Willamina City Council
Regular Meeting
Tuesday, July 9, 2024 at 6:00 p.m.

West Valley Fire Station
825 NE Main Street
Willamina, OR 97396

In-person attendance is allowed at the City Council meeting. The City also provides access via the Zoom platform. Zoom access information is available at the end of this Agenda.

AGENDA

CALL TO ORDER

ROLL CALL

FLAG SALUTE

AGENDA ADDITIONS, DELETIONS, AND CORRECTIONS

PUBLIC INPUT – BUSINESS FOR THE AUDIENCE

Public Input: Presentations not scheduled on the agenda are limited to three (3) minutes. Longer presentations should be submitted to the City Recorder prior to the meeting.

CORRESPONDENCE –

PRESENTATIONS –

1. Finance/HR Manager, Marissa Matias
   Financial reports are available in the City Council Financial Reports binder which will be present at each City Council meeting. Financial Reports will also be available via email upon request from Deputy City Recorder Krystal Stevens.
2. Keller Associates- Wastewater Facility Planning Study

CONSENT AGENDA

("A listing of routine business items, which are adopted with one motion, without discussion. However, any Councilor may request that an item be pulled from the Consent Agenda for discussion and separate action. The item is then not considered after the Consent Agenda items have been voted upon.")

1. Meeting Minutes from the June 11, 2024, City Council Regular Meeting.

REGULAR AGENDA

1. Union Contract (Contract will be provided on Monday 7/8/24)
2. Update for signers for City Bank Account

INFORMATIONAL REPORTS (Items that require no Council action)

1. Chamber Liaison – Mayor Skyberg
2. Yamhill County Transit Authority Board Member – Councilor Johnson
3. Library Board Liaison – Councilor Hernandez

MAYOR'S REPORT

INFORMATIONAL REPORTS FROM CITY OFFICERS

1. City Manager
    a. Council Goal- Downtown Beautification update-Oregon Main Street
    b. City County Dinner- Yamhill
    c. Weekender Bicycle Trail
2. Library Director
3. Public Works Director
4. Planning Report (provided in Agenda packet)
5. Sheriff's Report (provided in Agenda packet)
6. Code Enforcement (provided in Agenda packet)

COUNCIL COMMENTS

1. Yamhill County Commissioner Kit Johnston

ADJOURN

Next Council Meeting

City Council Regular Meeting on August 13, 2024 at 6:00 p.m.

Information regarding the above meeting(s) and Zoom access information can be found on the City of Willamina website at https://www.willamina.oregon.gov

Persons with hearing, visual or manual impairments who wish to participate in the meeting should contact the City of Willamina at least 48 hours prior to the meeting date in order that appropriate communication assistance can be arranged. The City of Willamina Council meetings are accessible to the disabled. Please let us know if you need any special accommodations to attend this meeting.

Join Zoom Webinar

https://us02web.zoom.us/j/81872318416?pwd=dn0fBKrgRuuaLIlhrxcISVDaNJvSU3.1

Webinar ID: 818 7231 8416 Passcode: 059503
Telephone numbers available: https://us02web.zoom.us/u/kerVfdWSHK

Wastewater Facilities Planning Study

CITY OF WILLAMINA

JULY 2024 | KA # 213018-019

PREPARED BY

KELLER ASSOCIATES

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PREPARED FOR

CITY OF Willamina
TIMBERTOWN U.S.A.

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EXECUTIVE SUMMARY

The City of Willamina contracted with Keller Associates, Inc. to complete a wastewater facilities planning study for the City's sanitary sewer. This chapter summarizes the major findings of the facilities plan, including brief discussions of alternatives considered and final recommendations. This wastewater facilities planning study aims to create a financial plan to guide the City's wastewater decisions.

Keller Associates has worked with key city staff to understand the system's current challenges and develop practical, cost-effective solutions. Keller Associates gratefully recognizes the Mayor and City Council, the Public Works Director, the Public Works Department, the city administrative support staff, and all others involved for their support and assistance in completing this study.

ES.1. PLANNING CRITERIA

Regulatory requirements, engineering best practices, and City-defined goals and objectives form the basis for planning and design. Applicable regulatory requirements include the National Pollutant Discharge Elimination System (NPDES) permit, Total Maximum Daily Loads (TMDLs), State Water Quality Standards, Recycled Water (Reuse) Regulations, and Land Use and Comprehensive Plan Requirements.

ES.2. DESIGN CONDITIONS

ES.2.1. Study Area and Land Use

The study area comprises all areas within the City of Willamina Urban Growth Boundary (UGB). Figure ES-1 on the next page shows the study area, existing service areas, and zoning areas. The Topography with Flood Plains map is shown in 2 below. The study area sits between Willamina Creek and the South Yamhill River.

FIGURE ES-1: STUDY AREA

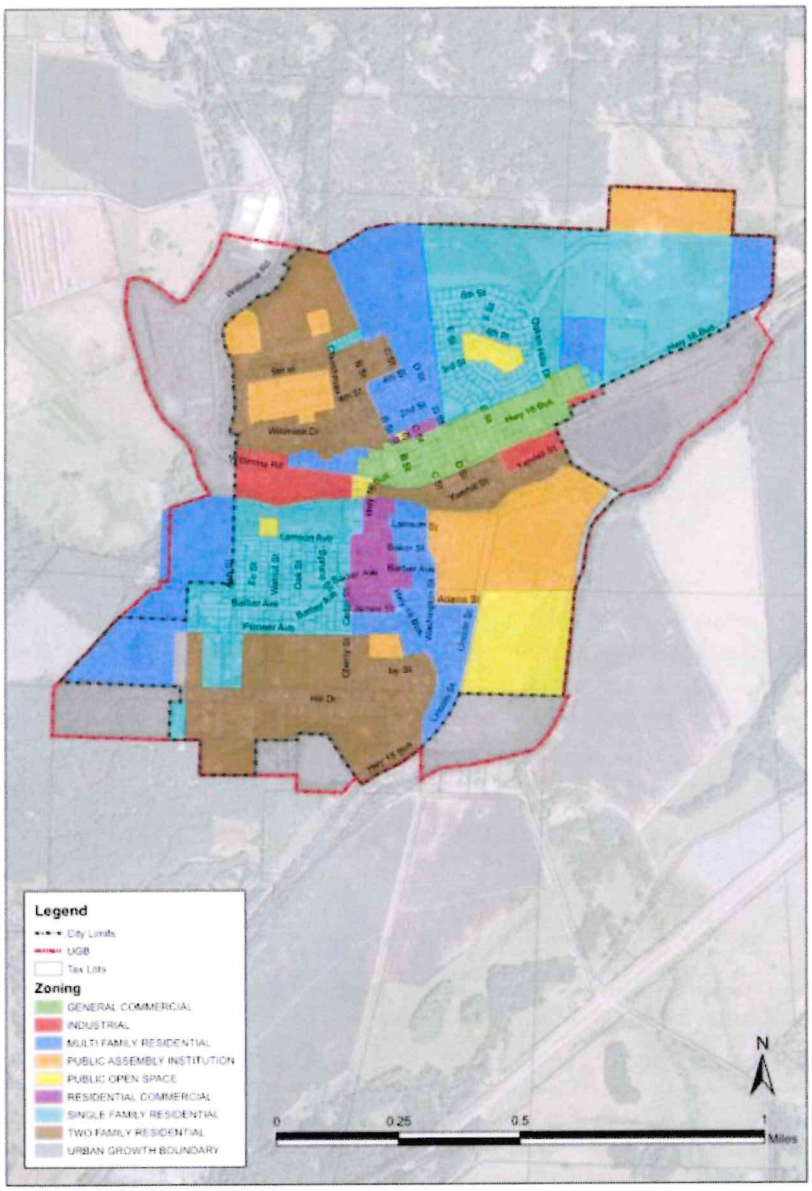
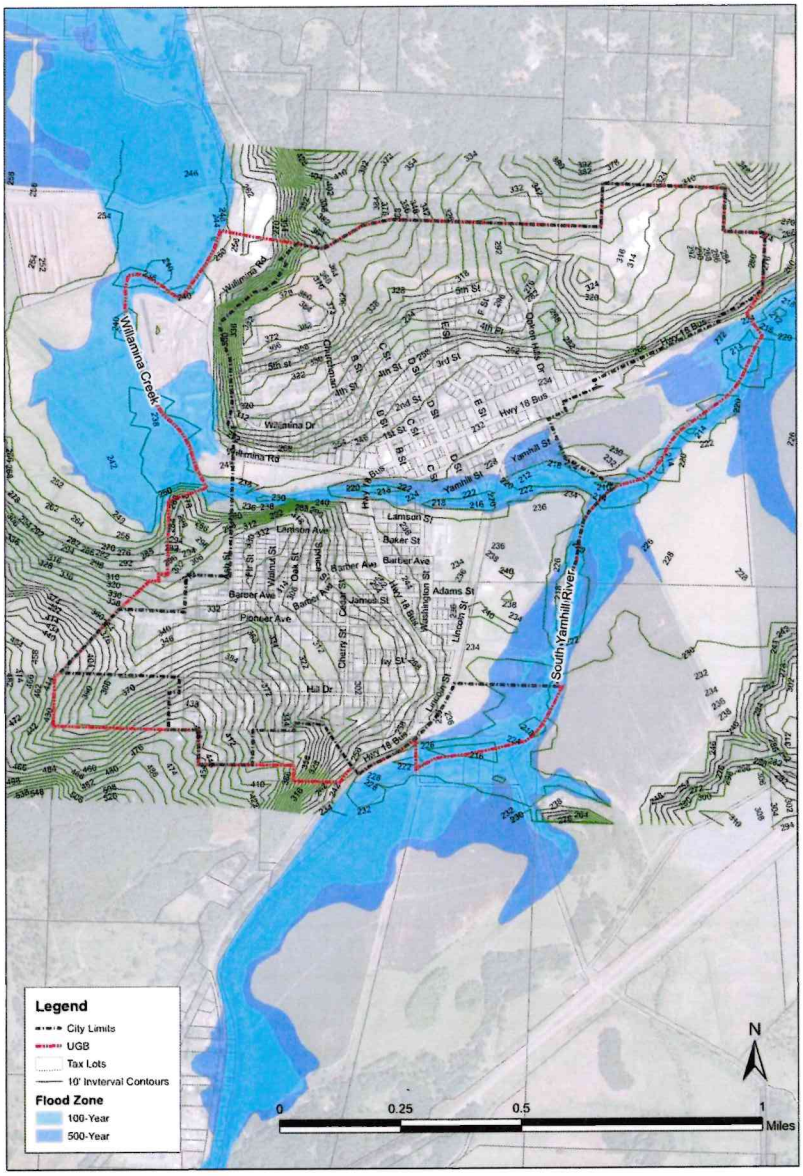


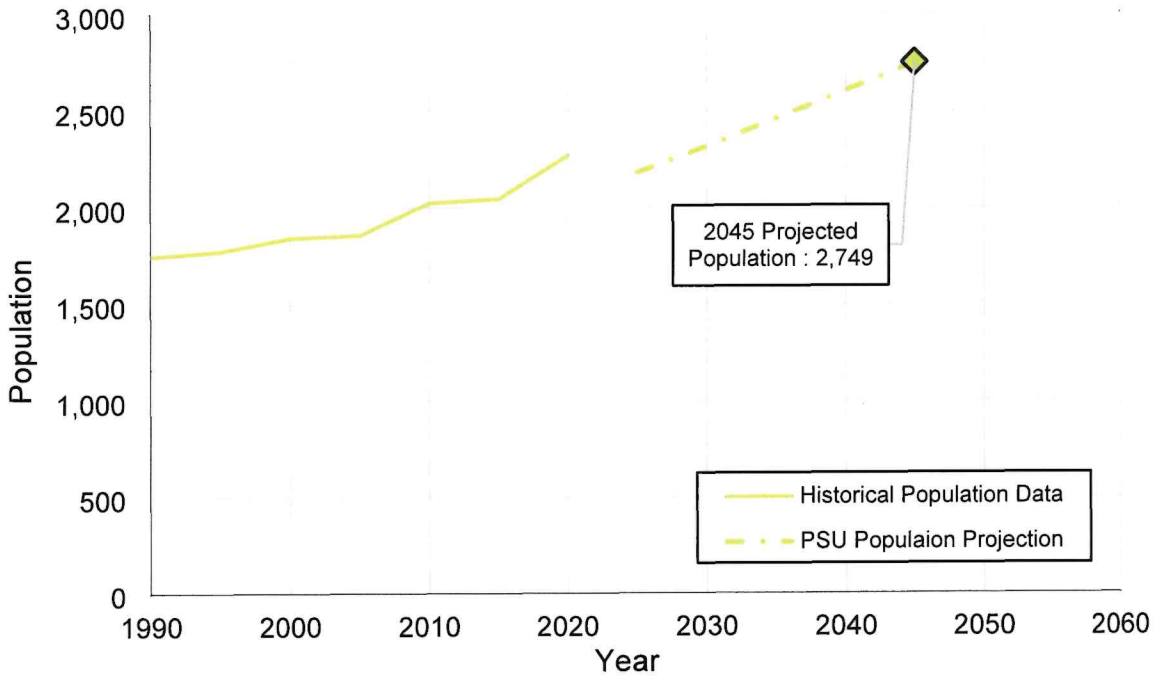
FIGURE ES-2: WILLAMINA TOPOGRAPHIC MAP



ES.2.2. Demographics

The City's population has been increasing over the past few decades. Historical populations were obtained from the U.S. Census, Polk County, and Yamhill County in cooperation with Portland State University (PSU). PSU analyzes historical trends and anticipates growth patterns to develop growth rates for 5-year increments. The most current certified population estimate from the U.S. Census was 2,270 in 2020. Growth calculation details can be found in FIGURE below.

FIGURE ES-3: POPULATION HISTORY AND PROJECTIONS



ES.2.3. Wastewater Flows

Data on daily and monthly treatment plant flows from 2018 to 2022 were provided by the City for analysis. The design influent flows listed in Table ES-1 were calculated from this information using methods recommended by the Oregon DEQ.

TABLE ES-1: PROJECTED FLOWS

	Planning Flow (MGD)	Planning Unit Flow (gpcd)	Projected Design Flow (MGD)				
Year	---	---	2025	2030	2035	2040	2045
Population	2,282	2,282	2,182	2,314	2,459	2,604	2,749
ADWF	0.00	96	0.21	0.22	0.23	0.25	0.26
10	0.00	280	0.61	0.65	0.69	0.73	0.77
AADF	0.00	205	0.45	0.47	0.50	0.53	0.56
AWWF	0.00	332	0.72	0.77	0.82	0.87	0.91
5	0.00	542	1.18	1.25	1.33	1.41	1.49
PWkF	0.00	964	2.10	2.23	2.37	2.51	2.65
	0.00	1,470	3.21	3.40	3.61	3.83	4.04
	0.00	2,100	4.58	4.86	5.16	5.47	5.77

* MGD – million gallons per day, gpcd – gallons per capita per day, ADWF – Average Dry-Weather Flow, $MMDWF_{10}$ – Max Month Dry-Weather Flow, AADF – Average Annual Daily Flow, AWWF – Average Wet-Weather Flow, $MMWWF_5$ – Max Month Wet-Weather Flow, PWkF – Peak Week Flow, $PDAF_5$ – Peak Daily Average Flow, PIF_5 – Peak Instantaneous Flow.

ES.2.4. Wastewater Composition

The influent Five-Day Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS) data from 2018 to 2022 was evaluated to determine the annual average, dry weather average, dry weather maximum month, wet weather average, and wet weather maximum month loads (pounds per day). The pounds per day BOD_5 and TSS loading data were used to calculate the pounds per capita per day (ppcd) for the various flows; these values were used to estimate future loadings. The City also sampled Total Kjeldahl Nitrogen (TKN) in 2023. A detailed summary of the data and projections is provided in Chapter 3.

ES.3. EXISTING DEFICIENCIES

ES.3.1. Collection Facilities

The City's collection system includes approximately 9.7 miles of gravity sewer mains, 1,900 feet of force main, and two pump stations. Sewage flows from the gravity collection system to the North (E Street) and South (Washington Street) pump stations. These two pump stations convey influent to the wastewater treatment plant (WWTP).

The collection system has the following deficiencies:

E Street Pump Station – The flow meter and electrical components should be replaced during the planning period. Fall protection is needed. The City is also replacing the pumps to achieve the required additional capacity during the planning period.

Washington Street Pump Station – The flow meter and electrical components should be replaced during the planning period, especially the level controller display. Fall protection, signs, and a fence with a gate are needed. The pumps need to be replaced to achieve the required capacity.

Collection System Piping – There is a large amount of infiltration and inflow (I/I), likely due to the asbestos cement pipe. Smoke testing also identified several problematic locations. Modeling showed some areas of the collection system that will be beyond capacity during the planning period.

ES.3.2. WWTP Facilities

The Willamina WWTP consists of two aerated lagoons, two effluent storage lagoons, and chlorine disinfection. 4 illustrates the layout and Figure ES-5 provides a general schematic. The influent wastewater is monitored and screened adjacent to the aerated lagoons. Following the influent screening, the wastewater flows by gravity into the lagoons, where it undergoes treatment. Following treatment and storage in the lagoons, the water flows by gravity through a magnetic flow meter, past a modulating flow control valve, and enters a chlorine contact basin. The water is chlorinated and dechlorinated in the basin before being discharged into the South Yamhill River.

FIGURE ES-4: EXISTING WWTP MAP

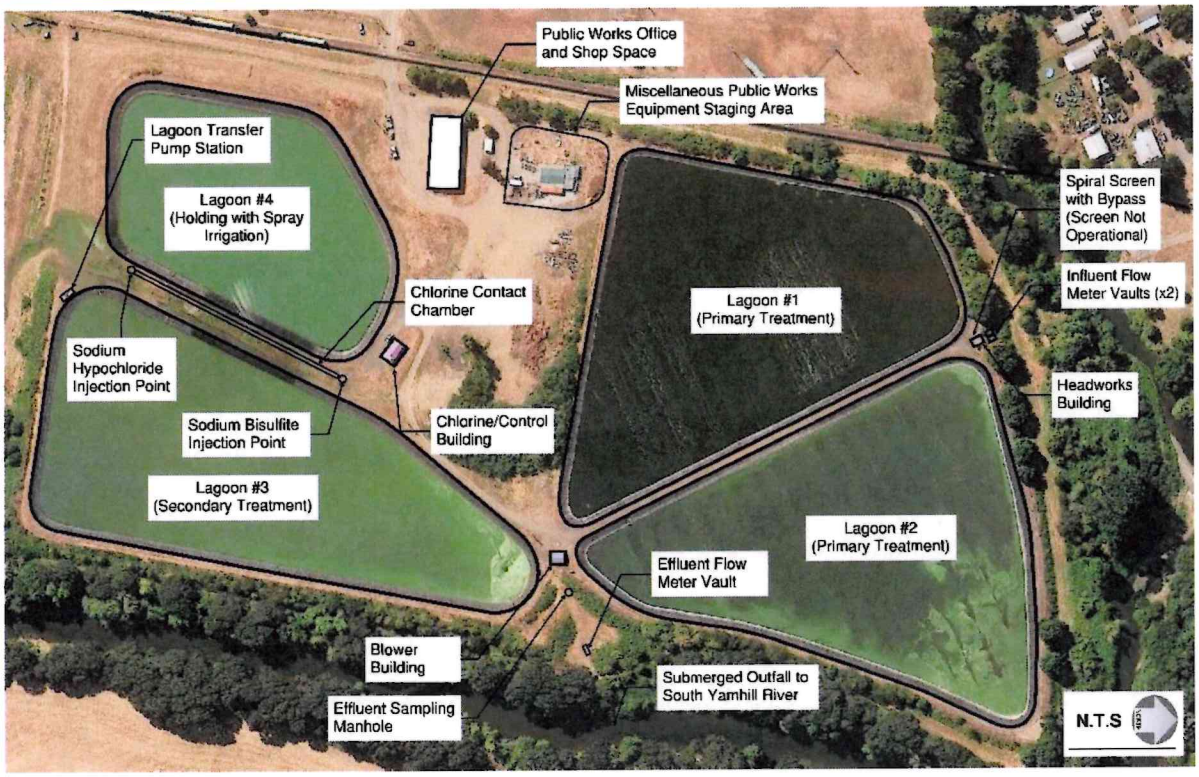
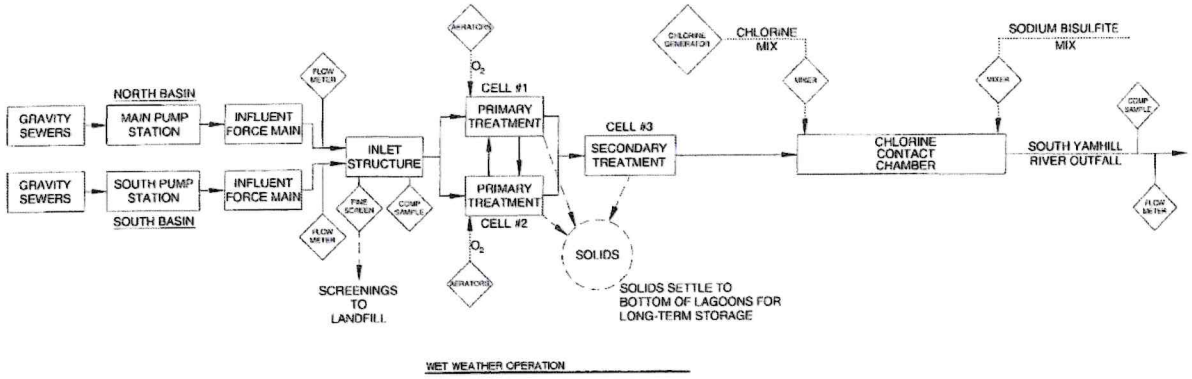
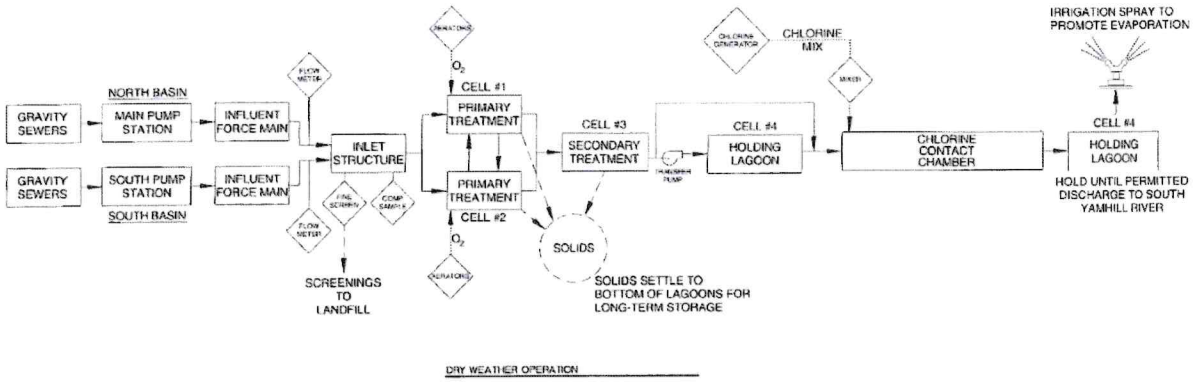


FIGURE ES-5: WWTP PROCESS SCHEMATICS





Following the disinfection process tThe flow is sampled from November 1st to April 30th. During the non-release months (May 1st to October 31st), the City promotes evaporation using sprayers that discharge back into the Lagoon #4. Solids generated in the aerated lagoons settle to the bottom of the lagoons for long-term storage.

Deficiencies of the existing WWTP include:

Headworks – The headworks screen stopped working back in 2018, so the backup bar screen is used and is manually raked. The screen is also not rated for future flows. The influent flow measurement is not sufficient for the planning period. Also, the channel to Lagoon #1 is hydraulically limited during high flow events.

Aerated Lagoons – There are cracks in the aeration system piping and the system is insufficient for the planning period. The liner in Lagoon #1 floats if the level drops too low. The City has not removed solids since 2005, and the current sludge levels are unknown.

Effluent Storage Lagoons – The effluent storage lagoons are past their storage capacity. The liner in Lagoons #3 floats if the water level gets too low. The effluent BOD_5 and TSS have approached the permit limits, especially the percent removal requirement when the influent is diluted during storm events. The spray guns are not rotating as they should.

Disinfection Systems – The City has electrical issues with the sodium hypochlorite system. Overall, the disinfection system is near the end of its useful life. Additionally, the chlorine contact basin will not have enough contact time based on the future planning flows.

Electrical and SCADA – The operators do not receive information in the alarms but must go to the facility to see what triggered the alarm. There is no backup power at the WWTP.

ES.3.3. Alternatives

Several alternatives were considered in this facility planning study to address the deficiencies. A summary of the alternatives and the selected alternatives are discussed in Chapters 4 and 5.

ES.4. CAPITAL IMPROVEMENT PLAN AND FINANCING

ES.4.1. Summary of Costs

Table ES-2 presents the 20-year capital improvement plan (CIP). Projects are organized by priority. Costs reflect planning-level estimates and should be refined in the pre-design and design phases of implementation. Priority 1 improvement expenses are anticipated to occur over the next six years.

Priority 2 improvements are items targeted as funds become available. Additional details on the CIP are discussed in Chapter 6.

TABLE ES-2: 20-YEAR CAPITAL IMPROVEMENT PLAN

Project ID#	Project Name	Total Estimated Cost (2024)	SDC Growth Apportionment		City's Estimated Portion
Total Priority 1 Improvements (0-6 years)					
CS.1.1	Lift Station Improvement \ Forcemain	$7,355,000	18%	$1,336,000	$6,019,000
T.1.1	Headworks Improvements	$1,448,000	21%	$299,000	$1,149,000
T.1.2	Lagoon 5	$2,883,000	18%	$528,000	$2,355,000
T.1.3	Aeration System and Blowers	$3,767,000	21%	$784,000	$2,983,000
T.1.4	Disinfection System and Chlorine Contact Basin	$1,453,000	21%	$300,000	$1,153,000
T.1.5	Discharge Piping to Outfall	$449,000	18%	$82,000	$367,000
T.1.6	Miscellaneous Plant Priority 1 Improvements	$1,131,000	21%	$232,000	$899,000
	Total Priority 1 Improvements (rounded)	**$18,486,000**	**-**	**$3,561,000**	**$14,925,000**
Total Priority 2 (6-13 years)					
CS.2.1	Upsizing Gravity Trunklines	$4,447,000	21%	$914,000	$3,533,000
T.2.1	Combine Lagoon 3 & 4	$3,887,000	21%	$799,000	$3,088,000
T.2.2	Lagoon Liner Improvements	$3,460,000	21%	$711,000	$2,749,000
	Total Priority 2 Improvements (rounded)	**$11,794,000**	**-**	**$2,424,000**	**$9,370,000**
Total Priority 3 Improvements (13-20 years)					
CS.3.1	Upsizing Gravity Mains	$2,704,000	21%	$556,000	$2,148,000
T.3.1	Facility Planning Study Update	$150,000	21%	$31,000	$119,000
	Total Priority 3 Improvements (rounded)	**$2,854,000**	**-**	**$587,000**	**$2,267,000**
	TOTAL SYSTEM IMPROVEMENTS COSTS (ROUNDED)	**$33,134,000**	**-**	**$6,572,000**	**$26,562,000**

The cost estimate herein is concept level information only based on our perception of current conditions at the project location and its accuracy is subject to variation depending upon project definition and other factors. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. This cost opinion is in 2024 dollars and does not include escalation to time of actual construction.

Table ES-3 illustrates how the Priority 1 improvement expenses are anticipated over the next several years. This 6-year CIP should be used by the City's financial consultant to complete a more detailed rate study.

TABLE ES-3: 6-YEAR CAPITAL IMPROVEMENT PLAN

ID#	ITEM	COST	Opinion of Probable Costs (2024 Dollars)					
			2025	2026	2027	2028	2029	2030
CS.1.1	Lift Station Improvements \ Forcemain	$ 7,355,000		$ 1,103,250	$ 3,125,875	$ 3,125,875		
T.1.1	Headworks Improvements	$ 1,448,000				$ 724,000	$ 724,000	
T.1.2	Storage Lagoon	$ 2,883,000			$ 1,441,500	$ 1,441,500		
T.1.3	Aeration System and Blowers	$ 3,767,000				$ 565,050	$ 1,600,975	$ 1,600,975
T.1.4	Disinfection System and Chlorine Contact Basin	$ 1,453,000		$ 726,500	$ 726,500			
T.1.5	Discharge Piping to Outfall	$ 449,000		$ 449,000				
T.1.6	Micellaneous Plant Priority 1 Improvements	$ 1,131,000						$ 1,131,000
	Total Capital Cost	***$ 18,486,000***	***$ -***	***$ 2,279,000***	***$ 5,294,000***	***$ 5,857,000***	***$ 2,325,000***	***$ 2,732,000***
	I/I Reduction Program	-	$159,000	$159,000	$159,000	$159,000	$159,000	$159,000
	Short-Lived Asset Replacement	-	$124,000	$124,000	$124,000	$124,000	$124,000	$124,000
	Total FY Cost	-	***$ 283,000***	***$ 2,562,000***	***$ 5,577,000***	***$ 6,140,000***	***$ 2,608,000***	***$ 3,015,000***

The cost estimate herein is concept level information only based on our perception of current conditions at the project location and its accuracy is subject to variation depending upon project definition and other factors. This estimate reflects our opinion of probable costs at this time and is subject to change as the project design matures. This cost opinion is in 2024 dollars and does not include escalation to time of actual construction.

ES.4.2. Budget and Rate Impacts

Funding for the recommended system improvements may come from any number of sources. The potential user rate impacts if all priority improvements are funded through a low-interest loan with debt service payments (30 years, 1.5%) made through a user rate increase are shown below. Table ES-4

outlines the potential impacts of residential user rates and assumes a flat rate increase for all 1,118 sewer Equivalent Dwelling Units (EDUs). As shown in Table ES-4, actual rate impacts can vary depending on the City's available System Development Charge (SDC) funds, the rate structure, existing budget surplus, funding source(s), potential grants, and terms of the loan. A separate user rate study is recommended to complete a more detailed evaluation of potential user rate impacts. Details about budget and rate impacts can be found in Chapter 6.

TABLE ES-4: POTENTIAL MONTHLY USER RATE IMPACT TO FUND PRIORITY IMPROVEMENTS

	Annual Payment (30 year, 1.5%)	Monthly User Rate without SDCs	Monthly User Rate Including SDCs
Existing User Rates (2023)	-	$81.03	$81.03
Priority 1 Improvements[1]	$769,742	$159.26	$101.87
1) Assumes $10,000,000 in grants are secured.			

ES.4.3. Other Annual Costs

In addition to the capital improvement costs presented in the previous section, Keller Associates recommends including additional annual operation and maintenance costs associated with the Capital Improvement Plan (additional aerators, aerobic digestion, grit removal, etc.) in setting annual budgets. It is anticipated that this cost may be close to twice the current amount by 2045, most of which is associated with increased power usage.

ES.4.4. SDCs

The scope of this study included estimating the SDC eligibility for each identified capital improvement. It is the intent that this information will be utilized by the City's financial consultant to update the City's SDCs. The estimated SDC eligibility (%) for each identified capital improvement is shown in Table ES-2. The SDC percentage was calculated using the capacity that can be utilized for future connections divided by the future capacity in 2045. For projects that did not have an increase in flows, the percent SDC eligible is derived from the percent growth in population over the 20-year planning period.

ES.4.5. Financing Options

Financing and incentive options that may assist with offsetting costs associated with implementing the CIP include but are not limited to user rate increases, SDCs, DEQ State Revolving Fund Loan Program, Oregon Infrastructure Finance Authority grants and loans, USDA Rural Utilities Services loans and grants, direct state loans appropriations, revenue bonds, general obligation bonds, US Economic Development Administration grants, and Energy Trust of Oregon. Additional financing options are discussed in Chapter 6.

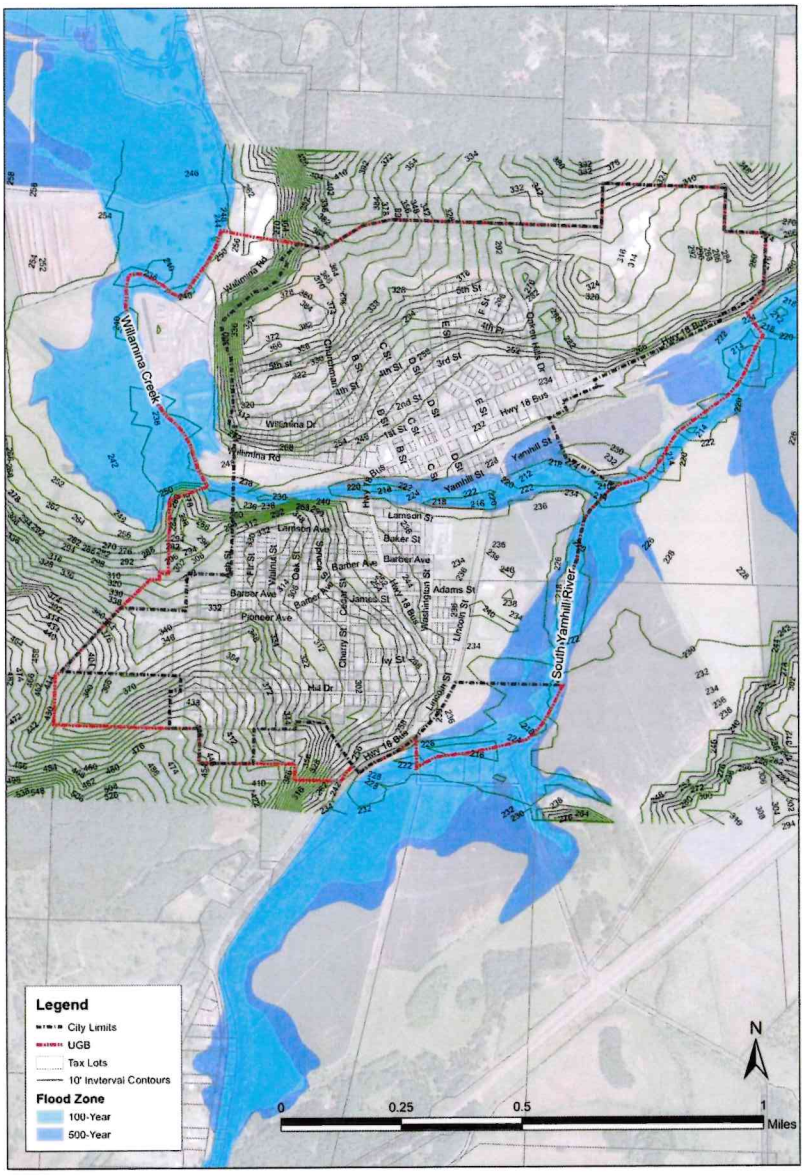
CHAPTER 1 - PROJECT PLANNING

The City of Willamina (City) owns and operates a municipal wastewater collection system and wastewater treatment plant (WWTP). This study aims to determine the City's wastewater needs, evaluate if the existing collection system and WWTP can meet those needs, and provide a long-term plan to implement improvements, if necessary, to meet the City's future needs.

1.1. LOCATION

The study area is shown on the topographical map in Figure 1-1 (Figure 3 in Appendix A) and consists of all areas within the City of Willamina Urban Growth Boundary (UGB).

FIGURE 1-1: WILLAMINA TOPOGRAPHIC MAP



The City of Willamina is in the foothills of the Oregon Coast Mountain Range, approximately 30 miles east of the Pacific Ocean. The City is located within both Polk and Yamhill Counties. Willamina Creek divides the City into northern and southern portions, with a bridge crossing the river on State Highway 18. The South Yamhill River borders the City Limits to the east. The City's topography generally slopes downward towards Willamina Creek.

1.2. ENVIRONMENTAL RESOURCES PRESENT

An inventory of existing environmental resources is needed, as any improvements must consider the environmental impacts. The factors discussed in this section include land use/prime farmland, floodplains, wetlands, cultural resources, coastal resources, and socio-economic conditions.

1.2.1. Land Use/Prime Farmland/Formally Classified Lands

Zoning in the study area is shown in Figure 1 in Appendix A. Table 1-1 provides a detailed breakdown for each zoning category by acre and percent of total area. The Farmland designation as presented in the United States Department of Agriculture (USDA) Web Soil Survey (WSS) is shown in Figure 2 in Appendix A. Much of the City is designated by the USDA WSS as prime farmland or farmland of statewide importance, although it is currently zoned and used for other purposes.

TABLE 1-1: SUMMARY OF WILLAMINA LAND USE

Zone/Designation	Acres	Percent of Total
Residential	**417**	**57%**
Multi Family Residential	118	16%
Single Family Residential	164	22%
Two Family Residential	135	18%
Non-Residential	**152**	**21%**
General Commercial	28	4%
Industrial	17	2%
Public Assembly Institution	74	10%
Public Open Space	34	5%
Other	**166**	**23%**
Residential Commercial	15	2%
Urban Growth Boundary	151	21%
Total	**735**	**100%**

1.2.2. Floodplains

The Federal Emergency Management Agency (FEMA) publishes flood insurance studies that classify land into different flood zone designations. Figure 3 in Appendix A presents the topography and floodplains in the study area. Some portions of the study area, including portions of the WWTP, are inside the 100-year and 500-year floodplains of the South Yamhill River. Both pump stations are located on the edge of the 500-year floodplain of Willamina Creek. The record drawings do not indicate the flood elevations or the vertical datum; therefore, it is unknown whether the pump station rims and the top bank of the treatment lagoons are above the 100-year and 500-year flood plain elevations. Operation and Maintenance Manuals from upgrades to the pump stations and WWTP indicate that the facilities are designed to remain fully operational during a 25-year flood event and to be protected from physical damage during a 100-year flood event.

1.2.3. Soils

Soil data retrieved from the USDA WSS is presented in Figure 4 in Appendix A. There are a variety of soils in the area; however, the majority of the soils are silty clay loams.

1.2.4. Wetlands

The Oregon Department of State Lands (ODSL) keeps an inventory of the local wetlands in Oregon. Currently, the City of Willamina is not included in any completed or pending local wetland inventories. Wetland delineation was not within this project's scope, so the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory was used to determine the wetland areas that could be impacted. The map of delineated wetlands from the National Wetlands Inventory is shown in Figure 5 in Appendix A. The National Wetlands Inventory mapping designates the WWTP lagoons and the Huddleston Pond as freshwater ponds. Small sections of land near the WWTP lagoons are designated freshwater forested/shrub wetlands.

1.2.5. Cultural Resources

The State Historic Preservation Office (SHPO) maps above-ground cultural resources on its website. According to the SHPO website, six structures are listed as "not eligible," and one is "eligible/listed" cultural resources within the UGB. The map from the SHPO website can be found in Figure 6 in Appendix A. The SHPO also keeps track of underground cultural resources. They only provide information from their database to professional archaeologists, with one exception. They will provide information for small project areas if provided the complete legal description of the project location, a United States Geological Survey (USGS) map of the project area, and a description of the project and ground disturbance. The SHPO should be consulted as part of the design process of any proposed recommendation.

1.2.6. Biological Resources

The USFWS produces a database that lists endangered and threatened plants throughout the country. Results of a search for the study area in the database can be found in Appendix B. The species documented in Polk and Yamhill Counties that are listed as endangered, threatened, proposed, and candidate species by USFWS are listed below:

- Threatened: Pacific Marten, Marbled Murrelet, Northern Spotted Owl, Streaked Horned Lark, Kincaid's Lupine, Nelson's Checker-mallow
- Endangered: Fender's Blue Butterfly, Willamette Daisy
- Candidate: Monarch Butterfly.

1.2.7. Water Resources

There are no wild or scenic rivers in the study area. The South Yamhill River forms a portion of the eastern City Limits of the City of Willamina. Willamina Creek, a tributary of the South Yamhill River, divides the City roughly in half as it flows west to east through the study area. Willamina Creek is 303(d) listed for turbidity, biocriteria, fecal coliform, and temperature. The South Yamhill River is 303(d) listed by DEQ for fecal coliform, E. coli, phosphorus, pH, ammonia, temperature, alkalinity, and dissolved oxygen. The Willamette Basin TMDL applies to both of these surface waters.

1.2.8. Coastal Resources

There are no coastal areas within the study area.

1.2.9. Socio-Economic Conditions

According to an American Community Survey (ACS) 5-Year Estimates Data Profiles (2019) published by the U.S. Census Bureau, the population in the 97396 zip code is primarily (88.7%) Caucasian. Hispanic or Latino comprises 3.3% of the population. The median household income is $48,244, which is lower than the state average of $62,818.

All areas of the City have equal access to the City wastewater system. Recommended improvements presented in this plan are to be designed to achieve and maintain an equal level of service for all users. The City Council holds public meetings to review the plan.

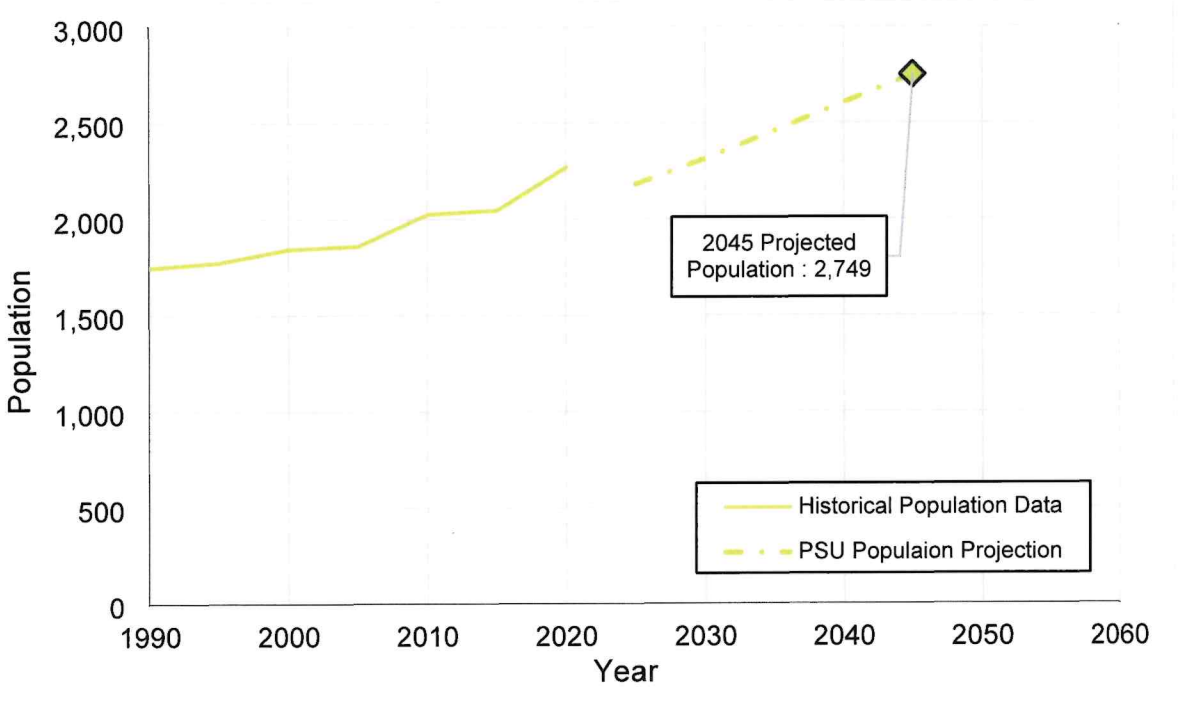
1.2.10. Miscellaneous Issues

Another environmental resource considered was air quality. The City of Willamina is not located in an area designated as an air maintenance or nonattainment area by DEQ.

1.3. POPULATION TRENDS

The official population projections for the City of Willamina reflect the collaborative efforts of Yamhill County, Polk County, and Portland State University (PSU). PSU published a document in July 2022 establishing the official population forecast. Historical population reports from PSU and the U.S. Census were retrieved to collect historical population data. Population projections for this planning study were copied directly from the July 2022 PSU population forecasts. As described above, the population estimates are shown in Figure 1-2.

FIGURE 1-2: POPULATION HISTORY AND PROJECTIONS



For the projected City expansion, Table 1-2 shows a breakdown of the number of people and housing type allocated by zoning. The information is based on 2.03 people per household and a population increase of 544 people.

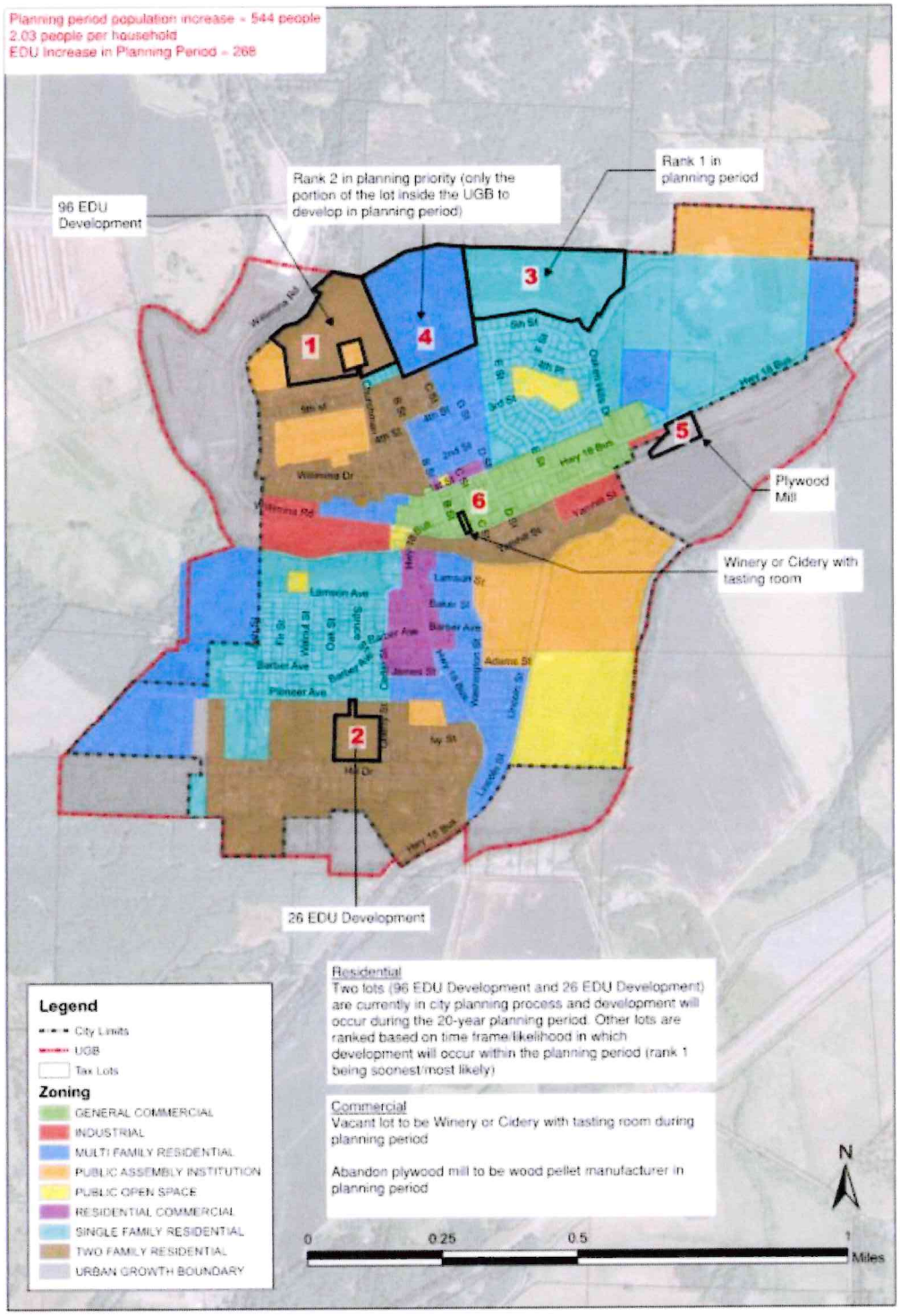
TABLE 1-2: POPULATION AND PROJECTED AREAS

Planned	Area (ft^2)	Acres	Type	EDUs	People
EDU's Approved	1,010,970	23	Two Family	122	248
Rank 1	978,831	22	Single Family	90	182
Rank 2	307,544	7	Multi-Family	56	115
Totals	2,297,345	53		268	544

*Willamina, as of 2022, has 1124 EDU's

Figure 1-3 shows the locations where future expansion will take place. The rank indicates what priority it will have. Rank 1 is anticipated to be where the first future expansion will occur, and Rank 2 is anticipated to follow.

FIGURE 1-3: ZONING AND PROJECTED AREAS



1.4. COMMUNITY ENGAGEMENT

The City provided opportunities for the community to engage in the planning process and provide comments or ask questions by participating in a City Council meeting held before the City Council voted to approve the planning study.

CHAPTER 2 - EXISTING FACILITIES

This chapter describes the existing wastewater system for the City of Willamina. The WWTP is classified as a Class I treatment system. The collection system is also classified as a Class I system. The City currently employs three operators with Class I treatment and one with Class 2 collection system certifications. The wastewater collection system comprises approximately 9.7 miles of gravity sewer mains, 1,900 feet of force main, and two pump stations. A map of the collection system can be found in Figure 8 in Appendix A. The pipelines range from 8 to 15 inches in diameter. Figure 9 in Appendix A illustrates the pipe diameters, and Figure 10 in Appendix A illustrates the pipe material in the City's collection system. There are over 200 manholes in the City's collection system. Sewage flows from the gravity collection system to the North (E Street) and South (Washington Street) pump stations. These two pump stations convey influent to the wastewater treatment plant (WWTP).

The pumped flows are metered in vaults just prior to the headworks structure. A spiral screen, which is no longer operational, is mounted on the headworks inlet structure. A bypass around the spiral screen diverts flow around the inoperable screen. Flow from the headworks enters either of the aerated primary lagoons (Lagoons #1 and #2). Solids settle to the bottom of Lagoons #1 and #2 and remain there for long-term storage. Generally, the best treatment will occur if the flow enters Lagoon #1 first and runs in series to Lagoon #2. The pipeline downstream of the screen, into Lagoon #1, is hydraulically limiting during high-flow events, so the influent is split between Lagoons #1 and #2. The piping is set up to allow temporary bypassing of a lagoon for repairs or cleaning.

A fine bubble diffused aeration system is at the bottom of each primary lagoon. Blowers (located in the blower building) provide air to the diffusers in the lagoons to enhance treatment. The water gravity drains from Lagoon #2 to Lagoon #3. Lagoon #3 provides additional treatment and storage of the effluent. From Lagoon #3, effluent can be pumped to Lagoon #4 for additional storage, spray irrigation/evaporation, or sent to the chlorine contact chamber and discharged to the South Yamhill River. Effluent from Lagoon #3 or Lagoon #4 can drain by gravity to the chlorine contact chamber. Sodium hypochlorite is injected at the beginning of the chamber and is mixed with a chemical induction mixer. At the end of the 350-foot chamber, sodium bisulfate is added to remove the chlorine residual.

The WWTP does not currently accept septage. Also, the WWTP does not treat a significant amount of industrial wastewater, as no major industrial facilities are connected to the collection system. Septage and industrial discharges can be significant sources of load to a plant, so the City should carefully consider each case before allowing septage or industrial discharge into the WWTP.

2.1. LOCATION MAP

Maps of the existing collection system and the WWTP are shown in Figure 2-1 and Figure 2-2, respectively.

FIGURE 2-1: EXISTING COLLECTION SYSTEM MAP

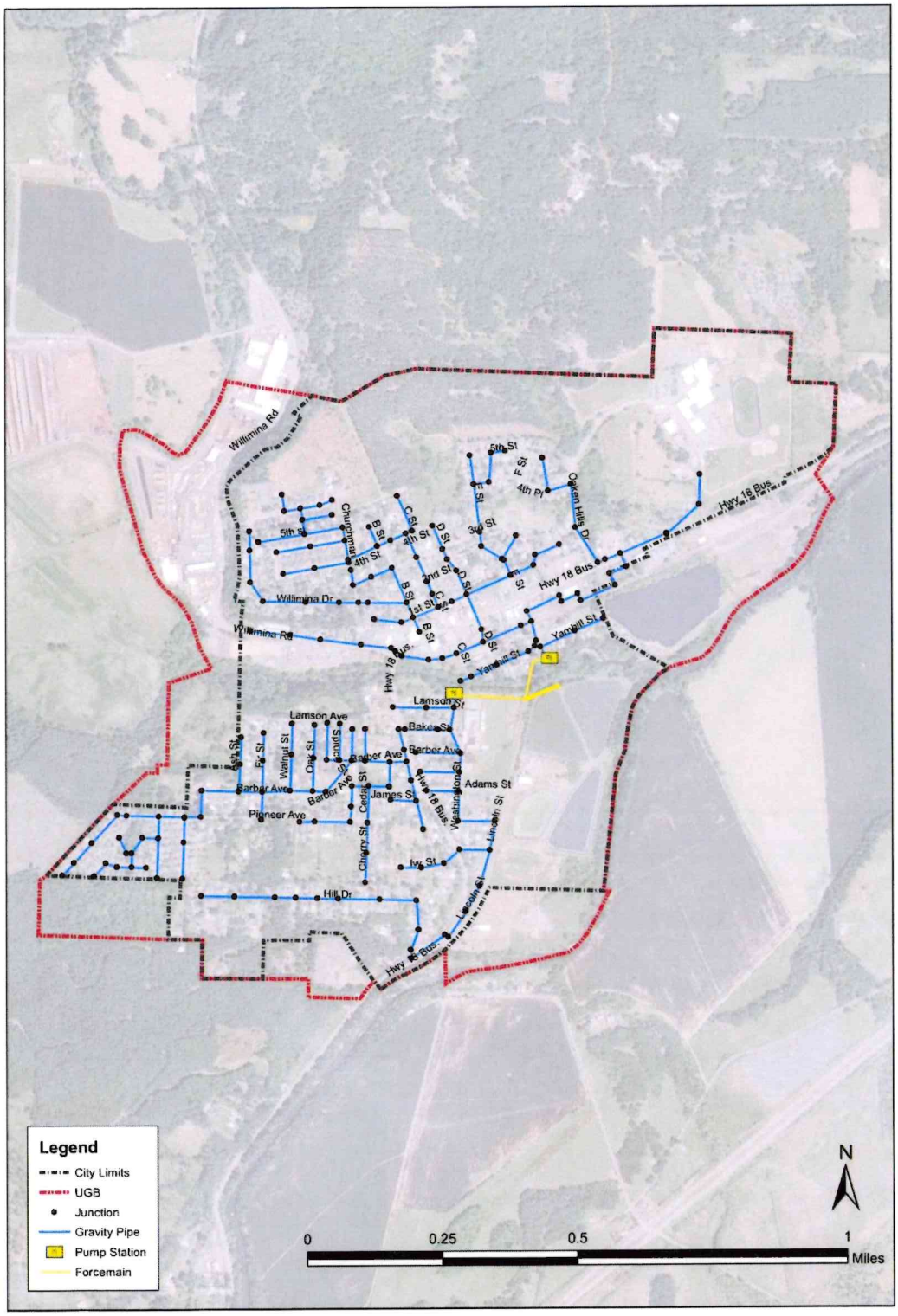
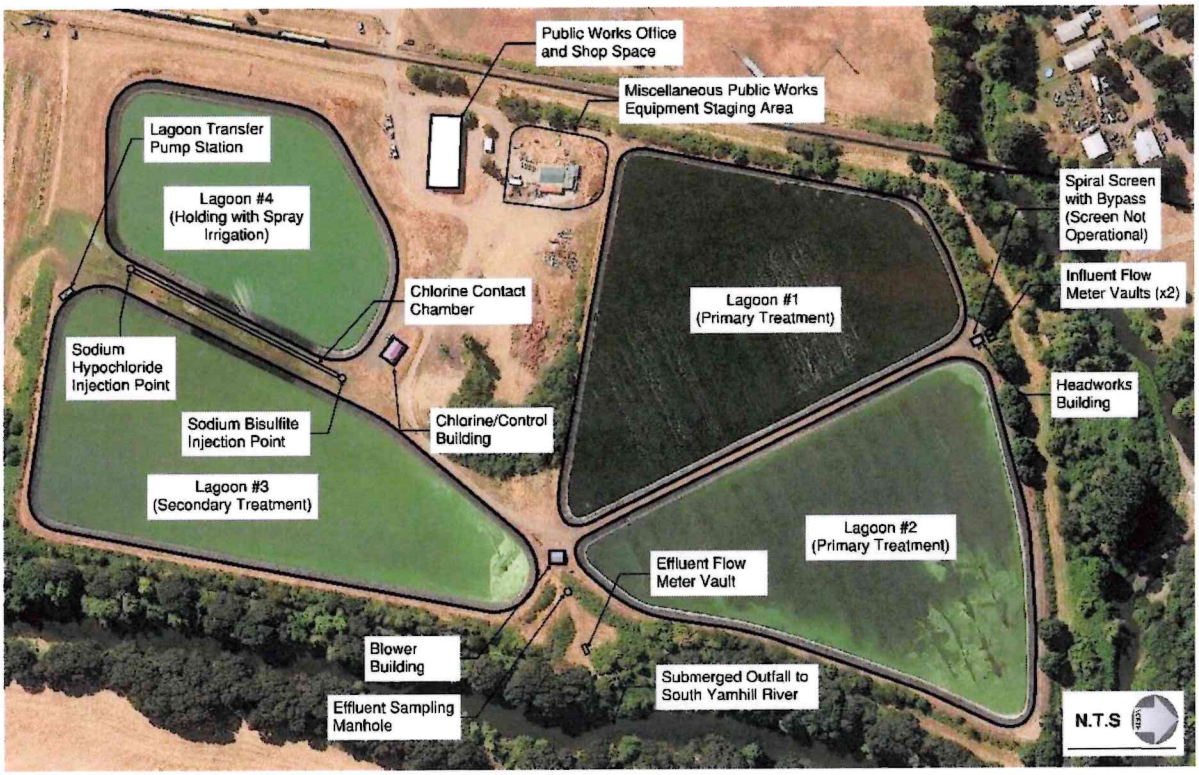


FIGURE 2-2: EXISTING WWTP MAP



2.2. HISTORY

The City of Willamina has been providing wastewater collection for parcels within Willamina city limits since the 1960s. The original collection system consisted of gravity lines (6" to 15" in diameter), an inverted siphon across the Willamina Creek, and the E Street (North) pump station. Flows from the portion of town south of Willamina Creek were conveyed north, across the creek, via the inverted siphon. E Street Pump Station pumped flows back across the creek to the WWTP. In 1979, a bypass pump station was added to supplement the 8" siphon. A wastewater collection system improvements project constructed in the 1990s abandoned the inverted siphon and installed a new pump station in its place at the north end of Southeast Washington Street. The Washington Street Pump Station pumps flow directly to the WWTP. In the early 2000s, an improvement project abandoned the existing E Street Pump Station and built a new pump station on the same site. The E Street Pump Station pumps flow directly to the WWTP. Pipe and manhole inflow and infiltration (I/I) abatement work was also performed as part of the improvements done in the early 2000s. Since the construction of the municipal sewer system, new residential development in the northeast, northwest, and southwest corners of City limits has prompted an expansion of the municipal sewer service area. Much of the newer collection system pipes are polyvinyl chloride (PVC).

The original WWTP as-built drawings were not available, but by 1995, the WWTP consisted of Lagoons #1, #2, and #3. Improvements in 1998 provided a new headworks structure at the WWTP, modified lagoon inlet piping downstream of the new headworks structure, provided an automatic sampler, added floating outlets to the lagoons to reduce TSS, and added a chemical induction mixer to the existing disinfection system to increase the deactivation of pathogens. Improvements in 2005 replaced the chlorine contact basin, replaced the effluent outfall piping, installed a screw screen at the headworks structure, added high-density polyethylene (HDPE) liners to the lagoons, converted an existing fishing pond to a Lagoon #4, and added a dechlorination system.

The current pump stations have a history of being overburdened during high rain events. This can be seen with a violation letter on December 27, 2023. During this time, a reported rainfall of 2.0 inches within 24 hours caused a spill that was reported to the DEQ (Appendix E)

2.3. CONDITION OF EXISTING FACILITIES

Facility evaluations were completed with City operations personnel in November and December of 2020 to review the conditions of the facilities, maintenance activities, and known operational problems encountered by City staff. Pump drawdown tests were conducted with help from City wastewater operators to observe the pump operation. A follow-up meeting was held in November 2023 to document current conditions.

2.3.1. Pump Stations Overview

E Street and Washington Street Pump Stations are each equipped with duplex submersible pumps. Each pump station alternates pumps between lead/lag/standby (duplex systems) to target equal runtime between pumps. The level control for the E Street pump station is through a Hydroranger ultrasonic level controller with the Washington Pump station being operated by floats. A backup Hydroranger is available for the Washington Pump station but is not in use due to noise. Float switches are used for high-level alarms. The floats are a redundant system to the main level control and provide a reliable system for the high-level alarm. Table 2-1 contains summary information for the two pump stations evaluated. Appendix C includes pump curves for the two pump stations.

TABLE 2-1: PUMP STATION INVENTORY

Item	Washington Street Pump Station	E Street Pump Station
Pump Stations		
Pump Station Type	Duplex wet well	Duplex wet well
Pump Type	Submersible, non-clog, centrifugal	Submersible, non-clog, centrifugal
Capacity (GPM)	770 GPM at 41 ft TDH	700 GPM at 45 ft TDH
Pump (Each)	15 HP	15 HP
Level Control Type	Mercury float switches	Hydroranger ultrasonic level controller with backup mercury float switches
Overflow Elevation	223 feet	220 feet
Overflow Discharge	Willamina Creek	Willamina Creek
Auxiliary Power Type	Permanent generator	Permanent generator
Location	On-Site	On-site
Output (kW)	30 kW	30 kW
Transfer Switch	Automatic (not operational)	Automatic
Alarm Telemetry Type	Autodialer to contact list and pager	Autodialer to contact list and pager
Originally Constructed	1979	1968
Year Upgraded	1999	2005
Wet Well Diameter (Feet)	7	7
Wet Well Depth (Feet)	18.4	22.8
Time to Overflow	61 minutes at ADF	61 minutes at ADF
Force Main		
Length, Type	1,050, 8-inch C900 PVC	800, 8-inch C900 PVC and 8-inch ductile iron
Profile, Continuously Ascending	No	No
Discharge Location	WWTP Inlet Structure	WWTP Inlet Structure
Combination Air Release/Vacuum Valves?	Yes	Yes

During site visits to the pump stations, drawdown pump tests were completed to determine approximate pump flow rates. Each pump was tested individually, and pump combinations (both pumps on) were tested at each pump station. Depths were measured with a laser and noted at equal time intervals to calculate an approximate flow rate. Flow rates from the flow meters, displayed via a screen at the wastewater treatment plant, were also noted during testing for comparison. The estimated calculated flow rates, meter readings, and rated capacities for each pump station are shown in Table 2-2.

TABLE 2-2: MEASURED PUMP FLOW RATES

		Washington Street (South)	E Street (North)
Pump #1 (East)	Field Measure (GPM)	912	480
	Flow Meter Measure (GPM)	391	367
	Pump Rating (GPM)	770	700
Pump #2 (West)	Field Measure (GPM)	720	504
	Flow Meter Measure (GPM)	402	366
	Pump Rating (GPM)	770	700
Both Pumps	Field Measure (GPM)	1128	696
	Flow Meter Measure (GPM)	660	542
	Pump Rating (GPM)	---	---

Record drawings for the Washington Street Pump Station report a design pump capacity of 770 gallons per minute at 41 feet TDH. During field testing, flow meters on the Washington Street Pump Station force main showed an average flow rate of 391 gallons per minute and 402 gallons per minute for pumps #1 and #2, respectively. Lift station pump calculations using time and depth measured in the manhole yielded an average flow rate of 912 gallons per minute and 720 gallons per minute for pumps #1 and #2, respectively.

Record drawings for the E Street Pump Station report a design pump capacity of 700 gallons per minute at 45 feet TDH. During field testing, flow meters on the E Street Pump Station force main showed an average flow rate of 367 gallons per minute and 366 gallons per minute for pumps #1 and #2, respectively. Lift station pump calculations using time and depth measured in the manhole yielded an average flow rate of 480 gallons per minute and 504 gallons per minute for pumps #1 and #2, respectively.

2.3.1. E Street Pump Station (North Pump Station)

The E Street Pump Station is located at the south end of E Street, on the north bank of Willamina Creek. The lift station was originally installed in the 1960s as part of the original collection system. Major improvements were made to the E Street Pump Station in 2005 (Wastewater Improvements, Phase 2). The dry well/wet well configuration was abandoned and replaced with a wet well housing two submersible pumps. Site improvements, accompanying electrical and control upgrades, and a generator housed outdoors in a weatherproof enclosure were installed with the upgrades.

E Street Pump Station

The improved pump station has two constant-speed submersible wastewater pumps in a seven-foot diameter wet well. From each pump, 4-inch ductile iron discharge piping passes through a valve vault with backflow prevention and a pressure gauge. Discharge piping combines into an 8-inch PVC force main that is approximately 800 linear feet. Flow in the force main is measured with a Doppler flow meter before discharging at the wastewater treatment plant headworks. The station's design capacity was 770 gallons per minute. The station has a redundant pump in the event that one pump becomes overrun with excess flow. The pump station operates duplex submersible pumps through an alternating lead/lag configuration to target equal runtime between pumps under normal operation. The wet well overflows to Willamina Creek through an 8-inch PVC pipe.

The concrete wet well appears to be in fair to good condition. When looking into the wet well from the rim, there was no visible evidence of spawling, exposed rebar, or other structural deficiencies in the concrete. There was also minimal buildup of grease and debris in the wet well. City staff indicate that grease and debris buildup is generally not an issue, and regular maintenance prevents significant buildups. A hose bib provides washdown water. Pump station pumps are pulled for maintenance every other year unless problems arise, prompting increased service frequency. Daily run hours are recorded multiple times a week.

Electrical systems and instrumentation were generally in good condition, although the equipment would become obsolete in the 20-year planning period, requiring replacement with new equipment. Standby power is controlled through a permanent diesel generator and automatic transfer switch. The station will alarm to an Autodialer tied to a leased phone line. Two level sensing transducers are in the wet well with a float backup. The transducer is set for the pump settings, while the float is set for the overflow alarm.

Four timber posts with a shingled roof cover a power meter, an automatic transfer switch, and the pump station control panels. Steel framing over the wet wells is used with a portable crane, kept at the City shop, to pull equipment from the wet wells. The pump station site is easily accessible from the street via a well-maintained gravel road. Chain link fencing with barbwire and a gate locked via a padlock secures the site. Video security provides a deterrent to vandalism, improved public safety, and a higher confidence level in the system's reliability. Permanent outdoor lighting is present at the site. The pump station does not have fall protection installed underneath the wet well or valve vault hatches. There are no first aid kits or fire extinguishers; however, operators carry first aid and fire extinguishers in their vehicles.

Deficiencies:

- Nylon netting fall protection on the wet well was removed. A fall protection system is not currently installed.
- The calibration status of the discharge piping pressure gauge is not known.
- The inlet piping, discharge piping, and valve vault appurtenances show signs of corrosion and rust.
- The force main flow meter is inaccurate.
- The field recorded pumping rate is 200 gpm less than the design point.

2.3.2. Washington Street Pump Station (South Pump Station)

The Washington Street Pump Station is located at the north end of Southeast Washington Street, on the south bank of Willamina Creek. The original collection system featured a sewer siphon at this site, which was used to convey flows from the southern portion of town across Willamina Creek and eventually to the E Street Pump Station. In the early 2000s, the Washington Street Pump Station was constructed to eliminate the need for the sewer siphon to the wastewater treatment plant. The current status of the pump station is mostly unchanged from its original construction.

Washington Street Pump Station

The Washington Street Pump Station features two constant-speed submersible wastewater pumps in a seven-foot diameter wet well. From each pump, four-inch ductile iron discharge piping passes through a valve vault with backflow prevention and a pressure gauge. Discharge piping combines into an 8-inch PVC force main that is approximately 1,050 linear feet. Flow in the force main is measured with a Doppler flow meter before discharging at the wastewater treatment plant headworks. The station was designed to handle 770 gallons per minute. The station has a redundant pump in the event that one pump becomes overrun with excess flow. The pump station operates duplex submersible pumps through an alternating lead/lag configuration to target equal runtime between pumps under normal operation. The wet well overflows to Willamina Creek through an 8-inch PVC pipe.

Similar to the North (E Street) Pump Station, the concrete wet well appears to be in fair to good condition and has minimal grease and debris buildup in the wet well. City staff indicate that grease and debris buildup is generally not an issue, and regular maintenance and washdown with the hose bib prevents significant buildups. A similar maintenance schedule of pulling the pumps each year is observed. Daily run hours are recorded multiple times a week.

Again, like the North Pump Station, the electrical systems and instrumentation appear in good condition. Standby power is controlled through a permanent diesel generator and automatic transfer switch. The station alarms to an Autodialer, which is tied to a leased phone line. Two level sensing transducers are in the wet well with a float backup. The transducer is set for the pump settings, while the float is set for the overflow alarm.

The shingled roof over the power meter, automatic transfer switch, and pump station control panels are similar to the North Pump Station. The pump station site is easily accessible from the street via a well-maintained gravel road. Green privacy slats are included in the chain link fencing. The fence also has barbwire, and the gate is secured by a padlock. The pump station is not equipped with an intrusion alarm system or video equipment; however, there is outdoor lighting. The pump station does not have fall protection installed underneath the wet well or valve vault hatches.

Deficiencies:

- Nylon netting fall protection on the wet well was removed and never replaced with adequate fall protection.
- The digital display on the Hydroranger level controller is not operational.
- The calibration status of the discharge piping pressure gauge is not known.
- The force main flow meter is inaccurate.
- The fence and gate do not have any "No Trespassing" or "No Parking" signs.

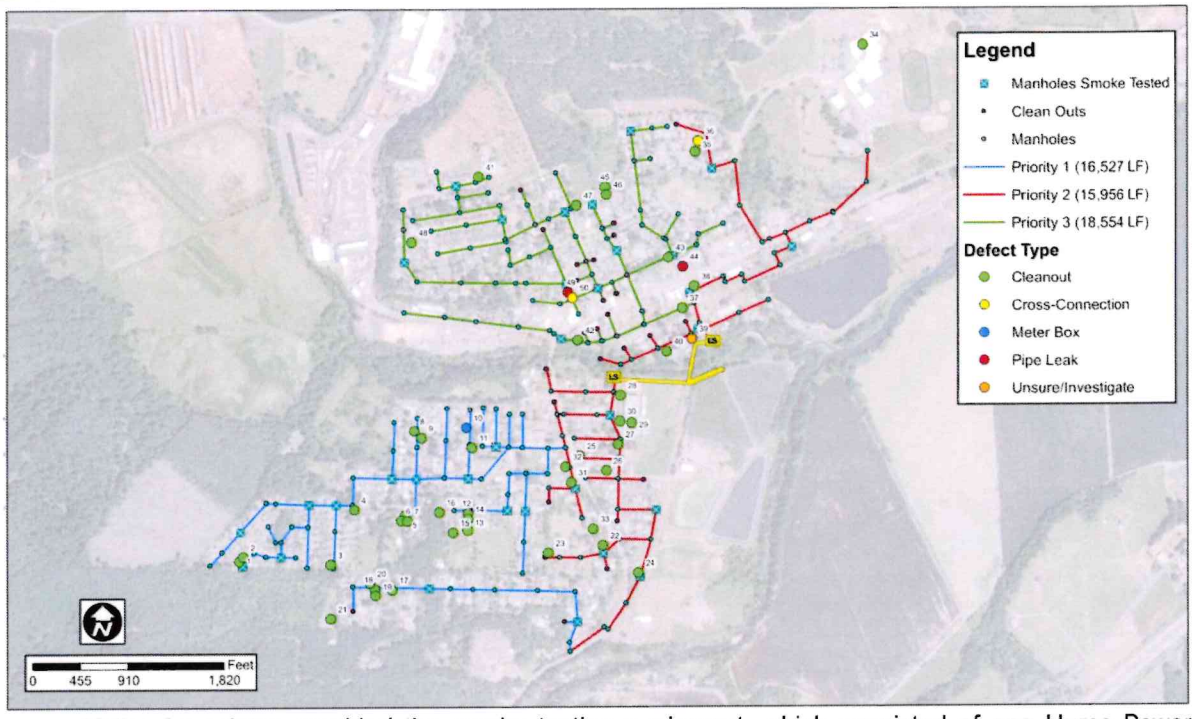
2.3.3. Collection System Piping

Reviewing closed circuit television (CCTV) inspection reports was not included in the scope of work for this facilities planning study. During future CCTV inspections, Keller Associates recommends that the City use the National Association of Sewer Service Companies (NASSCO) pipeline assessment certification program (PACP) to record defects and grade pipe condition during CCTV inspection. This program creates a comparable baseline for the pipelines studied and allows for tracking pipe conditions over time. The program creates specific codes for the various defects found in pipelines. Theoretically, if multiple operators were to inspect the same pipeline, they would generate similar, if not identical, PACP reports. While this may not be exact, it is a method of standardizing CCTV inspections.

2.3.4. Smoke Testing

Keller Associates smoke tested approximately 40,000 linear feet of the sanitary sewer mainlines system on August 12 - 17, 2022 (Figure 2-3). The City of Willamina notified all property owners within the smoke testing area one week before testing. City staff sent out notifications via water bills and posted the message on their website before August 12, 2022. Emergency services and dispatch were notified one week before and again each day with updates on the daily location of smoke testing.

FIGURE 2-3: SMOKE TESTING



Keller Associates provided the smoke testing equipment, which consisted of one Hurco Power Smokers, LiquiSmoke, and road signs. The smoker introduces smoke into the sanitary sewer system through the top of a manhole. Smoke introduced into the sanitary system should only be released from nearby manholes, cleanout pick holes, and building plumbing vents; smoke emitted anywhere else indicates a potential source of I/I.

Throughout the 7.58 miles of pipe smoke tested, 49 problem locations were noted. There were no illegal vents, but two cross-connections with the stormwater system, 44 broken or open cleanouts, two possible leaking laterals, and one new manhole were noted during smoke testing. These sites and concerns are summarized in Table 2-3. Photos and field notes of each problem are also presented in Appendix G. The main issues found and the reason for concern are listed below:

- Broken or open cleanouts (C/O)
  - It can collect localized stormwater, especially if located near a low point. Recommend notifying property owner and sealing C/O.
- Leaking laterals
  - It can allow high infiltration into the sewer system. Recommend notifying the property owner and repairing the lateral.
- Cross-connections
  - It consists of direct connections to the sewer system that should be connected to the stormwater system instead, such as roof drains and stormwater catch basins. For cross-connections on private property, we recommend notifying the property owner and having the cross-connection removed. For cross-connections on City property, investigate to confirm cross-connection and remove.

TABLE 2-3: RECORD OF SMOKE TESTING PROBLEM LOCATIONS

Picture ID	MH Tested	Address	Defect Type	Recommended Action	Photo
1	D15	925 SW Pine Street	CO	Cap Cleanout	Y
2	D15	935 SW Pine Street	CO	Cap Cleanout	Y
3	D4	925 Bale Ave	CO	Cap Cleanout	Y
4	D4	975 Pioneer Avenue	CO	Cap Cleanout	Y
5	D4	Field behind 875 Pioneer Avenue	CO	Cap Cleanout	Y
6	D4	Field behind 875 Pioneer Avenue	CO	Cap Cleanout	Y
7	D4	Field behind 875 Pioneer Avenue	CO	Cap Cleanout	Y
8	C-11	393 Fir Street	CO	Cap Cleanout	Y
9	C-11	394 Fir Street	CO	Cap Cleanout	Y
10	C3-3	385 Oak Street	Meter Box	Investigate	Y
11	C3-3	398 Oak Street	CO	Cap Cleanout	Y
12	C3-3	398 Oak Street	CO	Cap Cleanout	Y
13	C5-2	643 Pioneer Avenue	CO	Cap Cleanout	Y
14	C5-2	643 Pioneer Avenue	CO	Cap Cleanout	Y
15	C5-2	635 Pioneer Avenue	CO	Cap Cleanout	Y
16	C5-2	653 Pioneer Avenue	CO	Cap Cleanout	Y
17	C5-2	686 Pioneer Avenue	CO	Cap Cleanout	Y
18	A-30	875 Hill Drive	CO	Cap Cleanout	Y
19	A-30	945 Hill Drive	CO	Cap Cleanout	Y
20	A-30	945 Hill Drive	CO	Cap Cleanout	Y
21	A-30	960 Hill Drive	CO	Cap Cleanout	Y
22	A-30	1075 Hill Drive	CO	Cap Cleanout	Y
23	A12-2	130 Ivy Street	CO	Cap Cleanout	Y
24	A12-2	320 Ivy Street	CO	Cap Cleanout	Y
25	A-17	880 Lincoln Street	CO	Cap Cleanout	Y
26	A-11	452 Main Street (Willamina Automotive)	CO	Cap Cleanout	Y
27	A-11	253 Polk Street	CO	Cap Cleanout	Y
28	A-11	281 Barber Avenue	CO	Cap Cleanout	Y
29	A-9	West Valley Community Campus (266 Washington Street)	CO	Cap Cleanout	Y
30	A-9	West Valley Community Campus (266 Washington Street)	CO	Cap Cleanout	Y
31	A-9	West Valley Community Campus (266 Washington Street)	CO	Cap Cleanout	Y
N/A	A-9	143 Baker Street	CO	Cap Cleanout	N
32	C2-2	575 Main Street	CO	Cap Cleanout	Y
33	C2-2	551 Main Street	CO	Cap Cleanout	Y
34	C2-2	South End of Lincoln Street	CO	Cap Cleanout	Y
N/A	C2-2	216 Main Street	CO	Cap Cleanout	N
35	##	North Entrance of Elementary School	Cross-Connection	Reroute storm drain	Y
36	KA5	780 F Street	CO	Cap Cleanout	Y
37	KA5	820 F Street	CO	Cap Cleanout	Y
38	B1-1	371 Main Street	Unsure/Investigate	Cap Cleanout	Y
N/A	B1-1	391 Main Street (Slow Train Coffee)	CO	Cap Cleanout	N
39	B1-1	421 Main Street	CO	Cap Cleanout	Y
N/A	B1-7	750 5th Street	CO	Cap Cleanout	N
40	A-2	435 Yamhill Street	CO	Cap Cleanout	Y
41	A-2	337 Yamhill Street	CO	Cap Cleanout	Y
42	J5	350 6th Street	CO	Cap Cleanout	Y
43	B2-5	115 Main Street (City of Willamina)	CO	Cap Cleanout	Y
44	B4-1	420 E Street	Pipe Leak	Investigate	Y
45	B4-1	E Street and Valley Highway (Scrub It Up Carwash)	CO	Cap Cleanout	Y
46	B5-4	318 D Street	CO	Cap Cleanout	Y
47	B5-4	318 D Street	CO	Cap Cleanout	Y
48	B8-4	212 4th Street	CO	Cap Cleanout	Y
49	B-10	1st Street and B Street	Pipe Leak	Investigate	Y
50	B-10	1st Street and B Street	Cross-Connection	Reroute storm drain	Y

2.3.5. WWTP Operations

During wet weather (November 1st – April 30th) and dry weather (May 1st - October 31st) seasons the City changes how the WWTP is operated. During wet weather, the WWTP bypasses Lagoon #4 and discharges effluent to the South Yamhill River. During dry weather, the effluent is held within the lagoons. Figure 2-4 and Figure 2-5 show the WWTP process schematics and hydraulic profile, respectively.

FIGURE 2-4: WWTP PROCESS SCHEMATICS

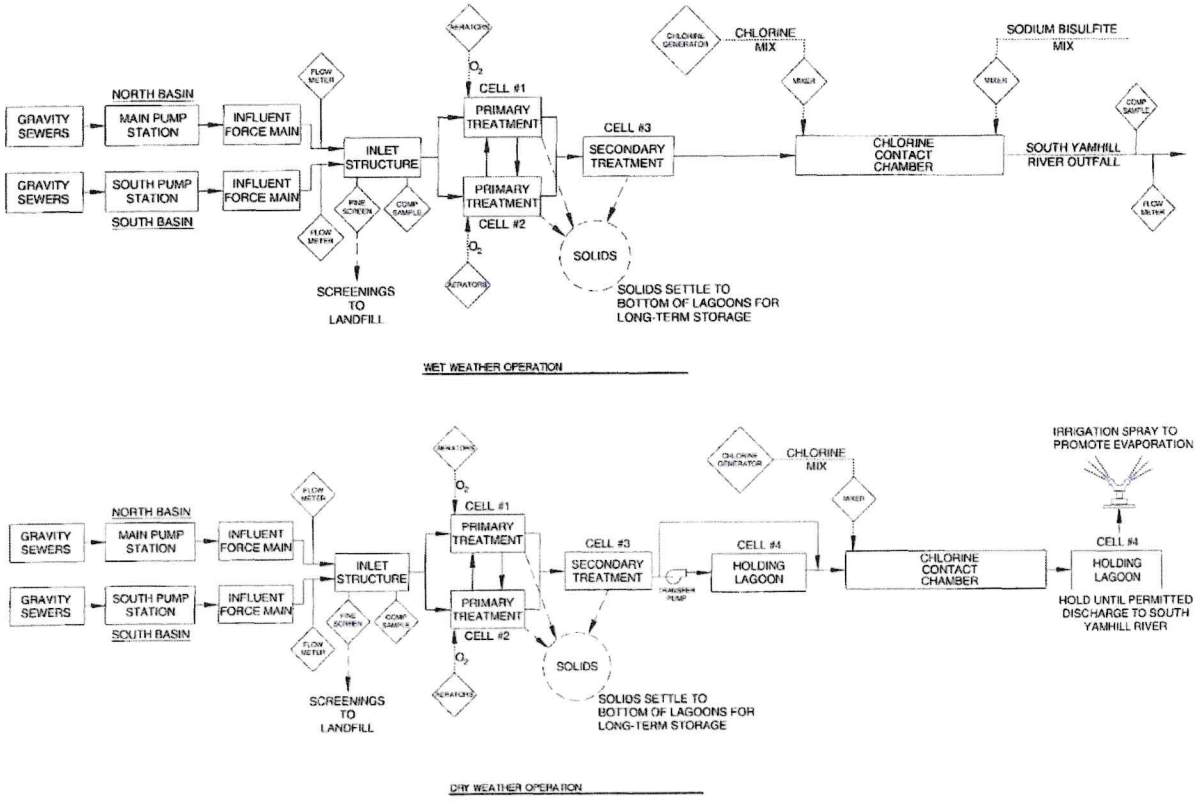
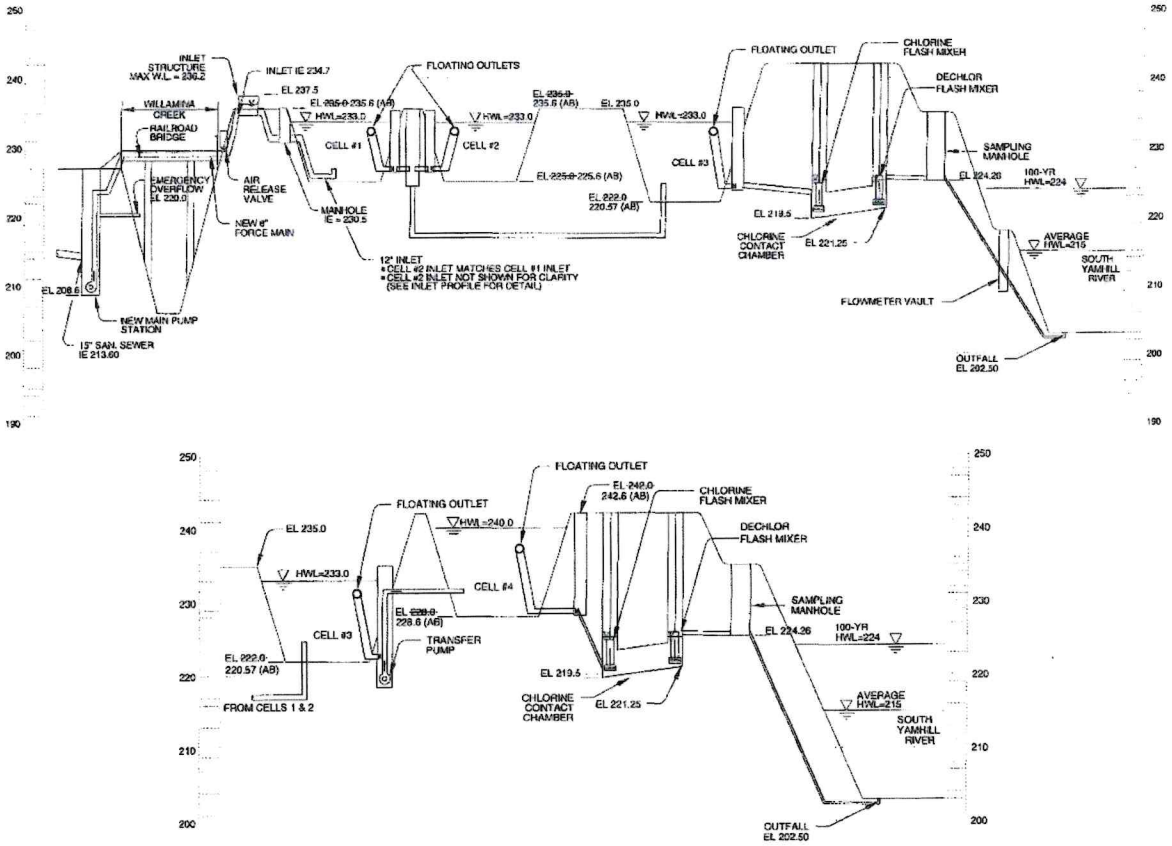
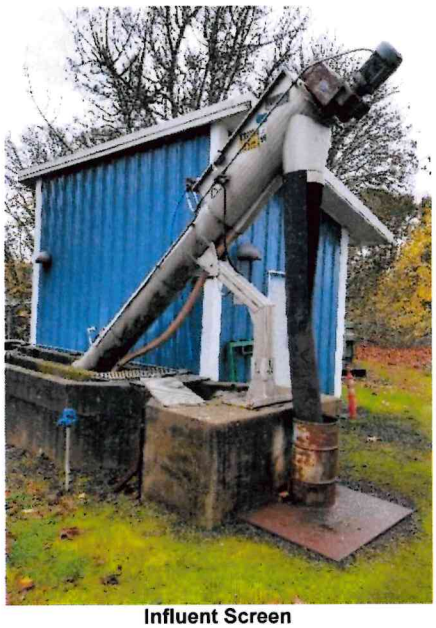


FIGURE 2-5: WWTP HYDRAULIC PROFILE



2.3.6. Headworks

Wastewater flows into the WWTP through two 8-inch force mains. The influent is measured with a Doppler flow meter on each forcemain. The flow meters are housed in a vault outside of the WWTP fence. Since their original installation, the meters have not been regularly maintained or calibrated. The flow meter output screens are housed inside the headworks building. A comparison of influent and effluent flows suggests that the influent flow meters underreport the actual influent flows. A SIGMA 900 All Weather refrigerated sampler is inside the headworks building. The sampler pulls samples from the concrete chamber of the influent screen, and it is programmed to collect influent samples every 30 minutes. Samples are collected using a peristaltic pump. The headworks building currently houses electrical panels and the sampler.



Influent Screen

A Vulcan ESS influent screw screen was installed in 2005. The City began experiencing issues with the screen a few years after it was installed, as the screw atop the screen's auger would not stay in place. The Vulcan screen and associated control panel have been out of commission since 2018, and the City currently uses a manually cleaned bar screen rather than the Vulcan screen. The screen was retrofitted by the operator. The screen is approximately 6 feet by 20 feet. The diversion structure following the screen contains two discharge channels to Lagoon #1 and Lagoon #2. The diversion structure is equipped with a level sensor. The channel to Lagoon #2 can be manually isolated via the stop gate. The bypass channel to Lagoon #2 is normally used during high-flow events but is currently more frequently used because the pipe leading to Lagoon #1 is hydraulically limited. The WWTP does not have a grit removal system, which would provide additional protection to the lagoon system. The influent screen is not covered, so freezing can be a problem.

Deficiencies

- There is currently no automatic mechanical screening of influent flows due to the existing screw screen being inoperable. The backup bar screen has to be manually raked.
- The influent flow meters appear to be inaccurate.
- The headworks channel has cracks.

2.3.7. Aerated Lagoons #1 and #2

Lagoons #1 and #2 were originally constructed in 1966 and then deepened and lined with HDPE in 2005. There are several tears in the liner above grade at the anchor trench, and the liner in Lagoon #1 can float when lagoon levels are low. The lagoons are separated by an earthen dyke with a gravel road on top. Lagoon #1 has a surface area of approximately 5.98 acres at the normal operating level. The total volume of Lagoon #1 is 12.5 million gallons (MG) and the usable storage volume is 3.9 (MG). Lagoon #2 has a surface area of approximately 5.91 acres at the normal operating level. The total volume of Lagoon #2 is 12.3 MG and the usable storage volume is 3.9 MG.


Lagoon Aeration Piping

Both lagoons have floating outlets. Two 10-inch HPDE pipes (north side of the lagoons and the south side of the lagoon) are hydraulically connecting the two lagoons. The transfer piping is reportedly undersized, and flows cannot transfer between Lagoons #1 and #2 fast enough during high-flow events. The liner features a rough surface for traction. Paint markings on the lagoon liners measure the water levels in the lagoons.

There are currently two ROOTS Rotary Lobe Blowers, each with a 40-horsepower (HP) Baldor Industrial Motor, mounted in the control building blower room. The blowers were installed in 2019 and replaced the original 19.7-HP blowers. Each blower is equipped with a PROGENTEX silencer. The two blowers operate in a lead/lag configuration. The blowers send compressed air through a filter, silencer, manifold, and then into each lagoon through a 10-inch HDPE pipe. The diffuser pipe is butt-fused welded and attached to fence posts with U-bolts. The header pipe is routed around the exterior of Lagoons #1 and #2. Each pipe contains 1-inch weighted tubes with air release openings spaced 1½-inch apart. There are PVC ball valves at the connection to the header pipe. Lagoon #1 contains 50 lines of aeration tube (12,500 feet), and Lagoon #2 contains 16 lines (5,250 feet).

The exposed HDPE aeration lines around Lagoons #1 and #2 are leaking and beyond their useful life. Expansion and contraction from sun exposure have caused the lines to weave up/down and left/right of the stakes holding it up, which created low points where moisture can gather within the piping. The underground header from the blower building and above-ground fittings are cracked and damaged. There have been some repairs to the aeration lines above grade, but not in the lagoons. The only maintenance to the aeration lines in the lagoons that has been completed is flushing the lines with hydrochloric acid to clean the diffusers.

ROOTS rotary lobe blowers with an ADS fine bubble aeration system of flexible diffusion pipes provide oxygen for the aerated lagoons. The blowers do not have variable frequency drives (VFD) and cannot be turned down for process control.

Deficiencies

- The liner in Lagoon #1 can float when the lagoon level gets too low.
- The air lines are cracking and leaking so the diffusers are not currently adding air to the lagoons.
- The aeration system is beyond its useful life.

2.3.8. Lagoons #3 and #4

There are two (2) polishing/storage lagoons, Lagoons #3 and #4. These lagoons are directly south of Lagoons #1 and #2. Lagoon #3 was originally constructed in 1966, then reshaped and deepened in 2005. Lagoon #4 was built in 2005. Both lagoons, similar to Lagoons #1 and #2, have a 3:1 side slope and are lined with an HDPE liner. The lagoons are separated by an earthen dyke and have a sediment control fence along the perimeter. Lagoon #3 has a surface area of approximately 5.49 acres at the normal operating level. The total volume of Lagoon #3 is 15.6 million gallons (MG) and the usable storage volume is 13.2 (MG). Lagoon #4 has a surface area of approximately 3.58 acres at the normal operating level. The total volume and usable storage volume of Lagoon #4 is 11.8 MG.

Lagoon #3

Lagoon #4

Flow is transferred between the two lagoons via the transfer pump station, where the 12.5 hp submersible transfer pump hydraulically connects the lagoons. The pump is controlled by level floats inside the wet well with above-grade external valves encased in a fiberglass enclosure. Both lagoons have floating outlets to control the water level. The floating outlets for Lagoon #3 and Lagoon #4 are located at the normal high water elevation of 2,320 ft. Paint markings on the lagoon liners measure the water levels in the lagoons. It is reported that a portion of the liner in Lagoon #3 floats when the water level is below 7 ft.

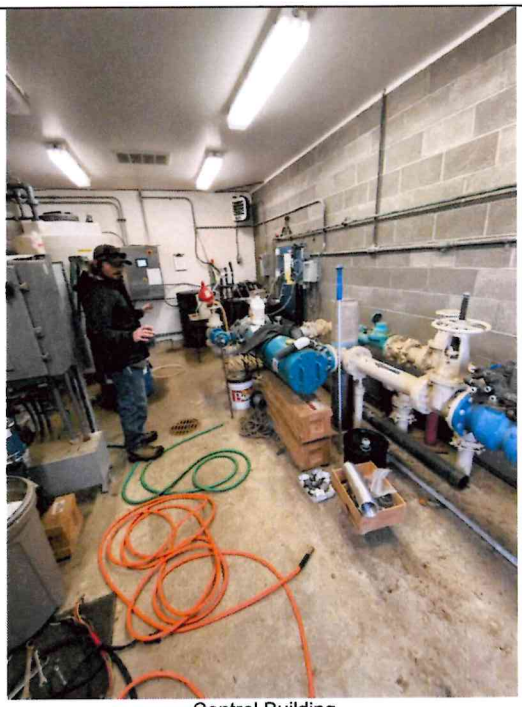
Two pump spray guns are used between Lagoons #3 and #4 to aid in evaporation during the dry weather period. The spray irrigation guns are Nelson SR75 Big Gun. The rated capacity of the spray guns is 30-100 gpm each. The guns are only utilized during summer months during the non-discharge period. The guns are currently not rotating as they should. The 10 HP vertical turbine pumps have a capacity of 220 gpm and are controlled by a timer. The pumps send effluent through a 3-inch common header to the spray guns. The 2005 improvements project included the design of an effluent reuse (irrigation) area of approximately 4.1 acres, but it was not constructed.

Deficiencies

- Lagoon #3 liner floats when the water is too low.
- There is no pump redundancy for the transfer pump station
- The spray guns are not currently able to rotate as they should.

2.3.9. Chlorination and Dechlorination Systems

The chlorine contact basin and chemical feed system were constructed in 2005, which means the chemical feed system is nearing the end of its useful life. The basin consists of 350 feet of 48-inch HDPE pipe between Lagoons #3 and #4. Both Lagoons #3 and #4 have a discharge valve vault, allowing effluent from either lagoon into the basin. The 1.7% sodium hypochlorite solution is generated on-site using a ClorTec system inside the control building. The solution is introduced into the effluent via a 1½ HP high-speed induction mixer connected to a sodium hypochlorite chemical feed line from the control building. The original metering pump has been replaced with a FLEXFLO Blue White peristaltic metering pump. The sodium hypochlorite tank has been replaced once, and the system has recently experienced electrical issues. There is a backup drum containing a 12.5% sodium hypochlorite solution used as needed for backup chlorination or to super chlorinate.


Control Building

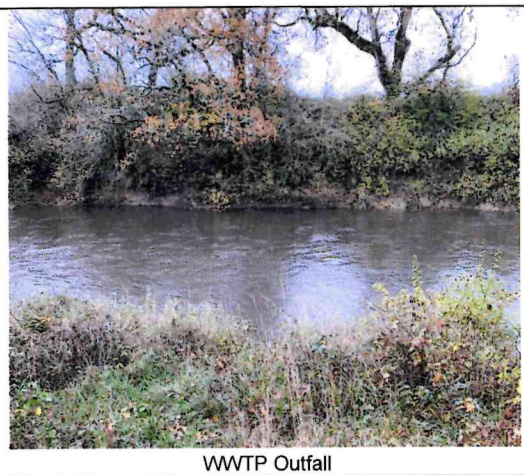
Dechlorination is achieved via a 1½ HP CHLOR-A-VAC chemical induction mixer connected to a sodium bisulfite chemical feed line from the control building. The City samples at the beginning and end of the basin to measure chlorine residual and actual dosing. Effluent is discharged through a 10-inch outlet to a sampling manhole.

Deficiencies

- The sodium hypochlorite system needs a new PLC.
- The chemical feed system is near the end of its useful life.
- The chlorine contact basin is undersized.

2.3.10. Yamhill River Outfall

The outfall was reconstructed in approximately 2005. Before the outfall, a 10-inch pipe is routed from a sampling manhole following disinfection to an effluent flow meter vault. The vault consists of a 10-inch submersible McCrometer UltraMag flow meter with a remote reader. The operators altered the submergence of the effluent flow meter and reconfigured it to a gooseneck to reduce fluctuations in the meter readings. The effluent flow meter outlet is an anchored 10-inch HDPE pipe traversing approximately 65 feet down the river embankment to an 8-inch single port diffuser. The City noted that if the flowmeter needed to be removed to be recalibrated, they would have difficulty getting it off and back on.


WWTP Outfall

Deficiencies

- The effluent flow meter needs to be replaced due to calibration issues.

2.3.11. Solids Handling

Solids settle to the bottom of lagoons for long-term storage. The solids have not been removed since the improvements were completed in 2005. The sludge levels have not been measured since being lined; however, the operator has not reported issues with solids built up inside the lagoons.

2.3.12. SCADA

The SCADA system is minimal and provides little control and opportunity for data collection. The current SCADA system allows for monitoring of the hypochlorite tank levels only. The operators receive auto-dialer alerts if an alarm is triggered. However, operators must go to the site physically and inspect equipment to identify the specific alarm and problem.

2.3.13. Emergency Power

The WWTP does not have emergency power provisions to maintain operations for the headworks and blower building in the event of a power outage.

2.4. FINANCIAL STATUS OF ANY EXISTING FACILITIES

The financial information for the City of Willamina sewer utility is located in Appendix D. Sewer revenue during the 2022-2023 fiscal year was $791,500.00. The annual costs to operate and maintain the wastewater system, separated by type of expense, are also shown in Appendix D. In the 2022-2023 fiscal year, the total spent from the sewer fund was $557,358 (excluding transfers). Table 2-4 below shows the 2023 fiscal year adopted sewer budget.

TABLE 2-4: 2023 FISCAL YEAR ADOPTED SEWER BUDGET

Recource Wastewater	Fiscal Year 2023 Adopted
Recource	$2,618,819.00
Fund Balance	$1,812,319.00
Revenue	$791,500.00
Transfer In	$15,000.00
Requirement	$2,618,819.00
Wastewater Operation	$557,358.00
Capital Outlay	$85,000.00
Debt Service	$175,000.00
Transfer Out	$115,371.00
Contingency	$1,686,090.00
Wastewater SDC	
Resource	$91,140.00
Fund Balance	$56,140.00
Revenue	$35,000.00
Requirement	$91,140.00
Capital Outlay	$0.00
Transfer Out	$15,000.00
Contigency	$76,140.00

Current sanitary sewer rate schedules are in the City of Willamina Master Fee Schedule (2022). Sanitary rates are summarized in Table 2-5.

TABLE 2-5: SEWER RATE SUMMARY

Description	Base Amount	15% Surcharge
Single Family (S1)	$70.46	$10.57
Car Wash – Sewer (SCW)	$134.10	$20.12
Grocery Store (SF)	$170.80	$25.62
Vacation Rate (SH)	$22.11	$3.32
Laundry Sewer (SL)	$351.84	$52.78
Willamina Lumber (SLW)	$851.43	$127.72
House/Cabins (SPS)	$202.92	$30.44
Café/Restaurant (ST1)	$168.85	$25.33
Café/Restaurant (ST3)	$225.20	$33.78
Café/Restaurant (ST4)	$107.00	$16.05
Willamina Lumber New	$3,644.11	$546.62

Sewer System Development Charges (SDCs) are on the City of Willamina Master Fee Schedule. SDCs are summarized in Table 2-6.

TABLE 2-6: SEWER SDC AND CONNECTION FEES

Meter Size	Total SDC Charge
0.625" x 0.75" – Displacement Multi-Jet	$5,128
0.75" x 0.75" – Displacement Multi-Jet	$5,128
1.00 inch – Displacement Multi-Jet	$8,547
1.50 inch – Displacement Class I Turbine	$17,093
2.00 inch – Displacement or Class I & II Turbine	$27,349
3.00 inch – Displacement	$51,280
4.00 inch – Displacement or Compound	$85,467
6.00 inch – Displacement or Compound	$170,933
8.00 inch – Compound	$273.493

The City of Willamina's Land Use Area Density (Table 2-7) can be found in the City of Willamina's Development Code Section 2.103.4 below.

TABLE 2-7: LAND USE AREA DENSITY

Land Use Designation	Land Use Area	Design Density
R-1	Single Family	4-6 Dwellings / Acre
R-2	1-3 Family	5-7 Dwellings / Acre
R-3	Subdivisions and Manufactored Home parks	6-8 Dwellings / Acre
R-3	Multi-Family	8-14 Dwellings / Acre

Table 2-7 was used to determine the area required for expansion for the 20-year projected planning. This information was then used to allocate loads to predict future expansion and growth of sewer trunks and mains.

TABLE 2-8: EQUIVALENT DWELLING UNIT SUMMARY TABLE

Type of User	Number of Users Before and After		Total Usage (Gal. / yr)	Usage Per User (Gal. / yr)
Residential	735	1,003	5,652,000	8,000
Commercial	27	29	457,000	17,000
Industial	3	3	213,000	71,000
Community Services	9	9	49,000	5,000
Church / School	15	15	182,000	12,000
Willamina Lumber Mill	1	1	2,382,000	2,382,000
Totals	790	1,060	8,935,000	

Table 2-8 was determined using the current Water Usage Data from the City. There is no current data on the connection from the residence and buildings to the sewer line.

2.5. WATER/ENERGY/WASTE AUDITS

No water, energy, or waste audits have been created at this time.

CHAPTER 3 - NEED FOR PROJECT

3.1. HEALTH, SANITATION, ENVIRONMENTAL REGULATIONS AND SECURITY

The Clean Water Act of 1972 provides the primary regulations for waters of the United States. It requires that point source contributions to surface waters obtain a discharge permit (currently, permits are issued from Oregon DEQ as National Pollutant Discharge Elimination System (NPDES) permits). These permits outline the conditions for discharging into surface waters. Willamina's WWTP has followed the NPDES effluent limits, with a few exceptions, since at least 2015, according to the records provided. The City has not reported any lasting compliance issues.

Other public health, sanitation, and security issues involve when untreated or undertreated effluent overflows onto the ground or is discharged to surface waters. There have not been any recent overflows at the Willamina WWTP.

The wastewater treatment plant property is secured with a chain link fence with locked gates. The power gate on the front-facing side of the treatment plant property is controlled by a keypad and is remotely controlled. The east side of the treatment plant property has a gate with a padlock. The office has a locked door and an intrusion alarm. All the lift stations are secured with chain link fence.

The current lift station and pumps are under capacity, and this is shown as the wastewater operator has to take additional pumps to the lift stations to avoid overflows during high rain events. However, overflows have occurred, as shown in Table 3-1.

TABLE 3-1: SANITARY SEWER VIOLATIONS

Violation Date	Gallons Discharged	Rainfall 24 Hours Proir (in)	Reason	Location
1/19/2012	500	2.24	Excess Rainfall Event	Washington Pump Station
1/27/2012	5,500	N/A	Excess Rainfall Event	E Street Pump Station
2/5/2017	Unknown	1.64	Excess Rainfall Event	Washington Pump Station
1/14/2021	242,627	1.88	Excess Rainfall Event	E Street Pump Station
11/12/2021	216,000	2.76	Excess Rainfall Event	E Street Pump Station
1/5/2022	73,800	2.37	Excess Rainfall Event	E Street Pump Station
12/27/2022	168,800	0.35	Mechanical Failure	E Street Pump Station
12/29/2022	62,856	2.55	Excess Rainfall Event	E Street Pump Station
12/13/2023	257,606	2	Excess Rainfall Event	E Street Pump Station

3.1.1. Current Regulatory Requirements

The City of Willamina discharges treated effluent under NPDES Permit No. 101070 to the South Yamhill River at River Mile 41.9 (Outfall 001). The permit allows discharges from November 1st to April 30th. The NPDES permit the City is currently operating under had an expiration date of November 30, 2015, but it has been administratively extended. The permit and permit fact sheet are included in Appendix B. Table 3-2 summarizes the existing effluent limits.

TABLE 3-2: EXISTING NPDES PERMIT LIMITS

Parameter	Unit	Effluent Requirements				
		Monthly Average Limit	Monthly Geometric Mean Limit	Weekly Average Limit	Daily Maximum Limit	Instantaneous Maximum Limit
Outfall 001 (South Yamhill River)						
May 1 - October 31	No discharge to waters of the State					
BOD_5	mg/L	30	--	45	--	--
	ppd	120	--	180	240	--
	% removal	85%	--	--	--	--
TSS	mg/L	30	--	45	--	--
	ppd	120	--	180	240	--
	% removal	65%	--	--	--	--
E. coli	#/100 mL	--	126	--	--	406
pH	Standard Units	Range of 6.0 - 9.0				
Total Residual Chlorine	mg/L	0.08	--	--	0.21	--

3.1.2. Known Future Regulatory Requirements

No new future regulatory requirements (excluding those currently on the Willamina permit) are known.

3.1.3. Potential Future Regulatory Requirements

Keller Associates communicated with the DEQ regarding future permit conditions. DEQ is currently planning to issue a renewed permit to the City in 2025.

The South Yamhill River is in the Willamette Basin and Yamhill Subbasin (Hydraulic Unit Code (HUC) 17090008), and where the City discharge enters the South Yamhill River, the assessment unit (AU) is the Agency Creek to Willamina Creek (OR_SR_1709000802_02_104603). TMDL stands for Total Maximum Daily Load (TMDL), and it is a water quality improvement plan for water bodies that do not meet water quality standards. Section 303(D) of the Clean Water Act requires states and tribal entities to establish beneficial uses for the bodies of water within their respective jurisdictions and develop improvement plans referred to as TMDLs in the event of an observed impairment. The TMDL establishes a total pollutant load that a given waterway can accept without exceeding applicable water quality standards and impairing its identified beneficial use.

According to the NPDES Fact Sheet (Appendix B), the South Yamhill River has designated beneficial uses of industrial water supply, fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, and commercial navigation and transportation. Based on the 2022 Integrated Report Assessment, the water body in this area is impaired for E. coli, fecal coliform, temperature, and phosphorus. A TMDL was created for the Willamette Basin in 2006 for bacteria, mercury, and temperature. However, no waste load allocations (WLA) were noted for Willamina in the TMDL, and the current permit was written after the Willamette Basin TMDL. It did not include special requirements based on the TMDL.

During the planning period, it is possible that water quality regulations could become more stringent. The following are a few items that might be included in future permits.

- Five-Day Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS)

A potential change could be if the plant increased its average dry weather flow and the city requested a mass load limit increase for either of these parameters. The DEQ would then expect the city to conduct an antidegradation study. It may be challenging to receive a mass load increase due to downstream limitations.

- Ammonia

Ammonia is sometimes found in wastewater treatment plant effluent at levels that exceed the state of Oregon water quality standards for toxicity. Currently, ammonia is not regulated at the WWTP. DEQ will conduct a reasonable potential analysis (RPA) during the permit renewal process. However, since the city's effluent ammonia samples have been non-detect for the past five years (2018-2023), the RPA will likely show that an effluent ammonia limit is unnecessary.

- Chlorine

Chlorine toxicity is highly dependent on dilution. When the City starts the permit renewal, the DEQ will re-evaluate the dilutions. The City will continue using the current chlorine limit and the South Yamhill Flows for the analysis to see if the current permit limit is protective enough.

- Temperature

A temperature RPA will be completed during the permit renewal. There may be a temperature limit based on any applicable migration or spawning criteria. The fish use maps show Salmon and Trout Rearing and Migration as well as Salmon and Steelhead Spawning from September 1 through May 15. The spawning criteria is 13ºC; however, the maximum effluent temperature has historically been less than 16ºC; therefore, the RPA may determine that a temperature limit is not needed. Additionally, since no large industries are discharging to the treatment plant, it is not likely that a thermal plume limit will be needed.

- Other Toxic Pollutants

Discharges must be evaluated for toxic pollutants of concern (POCs) that might cause an exceedance of the water quality standard in the receiving water body. The current water quality criteria for aquatic toxicity are listed in OAR 340-41 pollutant Tables 20, 33A, and 33B, and for human health water quality criteria in OAR 340-41 pollutant Table 40.

Mercury is a contaminate of concern throughout the Willamette Basin. The DEQ Final Revised Willamette Basin Mercury Total Maximum Daily Load (TMDL) and Water Quality Management Plan (WQMP) was published in November 2019. This plan outlines needed mercury reductions from nonpoint and point sources throughout the Willamette Basin and the DEQ's plan for implementation. It is understood from discussions with DEQ that minor WWTPs (<1 MGD average flows), such as Willamina, are not likely to receive a WLA in the TMDL. Similarly, DEQ noted that since the City is a minor discharger, it is not likely that copper or other toxic pollutants will be included in a permit soon.

- PFAS and Personal Care Products

Within the general wastewater industry, a class of 'emerging contaminants' has been discussed increasingly as regulators' attention has turned from nutrient pollutants to other constituents. The DEQ noted that they would follow EPA's lead for per and poly-fluoroalkyl substances (PFAS), and they do not expect to see that included soon, other than in pretreatment requirements for affected industries.

There are currently thousands of known PFAS chemicals used in everyday products, such as non-stick cookware and waterproof clothing. These substances have become prevalent as emerging contaminants due to their ability to bioaccumulate and persist in the environment. The EPA specifically calls out point source dischargers and municipally generated biosolids as sources of PFAS contamination; however, the principal parties responsible for these compounds are those industries involved in their manufacture and use. The EPA has identified a strategic roadmap that

will lead to future regulatory guidance regarding PFAS within the next several years. The most significant impact on municipal wastewater treatment plants will likely be biosolids handling.

Personal care products are becoming more common in surface waters because of societal changes and advancements in medical technologies. As the relative concentration of these compounds increases, there is concern regarding the impacts these products may have on aquatic life and communities located downstream of where they are introduced. Municipal wastewater discharge is a known mechanism by which these personal care product chemicals are introduced into the environment. Many of the chemicals that persist after wastewater treatment are included in a class of compounds referred to as endocrine disruptors (EDCs). EDCs are compounds that alter the normal function of organisms' endocrine (hormonal) system and can result in various adverse health impacts. Because of the nature of these compounds, negative health impacts are chronic rather than acute, and traditional toxicity tests do not adequately predict nor detect their effects. The EPA is working to update current ambient water quality protections to better accommodate these emerging pollutants. No imminent regulations regarding personal care products are anticipated.

- Biosolids

The City does not have a Biosolids Management Plan or Land Application Plan. If the City wants to land apply biosolids at any point in the future, DEQ will require the City to produce a Biosolids Management Plan and Land Application Plan that DEQ approves, obtain written site authorization from each land application site before land application, and apply the biosolids that meet the pathogen and vector attraction reduction standards under 40 CFR 503.

It is worth noting that future EPA guidance on PFAS compounds could have implications for the handling and disposing biosolids. No known modifications due to PFAS are known at this time, but will be based on EPA guidance scheduled to be released after 2024.

- Mixing Zone

Due to the lack of ambient water quality data available on the South Yamhill River for the dissolved oxygen, ammonia, temperature, total Kjeldahl nitrogen (TKN), pH, and alkalinity, DEQ will issue to the City a request for additional sampling in a few months. The comments provided by DEQ indicate that they would request the city sample the South Yamhill River upstream of the City's outfall. DEQ may also request specifications on the outfall.

The current permit provides for a mixing zone consisting of the portion of the South Yamhill River contained within a band extending twenty-five feet from the Northwest Bank of the river and extending from a point ten feet upstream of the outfall to a point one hundred feet downstream from the outfall. The Zone of Immediate Dilution (ZID) is defined as that portion of the regulatory mixing zone within ten feet of the discharge point. A mixing zone study was completed in 2010 and can be found in Appendix B. The DEQ noted that the renewed permit would likely include an item requiring the City to conduct a new mixing zone study during the permit period and an outfall inspection.

3.2. AGING INFRASTRUCTURE

3.2.1. Treatment Performance

This section evaluates the effluent quality from the existing plant relative to current effluent limits for BOD_5, TSS, E. coli bacteria, pH, and total residual chlorine. The current permit limits are shown in red.

- BOD_5

Monthly and weekly average effluent BOD_5 concentrations from October 2019 to April 2023 are shown in Figure 3-1, along with the corresponding discharge limits. Figure 3-2 shows the effluent BOD_5 loading (samples are taken weekly, so the daily maximum and weekly average are the same). The percent removal is shown in Figure 3-3. The effluent BOD_5 concentrations and loadings complied with the permit during this period, except for December 2019, when the weekly loading

was slightly greater than the permit limit. Similarly, the 85% BOD_5 removal requirement was consistently met except for January 2020. During this month, the influent BOD_5 was extremely dilute, so even though the effluent BOD_5 concentration was typical, the plant could not achieve the percent removal.

FIGURE 3-1: EFFLUENT BOD_5 CONCENTRATION

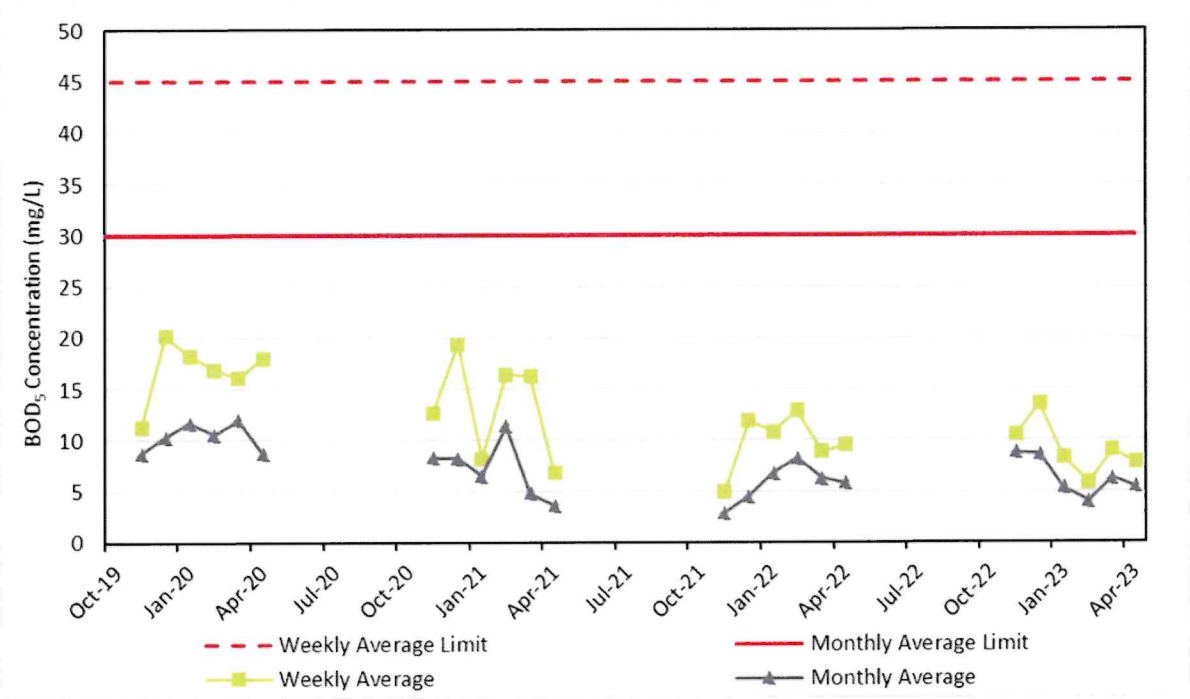


FIGURE 3-2: EFFLUENT BOD_5 LOADING

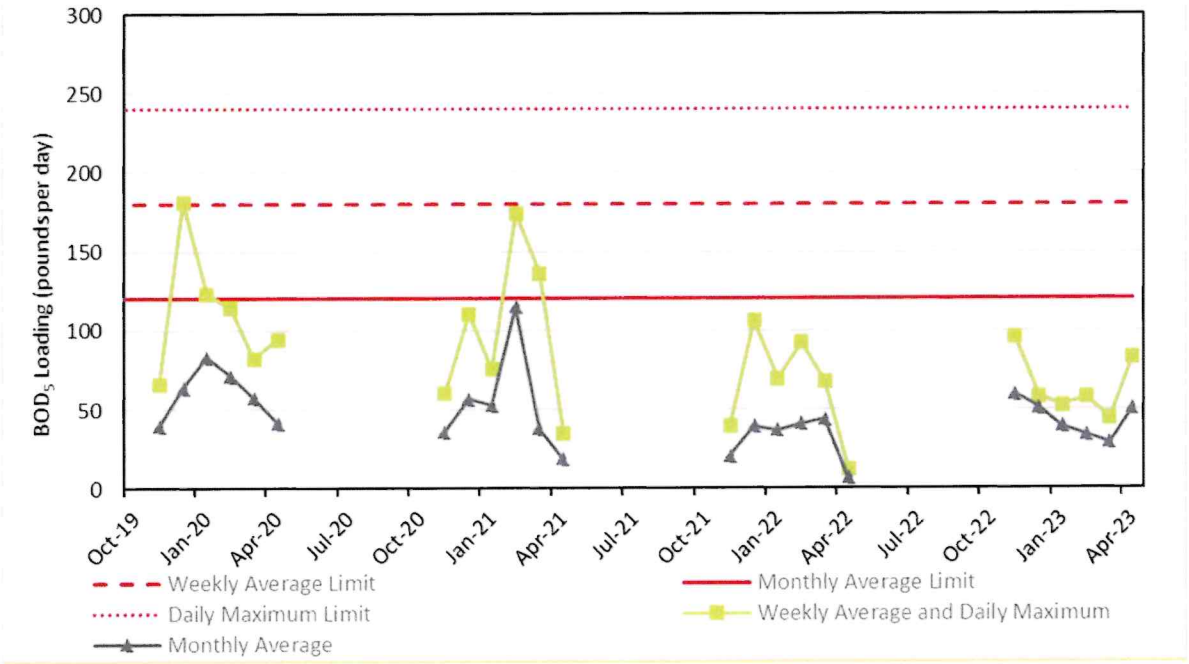
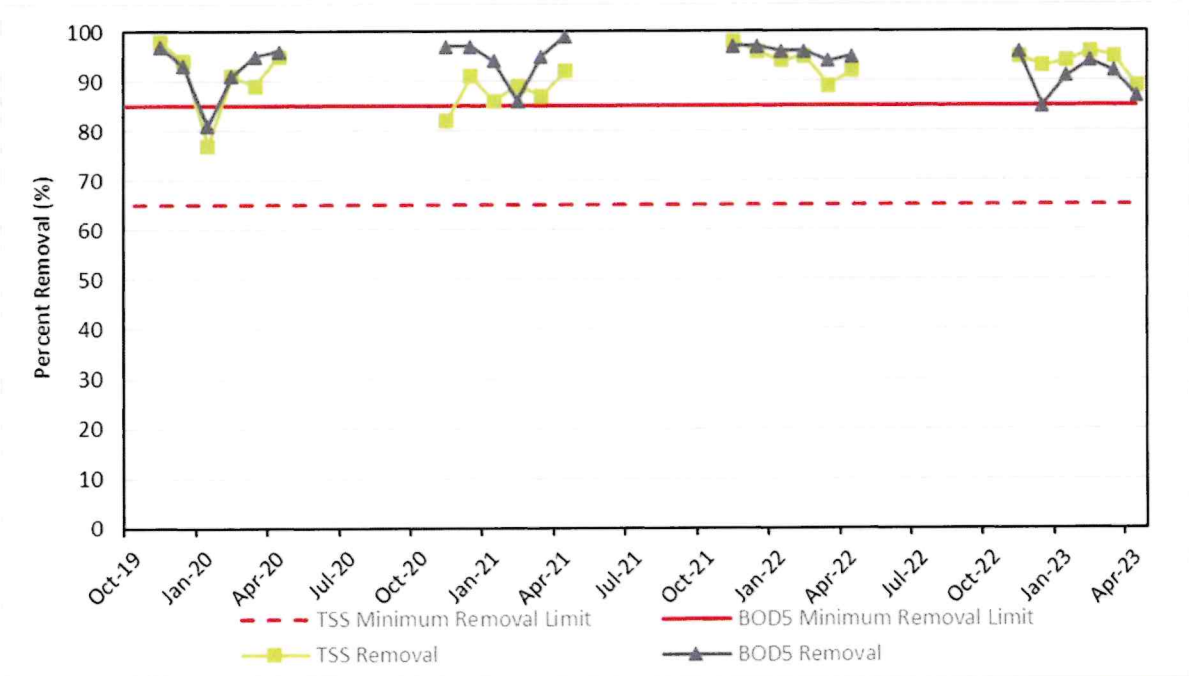


FIGURE 3-3: EFFLUENT BOD_5 AND TSS PERCENT REMOVAL



- TSS

Monthly and weekly effluent TSS concentrations from October 2019 to April 2023 are shown in Figure , and the effluent TSS loadings are shown in Figure 3-15. Like BOD_5, the TSS samples are taken weekly, so the daily maximum and weekly average are the same. The TSS percent removals are shown in Figure 3-3. The figures show that the effluent TSS results complied with the permit limits during this period.

FIGURE 3-4: EFFLUENT TSS CONCENTRATION

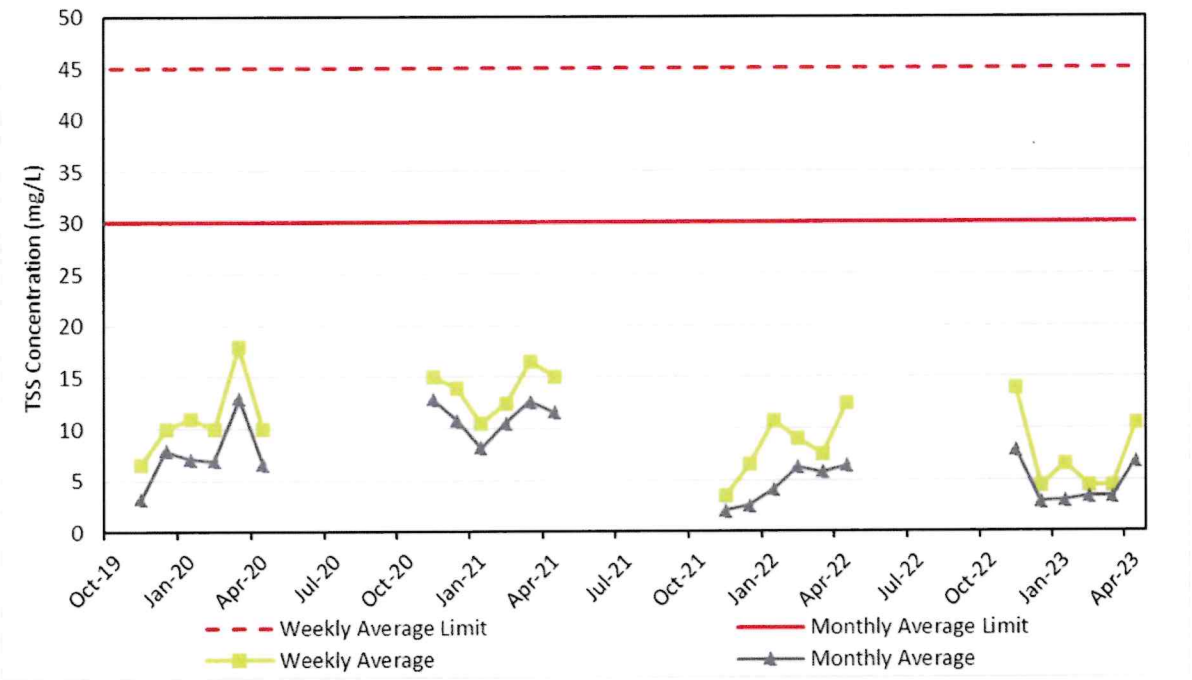
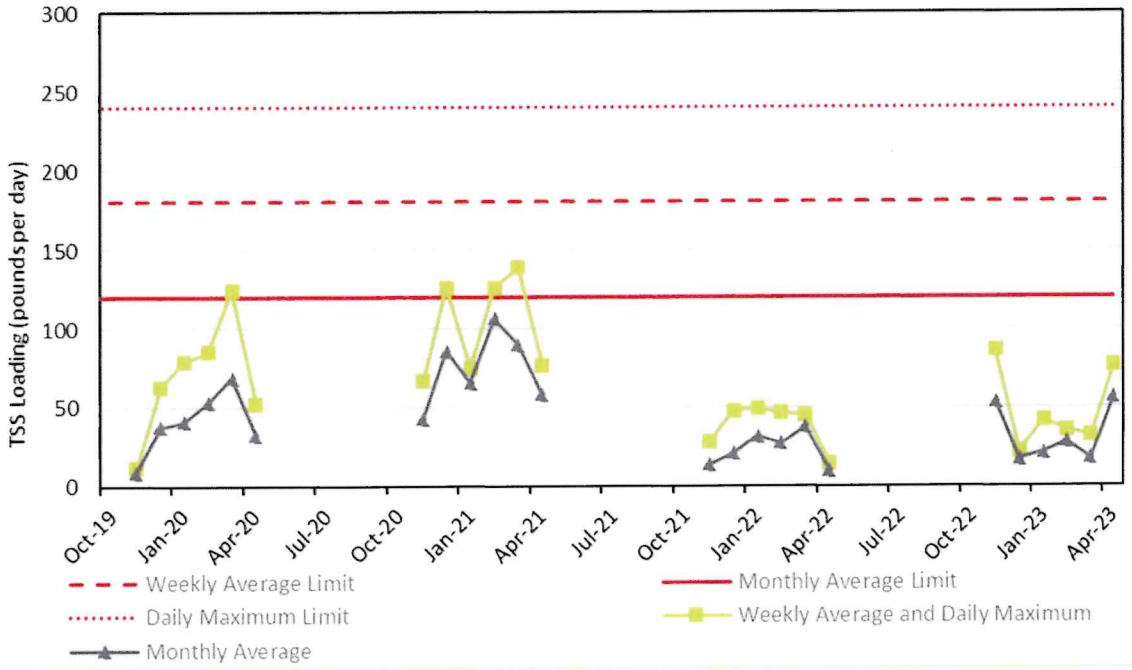


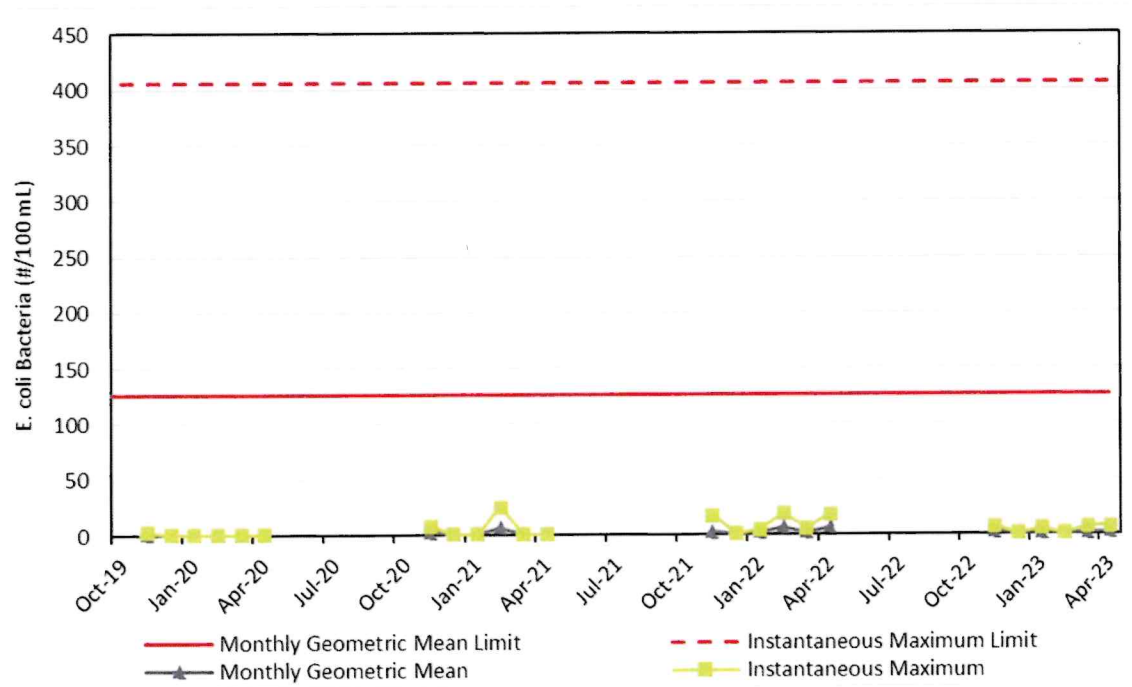
FIGURE 3-5: EFFLUENT TSS LOADING



- E. coli Bacteria

E. coli bacteria data is shown in Figure 3-6. No violations were noted during this period.

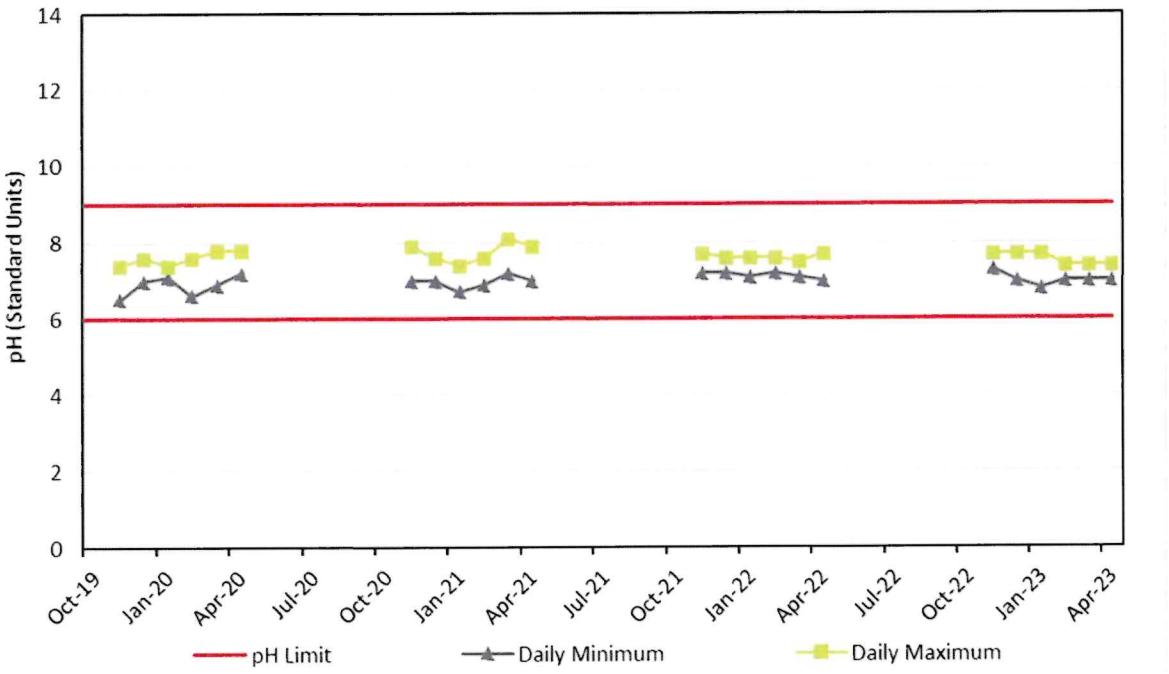
FIGURE 3-6: EFFLUENT E. COLI BACTERIA



- pH

The daily maximum and minimum pH are shown in Figure 3-17. No violations were noted.

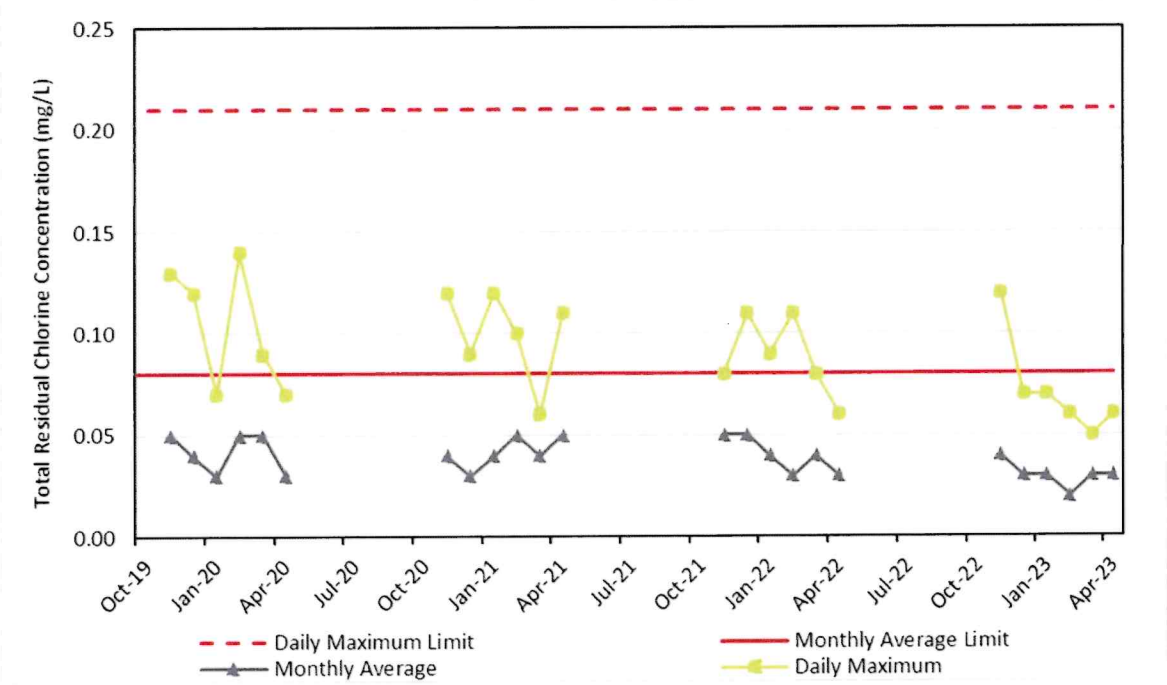
FIGURE 3-7: EFFLUENT pH



- Total Residual Chlorine

Chlorine residual data is shown in Figure 3-8. No violations occurred during this period.

FIGURE 3-8: EFFLUENT TOTAL RESIDUAL CHLORINE



3.2.2. Equipment Useful Life

Most of the existing collection system is the same asbestos cement pipes originally installed, but some areas are PVC. (Appendix A Figure 10) Degradation of these pipes allows large amounts of rainwater (inflow and infiltration) into the system. Once rainwater has entered the sanitary sewer system, it is treated as normal wastewater, which has resulted in occasional overflows. The City's two lift stations have generally been updated and maintained satisfactorily since their construction.

The wastewater treatment plant was last updated in 2005. The City operators indicate that the plant is operating satisfactorily except for the issues listed below:

- The headworks screen stopped working back in 2018, so the backup bar screen is used and is manually raked.
- Liners in Lagoons #1 and #3 float when the water level gets too low.
- The diffusers are not currently providing air to the lagoons as there are cracks in the system. The air lines also have a break at the elbow from the blower building to the lagoons. In general, the system is beyond its useful life.
- The pump spray guns used for evaporation are not rotating as they should.
- The City is having electrical issues with the sodium hypochlorite system. Overall, the disinfection system is near the end of its useful life.
- The City notes that if the gooseneck flowmeter needed to be removed to be recalibrated, they would have difficulty getting it off and back on.