2023 Wastewater Collection System

Facility Planning Study

Town of West Yellowstone, Montana

December 2023

2-27-24
PROVIDED TO TOWN OF WEST YELLOWSTONE FOR MARCH 5, 2024 TOWN COUNCIL MEETING.

Prepared by:
FORSGREN Associates Inc.

0) EXECUTIVE SUMMARY

This Facility Planning Study (FPS) is prepared for the Town of West Yellowstone for use in planning and funding wastewater collection system projects for the Town. The Wastewater Collection FPS has been required by the Montana Department of Environmental Quality (DEQ) to coincide with the Town's needs for their wastewater treatment plant and proposed upgrades and improvements for the treatment works. The Montana Department of Environmental Quality (DEQ) Circular DEQ-2, Design Standards for Public Sewage Systems 2018, is used as the basis for evaluation of the Town's wastewater collection system. This study follows the outline and content requirements of the Uniform Preliminary Engineering Report for Montana Public Facility Projects. The following sections, findings, and recommendations from the report are summarized below.

1. Project Planning

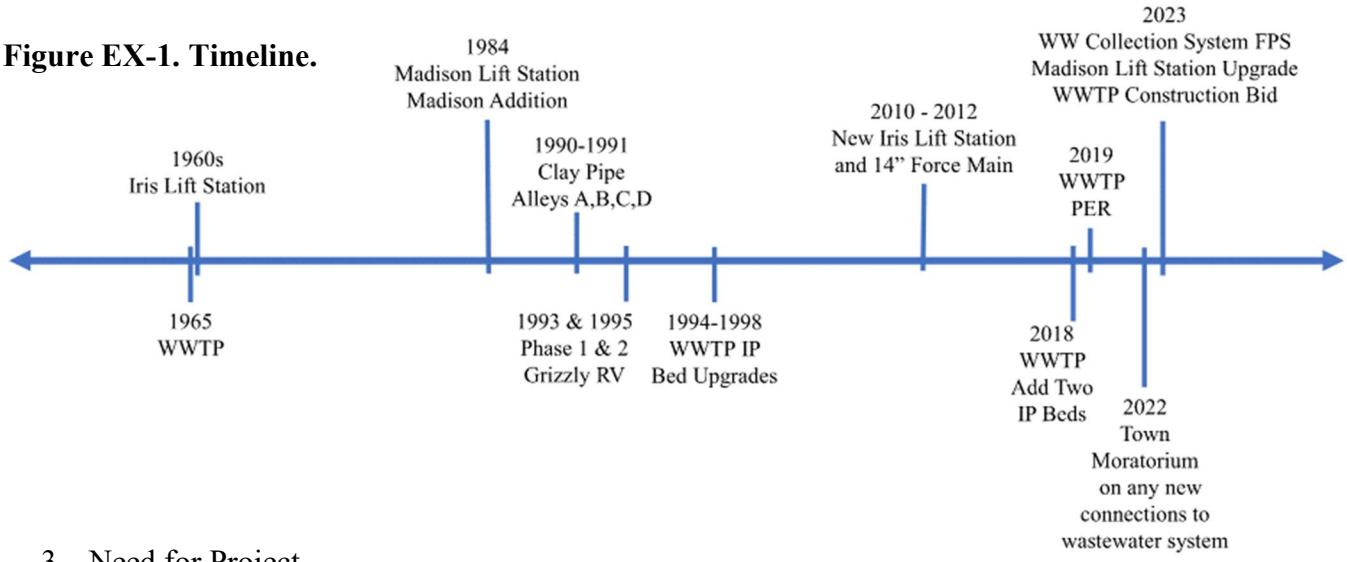
   The planning area for the study includes the Town of West Yellowstone limits and the recently acquired 80-acres on the southwest edge of the town. The wastewater collection system includes collection of wastewater flows and projected wastewater flows from these areas plus wastewater flows from the National Park Service (NPS) employee residence area within Yellowstone National Park to the east of the town and the U.S. Forest Service location on the northeast edge of the town. Mapping at the end of this Executive Summary shows the collection system. Outside of the Town limits, sewer service is provided by onsite septic systems.

   The planning period for the study is from 2023 to 2043, a 20-year planning period. From analysis of historic population data, wastewater flow data, tourism information, and new connections based on projected development in the 80-acres and Moonrise, a 6% annual growth rate for the 20-year planning period is utilized in the study in evaluating wastewater needs for the Town.

2. Existing Facilities

   The Town of West Yellowstone existing wastewater collection system includes facilities primarily in two regions: south of Alley D with flows directed to the Iris Lift Station and north of Alley D with flows directed to the Madison Lift Station. Separate force mains transfer the wastewater from the lift stations to the wastewater treatment plant where the influent is treated and discharged through evaporation and infiltration/percolation (I/P) cells to groundwater. The following timeline demonstrates construction and implementation of the wastewater system through YR 2023 and the Town's commitment to the establishment and maintenance of the system.

Figure EX-1. Timeline.



3. Need for Project

The need for the project is based on evaluation of the existing system for current and future use and wastewater flows. Based on findings from the report and through discussions with public works, finance, and administrative staff, deficiencies were identified and corresponding needs classified according to level of need by the Town.

The levels of need identified by the Town correspond to red, yellow and green. Level Red represents significant immediate needs recommended for immediate action. Level Yellow represents immediate needs for the 20-YR planning period (2023-2043) with action recommended on the listed items during that time. Level Green represents needs to monitor, needs that are a lower priority in the functioning and maintainability of the wastewater collection system.

Figure EX-2. Level of Need.

Level Red - Significant Immediate Needs	
1	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)
2	Iris Lift Station: Replace Force Main Air Relief Valve
3	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)
4	Iris Lift Station: Replace Safety Grate
5	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes
Level Yellow - Immediate Needs for 20-YR Planning Period (2023-2043)	
6	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots
7	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco
8	Select Locations: Correct Protruding Service Lines
9	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12"
10A	Fix Bellies/Dips - Select Locations: Correct Structural Deficiencies - point repairs OR
10B	Fix Bellies/Dips - Buy Flush Truck and Vac Truck to Maintain Lines Sytem-Wide
11	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)
12	System-Wide: Replace Manhole Rings (no cost - use maintenance)
13	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line
Level Green - Monitor Needs	
14	Alley A and Alley B: slipline clay pipe installed backwards

4. Alternatives Considered

   System deficiencies were evaluated to determine if they could be addressed without replacement of infrastructure, but through rehabilitation in cooperation with operations. This was an important approach since the Town has recently incurred substantial debt in funding the new mechanical wastewater treatment plant. Evaluation of alternatives for the wastewater collection system deficiencies included three alternatives. Alternative 1, No Action was not feasible due to it not addressing needs of the system. Alternative 2, the Recommended Alternative, addresses needs based on rehabilitation primarily with point repairs, slip-lining, and operations. Alternative 3, Other Feasible Alternative, is based primarily on replacement and upgrades.

5. Selection of an Alternative

   Selection of an alternative started with identifying deficiencies, advancing to alternatives addressing the deficiencies and associated needs, and then cost estimates for construction; Section 5 of the FPS covered analysis of the alternatives based on life cycle and non-monetary factors. Life cycle costs included capital costs, O&M, and salvage value. Non-monetary factors included sustainability, operator training, equipment maintenance, permits, community objection, reduction in greenhouse gas emissions, reliability, operability, and system maintenance.

   Initial screening of alternatives occurred in project meetings with Town public works, finance, and administrative staff through discussions of deficiencies identified Environmental impacts are anticipated to be minimal, as improvements are within previously disturbed areas and existing rights-of-ways.

6. Proposed Project (Recommended Alternative)

   The Proposed Project developed through the processes described above into a project with items that can be addressed and phased over the 20-YR planning period to 2043. The Proposed Project (Recommended Alternative) is for immediate rehabilitation of deficiencies and needs at the Iris Lift Station, and then over the 20-YR planning period to implement repair and replacement of sections of wastewater collection piping and retrofit of the Iris Lift Station to accommodate development of the 80-acres. A key component in the Recommended Alternative is the purchase and use of a vac-flush truck to use system-wide in removing debris and sediment that impedes flow and impacts the integrity of the collection system. The following tables represents the Engineer's Opinion of Probable Cost (EOPC) for the project and associated construction and implementation schedule proposed. The schedule is approximate and may change according to conditions in the Town and funding availability.

   Increase in sewer rates may or may not be necessary depending on wastewater collection system projects pursued by the Town. For significant immediate needs (level red), the recommended action is for the Town to consider funding the approximately $200,000 project with local infrastructure and sewer funds over the next 1-2 years, with no increase in sewer rates. For the other identified needs, for yellow and green, a monthly rate increase of $1/YR/SFE beginning in YR 2025 results in funds projected to pay for project items before the end of the 20-year planning period. However, pursuing an enhanced

maintenance approach that incorporates purchase and use of a vac-flush truck in maintaining sewer pipes has potential to decrease the total capital project needs by nearly $3M if Alleys A and B are determined to not require slip-lining and thus lessen needs for increases in rates.

7. Conclusion and Recommendations

This study recommends the Town first address the significant immediate needs (level red) which are recommended the Town consider paying for over the next couple years with local infrastructure and sewer funds. Then for point repairs of structural deficiencies and purchase of a vac-flush truck in maintaining the collection system. Upgrades for the Iris Lift Station are recommended for the Town to consider including as costs with developing the 80-acres. Lastly, for the sewer lines in Alleys A and B and the most easterly 12" sewer main in Iris Street to be monitored and maintained with the vac-flush truck.

This wastewater facility planning study is a guide and planning document for aid in implementing project improvements and securing funding for the wastewater collection system. The estimate and schedule can be used by the Town and professionals in phasing needed elements for construction ahead of and as development and growth occur. The following is a summary of the recommendations:

1-Significant Immediate Needs

- Health and Safety
- Iris Lift Station Rehab
- ~ $232,600 (construction, contingency, non-construction)
- Propose use Town Sewer Funds/Operations
- No rate increase proposed

2-Immediate Needs 20-YR Planning

- Pipe function and system capacity
- Consider when to do
- Vac-Flush Truck, Iris LS upgrades/retrofit
- Pipe replacements and point repairs
- ~ $3,006,900 (construction, contingency, non-construction)
- Propose build up sewer funds and/or finance
- Monthly rate increase proposed = $1/YR/SFE

3-Monitor Needs – Alleys A and B

- System integrity and maintenance
- Replace backwards pipe in Alleys A & B
- Vac truck maintenance may meet need
- ~ $2,750,400 (construction, contingency, non-construction)
- Propose build up sewer funds and/or finance
- Monthly rate increase proposed = $1/YR/SFE

In addressing the significant immediate needs (red level) **the Town requests DEQ's approval for placement of shutoff valves on the 12" lines prior to the sand trap in order to shut off flow to the sand trap and wet well for proper function and maintenance of the lift station.**

Figure EX-3. Deficiencies Identified.

1	**Structural issues in pipes and at joints** Cracks, gaps, offsets (leakage exfiltration at gaps), Roots in lines (potential for more structural damage)
2	**Undersized line, flows exceed capacity**
3	**Iris Lift Pump Station (Iris LS)**
3a	Electrical Equipment incorrectly housed - unsafe location -The Iris LS generator and electric controls are in the same room as wet well and hydrogen sulfide (HS) -The Iris LS generator is not rated for corrosion. It is reported to be corroded and poses safety concerns -The wet well exhaust fan is corroded and poses safety concerns
3b	Pumps operating above rating of pump start-stops per hour
3c	Unable to properly maintain and clean lift station and sand trap
3d	Unable to properly drain (current ball check valves)
3e	Air relief valve beyond its design and functional life
3f	Wet well piping/rails reaching design and functional life
3g	Grate placement and fitting pose health and safety concerns
4	**Pipe sections with flow depth>0.3 of the diameter and Nonuniform slope: bellies/dips) at various locations**
5	**Protruding Service Lines impair flow capacity, impedes cleaning**
6	**Inflow from irrigation (abandoned service lines not capped)**
7	**Sewer Pipe Installed incorrectly: sewer installed "backwards"** (Alleys A & B) (impedes flow, joints impacted)
8	**Manhole issues (Manhole Rings Broken, Manhole Bricks Fallen)**

Figure EX-4. Estimated Schedule for Improvements.

	Unit Process	Year 24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43
Red	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)	✓																			
Red	Iris Lift Station: Replace Force Main Air Relief Valve	✓																			
Red	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)	✓																			
Red	Iris Lift Station: Replace Safety Grate	✓																			
Red	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes	✓																			
Yellow	Fix Bellies/Dips - Purchase and Use Vac-Flush Truck for System-Wide Use		✓																		
Yellow	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots				✓																
Yellow	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12" Iris)					✓															
Yellow	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line						✓														
Yellow	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco								✓												
Yellow	Select Locations: Correct Protruding Service Lines									✓											
Yellow	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)	✓																			
Yellow	System-Wide: Replace Manhole Rings (no cost - use maintenance)			✓																	
Green	Various Sliplining:																				
Green	Alley A and Alley B: slipline clay pipe installed backwards															✓					

Figure EX-5. Engineer's Opinion of Probable Cost.

FORSGREN Associates Inc.

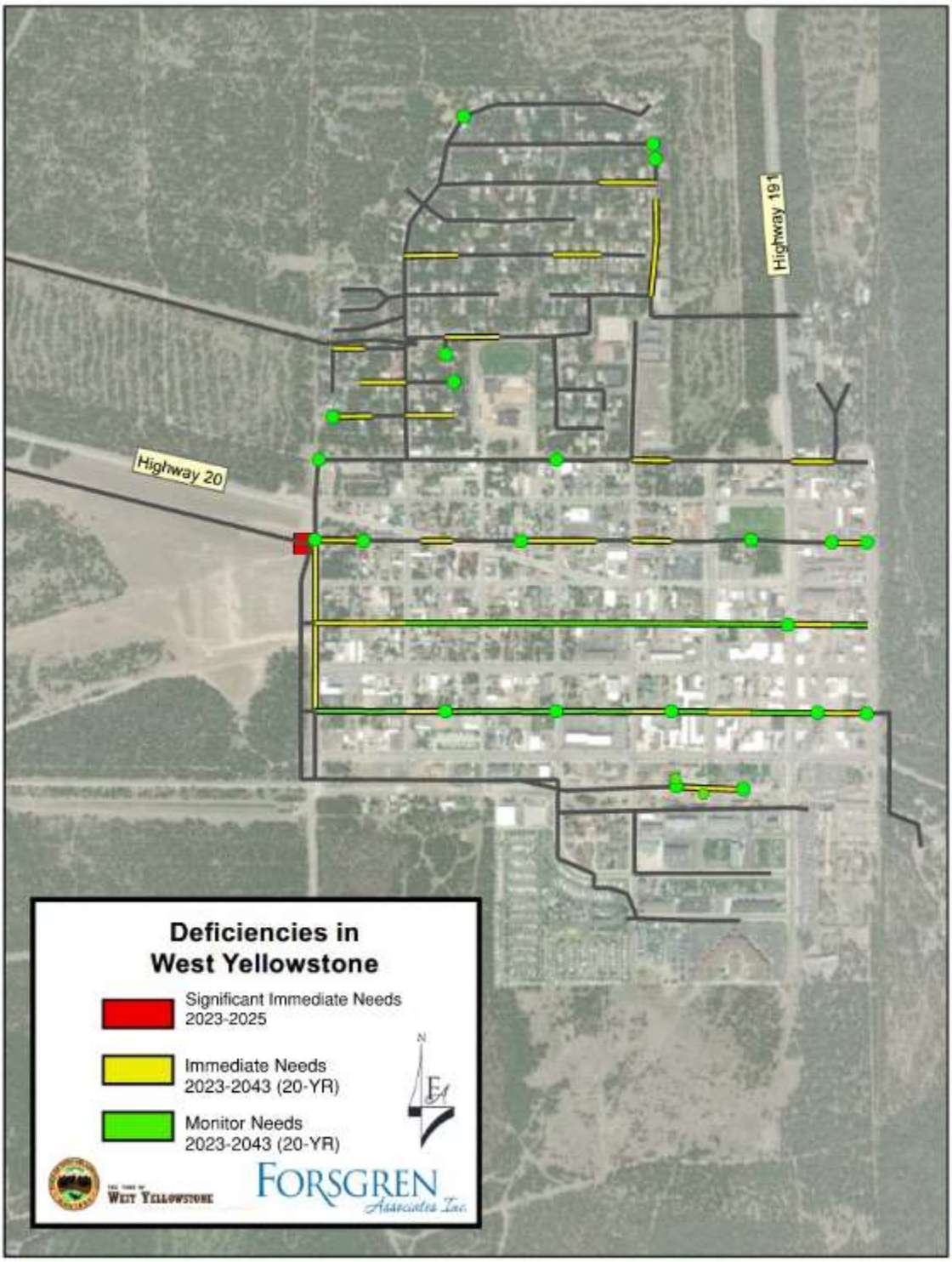
ENGINEER'S OPINION OF PROBABLE COST

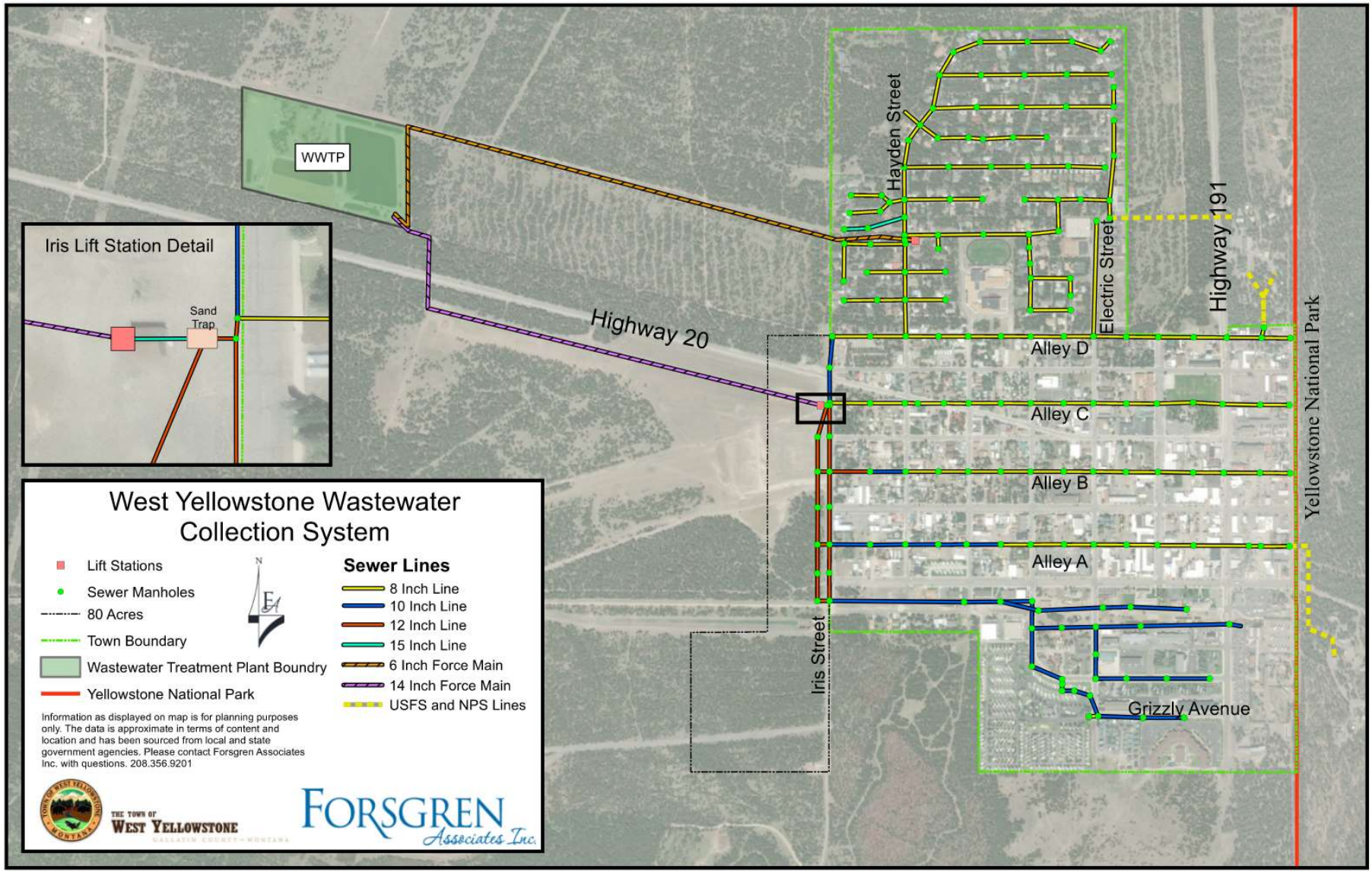
Alternative 2
Town of West Yellowstone
Wastewater Collection System Improvements

Project No
Project: West Yellowstone Wastewater Collection FPS — Date: 2/27/2024
Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION		Total Price
CONSTRUCTION PROJECTS - SUMMARY			
Level Red - Significant Immediate Needs	Construction* $ 182,600		
1	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)		$ 10,000
2	Iris Lift Station: Replace Force Main Air Relief Valve		$ 12,000
3	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)		$ -
4	Iris Lift Station: Replace Safety Grate		$ 13,500
5	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes		$ 104,900
Level Yellow - Immediate Needs for 20-YR Planning Period (2023-2043)	Construction* $ 2,360,300		with 10B (not 10A)
6	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots		$ 127,400
7	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco		$ 33,000
8	Select Locations: Correct Protruding Service Lines		$ 98,000
9	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12"		$ 994,000
10A	Fix Bellies/Dips - Select Locations: Correct Structural Deficiencies - point repairs OR		$ 614,000
10B	Fix Bellies/Dips - Purchase and Use Vac-Flush Truck for System-Wide Use		$ 400,000
11	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)		$ -
12	System-Wide: Replace Manhole Rings (no cost - use maintenance)		$ -
13	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line		$ 163,200
Level Green - Monitor Needs	Construction* $ 2,158,900		
14	Alley A and Alley B: slipline clay pipe installed backwards		$ 1,660,700
	TOTAL CONSTRUCTION COST		**$ 3,616,700**
* Levels - Construction Cost with Contingency			
	Contingency Fund (70% Confidence Factor)	30%	$ 1,085,100
	TOTAL CONSTRUCTION COST		**$ 4,701,800**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT			
1	Legal, Bonding, Audit	0.4%	$ 18,800
2	Basic Design Services (includes PER, ER, and Design)	10%	$ 470,200
3	Bid Services	1%	$ 47,000
4	Construction Observation/Inspection	8%	$ 376,100
5	Post Construction Services	2%	$ 94,000
6	Financing Administration	5%	$ 235,100
7	Bond/Interim Interest	1%	$ 51,100
	SUBTOTAL OTHER PROJECT COSTS		**$ 1,292,300**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST			**$ 5,994,100**

Figure EX-6 Deficiencies and Need.




WWTP
Iris Lift Station Detail
Sand Trap
Highway 20
Hayden Street
Electric Street
Highway 191
Yellowstone National Park
Alley D
Alley C
Alley B
Alley A
Iris Street
Grizzly Avenue
West Yellowstone Wastewater Collection System
Lift Stations
Sewer Manholes
80 Acres
Town Boundary
Wastewater Treatment Plant Boundry
Yellowstone National Park
Sewer Lines
8 Inch Line
10 Inch Line
12 Inch Line
15 Inch Line
6 Inch Force Main
14 Inch Force Main
USFS and NPS Lines
Information as displayed on map is for planning purposes only. The data is approximate in terms of content and location and has been sourced from local and state government agencies. Please contact Forsgren Associates Inc. with questions. 208.356.9201
THE TOWN OF WEST YELLOWSTONE
FORSGREN Associates Inc.

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APPENDICES

1) PROJECT PLANNING

The Town of West Yellowstone has been required to complete a Facility Planning Study (FPS), also referred to as a Preliminary Engineering Report (PER) in the State of Montana, for their wastewater collection system to analyze the function and needs of the system. The Wastewater Collection FPS has been required by Montana Department of Environmental Quality (DEQ) to coincide with the Town's needs for their wastewater treatment plant (WWTP) and proposed upgrades and improvements for the treatment works. This study is intended to evaluate function and needs of the wastewater collection system and prepare the system to provide reliable and adequate wastewater collection for current and future residents. This study includes recommended alternatives for needs and rate analysis in funding these needs. This study is a planning tool.

The Montana DEQ Circular DEQ-2, Design Standards for Public Sewage Systems 2018, is used as the basis for evaluation of the Town's wastewater collection system. Criteria required from Chapter 10 **Engineering Reports and Facility Plans** of the Circular are incorporated within this report. Criteria from Chapter 30 for **Design of Sewers** and Chapter 40 for **Wastewater Pumping Stations** are utilized in evaluating existing function and recommending improvements to the system for current and future use. This study follows the outline and content requirements of the Uniform Preliminary Engineering Report for Montana Public Facility Projects. Wastewater Treatment requirements of Circular-2 have been addressed in the 2022 Town of West Yellowstone Wastewater Treatment Plant Preliminary Engineering Report prepared by Forsgren Associates Inc. Table 1 identifies FPS sections corresponding to Montana DEQ Circular DEQ-2, Chapter 10.

Table 1. FPS Sections Corresponding to Montana DEQ Circular 2 (DEQ-2), Chapter 10

DEQ-2	Section Item	FPS/PER Section
11.21	Problem Evaluation and Existing Facility Review	**2023 WW FPS, Section 2.c**
11.22	Planning and Service Area	**2023 WW FPS, Section 1.a**
11.23	Population Projection and Planning Period	**2023 WW FPS, Sections 1.c, 3.c**
11.24	Hydraulic Capacity	**2023 WW FPS, Sections 2.c.1, 3.c.1.i**
11.25	Organic Nutrient Capacity	2022 WWTP PER, Sections 4.7, 5.9, 6.3
11.26	Wastewater Treatment Facility Design Capacity	2022 WWTP PER, Section 6.3
11.27	State and Federal Treatment Standards	2022 WWTP PER, 2.2a, Appendix B
11.28	Initial Alternative Development	**2023 WW FPS, Sections 4.c, 4.h**
11.29	Detailed Alternative Evaluation	**2023 WW FPS, Section 4**
11.30	Final Project Selection	**2023 WW FPS, Sections 5.a, 5.b**

1.a Location

1.a.1 Existing Planning Area

The Town of West Yellowstone, Gallatin County, is located in southern Montana. It is located adjacent to the western border of Yellowstone National Park. The West Yellowstone WWTP services the area within the Town limits, including the Madison Addition. The Town reports that the Yellowstone National Park Service (Park Service) and the Forest Service connect to the Town's collection system from septic systems inside the Park Service and Forest Service areas that service employee areas of these Federal lands. These connections to the town's wastewater collection system are indicated on **Figure 7.**

Note that the Town is bordered by Federal Lands, including National Park and Forest Service land, in all directions. However, there are three parcels to the west totaling 80-acres that have recently been deeded to the Town of West Yellowstone by the Forest Service. The 80-acres is not currently zoned for particular use, however, a document was prepared for the Town of West Yellowstone to use in planning for the 80-acres (THINKTANK, 2019). See Figure 2 for reference to the planning boundary including the three parcels making up the 80 acres.

1.a.1.i Unserved Developed Areas

Outside of the West Yellowstone town boundary, sewer service is provided by onsite septic systems. There are not any areas immediately adjacent to the community with sufficient concentration of homes or businesses to make extending sewer service feasible at this time.

1.a.2 Future Planning Area

As mentioned, the majority of land bordering the West Yellowstone town boundary is Federally owned. However, due to the unpredictability of any additional land transfers from federals lands taking place, and for the purposes of this study, the future planning area is not anticipated to extend outside of the planning boundary identified in Figure 2.

Figure 1. Vicinity Map

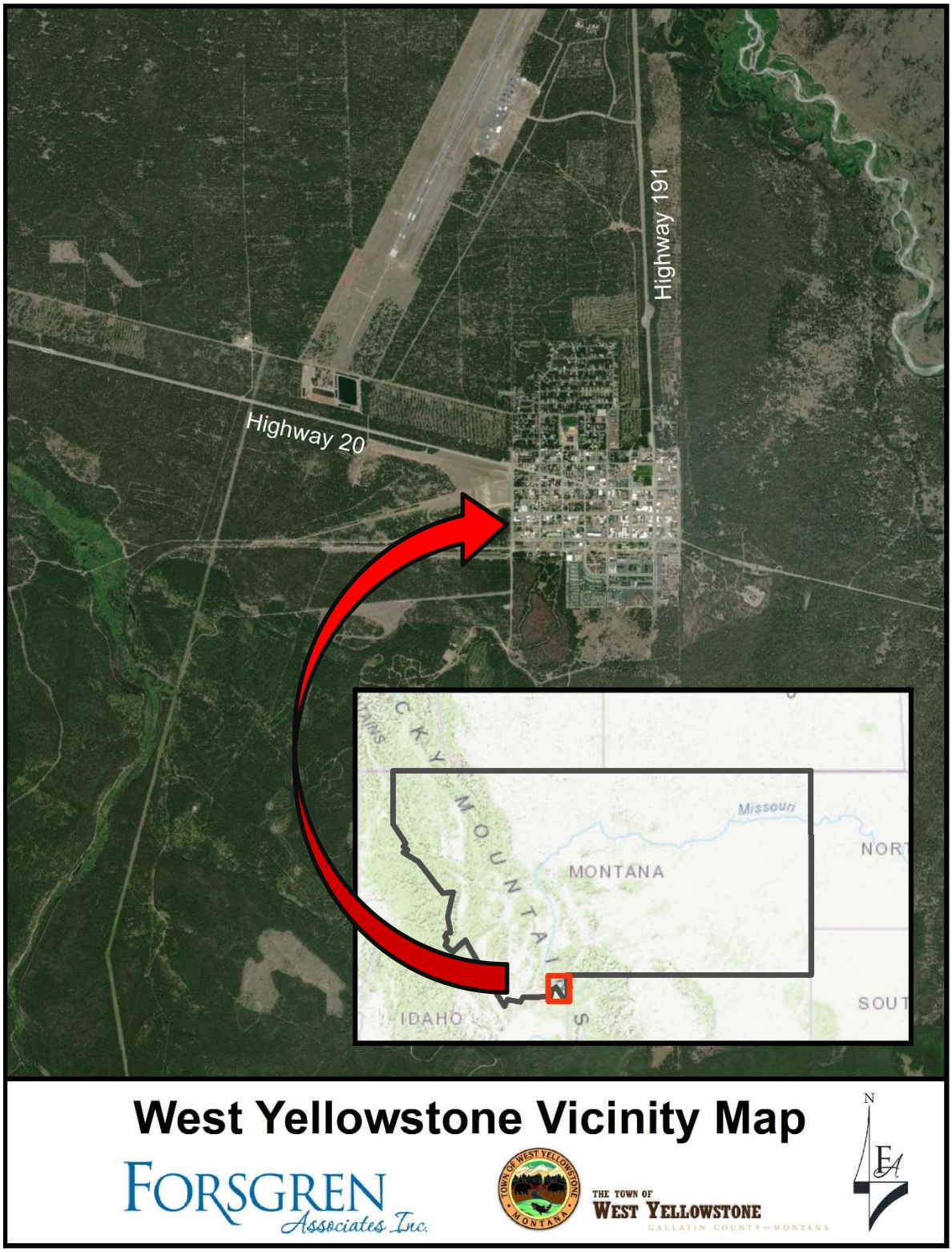
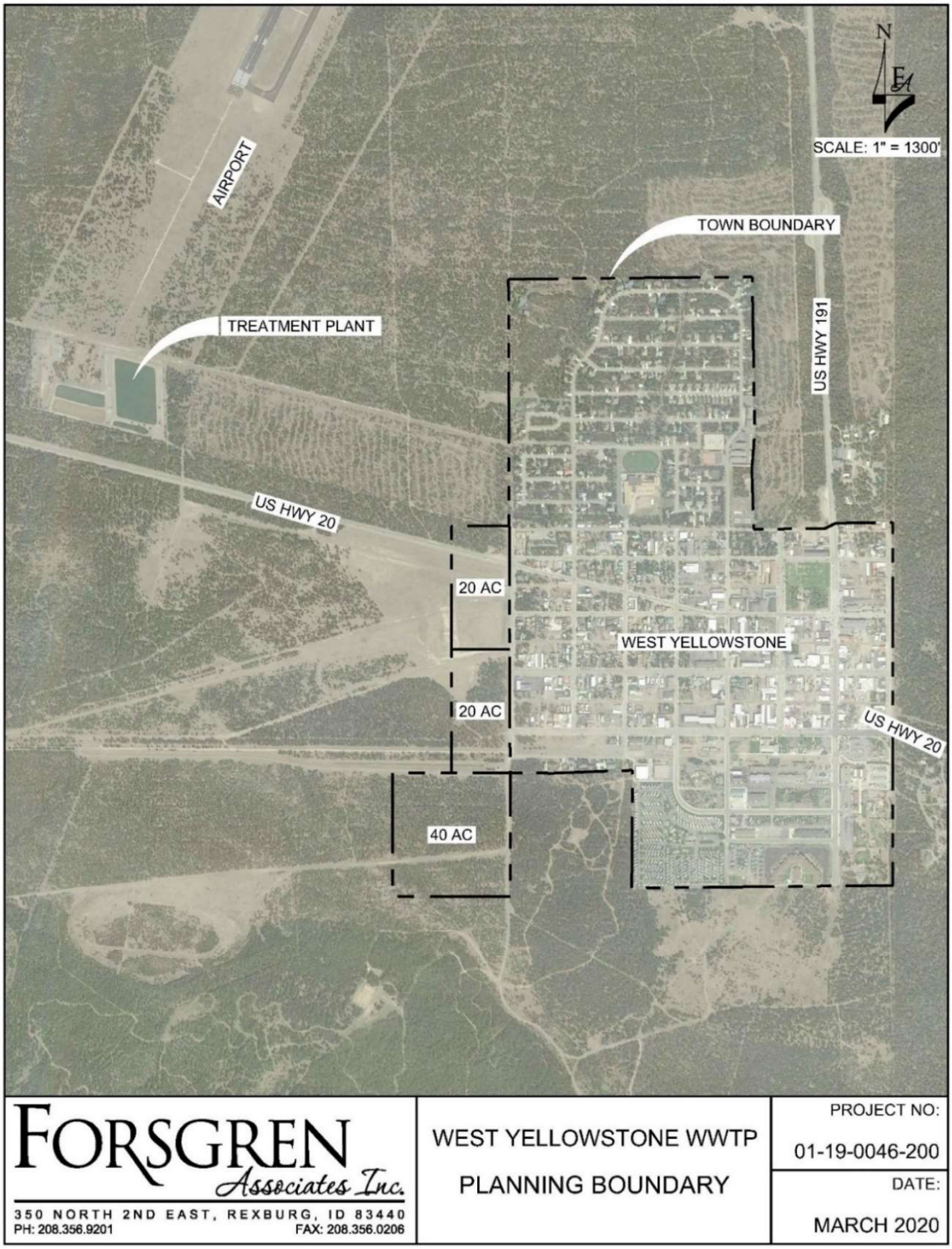


Figure 2. Town of West Yellowstone – Planning Boundary



1.b Environmental Resources Present

All state and federally funded projects are subject to either the Montana Environmental Policy Act (MEPA) or National Environmental Policy Act of 1969 (NEPA), or both. MEPA seeks to avoid or mitigate adverse impacts on the natural and human environment by mandating careful consideration of the potential impacts of any development assisted with state funds or approved by a state agency. NEPA establishes national policy, goals, and procedures for protecting, restoring, and enhancing environmental quality.

An analysis of the impacts that the project would have on the environment as per Chapter 10 paragraph 11.29.C of MDEQ Circular 2 has been included in Section 4.d of this report. Additionally, the Uniform Environmental Checklist has been completed, see Appendix B, which verifies that none of the impacts of the proposed Town of West Yellowstone WWTP project are significantly adverse, or warrant a more detailed Environmental Assessment (EA) or Environmental Impact Statement.

The existing environmental conditions can be found in Appendix B. Projects identified in this study are anticipated to take place in areas that have been previously disturbed and no significant impacts are anticipated on current environmental conditions.

The proposed improvements will require minimal, if any, vegetation removal. The Town of West Yellowstone is a gateway to Yellowstone National Park and surrounding U.S. Forest Service Lands; however, the project does not directly border the national park or forest lands. No other State Parks, National Wildlife Refuges, National Game Preserves, Wilderness Areas, or wild or scenic rivers are located on or in the vicinity of the proposed project activities.

The native ground cover vegetation consists of sparse grass and brush cover in a pine forest. Within the Town limits, there is little to no naturally occurring native ground cover due to development and human use of the land. Many of the developed lots have landscaping installed. Wildlife listed within the project area, or within its immediate vicinity include grizzly bear, black bear, moose, elk, deer, wolves, coyotes, migratory birds, bald eagles, and several other native wildlife (see Appendix B, IPaC, 2023).

1.c Population Trends

A reasonable assessment of the future population of a community is necessary to develop a reliable estimate of the future wastewater flows. Several methods of projecting the future population are used throughout the industry; the most applicable in each case selected after reviewing the available historical population data and recent development patterns. In the case of West Yellowstone, projecting future population tends to be difficult because the wastewater flows fluctuate with tourism and are not directly correlated with single-family equivalents (SFE's) and wastewater flows assigned with the SFE's. West Yellowstone and the surrounding areas become heavily populated by tourists in the summer, which tourism is directly correlated to Yellowstone National Park.

The methods employed for evaluating population trends were 1) evaluating historical census data for surrounding areas, 2) reviewing historical wastewater flows, 3) reviewing tourism data, and 4) the number of new applications for connections in the last 3 years.

The planning period for projects of this scale is typically 20 years, an interval based on the terms of the financing arrangements for municipal infrastructure projects and the approximate design life of major equipment components. In accordance with DEQ standards, a 20-year planning period has been used for the design of this project and projections have been made for the year 2043.

1.c.1 Evaluating Historical Census Data for Surrounding Areas

The following is an update to what was presented in the 2022 PER for the WWTP. Historical population and growth rates for surrounding communities were reviewed, particularly in the context of local development patterns which vary from one community to another. Population trends for Gallatin County, West Yellowstone, and Big Sky in Montana and Island Park and Fremont County in Idaho were evaluated to develop a perspective on the population growth and associated increase in wastewater production. For this comparison, census records were extracted from the United States Census Bureau and are presented in Table 2. From observation of surrounding areas, there is a general increasing growth for the entire area. West Yellowstone has been steadily increasing since 1930 and slowing over 2010-2020, with an annual average population change of **6.0%.**

Table 2. Historical Population Data: Surrounding Areas

U.S. Census Data	**1900**	**1910**	**1920**	**1930**	**1940**	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2010**	**2020**	**Historical Average**
West Yellowstone, MT				200	300	400	500	756	735	913	1,177	1,271	1,272	
Gallatin Co., MT	9553	14,079	15,846	16,124	18,269	21,902	26,045	32,505	42,865	50,463	67,831	89,513	118,960	
Big Sky, MT										686	1,106	2,308	3,591	
Fremont Co., ID	12,821	24,606	10,380	9,924	10,304	9,351	8,679	8,710	10,813	10,937	11,819	13,242	13,388	
Island Park, ID				50	50	50	53	136	154	159	215	286	193	
Percentage Change in Subsequent Decade (see Note 1)														**Historical Average % Change**
West Yellowstone, MT					5.0	3.3	2.5	5.1	(0.3)	2.4	2.9	0.8	0.0	6.0
Gallatin Co., MT		4.7	1.3	0.2	1.3	2.0	1.9	2.5	3.2	1.8	3.4	3.2	3.3	5.3
Big Sky, MT											6.1	10.9	5.6	21.2
Fremont Co., ID		9.2	(5.8)	(0.4)	0.4	(0.9)	(0.7)	0.0	2.4	0.1	0.8	1.2	0.1	0.0
Island Park, ID					-	-	0.6	15.7	1.3	0.3	3.5	3.3	(3.3)	3.2

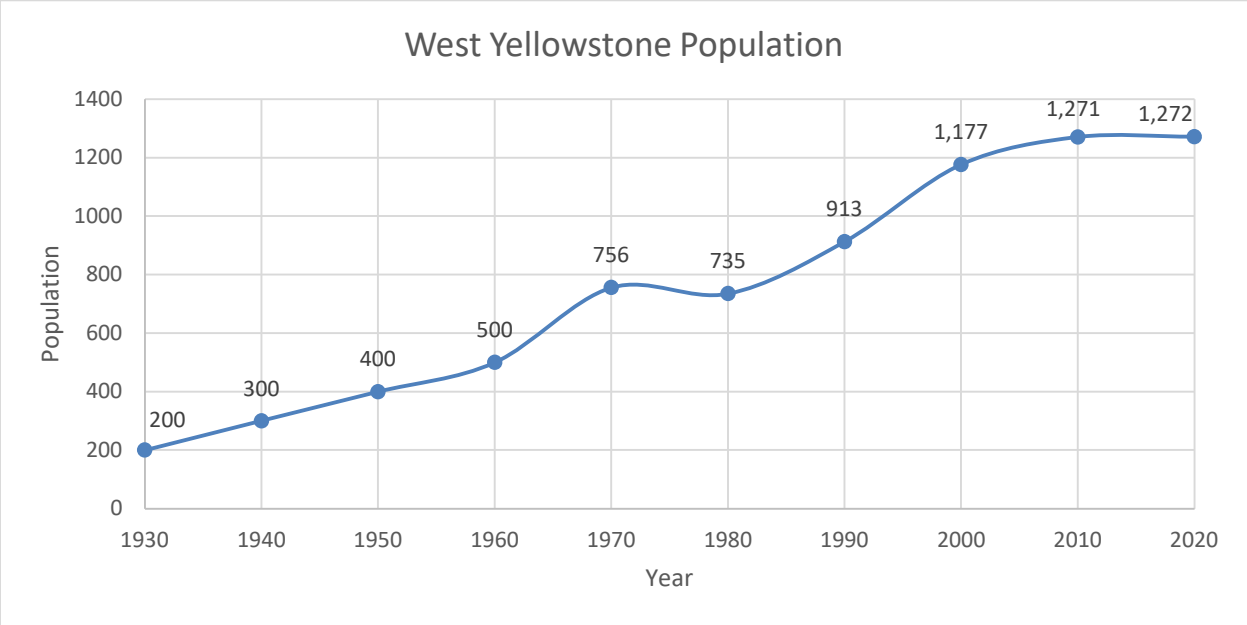
Notes:

1	For example, the 1970 value is change in population between 1970 and 1980, divided by the 1970 population, divived by the number of years between 1980 to 1970. Parentheses indicate negative growth, i.e., a loss of population.
2	Values for cities do not address city's impact area.
3	Historical Average % Change is per the decades of reported data shown in the table. (Ex: West Yellowstone historical average % change is for decades 1930 to 2020).

The Town of West Yellowstone has experienced mostly growth in population over time, with an exception in the 1980's and slowing over 2010-2020. As of the 2020 U.S. Census, there were 1,272 residents listed as residing within the Town of West Yellowstone (Montana Department of Commerce, 2020-a). The number of households within the Town was listed as **420 with 2.4** persons per household from Census Reporter (Census Bureau, 2021). As

indicated in the table above, from 1930 to 2020, the increase in population indicates a percent change in growth of **6.0%.** The slowing in population growth may be due in part to the current moratorium in development until capacity and limitations at the WWTP are adequately addressed.

Figure 3. Town of West Yellowstone Historical Population, 1930-2020.



Population trends in West Yellowstone may also indicate a recent slowing because of current limited affordable housing options available in the tourism-influenced town. However, with the recently deeded 80-acre parcel to the Town of West Yellowstone from the U.S. Forest Service and initial plans by the town to have this area developed as affordable housing for town residents and locally employed persons, population is anticipated to increase correlating with the rate of housing constructed in the 80 acres.

1.c.2 Reviewing Historical Wastewater Flows

As pointed out in the 2022 PER for the WWTP, because of the large number of tourists during the summer, historical wastewater flows were analyzed to develop population trends in the area. Flow data was provided by the Town and then percent change was determined. The design average flow for facilities having critical seasonal high hydraulic loading periods must be based on the daily average flow during each distinct seasonal period with the largest value used for design purposes, as stated in Circular DEQ-2 Section 11.241.a.

West Yellowstone is a tourist town, with a large population and flow influx happening during the summer months, specifically from Memorial Day to Labor Day. Therefore, the peak season design average flow has been determined based on the daily average flow during this period. The average change during the peak season and the AADF is approximately 4.2%-7.5% as shown below in Table 3. The table shows that the highest average percentage of change occurred during the Peak Season at 53% from 2020 to 2021 which is directly correlated to the

decrease of tourists due to COVID-19. There was an average of **4.2%** growth from 2017 to 2023 during the peak season. The highest average percent of change for the AADF from 2016-2023 was 35% from 2020-2021.

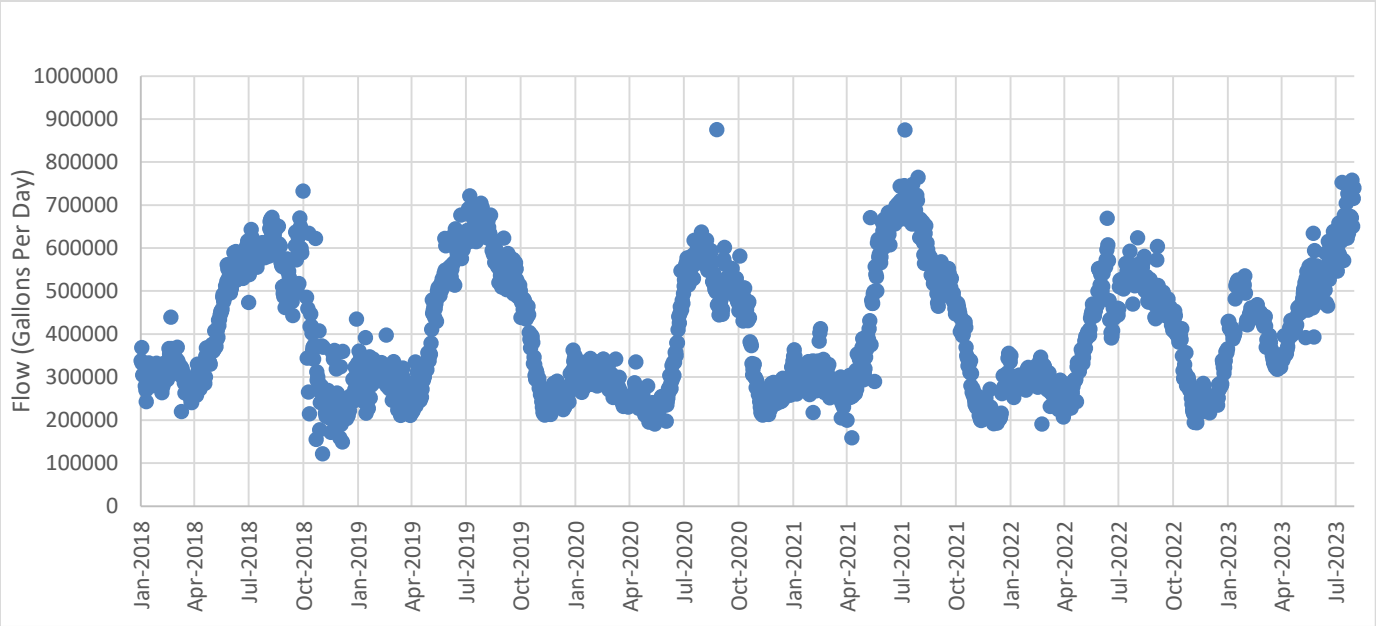
Table 3. Historical Wastewater Flow

Year	AADF[1] (GPD)	% Change[3]	Peak Season[2] ADF (GPD)	% Change[3]
2016	375,330		589,538	
2017	324,711	-13%	572,097	-3%
2018	404,577	25%	573,950	0%
2019	411,609	2%	604,864	5%
2020	377,802	-8%	481,785	-20%
2021	509,707	35%	738,892	53%
2022	459,672	-10%	609,504	-18%
2023[4]	562,594	22%	676,796	11%
Average	428,250	7.5%	608,270	4.2%

Notes:	
1	AADF is the average daily flow over the entire year
2	Peak Season ADF is the average daily design flow during the peak season which is typically Memorial Day to Labor Day and is evaluated as such in this study
3	% change is found by finding the difference between the two years, then dividing by the past year. For example, the 2018 value is change in AADF between 2017 and 2018, divided by the 2017 AADF.
4	2023 flow rates were calculated using data available. The data available was from January to July 2023. The gallons per day (GPD) for AADF may change for all of 2023 and be less than is shown since historically, there is less flow during the non-peak season which typically begins in October each year; however, peak season ADF is not anticipated to decrease and may increase over the peak season period.

The following figure shows the wastewater flow to the WWTP from the wastewater collection system from January 2018 through July 2023. The chart indicates a base domestic wastewater production from town residents during the off-season months from approximately November through March each year with low tourism influence during the regional winter snowmobile season of approximately January through February each year, and high tourism significantly increasing wastewater production from approximately April through October each year. The chart indicates a steady increase in peak season wastewater production at approximately **4.2%.**

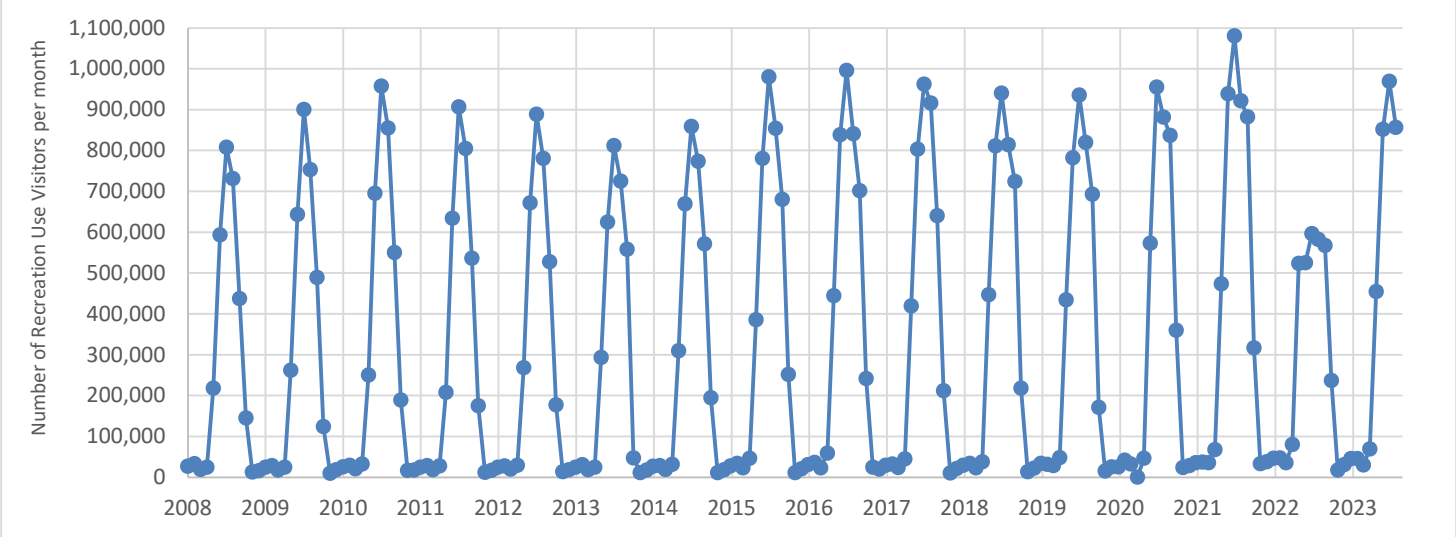
Figure 4. West Yellowstone Wastewater Flow January 2018-July 2023.



1.c.3 Reviewing Tourism Data

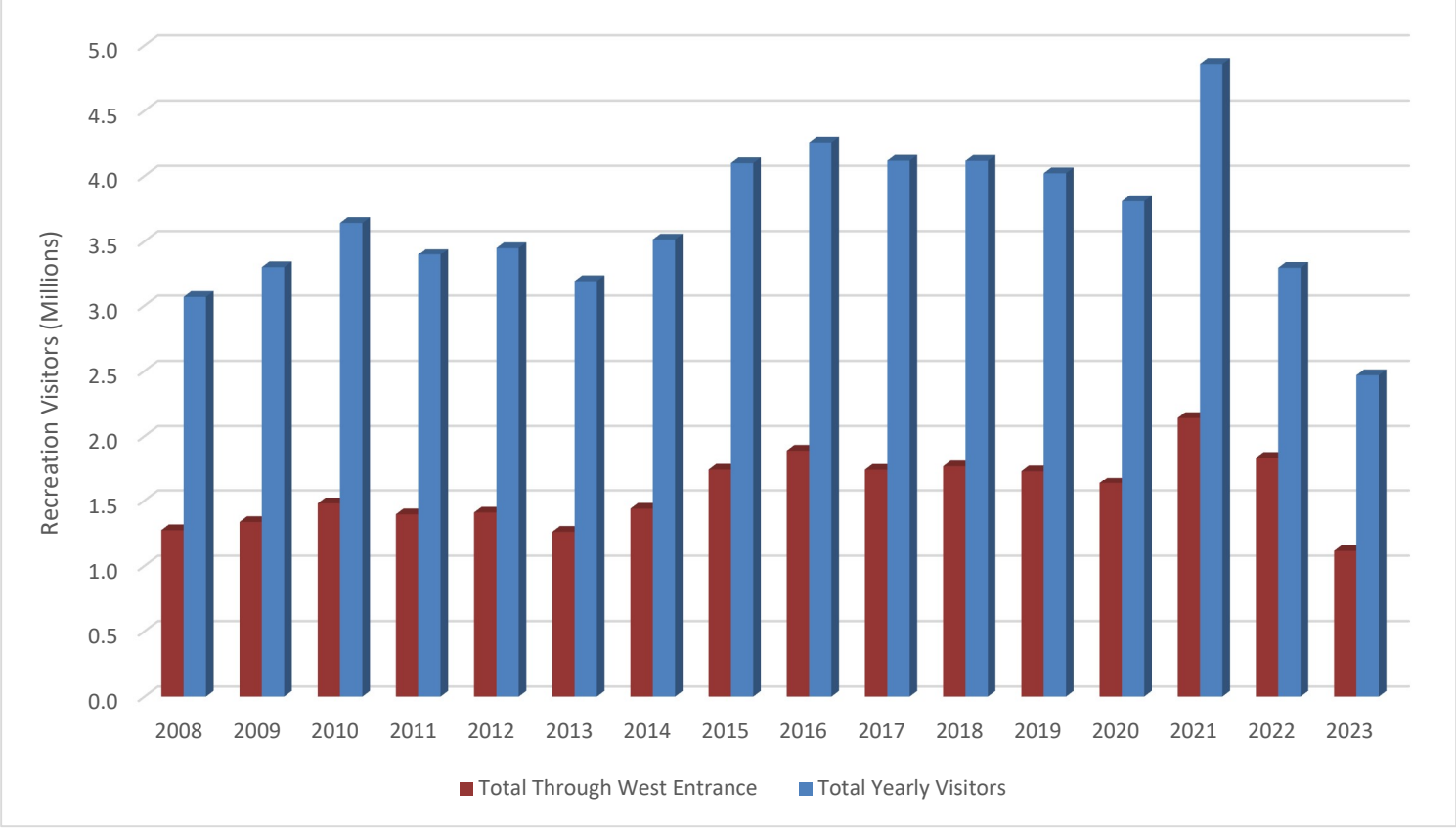
As indicated in the 2022 WWTP PER, the Town of West Yellowstone is a gateway community for Yellowstone National Park. The Town's economic health depends upon tourism as they see up to 4 million visitors per year. Many of the lifelong residents are hotel owners, restaurant owners, and business owners. Because of the large influx of people in the area related directly to tourism, the historical number of visitors to Yellowstone National Park (YNP) was also analyzed to determine an appropriate growth factor. Monthly visitor data since 2008 to Yellowstone National Park are shown in the figure below (National Park Service, 2023-a).

Figure 5. Monthly Visitors to Yellowstone National Park, January 2008-August 2023.



Based on the National Park Service Visitor Use Statistics (STATS - Park Reports (nps.gov)), there has been an increase in number of visitors since 2008 of approximately 4% change per year through 2021 (average 1.5% change per year 2008-2022). The graph below illustrates the number of recreation visits YNP has seen yearly since 2008. The amount of visits into YNP through the west entrance near the Town of West Yellowstone represents on average 43% of all visits into Yellowstone National Park from January 2008 through August 2023, with nearly 56% of visits through the west entrance in 2022. Trends indicate increasing percentages of visits into YNP through the west entrance (see Appendix C). In June 2022, Yellowstone National Park experienced flooding (National Park Service, 2023-c), and visits to the park increased only slightly from the pre-flooding levels during the peak tourism season of 2022, resulting in slightly less than 50% of typical park summer visitation. Wastewater flow contribution in West Yellowstone from summer tourism in 2022 was also down from previous years, and closer to 2020 wastewater flow amounts. The number of visits into Yellowstone National Park through the west entrance is used for this report to indicate tourism influence, with an average **3.3%** change per year from 2008 through 2022.

Figure 6. Total Yearly Visits Yellowstone National Park, January 2008-August 2023.



In evaluating tourism impact on use of wastewater facilities and flows, Figure 4 in Section 1.c.2 of this report indicates that flows during the low tourism season during snowmobile season increased significantly during 2022 when compared to previous years of 2018-2021. Trends in increased winter tourism contribution to wastewater flow may need to be evaluated in forthcoming years, however, based on peak use during summer tourism season, peak flow ADF in the summer months is continued to be used as a base peak flow.

1.c.4 Number of New Applications for Connection

New applications for connection to Town of West Yellowstone's wastewater collection system have not been authorized since the Town's May 18, 2022, moratorium placed on new connections, due to lack of capacity with the wastewater treatment system (see Appendix C for resolution). DEQ stated in March 2022 that the Town should not allow any more connections to the town's wastewater system as the town had exceeded the flow defined in their discharge permit (see Appendix C for correspondence).

However, as indicated in the 2022 PER for the WWTP, from 2019 to 2021 there were 32 applications for new connection. The Town charges each connection based on the number of single-family equivalents (SFEs) assigned. The 32 applications resulted in a total of 640 SFEs. At the time of the 2022 PER, there were a total of 2,643 SFEs. This resulted in a growth change of 8% from 2019 to 2021 based upon SFE's. It should be noted that out of the applications for 640 SFE's, the Town decided to approve 122 of those. The remaining applications for 518 SFE's have continued as pending and are awaiting to connect once improvements to the wastewater treatment system are made. See Appendix H for SFE schedule and SFE calculator adopted by the Town.

Additionally, the Town has purchased and annexed 80 acres of land to the west of town which are now included in the Town's service boundary. The Town will provide sewer services to this land. The 80 acres may have light-industrial, commercial, and residential zones but mainly comprised of residential including apartments, town homes, and single-family homes. The number of SFEs anticipated with the 80 acres is approximately 600.

1.c.5 Accepted Growth Pattern

Based on the foregoing analyses, growth trends yielded increase due to the following: 1) 6.0% increase based on historical population data, 2) 4.2% increase based on historical wastewater flow data, 3) 3.3% increase based on tourism, and 4) 8% increase based on new connections applied for prior to this study. Based on these increases, 5.4% is the average increase. This is the same average increase calculated in the 2022 WW PER, wherein the Town chose to utilize a 6% growth rate for the 20-year planning period. This 6% growth rate is utilized in this 2023 Wastewater Collection System FPS.

1.d Community Engagement

Town Staff and Administration have been invited and attended regular project team meetings with the technical team where progress on the study and findings have been discussed. In late November 2023, findings of the deficiencies were presented in a publicly available Town Council work meeting prior to the public Town Council meeting (11/20/23). At this work meeting, Forsgren Associates presented and reviewed information on deficiencies and preliminary alternatives in addressing the deficiencies.

2) EXISTING FACILITIES

2.a Location Map

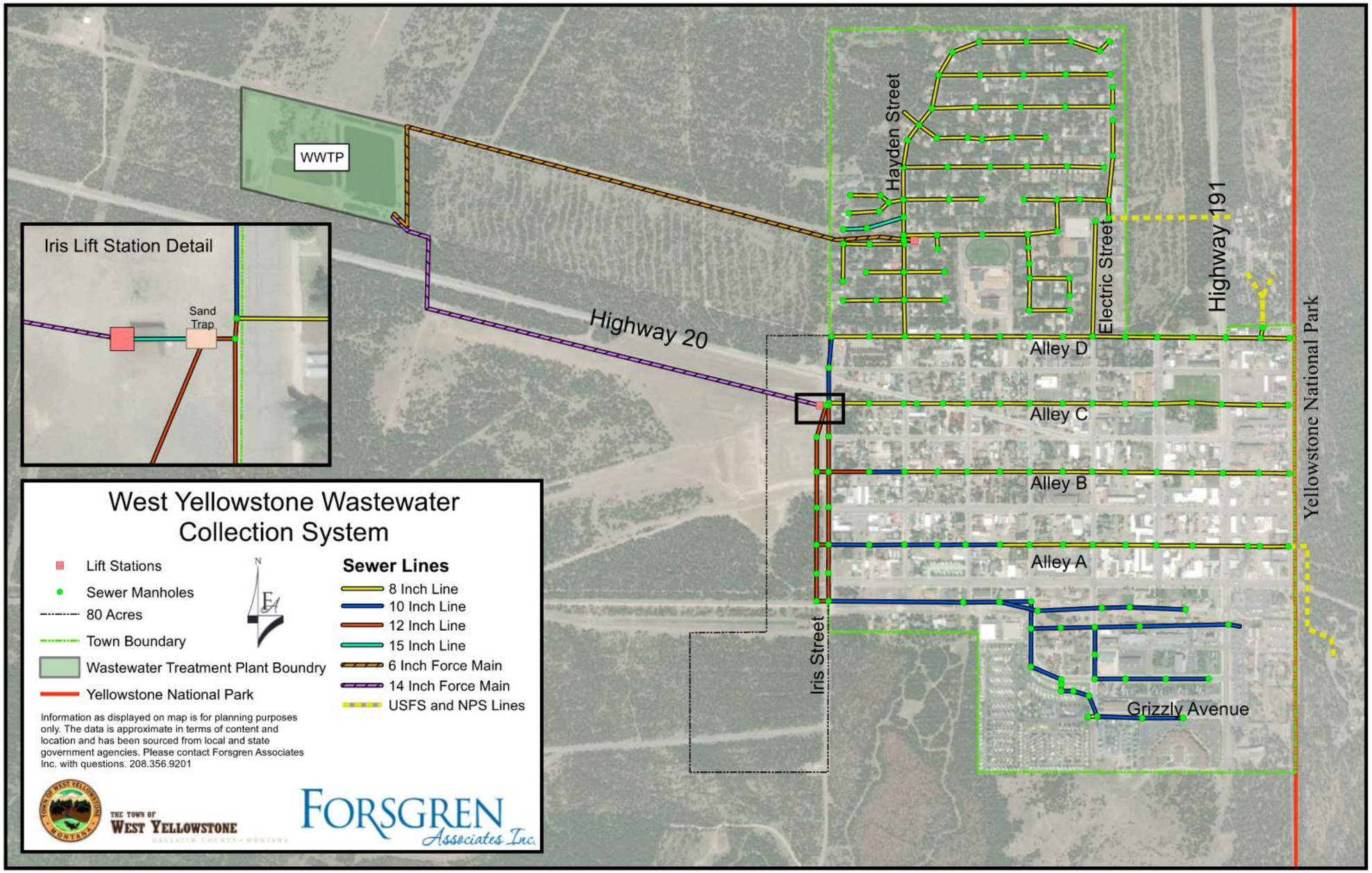
The location map contained in Figure 7 indicates the presently known wastewater collection system, pipe sizes, and existing facilities.

The Town of West Yellowstone contains 13.3 miles of sewer main lines, 176 manholes, and two lift stations with approximately 2.5 miles of force mains each that transfer the wastewater collected into the Town's wastewater treatment plant (WWTP). The WWTP is located approximately one mile to the west of the Town along Targhee Pass Highway (Highway 20) and just north of the highway. The town accepts sewage from outside the town boundary into the sewer mains from U.S. Forest Service (USFS) sewer lines on the northeast corner of the town and from a National Park Service (NPS) line entering the town's wastewater collection system on the east side of the town at Alley A (see Figure 7).

The wastewater collection system includes lines that run from east to west within four alleys (gravel service roads containing multiple utilities including water, sewer, fiber, gas, propane, and fuel lines). These alleys are Alley A, Alley B, Alley C, and Alley D which feed to the two main parallel 12" lines in Iris Street running from south to north to the Iris Lift Station. The area south of Alley A feeds from east to west and from south to north also to the 12" lines within Iris Street and to the Iris Lift Station. The Iris Lift Station pumps wastewater collected to the town's wastewater treatment plant through a 14" PVC force main. The area north of Alley D includes the Madison Addition of the Town and flows from east to west and directs flow to the Madison Lift Station. A bypass is installed from the Madison Lift Station to the Iris Lift Station in the event the Madison Lift Station is over capacity. The Madison Lift Station pumps collected wastewater through a 6" force main to the wastewater treatment facility where flows from the Madison Lift Station and Iris Lift Station are combined prior to flow metering and wastewater treatment.

At the wastewater water treatment facility, the Town currently operates a series of lagoons with discharge to groundwater and evaporation. The Town has proceeded with recommendations from the 2022 WW Treatment Preliminary Engineering Report (PER) for a mechanical treatment plant for wastewater treatment. At the time of preparing this 2023 Wastewater Collection System Facility Planning Study (FPS), plans have been approved by DEQ for the mechanical treatment plant, and the Town of West Yellowstone has proceeded with advertising the project for construction.

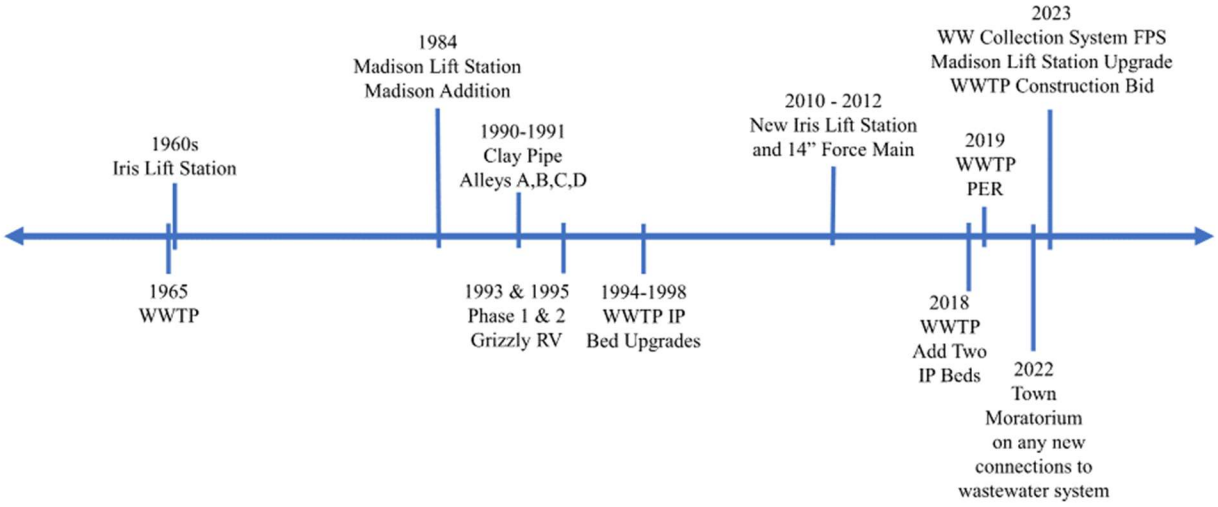
Figure 7. Town of West Yellowstone Wastewater Collection System



2.b History

The following timeline indicates construction and implementation of key wastewater collection system components and facilities.

Figure 8. Town of West Yellowstone Wastewater System Timeline



2.c Condition of Existing Facilities

2.c.1. Wastewater Collection Lines and Manholes

The Town had a sewer line video inspection using closed circuit television (CCTV) performed during 2021-2022 and manual manhole inspections in 2023. The CCTV included a videoing of each section of line, as well as a summary report with photos showing the existing condition of the sewer system.

Using the videos, photos, and conditions documented from the inspections done in 2021, there were some observations found in the sewer lines that indicate certain sections have significant structural issues. The issues noticed in observation were broken/cracked lines, bellying, the existence of roots, joint offsets, protruding service lines, grease build up, manholes covered, and gasket overpour. For a more detailed list of the specific issues, see Appendix D. After careful evaluation of the sewer lines, it was noted that the lines within the four alleys, Alley A, Alley B, Alley C, and Alley D, are the lines with the most defects within the Town's sewer lines. The lines within the Madison Addition and the southern collection lines have fewer defects and concerns.

The following table is the outcome of carefully evaluating the condition of the pipes from the recent pipe inspection videoing of the wastewater collection lines and consideration of past issues mentioned by Town Staff. As stated above, most of the issues are within the old part of town, specifically along Alleys A, B, C, D, and Iris Street. A few lines have multiple conditions and were counted accordingly. A summary of the evaluation with quantities noted is shown in Table 4.

Table 4. Sewer Line Deficiencies

Line Conditions	Quantity
Cracks and Gaps	15
Incorrect Slope (Bellying)	7
Protruding Service Lines	6
Roots	4
Installed Backwards	28

Flows were calculated throughout the town and the different junctions of areas were modeled with nodes. The diameters of the sewer lines meeting at the nodes were modeled with flows using peak hour demand, and the percentages of the flows were calculated. The results are below in Table 5. A map of the associated nodes and service areas is shown in Figure 9.

First, service areas were identified with their corresponding nodes. Then the SFE's were calculated per service area. This was done by counting the number of buildings with their corresponding SFE's and then the total SFE for the service area was noted. This was done for the entire town. Then the location and diameter of the pipe was noted that connected the nodes to the lift stations. Calculations were made to find the peak hour flow and then the percent of the pipe that was full during peak hour flow is noted below in Table 5.

Table 5. Percent of Pipe Used

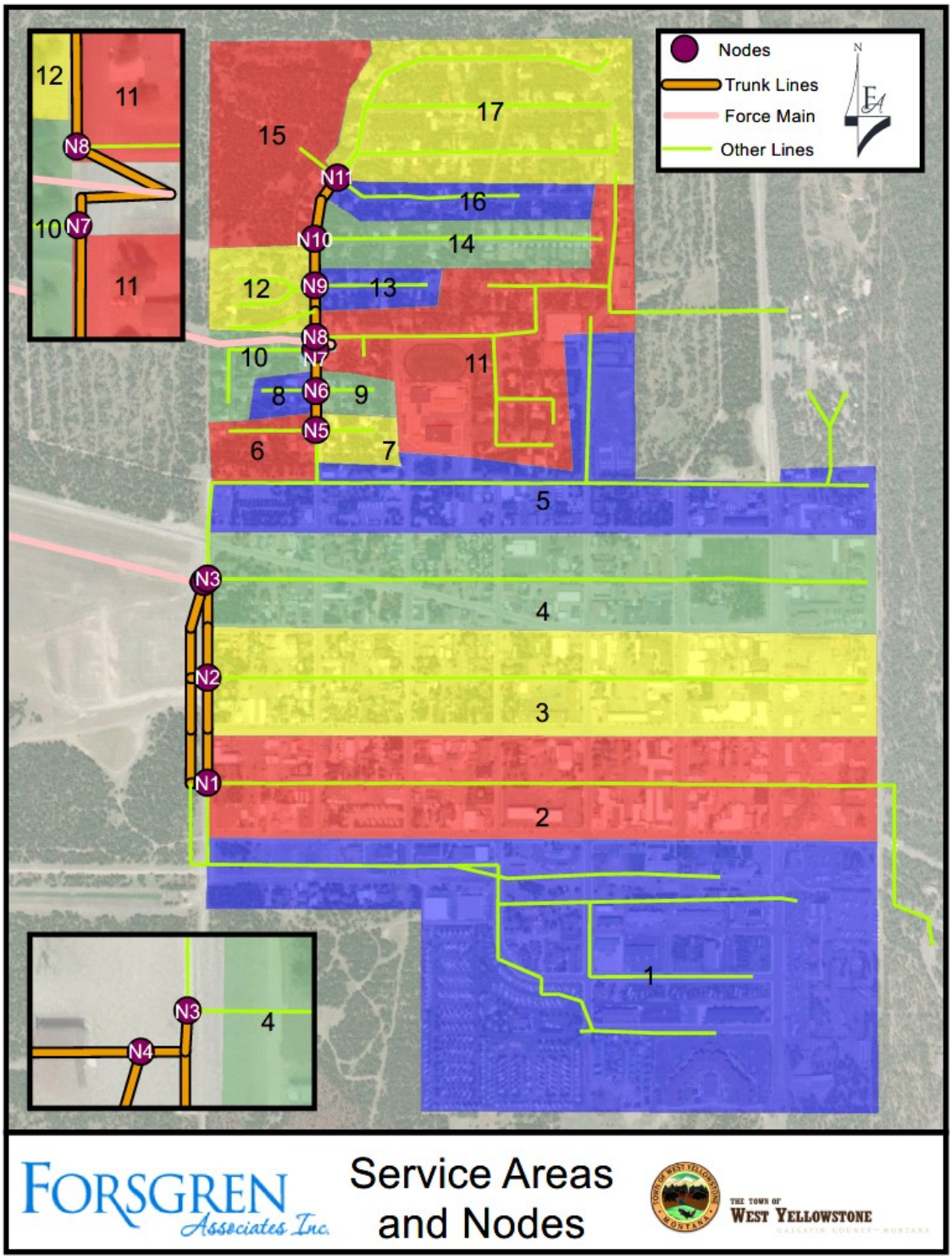
Node	Diameter (inch)	% Full
N1	12	51%
N2	12	92%
N3	12	29%
N4	15	81%
N5	8	1%
N6	8	2%
N7	8	3%
N8	8	17%
N9	8	11%
N10	8	9%
N11	8	6%
Overflow Data (Madison LS to Iris LS)		
N4	15	86%

Pipes modeled as having 75%-95% capacity (% full) are evaluated as approaching capacity and are recommended to be regularly monitored and cleaned. Pipes modeled as running at 95% or more are evaluated as running full and recommended for replacement and pipe size increase.

As shown on the map in Figure 9, there are two parallel 12" lines on Iris Street flowing from the south to the north, to the Iris Lift Station (LS). The 12" pipe on the east has multiple dips/bellies and is regularly jetted. The trunkline model indicates the pipe is currently running at 92% full between nodes N2 and N3 (see Figure 9). This pipe is reported to carry lots of flow and is regularly maintained; however, blockages due to bellies continue to occur. Overflow Data in Table 5 represents the bypass from the Madison LS to the Iris LS.

Node 3 (N3) represents a sand trap (concrete vault) before the Iris Lift Station that the 12" parallel lines discharge into. A 15" pipe between the sand trap at N3 and the Iris Lift Station at N4 is modeled as running at 81% and not at capacity. The overflow data noted at the bottom of Table 5 indicates that in cases where the Madison Lift Station fills, the overflow pipe from the Madison Lift Station to the Iris Lift Station runs less than capacity.

Figure 9. Nodes and Wastewater Service Areas



The manhole inspections completed in 2023 documented conditions manually observed during the inspection. The manhole inspection forms used sought information on general, structural, and hydraulic conditions, flow direction, and location of the manholes. No photos or videos of the manholes were taken at the time of the inspections. The following table describes the existing conditions of the manholes inspected. Several manholes were noted with multiple conditions.

Table 6. Manhole Inspections, 2023.

Manhole Condition	Quantity
Manholes Inspected (verified sewer)	168
Manholes Abandoned (inactive, line capped at or above MH)	2
Manhole Ring/Frame Damaged	1
Manhole Ring/Frame Displaced	19
Manhole Ladder – no ladder in manhole	1
Manhole Ladder – unsafe	3
Manhole Ring Broken	6
Manhole Ring Sulfated	3
Manhole Ring Misaligned	1
Manhole Ring Cracked	2
Roots in Manhole Ring	1
Debris in Manhole Channel	12
Debris on Manhole Shelf	7
Debris on Manhole Rungs	1
Incorrect Lid - storm sewer lid on verified sewer manhole	1

2.c.2 Wastewater Lift Stations and Force Main

The Town of West Yellowstone currently has two lift stations, the first one is the Iris Lift Station, located near the intersection of Iris Street and Alley C. The second one is the Madison Lift Station, located on the corner of De Lacy Avenue and Hayden Street.

2.c.2.i Iris Lift Station

The Iris Lift Station is located west of the intersection of Iris Street and Alley C. The lift station was constructed in 2010-2012 to replace an existing lift station located immediately to the north. The current Iris Lift Station has a wet well 24 feet deep with a diameter of 10 feet, with 5.2 feet from the bottom of the wet well to the influent flow pipe. A grinder pump is active in the wet well. The Iris Lift Station collects sewage from areas primarily south of Alley D. Connected to the lift station are two (2) 40 hp Hydromatic submersible pumps that alternate, each pumping flow into a separate 8-inch ductile iron pipe and a series of valves in a separate valve vault. The Town reports that currently, one of the pumps will turn on at 4- ft and off at 1.5-ft in the wet well and then the two pumps alternate accordingly. The effective volume available in the wet well for flow is approximately 1469 gallons.

From the valve vault, the wastewater flows under pressure through a 14-inch PVC force main to the wastewater treatment plant (WWTP). The force main enters the existing blower/metering building at the WWTP, just north of Highway 20. The previous Iris Lift Station had a 10-inch force main to the north of the 14-inch force main that was abandoned in place and is assumed to still be buried and present north of the 14-inch force main.

The Hydromatic submersible pumps have design capacity of 1850 gallons per minute (gpm) each, however, the Town reports that each pump operates at 1550 gpm. The capacity of the Iris Lift Station is currently limited by the volume of the wet well and the 1550 gpm operating capacity of the pumps. The Hydromatic pumps are rated for 3 starts/hour each to allow the motors to cool. Due to the amount of flow coming into the wet well from the 15” line from the sand trap, the town reports that the pumps are alternating approximately 2 minutes on and 2 minutes off as each pump takes a turn to pump the flow to the force main. This means the pumps are operating above their rated starts and stops, posing viability concerns with continued current operations. The pumps currently operate nearly 24 hours a day year-round. During peak visitor season (summer) the pumps are operating 24 hours a day. Overflow of the lift station is only a concern during the summer months, with no concern of freezing during these high flow months.

The lift station is equipped with a generator that has the capacity to run the pumps in case of an outage. The generator is run once a week to exercise the generator. The existing generator at the Iris Lift Station is a 130 kW Generac model and is currently housed with the electrical panel in the same room as the wet well where hydrogen sulfide is present. The generator is not rated for corrosion and is experiencing corrosion and issues in proper operation. The 1) location of the generator and electrical panel and 2) the generator not being rated for corrosion, are deficiencies and addressed later in this study.

The Iris Lift Station is equipped with a hoist to facilitate removing pumps and motors. This is described by the Town as a 2-Ton Harrington Gantry Crane.

Figure 10. Iris Lift Station, October 2023.

Figure 11. Iris Lift Station, Pumps, 10/23.

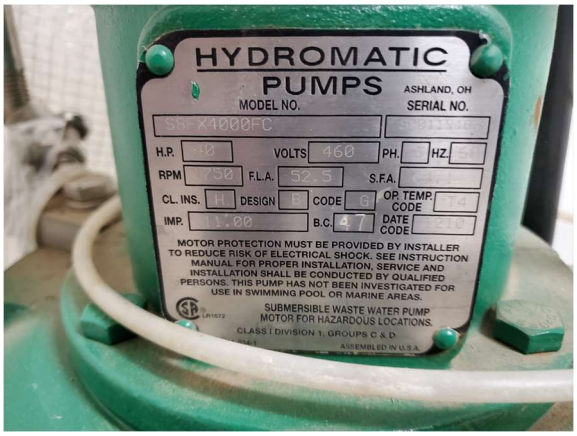


Figure 12. Iris Lift Station, Generator, 9/23.

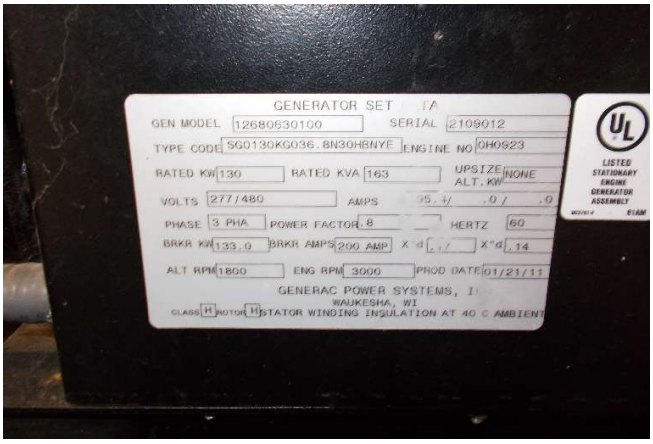
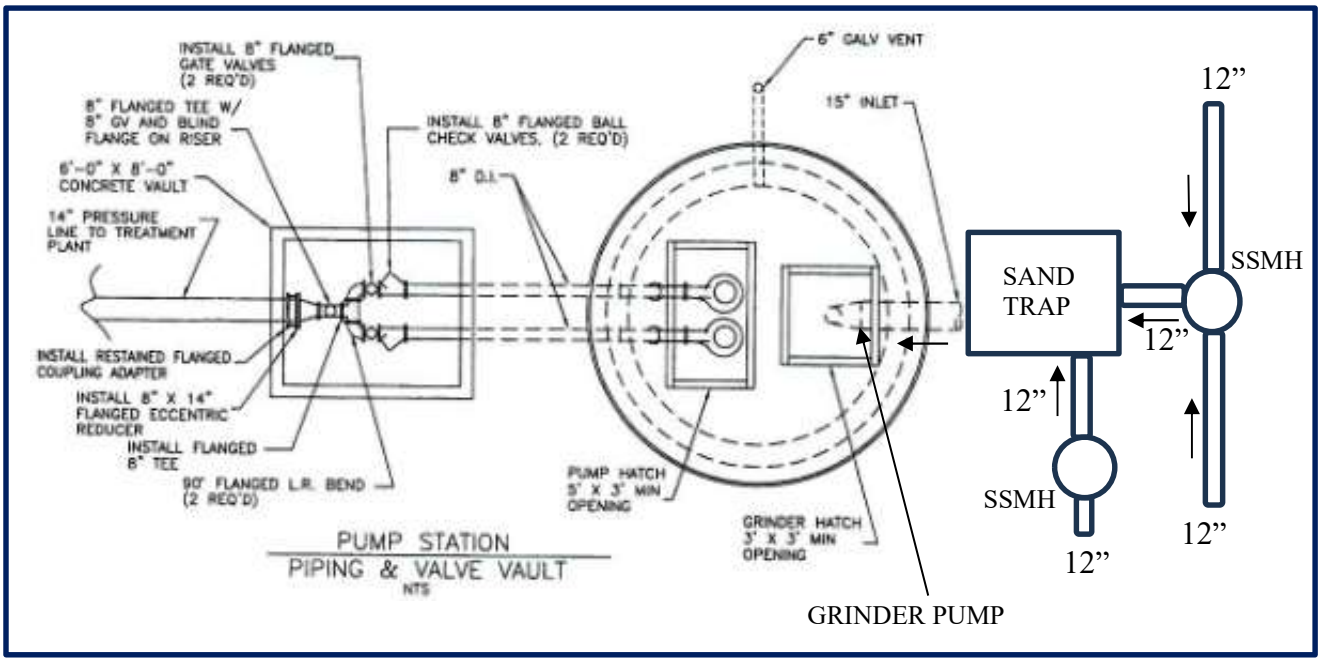


Figure 13. Iris Lift Station. Hoist, 9/23.

The pipes entering the Iris Lift Station from the south (the parallel 12" lines on Iris Street) and the 12" line entering from the north do not directly enter the lift station. The Town reports that these lines enter a large underground sand trap where the wastewater is collected and rocks, sand, and sediment present in the wastewater are deposited prior to the wastewater entering the grinder pump and lift station. The dimensions of the sand trap are currently unknown. An approximate location of the sand trap is shown in Figure 14.

Figure 14. Iris Lift Station, Pump Station, 2010 Plans (small print). Approximate Sand Trap Location.



There are currently no valves to shut off flow to the lift station (LS) or to the sand trap before the wet well for maintenance and cleaning. This is an issue with the continuous flow to the lift station. The Town suspects that the sand trap is full of rocks and other debris which may eventually affect the function of the lift station and/or the collection lines entering and leaving the sand trap. Figure 14 shows a schematic of the wet well, manholes, and valving.

Montana DEQ Circular 2 Chapter 40 Wastewater Pumping Stations, Section 42.52 states, "With the exception of screw pumps and short discharge lines (10 feet or less), shutoff and check valves must be placed on the discharge line of each pump" (p. 34).

However, **the Town requests DEQ's approval for placement of shutoff valves on the 12" lines prior to the sand trap in order to shut off flow to the sand trap and wet well for proper function and maintenance of the lift station.**

DEQ does allow special consideration, where no grit removal is provided. Section 41.3 of the circular states, "Where it is necessary to pump wastewater prior to grit removal, the design of the wet well and pump station piping must receive special consideration to avoid operational problems from the accumulation of grit" (p. 31). Grit removal is planned for implementation at the new mechanical WWTP, which is after the lift station.

The well and pump system are able to support the current amounts of SFEs and tourism influx in the town. However, assuming linear growth, the Iris Lift Station system will no longer be sufficient to manage the flows around year 2032, with the projected growth of the town and buildout of the 80-acres. To have sufficient pumping capacity, functioning fully with the flows that are estimated, it is recommended to install two (2) 2500 GPM into the Iris Lift Station to handle the flows projected. These recommendations and calculations were made with the assumption that the buildout in the 80 acres will empty solely into the Iris Lift Station.

The Town also reports safety and function concerns with valves in the valve vault after the pumps and with the air relief valve in the 14" force main. The valves following the wet well pumps are ball check valves in horizontal placement and are not able to drain, thus affecting the lift station's ability to function properly. The Town reports that swing check valves would allow for proper draining. The air relief valve immediately west of the valve vault in the 14" force main is past its design life and is a safety concern, jeopardizing the safety and function of the 14" force main and the Iris Lift Station.

2.c.2.ii Madison Lift Station

The Madison Lift Station is a dry well lift station that services the north side of the town and pumps the sewage to the wastewater treatment plant through a 6" force main located about a quarter of a mile north of Highway 20 along Power Line Road. The Madison Lift Station is fully functional with a backup generator and hoists. The Madison Lift Station also has a safety overflow feature built in that if the sewage reaches within 10 ft of the top of the shaft, the sewage will be redirected to a gravity bypass line to the Iris Lift Station. In 2023, the Madison Lift Station was being upgraded to replace the existing pumps with two T400 Gorman-Rupp pumps that were previously used in Rexburg, Idaho, and rebuilt by AquaPro. These Gorman-Rupp pumps are flexible and robust in their function to fit the needs of the system.

Figure 15. Madison Lift Station, Oct. 2023.

Figure 16. Madison Lift Station, Oct. 2023.

2.c.3 Wastewater Treatment Plant and Treatment

The Town of West Yellowstone currently treats wastewater at their wastewater treatment plant (WWTP) northwest of town on a 50-acre parcel leased from State of Montana Department of Transportation Aeronautics Division. The parcel is immediately south of the Yellowstone Airport (WYS). The WWTP is bordered by Highway 20 to the south, undeveloped land to the east, Yellowstone Airport to the north, and United States Forest Service land to the west.

The wastewater treatment methods currently in use to reduce pollutants include Aerated Lagoons, Facultative Pond with mechanical evaporators and algae controller, and nine IP beds.

The Town of West Yellowstone's municipal wastewater system was first built in 1965. It was originally a mechanical plant followed by a single facultative pond and seven infiltration/percolation (IP) cells. The Town conducted an initial expansion to the plant in 1994 (1993 design), increasing the design capacity from 323,000 to 439,000 GPD. The basis of design for the system established in 1993 was an aeration system capable of removing a minimum of 85% of the average design BOD loading of 800 lbs/day at an annual average rate of 439,000 GPD. Cells A&B were constructed in 1994-1995. Cell A was upgraded to a complete-mix aeration in 1997-1998.

In 2018, DEQ issued the Town a discharge permit (MTX000244) to discharge from the WWTP through IP beds to Class 1 groundwater. Also, in 2018, two new IP beds were added to increase discharge capacity. In 2019, additions included three mechanical evaporators to further increase discharge capacity and an ultrasonic algae controller to minimize the growth of algae for minimizing organic loading to the IP beds. The mechanical evaporators and ultrasonic algae controller were approved by DEQ for short term increases to capacity and were to be removed from service upon completion of a new WWTP by 2023. A new 1.5 MGD mechanical WWTP through extended aeration (AEROMOD) has been designed and is proposed for location on the existing WWTP site at the location of IP-1 bed.

At the time of preparing this 2023 WW Collection System FPS, DEQ reviewed and approved plans for the WWTP. Request was made to DEQ with the discharge permit renewal for continued use of the mechanical evaporators and algae controller until the new WWTP is completed. The 2022 WW PER gives further detail on the proposed WWTP.

Wastewater flows from the Iris and Madison Lift stations are combined and enter the WWTP through their respective force mains. Currently, no screen is present for primary treatment. The influent flow enters a splitter box and is directed to the aeration basins for secondary treatment, first the complete mix zone of Cell A and partial mix zone of Cell B. Flow then enters the facultative pond (Cell C) for tertiary treatment. Flow can be diverted to bypass Cell A or Cell B if one is not available for flow. Discharge from Cell C is rotated through nine IP beds to ground water. The current permit established a source specific mixing zone to ground water.

Treatment at the WWTP is conventional. The current method of treatment for wastewater is aerobic sewage treatment through use of aerated lagoons and facultative pond.

The maximum capacity of the existing WWTP is 650,000 gpd for the current discharge permit, 793,000 gpd based on source specific mixing zone (HydroSolutions, 2017, Section 5), and approximately 1,200,000 gpd with respect to Biological Oxygen Demand (BOD) and Total

Suspended Solids (TSS). A line drawing is shown in Appendix G for water balance of the existing WWTP with 650,000 GPD maximum design day flow submitted with the discharge permit renewal to DEQ in 2022. The average day design of the current WWTP is 439,000 gpd with a maximum day design of 650,000 gpd.

The new 1.5 MGD mechanical WWTP (YR2021-YR2041) is proposed with screen, grit removal, Biobags, extended aeration (AEROMOD), and use of facultative pond (Cell C) and discharge to IP beds 2-9. (Cells A and B would not be in use). Sludge would be hauled and disposed at Fremont, County, Idaho or Gallatin County, MT landfill.

The Facility Site Plan (see Appendix G) shows the location of the WWTP and outline of buildings, structures, and parking areas. The following table from the 2022 PER summarizes the existing condition of each of the main components of the existing WWTP with the exception that the influent flow meter is now replaced with doppler flow meter.

Table 7. Existing Condition of WWTP Components, 2022.

Equipment	Condition
Influent Flow Meter	Inoperable (hit by lightning~2018) Doppler Flow Meter installed 2022
Aeration Blowers	Exceeded Design Life
Splitter Box	Operable
Cell A	Operable Fine Bubble Aeration
Cell A & B	Damaged Liners
	Excessive Biosolids
	Inoperable Course Bubble Aeration
	Leaking Air Lines
Cell C	Operable
Outlet Structure	Damaged Gate
IP Beds	Operable

2.d Financial Status of any Existing Facilities

2.d.1 Current Rate Schedules

Currently, the Town charges each connection based on the number of single-family equivalents (SFE's) assigned. The Town has adopted an SFE calculator where user type and SFE's associated with each is defined. In 2023, the rate for one (1) SFE was $30.32 per month with a total of 2643 SFE's. Appendix H includes the SFE calculator and the number of SFE's per connection.

2.d.2 Existing Debt

The following table is the debt that the Town currently has. The Town does not have any existing debt associated with the construction of the wastewater treatment facilities.

Table 8. West Yellowstone WWTP and Town Debt

Year Issued	Purpose	Type of Bond/ Security	Amount	Maturity Date (mo/yr)	Debt Holder	Coverage Requirement	Avg. Annual Payment Amount	Outstanding Balance
2012	Town Hall Construction	Revenue Bond	$1,480,866	12/2025	Intercap	10% Reserve Requirement	$134,000	$291,641 *
2016	80-acre Purchase	Revenue Bond	$1,425,000	2/2026	First Security Bank	-	$87,712	$584,392 *
2018	Daycare Construction	Note	$650,000	2/2028	First Security Bank	-	$77,671	$318,753 *
2023 **	WWTP Mechanical Treatment	Revenue Bond	$33,000,000	12/31/2054	SRF	10% Reserve Requirement	~ $2M	$33,000,000

* 10/19/23 values, rounded to the nearest dollar. ** Values are as of 1/5/24 and may vary with finalized loan.

2.d.3 Operation and Maintenance (O&M)

There are a number of different aspects that are involved with the operation and maintenance of a wastewater system. These aspects range from power usage to routine maintenance. The following table shows what the Town paid for various categories of O&M in 2020 for the wastewater collection system and WWTP. Based upon the 2643 SFE's, approximately $9.42/month/SFE was put towards the O&M for the system in 2020.

Table 9. Current System O&M Costs, 2020.

O&M Category	O&M Cost
Personnel (i.e. Salary, Benefits, Payroll Tax, Insurance, Training)	$ 63,778.00
Administrative Costs (e.g. office supplies, printing, etc.)	$ 6,350.48
Land rental	$ 40,000.00
Insurance	$ 27,449.00
Energy Cost (Fuel and/or Electrical)	$ 29,257.09
Repair and Maintenance	$ 11,015.66
Monitoring & Testing	$ 15,835.83
Professional Services	$ 20,824.70
Telephone and Internet	$ 1,649.49
Miscellaneous - Supplies	$ 8,159.51
Miscellaneous - Travel	$ 5,789.92
Miscellaneous - Training, Membership Dues, Registration	$ 2,094.41
Depreciation	$ 66,649.00
Total Existing O&M	**$ 298,853.09**

2.d.4 Other Capital Improvement Programs (CIP)

The current capital improvements pursued or in progress by the Town includes the new mechanical WWTP. The Town budget currently sets aside funds towards the WWTP and other wastewater projects. The town budgeted a total of $110,000 in the capital improvement plan for other wastewater projects for fiscal year 2023-2024 (referred to as FY2024). (See the Town of West Yellowstone's budget, https://www.townofwestyellowstone.com/budget/).

2.e Water/Energy/Waste Audits

No water, energy, or waste audits have been done in West Yellowstone for the last 10 years.

3) NEED FOR PROJECT

3.a Health, Sanitation, and Security

As of the time this report was written, there were no concerns from federal and state regulatory agencies in writing of health, sanitation, and security with the wastewater collection system. However, in reviewing video and photos of the recent sewer line inspections done in 2021, broken and cracked lines were noted. These existing pipe conditions are a health and sanitation concern in general due to the potential for wastewater to escape the collection lines and navigate to surface water, groundwater, or other sources that would uptake or expose the wastewater. Roots in collection lines and at manhole rings are concerns for health and sanitation, since roots indicate structural issues in pipe lengths or at pipe joints and expose areas that are not watertight. Missing, damaged, or soiled manhole ladder steps are a concern for emergency entrance without planned entry. The Town reports that a portable ladder is primarily used in accessing the system manholes. DEQ Circular 2, requires that "a pumping station must be readily accessible by maintenance during all weather conditions" and recommends "that security fencing and access hatches with locks be provided to prevent unauthorized intrusion" (2018). The lift stations are secured within locked buildings with space for parking nearby.

Manholes with steps are present in the wastewater collection system, however, the Town of West Yellowstone utilizes a portable ladder to access manholes. This provides a ladder system less susceptible to debris and grimy buildup impacting the safety of maintenance personnel accessing the manholes and promotes health of the maintenance personnel. Where steps are broken or defective, maintenance personnel knock these off to prevent sharp or harmful surfaces.

3.b Aging Infrastructure

The pipe inspections and videoing showed the West Yellowstone collection system currently with pipes that are offset at joints and pipes that are cracked, some exposing soil. There are pipes that are bellied with insufficient slope and pipes with presence of tree roots. The structural issues are of concern as they may cause wastewater to contaminate the surrounding areas. The bellies may create blocking points, that can clog and back up a sewer main.

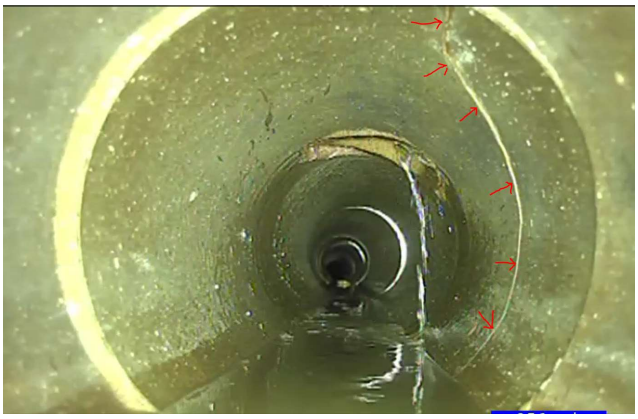
The lines along Alley A, Alley B, Alley C, and Alley D are all noted as clay pipe or vitrified clay pipe. These lines were installed in the 1960's and have functioned in use since then; however, the lines in Alleys A and B were installed "backwards," with installation of bell facing downstream and spigot facing upstream. This is not consistent with typical bell and spigot clay pipe installation (NCPI, 2020) and presents challenges for the Town in properly operating their collection system. These challenges include inconsistent slope from manhole to manhole with bellies at joints, multiple sections of clay pipe running full or near full due to bellied pipe, flow capacity diminished by pipe bellying, and flow blocked by offsets at joints.

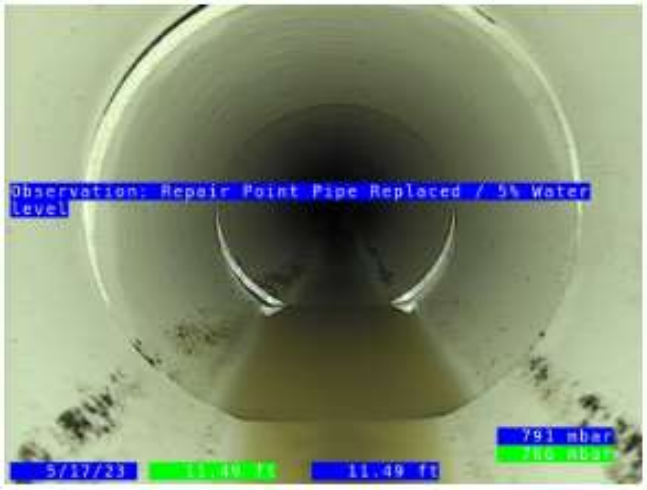
The backwards installation may have potential to have allowed dirt, rocks, or debris to lodge at the bell and spigot joints of the clay pipe and for the spigot end to impede flow with blunt end exposure at joints (AgTalk, 2013). ASTM C 12, Standard Practice for Installing Vitrified Clay Pipe Lines, Section 11.4, Pipe Laying, indicates, "Wherever practicable, start pipe laying at the lowest point and install the pipe so that the spigot ends point in the direction of flow to prevent bedding material from entering the joint" (2005). The size of clay pipe on these alleys is indicated as 8" (Figure 7).

Clay pipe manufacturers list 8" clay pipe lengths as 4.5ft to 6ft in length (Mission Clay Products, n.d.). For pipes between manholes placed approximately 300 ft apart, there may be approximately 50-60 lengths of pipe with potential for issues at the joints. The pipe inspections and videoing do not indicate concern at the majority of joints, however there are joints and sections of pipe with significant offsets, bellying, and cracking. Cracking was most notable at or near service line connections.

Figure 17 below shows examples of aging infrastructure and health and sanitation concerns currently present at locations indicated within the Town of West Yellowstone's wastewater collection system.

Figure 17. Examples of Aging Infrastructure and Health and Sanitation Issues.

<table>
<tr>
<td> 
Cracks – Broken Pipe
(Alley C)</td>
<td> 

Broken Pipe – Soil Exposed
(South of museum and police station)</td>
</tr>
<tr>
<td> 

Gaps – Fernco Pipe
(Lamar Ave. – Madison Addition)</td>
<td> 
Gaps – Clay Pipe
(Alley B)</td>
</tr>
</table>

3.b.2 Infiltration and Inflow

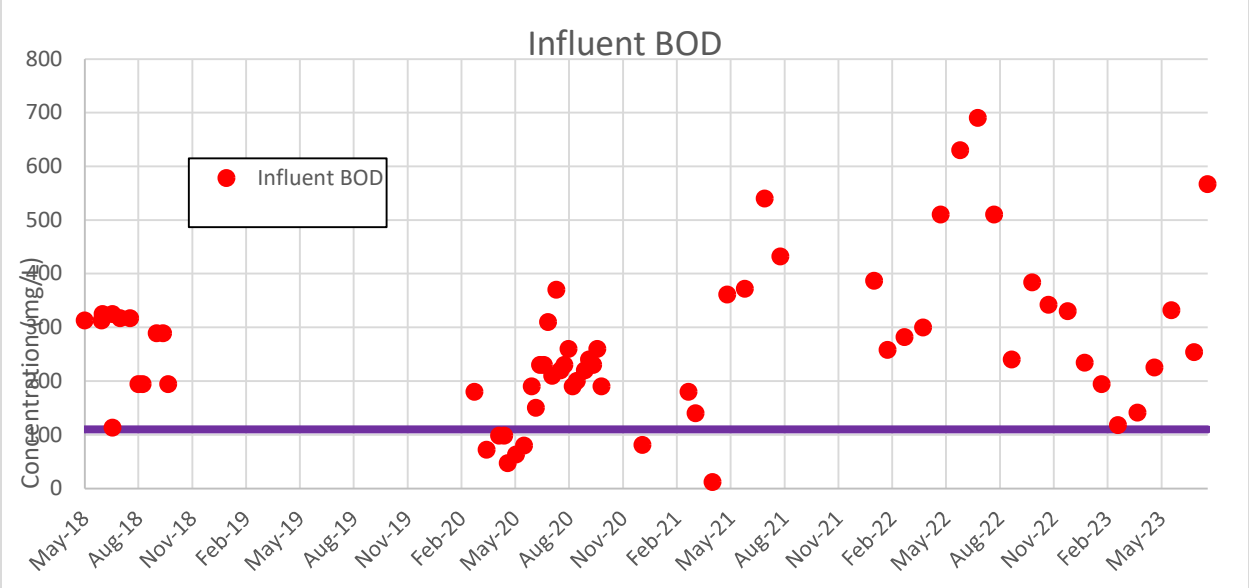
According to the 2022 PER for the WWTP, infiltration and inflow (I&I) in the collection system in West Yellowstone was evaluated in order to size the proposed treatment plant properly. Inflow is distinguished as water entering the wastewater system and service lines directly through connections to the sanitary sewer such as roof drains, yard drains, storm water, manhole covers, surface water runoff, and sanitary sewer and storm sewer cross connections. Infiltration is water entering the collection and service lines from the ground. Infiltration into the pipes was assumed to not be an issue because the groundwater table was anywhere from 30’ to 40’ below grade and the majority of the collection pipes were 8’ to 15’ below grade.

Inflow was noted by the town at two manholes south of Yellowstone Avenue behind the police station and museum. The inflow was attributed to irrigated lawn drainage that had found its way to an old service line leading to the manhole. This is noted as a deficiency later in this study since the old sewer line is not properly capped and allows surface water runoff to enter the sewer.

In reviewing wastewater flow data from 2018-2023, flows did not significantly increase during the runoff season. Compared to flow increase due to summer tourism and winter snowmobile seasons, infiltration and runoff during the runoff season of March-May each year was slight, if any. Infiltration is also considered to be very low due to the water table being significantly deeper than the depth of the collection pipes. Inflow coming in through manhole lids when the snow starts to melt normally starts in March or April and continues through May, depending on the snowpack for the year.

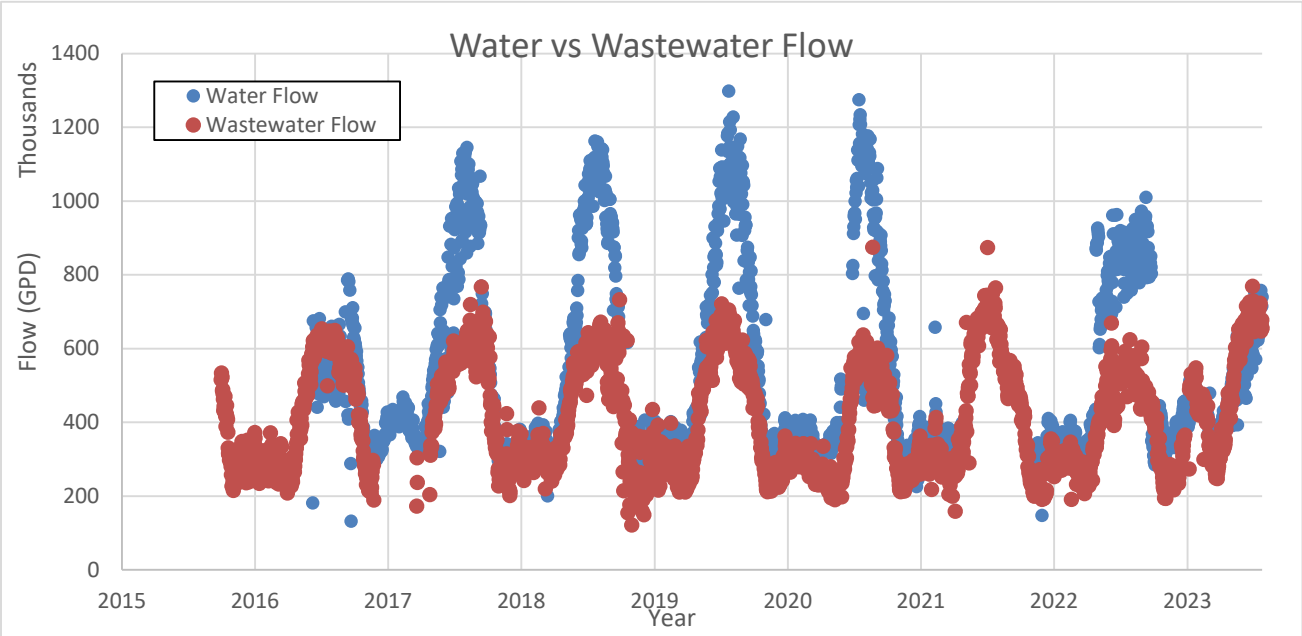
Typical Biochemical Oxygen Demand (BOD) concentration for domestic waste is 190 mg/L with anything below 110 mg/L being considered low and potentially influenced by I&I. Based on the minimal data for the BOD concentration from 2018-2023 from March through May, the average influent BOD was around 175 mg/L. The following figure shows the influent BOD concentration that the Town collected. During 2018, BOD of influent samples did not drop below the 110 mg/L mark. Data was not provided for 2019. In 2020, the concentration for the samples from March to May were below 110 mg/L. In 2021, most of the samples were above the 110 mg/L during the I&I timeframe. In 2022 and the current year of 2023, all the concentrations were above 110 mg/L. I&I are not considered notable flow contributors to wastewater flow. In reviewing the influent BOD data with the Town, no physical alterations have been made to manhole lids or lengths of pipe that would have the potential to reduce the influence of I&I. However, a change in the lab used and implementing composite testing are in some part attributed to the recent years of BOD readings.

Figure 18. Influent BOD Concentration 2018 – 2023.



Flow data for the water production versus the wastewater production was also analyzed. If the wastewater flow is more than the water flow, this is typically a good indicator that I&I is an issue. Based upon the flow data shown in the following figure, the water flow is more than the wastewater flow and the wastewater flow generally follows the water flow.

Figure 19. Water Vs Wastewater Flow 2018 – 2023.



Based on the influent BOD concentration data and comparison of the water and wastewater flow rates, it is found that I&I is a minimal influence on wastewater flow compared to wastewater flow during peak tourism season.

A new wastewater flow meter was implemented November 2022 – January 2023 and the wastewater flow measured during this time and during the runoff period March – May showed an increase from previous years. From previous years, prior to November 2022, the wastewater flows did not show significant increase during the runoff period. Using the flow meter versus previously employed measures of summing flows from the lift stations may produce a more accurate representation of flows and what is occurring with I&I during the spring runoff. Tourism may have also continued through the snowmobile, runoff season, and into peak tourism season during 2023 when compared to previous years shown.

For this 2023 WW FPS study, I&I is not considered a significant influence on wastewater flow since bedding and native material surrounding the pipe network is known to drain quickly. Inflow from intake at manholes is also considered minimal due to the native soils quickly absorbing and shedding runoff to lower layers of the native soils.

Note, inflow could be mitigated by strategically plowing or moving snow to areas where there aren't manholes. Additionally, the Town could switch perforated manhole lids to non-perforated manhole lids to prevent inflow in key areas. Sand in manhole troughs and benches are attributed to runoff (inflow) entering manholes**. Implementing non-perforated manhole lids may prevent sand from impacting manhole and wastewater collection line performance and capacity.**

3.b.3 Combined Sewer Interceptors

Inasmuch as the Town is aware and per the pipe and manhole inspections, there are no storm drains connected into the municipal wastewater collection system.

3.c Reasonable Growth

The Town of West Yellowstone is surrounded to the north, south, and west by U.S. Forest Service land and is situated adjacent to the west side of Yellowstone National Park and west entrance to the park. National Park statistics indicate that the percentage of recreation visits to the park through the west entrance (less than a mile from the Town Boundary), is trending upwards over time, indicating that more visits to West Yellowstone are likely to be occurring over time. Tourist use during snowmobile season has also increased, as noted by substantially increased wastewater flows during the lower tourism season of January – February 2023 when compared to previous years. Growth from new construction and development are limited by land availability and infrastructure limitations. With annexation and planned development of the recently acquired 80 acres of U.S. Forest Service land, population and domestic use of infrastructure are anticipated to grow.

The Moonrise Area has a development plan that will allow the expansion of new apartment buildings equating to 200 SFEs.

Currently, connections to the sewer system are not allowed with a moratorium in place by the town until the wastewater treatment system can be improved. This puts development of the 80 acres and approval of other development on hold. By not allowing all new potential connections, the Town is inhibiting growth to the community which has potential to affect the citizens of the community by not providing potential employment and housing. Completion of the WWTP and this supplemental WW Collection FPS to accompany findings for the WWTP can aid the Town and DEQ in understanding additional projected use, needs, and costs to the Town's wastewater collection system. This 2023 WW Collection FPS incorporates the estimated amount of 600 connections within the 80 acres as provided by the Town with these connections evenly distributed within the 80 acres.

As noted in the 2022 PER for the WWTP, in order to support growth within the system the Town has assigned a resort tax for additional revenues. A portion of the resort tax (1%) serves to fund infrastructure projects in the Town. SFEs that are committed to be serviced by upgrades per the 2022 PER for the WWTP, include current customers and 518 SFE's that are waiting to connect once the treatment plant is complete and operational. It is a high priority of the Town's to be able to keep their infrastructure in pace with the tourism, as this is the lifeblood of the community.

The Town continues to collect and utilize a resort tax in assisting to pay for infrastructure and other projects in the Town.

The Tourism Business Improvement District (TBID) markets the Town of West Yellowstone with fees collected since 2009, with a current "$1.00 per night fee assessed by all lodging facilities with ten or more rooms to offer" (Town of West Yellowstone, 2023-c). None of these fees are currently used for infrastructure.

3.c.1 Future Wastewater Collection System Flows

Projecting reasonable growth was performed using the 6% population growth rate established earlier in this report. The following hydraulic analysis was completed.

3.c.1.i Hydraulic Capacity

Flows for the design year (2043) have been projected and will be used for the basis and design of the wastewater collection system. Projections are based on flow data collected by the Town of West Yellowstone over the past several years, as well as pending growth and typical growth rates. Currently, the WWTP is operating beyond its design capacity. This caused a limitation to the approval of new development. The town currently has applications for developments inside the planning boundary and has put a moratorium on approval of said applications with additional sewer service agreements until an evaluation of the treatment system is complete and the Town is better equipped with data needed to allow growth.

Different flow scenarios were used to evaluate the worst-case scenario as well as ensure the design is adequate for future flows. DEQ has outlined the design flows that must be identified as part of a new design. The design flows are summarized below and have been evaluated as follows:

3.c.1.ii Design Average Flow

The design average flow is the average daily volume that the treatment plant will receive through a duration of a year. However, the design average flow for facilities having critical seasonal high hydraulic loading periods must be based on the **daily average flow during each distinct seasonal period with the largest value used for design purposes**, as stated in Circular DEQ-2 Section 11.241.a. For this study, the average flow of the month with the most usage will be used.

In order to project the design average flow out 30 years, historical growth rates were evaluated from 1993 to 2023. The historical growth rate for that period was approximately 1.1%. However, it must be considered that additional growth, especially within the last several years, has likely been stunted since the WWTF has been functioning at or above capacity and a moratorium was placed on development. Therefore, this 2023 WW FPS looked at a typical growth rate of 2% projected out 20 years. What neither of these analyses takes into consideration is the growth spurt that will likely occur over the next 5 years when the moratorium on development is lifted. The Town currently has several known developments requesting permits; however, the Town is postponing granting permits until improvements are in place to accommodate additional wastewater flows. When additional capacity becomes available and permits are granted, it is anticipated that there will be a spike in growth in the next 5 years, and then it is assumed that growth will continue at the average 2% growth rate until 2043. See Figure 39 for an illustration of the growth projection determination. Flow values are presented in Table 10.

3.c.1.iii Design Maximum Day Flow

The design maximum day flow is the largest volume of flow to be received during a continuous 24-hour period expressed as a volume per unit time. The Maximum Day Flow for the last 4 years was determined using data collected. An average of the maximum day flow for each of the last 5 years was determined as the current Design Maximum Day Flow. The projected Design Maximum Day Flow was determined using the same growth factor used in the Design Average Flow. See Figure 40 for an illustration of Design Maximum Day Flow. Flow values are presented in Table 10.

3.c.1.iv Design Peak Hourly Flow

The design peak hourly flow is the largest volume of flow to be received during a one-hour period expressed as a volume per unit time. This value was determined based on guidance set forth in the Recommended Standards for Wastewater Facilities, 2014 Edition, commonly referred to as the 10-States Standards. This was done by multiplying the design maximum day flow by 2.5. Flow values are presented in Table 10.

3.c.1.v Design Peak Instantaneous Flow

The design peak instantaneous flow is the highest recorded flow rate occurring for a period consistent with the recording equipment. Due to the larger volumes being treated, the instantaneous flow is not as critical as total volume since total volume governs the WWTP design. However, the influent lift stations that pump flow to the WWTP must be adequately sized to convey the peak flows. Therefore, the combined capacity of the influent lift stations has been indicated on the design peak instantaneous flow row in Table 10 below. Note that the current lift stations can convey the current flows. However, future upgrades/retrofitting to the lift stations will be required to convey future increases in flow. Pumps with higher capacity are forecast to be needed by year 2032 at the Iris Lift Station to manage flows from development in the 80-acres.

3.c.1.vi Design Maximum Month Flow

The design maximum month flow is the average daily flow received during the maximum calendar month, or 30 consecutive days, (whichever is greater) expressed as a volume per unit time. The maximum month flow for the last 4 years was determined using data collected. An average of the maximum month flow for each of the last 4 years was determined as the current Design Maximum Month Flow. The projected Design Maximum Month Flow was determined using the same growth factor used in the Design Average Flow. See Figure 21 for an illustration of Design Maximum Month Flow. Flow values are presented in Table 10.

Table 10. Design Wastewater Flows: Current Design Flow, Historical, 2043, and Future.

Parameter	Current Design	Historical Data	2043 Projected	Future Design*
Design Average Flow (gpd)	439,000	567,000	1,120,000	1,500,000
Design Maximum Day Flow (gpd)	650,000	758,000	1,497,000	2,700,000
Design Peak Hour Flow (gpd)	920,000	1,503,000	2,968,000	3,950,000
Design Peak Instantaneous Flow (gpd)	NA	2,250,000	3,100,000	3,950,000
Design Maximum Month Flow (gpd)	NA	657,000	1,234,000	1,500,000

*Future Design values are the WWTP Design Flows utilized in the 2022 WWTP PER. Historical Flow 2018-2023.

Table 11. Collection Lines % Full in 5 Years and 20 Years.

Node	Diameter (inch)	% Full in 5 Years	% Full in 20 Years
N1	12	73%	105%
N2	12	118%	181%
N3	12	34%	55%
N4	15	102%	158%
N5	8	1%	2%
N6	8	2%	3%
N7	8	3%	5%
N8	8	32%	54%
N9	8	26%	42%
N10	8	24%	40%
N11	8	20%	34%
Overflow Data			
N4	15	112%	176%

With the current design and sizing, there are sewer mainline sections that are near capacity and projected to reach capacity during the planning period. These include sections in Iris Street near Alley B as well as the pipe that connects Alleys A-D to the Iris Lift Station. The current parallel 12” pipe running south to north on the east side of Iris Street is reported by the Town to have multiple sections with bellies (dips). The flow in the east side 12” sewer main connects with the 12” sewer main to the west of it through short bypass lines connecting manholes, and the flow continues to the sand trap preceding the Iris Lift Station. During the planning period, development of the 80 acres is projected to increase flow through the pipes that reach and exceed capacity of the existing pipes. Calculating pipe capacities for the planning period were made using the same methods used in figuring the current pipe capacity percentages in Chapter 2. Table 11 shows the percentages that are estimated to be in the next five years representing projected development in the 80-acres and Moonrise. The 20-year pipe capacity percentages represent growth and flow projected at the end of the 20-year planning period in 2043. Recommendations and alternatives for handling the flows are presented later in this study.

Figure 20. Design Average Flow, 20-YR Flow Projection.

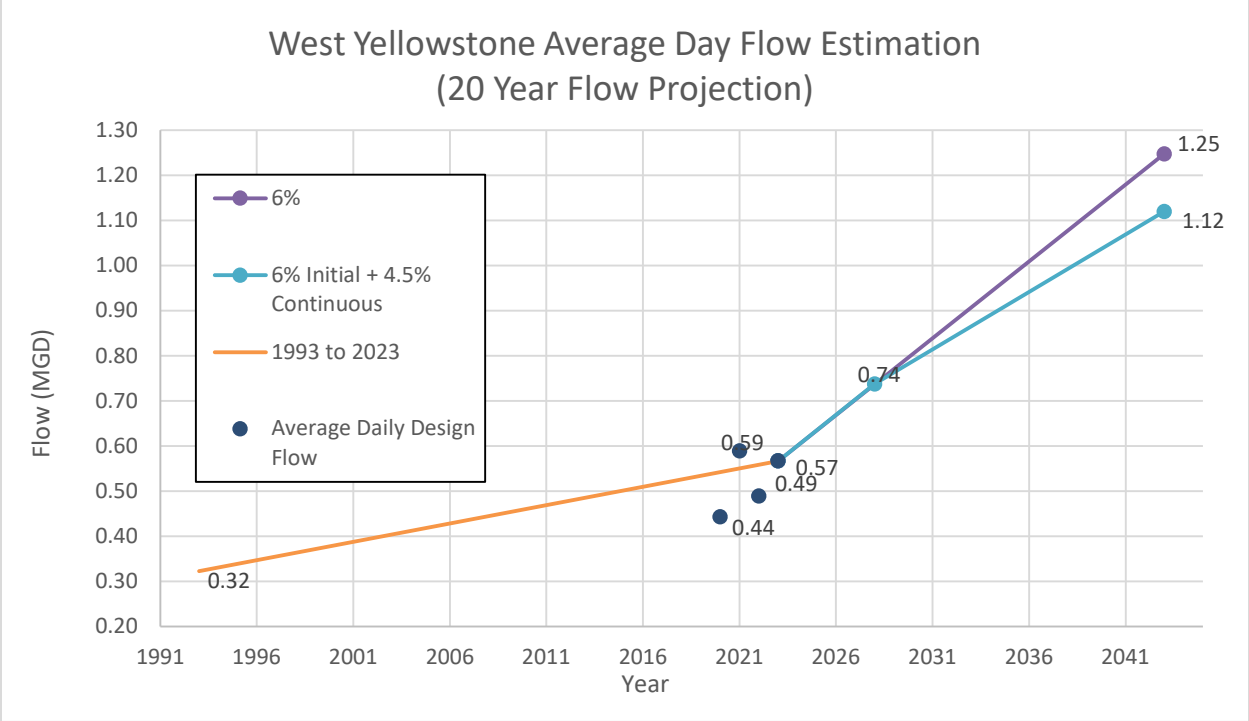
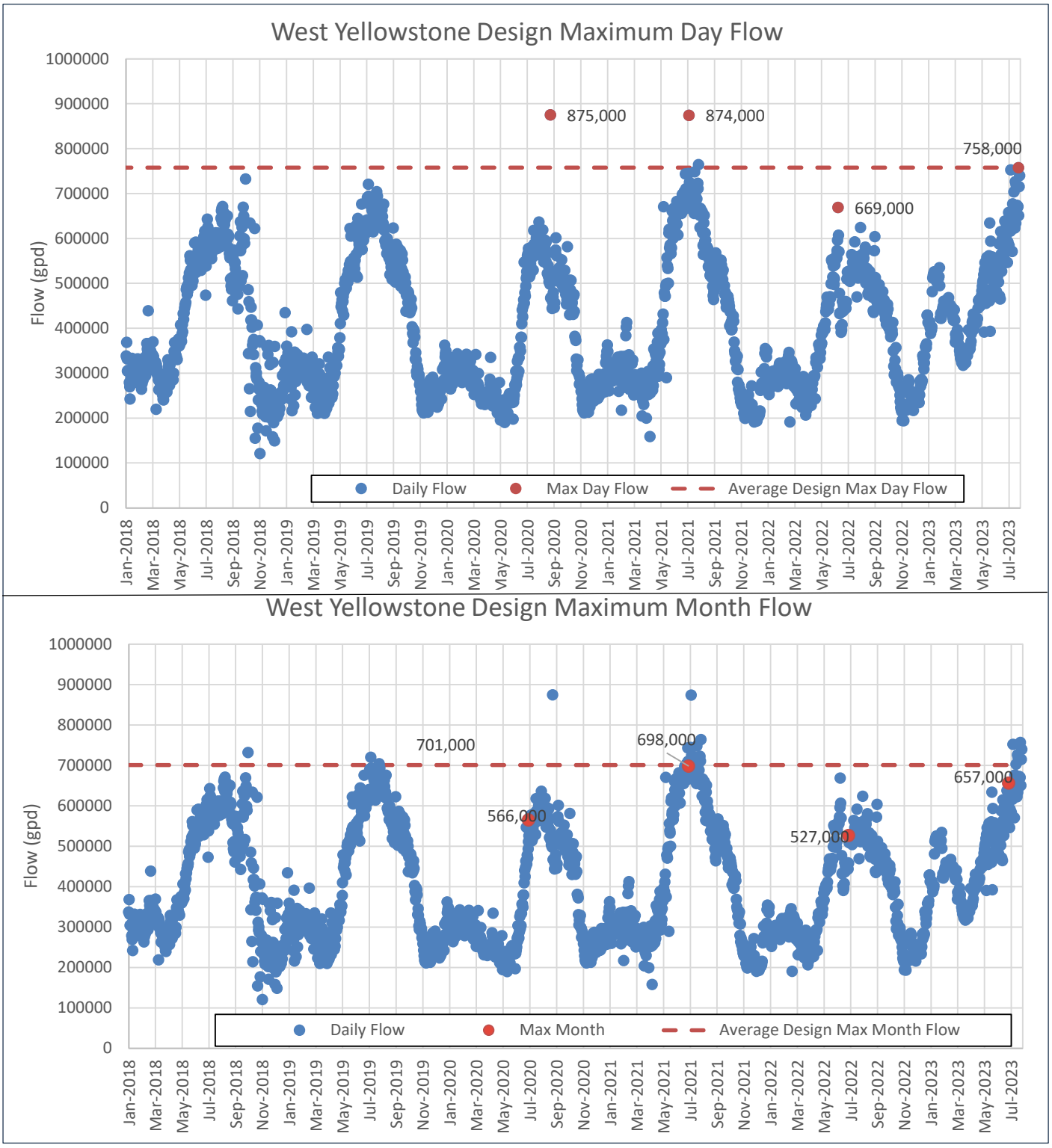


Figure 20, above, shows the growth of wastewater flow in the Town and the estimated growth of flow in the future. The orange line was gathered from data provided by the Town of West Yellowstone. The Town has put a hold on future connections to the wastewater system until the mechanical wastewater treatment plant is fully constructed and operational. It is estimated that for the first five years of the planning period, growth in the town and development in the 80-Acres and Moonrise would occur, an increase above the projected 6% for the 2023-2043 planning period. This assumes the mechanical wastewater treatment plant is completed and operational and that development occurs as projected during the first five years. For the remaining 15 years of the planning period, 2028-2043, a 4.5% annual growth rate was used to distribute the remaining projected growth of the town for modeling wastewater flows. This 4.5% growth was used to account for development in the first five years and was similar to modeling the 6% projected annual growth rate during the full 20-year planning period. The figure above shows both the flows with a constant 6% growth and the situation described previously.

Figure 21. Design Maximum Day Flow and Maximum Month Flow



3.d Summary of Deficiencies Identified

The following table is a summary of the deficiencies identified through evaluation of the system as described in the preceding sections of this study.

Table 12. Summary of Deficiencies Identified.

	Deficiencies	Current Problem	Regulation*
1	**Structural issues in pipes and at joints**		
1a	Cracks, gaps, offsets (leakage exfiltration at gaps)	Regulatory	DEQ Cir 2, Sec 33.81 DEQ Cir 2, Sec 33.92
1b	Roots in lines (potential for more structural damage)	Regulatory	DEQ Cir 2, Sec 33.93
2	**Undersized line, flows exceed capacity**	Regulatory	DEQ Cir 2, Sec. 32
3	**Iris Lift Pump Station (Iris LS)**		
3a	Electrical Equipment incorrectly housed - unsafe location -The Iris LS generator and electric controls are in the same room as wet well and hydrogen sulfide (HS) -The Iris LS generator is not rated for corrosion. It is reported to be corroded and poses safety concerns -The wet well exhaust fan is corroded and poses safety concerns	Regulatory	DEQ Cir 2, Sec. 42.35 DEQ Cir 2, Sec. 42.25
3b	Pumps operating above rating of pump starts	Regulatory	DEQ Cir 2, Sec. 42.62
3c	Unable to properly maintain and clean lift station and sand trap	Regulatory	DEQ Cir 2, Sec. 44.2
3d	Unable to properly drain (current ball check valves)	Regulatory	DEQ Cir 2, Sec. 42.52
3e	Air relief valve beyond its design and functional life	Regulatory	DEQ Cir 2, Sec. 49.2
3f	Wet well piping/rails reaching design and functional life	Regulatory	DEQ Cir 2, Sec. 44.2
3g	Grate placement and fitting pose health and safety concerns	Regulatory	DEQ Cir 2, Sec. 42.231 DEQ Cir 2 Sec. 57.1.c
4	**Pipe sections with flow depth>0.3 of the diameter and Nonuniform slope: bellying (dips) at various locations**	Regulatory	DEQ Cir 2, Sec. 33.42 DEQ Cir 2, Sec. 33.44
5	**Protruding Service Lines impair flow capacity, impedes cleaning**	Regulatory	DEQ Cir 2, Sec 33.81 DEQ Cir 2. Sec 33.93
6	**Inflow from irrigation (abandoned service lines not capped)**	Regulatory	DEQ Cir 2, Sec 31
7	**Sewer Pipe Installed incorrectly: sewer installed "backwards"** (Alleys A & B) (impedes flow at joint and potential debris in joints that can affect structural integrity of lines)	Regulatory	DEQ Cir 2, Sec 33.81 DEQ Cir 2, Sec 33.91 DEQ Cir 2, Sec. 33.44
8	**Manhole issues – see following table**	See table	See following table

* Regulations per Montana DEQ Circular 2 (also referred to as DEQ-2 and DEQ Cir 2 in this study)

Description of deficiencies identified.

1. Structural issues in pipes and joints

   As documented in the CCTV pipe inspections and evaluation there are pipes throughout the collection system with cracks, gaps, and roots in the sewer lines. These conditions can cause seepage of sewage into the soil and groundwater, and the wastewater is not treated to meet water quality standards. These pipes also do not meet industry standards of installation in DEQ-2, 33.81 and 33.92.

2. Undersized lines, flows exceed capacity.

   The line modeled in Iris Street from Alley B to the sand trap preceding the Iris Lift Station is approaching capacity. This is also the case with the 15" inlet pipe from the sand trap to the Iris Lift Station. The trunkline model indicated that in the next five years and continuing into the 20-year planning period, assuming development of the 80-acres and growth projected, the capacity of these pipes will be reached, and the collection system will not be able to handle the wastewater flows. These conditions do not allow for the "estimated ultimate tributary population" sewer capacity as called for in DEQ-2, Section 32, and sewage may backup the pipes, posing health and safety concerns to the Town and surrounding environment.

3. Iris Lift Station – multiple deficiencies

   The Iris Lift Station has multiple deficiencies. The first one is, the electrical equipment, including the electrical panel and generator, are located within the same room as the hatch to the wet well, exposing the electrical equipment to flammable gases and corrosive hydrogen sulfide gas. With the panel and generator exposed to hydrogen sulfide gas, the terminals on the generator have corroded and the Town has recently put in about $50,000 of repair work to help slow the amount of corrosion. The wet well is equipped with an exhaust fan to address removal of the hydrogen sulfide gas and its potential effects; however, the fan is reported to be corroded and not properly working. These conditions with the electrical equipment and exhaust fan pose safety concerns and do not meet the requirements of DEQ-2, Sections 42.35 and 42.25 and 61.13.

   Secondly, the Iris Lift Station pumps are reported by the Town to be operating above the pump-rated start-stop cycles per hour. The Iris Lift Station is equipped with two Hydromatic pumps that are reported by the Town to each be rated for 3 start-stops cylces an hour. The pumps are reported by the Town to pump at 1550 gpm and are equipped with VFDs. The flow was calculated by a flow meter that was attached to the lift station to accurately calculate the flow from the pumps. Evaluation of the pump cycles using the current flow of 1.4 MGD produced a calculated value of 7.4 start-stops cycles per hour per pump. The number of start-stop cycles the pump is currently running at is anticipated to lower the life expectancy and efficiency of the pumps and pose health and safety concerns to the town if the pumps were to fail as a result.

   Next, the continuous flow of wastewater to and through the Iris Lift Station does not allow the Town to not operate the pumps and properly maintain and clean the lift station, sand trap, and the pumps as set forth in DEQ-2, Section 44.2. In addition, the wet well/pump rails and piping are reported by the Town to be reaching their design

and functional life. The railing in the lift station has been corroded beyond repair, making it extremely difficult to remove the pumps for cleaning.

Another issue at the Iris Lift Station is the ball check valve on each of the horizontal discharge lines from the pumps to the force main. These valves are reported by the Town as not being able to properly drain as needed.

The air relief valve on the 14" force main at the Iris Lift Station to the WWTP is beyond its design and functional life. This is a health and safety concern since failure of the valve could result in sewage released into the soil, groundwater, and the surrounding environment with potential backup in to the sewer mains and service lines. DEQ-2, Section 49.2, addresses the need, evaluation for, and placement of air relief valves in a force main.

Finally, the Iris Lift Station has a two-piece safety grate system that must be manually installed requiring two operators to install the safety grating over the 24-ft deep wet well once the double hatch doors are opened. The hatch doors cannot be closed with these grates in place. These conditions with the current grates do not meet the requirements of DEQ-2 Sections 42.231 and 57.1.c.

4. Pipe sections bellying (dips)

   Multiple sections throughout the wastewater collection system experience bellying (dips) in the pipe. Bellying impacts flow and capacity by creating dips (bellies) through sections of pipe, meaning the slope is not uniform between manholes, and the flow is impeded. A nonuniform slope between manholes is a deficiency per DEQ Circular 2, Section 33.44. Capacity is decreased through these bellied sections, and pipes flow full or near full impacting the amount of wastewater the system can manage. This condition of pipes flowing full or near full also does not allow sewer videoing equipment to video which is a hindrance to the Town monitoring and effectively maintaining the system.

5. Protruding service lines

   The CCTV pipe inspections revealed that several installed service lines protrude into the main sewer lines. These protruding service lines create issues for the city. The cleaning of the lines is made significantly more difficult, impossible in extreme cases, as the machinery used to clean the sewer mains can easily get stuck or unable to pass. The protruding service lines are also more prone to clogging as items can stick to the pipe. DEQ-2 Section 33.93 does not allow protruding service connections into the sewer main.

6. Abandoned sewer line not capped (irrigation water inflow)

   Following the manhole inspections, the Town's public works department reported that in the old part of town, south of the Town Hall and Museum, two abandoned sewer service lines were flowing with irrigation water from nearby irrigated landscape into sewer manholes. This is considered inflow to the sewer system, and the abandoned lines need to be properly capped. DEQ-2, Section 31 does not allow runoff into municipal wastewater sewers.

7. Sewer pipe installed incorrectly (backwards)

   The Town of West Yellowstone reports the clay sewer pipe installed in Alleys A and B are installed backwards with spigot pointing upgrade and bell pointing downgrade, which is contrary to general industry standards for clay pipe installation. DEQ Circular 2, Section 33.81 Standards requires pipe installation established in technical publications. A primary technical publication establishing pipe installation is the National Clay Pipe Institute's (NCPI's) *Vitrified Clay Pipe Installation & Inspection Handbook*, 2022. The NCPI publication establishes that clay pipe "are generally installed with the bells pointing upgrade" (p.25) and references ASTM C12 *Standard Practice for Installing Vitrified Clay Pipe Lines*, another technical publication establishing clay pipe installation. ASTM C12 establishes in Section 11 Pipe Laying for clay pipe to be installed "so that the spigot ends point in the direction of flow to prevent bedding material from entering the joint" (2005). The clay pipe currently in place in Alleys A and B are opposite from standards established in these technical publications. The lines experience issues with flow and capacity inherent to clay pipe installed backwards including bellying, gaps, and joints. Clay pipe installed backwards may have bedding material in the joints that cause these conditions.

8. Manhole issues

   Table 13 lists various manhole issues recorded in the 2023 manhole inspection reports and from the 2021-2022 CCTV pipe inspections. Various manholes have broken or cracked rings, meaning they are not sealed. DEQ-2 Section 34.6 requires the rings be sealed and manholes be made of concrete. Two manholes south of the Town Hall and Museum were noted from the CCTV pipe inspection as being brick manholes with bricks in the downgrade pipes, meaning these manholes are losing bricks which may impact the manhole being watertight. Other issues are addressed with maintenance.

Table 13. Manhole issues from pipe and manhole inspections

Various Manhole Issues			
1	Manhole not watertight at ring: manhole Ring Broken	Regulatory	DEQ Cir 2, Sec. 34.6
2	Manhole not watertight at ring: manhole Ring Cracked	Regulatory	DEQ Cir 2, Sec. 34.6
3	Manhole not watertight: brick manholes, bricks in sewer line	Regulatory	DEQ Cir 2, Sec. 34.6
4	Manhole Ring/Frame Displaced	Maintenance	N/A
5	Manhole Ladder — no ladder in manhole	Maintenance	Portable ladder used
6	Manhole Ladder — unsafe	Maintenance	Portable ladder used
7	Manhole Ring/Frame Damaged	Maintenance	Regular maintenance
8	Manhole Ring Corroded	Maintenance	Regular maintenance
9	Manhole Ring Misaligned	Maintenance	Regular maintenance
10	Roots in Manhole Ring	Maintenance	Repaired as of 10/5/23
11	Debris in Manhole Channel	Maintenance	Regular maintenance
12	Debris on Manhole Shelf	Maintenance	Regular maintenance
13	Debris on Manhole Rungs	Maintenance	Regular maintenance
14	Incorrect Lid - storm sewer lid on verified sewer manhole	Maintenance	Replace SSMH lid

4) ALTERNATIVES CONSIDERED

Based on the information presented in the previous sections of this report, the goal of this study is to develop alternatives for addressing the system deficiencies and developing a recommended alternative or set of alternatives. First, existing deficiencies were identified and summarized. Then recommended alternatives were developed to address the deficiencies. System deficiencies were evaluated to determine if they could be addressed without replacement to infrastructure, but through rehabilitation in cooperation with operation. Evaluation included the No Action Alternative. Table 15 indicates deficiencies and recommended alternatives for the wastewater collection system.

Montana DEQ Circular DEQ-2 provides guidelines for sewer rehabilitation (2018). A copy of these guidelines are contained in Appendix J of this FPS. The guidelines include techniques, advantages, disadvantages, and issues. The following descriptions of Techniques are taken from the guidelines.

Table14. Rehabilitation/Replacement Techniques for Sewer Mains (Montana DEQ, 2018).

Technique	Description
Sliplining	Sliplining is the insertion of a new pipe, either continuous (typically buttfused HDPE) or segmented (typically PVC, ductile iron, or HDPE), of smaller diameter into an existing host pipe.
Cured-In-Place Pipe (CIPP)	The CIPP lining process consists of inverting a resin-impregnated flexible tube into an existing sewer using hydrostatic head or air pressure. The resin is cured using heat.
Fold-and-Form Lining	The fold-and-form process involves inserting a heated PVC or HDPE thermoplastic liner, folded or deformed into a U-shape, into an existing sewer and rerounding the liner using heat and pressure.
Pipe Bursting	Pipe bursting is a trenchless replacement technology. Through pipe bursting, the existing pipeline is fragmented and forced into the surrounding soil by pulling a bursting head through the sewer. A new pipe (typically butt-fused HDPE) of equal or larger diameter is pulled behind the bursting head. New manholes are usually provided at insertion and withdrawal pits.
Point Repairs	Point repairs can structurally rehabilitate and eliminate infiltration in short sections of sewers by such methods as short CIPP liners, epoxy resins, and structural grouting sleeves. Defects such as protruding laterals can be repaired by robotic grinding. Point repairs may be needed to properly prepare the sewer for some of the manhole-to-manhole rehabilitation/replacement options described in the techniques listed above.

Table 15. Deficiencies Identified and Alternatives Considered.

#	Deficiencies	Alternative 1 No Action	Alternative 2 Recommended	Alternative 3 Other Feasible
1	**Structural issues in pipes and at joints**			
1a	Cracks, gaps, offsets	-health & safety concerns -Sewage may enter soil and groundwater. -Structural concerns	Slipline select sections	Point repairs to replace sections of pipe between MH's
1b	Roots in lines	-Sewage may enter soil and groundwater. -Structural concerns -Increase jetting/clean	Slipline select sections	Slipline pipe and replace select sections
1c	Seven (7) or more deficiencies MH to MH	-Deficiencies remain -flow impeded	Replace pipe MH to MH, redo service lines	Point repairs at select sections of pipe
2	**Nearing Capacity - Undersized lines: 12" in Iris St. from Alley B to Sand trap and 15" from Sand trap to Iris Lift Station (LS)**	Continue to backup	Additional line on Iris Street with 80-acre development, increase line size: sand trap to LS	Point repair dips, slipline select sections of existing eastern pipe on Iris Street, regularly utilize vac-flush truck for cleaning
3	**Iris Lift Station**			
3a	Electrical Equipment separation from corrosive hydrogen sulfide gas/wet well	Electrical, generator, and fan continue to corrode	Replace vent fan to fiberglass fan, install HS monitor	Separation wall: electric from HS. Fiberglass fan and HS monitor
3b	Pumps operating above rating of pump starts.	Continue to overwork pumps and lessen pump life cycle	Optimize pumps and height of water in wet well	Replace pumps with higher capacity pumps
3c	Unable to properly maintain and clean lift station and sand trap	Continue to let sand trap fill up, backup lines, impact LS negatively	Clean with bypass from MHs to force main, clean	Upgrade/retrofit wet well
3d	Unable to properly drain (current ball check valves)	Leave as is, no way to drain lines	Replace ball valve with swing check	NA – no other feasible alternative
3e	Air relief valve beyond its design and functional life	Leave as is, potential air relief valve to fail	Replace with new air relief valve	NA – no other feasible alternative
3f	Wet well piping/rails reaching life expectancy, corroding, need controls	Leave as is, not functioning	Replace piping and rails.	NA – no other feasible alternative
3g	Unsafe condition with current safety grate function and placement at wet well	Leave as is, unsafe (two separate safety grates to place by hand. Takes two operators. Hatch doors do not close)	Replace with permanently mounted hinged safety grate	NA – no other feasible alternative

#	Deficiencies - *continued*	Alternative 1 No Action	Alternative 2 Recommended	Alternative 3 Other Feasible
5	**Incorrect Slope (bellying), flow depth > 0.3 x diameter of pipe**	Leave as is, impeded flow, scour, cannot clean properly	Excavate, point repairs at select locations.	Replace sections of pipe MH to MH.
6	**Protruding Service Lines**	Leave as is, flush lines, decreased capacity	Lateral cutting, replace service lines so not protruding	NA – no other feasible alternative
7	**Abandoned sewer lines not capped (irrigation water inflow)**	Leave as is – continue inflow.	Maintenance to properly cap lines.	NA – no other feasible alternative
8	**Clay sewer pipe installed incorrectly (backwards) (Alley A and Alley B)**	Leave as is – decreased capacity, flow impeded, debris stuck in joints, offsets at spigot ends	Leave as is – maintenance: clean and monitor regularly	Slipline each entire line. OR Replace with new pipe.
M1	Manhole Ring Broken	Leave as is - manholes not watertight	Maintenance - replace manhole ring	NA – no other feasible alternative
M2	Manhole Ring Cracked	Leave as is - manholes not watertight	Maintenance - replace manhole ring	Other Maintenance Repair
M3	Brick Manholes, bricks in sewer line	Leave as is – manholes not watertight, manholes deteriorated and brick material prone to fall off. Fallen brick impedes flow.	Maintenance – mortar bricks, monitor and clean lines regularly	Cap manhole, add service lines to line south of existing line, bore under old railroad and acquire utility easement to line south.
M4 to M14	Various Manhole Issues	Leave as is	Maintenance to address. **See Table XX.**	NA No other feasible alternative.

The table above shows the deficiencies identified and alternatives considered. In meeting with public work and town officials, seven or more deficiencies in a section of pipe from manhole to manhole, pipe rehabilitation or replacement was decided upon.

4.a Description

The recommended alternative seeks to maintain and utilize existing clay pipe and infrastructure with actions to address the deficiencies. The do nothing alternative allows multiple deficiencies to remain with potential contamination to soil and groundwater with unsanitary conditions that could impact health and safety for humans, animals, and the natural environment. The third alternative proposes actions, where feasible, that may require more extensive work and resources and produce a "near new" condition.

The trunkline model of the 12" sewer main on the east side of Iris Street indicated the pipe is able to convey current flows to the Iris Lift Station; however, its functioning with bellies and its capacity do not allow conveyance of flow modeled to be generated from the 80-acres. The trunkline model Constructing an additional pipe in Iris Street to the Iris Lift Station with development of the 80-acres development is proposed with this FPS. This is recommended to

manage the flows from the 80-acres and can be utilized for wastewater flow from existing areas on the south of West Yellowstone including wastewater collection from areas south of Alley A.

Pumps with higher pump capacity to handle the projected flows from development and human habitation of the 80-acres is recommended in the next 20-years.

4.b Design Criteria

Design criteria utilized in alternatives included Montana DEQ Circular 2, Design Standards for Public Sewage Systems (2018), national codes, and ordinances utilized by the Town in operating the wastewater collection system.

4.c Map

The following maps show locations of the various deficiencies described.

Figure 23 shows the various deficiencies according to level of need as identified by the Town. As was determined by the Town in initial screening, the deficiencies with highest need and priority should be addressed first. These are rated red, yellow, or green according to highest priority and need. Level red represents significant immediate needs, recommended for immediate action. Level yellow represents immediate needs recommended to be addressed over the 20-year planning period, from 2023-2043. Level green represents needs to monitor and build capital funds over an extensive period in order to replace. Level green is of a lower priority than the red or yellow levels. This approach allows the Town to address the significant immediate needs utilizing existing infrastructure and replacing or upgrading components in an effort to not increase significant debt to the Town at a time when a new WWTP is being built with significant financing and repayment of this investment from the Town and its wastewater customers.

Table 16. Wastewater Collection System Needs – Level of Needs.

Level Red - Significant Immediate Needs	
1	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)
2	Iris Lift Station: Replace Force Main Air Relief Valve
3	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)
4	Iris Lift Station: Replace Safety Grate
5	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes
Level Yellow - Immediate Needs for 20-YR Planning Period (2023-2043)	
6	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots
7	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco
8	Select Locations: Correct Protruding Service Lines
9	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12"
10A	Fix Bellies/Dips - Select Locations: Correct Structural Deficiencies - point repairs OR
10B	Fix Bellies/Dips - Buy Flush Truck and Vac Truck to Maintain Lines Sytem-Wide
11	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)
12	System-Wide: Replace Manhole Rings (no cost - use maintenance)
13	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line
Level Green - Monitor Needs	
14	Alley A and Alley B: slipline clay pipe installed backwards

Figure 22. Map of Deficiencies.

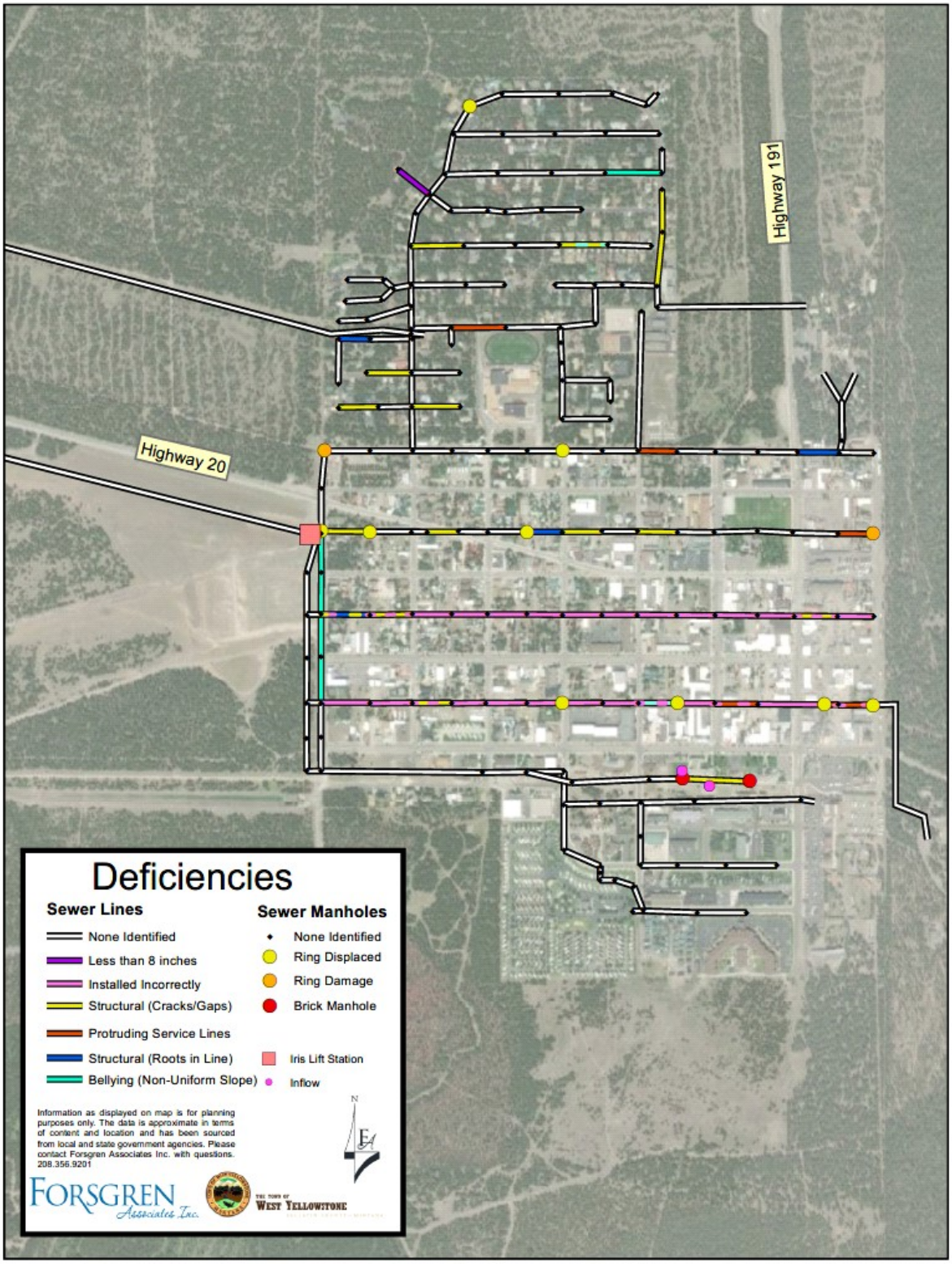
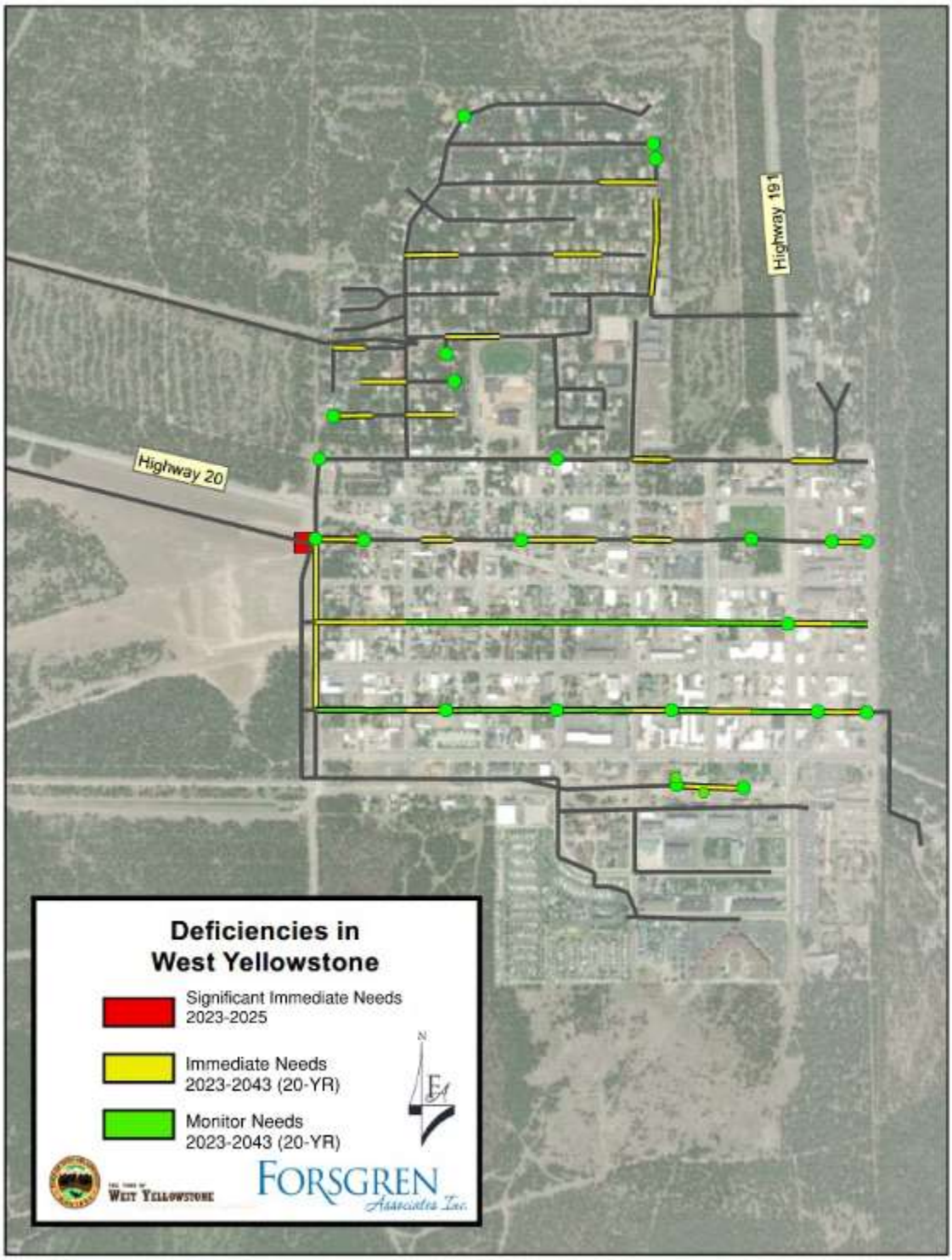


Figure 23. Map of Deficiences – Level of Need



4.d Environmental Impacts

Environmental impacts are anticipated to be minimal, as improvements are within previously disturbed areas and existing rights-of-ways. Environmental impacts due to development and improvements within the 80 acres and Moonrise are outside the scope of this study, however, work at the Iris Lift Station and collection lines in Iris Street for wastewater flows from these areas are anticipated to be within previously disturbed areas and existing rights-of-ways.

4.e Land Requirements

No land requirements are anticipated. The alternatives identified are within existing rights-of-way, and the construction of collection system improvements in the 80 acres to the west will be done in land already owned by the Town.

4.f Potential Construction Problems

Potential construction problems are anticipated along Alleys A, B, C, and D where pipe may need to be replaced and point repairs completed due to other utilities between the surface and the collection lines. These utilities have been reported by the Town as gas, propane, and fuel lines. Town sewer ordinances also refer to telephone lines in the vicinity of the sewer lines. Other potential construction problems include the time of year available to make the improvements to the collection lines. The construction season in Town of West Yellowstone coincides with the major tourism season in the area, that of May – September. This poses accessibility, traffic control, and scheduling utility shutoff challenges during the busy summer tourism season.

4.g Sustainability Consideration

Sustainability considerations include leaving the clay pipe in place and performing pipe repairs, including sliplining, to address the deficiencies identified. This allows the bedding material and pipe to remain intact with greater structural integrity than removing all the pipe and allows less pipe material needing to be removed and hauled to landfill.

4.g.1 Water and Energy Efficiency

Utilizing sustainable and energy efficient infrastructure and equipment is recommended.

4.g.2 Green Infrastructure

Green infrastructure considered with this study includes incorporating sustainable landscaping with upgrades and development of the 80-acres.

4.g.3 Other

No other sustainability considerations are included with this study.

4.h Cost Estimates

The following are the summaries of estimates of probable cost for Alternative 2 and Alternative 3. The needs/improvements are categorized into Level Red – Significant Immediate Needs, Level Yellow – Immediate Needs for 20-YR planning period (2023-2024), Level Green – Monitor Needs. In initial screening with departments from the City (Manager, Public Works, and Finance), it was determined to evaluated alternatives according to varying levels of needs. These levels represent summarized levels of needs from project team discussions and meeting with the City Council in a work meeting held November 21, 2023. Unit costs are provided in Appendix K.

Figure 24A. Alternative 2 – Engineer's Estimate of Probable Cost-Summary

FORSGREN Associates Inc.

ENGINEER'S OPINION OF PROBABLE COST
Alternative 2
Town of West Yellowstone
Wastewater Collection System Improvements

Project No.
Project: West Yellowstone Wastewater Collection FPS — Date: 2/27/2024
Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION		Total Price
CONSTRUCTION PROJECTS - SUMMARY			
Level Red - Significant Immediate Needs	Construction* $ 182,600		
1	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)		$ 10,000
2	Iris Lift Station: Replace Force Main Air Relief Valve		$ 12,000
3	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)		$ -
4	Iris Lift Station: Replace Safety Grate		$ 13,500
5	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes		$ 104,900
Level Yellow - Immediate Needs for 20-YR Planning Period (2023-2043)	Construction* $ 2,360,300	with 10B (not 10A)	
6	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots		$ 127,400
7	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco		$ 33,000
8	Select Locations: Correct Protruding Service Lines		$ 98,000
9	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12"		$ 994,000
10A	Fix Bellies/Dips - Select Locations: Correct Structural Deficiencies - point repairs OR		$ 614,000
10B	Fix Bellies/Dips - Purchase and Use Vac-Flush Truck for System-Wide Use		$ 400,000
11	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)		$ -
12	System-Wide: Replace Manhole Rings (no cost - use maintenance)		$ -
13	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line		$ 163,200
Level Green - Monitor Needs	Construction* $ 2,158,900		
14	Alley A and Alley B: slipline clay pipe installed backwards		$ 1,660,700
	TOTAL CONSTRUCTION COST		**$ 3,616,700**
* Levels - Construction Cost with Contingency			
	Contingency Fund (70% Confidence Factor)	30%	$ 1,085,100
	TOTAL CONSTRUCTION COST		**$ 4,701,800**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT			
1	Legal, Bonding, Audit	0.4%	$ 18,800
2	Basic Design Services (includes PER, ER, and Design)	10%	$ 470,200
3	Bid Services	1%	$ 47,000
4	Construction Observation/Inspection	8%	$ 376,100
5	Post Construction Services	2%	$ 94,000
6	Financing Administration	5%	$ 235,100
7	Bond/Interim Interest	1%	$ 51,100
	SUBTOTAL OTHER PROJECT COSTS		**$ 1,292,300**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST			**$ 5,994,100**

Figure 24B. Alternative 3 - Engineer's Estimate of Probable Cost-Summary

FORSGREN Associates Inc.

ENGINEER'S OPINION OF PROBABLE COST
Alternative 3
Town of West Yellowstone
Wastewater Collection System Improvements

Project No
Project: West Yellowstone Wastewater Collection FPS — Date: 2/15/2024
Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION		Total Price
CONSTRUCTION PROJECTS - SUMMARY			
No Level Assigned - Consider all one project over planning cycle			
1	Iris Lift Station - separation wall, upgrade pumps, wet well, valves, rails, inlet pipe increased,		$ 794,500
2	Correct Structural Issues (point repairs and replace sections of of pipe)		$ 1,966,200
3	Increase Capacity Iris Street - slipline and point repairs on eastern 12" in Iris		$ 508,000
4	Select Locations: Correct Protruding Service Lines		$ 98,000
5	Select Locations: Correct Structural Deficiencies - point repairs: Bellies/Dips		$ 614,000
6	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)		$ -
7	System-Wide: Replace Manhole Rings (no cost - use maintenance)		$ -
8	Alley A and Alley B: replace pipes and manholes		$ 3,168,800
	TOTAL CONSTRUCTION COST		**$ 7,149,500**
	Contingency Fund (70% Confidence Factor)	30%	$ 2,144,900
	TOTAL CONSTRUCTION COST		**$ 9,294,400**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT			
1	Legal, Bonding, Audit	0.4%	$ 37,200
2	Basic Design Services (includes PER, ER, and Design)	10%	$ 929,400
3	Bid Services	1%	$ 92,900
4	Construction Observation/Inspection	8%	$ 743,600
5	Post Construction Services	2%	$ 185,900
6	Financing Administration	5%	$ 464,700
7	Bond/Interim Interest	1%	$ 92,900
	SUBTOTAL OTHER PROJECT COSTS		**$ 2,546,600**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST			**$ 11,841,000**

5) SELECTION OF AN ALTERNATIVE

Selection of an alternative started with identifying deficiencies, advancing to alternatives addressing the deficiencies and associated needs, and then cost estimates for construction; and in this section, analysis of the alternatives based on life cycle and non-monetary factors.

5.a Life Cycle Cost Analysis

Evaluating life cycle costs creates a clear picture of anticipated costs over the life cycle of the system, not just capital costs, but costs for O&M and recurring costs to keep the collection system operating effectively. The following sections describe the costs analyzed.

In the life cycle cost analysis, a 20-YR planning period is utilized. Discount rates, capital costs, annual O&M, life-cycle costs, and salvage value are taken into account. The net present value (NPV) is calculated to be the capital cost plus the uniform series of annual O&M minus the salvage value of the pumps and vehicles (vac-flush truck) purchased. The Life Cycle Cost Analysis is included in Appendix L of this report. A lower NPV for this scenario represents less cost overall.

This analysis for the work shown in the respective alternatives described above results in a NPV for Alternative 2 of $6.5M and $12.3M for Alternative 3.

Alternative 2 has interim work done upfront to keep Iris Lift Station working until the 80-acres is developed and additional capacity needed at the Iris Lift Station in 2032. Alternative 3 puts the Iris Lift Station updates and retrofits upfront instead of later in 2032. This would require additional funding that the Town would need to acquire. The interim work proposed for the Iris Lift Station (red) may or may not require outside funding, or at the least require substantially less to keep the Iris Lift Station functioning.

Alternative 2 also includes a vac-flush truck. Alternative 3 does not. Alternative 3 would employ point repairs and pipe replacements to fix bellies, gaps, and roots. Alternative 2 would require additional ongoing maintenance for the system and the vac-flush truck. Alternative 3 would repair and make improvements to the system, with routine flushing contracted out. Depending on the capital costs of the trucks and maintenance of these vehicles, O&M and short-lived assets may vary.

Alternative 2 uses slip-lining to correct the pipes in Alleys A and B installed backwards. Alternative 3 removes the clay pipe and replaces the pipe with new PVC pipe. This pipe replacement would be a major endeavor for the Town, especially in continuing service during construction, installing with other utilities nearby, and being able to accommodate tourism without economic and visitation impact to the Town. Utilizing enhanced maintenance with a Town vac-flush truck may eliminate the need for these capital improvements.

Combining elements of both Alternative 2 and Alternative 3 to put in needed equipment and optimization until upgrades at Iris Lift Station are needed is basically Alternative 2. However, in Alternative 2, a vac-flush truck adds additional investment for maintaining and storing the vehicles. These are factors to consider in fixing deficiencies and/or maintaining equipment and substandard pipe lengths.

5.b Non-Monetary Factors

The recommended alternative will help keep the sewer system running optimally, while taking no action fosters health and safety issues to the community, the environment, and operation with the system. Other issues created would continue into the near future and over an extended period of time. These issues include flow impeded from roots, joint offsets, and protruding service lines. Pipes with cracks and sand and debris introduced from broken lines, inflow, and exfiltration would reduce capacity. Replacing or slip-lining sections of pipe seeks to eliminate many of these issues.

Non-monetary factors to consider include sustainability considerations (both socially and environmentally), operator training and maintenance of equipment, permits, community objections, reduction of greenhouse gas emissions, reliability, and operability.

Table 25. Preliminary Consideration of Non-Monetary Factors

	Alternative 2		Alternative 3	
Factors	**Alt 2**	**Comments**	**Alt 3**	**Comments**
Sustainability	-1	more time with flush and vac truck	0	PVC replace clay - possible concern?
Operator training	1	training on flush and vac truck	0	no new training
Equipment maintenance	0	maintain flush and vac truck	0	no new equipment
Permits	0	additional vehicle license, registration	0	no new permits
Community objection	-1	takes up space/land to house trucks	-1	construction impede Town & tourists
Reduction in greenhouse gas emissions	-1	increase in construction, use vac truck	-1	increase in construction/replace pipes
Reliability	1	able to maintain with own vac truck	0	increase overall, concern with PVC replacing clay?
Operability	1	able to maintain with own vac truck	1	system operates better in pipes and at Iris LS
System Maintenance	1	better maintain collection system	1	maintenance may go down

Scale:
positive 1 = requires less commitment from Town (capital, maintenance)
negative 1 = requires more commitment from Town
zero score = neither more nor less

6) PROPOSED PROJECT (RECOMMENDED ALTERNATIVES)

The proposed project for the wastewater collection system is a tiered approach following the red-yellow-green method outlined in the sections above. These can also be referred to as phases. The proposed project includes capital improvements at the Iris Lift Station, optimizing operations at the Iris Lift Station, point repairs, purchase and use of a vac-flush truck, and monitoring of the existing wastewater collection system in Alleys A and B to determine need for slip-lining or replacing those lines. Capital improvements and enhanced maintenance are discussed this section to aid the Town in planning projects to pursue for the wastewater collection system.

6.a Preliminary Project Design

6.a.1 Wastewater

6.a.1.i Collection System: New pipe in Iris Street as part of the upgrade/retrofit at the Iris Lift Station. Select locations of pipe replacement and point repairs to correct structural issues and bellies are included in the project. Lengths and sizes vary with location. Purchasing and implementing a vac-flush truck for enhanced maintenance of Alleys A and B and the eastern-most 12" line in Iris Street may decrease or eliminate the need for slip-lining and replacement of pipe in these locations. Use of the vac-flush truck is referred to in this study as enhanced maintenance and is strongly recommended. Use of the vac-flush truck may reduce needs for capital costs and increase overall proper function of the wastewater collection system.

6.a.1.ii Pumping Stations: The Iris Lift Station is proposed to be updated with components and operations until the 80 acres develops and an upgrade/retrofit is done at the Iris Lift Station prior to 2032 when capacity in the existing Iris Lift Station is projected to no longer be adequate. Pump capacity of two 2500 gpm pumps are recommended for the project. The Town may consider requiring costs for upgrades at the Iris Lift Station to be included with development of the 80-acres. The Town currently prefers lift station pumps from the following manufactures, in order: Grundfos, Gorman-Rupp, and Flygt. Power requirements and optimizing operations are included in the current updates and would be reviewed in developing design of the upgrades/retrofits to the Iris Lift Station. The Madison Lift Station is currently being updated, and operations are anticipated to function properly now and into the future for this lift station.

6.a.1.iii Storage: The Iris Lift Station wet well (including volume) will be reviewed in design and has been calculated to work with the proposed 2500 gpm pumps with operations optimized.

6.a.1.iv Treatment: The new mechanical wastewater treatment plant was covered in the 2022 WWTP PER and is out to bid at the time of preparing this FPS.

6.b. Project Schedule

The following schedule represents proposed dates for submittal and anticipated approval of all required documents, permit applications, advertisement for bids, loan closing, contract award, initiation of construction, substantial completion, final completion, and initiation of operation. No

land acquisition or easement is anticipated for the recommended improvements (proposed project) since the improvements are on lands and within streets currently owned and maintained by the Town.

6.c. Permit Requirements

Permits anticipated to be required with the improvements include local building and encroachment permits for construction and permits that may be required for bypass flow. No discharge or capacity permits are anticipated with improvements to the wastewater collection system.

Table 26. Project Schedule

Estimated Schedule for Improvements																						
	Unit Process	Year																				
		24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	
Red	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)	✓																				
Red	Iris Lift Station: Replace Force Main Air Relief Valve	✓																				
Red	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)	✓																				
Red	Iris Lift Station: Replace Safety Grate	✓																				
Red	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes	✓																				
Yellow	Fix Bellies/Dips - Purchase and Use Vac-Flush Truck for System-Wide Use		✓																			
Yellow	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots				✓																	
Yellow	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12" Iris)					✓																
Yellow	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line						✓															
Yellow	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco								✓													
Yellow	Select Locations: Correct Protruding Service Lines									✓												
Yellow	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)	✓																				
Yellow	System-Wide: Replace Manhole Rings (no cost - use maintenance)			✓																		
Green	Various Sliplining:																					
Green	Alley A and Alley B: slipline clay pipe installed backwards															✓						

6.d Sustainability Considerations

6.d.1 Water and Energy Efficiency

The proposed installation of a fan to ventilate the wet well chamber of the Iris Lift Station is anticipated to increase energy usage, however, use of an energy efficient unit is recommended with the project. Water use is anticipated to increase with cleaning and maintenance practices and can be scheduled to coincide with fire hydrant exercising in order to reuse water and clean the wastewater collection system.

6.d.2 Green Infrastructure

No green infrastructure is anticipated with the project. Capping abandoned unused sewer service lines identified in the study is proposed in the project to reduce inflow. Installation of vegetation and trees at lift stations may improve aesthetics and ongoing acceptability of lift stations in residential areas or proposed residential areas such as in the 80-acres immediate to the current Iris Lift Station.

6.d.3 Other

Other aspects of sustainability such as resiliency or operational simplicity incorporated with the selected (preferred) alternative include connecting operation of the ventilation fan with the Town's SCADA system.

6.e Total Project Cost Estimate

The following is the total project cost estimate including construction, non-construction, and contingency. O&M, debt reserve, and short-lived assets increase the total project cost to $9.34M.

FORSGREN Associates Inc.

ENGINEER'S OPINION OF PROBABLE COST
Alternative 2
Town of West Yellowstone
Wastewater Collection System Improvements

Project No
Project: West Yellowstone Wastewater Collection FPS — Date: 2/27/2024
Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION		Total Price
CONSTRUCTION PROJECTS - SUMMARY			
Level Red - Significant Immediate Needs	Construction* $ 182,600		
1	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)		$ 10,000
2	Iris Lift Station: Replace Force Main Air Relief Valve		$ 12,000
3	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)		$ -
4	Iris Lift Station: Replace Safety Grate		$ 13,500
5	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes		$ 104,900
Level Yellow - Immediate Needs for 20-YR Planning Period (2023-2043)	Construction* $ 2,360,300		with 10B (not 10A)
6	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots		$ 127,400
7	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco		$ 33,000
8	Select Locations: Correct Protruding Service Lines		$ 98,000
9	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12"		$ 994,000
10A	Fix Bellies/Dips - Select Locations: Correct Structural Deficiencies - point repairs OR		$ 614,000
10B	Fix Bellies/Dips - Purchase and Use Vac-Flush Truck for System-Wide Use		$ 400,000
11	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)		$ -
12	System-Wide: Replace Manhole Rings (no cost - use maintenance)		$ -
13	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line		$ 163,200
Level Green - Monitor Needs	Construction* $ 2,158,900		
14	Alley A and Alley B: slipline clay pipe installed backwards		$ 1,660,700
	TOTAL CONSTRUCTION COST		**$ 3,616,700**
* Levels - Construction Cost with Contingency			
	Contingency Fund (70% Confidence Factor)	30%	$ 1,085,100
	TOTAL CONSTRUCTION COST		**$ 4,701,800**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT			
1	Legal, Bonding, Audit	0.4%	$ 18,800
2	Basic Design Services (includes PER, ER, and Design)	10%	$ 470,200
3	Bid Services	1%	$ 47,000
4	Construction Observation/Inspection	8%	$ 376,100
5	Post Construction Services	2%	$ 94,000
6	Financing Administration	5%	$ 235,100
7	Bond/Interim Interest	1%	$ 51,100
	SUBTOTAL OTHER PROJECT COSTS		**$ 1,292,300**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST			**$ 5,994,100**

6.f Annual Operation Budget

6.f.1 Income

The following is a proposed rate schedule based on $110,000 of the local funding from the Town's capital improvements budget FY2024 and additional local funding from sewer, infrastructure, and operations funds. Additional funding is shown from state and federal sources. Funding from development of the 80-acres or other funding sources may be added as appropriate.

Table 27. Rate Analysis

Town of West Yellowstone - Wastewater Collection System		
Alternative 2 - Needs		
Rate Analysis		
February 2024		
COSTS	**Red**	**Yellow & Green**
Construction and Equipment	$ 182,600	$ 4,519,200
Engineering	$ 38,300	$ 949,000
Administration, bonding, and interest on interim financing, bond counsel	$ 11,700	$ 289,100
TOTAL PROJECT COST	$ 232,600	$ 5,757,300
FUNDING SOURCES		
Grant		
County Contribution	$ -	$ -
Local Funding - Sewer Funds, Infrastructure, Operations	*$ 232,600*	$ -
Commerce CDBG	$ -	*$ 500,000*
Army Corps of Engineers	$ -	$ -
Loan		
USDA Rural Development Loans / Revenue Bond / DEQ Water Pollution Control State Revolving Fund	$ -	$ 5,257,300
TOTAL FUNDING	**$ 232,600**	**$ 5,757,300**
RATE COMPONENTS		
Debt	**0**	**$ 5,757,300**
Term (years)	20	20
Interest Rate	2.500%	2.500%
Annual Payment	$ -	$ 337,240.70
No. of Current SFE's	2,643	2,643
Monthly Debt Payment / SFE-Month	$ -	$ 10.63
Reserve per Month, 10% debt	$ -	$ 1.06
O&M		
Proposed WWTP Annual O&M Costs	$ 4,000	$ 33,000
O&M / SFE-Month	$ 0.13	$ 1.04
Short Lived Assets		
Proposed WW Add Annual Short-Lived Asset Costs	$ 3,040	$ 56,010
Short Lived Asset / SFE-Month	$ 0.10	$ 1.77
TOTAL MONTHLY CHARGE / SFE	**$ 0.22**	**$ 14.49**

Based on this analysis and funding scenario indicated, a total monthly increase in sewer rates of $15/SFE (~$14.49 + $0.22) is anticipated to pay for the total project of $9.34M which includes construction, debt reserve, O&M, and short-lived assets). A monthly increase rate of $15/SFE is not recommended due to a rate increase anticipated with the construction of the mechanical treatment plant and the phasing of the wastewater collection system needs with red, yellow, and green levels. A rate increase in monthly rates of $1/YR/SFE is recommended in paying for the total project.

6.f.2 Annual O&M Costs

In 2020 the annual O&M Costs associated with for both collection and treatment system was $9.42/month/SFE based on 2643 SFEs.

Table 28. Annual O&M Costs – includes WWTP (2022 PER) and Proposed Project

O&M Category	O&M Cost		
	Proposed WWTP (2022 PER)	Increase from Proposed Collection (2023 FPS)	Existing Collection
Personnel (i.e. Salary, Benefits, Payroll Tax, Insurance, Training)	$103,560.00		$63,778.00
Administrative Costs (e.g. office supplies, printing, etc.)			$6,350.48
Land rental			$40,000.00
Insurance			$27,449.00
Energy Cost (Fuel and/or Electrical)*	$113,513.78	$12,000.00	$11,257.09
Repair and Maintenance*		$17,000.00	$11,015.66
Monitoring & Testing			$15,835.83
Cleaning and Chemicals (includes vac-flush truck use)*		$8,000.00	
Professional Services			$20,824.70
Telephone and Internet			$1,649.49
Miscellaneous - Supplies			$8,159.51
Miscellaneous - Travel			$5,789.92
Miscellaneous - Training, Membership Dues, Registration	$300.00		$2,094.41
Solids Disposal	$25,646.78		
Depreciation			$66,649.00
Total Proposed Project O&M*	$243,020.56	$37,000.00	$280,853.09

*O&M costs for Increase in Proposed Collection (2023 FPS) would begin at the time the projects are completed (see Appendix L for O&M).

6.f.3 Debt Repayments

Debt Repayments are proposed to be made through rate increases of connections to the wastewater collection system, existing and future. To repay improvements made by the project, existing monthly sewer rates are proposed to increase by $1/YR/SFE. Funding repayment shown in Table 27 above for SRF loans would be over the terms of the loan, typically a 20-year loan. The annual debt repayment for the funding shown would be approximately $337,240.

6.f.4 Reserves

Debt Service Reserves

Individual funding sources are recommended to be consulted for specific debt service requirements. If General Obligation Bonds are proposed to be used, this section should clearly state if that is the case. Individual funding sources have not been contacted for this project. The rate study (Table 27) included 10% debt reserve.

Short-Lived Assets

The following is a table of short-lived assets for the wastewater collection system. This study considers that only assets added as part of the 2023 Wastewater FPS preferred alternative will be evaluated (see green highlighted assets below). Other short-lived assets for the wastewater collection system are taken as accounted for in existing budgets and reserve funds managed by the Town.

Table 29. Short-Lived Assets, Added to WW Collection System with 2023 WW FPS

Alternative 2 - Recommended Alternative - Replacement (Short-Lived Assets) & Recurring Costs	Life (Years)	# Units	Add w/FPS	Total Annual Cost from -All levels-
Iris Lift Station HS Gas Monitor **	10	1	$ 4,000	$ 540
Isolation Valves: 12" Lines before Sand Trap	15	2	$ 12,000	$ 2,500
Vac-Flush Truck	15	1	$400,000	$ 41,550
Upgrade Iris LS - Pumps	20	2	$80,000	$ 14,460
Replacement TOTAL				**$ 59,050**

7) CONCLUSIONS AND RECOMMENDATIONS

This study is intended to evaluate the function and needs of the wastewater collection system and prepare the system to provide reliable and adequate wastewater collection for current and future residents. This study was conducted at the request of DEQ and includes recommended alternatives for needs and rate analysis in funding these needs. This 2023 WW Collection System FPS is a complement to the 2022 WW Treatment FPS.

The main findings of this 2023 Wastewater Collection System FPS are that the Town of West Yellowstone currently operates the collection system with deficiencies in several locations. These deficiencies were addressed through identifying the needs associated with these deficiencies and alternatives. Alternative 1, the No Action alternative was not carried into life cycle or cost analysis due to it not meeting regulations nor operational functioning. Alternative 2 utilized existing infrastructure and optimizing operations, and Alternative 3 looked at increased levels of rehabilitation and replacements.

The recommendations of this report and the project as shown in the table below are based on significant, immediate needs; immediate needs over the 20-year planning period, from 2023-2043; and needs to monitor. These are represented visually by level of need (or phases) as red, yellow, and green, respectively. Significant immediate needs (level red) are recommended to be accomplished with Town sewer, infrastructure, and operation funds. Immediate needs for the 20-year planning period (level yellow) include purchase and use of a Town vac-flush truck. Monitoring existing current sewer mains in Alleys A and B and utilizing the vac-flush truck is recommended.

Table 30. Level of Need – Project Items.

Level Red - Significant Immediate Needs	
1	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)
2	Iris Lift Station: Replace Force Main Air Relief Valve
3	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)
4	Iris Lift Station: Replace Safety Grate
5	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes
Level Yellow - Immediate Needs for 20-YR Planning Period (2023-2043)	
6	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots
7	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco
8	Select Locations: Correct Protruding Service Lines
9	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12"
10A	Fix Bellies/Dips - Select Locations: Correct Structural Deficiencies - point repairs OR
10B	Fix Bellies/Dips - Buy Flush Truck and Vac Truck to Maintain Lines Sytem-Wide
11	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)
12	System-Wide: Replace Manhole Rings (no cost - use maintenance)
13	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line
Level Green - Monitor Needs	
14	Alley A and Alley B: slipline clay pipe installed backwards

As covered in Section 2.c.2.i of this study, the Town requests DEQ's approval for placement of shutoff valve on the 12" lines prior to the sand trap at the Iris Lift Station to shut off flow to

the sand trap and wet well to properly maintain the lift station (see item #5 above Table 30) as part of the project.

This wastewater facility planning study is a guide and planning document for aid in implementing project improvements and securing funding for the wastewater collection system. The estimate and schedule provided can be used by the Town and professionals in phasing needed elements for construction ahead of and as development and growth occur.

Much gratitude and appreciation is extended to the Town of West Yellowstone, the Public Works Department, Finance Department, Administration, and Town Council for their input, information provided, participation in meetings, follow up measures, and their commitment to the Town of West Yellowstone and its public works facilities. Appreciation is also extended to DEQ for providing publicly available tools for use in preparing this FPS for the Town of West Yellowstone and the opportunity for West Yellowstone to have this FPS prepared in conjunction with the 2022 Wastewater Treatment FPS.

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APPENDIX A – Intentionally Left Blank

APPENDIX B - Existing Environmental Conditions

UNIFORM ENVIRONMENTAL CHECKLIST

As the engineer that prepared the preliminary engineering report, I, NAME,
have reviewed the information presented in this checklist and believe that it accurately identifies the environmental resources in the area and the potential impacts that the project could have on those resources. In addition, the required state and federal agencies were provided with the required information about the project and requested to provide comments on the proposed public facility project. Their comments have been incorporated into and attached to the Preliminary Engineering Report.

Engineer's Signature:_____
Date:_____

Key Letter: N – No Impact **B –** Potentially Beneficial **A –** Potentially Adverse
P – Approval/Permits Required **M –** Mitigation Required

PHYSICAL ENVIRONMENT	
Key **N**	**1. Soil Suitability, Topographic and/or Geologic Constraints (e.g., soil slump, steep slopes, subsidence, seismic activity)** NRCS Web Soil Survey (WSS) reports the town lies within Typic Cryochrepts, obsidian sand substratum. The soil is well drained with depth to water table listed as more than 80 inches. The soil is listed as NRCS Hydrologic Soil Type A. With sanitary sewer lines to be replaced and subsurface construction anticipated, construction during non-winter months is preferred by the Town. The WSS lists frost-free period for the area 50 to 70 days. The 2014 USGS map for the area indicates the town is within a flatter area with gradient towards the west, north, and northwest. *Comments and Source of Information*: 2014 USGS topo map and NRCS Web Soil Survey (included with Appendix B).
Key **N**	**2. Hazardous Facilities (e.g., power lines, EPA hazardous waste sites, acceptable distance from explosive and flammable hazards including chemical/petrochemical storage tanks, underground fuel storage tanks, and related facilities such as natural gas storage facilities & propane storage tanks)** There are no known hazardous facilities near the proposed construction areas. Power lines and underground utilities, if applicable, will be located through MT One-Call during the design and construction phases. The Town prohibits dumping of toxic, hazardous, or radioactive waste in their collection system. The Town also does not accept toxic, hazardous, or radioactive waste at their septage receiving station. Therefore, we do not anticipate any toxic, hazardous, or radioactive substances with the project construction or implementation. *Comments and Source of Information*: Field Observations, Town Ordinances

Key	
N	**3. Effects of Project on Surrounding Air Quality or Any Kind of Effects of Existing Air Quality on Project (e.g., dust, odors, emissions)** With construction and rehabilitation of wastewater collection system facilities, odor control is of upmost importance. Upgrades and rehabilitation at the Iris Lift Station are within existing structures and retrofitting would occur on the site of the existing lift station. DEQ has requirements to control odor and the design will be optimized to ensure that construction is such that odors are kept to a minimum. The project proposes purchase of a flush truck and vac truck that would increase greenhouse gas emissions when in use, however these vehicles would be maintained to reduce the impacts and the greenhouse gas emissions would be on the scale of equipment contracted to do the work these trucks would be operated to do. The proposed project site is not classified as a "non-attainment" area for any criteria pollutants. Furthermore, the local topographical or meteorological conditions do not hinder the dispersal of air emissions. The construction activities will generate dust during the summer months. These effects can be mitigated with a spray truck when necessary. *Comments and Source of Information*: Field Observations, facility maps.
Key	
N	**4. Groundwater Resources & Aquifers (e.g., quantity, quality, distribution, depth to groundwater, sole source aquifers)** The static groundwater elevation is relatively shallow and on average is approximately 40 feet BGS. The wastewater collection lines are reported to be 8 feet to 15 feet BGS and no groundwater is anticipated to be encountered with the project. The project has potential to be beneficial to groundwater by replacing and sliplining pipe that presently has gaps, cracks, and broken side walls that could impact groundwater by introducing wastewater into the soil and potentially to groundwater. See Figure I 1 from the 2022 WW Treatment PER for static water surface information for the groundwater wells near the Iris Lift Station are included with this uniform environmental checklist. *Comments and Source of Information*: Montana DEQ, Town of West Yellowstone operations group, well draw down testing, Montana DEQ Discharge Permit, MBMG Data Center
Key	
N	**5. Surface Water/Water Quality, Quantity & Distribution (e.g., streams, lakes, storm runoff, irrigation systems, canals)** There are no surface water resources within the project area. An NPDES permit will likely not be required as construction will disturb less than one acre and no stormwater will discharge directly into surface waters. The area is not located within an area mapped by the EPA as sole source aquifer recharge area. Drainage patterns will remain consistent with the current condition and significant increases in stormwater discharges due to the proposed improvements will not occur. *Comments and Source of Information*: Town of West Yellowstone, Forsgren Associates
Key	
N	**6. Floodplains & Floodplain Management (Identify any floodplains within one mile of the boundary of the project.)** The proposed project is located in a Zone D flood zone. A Zone D is an unstudied zone where floodplains are unmapped. However, the project site does not lie within an area, nor does it have typical vegetative characteristics that would indicate that it was in a floodplain. *Comments and Source of Information*: Montana DNRC Floodplain Section, Montana DEQ Circular 2

Key	
N	**7. Wetlands Protection (Identify any wetlands within one mile of the boundary of the project.)** The existing lagoons at the current WWTP are identified as Freshwater Ponds per the National Wetlands Inventory. Inasmuch as we are aware, no on-site wetland/waters delineation has been made for the site. The mechanical wastewater treatment plant in bid process at the time of this study will abandon the lagoon Cells A and B (PUSKx area) but will still utilize Cell C (PABKx area). No mitigation plan has been outlined at this time. *Comments and Source of Information*: US Fish & Wildlife Service, US Army Corps of Engineers.

Key	
N	**8. Agricultural Lands, Production, & Farmland Protection (e.g., grazing, forestry, cropland, prime or unique agricultural lands) (Identify any prime or important farm ground or forest lands within one mile of the boundary of the project.)** The current land use for the project area is the Town of West Yellowstone, streets and alleys, and town-owned locations of the Iris Lift Station and Madison Lift Station. Adjacent property includes Forest land and Yellowstone National Park. There are no adjacent agriculture land parcels designated as "prime/unique agriculture lands" by the U.S. Department of Agriculture (USDA) under the Federal Farmlands Protection Act or a local equivalent. *Comments and Source of Information*: Town of West Yellowstone Land Use Maps
Key **N**	**9. Vegetation & Wildlife Species & Habitats, Including Fish (e.g., terrestrial, avian and aquatic life and habitats)** native vegetation consists of mainly pine and spruce trees. Wildlife found in the project area or its immediate vicinity include grizzly bear, black bear, moose, elk, deer, wolves, coyotes, migratory birds, bald eagles, and several other native wildlife. Note that the project area and location of the wastewater collection system have already been previously disturbed with the development of the town and current, existing buried wastewater piping and facilities. The proposed improvements will require minimal, if any, vegetation removal. The proposed project only includes construction on existing Town-owned land already utilized for wastewater collection facilities. *Comments and Source of Information*: Town Records and Maps, Montana FWP, Montana Natural Heritage Program
Key **N**	**10. Unique, Endangered, Fragile, or Limited Environmental Resources, Including Endangered Species (e.g., plants, fish, sage grouse, or other wildlife)** Note that the project area and location of the wastewater collection system have already been previously disturbed with the development of the town and current, existing buried wastewater piping and facilities. During construction, equipment, machinery, and construction workers may temporarily cause noise disturbance; however, once construction is complete, no permanent disruptions or modifications are anticipated. Therefore, the impacts to endangered species will be minimal. *Comments and Source of Information*: Montana Natural Heritage Program, Montana FWP, US Fish & Wildlife Service
Key **N**	**11. Unique Natural Features (e.g., geologic features)** None known or thought to be present. *Comments and Source of Information*: Physical site survey

Key	
N	**12. Access to, and Quality of, Recreational & Wilderness Activities, Public Lands and Waterways (including Federally Designated Wild & Scenic Rivers), and Public Open Space** No impacts to access for recreational and/or wilderness activities will occur as a result of this project. *Comments and Source of Information*: Forsgren Associates
HUMAN POPULATION	
Key	**1. Visual Quality – Coherence, Diversity, Compatibility of Use and Scale, Aesthetics**
N	The proposed project is primarily below ground surface within the existing collection system, and upgrades, rehabilitation, and retrofitting will be done within existing facilities or adjacent to them. *Comments and Source of Information*: Forsgren Associates
Key	**2. Nuisances (e.g., glare, fumes)**
N	The project will not create any nuisance conditions *Comments and Source of Information*: Forsgren Associates
Key	**3. Noise -- suitable separation between noise sensitive activities (such as residential areas) and major noise sources (aircraft, highways & railroads)**
N	There have been no complaints from residents about the noise level from lift stations or collection system components. Noise will increase during construction of the project. *Comments and Source of Information*: Forsgren Associates
Key	**4. Historic Properties, Cultural, and Archaeological Resources**
N	To our knowledge, there are no known historic/archeological resources within the project site. The project is within previously disturbed areas. The forest land to the west of Iris Street that is part of the 80 acres and now owned by the Town is undisturbed, and historic, cultural, and archaeological resources are unknown. Construction of a new pipe on the west side of Iris Street would be the closest construction and implementation of the project to the undisturbed forest land to the west. The piping is planned to be placed in the existing right of way of Iris Street within previously disturbed areas. Therefore, it is assumed that the determination will be that no historical properties/cultural resources are present. *Comments and Source of Information*: Montana State Historic Preservation Office, Forsgren Associates
Key	**5. Changes in Demographic (population) Characteristics (e.g., quantity, distribution, density)**
B	Implementation of the project will provide the wastewater collection system capacity needed by the community to grow as development and growth occurs in the community, as evaluated for the planning period. *Comments and Source of Information*: Forsgren Associates

Key **N**	**6. Environmental Justice – (Does the project avoid placing lower income households in areas where environmental degradation has occurred, such as adjacent to brownfield sites?)** The proposed project will not result in disproportionate adverse human health or environmental impacts relative to minority and low-income populations. The system will provide equal service to all residential and commercial connections, regardless of minority status and/or income. The project will comply with Executive Order 12898. *Comments and Source of Information*: Montana Department of Commerce, Forsgren Associates
Key **N**	**7. General Housing Conditions - Quality, Quantity, Affordability** The proposed wastewater collection system improvements will provide enough capacity to support the future growth and development of the community, providing more economic opportunity and livability for local residents. *Comments and Source of Information*: Forsgren Associates
Key **N**	**8. Displacement or Relocation of Businesses or Residents** The proposed wastewater collection system improvements will be within existing rights-of-way and easements, therefore no businesses or residences will be relocated as a result of this project. *Comments and Source of Information*: Forsgren Associates
Key **B**	**9. Public Health and Safety** Implementation of this project will correct cracks, gaps, and offsets in the existing pipe that may be allowing wastewater to seep into the soil and allow potential navigation of wastewater to groundwater and water systems. Correction of bellies/dips in the pipe will improve public health by removing dips in the piping than may cause backups in the collection system and into homes and structures. This project will also implement improvements and upgrades at the Iris Lift Station to aid in serviceability and safe maintenance with safety grates permanently installed over the wet well and valving before the wet well for bypass pumping to allow proper and critical maintenance of the lift station. *Comments and Source of Information*: Forsgren Associates
Key **N**	**10. Lead Based Paint and/or Asbestos** No lead-based paint and/or asbestos is anticipated to be present in the wastewater collection system facilities. Retrofitting at the Iris Lift Station will be done on the system that was installed in 2010-2012, which was beyond the historic use of these materials in construction. *Comments and Source of Information*: Forsgren Associates
Key **N**	**11. Local Employment & Income Patterns - Quantity and Distribution of Employment, Economic Impact** The construction phase will provide a positive economic impact due to construction jobs and the presence of additional construction crews in Town during the construction phase. Longer-term, the capacity of the wastewater collection system will allow for economic development within the Town. *Comments and Source of Information:* Forsgren Associates

Key	
B	**12. Local & State Tax Base & Revenues** Construction employment will increase the state tax base for the duration of the construction period. Any construction work provided by local residents on the project will increase the local tax base. *Comments and Source of Information*: Forsgren Associates
N	**13. Educational Facilities - Schools, Colleges, Universities** No impacts expected. *Comments and Source of Information*: Forsgren Associates
B	**14. Commercial and Industrial Facilities - Production & Activity, Growth or Decline** The proposed wastewater collection system improvements will allow growth for any commercial or industrial facilities. *Comments and Source of Information*: Forsgren Associates

Key	
N	**15. Health Care – Medical Services** No impacts expected. *Comments and Source of Information*: Forsgren Associates
N	**16. Social Services – Governmental Services (e.g., demand on)** No impacts expected. *Comments and Source of Information*: Forsgren Associates
N	**17. Social Structures & Mores (Standards of Social Conduct/Social Conventions)** No impacts expected. *Comments and Source of Information*: Forsgren Associates
N	**18. Land Use Compatibility (e.g., growth, land use change, development activity, adjacent land uses and potential conflicts)** No impacts. The proposed project improves the wastewater collection system and upgrades for pumps and retrofitting at the Iris Lift Station will coincide with development in the 80-acres. No land use change is a result of the proposed project. *Comments and Source of Information*: Forsgren Associates
N	**19. Energy Resources - Consumption and Conservation** The proposed project may result in higher electricity usage at the Iris Lift Station with higher capacity pumps and replacement of the wet well vent fan. Energy efficient models would be evaluated in design and implemented accordingly. *Comments and Source of Information*: Forsgren Associates

Key	
N	**20. Solid Waste Management** Solid waste generation from the project is anticipated to increase slightly with the Town owning their own vac truck and being responsible to dispose of the solids from use of the vac truck. These solids would be disposed of properly. *Comments and Source of Information*: Forsgren Associates
Key **N**	**21. Wastewater Treatment - Sewage System** The WWTP is currently in the bidding process and the proposed wastewater collection system project will continue to function in properly delivering wastewater to the WWTP for treatment and discharge. *Comments and Source of Information*: Forsgren Associates
Key **N**	**22. Storm Water – Surface Drainage** A storm water pollution prevention permit (SWPPP) will likely not be required as construction will disturb less than one acre and no stormwater will discharge directly into surface waters. *Comments and Source of Information*: Forsgren Associates
Key **N**	**23. Community Water Supply** The project will be implemented in existing utility corridors along current sanitary sewer line configurations. The additional wastewater collection line on Iris Street will be constructed in accordance with DEQ's requirements for distance from community water supply wells. *Comments and Source of Information*: Forsgren Associates
Key **N**	**24. Public Safety – Police** No impacts anticipated *Comments and Source of Information*: Forsgren Associates
Key **N**	**25. Fire Protection – Hazards** No impacts anticipated *Comments and Source of Information*: Forsgren Associates

Key	
N	**26. Emergency Medical Services** No impacts anticipated *Comments and Source of Information*: Forsgren Associates

Key **N**	**27. Parks, Playgrounds, & Open Space** No impacts anticipated *Comments and Source of Information*: Forsgren Associates
Key **N**	**28. Cultural Facilities, Cultural Uniqueness & Diversity** No impacts anticipated *Comments and Source of Information*: Montana Natural Heritage Program, Forsgren Associates
Key **N**	**29. Transportation Networks and Traffic Flow Conflicts (e.g., rail; auto including local traffic; airport runway clear zones - avoidance of incompatible land use in airport runway clear zones)** The proposed wastewater collection system improvements are primarily within roadway and alley corridors where the sewer pipes are below ground surface 8'-15'. Replacement of pipe material and sliplining is anticipated to impact the flow of traffic in localized spots. Work within Alleys A,B,C,& D is anticipated to be less disruptive than on other roadway locations due to their discreet locations and gravel surfacing which are typically not traveled as transportation corridors. A traffic control plan will be required during the construction of the project in accordance with state and local regulations. Work at the Iris Lift Station is anticipated to require some traffic control due to its proximity to Iris Street. Construction of the project may cause some delays in local and tourist traffic. No existing capacities of these transportation facilities will be exceeded as a direct or indirect result of this project implementation, particularly in terms of car and truck traffic. The Level of Service currently designated will remain the same. *Comments and Source of Information*: Forsgren Associates
Key **N**	**30. Consistency with Local Ordinances, Resolutions, or Plans (e.g., conformance with local comprehensive plans, zoning, or capital improvement plans)** The proposed wastewater collection system improvements are in in accordance with 2022-2027 Capital Improvement Plan and Resolution no. 734 which allows the Town to use 1% of the Revenue Tax for this project. *Comments and Source of Information*: Forsgren Associates, Town of West Yellowstone Council and employees
Key **N**	**31. Is There a Regulatory Action on Private Property Rights as a Result of this Project? (consider options that reduce, minimize, or eliminate the regulation of private property rights.)** No impacts anticipated. *Comments and Source of Information*: Forsgren Associates

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
US Topo

WEST YELLOWSTONE QUADRANGLE
MONTANA-WYOMING
7.5-MINUTE SERIES

Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid: Universal Transverse Mercator, Zone 12T
10 000-foot ticks: Montana Coordinate System of 1983, Wyoming Coordinate System of 1983 (west central and west zones)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery....NAIP, September 2011
Roads.... HERE, ©2013
Roads within US Forest Service Lands....FSTopo Data with limited Forest Service updates, 2013
Names....GNIS, 2013
Hydrography....National Hydrography Dataset, 2011
Contours....National Elevation Dataset, 1999
Boundaries....Multiple sources; see metadata file 1972 - 2013
Public Land Survey System....BLM, 2011

MN
GN
12° 7´ 215 MILS
0° 3´ 1 MILS
UTM GRID AND 2014 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID VQ
Grid Zone Designation 12T

SCALE 1:24 000

KILOMETERS 1 0.5 0 1 2
METERS 1000 500 0 1000 2000
MILES 1 0.5 0 1
FEET 1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.16

MONTANA
QUADRANGLE LOCATION

1 Mount Hebgen
2 Richards Creek
3 Three Rivers Peak
4 Madison Arm
5 Mount Jackson
6 Reas Pass
7 Jack Straw Basin
8 Buffalo Meadows

ADJOINING QUADRANGLES

ROAD CLASSIFICATION

Expressway | Local Connector
Secondary Hwy | Local Road
Ramp | 4WD
Interstate Route | US Route | State Route
FS Primary Route | FS Passenger Route | FS High Clearance Route

Check with local Forest Service unit for current travel conditions and restrictions.

WEST YELLOWSTONE, MT-WY
2014

NSN. 7643016378360
NGA REF NO. USGSX24K48367

United States Department of Agriculture

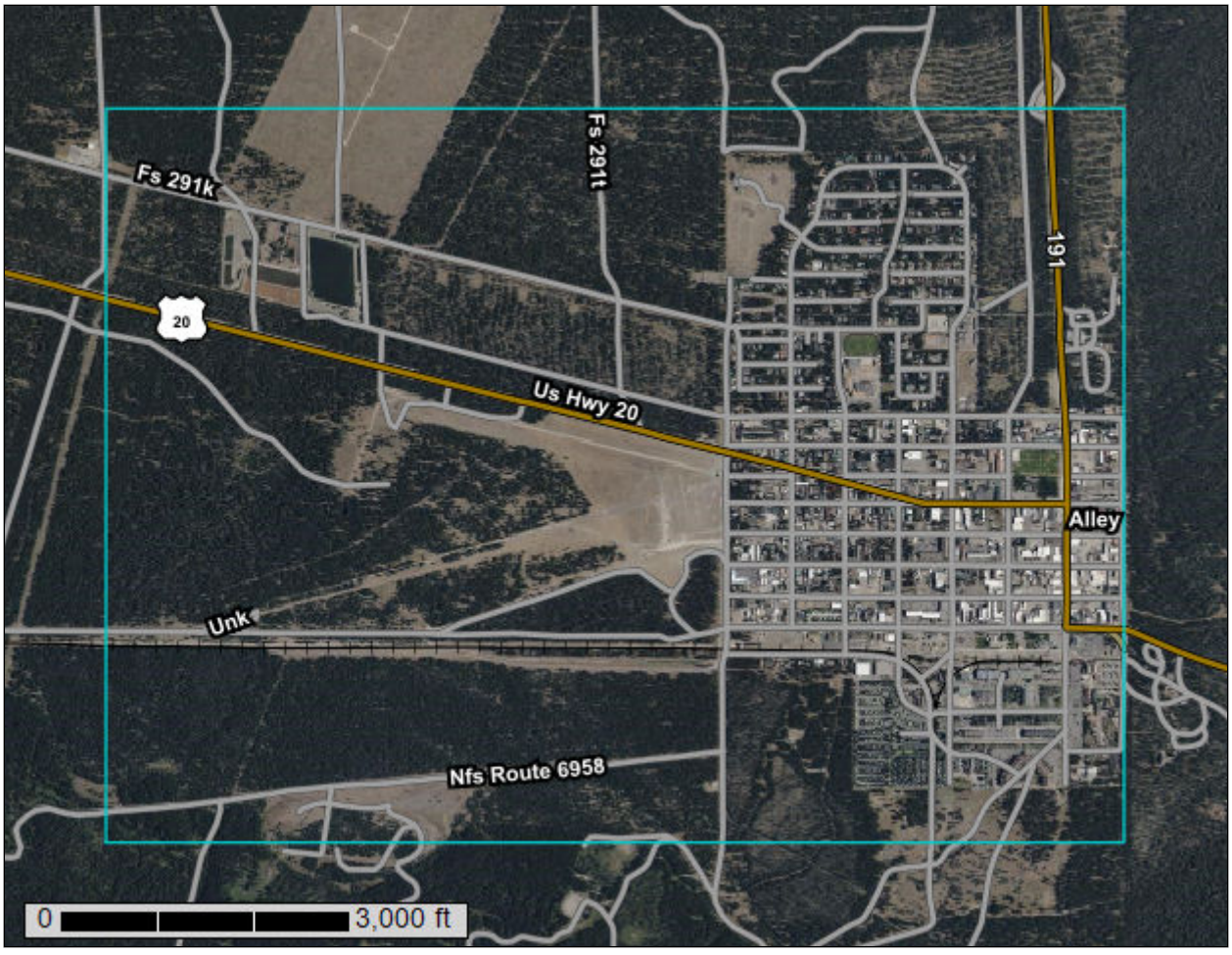
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Gallatin National Forest Area, Montana

Town of West Yellowstone



September 7, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

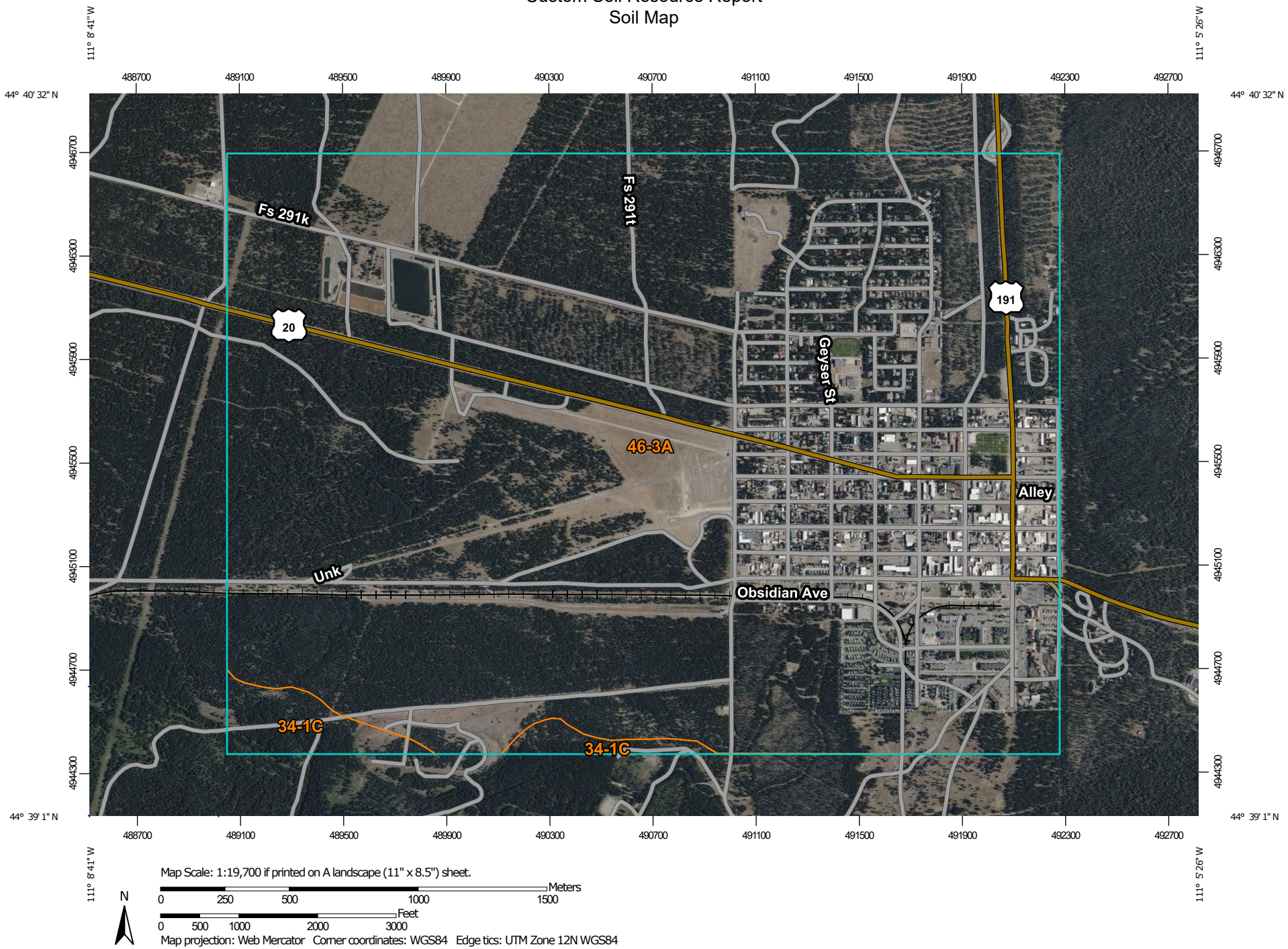
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Gallatin National Forest Area, Montana
Survey Area Data: Version 12, Aug 30, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 22, 2022—Aug 8, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
34-1C	Typic Cryochrepts, glacial drift substratum	49.3	2.6%
46-3A	Typic Cryochrepts, obsidian sand substratum	1,810.8	97.4%
Totals for Area of Interest		**1,860.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Gallatin National Forest Area, Montana

34-1C—Typic Cryochrepts, glacial drift substratum

Map Unit Setting

National map unit symbol: 58jt
Elevation: 6,700 to 7,900 feet
Mean annual precipitation: 50 to 60 inches
Mean annual air temperature: 36 to 39 degrees F
Frost-free period: 30 to 70 days
Farmland classification: Not prime farmland

Map Unit Composition

Typic cryochrepts and similar soils: 75 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Typic Cryochrepts

Setting

Landform: Moraines
Parent material: Glacial drift derived from granite

Properties and qualities

Slope: 5 to 20 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F043BP909MT - Upland Cold Woodland Group
Other vegetative classification: subalpine fir/grouse whortleberry (PK730)
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 10 percent
Other vegetative classification: subalpine fir/grouse whortleberry (PK730)

46-3A—Typic Cryochrepts, obsidian sand substratum

Map Unit Setting

National map unit symbol: 58kc
Elevation: 6,600 to 7,000 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 37 to 43 degrees F
Frost-free period: 50 to 70 days
Farmland classification: Not prime farmland

Map Unit Composition

Typic cryochrepts and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Typic Cryochrepts

Setting

Landform: Outwash plains

Typical profile

H1 - 0 to 5 inches: coarse sandy loam

Properties and qualities

Slope: 0 to 10 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 0.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F043BP610ID - Upland Cool Woodland Group, F043BP910MT - Upland Cool Woodland Group
Other vegetative classification: lodgepole pine/bitterbrush (PK910)

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IPaC **U.S. Fish & Wildlife Service**

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Gallatin County, Montana

Local office

Montana Ecological Services Field Office

(406) 449-5225

(406) 449-5339

585 Shephard Way, Suite 1
Helena, MT 59601-6287

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an

office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Canada Lynx Lynx canadensis There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3652	Threatened
Grizzly Bear Ursus arctos horribilis There is **proposed** critical habitat for this species. https://ecos.fws.gov/ecp/species/7642	Threatened
North American Wolverine Gulo gulo luscus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5123	Proposed Threatened

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate

Conifers and Cycads

NAME	STATUS
Whitebark Pine Pinus albicaulis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1748	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the

endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Any person or organization who plans or conducts activities that may result in impacts to bald or golden eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

Additional information can be found using the following links:

- Eagle Managment https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

There are bald and/or golden eagles in your project area.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list,click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Jan 1 to Aug 31

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds

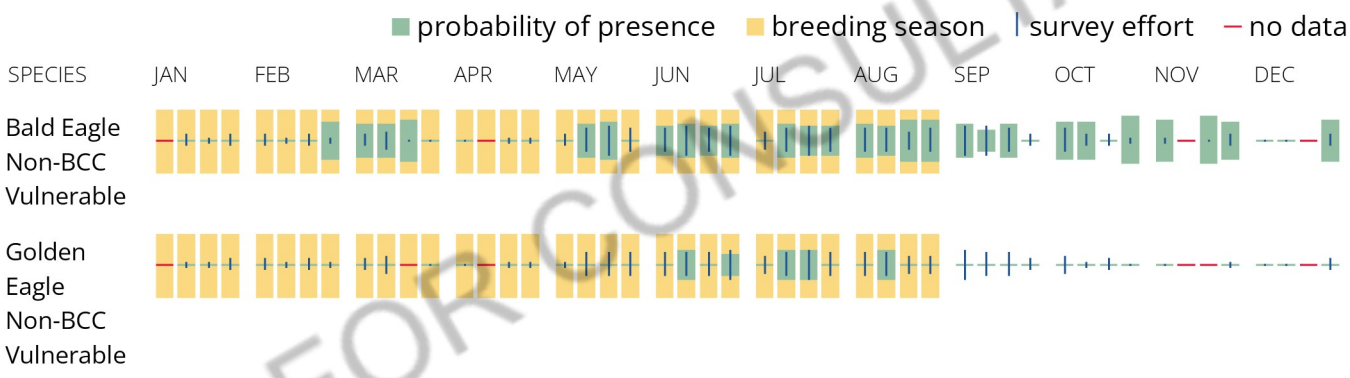
across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply). To see a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs of bald and golden eagles in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid

cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur. Please contact your local Fish and Wildlife Service Field Office if you have questions.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast

birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Jan 1 to Aug 31
Black Tern *Chlidonias niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
California Gull *Larus californicus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 1 to Jul 31
Cassin's Finch *Carpodacus cassinii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9462	Breeds May 15 to Jul 15
Evening Grosbeak *Coccothraustes vespertinus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Franklin's Gull *Leucophaeus pipixcan* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Golden Eagle *Aquila chrysaetos* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds Jan 1 to Aug 31

Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Olive-sided Flycatcher Contopus cooperi This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3914	Breeds May 20 to Aug 31
Pinyon Jay Gymnorhinus cyanocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9420	Breeds Feb 15 to Jul 15
Rufous Hummingbird selasphorus rufus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8002	Breeds Apr 15 to Jul 15
Western Grebe aechmophorus occidentalis This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/6743	Breeds Jun 1 to Aug 31
Willet Tringa semipalmata This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 5

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence

score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

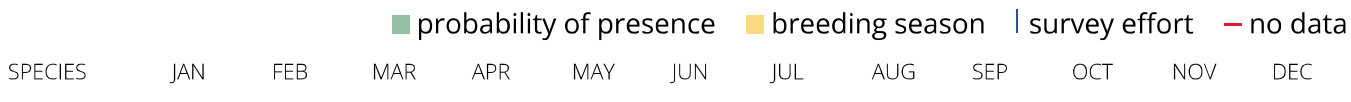
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

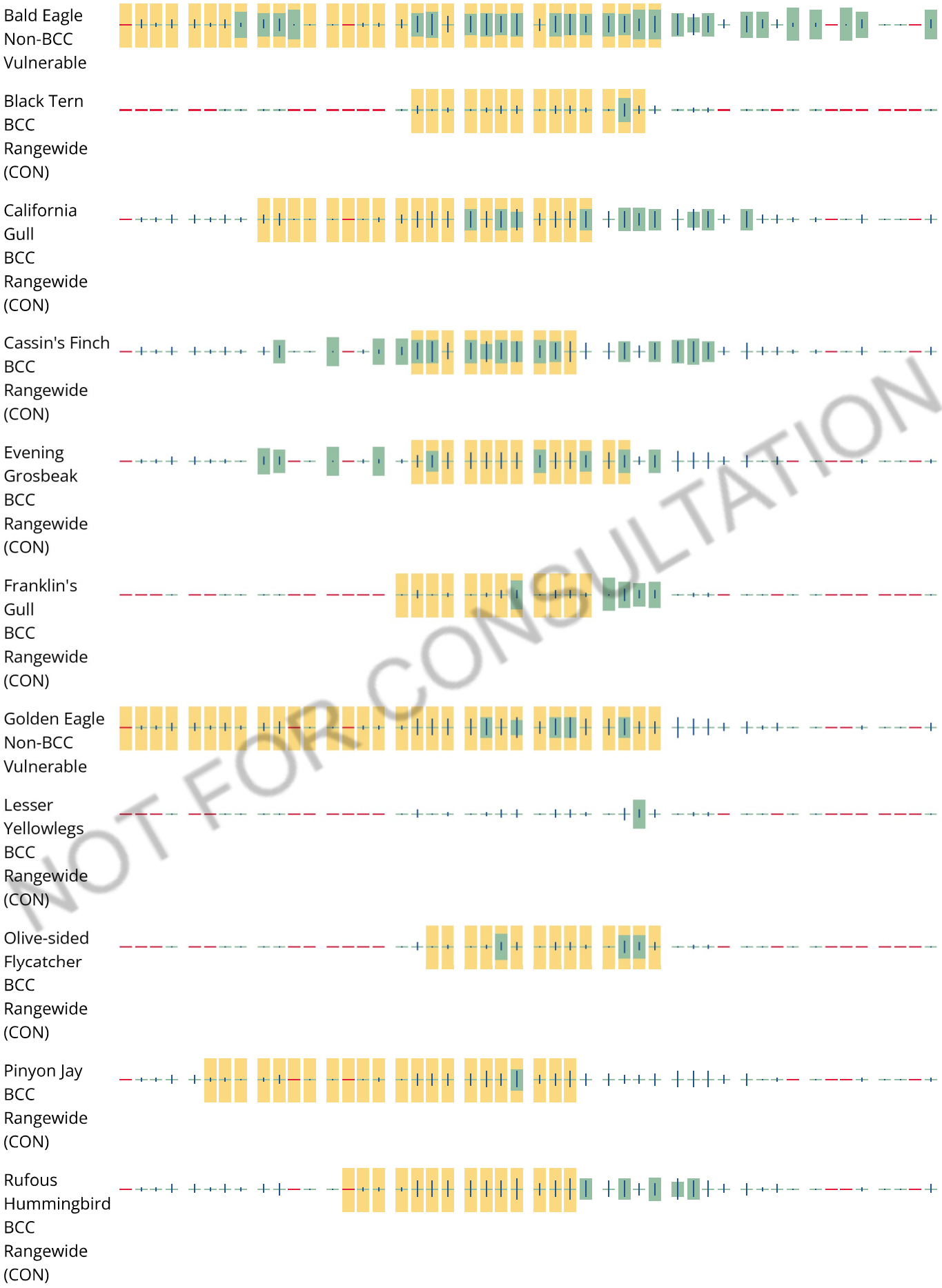
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

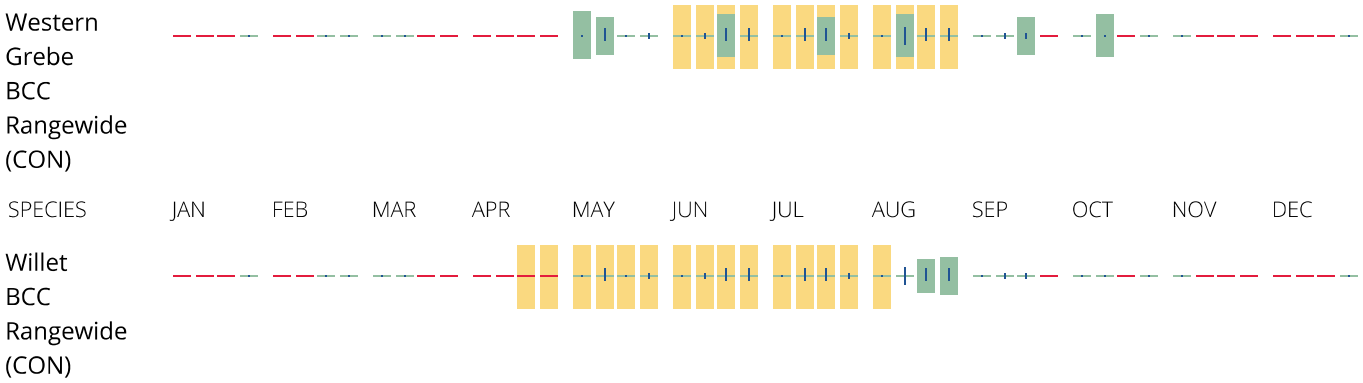
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.







Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these

graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

Wildlife refuges and fish hatcheries

Refuge and fish hatchery information is not available at this time

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI

map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

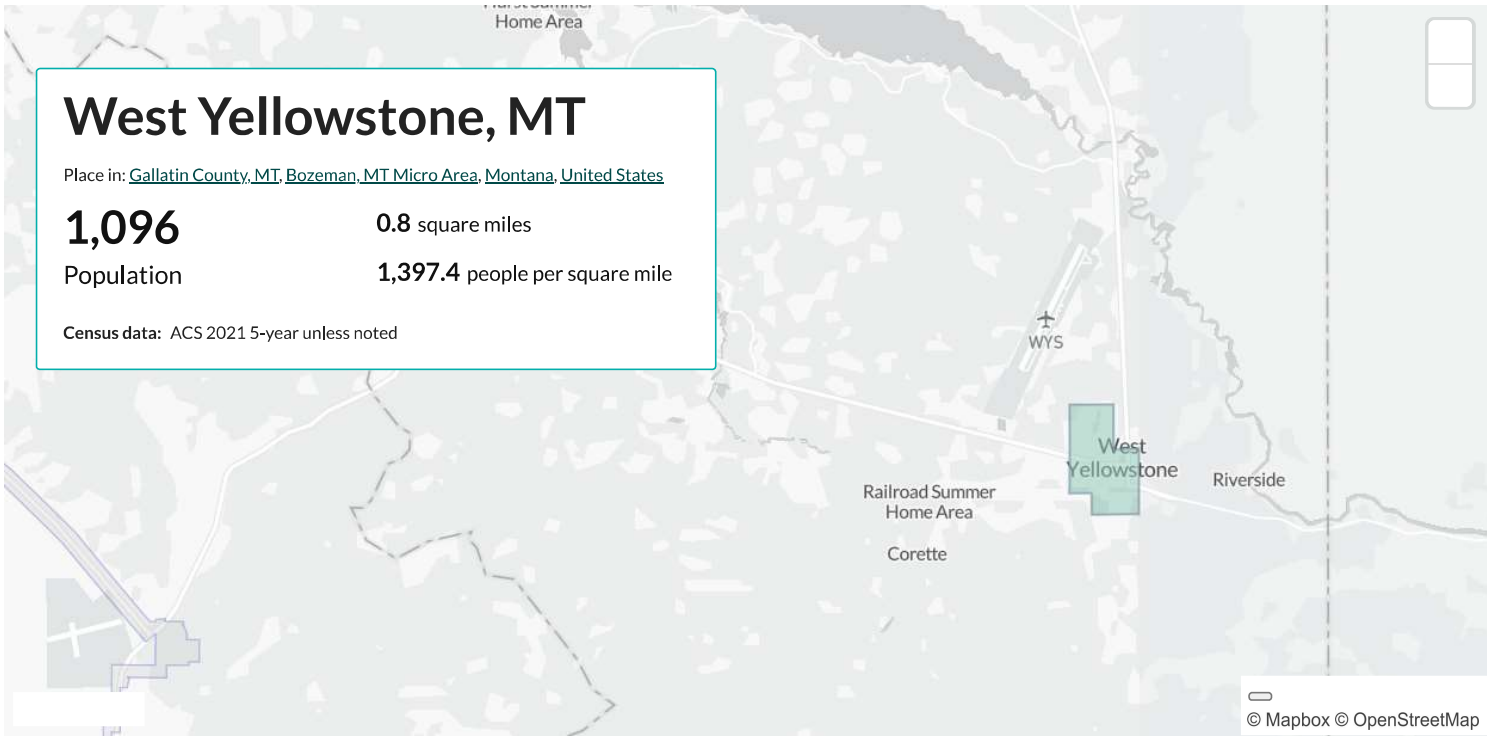
Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

APPENDIX C - Population



West Yellowstone, MT

Place in: Gallatin County, MT, Bozeman, MT Micro Area, Montana, United States

1,096
Population

0.8 square miles

1,397.4 people per square mile

Census data: ACS 2021 5-year unless noted

Find data for this place Search by table or column name...

Hover for margins of error and contextual data.

Demographics

† Margin of error is at least 10 percent of the total value. Take care with this statistic.

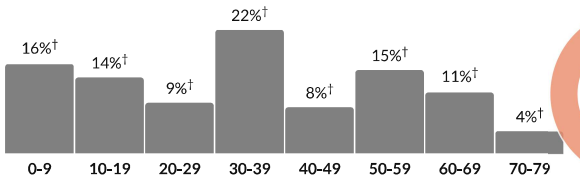
Age

34.8
Median age

a little higher than the figure in the Bozeman, MT Micro Area: 33.7

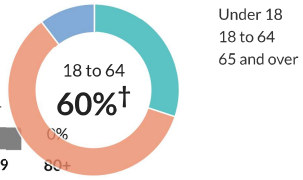
about 90 percent of the figure in Montana: 40

Population by age range



Show data / Embed

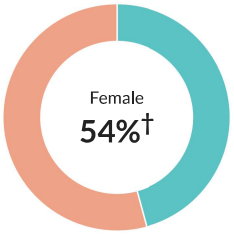
Population by age category



Show data / Embed

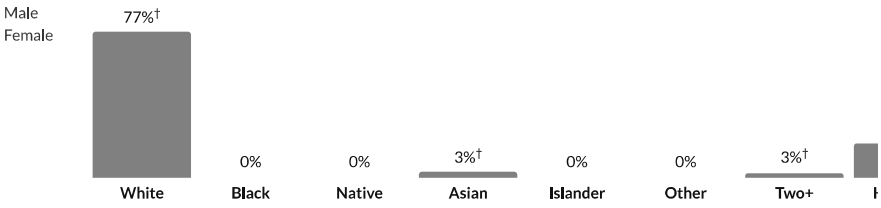
† Margin of error is at least 10 percent of the total value. Take care with this statistic.

Sex



Show data / Embed

Race & Ethnicity



* Hispanic includes respondents of any race. Other categories are non-Hispanic.

Show data / Embed

Economics

† Margin of error is at least 10 percent of the total

Income

$30,910

$55,403

Household income

value. Take care with this statistic.

Per capita income

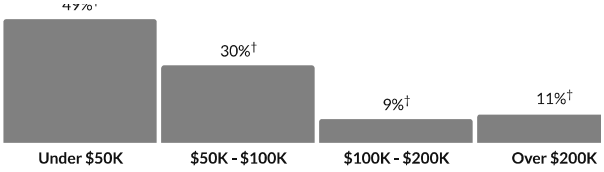
about three-quarters of the amount in the Bozeman, MT Micro Area: $42,219

about 90 percent of the amount in Montana: $34,423

Median household income

about three-quarters of the amount in the Bozeman, MT Micro Area: $76,208

about 90 percent of the amount in Montana: $60,560



Show data / Embed

† Margin of error is at least 10 percent of the total value. Take care with this statistic.

Poverty

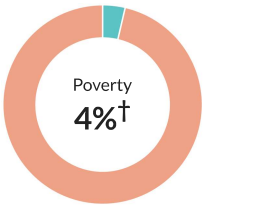
12.6%

Persons below poverty line

about 20 percent higher than the rate in the Bozeman, MT Micro Area: 10.4% †

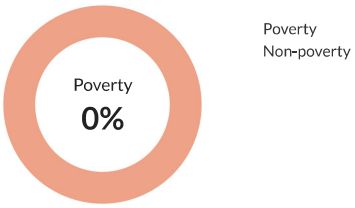
about the same as the rate in Montana: 12.5%

Children (Under 18)



Show data / Embed

Seniors (65 and over)



Show data / Embed

† Margin of error is at least 10 percent of the total value. Take care with this statistic.

Transportation to work

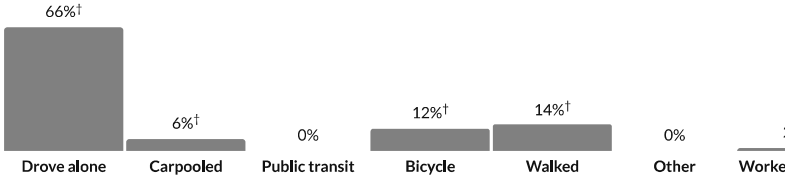
6.7 minutes

Mean travel time to work

about two-fifths of the figure in the Bozeman, MT Micro Area: 18.3

about one-third of the figure in Montana: 18.6

Means of transportation to work



* Universe: Workers 16 years and over

Show data / Embed

Families

† Margin of error is at least 10 percent of the total value. Take care with this statistic.

Households

420

Number of households

the Bozeman, MT Micro Area: 46,378

Montana: 436,481

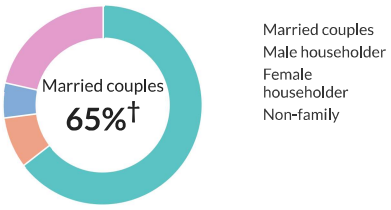
2.4

Persons per household

about the same as the figure in the Bozeman, MT Micro Area: 2.4

about the same as the figure in Montana: 2.4

Population by household type



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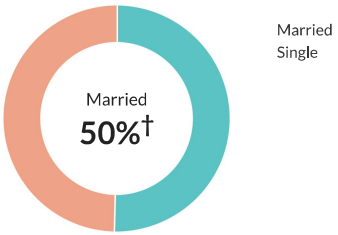
† Margin of error is at least 10 percent of the total value. Take care with this statistic.

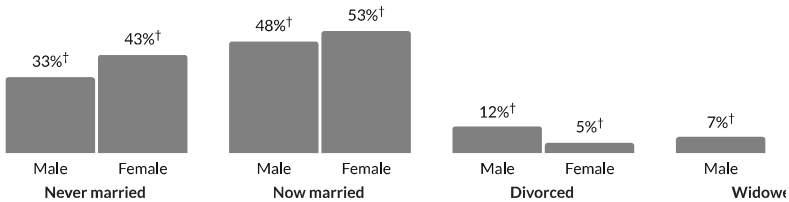
Marital status



* Universe: Population 15 years and over

Show data / Embed

Marital status, by sex



Show data / Embed

† Margin of error is at least 10 percent of the total value. Take care with this statistic.

Fertility

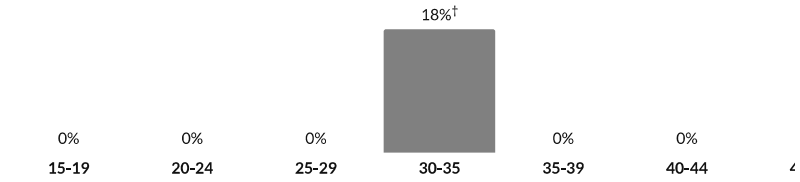
5.7%

Women 15-50 who gave birth during past year

about 1.5 times the rate in the Bozeman, MT Micro Area: 3.7% †

about 10 percent higher than the rate in Montana: 5.3%

Women who gave birth during past year, by age group



* Universe: Women 15 to 50 years

Show data / Embed

Housing

† Margin of error is at least 10 percent of the total value. Take care with this statistic.

Units & Occupancy

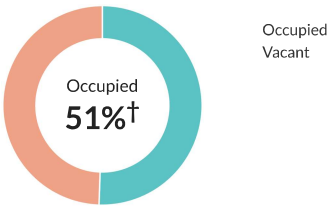
831

Number of housing units

the Bozeman, MT Micro Area: 51,826

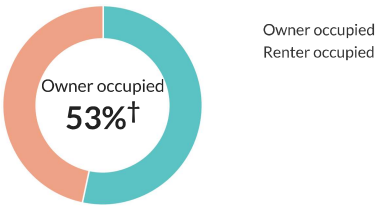
Montana: 512,553

Occupied vs. Vacant



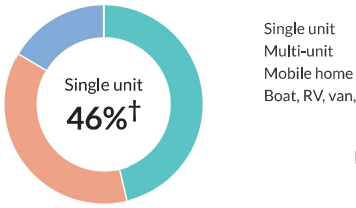
Show data / Embed

Ownership of occupied units



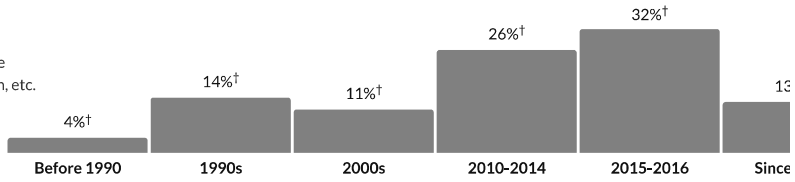
Show data / Embed

Types of structure



Show data / Embed

Year moved in, by percentage of population



Show data / Embed

† Margin of error is at least 10 percent of the total value. Take care with this statistic.

Value

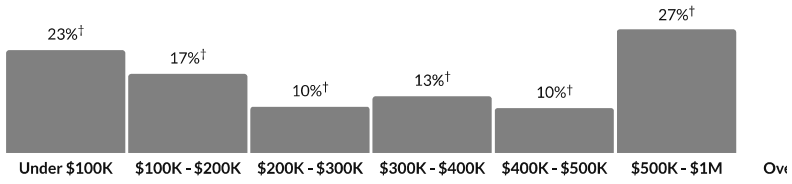
$297,800

Median value of owner-occupied housing units

about two-thirds of the amount in the Bozeman, MT Micro Area: $435,400

about 10 percent higher than the amount in Montana: $263,700

Value of owner-occupied housing units



Show data / Embed

† Margin of error is at least 10 percent of the total value. Take care with this statistic.

Geographical mobility

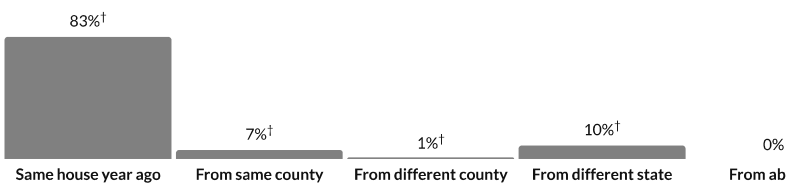
17.1%

Moved since previous year

about 80 percent of the rate in the Bozeman, MT Micro Area: 20.3%

about 10 percent higher than the rate in Montana: 15.1%

Population migration since previous year



Show data / Embed

Social

† Margin of error is at least 10 percent of the total value. Take care with this statistic.

Educational attainment

93.6%
High school grad or higher

a little less than the rate in the Bozeman, MT Micro Area: 97.5%

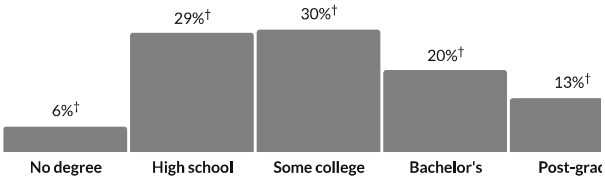
about the same as the rate in Montana: 94.4%

33.7%
Bachelor's degree or higher

about two-thirds of the rate in the Bozeman, MT Micro Area: 52.2%

about the same as the rate in Montana: 33.7%

Population by highest level of education



* Universe: Population 25 years and over

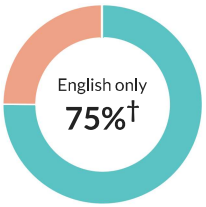
Show data / Embed

Language

† Margin of error is at least 10 percent of the total value. Take care with this statistic.

N/A
Persons with language other than English spoken at home

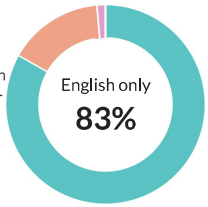
Language at home, children 5-17



English only
Spanish
Indo-European
Asian/Islander
Other

Show data / Embed

Language at home, adults 18+



English only
Spanish
Indo-European
Asian/Islander
Other

Show data / Embed

Place of birth

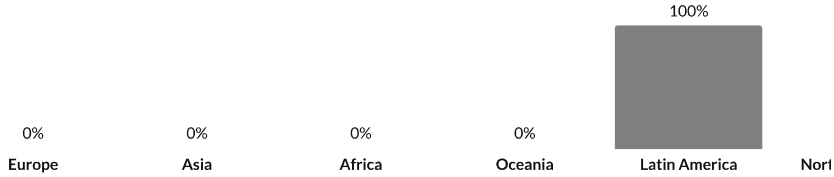
† Margin of error is at least 10 percent of the total value. Take care with this statistic.

10.3%
Foreign-born population

more than double the rate in the Bozeman, MT Micro Area: 3.5% †

more than double the rate in Montana: 2.2%

Place of birth for foreign-born population



Show data / Embed

Veteran status

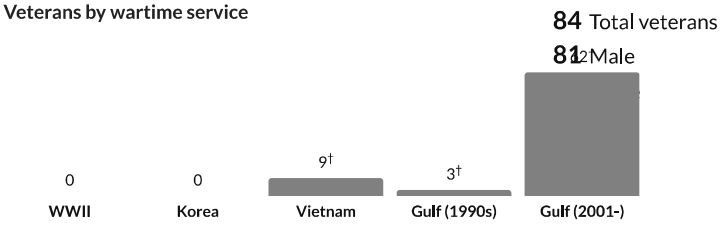
† Margin of error is at least 10 percent of the total value. Take care with this statistic.

11.1%
Population with veteran status

more than 1.5 times the rate in the Bozeman, MT Micro Area: 6.3%

about 10 percent higher than the rate in Montana: 10%

Veterans by wartime service



* Civilian veterans who served during wartime only

Show data / Embed

Hover for margins of error and contextual data.

Citation: U.S. Census Bureau (2021). *American Community Survey 5-year estimates.* Retrieved from *Census Reporter Profile page for West Yellowstone, MT* <http://censusreporter.org/profiles/16000US3079525-west-yellowstone-mt/>

Camille Miller

From: McDunn, John <JMcDunn@mt.gov>
Sent: Wednesday, March 16, 2022 11:36 AM
To: Camille Miller
Cc: Abrahamson, Michael; Dave Noel; Robert Cromwell; Smith, Mark; Miller, Anna; Dan Walker
Subject: RE: West Yellowstone WWTP

EXTERNAL MESSAGE

Camille
As I state before the evaporators were installed so that they could meet summertime flows: I say again it was not installed to allow more hookups! So to be blunt the town should not allow anymore connections at all until the treatment plant has been completed and is up and running. If the town is violating their discharge permit, they need to get ahold of the Water Protection Bureau-Jon Kenning is the Bureau Chief ASAP. I understand that you have not obtained any $ from the funding agencies. Because of the unfunded $ it is my opinion that a 2024 schedule is unrealistic. It has also come to my attention that the cost of the plant has tripled in the past year and is now estimated at $32 million. This $ amount for a system of the size required to treat the flows is extremely high. It has come to my attention that the town of West Yellowstone has not been following the procurement laws of Montana-this is a HUGE issue going forward with this project and must be addressed immediately so that the project can move forward. It was also told to me that that the town is planning on a sole source for the treatment plant; this will not allow the Town accesses to any of the funding agency $ and is against the procurement laws of Montana.
John

From: Camille Miller <cmiller@forsgren.com>
Sent: Tuesday, March 15, 2022 1:53 PM
To: McDunn, John <JMcDunn@mt.gov>
Cc: Abrahamson, Michael <MAbrahamson@mt.gov>; Dave Noel <dnoel@forsgren.com>; Robert Cromwell <rcromwell@forsgren.com>; Smith, Mark <marks@mt.gov>; Miller, Anna <annam@mt.gov>; Dan Walker <dwalker@townofwestyellowstone.com>
Subject: [EXTERNAL] RE: West Yellowstone WWTP

John,

Thank you for the response and advice, we have been coordinating with Mike and Anna Miller on this project and are close to completing the Uniform Application. The other intent of the email was to request technical guidance from DEQ regarding the possibility of additional connections to the sewer facilities. In the existing discharge permit (MTX000244) , Table 1 lists 439,000 gpd Average Day Design Flow and 650,000 gpd Maximum Day Flow. In 2021 the Average Day Design Flow was 635,000 gpd with a Maximum Day Flow of 875,000 gpd. In the Engineering Report, it was shown that the Mechanical Evaporators would reduce the inflow to the IP Cells by 140,000 gpd. Since then, the Town has allowed new connections that have consumed the majority of the mechanical evaporation capacity. It is assumed that the remaining capacity will be obligated by the end of the first quarter of 2022, resulting in a design average effluent discharge to the IP cells of approx. 638,000 gpd and maximum day discharge of approx. 879,000 gpd.

Please provide guidance regarding if the Town should limit the amount of new connections based on the flow listed in the discharge Permit and the approved Short Term upgrades implementation until the new WWTP is constructed, which is scheduled for completion in the Fall of 2024.

Thank you,
Camille

Camille Miller, P.E.
Project Engineer
1137 Summers Dr., [goo.gl]
Rexburg, ID 83440 [goo.gl]
208.356.9201 / 208.351.1510 Cell
208.356.0206 Fax
FORSGREN Associates Inc.[forsgren.com]

From: McDunn, John <JMcDunn@mt.gov>
Sent: Friday, March 11, 2022 2:57 PM
To: Camille Miller <cmiller@forsgren.com>
Cc: Abrahamson, Michael <MAbrahamson@mt.gov>; Dave Noel <dnoel@forsgren.com>; Robert Cromwell <rcromwell@forsgren.com>; Smith, Mark <marks@mt.gov>; Miller, Anna <annam@mt.gov>
Subject: RE: West Yellowstone WWTP

EXTERNAL MESSAGE

Camille
I see that you have cc Mike Abrahamson on this project. He is your best contact. Also, I do not remember that those temp upgrades were made to allowed any new hookups that is news to me, and I believe is not in the Engineering report that is referenced in your email. Please contact Anna Miller at DNRC and/or Mike Abrahamson about application for SRF Loan. You will need to complete a Uniform Application. Your project will need to be meet the requirements of the SRF program to receive any $ from SRF.
John

From: Camille Miller <cmiller@forsgren.com>
Sent: Friday, March 11, 2022 2:14 PM
To: McDunn, John <JMcDunn@mt.gov>
Cc: Abrahamson, Michael <MAbrahamson@mt.gov>; Dave Noel <dnoel@forsgren.com>; Robert Cromwell <rcromwell@forsgren.com>
Subject: [EXTERNAL] West Yellowstone WWTP

Hello John,

I am writing in regard to the Short Term Upgrades that were made at the West Yellowstone WWTP in spring of 2019. We submitted an Engineering Report with Plans to DEQ on March 6, 2019 and received approval from you on April 15, 2019. In the Engineering Report it explained that the Town was out of discharge capacity to their IP Beds and that the evaporators would be installed so that the total design flow could be reduced from 651,540 gpd to approximately 511,540 gpd. The improvements were made as a short term solution for the Town.

Since then, the Town has allowed more customers to connect to their system, specifically they have allowed 205 additional EDU's to connect to their system which is very close to the 217 additional EDU's that was projected in the Engineering Report. The flow data reflects this as they had an average flow during the 3rd quarter of 2021 of 711,000 gpd, as reported in their DMR's.

Additionally, in the Engineering Report it was discussed that the IP beds could take up to 188 lbs/day of BOD to get the optimal drying time. Based upon testing of the effluent stream, they are getting an average of 181 lbs/day during the 3rd quarter.

The purpose of this email is to ask for any assistance you may be able to provide for constructing a mechanical wastewater treatment plant as a long-term solution for West Yellowstone. The Town implemented temporary measures to increase the capacity of the lagoons, but they are approaching the projected flow and loading as described in the Engineering Report. The Town and Forsgren have been moving forward under the assumption that the Short Term upgrades were put into place to allow responsible growth while a long-term plan was developed. The solution selected is a mechanical treatment plant, which we plan to submit to DEQ in the next couple of days. The next step to progress this project is to secure funding, and we would like to utilize any support DEQ could provide. We violated the discharge permit in the 3rd Quarter, and now we are at the expanded capacity limits defined in the Engineering Report for the Short Term Upgrades. Please provide the best path forward to receive the support from DEQ needed to receive funding from entities like CDBG or Rural Development.

Thank you,
Camille

Camille Miller, P.E.
Project Engineer
1137 Summers Dr. [goo.gl]
Rexburg, ID 83440 [goo.gl]
208.356.9201 / 208.351.1510 Cell
208.356.0206 Fax

FORSGREN Associates Inc [forsgren.com]

RESOLUTION NO. 774

A RESOLUTION OF THE TOWN COUNCIL OF THE TOWN OF WEST YELLOWSTONE, MONTANA, TO ISSUE A MORATORIUM ON CONNECTIONS TO OR NEW USES OF THE TOWN'S WASTE WATER TREATMENT SYSTEM

BE IT RESOLVED by the Town Council of the Town of West Yellowstone, Montana, as follows:

WHEREAS: The Town has the power and authority to take emergency measures for the immediate preservation of the public peace, property, health and safety of the inhabitants of the Town of West Yellowstone in accordance with §7-3-4326, MCA; and

WHEREAS: The Town has received information from its Town Manager and the engineer contracted to review the Town's wastewater treatment system that the current waste water treatment facility has no further capacity to accept any new connections or new uses for treatment; and

WHEREAS: Continuing to allow connections to the waste water treatment facility could result in fines and other penalties issued to the Town by the Department of Environmental Quality; and

WHEREAS; The Town has 3 pending applications for connection to the Town's water and wastewater systems, which can be met but those applications will use the small amount of capacity currently remaining. Nothing herein shall be considered approval of any pending applications; and

WHEREAS: The Town believes it is necessary and proper to prohibit new connections or uses until such time as additional capacity is made available;

WHEREAS: This Resolution came before the Town Council for discussion at a work session meeting on May 17, 2022 and a regular Town Council meeting on the same day following the work session, both duly noticed as required and the Town Council provided an opportunity for the public to comment on this Resolution at each meeting prior to a final decision; and

WHEREAS: The Town Council of the Town of West Yellowstone believes that it is necessary and proper for the Town to prohibit any new uses of or connections to the waste water treatment system, other than the applications that are currently pending before the Town; and

WHEREAS: The Town Council of the Town of West Yellowstone believes it is necessary to issue a moratorium on any new connections or new uses to the Town's waste water treatment system after May 17, 2022, for a period of one year; and

WHEREAS: The Town Council believes that the period for evaluation is necessary in order to move forward in completing the design and competitive selection process for the new wastewater reclamation facility in order to preserve the public health, property and safety of the inhabitants of the Town.

NOW THEREFORE, BE IT RESOLVED:

The Town Council of the Town of West Yellowstone, Montana hereby declares a moratorium on any new connections to or uses of the Town's wastewater treatment system effective May 18, 2022 and shall remain in place until such time as the Town receives information that the moratorium is no longer needed, or for a period of one year, which ever shall come first.

This moratorium is effective May 18, 2022.

PASSED BY THE TOWN COUNCIL AND APPROVED BY THE MAYOR THIS 17th DAY OF MAY, 2022.

Mayor Travis Watt

Council Member Jeffrey Mathews

Council Member Brian Benike

Council Member Lisa Griffith

Council Member Jeff McBirnie

TOWN OF WEST YELLOWSTONE MONTANA

ATTEST:

Town Clerk Elizabeth Roos

Traffic Counts by Location: West Gate
https://irma.nps.gov/Stats/Reports/Park/YELL

Park Yellowstone NP Add Color Ramp None View Report

1 of 1 Find | Next

TRAFFIC COUNT AT WEST GATE

2023	0	0	0	12,131	88,198	149,707	171,637	143,700	142,047	61,209			768,629	8.1%
2022	0	0	0	18,459	109,874	99,226	140,590	137,964	135,364	69,564	0	0	711,041	-14.7%
2021	0	0	0	15,895	90,400	157,282	193,084	160,836	144,903	66,828	4,481	0	833,709	31.0%
2020	0	0	0	0	2,376	98,694	158,333	152,291	145,545	78,208	1,204	0	636,651	5.7%
2019	0	0	0	10,351	69,863	117,794	145,597	125,305	101,061	30,889	1,285	0	602,145	-2.2%
2018	0	0	0	8,742	72,218	122,596	144,551	122,132	102,592	41,398	1,267	0	615,496	0.9%
2017	0	0	0	9,167	67,127	116,785	143,945	135,746	97,267	39,330	530	0	609,897	-7.6%
2016	0	0	0	14,277	73,549	126,810	150,918	134,519	109,141	47,929	3,213	0	660,356	4.7%
2015	0	0	0	11,470	64,088	118,534	150,456	131,914	104,332	49,558	585	0	630,937	20.5%
2014	0	0	0	5,932	45,085	99,590	128,069	116,353	87,948	39,460	1,110	0	523,547	14.0%
2013	0	0	0	4,362	45,373	90,286	118,203	107,918	82,944	9,242	1,054	0	459,382	-2.6%
2012	0	0	0	5,824	43,250	88,983	118,162	101,033	81,700	31,356	1,464	0	471,772	-0.4%
2011	0	0	0	5,197	34,221	84,327	123,622	106,722	85,010	33,122	1,496	0	473,717	-7.9%
2010	0	0	0	5,879	42,635	92,921	130,293	114,074	90,346	35,455	2,544	0	514,147	18.0%
2009	0	0	0	3,671	40,345	81,716	121,782	93,429	72,851	21,685	312	0	435,791	0.4%
2008	0	0	0	3,601	36,811	83,927	110,298	98,891	72,678	27,123	804	0	434,133	-2.1%
2007	0	0	0	5,282	43,511	82,803	112,313	96,831	75,777	25,654	1,473	0	443,644	6.6%
2006	0	0	0	5,161	38,331	78,812	101,810	90,019	72,434	28,312	1,390	0	416,269	0.1%
2005	0	0	0	4,765	38,458	79,294	107,476	90,974	67,191	26,366	1,267	0	415,791	1.4%
2004	0	0	0	6,268	36,774	77,671	101,813	89,857	69,014	27,117	1,677	0	410,191	-1.0%
2003	0	0	0	5,633	35,361	76,705	105,186	93,622	65,496	31,896	626	0	414,525	1.6%
2002	0	0	0	5,042	37,586	74,853	103,157	92,014	65,560	28,932	905	0	408,049	11.6%
2001	0	0	0	4,579	34,858	66,785	96,163	82,547	57,475	21,890	1,215	0	365,512	-3.0%
2000	0	0	0	4,608	35,115	70,440	100,103	86,510	54,183	24,489	1,234	0	376,682	-7.7%
1999	0	0	0	5,399	31,580	71,690	102,823	96,164	71,287	27,036	1,951	0	407,930	0.7%
1998	0	0	0	6,201	33,570	69,330	103,446	95,049	69,921	27,129	381	0	405,027	14.7%
1997	0	0	0	4,330	29,514	61,831	92,784	85,862	58,796	19,306	566	0	352,989	-3.7%
1996	0	0	0	4,343	31,645	58,275	96,284	93,615	62,483	19,470	604	0	366,719	0.1%
1995	0	0	0	4,080	24,401	54,523	95,249	95,591	68,445	23,138	880	0	366,307	16.0%
1994	0	0	0	5,464	27,194	54,217	85,109	74,393	52,418	16,485	414	0	315,694	2.1%
1993	0	0	0	3,786	23,154	56,676	81,314	70,328	51,942	19,466	2,673	0	309,339	-9.5%
1992	0	0	832	8,675	31,987	54,731	83,101	77,382	60,816	24,067	120	0	341,711	3350.9%

APPENDIX D – Pipe Inspection Summary

Town of West Yellowstone
Alleys A,B,C,D Deficiencies - 2021-2022

	MH #	Length Surveyed (ft)	Total # Defect	Broken/ Cracked	Bellying	Roots	Joint Offset	Protruding Lines	Corrosion	Build Up	Manhole Covered	Gasket Overpour
Alley A	61-62	294	3	3								
	62-63	253.5	4	4								
	63-64	303.1	3	2			1					
	64-65	262.1	3	1			2					
	65-66	301.3	8	6	2							
	66-67	263	1		1							
	67-68	292.4	2		2							
	68-69	237.3	8	1	2					5		
	69-70	319.4	6				2			4		1
	70-71	489.6	8					2		5	1	1
	71-72	102.9	1							1		
	72-73	141.7	5			3		1		1		
	73-74	14.8	0									
Alley B	7-46	290	6	1		3	2					
	46-47	315	4	4								
	47-48	291.9	1				1					
	48-49	265.8	0									
	49-50	292	5	4	1							
	50-51	262.3	2	1	1							
	51-52	295.4	1				1					
	52-53	263.3	1	1								
	53-54	290.8	4	2						2		
	54-55	282.6	1							1		
	55-56	315.8	1							1		
	56-57	274	5	1						4		
	57-58	320.1	3	2						1		
	58-59	260.7	7					2		5		2
Alley C	5-31	357.7	0									1
	31-32	309.4	0									
	32-33	117.6	2	2								
	33-34	232.1	2	2								
	34-35	218.6	3	1		2						
	35-36	290	0									
	36-37	264.1	2			2						
	37-38	291.9	3	2		1						
	38-39	266.3	1				1					
	39-40	294.4	4	1	2			1				
	40-41	271.4	3	2				1				
	41-42	322.3	0									
	42-43	263.2	1							1		
	43-44	337	4	3				1				
	44-45	258.5	2				1			1		1
Alley D	2-16	338.7	4	1		1	2					
	16-17	315.1	1				1					
	17-18	293.1	5	4			1					
	18-19	265.5	4	2			2					
	19-20	289.4	1	1								
	20-21	264.8	1	1								
	21-22	297.2	0									
	22-23	202.4	1								1	
	23-24	291.8	2	1				1				
	24-25	285.9	1				1					
	25-26	314.8	2				1			1		
	26-27	294.2	2				2					1
	27-28	310.7	2			1				1		
	28-29	256	3	1		2						
Total		15408.9	149	57	11	15	21	9	0	34	2	7
Alley A		3275.1	52	17	7	3	5	3	0	16	1	2
Alley B		4019.7	41	16	2	3	4	2	0	14	0	2
Alley C		4094.5	27	13	2	5	2	3	0	2	0	2
Alley D		4019.6	29	11	0	4	10	1	0	2	1	1

Broken/ Cracked	Will need to be replaced/sliplined
Bellying	Replacement will be the only way to fix this issue
Roots	Can be replaced or sliplined. Can also be jetted to help slow the progress
Joint Offset	Replacement will be the only way to fix this issue
Protruding Lines	Going through and individually cutting each one
Corrosion	Can be fixed with fixing the bellying or other issues
Build Up	Can be fixed with fixing the bellying or other issues
Manhole Covered	Dig up lost manhole
Gasket Overpour	No issues were found. No action needed

Alley A

Manhole Section: 68-69

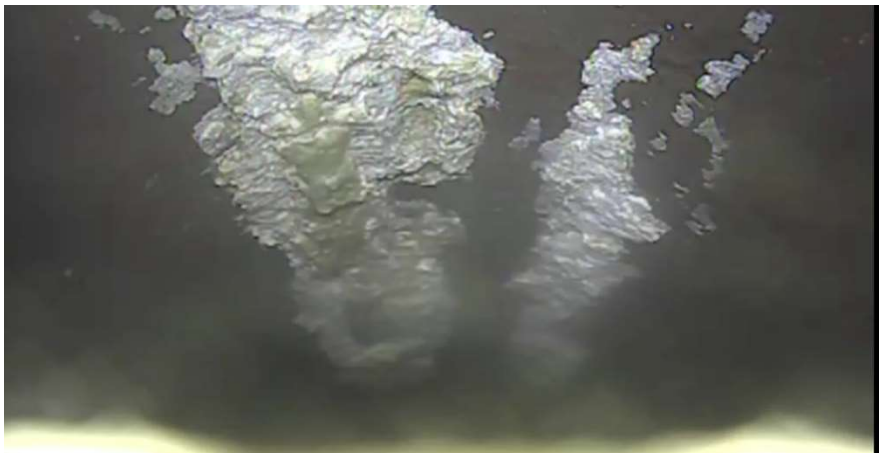
Video #7

6 Ft. broken/Grease Build Up

85 ft Grease Build Up

76 ft. Grease Build Up

98 ft Bows underwater



111 ft. Grease Build Up

Video #7B

11 ft. Grease Build Up

65 ft Underwater

Manhole Section: 69-70

Video #6

30 Ft. Joint offset

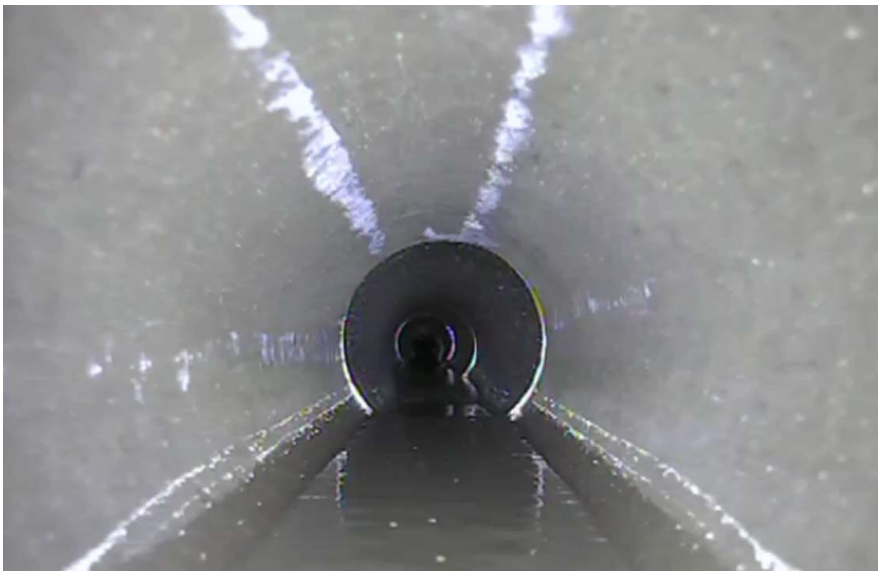
62 ft. Joint Offset

88 ft. Grease Build Up

120 ft Grease Build Up

149 Ft. Grease Build Up

168 Ft. Grease Build Up



190 ft. Gasket Overpour

270 ft. High water line (Not a deficiency)

Manhole Section: 70-71

Video #5

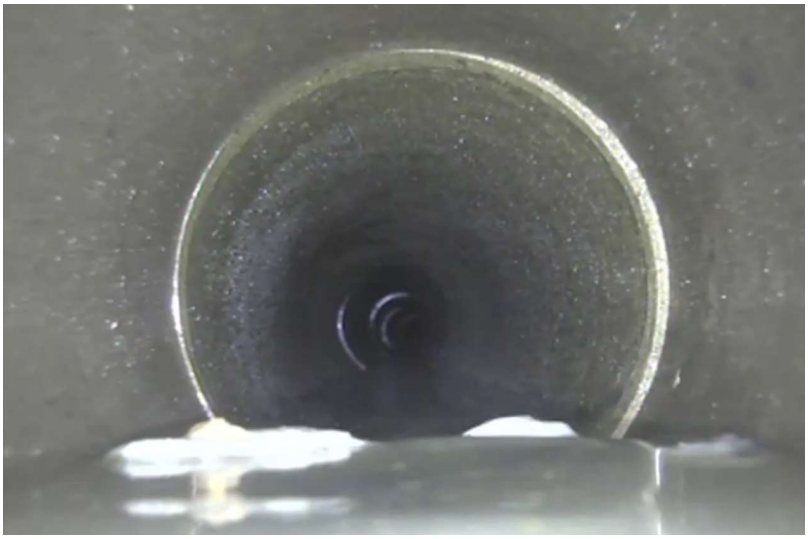
58 ft. Grease Build Up

61 ft. Protruding service line

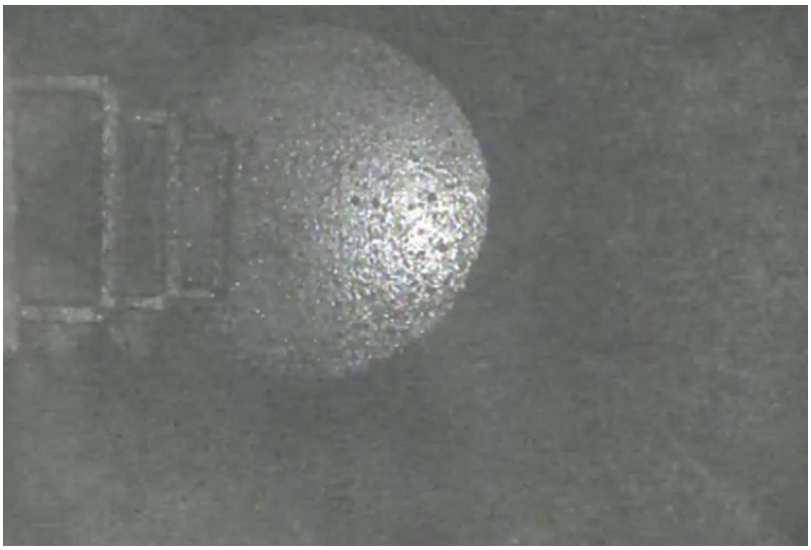
Video #5B

87 ft. buildup

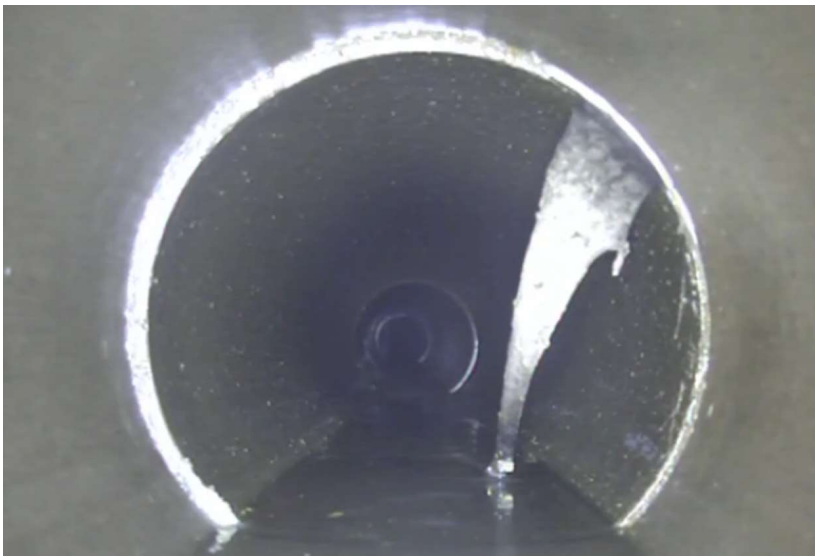
105 ft possible clog



208 ft. Manhole covered by street



338 ft. gasket overpour



357 ft. Grease Build Up

400 ft. Grease Build Up

424 ft. Protruding Service Line

Manhole Section 71-72

Video #2

5 ft. Debris

Manhole Section: 72-73

Video #3

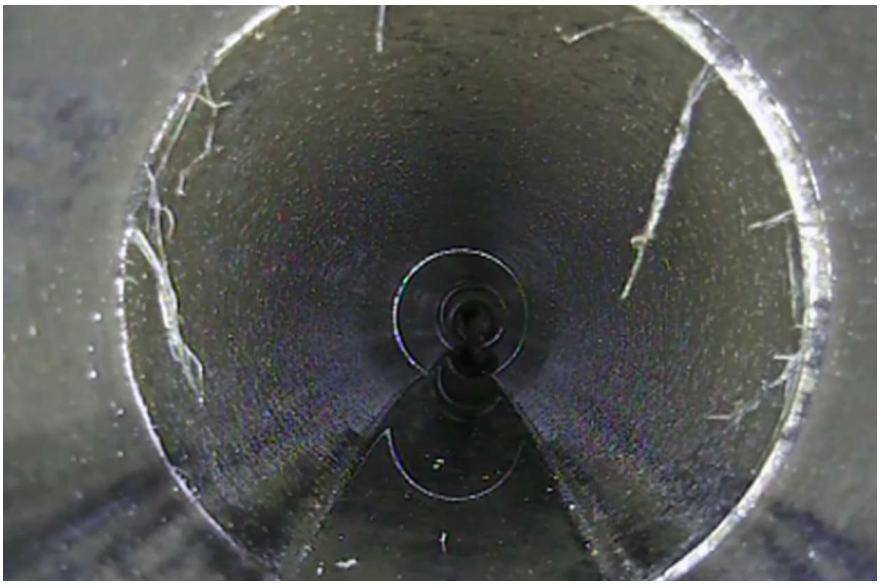
4 ft. bottom buildup

69 ft. Protruding Service Line

Video #3B

1 ft. tree roots

47 ft. Tree Roots



69 ft. Tree Roots

Alley B

Manhole Section: 53-54

Video #21

49 ft. Grease Build Up

79 ft. Grease Build Up

233 ft. Broken

286 ft. Broken

Manhole Section: 54-55

Video 20f

270 ft. Grease Build Up

Manhole Section 55-56

Video #19

84 ft. Debris

Manhole Section: 56-57

Video # 18

3 ft. Grease Build Up

122 ft. Broken/change in pipe material

154 ft. Grease Build Up

169 ft. Build up

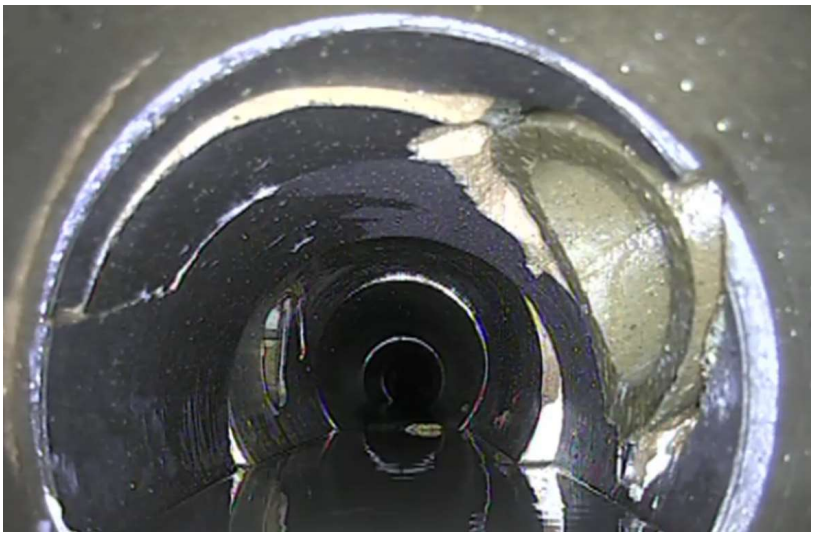
212 ft. Build up

Manhole Section: 57-58

Video #17

54 ft. Broken

117 ft. Broken, and protruding pipe



200 ft. Build up

Manhole Section: 58-59

Video #16

33 ft. Grease Build Up

45 ft. Buildup/protruding pipe

70 ft. Grease Build Up

100 ft. Grease Build Up

130 ft. Gasket Overpour

150 ft. Gasket Overpour at service line

153 ft. Protruding Service Line

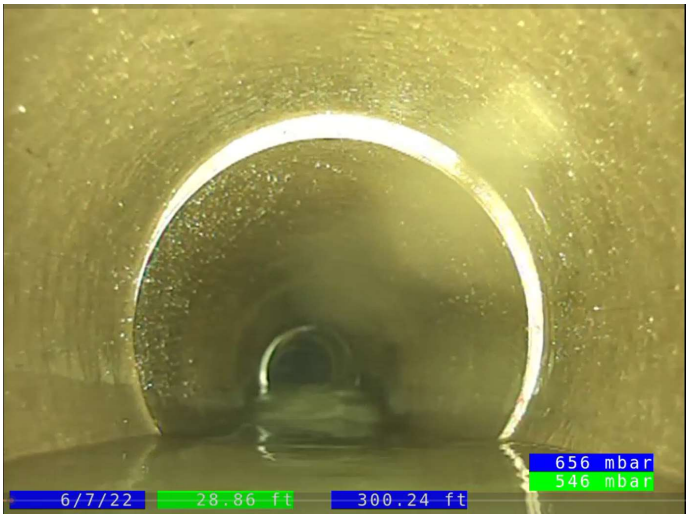
154 ft. Build Up

Alley C

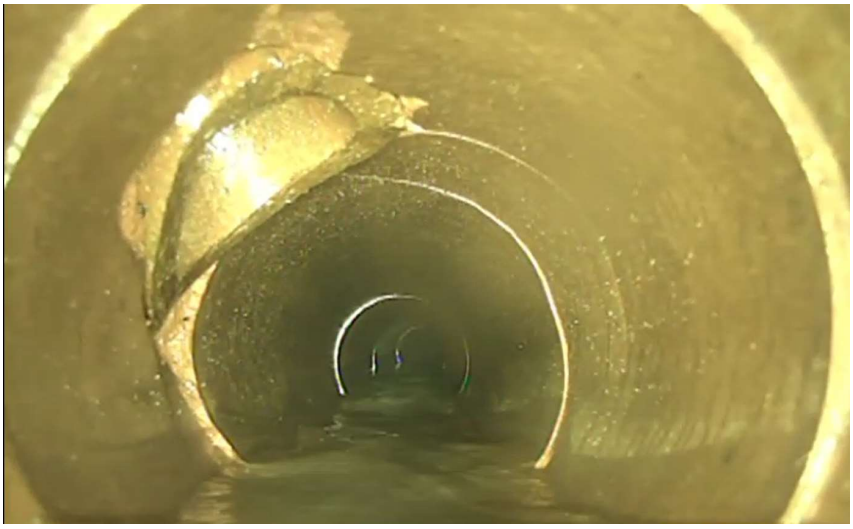
Manhole Section: 39-40

Video #6

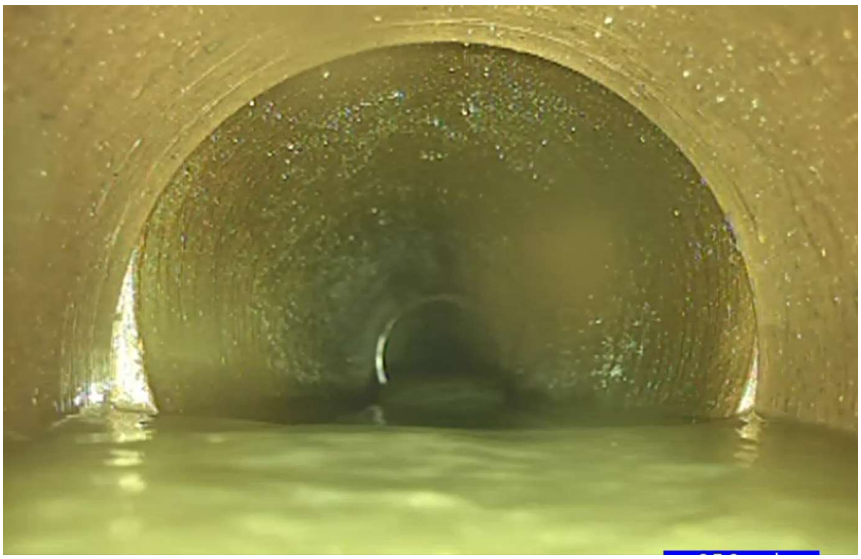
30 ft. Large dip



36 ft. Protruding Service Line



165 ft. Large Dip



232 ft. Broken

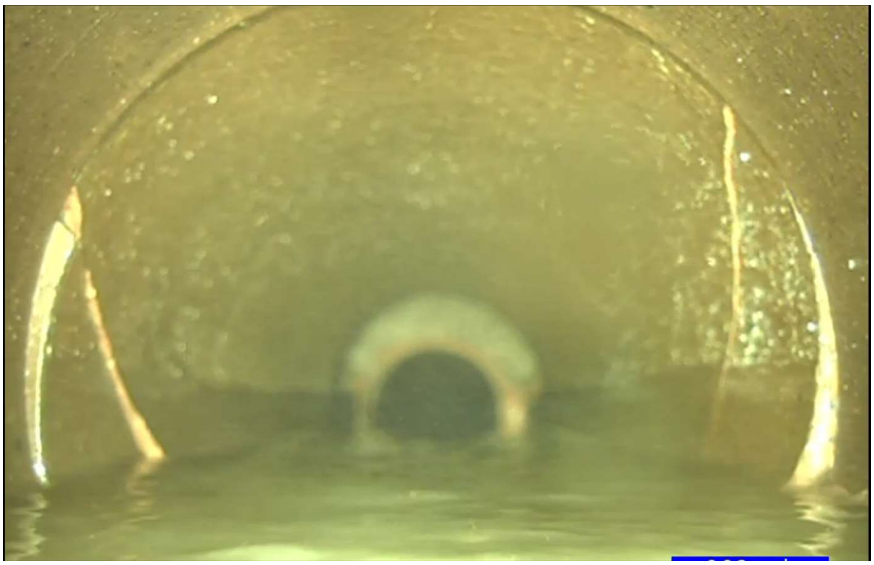
Manhole Section: 40-41

Video #5

2 ft. Protruding Service Line

190 ft. Cracking/Broken

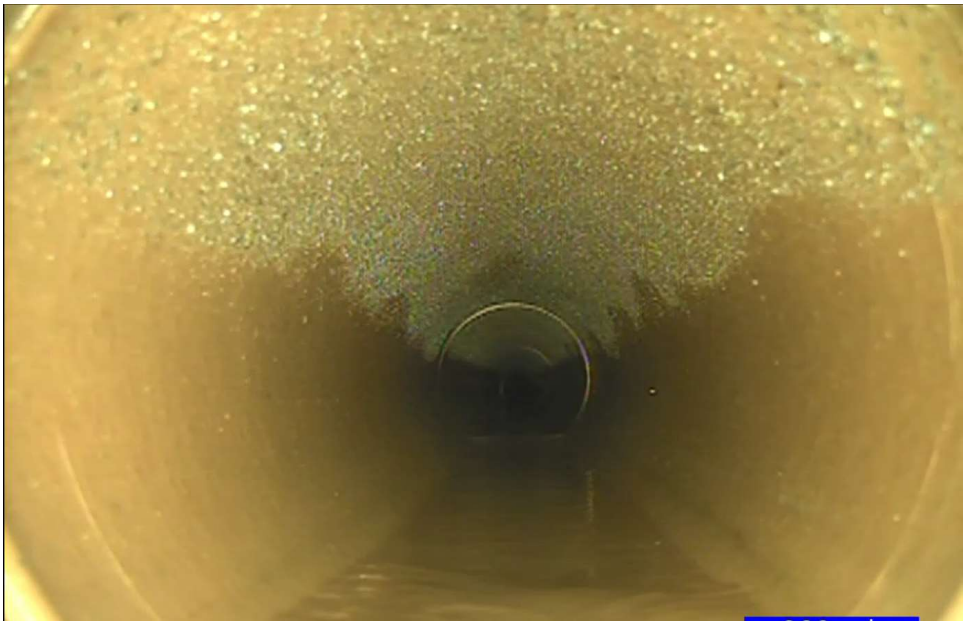
266 ft. Cracking



Manhole Section 42-43

Video #4

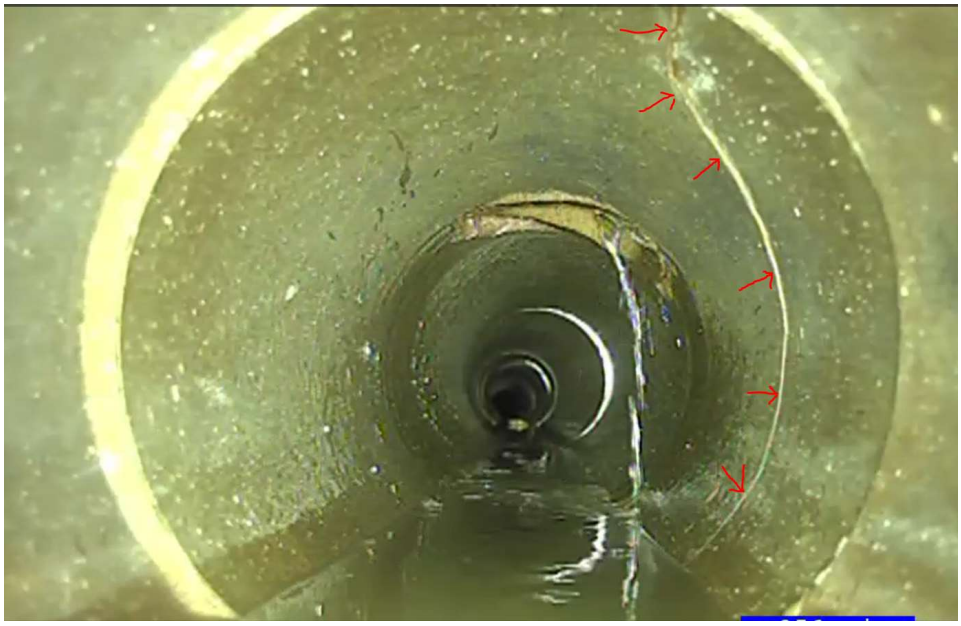
203-255 ft. Grease Build Up



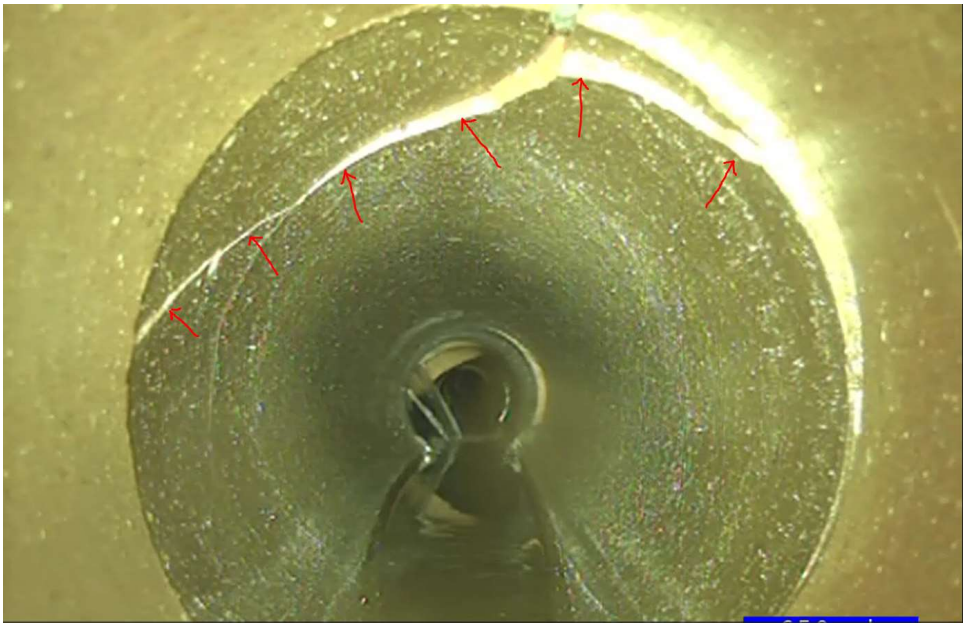
Manhole Section: 43-44

Video #2

1 ft. Cracking

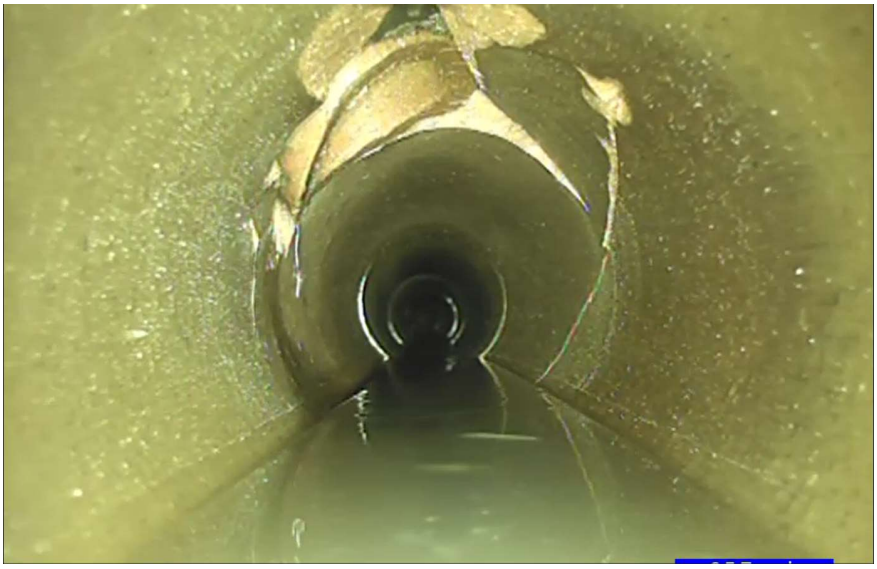


12 ft. Cracking

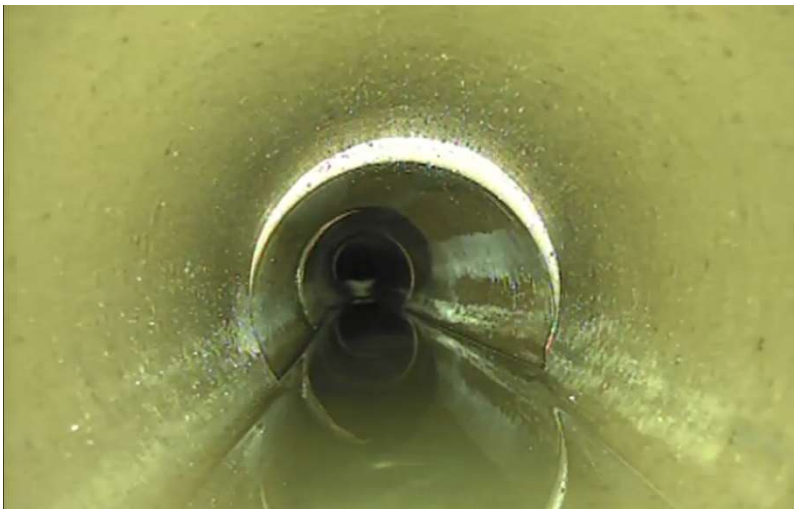


18 ft. Protruding Service Line

138 ft. Cracking/Broken

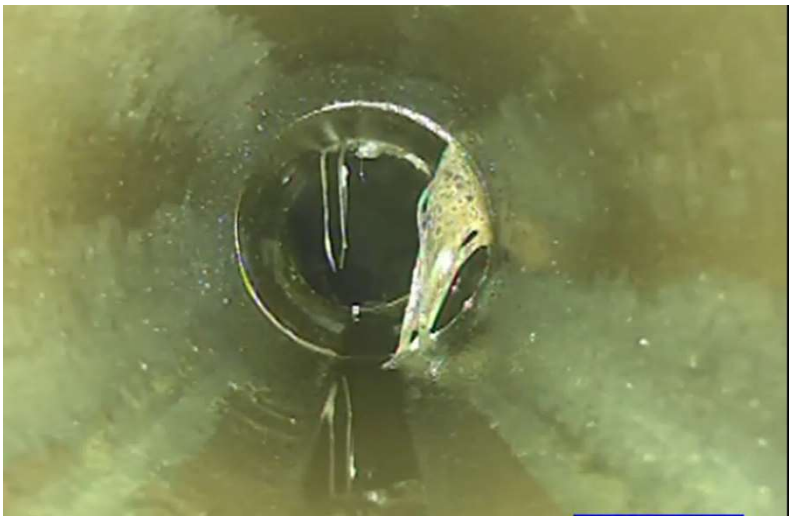


Manhole Section: 44-45



Video #1
76 ft. Pipe Offset

120 ft. Grease Build Up



194 ft. Gasket Overpour

Alley D

Manhole Section: 23-24

Video #21 A

179 ft. Protruding Service Line/Cracking

Manhole Section 23-24

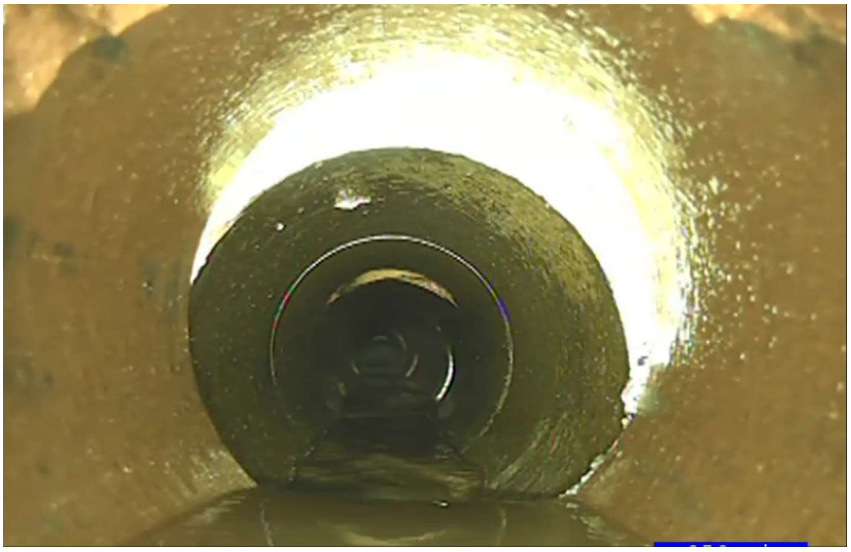
Video #21 B

20 ft. Joint Offset Large, 1 inch

Manhole Section: 24-25

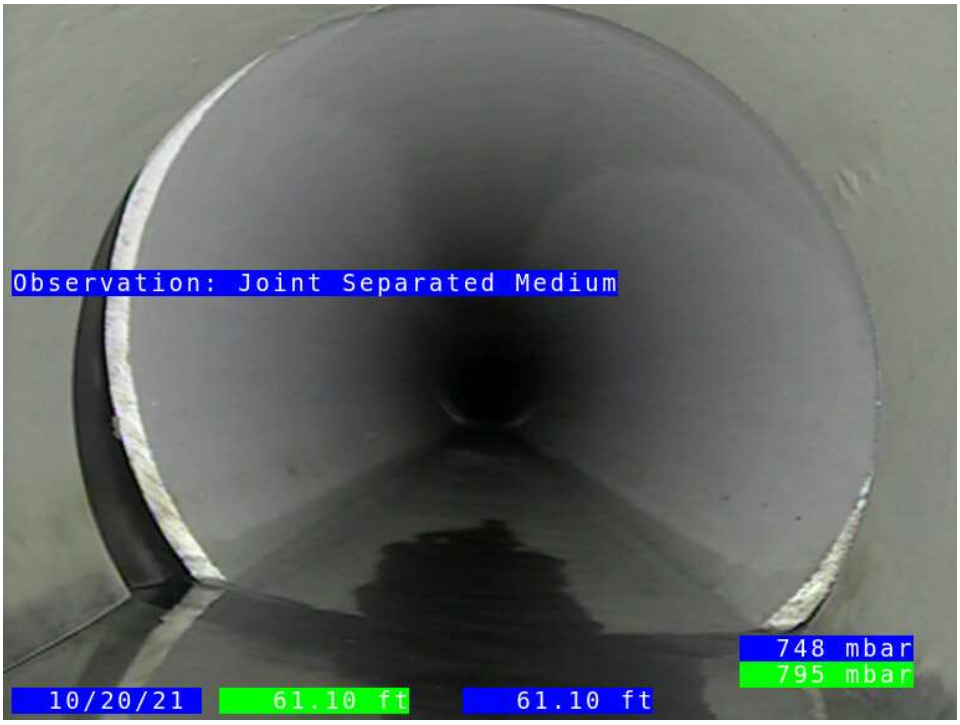
Video #20

1 ft. Large Drop Off

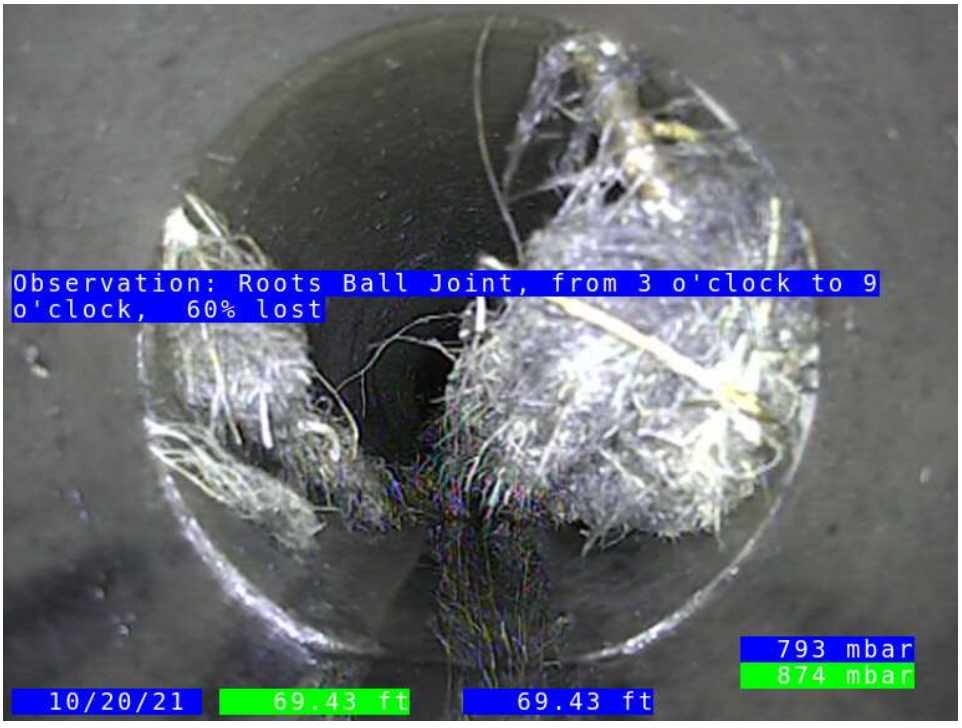


Other Lines and Manholes

Fernco missing joint medium/separated medium



Roots at pipe joint

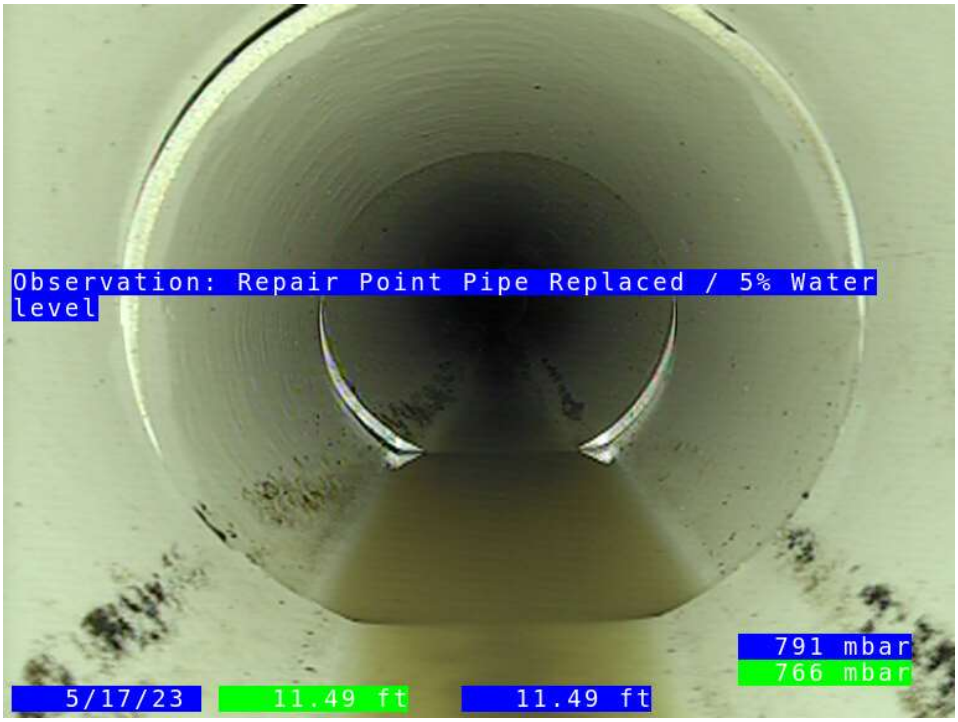


Gasket overpour – has been removed

Broken – soil visible

Protruding pipe

Fernco Pipe issues. Joint material missing/separated



APPENDIX E – Manhole Inspections

Town of West Yellowstone

2023 MH inspections MH's with concerns/deficiencies added note

Action:	Abandoned (Inactive)	TWY Maintenance		TWY uses MH Ladder & dismantles unsafe MH (Ladder preferred for any MH access - TWY)		TWY Maintenance								TWY Verified 9-14/23-9/21/23			
Concern:	**Location**	**Ring/Frame**		**Steps**		**Rings**				**Surcharge**			**Vermin**	**Comments to Address**			
Item:	**Parking Lot**	**Damaged**	**Displaced**	**None**	**Unsafe**	**Broken**	**Sulfated**	**Misaligned**	**Cracks**	**Debris in Channel**	**Debris on Shelf**	**Debris on Rungs**	**Rodents**	**Roots in Rings**	**Incorrect Lid**	**Not Sewer**	**Water Valve (WV)**	**Plastic Cap 1 foot & MH cover**
QTY	**2**	**1**	**19**	**1**	**3**	**6**	**3**	**1**	**2**	**12**	**7**	**1**		**1**	**1**			
MH#	165	2	89	80	44	2	75	74	15	108	102	183	88.5	136	19	181	186	178
	145		74		218	45	73		29	172	113		MH does not exist		storm sewer	182	water valve	electrial access
			72		155	44				112	9		No Vermin					not sewer
			69			184				109	57							
			66			180	180			106	42							
			31			222				123	183							
			4 or 5							97	19							
			21							130								
			179							163								
			183							134								
			184							142								
			143							183								
			11															
			12															
			28															
			36															
			18															
			16															
			157															

APPENDIX F - Ordinances

Chapter 13.08
SEWAGE DISPOSAL SYSTEM

Sections:

13.08.010 Sewer manager--Designated.

A. The town will employ a resident of West Yellowstone to be responsible for the operation and maintenance of the sewer system. This person will be the sewer manager. The sewer manager will make daily, semi-weekly, weekly and less frequent inspections as required. He will study and become familiar with the system and equipment and provide routine maintenance to assure the system is in good working order at all times. All questions and requests of residents of the town regarding the sewer system shall be made to the sewer manager.

B. The town council will assist the sewer manager. (Ord. 137 §6, 1989; Ord. 64 §1(part), 1974)

13.08.020 Sewer manager--Duties.

The duties of the sewer manager shall include:

A. Keep the sewers and appurtenances clean and in good working order;

B. Receive applications for new sewer connections, issue permits for new connections and inspect the construction of each;

C. Report violations of the rules and regulations set forth in this chapter and violations of Montana State Board of Health regulations to the town council;

D. Adequately operate and maintain the sewage lift station;

E. Adequately operate and maintain the sewage treatment facility;

F. Maintain accurate and complete records of all new sewer services;

G. Maintain records of the operation of the sewage lift station;

H. Maintain records of the operation of the sewage treatment facility;

I. Maintain a log showing the time and location of any cleaning and repair work on the sewage collection system;

J. Make an annual report to the town council including a summary of operation and maintenance costs, general information and recommendation for the coming year. (Ord. 64 §1(part), 1974)

13.08.030 Connections--Specifications--Application--Inspections.

A. All connections to the sewer system, when permitted, shall be made only by:

1. A Montana licensed master plumber; or

2. A journeyman plumber licensed by the state; or

3. If a licensed plumber is not available in West Yellowstone, by a person experienced in plumbing work approved in writing by the city council or sewer manager.

B. All new sewer connections shall be made using an approved cast-iron, clay tile or asbestos-cement saddle or hub. A hole shall be carefully cut in the sewer pipe which closely fits the pipe fitting. The fitting shall be carefully cemented to the pipe so as to make a water-tight connection. Extreme care shall be taken at all times to keep sand, pipe materials and other objects out of the sewer.

C. The individual connecting to the sewer, responsible for the entry of sand or other material into the sewer, shall be responsible for any cost directly or indirectly resulting from this negligence.

D. Commencing January 1, 2009, the sewer connection fees shall, at a minimum, be reviewed annually and updated by resolution of the town council to reflect actual costs of inflation, operation, maintenance, replacement and financing of the sewer system.

E. The connection to the main line will be made by the sewer manager. The sewer manager will endeavor to keep a supply of clay-tile sewer pipe saddles on hand and when available will provide the saddle. All other materials required for the connection and service lines will be furnished by the individual making the connection.

F. The sewer shall not be opened at any point without the permission of the sewer manager and the manager shall be present when the sewer is uncovered. Methods used shall be such as to be acceptable to the manager. (Ord. 241 §1, 2008; Ord. 64 §2, 1974)

13.08.040 Sewage waste discharge.

Since the success of the sewer system preventing further contamination of the shallower ground water and preventing eventual contamination of the deeper water is contingent on eliminating the disposal of sewage in the sandy soil underlying the community, it is important that all sewage be discharged into the sewer system. To accomplish this goal, the following time requirements are established:

A. All new construction or other facilities (whether a business, single-family cabin or trailer) requiring a sewer shall be connected to the sewer system prior to use. No facilities, not now existent, shall use a septic tank and/or cesspool or drain fields in the improved sewer district.

B. All existing motels, hotels, gas stations, cafes, laundries and other businesses with a sewage flow of over one hundred gallons per day shall connect to the sewer system and shall discontinue all disposal into the underlying soil.

C. All other businesses, homes, cabins, trailers and other facilities regardless of size shall discontinue discharging wastes into the underlying soil. All sewage wastes must be discharged into the sewer system.

D. All privies shall be removed from the town and will not be permitted in the town. Remaining holes shall be filled so as not to be hazardous or offensive.

E. All septic tanks and cesspools shall be filled (unless covered by a concrete cover capable of supporting any car or other loads that may be placed on it) at the time of hook up. (Ord. 64 §4, 1974)

13.08.050 Sewer services--Specifications.

A. Sewer services shall be provided by the individual property owners.

B. All materials and workmanship shall be of good quality.

C. Before excavating for a sewer service, the individual shall check the sewer maps showing the locations of service connections and shall so locate the new sewer service so as not to damage any existing services. Excavation near existing sewers shall be done by hand so as to avoid damaging existing pipes. Care must also be taken to not damage underground telephone wires located in several alleys.

D. Materials for sewer service lines (five foot from buildings) may be either clay-tile, asbestos-cement, concrete or cast iron. Bitumized fiber pipe (Orangeberg) will not be permitted. Existing line from house to cesspool will be excepted. Any new lines or repairs will be made to above specifications. Any repairs or replacements will require a new permit.

E. Sewer services shall be on a minimum grade of one-eighth inch per foot and preferably on a grade of three-sixteenths inch or one-quarter inch per foot. Sewer services shall be four inches or larger in size. Cleanouts shall be spaced at about one hundred foot intervals on long runs. Sewer joints shall be water-tight and root-proof. (Ord. 64 §5 (part), 1974)

13.08.060 Sewer services--Permit for alterations.

No unauthorized person shall uncover, make any connections with or opening into, use, alter, or disturb any public sewer or appurtenance thereon without first obtaining a permit from the manager. The permit application shall be supplemented by any plans, specifications or other information considered pertinent in the judgment of the manager. (Ord. 64 §5(part), 1974)

13.08.070 Incident costs to be borne by owner--Indemnification of city.

All costs and expense incident to the installation and connection of the building sewer shall be borne by the owner. The owner shall indemnify the town from any loss or damage that may directly or indirectly be occasioned by the installation of the building sewer. (Ord. 64 §5(part), 1974)

13.08.080 Sewer services--Barricades--Restoration of public property--Backfilling.

All excavations for building sewer installation shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways, and other public property disturbed in the course of the work shall be restored in a manner satisfactory to the manager. Backfilling of the sewer trench will in general require compaction under public streets. Blacktop will be returned and maintained to original condition. (Ord. 64 §5(part), 1974)

13.08.090 Storm drainage and other prohibited wastes.

A. No person shall make connection of roof downspouts, exterior foundation drains, areaway drains, or other sources of surface runoff or groundwater to a building sewer or building drain that is connected directly or indirectly to the town sanitary sewer unless such sewer or drain that is connected to an interceptor (clarifier) separator that is in compliance with the state of Montana plumbing code.

B. No person shall discharge or cause to be discharged any storm water, surface water, groundwater, roof runoff, subsurface drainage, uncontaminated cooling water, or unpolluted industrial process water that drains directly or indirectly to the town sanitary sewer unless such water flows through an interceptor (clarifier) separator that is in compliance with the state of Montana plumbing code.

C. No person shall discharge or cause to be discharged any of the following described waters or wastes to any public sewers:

1. Any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid, or gas;

2. Any waters or wastes containing toxic or poisonous solids, liquids or gases in sufficient quantity, either singly or by interaction with other wastes, to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, create a public nuisance, or create any hazard in the receiving waters of the sewage treatment plant, including but not limited to cyanides in excess of two mg/l as CN in the wastes as discharged to the public sewer;

3. Any waters or wastes having a pH lower than 5.5 or having any other corrosive property capable of causing damage or hazard to sewers, structures, equipment and personnel of the sewage works;

4. Solid or viscous substances in quantities or of such size capable of causing obstruction to the flow in sewers, or other interference with the proper operation of the sewage works, such as, but not limited to, ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, hair and fleshings, entrails and paper dishes, cups, milk containers, etc., either whole or ground up.

D. Grease, oil, sand interceptors and other treatment devices shall be provided for the proper handling of liquid wastes containing grease in excessive amounts, organic materials in excessive amounts, or any flammable wastes, sand, or other harmful ingredients, except that such interceptors or treatment devices shall be of a type and capacity approved by the sewer manager and shall be located as to be readily and easily accessible for cleaning and inspection. Where provided for any waters or wastes they shall be maintained continuously in satisfactory and effective operation by the owner at his expense.

E. Restaurants, bars and other food service facilities must pretreat their waste water with a grease interceptor or trap that is approved by the town sewer manager. All grease interceptors or traps shall be located to be easily accessible for cleaning and inspection. These pretreatment systems shall be maintained, inspected, cleaned and repaired regularly, as needed, by the owner at his expense. This will include maintaining an updated log book of these activities that must be submitted to the town sewer manager upon his request. All grease interceptor or trap contents shall be removed at the time of cleaning.

F. A variance to the required installation of an interceptor, trap or other pretreatment device may be granted by the town council. Criteria for granting a variance may include feasibility or cost of installation, the actual or potential amount of prohibited wastes to be generated, and the extent of interference with the town's sewer system and treatment facility by the prohibited wastes. A variance may carry additional requirements set by the town council. (Ord. 196 §1, 1998: Ord. 64 §6, 1974)

13.08.100 Private sewage disposal system--Prohibited.

A. The town council determines it to be a nuisance to employ, maintain or use a private sewage disposal system or to dispose of sewage by means other than by means of the public sewage system within the town, by reason of the danger to water supplies and sources used by the public.

B. The use, maintenance, or employing of a private sewage disposal system within the town is a nuisance.

C. Violation of this section shall be punishable as a municipal infraction under Section 13.08.130. (Ord. 207 §34, 2000: Ord. 42 §§1--3, 1974)

13.08.110 Operation and maintenance costs.

The operation and maintenance costs of the town's sewer system will be paid for on an equivalent user basis. Commencing January 1, 2009, the sewer connection fees shall, at a minimum, be reviewed annually and updated by resolution of the town council to reflect actual costs of inflation, operation, maintenance, replacement and financing of the sewer system. (Ord. 241 §2, 2008: Ord. 64 §8, 1974)

13.08.115 Operation and maintenance costs--Review and revision.

A. The town council shall review the total annual cost of operation and maintenance as well as each user's wastewater contribution percentage not less often than annually, and will revise the system as necessary to assure equity of the service charge system established by law and by ordinance and to assure that sufficient funds are obtained to adequately operate and maintain the wastewater treatment works. The council shall apply excess revenues collected from a class of users to the costs of operation and maintenance attributable to that class for the next year and adjust the rate accordingly. If a significant user, such as an industrial user, has completed in-plant modifications which would change that user's wastewater contribution percentage, the user can present, at a regularly scheduled meeting of the town council, such factual information and the town shall then determine if the user's wastewater contribution percentage is to be changed. The town shall notify the user of its findings as soon as possible.

B. Each user of the town sewer system shall be notified, at least annually, in conjunction with a regular bill, of the rate and that portion of the user charges which are attributable to wastewater treatment services. (Ord. 149, 1992)

13.08.120 Penalties for noncompliance.

Failure to connect in compliance with the regulations of this chapter will result in immediate disconnection. Reconnection will cost as stated in this chapter. Further, the cost of any damages to the sewer system resulting from connection thereto, not in compliance with the regulations of this chapter, will be borne by the individual or individuals causing such damage. (Ord. 64 §7, 1974)

13.08.130 Purpose.

The purpose of Sections 13.08.130 through 13.08.310 is to allow commercial haulers of septage to apply for a permit allowing discharge of their product into the existing town wastewater collection and treatment facilities, and to establish fees and other financial means to insure that proper treatment and disposal of septage is provided for. (Ord. 208 §1, 2001; Ord. 207 §§35, 50, 2000)

13.08.140 Definitions.

As used in sections 13.08.130 through 13.08.310, the following definitions apply:

A. "Disposal fee" means a fee charged by the town for reception of septage into its wastewater facilities. The fee includes the cost of receiving, treating, disposing, and otherwise managing the septage within the wastewater facilities.

B. "Permit" means a written authorization or activity approval or entitlement issued by the town approving an individual or commercial enterprise for discharge of septage into the town's wastewater facilities in accordance with the provisions of town ordinances and other applicable federal, state and local statutes, administrative regulations, or rules pertaining to septage or septage management.

C. "Septage" means wastewater that is collected from dwelling units, septic tanks, cesspools, portable toilets, or similar systems that constitutes concentrated domestic sewage (household, non-commercial, non-industrial sewage). Septage shall not include grease and grease trappings from any source or effluent from any commercial or industrial establishment that is not domestic in origin, nature, and composition. (Ord. 208 §2, 2001)

13.08.150 Permit required.

No person or corporation shall carry on or engage in the business of hauling and disposing of septage into the town's wastewater facilities without having first applied for and obtained a permit from the town. (Ord. 208 §3, 2001)

13.08.160 Issuance of permit.

Upon proper application, the town may issue a permit for septage disposal if it finds that the activity is proposed to be, or designed to be, carried out in accordance with the terms of town ordinances and the statutes, administrative regulations, and rules of the United States, the State of Montana and Gallatin County pertaining to the transport, storage and disposal of septage material. The town has no obligation to issue septage permits pursuant to this chapter. The town may reject any or all septage permit applications for whatever reason it deems appropriate, including, but not limited to, a determination that receipt or discharge of septage would adversely affect the town's wastewater collection and treatment facilities. (Ord. 208 §4, 2001)

13.08.170 Revocation of permit.

Permits issued to septage haulers may be revoked by the town if it finds that the activity has been, or is being carried on or engaged in contrary to statutes, administrative regulations, rules, or ordinances pertaining to septage handling, or that the activity is a threat to public health or safety, or that the activity violates a condition of the permit, or the permittee fails to remit fees in a timely manner to the town. (Ord. 208 §5, 2001)

13.08.180 Term of permit.

A permit is valid for one year from its issuance. At the end of the one-year period, the permit expires unless the permittee renews the permit according to the provisions of this chapter. (Ord. 208 §6, 2001)

13.08.190 Permit fees.

The town shall charge and collect a permit fee from each septage hauler and separate disposal fees for each truckload or other designated volume of septage discharged into the town's wastewater facilities. The town council shall set the precise amount of permit fees and disposal fees through resolution. (Ord. 208 §7, 2001)

13.08.200 Security guarantee.

If the town decides to reissue a permit which has been revoked for any reason, including the failure to remit permit fees or disposal fees on a timely basis, the town shall require the permittee to post a guarantee of his ability to timely remit permit fees or disposal fees to the town. The guarantee may be demonstrated by a cash security deposit in an amount approved by the town, a cash bond in an amount approved by the town, or a letter of credit. (Ord. 208 §8, 2001)

13.08.210 Waste discharge requirements.

No person shall discharge septage into the town's wastewater facilities unless he has complied with all the requirements of this chapter and has received a valid permit. An applicant or permittee shall, upon request of the town, provide the following: proof of a valid permit; a list containing license numbers of each vehicle which the permittee proposes to use for the discharge of septage to the town's wastewater system; certification of insurance coverage; a cash deposit or other security acceptable to the town; and proof of payment of all permit fees and disposal fees as may be prescribed by the town. (Ord. 208 §9, 2001)

13.08.220 Permissible discharges.

The town's wastewater collection treatment facilities shall only be used for the treatment and disposal of wastes which are compatible with the treatment process and the continued operation of a nonhazardous liquid management facility. Accordingly, only septage of domestic (household) origin or constituency shall be discharged into the wastewater system. This would include properly screened discharges of effluent from septic tanks, cesspools, portable toilets, or other similar systems providing for the concentration of domestic wastewater. (Ord. 208 §10, 2001)

13.08.230 Prohibited discharges.

Prohibited discharges include any hazardous waste which may be defined by either federal or state statute, administrative regulation or rule, any septage of commercial or industrial origin which is not completely domestic in nature, or any grease or grease trappings. (Ord. 208 §11, 2001)

13.08.240 Manifests.

All septage haulers shall verify the source of all waste contained within the waste load to be discharged by maintaining a detailed manifest. The manifest shall be carried in the vehicle at the time of septage disposal to the wastewater system. At a minimum, the information on the manifest shall include the customer's name and contact phone number, customer or pumping site location/address, date and time of service, and type of waste. Verification may be demonstrated by either a customer receipt containing the required information or a completed log form or manifest containing the required information. (Ord. 208 §12, 2001)

13.08.250 Disposal reports.

Monthly disposal reports shall be completed and submitted by all septage haulers to the town no later than thirty days after the end of each month. Late reporting shall be subject to an administrative penalty or permit revocation. The report shall include a compilation of the information required in the manifest of the septage hauler. All items listed on the report shall be complete, accurate and legible. All reports shall be certified and signed by the company owner or a duly authorized representative of the company. Incomplete or inaccurate reports shall be returned, and errors in reports or negligence in timely reporting shall be grounds for permit revocation. (Ord. 208 §13, 2001)

13.08.260 Spill and incident reporting.

Any spill shall be reported immediately by phone to town maintenance personnel or administrative staff. If direct contact cannot be made, a message must be left indicating the date and time of occurrence. Formal written notification describing the circumstances of the spill or incident shall be submitted to the town within five working days of the occurrence. Septage haulers or dischargers shall be responsible to contain and clean up any spills or incidents associated with their hauling or discharging of septage within the town. (Ord. 208 §14, 2001)

13.08.270 Record keeping.

The permittee shall maintain business records which verify disposal amount and sources of septage discharged into the town's wastewater facilities. All such records shall be retained for three years and shall be made available for inspection and copying at the request of the town. (Ord. 208 §15, 2001)

13.08.280 Site inspections and business records.

Business sites and records of permittees shall be subject to inspection and review by town representatives upon reasonable prior request and notification. (Ord. 208 §16, 2001)

13.08.290 Insurance coverage.

During the term of the permit, the permittee shall maintain at his own expense comprehensive general liability and automobile insurance with respect to the septage hauling business in a single limit amount of at least one million dollars. The permittee's liability insurance must include pollution coverage for discharge or damage caused by the release of septage into the environment. (Ord. 208 §17, 2001)

13.08.300 Other. provisions.

All septage haulers shall also be subject to the following provisions:

A. All septage shall be discharged only at a location designated by the town.

B. Discharge shall only be septage of domestic type and origin.

C. screening shall be employed to remove solids or other inert material prior to introduction of septage into the wastewater facilities.

D. Discharges shall be coordinated with, supervised, and inspected by an employee or officer of the town.

E. The septage hauler's equipment must be clean and maintained in good operating condition.

F. Upon completion of the discharge, the permittee shall provide appropriate cleanup and removal of accumulated debris from the discharge location.

G. A permit shall not relieve the permittee of his obligation to comply with all applicable statutes, ordinances, administrative regulations, rules, or standards under federal, state, or local law that are presently effective or become effective during the term of the permit. (Ord. 208 §18, 2001)

13.08.310 Penalty.

Violation of sections 13.08.130 through 13.08.300 shall be punishable as a municipal infraction subject to the provision of sections 7-1-4150 through 71-4152, MCA. (Ord. 208 §19, 2001)

13.08.320 Disposal of flexible hose prohibited.

It is unlawful for any person to discharge or dispose of flexible hosing into the town's sewer system. Flexible hosing means hosing of any material that is used primarily for the discharge of septic waste or septage from the holding tank of a recreational vehicle into the town sewer system. (Ord. 229 §1, 2007)

13.08.330 Installation of self-closing sewer caps.

Every owner or operator of a recreational vehicle park, campground, or other site within the town allowing for the dumping of septic waste or septage from holding tanks of recreational vehicles into the town sewer system shall install and maintain a self-closing sewer cap on each pipe inlet to the sewer system. (Ord. 229 §2, 2007)

13.08.340 Reducers required.

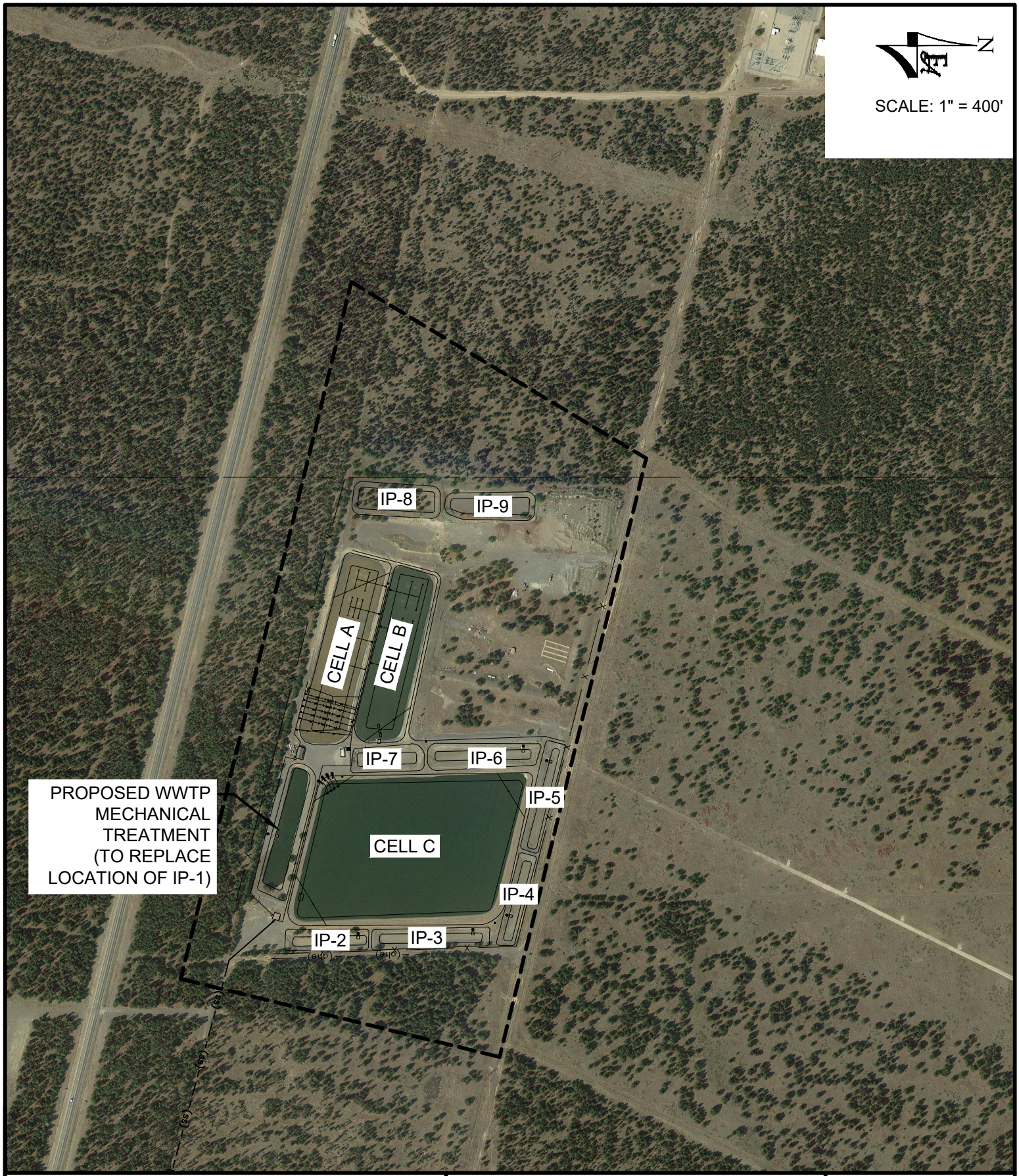
A. Each recreational vehicle park, campground, or other site allowing for the dumping of septic waste or septage from the holding tanks of recreational vehicles into the town sewer system that is constructed after the effective date of the ordinance codified in this section shall install and maintain a reducer as a component of the pipe inlet to the sewer system. The reducer shall have a maximum interior diameter of three inches, shall be located at least eight inches below the self-closing cap, and shall be maintained in good working order at all times.

B. Each recreational vehicle park, campground or other site allowing for the dumping of septic waste or septage from the holding tanks of recreational vehicles into the town sewer system that is constructed before the effective date of the ordinance codified in this section shall also install and maintain the reducer described in subsection A of this section. In the alternative, such an existing recreational vehicle park, campground or site shall either require RV owners to have available a universal sewer connector adapter (ninety-degree elbow) equipped with an airtight connection gasket for dumping septic waste or septage from RVs into the town sewer system or shall make such connector adapters available to owners for the dumping of septic waste or septage from their RVs. Dumping facilities at service stations or other dumping sites for septic waste or septage from recreational vehicles into the town sewer system that do not service only a single campsite must install and maintain the reducer described in subsection A of this section. (Ord. 229 §3, 2007)

13.08.350 Penalty.

Violation of Section 13.08.320, 13.08.330 or 13.08.340 shall be punishable as a municipal infraction subject to the provisions of Sections 7-1-4150 through 7-1-4152, MCA. (Ord. 229 §4, 2007)

APPENDIX G – Existing WWTP

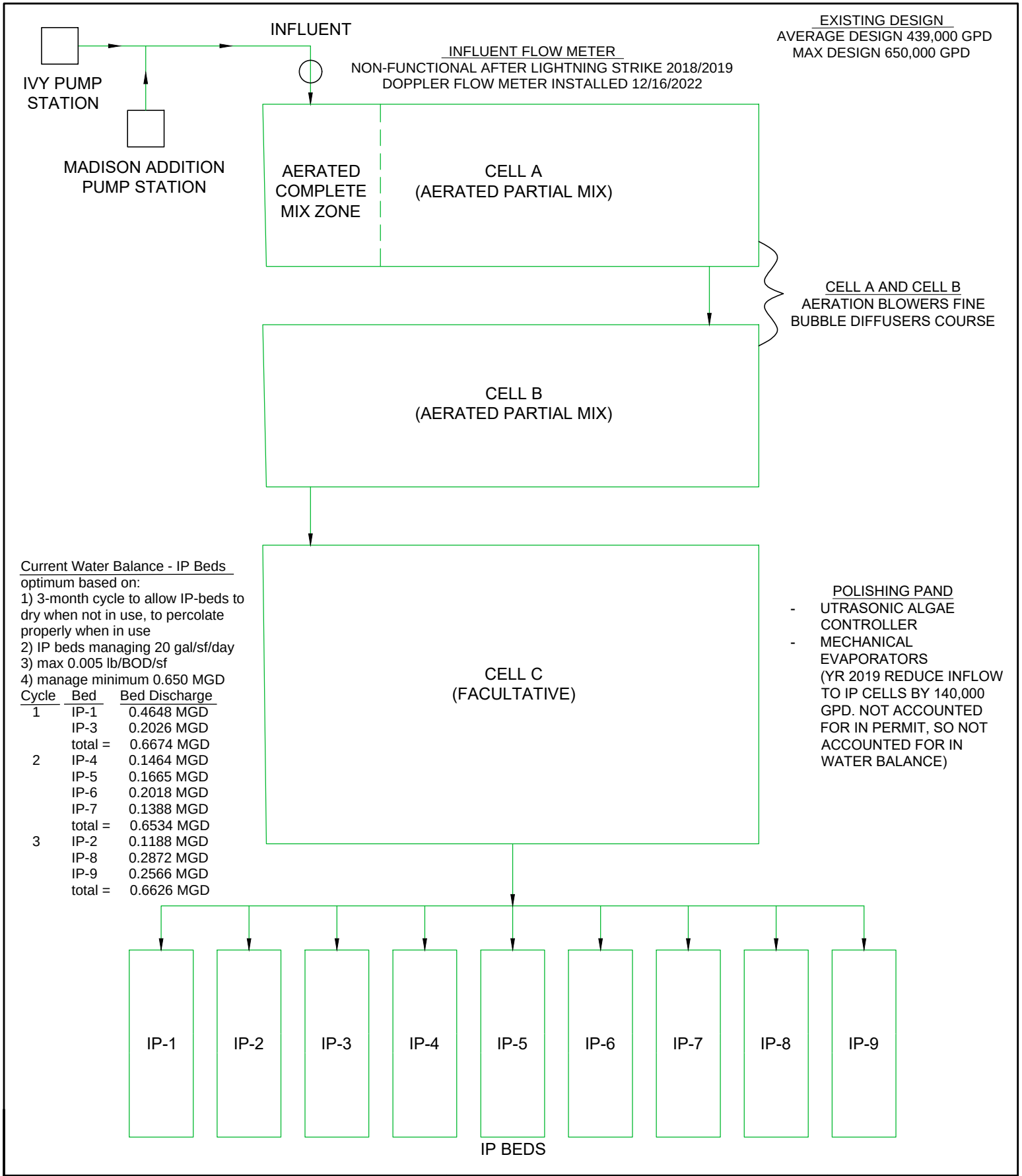


FORSGREN Associates Inc.
350 NORTH 2ND EAST, REXBURG, ID 83440
PH: 208.356.9201 FAX: 208.356.0206

PROPOSED (NEW) WEST YELLOWSTONE WWTP MECHANICAL TREATMENT SITE MAP

PROJECT NO: 01-22-0046-02

DATE: DEC. 2022



Current Water Balance - IP Beds
optimum based on:
1) 3-month cycle to allow IP-beds to dry when not in use, to percolate properly when in use
2) IP beds managing 20 gal/sf/day
3) max 0.005 lb/BOD/sf
4) manage minimum 0.650 MGD

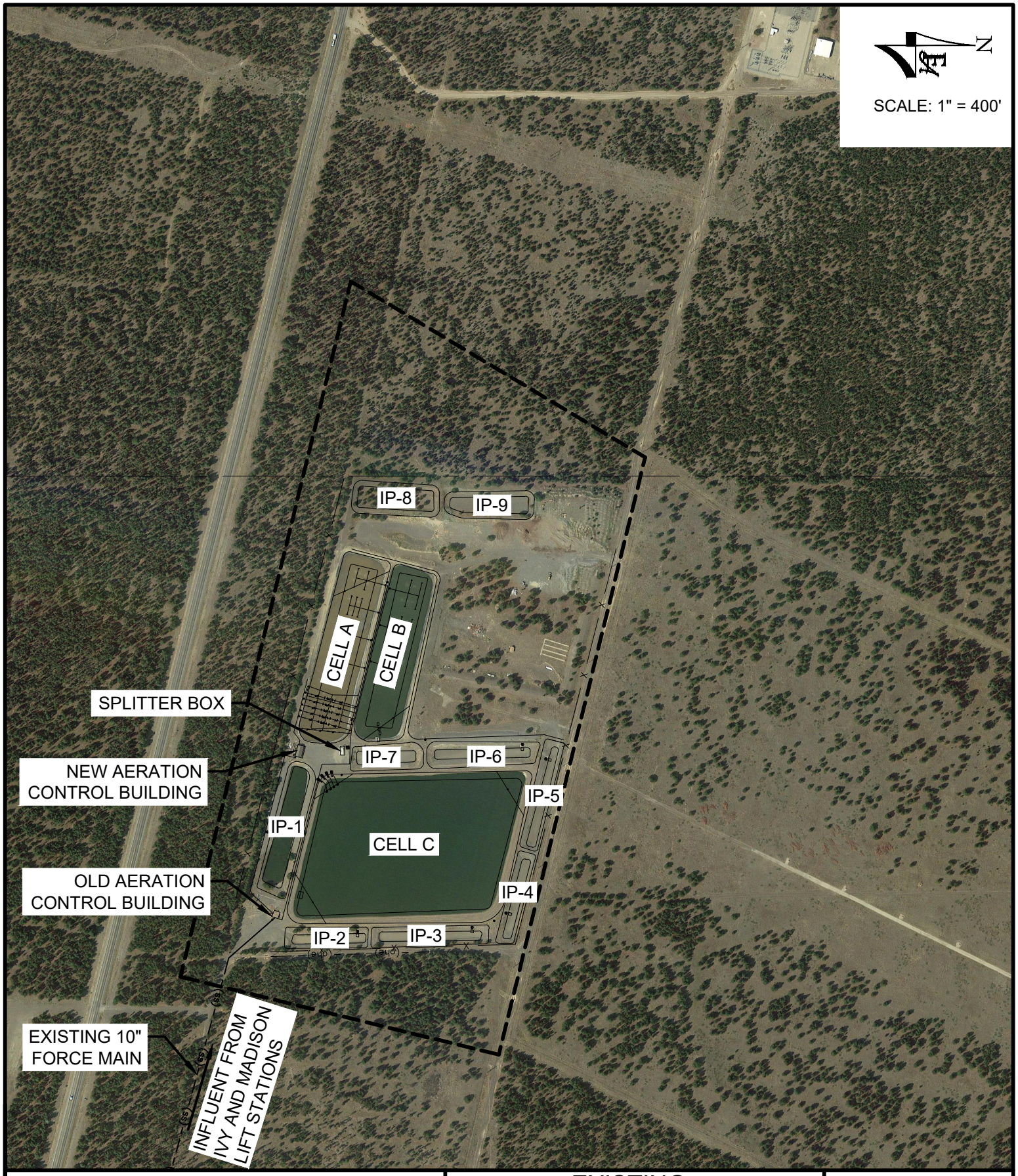
Cycle	Bed	Bed Discharge
1	IP-1	0.4648 MGD
	IP-3	0.2026 MGD
	total =	0.6674 MGD
2	IP-4	0.1464 MGD
	IP-5	0.1665 MGD
	IP-6	0.2018 MGD
	IP-7	0.1388 MGD
	total =	0.6534 MGD
3	IP-2	0.1188 MGD
	IP-8	0.2872 MGD
	IP-9	0.2566 MGD
	total =	0.6626 MGD

FORSGREN Associates Inc.
350 NORTH 2ND EAST, REXBURG, ID 83440
PH: 208.356.9201 FAX: 208.356.0206

EXISTING
WEST YELLOWSTONE WWTP
WATER BALANCE AND FLOW SCHEMATIC
650,000 GPD CURRENT AVERAGE FLOW

PROJECT NO:
01-22-0046-02

DATE:
DEC. 2022



FORSGREN Associates Inc.
350 NORTH 2ND EAST, REXBURG, ID 83440
PH: 208.356.9201 FAX: 208.356.0206

EXISTING
WEST YELLOWSTONE WWTP
LAGOONS AND IP BEDS
SITE MAP

PROJECT NO: 01-22-0046-02

DATE: DEC. 2022

APPENDIX H – Current SFEs

TOWN OF WEST YELLOWSTONE
SEWER DEVELOPMENT FEE STRUCTURE

CUSTOMER:
Contact:
Street Address
City, State, Zip
Phone No.

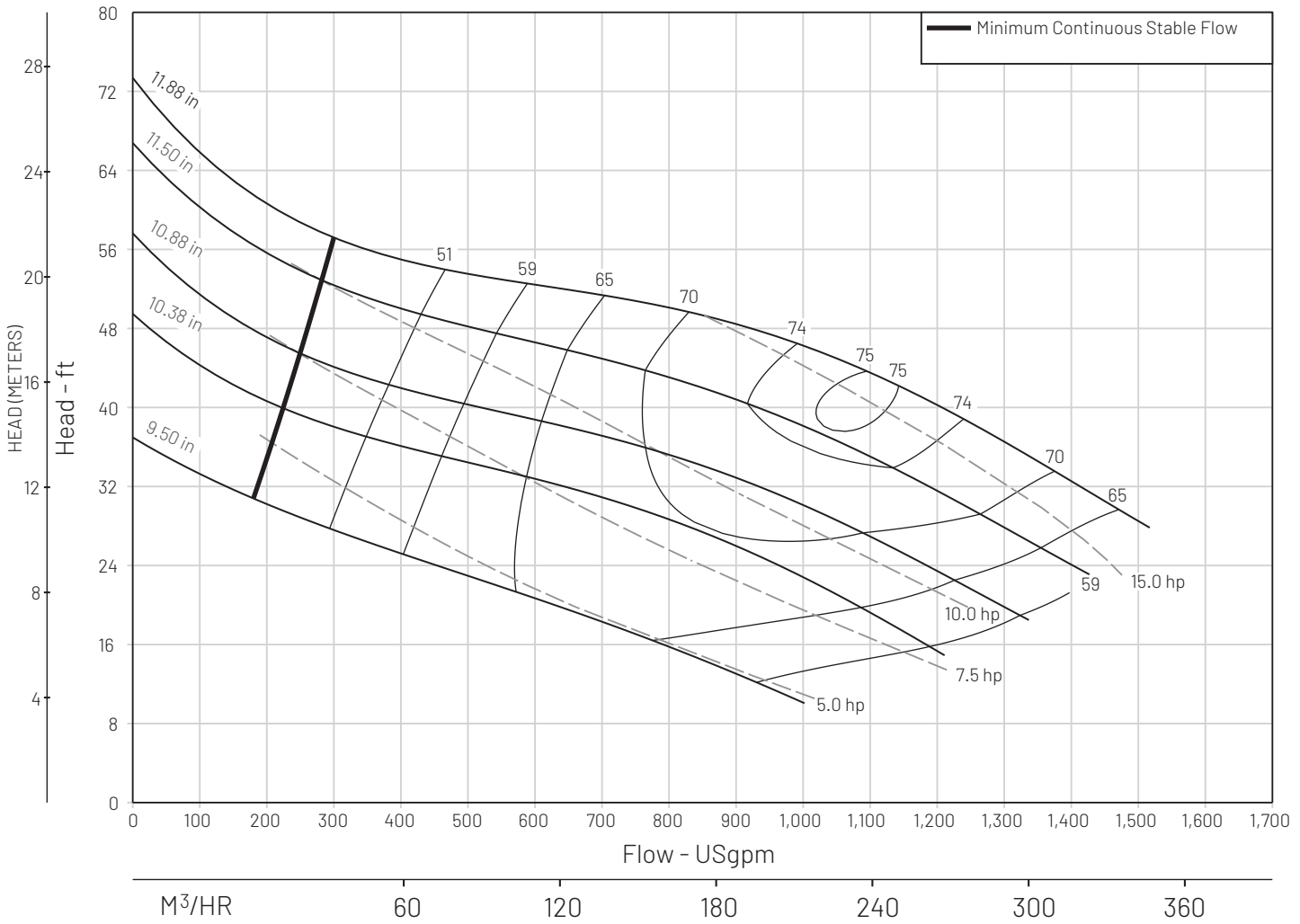
EIRWWA SFE SCHEDULE AND SFE CALCULATOR

USER TYPE	DESCRIPTOR	EVALUATON UNIT	NUMBER OF UNITS	EQUIVALENT UNIT Original SFE	EQUIVALENT UNIT Recommendation SFE	EQUIVALENT UNIT Adopted SFE
Institutional						
Assembly Hall/ Meeting House		Base		1.000		
Assembly Hall/ Meeting House		Seat			0.010	
Assembly Hall/ Meeting House	With Kitchen	Seat			0.022	
Church	Single Congregation	Congregation		2.000		
Church	Each additional	Congregation		1.000		
Church	Sunday only meetings	Congregation		1.000		
Church		Seat			0.010	
Church	With Kitchen	Seat			0.022	
Clinic/Massage/Spa		Establishment			1.000	
Hospital or clinic				3.000		
	Additional	Bed space		0.500		
Hospital		Bed space			0.667	
Hospital	Kitchen	Bed space			0.737	
Hospital	Laundry	Bed space			0.862	
Nursing Home/ Rest Home	Base Rate			1.000		
Nursing Home/ Rest Home	Additional	Resident		0.300		
Nursing Home/ Rest Home		Bed space			0.333	
School	with Cafeteria and Gym	Student			0.111	
School	with Cafeteria only	Student		0.030	0.067	
School	no Cafeteria or Gym	Student		0.020	0.049	
Time Share	hotel w/ full kitchen & W/D	Room			0.830	
Hotel		Room		0.200	0.670	
Hotel	Additive With Kitchen	Room		0.200	0.500	
Boarding/Rooming House/Bed & Breakfast	With Bathroom	Room		0.200		
Boarding/Rooming House/Bed & Breakfast		Guest			0.133	
Employee		Person			0.044	
Food Service						
Restaurant - Seating	up to 50 seats	Seat		2.000		
	For Each additional 25 seats	Seat		1.000		
Restaurant - Seating		Seat			0.033	
Restaurant - Drive In	<20 inside seats	Seat		2.000		
	Each additional 20 inside	seat		1.000		
Restaurant - Drive In		Seat			0.033	
Service Station		Establishment		2.000	2.000	
Service Station/C-Store	no public restroom	Establishment		2.000	2.000	
Service Station/C-Store	with public restrooms	Restroom			2.000	
Service Station/C-Store	with food prep facilities	Establishment/additive			1.000	
Drinking Establishment		Seat		0.060	0.049	
Employee		Employee			0.044	
Commercial and Industrial						
Bowling Alley		Lane		0.200	0.196	
Barber/Beauty Shop		Seat		0.200	0.331	
Laundry Self Service	up to 10 washers			2.000	1.502	
Laundry Self Service		Washer		0.100	0.222	
Garage or Maintenance Shop		Bay		1.000	0.133	
Car Wash		Bay		2.000	3.541	
Car Wash	Additive	Bay			1.563	
Grocery Store		Base		2.000		
Grocery Store	additive	Bakery		1.000		
Grocery Store		Employee			0.044	
Grocery Store	Additive	Butcher Shop		1.000	2.000	
Shopping Center (No food or laundry)		Parking Space			0.007	
Store or Business (up to 20 employees)		Base		1.000	0.880	
Store or Business	Additive	Employee		0.030	0.044	
Theatre - Auditorium		Seat		0.030	0.013	
Warehouse		Base		1.000		
Warehouse		Employee			0.058	
Warehouse	Showers/additive	Employee			0.178	
Offices	Up to 20 Employees	Base		1.000	0.880	
Offices	Additive	Employee		0.030	0.044	
Employee		Employee			0.087	
Seasonal and Recreational						
Fairground (peak day attendance)		Person			0.007	
RV Facility		Space		0.600		
RV Facility	Dump Station	Establishment		2.000		
Long Term RV Camp		Space			0.644	
Short Term RV site		Space			0.342	
Swimming Pool		Person			0.044	
Bathhouse	Toilets & Showers	Unit		1.000		
Bathhouse	Additional shower	Unit		0.500		
Bathhouse	Additional Toilet	Unit		0.200		
Bathhouse		Person			0.133	
Employee		Employee			0.044	
Misc. Category						
Designed or Calculated flow	volume	SFE value 225 gpd				
	0	225				0.00
TOTAL CALCULATED SFE VALUE						**0.00**

APPENDIX I – Iris Lift Station Pump

Performance Curve – S8F/S8FX

RPM: 1150 DISCHARGE: 8" SOLIDS: 3-1/4"



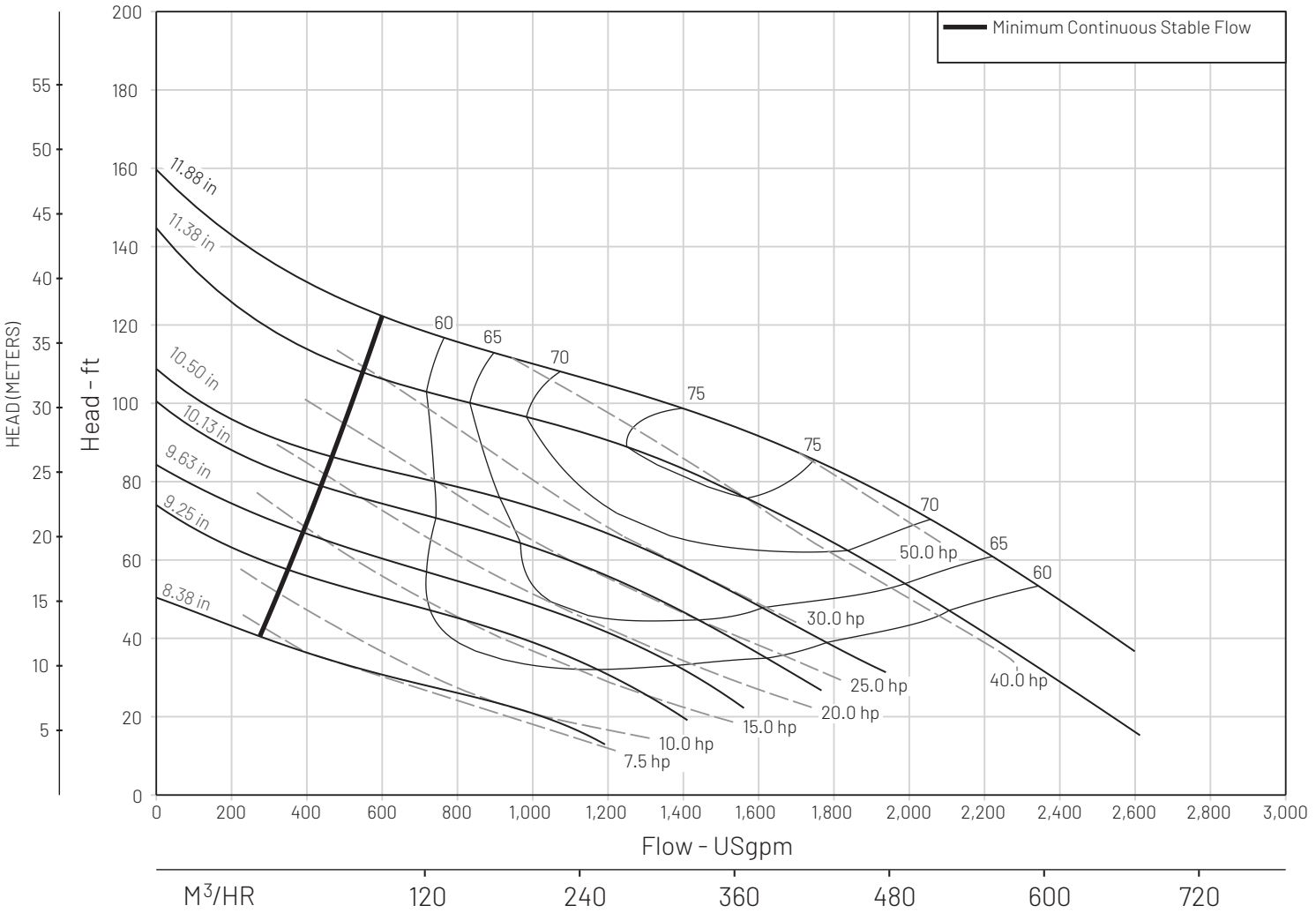
The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____ _

Performance Curve – S8F/S8FX

RPM: 1750 DISCHARGE: 8" SOLIDS: 3-1/4"



The curves reflect maximum performance characteristics without exceeding full load (Nameplate) horsepower. All pumps have a service factor of 1.2. Operation is recommended in the bounded area with operational point within the curve limit. Performance curves are based on actual tests with clear water at 70° F. and 1280 feet site elevation.

Conditions of Service:

GPM: _____ TDH: _____ _

PENTAIR HYDROMATIC

APPENDIX J – DEQ Guidelines for Sewer Rehabilitation

DEQ Montana Department of Environmental Quality

CIRCULAR DEQ-2

DESIGN STANDARDS FOR PUBLIC SEWAGE SYSTEMS

2018

2016 Edition

CIRCULAR DEQ-2
(formerly Circular WQB-2)

Adopted 03/24/95
Initially Effective 04/28/95
Revised 8/30/99
Revised 10/12/12
Revised 6/03/16
Revised 12/21/18

Montana Department of Environmental Quality
(Established 07/01/95; formerly Montana Department of Health and Environmental Sciences)

TABLE OF CONTENTS

NEW APPENDIX D

GUIDELINES FOR SEWER REHABILITATION

Sewer rehabilitation work as described in this guideline shall only be used when the existing infrastructure complies with the standards defined in DEQ-2, Chapter 30, unless a deviation from those standards is first sought and secured by the engineer. A rehabilitation project must be submitted to the Department by an engineer for approval unless the Department has issued written clarification that the project can be considered maintenance and not system modification. Plans and specifications or other documents, sufficient to allow for this determination, must be submitted to the Department to allow for this written determination.

D.1 SEWER SYSTEM REHABILITATION/REPLACEMENT TECHNIQUES

The objectives of sewer system rehabilitation/replacement are principally to preserve structural integrity and reduce I/I. There are a number of products available from a variety of manufacturers and contractors to help meet these objectives. Sewer system owners should take care to verify that a certain class of product is suited for its proposed application and that a specific product and its installer meet appropriate guidelines, including successful performance history. The purpose of this section is to highlight the advantages, disadvantages, and other issues for the various classes of sewer rehabilitation/replacement products.

D.11 Sewer Mains

The rehabilitation/replacement techniques for sewer mains are discussed in Table D-1.

Table D-1
Rehabilitation/Replacement Techniques for Sewer Mains

Technique	Advantages	Disadvantages	Issues
Sliplining Sliplining is the insertion of a new pipe, either continuous (typically butt-fused HDPE) or segmented (typically PVC, ductile iron, or HDPE), of smaller diameter into an existing host pipe.	• Economical. • Strong. • Bypass pumping of sewage may not be needed (for segmented slipliner pipe).	• Hydraulic capacity reduced. • Entry pits usually required. • Service lateral connections must be excavated.	• Flotation of sewer must be prevented during grouting of annular space. • Condition of existing pipe may limit length of slipliner runs between pits, diameter of slipliner pipe, and/or lengths of segmented pipe pieces.
Cured-In-Place Pipe (CIPP) The CIPP lining process consists of inverting a resin-impregnated flexible tube into an existing sewer using hydrostatic head or air pressure. The resin is cured using heat.	• No access pits. • Service laterals can be internally reopened. • Minimal annular space. • Suitable for various cross-sectional shapes. • Strength can be selected as a function of sewer thickness and resin formula. • Manholes can be rehabilitated rather than replaced.	• Bypass pumping of sewage required. • Limited local competition.	• Liner wet-out with resin must be ensured. • Resin pot life must not be exceeded. • Proper curing temperatures and times must be maintained. • I/I must be controlled during installation. • Expertise and performance of manufacturer and installer must be ensured.
Fold-and-Form Lining The fold-and-form process involves inserting a heated PVC or HDPE thermoplastic liner, folded or deformed into a U-shape, into an existing sewer and rerounding the liner using heat and pressure.	• No access pits. • Service laterals can be internally reopened. • Manholes can be rehabilitated rather than replaced.	• Annular space allows migration of I/I unless service lateral connections are sealed. • Bypass pumping of sewage required. • Limited local competition.	• Sewer contraction during cooling induces stresses; consider use of materials with lower coefficients of thermal expansion/contraction and minimize installation tension. • I/I must be controlled during installation. • Expertise and performance of manufacturer and installer must be ensured.
Pipe Bursting Pipe bursting is a trenchless replacement technology. Through pipe bursting, the existing pipeline is fragmented and forced into the surrounding soil by pulling a bursting head through the sewer. A new pipe (typically butt-fused HDPE) of equal or larger diameter is pulled behind the bursting head. New manholes are usually provided at insertion and withdrawal pits.	• Creates a new, strong pipeline, not just rehabilitation of existing pipes. • Capacity can be increased. • Preparation of existing sewer is not critical.	• Entry pits are required. • Service lateral connections must be excavated. • Bypass pumping of sewage required. • Manholes must usually be replaced.	• Condition and location of adjacent buried utilities and foundations as well as surface improvements should be considered. • Dense or rocky soil may limit suitability of this method.
Point Repairs Point repairs can structurally rehabilitate and eliminate infiltration in short sections of sewers by such methods as short CIPP liners, epoxy resins, and structural grouting sleeves. Defects such as protruding laterals can be repaired by robotic grinding. Point repairs may be needed to properly prepare the sewer for some of the manhole-to-manhole rehabilitation/replacement options described in the techniques listed above.	• Economical. • Repairs only what is needed.	• May not be appropriate for old sewers if many more repairs may be needed in near future.	• Goals of project must be considered, along with cost estimates, to ensure manhole-to-manhole rehabilitation and replacement is not warranted.

D.12 Side Sewer Repairs

Side sewers (also referred to as private service laterals) are sewers that connect building drains on private property to the public sewer main in the public right-of-way or easements.

Research studies by EPA and others indicate that a significant percentage of system-wide I/I is caused by private property sources. These include sump pumps, foundation drains, roof drains, and defects in service laterals. Service lateral defects include cracked, broken, or open-jointed laterals. In addition, infiltration frequently occurs at a leaky connection of the lateral to the sewer main.

Repair of service lateral defects can be accomplished using many of the same methods listed above for sewer mains. Currently, chemical grouting, CIPP lining, and pipe bursting, in addition to open-cut excavation and replacement, are most widely used.

Removal of other private property I/I sources requires an effective public awareness and disconnection program.

In cases where sewage backups have occurred through service laterals and into buildings, installation of backwater valves provides an immediate solution until the longer term sewer system rehabilitation/replacement program shows results. Backwater valves are typically installed beneath basement floor slabs on that portion of the building drain serving the basement only. This allows plumbing fixtures on the main floor and above to drain even during times when the sewer main is surcharged.

D.13 Manhole Rehabilitation

Manhole rehabilitation can be performed to correct structural deficiencies, address maintenance concerns, and/or eliminate I/I. Some of the manhole rehabilitation options include lining, sealing, grouting, or replacing various components or the entire manhole. The rehabilitation method selected depends on whether inflow or infiltration, or both, are to be eliminated and whether structural integrity is an issue.

Inflow typically occurs through holes in the manhole cover or around the manhole frame and cover. Manhole covers can be sealed by replacing them entirely with new watertight covers, or by sealing existing covers with rubber-covered gaskets, rubber vents, and pick-hole plugs, or by installing watertight inserts under the existing manhole covers (inflow protectors). Inflow protectors should contain vacuum and gas release valves.

Chemical grouting is commonly used to eliminate infiltration.

D.14 Trench Excavation for System Repairs and Retrofits

Pipeline separation is a necessity for protection of public health and safety, property, and the quality of the product in the pipeline. Pipeline failure or leaks result in contamination of the pipeline product that leads to a public health and safety risk. The process of excavating one pipeline to repair a leak increases the risk of complete failure of adjacent pipelines. This can also be a concern when excavating trenches for reclaimed wastewater retrofit project.

APPENDIX K – Engineer's Opinion of Probable Cost

- Alternative 2
- Alternative 3

ENGINEER'S OPINION OF PROBABLE COST

FORSGREN Associates Inc.

Alternative 2

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 2/27/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION		Total Price
CONSTRUCTION PROJECTS - SUMMARY			
Level Red - Significant Immediate Needs	Construction* $ 182,600		
1	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)		$ 10,000
2	Iris Lift Station: Replace Force Main Air Relief Valve		$ 12,000
3	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)		$ -
4	Iris Lift Station: Replace Safety Grate		$ 13,500
5	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes		$ 104,900
Level Yellow - Immediate Needs for 20-YR Planning Period (2023-2043)	Construction* $ 2,360,300		with 10B (not 10A)
6	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots		$ 127,400
7	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco		$ 33,000
8	Select Locations: Correct Protruding Service Lines		$ 98,000
9	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12" Iris)		$ 994,000
10A	Fix Bellies/Dips - Select Locations: Correct Structural Deficiencies - point repairs OR		$ 614,000
10B	Fix Bellies/Dips - Purchase and Use Vac-Flush Truck for System-Wide Use		$ 400,000
11	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)		$ -
12	System-Wide: Replace Manhole Rings (no cost - use maintenance)		$ -
13	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line		$ 163,200
Level Green - Monitor Needs	Construction* $ 2,158,900		
14	Alley A and Alley B: slipline clay pipe installed backwards		$ 1,660,700
	TOTAL CONSTRUCTION COST		**$ 3,616,700**
* Levels - Construction Cost with Contingency			
	Contingency Fund (70% Confidence Factor)	30%	$ 1,085,100
	TOTAL CONSTRUCTION COST		**$ 4,701,800**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT			
1	Legal, Bonding, Audit	0.4%	$ 18,800
2	Basic Design Services (includes PER, ER, and Design)	10%	$ 470,200
3	Bid Services	1%	$ 47,000
4	Construction Observation/Inspection	8%	$ 376,100
5	Post Construction Services	2%	$ 94,000
6	Financing Administration	5%	$ 235,100
7	Bond/Interim Interest	1%	$ 51,100
	SUBTOTAL OTHER PROJECT COSTS		**$ 1,292,300**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST			**$ 5,994,100**

ENGINEER'S OPINION OF PROBABLE COST

FORSGREN Associates Inc.

Alternative 2 - Red

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 2/27/2024

Client: Town of West Yellowstone — Prepared by: SD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION		Total Price
CONSTRUCTION COSTS - Level Red - Critical Needs			
1	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)		$ 10,000
2	Iris Lift Station: Replace Force Main Air Relief Valve		$ 12,000
3	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)		
4	Iris Lift Station: Replace Safety Grate		$ 13,500
5	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes		$ 104,900
	SUBTOTAL CONSTRUCTION COST		**$ 140,400**
	Contingency Fund (70% Confidence Factor)	30%	$ 42,200
	TOTAL CONSTRUCTION COST		**$ 182,600**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT			
1	Legal, Bonding, Audit	0.4%	$ 700
2	Basic Design Services (includes PER, ER, and Design)	10%	$ 18,300
3	Bid Services	1%	$ 1,800
4	Construction Observation/Inspection	8%	$ 14,600
5	Post Construction Services	2%	$ 3,700
6	Financing Administration	5%	$ 9,100
7	Bond/Interim Interest	1%	$ 1,800
	SUBTOTAL OTHER PROJECT COSTS		**$ 50,000**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST			**$ 232,600**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Yellow

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 2/27/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION		Total Price
CONSTRUCTION COSTS - Level Yellow - Immediate Needs for Planning Period (2023-2043)			
1	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots		$ 127,400
2	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco		$ 33,000
3	Select Locations: Correct Protruding Service Lines		$ 98,000
4	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12"		$ 994,000
5A	Fix Bellies/Dips - Select Locations: Correct Structural Deficiencies - point repairs **OR**		$ 614,000
5B	Fix Bellies/Dips - Purchase and Use Vac-Flush Truck for System-Wide Use		$ 400,000
6	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)		$ -
7	System-Wide: Replace Manhole Rings (no cost - use maintenance)		$ -
8	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line		$ 163,200
	SUBTOTAL CONSTRUCTION COST		**$ 1,815,600**
	Contingency Fund (70% Confidence Factor)	30%	$ 544,700
	TOTAL CONSTRUCTION COST		**$ 2,360,300**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT			
1	Legal, Bonding, Audit	0.4%	$ 9,400
2	Basic Design Services (includes PER, ER, and Design)	10%	$ 236,000
3	Bid Services	1%	$ 23,600
4	Construction Observation/Inspection	8%	$ 188,800
5	Post Construction Services	2%	$ 47,200
6	Financing Admininstration	5%	$ 118,000
7	Bond/Interim Interest	1%	$ 23,600
	SUBTOTAL OTHER PROJECT COSTS		**$ 646,600**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST			**$ 3,006,900**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Green

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 2/27/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION		Total Price
CONSTRUCTION COSTS - Level Green - Needs to Monitor (ongoing)			
1	Alley A and Alley B: slipline clay pipe installed backwards		$ 1,660,700
	SUBTOTAL CONSTRUCTION COST		**$ 1,660,700**
	Contingency Fund (70% Confidence Factor)	30%	$ 498,200
	TOTAL CONSTRUCTION COST		**$ 2,158,900**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT			
1	Legal, Bonding, Audit	0.4%	$ 8,600
2	Basic Design Services (includes PER, ER, and Design)	10%	$ 215,900
3	Bid Services	1%	$ 21,600
4	Construction Observation/Inspection	8%	$ 172,700
5	Post Construction Services	2%	$ 43,200
6	Financing Administration	5%	$ 107,900
7	Bond/Interim Interest	1%	$ 21,600
	SUBTOTAL OTHER PROJECT COSTS		**$ 591,500**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST			**$ 2,750,400**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Iris LS - exhaust fan and HS detection

Town of West Yellowstone

Wastewater Collection System Improvements

FORSGREN Associates Inc.

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 2/19/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Iris Lift Station - Upgrade Exhaust Fan - Safety Issue					
1	Mobilization	1	LS	$ 2,000	$ 2,000
2	Remove Existing Exhaust Fan	1	LS	$ 2,000	$ 2,000
3	Furnish and Install Fiberglass Belt-Driven Exhaust Fan	1	LS	$ 4,000	$ 4,000
4	Gas Detection and Connect to SCADA Alarm System	1	LS	$ 2,000	$ 2,000
	SUBTOTAL CONSTRUCTION COST				**$ 10,000**
	Contingency Fund (70% Confidence Factor)			30%	$ 3,000
	TOTAL CONSTRUCTION COST				**$ 13,000**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.4%	$ 100
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 1,300
3	Bid Services			1%	$ 100
4	Construction Observation/Inspection			8%	$ 1,000
5	Post Construction Services			1%	$ 100
	SUBTOTAL OTHER PROJECT COSTS				**$ 2,600**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 15,600**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Iris LS Replace Air Relief Valve

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Iris Lift Station - replace air relief valve					
1	Mobilization	1	LS	$ 3,000	$ 3,000
2	Remove Air Relief Valve	1	EA	$ 2,000	$ 2,000
3	Furnish and Install Relief Check Valve	1	EA	$ 7,000	$ 7,000
	SUBTOTAL CONSTRUCTION COST				**$ 12,000**
	Contingency Fund (70% Confidence Factor)			30%	$ 3,600
	TOTAL CONSTRUCTION COST				**$ 15,600**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ -
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 1,600
3	Bid Services			1%	$ 200
4	Construction Observation/Inspection			8%	$ 1,200
5	Post Construction Services			2%	$ 300
	SUBTOTAL OTHER PROJECT COSTS				**$ 3,300**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 18,900**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Iris LS Safety Grate

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Iris Lift Station - Safety Grates over Wet Well					
1	Mobilization	1	EA	$ 3,000	$ 3,000
2	Removal and Replacement of Grate Frame	1	EA	$ 8,000	$ 8,000
3	Furnish and Install Safety Grate (3x3)	1	EA	$ 1,000	$ 1,000
4	Furnish and Install Safety Grate (3x5)	1	EA	$ 1,500	$ 1,500
5					$ -
	SUBTOTAL CONSTRUCTION COST				**$ 13,500**
	Contingency Fund (70% Confidence Factor)			30%	$ 4,100
	TOTAL CONSTRUCTION COST				**$ 17,600**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 100
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 1,800
3	Bid Services			1%	$ 200
4	Construction Observation/Inspection			8%	$ 1,400
5	Post Construction Services			2%	$ 400
	SUBTOTAL OTHER PROJECT COSTS				**$ 3,900**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 22,000**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Iris LS replace pump rails, install influent shutoff

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Iris Lift Station - replace pump piping and rails					
1	Mobilization	1	LS	$ 30,000	$ 15,000
2	Remove pump piping and rails	1	LS	$ 20,000	$ 20,000
3	Furnish and install pump rails and piping	1	LS	$ 40,000	$ 60,000
4	Furnish and install 15" x 8" shutoff valve assembly	1	LS	$ 8,000	$ 9,900
	SUBTOTAL CONSTRUCTION COST				**$ 104,900**
	Contingency Fund (70% Confidence Factor)			30%	$ 31,500
	TOTAL CONSTRUCTION COST				**$ 136,400**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 400
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 13,600
3	Bid Services			1%	$ 1,400
4	Construction Observation/Inspection			8%	$ 10,900
5	Post Construction Services			2%	$ 2,700
	SUBTOTAL OTHER PROJECT COSTS				**$ 29,000**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 165,400**

ENGINEER'S OPINION OF PROBABLE COST

FORSGREN Associates Inc.

Alternative 2 - Slipline Cracks

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Sewer Rehabilitation - Slipline (cracks, gaps, offsets)					
1	Mobilization	1	LS	$ 6,000	$ 6,000
2	Sliplining Pipe - various locations	280	LF	$ 400	$ 112,000
3	Trim Service Line	1	LS	$ 6,000	$ 6,000
4	Replace Service Line (w/excavation, road repair)	2	EA	$ 4,000	$ 8,000
	SUBTOTAL CONSTRUCTION COST				**$ 132,000**
	Contingency Fund (70% Confidence Factor)			30%	$ 39,600
	TOTAL CONSTRUCTION COST				**$ 171,600**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 500
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 17,200
3	Bid Services			1%	$ 1,700
4	Construction Observation/Inspection			8%	$ 13,700
5	Post Construction Services			2%	$ 3,400
	SUBTOTAL OTHER PROJECT COSTS				**$ 36,500**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 208,100**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Slipline Roots

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS Date: 1/6/2024

Client: Town of West Yellowstone Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Sewer Rehabilitation - Slipline (roots in lines)					
1	Mobilization	1	LS	$ 6,000	$ 6,000
2	Sliplining Pipe - various locations	36	LF	$ 400	$ 14,400
3	Trim Service Line	1	LS	$ 4,000	$ 4,000
4	Replace Service Line (w/excavation, road repair)	1	EA	$ 4,000	$ 4,000
	SUBTOTAL CONSTRUCTION COST				**$ 28,400**
	Contingency Fund (70% Confidence Factor)			30%	$ 8,600
	TOTAL CONSTRUCTION COST				**$ 37,000**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 100
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 3,700
3	Bid Services			1%	$ 400
4	Construction Observation/Inspection			8%	$ 3,000
5	Post Construction Services			2%	$ 700
	SUBTOTAL OTHER PROJECT COSTS				**$ 7,900**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 44,900**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Correct Protruding Service Lines

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Iris Lift Station - trim/replace service lines					
1	Mobilization	1	EA	$ 6,000	$ 6,000
2	Trim Service Line	8	LS	$ 10,000	$ 80,000
3	Replace Service Line (w/excavation, road repair)	3	EA	$ 4,000	$ 12,000
	SUBTOTAL CONSTRUCTION COST				**$ 98,000**
	Contingency Fund (70% Confidence Factor)			30%	$ 29,400
	TOTAL CONSTRUCTION COST				**$ 127,400**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 400
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 12,700
3	Bid Services			1%	$ 4,000
4	Construction Observation/Inspection			8%	$ 10,200
5	Post Construction Services			2%	$ 2,500
	SUBTOTAL OTHER PROJECT COSTS				**$ 29,800**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 157,200**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Upgrade/Retrofit Iris LS

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Iris Lift Station - Upgrades (Pumps, Wet Well, Inflow Pipe Size, Rails, and Swing Check Valve)					
1	Mobilization	1	EA	$ 57,000	$ 57,000
2	Furnish and install 12-inch PVC Pipe	1,600	LF	$ 200	$ 320,000
3	Furnish and Install Manholes	6	EA	$ 14,000	$ 84,000
4	Electrical and electrical panel	1	LS	$ 40,000	$ 40,000
5	Generator (130kW)	1	LS	$ 80,000	$ 80,000
6	Pumps, Pump Assembly, Piping, Railings, Hoist	2	EA	$ 135,000	$ 270,000
7	Replace Ball Valves with Check Valves	2	EA	$ 7,000	$ 14,000
8	Replace 15" Influent Pipe with 24" PVC	1	LS	$ 25,000	$ 25,000
9	Upgrade Wet Well	1	LS	$ 100,000	$ 100,000
10	Traffic Control	1	LS	$ 4,000	$ 4,000
	SUBTOTAL CONSTRUCTION COST				**$ 994,000**
	Contingency Fund (70% Confidence Factor)			30%	$ 298,200
	TOTAL CONSTRUCTION COST				**$ 1,292,200**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 3,900
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 129,200
3	Bid Services			1%	$ 12,900
4	Construction Observation/Inspection			8%	$ 103,400
5	Post Construction Services			2%	$ 25,800
	SUBTOTAL OTHER PROJECT COSTS				**$ 275,200**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 1,567,400**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Point Repairs Bellying/Dips

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Correct pipe bellying - Point repairs					
1	Mobilization	1	LS	$ 78,000	$ 78,000
2	Remove pipe	900	LF	$ 100	$ 90,000
3	Furnish and Install 8" Sewer Collection Pipe	300	LF	$ 300	$ 90,000
4	Furnish and Install 10" Sewer Collection Pipe	300	LF	$ 350	$ 105,000
5	Furnish and Install 12" Sewer Collection Pipe	300	LF	$ 500	$ 150,000
6	Roadway Repair - gravel	450	LF	$ 60	$ 27,000
7	Roadway Repair - asphalt	450	LF	$ 100	$ 45,000
8	Sawcut Asphalt	900	LF	$ 10	$ 9,000
9	Traffic Control	1	LS	$ 20,000	$ 20,000
	SUBTOTAL CONSTRUCTION COST				**$ 614,000**
	Contingency Fund (70% Confidence Factor)			30%	$ 184,200
	TOTAL CONSTRUCTION COST				**$ 798,200**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 2,400
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 79,800
3	Bid Services			1%	$ 8,000
4	Construction Observation/Inspection			8%	$ 63,900
5	Post Construction Services			2%	$ 16,000
	SUBTOTAL OTHER PROJECT COSTS				**$ 170,100**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 968,300**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Alley A - replace line MH 65 to MH 66

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Replace Line (Alley A, MH 65 to MH 66)					
1	Mobilization	1	EA	$ 36,000	$ 36,000
2	Furnish and install 8-inch PVC pipe	320	LF	$ 200	$ 64,000
3	Roadway Repair - gravel	320	LF	$ 60	$ 19,200
4	Roadway Repair - asphalt (include chip & seal)	0	LF	$ 100	$ -
5	Furnish and Install Manholes	1	EA	$ 15,000	$ 15,000
6	Remove Exisitng Manhole	1	EA	$ 3,000	$ 3,000
7	Cut and Connect Exisitng Sewer Line	1	EA	$ 6,000	$ 6,000
8	Service Line Disconnects and Connects	8	EA	$ 2,000	$ 16,000
9	Traffic Control	1	LS	$ 4,000	$ 4,000
	SUBTOTAL CONSTRUCTION COST				**$ 163,200**
	Contingency Fund (70% Confidence Factor)			30%	$ 49,000
	TOTAL CONSTRUCTION COST				**$ 212,200**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 600
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 21,200
3	Bid Services			1%	$ 2,100
4	Construction Observation/Inspection			8%	$ 17,000
5	Post Construction Services			2%	$ 4,200
	SUBTOTAL OTHER PROJECT COSTS				**$ 45,100**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 257,300**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 2 - Slipline Alleys A & B

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Iris Lift Station - Slipline 12" in Alleys A & B					
1	Mobilization	1	LS	$ 138,000	$ 138,000
2	Sliplining pipe - entire lengths Alley A & Alley B	6,000	LF	$ 245	$ 1,470,000
3	Trim Service Line	1	LS	$ 8,000	$ 8,000
4	Replace Service Line (inlcudes excavation, road repair)	10	EA	$ 4,000	$ 40,000
5	Traffic Control	1	LS	$ 4,700	$ 4,700
	SUBTOTAL CONSTRUCTION COST				**$ 1,660,700**
	Contingency Fund (70% Confidence Factor)			30%	$ 498,300
	TOTAL CONSTRUCTION COST				**$ 2,159,000**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 6,500
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 215,900
3	Bid Services			1%	$ 21,600
4	Construction Observation/Inspection			8%	$ 172,700
5	Post Construction Services			2%	$ 43,200
	SUBTOTAL OTHER PROJECT COSTS				**$ 459,900**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 2,618,900**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 3

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 2/19/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION		Total Price
CONSTRUCTION PROJECTS - SUMMARY			
No Level Assigned - Consider all one project over planning cycle			
1	Iris Lift Station - separation wall, upgrade pumps, wet well, valves, rails, inlet pipe increased, grates		$ 794,500
2	Correct Structural Issues (point repairs and replace sections of of pipe)		$ 1,966,200
3	Increase Capacity Iris Street - slipline and point repairs on eastern 12" in Iris		$ 508,000
4	Select Locations: Correct Protruding Service Lines		$ 98,000
5	Select Locations: Correct Structural Deficiencies - point repairs: Bellies/Dips		$ 614,000
6	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)		$ -
7	System-Wide: Replace Manhole Rings (no cost - use maintenance)		$ -
8	Alley A and Alley B: replace pipes and manholes		$ 3,168,800
	TOTAL CONSTRUCTION COST		**$ 7,149,500**
	Contingency Fund (70% Confidence Factor)	30%	$ 2,144,900
	TOTAL CONSTRUCTION COST		**$ 9,294,400**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT			
1	Legal, Bonding, Audit	0.4%	$ 37,200
2	Basic Design Services (includes PER, ER, and Design)	10%	$ 929,400
3	Bid Services	1%	$ 92,900
4	Construction Observation/Inspection	8%	$ 743,600
5	Post Construction Services	2%	$ 185,900
6	Financing Administration	5%	$ 464,700
7	Bond/Interim Interest	1%	$ 92,900
	SUBTOTAL OTHER PROJECT COSTS		**$ 2,546,600**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST			**$ 11,841,000**

ENGINEER'S OPINION OF PROBABLE COST

FORSGREN Associates Inc.

Alternative 3 - upgrade/retrofit Iris LS

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 2/19/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Iris Lift Station - Upgrades (Pumps, Wet Well, Inflow Pipe Size, Rails, and Swing Check Valve)					
1	Mobilization	1	LS	$ 90,000	$ 90,000
2	Separation Wall (separate electrical and HS)	1	LS	$ 60,000	$ 60,000
3	Generator	1	LS	$ 80,000	$ 80,000
4	Pumps, Pump Assembly, Piping, Railings, Hoist	2	EA	$ 135,000	$ 270,000
5	Replace Ball Valves with Check Valves	2	EA	$ 7,000	$ 14,000
8	Replace 15" Influent Pipe with 24" PVC	1	LS	$ 25,000	$ 25,000
9	Shutoff Valves Before Sand Trap	2	EA	$ 8,000	$ 16,000
10	Replace Vent Fan with Fiberglass Vent Fan, Install HS monitor	1	LS	$ 10,000	$ 10,000
11	Upgrade/Retrofit Wet Well	1	LS	$ 200,000	$ 200,000
12	Furnish, Install hinged, permanently-mounted safety grate	1	LS	$ 13,500	$ 13,500
13	Replace Air Relief Valve	1	LS	$ 12,000	$ 12,000
14	Traffic Control	1	LS	$ 4,000	$ 4,000
	SUBTOTAL CONSTRUCTION COST				**$ 794,500**
	Contingency Fund (70% Confidence Factor)			30%	$ 238,400
	TOTAL CONSTRUCTION COST				**$ 1,032,900**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.4%	$ 4,100
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 103,300
3	Bid Services			1%	$ 10,300
4	Construction Observation/Inspection			8%	$ 82,600
5	Post Construction Services			1%	$ 10,300
	SUBTOTAL OTHER PROJECT COSTS				**$ 210,600**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 1,243,500**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 3 - Point Repairs

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Point Repairs (all but Iris Street)					
1	Mobilization	1	LS	$ 20,000	$ 20,000
2	Furnish and Install 8-inch Gravity Collection	5,990	LF	$ 200	$ 1,198,000
3	Road Repair - Gravel	2,750	LF	$ 60	$ 165,000
4	Road Repair - Asphalt	3,240	LF	$ 120	
5	Chip Seal Full Width of Asphalt Street	3,240	LF	$ 60	$ 194,400
	SUBTOTAL CONSTRUCTION COST				**$ 1,577,400**
	Contingency Fund (70% Confidence Factor)			30%	$ 473,300
	TOTAL CONSTRUCTION COST				**$ 2,050,700**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 6,200
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 205,100
3	Bid Services			1%	$ 20,500
4	Construction Observation/Inspection			8%	$ 164,100
5	Post Construction Services			2%	$ 41,000
	SUBTOTAL OTHER PROJECT COSTS				**$ 436,900**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 2,487,600**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 3 - Slipline 12" on east side of Iris Street

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Sewer main installation - MH to Iris Lift Station					
1	Mobilization	1	EA	$ 50,000	$ 50,000
2	Slipline 12" (Eastern Line)	1,500	LF	$ 300	$ 450,000
3	Traffic Control	1	LS	$ 8,000	$ 8,000
	SUBTOTAL CONSTRUCTION COST				**$ 508,000**
	Contingency Fund (70% Confidence Factor)			30%	$ 152,400
	TOTAL CONSTRUCTION COST				**$ 660,400**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 2,000
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 66,000
3	Bid Services			1%	$ 6,600
4	Construction Observation/Inspection			8%	$ 52,800
5	Post Construction Services			2%	$ 13,200
	SUBTOTAL OTHER PROJECT COSTS				**$ 140,600**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 801,000**

ENGINEER'S OPINION OF PROBABLE COST

Alternative 3 - Alley A&B replace pipes & MH's

Town of West Yellowstone

Wastewater Collection System Improvements

Project No.

Project: West Yellowstone Wastewater Collection FPS — Date: 1/6/2024

Client: Town of West Yellowstone — Prepared by: SAD, MSR

Line No.	UNIT PROCESS / ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	Total Price
CONSTRUCTION COSTS - Iris Lift Station - Replace 12" in Alleys A & B					
1	Mobilization	1	LS	$ 200,000	$ 200,000
2	Remove and Dispose Clay Pipe and Manholes	6,000	LF	$ 120	$ 720,000
3	Furnish and install 12-inch Gravity Collection	6,000	LF	$ 280	$ 1,680,000
4	Roadway Repair - gravel	5,790	LF	$ 60	$ 347,400
5	Roadway Repair - asphalt (include chip & seal)	210	LF	$ 100	$ 21,000
6	Saw-Cut Asphalt	420	LF	$ 20	$ 8,400
7	Furnish and Install Manholes	12	EA	$ 15,000	$ 180,000
8	Traffic Control	1	LS	$ 12,000	$ 12,000
	SUBTOTAL CONSTRUCTION COST				**$ 3,168,800**
	Contingency Fund (70% Confidence Factor)			30%	$ 950,700
	TOTAL CONSTRUCTION COST				**$ 4,119,500**
ENGINEERING, CONSTRUCTION OBSERVATION & FINANCIAL MANAGEMENT					
1	Legal, Bonding, Audit			0.3%	$ 12,400
2	Basic Design Services (includes PER, ER, and Design)			10%	$ 412,000
3	Bid Services			1%	$ 41,200
4	Construction Observation/Inspection			8%	$ 329,600
5	Post Construction Services			2%	$ 82,400
	SUBTOTAL OTHER PROJECT COSTS				**$ 877,600**
TOTAL ENGINEER'S OPINION OF PROBABLE PROJECT COST					**$ 4,997,100**

APPENDIX L – Life Cycle Costs and Rate Study

LIFE CYCLE COSTS: NET PRESENT VALUE OF FEASIBLE ALTERNATIVES

Town of West Yellowstone, MT - Wastewater Collection FPS, 2023

Feasible Alternatives	Total Capital Cost	Annual O&M and SLA Cost	Present Worth of O&M	Salvage Value at Planning Period End	Present Worth of Salvage Value	Net Present Value with No Salvage	Net Present Value with Salvage
Alternative 1 - No Action - Not Feasible	$ -	$ 298,853	$ 4,658,868	$ -	$ -	$ 4,658,868	**$ 4,658,868**
Alternative 2	$ 5,994,100	$ 37,000	$ 576,799	$ 194,371	$ 118,619	$ 6,570,899	**$ 6,452,280**
Alternative 3	$ 11,841,000	$ 34,000	$ 530,032	$ 78,329	$ 47,802	$ 12,371,032	**$ 12,323,230**

Life cycle years (n) =	20
Discount rate* used in analysis (i)	2.5%

*(2024 Discount Rates for OMB Circular A-94, Appendix C for cost effectiveness analysis
https://www.whitehouse.gov/omb/information-for-agencies/circulars/

Capital Cost = Total Project Cost (construction, non-construction, and construction contingency)
Present Worth of O&M = {based on Year 1 Annual O&M cost} [A*(((1+i)^n)-1)/((i*(1+i)^n))]
Salvage Values at Planning Period End, See Salvage Value Comparison for Calculated Value
Present Worth of Salvage Value = Calculated Salvage Value at Planning Period End X (1/(1+i)^n)
Net Present Worth = Capital Cost + Present Worth of O&M - Present Worth of Salvage Value
Annual O&M does not include Recurring costs of Annual Short Lived Assets
Use Depreciation for Salvage Value
Salvage value based on straight-line depreciation from the initial cost to the end of the planning period.

Alternative 2 Salvage Value

Item Description	Design Life in Years	Estimated Depreciation or Inflation Rate %	Present Capital Cost	Salvage Value at Period End dep=P*(1-i)^n infl=P*(1+i)^n
Salvage LS pumps and flush and vac trucks	20	6.00%	$ 670,000.00	$ 194,371.18
Engineering and Other Costs (except land)	-	-	-	$ -
Decommissiong Cost	-	-	$ -	$ -
Land	20	6%	$ -	$ -
TOTAL			**$ 670,000.00**	**$ 194,371.18**

Alternative 3 Salvage Value

Item Description	Design Life in Years	Estimated Depreciation or Inflation Rate %	Present Capital Cost	Salvage Value at Period End dep=P*(1-i)^n infl=P*(1+i)^n
Salvage lift station pumps	20	6.00%	$ 270,000.00	$ 78,328.69
Engineering and Other Costs (except land)	-	-	-	$ -
Decommissiong Cost	-	-	$ -	$ -
Land	20	6%	$ -	$ -
TOTAL			**$ 270,000.00**	**$ 78,328.69**

Town of West Yellowstone - Wastewater Collection System		
Alternative 2 - Yellow Level		
Rate Analysis		
February 2024		
COSTS		
Construction and Equipment	$	2,360,300
Engineering	$	495,600
Administration, bonding, and interest on interim financing, bond counsel	$	151,000
TOTAL PROJECT COST	$	3,006,900
FUNDING SOURCES		
Grant		
County Contribution	$	-
Local Contribution	$	-
Commerce CDBG	$	*500,000*
Army Corps of Engineers	$	-
Loan		
USDA Rural Development Loans / Revenue Bond / DEQ Water Pollution Control State Revolving Fund	$	2,506,900
TOTAL FUNDING	**$**	**3,006,900**
RATE COMPONENTS		
Debt		
Term (years)		20
Interest Rate		2.500%
Annual Payment	$	160,810.44
No. of Current SFE's		2,643
Monthly Debt Payment / SFE-Month	$	5.07
Reserve per Month, 10% debt	$	0.51
O&M		
Proposed WWTP Annual O&M Costs	$	28,000
Existing Collection Annual O&M Costs		
O&M / SFE-Month	$	0.88
Short Lived Assets		
Proposed WW Add Annual Short-Lived Asset Costs	$	56,010
Short Lived Asset / SFE-Month	$	1.77
TOTAL MONTHLY CHARGE / SFE	**$**	**8.23**

Town of West Yellowstone - Wastewater Collection System		
Alternative 2 - Needs		
Rate Analysis		
February 2024		
COSTS	**Red**	**Yellow & Green**
Construction and Equipment	$ 182,600	$ 4,519,200
Engineering	$ 38,300	$ 949,000
Administration, bonding, and interest on interim financing, bond counsel	$ 11,700	$ 289,100
TOTAL PROJECT COST	$ 232,600	$ 5,757,300
FUNDING SOURCES		
Grant		
County Contribution	*$ -*	*$ -*
Local Funding - Sewer Funds, Infrastructure, Operations	*$ 232,600*	*$ -*
Commerce CDBG	*$ -*	*$ 500,000*
Army Corps of Engineers	*$ -*	*$ -*
Loan		
USDA Rural Development Loans / Revenue Bond / DEQ Water Pollution Control State Revolving Fund	$ -	$ 5,257,300
TOTAL FUNDING	**$ 232,600**	**$ 5,757,300**
RATE COMPONENTS		
Debt	**0**	**$ 5,757,300**
Term (years)	20	20
Interest Rate	2.500%	2.500%
Annual Payment	$ -	$ 337,240.70
No. of Current SFE's	2,643	2,643
Monthly Debt Payment / SFE-Month	$ -	$ 10.63
Reserve per Month, 10% debt	$ -	$ 1.06
O&M		
Proposed WWTP Annual O&M Costs	$ 4,000	$ 33,000
O&M / SFE-Month	$ 0.13	$ 1.04
Short Lived Assets		
Proposed WW Add Annual Short-Lived Asset Costs	$ 3,040	$ 56,010
Short Lived Asset / SFE-Month	$ 0.10	$ 1.77
TOTAL MONTHLY CHARGE / SFE	**$ 0.22**	**$ 14.49**
	add to rate with other projects	total ~ $15/SFE $ 14.71

Town of West Yellowstone - Wastewater Collection System		
Alternative 2 - Green Level		
Rate Analysis		
February 2024		
COSTS		
Construction and Equipment	$	2,158,900
Engineering	$	453,400
Administration, bonding, and interest on interim financing, bond counsel	$	138,100
TOTAL PROJECT COST	$	2,750,400
FUNDING SOURCES		
Grant		
County Contribution	$	-
Local Contribution	$	-
Commerce CDBG	$	*500,000*
Army Corps of Engineers	$	-
Loan		
USDA Rural Development Loans / Revenue Bond / DEQ Water Pollution Control State Revolving Fund	$	2,250,400
TOTAL FUNDING	**$**	**2,750,400**
RATE COMPONENTS		
Debt		
Term (years)		20
Interest Rate		2.500%
Annual Payment	$	144,356.70
No. of Current SFE's		2,643
Monthly Debt Payment / SFE-Month	$	4.55
Reserve per Month, 10% debt	$	0.46
O&M		
Proposed WWTP Annual O&M Costs	$	5,000
Existing Collection Annual O&M Costs		
O&M / SFE-Month	$	0.16
Short Lived Assets		
Proposed WW Add Annual Short-Lived Asset Costs	$	-
Short Lived Asset / SFE-Month	$	-
TOTAL MONTHLY CHARGE / SFE	**$**	**5.16**

West Yellowstone - Wastewater Collection System

Alternative 2 - Red Level

Short-Lived Assets and O&M

Updated 2/26/2024

inflation (i) = 3.00%

Life of Project= 20

FV = PV*(1+I)^n

Description	Time Interval	Cost (Present Value)					Present Value (over facility life)
** total O&M**		Present Value (PV)	Present Value	Future Value	~Future Value at SLA Life	Future	
Alternative 2 - Recommended Alternative - Replacement (Short-Lived Assets) & Recurring Costs	**Life (Years)**	**# Units**	**Add w/2023 WW FPS**	**Initial Replacement/ Repair Cost**	**Annual Cost**	**Replacement Cost (with inflation)**	**Project Life FV Replacement Cost**	**Annual Cost from FV -per unit-**	**Total Annual Cost from FV -WW FPS-**
Iris Lift Station HS Gas Monitor **	10	1	$ 4,000	$ 4,000	$ 400	$ 5,376	$ 10,760	$ 540	$ 540
Isolation Valves: 12" Lines before Sand Trap	15	2	$ 12,000	$ 12,000	$ 800	$ 18,696	$ 24,930	$ 1,250	$ 2,500
Replacement TOTAL					**$ 1,200**				**$ 3,040**

Operation & Maintenance Costs	Period (Years)	# Units	Add w/2023 WW FPS	Annual Cost	Capital Cost	Future Value over 1 yr	Future Value over 20 yr	Annual Cost	PV Total Annual Cost from FV -All Units-
Personnel (Salary, Benefits, Training, Insurc.)									
Administrative Costs									
Land Rental									
Insurance									
Energy Cost (Fuel and/or Electrical)	1	1	$ 2,000	$ 2,000	$ 2,000	$ 2,060			$ 2,000
Repair and Maintenance	1	1	$ 2,000	$ 2,000	$ 2,000	$ 2,060			$ 2,000
Monitoring and Testing									
Cleaning & Chemicals (includes vac truck use)									$ -
Professional Services									
Telephone and Internet									
Miscellaneous - Supplies									
Miscellaneous - Travel									
Miscellaneous - Training, Dues, Registration									
Solids Disposal									
Depreciation									
Other Utilities									
O&M TOTAL			$ 4,000	$ 4,000	**$ 4,000**				**$ 4,000**

West Yellowstone - Wastewater Collection System

Alternative 2 - Yellow Level

Short-Lived Assets and O&M

Updated 1/3/2024

inflation (i) =

Life of Project=

FV =

Description

** total O&M**

Replacement (Short-Lived Assets) & Recurring Costs	Life (Years)	# Units	Add w/FPS	Initial Replacement/ Repair Cost	Present Value (PV) Annual Cost
NEW IRIS LS	20	2	$80,000	$ 80,000	$ 4,000
Flush Truck and Vac Truck	15	1	$ 400,000	$ 400,000	$ 26,667
Replacement TOTAL					**$ 30,667**

Operation & Maintenance Costs	Period (Years)	# Units	Add w/FPS	Annual Cost	Annual Cost
Personnel (Salary, Benefits, Training, Insurc.)					
Administrative Costs					
Land Rental					
Insurance					
Energy Cost (Fuel and/or Electrical)	1	1	$ 10,000	$ 10,000	
Repair and Maintenance	1	1	$ 10,000	$ 10,000	
Monitoring and Testing					
Cleaning & Chemicals			$ 8,000	$ 8,000	
Professional Services					
Telephone and Internet					
Miscellaneous - Supplies					
Miscellaneous - Travel					
Miscellaneous - Training, Dues, Registration					
Solids Disposal					
Depreciation					
Other Utilities					
O&M TOTAL			$ 28,000	$ 28,000	

3.00%
20
PV*(1+I)^n

Future Value	~Future Value at SLA Life	Future	
Replacement Cost (inflation)	**Project Life FV Replacement Cost**	**Annual Cost from FV -per unit-**	**Total Annual Cost from FV All Units-**
$ 144,489	$ 144,490	$ 7,230	$ 14,460
$ 623,187	$ 830,920	$ 41,550	$ 41,550
			$ 56,010

Future Value over 1 yr	**Future Value over 20 yr**	**Annual Cost**	**Total Annual Cost from FV All Units-**
			$ 10,000
			$ 10,000
			$ 8,000
			$ 28,000

West Yellowstone - Wastewater Collection System

Alternative 2 - Green Level

Short-Lived Assets and O&M

Updated 2/26/2024

Green	No additional costs since replacing pipe already being maint

Description

** total O&M**				Present Value (PV)	PV over life of system
Alternative 2 - Recommended Alternative - Replacement (Short-Lived Assets) & Recurring Costs	**Life (Years)**	**# Units**	**Add w/2023 WW FPS**	**Initial Replacement/ Repair Cost**	
Iris and Madison Lift Station Pumps, rails, etc					
Pump Controls					
NEW IRIS LS					
Vault Access Lids					
Access Hatches and Grates					
Alarm and SCADA					
Iris Lift Station HS Gas Monitor **				$ -	
Isolation Valves: 12" Lines before Sand Trap				$ -	
Iris Lift Station Exhaust Fan					
Iris and Madison Lift Station Generators					
Iris Lift Station Grinder Pump					
Flush Truck and Vac Truck				$ -	
Replace Pipe/Slipline - not included w/ FPS				$ -	
Replacement TOTAL					$ -

Operation & Maintenance Costs	**Period (Years)**	**# Units**	**Add w/2023 WW FPS**	**Annual Cost**
Personnel (Salary, Benefits, Training, Insurc.)				
Administrative Costs				
Land Rental				
Insurance				
Energy Cost (Fuel and/or Electrical)	1			
Repair and Maintenance - slipline material	1	1	$ 5,000	$ 5,000
Monitoring and Testing				
Cleaning & Chemicals -new LS	1			
Professional Services				
Telephone and Internet				
Miscellaneous - Supplies				
Miscellaneous - Travel				
Miscellaneous - Training, Dues, Registration				
Solids Disposal				
Depreciation				

Other Utilities		
O&M TOTAL	$ 5,000	$ 5,000

	inflation (i) =	3.00%	
	Life of Project=	50	yrs for slipline or clay pipe
enanced.	FV =	PV*(1+I)^n	

Annual Cost based on PV	Present Value	Future Value	~Future Value at SLA Life	Future	
Replacement costs/yr	**Annual Cost**	**Replacement Cost (infl=4%)**	**Project Life FV Replacement Cost**	**Annual Cost from FV -per unit-**	**Annual Cost**
		$ -			
		$ -			
		$ -			
		$ -			
	$ -				**$ -**

	Capital Cost	**Future Value over 1 yr**	**Future Value over 20 yr**	**Annual Cost**	**Annual cost**
	$ -	$ -			$ -
	$ 5,000	$ 5,150			$ 5,000
	$ -	$ -			$ -

$ 5,000	$ 5,000

Town of West Yellowstone - Wastewater Collection System	
Alternative 3 - All Levels	
Rate Analysis	
February 2024	
COSTS	
Construction and Equipment	$ 9,294,400
Engineering	$ 1,951,800
Administration, bonding, and interest on interim financing, bond counsel	$ 594,800
TOTAL PROJECT COST	$ 11,841,000
FUNDING SOURCES	
Grant	
County Contribution	$ -
Local Contribution	$ *110,000*
Commerce CDBG	$ *500,000*
Army Corps of Engineers	$ -
Loan	
USDA Rural Development Loans / Revenue Bond / DEQ Water Pollution Control State Revolving Fund	$ 11,231,000
TOTAL FUNDING	**$ 11,841,000**
RATE COMPONENTS	
Debt	
Term (years)	20
Interest Rate	2.500%
Annual Payment	$ 720,436.40
No. of Current SFE's	2,643
Monthly Debt Payment / SFE-Month	$ 22.72
Reserve per Month, 10% debt	$ 2.27
O&M	
Proposed WWTP Annual O&M Costs	$ 34,000.00
Existing Collection Annual O&M Costs	
O&M / SFE-Month	$ 1.07
Short Lived Assets	
Proposed WW Add Annual Short-Lived Asset Costs	$ 18,080
Short Lived Asset / SFE-Month	$ 0.57
TOTAL MONTHLY CHARGE / SFE	**$ 26.63**

Based on this analysis, with the Town securing funding as shown (or equivalent) for all project items in Alternative 3, an increase of $27/month per SFE is proposed for increase in capital cost and payments, interest, reserves, maintenance, and short-lived assets.

APPENDIX M – Comparison of Rates and Revenues

Scenario 1

Minimal growth - Increase Rates $1.20/YR/SFE

Rate Study Add	Existing Monthly	Anticipated
$ 1.20	$ 30.32	20-YR costs
every year	rate	$ 9,340,300.00
to monthly rate		

No % growth - only development

YR	SFEs - development no % growth	Rate Increase	Monthly Rate$/SFE	Rate revenue from rate increase	Yearly revenue from rate increase
2022	2,643	-	$ 30.32	$ -	$ -
2023	2,650	-	$ 30.32	$ -	$ -
2024	2,650	-	$ 30.32	$ -	$ -
2025	2,850	1.20	$ 31.52	$ 1.20	$ 41,040.00
2026	3,050	1.20	$ 32.72	$ 2.40	$ 87,840.00
2027	3,250	1.20	$ 33.92	$ 3.60	$ 140,400.00
2028	3,450	1.20	$ 35.12	$ 4.80	$ 198,720.00
2029	3,450	1.20	$ 36.32	$ 6.00	$ 248,400.00
2030	3,450	1.20	$ 37.52	$ 7.20	$ 298,080.00
2031	3,450	1.20	$ 38.72	$ 8.40	$ 347,760.00
2032	3,450	1.20	$ 39.92	$ 9.60	$ 397,440.00
2033	3,450	1.20	$ 41.12	$ 10.80	$ 447,120.00
2034	3,450	1.20	$ 42.32	$ 12.00	$ 496,800.00
2035	3,450	1.20	$ 43.52	$ 13.20	$ 546,480.00
2036	3,450	1.20	$ 44.72	$ 14.40	$ 596,160.00
2037	3,450	1.20	$ 45.92	$ 15.60	$ 645,840.00
2038	3,450	1.20	$ 47.12	$ 16.80	$ 695,520.00
2039	3,450	1.20	$ 48.32	$ 18.00	$ 745,200.00
2040	3,450	1.20	$ 49.52	$ 19.20	$ 794,880.00
2041	3,450	1.20	$ 50.72	$ 20.40	$ 844,560.00
2042	3,450	1.20	$ 51.92	$ 21.60	$ 894,240.00
2043	3,450	1.20	$ 53.12	$ 22.80	$ 943,920.00
		20-YR rate	$ 53.12	20-YR revenue	$ 9,410,400.00

Scenario 2

6% Growth & development of 80 Acre & Moonrise - $1.00/YR/SFE

Rate Study Add	Existing Monthly	Anticipated
$ 1.00	$ 30.32	20-YR costs
every year	rate	$ 9,340,300.00
to monthy rate		

% Growth and development

SFEs with Development and % growth	Add$ per Month/SFE	Monthly Rate$/SFE	Rate revenue from rate increase	Yearly revenue from rate increase	TOTAL Revenue
2,643	$ -	$ 30.32	$ -	$ -	
2,802	$ -	$ 30.32	$ -	$ -	
2,970	$ -	$ 30.32	$ -	$ -	
3,348	1.00	$ 31.32	$ 1.00	$ 40,174.26	$ 40,174.26
3,749	1.00	$ 32.32	$ 2.00	$ 89,969.44	$ 130,143.70
4,174	1.00	$ 33.32	$ 3.00	$ 150,251.41	$ 280,395.11
4,553	1.00	$ 34.32	$ 4.00	$ 218,566.29	$ 498,961.40
4,750	1.00	$ 35.32	$ 5.00	$ 285,022.22	$ 783,983.63
4,956	1.00	$ 36.32	$ 6.00	$ 356,841.87	$ 1,140,825.49
5,171	1.00	$ 37.32	$ 7.00	$ 434,377.71	$ 1,575,203.20
5,396	1.00	$ 38.32	$ 8.00	$ 518,003.09	$ 2,093,206.29
5,631	1.00	$ 39.32	$ 9.00	$ 608,113.38	$ 2,701,319.68
5,876	1.00	$ 40.32	$ 10.00	$ 705,127.21	$ 3,406,446.88
6,132	1.00	$ 41.32	$ 11.00	$ 809,487.73	$ 4,215,934.61
6,400	1.00	$ 42.32	$ 12.00	$ 921,664.01	$ 5,137,598.62
6,680	1.00	$ 43.32	$ 13.00	$ 1,042,152.46	$ 6,179,751.08
6,973	1.00	$ 44.32	$ 14.00	$ 1,171,478.35	$ 7,351,229.42
7,279	1.00	$ 45.32	$ 15.00	$ 1,310,197.36	$ 8,661,426.79
7,598	1.00	$ 46.32	$ 16.00	$ 1,458,897.33	$ 10,120,324.11
7,932	1.00	$ 47.32	$ 17.00	$ 1,618,199.94	$ 11,738,524.05
8,281	1.00	$ 48.32	$ 18.00	$ 1,788,762.64	$ 13,527,286.69
8,646	1.00	$ 49.32	$ 19.00	$ 1,971,280.57	$ 15,498,567.25
	20-YR rate	$ 49.32	20-YR revenue	$ 15,498,567.25	

Scenario 3

6% Growth & development of 80 Acre & Moonrise - $0.60/YR/SFE

Rate Study Add	Existing Monthly	Anticipated
$ 0.60	$ 30.32	20-YR costs
every year	rate	$ 9,340,300.00
to monthly rate		

% Growth and development

SFEs with Development and % growth	Add$ per Month/SFE	Monthly Rate$/SFE	Rate revenue from rate increase	Yearly revenue from rate increase	TOTAL Revenue
2,643	$ -	$ 30.32	$ -	$ -	
2,802	$ -	$ 30.32	$ -	$ -	
2,970	$ -	$ 30.32	$ -	$ -	
3,348	$ 0.60	$ 30.92	$ 0.60	$ 24,104.56	$ 24,104.56
3,749	$ 0.60	$ 31.52	$ 1.20	$ 53,981.66	$ 78,086.22
4,174	$ 0.60	$ 32.12	$ 1.80	$ 90,150.84	$ 168,237.07
4,553	$ 0.60	$ 32.72	$ 2.40	$ 131,139.78	$ 299,376.84
4,750	$ 0.60	$ 33.32	$ 3.00	$ 171,013.33	$ 470,390.18
4,956	$ 0.60	$ 33.92	$ 3.60	$ 214,105.12	$ 684,495.29
5,171	$ 0.60	$ 34.52	$ 4.20	$ 260,626.62	$ 945,121.92
5,396	$ 0.60	$ 35.12	$ 4.80	$ 310,801.85	$ 1,255,923.77
5,631	$ 0.60	$ 35.72	$ 5.40	$ 364,868.03	$ 1,620,791.81
5,876	$ 0.60	$ 36.32	$ 6.00	$ 423,076.32	$ 2,043,868.13
6,132	$ 0.60	$ 36.92	$ 6.60	$ 485,692.64	$ 2,529,560.77
6,400	$ 0.60	$ 37.52	$ 7.20	$ 552,998.40	$ 3,082,559.17
6,680	$ 0.60	$ 38.12	$ 7.80	$ 625,291.48	$ 3,707,850.65
6,973	$ 0.60	$ 38.72	$ 8.40	$ 702,887.01	$ 4,410,737.65
7,279	$ 0.60	$ 39.32	$ 9.00	$ 786,118.42	$ 5,196,856.07
7,598	$ 0.60	$ 39.92	$ 9.60	$ 875,338.40	$ 6,072,194.47
7,932	$ 0.60	$ 40.52	$ 10.20	$ 970,919.96	$ 7,043,114.43
8,281	$ 0.60	$ 41.12	$ 10.80	$ 1,073,257.58	$ 8,116,372.01
8,646	$ 0.60	$ 41.72	$ 11.40	$ 1,223,968.34	$ 9,340,340.35
	20-YR rate	$ 41.72	20-YR revenue	$ 9,340,340.35	

Estimated Schedule for Improvements

	Unit Process	Year 24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	Probable Cost Total
Red	Iris Lift Station: Replace Exhaust Fan, Add HS Monitor (Address Corrosive Conditions & Electrical)	✓																				$ 232,600
Red	Iris Lift Station: Replace Force Main Air Relief Valve	✓																				
Red	Iris Lift Station: Reduce Pump Start-Stops/Hr - Optimize Pumps & Wet Well Volume (maintenance)	✓																				
Red	Iris Lift Station: Replace Safety Grate	✓																				
Red	Iris Lift Station: Replace Pump Rails and Piping. Install valves before sand trap on 12" pipes	✓																				
Yellow	Fix Bellies/Dips - Purchase and Use Vac-Flush Truck for System-Wide Use		✓																			$ 662,500
Yellow	Select Locations: Correct Structural Deficiencies - slipline: Cracks, Gaps, Roots			✓																		$ 211,200
Yellow	Iris Lift Station: Upgrades/Retrofit (Pumps, Inflow Pipe Size, Rails, Swing Check Valves, new 12" Iris)					✓																$ 1,646,300
Yellow	Alley A, MH 65 to MH 66: Correct Structural Deficiencies - Seven or more present - replace line						✓															$ 270,400
Yellow	Select Locations: Correct Structural Deficiencies - point repairs: Gaps in Fernco								✓													$ 54,700
Yellow	Select Locations: Correct Protruding Service Lines									✓												$ 162,400
Yellow	South of Town Hall: Cap Abandoned Sewer Lines (no cost - use maintenance)	✓																				
Yellow	System-Wide: Replace Manhole Rings (no cost - use maintenance)			✓																		
Green	Various Sliplining:																					
Green	Alley A and Alley B: slipline clay pipe installed backwards															✓						$ 2,750,300
																						$ 5,990,400

Town of West Yellowstone - Rate Comparison
2023 Wastewater Collection System FPS