



Water and Wastewater System Master Plan Updates





Purpose and Nature of Master Plans

Serve as a Tool for the City Utility Department, Public Works Advisory Board, and Planning Commission

- Evaluate the condition, performance, and available capacity of existing water and sewer system infrastructure
- Evaluate forecasted population growth and associated increases in water demands/wastewater flows and loadings.
- Advise, guide, and plan for growth and development
- Outline necessary improvements to accommodate growth
- Develop capital improvements plans with implementation time frames and estimated cost of proposed improvement projects

Water System Elements

- Supply and treatment
- Storage
- Distribution

Wastewater System Elements

- Collection system including pump stations
- Wastewater treatment
- Treated wastewater reuse



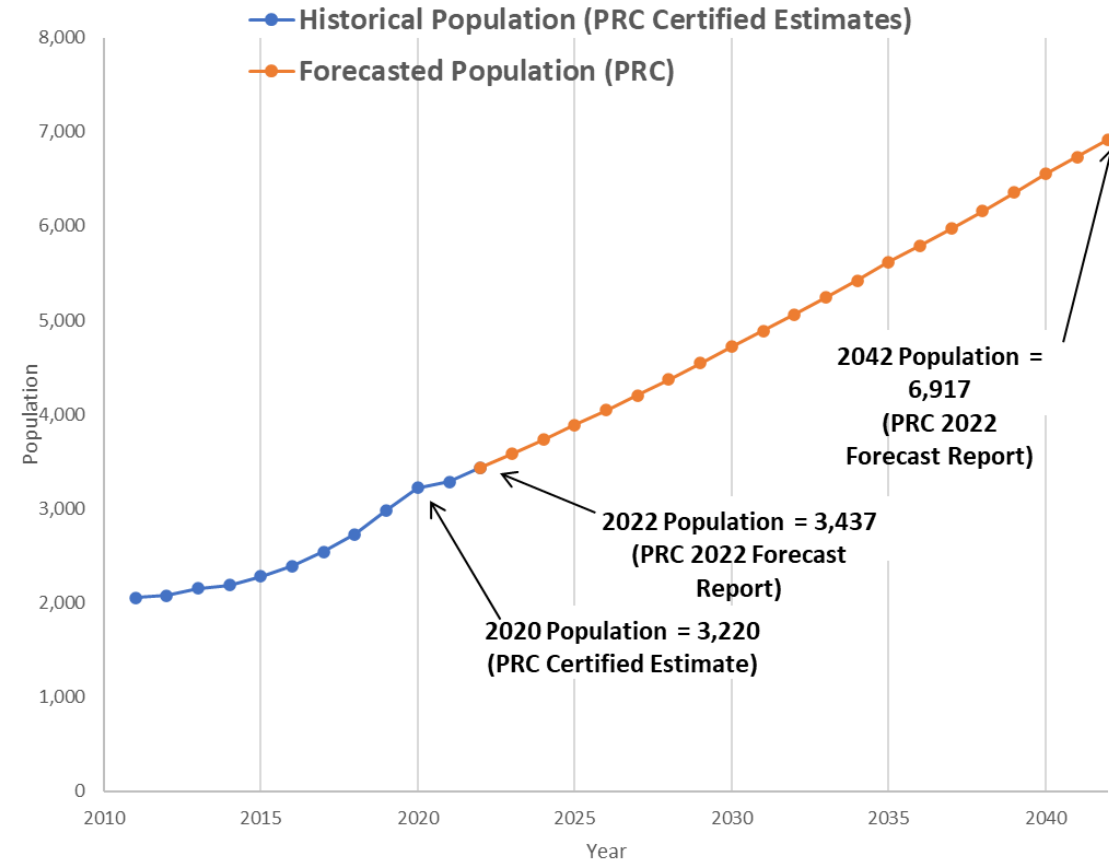
Development of Design Criteria

Methodology

- Determine average and peak water demand and wastewater flows and loadings on a per capita basis from past records and population estimates
- Apply per capita demands, flows, and loadings to forecasted populations

Resources

- Portland State University Population Research Center (PRC) certified population estimates and forecasted growth rates
- Water system production and consumption records
- Wastewater flows and sampling records





Water System Overview

Water Supply and Treatment

- Provide clean drinking water
- Maintain adequate supply during peak demand periods
- Current sources include four groundwater wells (constructed in 1975, 1991, 2007, and 2021)
- City recently added Well No. 4 to accommodate growing demands

Water Storage

- Allow flexible operation of sources
- Provide equalization during peak demand periods
- Reserve adequate volume for fire suppression
- Provide standby/emergency volume for situations beyond typical design criteria
- Current storage: 1.6-million-gallon (MG) concrete tank (constructed in 1995)

Water Distribution

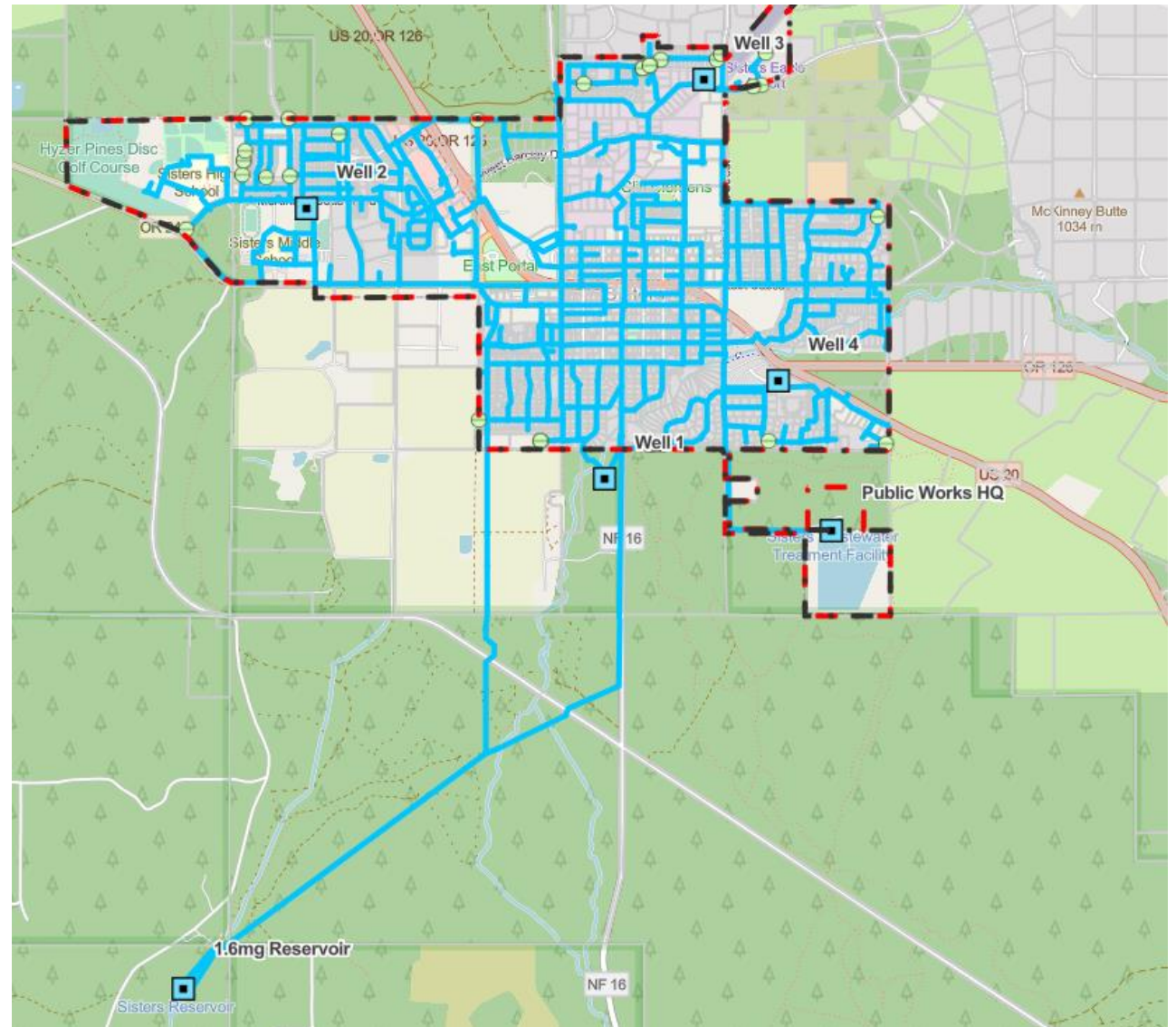
- Deliver clean drinking water to users
- Maintain adequate system pressure during peak demand periods
- Provide needed fire flow
- Current distribution includes pipes ranging from 4- to 16-inch diameter composed of various materials
- City has been actively replacing old, undersized pipe and looping areas to enhance circulation

Water System Schematic

City maintains an ArcGIS Online Subscription administered by AP.

Database used for mapping, visualization, and analysis.

Database was used to develop a water model for this Water System Master Plan Update.





Water System Evaluation

Supply and Treatment

- Water quality is good, and sources are reliable.
- Well No. 1 structure is nearing end of its useful life.
- Peak demand periods may exceed available source supply within the planning period.

Storage

- Storage is adequate to provide current operation, equalization, and needed fire flows.
- Emergency reserve is nearing minimum recommended value due to recent growth.
- Additional storage is needed to accommodate current/future growth.

Distribution

- Existing transmission lines constructed in 1960's are nearing end of their useful life.
- Existing transmission lines are undersized to accommodate forecasted growth.



Existing Well No. 1 Pump Station



Existing 1.6 MG Concrete Tank



Water System Recommended Improvements

Water Supply and Treatment

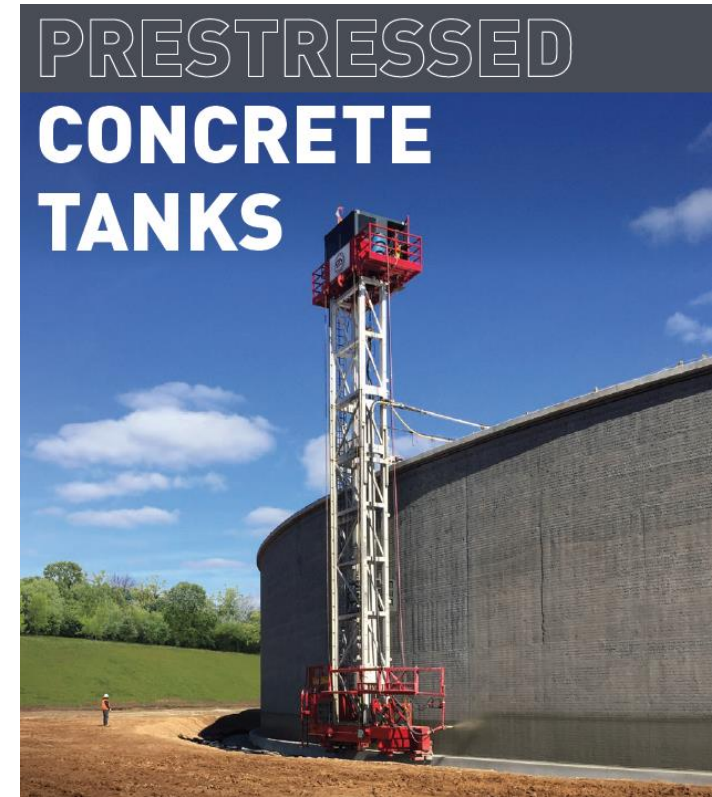
- Well No. 1 pump station improvements (0-5 years)
- Install standby power and variable frequency drive on Well No. 3 (0-5 years)
- Increase source capacity (10-20 years)

Water Storage

- Construct new 2.2 MG concrete tank and rehabilitate existing 1.6 MG concrete tank (0-5 years)

Distribution System

- New transmission line – Edgington Rd. (0-5 years)
- New transmission line – Reservoir to Whychus Creek (0-5 years)
- Continue to loop system (ongoing)
- Continue to replace old, undersized mains (ongoing)
- Implement ongoing meter replacement program



Courtesy of DN Tanks



Water Capital Improvements Plan

Implementation Priority	Recommended Improvement	Estimated Cost within Implementation Time Frame (2022 dollars)		
		2022 to 2027	2027 to 2032	2032 to 2042
1	Install a variable frequency drive and backup power at Well No. 3.	\$372,000		
2	Rebuild the Well No. 1 pump station building and install a new on-site generation system.	\$808,000		
3	Construct a new 2.2 MG water storage tank and rehabilitate the existing 1.6 MG water storage tank.	\$6,283,000		
4	Install a new 16-inch PVC transmission line on Edgington Rd from the existing reservoir to city limits near the middle and high schools.	\$3,635,000		
5	Install a new 16-inch DI transmission line from the existing reservoir to Whychus Creek junction.	\$1,466,000		
6	Replace existing AC distribution mains in the Edge O The Pines subdivision.		\$1,567,000	
7	Install a new 12-inch PVC water main on Camp Polk Road from East Barclay Dr to East Sun Ranch Dr.		\$319,000	
8	Install new 12-inch DI transmission line from Whychus Creek junction to East Tyee Drive. Install a new 12-inch PVC distribution main from E. Tyee Drive to E. Hood Avenue.		\$2,504,000	
9	Install a new 12-inch PVC main from East Desperado Trail to Creekside Drive.		\$654,000	
10	Hood Avenue South Alley water services reconnections.		\$103,000	
11	Construct a new Well No. 5 and transmission line.			\$2,102,000
Annually	Ongoing water service meter replacement.	50 per year at \$400 each (\$20,000 per year)	50 per year at \$400 each (\$20,000 per year)	50 per year at \$400 each (\$20,000 per year)
TOTALS		\$12.6 M	\$5.2 M	\$2.1 M
			TOTAL RECOMMENDED IMPROVEMENT COST	
			\$19.9 M	



Water System Questions?



Deep Well Pump Control Valve



Onsite Hypochlorite Generation System



Wastewater System Overview

Collection System

- Convey wastewater to wastewater treatment facility
- Gravity sewer generally consists of 6- to 24-inch diameter PVC
- Rope Street pump station
- Three satellite pump stations

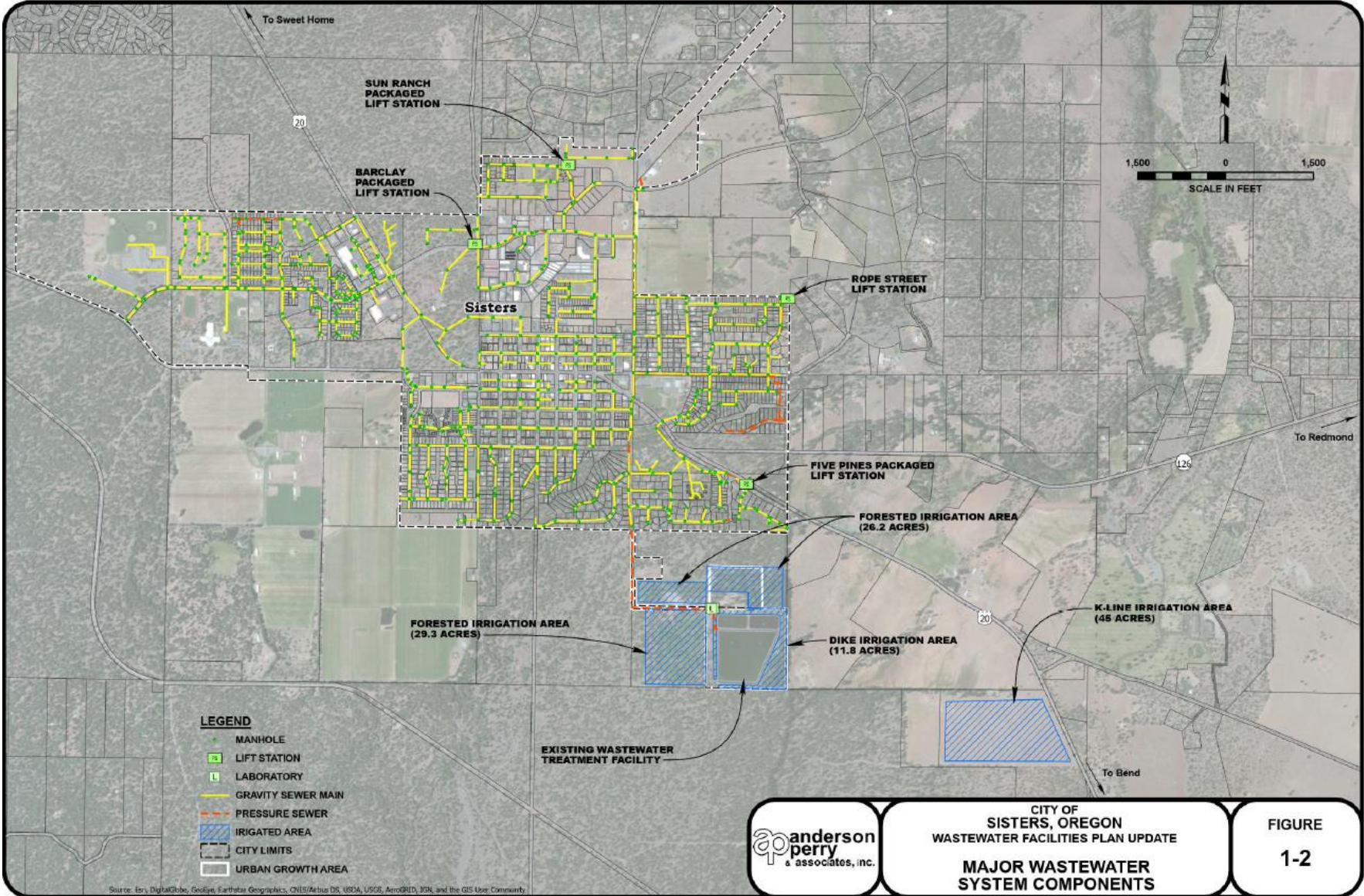
Wastewater Treatment

- Headworks screening
- Two primary lagoons with surface aerators
- One storage lagoon
- One chlorine contact pipe for disinfection

Treated Wastewater Effluent Disposal

- Multiple irrigation areas for application of recycled water

Wastewater System Schematic



	CITY OF SISTERS, OREGON WASTEWATER FACILITIES PLAN UPDATE	FIGURE 1-2
	MAJOR WASTEWATER SYSTEM COMPONENTS	
	<small>Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community</small>	



Wastewater System Evaluation

Collection System

- All areas *within* urban growth area were analyzed for potential growth
- Specific trunkline capacities analyzed in areas expected to see growth
- Condition/capacity assessment of lift stations

Wastewater Treatment and Disinfection

- Condition/capacity assessments of unit processes

Recycled Water

- Major focus on capacity assessments based on findings from the Lazy Z Ranch Master Plan



Existing Headworks



Existing Treatment Lagoons



Wastewater System Recommended Improvements

Collection and Conveyance

- Rope Street lift station improvements (0-5 years)
- New Westside lift station (0-5 years)
- New Creekside Court lift station (0-5 years)

Treatment

- Remove lagoon biosolids (5-10 years)
- Replace lagoon aerators (5-10 years)
- Headworks improvements (10-20 years)
- Chlorine contact chamber improvements (10-20 years)

Recycled Water Use Areas

- Lazy Z Ranch Phase 1 (0-5 years)
- Lazy Z Ranch Phase 2 (10-20 years)



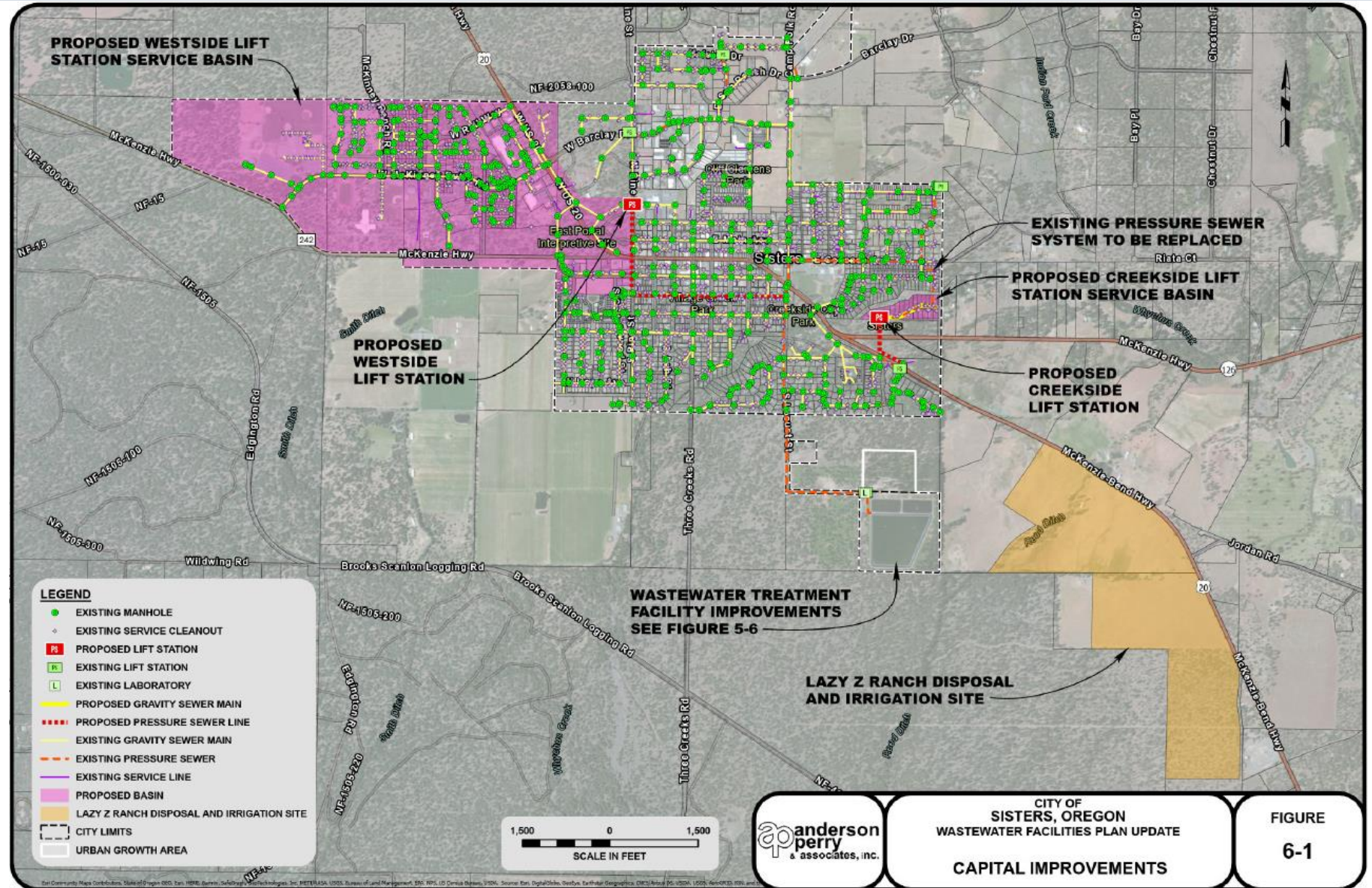
Rope Street Lift Station



Storage Lagoons

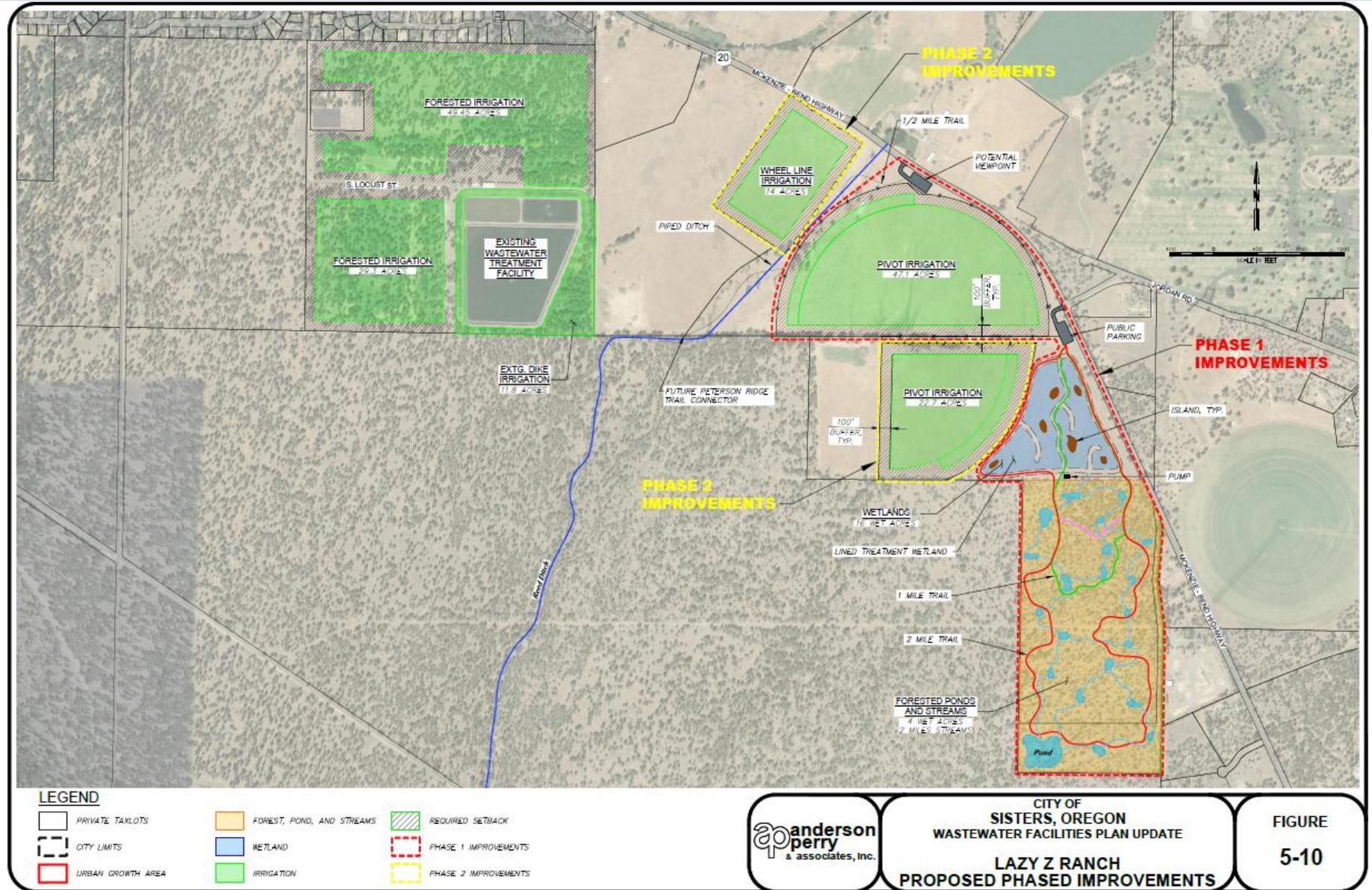


Wastewater System Recommended Improvements





Wastewater System Recommended Improvements





Wastewater Capital Improvements Plan

Implementation Priority	Recommended Improvement	Estimated Cost within Implementation Time Frame (2022 dollars)		
		2022 to 2027	2027 to 2032	2032 to 2042
1	Lazy Z Ranch Phase 1. Construct new recycled water use areas.	\$5,200,000		
2	Rope Street Lift Station Improvements.	\$624,000		
3	Construct West Side Lift Station.	\$2,165,000		
4	Construct Creekside Court Lift Station.	\$1,159,000		
5	Lagoon Biosolids Removal.		\$200,000	
6	Replace Lagoon Aerators.		\$443,000	
7	Lazy Z Ranch Phase 2.			\$550,000
8	WWTF Chlorine Contact Basin Improvements.			\$97,000
9	Headworks Improvements.			\$471,000
TOTALS		\$9.1 M	\$0.6 M	\$1.1 M
TOTAL RECOMMENDED IMPROVEMENT COST				\$10.9 M



Wastewater System Questions?

