Mixing Zone	feet	305
Thickness of Mixing Zone	feet	15
Outfall Width, Perpendicular to Ground Water Flow Direction	feet	700
Dispersion angle	degrees	5
Width of Mixing Zone at Down Gradient Boundary	feet	753
Cross Sectional Area of Mixing Zone (A)	ft^2	11,301
Volume of Ground Water Available for Mixing (Q_{gw})	ft^3/day	1,661

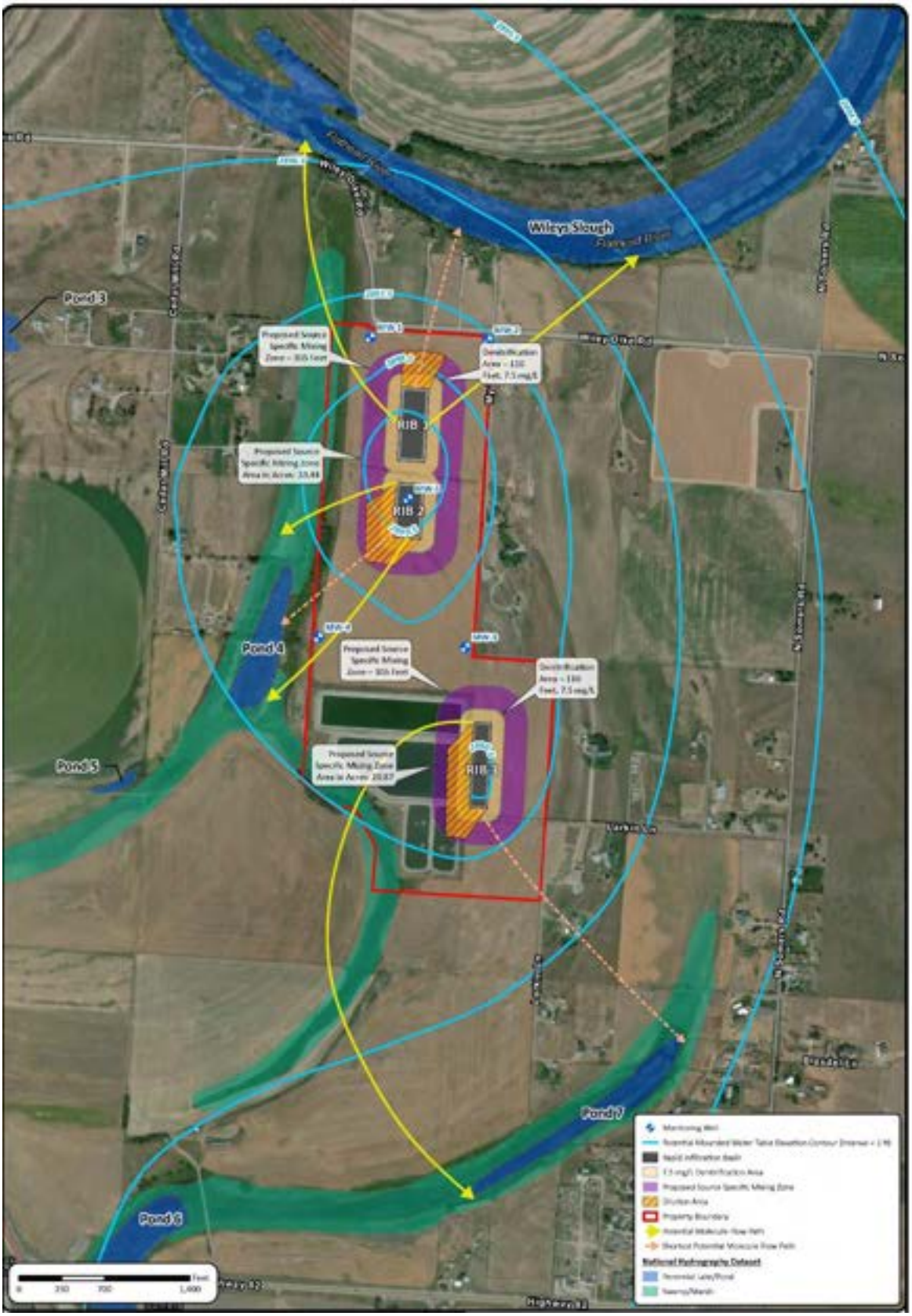

Figure 20: Mixing zone map with dilution area in orange.

5.0 LIMITATIONS

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

5.1 NITROGEN

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

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

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

Where Q_{gw} = ground water available for mixing; C_{gw} = ambient receiving ground water concentration; Q_{eff} = design capacity of wastewater system; C_{eff} = effluent pollutant concentration; Q_{comb} = combined ground water and effluent volume; and, C_{proj} = projected pollutant concentration (after available dilution).

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

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

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

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

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

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

See **Appendix E** for the total nitrogen effluent limit calculations. See **Table 8** for final effluent limitations.

DEQ evaluates and recalculates the limits using updated water quality data as part of every permit renewal cycle. In this way, DEQ protects the receiving water quality by continually assessing impacts to the receiving water.

5.2 PHOSPHORUS

As discussed in **Section 3.3.2**, the phosphorus breakthrough analysis estimated the phosphorus breakthrough to occur in 30 years for 001 and 46 years for 002. Therefore, a limit has been developed for Outfalls 001 and 002 based on a predicted 50-year breakthrough. This will prevent degradation of downgradient surface water to ensure that changes in water quality are nonsignificant. The phosphorus breakthrough analysis and supporting calculations are provided in **Appendix D**.

To develop the total phosphorus limits, DEQ back-calculates the annual load required to produce a 50-year breakthrough given the adsorption capacity of the soils between the source and surface waters. This is described by the following equation:

$$Pt = \frac{P1}{BT}$$

Where Pt is the total phosphorus load (lbs/yr), $P1$ is the total phosphorus adsorption of soils (lbs), and BT is the breakthrough time of 50 years.

See **Appendix F** for total phosphorus calculations. See **Table 8** for the final effluent limits.

5.3 FINAL EFFLUENT LIMITATIONS

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

Table 8: Final Effluent Limitations

Outfall	Parameter	Units	Quarterly Average	Annual Average
001	Nitrogen, Total (as N)	lbs/day	5.4	-
	Phosphorus, Total (as P)	lbs/year	-	291
002	Nitrogen, Total (as N)	lbs/day	4.3	-
	Phosphorus, Total (as P)	lbs/year	-	337
003	Nitrogen, Total (as N)	lbs/day	4.5	-
	Phosphorus, Total (as P)	lbs/year	-	-

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

6.0 MONITORING AND REPORTING

6.1 EFFLUENT MONITORING

Long-term monitoring and reporting of wastewater and ground water will be established as a condition of the permit. Monitoring of the wastewater characteristics before and after treatment will help ensure operation, maintenance, and compliance with the permit limitations. Wastewater monitoring and reporting requirements are provided in **Table 9**. The permittee must develop and implement a Wastewater Sampling, Analysis, and Reporting Operation Manual. This manual is further discussed in **Section 7.1**.

Table 9: Influent and Effluent Monitoring and Reporting Requirements

Analyte/Measurement	Monitor Location	Units	Sample Type(1)	Minimum Sample Frequency	Reporting Requirements(1)(2)	Report Frequency
Escherichia coli Bacteria	INF-00A EFF-00A	CFU/100ml	Grab	1/Month	Monthly Average(3)	Monthly
Flow Rate, Effluent(4)	FM-001 FM-002 FM-003	gal/day	Contin-uous	Contin-uous	Daily Maximum Monthly Average(5)	Monthly
	FM-001 FM-002 FM-003	gal/month	Contin-uous	Contin-uous	Monthly Total	Monthly
	FM-001 FM-002 FM-003	gal/year	Contin-uous	Contin-uous	Annual Total	Annually(9)
Nitrogen, Nitrite+Nitrate [as N]	INF-00A EFF-00A	mg/L	Grab	1/Month	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Ammonia [as N]	INF-00A EFF-00A	mg/L	Grab	1/Month	Daily Maximum Monthly Average	Monthly
Nitrogen, Total Kjeldahl (TKN)[as N]	INF-00A EFF-00A	mg/L	Grab	1/Month	Daily Maximum Monthly Average	Monthly
Nitrogen, Total [as N](6)	INF-00A EFF-00A	mg/L	Calculate	1/Month	Daily Maximum Monthly Average	Monthly
	EFF-001 EFF-002 EFF-003	lbs/day(7)	Calculate	1/Month	Daily Maximum Monthly Average	Monthly
Phosphorus, Total [as P]	INF-00A EFF-00A	mg/L	Grab	1/Month	Daily Maximum Monthly Average	Monthly
	EFF-001	lbs/day(7)	Calculate	1/Month	Monthly Average	Monthly
	EFF-002 EFF-003	lbs/year(8)	Calculate	1/Month	Annual Average	Annually(9)

Footnotes:
See **Table 1** for a description of the different monitoring locations.
CFU = Colony Forming Units
If no discharge occurs throughout the reporting period, "no discharge" shall be recorded on the wastewater Discharge Monitoring Report (DMR) report forms.
Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above or within a deviation authorized by DEQ.
(1) See definitions in Part V of the permit unless defined within this table or by a permit condition.
(2) Monthly Average: The average of all individual daily concentrations (mg/L) analyzed during the monthly reporting period.
(3) The geometric mean must be reported if multiple samples are taken during a reporting period.
(4) Requires recording device and/or totalizing meter. Equipment must be capable of recording daily, quarterly, and annual effluent volumes.
(5) Monthly Average Flows: determine total flows (gal/month) that occurred during the month reporting period. Divide total flow by the number of calendar days in the monthly reporting period to get a unit of daily flow (gal/day).

(6) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
(7) Monthly Load Calculation. Determine concentration (mg/L): use the average of all individual daily concentrations (mg/L) analyzed during the monthly reporting period. Determine totalized monthly flows (gal/month): total flow that occurred during the monthly reporting period. Convert to a daily flow average (gal/day): divide the total quarterly flow (gal/month) by the total calendar days (days) of the monthly reporting period. Calculate monthly load (lbs/day): concentration (mg/L) x flow (gal/day) x [$8.34x10^{-6}$].
(8) Annual Load Calculation. Determine concentration (mg/L): use the average of all reported daily concentrations (mg/L) reported during the annual reporting period. Determine totalized annual flows (gal/year): total flow that occurred during the annual reporting period. Convert to daily flows (gal/day): divide the total annual flow (gal/year) by the total calendar days (days) of the reporting annual period. Calculate annual load (lbs/year): = concentration (mg/L) x flow (gal/day) x [8.34×10^{-6}] x 365 (days/year).
(9) Annual average load and annual flows shall be reported (DMR) on an annual basis (due January 28 each year of the permit cycle).

6.2 GROUND WATER MONITORING

Ground water monitoring will provide DEQ with ongoing information on the current and future health of the aquifer. Ground water monitoring and reporting requirements are provided in **Table 10**. The permittee must develop and implement a Ground Water Monitoring, Analysis, and Reporting Operational Manual. This manual is further discussed in **Section 7.3**.

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

Table 10: Ground Water Monitoring and Reporting Requirements

Analyte/Measurement	Monitor Location	Units	Sample Type(1)	Minimum Sampling Frequency	Reporting(2) Requirements	Report Frequency
Chloride [as Cl]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	mg/L	Grab	1/Month	Monthly Average	Monthly
Escherichia coli Bacteria	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	CFU/100ml	Grab	1/Month	Monthly Average(3)	Monthly
Nitrogen, Nitrite + Nitrate [as N]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total Ammonia [as N]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	mg/L	Grab	1/Month	Monthly Average	Monthly
Nitrogen, Total Kjeldahl (TKN)[as N]	MW-1 MW-2 MW-3 MW-4 MW-6	mg/L	Grab	1/Month	Monthly Average	Monthly

	MW-7					
Nitrogen, Total [as N][4]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	mg/L	Calculate	1/Month	Monthly Average	Monthly
Specific Conductivity @ 25°C	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	µS/cm	Grab or Instant-aneous	1/Month	Monthly Average	Monthly
Temperature	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	°C	Instant-aneous	1/Month	Monthly Average	Monthly
Static Water Level (SWL)[5]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	ft-bmp	Instant-aneous	1/Month	Monthly Average	Monthly
Well Depth[5]	MW-1 MW-2 MW-3 MW-4 MW-6 MW-7	ft-bmp	Instant-aneous	1/Month	Monthly Average	Monthly

Footnotes:
CFU = Colony Forming Units
ft-bmp = feet below measuring point
Monitoring for MW-1, MW-2, MW-3, and MW-4 commences upon the permit effective date.
Monitoring for MW-6 and MW-7 shall commence on the Completion Date listed in the Compliance Table.
A description of each monitoring well can be found in **Table 2** of the Fact Sheet.
At no time shall the permittee mark or state "no discharge" on any monitoring well DMR form.
Each monitor well to be individually monitored and sampled for the analyte and measurements respectively listed.
If any monitoring well(s) are abandoned, destroyed or decommissioned, or are no longer able to be sampled due to fluctuations in the ground water table; the permittee shall install a new well to replace the abandoned, destroyed, decommissioned, or non-viable well(s).
Parameter analytical methods shall be in accordance with the Code of Federal Regulations, 40 CFR Part 136, unless specified above.
Samples must not be collected until after the well casing is properly purged as determined by the DEQ approved Ground Water Monitoring Operational Manual.
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) See definitions in Part V of the permit unless defined within this table or by a permit condition.
(2) Monthly Average: The average of all individual daily concentrations (mg/L) analyzed during the monthly reporting period.
(3) The geometric mean must be reported if more than one sample is taken during a reporting period.
(4) Total Nitrogen is the sum of Nitrate + Nitrite and Total Kjeldahl Nitrogen.
(5) Measuring point (point of reference) for SWL measurements shall be from top of inner casing or as established by the Operational Manual and measured to within 1/100th of one foot.

7.0 SPECIAL CONDITIONS

7.1 SEPTAGE HANDLING AND TREATMENT OPERATION MANUAL

The permittee shall use best management practices (BMPs) in developing standard operating procedures (SOPs) for handling and treating high-strength influent from septage pumpers. The manual needs to be site-specific and maintained at the facility at all times. The manual must include procedures for:

- Handling and treating the septage.
- Ensuring that there are no unexpected wastes in the septage, including: industrial wastes, chemicals or chemical dumping, or any other wastes that may be injurious to the treatment system and/or receiving water.
- Equalizing the high-strength septage into the residential-strength municipal waste stream.
- General safety for operational personnel.

The completion and submittal date for the manual is listed in **Section 8.0.** The manual must be reviewed and approved by DEQ prior to implementation. Influent monitoring requirements are detailed in **Section 6.1**. All subsequent amended manuals must be reported to DEQ within 30 calendar days.

7.2 WASTEWATER SAMPLING, ANALYSIS, AND REPORTING OPERATION MANUAL

The permittee shall use BMPs in developing SOPs for sampling, analyzing, and reporting wastewater characteristics from the wastewater system. The manual needs to be site-specific and result in monitoring and reporting that is representative of the nature of the wastewater streams. The manual must be used as a guide in:

- Equipment calibration.
- Preparing and collecting wastewater influent (INF-00A) and effluent (EFF-00A) wastewater samples.
- Analyte calculations (**Table 9**).
- Recording and reporting wastewater characteristics.
- Recording and reporting wastewater flows (FM-001, FM-002, FM-003)
- Calculating and reporting wastewater loads (EFF-001, EFF-001, EFF-003).

The completion and submittal date for the manual is listed in **Section 8.0.** The manual must be reviewed and approved by DEQ prior to implementation. The permittee shall maintain a copy of the operational manual, sampling, and calibration records at the facility at all times. Wastewater monitoring requirements are detailed in **Section 6.1**. All subsequent amended manuals must be reported to DEQ within 30 calendar days.

7.3 GROUND WATER MONITORING, ANALYSIS, AND REPORTING OPERATIONAL MANUAL

The permittee shall use Best Management Practices (BMPs) in developing SOPs (Standard Operating Procedures) for sampling, analyzing, and reporting ground water characteristics. The SOP manual must be site-specific and result in monitoring and reporting that is representative of the nature of the shallow ground water bearing zone. The manual must provide for consistent identification, development,

monitoring, sampling, calculating, recording, and reporting of the monitoring wells. The manual must provide guidance on determining and documenting dry-well occurrences; and determining future well viability. DEQ recommends using the Montana Bureau of Mines and Geology Open-File Report 746 titled Standard Procedures and Guidelines for Field Activities (MBMG, 2021) as a reference in developing a site-specific operational manual.

The completion and submittal date of the manual is listed in **Section 8.0**. The manual must be reviewed and approved by DEQ prior to implementation. The permittee shall maintain a copy of the manual, monitoring well development records, dry well occurrence records, sampling records, and calibration records at the facility at all times. Ground water monitoring requirements are discussed in **Section 6.2**. All subsequent amended manuals must be reported to DEQ within 30 calendar days.

7.4 MONITORING WELL INSTALLATION PLAN

Submit for approval an installation plan for a minimum of two additional monitoring wells. At least one monitoring well (MW-6) must be built on or near the downgradient boundary of the proposed mixing zone between RIB #2 and Pond 4. At least one monitoring well (MW-7) must be built on or near the downgradient boundary of the proposed mixing zone extending from RIB #3 in the direction of Pond 7. Well locations should take setbacks into account. The well must be constructed to be representative of ground water occurring in the top twenty feet of the shallow aquifer or as otherwise approved.

The plan needs to be approved prior to installation of the monitoring well(s). All monitoring wells must be secured, maintained, labeled, and monitored for long-term viability. The completion and submittal date of the plan is listed in **Section 8.0**.

The installation date for the additional monitoring wells is also provided in **Section 8.0**. A post construction report documenting lithology, drilling and construction techniques, well construction information and diagram, surveyed spatial location and measuring point is due two months after installation. All new wells must be reported to the Montana Bureau of Mining and Geology's Ground Water Information Center.

Installation and post construction reports are required for all subsequent well installation and modification actions.

DEQ recognizes the challenges faced with well installation efforts in the field. Upon approval, modification to the plan can be made when challenging field conditions occur.

7.5 MONITORING WELL VIABILITY

The permittee shall monitor and collect representative ground water samples from the receiving ground water aquifer. If any of the wells are abandoned, destroyed, decommissioned, or non-viable; or are no longer able to be monitored due to obstructions or fluctuations in the ground water table; the permittee shall rehab the non-viable well or replace with the installation of a new well.

7.6 MONITORING WELL REPLACEMENT, REHABILITATION, AND ABANDONMENT

If for any reason a monitoring well needs to be replaced, rehabilitated, or abandoned, the permittee shall submit a plan to DEQ for approval prior to the action taking place. The plan must document

existing site-specifics and the reasoning behind the proposed action. The plan must detail the specific steps to take place during deconstruction, drilling, workover, and/or construction of the respective wells.

Written permission from DEQ is needed prior to the abandonment of any monitoring well. At minimum, monitoring well abandonment activities must be done in accordance with ARM 36.21.810(2-5). If the monitoring well is located in or around any collection, storage, treatment, disposal, land application, and/or mixing zone workings (or similar) additional actions may be required to prevent preferential subsurface flows, cross contamination, and to mitigate against any unauthorized wastewater releases. All new well installations must have detailed drilling, lithology, geospatial, and well construction information. A follow-up report summarizing all actions and details must be submitted to DEQ within 30 calendar days.

8.0 COMPLIANCE SCHEDULE

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

Table 11: Compliance Schedule

Action	Frequency	Completion Date of Action	Reporting Due Date
Develop and implement a **Septage Handling and Treatment Operation Manual**.	Single event	Within one (1) year of the effective date of the permit or upon finalizing the WWTP design, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Develop and implement a **Wastewater Sampling, Analysis, and Reporting Operation Manual.**	Single event	Within one (1) year of the effective date of the permit or upon finalizing the WWTP design, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Develop and implement a **Ground Water Monitoring, Analysis, and Reporting Operational Manual.**	Single event	Within one (1) year of the effective date of the permit or upon finalizing the WWTP design, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Complete a **Monitoring Well Installation Plan**.	Single event	Within one (1) year of the effective date of the permit or upon finalizing the WWTP	Due on or before the 28th day of the month following the completion date.

		design, whichever is sooner.	
Complete the installation of the monitoring well(s).	Single event	Within two (2) years of the effective date of the permit or prior to finalizing the WWTP construction, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Commence monitoring and reporting of the newly installed monitoring well(s).	Single event	Within two (2) years of the effective date of the permit or prior to commencing discharge, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Complete a **Monitoring Well Installation Report**.	Single event	Within two (2) years of the effective date of the permit or prior to commencing discharge, whichever is sooner.	Due on or before the 28th day of the month following the completion date.
Complete a **Well Abandonment Report.**	Single event	Within two (2) years of the effective date of the permit or prior to finalizing the WWTP construction, whichever is sooner.	Due on or before the 28th day of the month following the completion date.

9.0 PUBLIC NOTICE

Legal notice information for water quality discharge permits is 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 **December XX, 2024**. Comments may be directed to DEQWPBPublicComments@mt.gov or to

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

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

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

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

Any person interested in being placed on the mailing list for information regarding this permit may contact the DEQ Water Protection Bureau at (406) 444-5546 or email DEQWPBPublicComments@mt.gov. All inquiries will need to reference the permit number (MTX000307), and include the following information: name, address, and phone number.

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

10.0 REFERENCES

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

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Department of Environmental Quality, Water Quality Circulars:
- Circular DEQ-2 – Design Standards for Wastewater Facilities.
  - Appendix A: Handling and Treatment of Septage at a Wastewater Treatment Plant
- 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.

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APPENDIX A TECHNICAL MEMORANDUM, WET 2024

See Page 70.

APPENDIX B NITRATE DILUTION PROJECTIONS

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

Montana Ground Water Pollution Control System

Ground Water Dilution Projection (GWDP) - Nondegradation Significance Analysis

These projections estimate the parameter concentrations in the aquifer downgradient of the subsurface discharge. After dilution with ground water, the projected concentration is compared to the respective significance criteria in determining nonsignificant changes in water quality (ARM 17.30.715).

Site Name:	LCWSD Rapid Infiltration System
Location:	Wiley Dike Rd, Kalispell, MT 59901
Permit #:	MTX000307, **Outfall 001 (RIB #1)**
Notes:	Design Capacity = 80,000 gpd; 10,694 ft^3/d
	These calculations are for the following parameter of interest: Nitrate
	These calculations use the most restrictive ground water standard.
	These calculations do not credit potential losses due to chemical transformation.
	These calculations do not credit potential losses due to attenuation.

Projected Concentration Calculation

$$Cr = \frac{(Qd)(Cd) + (Qs)(Cs)}{Qd + Qs}$$

The Activity is Not Significant if Cr < Significance Criteria

GWDP(a) - Ground Water Nitrate Projection at the End of the Mixing Zone.

Qd =	**10694**	ft^3/d	Design capacity - effluent flow rate
Cd =	**8.0**	mg/L	Concentration - effluent (treated wastewater)
	305	ft	Length of ground water dilution zone
	15	ft	Thickness of dilution zone
	225	ft	Outfall width, perpendicular to ground water flow direction
	12.5	°	Dispersion angle
	360	ft	Projected width of downgradient dilution zone
	5404	ft^2	Cross sectional area of dilution zone (A)
	49	ft/d	Hydraulic conductivity (K)
	0.0030	ft/ft	Hydraulic gradient (I)
Qs(Qgw) =	**794**	ft^3/d	Ground water volume (Qgw)
Cs =	**0.105**	mg/L	Ambient nitrate concentration in ground water
Cr =	**7.45**	mg/L	Projected concentration - end of the mixing zone
Sign. Criteria =	**7.5**	mg/L	Nonsignificance Criteria, ARM 17.30.715
Sign. Activity?	**< 7.5**	mg/L	**The activity is not significant**

By Melinda Horne, July 2024

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

Montana Ground Water Pollution Control System

Ground Water Dilution Projection (GWDP) - Nondegradation Significance Analysis

These projections estimate the parameter concentrations in the aquifer downgradient of the subsurface discharge. After dilution with ground water, the projected concentration is compared to the respective significance criteria in determining nonsignificant changes in water quality (ARM 17.30.715).

Site Name:	LCWSD Rapid Infiltration System
Location:	Wiley Dike Rd, Kalispell, MT 59901
Permit #:	MTX000307, **Outfall 002 (RIB #2)**
Notes:	Design Capacity = 60,000 gpd; 8,021 ft^3/d
-	These calculations are for the following parameter of interest: Nitrate
-	These calculations use the most restrictive ground water standard.
-	These calculations do not credit potential losses due to chemical transformation.
-	These calculations do not credit potential losses due to attenuation.

Projected Concentration Calculation

$$Cr = \frac{(Qd)(Cd) + (Qs)(Cs)}{Qd + Qs}$$

The Activity is Not Significant if Cr < Significance Criteria

GWDP(a) - Ground Water Nitrate Projection at the End of the Mixing Zone.

Qd =	**8021**	ft^3/d	Design capacity - effluent flow rate
Cd =	**8.0**	mg/L	Concentration - effluent (treated wastewater)
	305	ft	Length of ground water dilution zone
	15	ft	Thickness of dilution zone
	450	ft	Outfall width, perpendicular to ground water flow direction
	5	°	Dispersion angle
	503	ft	Projected width of downgradient dilution zone
	7551	ft^2	Cross sectional area of dilution zone (A)
	49	ft/d	Hydraulic conductivity (K)
	0.0030	ft/ft	Hydraulic gradient (I)
Qs(Qgw) =	**1110**	ft^3/d	Ground water volume (Qgw)
Cs =	**0.105**	mg/L	Ambient nitrate concentration in ground water
Cr =	**7.04**	mg/L	Projected concentration - end of the mixing zone
Sign. Criteria =	**7.5**	mg/L	Nonsignificance Criteria, ARM 17.30.715
Sign. Activity?	**<7.5**	mg/L	**The activity is not significant**

By Melinda Horne, July 2024

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

Montana Ground Water Pollution Control System

Ground Water Dilution Projection (GWDP) - Nondegradation Significance Analysis

These projections estimate the parameter concentrations in the aquifer downgradient of the subsurface discharge. After dilution with ground water, the projected concentration is compared to the respective significance criteria in determining nonsignificant changes in water quality (ARM 17.30.715).

Site Name:	LCWSD Rapid Infiltration System
Location:	Wiley Dike Rd, Kalispell, MT 59901
Permit #:	MTX000307, **Outfall 003 (RIB #3)**
Notes:	Design Capacity = 60,000 gpd; 8,021 ft^3/d
-	These calculations are for the following parameter of interest: Nitrate
-	These calculations use the most restrictive ground water standard.
-	These calculations do not credit potential losses due to chemical transformation.
-	These calculations do not credit potential losses due to attenuation.
-	

Projected Concentration Calculation

$$Cr = \frac{(Qd)(Cd) + (Qs)(Cs)}{Qd + Qs}$$

The Activity is Not Significant if Cr < Significance Criteria

GWDP(a) - Ground Water Nitrate Projection at the End of the Mixing Zone.

Qd =	**8021**	ft^3/d	Design capacity - effluent flow rate
Cd =	**8.0**	mg/L	Concentration - effluent (treated wastewater)
	305	ft	Length of ground water dilution zone
	15	ft	Thickness of dilution zone
	700	ft	Outfall width, perpendicular to ground water flow direction
	5	°	Dispersion angle
	753	ft	Projected width of downgradient dilution zone
	11301	ft^2	Cross sectional area of dilution zone (A)
	49	ft/d	Hydraulic conductivity (K)
	0.0030	ft/ft	Hydraulic gradient (I)
Qs(Qgw) =	**1661**	ft^3/d	Ground water volume (Qgw)
Cs =	**0.105**	mg/L	Ambient nitrate concentration in ground water
Cr =	**6.65**	mg/L	Projected concentration - end of the mixing zone
Sign. Criteria =	**7.5**	mg/L	Nonsignificance Criteria, ARM 17.30.715
Sign. Activity?	**<7.5**	mg/L	**The activity is not significant**

By Melinda Horne, July 2024

APPENDIX C NITRATE ATTENTUATION PROJECTIONS

GW Velocity and Travel Time

Darcy's Law: $GW_v = K * I / n$

K =	49.5	ft/dy
I =	0.003	ft/ft
n =	0.1	low
	0.46	high
GW_v =	0.32	ft/d low
	1.49	ft/d high
	0.90	**ft/d average**

Effective Porosity (Woessner)

Type of Bedrock/Unconsolidated Sediment	Range of n	
Limestone/Dolomite	0.01	0.24
Sandstone	0.10	0.30
Siltstone	0.21	0.41
Clay	0.01	0.18
Silt	0.01	0.39
Sand, fine	0.01	0.46
Sand, medium	0.16	0.46
Sand, coarse	0.18	0.43
Gravel	0.13	0.44

	RIB to end of SSMZ	RIB #1 to Wiley Slough	RIB #2 to Pond 4	RIB #3 to Pond 7
Distance (ft)	305	1335	1160	2540
Travel time (days)	337	1477	1283	2810
Travel time (years)	0.9	4.0	3.5	7.7

Footnotes:

t *travel/residence time*
GW_v *ground water velocity*
K *Hydraulic Conductivity*
I *Hydraulic Gradient*
n *Porosity (effective)*

Conservative, equation considers only horizontal movement
Distance = feet to downgradient (gaining) surface water
Time = travel/residence time in the aquifer
Effective porosity is based on aquifer lithology
Choose porosity based on the primary (major) sediment of the matrix
Use both the low and high porosity values (when a range is provided)
Sources: Brady and Weil, 2002; Woessner and Poeter, 2021.

First-Order Denitrification Rate for Nitrogen (Horizontal Flow)		
0.004 to 2.27	1/day	McCray, Kirkland
0.0065	1/day @ 25th percentile	DEQ, Regensburger

0.275 mg/L	TN standard for surface water
0.01 mg/L	Typical detection level
0.11 mg/L	Ambient level

Integrated Rate Law - First Order Reaction

$\ln[A]_t - \ln[A]_o = -kt$

$(\ln[A]_t - \ln[A]_o) / -k = t$

Rearranged to graph line

First order decline = straight line: y = mx + b

$\ln[A]_t = -kt + \ln[A]_o$

ln	*Natural log*
$[A]_o$	*Initial concentration*
$[A]_t$	*Future concentration*
t	*Travel/residence time*
k	*Decay rate constant*
GW_v	*Ground water velocity*

Total reduction		
$[A]_o$	8	%
$[A]_{t\text{-}MZ}$	0.9	88.75
$[A]_{t\text{-}max}$	0.275	96.56
$[A]_{t\text{-}min}$	0.01	99.88
Range of Reduction %		
	88.75	**99.88**

Time for Reduction to 0.275 mg/L		
$[A]_o$	8	mg/l
$[A]_t$	0.275	mg/l
k	0.0065	1/day
t	**519**	days
Distance for Reduction to 0.275 mg/L		
GW_v avg	0.90	ft/day
Distance avg	**469**	**ft**

Time for Reduction to 0.01 mg/L		
$[A]_o$	8	mg/l
$[A]_t$	0.01	mg/l
k	0.0065	1/day
t	**1028**	days
Distance for Reduction to 0.01 mg/L		
GW_v avg	0.90	ft/day
Distance avg	**930**	**ft**

Denitrification at 305 ft		
$[A]_o$	8	mg/l
$[A]_t$	0.9	mg/l
k	0.0065	1/day
t	**336**	days
Distance for Reduction to 0.9 mg/L		
GW_v avg	0.90	ft/day
Distance avg	**304**	**ft**

Footnotes:
LRL = lab reporting level
RRV = DEQ Circular 7 required reporting value
Conservative, equation considers only horizontal movement
Sources: Brady and Weil, 2002; Kirkland, 2001; Martin and Focht, 1977; McCray et al., 2005; McCray et al., 2009; Parry et al., 2000; & Woessner and Poeter, 2020.

APPENDIX D PHOSPHORUS BREAKTHROUGHS

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME:	LCWSD Rapid Infiltration System - Outfall 001 (RIB #1)
COUNTY:	Flathead
Permit #:	MTX000307
NOTES:	Variables used are based on WET's Technical Memo (2024).
	Design Capacity = 80,000 gpd = 10,694 ft^3/day
	Design total phosphorus concentration = 2.00 mg/L

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	225	ft
L	Length of Primary Drainfield's Long Axis	300	ft
W	Width of Primary Drainfield's Short Axis	225	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	4	ft
D	Distance from Drainfield to Surface Water	1335	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils,	1.0	ft
Ne	1.0 ft for fine soils)**		
Sw	Soil Weight (usually constant)	100	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200	ppm
#l	Number of proposed wastewater treatment systems	1	
CONSTANTS			
Pl	Phosphorous Load per proposed wastewater treatment system	487	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (Pl)(#l)	487	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	27000000	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	45631969	lbs
P1	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	14526	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	**30**	**years**

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

By Melinda Horne, July 2024

REV. 04/2000

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME:	LCWSD Rapid Infiltration System - Outfall 002 (RIB #2)
COUNTY:	Flathead
Permit #:	MTX000307
NOTES:	Variables used are based on WET's Technical Memo (2024).
	Design Capacity = 60,000 gpd = 8,021 ft^3/day
	Design total phosphorus concentration = 2.00 mg/L

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	450	ft
L	Length of Primary Drainfield's Long Axis	450	ft
W	Width of Primary Drainfield's Short Axis	113	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	4	ft
D	Distance from Drainfield to Surface Water	1160	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils, 1.0 ft for fine soils)**	1.0	ft
Ne			
Sw	Soil Weight (usually constant)	100	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200	ppm
#I	Number of proposed wastewater treatment systems	1	
CONSTANTS			
Pl	Phosphorous Load per proposed wastewater treatment system	366	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (Pl)(#I)	366	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	20250000	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	63974000	lbs
P1	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	16845	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	46	years

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

By Melinda Horne, July 2024

REV. 04/2000

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME:	LCWSD Rapid Infiltration System - Outfall 003 (RIB #3)
COUNTY:	Flathead
Permit #:	MTX000307
NOTES:	Variables used are based on WET's Technical Memo (2024).
	Design Capacity = 60000 gpd = 8,021 ft^3/day
	Design total phosphorus concentration = 2.00 mg/L

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	700	ft
L	Length of Primary Drainfield's Long Axis	700	ft
W	Width of Primary Drainfield's Short Axis	145	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	4	ft
D	Distance from Drainfield to Surface Water	2540	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils, 1.0 ft for fine soils)**	1.0	ft
Ne			
Sw	Soil Weight (usually constant)	100	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200	ppm
#I	Number of proposed wastewater treatment systems	1	
CONSTANTS			
Pl	Phosphorous Load per proposed wastewater treatment system	366	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (Pl)(#I)	366	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	40600000	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	234251500	lbs
P1	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	54970	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	150	years

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

By Melinda Horne, July 2024

REV. 04/2000

APPENDIX E TOTAL NITROGEN WQBEL DEVELOPMENT

MASS BALANCE EQUATION ALLOWABLE DISCHARGE CONCENTRATION DETERMINATION		
	L = C2 (mg/L) Q2 (gpd) Fcon (8.34 x 10^{-6})	
L	**Load-based effluent limit (lbs/day)**	**5.37**
	C2 = [C3(Q1+Q2)-C1Q1] / Q2	
C1	Ambient ground water (background) concentration (mg/L)	0.11
C2	**Allowable discharge concentration (mg/L)**	**8.05**
C3	Ground water concentration limit for pollutant (from Circular WQB-7) at the end of the mixing zone.	7.50
Q1	Ground water volume (ft3/day)	**794**
Q2	Average flow of discharge (design capacity of system in ft3/day)	10694
	Q1 = K I A	
Q1	**Ground water flow volume (ft3/day)**	**794**
K	hydraulic conductivity (ft/day)	49
I	hydraulic gradient (ft/ft)	0.0030
A	cross-sectional area (ft2) of flow at the down-gradient boundary of a standard 500-foot mixing zone.	5404
Outfall 001 - MTX000307, July 2024		

MASS BALANCE EQUATION ALLOWABLE DISCHARGE CONCENTRATION DETERMINATION		
	L = C2 (mg/L) Q2 (gpd) Fcon (8.34 x 10^{-6})	
L	**Load-based effluent limit (lbs/day)**	**4.26**
	C2 = [C3(Q1+Q2)-C1Q1] / Q2	
C1	Ambient ground water (background) concentration (mg/L)	0.11
C2	**Allowable discharge concentration (mg/L)**	**8.52**
C3	Ground water concentration limit for pollutant (from Circular WQB-7) at the end of the mixing zone.	7.50
Q1	Ground water volume (ft3/day)	**1110**
Q2	Average flow of discharge (design capacity of system in ft3/day)	8021
	Q1 = K I A	
Q1	**Ground water flow volume (ft3/day)**	**1110**
K	hydraulic conductivity (ft/day)	49
I	hydraulic gradient (ft/ft)	0.0030
A	cross-sectional area (ft2) of flow at the down-gradient boundary of a standard 500-foot mixing zone.	7551
Outfall 002 - MTX000307, July 2024		

MASS BALANCE EQUATION ALLOWABLE DISCHARGE CONCENTRATION DETERMINATION		
	L = C2 (mg/L) Q2 (gpd) Fcon (8.34 x 10^{-6})	
L	**Load-based effluent limit (lbs/day)**	**4.52**
	C2 = [C3(Q1+Q2)-C1Q1] / Q2	
C1	Ambient ground water (background) concentration (mg/L)	0.11
C2	**Allowable discharge concentration (mg/L)**	**9.03**
C3	Ground water concentration limit for pollutant (from Circular WQB-7) at the end of the mixing zone.	7.50
Q1	Ground water volume (ft3/day)	**1661**
Q2	Average flow of discharge (design capacity of system in ft3/day)	8021
	Q1 = K I A	
Q1	**Ground water flow volume (ft3/day)**	**1661**
K	hydraulic conductivity (ft/day)	49
I	hydraulic gradient (ft/ft)	0.0030
A	cross-sectional area (ft2) of flow at the down-gradient boundary of a standard 500-foot mixing zone.	11301
Outfall 003 – MTX000307, July 2024		

APPENDIX F TOTAL PHOSPHORUS WQBEL DEVELOPMENT

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

PHOSPHORUS WQBEL

SITE NAME:	LCWSD Rapid Infiltration System - Outfall 001 (RIB #1)
COUNTY:	
Permit #:	MTX000307
NOTES:	Variables used are based on WET's Technical Memo (2024).
-	Design Capacity = 80,000 gpd = 10,694 ft³/day
-	Design total phosphorus concentration = 2.00 mg/L

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	225	ft
L	Length of Primary Drainfield's Long Axis	300	ft
W	Width of Primary Drainfield's Short Axis	225	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	4	ft
D	Distance from Drainfield to Surface Water	1335	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils,	1.0	ft
Ne	1.0 ft for fine soils)**		
Sw	Soil Weight (usually constant)	100	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200	ppm
#I	Number of proposed wastewater treatment systems	1	
CONSTANTS			
PI	Phosphorous Load per proposed wastewater treatment system	487	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
BT	**Breakthrough Time to Surface Water**	**50**	yr
Pt	Total Phosphorous Load = (PI)(#I)	487	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	27000000	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	45631969	lbs
P1	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	14526	lbs
SOLUTION			
Pt	**Total Phosphorous Load = (P1)/(BT)**	**291**	**lbs/yr**

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

REV. 04/2000

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

PHOSPHORUS WQBEL

SITE NAME:	LCWSD Rapid Infiltration System - Outfall 002 (RIB #2)
COUNTY:	
Permit #:	MTX000307
NOTES:	Variables used are based on WET's Technical Memo (2024).
	Design Capacity = 60,000 gpd = 8,021 ft³/day
	Design total phosphorus concentration = 2.00 mg/L

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	450	ft
L	Length of Primary Drainfield's Long Axis	450	ft
W	Width of Primary Drainfield's Short Axis	113	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	4	ft
D	Distance from Drainfield to Surface Water	1160	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils,	1.0	ft
Ne	1.0 ft for fine soils)**		
Sw	Soil Weight (usually constant)	100	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200	ppm
#I	Number of proposed wastewater treatment systems	1	
CONSTANTS			
Pl	Phosphorous Load per proposed wastewater treatment system	366	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
BT	**Breakthrough Time to Surface Water**	**50**	yr
Pt	Total Phosphorous Load = (Pl)(#I)	366 2025000	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	0 6397400	lbs
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	0	lbs
P1	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	16845	lbs
SOLUTION			
Pt	**Total Phosphorous Load = (P1)/(BT)**	**337**	**lbs/yr**

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

REV. 04/2000

Appendix A – Technical Memorandum, WET 2024.

TECHNICAL MEMORANDUM

To: Melinda Horne, Montana DEQ

From: Brad Bennett, PG – Senior Hydrogeologist, Water & Environmental Technologies
Christina Eggensperger, MS – Project Engineer, Water & Environmental Technologies

Copy: Brad Koenig, PE – Robert Peccia & Associates
Rodney Olson, General Manager, Lakeside County Water & Sewer District

Date: February 14, 2024; updated May 7, 2024

Re: Non-Degradation Assessment – MGWPCS Permit Application Lakeside County Water Sewer District Rapid Infiltration System Permit MTX000307 (pending)

Introduction

Lakeside County Water and Sewer District (LCWSD) is in the process of designing a new sewage wastewater treatment facility to improve LCWSDs ability to treat wastewater and increase the systems overall capacity. As part of the facility upgrades LCWSD seeks to obtain a Montana Groundwater Pollution Control System (MGWPCS) permit from the Montana Department of Environmental Quality (DEQ) to allow for utilization of rapid infiltration (RI) basins discharging up to 200,000 gallons per day (GPD) of treated wastewater. Currently, LCWSD utilizes treatment lagoons and land application for disposal of municipal wastewater. Utilization of RI basins allows for year-round discharge and mitigates the need for additional storage facilities as LCWSDs service increases.

LCWSD is working with Robert Peccia and Associates (RPA) to complete design of the sewage treatment system. Water and Environmental Technologies (WET) has been retained to evaluate the hydrogeologic significance of discharging treated wastewater via RI basins. LCWSD identified portions of their property in the E½ SE¼ Section 11 and NW¼ NW¼ Section 13, Township 27 North, Range 21 West, Flathead County (Site) as potentially suitable for the proposed RI basins. **Figure 1** illustrates LCWSD's current wastewater treatment site relative to the general features of the area.

Hydrogeologic Setting

LCWSD's proposed RI basin systems are in the southwest portion of the Flathead Valley in northwest Montana. The Flathead Valley is a northwest trending intermontane basin forming the southern extension of the Rocky Mountain Trench. The valley is bounded on the east by the Swan-Whitefish fault located along the base of the Swan Range and on the west by the Kalispell fault at the base of the Salish Mountains. The mountains rise abruptly 4,500 feet above the valley floor.

Two aquifers are recognized at the Site: (1) the shallow Delta aquifer; and (2) the deep alluvial

aquifer. Potable water is commonly diverted from the deep alluvial aquifer in this area and the Delta aquifer is the receiving water for the proposed discharge via the RI basins.

The primary source of potable water within the vicinity of the Site is the deep alluvial aquifer. The aquifer is primarily recharged from snowmelt infiltration in the surrounding mountain ranges. The top of the deep alluvial aquifer in this area is generally encountered between 100 to 200 feet below ground surface (bgs). The predominant flow direction of the deep alluvial aquifer in this area is from west to east (from margin toward center of the valley) at a gradient of approximately 0.004 (LaFave, 2000).

The Site overlies the Delta Aquifer in the southern portion of the valley. The Delta aquifer (McDonald and LaFave, 2004 and LaFave and others, 2004) is also recognized as the sand aquifer (Konizeski and others, 1968) and the Deltaic sand aquifer (Noble and Stanford, 1986). The aquifer consists of fine- to medium-grained sand deposited between the north shore of Flathead Lake to a distinct topographic break, which occurs at an elevation of approximately 2,910 feet above mean sea level (amsl). This elevation represents one of the final still-stands of the ancestral glacial lake.

A map illustrating the areal extent of the Delta aquifer is provided in **Attachment A**. As shown, the aquifer extends throughout the entire lower Kalispell Valley. The LCWSD proposed RI basin system is near the aquifer's southwest extent. The groundwater flow direction near the Site is generally east-northeast toward the Flathead River. Wells completed in the Delta aquifer can be as deep as 75 feet below land surface, but the median depth is 26 feet (LaFave and others, 2004).

Well yields are generally lower, around five to ten gallons per minute (GPM). Noble and Stanford (1986) completed four aquifer tests in the Delta aquifer and reported values of aquifer transmissivity ranging from 1.0 to 3,700 ft^2/day. Water quality is typically fair to poor due to the occurrence of elevated levels of iron, nitrate, and other undesirable constituents present in the groundwater.

Hydrogeologic Investigation

Soil Boring Advancement

Five soil borings were drilled and completed as monitoring wells at the Site between September 6 and September 8, 2022. Soil boring and monitoring well locations are illustrated on **Figure 2**. Soil borings were drilled by Alpine Geotechnical with a CME 45B auger drill rig. Soil samples were collected at five-foot intervals as drilling proceeded to characterize the subsurface conditions. Sediment types were identified and described using the Unified Soil Classification System in accordance with the American Society for Testing Materials (ASTM) procedure D2487. Copies of the soil boring logs are provided as **Attachment B**. The boring logs for MW-1, MW-2, MW-3, MW-4, and MW-5 indicate that subsurface soil generally consists of poorly graded silty sand (typical of the Delta aquifer) between five and 33 to 39 feet bgs.

Monitoring Well Installation

Monitoring wells are completed with two-inch schedule 40 PVC well casing and well screen. Sections of 0.020-slot manufactured well screen were set at or near the base of the Delta aquifer for each monitoring well. The monitoring wells are completed to depths between 33 feet and 39 feet. The borehole filter pack consists of 10-20 Colorado® silica sand extending a minimum of two feet above the screen. A surface seal was installed using 3/8-inch bentonite "hole plug" from the top of the filter-pack extending to ground surface. Well construction details are documented on the soil boring logs provided as **Attachment B**.

Groundwater Monitoring

After construction, the monitoring wells were developed by bailing and surging utilizing a stainless-steel bailer. Well development via surging and bailing serves to agitate the water column, establish the hydraulic connection between the well and aquifer, and remove silt and fine sand from the well and filter pack. All wells were developed for a minimum of one hour. Static water levels (SWLs) in the five onsite monitoring wells were measured and recorded by WET personnel biweekly between September 8, 2022, and July 11, 2023. Results of the water-level data are presented in **Attachment C**.

Quarterly water quality samples were collected from well MW-5. Analytical data summary reports from each sampling event, along with a table summarizing the data, are included in **Attachment D**. Additionally, a surface water sample was collected from Pond 4 and the analytical data from that sample is also included in **Attachment D**.

Slug Testing

Rising-head slug tests were conducted in the five monitoring wells (MW-1, MW-2, MW-3, MW-4 and MW-5) between March 8 and March 10, 2023. A pressure transducer in each well recorded the change in recovering water levels at one-second intervals during the tests. Groundwater data from the slug tests were analyzed using AQTESOLV© software (Duffield, 2007). Individual hydraulic conductivity estimated from the slug tests ranged from 7.1 ft/day to 392.4 ft/day (**Table 1**). The mean hydraulic conductivity estimated from slug testing the five on-site monitoring wells is 122.4 ft^2/day.

Table 1. Estimated Hydrologic Parameters from Slug Tests

Well ID	Hydraulic Conductivity (ft/day) Derived from Type-Curve Match Utilizing Bouwer-Rice (1976)			Average
MW-1	6.7	7.0	7.6	7.1
MW-2	415.7	490.5	270.9	392.4
MW-3	49.9	42.9	42.9	45.2
MW-4	41.9	57.0	49.9	49.6
MW-5	121.4	111.6	120.0	117.7

Average	122.4
Median	49.6

Rapid Infiltration Basin Site Analysis

After completion of groundwater monitoring, the proposed placement and design of the RI basins were evaluated. As further analysis regarding the fate and transport of the discharge has been completed, the proposed size, location, and volume of discharge has been refined. The location of the proposed RI basins is illustrated in **Figure 2**. A setback analysis is depicted on **Figure 3**, along with an inventory of wells within ¼-mile of the proposed discharge and surface water bodies within one-mile of the proposed discharge. As shown, no drinking water wells are within 500 feet of the proposed RI basin area locations. The Montana Bureau of Mines and Geology (MBMG) Ground Water Information Center (GWIC) database was queried to identify potential wells located within ¼-mile of the proposed RI basin areas. Initially three wells plotted within 500 feet of the proposed RI basin areas; further research confirmed that these wells are more than 500 feet from the proposed outfalls (RI basin areas). The approximate location of the wells is identified on **Figure 3**. The GWIC Well Log Reports for all wells that are mapped within ¼ mile of the proposed RI basins by the GWIC database are provided in **Attachment E**.

Site Specific Hydrogeologic Conditions

The proposed RI basin discharge system for LCWSD shall be keyed approximately 2.0 to 4.0 feet into the sediment above the saturated portion of the unconfined Delta aquifer. Seepage is anticipated to migrate vertically through the vadose zone before reaching the water table, where it will develop a mound and migrate horizontally in a downgradient direction. Regionally, the Delta aquifer is hydraulically connected to the Flathead River and Flathead Lake, and water levels are controlled by the stage of Flathead Lake. The following aquifer characteristics, provided in **Table 2**, were assumed for the aquifer in this area and were utilized to model the influence of the proposed RI basin system (discharge) on the aquifer to calculate the fate and transport of nitrates, phosphorous, and pathogens.

Table 2. Aquifer Characteristics

Estimated Aquifer Properties of the Shallow Alluvial Aquifer Somers, Montana	
Confinement:	Unconfined *
Groundwater Flow Direction:	East/Northeast (Approximately 17.7°) ^
Aquifer Thickness:	14.7 feet ^
Hydraulic Gradient:	0.0002 feet/feet ^
Hydraulic Conductivity:	122.4 feet/day ^
Effective Porosity:	27 percent *

** indicates referenced value, ^ indicates measured value*

Aquifer Thickness

Aquifer saturation (aquifer thickness) was approximated from the five (5) on-site monitoring wells. The on-site wells vary in completion depth from 33 to 39 feet bgs. Water levels were monitored biweekly between September 2022 and July 2023. In this calculation, each of the monitoring wells is assumed to be completed at the base of the Delta aquifer at the contact with the underlying confining unit. Well logs for the monitoring wells utilized in estimating the aquifer thickness are listed in **Table 3** and boring and well construction logs are provided as **Attachment B**. Water level data collected in the on-site monitoring wells is provided as **Attachment C**. As shown, the average saturated thickness of the aquifer is 14.68 feet. A value of 14.7 feet was utilized within the MOUNDSOLV© modeling software model.

Table 3. Well Log Summary

Assessment of Aquifer Saturation			
Well ID	**TD (ft)**	**Average SWL (ft)**	**Average Aquifer Thickness (ft)**
MW-1	35	20.97	14.03
MW-2	33	18.59	14.41
MW-3	35	20.02	14.98
MW-4	39	21.24	17.76
MW-5	35	22.81	12.19
Average	**35.4**	**20.72**	**14.68**

Hydraulic Gradient

Near the proposed RI basins, the groundwater flow direction over the monitoring period was generally to the northeast. However, the direction of groundwater flow varied between approximately 61 degrees to the southeast and 61 degrees to the northeast. The hydraulic gradient varies seasonally as the water level in Flathead Lake (and Flathead River) fluctuates. Regionally, the Delta aquifer is hydraulically connected to the Flathead River and Flathead Lake, and water levels are controlled by the stage of Flathead Lake. In general, water from the aquifer discharges to the Flathead River or Flathead Lake when the lake and river are low and from the lake and river to the aquifer when water levels are high. Monthly groundwater contour maps from September 2022 to July 2023 are included as **Attachment F**. As expected, the hydraulic gradient was flattest (0.0002 feet/feet) in June 2023 when Flathead Lake and Flathead River stage were at their peak. With all other factors being held constant, the flattest gradient will result in the highest potential for groundwater mounding beneath the RI basin areas. As such, the flattest gradient (0.0002 feet/feet) was utilized to model potential impacts of the proposed RI basins. **Figure 4** illustrates the water table observed on June 6, 2023, which is the hydraulic gradient utilized in this evaluation.

Hydraulic Conductivity

Hydraulic conductivity is estimated from slug tests completed on the on-site monitoring wells.

Estimates of aquifer hydraulic conductivity range from 7.1 to 392.4 ft/day. A value of 122.4 ft/day (average from 15 tests) was selected for utilization in this assessment. Type-curve matches for the slug test analyses are provided as **Attachment G**. This value is less than the 569 ft/day allowed for a medium sand aquifer and is closer to the 51 ft/day allowed for fine sand aquifer and 45 ft/day allowed for a silty sand aquifer per ARM 17.30.1702(6)(a)(i).

Effective Porosity

An effective porosity of 0.27 (27-percent) is assumed for the Delta aquifer, which is based on aquifer testing completed by Noble and Stanford (1986). This value is consistent with the default value for loamy sand and silty sand in DEQ's *Draft – Pathogen Reduction Model for Setbacks between Sewage Lagoons and Water Wells* spreadsheet. Per the spreadsheet, the values represent the 90th percentile of published values from numerous reference sources. A copy of DEQ's spreadsheet is provided as **Attachment H**. Note that the lagoon leakage rate has been modified to reflect the proposed infiltrative rate of the planned RI basin areas.

Modeling Treated Wastewater Transport

Initial Inputs

The site specific hydrogeologic conditions outlined above were utilized to evaluate the development of a groundwater mound beneath the proposed RI basin locations. An analytical solution by Zlotnik et al. (2017) and the MOUNDSOLV© software were utilized to evaluate the height of the water table mound beneath the proposed RI basins and ensure adequate unsaturated thickness remains beneath each RI basin area. The unsaturated thickness between the RI basins and the top of the water table mound is utilized to evaluate the fate and transport of phosphorous and pathogens.

Initially, the estimated aquifer properties were input into the model without a proposed recharge source to confirm the modeled water levels at the site are consistent with those observed during June 2023. As shown in **Figure 4**, the modeled water table (pink contours) provides a reasonable match to the measured water levels and approximate water table (blue contours). As such, the model is believed to adequately represent the development of a groundwater mound beneath the proposed RI basins at the site.

Groundwater mounding was modeled for the proposed RI basin areas using the Zlotnick et al. (2017) analytical solution with the site specific hydrogeologic data input and RI basin data representative of 200,000 GPD. RI basin area one has a modeled recharge of 80,000 GPD, RI basin area two and three are modeled with 60,000 GPD each. Each RI basin area is sized so that the average discharge rate is 0.59 GPD per square foot of RI basin area. A forward solution was performed for five years, at which time, due to the constant head boundary of the Flathead River and Flathead Lake, the system is believed to achieve stabilized conditions. **Figure 5** illustrates the modeled water table resulting from continual discharge of 200,000 GPD at the Site. A MOUNDSOLV© generated report documenting the model inputs and results is provided in **Attachment I**. Note that water table height utilized in modeling (14.7 feet) is equal to a water table elevation of 2,895.20 feet amsl.

Assessment of Groundwater Flow Direction

Between September 2022 and July 2023 groundwater flow at the Site was predominantly to the northeast toward the Flathead River. However, the direction of groundwater flow varied between approximately 61 degrees (northeast) and 61 degrees (southeast). On September 14, 2022, the groundwater flow direction was to the southeast (approximately 61-degrees) toward Flathead Lake. Following the September 2022 groundwater monitoring event, the direction of groundwater flow rotated to the northeast toward the Flathead River, where it ultimately remained through July 2023. This observation is consistent with published reports documenting flow conditions in the Delta aquifer. In general, water from the aquifer discharges to the Flathead River or Flathead Lake when the lake and river are low and from the lake and river to the aquifer when water levels are high. Monthly groundwater contour maps from September 2022 through July 2023 are included as **Attachment F**.

An alternate mounding scenario was modeled to evaluate the effect groundwater flow direction has on the mound that forms below the RI basins. An alternate groundwater mounding scenario was modeled for the proposed RI basin areas using the same analytical solution (Zlotnick et al., 2017), site specific hydrogeologic data, and RI basin data representative of 200,000 GPD that was used in the primary model. The direction of groundwater flow was modified from 17.7-degrees (east-northeast) to -61-degrees to represent the southeastern flow direction observed in September 2022. As illustrated in **Figure 6**, the predicted groundwater mound that develops under southeasterly flow conditions (purple contours) is very similar to the mound predicted at the Site from the primary model (blue contours). This alternate mounding evaluation confirms that the location of the RI basins, relatively flat hydraulic gradient, and hydraulic conductivity of the Delta aquifer ultimately control the size and shape of the mound developing beneath the proposed RI basin areas at the Site, and thus the fate and transport of phosphorous, pathogens, and nitrogen. In both scenarios, the developed mound results in radial flow from the RI basin areas.

Water Table Mound Assessment (Unsaturated Conditions Beneath Mound)

The resulting groundwater mound peaks beneath RI basin areas one and two at an elevation of 2,900.24 feet amsl (rise of 4.99 feet). At the northern end of RI basin three, the water table elevation is anticipated to be 2,898.92 feet amsl (rise of 3.65 feet). As noted above, the Delta aquifer is hydraulically connected to the Flathead River and Flathead Lake, and water levels are effectively controlled by the stage of Flathead Lake. Water levels in the Delta aquifer peak when Flathead Lake is held at or near full pool. Groundwater monitoring performed through July 2023 confirms that overall, water levels peaked in early June 2023. The proposed RI basin system for LCWSD is anticipated to be keyed between 2.0 to 4.0 feet into the sediment above the saturated portion of the unconfined Delta aquifer. Per the mounding assessment, at minimum, 7.81 feet of unsaturated sediment is calculated to remain beneath the proposed RI basin area three. As a conservative measure, a value of 4.0 feet was utilized for the unsaturated thickness in calculations addressing phosphorous breakthrough and pathogen reduction. **Figure 7** illustrates the MOUNDSOLV© predicted water table mound beneath each of the RI basin areas.

Phosphorous Breakthrough

Phosphorous breakthrough to surface water was evaluated utilizing the proposed discharge volume of 200,000 GPD. As shown in **Figures 5,** discharge through the proposed RI basins is anticipated to result in a water table mound that forces water radially in all directions from RI basins. The water table mound results in a groundwater divide that splits the RI basin areas and forces half of the discharge to the western portion of the mound and half to the eastern portion of the mound. As a result, the amount of discharge with the potential to be intercepted by various surface water bodies is variable depending upon the direction of flow.

Pond 4

RI basin area two is designed to discharge up to 60,000 GPD; of that, approximately 30,000 GPD will flow in a westerly direction. As shown in **Figure 8**, a portion (less than half) of the discharged water from RI basin area two has the potential to reach Pond 4. In a conservative (worst-case) scenario, WET modeled the phosphorous breakthrough to Pond 4, assuming all discharges on the western portion of RI basin two (30,000 GPD) will flow toward Pond 4. The proposed phosphorous concentration of 2.0 mg/L was utilized in the calculations, resulting in 183 pounds per year of phosphorous load. As noted above, a conservative four-foot unsaturated zone was assumed beneath RI basin area two and a flow path of 1,160 feet. A conservative dispersion angle of five degrees was assumed. The calculated phosphorous breakthrough to Pond 4 is 92 years.

Wiley's Slough

RI basin area one is designed to discharge up to 80,000 GPD; of that, about 40,000 GPD will flow in a northerly direction, with a portion of that potentially reaching Wiley's Slough. As shown in **Figure 8**, a portion (less than half) of the discharged water from RI basin one can reach Wiley's Slough. In a conservative (worst-case) scenario, WET modeled the phosphorous breakthrough to Wiley's Slough, assuming all discharges on the northern portion of RI basin area one (40,000 GPD) will flow toward Wiley's Slough. The proposed phosphorous concentration of 2.0 mg/L was utilized in the calculations, resulting in 244 pounds per year of phosphorous load. As noted above, a conservative four-foot unsaturated zone was assumed beneath RI basin area one and a flow path of 1,335 feet. A more representative, but still conservative dispersion angle of 12.5-degrees was assumed in the calculations. The calculated phosphorous breakthrough to Wiley's Slough is 78.7 years.

Pond 7

RI basin area three is designed to discharge up to 60,000 GPD; of that, approximately 30,000 GPD will flow in a southerly direction toward Pond 7. As shown in **Figure 8**, a portion (less than half) of the discharged water from RI basin three can reach Pond 7. In a conservative (worst-case) scenario, WET modeled the phosphorous breakthrough to Pond 7, assuming all discharges on the western side of RI basin area three (30,000 GPD) will flow toward Pond 7. The proposed phosphorous concentration of 2.0 mg/L was utilized in the calculations, resulting in 183 pounds per year of phosphorous load. As noted above, a conservative four-foot unsaturated zone was

assumed beneath RI basin area three and a flow path of 2,540 feet. A conservative dispersion angle of five-degrees was assumed. The calculated phosphorous breakthrough to Pond 7 is 300.4 years.

The resulting calculations indicate that phosphorous breakthrough to the adjacent surface water bodies will not occur within 50 years and impacts to surface water bodies are not anticipated. The results of year-round discharge are summarized below in **Table 4;** phosphorus breakthrough calculations can be found in **Attachment J**.

Table 4. Phosphorus Breakthrough Calculation Summary

Surface Water Body	LCWSD Discharge at 2.0 mg/L (GPD)	Phosphorous Breakthrough (years)
Pond 4	30,000	92.0
Wiley's Slough	40,000	78.7
Pond 7	30,000	322.2

Pathogen Removal

An assessment of potential pathogen impacts to downgradient drinking water wells was completed as part of this assessment. Pathogen removal was estimated utilizing the same aquifer characteristics as the mounding analysis. A conservative four-foot unsaturated zone was assumed beneath the RI basin areas. A volumetric soil moisture content of 0.1 mL/cm^3 was assumed for the unsaturated soil. This value (0.1 mL/cm^3) is consistent with the default value for loamy sand and silty sand in DEQ's *Draft – Pathogen Reduction Model for Setbacks between Sewage Lagoons and Water Wells* spreadsheet. Per the spreadsheet, the values represent the 90th percentile of published values from numerous reference sources. A copy of DEQ's Pathogen Transport Model spreadsheet is provided as **Attachment H**. Nearby drinking water wells were assigned a conservative demand of 3,000 GPD in the model.

DEQ's Pathogen Transport Model spreadsheet utilizes both vertical and horizontal travel to calculate pathogen removal. 4-log microbiological attenuation typically occurs within 200 days. A small amount of virus inactivation occurs in the short travel time (5.8 days) between the bottom of the RI basin areas and the top of the water table mound (0.11 logs). However, even at the steepest gradients occurring immediately adjacent to the water table mound (0.003 feet or 0.9 feet/300 feet), 4-log microbial inactivation or removal of 99.99-percent of virus is achieved within 305 feet of each RI basin area. As noted above, no wells are within 500 feet of the proposed RI basin areas. As such, LCWSD seeks a Source Specific Mixing Zone (SSMZ) of 305 feet, which is the minimum required distance to achieve 4-log microbial inactivation. The location and extent of the proposed SSMZ is illustrated in **Figure 9**.

Nitrogen Reduction

An assessment of potential nitrogen impacts to downgradient water wells and select surface water features was completed as part of this assessment. Nitrogen removal via denitrification (reduction of nitrate [NO3-] to nitrogen gas [N2]) primarily accounts for the decay of nitrate between the discharge point and nearby surface water bodies. WET repurposed the horizontal time of travel models utilized in the Pathogen Transport Model spreadsheet and a first-order denitrification rate of 0.0065 day^{-1}, (25^{th} percentile value of published values, Kirkland, 2001). Assuming the first-order denitrification rate of 0.0065 day-1 and a nitrate discharge concentration of 8.0 mg/L, nitrate concentrations are calculated to be below 7.5 mg/L within 78 days of discharge and return to background values (0.11 mg/L) within 1,216 days (about 3.5 years).

Area Groundwater Wells

The steepest hydraulic gradient of 0.003 (0.9 feet/300 feet), which occurs near the edges of the proposed RI basin areas was utilized to calculate the time of travel required for denitrification processes to result in a nitrate concentration of 7.5 mg/L. Utilizing the hydraulic gradient near the edges of the mound, the average groundwater flow velocity is 1.36 ft/day and nitrate concentrations are calculated to be below 7.5 mg/L within 110 feet of each RI basin area. Nitrate concentrations are calculated to be below 5.0 mg/L within 335 to 670 feet from the proposed RI basin areas. Nitrogen concentrations will be between 8.0 mg/L and 5.0 mg/L within the proposed SSMZ; concentrations are calculated to be below 7.5 mg/L at the end of the proposed mixing zone. The location and extent of the proposed SSMZ is illustrated in **Figure 9**.

Nitrate concentrations are estimated to reach near background conditions of 0.11 mg/L within 640 to 1,200 feet of the proposed RI basin areas. As shown on **Figure 9**, the hydraulic gradient resulting from the modeled water table mound, which develops beneath the proposed RI basin areas, controls the time of travel in each direction. Groundwater flow is fastest in the initial (pre-discharge) direction of groundwater flow, and the time of travel is slowest in the opposite direction of pre-discharge groundwater flow.

Pond 4

A hydraulic gradient of 0.0016 (1.15 feet/720 feet) was used to calculate time of travel between RI basin two and Pond 4. Utilizing the predicted hydraulic gradient for this portion of the mound, the average groundwater flow velocity is 0.72 ft/day. The shortest flow path to Pond 4 is estimated to be 1,160 feet and nitrate concentrations are calculated to return to background levels within 880 feet from the southwest corner of RI basin two, prior to groundwater from the RI basin areas potentially discharging to Pond 4.

Wiley's Slough

A hydraulic gradient of 0.0022 (1.96 feet/910 feet) was used to calculate time of travel between RI basin area one and Wiley's Slough. Based on the modeled hydraulic gradient north of RI basin area one, the average groundwater flow velocity is 0.98 ft/day. The shortest flow path to Wiley's Slough is estimated to be 1,335 feet and nitrate concentrations are calculated to return to

background levels within 1,185 feet from the northern edge of RI basin one, before groundwater discharged via RI basin area one discharges to Wiley's Slough.

Pond 7

A hydraulic gradient of 0.0019 (1.14 feet/595 feet) was used to calculate time of travel between RI basin area three and Pond 7. Based on the hydraulic gradient of the water table mound south of RI basin area three, the average groundwater velocity is 0.87 ft/day. The shortest flow path to Pond 7 is estimated to be 2,540 feet and nitrate concentrations are calculated to return to background levels within 1,050 feet from the south edge of RI basin three, well before groundwater discharged via RI basin area three discharges to Pond 7.

Utilizing a first-order denitrification rate of 0.0065 day-1 and the proposed nitrate discharge concentration of 8.0 mg/L, nitrate concentrations are calculated to return to background values (0.11 mg/L) within 1,216 days. This first-order denitrification rate results in nitrate concentrations returning to background levels before groundwater discharging from the RI basin areas has the potential to reach surface water.

Mounding Effect to Shallow Groundwater

Water level monitoring completed at the Site suggests that water levels varied between 2,894.2 and 2,895.5 feet amsl between September 2022 and July 2023. On June 6, 2023 water levels on the eastern margin of the Site were measured at 2,895.05 (MW-2) and 2,895.23 (MW-3) and on the western margin of the site at 2,895.13 (MW-1) and 2,895.47 (MW-4). As illustrated in **Figures 5 and 6**, the post-mound water levels near the boundary of the Site are predicted to be between 2,897.5 and 2,898.5 feet amsl, representing an approximate increase of 2.5 feet in the on-site monitoring wells. The water level rise predicted by the modeled mound decreases with distance, and the maximum predicted water level rise off the Site is approximately 3.5 feet, occurring immediately east of RI basin area one and two. **Figure 10** illustrates the predicted depth to water based on the modeled groundwater mound and water level data from June 6, 2023. Modeled depth to water is predicted to exceed ten feet in all but the low-lying areas associated with historic channels of the Flathead River, where depth to groundwater is typically near surface under current conditions.

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Figures

Potential Rapid Infiltration Basin Location

National Hydrography Dataset

Perennial Stream/River

Intermittent Stream/River

N
W
E
S

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION		KK	CE
2	MAP EDITS	6/29/23	EK	CE
3	NHD/MAP EDITS	7/20/23	EK	CE
4	CALLOUT, SYMBOLOGY	7/21/23	KK	CE
5				

NOTES

SITE LOCATION

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 1

JOB#: 1539-22

DATE:2/12/2024

Path: C:\Users\kkresan\Working\1539-22\1539-22.aprx, Author: kkresan

Water & Environmental TECHNOLOGIES

Water & Environmental TECHNOLOGIES

SITE FEATURES & RAPID INFILTRATION BASIN LAYOUT

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 2

JOB#: 1539-22

DATE:2/12/2024

Path: C:\Users\kkresan\Working\1539-22\1539-22.aprx, Author: kkresan

NOTES

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
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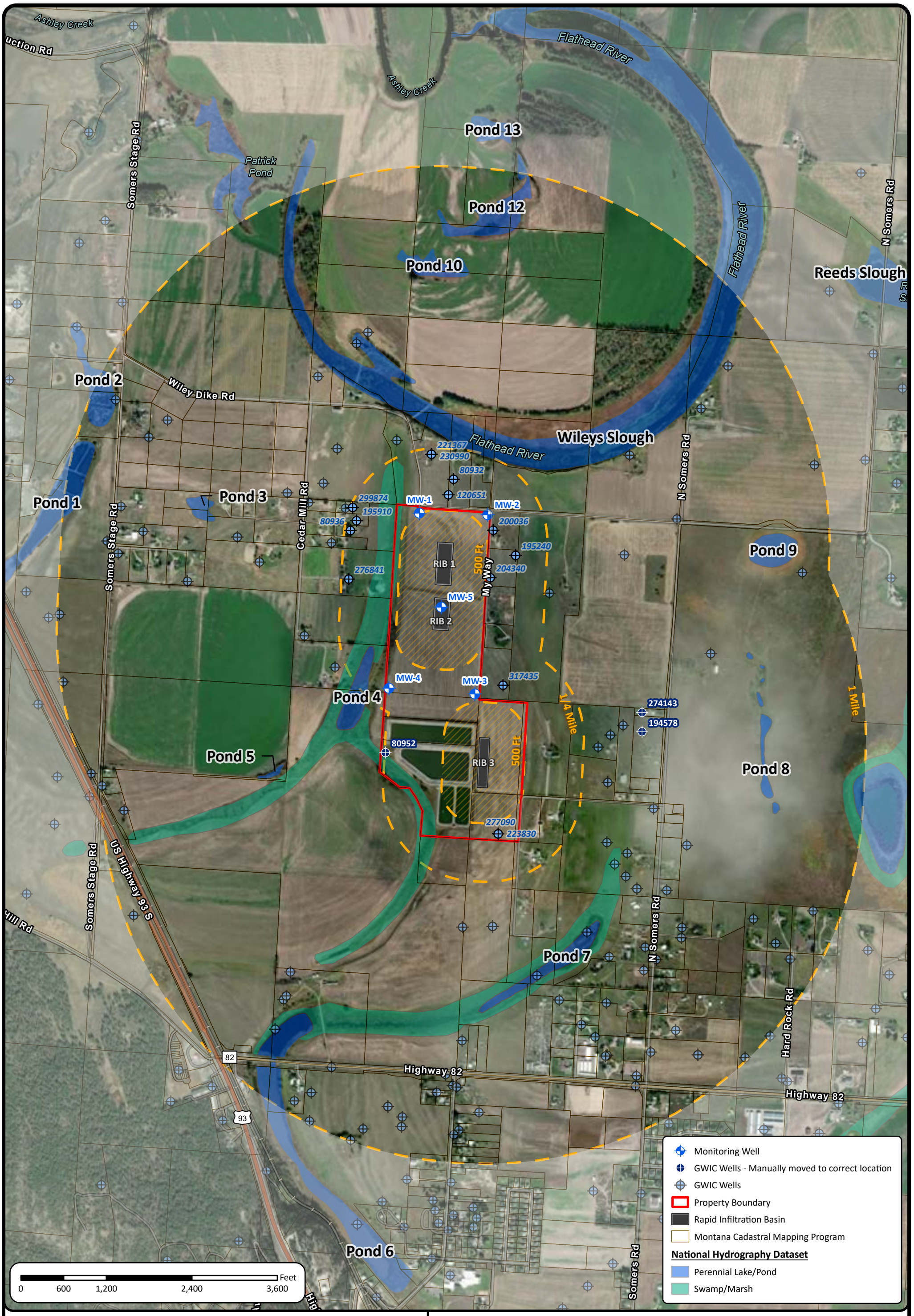

Water & Environmental TECHNOLOGIES

SETBACK & INVENTORY

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 3

JOB#: 1539-22

DATE:2/12/2024

Path: C:\Users\kkresan\Working\1539-22\1539-22.aprx, Author: kkresan

NOTES

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N W E S

Water & Environmental TECHNOLOGIES

TYPICAL GROUNDWATER FLOW

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 4

JOB#: 1539-22

DATE:2/13/2024

Path: C:\Users\kkresan\Working\1539-22\1539-22.aprx, Author: kkresan

NOTES

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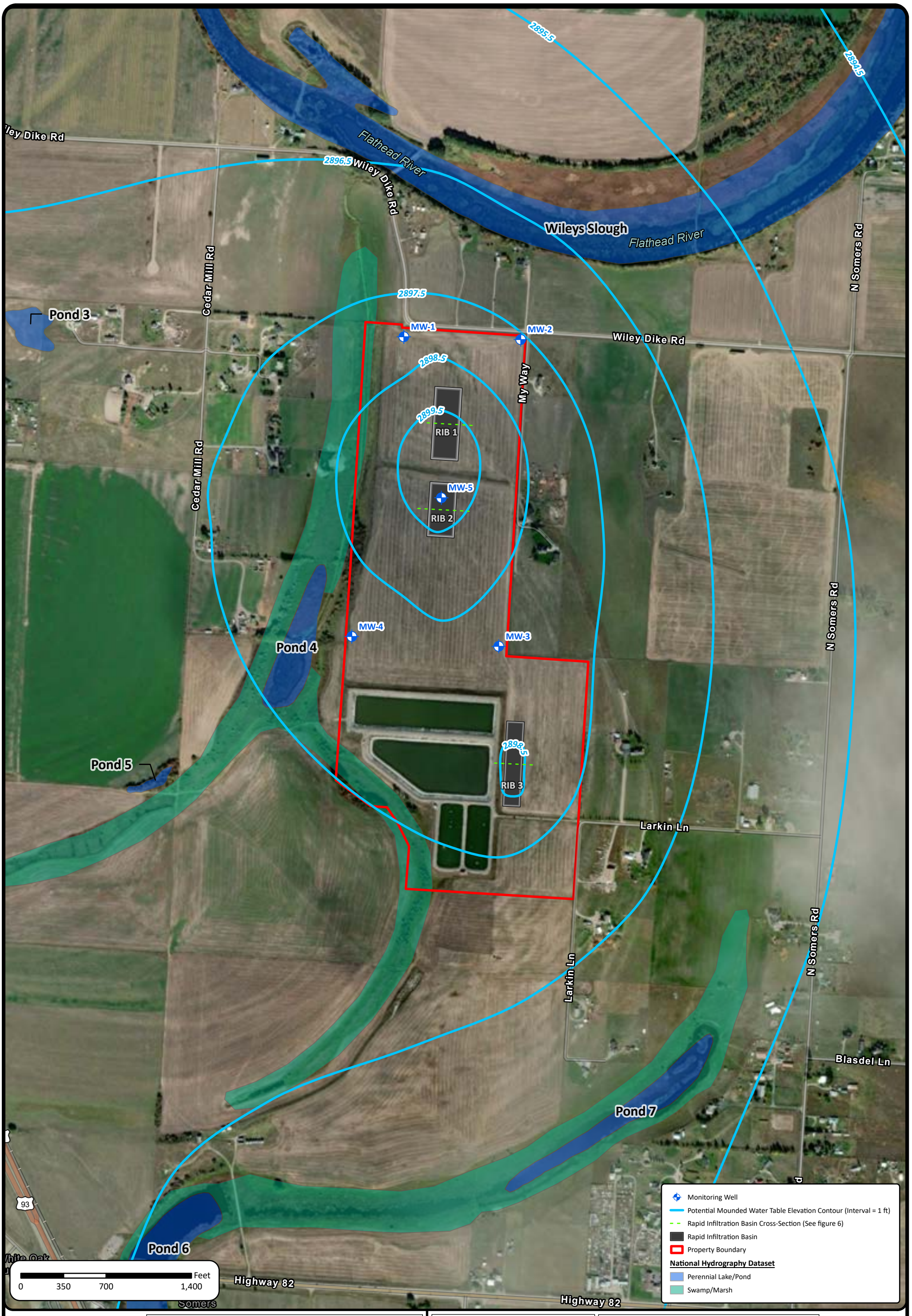

Water & Environmental TECHNOLOGIES

MODELED WATER TABLE ELEVATION

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 5

JOB#: 1539-22

DATE:2/12/2024

Path: C:\Users\kkresan\Working\1539-22\1539-22.aprx, Author: kkresan

NOTES:
Contours represent water-table elevation above base of aquifer beneath the center of primary recharge source

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	2/6/24	KK	CE
2	MOLECULE FLOW PATHS	2/12/24	KK	CE/BB
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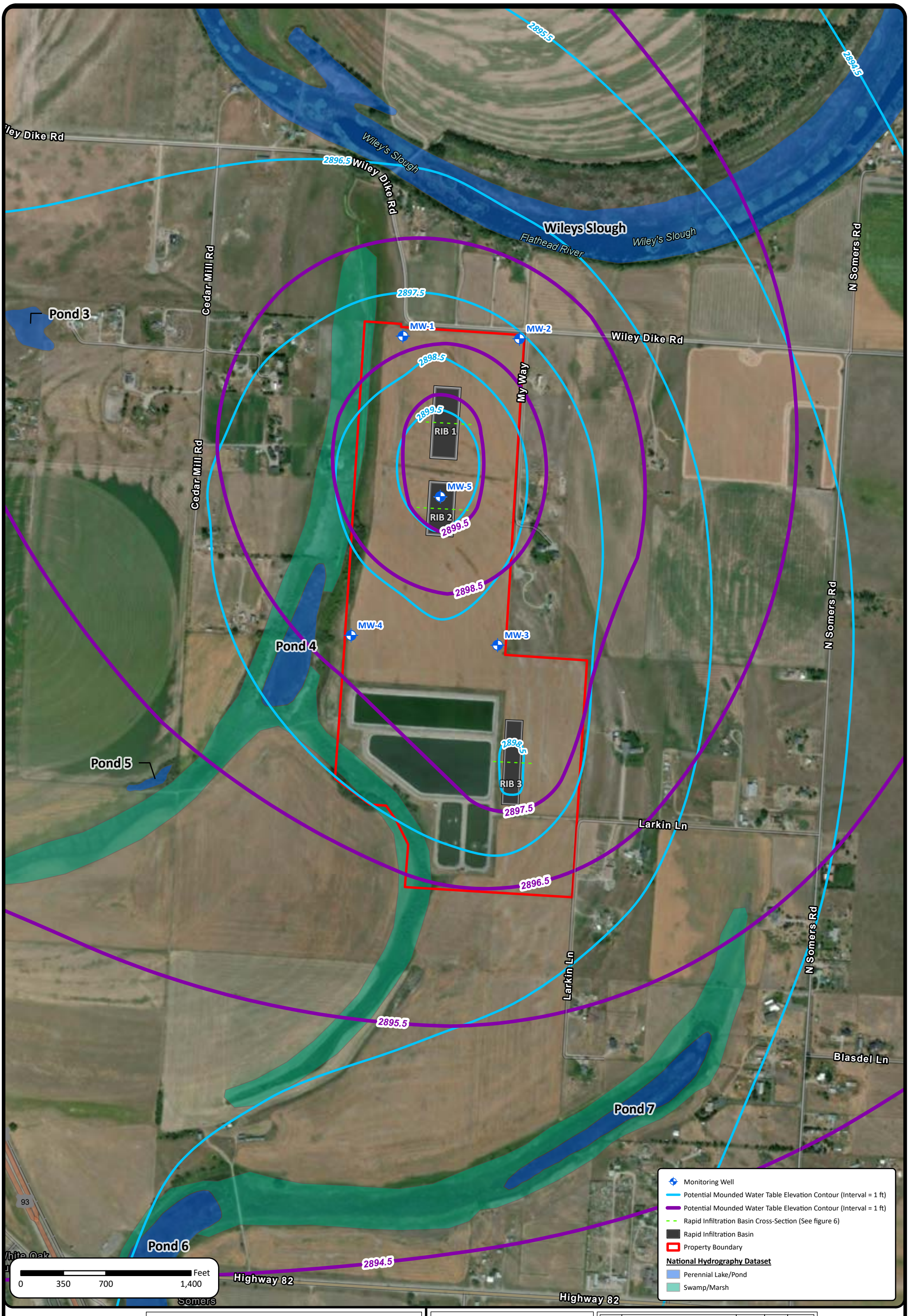

Water & Environmental TECHNOLOGIES

MODELED WATER TABLE ELEVATION

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 6

JOB#: 1539-22

DATE:5/8/2024

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: jleprowse

NOTES:
Contours represent water-table elevation above base of aquifer beneath the center of primary recharge source

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	2/6/24	KK	CE
2	MOLECULE FLOW PATHS	2/12/24	KK	CE/BB
3				
4				
5				

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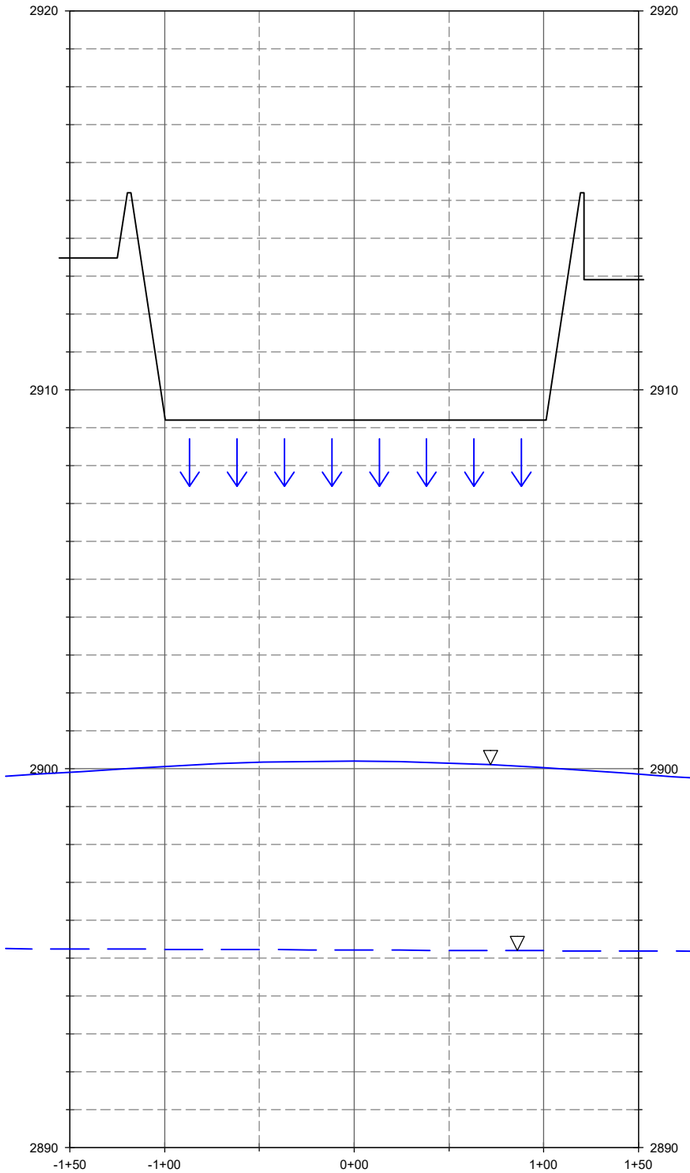
MODELED WATER TABLE MOUND

MODELED STATIC WATER LEVEL

0 40 80 FEET

RI BASIN AREA 1

MOUNDING BASIN POND PROFILE
STA: -1+50 to STA: 1+50



RI BASIN AREA 2

MOUNDING BASIN POND PROFILE
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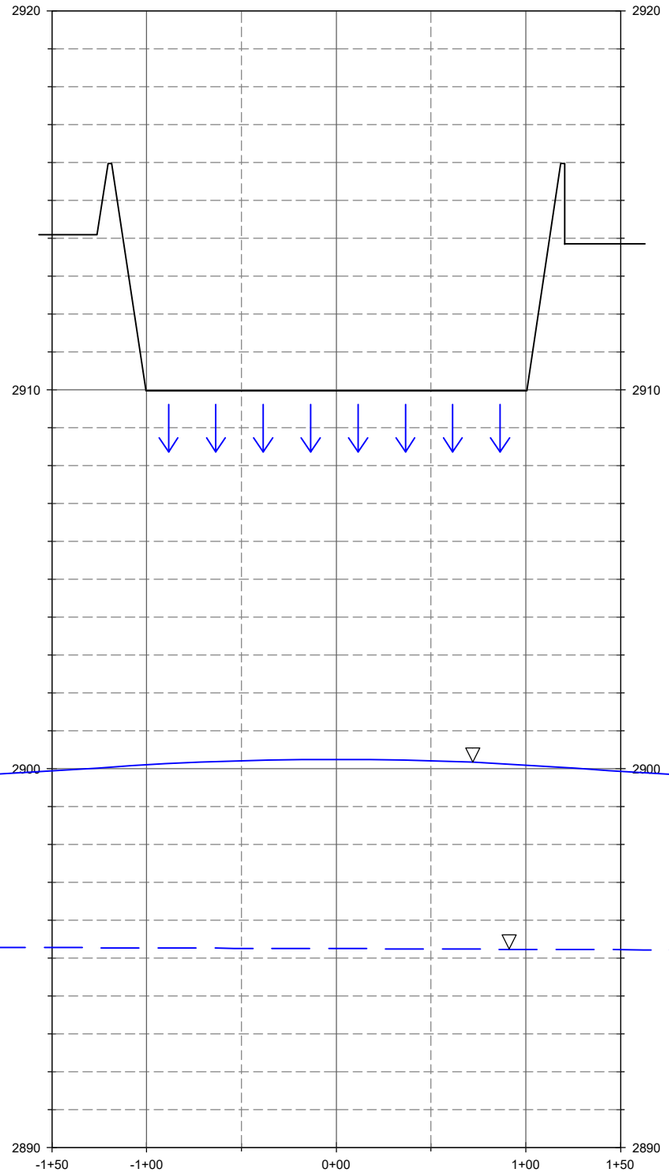

RI BASIN AREA 3

MOUNDING BASIN POND PROFILE
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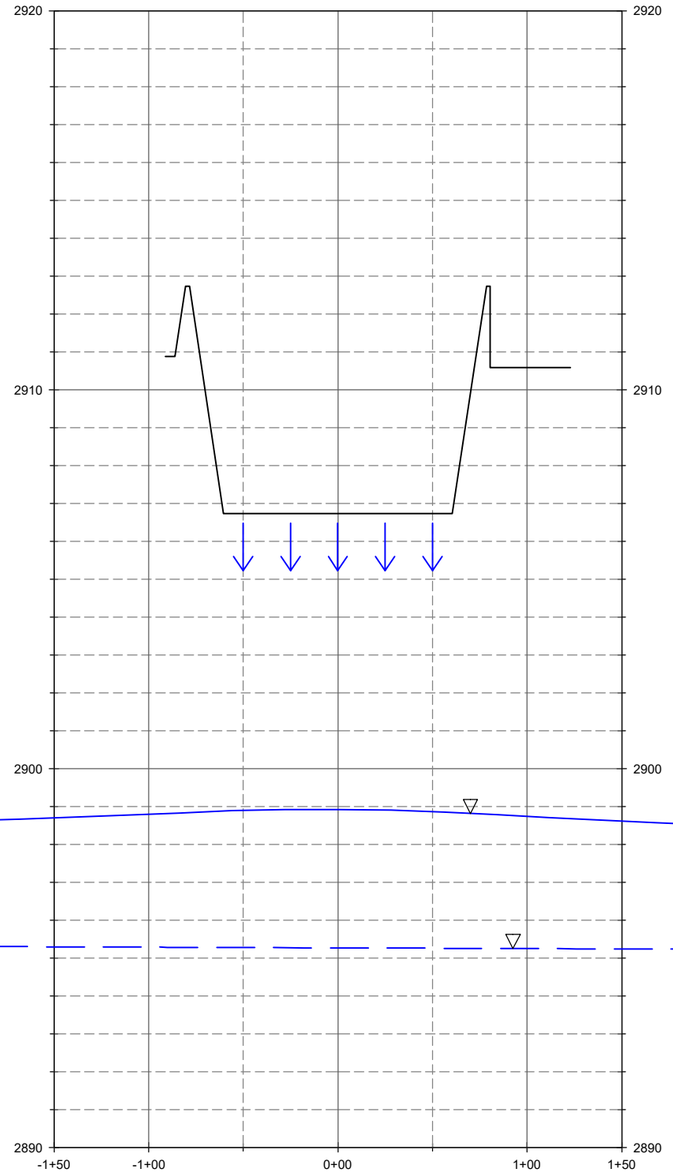

No	Description	Date	Drawn By

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(406) 309-6085
watenvtech.com

MODELED WATER TABLE CROSS SECTION

PROJECT NAME: LCWSD Discharge Assessment
LOCATION: Kalispell, Montana
FILE NO. Fig. 1 - Lagoon Ponding.dwg

JOB NO:	1539-22
DATE:	2/13/24
DRAFTER:	NS
CHECKED BY:	BB

SHEET
FIG. 7

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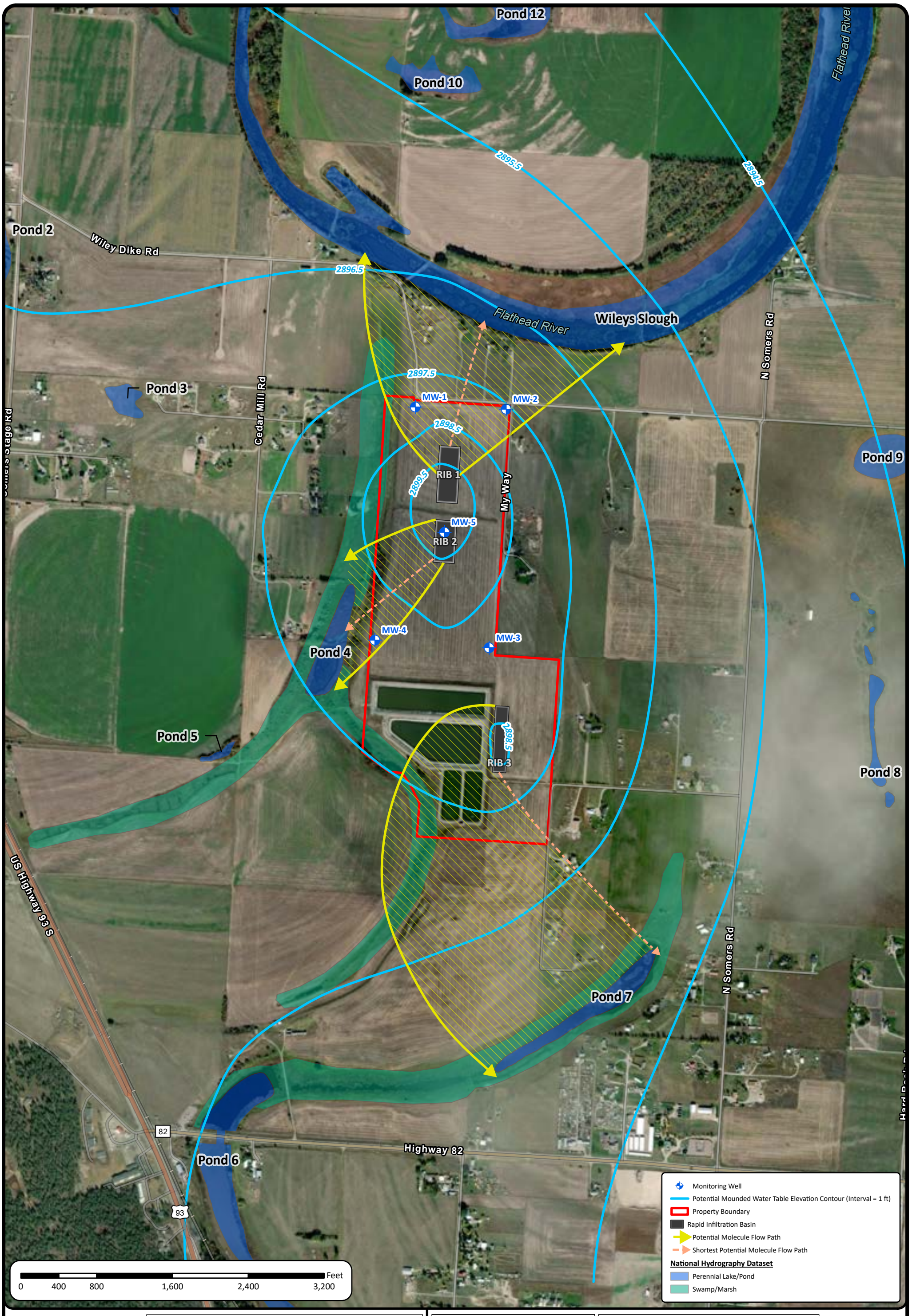

Water & Environmental TECHNOLOGIES

MODELED WATER TABLE ELEVATION AND FLOW PATHS

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 8

JOB#: 1539-22

DATE:2/12/2024

Path: C:\Users\kkresan\Working\1539-22\1539-22.aprx, Author: kkresan

NOTES:
Contours represent water-table elevation above base of aquifer beneath the center of primary recharge source

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	2/6/24	KK	CE
2	MOLECULE FLOW PATHS	2/12/24	KK	CE/BB
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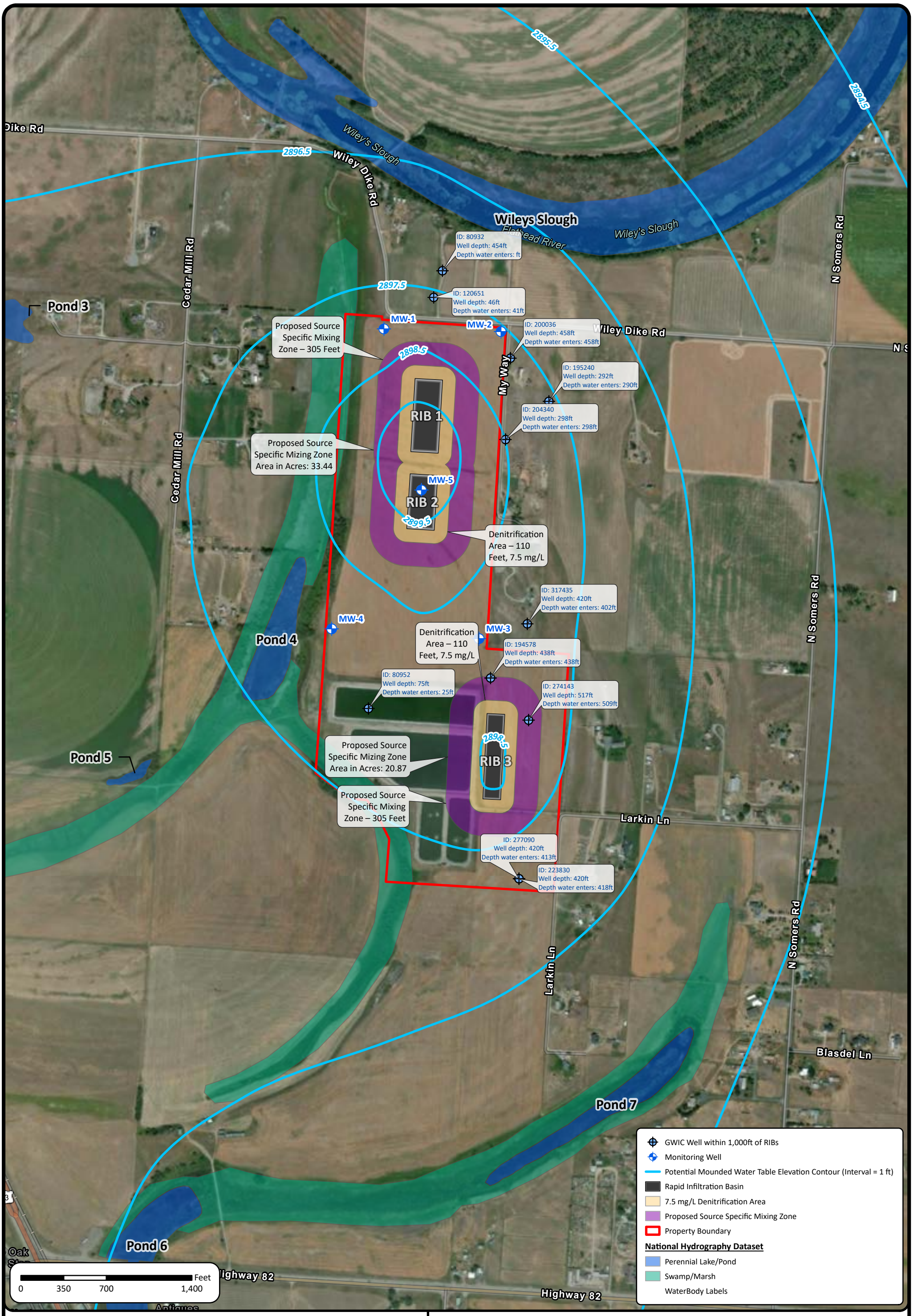


Water & Environmental TECHNOLOGIES

PROPOSED SOURCE SPECIFIC MIXING ZONE

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 9

JOB#: 1539-22

DATE:4/1/2024

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: lgeorge

NOTES:
Contours represent water-table elevation above base of aquifer beneath the center of primary recharge source

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	2/6/24	KK	CE
2	MOLECULE FLOW PATHS	2/12/24	KK	CE/BB
3				
4				
5				

N W E S

Monitoring Well
Rapid Infiltration Basin Cross-Section (See figure 6)
Rapid Infiltration Basin
Property Boundary

Ground Water Depth

-8.188 - 0
0.001 - 5
5.001 - 10
10.001 - 15
15.001 - 20
20.001 - 25
25.001 - 30

MW-1
MW-2
MW-3
MW-4
MW-5
RIB 1
RIB 2
RIB 3
My Way
Pond 4
Larkin Ln

0 350 700 1,400 Feet

MODELED DEPTH TO GROUNDWATER

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 10

JOB#: 1539-22

DATE:5/8/2024

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: jleprowse

Water & Environmental TECHNOLOGIES

NOTES:
Contours represent water-table elevation above base of aquifer beneath the center of primary recharge source

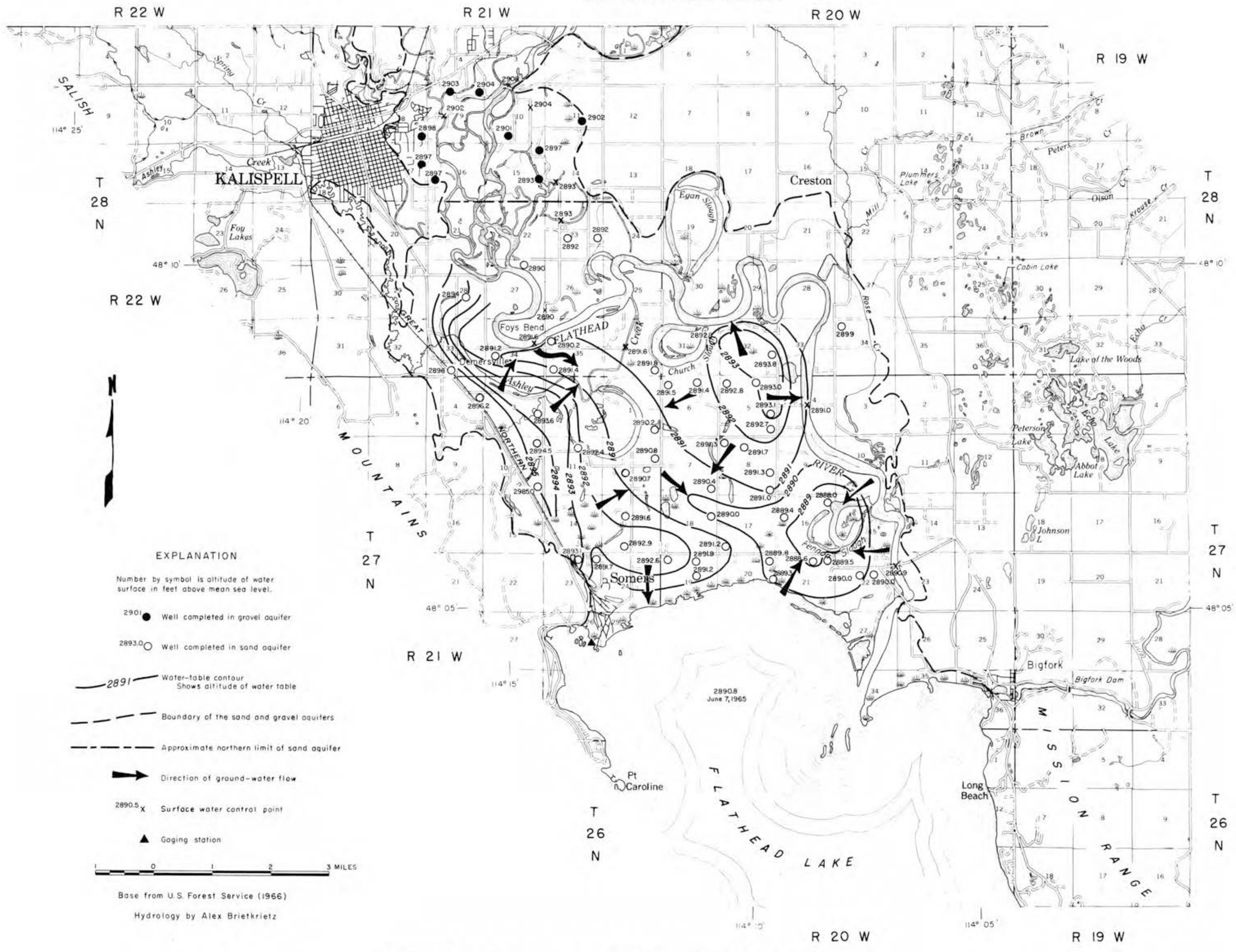
NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	2/6/24	KK	CE
2	MOLECULE FLOW PATHS	2/12/24	KK	CE/BB
3	MODELED DEPTH TO GROUNDWATER	5/8/24	JL	BB
4				
5				

N W E S

Attachment A

Map of Delta Aquifer

(MBMG Bulletin 68)



EXPLANATION

Number by symbol is altitude of water surface in feet above mean sea level.

2901 ● Well completed in gravel aquifer

2893.0 ○ Well completed in sand aquifer

2891 Water-table contour. Shows altitude of water table

Boundary of the sand and gravel aquifers

Approximate northern limit of sand aquifer

Direction of ground-water flow

2890.5 X Surface water control point

▲ Gaging station

1 0 1 2 3 MILES

Base from U.S. Forest Service (1966)

Hydrology by Alex Brietkrietz

3 REPORTER PRTG. & SUPPLY CO.

CONTOURS ON THE WATER TABLE IN THE SAND AQUIFER DURING RISING STAGE IN FLATHEAD LAKE, JUNE 5—10, 1965

Attachment B

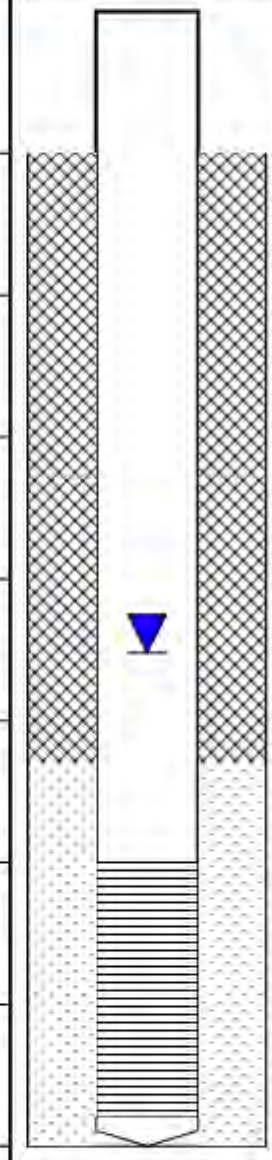
Site Monitoring Well Logs

BORING AND WELL CONSTRUCTION LOG

Boring/Well # : MW-1
Project Name: LCWD GW STUDY
Project No: 1539-22

DRILL METHOD:	AUGER	LOGGED BY:	CHRISTINA EGGENSPERGER			DATE STARTED:	9/6/2022
DRILLED BY:	ALPINE GEOTECHNICAL	SURFACE COMPLETION:	PIEZOMETER			DATE COMPLETED:	9/6/2022
CASING TYPE:	SCH 40 PVC/2"	FROM	-5	TO	25 FT.	TOC ELEV.	2915.96 amsl (NAVD 88)
SCREEN TYPE:	SCH 40 PVC 0.010" SLOT	FROM	25	TO	35 FT.	NORTHING:	NM (MT SP-N83 IF)
SEAL:	BENTONITE CHIPS 3/8"	FROM	0	TO	21.5 FT.	EASTING:	NM (MT SP-N83 IF)
FILTER PACK:	10-20 SILICA SAND	FROM	21.5	TO	35 FT.	BORING DIAMETER:	8"
TD WELL:	35 FT	TD BORING:	35 FT			DTW:	20.21 FT. Below TOC

Depth (ft)	Blow Count	Density	Lithology Log	USCS Symbol	Lithology Description	Elevation (ft) (NAVD 88)	Depth (ft)
-4						4	-4
0		Medium		SM	Medium brown, fine grained, damp silty sand. Peds observed but easily broken.	0	0
4	22 33				As above, increasing moisture, non-cohesive and low plasticity.	-4	4
8						-8	8
12	33 34				As above with increasing sand and organic content. Increased cohesion and poorly graded.	-12	12
16	21 23				As above, wet at approximately 18 ft.	-16	16
20	22 34				As above with increased plasticity, increased fines and poorly graded	-20	20
24	12 12				Medium to dark gray silty sand, poorly graded and medium plasticity. Wet	-24	24
28	21 33			SP-SM	Poorly graded wet sand with silt.	-28	28
32						-32	32
36	23 55					-36	36



Lithology Key

SM SP-SM

Well Construction Key

Bentonite Chip | End Cap | 0.01" Slotted Scre
Boring | 10-20 Silica Sand | 2" PVC Riser

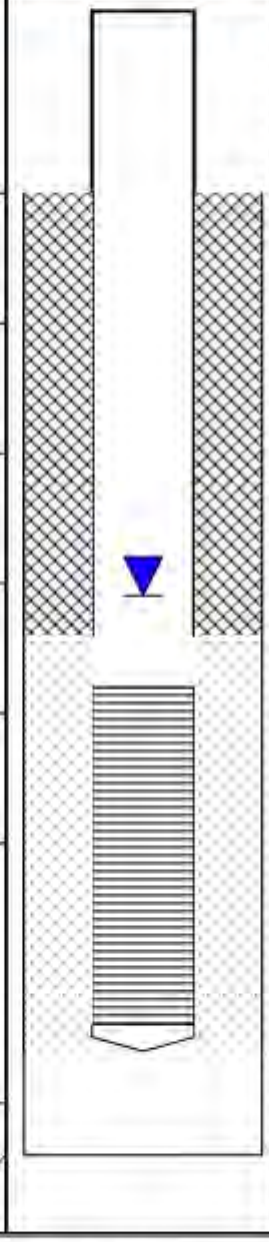
BORING AND WELL CONSTRUCTION LOG

Boring/Well # : MW-2
Project Name: LCWD GW STUDY
Project No: 1539-22

DRILL METHOD: AUGER	LOGGED BY: CHRISTINA EGGENSPERGER	DATE STARTED: 9/6/2022
DRILLED BY: ALPINE GEOTECHNICAL	SURFACE COMPLETION: PIEZOMETER	DATE COMPLETED: 9/6/2022
CASING TYPE: SCH 40 PVC/2"	FROM -7 TO 19 FT.	TOC ELEV. 2913.26 amsl (NAVD 88)
SCREEN TYPE: SCH 40 PVC 0.010" SLOT	FROM 19 TO 33 FT.	NORTHING: NM (MT SP-N83 IF)
SEAL: BENTONITE CHIPS 3/8"	FROM 0 TO 17 FT.	EASTING: NM (MT SP-N83 IF)
FILTER PACK: 10-20 SILICA SAND	FROM 17 TO 33 FT.	BORING DIAMETER: 8"
TD WELL: 33 FT	TD BORING: 37 FT	DTW: 17.94 FT. Below TOC

Depth (ft)	Blow Count	Density	Lithology Log	USCS Symbol	Lithology Description
-8 to 0					
0 to 4		Medium dense		ML	Light brown to olive gray sandy silt. Sand is fine grained.Dry, non-cohesive with easily broken peds. Dry.
4 to 8	33 45			SM	Light brown to light gray fine grained, poorly graded silty sand. Non-cohesive and non-plastic. Moist.
8 to 12	22 22	Loose		Sm	Medium brown fine grained, poorly graded silty sand. Low cohesiveness and non-plastic. Moist to wet.
12 to 16	12 11			SM	As above with slightly larger grain size. Wet.
16 to 20	12 33				Gray fine grained, poorly graded silty sand. Non-cohesive to low cohesiveness and non-plastic. Wet.
20 to 28	22 33				Poor recovery due to heaving.
28 to 36	13 23	Loose		SM	Gray fine grained, poorly graded silty sand. Non-cohesive to low cohesiveness and non-plastic. Wet.
36 to 40					

Well Construction Details



Elevation (ft) (NAVD 88)	Depth (ft)
8	-8
4	-4
0	0
-4	4
-8	8
-12	12
-16	16
-20	20
-24	24
-28	28
-32	32
-36	36
-40	40

Lithology Key

SM ML

Well Construction Key

Bentonite Chip | End Cap | 0.01" Slotted Scre
Boring | 10-20 Silica Sand | 2" PVC Riser

BORING AND WELL CONSTRUCTION LOG

Boring/Well # : MW-3
Project Name: LCWD GW STUDY
Project No: 1539-22

DRILL METHOD: AUGER	LOGGED BY: CHRISTINA EGGENSPERGER	DATE STARTED: 9/7/2022
DRILLED BY: ALPINE GEOTECHNICAL	SURFACE COMPLETION: PIEZOMETER	DATE COMPLETED: 9/7/2022
CASING TYPE: SCH 40 PVC/2"	FROM -5 TO 25 FT.	TOC ELEV. 2914.93 amsl (NAVD 88)
SCREEN TYPE: SCH 40 PVC 0.010" SLOT	FROM 25 TO 35 FT.	NORTHING: NM (MT SP-N83 IF)
SEAL: BENTONITE CHIPS 3/8"	FROM 0 TO 22 FT.	EASTING: NM (MT SP-N83 IF)
FILTER PACK: 10-20 SILICA SAND	FROM 22 TO 35 FT.	BORING DIAMETER: 8"
TD WELL: 35 FT	TD BORING: 35 FT	DTW: 20.14 FT. Below TOC

Depth (ft)	Blow Count	Density	Lithology Log	USCS Symbol	Lithology Description	Well Construction Details	Elevation (ft) (NAVD 88)	Depth (ft)
-4							4	-4
0		Medium dense		ML	Dry to moist. Medium brown poorly graded fine sandy silt. Moderately cohesive and non-plastic. Dry to moist.		0	0
4	33 45						-4	4
8		Medium			Gray, brown, and tan poorly graded fine silty sand. Low cohesion and non-plastic. Dry.		-8	8
12	22 33	Medium dense to dense			Medium brown poorly graded fine silty sand. Low cohesion and non-plastic. Moist.		-12	12
16	22 32				Gray brown poorly graded fine silty sand. Moderate cohesion and non-plastic. Wet.		-16	16
20	12 33	Medium		SM			-20	20
24	12 22				Gray as above with increased cohesion and plasticity. Dark organic material visible @ 20 ft. Wet		-24	24
28							-28	28
32	25 43	Medium loose					-32	32
36	21 01						-36	36

Lithology Key

SM ML

Well Construction Key

Bentonite Chip | End Cap | 0.01" Slotted Scre
Boring | 10-20 Silica Sand | 2" PVC Riser

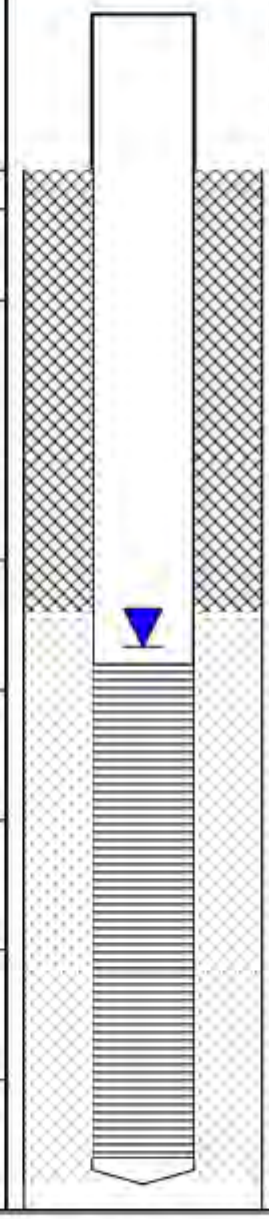
BORING AND WELL CONSTRUCTION LOG

Boring/Well # : MW-4
Project Name: LCWD GW STUDY
Project No: 1539-22

DRILL METHOD: AUGER	LOGGED BY: CHRISTINA EGGENSPERGER	DATE STARTED: 9/7/2022
DRILLED BY: ALPINE GEOTECHNICAL	SURFACE COMPLETION: PIEZOMETER	DATE COMPLETED: 9/7/2022
CASING TYPE: SCH 40 PVC/2"	FROM -6 TO 19 FT.	TOC ELEV. 2916.41 amsl (NAVD 88)
SCREEN TYPE: SCH 40 PVC 0.010" SLOT	FROM 19 TO 39 FT.	NORTHING: NM (MT SP-N83 IF)
SEAL: BENTONITE CHIPS 3/8"	FROM 0 TO 17 FT.	EASTING: NM (MT SP-N83 IF)
FILTER PACK: 10-20 SILICA SAND	FROM 17 TO 39 FT.	BORING DIAMETER: 8"
TD WELL: 39 FT	TD BORING: 39 FT	DTW: 21.25 FT. Below TOC

Depth (ft)	Blow Count	Density	Lithology Log	USCS Symbol	Lithology Description
0					
0		Medium dense		ML	Topsoil Light brown to tan sandy silt. Peds present. Moderate cohesion and non-plastic. Dry.
4	22 33	Medium		SM	Light gray/brown poorly graded fine sand with silt. Non-cohesive and non-plastic. Moist at 10 ft
8	22 33	Medium dense			
12	24 43				Medium brown to gray well graded silty sand. Non-cohesive and non-plastic. Wet
16	23 43			SP-SM	As above with increasing grain size and poorly graded. Medium to dark gray and wet.
20	12 34				Poor recovery due to heaving.
24	23 44	Medium		SP-SM	Gray poorly graded silty sand. Medium to dark gray and wet
28	11 12			SM	As above with increased fines and cohesion. Non-plastic and wet.
32					
36					
40					

Well Construction Details



Elevation (ft) (NAVD 88)	Depth (ft)
8	-8
4	-4
0	0
-4	4
-8	8
-12	12
-16	16
-20	20
-24	24
-28	28
-32	32
-36	36
-40	40

Lithology Key

SM | SP-SM | ML

Well Construction Key

Bentonite Chip | End Cap | 0.01" Slotted Scre
Boring | 10-20 Silica Sand | 2" PVC Riser

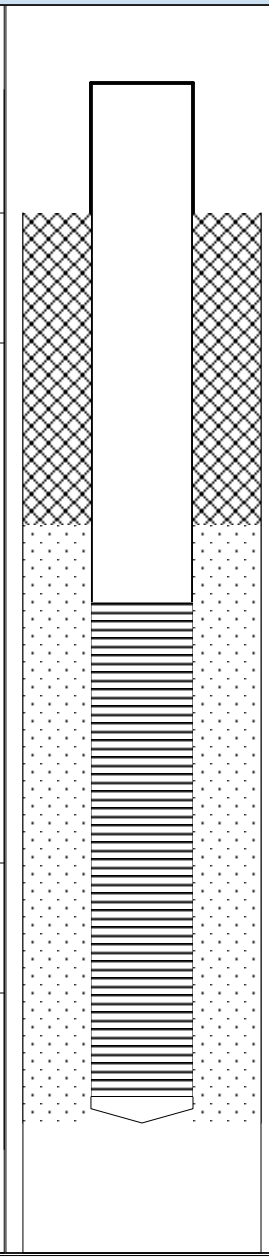
BORING AND WELL CONSTRUCTION LOG

Boring/Well # : MW-5
Project Name: LCWD GW STUDY
Project No: 1539-22

DRILL METHOD: AUGER	LOGGED BY: CHRISTINA EGGENSPERGER	DATE STARTED: 9/8/2022
DRILLED BY: ALPINE GEOTECHNICAL	SURFACE COMPLETION: PIEZOMETER	DATE COMPLETED: 9/8/2022
CASING TYPE: SCH 40 PVC/2"	FROM -5 TO 15 FT.	TOC ELEV.: 2917.8 amsl (NAVD 88)
SCREEN TYPE: SCH 40 PVC 0.010" SLOT	FROM 15 TO 35 FT.	NORTHING: NM (MT SP-N83 IF)
SEAL: BENTONITE CHIPS 3/8"	FROM 0 TO 12 FT.	EASTING: NM (MT SP-N83 IF)
FILTER PACK: 10-20 SILICA SAND	FROM 12 TO 35 FT.	BORING DIAMETER: 8"
TD WELL: 35 FT.	TD BORING : 40 FT.	DTW: NM FT. Below TOC

Depth (ft)	Blow Count	Density	Lithology Log	USCS Symbol	Lithology Description
0 – 4		Medium dense		ML	Light to medium brown sandy silt with moderate cohesion and non-plastic. Peds present. Dry.
4 – 8	12 33	Medium		SM	Brown poorly graded fine grained silty sand with increasing moisture with depth. Wet at 15 ft. Heaving and poor recovery at 20-25 ft.
8 – 12	22 33	Medium		SM	Brown poorly graded fine grained silty sand with increasing moisture with depth. Wet at 15 ft. Heaving and poor recovery at 20-25 ft.
12 – 16		Medium		SM	Brown poorly graded fine grained silty sand with increasing moisture with depth. Wet at 15 ft. Heaving and poor recovery at 20-25 ft.
16 – 20	22 44	Medium loose		SM	Brown poorly graded fine grained silty sand with increasing moisture with depth. Wet at 15 ft. Heaving and poor recovery at 20-25 ft.
20 – 24	11 22	Medium loose		SM	Brown poorly graded fine grained silty sand with increasing moisture with depth. Wet at 15 ft. Heaving and poor recovery at 20-25 ft.
24 – 28	12 22	Medium loose		SP-SM	dark gray poorly graded silty sand with moderate cohesion and non-plastic. Wet.
28 – 32	11 12	Medium loose		SP-SM	Poor recovery due to heaving. Advanced to 42 ft to retrieve sample.
32 – 36		Medium loose		SP-SM	Poor recovery due to heaving. Advanced to 42 ft to retrieve sample.
36 – 40		Medium loose		SP-SM	Poor recovery due to heaving. Advanced to 42 ft to retrieve sample.

Well Construction Details



Elevation (ft) (NAVD 88)	Depth (ft)
8	-8
4	-4
0	0
-4	4
-8	8
-12	12
-16	16
-20	20
-24	24
-28	28
-32	32
-36	36
-40	40

Lithology Key

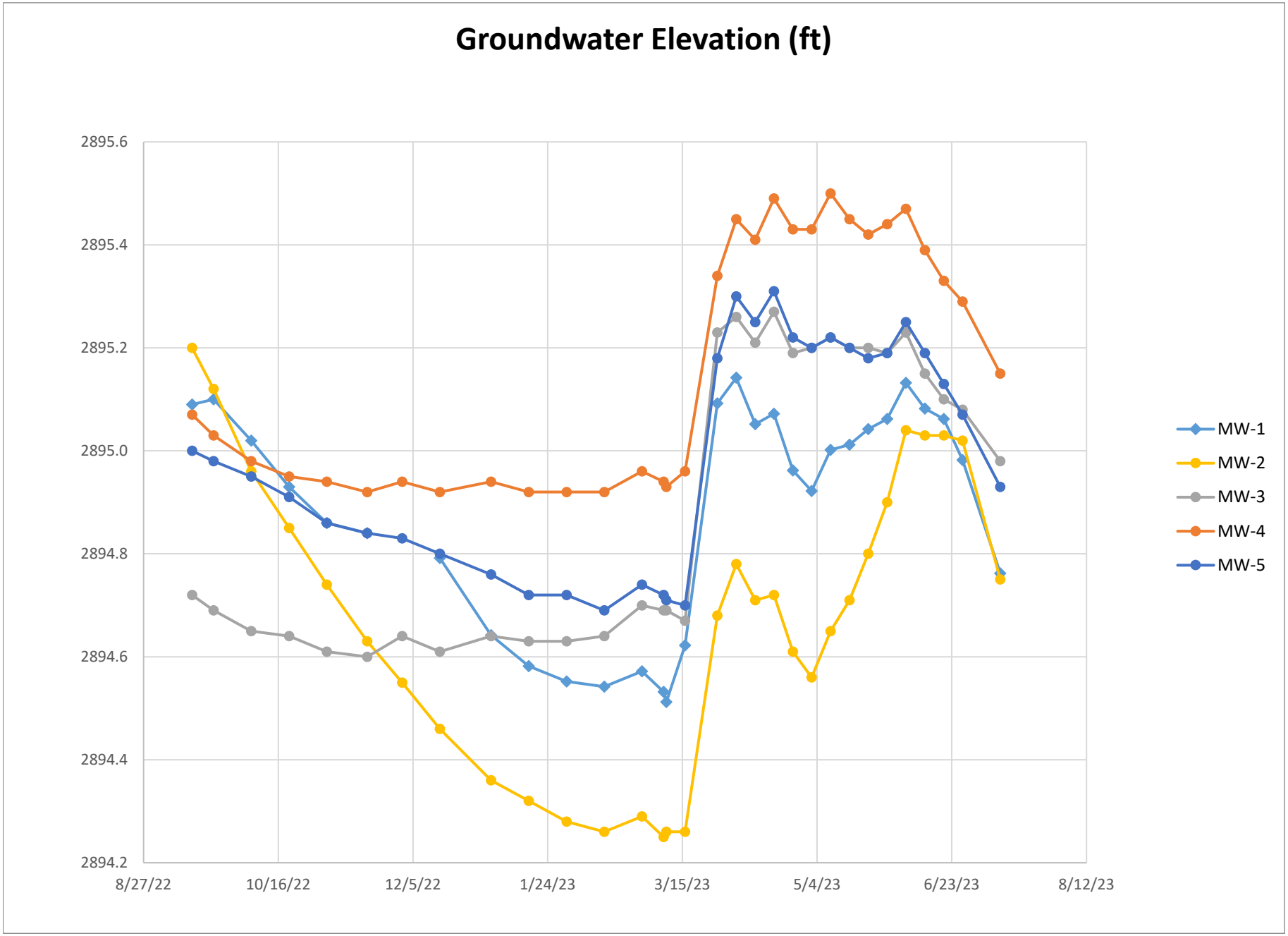
SM | SP-SM | ML

Well Construction Key

Bentonite Chip | End Cap | 0.01" Slotted Scre
Boring | 10-20 Silica Sand | 2" PVC Riser

Attachment C

Hydrograph with Tabulated Water Levels


Groundwater Elevation (ft)
2895.6
2895.4
2895.2
2895.0
2894.8
2894.6
2894.4
2894.2
8/27/22
10/16/22
12/5/22
1/24/23
3/15/23
5/4/23
6/23/23
8/12/23
MW-1
MW-2
MW-3
MW-4
MW-5

Project Name:	Lakeside County Water & Sewer District
Project Number:	1539-22
Activity:	Groundwater Monitoring

	MW-1	MW-2	MW-3	MW-4	MW-5
Well Depth (ft) btomp - 9/22/2022	35.66	34.62	35.79	41.02	36.82
Measuring Point Elev. (ft)	2915.44	2913.26	2914.93	2916.41	2917.80
MW-1 Resurvey	2915.96				
Ground Surface Elev. (ft)	2912.60	2910.44	2912.03	2913.45	2914.27
Stick Up (ft)	2.84	2.82	2.90	2.96	3.53

		Depth to Water (ft) btomp					Groundwater Elevation (ft)				
Date	Time	MW-1	MW-2	MW-3	MW-4	MW-5	MW-1	MW-2	MW-3	MW-4	MW-5
9/14/2022	8:00am	20.35	18.06	20.21	21.34	22.80	2895.09	2895.20	2894.72	2895.07	2895.00
9/22/2022	10:00am	20.34	18.14	20.24	21.38	22.82	2895.10	2895.12	2894.69	2895.03	2894.98
10/6/2022	12:00pm	20.42	18.30	20.28	21.43	22.85	2895.02	2894.96	2894.65	2894.98	2894.95
10/20/2022	11:45am	20.51	18.41	20.29	21.46	22.89	2894.93	2894.85	2894.64	2894.95	2894.91
11/3/2022	10:10am	20.58	18.52	20.32	21.47	22.94	2894.86	2894.74	2894.61	2894.94	2894.86
11/18/2022	11:18am	20.60	18.63	20.33	21.49	22.96	2894.84	2894.63	2894.60	2894.92	2894.84
12/1/2022	11:25am	n/a	18.71	20.29	21.47	22.97	n/a	2894.55	2894.64	2894.94	2894.83
12/15/2022	10:48am	21.17	18.80	20.32	21.49	23.00	2894.79	2894.46	2894.61	2894.92	2894.80
1/3/2023	10:55am	21.32	18.90	20.29	21.47	23.04	2894.64	2894.36	2894.64	2894.94	2894.76
1/17/2023	9:23am	21.38	18.94	20.30	21.49	23.08	2894.58	2894.32	2894.63	2894.92	2894.72
1/31/2023	11:35am	21.41	18.98	20.30	21.49	23.08	2894.55	2894.28	2894.63	2894.92	2894.72
2/14/2023	9:12am	21.42	19.00	20.29	21.49	23.11	2894.54	2894.26	2894.64	2894.92	2894.69
2/28/2023	10:47am	21.39	18.97	20.23	21.45	23.06	2894.57	2894.29	2894.70	2894.96	2894.74
3/8/2023	9:30am	21.43	19.01	20.24	21.47	23.08	2894.53	2894.25	2894.69	2894.94	2894.72
3/9/2023	10:30am	21.45	19.00	20.24	21.48	23.09	2894.51	2894.26	2894.69	2894.93	2894.71
3/16/2023	4:50pm	21.34	19.00	20.26	21.45	23.10	2894.62	2894.26	2894.67	2894.96	2894.70
3/28/2023	10:00am	20.87	18.58	19.70	21.07	22.62	2895.09	2894.68	2895.23	2895.34	2895.18
4/4/2023	11:28am	20.82	18.48	19.67	20.96	22.50	2895.14	2894.78	2895.26	2895.45	2895.30
4/11/2023	10:38am	20.91	18.55	19.72	21.00	22.55	2895.05	2894.71	2895.21	2895.41	2895.25
4/18/2023	10:05am	20.89	18.54	19.66	20.92	22.49	2895.07	2894.72	2895.27	2895.49	2895.31
4/25/2023	11:33am	21.00	18.65	19.74	20.98	22.58	2894.96	2894.61	2895.19	2895.43	2895.22
5/2/2023	10:53am	21.04	18.70	19.73	20.98	22.60	2894.92	2894.56	2895.20	2895.43	2895.20
5/9/2023	11:25am	20.96	18.61	19.71	20.91	22.58	2895.00	2894.65	2895.22	2895.50	2895.22
5/16/2023	11:55am	20.95	18.55	19.73	20.96	22.60	2895.01	2894.71	2895.20	2895.45	2895.20
5/23/2023	11:47am	20.92	18.46	19.73	20.99	22.62	2895.04	2894.80	2895.20	2895.42	2895.18
5/30/2023	11:27am	20.90	18.36	19.74	20.97	22.61	2895.06	2894.90	2895.19	2895.44	2895.19
6/6/2023	12:42pm	20.83	18.22	19.70	20.94	22.55	2895.13	2895.04	2895.23	2895.47	2895.25
6/13/2023	12:41pm	20.88	18.23	19.78	21.02	22.61	2895.08	2895.03	2895.15	2895.39	2895.19
6/20/2023	11:00am	20.90	18.23	19.83	21.08	22.67	2895.06	2895.03	2895.10	2895.33	2895.13
6/27/2023	11:22am	20.98	18.24	19.85	21.12	22.73	2894.98	2895.02	2895.08	2895.29	2895.07
7/11/2023	11:20am	21.20	18.51	19.95	21.26	22.87	2894.76	2894.75	2894.98	2895.15	2894.93

Note: MW-1 casing was damaged before the 12/1/2022 measurement and repaired with a new stick up for the 12/15/2022 measurement.

Attachment D

Analytical Data

ANALYTICAL REPORT

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904-1900
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

Water & Environmental Tech
Water & Environmental Technologies
102 Cooperative Way, Ste 100
Kalispell, MT 59901

PWS ID:
Project: LCWSD

Client Sample ID: MW-5 **Lab ID:** 2210371-01
Matrix: DRINKING WATER **Collected:** 09/22/2022 10:10 **Received:** 09/22/2022 11:35

Coliform	Result	Units	RL	MCL	Method	Prepared	Analyzed	Analyst
Coliform Bacteria	**Present**	P/A	1	1	SM9223B	09/22/2022 14:30	09/23/2022 9:35	BSB
Coliform, Escherichia - P/A	**Absent**	P/A	1	1	SM9223B	09/22/2022 14:30	09/23/2022 9:35	BSB

MCL = Maximum Contaminant Limit ND = Not Detected
RL = Reporting Limit

MEL REVIEW:

ANALYTICAL REPORT

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904-1900
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

Water & Environmental Tech
Water & Environmental Technologies
102 Cooperative Way, Ste 100
Kalispell, MT 59901

PWS ID:
Project: LCWSD

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

10371

Total Coliform Bacteria - Chain of Custody

Samples must arrive at the lab within 18 hours of collection.
Keep sample cool, not frozen. It is important to sample correctly.
SEE THE BACK OF THIS FORM FOR SAMPLING PROCEDURES.

PAYMENT MUST ACCOMPANY SAMPLE

Total Coliform Bacteria and E. coli test: $32
Extra copies of report, emails, faxes ($1 each): ____
If using a prepaid postage mailer tube, add $9: ____
Total enclosed: ____

Customer Name: Water + Environmental Technologies
Mailing Address: 102 Cooperative Way STE 100
City, State, Zip: Kalispell MT 59901 Phone #: (406) 756-2550

Sample Information			
Physical address of property:	Sample Site (Kitchen sink, hydrant, etc.)	Sample Date	Sample Time
LCWSD	MW-5	9/22/22	10:10

One copy of the report is included in the price of the test. How would you like to receive this report?

☐ Mail to:
☒ Email to: jgraham@waterenvtech.com
☐ Fax to:
Extra copies ($1 each) to:
Extra copies ($1 each) to:

I hereby acknowledge that this sample was collected at the above location, date and time.
Sampler signature: [signature] Date: 9/22/22

This form MUST be signed | Signature of person delivering the sample: Date/Time: | Received by laboratory: 9/22/22 1135 WC Date/Time:

LABORATORY USE ONLY

Paid by:
Amount: $ EMAIL AM CC CASH CHK M C DB

ANALYTICAL SUMMARY REPORT

October 11, 2022

Water and Environmental Technologies
480 E Park St Ste 200
Butte, MT 59701-1923

Work Order: B22092240

Project Name: (1539-22) LCWSD

Energy Laboratories Inc Billings MT received the following 1 sample for Water and Environmental Technologies on 9/23/2022 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B22092240-001	MW-5	09/22/22 10:10	09/23/22	Aqueous	Conductivity Carbon, Total Organic Anions by Ion Chromatography Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl pH Preparation for TDS A2540 C TKN preparation E351.2 Solids, Total Dissolved

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: Water and Environmental Technologies
Project: (1539-22) LCWSD
Work Order: B22092240

Report Date: 10/11/22

CASE NARRATIVE

Tests associated with analyst identified as ELI-CA were subcontracted to Energy Laboratories, PO Box 247, Casper, WY, EPA Number WY00002.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies
Project: (1539-22) LCWSD
Lab ID: B22092240-001
Client Sample ID: MW-5

Report Date: 10/11/22
Collection Date: 09/22/22 10:10
DateReceived: 09/23/22
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.4	s.u.	H	0.1		A4500-H B	09/26/22 10:23 / fap
pH Measurement Temp	13.9	°C		1.0		A4500-H B	09/26/22 10:23 / fap
Conductivity @ 25 C	595	umhos/cm		5		A2510 B	09/26/22 10:23 / fap
Solids, Total Dissolved TDS @ 180 C	337	mg/L	D	20		A2540 C	09/27/22 09:03 / jaw
INORGANICS							
Chloride	9	mg/L		1		E300.0	10/06/22 06:06 / caa
Sulfate	4	mg/L		1		E300.0	10/06/22 06:06 / caa
AGGREGATE ORGANICS							
Organic Carbon, Total (TOC)	3.5	mg/L		0.5		A5310 C	09/30/22 11:55 / mnm
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.06	mg/L		0.01		E353.2	10/03/22 17:54 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	10/04/22 15:50 / mh

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
D - Reporting Limit (RL) increased due to sample matrix
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)
H - Analysis performed past the method holding time

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22092240 **Report Date:** 10/11/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **A2510 B**										Batch: R388509
Lab ID: **SC 2nd 1413**	Laboratory Control Sample					Run: PHSC _101-B_220926A				09/26/22 09:05
Conductivity @ 25 C		1410	umhos/cm	5.0	100	90	110			
Lab ID: **MBLK**	Method Blank					Run: PHSC _101-B_220926A				09/26/22 09:11
Conductivity @ 25 C		ND	umhos/cm	5						
Lab ID: **B22090504-002ADUP**	Sample Duplicate					Run: PHSC _101-B_220926A				09/26/22 09:22
Conductivity @ 25 C		1470	umhos/cm	5.0				0.6	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22092240 **Report Date:** 10/11/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **A2540 C**										Batch: 170866
Lab ID: **MB-170866**		Method Blank				Run: BAL #30_220927C				09/27/22 09:01
Solids, Total Dissolved TDS @ 180 C		7	mg/L							
Lab ID: **LCS-170866**		Laboratory Control Sample				Run: BAL #30_220927C				09/27/22 09:01
Solids, Total Dissolved TDS @ 180 C		1030	mg/L	25	103	90	110			
Lab ID: **B22092175-006A DUP**		Sample Duplicate				Run: BAL #30_220927C				09/27/22 09:01
Solids, Total Dissolved TDS @ 180 C		72000	mg/L	2500				1.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22092240 **Report Date:** 10/11/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B									Analytical Run: PHSC _101-B_220926A	
Lab ID: pH 8	2	Initial Calibration Verification Standard							09/26/22 08:52	
pH		8.0	s.u.	0.1	100	98	102			
pH Measurement Temp		19.4	°C	1.0						
Method: A4500-H B									Batch: R388509	
Lab ID: B22092276-001ADUP	2	Sample Duplicate				Run: PHSC _101-B_220926A			09/26/22 16:07	
pH		7.7	s.u.	0.1				0.1	3	
pH Measurement Temp		17.6	°C	1.0						

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22092240 **Report Date:** 10/11/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A5310 C									Analytical Run: SUB-C287653	
Lab ID: CCV-11940	Continuing Calibration Verification Standard								09/29/22 16:56	
Organic Carbon, Total (TOC)		10.3	mg/L	0.50	103	90	110			
Method: A5310 C									Batch: C_R287653	
Lab ID: MBLK	Method Blank					Run: SUB-C287653			09/29/22 16:15	
Organic Carbon, Total (TOC)		ND	mg/L	0.2						
Lab ID: LCS-11923	Laboratory Control Sample					Run: SUB-C287653			09/29/22 16:39	
Organic Carbon, Total (TOC)		10.3	mg/L	0.50	103	91	111			
Lab ID: B22092175-001H	Sample Matrix Spike					Run: SUB-C287653			09/29/22 17:45	
Organic Carbon, Total (TOC)		2.80	mg/L	0.50	34	91	111			S
Lab ID: B22092175-001H	Sample Matrix Spike Duplicate					Run: SUB-C287653			09/29/22 18:15	
Organic Carbon, Total (TOC)		2.96	mg/L	0.50	38	91	111	5.6	20	S
Lab ID: C22091046-001EMS	Sample Matrix Spike					Run: SUB-C287653			09/30/22 13:21	
Organic Carbon, Total (TOC)		5.27	mg/L	0.50	105	91	111			
Lab ID: C22091046-001EMSD	Sample Matrix Spike Duplicate					Run: SUB-C287653			09/30/22 13:37	
Organic Carbon, Total (TOC)		5.38	mg/L	0.50	108	91	111	2.0	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22092240 **Report Date:** 10/11/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E300.0**									Analytical Run: IC METROHM 1_221005A	
Lab ID: **ICV**	2	Initial Calibration Verification Standard							10/05/22 16:25	
Chloride		25.4	mg/L	1.0	102	90	110			
Sulfate		107	mg/L	1.0	107	90	110			
Lab ID: **CCV**	2	Continuing Calibration Verification Standard							10/06/22 04:44	
Chloride		25.8	mg/L	1.0	103	90	110			
Sulfate		109	mg/L	1.0	109	90	110			
Method: **E300.0**									Batch: R389157	
Lab ID: **ICB**	2	Method Blank				Run: IC METROHM 1_221005A			10/05/22 16:41	
Chloride		ND	mg/L	0.06						
Sulfate		ND	mg/L	0.1						
Lab ID: **LFB**	2	Laboratory Fortified Blank				Run: IC METROHM 1_221005A			10/05/22 16:58	
Chloride		26.3	mg/L	1.0	105	90	110			
Sulfate		108	mg/L	1.0	108	90	110			
Lab ID: **B22092156-015AMS**	2	Sample Matrix Spike				Run: IC METROHM 1_221005A			10/06/22 05:17	
Chloride		27.0	mg/L	1.0	104	90	110			
Sulfate		128	mg/L	1.0	110	90	110			
Lab ID: **B22092156-015AMSD**	2	Sample Matrix Spike Duplicate				Run: IC METROHM 1_221005A			10/06/22 05:33	
Chloride		27.3	mg/L	1.0	105	90	110	1.0	20	
Sulfate		129	mg/L	1.0	111	90	110	1.0	20	S

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22092240 **Report Date:** 10/11/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2										Analytical Run: FIA204-B_221004B
Lab ID: ICV-170281		Initial Calibration Verification Standard								10/04/22 13:57
Nitrogen, Kjeldahl, Total as N		9.01	mg/L	0.50	90	90	110			
Lab ID: CCV-171068		Continuing Calibration Verification Standard								10/04/22 15:32
Nitrogen, Kjeldahl, Total as N		9.89	mg/L	0.50	99	90	110			
Method: E351.2										Batch: 171114
Lab ID: MB-171114		Method Blank				Run: FIA204-B_221004B				10/04/22 15:35
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.3						
Lab ID: LCS-171114		Laboratory Control Sample				Run: FIA204-B_221004B				10/04/22 15:37
Nitrogen, Kjeldahl, Total as N		9.67	mg/L	0.50	97	90	110			
Lab ID: B22092164-001DMS		Sample Matrix Spike				Run: FIA204-B_221004B				10/04/22 15:40
Nitrogen, Kjeldahl, Total as N		10.4	mg/L	0.50	104	90	110			
Lab ID: B22092164-001DMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_221004B				10/04/22 15:42
Nitrogen, Kjeldahl, Total as N		10.2	mg/L	0.50	102	90	110	1.9	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22092240 **Report Date:** 10/11/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E353.2**										Analytical Run: FIA203-B_221003B
Lab ID: **ICV**		Initial Calibration Verification Standard								10/03/22 17:23
Nitrogen, Nitrate+Nitrite as N		0.569	mg/L	0.010	101	90	110			
Lab ID: **CCV**		Continuing Calibration Verification Standard								10/03/22 17:42
Nitrogen, Nitrate+Nitrite as N		1.03	mg/L	0.010	103	90	110			
Method: **E353.2**										Batch: R388986
Lab ID: **MBLK**		Method Blank				Run: FIA203-B_221003B				10/03/22 17:24
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.007						
Lab ID: **LFB**		Laboratory Fortified Blank				Run: FIA203-B_221003B				10/03/22 17:26
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.010	104	90	110			
Lab ID: **FILTERLFB**		Laboratory Fortified Blank				Run: FIA203-B_221003B				10/03/22 17:28
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: **B22092451-001CMS**		Sample Matrix Spike				Run: FIA203-B_221003B				10/03/22 18:01
Nitrogen, Nitrate+Nitrite as N		48.6	mg/L	0.20	103	90	110			
Lab ID: **B22092451-001CMSD**		Sample Matrix Spike Duplicate				Run: FIA203-B_221003B				10/03/22 18:02
Nitrogen, Nitrate+Nitrite as N		49.3	mg/L	0.20	107	90	110	1.4	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

Water and Environmental Technologies B22092240

Login completed by: Tabitha Edwards
Date Received: 9/23/2022
Reviewed by: gmccartney
Received by: jdr
Reviewed Date: 10/1/2022
Carrier name: Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	1.3°C On Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

Chain of Custody & Analytical Request Record

ENERGY LABORATORIES — Solutions Provider, Trust and Data

www.energylab.com

Account Information (Billing Information)

Company/Name	Water & Environmental Technologies
Contact	Lisa Johnson
Phone	(406) 756 2550
Mailing Address	102 Cooperative Way
City, State, Zip	Kalispell MT 59901
Email	ljohnson@waterenvtech.com
Receive Invoice	☐ Hard Copy ☐ Email
Receive Report	☐ Hard Copy ☒ Email
Purchase Order	
Quote	
Bottle Order	167260

Report Information (if different than Account Information)

Company/Name	
Contact	Jamie Graham
Phone	(406) 309-6084
Mailing Address	
City, State, Zip	
Email	jgraham@waterenvtech.com
Receive Report	☐ Hard Copy ☒ Email
Special Report/Formats	☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other:

Comments

Project Information

Project Name, PWSID, Permit, etc.	(1539-22) LCWSD
Sampler Name	J. Graham
Sampler Phone	(406) 471-1205
Sample Origin State	MT
EPA/State Compliance	☐ Yes ☐ No

URANIUM MINING CLIENTS MUST indicate sample type
☐ Unprocessed Ore
☐ Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11(e)2 Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes

A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Biosolids
O - Oil
DW - Drinking Water

Analysis Requested

Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	A4500H B E300.0 A2510B	A2540C	E351.2 E353.2	A5310C	See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1 MW-5	9/22/22	10:10	4	W	X	X	X	X			B22092240
2											
3											
4											
5											
6											
7											
8											
9											

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

ELI is REQUIRED to provide preservative traceability. If the preservatives supplied with the bottle order were NOT used, please attach your preservative information with this COC.

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Jamie Graham	9/22/22 1300				
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
				BRANDON	9/23/22 910	

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-01/21 v.4

BOTTLE ORDER 167260

SHIPPED TO: **Water and Environmental Technologies**

Contact: Jamie Graham
102 Cooperative Way Unit 100
Kalispell MT 59901-
Phone: (406) 309-6084
Project: Lakeside Water and Sewer District

Order Created by: Darcy Chirrick
Shipped From: Billings, MT
Ship Date: 9/16/2022
VIA: FedEx in box

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
500 mL Plastic	1	A4500-H B E300.0 A2510 B	pH Anions by Ion Chromatography Conductivity	0.25 hrs			1
1 Liter Plastic	1	A2540 C	Solids, Total Dissolved				1
100 mL Plastic Sterile	1	E1603	Bacteria, Ecoli Water - MF	8.00 hrs			1
500 mL Plastic	1	E351.2 E353.2	Nitrogen, Total Kjeldahl Nitrogen, Nitrate + Nitrite		☐ H2SO4		1
250 mL Amber Glass	1	A5310 C	Carbon, Total Organic		☐ H3PO4		1

Comments

☐ HNO3 - Nitric Acid ☐ H2SO4 - Sulfuric Acid ☐ NaOH - Sodium Hydroxide
☐ ZnAc - Zinc Acetate ☐ HCl - Hydrochloric Acid ☐ H3PO4 - Phosphoric Acid

We strongly suggest that the samples are shipped the same day as they are collected.

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

ANALYTICAL REPORT

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904-1900
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

Water & Environmental Tech
Water & Environmental Technologies
102 Cooperative Way, Ste 100
Kalispell, MT 59901

PWS ID:
Project: 48.11678, -114.22775

Client Sample ID: Monitoring Well #5 **Lab ID:** 2212401-01
Matrix: DRINKING WATER **Collected:** 11/17/2022 14:30 **Received:** 11/17/2022 15:25

Coliform	Result	Units	RL	MCL	Method	Prepared	Analyzed	Analyst
Coliform Bacteria	**Present**	P/A	1	1	SM9223B	11/18/2022 12:30	11/19/2022 10:05	BSB
Coliform, Escherichia - P/A	**Absent**	P/A	1	1	SM9223B	11/18/2022 12:30	11/19/2022 10:05	BSB

MCL = Maximum Contaminant Limit ND = Not Detected
RL = Reporting Limit

MEL REVIEW: _____

ANALYTICAL REPORT

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904-1900
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

Water & Environmental Tech
Water & Environmental Technologies
102 Cooperative Way, Ste 100
Kalispell, MT 59901

PWS ID:
Project: 48.11678, -114.22775

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

12401

Total Coliform Bacteria - Chain of Custody

Samples must arrive at the lab within 18 hours of collection.
SEE BACK OF FORM FOR SAMPLING INSTRUCTIONS
Keep sample cool, not frozen. It is important to sample correctly.

PAYMENT MUST ACCOMPANY SAMPLE

Total Coliform Bacteria and E. coli test: $32
For **RUSH** (next morning results) add $16: _____
Extra copies of report, emails, faxes ($1 each): _____
If using a prepaid postage mailer tube, add $9: _____

Total enclosed:$ _____

Customer Name: Water & Environmental Technologies
Mailing Address: 102 Cooperative Way, Unit 100
City, State, Zip: Kalispell, MT, 59901 Phone #: 626-993-0638

Physical address of Sample Site	Sample Site (kitchen sink, hydrant, etc.)	Sample Date	Sample Time
48.11678, -114.22775	Monitoring Well #5	11/17/22	14:30

One copy of the report is included in the price of the test. How would you like to receive this report?

☐ Mail to:
☑ Email to: nsmall@waterenvtech.com
☐ Fax to:
Extra copies ($1 each) to:

I hereby acknowledge that this sample was collected at the above location, date and time.

Sampler signature: Nathan Small **Date/Time:** 11/17/22 14:30

This form MUST be signed — **Signature of person delivering sample:** Nathan Small **Date/Time:** 11/17/22 15:14

LAB USE ONLY

Received by lab date/time: GS 11-17-22 15:25 — M (C) DB UPS — Shipping charge: $

Paid by: EMAIL AR

Amount: $ CC CASH CHK # — Invoice

MCL = Maximum Contaminant Limit ND = Not Detected
RL = Reporting Limit

MEL REVIEW: _____

ANALYTICAL SUMMARY REPORT

November 30, 2022

Water and Environmental Technologies
480 E Park St Ste 200
Butte, MT 59701-1923

Work Order: B22111573

Project Name: Lakeside Water and Sewer District

Energy Laboratories Inc Billings MT received the following 1 sample for Water and Environmental Technologies on 11/18/2022 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B22111573-001	LCWSD MW #5	11/17/22 14:22	11/18/22	Aqueous	Conductivity Carbon, Total Organic Anions by Ion Chromatography Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) pH Preparation for TDS A2540 C TKN preparation E351.2 Solids, Total Dissolved

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: Water and Environmental Technologies
Project: Lakeside Water and Sewer District
Work Order: B22111573

Report Date: 11/30/22

CASE NARRATIVE

Tests associated with analyst identified as ELI-CA were subcontracted to Energy Laboratories, PO Box 247, Casper, WY, EPA Number WY00002.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies
Project: Lakeside Water and Sewer District
Lab ID: B22111573-001
Client Sample ID: LCWSD MW #5

Report Date: 11/30/22
Collection Date: 11/17/22 14:22
DateReceived: 11/18/22
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.4	s.u.	H	0.1		A4500-H B	11/18/22 15:08 / jaw
pH Measurement Temp	10.0	°C		1.0		A4500-H B	11/18/22 15:08 / jaw
Conductivity @ 25 C	600	umhos/cm		5		A2510 B	11/18/22 15:08 / jaw
Solids, Total Dissolved TDS @ 180 C	340	mg/L	D	20		A2540 C	11/21/22 13:38 / jaw
INORGANICS							
Chloride	7	mg/L		1		E300.0	11/21/22 19:03 / caa
Sulfate	5	mg/L		1		E300.0	11/21/22 19:03 / caa
AGGREGATE ORGANICS							
Organic Carbon, Total (TOC)	3.5	mg/L		0.5		A5310 C	11/23/22 14:20 / eli-ca
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.06	mg/L		0.01		E353.2	11/21/22 14:58 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	11/23/22 16:32 / mh
Nitrogen, Total	ND	mg/L		0.5		Calculation	11/23/22 17:13 / bap

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
D - Reporting Limit (RL) increased due to sample matrix
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)
H - Analysis performed past the method holding time

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Water and Environmental Technologies **Work Order:** B22111573 **Report Date:** 11/29/22

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A5310 C									Analytical Run: TOC4-C_221123A
Lab ID: CCV-11940	Continuing Calibration Verification Standard								11/23/22 11:34
Organic Carbon, Total (TOC)	4.75	mg/L	0.50	95	90	110			
Method: A5310 C									Batch: R289745
Lab ID: MBLK	Method Blank				Run: TOC4-C_221123A				11/23/22 11:03
Organic Carbon, Total (TOC)	ND	mg/L	0.2						
Lab ID: LCS-11923	Laboratory Control Sample				Run: TOC4-C_221123A				11/23/22 11:18
Organic Carbon, Total (TOC)	4.74	mg/L	0.50	95	91	111			
Lab ID: C22110761-003BMS	Sample Matrix Spike				Run: TOC4-C_221123A				11/23/22 15:55
Organic Carbon, Total (TOC)	6.10	mg/L	0.50	102	91	111			
Lab ID: C22110761-003BMSD	Sample Matrix Spike Duplicate				Run: TOC4-C_221123A				11/23/22 16:11
Organic Carbon, Total (TOC)	6.12	mg/L	0.50	102	91	111	0.3	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22111573 **Report Date:** 11/30/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2510 B									Analytical Run: PHSC _101-B_221118A	
Lab ID: CCV - SC 1413		Continuing Calibration Verification Standard							11/18/22 14:20	
Conductivity @ 25 C		1420	umhos/cm	5.0	101	90	110			
Method: A2510 B									Batch: R391613	
Lab ID: SC 2nd 1413		Laboratory Control Sample				Run: PHSC _101-B_221118A			11/18/22 08:56	
Conductivity @ 25 C		1420	umhos/cm	5.0	100	90	110			
Lab ID: MBLK		Method Blank				Run: PHSC _101-B_221118A			11/18/22 14:23	
Conductivity @ 25 C		ND	umhos/cm	5						
Lab ID: B22111548-002ADUP		Sample Duplicate				Run: PHSC _101-B_221118A			11/18/22 14:28	
Conductivity @ 25 C		31800	umhos/cm	5.0				0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22111573 **Report Date:** 11/30/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **A2540 C**										Batch: 172726
Lab ID: **MB-172726**		Method Blank				Run: BAL #30_221121B				11/21/22 13:37
Solids, Total Dissolved TDS @ 180 C		1	mg/L							
Lab ID: **LCS-172726**		Laboratory Control Sample				Run: BAL #30_221121B				11/21/22 13:37
Solids, Total Dissolved TDS @ 180 C		1000	mg/L	25	100	90	110			
Lab ID: **B22111548-001A DUP**		Sample Duplicate				Run: BAL #30_221121B				11/21/22 13:38
Solids, Total Dissolved TDS @ 180 C		22600	mg/L	500				1.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22111573 **Report Date:** 11/30/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B										Analytical Run: PHSC _101-B_221118A
Lab ID: pH 8	2	Initial Calibration Verification Standard								11/18/22 08:43
pH		8.0	s.u.	0.1	100	98	102			
pH Measurement Temp		19.2	°C	1.0						
Lab ID: CCV - pH 7	2	Continuing Calibration Verification Standard								11/18/22 14:17
pH		7.0	s.u.	0.1	100	98	102			
pH Measurement Temp		19.6	°C	1.0		0	0			
Method: A4500-H B										Batch: R391613
Lab ID: B22111548-002ADUP	2	Sample Duplicate				Run: PHSC _101-B_221118A				11/18/22 14:28
pH		6.8	s.u.	0.1				0.6	3	
pH Measurement Temp		15.7	°C	1.0						

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22111573 **Report Date:** 11/30/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E300.0**									Analytical Run: IC METROHM 1_221121A	
Lab ID: **ICV**	2	Initial Calibration Verification Standard							11/21/22 16:20	
Chloride		24.8	mg/L	1.0	99	90	110			
Sulfate		104	mg/L	1.0	104	90	110			
Lab ID: **CCV**	2	Continuing Calibration Verification Standard							11/21/22 17:09	
Chloride		26.0	mg/L	1.0	104	90	110			
Sulfate		109	mg/L	1.0	109	90	110			
Method: **E300.0**									Batch: R391758	
Lab ID: **ICB**	2	Method Blank				Run: IC METROHM 1_221121A			11/21/22 16:36	
Chloride		ND	mg/L	0.06						
Sulfate		ND	mg/L	0.1						
Lab ID: **LFB**	2	Laboratory Fortified Blank				Run: IC METROHM 1_221121A			11/21/22 16:52	
Chloride		25.0	mg/L	1.0	100	90	110			
Sulfate		105	mg/L	1.0	105	90	110			
Lab ID: **B22111469-003AMS**	2	Sample Matrix Spike				Run: IC METROHM 1_221121A			11/21/22 18:31	
Chloride		244	mg/L	1.3	100	90	110			
Sulfate		1370	mg/L	2.6	97	90	110			
Lab ID: **B22111469-003AMSD**	2	Sample Matrix Spike Duplicate				Run: IC METROHM 1_221121A			11/21/22 18:47	
Chloride		240	mg/L	1.3	96	90	110	1.8	20	
Sulfate		1330	mg/L	2.6	91	90	110	2.5	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22111573 **Report Date:** 11/30/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2										Analytical Run: FIA204-B_221123B
Lab ID: ICV-171604		Initial Calibration Verification Standard								11/23/22 12:06
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Lab ID: CCV-172790		Continuing Calibration Verification Standard								11/23/22 16:24
Nitrogen, Kjeldahl, Total as N		10.2	mg/L	0.50	102	90	110			
Method: E351.2										Batch: 172840
Lab ID: MB-172840		Method Blank				Run: FIA204-B_221123B				11/23/22 15:59
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.3						
Lab ID: LCS-172840		Laboratory Control Sample				Run: FIA204-B_221123B				11/23/22 16:01
Nitrogen, Kjeldahl, Total as N		10.3	mg/L	0.50	103	90	110			
Lab ID: B22111816-005DMS		Sample Matrix Spike				Run: FIA204-B_221123B				11/23/22 16:43
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	98	90	110			
Lab ID: B22111816-005DMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_221123B				11/23/22 16:44
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	93	90	110	4.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B22111573 **Report Date:** 11/30/22

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E353.2**										Analytical Run: FIA203-B_221121B
Lab ID: **ICV**		Initial Calibration Verification Standard								11/21/22 13:47
Nitrogen, Nitrate+Nitrite as N		0.567	mg/L	0.010	100	90	110			
Lab ID: **CCV**		Continuing Calibration Verification Standard								11/21/22 14:43
Nitrogen, Nitrate+Nitrite as N		1.02	mg/L	0.010	102	90	110			
Method: **E353.2**										Batch: R391739
Lab ID: **MBLK**		Method Blank				Run: FIA203-B_221121B				11/21/22 13:49
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.007						
Lab ID: **LFB**		Laboratory Fortified Blank				Run: FIA203-B_221121B				11/21/22 13:55
Nitrogen, Nitrate+Nitrite as N		0.997	mg/L	0.010	100	90	110			
Lab ID: **FILTERLFB**		Laboratory Fortified Blank				Run: FIA203-B_221121B				11/21/22 13:56
Nitrogen, Nitrate+Nitrite as N		1.02	mg/L	0.010	102	90	110			
Lab ID: **B22111639-001DMS**		Sample Matrix Spike				Run: FIA203-B_221121B				11/21/22 15:05
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.010	103	90	110			
Lab ID: **B22111639-001DMSD**		Sample Matrix Spike Duplicate				Run: FIA203-B_221121B				11/21/22 15:06
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	104	90	110	1.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

Water and Environmental Technologies B22111573

Login completed by: Yvonna E. Smith
Date Received: 11/18/2022
Reviewed by: cindy
Received by: lel
Reviewed Date: 11/19/2022
Carrier name: Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☐	No ☑	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	0.7°C On Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

The collection date/time indicated on the container label for sample LCWSD MW#5 ranges from 14:20-14:26 and on the Chain of Custody it is 14:22. Proceeded with the collection date/time as indicated on the Chain of Custody.

ENERGY LABORATORIES

www.energylab.com

Chain of Custody (COC) & Analytical Request Record

Lab Workorder #: B22111573

Project Information

Client:	Water and Environmental Technologies
Project:	Lakeside Water and Sewer District
Purchase Order:	
Contact/Phone:	Nathan Small (406)309-6091/M:(626)993-0638

Laboratory Use

Quote:	N/A
BO#:	168767
EE#:	45786
Turn-Around Time:	Standard
Critical Hold Time:	30 Hours
# of Samples:	1
Matrix:	Aqueous

Comments:

Contact ELI prior to RUSH sample submittal for charges, availability & scheduling. Samples submitted may be subcontracted to other laboratories to complete the test(s) requested; this will be clearly noted on the analytical report.

Analysis Requested

	Sample Identification	Collection Date/Time	# of Containers	Matrix	RUSH TAT	Conductivity (A2510 B)	Anions by Ion Chromatography (E300.0)	pH (A4500-H B)	Solids, Total Dissolved (A2540 C)	Nitrogen, Nitrate + Nitrite (E353.2)	Nitrogen, Total Kjeldahl (E351.2)	Nitrogen, Total (TKN +NO3+NO2) (Calculation)	Carbon, Total Organic (A5310 C)	Bacteria, Private Water Supply (A9223 B)					
	Hold Time (Days)					28	28	Fld	7	28	28	N/A	28	1.25					
1			4	W		X	X	X	X	X	X	X	X	X					
2	LCWSD MW#5	11/17/22 14:22	3	W		X	X	X	X	X	X	X	X						
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			

Custody Record MUST be signed

Lab provided preservatives were used ☐Yes ☐No

Sampler Name (if different than Relinquished by): Nathan Small

Sampler Phone: 406-309-6091

Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
Nathan Small	11/17/22 1630	Nathan Small			
Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
			Lynda: LeBrowse	11/18/22 09:15	Lynda LeBrowse

Date Printed: 11/09/2022 EE: BL - 45786 COC: Page 1 of 1

ANALYTICAL REPORT

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904-1900
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

Water & Environmental Tech
Water & Environmental Technologies
102 Cooperative Way, Ste 100
Kalispell, MT 59901

PWS ID:
Project: 48.1167, -114.2276

Client Sample ID: 48.1167, -114.2276 **Lab ID:** 2302242-01
Matrix: DRINKING WATER **Collected:** 03/15/2023 14:02 **Received:** 03/15/2023 15:05

Coliform	Result	Units	RL	MCL	Method	Prepared	Analyzed	Analyst
Coliform Bacteria	**Present**	P/A			SM9223B	03/16/2023 10:45	03/18/2023 9:00	BSB
Coliform, Escherichia - P/A	**Absent**	P/A			SM9223B	03/16/2023 10:45	03/18/2023 9:00	BSB

MCL = Maximum Contaminant Limit ND = Not Detected
RL = Reporting Limit

MEL REVIEW: _____

ANALYTICAL REPORT

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904-1900
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

Water & Environmental Tech
Water & Environmental Technologies
102 Cooperative Way, Ste 100
Kalispell, MT 59901

PWS ID:
Project: 48.1167, -114.2276

Montana Environmental Laboratory LLC
1170 N. Meridian Rd., P.O. Box 8900, Kalispell, MT 59904
Phone: 406-755-2131 Fax: 406-257-5359 www.melab.us

2242

Total Coliform Bacteria - Chain of Custody

Samples must arrive at the lab within 18 hours of collection.
SEE BACK OF FORM FOR SAMPLING INSTRUCTIONS
Keep sample cool, not frozen. It is important to sample correctly.

PAYMENT MUST ACCOMPANY SAMPLE

Total Coliform Bacteria and E. coli test: $32
For RUSH (next morning results) add $16: _____
Extra copies of report, emails, faxes ($1 each): _____
If using a prepaid postage mailer tube, add $9: _____

Total enclosed:$ _____

Customer Name: Water & Environmental Technologies, Nathan Small
Mailing Address: 102 Cooperative Way Suite 100
City, State, Zip: Kalispell MT 59901 Phone #: 406-309-6085

Physical address of Sample Site	Sample Site (kitchen sink, hydrant, etc.)	Sample Date	Sample Time
48.1167, -114.2276	Monitoring Well	3/15/23	1402

One copy of the report is included in the price of the test. How would you like to receive this report?

☐ Mail to:
☐ Email to: nsmall@waterenvtech.com
☐ Fax to:
Extra copies ($1 each) to:

I hereby acknowledge that this sample was collected at the above location, date and time.

Sampler signature: Nathan Small **Date/Time:** 3/15/23

This form MUST be signed — **Signature of person delivering sample:** Nathan Small **Date/Time:** 3/15/23

LAB USE ONLY

Received by lab date/time: AB 3-15-23 15:05 M DB UPS Shipping charge: $

Paid by:

Amount: $ CC CASH CHK # Invoice EMAIL AM

MCL = Maximum Contaminant Limit ND = Not Detected
RL = Reporting Limit

MEL REVIEW: _____

ANALYTICAL SUMMARY REPORT

March 28, 2023

Water and Environmental Technologies
480 E Park St Ste 200
Butte, MT 59701-1923

Work Order: B23031196

Project Name: 1539-22 LCWSD

Energy Laboratories Inc Billings MT received the following 1 sample for Water and Environmental Technologies on 3/16/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23031196-001	MW-5	03/15/23 14:04	03/16/23	Aqueous	Carbon, Total Organic Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) pH Preparation for TDS A2540 C TKN preparation E351.2 Solids, Total Dissolved

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: Water and Environmental Technologies
Project: 1539-22 LCWSD
Work Order: B23031196

Report Date: 03/28/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-CA were subcontracted to Energy Laboratories, PO Box 247, Casper, WY, EPA Number WY00002.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies
Project: 1539-22 LCWSD
Lab ID: B23031196-001
Client Sample ID: MW-5

Report Date: 03/28/23
Collection Date: 03/15/23 14:04
DateReceived: 03/16/23
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.5	s.u.	H	0.1		A4500-H B	03/16/23 16:56 / fap
pH Measurement Temp	15.4	°C		1.0		A4500-H B	03/16/23 16:56 / fap
Solids, Total Dissolved TDS @ 180 C	334	mg/L		20		A2540 C	03/17/23 13:42 / pjw
AGGREGATE ORGANICS							
Organic Carbon, Total (TOC)	3.5	mg/L		0.5		A5310 C	03/24/23 15:45 / eli-ca
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.15	mg/L		0.01		E353.2	03/21/23 15:54 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	03/22/23 16:52 / jaw
Nitrogen, Total	ND	mg/L		0.5		Calculation	03/24/23 08:07 / rs4

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
H - Analysis performed past the method holding time
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Water and Environmental Technologies **Work Order:** B23031196 **Report Date:** 03/27/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A5310 C									Analytical Run: TOC4-C_230324A	
Lab ID: CCV-11940	Continuing Calibration Verification Standard								03/24/23 13:46	
Organic Carbon, Total (TOC)		5.31	mg/L	0.50	106	90	110			
Method: A5310 C									Batch: R293074	
Lab ID: MBLK	Method Blank					Run: TOC4-C_230324A			03/24/23 13:11	
Organic Carbon, Total (TOC)		ND	mg/L	0.1						
Lab ID: LCS-11923	Laboratory Control Sample					Run: TOC4-C_230324A			03/24/23 13:31	
Organic Carbon, Total (TOC)		5.13	mg/L	0.50	103	90	111			
Lab ID: C23030598-001AMS	Sample Matrix Spike					Run: TOC4-C_230324A			03/24/23 14:53	
Organic Carbon, Total (TOC)		6.69	mg/L	0.50	102	90	111			
Lab ID: C23030598-001AMSD	Sample Matrix Spike Duplicate					Run: TOC4-C_230324A			03/24/23 15:08	
Organic Carbon, Total (TOC)		6.64	mg/L	0.50	101	90	111	0.8	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B23031196 **Report Date:** 03/28/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 C										Batch: 176850
Lab ID: MB-176850		Method Blank				Run: BAL #30_230317E				03/17/23 13:37
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	20						
Lab ID: LCS-176850		Laboratory Control Sample				Run: BAL #30_230317E				03/17/23 13:38
Solids, Total Dissolved TDS @ 180 C		1010	mg/L	25	101	90	110			
Lab ID: B23031161-012A DUP		Sample Duplicate				Run: BAL #30_230317E				03/17/23 13:38
Solids, Total Dissolved TDS @ 180 C		117	mg/L	25				2.2	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B23031196 **Report Date:** 03/28/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B									Analytical Run: PHSC _101-B_230316A	
Lab ID: pH 8	2	Initial Calibration Verification Standard							03/16/23 09:11	
pH		8.0	s.u.	0.1	100	98	102			
pH Measurement Temp		20.2	°C	1.0						
Lab ID: CCV - pH 7	2	Continuing Calibration Verification Standard							03/16/23 16:40	
pH		7.0	s.u.	0.1	101	98	102			
pH Measurement Temp		19.2	°C	1.0		0	0			
Method: A4500-H B									Batch: R399018	
Lab ID: B23031189-003ADUP	2	Sample Duplicate				Run: PHSC _101-B_230316A			03/16/23 16:51	
pH		7.0	s.u.	0.1				0.7	3	
pH Measurement Temp		15.4	°C	1.0						

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B23031196 **Report Date:** 03/28/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2									Analytical Run: FIA204-B_230322B	
Lab ID: ICV-176770		Initial Calibration Verification Standard							03/22/23 15:15	
Nitrogen, Kjeldahl, Total as N		10.3	mg/L	0.50	103	90	110			
Lab ID: CCV-176770		Continuing Calibration Verification Standard							03/22/23 16:46	
Nitrogen, Kjeldahl, Total as N		9.97	mg/L	0.50	100	90	110			
Method: E351.2									Batch: 176920	
Lab ID: MB-176920		Method Blank				Run: FIA204-B_230322B			03/22/23 16:23	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: LCS-176920		Laboratory Control Sample				Run: FIA204-B_230322B			03/22/23 16:25	
Nitrogen, Kjeldahl, Total as N		9.84	mg/L	0.50	98	90	110			
Lab ID: B23031224-002AMS		Sample Matrix Spike				Run: FIA204-B_230322B			03/22/23 16:59	
Nitrogen, Kjeldahl, Total as N		11.5	mg/L	0.50	101	90	110			
Lab ID: B23031224-002AMSD		Sample Matrix Spike Duplicate				Run: FIA204-B_230322B			03/22/23 17:01	
Nitrogen, Kjeldahl, Total as N		11.5	mg/L	0.50	101	90	110	0.0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B23031196 **Report Date:** 03/28/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E353.2**									Analytical Run: FIA203-B_230321A	
Lab ID: **ICV**		Initial Calibration Verification Standard							03/21/23 13:25	
Nitrogen, Nitrate+Nitrite as N		0.573	mg/L	0.010	101	90	110			
Lab ID: **CCV**		Continuing Calibration Verification Standard							03/21/23 15:43	
Nitrogen, Nitrate+Nitrite as N		0.992	mg/L	0.010	99	90	110			
Lab ID: **ICV**		Initial Calibration Verification Standard							03/21/23 18:29	
Nitrogen, Nitrate+Nitrite as N		0.589	mg/L	0.010	104	90	110			
Method: **E353.2**									Batch: R399259	
Lab ID: **MBLK**		Method Blank				Run: FIA203-B_230321A			03/21/23 13:26	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.008						
Lab ID: **LFB**		Laboratory Fortified Blank				Run: FIA203-B_230321A			03/21/23 13:28	
Nitrogen, Nitrate+Nitrite as N		0.994	mg/L	0.010	99	90	110			
Lab ID: **FILTERLFB**		Laboratory Fortified Blank				Run: FIA203-B_230321A			03/21/23 13:29	
Nitrogen, Nitrate+Nitrite as N		1.03	mg/L	0.010	103	90	110			
Lab ID: **B23031189-001EMS**		Sample Matrix Spike				Run: FIA203-B_230321A			03/21/23 15:46	
Nitrogen, Nitrate+Nitrite as N		1.56	mg/L	0.010	103	90	110			
Lab ID: **B23031189-001EMSD**		Sample Matrix Spike Duplicate				Run: FIA203-B_230321A			03/21/23 15:47	
Nitrogen, Nitrate+Nitrite as N		1.57	mg/L	0.010	104	90	110	0.8	10	
Lab ID: **B23031219-001CMS**		Sample Matrix Spike				Run: FIA203-B_230321A			03/21/23 16:02	
Nitrogen, Nitrate+Nitrite as N		0.970	mg/L	0.010	97	90	110			
Lab ID: **B23031219-001CMSD**		Sample Matrix Spike Duplicate				Run: FIA203-B_230321A			03/21/23 16:03	
Nitrogen, Nitrate+Nitrite as N		1.01	mg/L	0.010	101	90	110	3.9	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

Water and Environmental Technologies B23031196

Login completed by:	Lyndsi E. LeProwse	Date Received:	3/16/2023
Reviewed by:	tedwards	Received by:	lrs
Reviewed Date:	3/20/2023	Carrier name:	Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	2.3°C On Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

ENERGY LABORATORIES
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Page _____ of _____

Account Information (Billing information)

Company/Name	Water & Environmental Technologies
Contact	Lisa Johnson
Phone	406-756-2550
Mailing Address	102 Cooperative Way
City, State, Zip	Kalispell MT 59901
Email	ljohnson@waterenvtech.com
Receive Invoice	☐ Hard Copy ☐ Email
Receive Report	☐ Hard Copy ☐ Email
Purchase Order	
Quote	
Bottle Order	

Report Information (if different than Account Information)

Company/Name	
Contact	Nathan Small
Phone	406-309-6091
Mailing Address	
City, State, Zip	
Email	nsmall@waterenvtech.com
Receive Report	☐ Hard Copy ☑ Email

Special Report/Formats: ☐ LEVEL IV ☐ NELAC ☐ EDD/EDT (contact laboratory) ☐ Other_____

Comments

Project Information

Project Name, PWSID, Permit, etc.	1531-22 LCWSD
Sampler Name	N. Small
Sampler Phone	676-993-0638
Sample Origin State	MT
EPA/State Compliance	☐ Yes ☐ No

URANIUM MINING CLIENTS MUST indicate sample type.
☐ NOT Source or Byproduct Material
☐ Source/Processed Ore (Ground or Refined) **CALL BEFORE SENDING
☐ 11e.(2) Byproduct Material (Can ONLY be Submitted to ELI Casper Location)

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Biossay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	A4500HB	A2540C	E351.2 E353.2	A5310C	See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	MW-5	3/15/23	1404	4	W	X	X	X	X			B230311-06
2												
3												
4												
5												
6												
7												
8												
9												
10												

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	Nathan Small	3/15/23 1600	Nathan Small			
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) Lee Shelton	Date/Time 3/16/23 08:55	Signature

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals Y N C B	Intact Y N	Receipt Temp °C	Temp Blank Y N	On Ice Y N	Payment Type CC Cash Check_____	Amount $	Receipt Number (cash/check only)

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-10/18 v.3

ANALYTICAL SUMMARY REPORT

May 11, 2023

Water and Environmental Technologies
480 E Park St Ste 200
Butte, MT 59701-1923

Work Order: B23050152

Project Name: Lakeside Water and Sewer District

Energy Laboratories Inc Billings MT received the following 1 sample for Water and Environmental Technologies on 5/2/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B23050152-001	MW-5	05/01/23 13:05	05/02/23	Aqueous	Bacteria, Private Water Supply Conductivity Carbon, Total Organic Anions by Ion Chromatography Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) pH Preparation for TDS A2540 C TKN preparation E351.2 Solids, Total Dissolved

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: Water and Environmental Technologies
Project: Lakeside Water and Sewer District
Work Order: B23050152

Report Date: 05/11/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-CA were subcontracted to Energy Laboratories, PO Box 247, Casper, WY, EPA Number WY00002.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies
Project: Lakeside Water and Sewer District
Client Sample ID: MW-5
Sampled By: Nathan Small
Lab ID: B23050152-001D

Report Date: 05/11/23
Collection Date: 05/01/23 13:05
Received Date: 05/02/23 10:20
Matrix: Aqueous

Analyses	Result	Units	Safe/Unsafe	Qualifier	Method	Analysis Date / By
MICROBIOLOGICAL						
Coliform, Total	Absent	per 100ml	SAFE		A9223 B	05/02/23 14:06 / spb
Coliform, E-Coli	Absent	per 100ml			A9223 B	05/02/23 14:06 / spb

Comments: The notation "SAFE" indicates that the water was bacteriologically SAFE when sampled.
The notation "UNSAFE" indicates that the water was bacteriologically UNSAFE when sampled.

Qualifiers:

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies
Project: Lakeside Water and Sewer District
Lab ID: B23050152-001
Client Sample ID: MW-5

Report Date: 05/11/23
Collection Date: 05/01/23 13:05
DateReceived: 05/02/23
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.4	s.u.	H	0.1		A4500-H B	05/02/23 13:53 / nrb
pH Measurement Temp	11.5	°C		1.0		A4500-H B	05/02/23 13:53 / nrb
Conductivity @ 25 C	589	umhos/cm		5		A2510 B	05/02/23 13:53 / nrb
Solids, Total Dissolved TDS @ 180 C	338	mg/L		20		A2540 C	05/02/23 15:39 / idg
INORGANICS							
Chloride	8	mg/L		1		E300.0	05/03/23 00:52 / caa
Sulfate	8	mg/L		1		E300.0	05/03/23 00:52 / caa
AGGREGATE ORGANICS							
Organic Carbon, Total (TOC)	3.6	mg/L		0.5		A5310 C	05/04/23 19:26 / eli-ca
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	0.15	mg/L		0.01		E353.2	05/03/23 14:30 / krt
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	05/05/23 10:03 / jaw
Nitrogen, Total	ND	mg/L		0.5		Calculation	05/08/23 10:42 / bap

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
H - Analysis performed past the method holding time
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Water and Environmental Technologies **Work Order:** B23050152 **Report Date:** 05/09/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **A5310 C**									Analytical Run: TOC3-C_230504A	
Lab ID: **CCV-11940**	Continuing Calibration Verification Standard								05/04/23 17:44	
Organic Carbon, Total (TOC)		5.40	mg/L	0.50	108	90	110			
Method: **A5310 C**									Batch: R294293	
Lab ID: **MBLK**	Method Blank					Run: TOC3-C_230504A			05/04/23 17:09	
Organic Carbon, Total (TOC)		ND	mg/L	0.1						
Lab ID: **LCS-11923**	Laboratory Control Sample					Run: TOC3-C_230504A			05/04/23 17:29	
Organic Carbon, Total (TOC)		5.27	mg/L	0.50	105	90	111			
Lab ID: **C23050116-001AMS**	Sample Matrix Spike					Run: TOC3-C_230504A			05/04/23 18:17	
Organic Carbon, Total (TOC)		10.4	mg/L	0.50	98	90	111			
Lab ID: **C23050116-001AMSD**	Sample Matrix Spike Duplicate					Run: TOC3-C_230504A			05/04/23 18:33	
Organic Carbon, Total (TOC)		10.5	mg/L	0.50	101	90	111	1.3	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B23050152 **Report Date:** 05/11/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **A2510 B**										Batch: R401317
Lab ID: **SC 2nd 1413**	Laboratory Control Sample					Run: PHSC _101-B_230502A				05/02/23 08:42
Conductivity @ 25 C		1410	umhos/cm	5.0	100	90	110			
Lab ID: **MBLK**	Method Blank					Run: PHSC _101-B_230502A				05/02/23 08:49
Conductivity @ 25 C		ND	umhos/cm	5						
Lab ID: **B23050080-001ADUP**	Sample Duplicate					Run: PHSC _101-B_230502A				05/02/23 09:07
Conductivity @ 25 C		408	umhos/cm	5.0				7.1	10	
Lab ID: **B23050168-001ADUP**	Sample Duplicate					Run: PHSC _101-B_230502A				05/02/23 15:07
Conductivity @ 25 C		339	umhos/cm	5.0				3.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B23050152 **Report Date:** 05/11/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 C										Batch: 178312
Lab ID: MB-178312		Method Blank				Run: BAL #30_230502F				05/02/23 15:36
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	20						
Lab ID: LCS-178312		Laboratory Control Sample				Run: BAL #30_230502F				05/02/23 15:36
Solids, Total Dissolved TDS @ 180 C		1020	mg/L	25	102	90	110			
Lab ID: B23041936-001A DUP		Sample Duplicate				Run: BAL #30_230502F				05/02/23 15:36
Solids, Total Dissolved TDS @ 180 C		15900	mg/L	500				2.5	10	H
Method: A2540 C										Batch: 178312
Lab ID: B23050170-001A DUP		Sample Duplicate				Run: BAL #30_230508D				05/08/23 14:38
Solids, Total Dissolved TDS @ 180 C		665	mg/L	25				1.4	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

H - Analysis performed past the method holding time

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B23050152 **Report Date:** 05/11/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B									Analytical Run: PHSC _101-B_230502A	
Lab ID: pH 8	2	Initial Calibration Verification Standard							05/02/23 08:27	
pH		8.0	s.u.	0.1	100	98	102			
pH Measurement Temp		20.5	°C	1.0						
Method: A4500-H B									Batch: R401317	
Lab ID: B23050080-001ADUP	2	Sample Duplicate				Run: PHSC _101-B_230502A			05/02/23 09:07	
pH		6.3	s.u.	0.1				2.7	3	H
pH Measurement Temp		13.3	°C	1.0						
Lab ID: B23050168-001ADUP	2	Sample Duplicate				Run: PHSC _101-B_230502A			05/02/23 15:07	
pH		8.3	s.u.	0.1				2.1	3	H
pH Measurement Temp		11.0	°C	1.0						

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

H - Analysis performed past the method holding time

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B23050152 **Report Date:** 05/11/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E300.0**									Analytical Run: IC METROHM 2_230501A	
Lab ID: **ICV**	2	Initial Calibration Verification Standard							05/01/23 11:44	
Chloride		25.1	mg/L	1.0	100	90	110			
Sulfate		101	mg/L	1.0	101	90	110			
Lab ID: **CCV**	2	Continuing Calibration Verification Standard							05/03/23 00:35	
Chloride		25.1	mg/L	1.0	100	90	110			
Sulfate		101	mg/L	1.0	101	90	110			
Method: **E300.0**									Batch: R401318	
Lab ID: **ICB**	2	Method Blank				Run: IC METROHM 2_230501A			05/01/23 12:00	
Chloride		ND	mg/L	0.1						
Sulfate		ND	mg/L	0.5						
Lab ID: **LFB**	2	Laboratory Fortified Blank				Run: IC METROHM 2_230501A			05/01/23 12:17	
Chloride		23.9	mg/L	1.0	95	90	110			
Sulfate		96.9	mg/L	1.1	97	90	110			
Lab ID: **B23050152-001AMS**	2	Sample Matrix Spike				Run: IC METROHM 2_230501A			05/03/23 01:08	
Chloride		34.1	mg/L	1.0	105	90	110			
Sulfate		114	mg/L	1.1	106	90	110			
Lab ID: **B23050152-001AMSD**	2	Sample Matrix Spike Duplicate				Run: IC METROHM 2_230501A			05/03/23 01:25	
Chloride		34.3	mg/L	1.0	106	90	110	0.6	20	
Sulfate		115	mg/L	1.1	107	90	110	0.7	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B23050152 **Report Date:** 05/11/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E351.2**									Analytical Run: FIA204-B_230505A	
Lab ID: **ICV-178056**	Initial Calibration Verification Standard								05/05/23 09:57	
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Method: **E351.2**									Batch: 178372	
Lab ID: **MB-178372**	Method Blank					Run: FIA204-B_230505A			05/05/23 10:00	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.4						
Lab ID: **LCS-178372**	Laboratory Control Sample					Run: FIA204-B_230505A			05/05/23 10:01	
Nitrogen, Kjeldahl, Total as N		10.1	mg/L	0.50	101	90	110			
Lab ID: **B23050152-001BMS**	Sample Matrix Spike					Run: FIA204-B_230505A			05/05/23 10:05	
Nitrogen, Kjeldahl, Total as N		10.6	mg/L	0.50	106	90	110			
Lab ID: **B23050152-001BMSD**	Sample Matrix Spike Duplicate					Run: FIA204-B_230505A			05/05/23 10:06	
Nitrogen, Kjeldahl, Total as N		10.9	mg/L	0.50	109	90	110	2.8	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Water and Environmental Technologies **Work Order:** B23050152 **Report Date:** 05/11/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2										Analytical Run: FIA203-B_230503B
Lab ID: ICV		Initial Calibration Verification Standard								05/03/23 12:45
Nitrogen, Nitrate+Nitrite as N		0.562	mg/L	0.010	99	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard								05/03/23 14:21
Nitrogen, Nitrate+Nitrite as N		0.985	mg/L	0.010	98	90	110			
Method: E353.2										Batch: R401439
Lab ID: MBLK		Method Blank				Run: FIA203-B_230503B				05/03/23 12:46
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.008						
Lab ID: LFB		Laboratory Fortified Blank				Run: FIA203-B_230503B				05/03/23 12:48
Nitrogen, Nitrate+Nitrite as N		1.05	mg/L	0.010	105	90	110			
Lab ID: FILTERLFB		Laboratory Fortified Blank				Run: FIA203-B_230503B				05/03/23 12:49
Nitrogen, Nitrate+Nitrite as N		1.06	mg/L	0.010	106	90	110			
Lab ID: B23050125-001BMS		Sample Matrix Spike				Run: FIA203-B_230503B				05/03/23 14:25
Nitrogen, Nitrate+Nitrite as N		5.21	mg/L	0.020	102	90	110			
Lab ID: B23050125-001BMSD		Sample Matrix Spike Duplicate				Run: FIA203-B_230503B				05/03/23 14:26
Nitrogen, Nitrate+Nitrite as N		5.29	mg/L	0.020	106	90	110	1.5	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

Water and Environmental Technologies B23050152

Login completed by: Tyler J. Gasser
Date Received: 5/2/2023
Reviewed by: nhill
Received by: tjg
Reviewed Date: 5/3/2023
Carrier name: Return-FedEx Ground

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	2.9°C On Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☑	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

Contact and Corrective Action Comments:

None

ENERGY LABORATORIES

www.energylab.com

Chain of Custody (COC) & Analytical Request Record

Lab Workorder #: B23050152

Project Information

Laboratory Use

Client:	Water and Environmental Technologies	*Quote:*	N/A	*Critical Hold Time:*	30 Hours
Project:	Lakeside Water and Sewer District	*BO#:*	173151	*# of Samples:*	1
Purchase Order:		*EE#:*	49878	*Matrix:*	Aqueous
Contact/Phone:	Nathan Small (406)309-6091/M:(626)993-0638	*Turn-Around Time:*	Standard		

Comments:

Contact ELI prior to RUSH sample submittal for charges, availability & scheduling. Samples submitted may be subcontracted to other laboratories to complete the test(s) requested; this will be clearly noted on the analytical report.

Analysis Requested

	Sample Identification	Collection Date/Time	# of Containers	Matrix	RUSH TAT	Conductivity (A2510 B)	Anions by Ion Chromatography (E300.0)	pH (A4500-H B)	Solids, Total Dissolved (A2540 C)	Nitrogen, Nitrate + Nitrite (E353.2)	Nitrogen, Total Kjeldahl (E351.2)	Nitrogen, Total (TKN +NO3+NO2) (Calculation)	Carbon, Total Organic (A5310 C)	Bacteria, Private Water Supply (A9223 B)					
	Hold Time (Days)					28	28	Fld	7	28	28	N/A	28	1.25					
1	MW-5	5/1/23 1305	4	W		X	X	X	X	X	X	X	X	X					
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			
11																			

Custody Record MUST be signed

Lab provided preservatives were used ☐Yes ☐No

Sampler Name (if different than Relinquished by):

Sampler Phone: 406-309-6091

Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
Nathan Small	5/1/23 1305				
Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print)	Date/Time	Signature
			Tyler Grasser	5/2/23 1020	

ANALYTICAL SUMMARY REPORT

November 08, 2023

Water and Environmental Technologies
480 E Park St Ste 200
Butte, MT 59701-1923

Work Order: H23100915

Project Name: B&P

Energy Laboratories Inc Helena MT received the following 1 sample for Water and Environmental Technologies on 10/25/2023 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
H23100915-001	WET-10-23-23-1	10/23/23 13:30	10/25/23	Aqueous	Conductivity Carbon, Total Organic Anions by Ion Chromatography Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Nitrogen, Total (TKN+NO3+NO2) pH E365.1 Digestion, Total P TKN Prep Phosphorus, Total Solids, Total Dissolved

The analyses presented in this report were performed by Energy Laboratories, Inc., 3161 E. Lyndale Ave., Helena, MT 59604, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

CLIENT: Water and Environmental Technologies
Project: B&P
Work Order: H23100915

Report Date: 11/08/23

CASE NARRATIVE

Tests associated with analyst identified as ELI-CA were subcontracted to Energy Laboratories, 2393 Salt Creek Hwy., Casper, WY, EPA Number WY00002.

LABORATORY ANALYTICAL REPORT

Prepared by Helena, MT Branch

Client: Water and Environmental Technologies
Project: B&P
Lab ID: H23100915-001
Client Sample ID: WET-10-23-23-1

Report Date: 11/08/23
Collection Date: 10/23/23 13:30
DateReceived: 10/25/23
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	7.4	s.u.	H	0.1		A4500-H B	10/25/23 15:17 / eek
pH Measurement Temp	18.2	°C				A4500-H B	10/25/23 15:17 / eek
Conductivity @ 25 C	1190	umhos/cm		5		A2510 B	10/26/23 10:41 / dpw
Solids, Total Dissolved TDS @ 180 C	690	mg/L		20		A2540 C	10/25/23 13:50 / dpw
INORGANICS							
Chloride	179	mg/L		1		E300.0	10/31/23 00:01 / SRW
Sulfate	2	mg/L		1		E300.0	10/31/23 00:01 / SRW
AGGREGATE ORGANICS							
Organic Carbon, Total (TOC)	15.6	mg/L		0.5		A5310 C	11/01/23 21:38 / eli-ca
NUTRIENTS							
Nitrogen, Kjeldahl, Total as N	2.8	mg/L		0.50		E351.2	11/03/23 14:01 / JAR
Nitrogen, Nitrate+Nitrite as N	0.02	mg/L		0.01		E353.2	11/01/23 16:40 / JAR
Nitrogen, Total	2.8	mg/L		0.50		Calculation	11/07/23 08:07 / tkj
Phosphorus, Total as P	0.26	mg/L		0.01		E365.1	11/02/23 17:26 / JAR

Report Definitions:
RL - Analyte Reporting Limit
QCL - Quality Control Limit
H - Analysis performed past the method holding time
MCL - Maximum Contaminant Level
ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Water and Environmental Technologies **Work Order:** H23100915 **Report Date:** 11/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2510 B									Analytical Run: PHSC_101-H_231026A	
Lab ID: SC 150		Initial Calibration Verification Standard							10/26/23 08:46	
Conductivity @ 25 C		150	umhos/cm	5.0	100	90	110			
Lab ID: SC 20000		Initial Calibration Verification Standard							10/26/23 08:48	
Conductivity @ 25 C		19300	umhos/cm	5.0	97	90	110			
Lab ID: SC 5000		Initial Calibration Verification Standard							10/26/23 08:50	
Conductivity @ 25 C		4890	umhos/cm	5.0	98	90	110			
Method: A2510 B									Batch: R189493	
Lab ID: SC 1000		Laboratory Control Sample				Run: PHSC_101-H_231026A			10/26/23 08:52	
Conductivity @ 25 C		988	umhos/cm	5.0	99	90	110			
Lab ID: MBLK		Method Blank				Run: PHSC_101-H_231026A			10/26/23 10:27	
Conductivity @ 25 C		ND	umhos/cm	5						
Lab ID: H23100915-001ADUP		Sample Duplicate				Run: PHSC_101-H_231026A			10/26/23 10:43	
Conductivity @ 25 C		1190	umhos/cm	5.0				0.5	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Water and Environmental Technologies **Work Order:** H23100915 **Report Date:** 11/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **A2540 C**										Batch: TDS231025A
Lab ID: **MB-1_231025**		Method Blank				Run: ACCU-124 (14410200)_23102				10/25/23 13:44
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	6						
Lab ID: **LCS-2_231025**		Laboratory Control Sample				Run: ACCU-124 (14410200)_23102				10/25/23 13:44
Solids, Total Dissolved TDS @ 180 C		1970	mg/L	50	98	90	110			
Lab ID: **H23100876-001B DUP**		Sample Duplicate				Run: ACCU-124 (14410200)_23102				10/25/23 13:45
Solids, Total Dissolved TDS @ 180 C		267	mg/L	25				2.7	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Water and Environmental Technologies **Work Order:** H23100915 **Report Date:** 11/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A4500-H B									Analytical Run: PHSC_101-H_231025A	
Lab ID: pH 7	2	Initial Calibration Verification Standard							10/25/23 08:33	
pH		7.0	s.u.	0.1	100	98	102			
pH Measurement Temp		19.4	°C			0	0			
Lab ID: CCV - pH 7	2	Continuing Calibration Verification Standard							10/25/23 11:21	
pH		7.0	s.u.	0.1	100	98	102			
pH Measurement Temp		18.5	°C			0	0			
Method: A4500-H B									Batch: R189427	
Lab ID: H23100898-001ADUP	2	Sample Duplicate				Run: PHSC_101-H_231025A			10/25/23 15:15	
pH		7.9	s.u.	0.1				0.1	3	H
pH Measurement Temp		17.7	°C							

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

H - Analysis performed past the method holding time

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Water and Environmental Technologies **Work Order:** H23100915 **Report Date:** 11/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A5310 C									Analytical Run: SUB-C300601	
Lab ID: CCV-11940		Continuing Calibration Verification Standard							11/01/23 19:35	
Organic Carbon, Total (TOC)		5.03	mg/L	0.50	101	90	110			
Method: A5310 C									Batch: C_R300601	
Lab ID: MBLK		Method Blank				Run: SUB-C300601			11/01/23 15:03	
Organic Carbon, Total (TOC)		ND	mg/L	0.1						
Lab ID: LCS		Laboratory Control Sample				Run: SUB-C300601			11/01/23 15:24	
Organic Carbon, Total (TOC)		5.07	mg/L	0.50	101	90	111			
Lab ID: C23101048-003HMS		Sample Matrix Spike				Run: SUB-C300601			11/01/23 20:27	
Organic Carbon, Total (TOC)		14.5	mg/L	0.50	99	90	111			
Lab ID: C23101048-003HMSD		Sample Matrix Spike Duplicate				Run: SUB-C300601			11/01/23 20:45	
Organic Carbon, Total (TOC)		14.5	mg/L	0.50	99	90	111	0.1	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Water and Environmental Technologies **Work Order:** H23100915 **Report Date:** 11/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E300.0									Analytical Run: IC METROHM_231030A	
Lab ID: ICV	2	Initial Calibration Verification Standard							10/30/23 12:45	
Chloride		108	mg/L	1.0	108	90	110			
Sulfate		424	mg/L	1.0	106	90	110			
Lab ID: CCV	2	Continuing Calibration Verification Standard							10/30/23 23:04	
Chloride		49.7	mg/L	1.0	99	90	110			
Sulfate		201	mg/L	1.0	100	90	110			
Method: E300.0									Batch: R189623	
Lab ID: ICB	2	Method Blank				Run: IC METROHM_231030A			10/30/23 11:47	
Chloride		ND	mg/L	0.02						
Sulfate		ND	mg/L	0.03						
Lab ID: LFB	2	Laboratory Fortified Blank				Run: IC METROHM_231030A			10/30/23 12:59	
Chloride		25.0	mg/L	1.0	100	90	110			
Sulfate		105	mg/L	1.0	105	90	110			
Lab ID: H23100948-006BMS	2	Sample Matrix Spike				Run: IC METROHM_231030A			10/31/23 01:56	
Chloride		34.2	mg/L	1.0	106	90	110			
Sulfate		142	mg/L	1.0	104	90	110			
Lab ID: H23100948-006BMSD	2	Sample Matrix Spike Duplicate				Run: IC METROHM_231030A			10/31/23 02:10	
Chloride		34.2	mg/L	1.0	106	90	110	0.1	20	
Sulfate		143	mg/L	1.0	106	90	110	0.9	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Water and Environmental Technologies **Work Order:** H23100915 **Report Date:** 11/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E351.2									Analytical Run: SEAL AA500_231103A	
Lab ID: ICV		Initial Calibration Verification Standard							11/03/23 13:40	
Nitrogen, Kjeldahl, Total as N		9.97	mg/L	0.50	100	90	110			
Method: E351.2									Batch: 69122	
Lab ID: MB-69122		Method Blank				Run: SEAL AA500_231103A			11/03/23 13:43	
Nitrogen, Kjeldahl, Total as N		ND	mg/L	0.1						
Lab ID: LCS-69122		Laboratory Control Sample				Run: SEAL AA500_231103A			11/03/23 13:46	
Nitrogen, Kjeldahl, Total as N		9.31	mg/L	0.50	93	90	110			
Lab ID: H23100915-001Bms		Sample Matrix Spike				Run: SEAL AA500_231103A			11/03/23 14:02	
Nitrogen, Kjeldahl, Total as N		12.3	mg/L	0.50	95	90	110			
Lab ID: H23100915-001Bmsd		Sample Matrix Spike Duplicate				Run: SEAL AA500_231103A			11/03/23 14:04	
Nitrogen, Kjeldahl, Total as N		12.3	mg/L	0.50	95	90	110	0.2	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Water and Environmental Technologies **Work Order:** H23100915 **Report Date:** 11/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Analytical Run: SEAL AA500_231101A	
Lab ID: ICV		Initial Calibration Verification Standard							11/01/23 16:16	
Nitrogen, Nitrate+Nitrite as N		0.978	mg/L	0.010	98	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/01/23 16:31	
Nitrogen, Nitrate+Nitrite as N		1.02	mg/L	0.010	102	90	110			
Method: E353.2									Batch: R189685	
Lab ID: ICB		Method Blank				Run: SEAL AA500_231101A			11/01/23 16:14	
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.01						
Lab ID: LFB		Laboratory Fortified Blank				Run: SEAL AA500_231101A			11/01/23 16:17	
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.011	104	90	110			
Lab ID: H23100915-001BMS		Sample Matrix Spike				Run: SEAL AA500_231101A			11/01/23 16:41	
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.011	102	90	110			
Lab ID: H23100915-001BMSD		Sample Matrix Spike Duplicate				Run: SEAL AA500_231101A			11/01/23 16:42	
Nitrogen, Nitrate+Nitrite as N		1.04	mg/L	0.011	102	90	110	0	10	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

QA/QC Summary Report

Prepared by Helena, MT Branch

Client: Water and Environmental Technologies **Work Order:** H23100915 **Report Date:** 11/08/23

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E365.1									Analytical Run: SEAL AA500_231102A	
Lab ID: ICV		Initial Calibration Verification Standard							11/02/23 16:29	
Phosphorus, Total as P		0.246	mg/L	0.010	99	90	110			
Lab ID: CCV		Continuing Calibration Verification Standard							11/02/23 17:18	
Phosphorus, Total as P		0.0991	mg/L	0.010	99	90	110			
Method: E365.1									Batch: 69125	
Lab ID: MB-69125		Method Blank				Run: SEAL AA500_231102A			11/02/23 16:33	
Phosphorus, Total as P		ND	mg/L	0.001						
Lab ID: LCS-69125		Laboratory Control Sample				Run: SEAL AA500_231102A			11/02/23 17:01	
Phosphorus, Total as P		0.416	mg/L	0.010	104	90	110			
Lab ID: H23100876-009Ems		Sample Matrix Spike				Run: SEAL AA500_231102A			11/02/23 17:22	
Phosphorus, Total as P		0.216	mg/L	0.010	108	90	110			
Lab ID: H23100876-009Emsd		Sample Matrix Spike Duplicate				Run: SEAL AA500_231102A			11/02/23 17:23	
Phosphorus, Total as P		0.214	mg/L	0.010	107	90	110	0.6	20	

Qualifiers:

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

Work Order Receipt Checklist

Water and Environmental Technologies H23100915

Login completed by: Rebecca A. Tooke
Date Received: 10/25/2023
Reviewed by: tjones
Received by: rrs
Reviewed Date: 10/27/2023
Carrier name: US Mail

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☐	No ☑	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	14.6°C Melted Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☑	No ☐	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

The reference date for Radon analysis is the sample collection date. The reference date for all other Radiochemical analyses is the analysis date. Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

For methods that require zero headspace or require preservation check at the time of analysis due to potential interference, the pH is verified at analysis. Nonconforming sample pH is documented as part of the analysis and included in the sample analysis comments.

Contact and Corrective Action Comments:

Sample for E-Coli Bacteria was received past the EPA 8 hour holding time and past 24 hour holding time allowed by MT DEQ. Emailed Brad about past hold bacteria/ecoli and over temperature status. 10/25/23 rt
Per email we are to continue with analysis over temp. Christina acknowledged ecoli will need to be resampled. 10/25/23 rt

ENERGY LABORATORIES
Trust our People. Trust our Data.

Chain of Custody & Analytical Request Record

www.energylab.com

Page 1 of 1

Account Information (Billing information)

Company/Name	WET
Contact	Accounting
Phone	4067825220
Mailing Address	480 E Park St
City, State, Zip	Butte, MT 59701
Email	accounting@waterenvtech.com
Receive Invoice	☐ Hard Copy ☐ Email
Receive Report	☐ Hard Copy ☒ Email
Purchase Order	
Quote	
Bottle Order	

Report Information (if different than Account Information)

Company/Name	WET
Contact	Brad Bennett
Phone	4069825220
Mailing Address	102 Cooperative Way, Ste 100
City, State, Zip	Kalispell, MT 59901
Email	bbennett@waterenvtech.com
Receive Report	☐ Hard Copy ☒ Email

Special Report/Formats: ☐ LEVEL IV ☐ NELAC ☒ EDD/EDT (contact laboratory) ☐ Other

Comments

please also cc eggensperger@waterenvtech.com

Project Information

Project Name, PWSID, Permit, etc.	B&P
Sampler Name	christina eggensperger
Sampler Phone	4065319486
Sample Origin State	MT
EPA/State Compliance	☐ Yes ☐ No

MINING CLIENTS, please indicate sample type.
*If ore has been processed or refined, call before sending.
☐ Byproduct 11 (e)2 material ☐ Unprocessed ore (NOT ground or refined)*

Matrix Codes
A - Air
W - Water
S - Soils/Solids
V - Vegetation
B - Bioassay
O - Other
DW - Drinking Water

All turnaround times are standard unless marked as RUSH.
Energy Laboratories MUST be contacted prior to RUSH sample submittal for charges and scheduling – See Instructions Page

	Sample Identification (Name, Location, Interval, etc.)	Collection Date	Collection Time	Number of Containers	Matrix (See Codes Above)	Analysis Requested: Bact/Ecoli	TKN, Total N, Nitrate/Nitrite	Conductivity	TOC	pH	TDS	Chloride	Sulfate	Total Phosphorous	See Attached	RUSH TAT	ELI LAB ID (Laboratory Use Only)
1	WET-10-23-23-1	10-23-23	1330	4	W	x	x	x	x	x	^	x	x	x			H23100915
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Custody Record MUST be signed	Relinquished by (print)	Date/Time	Signature	Received by (print)	Date/Time	Signature
	christina eggensperger	10-23-23 1430				
	Relinquished by (print)	Date/Time	Signature	Received by Laboratory (print) R SANCHEZ	Date/Time 102523 1145	Signature

LABORATORY USE ONLY

Shipped By	Cooler ID(s)	Custody Seals (Y N C B)	Intact (Y N)	Receipt Temp	Temp Blank (Y N)	On Ice (Y N)	Payment Type	Amount	Receipt Number (cash/check only)
US MAIL	Y	Y N C B	Y N	14.6 °C	Y N	Y N	CC Cash Check	$	

REJECTED

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All subcontracted data will be clearly notated on your analytical report.

ELI-COC-12/16 v.1

Attachment E

GWIC Well Logs within ¼-mile

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (7/20/2009 1:12:51 PM)

Site Name: HISLOP ANDREW C
GWIC Id: 80932
DNRC Water Right: 65001

Section 1: Well Owner(s)

1) HISLOP, ANDREW C. (MAIL)
470 WILY DYKE RD
KALISPELL MT 59901 [12/12/1986]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	11	SE¼ SE¼ NE¼

County FLATHEAD **Geocode**

Latitude	Longitude	Geomethod	Datum
48.118174	-114.225721	TRS-SEC	NAD83

Ground Surface Altitude **Ground Surface Method** **Datum** **Date**

Addition **Block** **Lot**

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, December 12, 1986

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	452	6				STEEL

There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	PUDDLED CLAY	

Section 7: Well Test Data

Total Depth: 454
Static Water Level: 10
Water Temperature:

Air Test *

80 gpm with drill stem set at _ feet for 2 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 440 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

112ALVM - ALLUVIUM (PLEISTOCENE)

From	To	Description
0	2	BLACK TOP SOIL
2	28	TAN SAND
28	134	GRAY SAND
134	215	GRAY CLAY
215	287	TAN CLAY
287	325	GREEN CLAY
325	387	TAN CLAY
387	420	TAN CLAY- SMALL GRAVEL- SAND
420	446	SAND- SMALL GRAVELS
446	454	TAN CLAY- GRAVELS

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: LOWE-BUSH
License No: WWC-476
Date Completed: 12/12/1986

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
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View scanned well log (7/20/2009 1:18:13 PM)

Site Name: HUNTSMAN DALE
GWIC Id: 80936

Section 1: Well Owner(s)

1) HUNTSMAN, DALE (MAIL)
347 WILEY DIKE RD
KALISPELL MT 59901 [05/14/1996]
2) HUNTSMAN, DALE (MAIL)
BOX 2378
KALISPELL MT 59901 [03/30/1983]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	11	SW¼ NE¼ NW¼ SE¼

County
FLATHEAD

Geocode

Latitude	Longitude	Geomethod	Datum
48.1161	-114.2305	MAP	NAD27

Ground Surface Altitude	Ground Surface Method	Datum	Date
2904	LIDAR	NAVD88	8/12/2015

Measuring Point Altitude	MP Method	Datum	Date Applies
2905.7	LIDAR	NAVD88	5/14/1996 2:24:00 PM

Addition	Block	Lot
		4

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Wednesday, March 30, 1983

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
0	280	6				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
280	280	6			OPEN BOTTOM *

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	25	CLAY- SLURRY	

Section 7: Well Test Data

Total Depth: 280
Static Water Level: 10
Water Temperature:

Air Test *

30 gpm with drill stem set at _ feet for 3 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level 280 feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

6 STEEL CASING WITH SUBMERSIBLE PUMP AND BOLT ON CAP- USE HAMMER TO REMOVE CAP. SAMPLING PT -HYDRANT JUST NORTH OF WELL AND AT SW CORNER OF TRAILER HOUSE.

Section 9: Well Log

Geologic Source

112ALVM - ALLUVIUM (PLEISTOCENE)

From	To	Description
0	1	TOPSOIL
1	10	CLAY
10	100	CLAY AND SILT
100	150	SILT AND WATER
150	250	SAND AND WATER
250	270	SAND- GRAVEL AND WATER
270	280	GRAVEL AND WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: STINGER WELL DRILLING
License No: WWC-325
Date Completed: 3/30/1983

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

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Site Name: LAKESIDE COUNTY SEWER DISTRICT
GWIC Id: 80952
DNRC Water Right: 67752

Section 1: Well Owner(s)

1) LAKESIDE COUNTY SEWER DISTRICT (MAIL)
BOX 532
LAKESIDE MT 59922 [06/25/1987]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	14	NE¼ NE¼

County: FLATHEAD
Geocode:

Latitude	Longitude	Geomethod	Datum
48.108258	-114.227314	TRS-SEC	NAD83

Ground Surface Altitude: **Ground Surface Method**: **Datum**: **Date**:

Addition: **Block**: **Lot**:

Section 3: Proposed Use of Water

INDUSTRIAL (1)

Section 4: Type of Work

Drilling Method: FORWARD ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Thursday, June 25, 1987

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	25	6				
14	25	5				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
25	35	5			5X9/16 SCREEN

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	20	CEMENT	

Section 7: Well Test Data

Total Depth: 75
Static Water Level: 10
Water Temperature:

Unknown Test Method *

Yield 30 gpm.
Pumping water level 25 feet.
Time of recovery _ hours.
Recovery water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

111ALVM - ALLUVIUM (HOLOCENE)

From	To	Description
0	9	BROWN CLAY AND SILT
9	25	BROWN CLAY- SILT AND WATER
25	35	SAND AND WATER
35	75	BROWN CLAY- SILT AND WOOD CHIPS

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: BILLMAYER DRILLING
License No: WWC-335
Date Completed: 6/25/1987

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

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View hydrograph for this site
View field visits for this site
View scanned well log (7/20/2009 1:13:01 PM)

Site Name: FLANAGAN DARRIS R
GWIC Id: 120651
DNRC Water Right: 75397

Section 1: Well Owner(s)

1) FLANAGAN, DARRIS R. (MAIL)
480 WILEY DIKE RD
KALISPELL MT 59901 [05/21/1990]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	11	SW¼ SE¼ SE¼ NE¼

County	Geocode
FLATHEAD	

Latitude	Longitude	Geomethod	Datum
48.1177	-114.225	MAP	NAD27

Ground Surface Altitude	Ground Surface Method	Datum	Date
2912	LIDAR	NAVD88	8/12/2015

Measuring Point Altitude	MP Method	Datum	Date Applies
2913.95	LIDAR	NAVD88	6/4/1996 6:10:00 PM

Addition	Block	Lot
		A

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: CABLE
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Monday, May 21, 1990

Section 6: Well Construction Details

There are no borehole dimensions assigned to this well.

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	41	6				STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
41	46	5			.020 COOK SCRNS

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	18	BENTONITE	

Section 7: Well Test Data

Total Depth: 46
Static Water Level: 17
Water Temperature:

Bailer Test *

25 gpm with _ feet of drawdown after 1 hours.
Time of recovery _ hours.
Recovery water level _ feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

6 STEEL CASING WITH BOLT-ON CAP. HAS A JET PUMP IN THE PUMP HOUSE NEXT TO WELL HEAD. SAMPLING PT -FAUCET ON NW CORNER OF HOUSE.

Section 9: Well Log

Geologic Source

111ALVM - ALLUVIUM (HOLOCENE)

From	To	Description
0	3	TOPSOIL
3	35	BROWN SAND
35	46	COARSE SAND

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: MONTANA
License No: WWC-488
Date Completed: 5/21/1990

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

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View scanned well log (7/20/2009 2:44:16 PM)

Site Name: RHOADES JACOB
GWIC Id: 194578

Section 1: Well Owner(s)

1) RHOADES, JACOB (MAIL)
446 N SOMERS ROAD
SOMERS MT 59932 [12/17/2001]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	13	NW¼ NW¼ NW¼

County

FLATHEAD

Latitude	Longitude	Geomethod	Datum
48.109107	-114.223288	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date

Addition	Block	Lot
	8	

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Monday, December 17, 2001

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	440	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	438	6	0.250			STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
438	440	6			OPEN HOLE

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	

Section 7: Well Test Data

Total Depth: 438
Static Water Level: 15
Water Temperature:

Air Test *

50 gpm with drill stem set at 120 feet for 1 hours.
Time of recovery 0.16 hours.
Recovery water level 18 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source

Unassigned

From	To	Description
0	1	TOPSOIL
1	21	BROWN SAND SILT
21	68	GRAY SAND
68	297	GRAY CLAY
297	440	SAND GRAVEL WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: SUDAN DRILLING
License No: WWC-450
Date Completed: 12/17/2001

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

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Site Name: HALLSTROM LEIF
GWIC Id: 195240

Section 1: Well Owner(s)

1) HALLSTROM, LEIF (MAIL)
2231 TEAL DRIVE
KALISPELL MT 59901 [03/14/2002]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	12	NW¼ SW¼

County
FLATHEAD

Geocode

Latitude	Longitude	Geomethod	Datum
48.11539	-114.221894	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date
2907	LIDAR	NAVD88	8/12/2015

Addition **Block** **Lot**

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Thursday, March 14, 2002

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	292	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	290	6	0.250			STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
290	292	6			OPEN HOLE

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	

Section 7: Well Test Data

Total Depth: 292
Static Water Level: 16
Water Temperature:

Air Test *

60 gpm with drill stem set at 283 feet for 1 hours.
Time of recovery 2 hours.
Recovery water level 16 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	2	TOPSOIL
2	34	TAN SILTY CLAY SAND
34	55	SAND WATER
55	84	TAN CLAY
84	245	GRAY SILTY CLAY
245	265	REDDISH CLAY
265	275	GRAY CLAY
275	288	GRAVEL SAND WATER
288	292	GRAVEL WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: GLAZIER DRILLING
License No: WWC-113
Date Completed: 3/14/2002

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

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Site Name: BASNETT JEFF AND CINDY
GWIC Id: 195910

Section 1: Well Owner(s)

1) BASNETT, JEFF AND CINDY (MAIL)
345 CEDAR MILL
KALISPELL MT 59901 [05/03/2002]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	11	NE¼ NW¼ SE¼

County
FLATHEAD

Geocode

Latitude	Longitude	Geomethod	Datum
48.116357	-114.231147	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date
2902	LIDAR	NAVD88	8/12/2015

Addition **Block** **Lot**

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, May 3, 2002

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	300	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-1.5	297	6	0.250			STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
297	300	6			OPEN HOLE

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	

Section 7: Well Test Data

Total Depth: 297
Static Water Level: 11
Water Temperature:

Air Test *

50 gpm with drill stem set at 290 feet for 1 hours.
Time of recovery 1 hours.
Recovery water level 11 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	1	TOPSOIL
1	13	CLAY GRAVEL
13	38	CLAY SAND WATER
38	142	GRAY CLAY
142	217	BROWN CLAY
217	225	CLAY GRAVEL WATER
225	300	SAND GRAVEL WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: SUDAN DRILLING
License No: WWC-450
Date Completed: 5/3/2002

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

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Site Name: RHOADES BEN AND KAREN
GWIC Id: 200036

Section 1: Well Owner(s)

1) RHOADES, BEN AND KAREN (MAIL)
521 WILEY DIKE
KALISPELL MT 59904 [11/08/2002]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	12	NW¼ NW¼ SW¼

County FLATHEAD **Geocode**

Latitude	Longitude	Geomethod	Datum
48.116306	-114.22327	TRS-SEC	NAD83

Ground Surface Altitude **Ground Surface Method** **Datum** **Date**

Addition **Block** **Lot**

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, November 8, 2002

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	460	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	458	6	0.250			STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
458	460	6			OPEN HOLE

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	CONT FED BENTONITE	

Section 7: Well Test Data

Total Depth: 458
Static Water Level: 11
Water Temperature:

Air Test *

35 gpm with drill stem set at 450 feet for 1 hours.
Time of recovery 0.75 hours.
Recovery water level 11 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	10	SAND AND SILT
10	22	BROWN CLAY
22	38	SAND AND SILT
38	388	BROWN SILTY CLAY
388	425	MEDIUM GRAVEL AND SAND
425	442	COARSE SAND AND SILT AND GRAVEL
442	460	MEDIUM GRAVEL AND SAND AND WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: SUDAN DRILLING
License No: WWC-450
Date Completed: 11/8/2002

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

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Site Name: FARRIER JOHN AND CHRISTINA
GWIC Id: 204340

Section 1: Well Owner(s)

1) FARRIER, JOHN AND CHRISTINA (MAIL)
531 WILEY DIKE RD
KALISPELL MT 59901 [05/30/2003]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	12	SW¼ NW¼ SW¼

County
FLATHEAD

Geocode

Latitude	Longitude	Geomethod	Datum
48.114475	-114.22327	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date
2907	LIDAR	NAVD88	8/12/2015

Addition	Block	Lot
	3AB	

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, May 30, 2003

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	300	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	298	6	0.250			STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
298	300	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	CONT FED BENTONITE	

Section 7: Well Test Data

Total Depth: 298
Static Water Level: 19
Water Temperature:

Air Test *

80 gpm with drill stem set at 160 feet for 1 hours.
Time of recovery 0.5 hours.
Recovery water level 19 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	182	SILT SAND
182	215	STICKY GRAY CLAY
215	283	STICKY BROWN CLAY
283	300	MEDIUM GRAVEL SAND WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: SUDAN DRILLING
License No: WWC-450
Date Completed: 5/30/2003

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
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Plot this site in Google Maps

Site Name: ROBBINS, ROBERT OR DOROTHY
GWIC Id: 221367

Section 1: Well Owner(s)

1) ROBBINS, ROBERT OR DOROTHY (MAIL)
410 WILEY DIKE ROAD
KALISPELL MT 59901 [08/15/2005]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	11	SE¼ NE¼

County
FLATHEAD

Geocode

Latitude	Longitude	Geomethod	Datum
48.119082	-114.227077	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date
2914	LIDAR	NAVD88	8/12/2015

Addition **Block** **Lot**

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Monday, August 15, 2005

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	18	10
18	510	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	510.1	6	0.250		WELDED	A53B STEEL

There are no completion records assigned to this well.

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	18	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 510
Static Water Level: 12
Water Temperature:

Air Test *

80 gpm with drill stem set at 60 feet for 2 hours.
Time of recovery 0.5 hours.
Recovery water level 12 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	1	TOPSOIL.
1	231	GRAY SILTY, SANDY CLAY MATRIX WITH SEEPS OF STINKY WATER.
231	365	TAN TO BROWN SILTY, SANDY CLAY MATRIX.
365	475	SMALL GRAVEL IN SILTY SAND MATRIX - SOME SILTY, SANDY WATER.
475	495	SMALL RED GRAVEL IN BROWN SILTY SAND MATRIX - SOME SILTY, SANDY WATER.
495	502	LARGER GRAVEL WITH LESS SILT AND SAND - SOME WATER.
502	510	CLEAN COARSE SAND AND GRAVEL - WATER. 80 GPM TOTAL WATER.

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: LIBERTY DRILLING & PUMP CO
License No: WWC-458
Date Completed: 8/15/2005

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (5/9/2006 2:57:07 PM)

Site Name: MASSIE WALLEY
GWIC Id: 223830

Section 1: Well Owner(s)

1) MASSIE, WALLY (MAIL)
764 PARKWAY DRIVE
KALISPELL MT 59901 [12/02/2005]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	13	SW¼ NW¼

County
FLATHEAD

Geocode

Latitude	Longitude	Geomethod	Datum
48.104645	-114.22193	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date
2912	LIDAR	NAVD88	8/12/2015

Addition **Block** **Lot**

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, December 2, 2005

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	420	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	418	6	0.250		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
418	420	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 420
Static Water Level: 17
Water Temperature:

Air Test *

60 gpm with drill stem set at 180 feet for 2 hours.
Time of recovery 1 hours.
Recovery water level 17 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	1	TOPSOIL
1	30	TAN SANDY CLAY
30	78	GRAY SATURATED SILTY SAND
78	82	GRAY CLAY GRAVEL
82	195	GRAY CLAY
195	321	TAN CLAY
321	365	GRAY CLAY GRAVEL
365	410	GRAVEL FINE SAND GRAY SILT TAN SILT WATER
410	420	GRAVEL SAND TAN SILT WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name:
Company: GLAZIER DRILLING
License No: WWC-113
Date Completed: 12/2/2005

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (11/14/2006 7:50:02 PM)

Site Name: OSLER MIKE
GWIC Id: 230990

Section 1: Well Owner(s)

1) OSLER, MIKE (MAIL)
241 MAIN ST.
KALISPELL MT 59901 [08/25/2006]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	11	SE¼ NE¼

County: FLATHEAD
Geocode:

Latitude	Longitude	Geomethod	Datum
48.119082	-114.227077	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date
2914	LIDAR	NAVD88	8/12/2015

Addition: **Block**: **Lot**:

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Friday, August 25, 2006

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	521	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	519	6	0.25		WELDED	STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
519	521	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 519
Static Water Level: 11
Water Temperature:

Air Test *

80 gpm with drill stem set at 502 feet for 1.5 hours.
Time of recovery 1 hours.
Recovery water level 11 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	2	TOPSOIL
2	17	TAN SAND AND SMALL AMOUNT OF CLAY
17	23	TAN SAND
23	176	GRAY SILTY SAND AND BURNT WOOD CHIPS
176	350	GRAY STICKY CLAY
350	450	TAN SANDY SILTY CLAY
450	475	HEAVING TAN SILTY SAND AND SCATTERED GRAVEL, WATER
475	502	SEMI-CONSOLIDATED GRAVEL, SAND, SILTY WATER, CLEANING UP PRETTY GOOD, BUT ONLY 35 GPM
502	521	COARSE TAN SAND, GRAVEL, TAN SILT, AND WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: JEFF GLAZIER
Company: GLAZIER DRILLING
License No: WWD-113
Date Completed: 8/25/2006

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps
View scanned well log (2/24/2014 9:39:29 AM)

Site Name: PERIMAN, LAWRENCE AND MARGORIE
GWIC Id: 276841

Section 1: Well Owner(s)

1) PERIMAN, LAWRENCE AND MARGORIE (MAIL)
355 CEDAR MILL ROAD
KALISPELL MT 59901 [04/09/2013]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	11	NW¼ SE¼ NW¼ SE¼

County
FLATHEAD

Geocode

Latitude	Longitude	Geomethod	Datum
48.1141	-114.2314	NAV-GPS	WGS84

Ground Surface Altitude	Ground Surface Method	Datum	Date
2907	LIDAR	NAVD88	8/12/2015

Addition **Block** **Lot**

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: CABLE TOOL
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Tuesday, April 9, 2013

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	50	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	22	6	0.25		WELDED	STEEL
9	22	4		40.00		PVC
42	50	4		40.00		PVC

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
22	42	4		0.020	SCREEN-CONTINUOUS-PVC

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	0	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 50
Static Water Level: 17.83
Water Temperature:

Pump Test *

Depth pump set for test 40 feet.
17 gpm pump rate with 1.67 feet of drawdown after 8 hours of pumping.
Time of recovery 0.02 hours.
Recovery water level 17.83 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	2	BROWN SOIL
2	19	BROWN SANDS AND SILTY CLAY
19	42	GRAY SANDS AND H2O
42	50	GRAY SILT AND FINE GRAY SANDS

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: PAUL A. ERICKSON
Company: ERICKSON DRILLING & PUMP CO
License No: WWC-478
Date Completed: 4/9/2013

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps

Site Name: KOISTINEN, DARWIN AND ERIKA
GWIC Id: 277090

Section 1: Well Owner(s)

1) KOISTINEN, DARWIN AND ERIKA (MAIL)
P.O. BOX 3306
KALISPELL MT. 59903 [03/27/2014]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	13	SW¼ NW¼

County
FLATHEAD

Geocode

Latitude	Longitude	Geomethod	Datum
48.1046448138	-114.2219299135	TRS-SEC	NAD83

Ground Surface Altitude	Ground Surface Method	Datum	Date
2912	LIDAR	NAVD88	8/12/2015

Addition **Block** **Lot**

Section 3: Proposed Use of Water

DOMESTIC (1)
IRRIGATION (2)

Section 4: Type of Work

Drilling Method: ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Thursday, March 27, 2014

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	420	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	418	6	0.25		WELDED	A53B STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
413	417	6	25	1/8X5	TORCH OR PLASMA CUTS

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	30	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 420
Static Water Level: 86
Water Temperature:

Air Test *

60 gpm with drill stem set at 400 feet for 2 hours.
Time of recovery 0.33 hours.
Recovery water level 86 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	2	SOIL AND SAND
2	59	SILTY SAND
59	215	SANDY GRAY CLAY
215	291	TAN SILTY CLAY
291	354	TAN CLAY AND GRAVEL
354	396	SANDY GRAVEL AND WATER
396	420	CLEANER GRAVEL AND WATER 60 GPM

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: BRAD FORMAN
Company: ALLWEST DRILLING INC
License No: WWC-571
Date Completed: 3/27/2014

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps

Site Name: CAMAS CREEK CONTRACTING
GWIC Id: 299874

Section 1: Well Owner(s)

1) CAMAS CREEK CONTRACTING (MAIL)
310 KINSHELLA RD
KALISPELL MT 59901 [11/17/2018]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	11	NW¼ SE¼

County

FLATHEAD

Geocode

Latitude	Longitude	Geomethod	Datum
48.116856	-114.231411	NAV-GPS	NAD83

Ground Surface Altitude **Ground Surface Method** **Datum** **Date**

Addition **Block** **Lot**

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: DUAL ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Tuesday, June 19, 2018

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	290	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	290	6	0.25		WELDED	A53B STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
-2	290	6			OPEN BOTTOM

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	290	BENTONITE	Y

Section 7: Well Test Data

Total Depth: 290
Static Water Level: 15
Water Temperature:

Air Test *

35 gpm with drill stem set at 1 feet for 1 hours.
Time of recovery 1 hours.
Recovery water level 15 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

WELL DRILLED BY MARTY WILSON

Section 9: Well Log

Geologic Source

Unassigned

From	To	Description
0	15	TAN SANDY SOIL
15	120	GREY WET SAND
120	140	GRAY SILTY CLAY
140	235	TAN SILTY CLAY
235	265	CLAY SOME GRAVEL
265	280	CEMENTED GRAVELS
280	290	CEMENTED GRAVELS WITH WATER

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: MARTIN WILSON
Company: COLDWATER DRILLING AND PUMPS
License No: WWC-624
Date Completed: 6/19/2018

MONTANA WELL LOG REPORT

This well log reports the activities of a licensed Montana well driller, serves as the official record of work done within the borehole and casing, and describes the amount of water encountered. This report is compiled electronically from the contents of the Ground Water Information Center (GWIC) database for this site. Acquiring water rights is the well owner's responsibility and is NOT accomplished by the filing of this report.

Other Options

Return to menu
Plot this site in State Library Digital Atlas
Plot this site in Google Maps

Site Name: BAKER, ALLAN
GWIC Id: 317435

Section 1: Well Owner(s)

1) BAKER, ALLAN (MAIL)
277 MY WAY
KALISPELL MT 59901 [10/19/2021]

Section 2: Location

Township	Range	Section	Quarter Sections
27N	21W	12	SW¼ SW¼

County
FLATHEAD

Geocode

Latitude	Longitude	Geomethod	Datum
48.110378	-114.222181	NAV-GPS	WGS84

Ground Surface Altitude	Ground Surface Method	Datum	Date

Addition	Block	Lot

Section 3: Proposed Use of Water

DOMESTIC (1)

Section 4: Type of Work

Drilling Method: DUAL ROTARY
Status: NEW WELL

Section 5: Well Completion Date

Date well completed: Tuesday, October 19, 2021

Section 6: Well Construction Details

Borehole dimensions

From	To	Diameter
0	30	10.8
30	420	6

Casing

From	To	Diameter	Wall Thickness	Pressure Rating	Joint	Type
-2	420	6.6	0.25		WELDED	A53B STEEL

Completion (Perf/Screen)

From	To	Diameter	# of Openings	Size of Openings	Description
402	412	6	4 ROWS	1/8 X 1	HOLTE PERFORATOR SLOTS

Annular Space (Seal/Grout/Packer)

From	To	Description	Cont. Fed?
0	30	BENTONITE CHIPS	

Section 7: Well Test Data

Total Depth: 420
Static Water Level: 20
Water Temperature:

Air Test *

100 gpm with drill stem set at 120 feet for 4 hours.
Time of recovery 1 hours.
Recovery water level 20 feet.
Pumping water level _ feet.

** During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.*

Section 8: Remarks

Section 9: Well Log

Geologic Source
Unassigned

From	To	Description
0	60	BROWN SANDY CLAY
60	220	WET BROWN CLAY
220	290	GRAY STICKY CLAY
290	340	GRAY CLAY AND SOME GRAVEL
340	400	SAND GRAVEL WATER SANDY
400	415	SAND GRAVEL WATER CLEAN 400'
415	420	CEMENTED GRAVEL WATER SHUT OFF

Driller Certification

All work performed and reported in this well log is in compliance with the Montana well construction standards. This report is true to the best of my knowledge.

Name: MARTIN WILSON
Company: COLDWATER DRILLING AND PUMPS
License No: WWC-624
Date Completed: 10/19/2021

Attachment F

Monthly Groundwater Contour Maps

N
W E
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NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	GWE CONTOURS	1/25/23	KK	CE
2	GW FLOW DIRECTION	4/21/23	KK	CE
3	MAP EDITS	7/5/23	EK	CE
4				
5				

NOTES

GROUNDWATER POTENTIOMETRIC SURFACE MAP 9-14-22

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 3

JOB#: 1539-22

DATE:7/5/2023

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: ekamp

Water & Environmental TECHNOLOGIES

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NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	GWE CONTOURS	2/1/23	KK	CE
2	CONTOUR EDITS, FLOW DIRECTION	4/21/23	KK	CE
3				
4				
5				

NOTES

GROUNDWATER POTENTIOMETRIC SURFACE MAP 10-20-22

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 6

JOB#: 1539-22

DATE: 7/5/2023

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: ekamp

Water & Environmental TECHNOLOGIES

Monitoring Well
Flow Direction
Groundwater Contour
Property Boundary

MW-1
2894.84

MW-2
2894.63

MW-3
2894.60

MW-4
2894.92

MW-5
2894.84

2894.80

2894.70

2894.85

2894.90

0 150 300 600

N
W E
S

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	GWE CONTOURS	2/1/23	KK	CE
2	ADD FLOW DIRECTION	4/21/23	KK	CE
3				
4				
5				

NOTES

GROUNDWATER POTENTIOMETRIC SURFACE MAP 11-18-22

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 8

JOB#: 1539-22

DATE:7/5/2023

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: ekamp

Water & Environmental TECHNOLOGIES

Monitoring Well
Flow Direction
Groundwater Contour
Property Boundary

2894.75
MW-1R
2894.79
2894.65
2894.55
MW-2
2894.46
2894.85
MW-5
2894.80
MW-4
2894.92
MW-3
2894.61

0 150 300 600

N
W E
S

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	1/25/23	KK	CE
2	ADD CONTOURS	4/7/23	KK	CE
3	CONTOUR EDITS, GW FLOW EDIT	4/21/23	KK	CE
4				
5				

NOTES: MW-1 stick-up was destroyed, and has been re-surveyed and replaced by MW-1R

GROUNDWATER POTENTIOMETRIC SURFACE MAP 12-15-22

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 10

JOB#: 1539-22

DATE: 7/5/2023

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: ekamp

Water & Environmental TECHNOLOGIES

Monitoring Well
Flow Direction
Groundwater Contour
Property Boundary

2894.55
2894.45
2894.35
2894.65
2894.75
2894.85

MW-1R
2894.58

MW-2
2894.32

MW-5
2894.72

MW-4
2894.92

MW-3
2894.63

0 150 300 600

N
W E
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NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	1/25/23	KK	CE
2	GWE CONTOURS	2/1/23	KK	CE
3	GW FLOW DIRECTION	4/21/23	KK	CE
4				
5				

NOTES: MW-1 stick-up was destroyed, and has been re-surveyed and replaced by MW-1R

GROUNDWATER POTENTIOMETRIC SURFACE MAP 1-17-23

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 12

JOB#: 1539-22

DATE: 7/5/2023

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: ekamp

Water & Environmental TECHNOLOGIES

Monitoring Well
Flow Direction
Groundwater Contour
Property Boundary

MW-1R
2894.54

MW-2
2894.26

MW-3
2894.64

MW-4
2894.92

MW-5
2894.69

2894.55
2894.45
2894.35
2894.65
2894.75
2894.85

0 150 300 600

N
W E
S

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	3/31/23	KK	CE
2	ADDED CONTOURS	4/7/23	KK	CE
3				
4				
5				

NOTES: MW-1 stick-up was destroyed in December 22, and has been re-surveyed and replaced by MW-1R

GROUNDWATER POTENTIOMETRIC SURFACE MAP 2-14-23

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 13

JOB#: 1539-22

DATE: 7/5/2023

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: ekamp

Water & Environmental TECHNOLOGIES

Monitoring Well
Flow Direction
Groundwater Contour
Property Boundary

2894.55
2894.45
2894.35
2894.65
MW-1R
2894.62
MW-2
2894.26
2894.75
MW-5
2894.70
2894.85
2894.95
MW-4
2894.96
MW-3
2894.67

0 150 300 600

N
W E
S

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	3/31/23	KK	CE
2	ADDED CONTOURS	4/7/23	KK	CE
3				
4				
5				

NOTES: MW-1 stick-up was destroyed in December 22, and has been re-surveyed and replaced by MW-1R

GROUNDWATER POTENTIOMETRIC SURFACE MAP 3-16-23

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 14

JOB#: 1539-22

DATE: 7/5/2023

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: ekamp

Water & Environmental TECHNOLOGIES

Monitoring Well
Groundwater Contour
Flow Direction
Property Boundary

2895
MW-1R
2895.07
2894.75
MW-2
2894.72
2895.25
MW-5
2895.31
2895.45
MW-4
2895.49
MW-3
2895.27

0 150 300 600

N
W E
S

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	6/12/23	KK	CE
2	GW FLOW DIRECTION	6/20/23	EK	CE
3				
4				
5				

NOTES: MW-1 stick-up was destroyed in December 22, and has been re-surveyed and replaced by MW-1R

GROUNDWATER POTENTIOMETRIC SURFACE MAP 4-18-23

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 16

JOB#: 1539-22

DATE: 7/5/2023

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: ekamp

Water & Environmental TECHNOLOGIES

Monitoring Well
Flow Direction
Groundwater Contour
Property Boundary

2894.75
MW-1R
2895.00
2895.25
MW-2
2894.65
MW-5
2895.22
2895.25
2895.45
MW-4
2895.50
MW-3
2895.22

0 150 300 600

N
W E
S

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION	6/12/23	KK	CE
2	CONTOURS	6/23/23	KK	CE
3				
4				
5				

NOTES: MW-1 stick-up was destroyed in December 22, and has been re-surveyed and replaced by MW-1R

GROUNDWATER POTENTIOMETRIC SURFACE MAP 5-9-23

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 19

JOB#: 1539-22

DATE: 7/5/2023

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: ekamp

Water & Environmental TECHNOLOGIES

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W E
S

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION & CONTOUR PLACEMENT	7/20/23	EK	CE
2	CONTOURS	2/12/24	KK	CE
3				
4				
5				

NOTES: MW-1 stick-up was destroyed in December 22, and has been re-surveyed and replaced by MW-1R

GROUNDWATER POTENTIOMETRIC SURFACE MAP 6-6-23

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE

JOB#: 1539-22

DATE:2/12/2024

Path: C:\Users\kkresan\Working\1539-22\1539-22.aprx, Author: kkresan

Water & Environmental TECHNOLOGIES

Monitoring Well
Flow Direction
Groundwater Contour
Property Boundary

N
W E
S

Wiley Dike Rd
Cedar Mill Rd
My Way

MW-1R
2894.76

MW-2
2894.75

MW-5
2894.93

MW-4
2895.15

MW-3
2894.98

2894.80
2894.90
2895
2895.10

0 150 300 600

NO.	DESCRIPTION	DATE	DRAFT	REVIEW
1	MAP CREATION & CONTOUR PLACEMENT	7/20/23	EK	CE
2				
3				
4				
5				

NOTES: MW-1 stick-up was destroyed in December 22, and has been re-surveyed and replaced by MW-1R

GROUNDWATER POTENTIOMETRIC SURFACE MAP 7-11-23

LAKESIDE COUNTY WATER & SEWER DISTRICT, FLATHEAD COUNTY, MT

FIGURE 25

JOB#: 1539-22

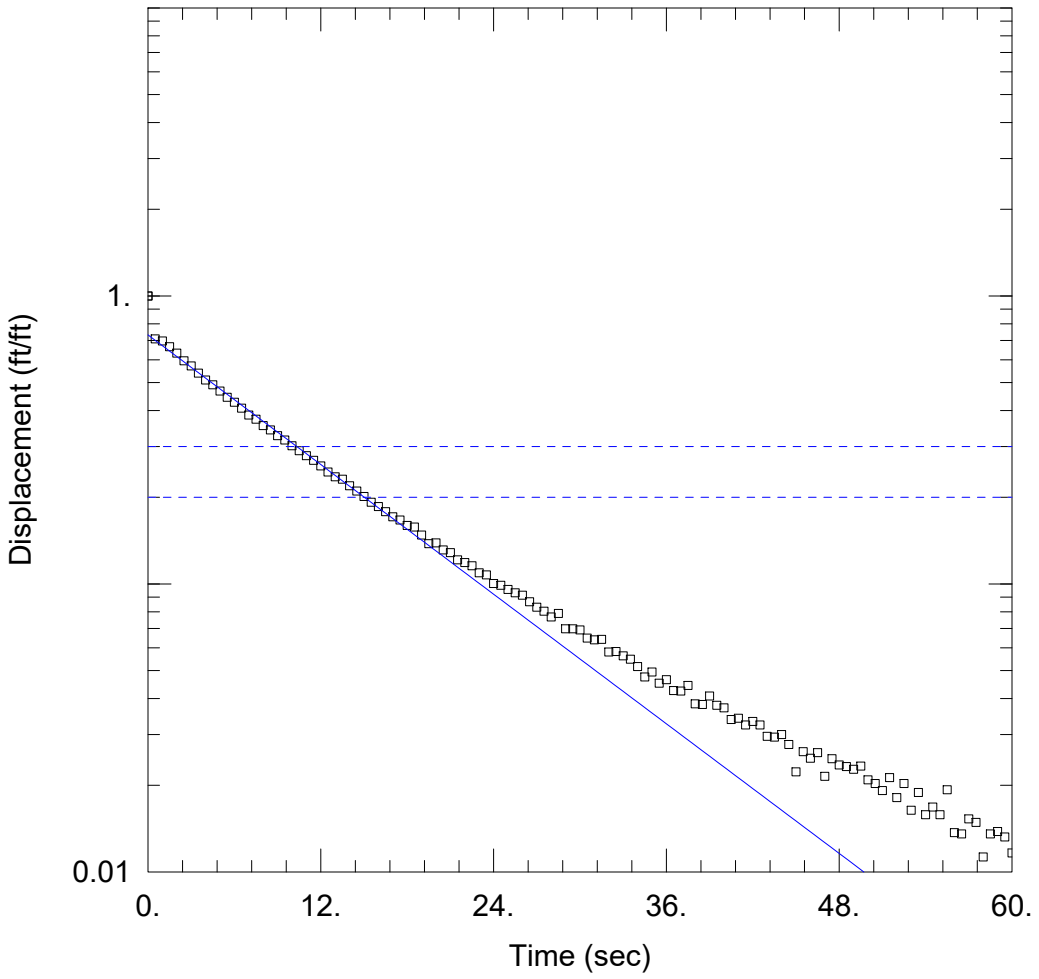
DATE: 7/20/2023

Path: M:\0 Kalispell\1539-22 LCWSD GW Discharge Permit\GIS\1539-22\1539-22.aprx, Author: ekamp

Water & Environmental TECHNOLOGIES

Attachment G

AQTESOLV© Slug Test Solutions



WELL TEST ANALYSIS

Data Set: K:\...\MW-1 TSlug Test 1.aqt
Date: 04/10/23 Time: 09:13:04

AQUIFER DATA

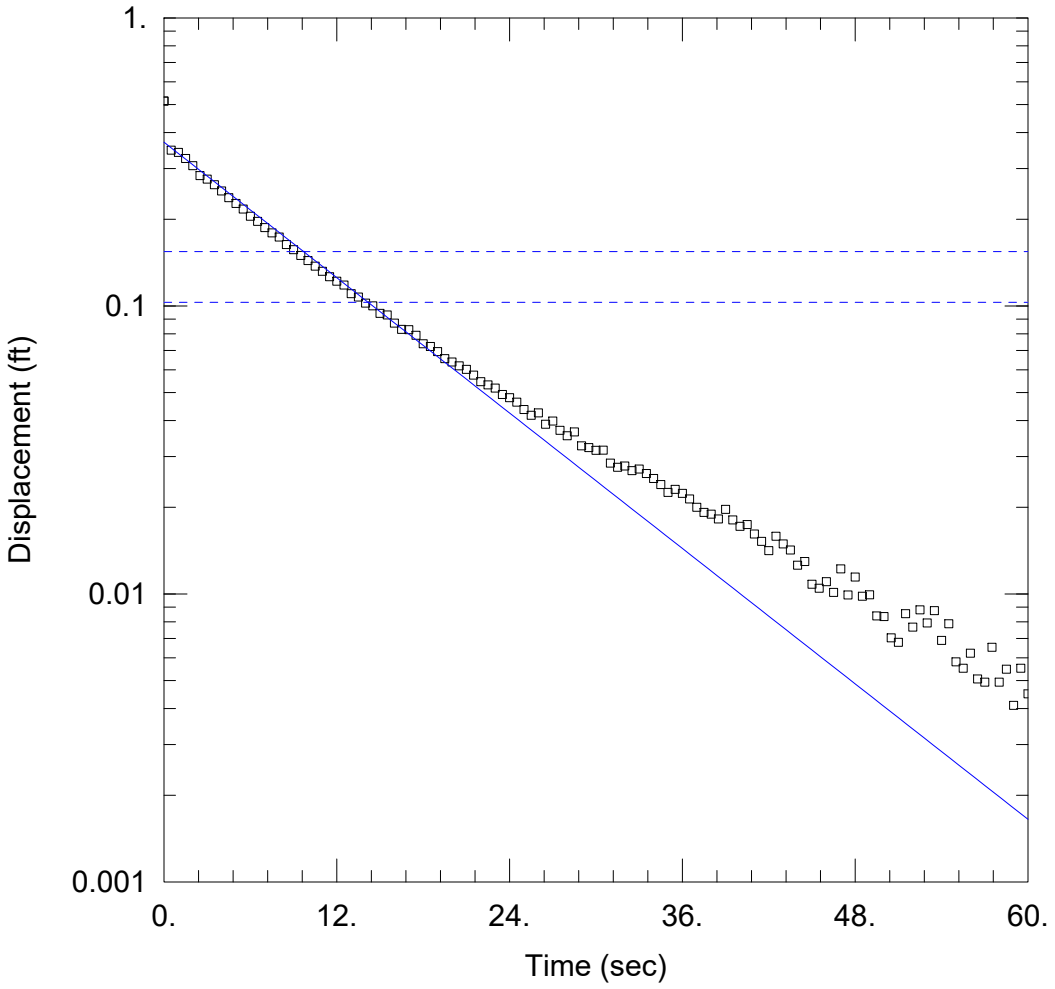
Saturated Thickness: 14.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1)

Initial Displacement: 0.4993 ft
Total Well Penetration Depth: 13.57 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 14.23 ft
Screen Length: 10. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 6.706 ft/day
y0 = 0.3656 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-1 TSlug Test 2.aqt
Date: 04/10/23 Time: 09:13:19

AQUIFER DATA

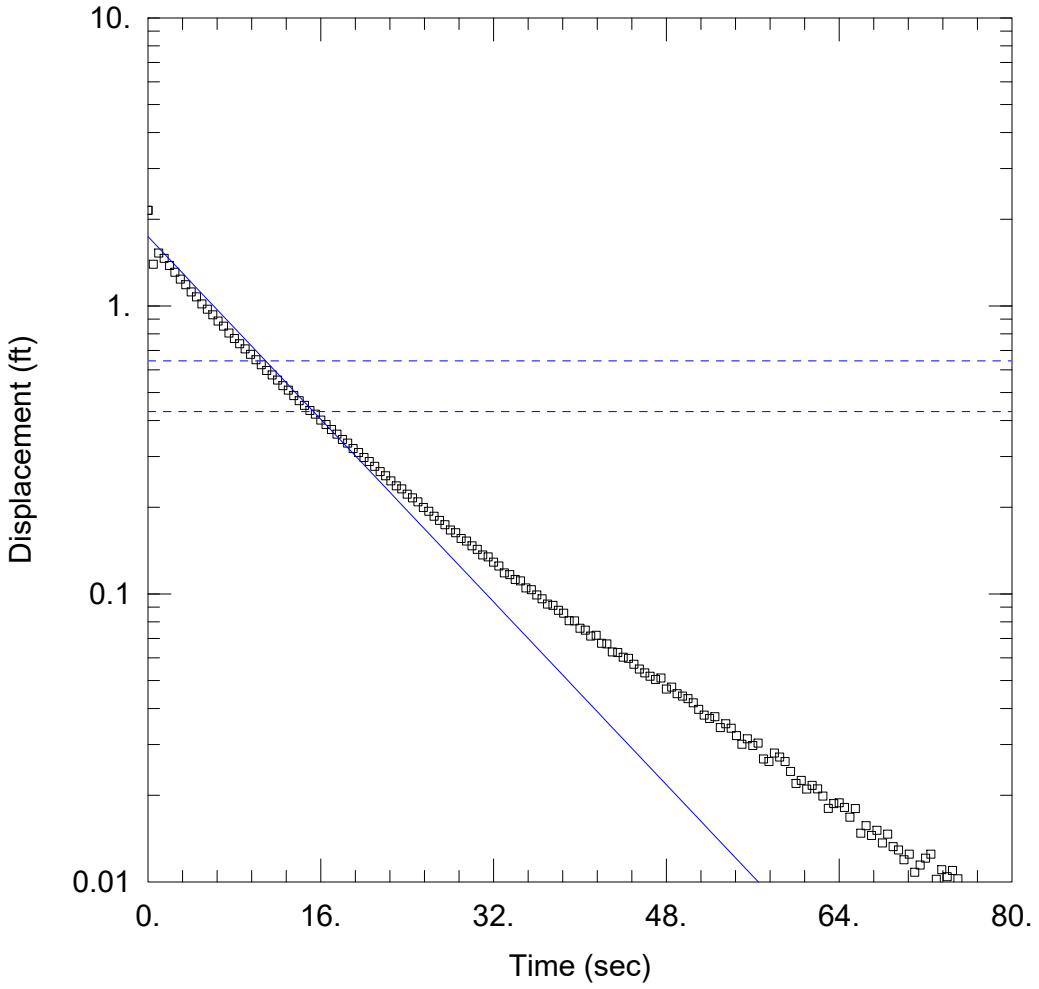
Saturated Thickness: 14.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1)

Initial Displacement: 0.5147 ft
Total Well Penetration Depth: 13.57 ft
Casing Radius: 0.0833 ft
Static Water Column Height: 14.23 ft
Screen Length: 10. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 7.005 ft/day
y0 = 0.3702 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-1 TSlug Test 3.aqt
Date: 04/10/23 Time: 09:14:29

AQUIFER DATA

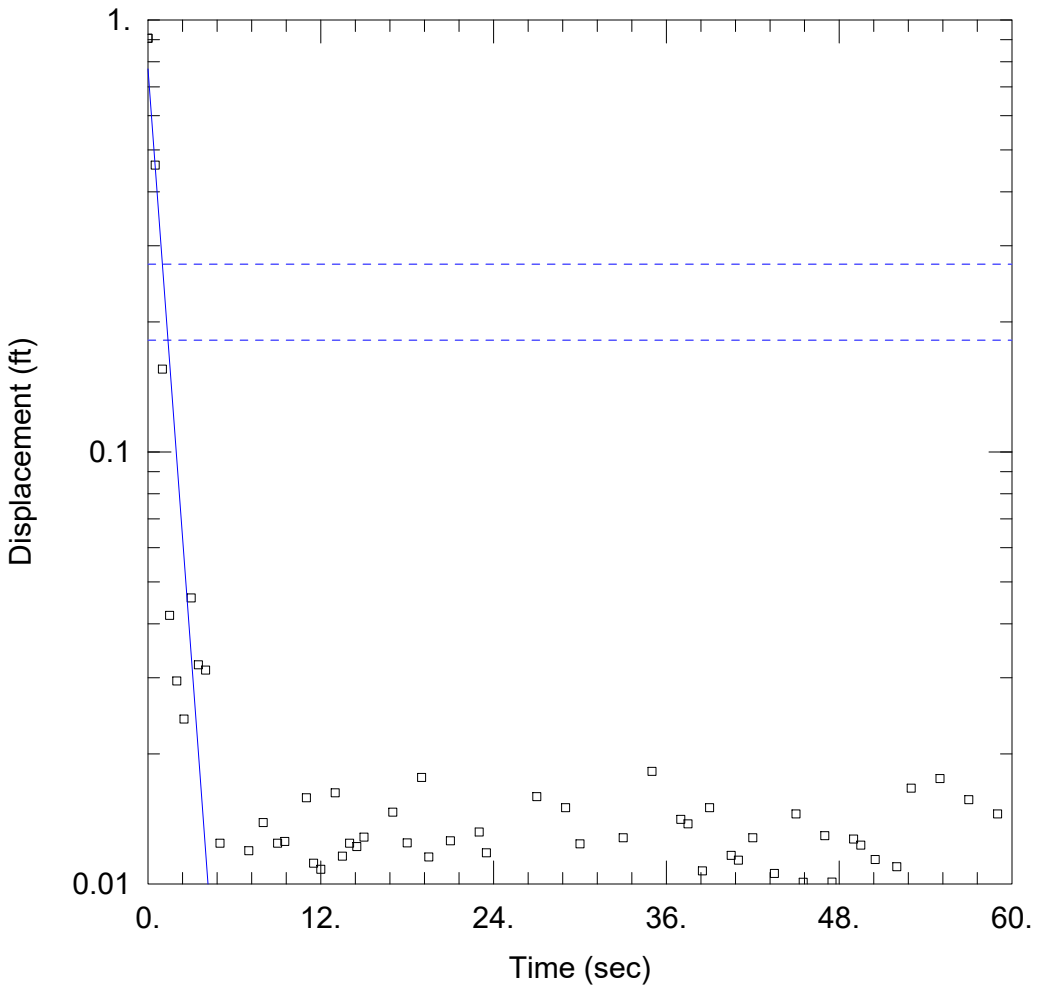
Saturated Thickness: 14.27 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-1)

Initial Displacement: 2.148 ft
Total Well Penetration Depth: 14.27 ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.27 ft
Screen Length: 10. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 7.602 ft/day
y0 = 1.741 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-2 Slug Test 1.aqt
Date: 04/10/23 Time: 09:14:08

AQUIFER DATA

Saturated Thickness: 12.79 ft Anisotropy Ratio (Kz/Kr): 1.

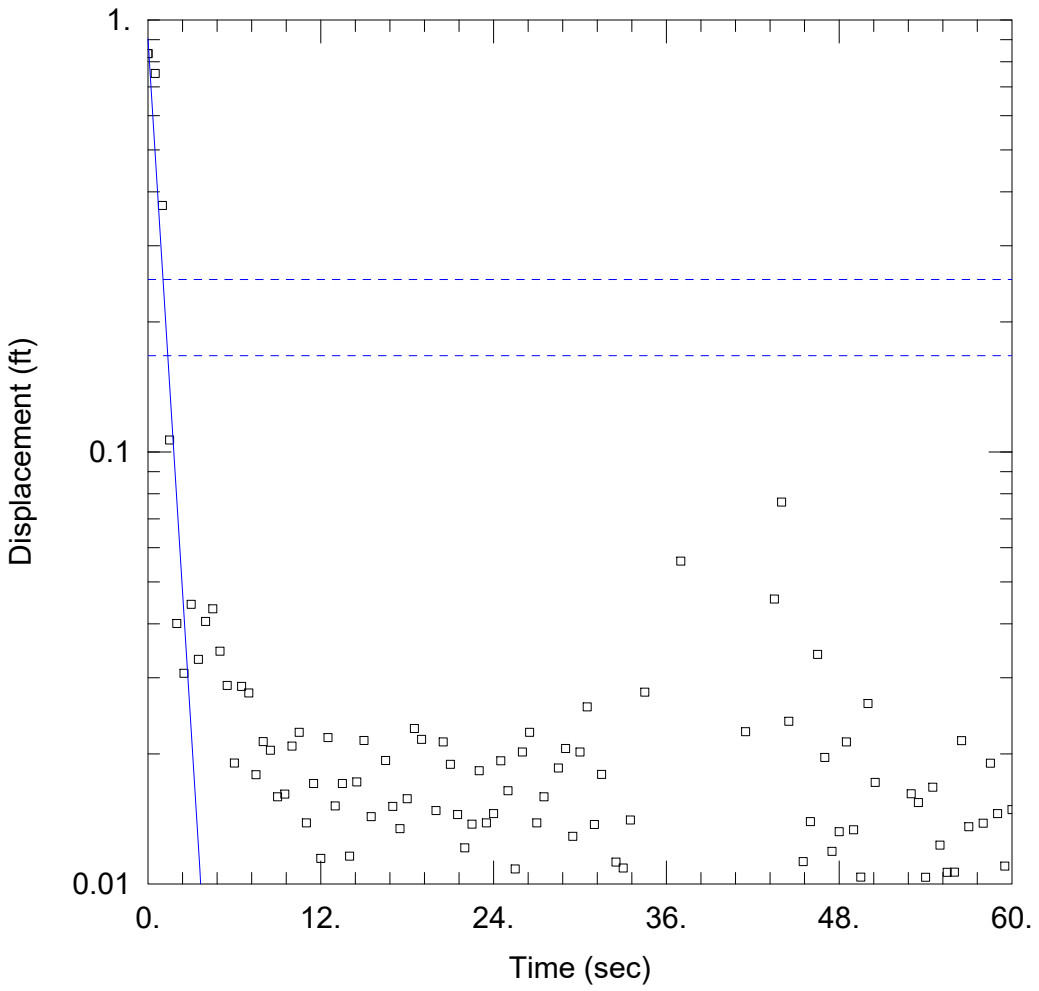
WELL DATA (MW-2)

Initial Displacement: 0.9069 ft
Total Well Penetration Depth: 13.17 ft
Casing Radius: 0.167 ft
Static Water Column Height: 12.79 ft
Screen Length: 10. ft
Well Radius: 0.167 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 415.7 ft/day y0 = 0.7701 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-2 Slug Test 2.aqt
Date: 04/10/23 Time: 09:14:46

AQUIFER DATA

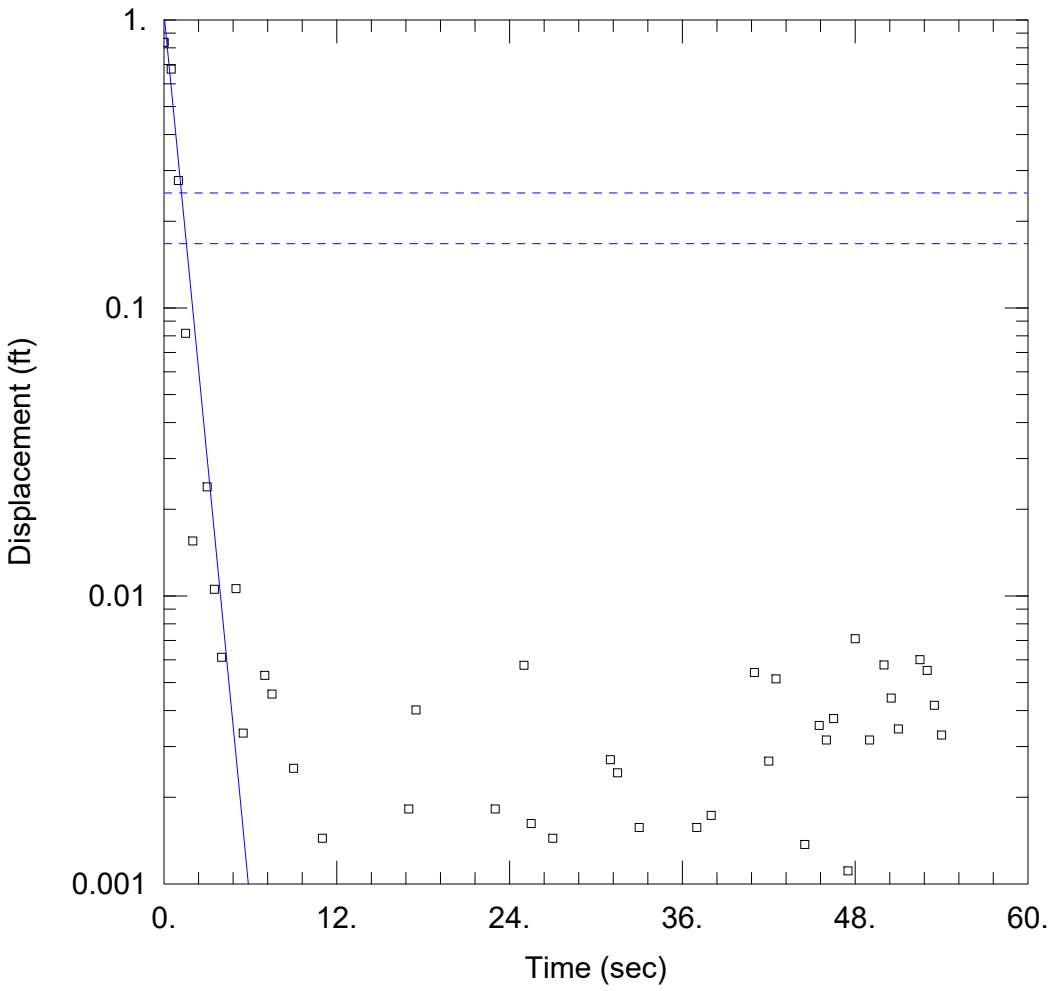
Saturated Thickness: 12.79 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2)

Initial Displacement: 0.8354 ft
Total Well Penetration Depth: 13.17 ft
Casing Radius: 0.167 ft
Static Water Column Height: 12.79 ft
Screen Length: 10. ft
Well Radius: 0.167 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 490.5 ft/day
y0 = 0.9035 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-2 Slug Test 3.aqt
Date: 04/10/23 Time: 09:14:58

AQUIFER DATA

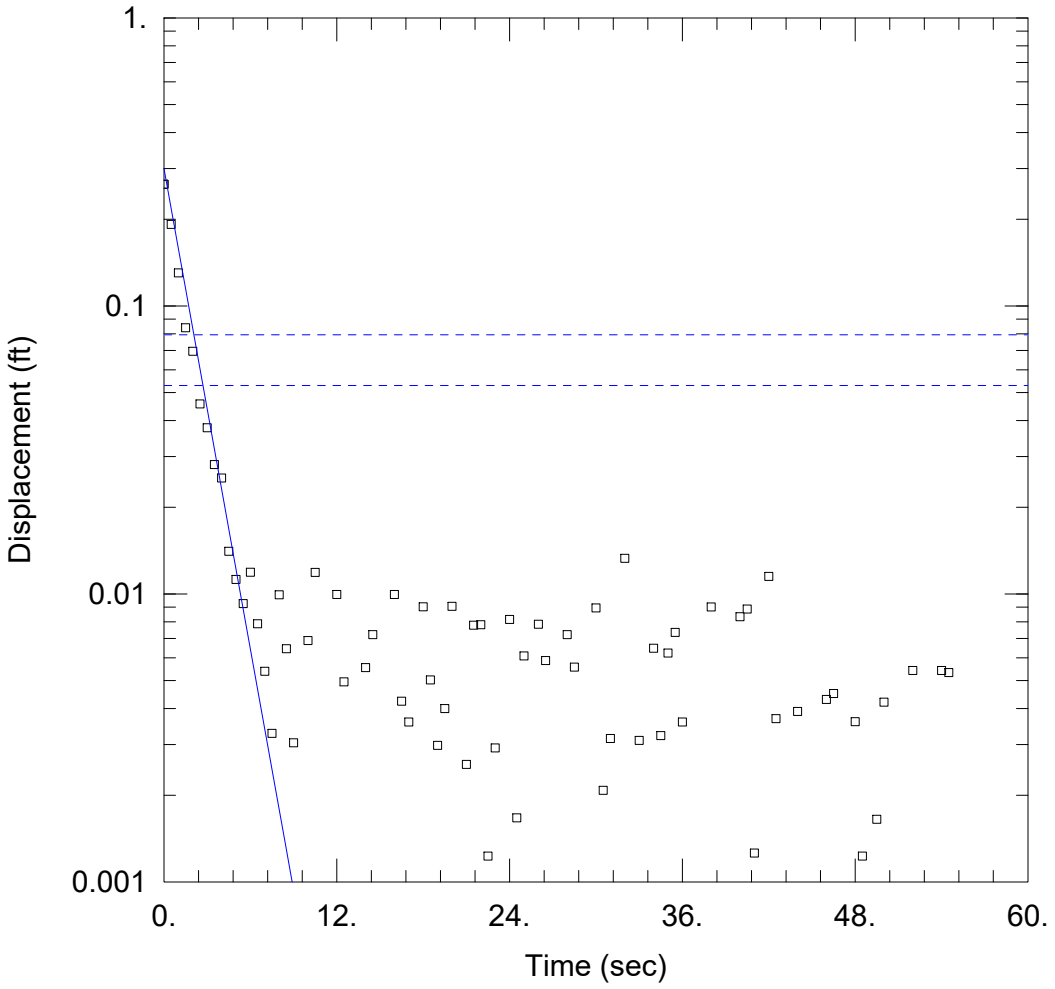
Saturated Thickness: 15.61 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-2)

Initial Displacement: 0.836 ft
Total Well Penetration Depth: 14.01 ft
Casing Radius: 0.167 ft
Static Water Column Height: 15.61 ft
Screen Length: 14. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice
K = 270.9 ft/day
y0 = 1.061 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-3 Slug Test 1.aqt
Date: 04/10/23 Time: 09:15:24

AQUIFER DATA

Saturated Thickness: 15.55 ft Anisotropy Ratio (Kz/Kr): 1.

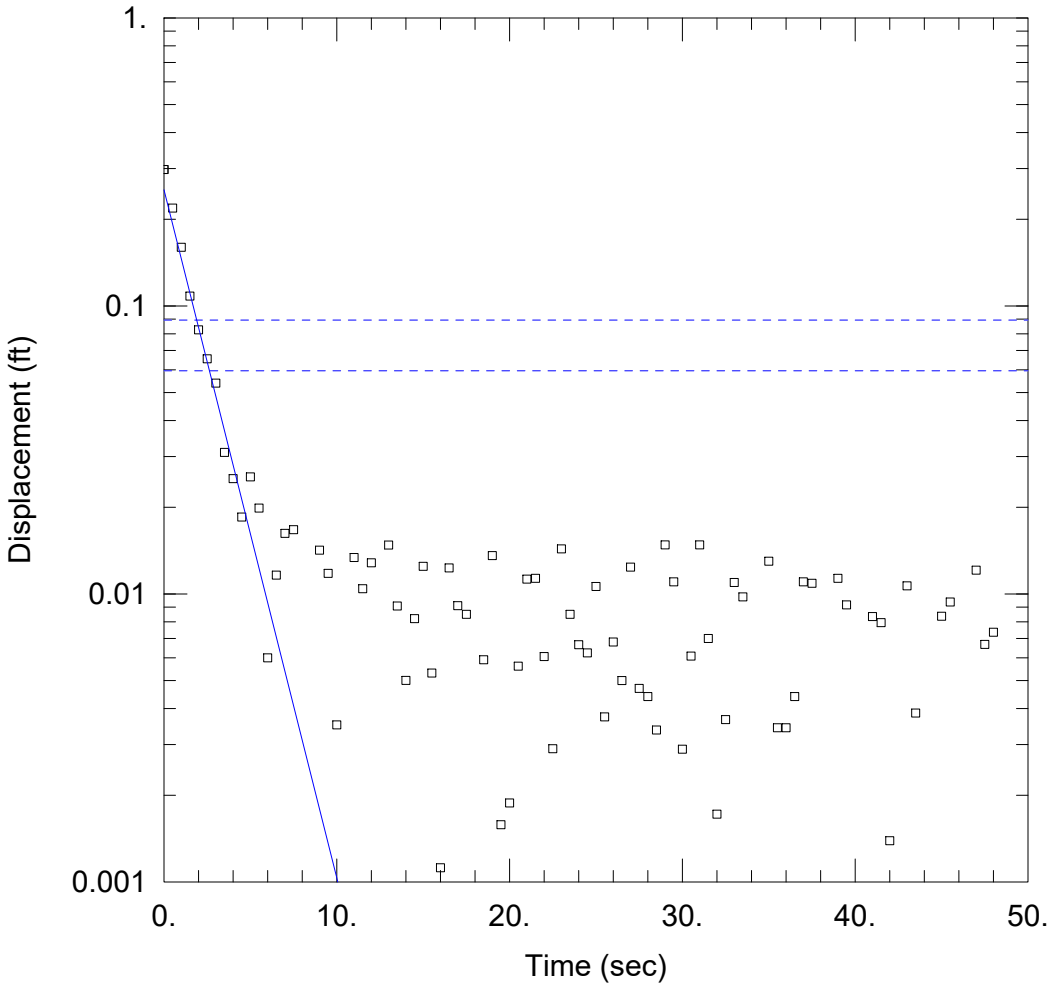
WELL DATA (MW-3)

Initial Displacement: 0.2646 ft
Total Well Penetration Depth: 14.76 ft
Casing Radius: 0.083 ft
Static Water Column Height: 15.55 ft
Screen Length: 10. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 49.92 ft/day y0 = 0.2998 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-3 Slug Test 2.aqt
Date: 04/10/23 Time: 09:15:38

AQUIFER DATA

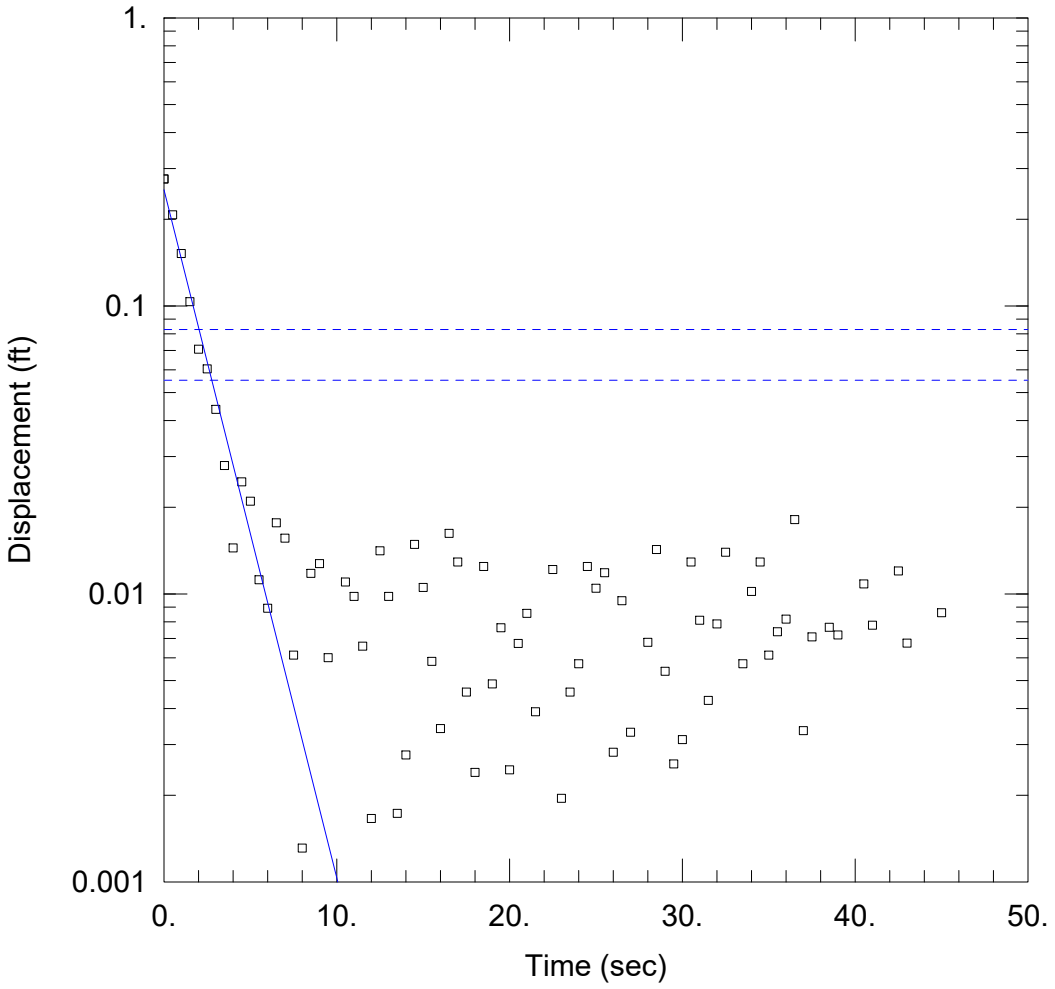
Saturated Thickness: 15.55 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3)

Initial Displacement: 0.2975 ft
Total Well Penetration Depth: 14.76 ft
Casing Radius: 0.083 ft
Static Water Column Height: 15.55 ft
Screen Length: 10. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 42.86 ft/day
y0 = 0.2528 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-3 Slug Test 3.aqt
Date: 04/10/23 Time: 09:13:39

AQUIFER DATA

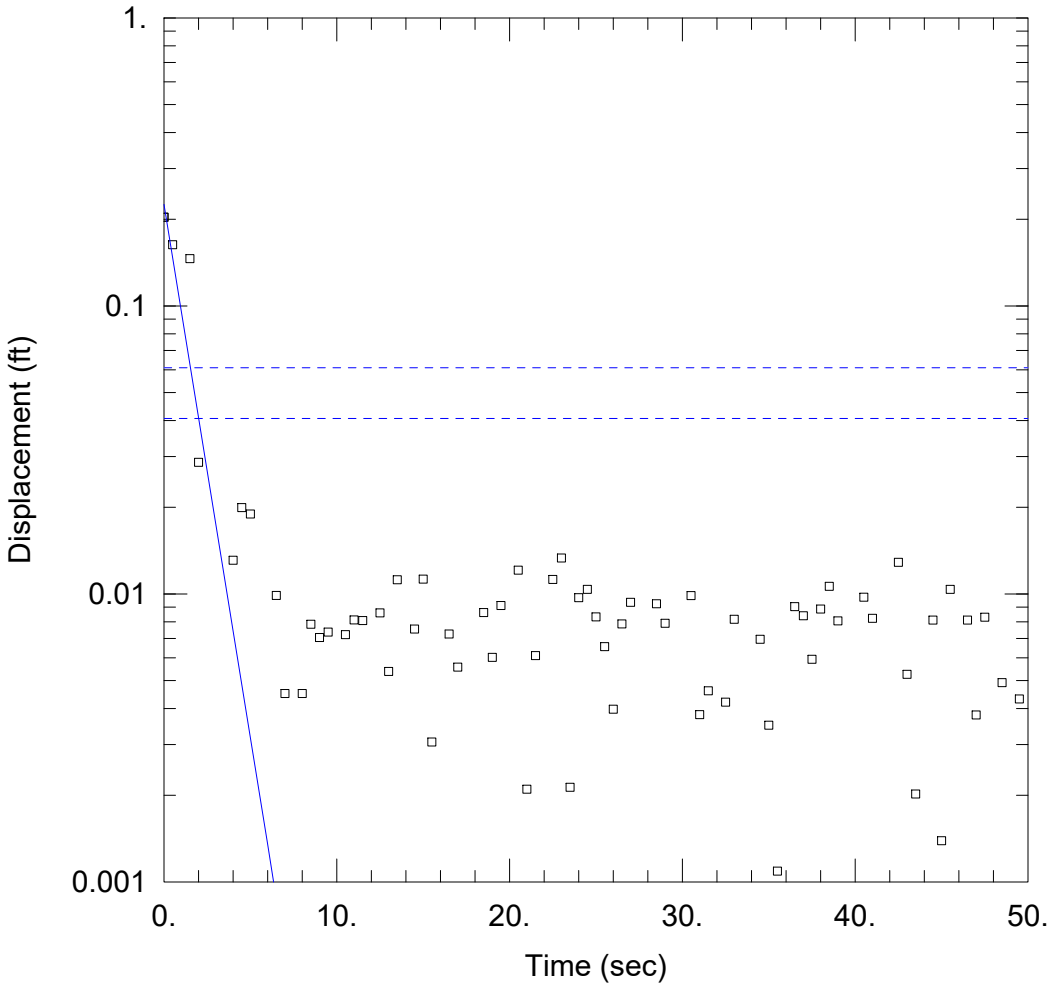
Saturated Thickness: 15.55 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-3)

Initial Displacement: 0.2761 ft
Total Well Penetration Depth: 14.76 ft
Casing Radius: 0.083 ft
Static Water Column Height: 15.55 ft
Screen Length: 10. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 42.86 ft/day
y0 = 0.2528 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-4 Slug Test 1.aqt
Date: 04/10/23 Time: 09:15:51

AQUIFER DATA

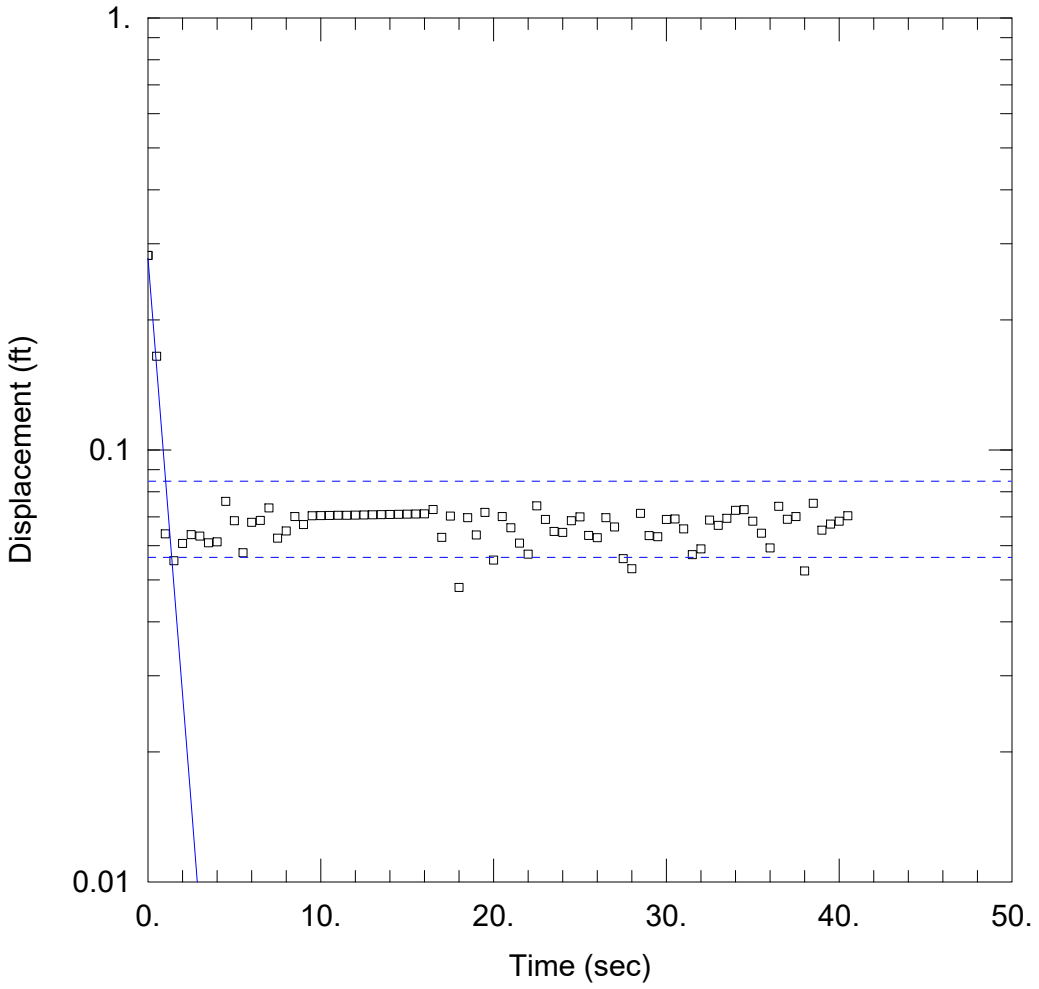
Saturated Thickness: 19.53 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4)

Initial Displacement: 0.2032 ft
Total Well Penetration Depth: 22.49 ft
Casing Radius: 0.083 ft
Static Water Column Height: 19.53 ft
Screen Length: 20. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 41.85 ft/day
y0 = 0.2252 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-4 Slug Test 2.aqt
Date: 04/10/23 Time: 09:16:24

AQUIFER DATA

Saturated Thickness: 19.53 ft Anisotropy Ratio (Kz/Kr): 1.

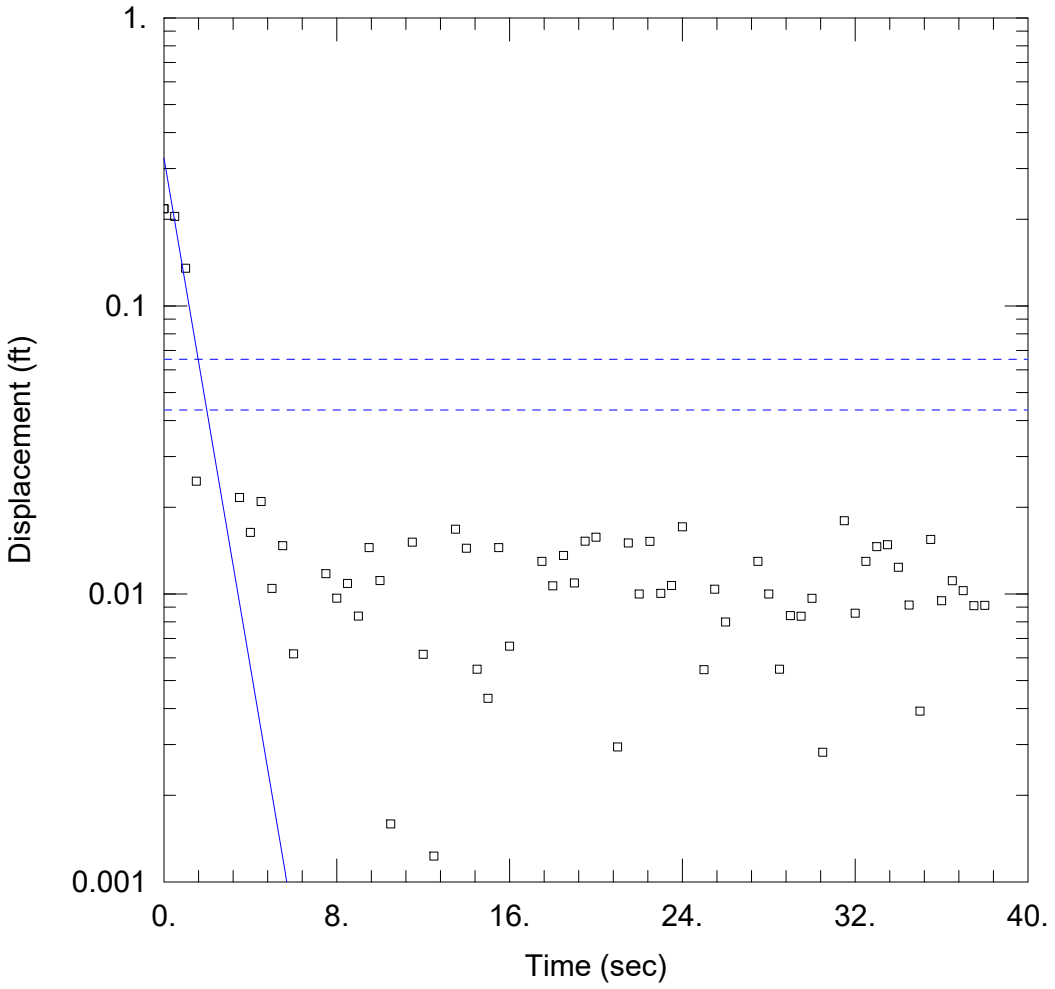
WELL DATA (MW-4)

Initial Displacement: 0.2821 ft
Total Well Penetration Depth: 22.49 ft
Casing Radius: 0.083 ft
Static Water Column Height: 19.53 ft
Screen Length: 20. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 57.01 ft/day y0 = 0.2776 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-4 Slug Test 3.aqt
Date: 04/10/23 Time: 09:16:32

AQUIFER DATA

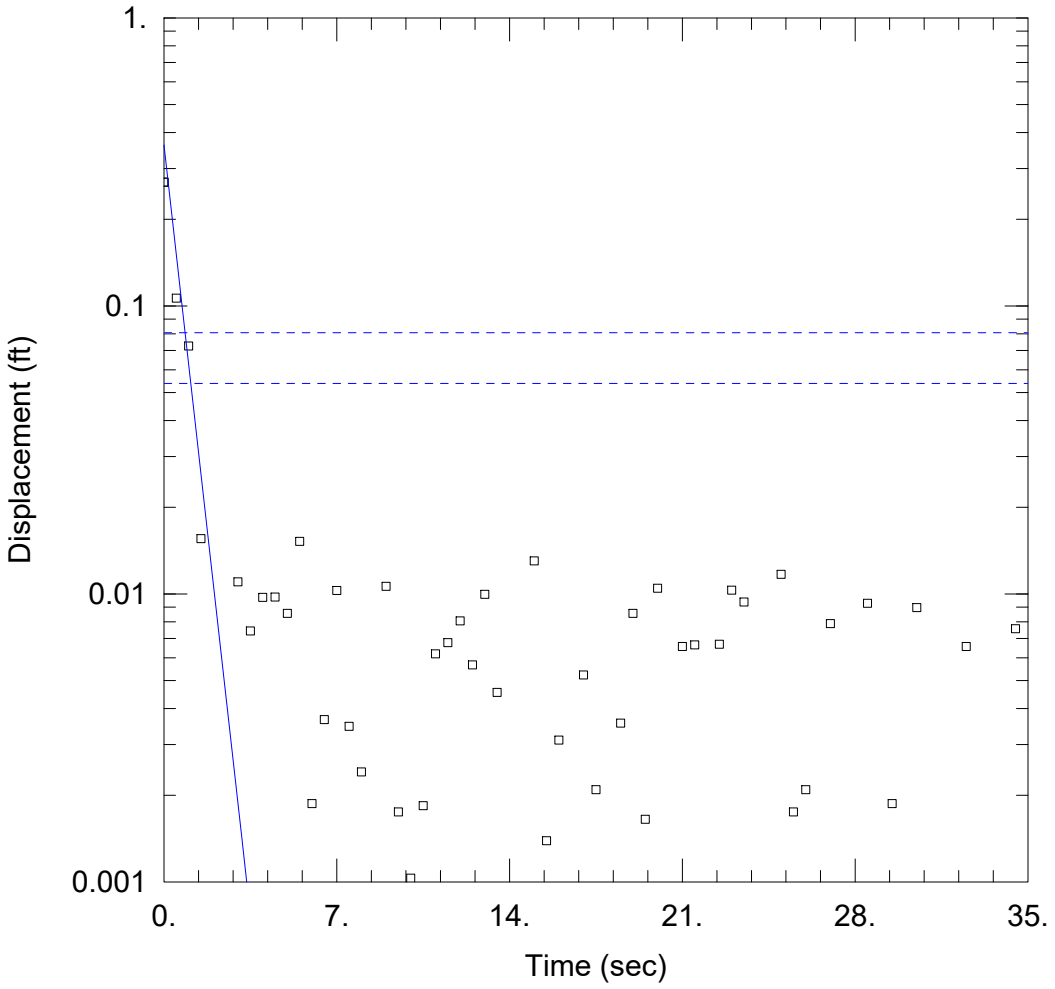
Saturated Thickness: 19.53 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-4)

Initial Displacement: 0.2175 ft
Total Well Penetration Depth: 22.49 ft
Casing Radius: 0.083 ft
Static Water Column Height: 19.53 ft
Screen Length: 20. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 49.93 ft/day
y0 = 0.3265 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-5 Slug Test 1.aqt
Date: 04/10/23 Time: 09:16:46

AQUIFER DATA

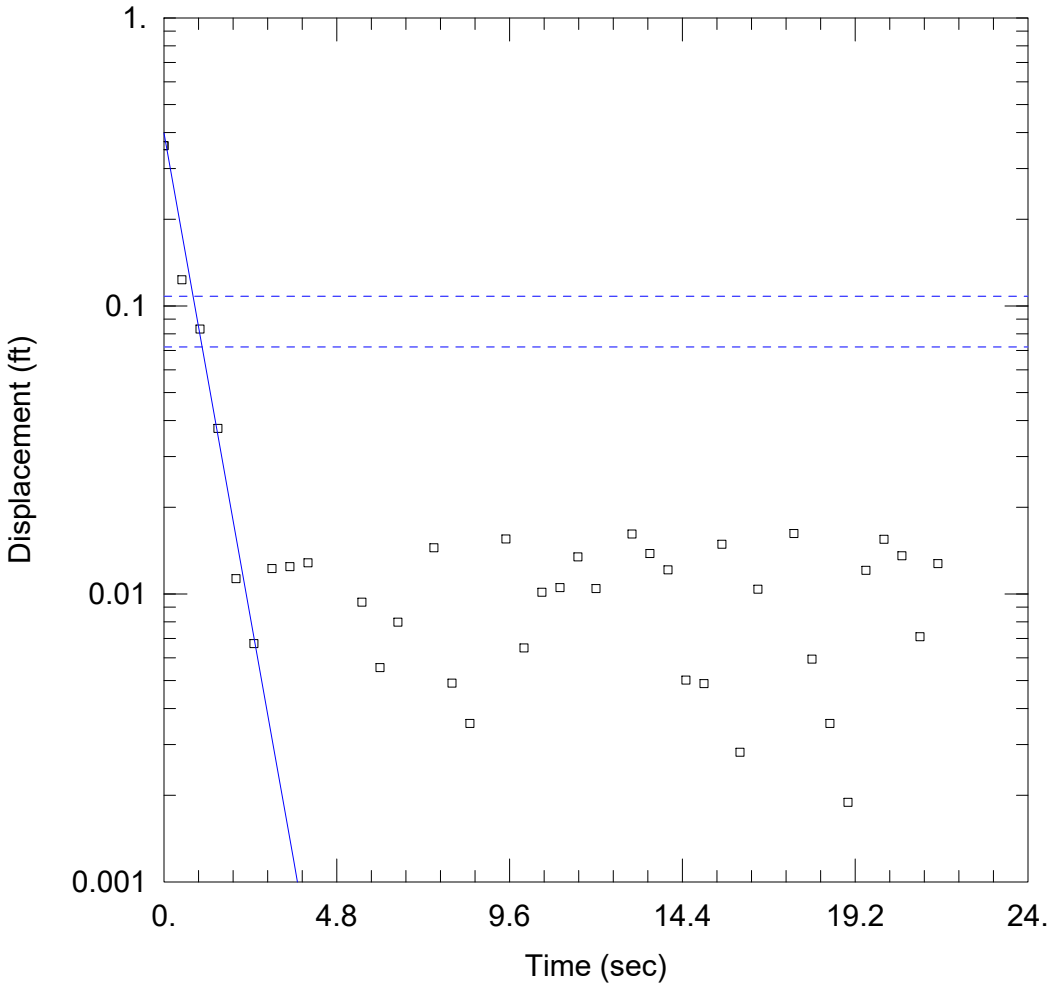
Saturated Thickness: 13.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5)

Initial Displacement: 0.2689 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 13.23 ft
Screen Length: 20. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 121.4 ft/day
y0 = 0.3621 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-5 Slug Test 2.aqt
Date: 04/10/23 Time: 09:16:57

AQUIFER DATA

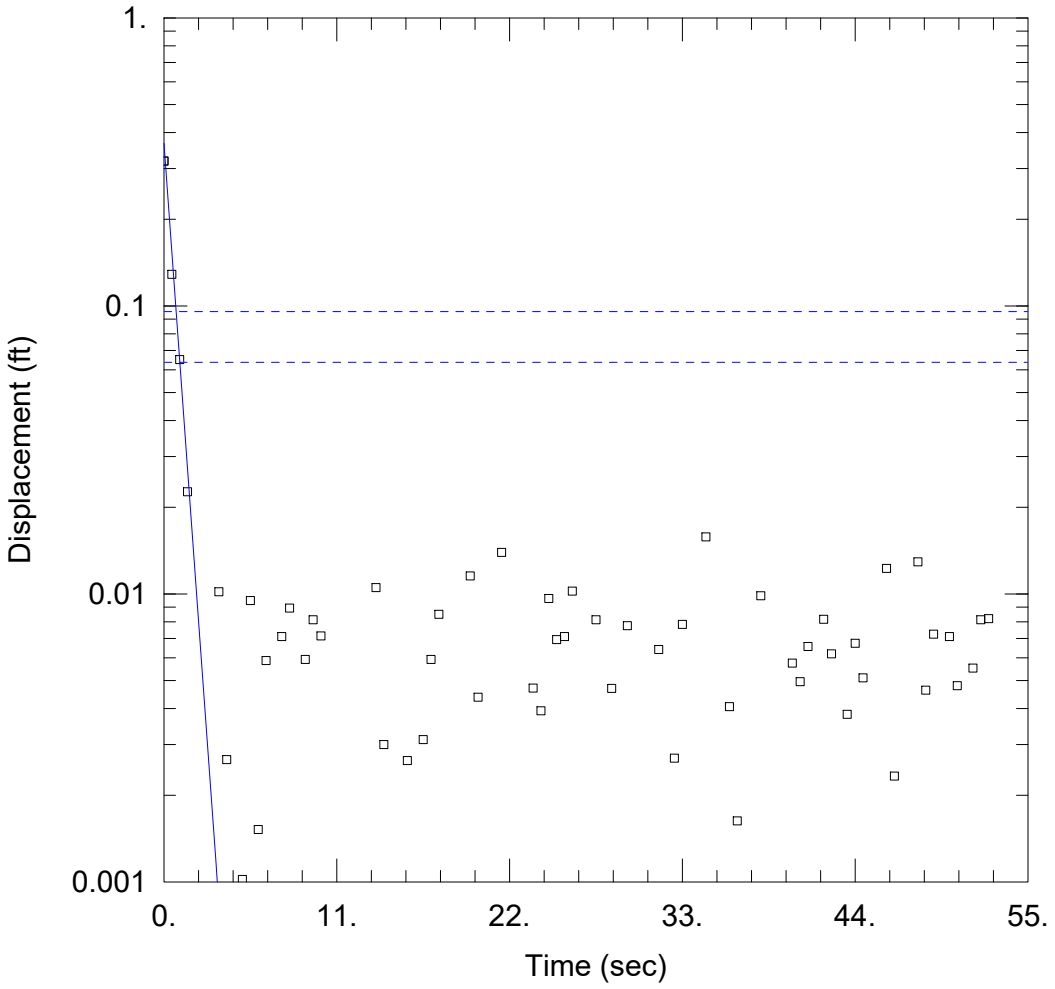
Saturated Thickness: 13.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5)

Initial Displacement: 0.3602 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 13.23 ft
Screen Length: 20. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 111.6 ft/day
y0 = 0.3981 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-5 Slug Test 3.aqt
Date: 04/10/23 Time: 09:17:12

AQUIFER DATA

Saturated Thickness: 13.23 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-5)

Initial Displacement: 0.3185 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 13.23 ft
Screen Length: 20. ft
Well Radius: 0.33 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 120. ft/day
y0 = 0.3664 ft

Attachment H

Montana DEQ Pathogen Model Spreadsheet

Appendix U
Pathegen Transport Model

Input Parameters		**units**			**converted**	
K	hydraulic conductivity	ft/day	122.4			from non-deg analysis
i	groundwater gradient	ft/ft	0.003			triangulated or published data
b	aquifer saturated thickness	ft	14.7			from drinking water well log
d	depth to groundwater	feet	4	cm	121.92	depth of soil test pit less trench depth
dw	distance to drinking water well	ft	305			from lot layout - drainfield to well isolation zone
Q	drinking water well pumping rate	gpd	3000	ft3/day	401.0159	estimated demand- well use + irrigation. Assume 1 living unit uses 250 gpd + irrigaion
p	annual precipitation	in/year	15.17	cm/year	38.5318	local rainfall from NOAA (https://www.ncdc.noaa.gov/cdo-web/datatools/normals)
e	effluent application rate	gpd/sf	1.01	cm/year	1501.87	from test pits
	soil type		loamy sand			from test pits
n	effective soil porosity	%	0.27			** see soil properties sheet below
	volumetric soil moisture content	mL/cm3	0.1			** see soil properties sheet below
	virulo soil type					from test pits
	soil depth	m				depth from bottom of infiltrative surface to either limiting layer or bottom of the test pit
	virulo virus					must run all virus to see the worst case for the soil type
	number of runs					minimum of 5 runs/ worst case virus
	highest # of exceedances					highest value
	log equivalent		#NUM!			

Results w/o Virulo:		
Horizontal travel time	3.913534	logs
Vertical travel time - Wyoming	0.115556	logs
Total	**4.02909**	**logs**

Results with Virulo:		
Horizontal travel time	3.913534	logs
Vertical travel time - virulo	#NUM!	
Total	**#NUM!**	**logs**

Time of Travel Calculation

User supplies K, b, I, Q, n, and X (distance estimate) to calculate travel time and other parameters.

Input Values				TOT and Capture Zone Results		
K=	122.4	ft/day				
b=	14.7	ft		Tx	195.68	Days
I=	0.003	ft/ft		Tx (years)	0.54	Years
Q=	401.02	ft3/day		Null Point	-11.82	ft
n=	0.27	%		Boundary	37.15	ft
X=	305.00	ft		Flow Veloc	1.56	ft/day

logs of inactivation:
3.913534

from EPA Ground Water Rule Source Assessment Guidance Manual, Appendix C
viruses are typically 0.02 log10 removal/day

Distance Traveled			Time of Travel			
feet	miles		days	months	years	
100	**0.02**		**64.2**	**2.1**	**0.18**	**Control Zone**
200	0.04		128.3	4.3	0.35	
300	0.06		192.5	6.4	0.53	
400	0.08		256.6	8.6	0.70	
500	0.09		320.8	10.7	0.88	
1,000	**0.19**		**641.6**	**21.4**	**1.76**	**Confined Aquifer Inventory Region**
2,640	0.50		1693.7	56.5	4.64	
5,280	**1**		**3387.5**	**112.9**	**9.28**	**General Inventory Region**
7,920	2		5081.2	169.4	13.92	
10,560	2		6774.9	225.8	18.56	
15,840	3		10162.4	338.7	27.84	
21,120	4		13549.8	451.7	37.12	
26,400	5		16937.3	564.6	46.40	
52,800	10		33874.5	1129.2	92.81	

Attachment I

MOUNDSOLV© Modeling Summary Report
Primary Analysis

MOUNDSOLV
Groundwater Mounding Analysis
For A Sloping Water-Table Aquifer
Zlotnik et al. (2017) Solution

Solution Method

Zlotnik et al. (2017) transient solution for a rectangular source (linearization method 2)

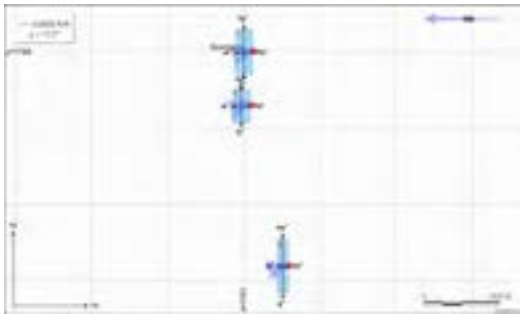
Site Description

Aquifer Data

Property	Value
Horizontal hydraulic conductivity, K (ft/d)	122.4
Specific yield, Sy	0.27
Initial saturated thickness, h_0 (ft)	14.7
Maximum allowable water-table rise, σ (ft)	0
Dip, i (ft/ft)	-0.0002
Slope rotation from x axis, γ (°)	17.7

Recharge Sources

Property	Source 1	Source 2	Source 3
X coordinate at center, X (ft)	1161	1127	1669
Y coordinate at center, Y (ft)	1784	1077	-1025
Dimension along x* axis, L (ft)	225	225	145
Dimension along y* axis, W (ft)	600	450	700
Rotation from slope direction, ϕ (°)	-17.7	-17.7	-17.7
Recharge rate, Q (ft³/d)	10694	8021	8021
Infiltration rate, q (ft/d)	0.07921481481	0.07921975309	0.07902463054

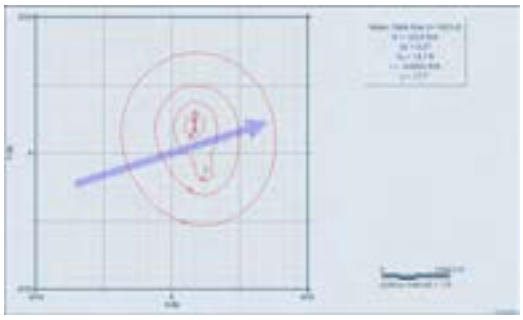


Map of recharge source.

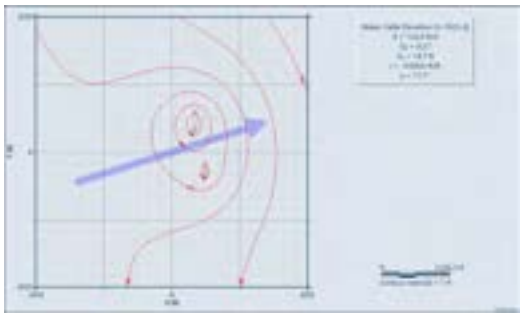
Monitoring Points

Elapsed Time, t = 1825 d

Name	x (ft)	y (ft)	s (ft)	h (ft)	z (ft)
Source 1	1161	1784	4.981	19.68	0



Contour plot of water-table rise.



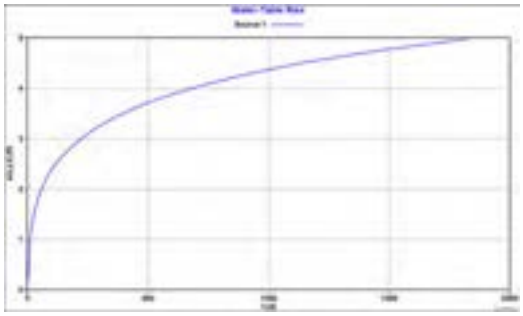
Contour plot of water-table elevation.

Time Series Data

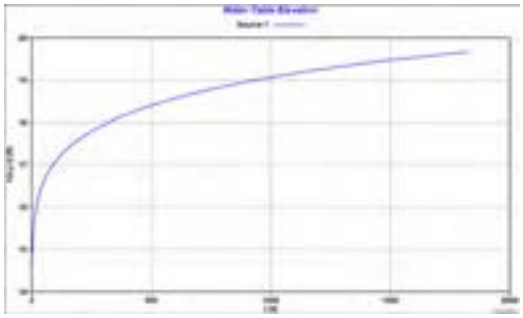
Time	Source 1	
(d)	s (ft)	h (ft)
0	0	14.7
0.002327	0.0006828	14.7
0.005236	0.001536	14.7
0.008873	0.002603	14.7

0.01342	0.003937	14.7
0.0191	0.005604	14.71
0.0262	0.007688	14.71
0.03508	0.01029	14.71
0.04618	0.01355	14.71
0.06005	0.01762	14.72
0.07739	0.0227	14.72
0.09906	0.02906	14.73
0.1262	0.03697	14.74
0.16	0.04681	14.75
0.2024	0.05895	14.76
0.2553	0.07382	14.77
0.3214	0.09187	14.79
0.4041	0.1135	14.81
0.5075	0.1393	14.84
0.6366	0.1697	14.87
0.7981	0.205	14.91
1	0.2458	14.95
5.245	0.7268	15.43
10.55	1.023	15.72
17.18	1.268	15.97
25.48	1.49	16.19
35.84	1.698	16.4
48.79	1.897	16.6
64.99	2.09	16.79
85.23	2.28	16.98
110.5	2.467	17.17
142.2	2.655	17.36
181.7	2.846	17.55
231.1	3.04	17.74
292.9	3.239	17.94
370.1	3.443	18.14
466.6	3.652	18.35
587.3	3.865	18.57
738.1	4.083	18.78

926.6	4.304	19
1162	4.528	19.23
1457	4.754	19.45
1825	4.981	19.68



Time-series plot of water-table rise.



Time-series plot of water-table elevation.

Profile Data

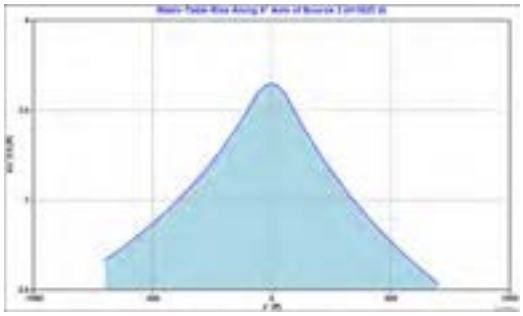
Profile Along X Axis for Source 3 at Elapsed Time, t = 1825 d*

x* (ft)	s (ft)	h (ft)	z (ft)
-700	2.667	17.57	0.2074
-672	2.693	17.6	0.2021
-644	2.72	17.62	0.1967
-616	2.747	17.64	0.1914
-588	2.776	17.66	0.186
-560	2.805	17.69	0.1807
-532	2.835	17.71	0.1754
-504	2.866	17.74	0.17
-476	2.898	17.76	0.1647
-448	2.932	17.79	0.1594

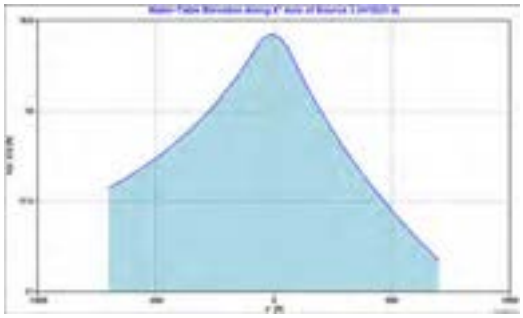
-420	2.966	17.82	0.154
-392	3.003	17.85	0.1487
-364	3.04	17.88	0.1434
-336	3.08	17.92	0.138
-308	3.121	17.95	0.1327
-280	3.165	17.99	0.1274
-252	3.211	18.03	0.122
-224	3.259	18.08	0.1167
-196	3.309	18.12	0.1114
-168	3.363	18.17	0.106
-140	3.419	18.22	0.1007
-112	3.478	18.27	0.09535
-84	3.541	18.33	0.09002
-56	3.601	18.39	0.08469
-28	3.638	18.42	0.07935
0	3.648	18.42	0.07402
28	3.632	18.4	0.06868
56	3.59	18.35	0.06335
84	3.524	18.28	0.05801
112	3.456	18.21	0.05268
140	3.391	18.14	0.04734
168	3.329	18.07	0.04201
196	3.27	18.01	0.03667
224	3.213	17.94	0.03134
252	3.16	17.89	0.026
280	3.108	17.83	0.02067
308	3.059	17.77	0.01533
336	3.012	17.72	0.009997
364	2.967	17.67	0.004662
392	2.924	17.62	-0.0006733
420	2.882	17.58	-0.006008
448	2.842	17.53	-0.01134
476	2.804	17.49	-0.01668
504	2.766	17.44	-0.02201
532	2.73	17.4	-0.02735

560	2.695	17.36	-0.03268
588	2.661	17.32	-0.03802
616	2.628	17.28	-0.04335
644	2.596	17.25	-0.04869
672	2.564	17.21	-0.05402
700	2.534	17.17	-0.05936

The axes of Source 3 (x, y*) are rotated 0° from the axes of mapping coordinate system (x, y)*



Profile of water-table rise along x axis of Source 3.*



Profile of water-table elevation along x axis of Source 3.*

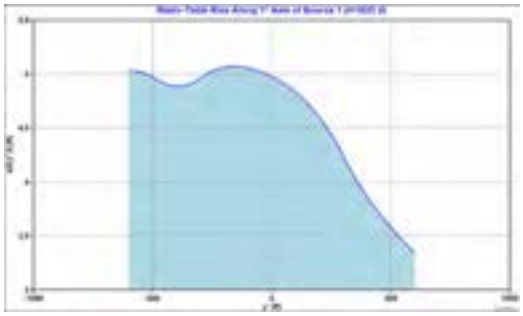
Profile Along Y Axis for Source 1 at Elapsed Time, t = 1825 d*

y* (ft)	s (ft)	h (ft)	z (ft)
-600	5.034	19.77	0.03648
-576	5.031	19.77	0.03502
-552	5.022	19.76	0.03357
-528	5.006	19.74	0.03211
-504	4.981	19.71	0.03065
-480	4.948	19.68	0.02919
-456	4.917	19.65	0.02773
-432	4.897	19.62	0.02627

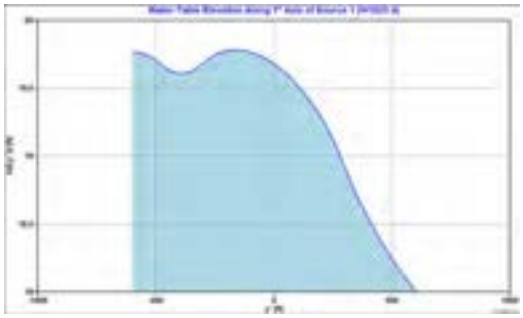
-408	4.888	19.61	0.02481
-384	4.887	19.61	0.02335
-360	4.897	19.62	0.02189
-336	4.916	19.64	0.02043
-312	4.946	19.66	0.01897
-288	4.984	19.7	0.01751
-264	5.016	19.73	0.01605
-240	5.04	19.75	0.01459
-216	5.057	19.77	0.01313
-192	5.067	19.78	0.01167
-168	5.072	19.78	0.01022
-144	5.072	19.78	0.008756
-120	5.067	19.77	0.007297
-96	5.058	19.76	0.005837
-72	5.045	19.75	0.004378
-48	5.028	19.73	0.002919
-24	5.006	19.71	0.001459
0	4.981	19.68	0
24	4.952	19.65	-0.001459
48	4.918	19.62	-0.002919
72	4.881	19.58	-0.004378
96	4.839	19.53	-0.005837
120	4.792	19.48	-0.007297
144	4.741	19.43	-0.008756
168	4.684	19.37	-0.01022
192	4.621	19.31	-0.01167
216	4.551	19.24	-0.01313
240	4.474	19.16	-0.01459
264	4.389	19.07	-0.01605
288	4.293	18.98	-0.01751
312	4.189	18.87	-0.01897
336	4.091	18.77	-0.02043
360	4.001	18.68	-0.02189
384	3.917	18.59	-0.02335
408	3.839	18.51	-0.02481

432	3.766	18.44	-0.02627
456	3.697	18.37	-0.02773
480	3.631	18.3	-0.02919
504	3.568	18.24	-0.03065
528	3.508	18.18	-0.03211
552	3.451	18.12	-0.03357
576	3.396	18.06	-0.03502
600	3.343	18.01	-0.03648

The axes of Source 1 (x, y*) are rotated 0° from the axes of mapping coordinate system (x, y)*



Profile of water-table rise along y axis of Source 1.*



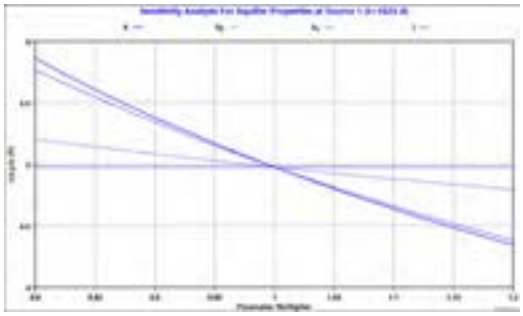
Profile of water-table elevation along y axis of Source 1.*

Sensitivity Data

Source 1, x=1161 ft, y=1784 ft

Parameter	Water-Table Rise (ft)			
Multiplier	**K**	**Sy**	**h_o**	**i**
0.8	5.864	5.208	5.771	4.981
0.82	5.76	5.183	5.681	4.981
0.84	5.66	5.158	5.593	4.981
0.86	5.564	5.134	5.508	4.981
0.88	5.472	5.111	5.426	4.981

0.9	5.382	5.088	5.346	4.981
0.92	5.296	5.066	5.269	4.981
0.94	5.214	5.044	5.194	4.981
0.96	5.133	5.023	5.121	4.981
0.98	5.056	5.002	5.05	4.981
1	4.981	4.981	4.981	4.981
1.02	4.909	4.961	4.914	4.981
1.04	4.839	4.941	4.849	4.981
1.06	4.771	4.922	4.785	4.981
1.08	4.705	4.903	4.724	4.981
1.1	4.641	4.885	4.664	4.981
1.12	4.579	4.866	4.605	4.981
1.14	4.519	4.849	4.548	4.981
1.16	4.46	4.831	4.493	4.981
1.18	4.404	4.814	4.438	4.982
1.2	4.348	4.797	4.386	4.982



Sensitivity plot for water-table rise.

Notation

h is water-table elevation above datum[1]
h_o is aquifer saturated thickness prior to mounding
i is dip of aquifer
K is horizontal hydraulic conductivity
L is dimension of recharge source parallel to *x** axis
q is infiltration rate (= *Q* / *L*·*W*)
Q is recharge rate
s is water-table rise above static water table
Sy is specific yield
t is time since start of recharge
t_o is time when recharge stops
W is dimension of recharge source parallel to *y** axis

x, y are mapping Cartesian coordinate axes x^*, y^* are recharge source Cartesian coordinate axes z is elevation above datum[1] γ is angle between x axis and dip direction ϕ is angle between dip direction and x^* axis of recharge source σ is maximum acceptable water-table rise
[1]*Elevation datum is the base of aquifer beneath the center of primary recharge source*

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Attachment J

MOUNDSOLV© Modeling Summary Report
Alternate Analysis

MOUNDSOLV
Groundwater Mounding Analysis
For A Sloping Water-Table Aquifer
Zlotnik et al. (2017) Solution

Solution Method

Zlotnik et al. (2017) transient solution for a rectangular source (linearization method 2)

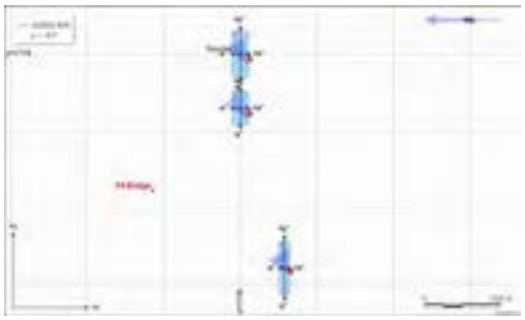
Site Description

Aquifer Data

Property	Value
Horizontal hydraulic conductivity, K (ft/d)	122.4
Specific yield, Sy	0.27
Initial saturated thickness, h_0 (ft)	14.7
Maximum allowable water-table rise, σ (ft)	0
Dip, i (ft/ft)	-0.0002
Slope rotation from x axis, γ (°)	-61

Recharge Sources

Property	Source 1	Source 2	Source 3
X coordinate at center, X (ft)	1138	1138	1714
Y coordinate at center, Y (ft)	1778	1071	-1005
Dimension along x* axis, L (ft)	225	225	145
Dimension along y* axis, W (ft)	600	450	700
Rotation from slope direction, ϕ (°)	61	61	61
Recharge rate, Q (ft³/d)	10694	8021	8021
Infiltration rate, q (ft/d)	0.07921481481	0.07921975309	0.07902463054

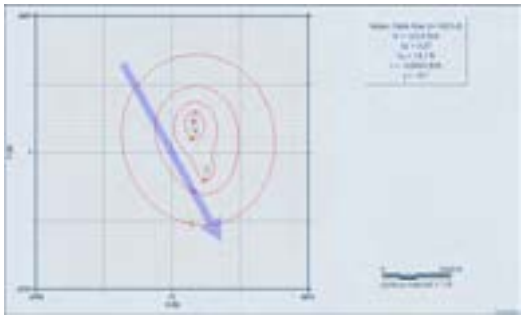


Map of recharge source.

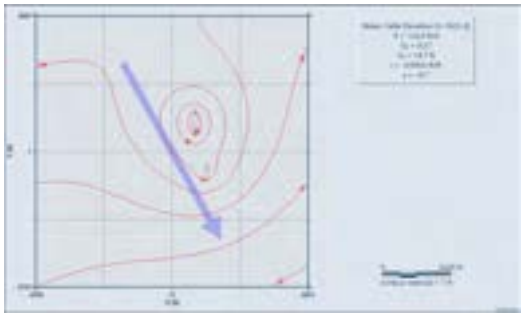
Monitoring Points

Elapsed Time, t = 1825 d

Name	x (ft)	y (ft)	s (ft)	h (ft)	z (ft)
Source 1	1138	1778	4.967	19.67	0
P4 Bridge	0	0	2.45	16.95	-0.2007



Contour plot of water-table rise.



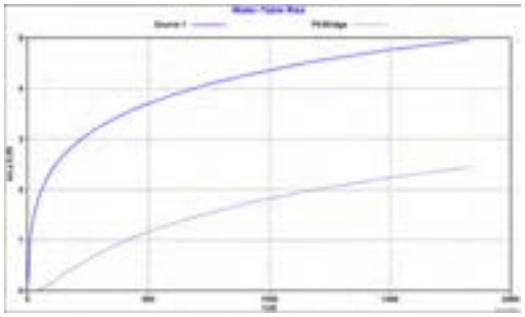
Contour plot of water-table elevation.

Time Series Data

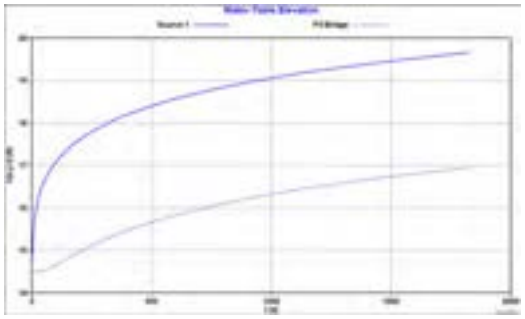
Time	Source 1		P4 Bridge	
(d)	s (ft)	h (ft)	s (ft)	h (ft)
0	0	14.7	0	14.5
0.002327	0.0006828	14.7	0	14.5
0.005236	0.001536	14.7	0	14.5

0.008873	0.002603	14.7	0	14.5
0.01342	0.003937	14.7	0	14.5
0.0191	0.005604	14.71	0	14.5
0.0262	0.007688	14.71	0	14.5
0.03508	0.01029	14.71	0	14.5
0.04618	0.01355	14.71	0	14.5
0.06005	0.01762	14.72	0	14.5
0.07739	0.0227	14.72	0	14.5
0.09906	0.02906	14.73	0	14.5
0.1262	0.03697	14.74	0	14.5
0.16	0.04681	14.75	0	14.5
0.2024	0.05895	14.76	0	14.5
0.2553	0.07382	14.77	0	14.5
0.3214	0.09187	14.79	0	14.5
0.4041	0.1135	14.81	0	14.5
0.5075	0.1393	14.84	0	14.5
0.6366	0.1697	14.87	0	14.5
0.7981	0.205	14.91	0	14.5
1	0.2458	14.95	0	14.5
5.245	0.7268	15.43	3.564E-9	14.5
10.55	1.023	15.72	1.159E-5	14.5
17.18	1.268	15.97	0.000374	14.5
25.48	1.49	16.19	0.002826	14.5
35.84	1.698	16.4	0.0111	14.51
48.79	1.897	16.6	0.0303	14.53
64.99	2.089	16.79	0.06565	14.56
85.23	2.278	16.98	0.1213	14.62
110.5	2.465	17.17	0.1998	14.7
142.2	2.653	17.35	0.3017	14.8
181.7	2.843	17.54	0.4265	14.93
231.1	3.037	17.74	0.5723	15.07
292.9	3.235	17.94	0.7368	15.24
370.1	3.438	18.14	0.9176	15.42
466.6	3.646	18.35	1.112	15.61
587.3	3.859	18.56	1.318	15.82

738.1	4.075	18.77	1.532	16.03
926.6	4.295	18.99	1.755	16.25
1162	4.517	19.22	1.982	16.48
1457	4.741	19.44	2.214	16.71
1825	4.967	19.67	2.45	16.95



Time-series plot of water-table rise.



Time-series plot of water-table elevation.

Profile Data

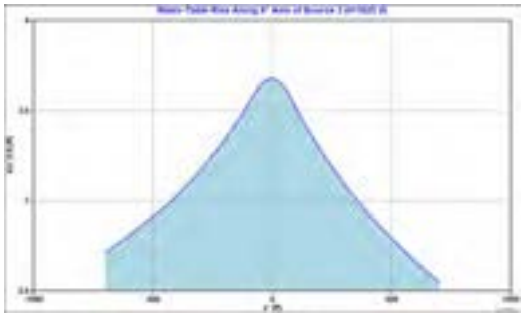
Profile Along X Axis for Source 3 at Elapsed Time, t = 1825 d*

x* (ft)	s (ft)	h (ft)	z (ft)
-700	2.713	16.94	-0.4748
-672	2.738	16.96	-0.4775
-644	2.765	16.98	-0.4802
-616	2.792	17.01	-0.4829
-588	2.819	17.03	-0.4856
-560	2.848	17.06	-0.4884
-532	2.878	17.09	-0.4911
-504	2.908	17.11	-0.4938
-476	2.94	17.14	-0.4965

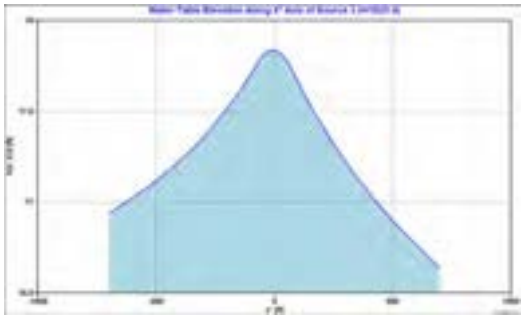
-448	2.973	17.17	-0.4992
-420	3.007	17.21	-0.5019
-392	3.043	17.24	-0.5047
-364	3.08	17.27	-0.5074
-336	3.119	17.31	-0.5101
-308	3.16	17.35	-0.5128
-280	3.203	17.39	-0.5155
-252	3.248	17.43	-0.5182
-224	3.295	17.47	-0.5209
-196	3.345	17.52	-0.5237
-168	3.398	17.57	-0.5264
-140	3.453	17.62	-0.5291
-112	3.512	17.68	-0.5318
-84	3.574	17.74	-0.5345
-56	3.634	17.8	-0.5372
-28	3.67	17.83	-0.5399
0	3.679	17.84	-0.5427
28	3.663	17.82	-0.5454
56	3.62	17.77	-0.5481
84	3.553	17.7	-0.5508
112	3.484	17.63	-0.5535
140	3.418	17.56	-0.5562
168	3.356	17.5	-0.559
196	3.296	17.43	-0.5617
224	3.239	17.37	-0.5644
252	3.185	17.32	-0.5671
280	3.133	17.26	-0.5698
308	3.083	17.21	-0.5725
336	3.035	17.16	-0.5752
364	2.99	17.11	-0.578
392	2.946	17.07	-0.5807
420	2.904	17.02	-0.5834
448	2.863	16.98	-0.5861
476	2.824	16.93	-0.5888
504	2.786	16.89	-0.5915

532	2.749	16.85	-0.5942
560	2.713	16.82	-0.597
588	2.678	16.78	-0.5997
616	2.645	16.74	-0.6024
644	2.612	16.71	-0.6051
672	2.58	16.67	-0.6078
700	2.549	16.64	-0.6105

The axes of Source 3 (x, y*) are rotated 0° from the axes of mapping coordinate system (x, y)*



Profile of water-table rise along x axis of Source 3.*



Profile of water-table elevation along x axis of Source 3.*

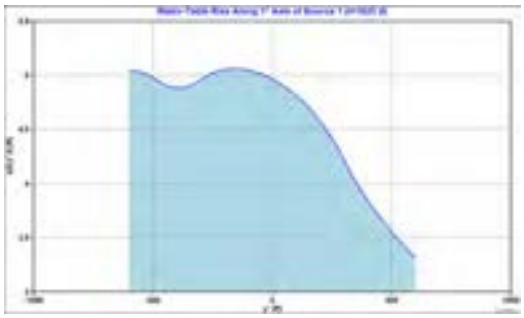
Profile Along Y Axis for Source 1 at Elapsed Time, t = 1825 d*

y* (ft)	s (ft)	h (ft)	z (ft)
-600	5.048	19.64	-0.105
-576	5.044	19.64	-0.1008
-552	5.033	19.64	-0.09656
-528	5.015	19.62	-0.09236
-504	4.989	19.6	-0.08816
-480	4.954	19.57	-0.08396
-456	4.921	19.54	-0.07977

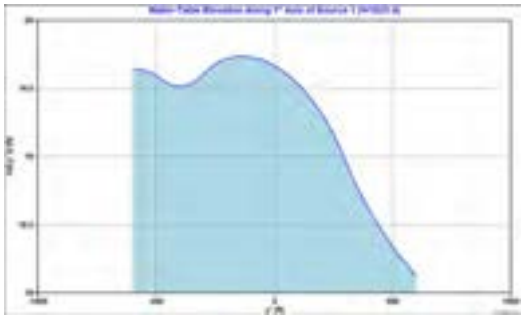
-432	4.899	19.52	-0.07557
-408	4.888	19.52	-0.07137
-384	4.886	19.52	-0.06717
-360	4.894	19.53	-0.06297
-336	4.913	19.55	-0.05877
-312	4.941	19.59	-0.05458
-288	4.979	19.63	-0.05038
-264	5.01	19.66	-0.04618
-240	5.033	19.69	-0.04198
-216	5.049	19.71	-0.03778
-192	5.059	19.73	-0.03359
-168	5.063	19.73	-0.02939
-144	5.062	19.74	-0.02519
-120	5.057	19.74	-0.02099
-96	5.047	19.73	-0.01679
-72	5.033	19.72	-0.01259
-48	5.015	19.71	-0.008396
-24	4.993	19.69	-0.004198
0	4.967	19.67	0
24	4.937	19.64	0.004198
48	4.903	19.61	0.008396
72	4.865	19.58	0.01259
96	4.823	19.54	0.01679
120	4.776	19.5	0.02099
144	4.723	19.45	0.02519
168	4.666	19.4	0.02939
192	4.602	19.34	0.03359
216	4.532	19.27	0.03778
240	4.455	19.2	0.04198
264	4.369	19.12	0.04618
288	4.273	19.02	0.05038
312	4.168	18.92	0.05458
336	4.07	18.83	0.05877
360	3.98	18.74	0.06297
384	3.895	18.66	0.06717

408	3.817	18.59	0.07137
432	3.743	18.52	0.07557
456	3.674	18.45	0.07977
480	3.607	18.39	0.08396
504	3.545	18.33	0.08816
528	3.484	18.28	0.09236
552	3.427	18.22	0.09656
576	3.372	18.17	0.1008
600	3.318	18.12	0.105

The axes of Source 1 (x, y*) are rotated 0° from the axes of mapping coordinate system (x, y)*



Profile of water-table rise along y axis of Source 1.*



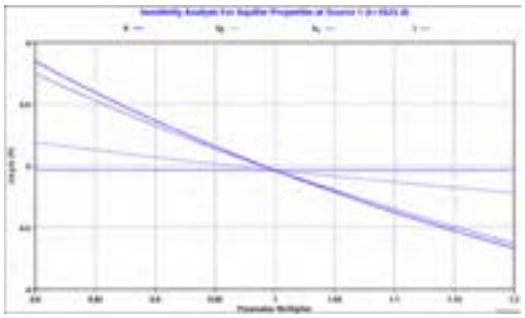
Profile of water-table elevation along y axis of Source 1.*

Sensitivity Data

Source 1, x=1138 ft, y=1778 ft

Parameter	**Water-Table Rise (ft)**			
Multiplier	**K**	**Sy**	**h_0**	**i**
0.8	5.849	5.193	5.751	4.97
0.82	5.745	5.168	5.662	4.97
0.84	5.645	5.143	5.575	4.97
0.86	5.549	5.119	5.491	4.969

0.88	5.457	5.096	5.409	4.969
0.9	5.368	5.073	5.33	4.969
0.92	5.282	5.051	5.253	4.968
0.94	5.199	5.03	5.179	4.968
0.96	5.119	5.008	5.106	4.968
0.98	5.042	4.988	5.036	4.968
1	4.967	4.967	4.967	4.967
1.02	4.895	4.947	4.901	4.967
1.04	4.825	4.928	4.836	4.967
1.06	4.757	4.909	4.773	4.966
1.08	4.691	4.89	4.712	4.966
1.1	4.628	4.871	4.652	4.966
1.12	4.566	4.853	4.594	4.965
1.14	4.506	4.836	4.537	4.965
1.16	4.447	4.818	4.482	4.965
1.18	4.391	4.801	4.428	4.965
1.2	4.336	4.784	4.375	4.964



Sensitivity plot for water-table rise.

Notation

h is water-table elevation above datum[1]
h_0 is aquifer saturated thickness prior to mounding
i is dip of aquifer
K is horizontal hydraulic conductivity
L is dimension of recharge source parallel to x^* axis
q is infiltration rate ($= Q / L \cdot W$)
Q is recharge rate
s is water-table rise above static water table
Sy is specific yield
t is time since start of recharge

t_0 is time when recharge stops
W is dimension of recharge source parallel to y^* axis
x, y are mapping Cartesian coordinate axes
x^*, y^* are recharge source Cartesian coordinate axes
z is elevation above datum[1]
γ is angle between x axis and dip direction
ϕ is angle between dip direction and x^* axis of recharge source
σ is maximum acceptable water-table rise

[1]*Elevation datum is the base of aquifer beneath the center of primary recharge source*

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Attachment K

Phosphorous Breakthrough Analyses

Appendix J

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME: LCWSD RIB
COUNTY: Flathead
LOT #:
NOTES: RI Basin Area Two - Phosphorous Breakthrough to Pond 4

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	450.0	ft
L	Length of Primary Drainfield's Long Axis	450.0	ft
W	Width of Primary Drainfield's Short Axis	112.5	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	4.0	ft
D	Distance from Drainfield to Surface Water	1160.0	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils, 1.0 ft for fine soils)**	1.0	ft
~~Ne~~			
Sw	Soil Weight (usually constant)	100.0	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200.0	ppm
#I	Volume of Contributing Discharge	30,000.0	gpd
	Phosphorous Concentration in Discharge	2.00	mg/L
CONSTANTS			
PI	Phosphorous Load (1/2-RI Basin Area 2)	183.00	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (PI)(#I)	183.00	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	20250000.0	lbs
Da	Dispersion Angle	5.0	degrees
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	63974000.0	lbs
P	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	16844.8	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	92.0	years

BY: B. Bennett
DATE: February 13, 2024

NOTES:

** Depth to limiting layer is typically based on depth to a limiting layer (such as clay, bedrock or water) in a test pit or bottom of a dry test pit minus two feet to account for burial depth of standard drainfield laterals.*

*** Material type is usually based on test pit. A soil that can be described as loam (e.g. gravelly loam, sandy loam, etc.) or finer according to the USDA soil texture classification system is considered a "fine" soil.*

REV. 12/2007

Appendix J

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME: LCWSD RIB
COUNTY: Flathead
LOT #:
NOTES: RI Basin Area One - Phosphorous Breakthrough to Wiley Slough

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	225.0	ft
L	Length of Primary Drainfield's Long Axis	300.0	ft
W	Width of Primary Drainfield's Short Axis	225.0	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	4.0	ft
D	Distance from Drainfield to Surface Water	1335.0	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils, 1.0 ft for fine soils)**	1.0	ft
~~Nc~~			
Sw	Soil Weight (usually constant)	100.0	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200.0	ppm
#I	Volume of Contributing Discharge	40,000.0	gpd
	Phosphorous Concentration in Discharge	2.00	mg/L
CONSTANTS			
Pl	Phosphorous Load (1/2-RI Basin Area 2)	244.00	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (Pl)(#I)	244.00	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	27000000.0	lbs
Da	Dispersion Angle	12.5	degrees
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.21875)(D)(D)] (T)(Sw)	69023671.9	lbs
P	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	19204.7	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	78.7	years

BY: B. Bennett
DATE: February 13, 2024

NOTES:

** Depth to limiting layer is typically based on depth to a limiting layer (such as clay, bedrock or water) in a test pit or bottom of a dry test pit minus two feet to account for burial depth of standard drainfield laterals.*

*** Material type is usually based on test pit. A soil that can be described as loam (e.g. gravelly loam, sandy loam, etc.) or finer according to the USDA soil texture classification system is considered a "fine" soil.*

REV. 12/2007

Appendix J

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

PHOSPHOROUS BREAKTHROUGH ANALYSIS

SITE NAME: LCWSD RIB
COUNTY: Flathead
LOT #:
NOTES: RI Basin Area Three - Phosphorous Breakthrough to Pond 7

VARIABLES	DESCRIPTION	VALUE	UNITS
Lg	Length of Primary Drainfield as Measured Perpendicular to Ground Water Flow	700.0	ft
L	Length of Primary Drainfield's Long Axis	700.0	ft
W	Width of Primary Drainfield's Short Axis	145.0	ft
B	Depth to Limiting Layer from Bottom of Drainfield Laterals*	4.0	ft
D	Distance from Drainfield to Surface Water	2540.0	ft
T	Phosphorous Mixing Depth in Ground Water (0.5 ft for coarse soils, 1.0 ft for fine soils)**	1.0	ft
~~Ne~~			
Sw	Soil Weight (usually constant)	100.0	lb/ft3
Pa	Phosphorous Adsorption Capacity of Soil (usually constant)	200.0	ppm
#I	Volume of Contributing Discharge	30,000.0	gpd
	Phosphorous Concentration in Discharge	2.00	mg/L
CONSTANTS			
Pl	Phosphorous Load (1/2-RI Basin Area 2)	183.00	lbs/yr
X	Conversion Factor for ppm to percentage (constant)	1.0E+06	
EQUATIONS			
Pt	Total Phosphorous Load = (Pl)(#I)	183.00	lbs/yr
W1	Soil Weight under Drainfield = (L)(W)(B)(Sw)	40600000.0	lbs
Da	Dispersion Angle	5.0	degrees
W2	Soil Weight from Drainfield to Surface Water = [(Lg)(D) + (0.0875)(D)(D)] (T)(Sw)	234251500.0	lbs
P	Total Phosphorous Adsorption by Soils = (W1 + W2)[(Pa)/(X)]	54970.3	lbs
SOLUTION			
BT	**Breakthrough Time to Surface Water = P / Pt**	300.4	years

BY: B. Bennett
DATE: February 13, 2024

NOTES: ** Depth to limiting layer is typically based on depth to a limiting layer (such as clay, bedrock or water) in a test pit or bottom of a dry test pit minus two feet to account for burial depth of standard drainfield laterals.*
*** Material type is usually based on test pit. A soil that can be described as loam (e.g. gravelly loam, sandy loam, etc.) or finer according to the USDA soil texture classification system is considered a "fine" soil.*

REV. 12/2007

Appendix D: Effluent Disposal Cost Estimates

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - IP Cell System
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 121,000.00	$ 121,000.00
12" Storage Pond Piping	1200	FT	$ 120.00	$ 144,000.00
Pond Piping Modification	1	LS	$ 20,000.00	$ 20,000.00
Storage Pond Piping Tie in	1	LS	$ 20,000.00	$ 20,000.00
Buried 12" Gate Valves to Storage Ponds	3	EA	$ 10,000.00	$ 30,000.00
Ip Cell Building #1 Excavation	19.55556	CUYD	$ 40.00	$ 782.22
Structural Fill Building #1	18.96296	CUYD	$ 75.00	$ 1,422.22
Backfill Building #1	13.03704	CUYD	$ 50.00	$ 651.85
Footing Building #1	4.740741	CUYD	$ 2,100.00	$ 9,955.56
Stem Wall Building #1	9.481481	CUYD	$ 2,100.00	$ 19,911.11
Floor Building Number #1	6.257778	CUYD	$ 2,100.00	$ 13,141.33
Structure Building #1	256	SQFT	$ 250.00	$ 64,000.00
HVAC #1	1	LS	$ 10,000.00	$ 10,000.00
Electrical Building #1	1	LS	$ 75,000.00	$ 75,000.00
Building #1 Piping and Valves	1	LS	$ 50,000.00	$ 50,000.00
Building #2 Mag Meters	1	EA	$ 10,000.00	$ 10,000.00
Ip Cell Building #2 Excavation	19.55556	CUYD	$ 40.00	$ 782.22
Structural Fill Building #2	18.96296	CUYD	$ 75.00	$ 1,422.22
Backfill Building #2	13.03704	CUYD	$ 50.00	$ 651.85
Footing Building #2	4.740741	CUYD	$ 2,100.00	$ 9,955.56
Stem Wall Building #2	9.481481	CUYD	$ 2,100.00	$ 19,911.11
Floor Building Number #2	6.257778	CUYD	$ 2,100.00	$ 13,141.33
Structure Building #2	256	SQFT	$ 300.00	$ 76,800.00
HVAC #2	1	LS	$ 10,000.00	$ 10,000.00
Electrical Building #2	1	LS	$ 75,000.00	$ 75,000.00
Building #2 Piping and Valves	1	LS	$ 85,000.00	$ 85,000.00
Building #2 Mag Meters	2	EA	$ 10,000.00	$ 20,000.00
6 " IP Cell Piping	5000	LF	$ 80.00	$ 400,000.00
IPBasin #1 Grading	27347	CUYD	$ 10.00	$ 273,472.22
IP Basin #1 Gravel	2500	CUYD	$ 45.00	$ 112,500.00
IPBasin #2 Grading	16228	CUYD	$ 10.00	$ 162,284.44
IP Basin #2 Gravel	1875	CUYD	$ 45.00	$ 84,375.00
IPBasin #3 Grading	26032	CUYD	$ 10.00	$ 260,315.56
IP Basin #3 Gravel	1880	CUYD	$ 45.00	$ 84,583.33
Seeding/Surface Restoration	24.34573	ACRES	$ 5,000.00	$ 121,728.65
IP Cells Distribution Structure	9	EA	$ 15,000.00	$ 135,000.00
Fencing	6000	FT	$ 15.00	$ 90,000.00
Construction Subtotal Cost - 2025				$ 2,626,800.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$2,896,100.00
Total Estimated Project Cost				**$ 2,896,100.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	250	HRS	$ 45.00	$ 11,250.00
Power	16330.83	KWH	$ 0.10	$ 1,633.08
Total Annual Cost				**$ 12,883.08**

PRESENT WORTH ANALYSIS

DESCRIPTON	TOTAL
Capital Cost	$ 2,896,100.00
Annual O&M	$ 12,883.08
Salvage Value in 20 years (estimate)	$ 326,400.00
Interest Rate	3.0%
Number of payments	20
TOTAL PRESENT WORTH	**$2,907,000.00**

Appendix E: Secondary Treatment Cost Estimates

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Oxidation Ditch
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 886,000.00	$ 886,000.00
Oxidation Ditch				
Ditch Excavation	12,115	CY	$ 35.00	$ 424,033.75
Structural Fill	790	CY	$ 50.00	$ 39,500.00
Ground Improvements - Oxidation Ditch	28,445	SQFT	$ 85.00	$ 2,417,782.50
Backfill - Oxidation Ditch	1,191	CY	$ 30.00	$ 35,726.67
Concrete Vertical - Ditch	1,942	CY	$ 1,600.00	$ 3,107,127.30
Concrete Mat Slab - Ditch	1,428	CY	$ 1,600.00	$ 2,285,555.56
Concrete Platform - Ditch	526	CY	$ 2,000.00	$ 1,052,694.66
Influent Structure & Flow Isolation	1	LS	$ 50,000.00	$ 50,000.00
Ditch Equipment	1	LS	$ 2,500,000.00	$ 2,500,000.00
Ditch Effluent Diversion Structure	1	LS	$ 20,000.00	$ 20,000.00
Platform Grating	120	SQFT	$ 120.00	$ 14,400.00
Stairs	1	LS	$ 60,000.00	$ 60,000.00
Safety Railing	1,400	LF	$ 85.00	$ 119,000.00
Aluminium Weir Gates	2	EA	$ 15,000.00	$ 30,000.00
Electrical and Controls	1	LS	$ 875,000.00	$ 875,000.00
Secondary Clarifiers				
Clarifier Excavation	10,337	CY	$ 15.00	$ 155,049.81
Ground Improvements - Clarifiers	12,723	SQFT	$ 85.00	$ 1,081,493.27
Backfill - Clarifiers	1,619	CY	$ 25.00	$ 40,468.37
Concrete Mat Slab - Clarifiers	707	CY	$ 1,600.00	$ 1,130,973.36
Concrete Vertical - Clarifiers	550	CY	$ 1,800.00	$ 990,416.17
Dewatering	1	LS	$ 100,000.00	$ 100,000.00
Clarifier Equipment	1	LS	$ 1,187,500.00	$ 1,187,500.00
RAS/WAS Pump Station				
Solids Handling Building - Structural	288	SQFT	$ 175.00	$ 50,400.00
Solids Handling Building - Excavation	92	CY	$ 25.00	$ 2,311.11
Solids Handling Building - Backfill	90	CY	$ 35.00	$ 3,152.59
Solids Handling Building - Concrete Foundation and Floor Slab	22	CY	$ 1,600.00	$ 34,653.50
Ground Improvemements - Solids Handling Building	288	SQFT	$ 85.00	$ 24,480.00
Sludge Pumps	1	LS	$ 115,000.00	$ 115,000.00
Sludge Pump Installation	1	LS	$ 35,000.00	$ 35,000.00
Sludge Magnetic Flow Meter	1	EA	$ 10,000.00	$ 10,000.00
Construction Subtotal Cost - 2025				$ 18,602,700.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$20,509,500.00
Total Estimated Project Cost				**$ 20,509,500.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	2080	HRS	$ 45.00	$ 93,600.00
Chemicals	1	LS	$ 10,000.00	$ 10,000.00
Power	637875.75	KWH	$ 0.10	$ 63,787.58
Materials	1	LS	$ 10,200.00	$ 10,200.00
Total Annual Cost				**$ 177,587.58**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 20,509,500.00
Annual O&M		$ 177,587.58
Salvage Value in 20 years (estimate)		$ 6,756,813.10
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$19,410,500.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Process Building
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 242,000.00	$ 242,000.00
Process Building - Excavation	431	CY	$ 25.00	$ 10,765.43
Process Building - Ground Improvements	7,200	SQFT	$ 85.00	$ 612,000.00
Process Building - Backfill	450	CY	$ 30.00	$ 13,487.41
Prcoess Building - Structural Fill	834	CY	$ 50.00	$ 41,682.10
Solids Handling Building - Structural Exterior Walls	7,200	SQFT	$ 175.00	$ 1,260,000.00
Process Building Building - Concrete Foundation and Floor Slab	287	CY	$ 1,600.00	$ 459,621.40
Interior Walls and Roof Package	7200	SQFT	$ 185.00	$ 1,332,000.00
Effluent Pump Station Wet Well (12'W x 16'L x 12'D)	23	CY	$ 2,250.00	$ 52,222.22
Effluent Pump Station	1	LS	$ 250,000.00	$ 250,000
Handrailing	1	LS	$ 25,000.00	$ 25,000.00
Stairs	1	LS	$ 60,000.00	$ 60,000.00
Alum Tank	1	LS	$ 15,000.00	$ 15,000.00
Alum Chem Feed Pumps	1	LS	$ 30,000.00	$ 30,000.00
Chem Feed Piping	1	LS	$ 15,000.00	$ 15,000.00
Influent Piping	1	LS	$ 60,000.00	$ 60,000.00
HVAC System	1	LS	$ 250,000.00	$ 250,000.00
Bathroom	1	LS	$ 35,000.00	$ 35,000.00
Potable Water System	1	LS	$ 40,000.00	$ 40,000.00
NPW System	1	LS	$ 50,000.00	$ 50,000.00
Floor Drain System	1	LS	$ 50,000.00	$ 50,000.00
Monorail Beams & Hoist/Trolleys	1	LS	$ 50,000.00	$ 50,000
Painting	1	LS	$ 75,000.00	$ 75,000.00
Electrical & Controls	1	LS	$ 50,000.00	$ 50,000.00
Construction Subtotal Cost - 2025				$ 5,078,800.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$5,599,400.00
Total Estimated Project Cost				**$ 5,599,400.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	800	HRS	$ 45.00	$ 36,000.00
Power	261293.3	KWH	$ 0.10	$ 26,129.33
Materials	1	LS	$ 4,300.00	$ 4,300.00
Total Annual Cost				**$ 66,429.33**

PRESENT WORTH ANALYSIS

DESCRIPTON	TOTAL
Capital Cost	$ 5,599,400.00
Annual O&M	$ 66,429.33
Salvage Value in 20 years (estimate)	$ 2,305,515.43
Interest Rate	3.0%
Number of payments	20
TOTAL PRESENT WORTH	**$5,311,200.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Site Process Piping
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$	27,000.00	$	27,000.00
Influent Piping - 16"	300	FT	$	200.00	$	60,000.00
Ditch Effluent - 12"	60	FT	$	180.00	$	10,800.00
Clarifier Effluent- 12"	135	FT	$	180.00	$	24,300.00
Secondary Effluent Pump Station (to Larkin Ave) - 8/10"	565	FT	$	150.00	$	84,750.00
WAS - 6"	365	FT	$	120.00	$	43,800.00
RAS - 4"	475	FT	$	100.00	$	47,500.00
NPW - 4"	450	FT	$	80.00	$	36,000.00
Sludge Piping (to Dewatering Process) - 6/8"	180	FT	$	120.00	$	21,600.00
Septage Piping - 6" Forcemain	370	FT	$	120.00	$	44,400.00
Biofilter Piping	500	FT	$	160.00	$	80,000.00
Potable Water Well	1	LA	$	80,000.00	$	80,000.00
Construction Subtotal Cost - 2025					$	560,200.00
Number of Years Until Construction						2
Inflation Rate						5.0%
Construction Subtotal Cost - 2025						$617,700.00
Total Estimated Project Cost					**$**	**617,700.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Materials	1	LS	$	500.00	$	500.00
Total Annual Cost					**$**	**500.00**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost	$	617,700.00
Annual O&M	$	500.00
Salvage Value in 20 years (estimate)	$	223,890.00
Interest Rate		3.0%
Number of payments		20
TOTAL PRESENT WORTH		**$501,200.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Septage EQ Basin
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 64,000.00	$ 64,000.00
Excavation -Septage EQ Basin	605	CY	$ 35.00	$ 21,177.59
Structural Fill - Septage EQ Basin	81	CY	$ 50.00	$ 4,050.00
Ground Improvements - Septage EQ Basin	961	SQFT	$ 85.00	$ 81,685.00
Backfill - SeptageEQ Basin	468	CY	$ 30.00	$ 14,053.33
Concrete - Vertical	170	CY	$ 1,600.00	$ 272,592.59
Concrete - Mat Slab	54	CY	$ 1,650.00	$ 89,100.00
Concrete - Platform	18	CY	$ 3,000.00	$ 54,000.00
Handrailing	1	LS	$ 25,000.00	$ 25,000.00
Stairs	1	LS	$ 60,000.00	$ 60,000.00
Cover	625	LS	$ 150.00	$ 93,750.00
Septage Storage Aeration Equipment	1	LS	$ 150,000.00	$ 150,000.00
Septage Storage Aeration Equipment Installation	1	LS	$ 75,000.00	$ 75,000.00
Septage Pump Station	1	LS	$ 150,000.00	$ 150,000.00
Septage Pump Station - HVAC	1	LS	$ 50,000.00	$ 50,000.00
Septage EQ Basin Mixer	1	LS	$ 25,000.00	$ 25,000.00
Electrical	1	LS	$ 100,000.00	$ 100,000.00

Construction Subtotal Cost - 2025	$ 1,329,400.00
Number of Years Until Construction	2
Inflation Rate	5.0%
Construction Subtotal Cost - 2025	$1,465,700.00
Total Estimated Project Cost	**$ 1,465,700.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	250	HRS	$ 45.00	$ 11,250.00
Power	250406.1	KWH	$ 0.10	$ 25,040.61
Materials	1	LS	$ 2,200.00	$ 2,200.00
Total Annual Cost				**$ 38,490.61**

PRESENT WORTH ANALYSIS

DESCRIPTON	TOTAL
Capital Cost	$ 1,465,700.00
Annual O&M	$ 38,490.61
Salvage Value in 20 years (estimate)	$ 416,538.56
Interest Rate	3.0%
Number of payments	20
TOTAL PRESENT WORTH	**$1,807,700.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Sitework
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$	22,000.00	$	22,000.00
Concrete Surfacing	40	CY	$	2,000.00	$	80,000.00
Site Grading	5000	CY	$	20.00	$	100,000.00
Gravel Subgrade	844	CY	$	50.00	$	42,222.22
Access Road IP Cell Building	711	CY	$	50.00	$	35,555.56
Access Gate	1	LS	$	25,000.00	$	25,000.00
Chain link Fencing	2200	LS	$	50.00	$	110,000.00
Surface Restoration	3	AC	$	5,000.00	$	15,000.00
Irrigation System	1	LS	$	25,000.00	$	25,000.00
Landscaping	1	LS	$	75,000.00	$	75,000.00
Construction Subtotal Cost - 2025					$	529,800.00
Number of Years Until Construction						2
Inflation Rate						5.0%
Construction Subtotal Cost - 2027						$584,200.00
Total Estimated Project Cost					**$**	**584,200.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Materials	1	LS	$	5,100.00	$	5,100.00
Total Annual Cost					**$**	**5,100.00**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 584,200.00
Annual O&M		$ 5,100.00
Salvage Value in 20 years (estimate)		$ 66,000.00
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$623,500.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - SBR
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$	460,000.00	$	460,000.00
SBR Basin Excavation	11654	CY	$	25.00	$	291,345.37
Structural Fill	1887	CY	$	50.00	$	94,361.11
Ground Improvements	18509	SFT	$	85.00	$	1,573,265.00
Backfill	1959	CY	$	30.00	$	58,782.22
Concrete Vertical	1162	CY	$	1,600.00	$	1,859,081.48
Concrete Mat Slab	1258	CY	$	1,650.00	$	2,075,944.44
Concrete walkway	17	CY	$	2,000.00	$	33,645.33
Handrailing	1	LS	$	75,000.00	$	75,000.00
Stairs	1	LS	$	60,000.00	$	60,000.00
SBR Equipment	1	LS	$	1,806,780.00	$	1,806,780.00
SBR Equipment Installation	1	LS	$	900,000.00	$	900,000.00
Basin NPW System	1	LS	$	10,000.00	$	10,000.00
Scum Piping and Telescoping Valves	1	LS	$	250,000.00	$	250,000.00
Electrical	1	LS	$	100,000.00	$	100,000.00
Construction Subtotal Cost - 2025					$	9,648,200.00
Number of Years Until Construction						2
Inflation Rate						5.0%
Construction Subtotal Cost - 2027						$10,637,200.00
Total Estimated Construction Cost					**$**	**10,637,200.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Labor	2139	HRS	$	45.00	$	96,255.00
Chemicals	1	LS	$	10,000.00	$	10,000.00
Power	738793.14	KWH	$	0.10	$	73,879.31
Materials	1	LS	$	12,500.00	$	12,500.00
Total Annual Cost					**$**	**192,634.31**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost	$	10,637,200.00
Annual O&M	$	192,634.31
Salvage Value in 20 years (estimate)	$	3,498,047.76
Interest Rate		3.0%
Number of payments		20
TOTAL PRESENT WORTH		**$11,566,300.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - PROCESS BUILDING
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 247,000.00	$ 247,000.00
Excavation	2068	CY	$ 25.00	$ 51,688.89
Shoring	1	LS	$ 100,000.00	$ 100,000.00
Structural Fill	795	CY	$ 50.00	$ 39,733.33
Ground Improvements	7152	SFT	$ 85.00	$ 607,920.00
Backfill	560	CY	$ 25.00	$ 13,992.59
Footing	14	CY	$ 1,600.00	$ 22,637.04
Stem Walls	28	CY	$ 1,600.00	$ 45,274.07
Basement/Wet Well Slab	64	CY	$ 1,650.00	$ 105,600.00
Basement/Wet Well Walls	165	CY	$ 1,650.00	$ 272,250.00
Main Area Slab	98	CY	$ 1,650.00	$ 162,311.11
Suspended Slab	128	CY	$ 1,650.00	$ 211,200.00
Exterior Walls	3920	SFT	$ 165.00	$ 646,800.00
Handrailing	1	LS	$ 25,000.00	$ 25,000.00
Stairs	1	LS	$ 35,000.00	$ 35,000.00
Interior Walls	3760	SQFT	$ 125.00	$ 470,000.00
Roof System	7152	SQFT	$ 60.00	$ 429,120.00
Alum Tank	1	LS	$ 15,000.00	$ 15,000.00
Alum Chem Feed Pumps	1	LS	$ 30,000.00	$ 30,000.00
Chem Feed Piping	1	LS	$ 15,000.00	$ 15,000.00
Influent Piping	1	LS	$ 100,000.00	$ 100,000.00
Secondary Pump Station Pumps and Controls	6	EA	$ 30,000.00	$ 180,000.00
Secondary Pump Station Piping and Valving	1	LS	$ 150,000.00	$ 150,000.00
Automatic Sampler	1	LS	$ 10,000.00	$ 10,000.00
WAS Piping	1	LS	$ 60,000.00	$ 60,000.00
Aeration Piping	1	LS	$ 150,000.00	$ 150,000.00
HVAC System	1	LS	$ 250,000.00	$ 250,000.00
Bathroom	1	LS	$ 35,000.00	$ 35,000.00
Potable Water System	1	LS	$ 40,000.00	$ 40,000.00
NPW System	1	LS	$ 50,000.00	$ 50,000.00
Floor Drain System	1	LS	$ 50,000.00	$ 50,000.00
Basement Sump Pumps	1	LS	$ 25,000.00	$ 25,000.00
Painting	1	LS	$ 75,000.00	$ 75,000.00
Electrical	1	LS	$ 447,352.70	$ 447,352.70
Construction Subtotal Cost - 2025				$ 5,167,900.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$5,697,700.00
Total Estimated Project Cost				**$ 5,697,700.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	1000	HRS	$ 45.00	$ 45,000.00
Power	261293.3	KWH	$ 0.10	$ 26,129.33
Materials	1	LS	$ 6,800.00	$ 6,800.00
Total Annual Cost				**$ 77,929.33**

PRESENT WORTH ANALYSIS

DESCRIPTON	TOTAL
Capital Cost	$ 5,697,700.00
Annual O&M	$ 77,929.33
Salvage Value in 20 years (estimate)	$ 1,852,100.00
Interest Rate	3.0%
Number of payments	20
TOTAL PRESENT WORTH	**$5,831,600.00**

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Site Process Piping
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 19,000.00	$ 19,000.00
16" Influent Piping	300	LF	$ 200.00	$ 60,000.00
6" Septage Forcemain Piping	250	LF	$ 80.00	$ 20,000.00
4" Septage Forcemain Piping	100	LF	$ 80.00	$ 8,000.00
4" NPW Piping	600	LF	$ 80.00	$ 48,000.00
8" NPW Piping	150	LS	$ 100.00	$ 15,000.00
8" Gravity SS	400	LF	$ 100.00	$ 40,000.00
8" SSMH	4	EA	$ 8,000.00	$ 32,000.00
4" WAS Piping	200	LF	$ 80.00	$ 16,000.00
4" Plug Valves	4	EA	$ 5,000.00	$ 20,000.00
6" Plug Valves	1	EA	$ 6,500.00	$ 6,500.00
4" Gate Valves	3	EA	$ 4,000.00	$ 12,000.00
8" Gate Valves	1	EA	$ 6,000.00	$ 6,000.00
Potable Water Well	1	EA	$ 100,000.00	$ 100,000.00
1" Potable Water Piping	1000	LF	$ 50.00	$ 50,000.00
Construction Subtotal Cost - 2025				$ 452,500.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$498,900.00
Total Estimated Project Cost				**$ 498,900.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Materials	1	LS	$ 500.00	$ 500.00
Total Annual Cost				**$ 500.00**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 498,900.00
Annual O&M		$ 500.00
Salvage Value in 20 years (estimate)		$ 173,400.00
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$410,300.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - SEPTAGE EQ BASIN
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 58,000.00	$ 58,000.00
Basin Excavation	333	CY	$ 25.00	$ 8,326.85
Structural Fill	100	CY	$ 50.00	$ 4,994.44
Ground Improvements	899	SFT	$ 85.00	$ 76,415.00
Backfill	348	CY	$ 30.00	$ 10,426.67
Concrete Vertical	128	CY	$ 1,600.00	$ 204,444.44
Concrete Mat Slab	67	CY	$ 1,650.00	$ 109,877.78
Concrete walkway	2	CY	$ 3,000.00	$ 5,550.00
Handrailing	1	LS	$ 25,000.00	$ 25,000.00
Stairs	1	LS	$ 60,000.00	$ 60,000.00
Cover	625	SFT	$ 150.00	$ 93,750.00
Septage Aeration Equipment	1	LS	$ 150,000.00	$ 150,000.00
Septage Aeration Equipment Installation	1	LS	$ 75,000.00	$ 75,000.00
Septage Pump Station	1	LS	$ 150,000.00	$ 150,000.00
Septage HVAC	1	LS	50,000	$ 50,000.00
Basin NPW System	1	LS	$ 5,000.00	$ 5,000.00
Septage Basin Mixer	1	LS	$ 25,000.00	$ 25,000.00
Electrical	1	LS	$ 100,000.00	$ 100,000.00
Construction Subtotal Cost - 2025				$ 1,211,800.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$1,336,100.00
Total Estimated Project Cost				**$ 1,336,100.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	250	HRS	$ 45.00	$ 11,250.00
Power	250406.06	KWH	$ 0.10	$ 25,040.61
Materials	1	LS	$ 2,300.00	$ 2,300.00
Total Annual Cost				**$ 38,590.61**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 1,336,100.00
Annual O&M		$ 38,590.61
Salvage Value in 20 years (estimate)		$ 354,300.00
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$1,714,100.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Sitework
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 22,000.00	$ 22,000.00
Concrete Surfacing	40	CUYD	$ 2,000.00	$ 80,000.00
Site Grading	5000	CUYD	$ 20.00	$ 100,000.00
Gravel Subgrade	844.4444	CUYD	$ 50.00	$ 42,222.22
Access Road IP Cell Building	711.1111	CUYD	$ 50.00	$ 35,555.56
Access Gate	1	LS	$ 25,000.00	$ 25,000.00
Chain link Fencing	2200	LS	$ 50.00	$ 110,000.00
Surface Restoration	3	ac	$ 5,000.00	$ 15,000.00
Irrigation System	1	LS	$ 25,000.00	$ 25,000.00
Landscaping	1	LS	$ 75,000.00	$ 75,000.00
Construction Subtotal Cost - 2025				$ 529,800.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$584,200.00
Total Estimated Project Cost				**$ 584,200.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Materials	1	LS	$ 5,100.00	$ 5,100.00
Total Annual Cost				**$ 5,100.00**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 584,200.00
Annual O&M		$ 5,100.00
Salvage Value in 20 years (estimate)		$ 66,000.00
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$623,500.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - MBR
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 663,000.00	$ 663,000.00
MBR Basin Excavation	6533	CY	$ 25.00	$ 163,333.33
Structural Fill	1540	CY	$ 50.00	$ 77,000.00
Ground Improvements	14700	SFT	$ 85.00	$ 1,249,500.00
Backfill	1244	CY	$ 30.00	$ 37,333.33
Concrete Vertical	1304	CY	$ 1,600.00	$ 2,085,925.93
Concrete Mat Slab	1027	CY	$ 1,600.00	$ 1,642,666.67
Concrete walkway	22	CY	$ 2,000.00	$ 43,413.33
Cover	11780	SQFT	$ 140.00	$ 1,649,200.00
Stairs	1	LS	$ 60,000.00	$ 60,000.00
MBR Equipment	1	LS	$ 3,326,670.00	$ 3,326,670.00
MBR Equipment Installation	1	LS	$ 2,495,002.50	$ 2,495,002.50
Basin NPW System	1	LS	$ 10,000.00	$ 10,000.00
Scum Piping and Telescoping Valves	1	LS	$ 250,000.00	$ 250,000.00
Electrical	1	LS	$ 150,000.00	$ 150,000.00
Construction Subtotal Cost - 2025				$ 13,903,000.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$15,328,100.00
Total Estimated Project Cost				**$ 15,328,100.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	3200	HRS	$ 45.00	$ 144,000.00
Chemicals	1	LS	$ 20,000.00	$ 20,000.00
Power	1116355.1	KWH	$ 0.10	$ 111,635.51
Materials	1	LS	$ 79,900.00	$ 79,900.00
Total Annual Cost				**$ 355,535.51**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 15,328,100.00
Annual O&M		$ 355,535.51
Salvage Value in 20 years (estimate)		$ 3,081,503.56
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$18,911,400.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - PROCESS BUILDING
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 364,000.00	$ 364,000.00
Excavation	2382	CY	$ 35.00	$ 83,377.78
Structural Fill	1195	CY	$ 50.00	$ 59,733.33
Ground Improvements	10752	SFT	$ 110.00	$ 1,182,720.00
Backfill	284	CY	$ 30.00	$ 8,533.33
Footing	19.25926	CY	$ 1,600.00	$ 30,814.81
Stem Walls	38.51852	CY	$ 1,600.00	$ 61,629.63
Basement/Wet Well Slab	71.11111	CY	$ 1,650.00	$ 117,333.33
Basement Walls	130	CY	$ 1,650.00	$ 214,500.00
Main Area Slab	194	CY	$ 1,650.00	$ 320,711.11
Suspended Slab	142	CY	$ 1,650.00	$ 234,666.67
Exterior Walls	5120	SFT	$ 165.00	$ 844,800.00
Dewatering	1	LS	$ 100,000.00	$ 100,000.00
Handrailing	1	LS	$ 25,000.00	$ 25,000.00
Stairs	1	LS	$ 35,000.00	$ 35,000.00
Interior Walls and Roof Package	10752	SFT	$ 185.00	$ 1,989,120.00
Alum Tank	1	LS	$ 15,000.00	$ 15,000.00
Alum Chem Feed Pumps	1	LS	$ 30,000.00	$ 30,000.00
Chem Feed Piping	1	LS	$ 15,000.00	$ 15,000.00
Ras Recycle Piping	1	LS	$ 100,000.00	$ 100,000.00
Pre Aeration Cycle	1	LS	$ 120,000.00	$ 120,000.00
Permeate Piping Pumps and Controls	1	LS	$ 400,000.00	$ 400,000.00
WAS Piping	1	LS	60,000	$ 60,000.00
Aeration Piping	1	LS	$ 150,000.00	$ 150,000.00
HVAC System	1	LS	$ 25,000.00	$ 25,000.00
Lab	1	LS	$ 75,000.00	$ 75,000.00
Office	1	LS	$ 50,000.00	$ 50,000.00
Bathroom	1	LS	$ 15,000.00	$ 15,000.00
Potable Water System	1	LS	$ 40,000.00	$ 40,000.00
NPW System	1	LS	$ 50,000.00	$ 50,000.00
Floor Drain System	1	LS	$ 50,000.00	$ 50,000.00
Basement Sump Pumps	1	LS	$ 25,000.00	$ 25,000.00
Painting	1	LS	$ 75,000.00	$ 75,000.00
Electrical	1	LS	$ 660,294.00	$ 660,294.00
Construction Subtotal Cost - 2025				$ 7,627,200.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$8,409,000.00
Total Estimated Project Cost				**$ 8,409,000.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	500	HRS	$ 45.00	$ 22,500.00
Power	261293.3	KWH	$ 0.10	$ 26,129.33
Materials	1	LS	$ 7,900.00	$ 7,900.00
Total Annual Cost				**$ 56,529.33**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 8,409,000.00
Annual O&M		$ 56,529.33
Salvage Value in 20 years (estimate)		$ 3,134,737.33
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$7,514,400.00**

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Site Process Piping
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 26,000.00	$ 26,000.00
16" Influent Piping	300	LF	$ 200.00	$ 60,000.00
Buried 16" Pre Aeration Piping	200	LF	$ 200.00	$ 40,000.00
Buried 16" RAS Piping	200	LF	$ 200.00	$ 40,000.00
6" Septage Forcemain Piping	250	LF	$ 80.00	$ 20,000.00
4" Septage Forcemain Piping	100	LF	$ 80.00	$ 8,000.00
4" NPW Piping	600	LF	$ 80.00	$ 48,000.00
8" NPW Piping	150	LS	$ 100.00	$ 15,000.00
8" Gravity SS	400	LF	$ 100.00	$ 40,000.00
8" SSMH	4	EA	$ 8,000.00	$ 32,000.00
4" WAS Piping	200	LF	$ 80.00	$ 16,000.00
4" Plug Valves	4	EA	$ 5,000.00	$ 20,000.00
6" Plug Valves	1	EA	$ 6,500.00	$ 6,500.00
4" Gate Valves	3	EA	$ 4,000.00	$ 12,000.00
8" Gate Valves	1	EA	$ 6,000.00	$ 6,000.00
Potable Water Well	1	EA	$ 100,000.00	$ 100,000.00
1" Potable Water Piping	1000	LF	$ 50.00	$ 50,000.00
Construction Subtotal Cost - 2025				$ 539,500.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$594,800.00
Total Estimated Project Cost				**$ 594,800.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Materials	1	LS	$ 500.00	$ 500.00
Total Annual Cost				**$ 500.00**

PRESENT WORTH ANALYSIS

DESCRIPTON	TOTAL
Capital Cost	$ 594,800.00
Annual O&M	$ 500.00
Salvage Value in 20 years (estimate)	$ 205,400.00
Interest Rate	3.0%
Number of payments	20
TOTAL PRESENT WORTH	**$488,500.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - SEPTAGE EQ BASIN
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$	61,000.00	$	61,000.00
Basin Excavation	278	CY	$	25.00	$	6,944.44
Structural Fill	114	CY	$	50.00	$	5,683.33
Ground Improvements	1023	SFT	$	85.00	$	86,955.00
Backfill	267	CY	$	30.00	$	8,000.00
Concrete Vertical	120	CY	$	1,600.00	$	192,000.00
Concrete Mat Slab	76	CY	$	1,650.00	$	125,033.33
Concrete walkway	2	CY	$	3,000.00	$	5,994.00
Dewatering	1	LS	$	25,000.00	$	25,000.00
Handrailing	1	LS	$	25,000.00	$	25,000.00
Stairs	1	LS	$	60,000.00	$	60,000.00
Cover	729	SFT	$	150.00	$	109,350.00
Septage Aeration Equipment	1	LS	$	150,000.00	$	150,000.00
Septage Aeration Equipment Installation	1	LS	$	75,000.00	$	75,000.00
Septage Pump Station	1	LS	$	150,000.00	$	150,000.00
Septage HVAC	1	LS		50,000	$	50,000.00
Basin NPW System	1	LS	$	5,000.00	$	5,000.00
Septage Basin Mixer	1	LS	$	25,000.00	$	25,000.00
Electrical	1	LS	$	100,000.00	$	100,000.00
Construction Subtotal Cost - 2025					$	1,266,000.00
Number of Years Until Construction						2
Inflation Rate						5.0%
Construction Subtotal Cost - 2027						$1,395,800.00
Total Estimated Project Cost					**$**	**1,395,800.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Labor	250	HRS	$	45.00	$	11,250.00
Power	250406.06	KWH	$	0.10	$	25,040.61
Materials	1	LS	$	2,300.00	$	2,300.00
Total Annual Cost					**$**	**38,590.61**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost	$	1,395,800.00
Annual O&M	$	38,590.61
Salvage Value in 20 years (estimate)	$	320,199.40
Interest Rate		3.0%
Number of payments		20
TOTAL PRESENT WORTH		**$1,792,600.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Sitework
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 22,000.00	$ 22,000.00
Concrete Surfacing	40	CUYD	$ 2,000.00	$ 80,000.00
Site Grading	5000	CUYD	$ 20.00	$ 100,000.00
Gravel Subgrade	844.4444	CUYD	$ 50.00	$ 42,222.22
Access Road IP Cell Building	711.1111	CUYD	$ 50.00	$ 35,555.56
Access Gate	1	LS	$ 25,000.00	$ 25,000.00
Chain link Fencing	2200	LS	$ 50.00	$ 110,000.00
Surface Restoration	3	ac	$ 5,000.00	$ 15,000.00
Irrigation System	1	LS	$ 25,000.00	$ 25,000.00
Landscaping	1	LS	$ 75,000.00	$ 75,000.00
Construction Subtotal Cost - 2025				$ 529,800.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$584,200.00
Total Estimated Project Cost				**$ 584,200.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Materials	1	LS	$ 5,100.00	$ 5,100.00
Total Annual Cost				**$ 5,100.00**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 584,200.00
Annual O&M		$ 5,100.00
Salvage Value in 20 years (estimate)		$ 66,000.00
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$623,500.00**

Estimate is a Planning Level Estimate Based on Limited Information

Appendix F: Solids Handling Cost Estimates

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Solids Dewatering Screw Press
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$	119,000.00	$	119,000.00
Solids Handling Building - Excavation	465	CY	$	25.00	$	11,614.81
Solids Handling Building - Structural Fill	256	CY	$	50.00	$	12,800.00
Solids Handling Building - Ground Improvements	2,304	SQFT	$	85.00	$	195,840.00
Solids Handling Building - Backfill	199	CY	$	25.00	$	4,977.78
Solids Handling Building - Structural	2,304	SQFT	$	175.00	$	403,200.00
Process Building Building - Concrete Foundation and Floor Slab	106	CY	$	1,600.00	$	169,725.10
Dewatering Equipment	1	LS	$	623,000.00	$	623,000.00
Sludge Pumps	2	EA	$	40,000.00	$	80,000.00
Equipment Installation and Piping	1	LS	$	450,000.00	$	450,000.00
Painting	1	LS	$	20,000.00	$	20,000.00
NPW System	1	LS	$	50,000.00	$	50,000.00
Drainage System	1	LS	$	50,000.00	$	50,000.00
HVAC System	1	LS	$	75,000.00	$	75,000.00
Electrical and Controls	1	LS	$	214,615.77	$	214,615.77
Construction Subtotal Cost - 2025					$	2,479,800.00
Number of Years Until Construction						2
Inflation Rate						5.0%
Construction Subtotal Cost - 2027						$2,734,000.00
Total Estimated Project Cost					**$**	**2,734,000.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Labor	1000	HRS	$	45.00	$	45,000.00
Chemicals/Polymer	1	LS	$	21,000.00	$	21,000.00
Power	130647	KWH	$	0.10	$	13,064.66
Materials	1	LS	$	6,300.00	$	6,300.00
Haul Sludge to Landfill (250 trips per year, 20 yd truck)	1250	MILES	$	40.00	$	50,000.00
Sludge Tipping Fee	5000	TON	$	32.00	$	160,000.00
Total Annual Cost					**$**	**295,364.66**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 2,734,000.00
Annual O&M		$ 295,364.66
Salvage Value in 20 years (estimate)		$ 370,090.67
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$6,923,400.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - SOLIDS HANDLING SLUDGE STORAG BASINS
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$	107,000.00	$	107,000.00
Basin Excavation	2143	CY	$	35.00	$	75,014.07
Structural Fill	409	CY	$	50.00	$	20,444.44
Ground Improvements	3680	SFT	$	85.00	$	312,800.00
Backfill	836	CY	$	30.00	$	25,084.44
Concrete Vertical	337	CY	$	1,650.00	$	556,600.00
Concrete Mat Slab	273	CY	$	1,600.00	$	436,148.15
Concrete walkway	5	CY	$	3,000.00	$	14,652.00
Handrailing	1	LS	$	25,000.00	$	25,000.00
Stairs	1	LS	$	60,000.00	$	60,000.00
Digester Aeration Equipment	1	LS	$	250,000.00	$	250,000.00
Digester Aeration Equipment Installation	1	LS	$	125,000.00	$	125,000.00
Basin NPW System	1	LS	$	5,000.00	$	5,000.00
Septage Basin Mixer	2	EA	$	25,000.00	$	50,000.00
Telescoping Valves and Decant System	1	LS	$	75,000.00	$	75,000.00
Electrical	1	LS	$	100,000.00	$	100,000.00
Construction Subtotal Cost - 2025					$	2,237,700.00
Number of Years Until Construction						2
Inflation Rate						5.0%
Construction Subtotal Cost - 2027						$2,467,100.00
Total Estimated Project Cost					**$**	**2,467,100.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Labor	250	HRS	$	45.00	$	11,250.00
Power	185082.74	KWH	$	0.10	$	18,508.27
Materials	1	LS	$	2,500.00	$	2,500.00
Total Annual Cost					**$**	**32,258.27**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost	$	2,467,100.00
Annual O&M	$	32,258.27
Salvage Value in 20 years (estimate)	$	870,437.42
Interest Rate		3.0%
Number of payments		20
TOTAL PRESENT WORTH		**$2,465,100.00**

Appendix G: Recommended Project Cost Estimates

ENGINEER'S OPINION OF PROBABLE COSTS
Lakeside Wastewater Improvements Phase II - 2025
Lakeside, MT
0.6 MGD SBR

	(Construction Costs with 2 years of inflation at 5%)
SBR	**$ 9,010,300.00**
SEPTAGE EQ	**$ 1,336,100.00**
Solids Handling Basins	**$ 2,467,100.00**
Process Building	**$ 5,335,500.00**
Process Piping	**$ 498,900.00**
Solids Handling Building	**$ 2,734,000.00**
Site Work	**$ 584,200.00**
IP Cells and Storage Pond Modifications	**$ 2,896,100.00**
TOTAL CONSTRUCTION COSTS =	***$ 24,862,200.00***
Admin @ 5%	$1,243,110.00
Contingency @ 10%	$2,486,220.00
Engineering @ 18%	$4,475,196.00
Total Project Costs=	***$33,066,726.00***

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - SBR
July 2025
COST ESTIMATE

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$	390,000.00	$	390,000.00
SBR Basin Excavation	9132	CY	$	25.00	$	228,303.70
Structural Fill	1462	CY	$	50.00	$	73,111.11
Ground Improvements	14504	SFT	$	85.00	$	1,232,840.00
Backfill	1733	CY	$	30.00	$	51,982.22
Concrete Vertical	1009	CY	$	1,600.00	$	1,613,748.15
Concrete Mat Slab	975	CY	$	1,650.00	$	1,608,444.44
Concrete walkway	15	CY	$	2,000.00	$	29,205.33
Handrailing	1	LS	$	75,000.00	$	75,000.00
Stairs	1	LS	$	60,000.00	$	60,000.00
SBR Equipment	1	LS	$	1,700,000.00	$	1,700,000.00
SBR Equipment Installation	1	LS	$	750,000.00	$	750,000.00
Basin NPW System	1	LS	$	10,000.00	$	10,000.00
Scum Piping and Telescoping Valves	1	LS	$	250,000.00	$	250,000.00
Electrical	1	LS	$	100,000.00	$	100,000.00
Construction Subtotal Cost - 2025					$	8,172,600.00
Number of Years Until Construction						2
Inflation Rate						5.0%
Construction Subtotal Cost - 2027						$9,010,300.00
Total Estimated Construction Cost					**$**	**9,010,300.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Labor	2100	HRS	$	45.00	$	94,500.00
Chemicals	1	LS	$	8,000.00	$	8,000.00
Power	492646.71	KWH	$	0.10	$	49,264.67
Materials	1	LS	$	11,900.00	$	11,900.00
Total Annual Cost					**$**	**163,664.67**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost	$	9,010,300.00
Annual O&M	$	163,664.67
Salvage Value in 20 years (estimate)	$	2,846,598.76
Interest Rate		3.0%
Number of payments		20
TOTAL PRESENT WORTH		**$9,869,100.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - IP Cell System
July 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 121,000.00	$ 121,000.00
12" Storage Pond Piping	1200	FT	$ 120.00	$ 144,000.00
Pond Piping Modification	1	LS	$ 20,000.00	$ 20,000.00
Storage Pond Piping Tie in	1	LS	$ 20,000.00	$ 20,000.00
Buried 12" Gate Valves to Storage Ponds	3	EA	$ 10,000.00	$ 30,000.00
Ip Cell Building #1 Excavation	19.55556	CUYD	$ 40.00	$ 782.22
Structural Fill Building #1	18.96296	CUYD	$ 75.00	$ 1,422.22
Backfill Building #1	13.03704	CUYD	$ 50.00	$ 651.85
Footing Building #1	4.740741	CUYD	$ 2,100.00	$ 9,955.56
Stem Wall Building #1	9.481481	CUYD	$ 2,100.00	$ 19,911.11
Floor Building Number #1	6.257778	CUYD	$ 2,100.00	$ 13,141.33
Structure Building #1	256	SQFT	$ 250.00	$ 64,000.00
HVAC #1	1	LS	$ 10,000.00	$ 10,000.00
Electrical Building #1	1	LS	$ 75,000.00	$ 75,000.00
Building #1 Piping and Valves	1	LS	$ 50,000.00	$ 50,000.00
Building #2 Mag Meters	1	EA	$ 10,000.00	$ 10,000.00
Ip Cell Building #2 Excavation	19.55556	CUYD	$ 40.00	$ 782.22
Structural Fill Building #2	18.96296	CUYD	$ 75.00	$ 1,422.22
Backfill Building #2	13.03704	CUYD	$ 50.00	$ 651.85
Footing Building #2	4.740741	CUYD	$ 2,100.00	$ 9,955.56
Stem Wall Building #2	9.481481	CUYD	$ 2,100.00	$ 19,911.11
Floor Building Number #2	6.257778	CUYD	$ 2,100.00	$ 13,141.33
Structure Building #2	256	SQFT	$ 300.00	$ 76,800.00
HVAC #2	1	LS	$ 10,000.00	$ 10,000.00
Electrical Building #2	1	LS	$ 75,000.00	$ 75,000.00
Building #2 Piping and Valves	1	LS	$ 85,000.00	$ 85,000.00
Building #2 Mag Meters	2	EA	$ 10,000.00	$ 20,000.00
6 " IP Cell Piping	5000	LF	$ 80.00	$ 400,000.00
IPBasin #1 Grading	27347	CUYD	$ 10.00	$ 273,472.22
IP Basin #1 Gravel	2500	CUYD	$ 45.00	$ 112,500.00
IPBasin #2 Grading	16228	CUYD	$ 10.00	$ 162,284.44
IP Basin #2 Gravel	1875	CUYD	$ 45.00	$ 84,375.00
IPBasin #3 Grading	26032	CUYD	$ 10.00	$ 260,315.56
IP Basin #3 Gravel	1880	CUYD	$ 45.00	$ 84,583.33
Seeding/Surface Restoration	24.34573	ACRES	$ 5,000.00	$ 121,728.65
IP Cells Distribution Structure	9	EA	$ 15,000.00	$ 135,000.00
Fencing	6000	FT	$ 15.00	$ 90,000.00
Construction Subtotal Cost - 2025				$ 2,626,800.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$2,896,100.00
Total Estimated Project Cost				**$ 2,896,100.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	250	HRS	$ 45.00	$ 11,250.00
Power	16330.83	KWH	$ 0.10	$ 1,633.08
Total Annual Cost				**$ 12,883.08**

PRESENT WORTH ANALYSIS

DESCRIPTON	TOTAL
Capital Cost	$ 2,896,100.00
Annual O&M	$ 12,883.08
Salvage Value in 20 years (estimate)	$ 326,400.00
Interest Rate	3.0%
Number of payments	20
TOTAL PRESENT WORTH	**$2,907,000.00**

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - PROCESS BUILDING
July 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 231,000.00	$ 231,000.00
Excavation	1410	CY	$ 25.00	$ 35,244.44
Shoring	1	LS	$ 100,000.00	$ 100,000.00
Structural Fill	715	CY	$ 50.00	$ 35,733.33
Ground Improvements	6432	SFT	$ 85.00	$ 546,720.00
Backfill	537	CY	$ 25.00	$ 13,418.52
Footing	13	CY	$ 1,600.00	$ 21,451.85
Stem Walls	27	CY	$ 1,600.00	$ 42,903.70
Basement/Wet Well Slab	58	CY	$ 1,650.00	$ 95,822.22
Basement/Wet Well Walls	161		$ 1,650.00	$ 265,375.00
Main Area Slab	81	CY	$ 1,650.00	$ 132,977.78
Suspended Slab	116	CY	$ 1,650.00	$ 191,644.44
Exterior Walls	3680	SFT	$ 165.00	$ 607,200.00
Handrailing	1	LS	$ 25,000.00	$ 25,000.00
Stairs	1	LS	$ 35,000.00	$ 35,000.00
Interior Walls	3760	SQFT	$ 125.00	$ 470,000.00
Roof System	6432	SQFT	$ 60.00	$ 385,920.00
Alum Tank	1	LS	$ 15,000.00	$ 15,000.00
Alum Chem Feed Pumps	1	LS	$ 30,000.00	$ 30,000.00
Chem Feed Piping	1	LS	$ 15,000.00	$ 15,000.00
Influent Piping	1	LS	$ 100,000.00	$ 100,000.00
Secondary Pump Station Pumps and Controls	6	EA	$ 30,000.00	$ 180,000.00
Secondary Pump Station Piping and Valving	1	LS	$ 150,000.00	$ 150,000.00
Automatic Sampler	1	LS	$ 10,000.00	$ 10,000.00
WAS Piping	1	LS	$ 60,000.00	$ 60,000.00
Aeration Piping	1	LS	$ 150,000.00	$ 150,000.00
HVAC System	1	LS	$ 200,000.00	$ 200,000.00
Bathroom	1	LS	$ 35,000.00	$ 35,000.00
Potable Water System	1	LS	$ 40,000.00	$ 40,000.00
NPW System	1	LS	$ 50,000.00	$ 50,000.00
Floor Drain System	1	LS	$ 50,000.00	$ 50,000.00
Basement Sump Pumps	1	LS	$ 25,000.00	$ 25,000.00
Painting	1	LS	$ 75,000.00	$ 75,000.00
Electrical	1	LS	$ 418,941.13	$ 418,941.13
Construction Subtotal Cost - 2025				$ 4,839,400.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$5,335,500.00
Total Estimated Project Cost				**$ 5,335,500.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	1000	HRS	$ 45.00	$ 45,000.00
Power	250406.1	KWH	$ 0.10	$ 25,040.61
Materials	1	LS	$ 6,500.00	$ 6,500.00
Total Annual Cost				**$ 76,540.61**

PRESENT WORTH ANALYSIS

DESCRIPTON	TOTAL
Capital Cost	$ 5,335,500.00
Annual O&M	$ 76,540.61
Salvage Value in 20 years (estimate)	$ 1,721,500.00
Interest Rate	3.0%
Number of payments	20
TOTAL PRESENT WORTH	**$5,521,100.00**

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Site Process Piping
July 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 19,000.00	$ 19,000.00
16" Influent Piping	300	LF	$ 200.00	$ 60,000.00
6" Septage Forcemain Piping	250	LF	$ 80.00	$ 20,000.00
4" Septage Forcemain Piping	100	LF	$ 80.00	$ 8,000.00
4" NPW Piping	600	LF	$ 80.00	$ 48,000.00
8" NPW Piping	150	LS	$ 100.00	$ 15,000.00
8" Gravity SS	400	LF	$ 100.00	$ 40,000.00
8" SSMH	4	EA	$ 8,000.00	$ 32,000.00
4" WAS Piping	200	LF	$ 80.00	$ 16,000.00
4" Plug Valves	4	EA	$ 5,000.00	$ 20,000.00
6" Plug Valves	1	EA	$ 6,500.00	$ 6,500.00
4" Gate Valves	3	EA	$ 4,000.00	$ 12,000.00
8" Gate Valves	1	EA	$ 6,000.00	$ 6,000.00
Potable Water Well	1	EA	$ 100,000.00	$ 100,000.00
1" Potable Water Piping	1000	LF	$ 50.00	$ 50,000.00
Construction Subtotal Cost - 2025				$ 452,500.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$498,900.00
Total Estimated Project Cost				**$ 498,900.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Materials	1	LS	$ 500.00	$ 500.00
Total Annual Cost				**$ 500.00**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 498,900.00
Annual O&M		$ 500.00
Salvage Value in 20 years (estimate)		$ 173,400.00
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$410,300.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - SEPTAGE EQ BASIN
July 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 58,000.00	$ 58,000.00
Basin Excavation	333	CY	$ 25.00	$ 8,326.85
Structural Fill	100	CY	$ 50.00	$ 4,994.44
Ground Improvements	899	SFT	$ 85.00	$ 76,415.00
Backfill	348	CY	$ 30.00	$ 10,426.67
Concrete Vertical	128	CY	$ 1,600.00	$ 204,444.44
Concrete Mat Slab	67	CY	$ 1,650.00	$ 109,877.78
Concrete walkway	2	CY	$ 3,000.00	$ 5,550.00
Handrailing	1	LS	$ 25,000.00	$ 25,000.00
Stairs	1	LS	$ 60,000.00	$ 60,000.00
Cover	625	SFT	$ 150.00	$ 93,750.00
Septage Aeration Equipment	1	LS	$ 150,000.00	$ 150,000.00
Septage Aeration Equipment Installation	1	LS	$ 75,000.00	$ 75,000.00
Septage Pump Station	1	LS	$ 150,000.00	$ 150,000.00
Septage HVAC	1	LS	50,000	$ 50,000.00
Basin NPW System	1	LS	$ 5,000.00	$ 5,000.00
Septage Basin Mixer	1	LS	$ 25,000.00	$ 25,000.00
Electrical	1	LS	$ 100,000.00	$ 100,000.00
Construction Subtotal Cost - 2025				$ 1,211,800.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$1,336,100.00
Total Estimated Project Cost				**$ 1,336,100.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Labor	250	HRS	$ 45.00	$ 11,250.00
Power	250406.06	KWH	$ 0.10	$ 25,040.61
Materials	1	LS	$ 3,000.00	$ 3,000.00
Total Annual Cost				**$ 39,290.61**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 1,336,100.00
Annual O&M		$ 39,290.61
Salvage Value in 20 years (estimate)		$ 354,300.00
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$1,724,500.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Sitework
July 2025
COST ESTIMATE

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$ 22,000.00	$ 22,000.00
Concrete Surfacing	40	CUYD	$ 2,000.00	$ 80,000.00
Site Grading	5000	CUYD	$ 20.00	$ 100,000.00
Gravel Subgrade	844.4444	CUYD	$ 50.00	$ 42,222.22
Access Road IP Cell Building	711.1111	CUYD	$ 50.00	$ 35,555.56
Access Gate	1	LS	$ 25,000.00	$ 25,000.00
Chain link Fencing	2200	LS	$ 50.00	$ 110,000.00
Surface Restoration	3	ac	$ 5,000.00	$ 15,000.00
Irrigation System	1	LS	$ 25,000.00	$ 25,000.00
Landscaping	1	LS	$ 75,000.00	$ 75,000.00
Construction Subtotal Cost - 2025				$ 529,800.00
Number of Years Until Construction				2
Inflation Rate				5.0%
Construction Subtotal Cost - 2027				$584,200.00
Total Estimated Project Cost				**$ 584,200.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT	UNIT PRICE	TOTAL PRICE
Materials	1	LS	$ 5,100.00	$ 5,100.00
Total Annual Cost				**$ 5,100.00**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 584,200.00
Annual O&M		$ 5,100.00
Salvage Value in 20 years (estimate)		$ 66,000.00
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$623,500.00**

Estimate is a Planning Level Estimate Based on Limited Information

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - SOLIDS HANDLING
July 2025
COST ESTIMATE

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$	107,000.00	$	107,000.00
Basin Excavation	2143	CY	$	35.00	$	75,014.07
Structural Fill	409	CY	$	50.00	$	20,444.44
Ground Improvements	3680	SFT	$	85.00	$	312,800.00
Backfill	836	CY	$	30.00	$	25,084.44
Concrete Vertical	337	CY	$	1,650.00	$	556,600.00
Concrete Mat Slab	273	CY	$	1,600.00	$	436,148.15
Concrete walkway	5	CY	$	3,000.00	$	14,652.00
Handrailing	1	LS	$	25,000.00	$	25,000.00
Stairs	1	LS	$	60,000.00	$	60,000.00
Digester Aeration Equipment	1	LS	$	250,000.00	$	250,000.00
Digester Aeration Equipment Installation	1	LS	$	125,000.00	$	125,000.00
Basin NPW System	1	LS	$	5,000.00	$	5,000.00
Septage Basin Mixer	2	EA	$	25,000.00	$	50,000.00
Telescoping Valves and Decant System	1	LS	$	75,000.00	$	75,000.00
Electrical	1	LS	$	100,000.00	$	100,000.00
Construction Subtotal Cost - 2025					$	2,237,700.00
Number of Years Until Construction						2
Inflation Rate						5.0%
Construction Subtotal Cost - 2027						$2,467,100.00
Total Estimated Project Cost					**$**	**2,467,100.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Labor	250	HRS	$	45.00	$	11,250.00
Power	185082.74	KWH	$	0.10	$	18,508.27
Materials	1	LS	$	2,500.00	$	2,500.00
Total Annual Cost					**$**	**32,258.27**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost	$	2,467,100.00
Annual O&M	$	32,258.27
Salvage Value in 20 years (estimate)	$	870,437.42
Interest Rate		3.0%
Number of payments		20
TOTAL PRESENT WORTH		**$2,465,100.00**

LAKESIDE COUNTY WATER & SEWER DISTRICT
SECONDARY TREATMENT - Solids Handling
May 2025
COST ESTIMATE

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Mobilization, Bonding, Submittals (May Not Exceed 5%)	1	LS	$	119,000.00	$	119,000.00
Solids Handling Building - Excavation	465	CY	$	25.00	$	11,614.81
Solids Handling Building - Structural Fill	256	CY	$	50.00	$	12,800.00
Solids Handling Building - Ground Improvements	2,304	SQFT	$	85.00	$	195,840.00
Solids Handling Building - Backfill	199	CY	$	25.00	$	4,977.78
Solids Handling Building - Structural	2,304	SQFT	$	175.00	$	403,200.00
Process Building Building - Concrete Foundation and Floor Slab	106	CY	$	1,600.00	$	169,725.10
Dewatering Equipment	1	LS	$	623,000.00	$	623,000.00
Sludge Pumps	2	EA	$	40,000.00	$	80,000.00
Equipment Installation and Piping	1	LS	$	450,000.00	$	450,000.00
Painting	1	LS	$	20,000.00	$	20,000.00
NPW System	1	LS	$	50,000.00	$	50,000.00
Drainage System	1	LS	$	50,000.00	$	50,000.00
HVAC System	1	LS	$	75,000.00	$	75,000.00
Electrical and Controls	1	LS	$	214,615.77	$	214,615.77
Construction Subtotal Cost - 2025					$	2,479,800.00
Number of Years Until Construction						2
Inflation Rate						5.0%
Construction Subtotal Cost - 2027						$2,734,000.00
Total Estimated Project Cost					**$**	**2,734,000.00**

ANNUAL OPERATING AND MAINTENANCE COSTS

ITEM	QUAN.	UNIT		UNIT PRICE		TOTAL PRICE
Labor	1000	HRS	$	45.00	$	45,000.00
Chemicals/Polymer	1	LS	$	21,000.00	$	21,000.00
Power	130647	KWH	$	0.10	$	13,064.66
Materials	1	LS	$	6,300.00	$	6,300.00
Haul Sludge to Landfill (250 trips per year, 20 yd truck)	1250	MILES	$	40.00	$	50,000.00
Sludge Tipping Fee	5000	TON	$	32.00	$	160,000.00
Total Annual Cost					**$**	**295,364.66**

PRESENT WORTH ANALYSIS

DESCRIPTON		TOTAL
Capital Cost		$ 2,734,000.00
Annual O&M		$ 295,364.66
Salvage Value in 20 years (estimate)		$ 370,090.67
Interest Rate		3.0%
Number of payments		20
	TOTAL PRESENT WORTH	**$6,923,400.00**

Estimate is a Planning Level Estimate Based on Limited Information

Appendix H: Water Balance

Lakeside Wastewater Improvements
Primary Lagoon with Storage Lagoon with Spray Irrigation

ANNUAL HYDRAULIC LOADING RATE

Soil Permeability Calculations:

$$Lp = \frac{Etc - P + Pw}{SE}$$

Lp = hydraulic loading rate, inches
ETc = crop evapotranspiration, inches
P= precipitation, inches
Pw = percolation rate, inches
SE = distribution system efficiency, 0.70 to 0.85 for spinklers, fraction

Month	ETc (in)	P (in)	Pw (in)	SE	Lp (in)
May	4.04	2.91	14.40	0.75	20.71
June	4.45	3.90	14.40	0.75	19.93
July	5.63	1.80	14.88	0.75	24.95
August	5.16	1.70	14.88	0.75	24.45
September	3.34	1.88	14.40	0.75	21.14
Annual	**22.62**	**12.20109646**	**72.96**	0.75	**111.18**

Percolation rate - Pw
method #1
Web Soil Survey data (04/11/22)

		Pw	
Soil Type:	Kalispell silt Loam =	9.00	um/sec
		1.28	in/hr

Monthly Percolation - Pw

Month	Irrigated Days	Irrigation Time (hr)	Pw (in)		
May	30	180	14.40	0.48	0.0768
June	30	180	14.40	0.48	
July	31	186	14.88	0.48	
August	31	186	14.88	0.48	
September	30	180	14.40	0.48	

irrigation time = 1/4 irrigation days

Percolation rate - Pw
method #2
DEQ-4 Table 2.2-1 - high end of very fine sand, sandy clay loam, silt loam

		Pw	
Soil Type:	Cherry Creek Loam =	30	min/in
		0.03	in/min
		2.00	in/hr
		0.08	in/hr

4% of percolation rate per DEQ-2 Ch. 120

Design Percolation Rate = 0.08 in/hr

Crop Evapotranspiratin Rate - Etc
Climatic Area = 2 moderately high use

Crop = alfalfa
DNRC Consumptive Use Methodology Figure 4.1

Monthly Crop Evapotranspiration - Etc
List= Average

Month	Total Consumpitve Use (in)
May	4.04
June	4.45
July	5.63
August	5.16
September	3.34

Lists

Alfalfa CRSM 2024	Alfalfa CRSM 2023	Alfalfa CRSM 2022	Alfalfa CRSM 2021	Alfalfa CRSM 2020	Alfalfa CRSM 2019	Average AgriMet
3.72	4.17	3.79	3.67	3.94	4.52	4.04
4.93	4.91	3.84	4.84	4.00	4.51	4.45
6.30	6.55	5.51	6.23	5.61	5.06	5.63
4.62	5.18	5.58	4.90	5.59	4.99	5.16
3.49	3.12	3.55	3.37	3.68	2.96	3.34
23.06	23.93	22.27	23.01	22.82	22.04	22.62

ANNUAL HYDRAULIC LOADING RATE

Nitrogen Calculation

$$Ln = \frac{U \times C}{Cn(1-f)}$$

Ln = hydraulic loading rate, in/month
U = crop uptake as a function of yield, lb/acre*month
C = Conversion constant, 4.41
Cn = applied total nitrogen concentration, mg/L
f = nitrogen loss factor

Month	ETc (in)	U (lb/acre)	Ln (in)
May	4.04	32.17	20.86
June	4.45	35.41	22.96
July	5.63	44.82	29.07
August	5.16	41.05	26.63
September	3.34	26.55	17.22
Annual	**22.62**	**180.00**	**116.74**

Crop Nutrient Uptake - U

U avg = 180 lb/acre-yr From DEQ2 pg 165

Nitrogen Loss Factor

f = 0.15 From DEQ2 pg 168

DEQ-2 Section 121.113.12

Total Nitrogen Concentration - Cn

Cn = (No) e^-0.0075 (t)

Cn = total nitrogen concentration, mg/L
No = influent nitrogen concentration, mg/L
t = minimum detention time in treatment/storage ponds
e = 2.71828

No = 55 mg/L
t = 120 days per DEQ-2 requirements for facultative lagoons
Cn = 22.4 mg/L
Cn = 8.0 mg/L (based on 5 years of effluent data)

ANNUAL HYDRAULIC LOADING RATE - Lh

Month	Lp (in)	Ln (in)	Lh (in)
May	20.71	20.86	**20.71**
June	19.93	22.96	**19.93**
July	24.95	29.07	**24.95**
August	24.45	26.63	**24.45**
September	21.14	17.22	**17.22**
Annual	**111.18**	**116.74**	**107.25**

LAND AREA REQUIRED

$$A = \frac{Q + \Delta Vs}{C \times Lh}$$

A = area, acres
Q = average daily flow, CF/year
ΔVs = net loss or gain in stored wastewater due to precip and evap, CF/year
C = conversion constant, 3,630
Lh = annual hydraulic loading rate

Q = 26,492,661 CF/year
ΔVs = 16,541 CF/year
C = 3,630
Lh = 107.25 inches

Minimum A = 68.09 acres does not include buffer zone
2,966,032 SF

IRRIGATION SCHEDULE

Month	Application (in)	Application Volume (CF)	Application Volume (Gal)
May	20.71	5,118,511	38,286,465
June	19.93	4,925,357	36,841,673
July	24.95	6,165,739	46,119,729
August	24.45	6,044,071	45,209,650
September	17.22	4,255,523	31,831,315

Proposed A= 135.00 acres does not include buffer zone
5,880,600 SF

Month	Application (in)	Application Volume (CF)	Application Volume (Gal)
May	20.71	10,148,211	75,908,618
June	19.93	9,765,254	73,044,103
July	24.95	12,224,496	91,439,232
August	24.45	11,983,271	89,634,864
September	17.22	8,437,209	63,110,323

Lakeside Wastewater Improvements **ALFALFA**

Primary Lagoon with Storage Lagoon with Spray Irrigation

Average Daily Flow	542,958	GPD	72,583	CF
Primary Treatment Pond #1	5,180,000	gal	10	days
Primary Treatment Pond #2	5,180,000	gal	10	days
Lakeside Storage Pond #1	45,500,000	gal	84	days
Somers Storage Pond #2	27,700,000	gal	51	days
Additional Storage	0	gal	0	days

Conversion Calculator

gal		CF
1,000,000	to	133,681

CF		gal
1,000,000	to	7,480,520

	Precipitation Area		**Evaporation Area**[1]		**Storage Volume**	
Primary Treatment Pond #1	114,100	SQ FT	100,800	SQ FT	~~692,462~~	CF
Primary Treatment Pond #2	114,100	SQ FT	100,800	SQ FT	~~692,462~~	CF
Lakeside Storage Pond #1	481,300	SQ FT	393,100	SQ FT	6,082,440	CF
Somers Storage Pond #2	390,200	SQ FT	309,900	SQ FT	3,702,936	CF
Additional Storage	0	SQ FT	0	SQ FT	0	CF
	1,099,700	SQ FT	904,600	SQ FT	**9,785,376**	**CF**
GW Discharge Out Flow	200,000	gpd				

Proposed Irrigation Area =	135.00	ACRES
Minimum Irrigation Area =	68.09	ACRES
Additional Storage required =	0	gal

			INFLOW					OUTFLOW					MONTHLY	TOTAL
Days per	MONTH	Percent of Average Inflow	WASTEWATER INFLUENT (GAL)	WASTEWATER INFLUENT (CF)	PRECIP (IN)	PRECIP (CF)	TOTAL INFLOW	EVAP (IN)[2]	EVAP (CF)	Groundwater Discharge (CF)	IRRIGATION (CF)	TOTAL OUTFLOW (CF)	MONTHLY STORAGE (CF)	TOTAL STORAGE REQUIRED (CF)
31	October	95%	15,747,095	2,105,072	1.79	164,331	2,269,403	1.37	103,275	828,877	0	932,152	1,337,251	1,337,251
30	November	91%	14,982,404	2,002,848	1.94	177,785	2,180,633	0.00	0	802,139	0	802,139	1,378,494	2,715,745
31	December	89%	14,763,637	1,973,603	1.97	180,941	2,154,544	0.00	0	828,877	0	828,877	1,325,667	4,041,412
31	January	92%	15,239,968	2,037,279	1.85	169,892	2,207,171	0.00	0	828,877	0	828,877	1,378,294	5,419,706
28	February	89%	14,776,445	1,975,315	1.49	136,422	2,111,737	0.00	0	748,663	0	748,663	1,363,074	6,782,779
31	March	94%	15,544,379	2,077,973	1.43	131,048	2,209,020	0.00	0	828,877	0	828,877	1,380,143	8,162,923
30	April	102%	16,802,863	2,246,207	1.95	178,386	2,424,592	0.00	0	802,139	0	802,139	1,622,453	9,785,376
31	May	100%	16,503,735	2,206,219	2.91	266,855	2,473,075	4.83	364,102	828,877	10,148,211	11,341,189	-8,868,115	917,261
30	June	104%	17,106,781	2,286,834	3.90	357,834	2,644,668	5.62	423,654	802,139	9,765,254	10,991,048	-8,346,379	-7,429,118
31	July	125%	20,681,381	2,764,687	1.80	165,347	2,930,034	7.81	588,744	828,877	12,224,496	13,642,117	-10,712,083	-18,141,201
31	August	115%	19,037,043	2,544,872	1.70	155,803	2,700,675	6.63	499,792	828,877	11,983,271	13,311,939	-10,611,264	-28,752,466
30	September	103%	16,993,962	2,271,753	1.88	172,290	2,444,043	3.46	260,826	802,139	8,437,209	9,500,174	-7,056,132	-35,808,597
365	Total		198,179,693	26,492,661	24.63	2,256,933	28,749,595	29.72	2,240,393	9,759,358	52,558,441	64,558,192	-35,808,597	
	Average Yearly Flow =		198,179,693	gal/yr						200,000				

[1] uses midpoint water elevation on storage and full on primary to calculate evaporation area

[2] Using WRCC Hungry Horse Dam Pan Evaporation Data (https://wrcc.dri.edu/Climate/comp_table_show.php?stype=pan_evap_avg)

Appendix I: LCWSD Wastewater Improvements Phase I Agency Comments

RPA

CIVIL ENGINEERING / PLANNING / SURVEYING

September 26, 2024

Amity Bass
Field Supervisor
U.S. Fish and Wildlife Services
Ecological Services
Montana Field Office
585 Shepard Way, Suite 1
Helena, MT 59601

Subject: Lakeside County Water and Sewer District Wastewater System Improvements Project - Updated
Lakeside, Montana

Dear Ms. Bass:

Our firm was retained by the Lakeside County Water and Sewer District (LCWSD) to complete the Lakeside County Water and Sewer District Wastewater System Improvements Project. As part of our work for the District, we are compiling information for an environmental review. This process requires us to advise appropriate agencies of the scope of the project and request their comments.

The current wastewater treatment facility consists of two aerated primary treatment ponds, two storage ponds, and a spray irrigation system for land application. The LCWSD also operates and maintains a wastewater collection system consisting of approximately 61,000 feet of 8-inch PVC gravity sewer main, 500 feet of 10-inch PVC gravity sewer main, 13 lift stations, a seven-mile-long force main between Lakeside and the treatment facility. This system has served the community since 1987. Lift Station Number 10 receives flow from several other lift stations and is in a low area along the lakeshore. Wastewater collected at Lift Station Number 10 is pumped through to the seven-mile-long force main to the treatment facility, making Lift Station Number 10 a critical component of the wastewater collection system.

The existing wastewater treatment system has reached the end of its design life and is at capacity. To improve the treatment and capacity, the District is proposing to upgrade the treatment process and dispose of wastewater by the current land application system and a new ground water discharge system. The project is proposed to be broken into two phases based on funding.

Phase I of the project includes the construction of a new headworks facility and improvements to Lift Station 10. Headworks is the first step of the treatment process and a line of defense against premature wear and damage to downstream process equipment. The headworks includes a new ¼" mechanical screen with a washer compactor to remove rags and other inorganic objects. Downstream of the screen, a new vortex grit removal system will be installed to remove grit from the wastewater system. The removed grit will be pumped to a grit washer to clean and remove organics from the grit. Other

improvements proposed as part of Phase I include improvements to Lift Station 10. The lift station improvements include replacing the existing pumps, installing a new heated valve enclosure, and upgrading the SCADA system. Additionally, a septage unloading facility will be constructed as part of Phase 1 of the project. Septage haulers within Flathead County will take the septage to the new facility where it will be screened and the grit removed. The wastewater will then be pumped via forcemain to the Wastewater Treatment Facility.

Phase II includes the construction of a sequencing batch reactor, process buildings, a solids handling system, and IP Cells for groundwater discharge. The sequencing batch reactor will consist of two reaction basins and provide treatment and settling. Treated wastewater will leave the reactor basins and enter the process building. Effluent will be directed to either the existing storage ponds that will ultimately be disposed of with the land application system or to the infiltration/percolation (IP) Cells which will be disposed of by groundwater discharge. The Groundwater discharge system will consist of IP Cells that will allow for the percolation of treated effluent into the groundwater. A valve building will be located near the IP Cells to allow for proper loading, wetting, and drying of the IP Cells. Waste sludge will be handled by having small sludge holding tank, then disposed of at the Flathead County Solids/Septage Handling Facility. Phase II of the project will not begin until Phase I has been completed.

Figures showing the location of the project components has been included.

To satisfy our requirements, please identify any federally-listed threatened or endangered species or critical habitat for such species that occur or may occur in the project area. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation of the potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer regarding this project.

If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic

Trisha Bodlovic
Environmental Specialist

Enclosures

RPA

CIVIL ENGINEERING / PLANNING / SURVEYING

April 30, 2024

Sage Joyce, P.E.
Montana Program Manager
U.S. Army Corps of Engineers
10 West 15th Street, Suite 2200
Helena, MT 59626

Subject: Lakeside County Water and Sewer District Wastewater System Improvements Project – NWO-2023-01787-MT
Lakeside, Montana

Dear Ms. Joyce:

Our firm was retained by the Lakeside County Water and Sewer District (LCWSD) to complete the Lakeside County Water and Sewer District Wastewater System Improvements Project. As part of our work for the District, we are compiling information for an environmental review. This process requires us to advise appropriate agencies of the scope of the project and request their comments as well as determine whether any permits may be required. A request for comment was sent to your agency on October 18, 2023 and on April 30, 2024 on Phase 1 and Phase 2 of the Lakeside County Water and Sewer District Wastewater System Improvements Project. Since that time, design of Phase I of the project has been ongoing and we are requesting any additional comments your agency may have as well as confirmation whether a permit through your agency will be required.

The current wastewater treatment facility consists of two aerated primary treatment ponds, two storage ponds, and a spray irrigation system for land application. The LCWSD also operates and maintains a wastewater collection system consisting of approximately 61,000 feet of 8-inch PVC gravity sewer main, 500 feet of 10-inch PVC gravity sewer main, 13 lift stations, a seven-mile-long force main between Lakeside and the treatment facility. This system has served the community since 1987. Lift Station Number 10 receives flow from several other lift stations and is in a low area along the lakeshore. Wastewater collected at Lift Station Number 10 is pumped through to the seven-mile-long force main to the treatment facility, making Lift Station Number 10 a critical component of the wastewater collection system.

The existing wastewater treatment system has reached the end of its design life and is at capacity. To improve the treatment and capacity, the District is proposing to upgrade the treatment process and dispose of wastewater by the current land application system and a new ground water discharge system. The project is proposed to be broken into two phases based on funding.

Phase I of the project includes the construction of a new headworks facility and improvements to Lift Station 10. Headworks is the first step of the treatment process and a line of defense against premature

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HELENA / KALISPELL / BOZEMAN

wear and damage to downstream process equipment. The headworks includes a new ¼" mechanical screen with a washer compactor to remove rags and other inorganic objects. Downstream of the screen, a new vortex grit removal system will be installed to remove grit from the wastewater system. The removed grit will be pumped to a grit washer to clean and remove organics from the grit. Other improvements proposed as part of Phase I include improvements to Lift Station 10. The lift station improvements include replacing the existing pumps, installing a new heated valve enclosure, and upgrading the SCADA system. Additionally, a septage unloading facility will be constructed as part of Phase 1 of the project. Septage haulers within Flathead County will take the septage to the new facility where it will be screened and the grit removed. The wastewater will then be pumped via forcemain to the Wastewater Treatment Facility.

Phase II includes the construction of a sequencing batch reactor, process buildings, a solids handling system, and IP Cells for groundwater discharge. The sequencing batch reactor will consist of two reaction basins and provide treatment and settling. Treated wastewater will leave the reactor basins and enter the process building. Effluent will be directed to either the existing storage ponds that will ultimately be disposed of with the land application system or to the infiltration/percolation (IP) Cells which will be disposed of by groundwater discharge. The Groundwater discharge system will consist of IP Cells that will allow for the percolation of treated effluent into the groundwater. A valve building will be located near the IP Cells to allow for proper loading, wetting, and drying of the IP Cells. Waste sludge will be handled by having small sludge holding tank, then disposed of at the Flathead County Solids/Septage Handling Facility. Phase II of the project will not begin until Phase I has been completed.

Figures showing the location of the project components has been included. Wetland mapping also included shows the wetlands located in the area of the project. The forcemain to be installed from the septage uploading facility to the wastewater treatment facility will cross the location of the Freshwater Emergent Wetlands shown in this figure. However, the forcemain will be installed via directional drilling over 20' below the ground surface and the wetlands will not be impacted as a result of the installation. A project plan sheet has been included that shows the installation of this forcemain and the location of the wetland in the area.

As previously stated, we are requesting confirmation whether a Department of the Army Permit is or is not required as part of this project or any additional comments you may have. If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic
Environmental Specialist

Enclosures

RPA

CIVIL ENGINEERING / PLANNING / SURVEYING

September 26, 2024

Larry Schock
Civil Engineering Specialist
Montana Department of Natural Resources and Conservation
Water Resources Bureau
Kalispell Regional Office
655 Timberwolf Parkway Suite 4
Kalispell, MT 59901-1215

Subject: Lakeside County Water and Sewer District Wastewater System Improvements Project - Updated
Lakeside, Montana

Dear Mr. Schock:

Our firm was retained by the Lakeside County Water and Sewer District (LCWSD) to complete the Lakeside County Water and Sewer District Wastewater System Improvements Project. As part of our work for the District, we are compiling information for an environmental review. This process requires us to advise appropriate agencies of the scope of the project and request their comments as well as determine whether any permits may be required. A request for comment was sent to your agency on October 18, 2023 and on April 30, 2024 on Phase 1 and Phase 2 of the Lakeside County Water and Sewer District Wastewater System Improvements Project. Since that time, design of Phase I of the project has been ongoing and we are requesting any additional comments your agency may have as well as confirmation whether a floodplain permit will be required.

The current wastewater treatment facility consists of two aerated primary treatment ponds, two storage ponds, and a spray irrigation system for land application. The LCWSD also operates and maintains a wastewater collection system consisting of approximately 61,000 feet of 8-inch PVC gravity sewer main, 500 feet of 10-inch PVC gravity sewer main, 13 lift stations, a seven-mile-long force main between Lakeside and the treatment facility. This system has served the community since 1987. Lift Station Number 10 receives flow from several other lift stations and is in a low area along the lakeshore. Wastewater collected at Lift Station Number 10 is pumped through to the seven-mile-long force main to the treatment facility, making Lift Station Number 10 a critical component of the wastewater collection system.

The existing wastewater treatment system has reached the end of its design life and is at capacity. To improve the treatment and capacity, the District is proposing to upgrade the treatment process and dispose of wastewater by the current land application system and a new ground water discharge system. The project is proposed to be broken into two phases based on funding.

Phase I of the project includes the construction of a new headworks facility and improvements to Lift Station 10. Headworks is the first step of the treatment process and a line of defense against premature wear and damage to downstream process equipment. The headworks includes a new ¼" mechanical screen with a washer compactor to remove rags and other inorganic objects. Downstream of the screen, a new vortex grit removal system will be installed to remove grit from the wastewater system. The removed grit will be pumped to a grit washer to clean and remove organics from the grit. Other improvements proposed as part of Phase I include improvements to Lift Station 10. The lift station improvements include replacing the existing pumps, installing a new heated valve enclosure, and upgrading the SCADA system. Additionally, a septage unloading facility will be constructed as part of Phase 1 of the project. Septage haulers within Flathead County will take the septage to the new facility where it will be screened and the grit removed. The wastewater will then be pumped via forcemain to the Wastewater Treatment Facility.

Phase II includes the construction of a sequencing batch reactor, process buildings, a solids handling system, and IP Cells for groundwater discharge. The sequencing batch reactor will consist of two reaction basins and provide treatment and settling. Treated wastewater will leave the reactor basins and enter the process building. Effluent will be directed to either the existing storage ponds that will ultimately be disposed of with the land application system or to the infiltration/percolation (IP) Cells which will be disposed of by groundwater discharge. The Groundwater discharge system will consist of IP Cells that will allow for the percolation of treated effluent into the groundwater. A valve building will be located near the IP Cells to allow for proper loading, wetting, and drying of the IP Cells. Waste sludge will be handled by having small sludge holding tank, then disposed of at the Flathead County Solids/Septage Handling Facility. Phase II of the project will not begin until Phase I has been completed.

Figures showing the location of the project components has been included. The forcemain to be installed from the septage uploading facility to the wastewater treatment facility will cross the location of the 100-year floodplain in this area. However, the forcemain will be installed via directional drilling over 20' below the ground surface and the floodplain will not be impacted as a result of the installation. A project plan sheet has been included that shows the installation of this forcemain and the location of the floodplain in the area.

As previously stated, we are requesting confirmation whether a floodplain permit is or is not required as part of this project or any additional comments you may have. If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic
Environmental Specialist

Enclosures

RPA

CIVIL ENGINEERING / PLANNING / SURVEYING

September 26, 2024

Region 1
Montana Department of Fish, Wildlife & Parks
490 N. Meridian Rd.
Kalispell, MT 59901

Subject: Lakeside County Water and Sewer District Wastewater System Improvements Project - Updated
Lakeside, Montana

To Whom it May Concern:

Our firm was retained by the Lakeside County Water and Sewer District (LCWSD) to complete the Lakeside County Water and Sewer District Wastewater System Improvements Project. As part of our work for the District, we are compiling information for an environmental review. This process requires us to advise appropriate agencies of the scope of the project and request their comments.

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The existing wastewater treatment system has reached the end of its design life and is at capacity. To improve the treatment and capacity, the District is proposing to upgrade the treatment process and dispose of wastewater by the current land application system and a new ground water discharge system. The project is proposed to be broken into two phases based on funding.

Phase I of the project includes the construction of a new headworks facility and improvements to Lift Station 10. Headworks is the first step of the treatment process and a line of defense against premature wear and damage to downstream process equipment. The headworks includes a new ¼" mechanical screen with a washer compactor to remove rags and other inorganic objects. Downstream of the screen, a new vortex grit removal system will be installed to remove grit from the wastewater system. The removed grit will be pumped to a grit washer to clean and remove organics from the grit. Other improvements proposed as part of Phase I include improvements to Lift Station 10. The lift station improvements include replacing the existing pumps, installing a new heated valve enclosure, and upgrading the SCADA system. Additionally, a septage unloading facility will be constructed as part of

Phase 1 of the project. Septage haulers within Flathead County will take the septage to the new facility where it will be screened and the grit removed. The wastewater will then be pumped via forcemain to the Wastewater Treatment Facility.

Phase II includes the construction of a sequencing batch reactor, process buildings, a solids handling system, and IP Cells for groundwater discharge. The sequencing batch reactor will consist of two reaction basins and provide treatment and settling. Treated wastewater will leave the reactor basins and enter the process building. Effluent will be directed to either the existing storage ponds that will ultimately be disposed of with the land application system or to the infiltration/percolation (IP) Cells which will be disposed of by groundwater discharge. The Groundwater discharge system will consist of IP Cells that will allow for the percolation of treated effluent into the groundwater. A valve building will be located near the IP Cells to allow for proper loading, wetting, and drying of the IP Cells. Waste sludge will be handled by having small sludge holding tank, then disposed of at the Flathead County Solids/Septage Handling Facility. Phase II of the project will not begin until Phase I has been completed.

Figures showing the location of the project components has been included.

To satisfy our requirements, please identify any federally-listed threatened or endangered species or critical habitat for such species that occur or may occur in the project area. Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation of the potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer regarding this project.

If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic
Environmental Specialist

Enclosures

RPA

CIVIL ENGINEERING / PLANNING / SURVEYING

September 26, 2024

Damon Murdo, Cultural Records Manager
State Historic Preservation Office
Montana Historical Society
P.O. Box 201802
Helena, MT 59620-1202

Subject: Lakeside County Water and Sewer District Wastewater System Improvements Project - Updated
Lakeside, Montana

Dear Mr. Murdo:

Our firm was retained by the Lakeside County Water and Sewer District (LCWSD) to complete the Lakeside County Water and Sewer District Wastewater System Improvements Project. As part of our work for the District, we are compiling information for an environmental review. This process requires us to advise appropriate agencies of the scope of the project and request their comments.

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Phase I of the project includes the construction of a new headworks facility and improvements to Lift Station 10. Headworks is the first step of the treatment process and a line of defense against premature wear and damage to downstream process equipment. The headworks includes a new ¼" mechanical screen with a washer compactor to remove rags and other inorganic objects. Downstream of the screen, a new vortex grit removal system will be installed to remove grit from the wastewater system. The removed grit will be pumped to a grit washer to clean and remove organics from the grit. Other improvements proposed as part of Phase I include improvements to Lift Station 10. The lift station improvements include replacing the existing pumps, installing a new heated valve enclosure, and

406.447.5000
3147 Saddle Dr. Helena, MT 59601
www.rpa-hln.com
HELENA / KALISPELL / BOZEMAN

upgrading the SCADA system. Additionally, a septage unloading facility will be constructed as part of Phase 1 of the project. Septage haulers within Flathead County will take the septage to the new facility where it will be screened and the grit removed. The wastewater will then be pumped via forcemain to the Wastewater Treatment Facility.

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In an effort to help us identify any historical or archaeological resources that may be affected by the proposed project, we would like to request a cultural resource file search for the following areas:

T-26-N, R-20-W, Section 17
T-27-N, R-21-W, Section 11, 12, 13, and 14

Maps showing the locations of the project components are included for your reference.

Any other statements you may have on this project will help us determine the need for further coordination and for more detailed evaluation of the potential project impacts. If we do not receive a reply, we will assume that your agency has no comments to offer regarding this project.

If you have any questions, please contact Brad Koenig, P.E. or me at 406-447-5000 or tbodlovic@rpa-hln.com

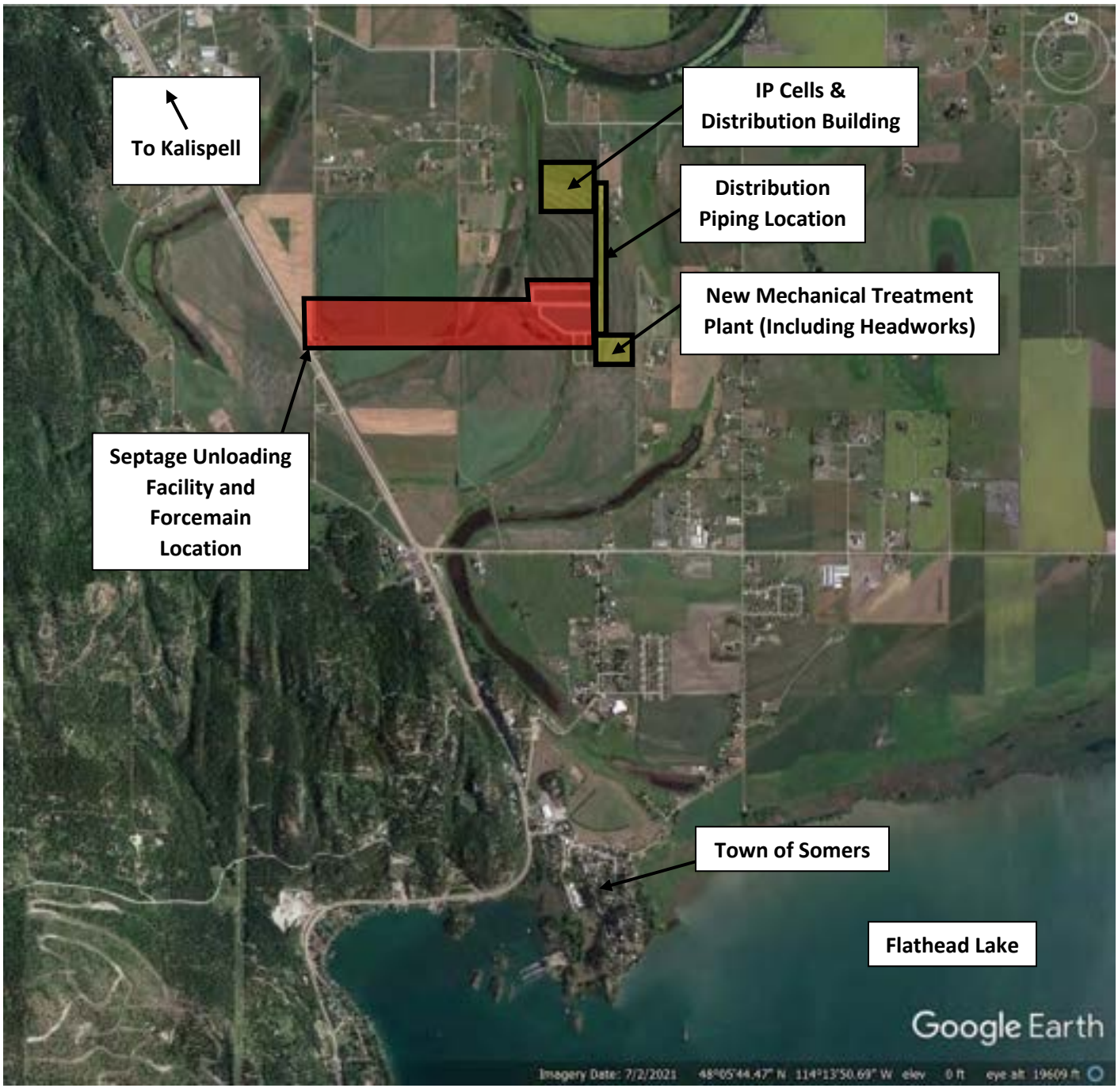
Sincerely,
ROBERT PECCIA & ASSOCIATES

Trisha Bodlovic
Environmental Specialist

Enclosures

LAKESIDE COUNTY WATER AND SEWER DISTRICT
WASTEWATER SYSTEM IMPROVEMENTS PROJECT

PROJECT LOCATION MAP 1



LAKESIDE COUNTY WATER AND SEWER DISTRICT
WASTEWATER SYSTEM IMPROVEMENTS PROJECT

PROJECT LOCATION MAP 2

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Robert Peccia
& Associates

RPA

MATCHLINE
STA 24+40 – SHEET C1-9

REMOVE & REPLACE FENCE AS NECESSARY

PROPOSED EASEMENT

6" FORCE MAIN (2)

(2) 4" NPW

(2) 3" FIBER OPTIC CONDUIT

(1) FRESHWATER EMERGENT WETLAND (TYPICAL)

EDGE OF ZONE A FLOODPLAIN
STA: 28+20.28

EDGE OF 500-YEAR FLOODPLAIN
STA: 27+34.38

EDGE OF ZONE A FLOODPLAIN
STA: 37+14.16

(1) FIBER OPTIC PULL BOX
C-6

DIRECTIONAL DRILL EXIT PIT

MATCHLINE
STA 38+50
SHEET C1-11

CONSTRUCTION NOTES:

(1) WETLAND SHALL NOT BE DISTURBED.

(2) SEPTAGE FORCEMAIN, NPW PIPE, & FIBER OPTIC CONDUIT TO BE PULLED THROUGH SAME DRILL HOLE.

SEPTAGE & NPW PLAN AND PROFILE (1) C-2

HORIZONTAL
50 0 50 100
(SCALE IN FEET)

VERTICAL
5 0 5 10
(SCALE IN FEET)

EXST IRRIGATION PIPING

ZONE X (0.2% ANNUAL CHANCE) FLOODPLAIN
STA 27+34.38 – STA 38+62.00

(2) DIRECTIONAL DRILL

EXISTING GROUND

ZONE A FLOODPLAIN
STA 28+20.28 – STA 37+14.16

STA 24+43.4
22.5° HDPE BEND (FUSED)

STA 37+95.2
90° HDPE BEND (FUSED)

STA 38+00
FIBER OPTIC PULL BOX

6" HDPE DR11

2915 2910 2905 2900 2895 2890 2885 2880 2875 2870 2865 2860

24+20 24+50 25+00 25+50 26+00 26+50 27+00 27+50 28+00 28+50 29+00 29+50 30+00 30+50 31+00 31+50 32+00 32+50 33+00 33+50 34+00 34+50 35+00 35+50 36+00 36+50 37+00 37+50 38+00 38+50

SYM	REVISION	BY	APPR.	DATE
	PRELIMINARY NOT FOR CONSTRUCTION			

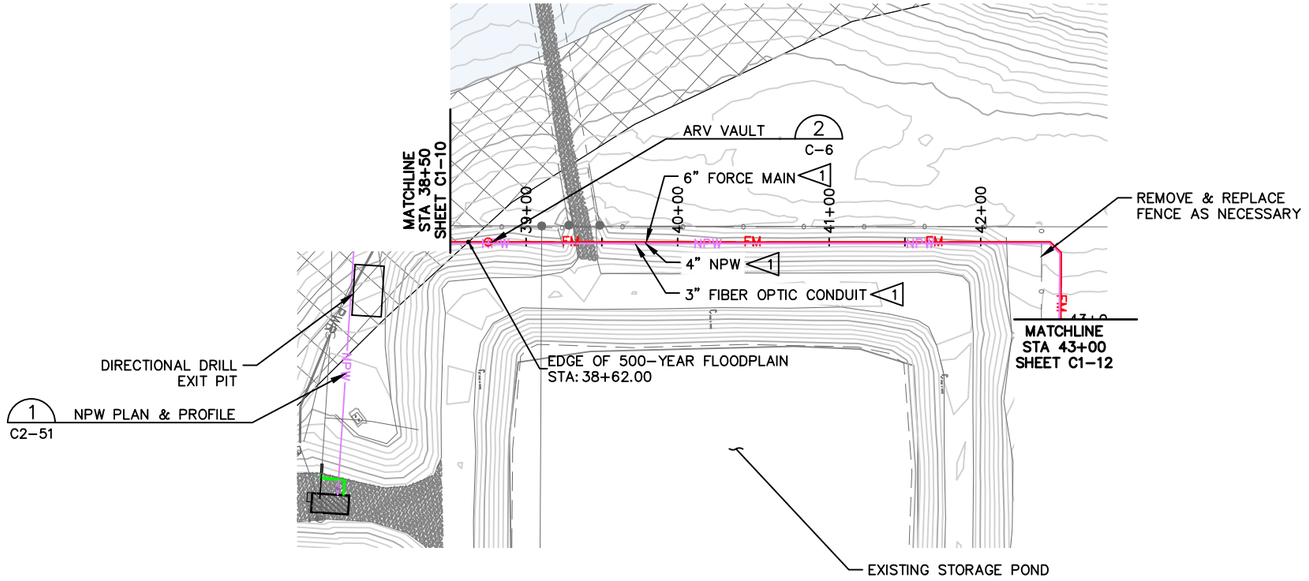
JULY 2024	DATE
21733	PROJECT NO.
C1-8_C1-13	FILE
A. WARGO	DESIGNED BY
J. BROWN	DRAWN BY
B. KOENIG, PE	CHECKED BY

PROJECT TITLE
Lakeside Water Improvements Phase I - 2024
Lakeside, Montana

SHEET TITLE
SEPTAGE & NPW PLAN & PROFILE

SHEET
C1-10
OF

F:\water\21733 – Lakeside Wastewater Improvements – 2022\Lakeside – C3D\CADD\Sheets\Phase I – 2024\C1-8_C1-13.dwg Sep 24, 2024



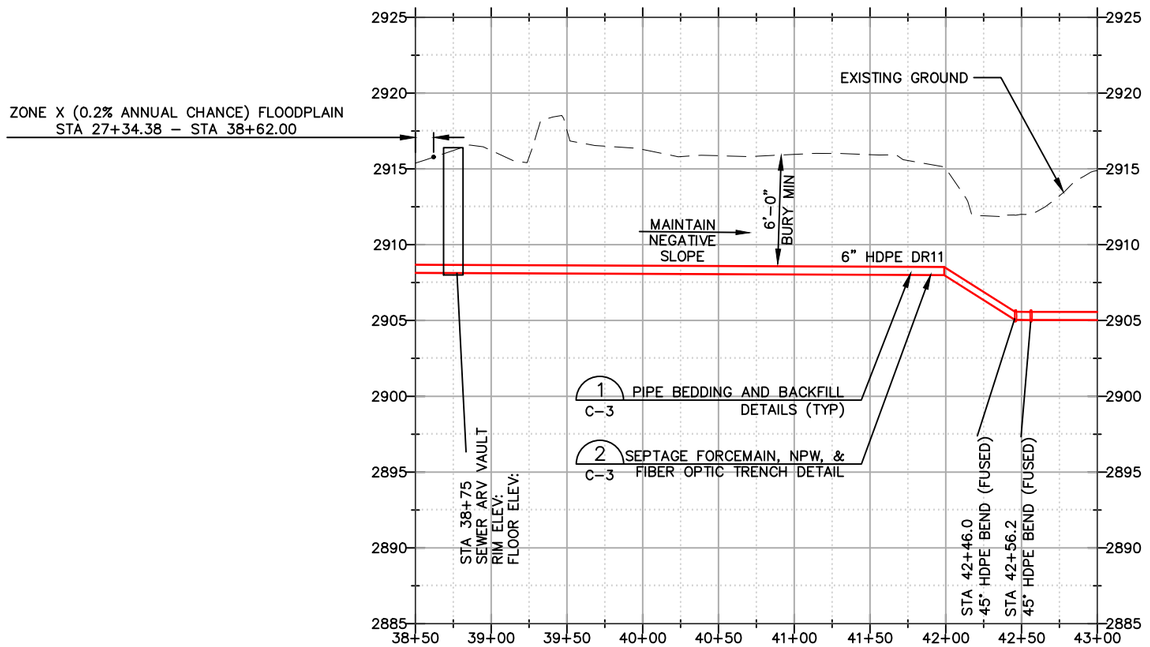
SEPTAGE & NPW PLAN AND PROFILE 1 C-2

CONSTRUCTION NOTES:

1. PROFILE DEPICTS SEPTAGE FORCEMAIN, NPW, AND FIBER OPTIC CONDUIT TO BE INSTALLED IN SAME TRENCH.

HORIZONTAL
50 0 50 100
(SCALE IN FEET)

VERTICAL
5 0 5 10
(SCALE IN FEET)



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Robert Peccia
& Associates

RPA

SYM	REVISION	BY	APPR.	DATE
	PRELIMINARY NOT FOR CONSTRUCTION			

A. WARGO — DESIGNED BY
J. BROWN — DRAWN BY
B. KOENIG, PE — CHECKED BY
JULY 2024 — DATE
21733 — PROJECT NO.
C1-8_C1-13 — FILE

PROJECT TITLE
Lakeside Water Improvements Phase I - 2024
Lakeside, Montana

SHEET TITLE
SEPTAGE & NPW PLAN & PROFILE

SHEET
C1-11
OF

F:\water\21733 - Lakeside Wastewater Improvements - 2022\Lakeside - C3D\CADD\Sheets\Phase I - 2024\C1-8_C1-13.dwg Sep 24, 2024

From: Schock, Larry
To: Trisha Bodlovic
Subject: Lakeside County Water Sewer District Wastewater System improvements Project.
Date: Wednesday, October 2, 2024 12:30:12 PM
Attachments: image003.png

Hello Trisha,

The DNRC water Resources Division has received you letter, dated 2024-09-27, requesting comment.

After reviewing the document the DNRC has the following comments.

1. There is a FEMA mapped Regulatory Floodplain around, and adjacent to your proposed construction site.
2. Construction within the mapped floodplain will be required to follow the Flathead County Floodplain and Floodway Management Regulations and require a floodplain permit from Flathead County. The DNRC recommends that you consult with them regarding a floodplain permit.

Please let me know if you have any questions.

Larry A. Schock, Civil Engineering Specialist
Water Resources Division, Missoula Regional Office
Montana Department of Natural Resources and Conservation
2704 Spurgin Road, Bldg C, Missoula, Mt 59806, PO BOX 5004
DESK: 406-542-5885 **MOBILE:** 406-360-1632 **EMAIL:** lschock@mt.gov
Website | Facebook | X (Twitter) | Instagram
How did we do? Let us know here: Feedback Survey

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
MONTANA REGULATORY OFFICE
100 NEILL AVENUE
HELENA, MONTANA 59601-3329

October 9, 2024

SUBJECT: Lakeside County Water - Wastewater System Improvements, Flathead Lake - Flathead County, File No. **NWO-2023-01787-MT**

Trisha Bodlovic
Robert Peccia & Associates
3147 Saddle Drive
Helena, Montana 59601

Dear Ms. Bodlovic:

This letter is in response to correspondence we received requesting comments or permitting information regarding the above-referenced project. Specifically, the project involves wastewater system improvements. The project is located on or near Flathead River, at Latitude 48.095686°, Longitude -114.230747°, in Section 14, Township 27 N, Range 21 W, Flathead County, Montana.

The purpose of this letter is to inform you that based on the information provided in your submittal, we are unable to ascertain if regulated activities are proposed or if jurisdictional waters of the U.S. are present within the project area. A Department of the Army (DA) permit may be required for the proposed activity. In lieu of a specific response, please consider the following general information concerning our regulatory program that may apply to the proposed project.

If the proposal involves activity in navigable waters of the United States, it may be subject to the U.S. Army Corps of Engineers (USACE) jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 (RHA). Within the state of Montana, portions of the Kootenai River, the Missouri River, and the Yellowstone River[1] are considered a navigable water of the U.S. Section 10 prohibits the construction, excavation, or deposition of materials in, over, or under navigable waters of the United States unless the work has been authorized by a DA permit. Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work affects the course, location, or condition of the water body. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States,

[1] Section 10 waters in Montana are the Kootenai River (from the International Border between the United States and Canada downstream to Jennings Rapids near Jennings, Montana), the Missouri River and its impoundments (from its headwaters near Three Forks to the North Dakota state line), and the Yellowstone River (from Emigrant to the North Dakota state line).

and applies to all structures, from the smallest floating dock to the largest commercial undertaking.

If the proposal involves a discharge of dredged or fill material into waters of the United States, it may be subject to USACE jurisdiction under Section 404 of the Clean Water Act (CWA). Discharges of fill material generally include, without limitation: placement of fill that is necessary for the construction of any structure, or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; dams and dikes; property protection or reclamation devices such as riprap, weirs, bulkheads, and revetments; levees or berms; fill for intake and outfall pipes and trenched utility lines; fill associated with the creation of ponds; and any other work involving the discharge of fill or dredged material. A DA permit is required whether the work is permanent or temporary. Waters of the U.S. include the area below the ordinary high water mark of stream channels, lakes or ponds connected to the tributary system, and wetlands adjacent to these waters (33 CFR § 328.3). Other waters and wetlands, as well as man-made channels, may be waters of the U.S. in certain circumstances, which must be determined on a case-by-case basis. CWA Section 301(a) prohibits discharges of dredged or fill material into waters of the United States unless the work has been authorized by a Department of the Army permit under Section 404. Information about the USACE permitting process can be obtained online at http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/Montana.

The mission of the USACE Regulatory Program is to protect the Nation’s aquatic resources while allowing reasonable development through fair, flexible, and balanced permit decisions. Under Section 404 of the Clean Water Act, we work to protect the biological, physical, and chemical integrity of the Nation’s aquatic resources. Projects are evaluated on a case-by-case basis to determine the potential benefits and detriments that may occur as a result of the proposal.

Before a permit is issued or verified, the Corps must ensure that we've met all our obligations under any related federal and state laws. For all projects, the Corps will consult with other state and federal agencies and Native American tribes, as appropriate. USACE evaluation of a Section 10 and/or a Section 404 permit application involves multiple analyses; please see the attached document for additional information and resources for permitting.

Useful documents, links, and information about Jurisdictional Determinations, Pre-Application Meetings, Permit Exemptions, Nationwide Permits, Regional Permits, Individual Permits, and Permit Applications and Permit Resources are available on our webpage: http://www.nwo.usace.army.mil/Missions/RegulatoryProgram/Montana.

Prior to applying for a DA permit, the project proposer may request a pre-application consultation meeting with USACE (virtual or in-person, on or off-site) to obtain information regarding the information needed, alternatives, and options for permitting before an applicant makes irreversible commitments of resources (funds, detailed

designs, materials, etc.). A pre-application meeting is strongly recommended if the proposal has substantial impacts to waters of the U.S., or if it is a large, unique, or controversial project.

USACE Section 10/404 permits do not cover other potential authorizations that are often required. Others may include state or local permits such as a 310 Permit, SPA 124 Permit, 318 Authorization or 401 Water Quality Certification, Navigable Rivers Land Use License, or Floodplain Permit. Local and state governments issue permits or other authorizations to ensure compliance with local and state laws and regulations. The Corps permitting program is in place to ensure your project is in compliance with federal laws and regulations.

Note that this letter is not a DA authorization to proceed. It only informs you of the need to obtain a DA permit if waters of the U.S. will be affected. If the final design includes the placement of fill material in any jurisdictional area described above, or otherwise requires authorization by a DA permit, please submit a Montana Joint Permit Application to this office prior to starting any work. After a review of the materials submitted, we will determine what type of permit, if any, will be required. If waters of the U.S. will not be affected by a jurisdictional activity a DA permit will not be required for the project.

Please refer to identification number **NWO-2023-01787-MT** in any correspondence concerning this project. If you have any questions, please contact the Montana Regulatory Office by email at Montana.Reg@usace.army.mil, or by telephone at (406) 441-1375.

Sincerely,

Montana
Regulatory Team

The Omaha District, Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete our Customer Service Survey found on our website at: https://regulatory.ops.usace.army.mil/customer-service-survey/. Paper copies of the survey are also available upon request for those without Internet access.

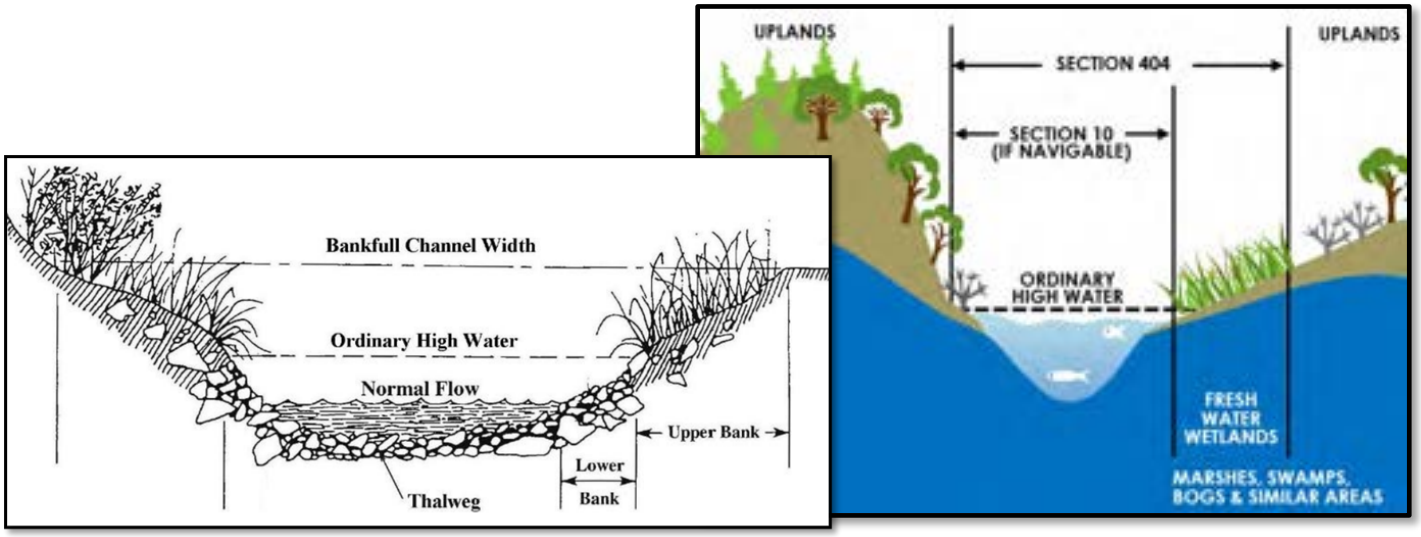
U.S. Army Corps of Engineers – Omaha District, Montana
Additional Information and Resources for Permitting

1. Geographic and Activity Jurisdiction: The U.S. Army Corps of Engineers (USACE) Regulatory Program, administers and enforces **Section 10 of the Rivers and Harbors Act of 1899 (RHA)** and **Section 404 of the Clean Water Act (CWA).**

Under **Section 10 of the RHA**, a permit is required to do **any work in, over or under** a navigable water of the United States or to do **any work that affects the course, location, or condition** of the waterbody in such a manner as to impact on its navigable capacity. Navigable waters in Montana include the Missouri River, most of the Yellowstone River and a portion of the Kootenai River, their impoundments and side channels.

Under **Section 404 of the CWA**, a permit is required for the **discharge of dredged or fill material** into waters of the United States (WOTUS). WOTUS includes the area below the ordinary high water mark of river and stream channels, lakes or ponds connected to the tributary system, and wetlands adjacent to these waters. Other waters and wetlands, as well as man-made ditches and channels, may be WOTUS in certain circumstances, which must be determined by the Corps on a case-by-case basis.

There are some activities that have been determined to be exempt from USACE regulation. For example, discharges resulting from normal farming, silviculture, and ranching activities (plowing, seeding, cultivating, etc.) are generally not subject to regulation under Section 404 of the CWA. To be considered exempt, these activities must occur in the context of established (on-going) farming operations. You should obtain confirmation from the Corps to avoid a potential violation of federal law before conducting any discharge you believe is exempt.



2. Pre-Application Meeting: Applicants can request a pre-application consultation or meeting – virtual or in-person, on or off-site. This is an optional step, but helpful in determining the information needed for permitting, additional authorizations that may be needed, alternatives, and options for permitting before an applicant makes irreversible commitments of resources (funds, detailed designs, materials, etc.). Send requests for Pre-App meetings to Montana.Reg@usace.army.mil and include information on point of contacts, location, and preliminary project details.

3. Application Submission: Applicants should submit their application package, including maps, plans and drawings to Montana.Reg@usace.army.mil. Submit complete, detailed, and thorough information regarding the project. Processing time cannot begin until the Corps receives complete application information, including proper drawings. We need to be able to locate the project (detailed location map) and easily determine and verify dimensions and position of the project (site plan and cross section drawings).

4. Aquatic Resource Inventory: The application package must include a delineation of waters of the United States and special aquatic sites, including wetlands or pool and riffle complexes, and other waters, such as lakes, ponds and ditches, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by USACE to include the use of the 1987 Wetland Delineation Manual and appropriate Regional Supplements. USACE can perform the delineation upon request; however, this may take time to schedule due to often high workloads in USACE District Regulatory offices. Therefore, delineations are typically performed by a consultant hired by the property owner and verified by USACE personnel.

5. Project Evaluations & Alternatives: USACE evaluation of a Section 10 and/or a Section 404 permit application involves multiple analyses, including (1) evaluating the proposal's impacts in accordance with the National Environmental Policy Act (NEPA) (33 CFR part 325), (2) determining whether the proposal is contrary to the public interest (33 CFR § 320.4), and (3) in the case of a Section 404 permit, determining whether the proposal complies with the Section 404(b)(1) Guidelines (Guidelines) (40 CFR part 230). If the proposal requires a Section 404 permit application, the Guidelines specifically require that "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 CFR § 230.10(a)). Time and money spent on the proposal prior to applying for a Section 404 permit cannot be factored into the Corps' decision whether there is a less damaging practicable alternative to the proposal.

6. Endangered Species and Critical Habitat: The Endangered Species Act requires Federal agencies to consult with the U.S. Fish and Wildlife Service (Service) and the National Marine Fisheries Service, as appropriate, if an activity that requires Federal authorization (such as a USACE permit) may affect endangered or threatened species or critical habitat. For non-Federal permittees, if any listed species or designated critical habitat might be affected or is in the vicinity of the activity, or if the activity is located in designated critical habitat, the application must include the name(s) of those endangered or threatened species that might be affected by the proposed activity or utilize the designated critical habitat that might be affected by the proposed activity. The Service has developed an online system that allows users to find information about sensitive resources that may occur within the vicinity of a proposed project. The "Information, Planning and Conservation System," (IPaC), is located at: https://ipac.ecosphere.fws.gov/.

7. Historic and Cultural Resources: Section 106 of the National Historic Preservation Act (NHPA) requires the Corps to take into account the effects that activities authorized by Department of the Army permits are likely to have on historical properties listed in, or eligible for listing in, the National Register of Historic Places (NRHP). Any structure over fifty years of age is considered historic and is potentially eligible for listing on the NRHP unless it has been previously determined ineligible. State Historic Preservation Officers (SHPO) and Tribal Historic Preservation Officers (THPO) are provided the opportunity to review and comment on all individual permit activities and certain general permit activities. For non-Federal permittees, if the activity might have the potential to cause effects to a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the NRHP, the application must state which historic property might have the potential to be affected by the proposed activity or include a vicinity map indicating the location of the historic property. Inquiry with the Montana SHPO is recommended to determine the presence of any associated historic resources in the area. Contact information can be found at http://mhs.mt.gov/shpo.

8. Water Quality Certification: Section 401 of the Clean Water Act requires any applicant for a permit for an activity that may result in the discharge of a pollutant into WOTUS to obtain a certification that the discharge will comply with applicable effluent limitations and water quality standards. Applications for water quality certifications are reviewed by states, Tribes, or the U.S. Environmental Protection Agency (EPA). Water quality certifications are required for USACE permits that authorize discharges of

dredged or fill materials into WOTUS. Some of the Nationwide Permits (NWP) or Regional General Permits (RGP) have WQC granted for them already; individual permits and other NWP/RGP will require individual certification. Contact our office to determine the appropriate Water Quality Agency for your project.

9. Mitigation: Mitigation consists of avoidance, minimization, and compensation. USACE requires that applicants consider and use all reasonable and practical measures to avoid and minimize impacts to aquatic resources. You are required to submit a mitigation plan/statement with an application if impacts will occur to 0.10 acre of wetlands and/or 0.03 acre of stream.

Compensatory mitigation is the restoration, establishment, enhancement, and in certain circumstances, preservation of aquatic resources to offset unavoidable adverse impacts. Compensatory mitigation is accomplished through purchase of credits from a mitigation bank or in-lieu fee program, or permittee-responsible mitigation. During the application review process, the Corps will determine whether compensatory mitigation is necessary, and may require the applicant submit a plan for conducting proposed compensatory mitigation.

10. Activities Affecting Structures or Works Built by the United States: If any aspect of your proposed project is located within the vicinity of an existing USACE federally authorized Civil Works project (a "USACE project"), you may be required to seek permission from USACE pursuant to 33 U.S.C. 408 (Section 408) and/or real estate related permissions. Alterations/modifications to completed USACE projects requires a USACE permission pursuant to Section 408. In addition, real estate permissions may be necessary if the proposed project would affect United States real estate interests managed by USACE. For information on our Section 408 request process or to determine whether a Section 408 or real estate permission is required, please contact: Section408NWO@usace.army.mil

11. United States Coast Guard (USCG): In Montana, the Missouri River, portions of the Kootenai River, and the majority of the Yellowstone River are considered navigable waters of the U.S. as determined by USACE. The state of Montana considers additional waterways to be navigable waterways. The USCG is the agency with the authority to regulate the construction, operation, and maintenance of bridges and causeways in or across navigable waters under Section 9 of the Rivers and Harbors Act. Aerial trams and conveyors, aqueducts, utility lines, overhead pipelines, and similar structures that are affixed to a bridge span over waters of the U.S., are themselves considered a bridge structure. If the proposed work involves bridging or crossing of a navigable water the work may be regulated by the USCG.

To determine USCG requirements, please contact:

Commander (dpw)
13th Coast Guard District
915 2nd Avenue, Room 3510
Seattle, WA. 98174-1067
Attn: Waterways Management Branch
(206) 220-7282 | D13-SMB-D13-DPW@uscg.mil

12. Other Federal, State, or Local Permits: A USACE Section 10/404 permit does not cover other potential authorizations that may be required. Others may include state or local permits such as a 310 Permit, SPA 124 Permit, 318 Authorization or 401 Water Quality Certification, Navigable Rivers Land Use License, or Floodplain Permit. Local and state governments issue permits or other authorizations to ensure compliance with local and state laws and regulations. The Corps permitting program is in place to ensure your project is in compliance with federal laws and regulations.

See the Montana Department of Natural Resources & Conservation – Stream Permitting website for details: https://dnrc.mt.gov/Licenses-and-Permits/Stream-Permitting/

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, OMAHA DISTRICT
MONTANA REGULATORY OFFICE
100 NEILL AVENUE
HELENA, MONTANA 59601-3329

October 30, 2024

SUBJECT: No Permit Required – Lakeside Wastewater System Improvements, Flathead Lake - Flathead County; File No. **NWO-2023-01787-MT**

Robert Peccia & Associates
Attn: Trisha Bodlovic
3147 Saddle Drive
Helena, Montana 59601

Dear Ms. Bodlovic:

This is in response to your letter dated October 23, 2024, wherein you inquire of the necessity to obtain a Department of the Army Permit for the force main installation project. The project's entry and exit bore pits are located at Latitude 48.108331°, Longitude -114.234317° and Latitude 48.107892°, Longitude -114.228755°, within Section 15, Township 27 N, Range 21 W, Lakeside, Flathead County, Montana.

We are responding to your request for nationwide permit verification regarding the proposed force main installation project. The force main will be installed via directional drilling beginning and ending outside the wetland boundary and will be installed 20-feet below the ground surface. No material will be placed in waters of the U.S. including wetlands.

This project has been reviewed in accordance with Section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). Under the authority of Section 404 of the Clean Water Act (CWA), Department of the Army (DA) permits are required for the discharge of fill material into waters of the United States. Waters of the U.S. include the area below the ordinary highwater mark of stream channels and lakes, or ponds connected to the tributary system, and wetlands adjacent to these waters. Isolated waters and wetlands, as well as man-made channels, may be waters of the U.S. in certain circumstances, which must be determined on a case-by-case basis. Under the authority of Section 10 of the Rivers and Harbors Act, DA permits are required for structures or work in, over, under or affecting navigable waters of the U.S.

Based on the information you have provided on October 23, 2024, we have determined that the proposed work will not result in a permanent or temporary discharge of dredged or fill material in waters of the U.S., nor does it include any structure or activity in, over, or under a navigable water of the U.S. Therefore, your

proposed project as described does not require DA authorization pursuant to Section 404 of the Clean Water Act (CWA) or Section 10 of the Rivers and Harbors Act of 1899 (RHA). Measures should be taken to prevent construction materials and/or activities from entering any waters of the United States. Appropriate soil erosion and sediment controls should be implemented onsite to achieve this end.

We are relying on the information and data provided by the applicant or agent in the permit application. If such information and data subsequently prove to be materially false or materially incomplete, this no permit required determination may be suspended or revoked and/or the Government may institute appropriate legal proceedings. Although a Department of the Army permit will not be required for this activity, this does not eliminate the requirements that other applicable federal, state, tribal, and local permits are obtained if needed prior to commencing with the proposed work.

This letter does not address nor include any consideration for geographic jurisdiction on aquatic resources and shall not be interpreted as such. Should your plans change, or should you wish to obtain a jurisdictional determination from the Corps, please contact this office immediately to determine if a CWA or RHA permit is required for those changes.

Please refer to identification number NWO-2023-01787-MT in any correspondence concerning this project. If you have any questions, please contact me by email at kayla.urbanowski@usace.army.mil or by telephone at 406-441-1375 x1364.

Sincerely,

Kayla Urbanowski
Regulatory Project Manager

The Omaha District, Regulatory Branch is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete our Customer Service Survey found on our website at: https://regulatory.ops.usace.army.mil/customer-service-survey/. Paper copies of the survey are also available upon request for those without Internet access.

From: Schock, Larry
To: Trisha Bodlovic
Subject: RE: Lakeside County Water Sewer District Wastewater System improvements Project.
Date: Wednesday, October 2, 2024 12:44:55 PM
Attachments: image003.png
image006.png
image007.png
image008.png
image009.png

Yes.

Larry A. Schock, Civil Engineering Specialist
Water Resources Division, Missoula Regional Office
Montana Department of Natural Resources and Conservation
2704 Spurgin Road, Bldg C, Missoula, Mt 59806, PO BOX 5004
DESK: 406-542-5885 **MOBILE:** 406-360-1632 **EMAIL:** lschock@mt.gov
Website | Facebook | X (Twitter) | Instagram
How did we do? Let us know here: Feedback Survey

From: Trisha Bodlovic <TBodlovic@rpa-hln.com>
Sent: Wednesday, October 2, 2024 12:37 PM
To: Schock, Larry <lschock@mt.gov>
Subject: [EXTERNAL] RE: Lakeside County Water Sewer District Wastewater System improvements Project.

Hi Larry,

Thanks for the response. Just to confirm for this and future projects, although the project will be directional drilling underneath the floodplain and will not be open-digging inside the designated floodplain to install the transmission main, a floodplain development permit will still be required?

Thanks!
Trish

Trisha Bodlovic | Environmental and Funding Specialist
p: 406-447-5006 | **c:** 406-439-5886 | **e:** tbodlovic@rpa-hln.com

www.rpa-hln.com [rpa-hln.com]

[facebook.com] [linkedin.com]

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From: Schock, Larry <lschock@mt.gov>
Sent: Wednesday, October 2, 2024 12:30 PM
To: Trisha Bodlovic <TBodlovic@rpa-hln.com>
Subject: Lakeside County Water Sewer District Wastewater System improvements Project.

Hello Trisha,

The DNRC water Resources Division has received you letter, dated 2024-09-27, requesting comment.

After reviewing the document the DNRC has the following comments.

1. There is a FEMA mapped Regulatory Floodplain around, and adjacent to your proposed construction site.
2. Construction within the mapped floodplain will be required to follow the Flathead County Floodplain and Floodway Management Regulations and require a floodplain permit from Flathead County. The DNRC recommends that you consult with them regarding a floodplain permit.

Please let me know if you have any questions.

Larry A. Schock, Civil Engineering Specialist
Water Resources Division, Missoula Regional Office
Montana Department of Natural Resources and Conservation
2704 Spurgin Road, Bldg C, Missoula, Mt 59806, PO BOX 5004
DESK: 406-542-5885 **MOBILE:** 406-360-1632 **EMAIL:** lschock@mt.gov
Website | Facebook | X (Twitter) | Instagram
How did we do? Let us know here: Feedback Survey

Trisha Bodlovic

From: Murdo, Damon <dmurdo@mt.gov>
Sent: Wednesday, October 2, 2024 2:53 PM
To: Trisha Bodlovic
Subject: LAKESIDE COUNTY WATER AND SEWER DISTRICT SYSTEM IMPROVEMENTS
Attachments: Reports.pdf; Sites.pdf; 20241001008.pdf

October 2, 2024

Trisha Bodlovic
RPA
3147 Saddle Drive
Helena MT 59601

MONTANA HISTORICAL SOCIETY
State Historic Preservation Office

RE: LAKESIDE COUNTY WATER AND SEWER DISTRICT SYSTEM IMPROVEMENTS. SHPO Project #: 20241001008

Dear Trisha:

I have conducted a cultural resource file search for the above-cited project located in Section 17 T26N R20W, and Sections 11, 12, 13, 14, T27N R21W. According to our records there have been a few previously recorded sites within the designated search locales. In addition to the sites there have been a few previously conducted cultural resource inventories done in the areas. I've attached a list of these sites and reports. If you would like any further information regarding these sites or reports, you may contact me at the number listed below.

It is SHPO's position that any structure over fifty years of age is considered historic and is potentially eligible for listing on the National Register of Historic Places. If any structures are within the Area of Potential Effect, and are over fifty years old, we would recommend that they be recorded, and a determination of their eligibility be made prior to any disturbance taking place.

As long as there will be no disturbance or alteration to structures over fifty years of age, we feel that there will be no cultural or historic properties affected by this undertaking. We, therefore, feel that a recommendation for a cultural resource inventory is unwarranted at this time. However, should structures need to be altered or if cultural materials are inadvertently discovered during this project, we would ask that our office be contacted, and the site investigated.

FYI: The MT SHPO is now paperless!
For all future file search and consultations with the MT SHPO please use the new Montana Cultural Resource Database to upload your projects. You can find instructions for how to upload your documents on our website.

If you have any further questions or comments, you may contact me at (406) 444-7767 or by e-mail at dmurdo@mt.gov. I have attached an invoice for the file search. Thank you for consulting with us.

Sincerely,

Damon Murdo
Cultural Records Manager
State Historic Preservation Office

STATE HISTORIC PRESERVATION OFFICE
Montana Cultural Resource Database
Report Township,Range,Section Results
Report Date:10/2/2024

Township:27 N Range:21 W Section: 13

DECCO DALE L.

6/1/1989 CULTURAL RESOURCE INVENTORY: SOMERS - EAST PROJECT

Report Document Number: FH 4 3198 Agency Document Number: F82-1(2)0

Township:27 N Range:21 W Section: 14

DECCO DALE L.

6/1/1989 CULTURAL RESOURCE INVENTORY: SOMERS - EAST PROJECT

Report Document Number: FH 4 3198 Agency Document Number: F82-1(2)0

Township:27 N Range:21 W Section: 11

TIMMONS REBECCA S..& CINDY HEMRY

2/20/2008 KOOTENAI NATIONAL FOREST 2007 ANNUAL PA REPORT

Report Document Number: LN 1 30333 Agency Document Number: 07-KO-1/7-04

STATE HISTORIC PRESERVATION OFFICE Montana Cultural Resource Database

Township, Range, Section Report

Report Date:10/2/2024

Site #	Twp	Rng	Sec	Qs	Site Type 1	Site Type 2	Time Period	Owner	NR Status
24FH0276	27N	21W	14	SW	Historic Homestead/Farmstead		Historic Period	Private	Eligible
24FH0350	27N	21W	14	NE	Historic Railroad		Historic More Than One Decade	Private	Eligible
24FH0408	27N	21W	13	SW	Historic Homestead/Farmstead		No Data	Private	Undetermined*
24FH0469	27N	21W	12	SE	Historic Barn		1910-1919	State Owned	NR Listed

Appendix J: Public Involvement

LAKESIDE COUNTY WATER AND SEWER DISTRICT

WASTEWATER TREATMENT FACILITY UPGRADE PROJECT

April 2024 Newsletter

WHAT IS THE PROJECT?

The Lakeside County Water and Sewer District (LCWSD) Wastewater Treatment Facility Upgrade Project includes **two phases**.

- The **first phase** includes construction of a new **screening and grit removal facility** which will be constructed at the LCWSD's existing wastewater treatment facility (WWTF) site to screen raw septage and remove inorganic materials such as plastics and grit. Additionally, a new Septage Receiving and Treatment Facility (SRTF) will include a **septage unloading site** where septage pumped from septic tanks within Flathead County can be disposed. The septage facility will not be operational until Phase II is completed.

- A **second phase** will include construction of a **specialized wastewater treatment facility** that will treat LCWSD's normal wastewater flows along with septage. This facility will provide higher levels of treatment using the latest technologies compared to what is provided today by the current treatment. Relatively, the septage will be a small proportion of wastewater received by LCWSD daily.

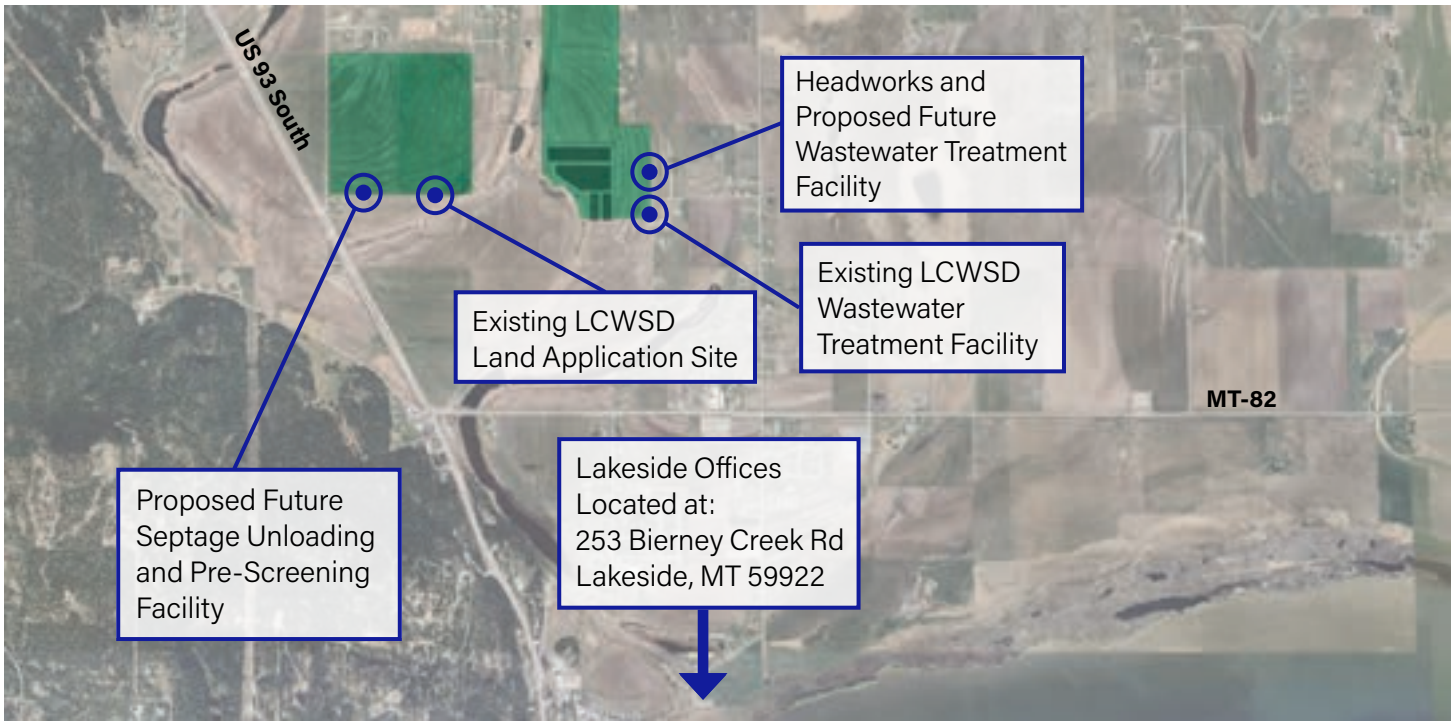
WHY IS THIS PROJECT NEEDED?

After nearly 40 years of service, the original LCWSD wastewater treatment system is nearing the end of its useful life and has very little capacity to accept additional wastewater from ongoing growth and development in the area. Additionally, material from onsite wastewater treatment systems (commonly called septic systems) must be pumped regularly, and limited options are currently available for treatment and disposal within Flathead County. A **single combined facility** is the most efficient, economical solution to treat septage generated within the County while simultaneously increasing municipal wastewater treatment capacity for the LCWSD.

This project is needed to serve current residents and businesses and **accommodate anticipated future residential and commercial growth** expected in the coming years within Flathead County and the LCWSD boundaries. Upgraded and expanded wastewater treatment capacity will responsibly serve the regional community while continuing to **protect Flathead Lake and the surrounding natural environment**.

WHERE IS THE PROJECT LOCATED?

The new Septage Receiving and Treatment Facility (SRTF) will be located west of the existing LCWSD wastewater treatment facility (WWTF) on property owned by the District.



WHO ARE THE PROJECT PARTNERS?

LCWSD is leading development of the WWTF project. Under an Interlocal Agreement signed on **March 19, 2024**, Flathead County will pay LCWSD to design, construct, operate, and maintain the new SRTF[2], which is an addition to the project the District was previously planning. Robert Peccia & Associates (RPA) is the engineering firm contracted to provide design services to LCWSD.

CONTACTS

RODNEY OLSON
General Manager
(406) 844-3881
rodneyolson@lcwsd.net

BRAD KOENIG, PE
Project Manager
(406) 447-5044
bkoenig@rpa-hln.com

SARAH NICOLAI, PE, PTP
Public Involvement
(406) 447-5038
snicolai@rpa-hln.com

HOW MUCH WILL THE NEW FACILITIES COST? WHO IS PROVIDING THE FUNDING?

The total project (both phases) is estimated to cost $26-$30 million to design and construct.

Flathead County has received grant funding from multiple sources, including the American Rescue Plan Act (ARPA) and the Montana Department of Natural Resources and Conservation (DNRC). Additional grant funding from the United States Environmental Protection Agency (EPA) and the Western Montana Conservation Commission (WMCC) is pending. Under the terms of the **March 19, 2024** Interlocal Agreement, Flathead County will make periodic payments to LCWSD as design and construction is completed. LCWSD has also received funding that will be used for the project.

WHAT IS THE ANTICIPATED PROJECT TIMELINE?

MARCH 2024
Interlocal Agreement signed between Flathead County and LCWSD, with Flathead County providing funding for LCWSD to build, own, operate, and maintain new SRTF.

SPRING 2024
Project planning, design, permitting, and environmental review process to begin for the SRTF and WWTP facility upgrades.

SUMMER 2024
Phase I design submitted to DEQ for review and approval.

WINTER 2024/2025
Construction of Phase I SRTF and WWTP facility upgrades to begin.

DECEMBER 2026
Phase II anticipated construction completion.

JANUARY 2027
Operation of new facility to begin.

WHO IS OVERSEEING THE PROJECT?

LCWSD is required to provide quarterly progress reports to Flathead County outlining the expenditure of funds.

Additionally, LCWSD is required to obtain all necessary project permits, including a Montana Department of Environmental Quality (DEQ) discharge permit. No septage will be received at the LCWSD facility until the project design is approved by DEQ and construction of the Phase I and Phase II facilities has been completed. If LCWSD fails to obtain necessary permits, Flathead County may provide written notice of default and seek reimbursement of project funds.

To submit comments, access project documents, review Frequently Asked Questions (FAQs), and learn more about the project, please visit: **rpa-hln.com/lcwsd**

[1]*Source: Flathead County Regional Septage Treatment Facility website, https://flathead.mt.gov/department-directory/commissioners-office/project-and-engineering/septage-treatment, Frequently Asked Questions (FAQs), accessed April 2024.*
[2]*Source: Flathead County Regional Septage Treatment Facility website, https://flathead.mt.gov/department-directory/commissioners-office/project-and-engineering/septage-treatment, Lakeside County Water and Sewer District Interlocal Agreement - March 19, 2024, accessed April 2024.*

WELCOME!

Lakeside County Water
& Sewer District

Wastewater Treatment Facility
Upgrade Project

Open House

Stay Informed

Learn more about the project and why improvements are needed

Share your comments and questions

Visit the project website at:
www.rpa-hln.com/lcwsd

Contact:

Brad Koenig
RPA Project Manager
(406) 447-5044
bkoenig@rpa-hln.com

SCAN ME

PROJECT OVERVIEW

WHY IS LCWSD UPDATING ITS WASTEWATER TREATMENT FACILITY (WWTF)?

- The original LCWSD system was constructed in the 1980s to reduce public health hazards and nutrient loading into Flathead Lake.
- After nearly 40 years of service, the system is nearing the end of its useful life and has very little capacity to accept additional wastewater from ongoing growth and development in the area.
- A Wastewater Treatment Facility system upgrade is now needed to transition to **modern, efficient treatment methods** and expand wastewater treatment capacity to responsibly serve the regional community while continuing to protect Flathead Lake and the surrounding natural environment.

WHY IS LCWSD PARTNERING WITH FLATHEAD COUNTY TO PROVIDE SEPTAGE TREATMENT?

- The need for treatment of septage (or septic tank waste) has increased with an increasing population. Untreated septage is currently applied to the surface of undeveloped lands. There is an increasing shortage of land available for this purpose as uses are changing within the valley.
- Flathead County originally planned to construct a stand-alone County facility near Lakeside and deliver semi-treated water to LCWSD.
- However, LCWSD and Flathead County agreed to partner on a single combined facility for the following reasons:
  - Cost: Constructing and managing a single facility is more economical and efficient than two separate facilities.
  - Environment: A single facility minimizes disturbance to the land and environment.
  - Community Growth: The combined project will efficiently and economically serve current residents and businesses while also accommodating anticipated future residential and commercial growth, both within the District and Flathead County.

HOW DOES THIS PROJECT BENEFIT LCWSD CUSTOMERS?

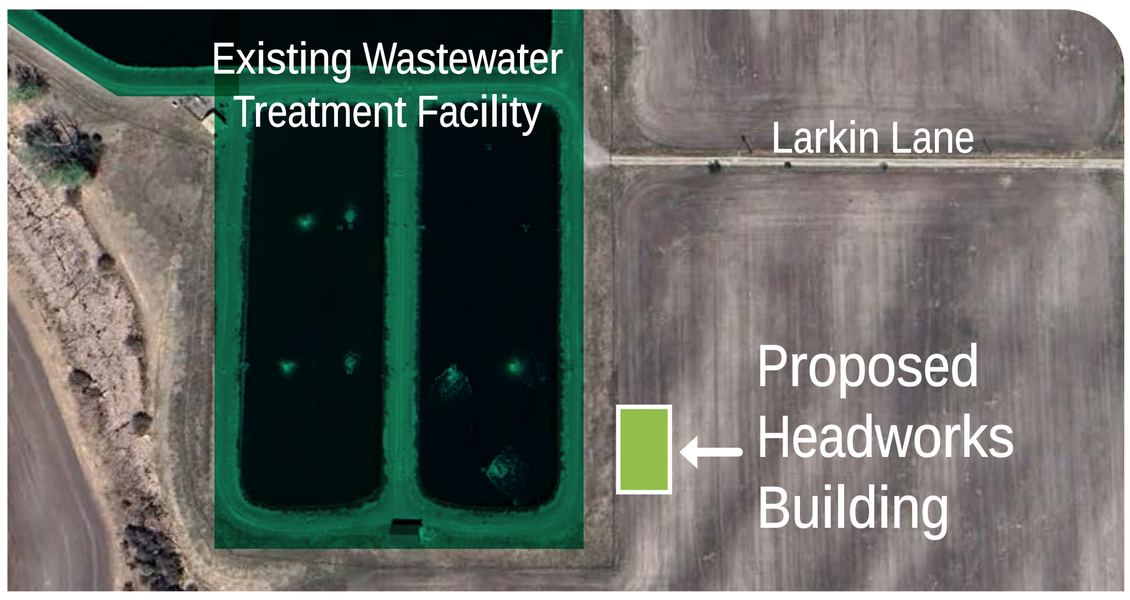
- In addition to providing safeguards for human health and the natural environment, the project will enable LCWSD to maintain a stable rate structure for its customers.
- Grant funding from federal and state programs will enable the design and construction of facility upgrades while keeping fees affordable for ratepayers.

HOW MUCH WILL THE NEW FACILITIES COST?

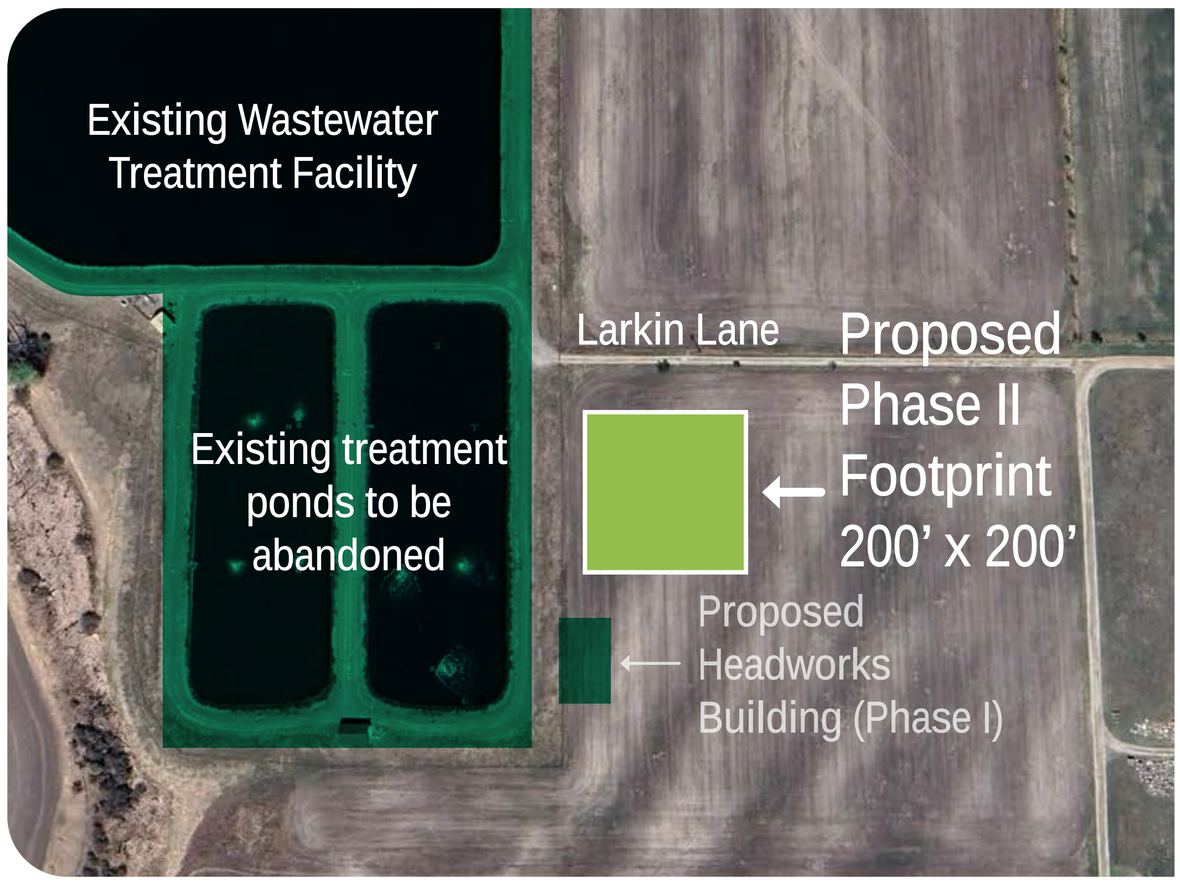
- The project is estimated to cost approximately $26-30 million to construct.
- LCWSD and Flathead County have received grant funding from multiple sources, including the American Rescue Plan Act (ARPA).

THE LCWSD WASTEWATER TREATMENT FACILITY UPGRADE PROJECT CONSISTS OF TWO PHASES

Phase I includes construction of a **new headworks/screening facility and grit removal facility**, which will be located at the LCWSD's existing wastewater treatment facility site to screen raw wastewater and remove inorganic materials such as plastics and grit.



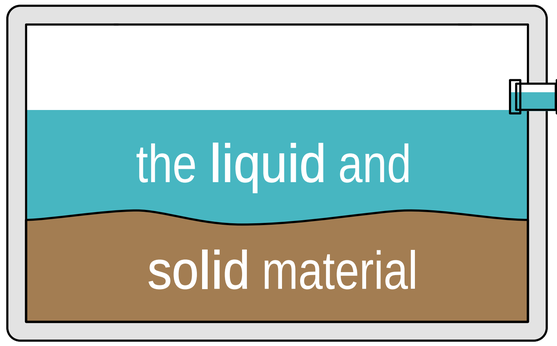
Additionally, a **new Septage Receiving and Treatment Facility (SRTF)** will be constructed at the LCWSD's existing land application site. The septage facility will include a septage unloading site where septage pumped from septic tanks within Flathead County can be disposed. The septage facility will not be operational until Phase II is completed.



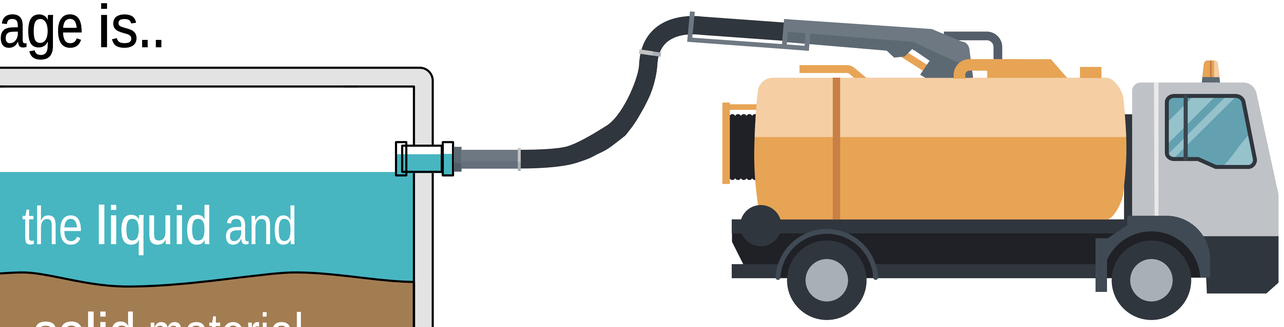
Phase II will include construction of **a specialized wastewater treatment facility** that will treat LCWSD's normal wastewater flows along with septage. This facility will provide **higher levels of treatment** than what is possible today by the current treatment facility. It will have **special design features** to handle the new septage volume and concentration. Relatively, the septage will be a small proportion of wastewater received by LCWSD daily.

WHAT IS SEPTAGE?

Septage is..

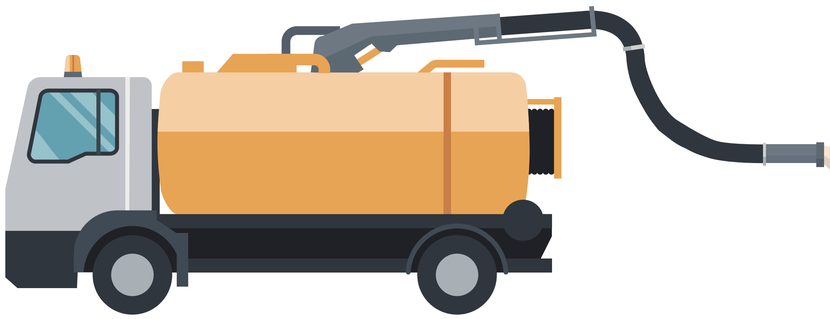


pumped from septic tanks.



Septic tanks
should be pumped every
three-five years.

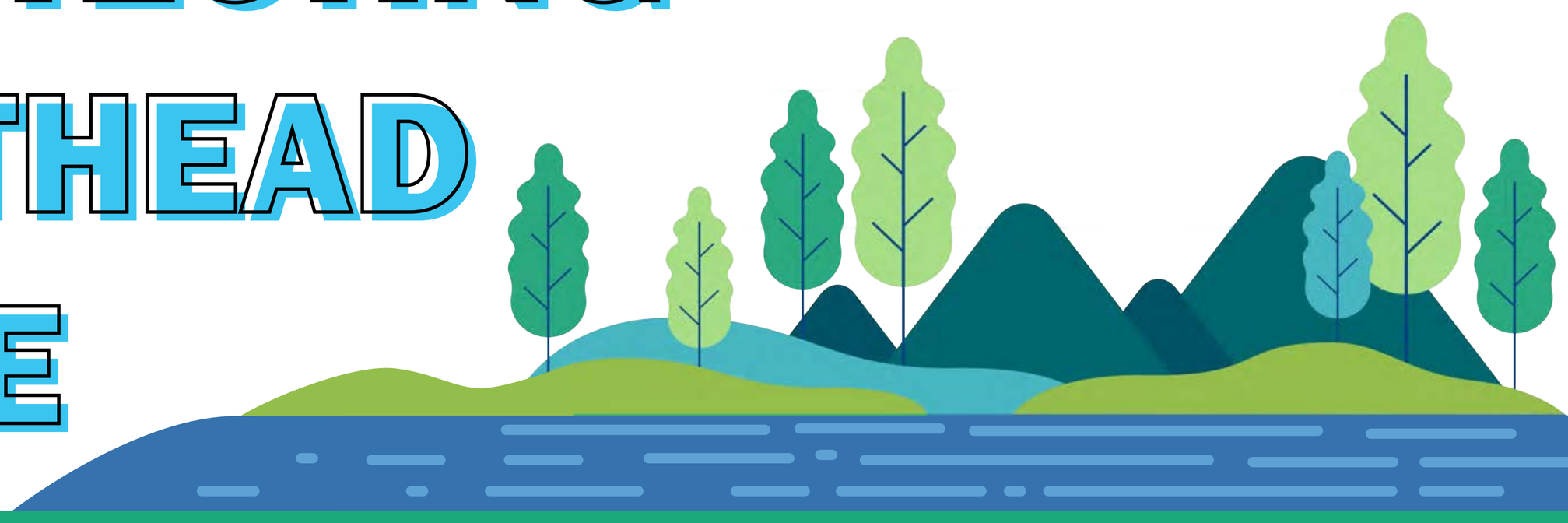
There are approximately
30,000
septic tanks
in the Flathead Valley,
with hundreds
more added each year.



It is estimated that
30,000-40,000 gallons
of septage is pumped every day
in the Flathead Valley.

Where does septage currently go?
The majority of septage is
land applied directly to **agricultural fields**.

PROTECTING FLATHEAD LAKE



STEWARDSHIP OF FLATHEAD LAKE

- The original LCWSD facility was constructed using U.S. EPA funding in 1987 to install a wastewater collection and treatment system as a means to protect Flathead Lake.
- Providing this service remains the goal of the District today.
- The District intends to continue its environmental stewardship by effectively collecting and treating wastewater within the District's service area.

2019 LEAKAGE TEST

In response to claims that the LCWSD treatment ponds were leaking, the *Lakeside Wastewater System Pond Seepage Test Analysis* was completed by Jackola Engineering in 2019.

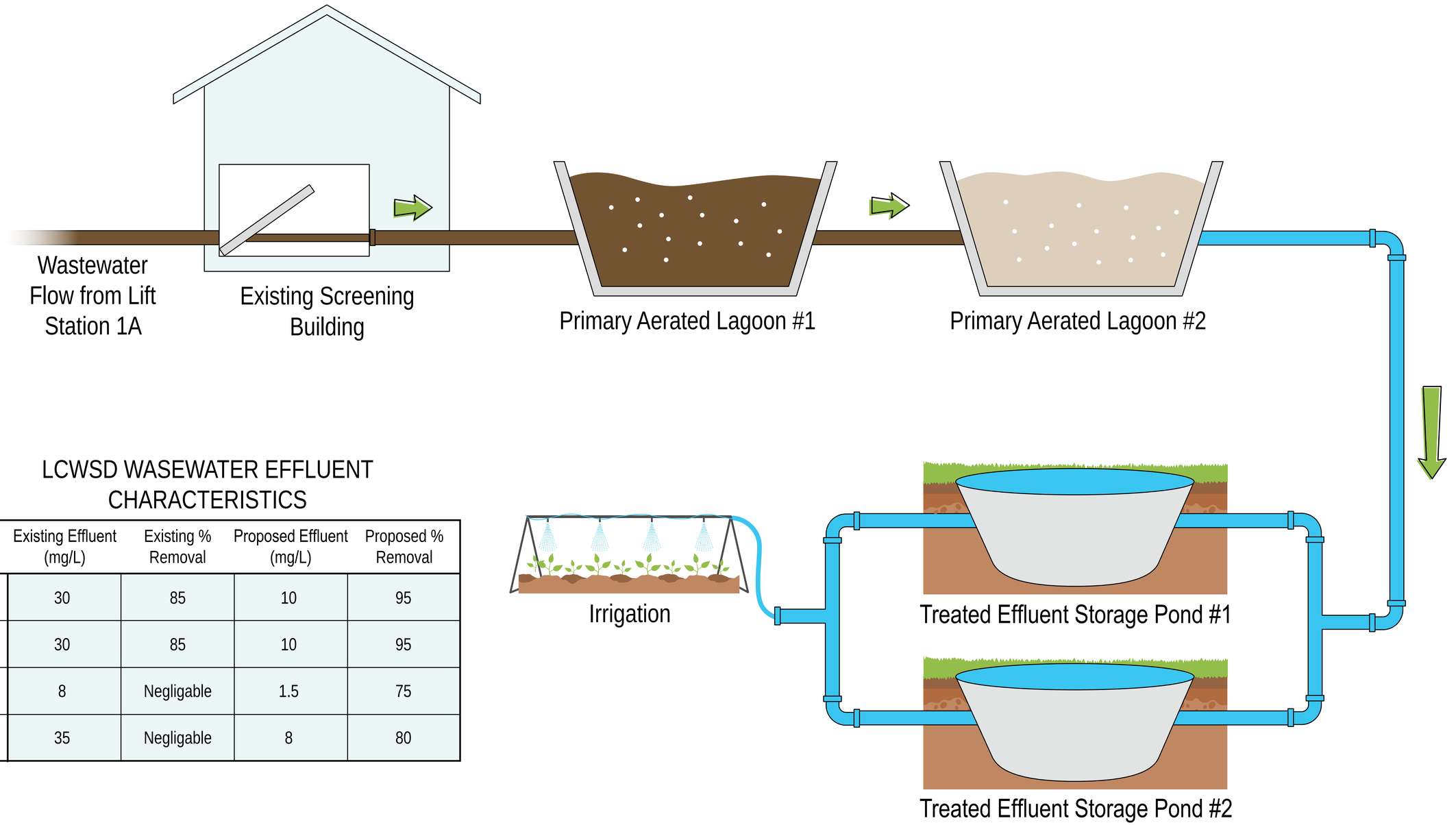
How was the test conducted?

The WWTF pond levels were monitored over a 6-day period.

What were the results?

- All pond seepage values were determined to be negative, suggesting pond evaporation exceeded pond seepage per wastewater standards outlined in DEQ Circular 2. As such, the analysis concluded: there is no seepage.
- The District has no reason to believe the ponds leak as they all hold water year-round with no indication of leakage.

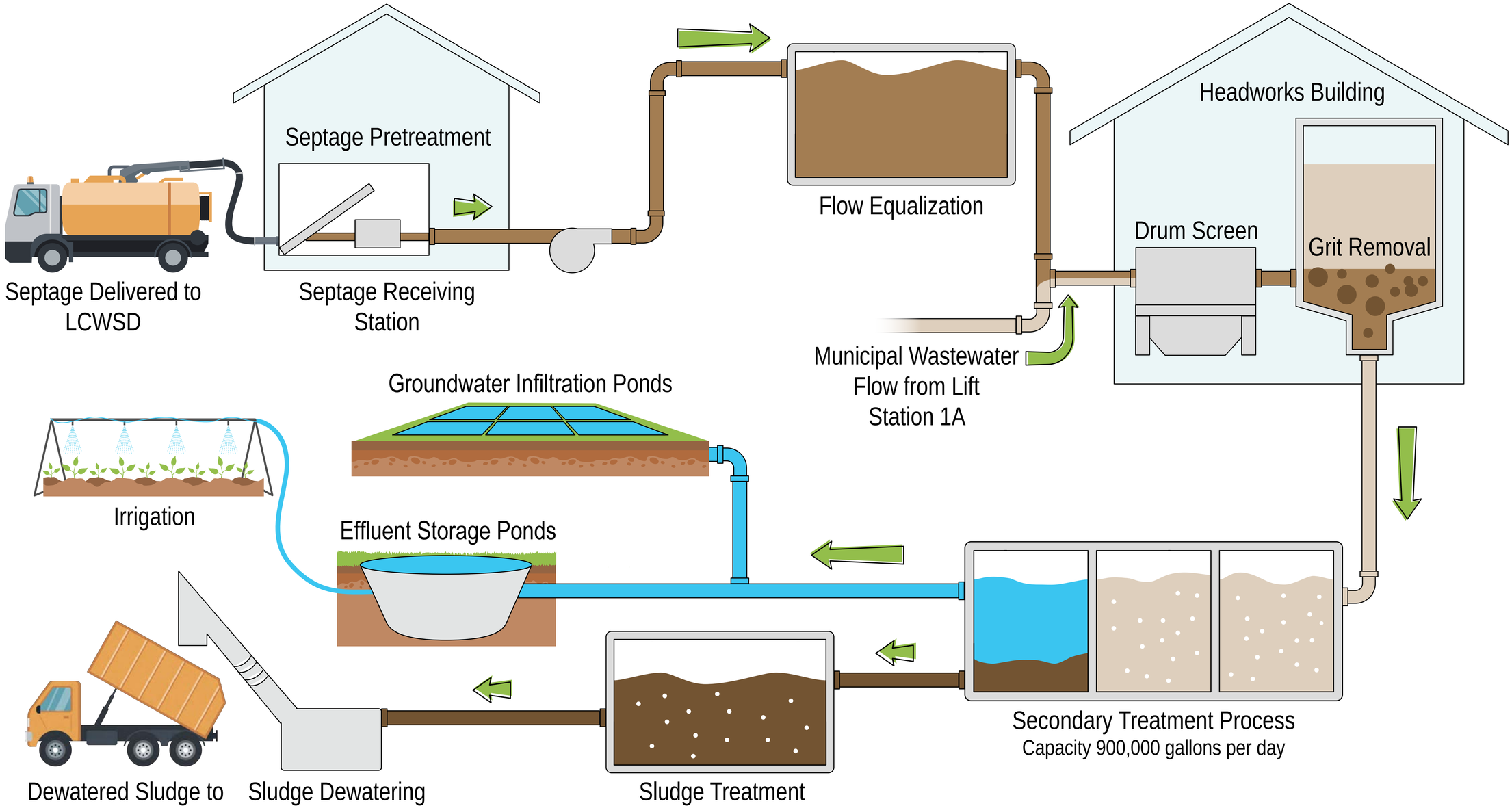
EXISTING WASTEWATER TREATMENT FLOW PATH



LCWSD WASEWATER EFFLUENT CHARACTERISTICS

	Existing Effluent (mg/L)	Existing % Removal	Proposed Effluent (mg/L)	Proposed % Removal
TSS	30	85	10	95
BOD	30	85	10	95
TP	8	Negligable	1.5	75
TN	35	Negligable	8	80

HYDRAULIC PROFILE



TIMELINE

The original LCWSD facility was constructed using U.S. Environmental Protection Agency (EPA) funding in 1987 to install a wastewater collection and treatment system as a means to protect Flathead Lake. Providing this service remains the goal of the District today. The District intends to continue its environmental stewardship by effectively collecting and treating wastewater within the District's service area.

2021

LCWSD began planning to upgrade its WWTF to process municipal wastewater using modern treatment methods to protect the surrounding environment and water quality.

2022/2023

LCWSD and Flathead County discussed potential opportunities to combine wastewater treatment efforts.

September 14, 2023

Flathead County entered into an Interlocal Agreement with LCWSD, under which the County planned to build, own, and operate a stand-alone facility to treat septage down to residential strength before delivering it to LCWSD for further treatment.

September 15, 2023

Flathead County closed on the purchase of property at 305 Wiley Dike Road in Kalispell where the new County WWTP was intended to be located.

Since the initial interlocal agreement, the County and LCWSD determined that a more effective construction and management model would be to build a single facility that could treat septage and portable bathroom waste while simultaneously increasing wastewater treatment capacity for the LCWSD.

March 19, 2024

The Flathead County Commissioners unanimously voted to enter into a new Interlocal Agreement with LCWSD to improve and expand wastewater treatment for the County.

March 28, 2024

The Flathead County Commissioners unanimously voted to sell the property located at 305 Wiley Dike Road in Kalispell to LCWSD.

Phase I

March - April 2024

Preliminary engineering

May 2024

Environmental process completed

May 2024

Groundwater discharge permit application complete

May 2024

DEQ preparing draft permit

Letters about the project have been sent to agencies listed below.
No negative comments have been received.

- U.S. Fish and Wildlife Service (FWS)
- Montana Department of Environmental Quality (DEQ)
- Montana Fish, Wildlife, and Parks (FWP)
- Montana Department of Natural Resources and Conservation (DNRC)
- Montana State Historic Preservation Office (SHPO)

April - August 2024

Project design

August 1, 2024

Submit Phase I design to DEQ for review

Winter 2024 - Spring 2025

Construction to begin

November 2025

Anticipated construction completion

Phase II

March - July 2024

Preliminary engineering

July 2024 - March 2025

Project design

TBD

Construction to begin

TBD

Anticipated construction completion

WHERE ARE WE NOW?

GROUNDWATER PERMIT APPLICATION IS COMPLETE

- DEQ is currently preparing the draft groundwater discharge permit.

ENVIRONMENTAL PROCESS IS COMPLETE

Letters about the project have been sent to agencies listed below.
No negative comments have been received.

- U.S. Fish and Wildlife Service (FWS)
- Montana Department of Environmental Quality (DEQ)
- Montana Fish, Wildlife, and Parks (FWP)
- Montana Department of Natural Resources and Conservation (DNRC)
- Montana State Historic Preservation Office (SHPO)

PHASE I

- Design is currently underway.
- Design will adhere to LCWSD, Flathead County, and DEQ standards and regulations.

PHASE II

- Project planning is ongoing.
- Secondary treatment process to be decided by Fall 2024.
- Phase II design to follow.

PROPERTY AT 305 WILEY DIKE ROAD IN KALISPELL

- Flathead County initially purchased when there were plans for two separate facilities.
- On March 28, 2024, the Flathead County Commissioners voted to sell the property to LCWSD.
- LCWSD is determining future use of the land, options include agricultural (LCWSD would lease out), buffer zone, and possible wetland mitigation.

- No volume of wastewater exceeding the existing Wastewater Treatment Facility's capacity will be accepted until Phase II improvements are constructed.
- No septage will be accepted until construction Phase II is completed.

LAKESIDE
WATER & SEWER

LAKESIDE COUNTY WATER AND SEWER DISTRICT

WASTEWATER TREATMENT UPDATE & COLLECTION SYSTEM UPGRADES

May 2025 Update

WWTF UPGRAGES PROJECT

The original LCWSD system was constructed in 1987 to reduce public health hazards and nutrient loading into Flathead Lake. After nearly 40 years of service, the system is nearing the end of its useful life and has very little capacity to accept additional wastewater from ongoing growth and development in the area. A WWTF system upgrade is needed to transition to modern, efficient treatment methods and expand wastewater treatment capacity to responsibly serve the regional community while continuing to protect Flathead Lake and the surrounding natural environment. Similarly, collection System Improvements are needed to enhance system reliability and increase capacity.

PHASE I UPDATE

Construction of Phase I is currently underway!

The Phase I project includes:

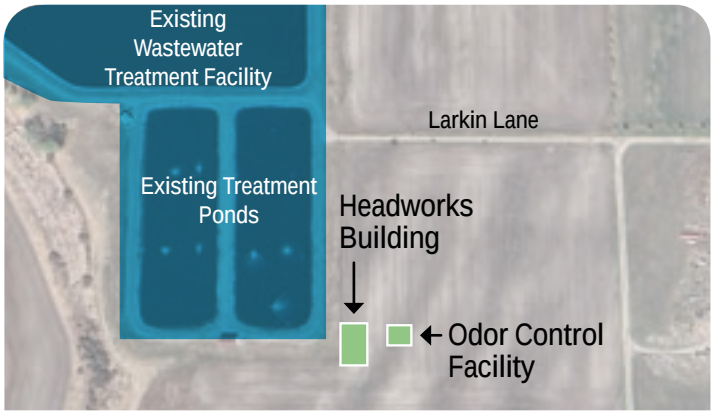
- A new Headworks Building (Screening and Grit Removal) at the Existing WWTF Site
- Lift Station #10 Upgrades
- Construction of the Septage Receiving Facility
- Odor Control Facilities at the Headworks (Sized for Phase I and Phase II of the WWTF Improvements) and the Septage Receiving Facility

Phase I of the WWTF Improvements will primarily utilize grant funding.

April 28, 2025 — Groundwater Discharge Permit Issued and Environmental Assessment Finalized

May 2025 — Construction of Phase I Improvements Begins

November 2025 — Anticipated Phase I Construction Completion



PHASE II UPDATE

Final Phase II planning is currently in progress with the ground water discharge permit issued, planning will soon be finalized. A new Headworks Building (Screening and Grit Removal) at the Existing WWTF Site.

The Phase II Project Includes:

- Secondary Treatment
- Solids Handling
- Effluent Disposal

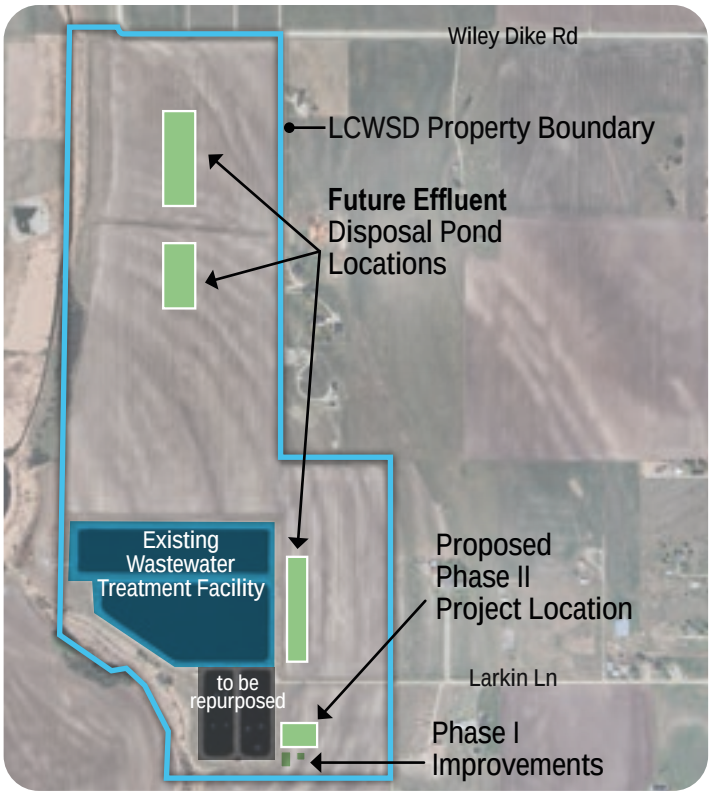
April 28, 2025 — Groundwater Discharge Permit Issued

May 2025 — Final Planning

June - March 2026 — Project Design

Summer-Fall 2026 — Construction Begins

Fall 2027 — Construction Completion



COLLECTION SYSTEM UPGRADES

The collection system infrastructure was largely installed in 1987 and is in need of updating. Improvements to the Collection System will increase the capacity of the main wastewater trunk line along Highway 93 and several of the pump stations along this corridor will be upgraded.

Design of the Collection System Improvements is currently underway with surveyors on site for this project along Highway 93. Construction of improvements is expected to begin in 2026.

Project Objectives

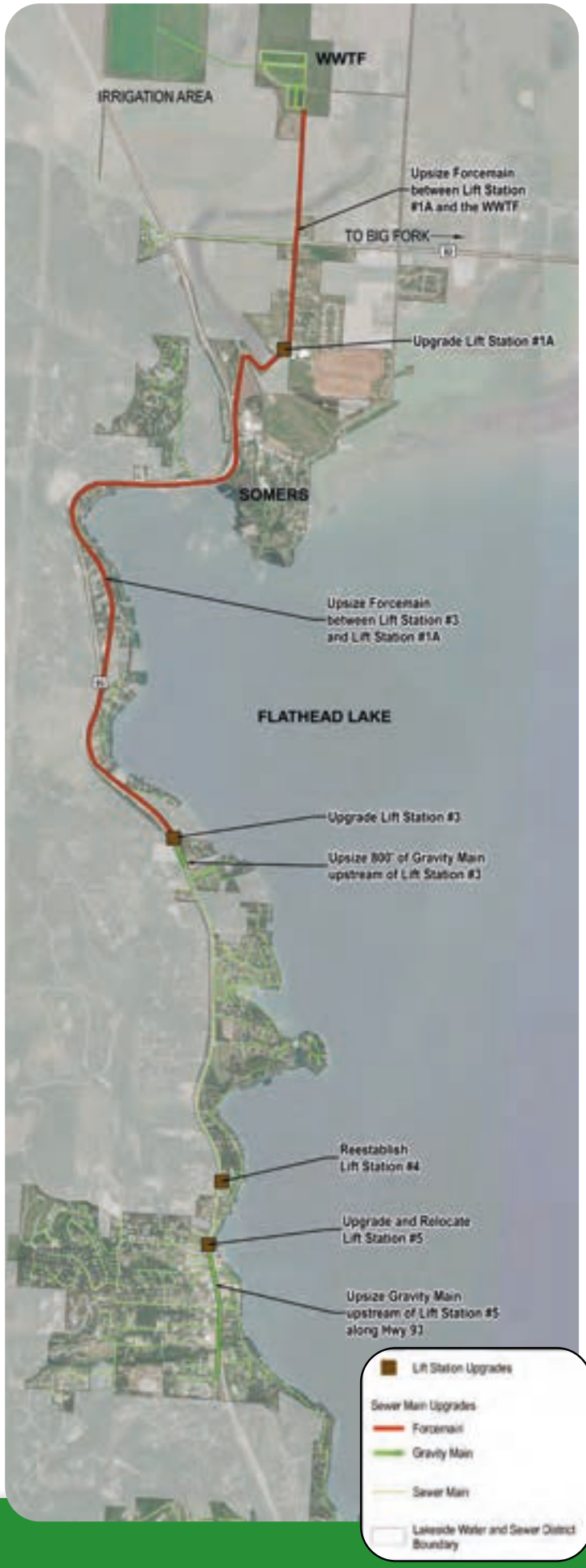
- Increase collection system capacity
- Update pumping infrastructure
- Project Funding
- All improvements will be 100% paid for by the developer

All improvements will be 100% paid for by the developer.

April 28, 2025
Begin Project Survey

May 2025
Design Collection System Upgrades

November 2025
Construction of Collection System Upgrades



PROJECT PARTNERS

LCWSD is leading development of the WWTF project. Under an Interlocal Agreement signed on March 19, 2024, Flathead County will pay LCWSD to design, construct, operate, and maintain the new SRTF, which is an addition to the project the District was previously planning. Robert Peccia & Associates (RPA) isthe engineering firm contracted to provide design services to LCWSD.

LAKESIDE WATER & SEWER

RPA

CONTACTS

LAKESIDE WATER & SEWER

RODNEY OLSON
General Manager
(406) 844-3881
rodneyolson@lcwsd.net

RPA

BRAD KOENIG, PE
Project Manager
(406) 447-5044
bkoenig@rpa-eng.com

WELCOME!

Lakeside County Water
& Sewer District

LAKESIDE
WATER & SEWER

Wastewater Treatment Update &
Collection System Improvements Project

Open House

Stay Informed

Learn more about the project and why improvements are needed

Share your comments and questions

Visit the project website at:
rpa-eng.com/lcwsd/

Contact:

RPA
Brad Koenig
RPA Project Manager
(406) 447-5044
bkoenig@rpa-eng.com

SCAN ME

PROJECT OVERVIEW

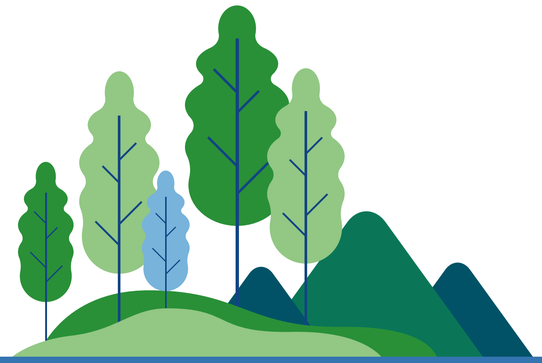
HOW DOES THIS PROJECT BENEFIT LAKESIDE WATER & SEWER DISTRICT (LCWSD) CUSTOMERS?

- In addition to providing safeguards for human health and the natural environment, the project will enable LCWSD to maintain a stable rate structure for its customers.
- Grant funding from federal and state programs will enable the design and construction of facility upgrades while keeping fees affordable for ratepayers.
- Future Collection System project coming! 100% of the Collection System Improvements will be paid for by the developer.

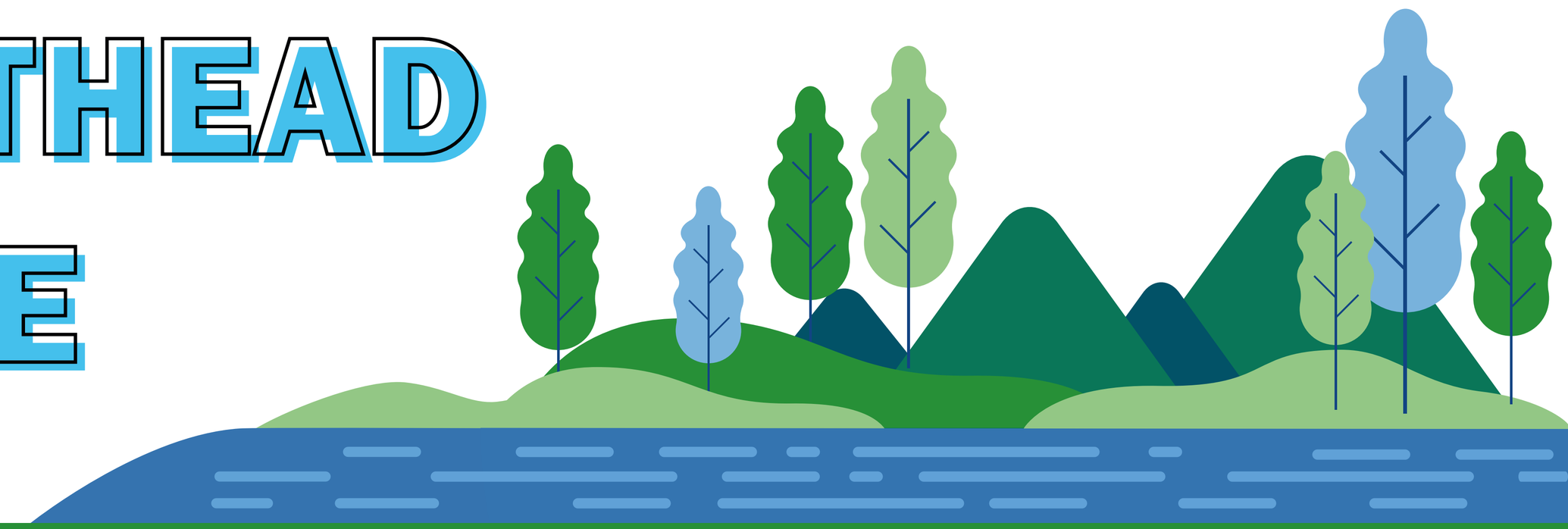
WHY IS LCWSD UPDATING ITS WASTEWATER TREATMENT FACILITY (WWTF)?

- The original LCWSD system was constructed in the 1980s to reduce public health hazards and nutrient loading into Flathead Lake.
- After nearly 40 years of service, the system is nearing the end of its useful life and has very little capacity to accept additional wastewater from ongoing growth and development in the area.
- A WWTF system upgrade is now needed to transition to modern, **efficient treatment methods** and expand wastewater treatment capacity to responsibly serve the regional community while continuing to protect Flathead Lake and the surrounding natural environment.
- The Collection System Improvements are needed to enhance system reliability and increase capacity.

- No volume of wastewater exceeding the existing WWTF's capacity will be accepted until Phase II improvements are constructed.
- No septage will be accepted until construction Phase II is completed.



PROTECTING FLATHEAD LAKE



STEWARDSHIP OF FLATHEAD LAKE

- The original LCWSD facility was constructed using U.S. EPA funding in 1987 to install a wastewater collection and treatment system as a means to protect Flathead Lake.
- Providing this service remains the goal of the District today.
- The District intends to continue its environmental stewardship by effectively collecting and treating wastewater within the District's service area.
- Septic systems can release harmful pathogens and nutrients into groundwater and surface water, leading to contamination of nearby water bodies.
- Septic systems located adjacent to Flathead Lake pose risks to human health and aquatic life, eliminating these septic systems was and continues to be a main focus of the District.
- Wastewater collection mains and lift stations convey wastewater from the LCWSD service area, including homes located along the lake shore, to the LCWSD Wastewater Treatment Facility (WWTF) where the wastewater is effectively treated in a single location. WWTF upgrades will increase the treatment efficiency and reliability.

WWTF UPGRADES

PHASE I UPDATE

CONSTRUCTION UNDERWAY!

The Phase I Project Includes

- A new Headworks Building (Screening and Grit Removal) at the Existing WWTF Site
- Lift Station #10 Upgrades
- Construction of the Septage Receiving Facility
- Odor Control Facilities at the Headworks (Sized for Phase I and Phase II of the WWTF Improvements) and the Septage Receiving Facility

Phase I Project Funding

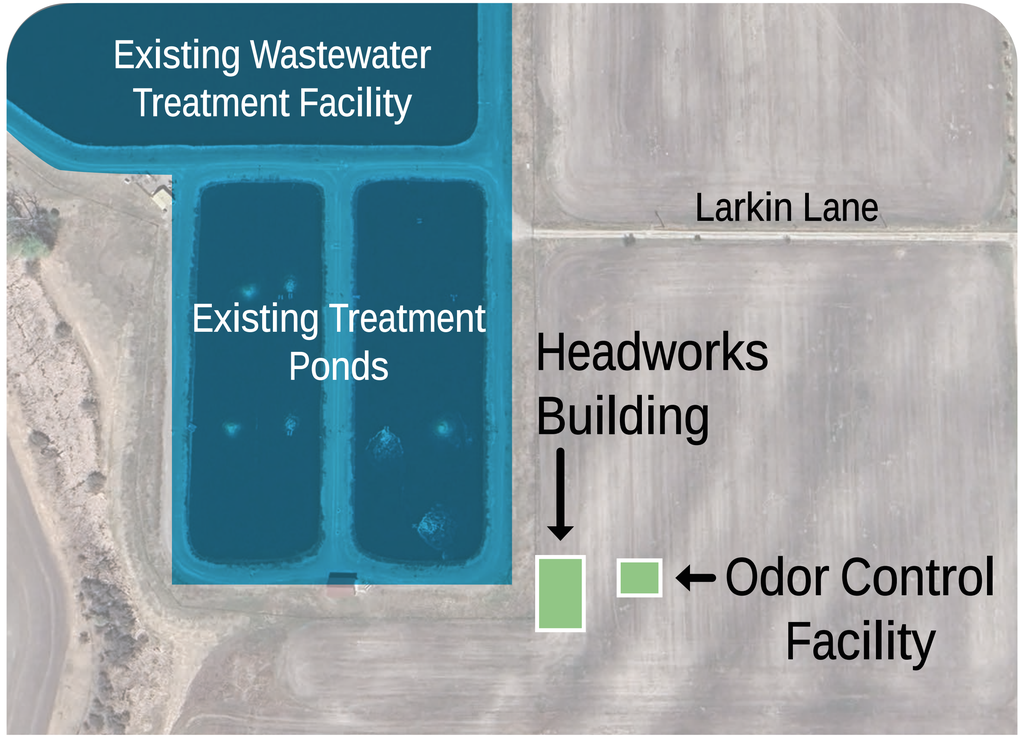
Phase I of the WWTF Improvements will primarily utilize grant funding.

Timeline

April 28, 2025
Groundwater Discharge Permit Issued and Environmental Assessment Finalized

May 2025
Construction of Phase I Improvements Begins

November 2025
Anticipated Phase I Construction Completion



LIFT STATION #10 LOCATION MAP PHASE I IMPROVEMENT

WWTF UPGRADES

PHASE II UPDATE

The Phase II Project Includes

- Secondary Treatment
- Solids Handling
- Effluent Disposal

Timeline

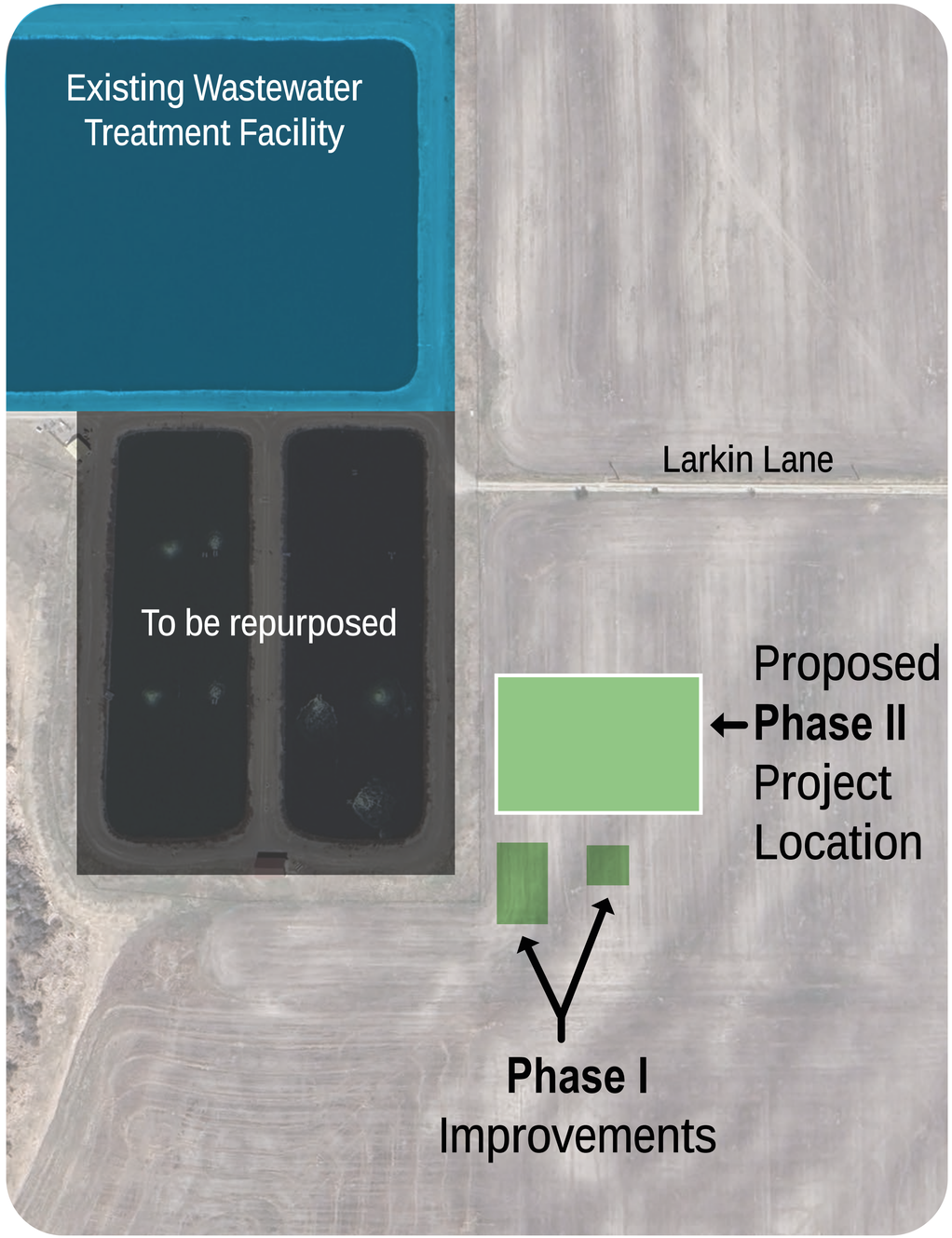
April 28, 2025
Groundwater Discharge Permit Issued

May 2025
Final Planning

June - March 2026
Project Design

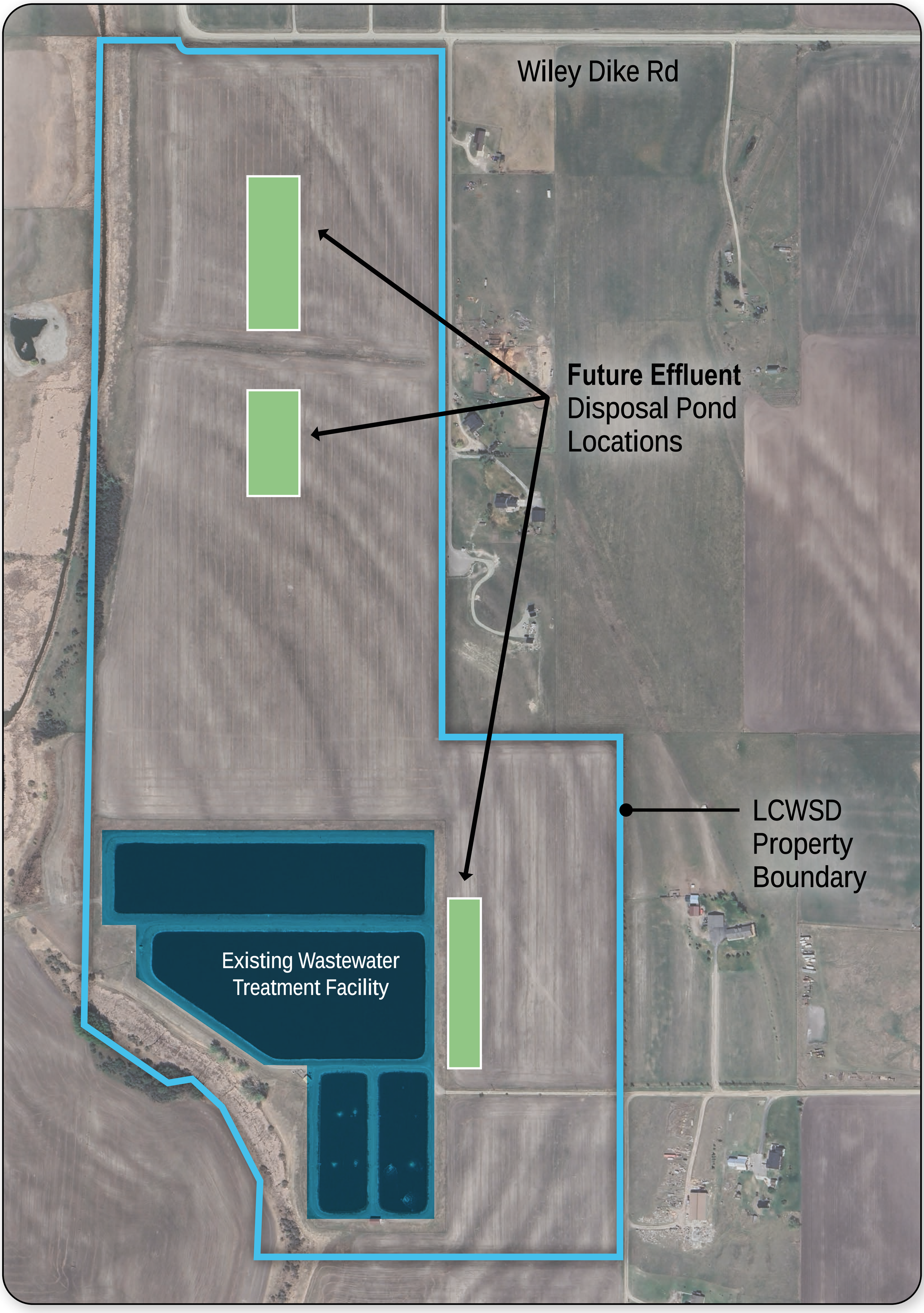
Summer-Fall 2026
Construction Begins

Fall 2027
Construction Completion



GROUNDWATER DISPOSAL LOCATION MAP

PHASE II IMPROVEMENT



COLLECTION SYSTEM UPGRADES

UPCOMING PROJECT!

The collection system infrastructure was largely installed in 1987 and is in need of updating. Improvements to the Collection System will increase the capacity of the main wastewater trunk line along Highway 93 and several of the pump stations along this corridor will be upgraded.

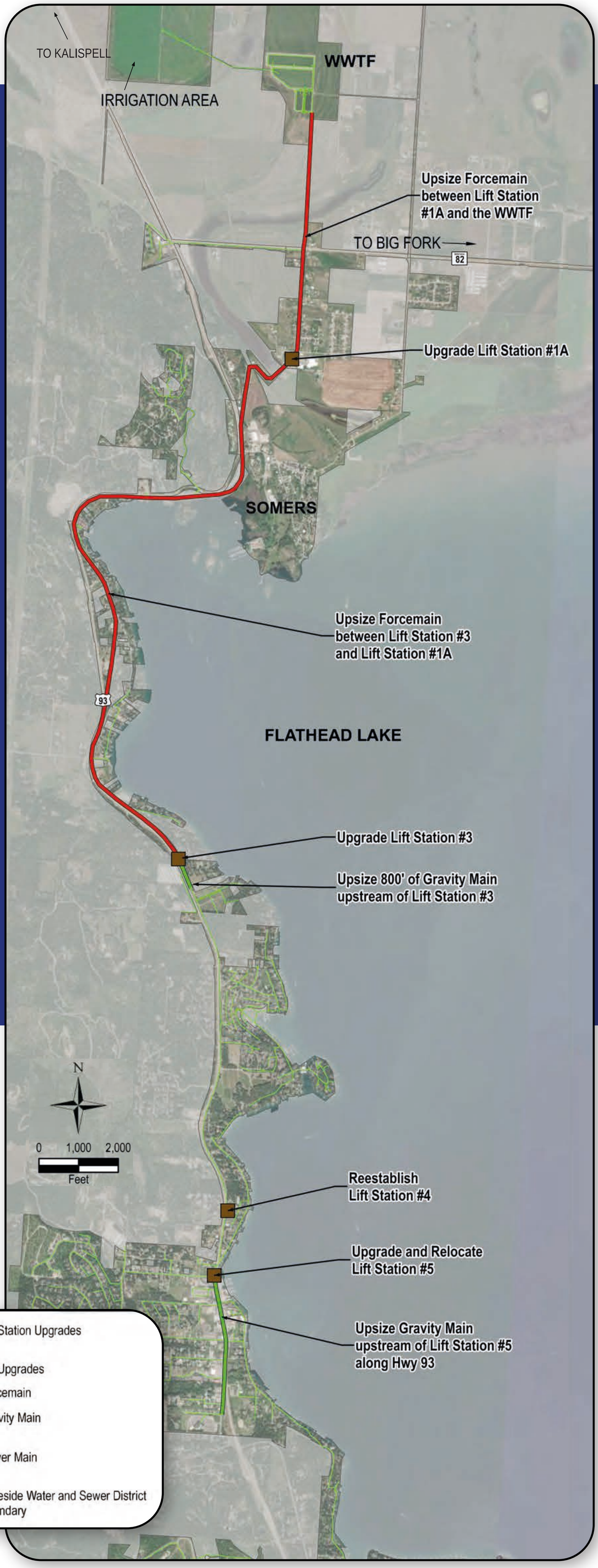
Design of the Collection System Improvements is currently underway with surveyors on site for this project along Highway 93. Construction of improvements is expected to begin in 2026.

Project Objectives

- Increase collection system capacity
- Update pumping infrastructure

Project Funding

All improvements will be 100% paid for by the developer



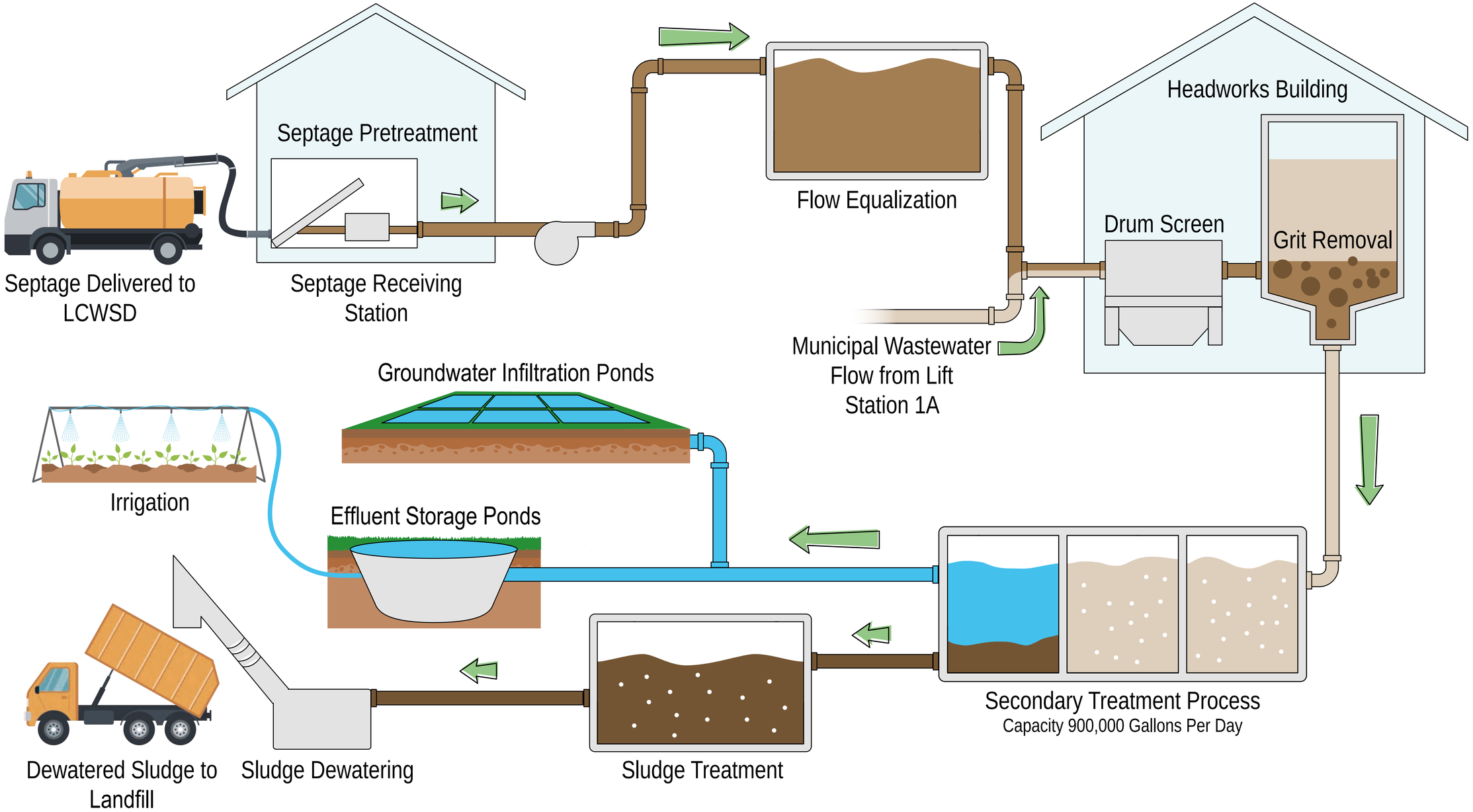
Timeline

April 2025
Begin Project Survey

Spring 2025 - Spring 2026
Design Collection System Upgrades

Spring 2026 - Fall 2027
Construction of Collection System Upgrades

PROCESS FLOW DIAGRAM PHASE I & PHASE II



LCWSD WASTEWATER RATE OVERVIEW

EXISTING RATES

Existing Base Rate	$31.59
Existing Variable Rate	$2.43/1,000 gal
Existing Average Combined Rate	$43.74*

* Assumes 5,000 gal/month of wastewater generated per equivalent dwelling unit (EDU)

PROPOSED RATES

Wastewater rate increases are necessary to cover the system operation and maintenance expenses including:

- Additional LCWSD employee salary
- WWTF Manager salary
- Collection System operation and maintenance costs
- WWTF upgrade Phase I operation and maintenance costs
- WWTF upgrade Phase II operation and maintenance costs
- Phase I loan ($1,084,573)
- Phase II possible loan (~$20,000,000)

An initial wastewater rate increase of $30/EDU/Month will be applied to LCWSD ratepayers in 2025. This increase is to prepare for upcoming collection and treatment operation and maintenance expenses associated with the WWTF Improvements.

Proposed Base Rate	$61.59
Proposed Variable Rate	$2.43/1,000 gal
Proposed Average Combined Rate	$73.74*

* Assumes 5,000 gal/month of wastewater generated per EDU

NOTICE: WASTEWATER RATE HEARING TO FOLLOW

Flathead County
Board of Commissioners
(406) 758-5503

Brad W. Abell
Randy L. Brodehl
Pamela J. Holmquist

April 17, 2024

Melinda Horne, Permit Writer
Montana Dept. of Environmental Quality
MGWPCS Program, Water Protection Bureau
P.O. Box 200901
Helena MT 59620-0901

Ms. Horne,

I am writing to express full support from Flathead County for the Lakeside County Water and Sewer District's (LCWSD) application for a groundwater discharge permit. We believe that granting this permit is of utmost importance. The permit will allow LCWSD to increase capacity and improve their operations, while also addressing the pressing issue of septage disposal and portable restroom waste disposal in our region.

Flathead County recognizes the critical need for an acceptable solution to manage septage and portable restroom waste, especially given the significant number of septic systems in the Flathead Valley. With approximately 30,000 septic systems existing in our region, the potential environmental and public health risks associated with inadequate disposal methods cannot be overstated.

Furthermore, approving this permit aligns with Flathead County's commitment to environmental stewardship and responsible resource management. We recognize the importance of maintaining water quality standards to preserve the health and well-being of our communities, as well as to protect the natural beauty of our surroundings, which are integral to our local economy and way of life.

I urge the Montana Department of Environmental Quality to consider the gravity of the situation and to expedite the review and approval process for the Lakeside County Water and Sewer District's groundwater discharge permit application. Granting this permit will not only address an urgent need for proper waste disposal but also demonstrate a proactive approach to safeguarding our environment for current and future generations.

Thank you for your attention to this matter.

Sincerely,

OFFICE OF THE FLATHEAD COUNTY
BOARD OF COMMISSIONERS

P.N. Melnick

Pete Melnick, County Administrator

Evergreen Water & Sewer DISTRICT 1

Flathead County Water District No.1
130 Nicholson Drive
Kalispell, MT 59901
P: 406-257-5861
E: info@evergreenwaterdistrict.com

April 17, 2024

Melinda Horne, Permit Writer

MGWPCS Program, Water Protection Bureau

Montana Dept. of Environmental Quality

Melinda.Horne@mt.gov

Dear Ms. Horne:

Evergreen Water & Sewer District (formal name: Flathead County Water District #1 – Evergreen) serves approximately 10,000 residents in the Evergreen community, which is part of the unincorporated area of Flathead County and adjacent to the City of Kalispell. Our sewer system was built in the mid-nineties and consists of septic tanks as well as conventional sewer facilities.

The District has approximately 1500 septic tanks that are connected to our sewer system for liquids discharge but must be pumped on a schedule to manage the solids. We also have a conventional sewer system with twenty-six lift stations that must be cleaned quarterly and lines that need to be jetted on a schedule. All of this waste/septage is currently pumped by a third-party contractor as the District has no pump trucks and no disposal site. Our current pumper is A1 Sanitation and the septage is land-applied in Flathead County. Our non-septage wastewater is pumped to the City of Kalispell's wastewater treatment plant. We have requested permission to dispose of septage at the City's facility and they have refused our request.

I am writing to urge DEQ to expedite approval of the discharge permit requested by Lakeside Water & Sewer District that will facilitate construction of Flathead County's Septage Treatment Facility ("Facility"). Attached are two resolutions passed by the District's elected Board of Directors providing strong support for the Facility. As the attached resolution outlines, we recently went out for bid on the septage pumping and disposal and received only one bid from

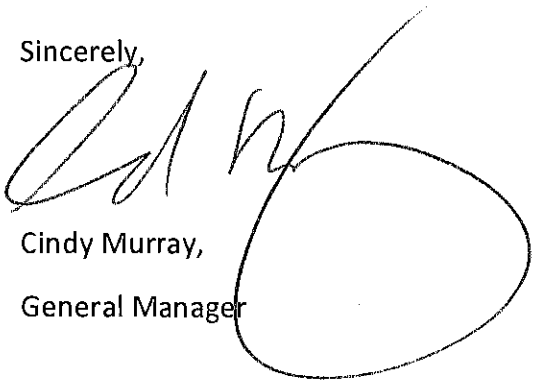
A1-Sanitation that was more than 250% of our 2023 pumping costs. While we have seen a rise in service costs throughout our operations, this increase was unprecedented and unacceptable. A significant number of our septic customers are also low-income so passing these costs directly on to them would create serious financial and social consequences.

In recent months, we have also seen the availability of pumper services decline due to the lack of disposal sites and lack of personnel, especially in off-hours, such that we are currently unable to deal with after-hours emergencies if there are no pumpers available. We have also been contacted by outside parties stating that they plan to take legal action to shut down certain disposal sites. While we plan to rebid our pumping/disposal services, until we have a County-wide disposal alternative, our customers are subject to price increases and reduced service delivery and/or interruptions.

I understand that DEQ must carefully evaluate the permit application, but I would ask that the urgency of this matter be considered during DEQ's review given the serious threats to public health and safety that will be addressed effectively by the discharge permit/proposed Facility. The environmental consequences and community impacts of the lack of disposal alternatives if the permit is not granted should be considered carefully as part of the evaluation of the permit application. I would be happy to provide testimony if a live hearing is conducted.

Thank you for your careful consideration of these comments.

Sincerely,



Cindy Murray,

General Manager

Attachments: Board Resolutions 2024-04 and 2023-13

Evergreen Water & Sewer DISTRICT 1

130 Nicholson Drive
Kalispell, MT 59901
P: 406-257-5861
E: info@evergreenwaterdistrict.com

RESOLUTION 2024-04

CONSIDERING THE BID OF A-1 SANITATION FOR SEPTIC TANK PUMPING SERVICES

Whereas, the District has contracted with septic tank pumpers with licensed disposal facilities to pump more than 1500 septic tanks owned by the District; and

Whereas, the District issued an Invitation to Bid on January 9, 2024, for Septic Tank Pumping Services; and

Whereas, the District proceeded with the required advertisements of the Invitation to Bid in the Daily Interlake in Flathead County on January 10, 2024, and January 28, 2024, with posting on the District's website; and

Whereas, the District received only one bid form submittal from A-1 Sanitation by the deadline of 3:00 p.m. on February 1, 2024, which was deemed to have been timely submitted and to have met the minimum requirements; and

Whereas, in Fiscal Year 2023 (July 1, 2022 – June 30, 2023), the District had previously been paying pumpers, including A-1 Sanitation, an average of $269 for pumping a 1,000 gallon tank with additional surcharges, as appropriate; and

Whereas, the bid by A-1 Sanitation proposed, among other prices, an increase to $956 per 1,000 gallon tank (more than a 250% increase) with additional surcharges, as appropriate; and

Whereas, an increase of the magnitude contained in the A-1 Sanitation bid would have significant rate impacts for the District's sewer customers and could result in potential surcharges to septic tank customers, including lower-income customers of the District; and

Whereas, after careful consideration, the District Staff is recommending that the Board reject the Bid submitted, which is allowed under the Bid Invitation that provides: "The right is reserved to reject any or all proposals received . . ."; and

Whereas, after careful consideration, the District Staff is recommending that all possible options for septic tank pumping be considered to provide the District with services that are reliable, economical, and promote public health and safety; and

Whereas, the District remains committed to its support of Flathead County's proposed Septage Treatment Plant, which the Board has supported in Resolution 2023-13 to provide alternative septage disposal for the benefit of the District's customers and ratepayers as well as other residents of Flathead County.

NOW THEREFORE BE IT RESOLVED that the Board of Directors approves the recommendations of the District Staff, formally rejects the Bid for Septic Tank Pumping Services submitted by A-1 Sanitation on February 1, 2024, and directs the District Staff to consider all possible options for required services; and

FURTHER BE IT RESOLVED that the Board formally requests Flathead County to expedite the Septage Treatment Plant project for the benefit of the District's customers and ratepayers as previously detailed in Resolution 2023-13, which is attached to this Resolution, and directs District Staff to send this Resolution to the Flathead County Commissioners.

Dated: February 21, 2024

FLATHEAD COUNTY WATER DISTRICT #1 - EVERGREEN BOARD OF DIRECTORS

By: _____

B.J. Lupton,
President

ATTEST:

_____

Secretary to the Board

Attachment: Resolution 2023-13

Evergreen
Water & Sewer
DISTRICT 1

RESOLUTION 2023- 13

SUPPORT FOR THE

PROPOSED FLATHEAD COUNTY SEPTAGE TREATMENT PLANT AND COMPOSTING FACILITY

Whereas, the Board of Directors of the Flathead County Water District #1 - Evergreen ("District") has been following very closely the County's initiative to build a Septage Treatment Plant and Composting Facility ("Project") in the Flathead Valley using ARPA funding; and

Whereas, on July 12, 2023, B.J. Lupton, Vice-President, sent a letter of support for the Project to the Flathead County Commissioners; and

Whereas, at various Flathead County Commission meetings, General Manager, Cindy Murray, has provided significant supportive testimony on behalf of the District Staff; and

Whereas, the District Staff has developed "Talking Points" to provide background and support for this Project, which are attached to this Resolution as Exhibit "A"; and

Whereas, considering the great value this Project will have for the District and the extreme urgency to complete the Project due to deadlines for the use of ARPA funding.

NOW, THEREFORE, BE IT RESOLVED that the Board of Directors urges the Flathead County Commission to take all appropriate action to encourage and push this Project forward to completion at the earliest possible time.

Signed August 16, 2023

FLATHEAD COUNTY WATER DISTRICT #1 – EVERGREEN

By: BJ Lupton

Title: PRESIDENT

Attest: _____
Secretary

Evergreen Water & Sewer DISTRICT 1

SUPPORT FOR THE FLATHEAD COUNTY SEPTAGE TREATMENT FACILITY
TALKING POINTS

COUNTY

Septage is pumped waste from septic tanks, porta-potties, and Vactor trucks that are used to clean or repair sewer facilities of municipalities, HOA's, and districts such as Evergreen.

Environmental regulations are increasingly focused on land applications and soon may mandate that all septage be treated in a facility.

The County has been given federal and state funds to acquire property and to build a septage treatment plant. The County will purchase a suitable location for this facility considering many factors.

Time is of the essence due to the deadlines for use of the ARPA funding.

The County's plant will serve the entire valley and treat sludge produced by all the wastewater treatment plants in Kalispell, Whitefish, and Columbia Falls, reducing the impacts on the landfill.

The plant will turn septage and sludge into compost that is safe to use on lawns and flower gardens. Septage is a win-win for everyone.

DISTRICT

Currently the District contract with two providers who pump the tanks and then land-apply the septage at a licensed dumpsite in the Valley.

The District owns 1500 septic tanks that generate septage. That is nearly 2/3rds of the Evergreen's sewer system making the District the largest septage producing utility in the Flathead Valley.

Annual septage generated by the District from septic tank pumping alone is approximately 350,000 gallons per year.

For the usage and reliable operation of the sewer system, the District needs a septage treatment plant.

Building a plant just for the District would severely increase sewer rates for Evergreen customers. A county-wide solution for septage treatment is also the best solution for the District.

The District will continue to use local providers for the septage pumping when it is feasible and cost effective so the septage treatment plant will not put tank pumpers out of business.

OTHER SUPPORTERS

Environmental groups such as the Flathead Lakers and many other community stakeholders support this project.

The Flathead Basin Commission, which focuses on protection of the water resources in the Valley, supports the project and has provided additional grant funding to the County.

Flathead County
Board of Commissioners
(406) 758-5503

Brad W. Abell
Randy L. Brodehl
Pamela J. Holmquist

April 25, 2024

Chris Dorrington, Director
Montana Dept. of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Director Dorrington,

As representatives of the 115,000 residents of Flathead County, we are writing to emphasize the critical importance of supporting your staff and approving Lakeside County Water and Sewer District's application for a groundwater discharge permit without delay. We urge the Department to demonstrate courage and vision in recognizing the necessity of this permit for our community's well-being and environmental sustainability.

Lakeside County Water and Sewer District has a proven track record with 36 years of successful wastewater management. The discharge permit will increase capacity and allow transition to more advanced treatment methods. The permit also offers a solution to the urgent issue of septage disposal and portable restroom waste disposal in our region. With the rapid growth in rural parts of the Flathead Valley, the need for a regulated and environmentally sound waste management system is paramount.

As their elected representatives, we want to stress that the vast majority of Flathead County's residents stand firmly behind this solution.

Therefore, we implore the Montana Department of Environmental Quality to act swiftly and decisively in approving the groundwater discharge permit application. By doing so, you will not only be fulfilling your regulatory responsibilities but also aligning with the will and best interests of the community we both serve.

We trust in your wisdom and commitment to upholding the principles of environmental protection and public health.

Sincerely,
BOARD OF COMMISSIONERS
FLATHEAD COUNTY, MONTANA

Randy L. Brodehl, Chairman

Pamela J. Holmquist, Member

Brad W. Abell, Member

CC: Melinda Horne, Montana Dept. of Environmental Quality

RYAN K. ZINKE
1st District, Montana

512 Cannon House Office Building
Washington, DC 20515–2601
(202) 225-5628

Congress of the United States
House of Representatives
Washington, DC 20515–2601

April 26, 2024

Melinda Horne, Permit Writer
MGWPCS Program, Water Protection Bureau
Montana Dept. of Environmental Quality
PO Box 200901, Helena MT 59620-0901

Ms. Horne,

I am writing to express my full support for the Lakeside County Water and Sewer District's (LCWSD) application for a groundwater discharge permit. The permit will allow LCWSD to increase capacity and improve their operations, while also addressing the pressing issue of septage disposal and portable restroom waste disposal in our region.

Please recognize this critical need for an acceptable solution to manage septage and portable restroom waste, especially given the significant number of septic systems in the Flathead Valley. With approximately 30,000 septic systems existing in our region, the potential environmental and public health risks associated with inadequate disposal methods cannot be overstated.

I urge the Montana Department of Environmental Quality to consider the gravity of the situation and to expedite the review and approval process for the Lakeside County Water and Sewer District's groundwater discharge permit application. Granting this permit will not only address an urgent need for proper waste disposal but also demonstrate a proactive approach to safeguarding our environment for current and future generations.

For God and Country,

Ryan K. Zinke

RYAN ZINKE
Congressman (MT-01)
52nd Secretary of the Interior
Commander U.S. Navy SEALs (Ret.)

PRINTED ON RECYCLED PAPER

Office of the Speaker

MONTANA HOUSE OF REPRESENTATIVES

MATT REGIER
SPEAKER

Melinda Horne, Permit Writer
MGWPCS Program, Water Protection Bureau
Montana Dept. of Environmental Quality
PO Box 200901, Helena MT 59620-0901

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Sincerely,

Matt Regier

HELENA ADDRESS: BOX 200400 HELENA, MONTANA 59620-0400 406-444-4827

Wastewater Treatment Facility Improvement Project Phase II

Lakeside County Water and Sewer District

August 21, 2025

LAKESIDE
WATER & SEWER

RPA
CIVIL ENGINEERING / PLANNING / SURVEYING

Presentation Overview

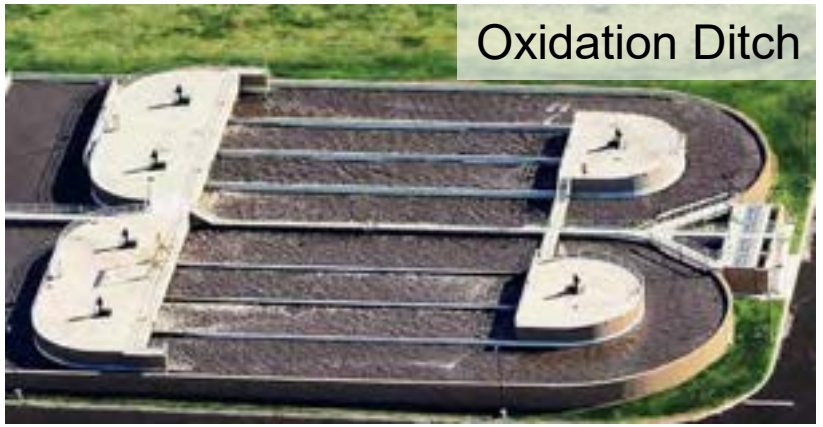
- Need for the Project
- Secondary Treatment Alternatives & Selection
- Solids Handling
- Effluent Disposal
- Total Project Cost with Preferred Alternatives

Need for the Project

- The original LCWSD system was constructed in1987 to reduce public health hazards and nutrient loading into Flathead Lake.
- After nearly 40 years of service, the system is nearing the **end of its useful life** and has very little capacity to accept additional wastewater from ongoing growth and development in the area.
- A Wastewater Treatment Facility upgrade is now needed to transition to a more **modern proven treatment method** and **expand wastewater treatment capacity** to responsibly serve the regional community while continuing to protect Flathead Lake and the surrounding natural environment.

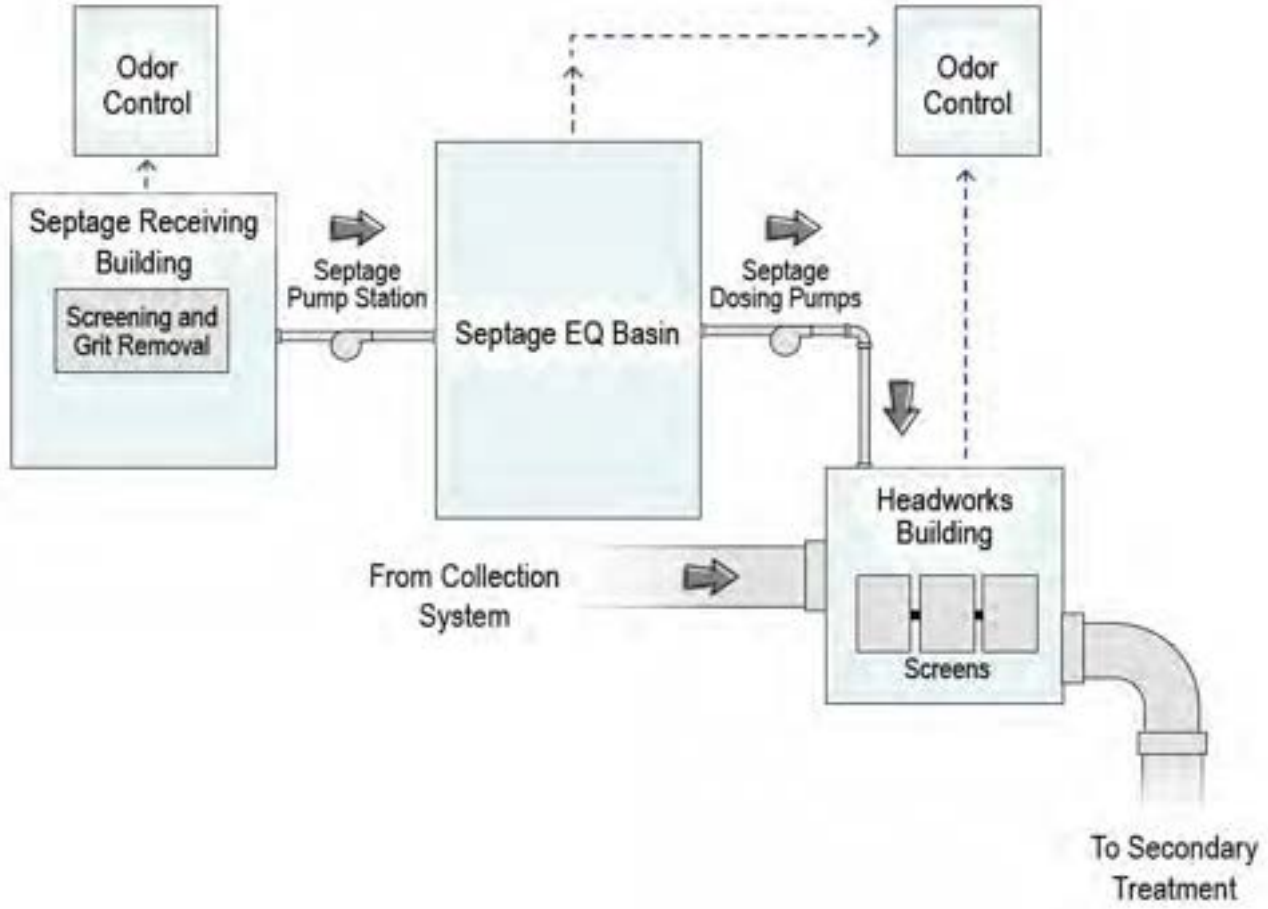
Secondary Treatment Alternatives

- **Why are These Processes Called Secondary Treatment?**
- **Design Flow**
  - 900,000 Gallons per Day (used as basis for comparing alternatives)
  - Loading accounts for a summer average of 53,250 GPD of septage received 5 days per week
  - All alternatives are for process that provide 10 mg/l BOD, 10 mg/l TSS, 8 mg/l TN, and 1.2 mg/l TP
- **Secondary Treatment Alternatives Evaluated**
  - Oxidation Ditch
  - Sequencing Batch Reactor (SBR)
  - Membrane Bioreactor (MBR)
- **All secondary treatment alternatives include a 100,000 - gallon septage equalization (EQ) basin. The septage EQ basin allows for consistent dosing of septage into the facility.**



Septage Flow Equalization Basin

- Septage will be accepted during the weekdays during normal working hours
- The Septage Flow Equalization Basin will allow septage to be held and dosed proportionally into the influent flow
- Septage will be dosed into the process 7 days per week 24 hours per day

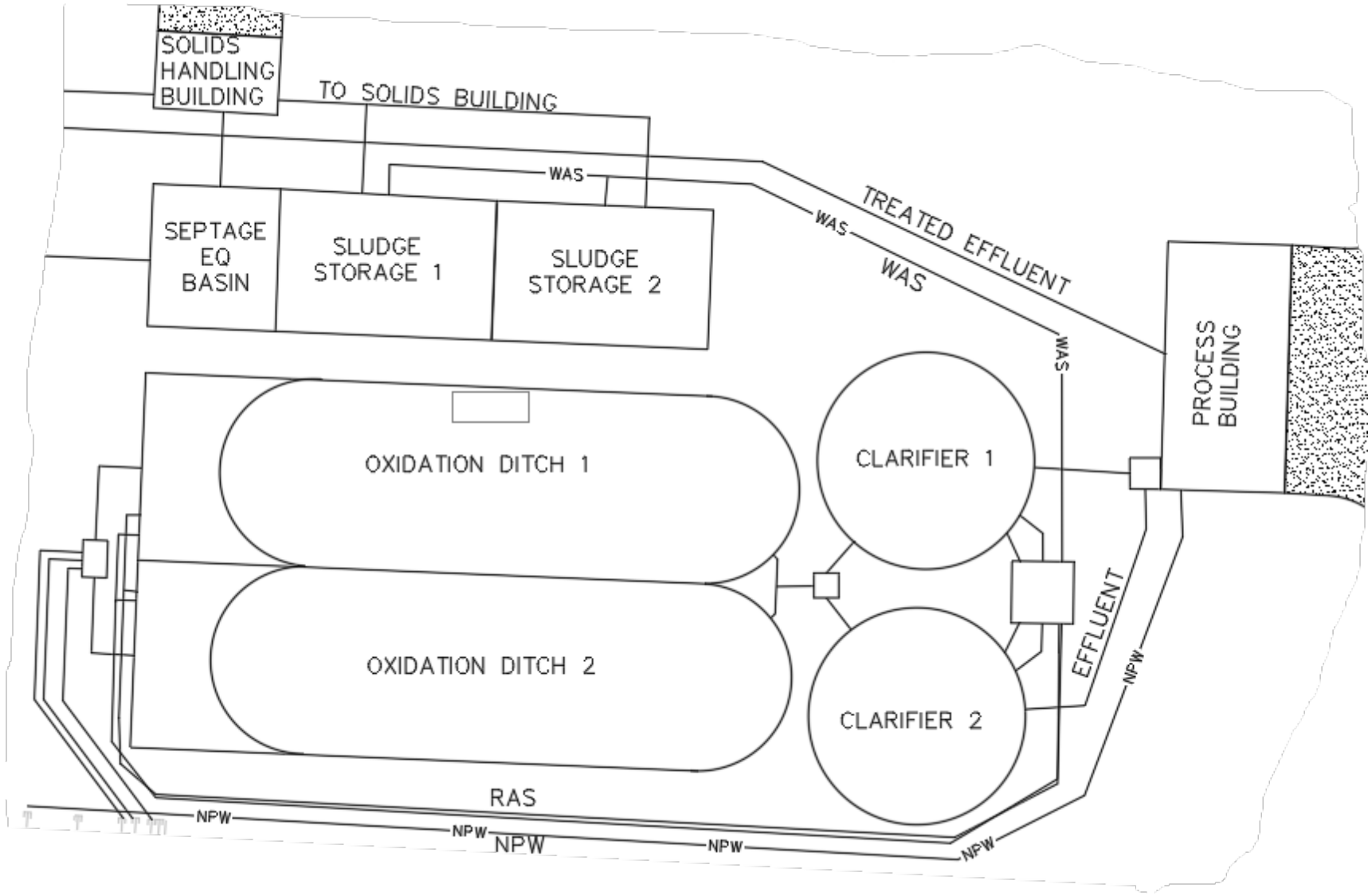


Alt #1 Oxidation Ditch

Process Overview

- Activated sludge treatment process
- Utilizes concentric, oval-shaped channels
- Aerators circulate, mix, and provide oxygen to the wastewater
- Portions of the channel provide environments for BOD removal and nutrient removal
- Requires separate tanks for settling - secondary clarifiers
- Requires pump station to deliver settled biomass to oxidation ditch process – RAS pump station
- This process is utilized in Miles City, Lewistown, and most recently in Belgrade

Preliminary Oxidation Ditch Layout



Oxidation Ditch Pros and Cons

Benefits

- Simple Operation
- Generally low maintenance
- Unit Process Separation
- Reasonable Initial Equipment Cost

Disadvantages

- Large Footprint – Requires more ground improvements and more concrete
  - Ditches approximately 60’ by 212’ each
  - Clarifiers 60’ in diameter each
- Higher capital cost
- Moderately flexible for process changes

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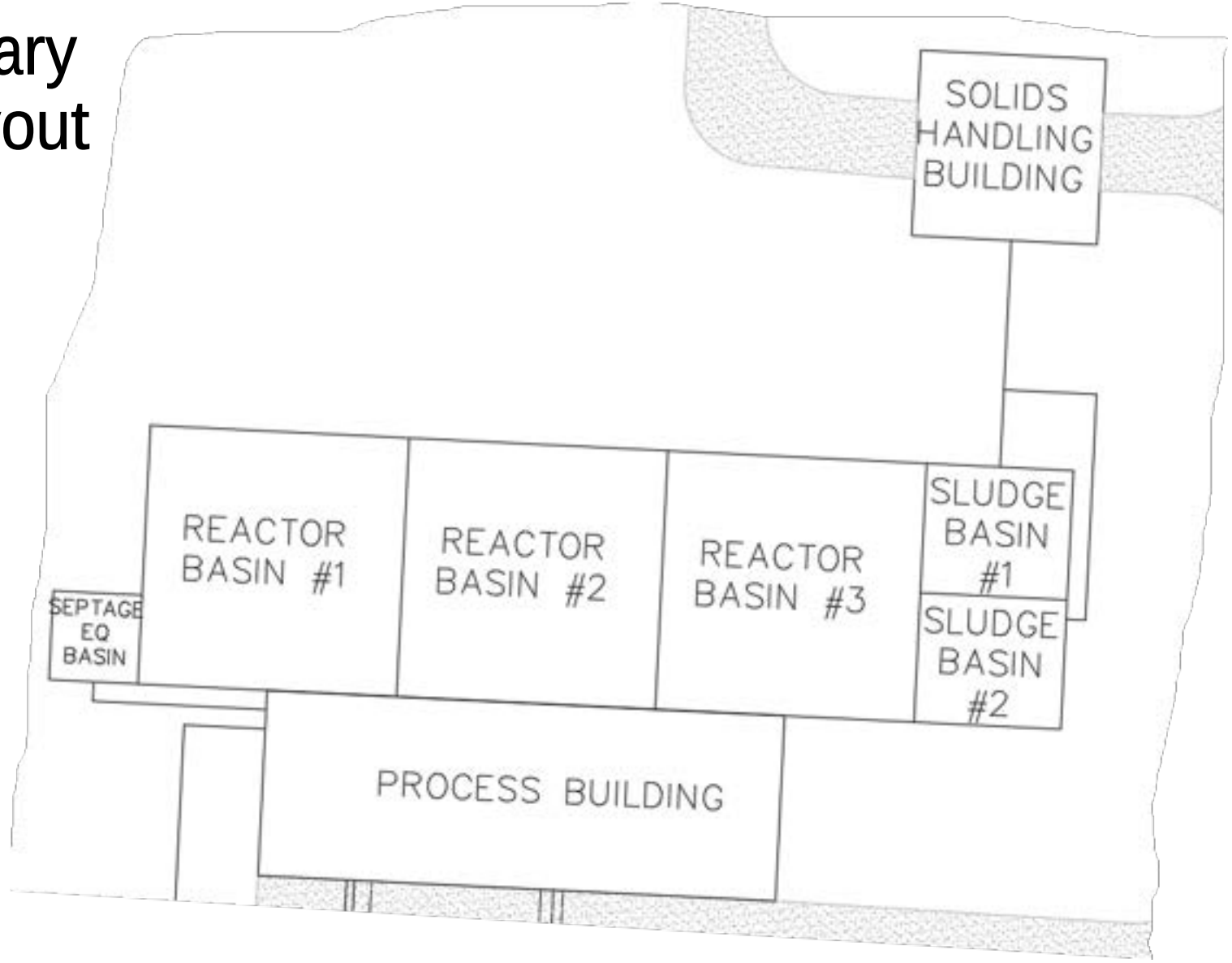
Alt #2 Sequence Batch Reactor (SBR)

Process Overview

- Activated sludge treatment process that operates in cycles (batches) where treatment and settling occur in same tank
- Fill phase: reactor tank is filled with influent
- React Phase: aeration is intermittently provided to support aerobic, anoxic, and anaerobic environments to provide BOD and nutrient removal
- Settling Phase: aeration stops; solids settle to the bottom
- Decant Phase: treated water is removed from the top of the reactor basin
- Idle Phase: system rests briefly before the next cycle begins
- This process is utilized in Whitefish, Glacier Park - Apgar, Livingston, and Glendive.

Preliminary SBR Layout



SBR Pros and Cons

Benefits

- Compact footprint
  - 3 basins each 67’ by 67’
- Flexible operation – easily adjusted for varying flow and load conditions
- Reasonable initial equipment cost
- Technology being used nearby - Whitefish

Disadvantages

- More complex operation when compared to the oxidation ditch alternative

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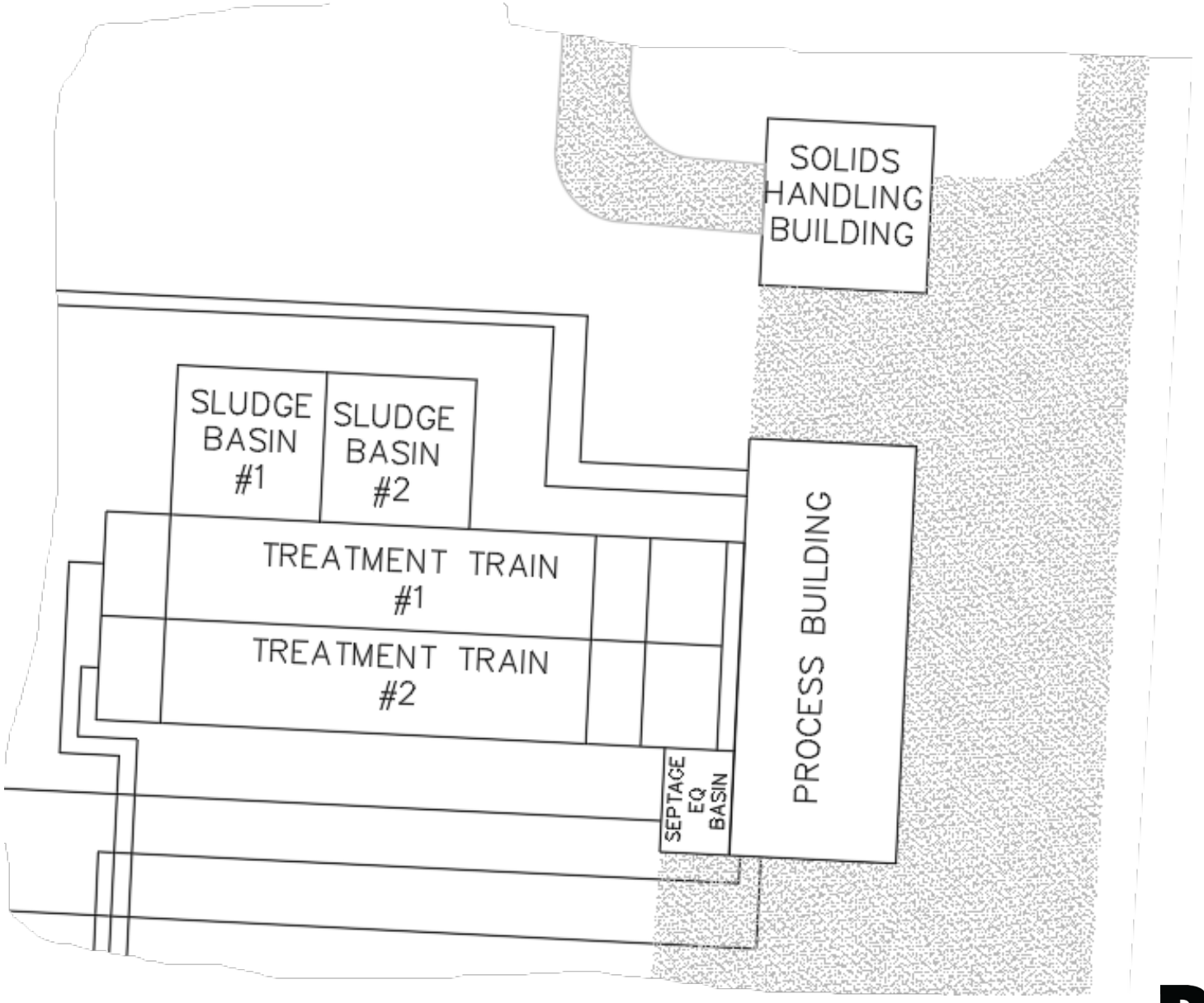
Alt #3 Membrane Bioreactor (MBR)

- **Process Overview**
  - Combines biological treatment with membrane filtration to separate biomass from treated water
  - Aerobic, anoxic, and anaerobic tanks supplied to provide BOD and nutrient removal
  - Requires pump station to deliver biomass to head of process – RAS pump station
  - Requires recirculation pump station to facilitate nitrogen removal
  - This process is utilized in Bigfork, Butte, and Big Sky.

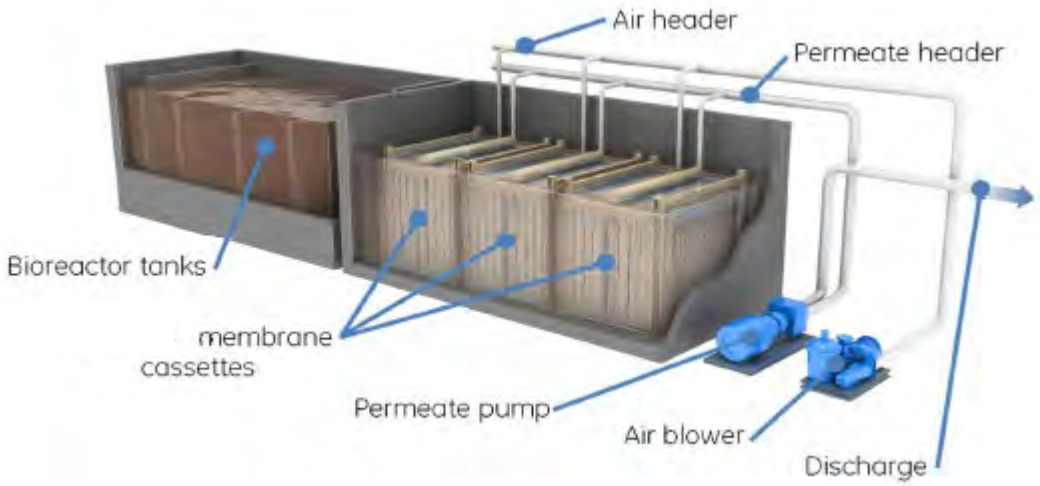
Preliminary MBR Layout



MBR Pros and Cons

Benefits

- **Compact footprint - slightly less than SBR**
  - 2 treatment trains each 180’ by 30’
- **High effluent quality**



Disadvantages

- **Increased maintenance cost and efforts – membrane scouring and chemical cleaning**
- **Higher operational complexity**
- **Higher capital cost**
- **Increase operational costs - energy intensive**
- **Membranes have a 10 to 15-year design life**
- **Less flexible to process changes**
- **Sensitive to system upsets**

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Secondary Treatment Summary

Secondary Treatment Process	Capital Cost	O&M Cost	Operational Complexity	Operational Flexibility
Oxidation Ditch	**$28,776,500**	**$288,100**	Low	Medium
SBR	**$18,754,100**	**$314,700**	Medium	High
MBR	**$26,311,900**	**$456,300**	High	Medium

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Treatment System Comparison

Existing Lagoon Process

	Concentration (mg/L)	Flow Rate (gals/day)	**Daily Loading (lbs/day)**
BOD	28.0	316,500	**73.9**
Total Suspended Solids	35.4	316,500	**93.5**
Total Nitrogen	20.6	316,500	**54.4**
Total Phosphorus	5.4	316,500	**14.2**
BOD	28.0	600,000	**140.1**
Total Suspended Solids	35.4	600,000	**177.3**
Total Nitrogen	20.6	600,000	**103.2**
Total Phosphorus	5.4	600,000	**27.0**
BOD	28.0	900,000	**210.2**
Total Suspended Solids	35.4	900,000	**265.9**
Total Nitrogen	20.6	900,000	**154.8**
Total Phosphorus	5.4	900,000	**40.5**

New SBR Process

	Concentration (mg/L)	Flow Rate (gals/day)	**Daily Loading (lbs/day)**
BOD	10	316,500	**26.4**
Total Suspended Solids	10	316,500	**26.4**
Total Nitrogen	8	316,500	**21.1**
Total Phosphorus	1.2	316,500	**3.2**
BOD	10	600,000	**50.0**
Total Suspended Solids	10	600,000	**50.0**
Total Nitrogen	8	600,000	**40.0**
Total Phosphorus	1.2	600,000	**6.0**
BOD	10	900,000	**75.1**
Total Suspended Solids	10	900,000	**75.1**
Total Nitrogen	8	900,000	**60.0**
Total Phosphorus	1.2	900,000	**9.0**

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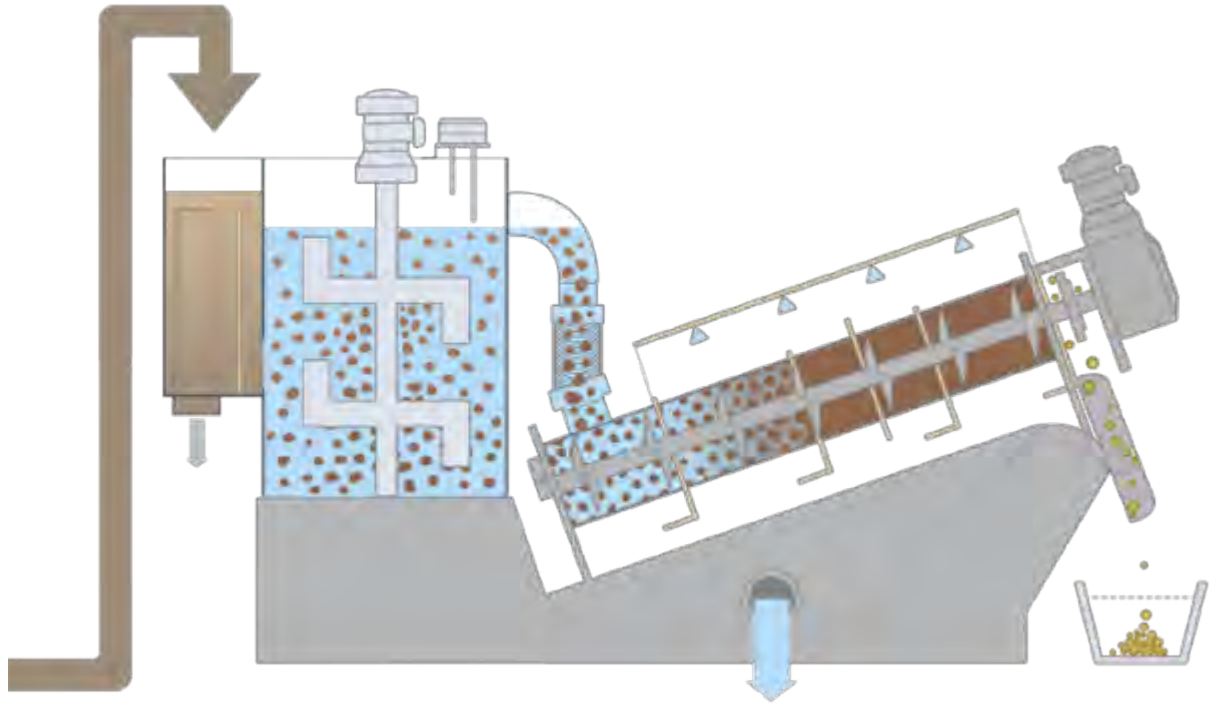
Solids Handling Alternatives

A portion of the activated sludge is withdrawn to maintain optimal biomass concentrations within the system (WAS). All alternatives considered include measures for storing these solids for up to 14 days in an aerated tank before being dewatered and disposed of at the County landfill.

Solids Storage and Dewatering

- Solids Storage – Concrete Basins
- Solids Dewatering – Mechanical Dewatering (Screw Press)



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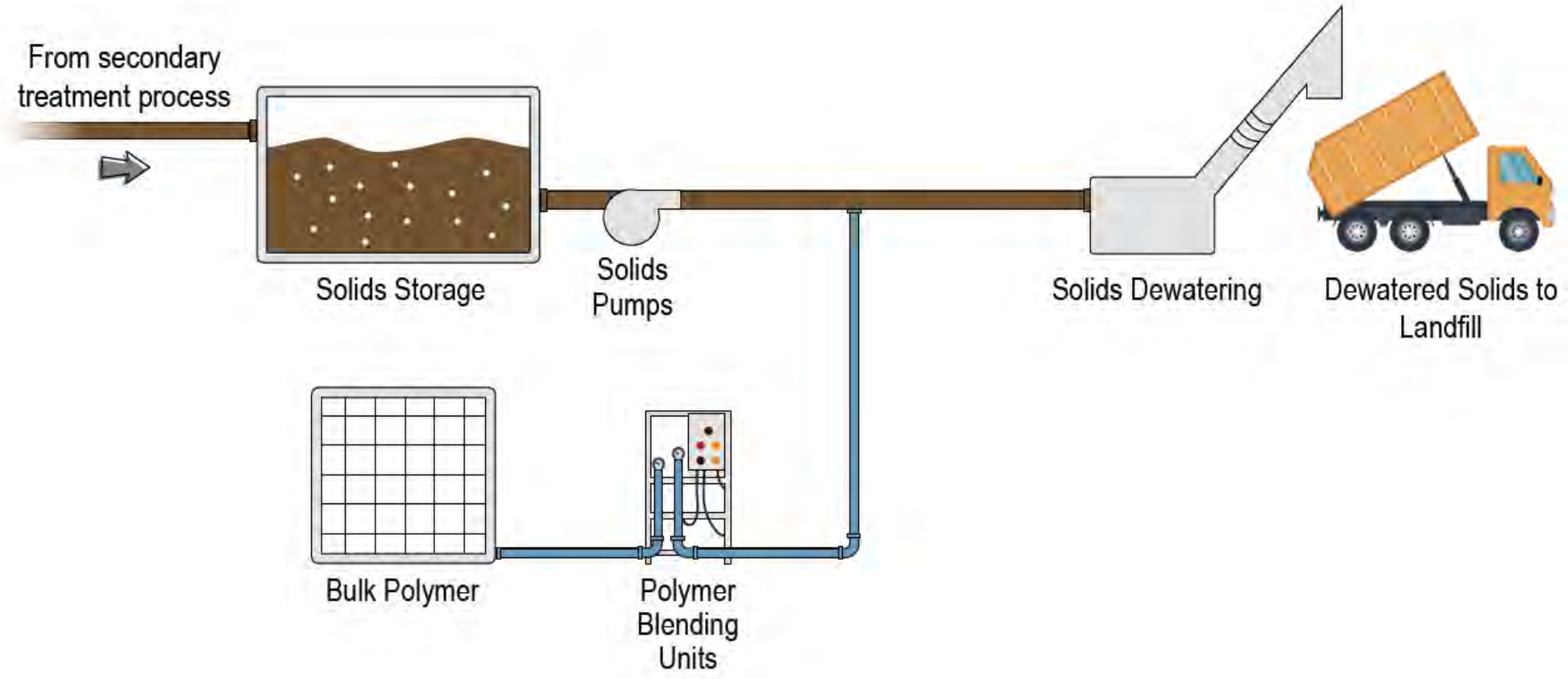
Solids Handling Process Flow



Solids Storage – Concrete Basins

Process Overview

- Two concrete basins will be constructed to provide operational flexibility
- Basins will share a common wall with treatment basins – providing a cost savings
- Aeration provided to maintain 2 mg/L dissolved oxygen concentration
- Submersible mixers will ensure each basin remains fully mixed
- Equipped with telescoping valves to allow manual thickening of the WAS

Concrete Basin Solids Storage Cost: $2,467,100

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Solids Dewatering – Screw Press

Process Overview

- WAS pumped from the solids storage basin through a magnetic flow meter
- Polymer is added to the WAS stream
- WAS enters a flocculation tank to ensure complete mixing of the WAS and polymer
- Filtrate (water) is mechanically separated from solids and flows back to the Headworks
- Sludge cake is discharged into receiving vessel and hauled to landfill for final disposal
- This type of system is widely used across Montana

Solids Dewatering Process and Building Construction Cost: $2,734,000

Solids Handling Summary

Solids Handling Total Construction Cost			**$5,201,100**
Solids Handling O&M Costs			
Base O&M Costs			$96,500
Variable O&M Costs			
Year	Flow	Volume of Dewatered Solids (CUYD) Per Weekday	O&M Cost
2027	300,000 GPD 14,300 GPD of Septage	7.1	$82,000
2037	600,000 GPD 26,000 GPD of Septage	14	$161,700
2047	900,000 GPD 38,000 GPD of Septage	20	$231,000

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Solids Handling Future Discussions

- **Items to be further determined in design**
  - Contract hauling?
  - Rolloff container?
  - District purchases a truck and operators haul?

Effluent Disposal Alternatives

Projected growth within the District has prompted a need for effluent disposal. To avoid additional storage ponds, a method for year-round disposal is desired.

Effluent Disposal Alternatives Evaluated

- Groundwater Discharge with Existing Land Application System

Effluent Disposal - Groundwater Discharge

Process Overview

- This method will supplement the existing land application system
- Will include 3 rapid infiltration basins, a treated effluent equalization basin, and a pump station
- Allows disposal of treated effluent year-round
- Can dispose of up to 200,000 gallons/day of treated effluent
- This alternative will occupy approximately 8 acres of district-owned land

Groundwater Discharge Construction Cost: $2,896,100

Effluent Flow Summary

- **Existing Effluent Flow**
  - **316,500** GPD
  - Limited by Storage Capacity
- **Available Effluent Flow with Existing System and Groundwater Discharge**
  - Groundwater discharge **200,000** GPD
  - Land application system **343,000** GPD (slight increase in storage capacity by utilizing groundwater discharge)
  - Total available effluent flow **543,000** GPD
  - Limited by storage capacity in winter
  - Existing land application system has more capacity in summer months, especially with lower effluent nutrients.

- **Design Flows**
- **10-Year Design Flow**
  - Winter – 553,400 GPD*
  - Summer – 650,000 GPD*
  - Max Month – 716,000 GPD*
- **20-Year Design Flow**
  - Winter – 812,400 GPD
  - Summer – 914,000 GPD
  - Max Month – 982,000 GPD

*** Assumes full buildout of septage to meet contractual obligations with County**

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Total Construction Cost for Preferred Project Alternatives

- **Secondary Treatment**
  - Sequence Batch Reactors (SBR) - $18,754,100
- **Solids Handling**
  - Concrete Solids Storage Basins - $2,467,100
  - Solids Dewatering – Screw Press - $2,734,000
- **Treated Effluent Disposal**
  - Groundwater Discharge - $2,896,100

Total Project Construction Cost: $26,851,300 (based on 900,000 GPD design flow)

Total Project Construction Cost: $24,862,200 (based on 600,000 GPD design flow)

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LAKESIDE
WATER & SEWER

August 21, 2025, Board Meeting

Visitor Sign In Sheet

Please CLEARLY PRINT Full Name & Address

~~James Heim~~	~~86 Haza Dr. Lakeside~~
William C Pullin	241 Sky Ranch Ln
Lisa S. Pullin	" " "
Benjamin Knolls	P.O. Box 255 Somers
~~P.~~ Darcy Lard	732 Lakeside Blvd Lakeside
Liz Seabaugh	395 Copper Valley Rd. Kal
Kate Droll	501 Archery Rd
Lois Nichols + Marcus	672 Lakeside Blvd
Hannah Shields	Daily Inter Lake
Michael J Wall	290 Sisters Creek
Jim Spaulding	1116 Alpine Glow Drive
Karen Rhodes	225 Burns St. Somers
Lynne Hillebof	593 Conrad Pt.
Margaret Olvera	845 Lakeside Blvd
June Jackson	PO Box 1168 Lakeside
Jerry Smith	P.O. 501 Blacktail Rd Lakeside

LAKESIDE
WATER & SEWER

August 21, 2025, Board Meeting

Visitor Sign In Sheet

Please CLEARLY PRINT Full Name & Address

Ann Cathroe 206 Lakeshore Dr Lakeside
Mark James 108 Cooperative way Kalispell MT
Debbie Green 217 Pennant Lane Lakeside
Tim & Sue Bodurtha 130 Thoutbec Ln. Rd Polson MT
JANI THOMPSON 580 N. Village Dr. Bigfork
MIKE GLAIN " "
Alice L. Wile } 7000 US. Hwy. 93 So. Lakeside
Charles L. Wile }
Janet Kerr 290 Blacktail Heights Rd
Andy
Maureen Redfield 5 Lakeside Ave.

LAKESIDE
WATER & SEWER

August 21, 2025, Board Meeting

Visitor Sign In Sheet

Please CLEARLY PRINT Full Name & Address

Major Catrina LaPointe	
CAROL PARDINI	LS.
DAN BANGHMAN	SOMERS NY
Maggie Dresser	69 Main St
SUSAN M SNYDER	15 BATTLE HOLLOW SOMERS
Holly Osterday	540 Bierney Creek Rd
Randy WOLFF	156 Goldenview Ln
Randy Iola	329 Jib Ct.
Willie Dough Rou	845 Lehmie Blvd.
Ann Driskell	134 Crabtree lane Kal
Jennifer Tipton	123 Crabtree Ln.
July Parker Steve PARKER	345 CAROLINE PT.
Mary Sameit	113 Spar Lane
Julie Heaton	275 Cedar Mill Rd Kali

(10)

LAKESIDE
WATER & SEWER

August 21, 2025, Board Meeting

Visitor Sign In Sheet

Please CLEARLY PRINT Full Name & Address

Margie Flowers CBF	
Craig & Suzy Spencer	170 Dr. Stwood Dr #10 Big Fork, MT
Caroline Casteel	855 Lakeside Blvd KS
Cameron Dexter	137 S. Main St. Kalispell MT
Mike Schultz	231 Stoner Cr Rd Lakeside
Debbie Spaulding	1116 Alpenglow Dr. Lakeside
Jeff Martin	355 Adams Street Lakeside
Andrea Palmer	679 Conrad Point Lakeside
Susan How	P.O. Box 404 Somers, MT
Elizabeth Rose	845 Lakeside Blvd.
RRD & WERNER	KALISPELL
Susan Caliel	Kalispell
C. JEAN HUNTSMAN	KALISPELL, MT
STEVEN MARTINE	KALISPELL MT
Ruth Dotson	109 Brads Rd
Kylie Brown	101 Marline Dr.
Margaret S Davis	Lakeside

LAKESIDE
WATER & SEWER

August 21, 2025, Board Meeting

Visitor Sign In Sheet

Please CLEARLY PRINT Full Name & Address

Linda L. Jenkins 345 Caroline Pt. Rd Lakeside
Bruce A Young 274 Stoner Creek Rd-
John Rodwick 117 Tamarack Terr. Lksd
Joanne Delong 637 Somers Rd Somers MT
Jane Jacobson 191 Overlook Ter. Lakeside, MT
H. Rosa Cloud 440 Co. Ave WF MT 59937
Christian Salcedo 159 Greenbriar Dr, Kalispell
Tobias Liechti 245 Lakeview Dr, Lakeside