2025 Sanitary Sewer Master Plan Update

March 2025

Prepared For:
City of West Jordan

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FINAL DOCUMENT

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Executive Summary

This executive summary provides an overview of the Sanitary Sewer Master Plan (SSMP) prepared for the City of West Jordan. The objective of this SSMP is to incorporate updated 2024 data, evaluate the current condition of the sewer infrastructure, and provide recommendations to ensure the system meets the needs of future growth and regulatory requirements.

A comprehensive hydraulic model of West Jordan's sewer system was created to evaluate its capacity to convey wastewater under design flow conditions. The analysis identifies areas requiring upgrades to support projected growth, address existing deficiencies, and maintain compliance with state regulations.

Based on these findings, the SSMP outlines strategic recommendations for the City's sewer infrastructure, including a prioritized list of capital improvement and maintenance projects to guide future investments and system enhancements. As the provider of sanitary sewer services for Utah's third-largest city, West Jordan must proactively plan for sustainable infrastructure. This SSMP update includes the following:

Maintenance and Inspection Recommendations

Regular maintenance and inspections are critical to ensuring the long-term functionality and efficiency of the sewer system. The following recommendations outline the necessary inspection and cleaning schedules:

- Manhole Inspection. Inspect manholes once every 4 years.
- Closed Circuit Television (CCTV) Video Inspection. Inspect all sewer mainline and trunklines once every 7 years.
- Jet Truck Cleaning. Clean all sewer mainlines and trunklines once every 4 years.

These inspections and cleanings are best tracked with applications connected to GIS map databases. Manhole inspections could be preformed as part of the Jet Truck Cleaning.

Replacement Recommendations

Sanitary sewer pipes in West Jordan were first constructed in the early 1900s, and many are now approaching the end of their useful life. To prevent failures, it is essential to implement a gradual replacement strategy.

- Average Pipe Design Life: 70 Years
- Average Pipe Useful Life: 90 Years

Table 1 provides an annual budget estimate necessary to replace pipes on a 90-year cycle, ensuring continued service reliability and system sustainability.

Table 1 | Annual Pipe Replacement Budget

	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	FY 2034
Projected Population	116K	120K	124K	128K	132K	135K	140K	144K	149K	154K
Total Pipe Length (ft)	1.68M	1.73M	1.79M	1.85M	1.91M	1.95M	2.02M	2.09M	2.16M	2.23M
Total Replacement Cost	$187M	$193M	$199M	$206M	$212M	$219M	$226M	$233M	$241M	$248M
Annual Replacement Budget	$2.09M	$2.16M	$2.22M	$2.30M	$2.37M	$2.44M	$2.52M	$2.60M	$2.69M	$2.77M

Apart from the collection system, the City also has the responsibility to contribute its share of maintenance and upgrade of the South Valley Water Reclamation Facility (SVWRF). The SVWRF Capital Facilities Plan, developed by Carollo Engineers, Inc. (see Section 5.4.5 for details), estimates that WJC's share of these costs will amount to approximately $1.8 million in 2022 dollars annually from 2024 to 2038.

Existing System Description

The current West Jordan sanitary sewer collection system consists of 365 miles of pipeline, with mainline sizes ranging from 4 to 36 inches in diameter, seven main metering collection points (see Figure 1), and 6,991 manholes. The sewer collection system outfalls into the SVWRF's interceptor through the City's four major sewer trunklines along 7000 S, 7800 S, 8050 S and 9000 S. The discharge point for the treatment plant is the Jordan River near 7600 S and 1000 W. The sewer system operates completely as a gravity-collected system. The City does not own or maintain any lift stations.

The sewer system in certain locations south of 9000 S, near the east side of the City, is collected and operated by the South Valley Sewer District. Taylorsville – Bennion Improvement District owns and maintains the collection system in limited areas along the northern border of the City. Additionally, Kearns Improvement District owns and maintains sewer collection within the City in the Oquirrh Shadows and Woods Ranch areas (see Figure 2).

Piping materials in the system include polyvinyl chloride (PVC), high density polyvinyl chloride (HDPE), concrete, asbestos cement, and clay. Some pipes have also been slip lined or Cured-In-Place-Pipe (CIPP) lined. The most common pipe materials are PVC and concrete; comprising 57% and 22% of the system, respectively. Table 2 summarizes the collection system's gravity piping by material and diameter (see Figure 3). It should be noted that the full 365 miles of pipeline is not included in the summary table, as the City's GIS database does not account for all small-diameter pipes.

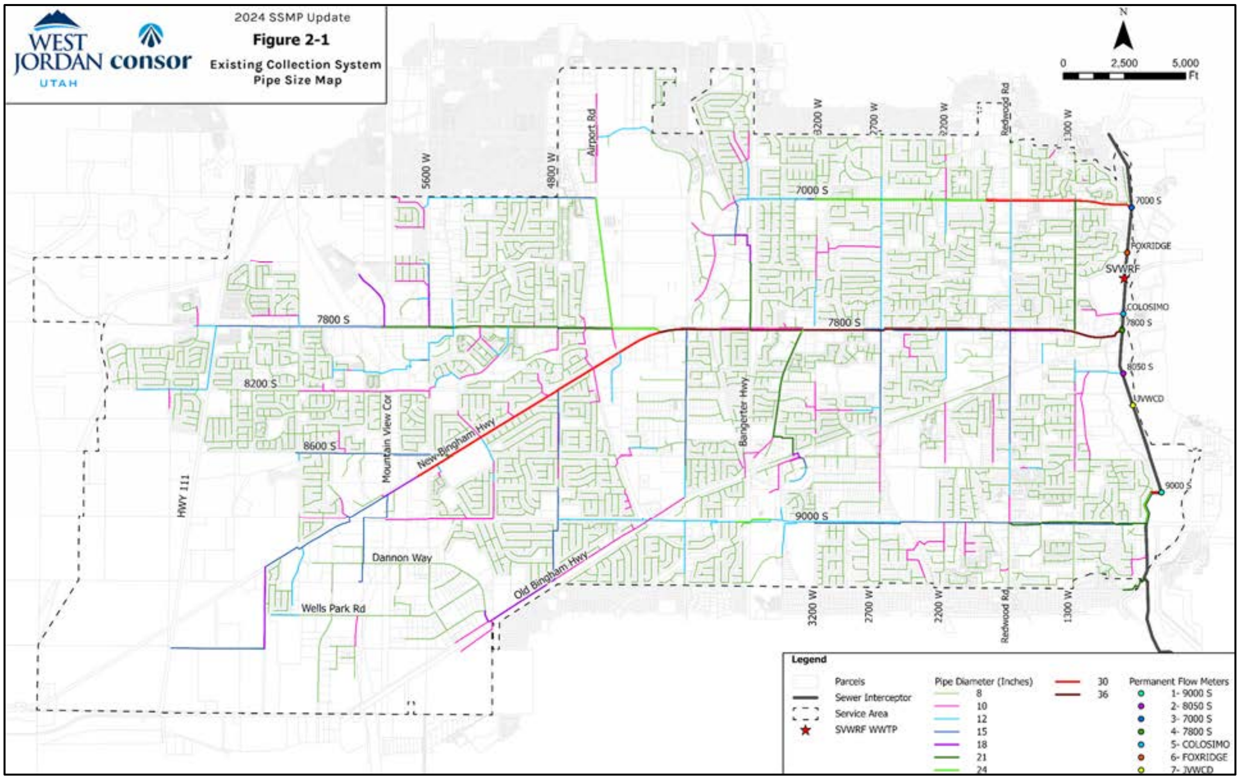

Figure 1 | Existing Collection System *(Corresponds to **Figure 2-1**)*

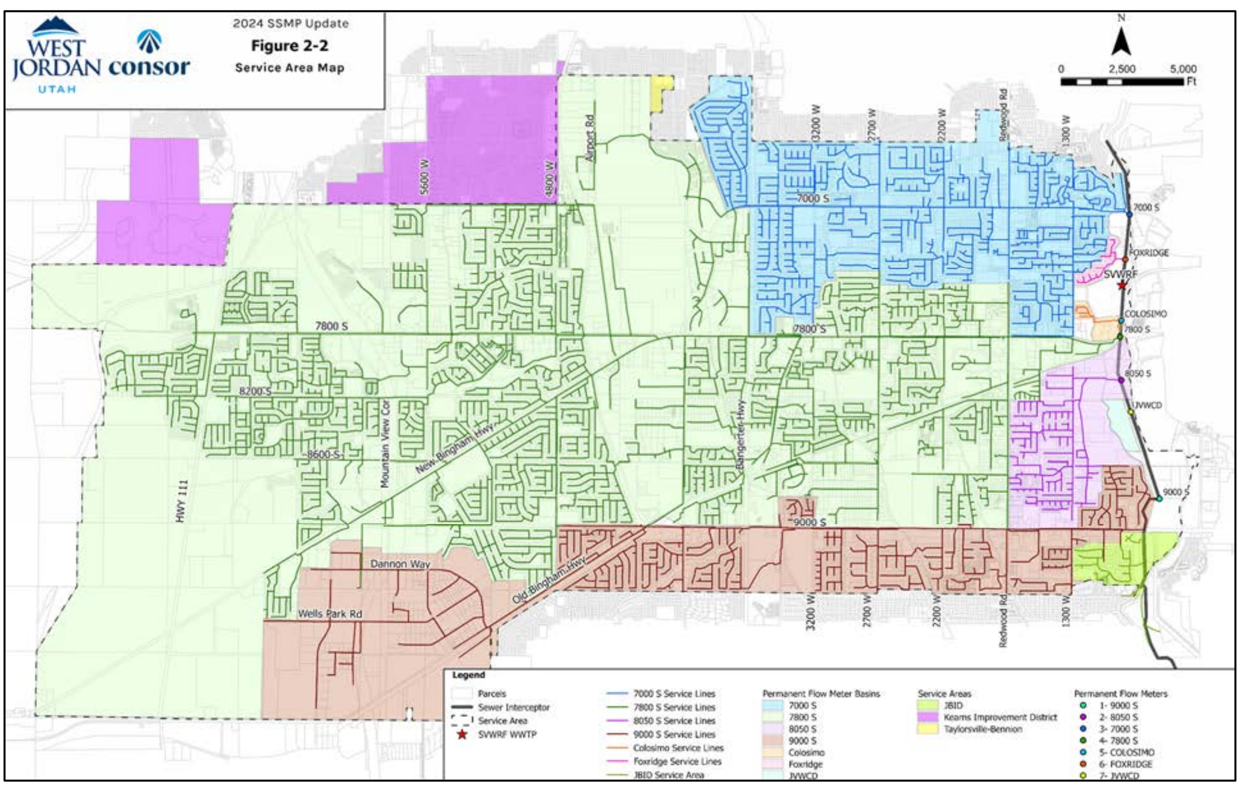

Figure 2| Service Area Map *(Corresponds to **Figure 2-2**)*

Table 2 | Gravity Pipe Materials & Diameter[1]

Dia (inches)	Length (ft)								
	FRP	CIPP	CLAY	Concrete	HDPE	PVC	RCP	Total	%
Unknown	0	0	970	0	0	9,869	330	11,169	1%
4 to 8	0	0	36	153	0	1,911	0	2,100	0%
8	0	5,553	172,755	280,277	2,378	834,467	5,361	1,300,791	77%
10	0	367	25,262	20,256	293	75,670	0	121,849	7%
12	0	0	5,170	26,077	0	49,780	4,113	85,139	5%
15	0	0	1,365	26,093	1,131	31,740	10,256	70,586	4%
18	0	0	0	2,129	3,187	8,973	0	14,288	1%
21	0	0	0	11,031	9,112	6,441	3,110	29,694	2%
24	0	0	0	7,392	152	8,434	1,357	17,335	1%
30	11,486	0	0	2,304	0	3,683	423	17,897	1%
36	0	0	9,087	4,600	0	0	5,390	19,077	1%
Total	11,486	5,920	214,645	380,313	16,252	1,030,968	30,341	1,689,924	100%
%	1%	0%	13%	23%	1%	61%	2%	100%	

[1]*Some unknown pipe materials have been assumed to match the upstream/ downstream pipe material*

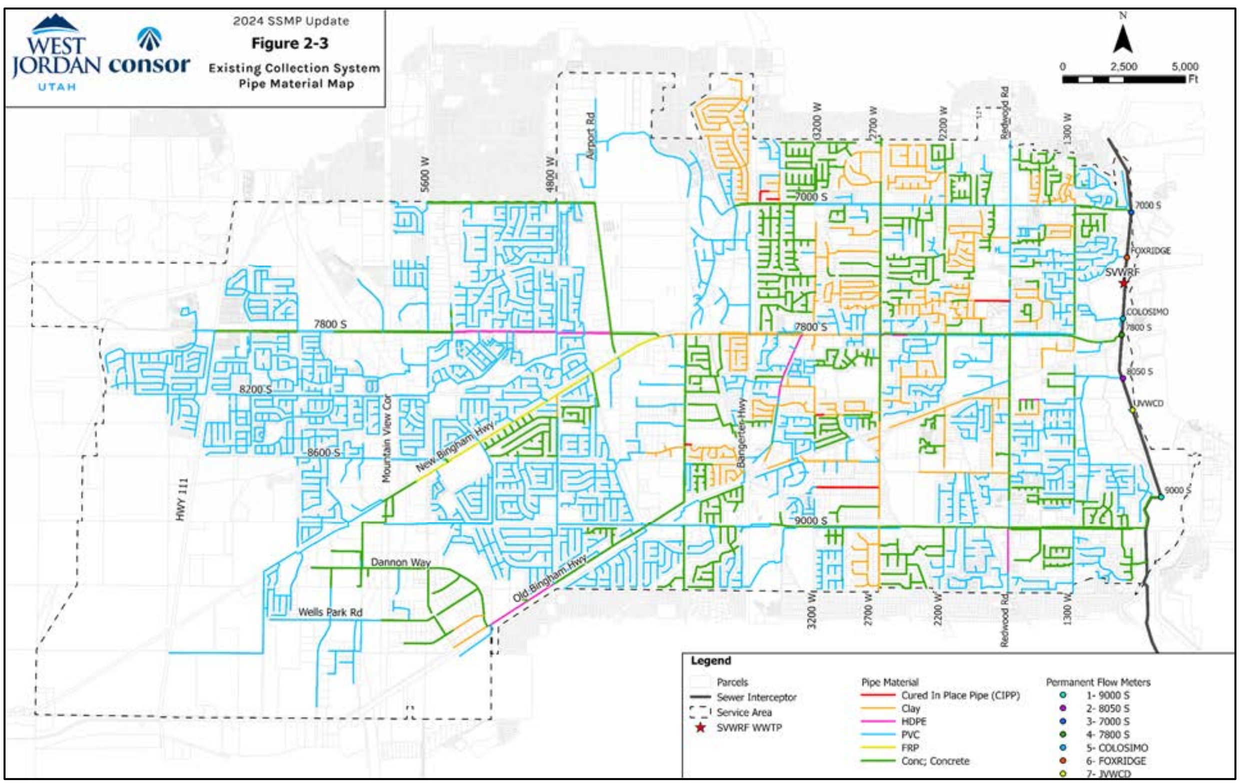

Figure 3| Existing Collection System - Pipe Material Map *(Corresponds to **Figure 2-3**)*

Pipe installation year is based on the GIS data provided by the City. Almost 30% of the gravity mains were installed before 1990. The majority of the pipes are 20-25 years old, with over 50% being installed after 1990. The year of installation of nearly 19% of pipes is unknown. Pipe installation year and diameter is summarized in **Table 3** (see **Figure 4**).

Table 3 | Gravity Pipe Diameter & Installation Date

Diameter (inches)	Length (ft)										
	Before 1950	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2010	2010-2024	Unknown	Grand Total	%
0	0	0	0	0	0	1,581	529	2,166	7,139	11,415	1%
<8	0	0	0	0	0	0	0	49	123,575	123,624	7%
8	1,747	2,837	41,030	295,439	103,610	342,445	257,708	132,401	48,537	1,225,752	73%
10	0	0	6,007	13,665	5,998	15,924	21,430	10,287	49,086	122,397	7%
12	0	0	547	12,975	4,130	1,555	10,850	6,046	31,198	67,301	4%
15	0	0	414	301	7,605	11,242	15,266	6,524	9,863	51,214	3%
18	0	0	0	521	0	2,673	0	1,734	24,467	29,395	2%
21	0	0	0	0	0	7,498	1,538	3,350	5,385	17,770	1%
24	0	0	0	0	5,378	0	0	8,434	2,728	16,540	1%
30	0	0	0	0	0	0	0	3,683	14,581	18,264	1%
36	0	0	0	0	2,991	994	511	0	2,051	6,547	0%
Grand Total	1,747	2,837	47,997	322,900	129,713	383,912	307,831	174,673	318,610	1,690,219	100%
%	0%	0%	3%	19%	8%	23%	18%	10%	19%	100%	

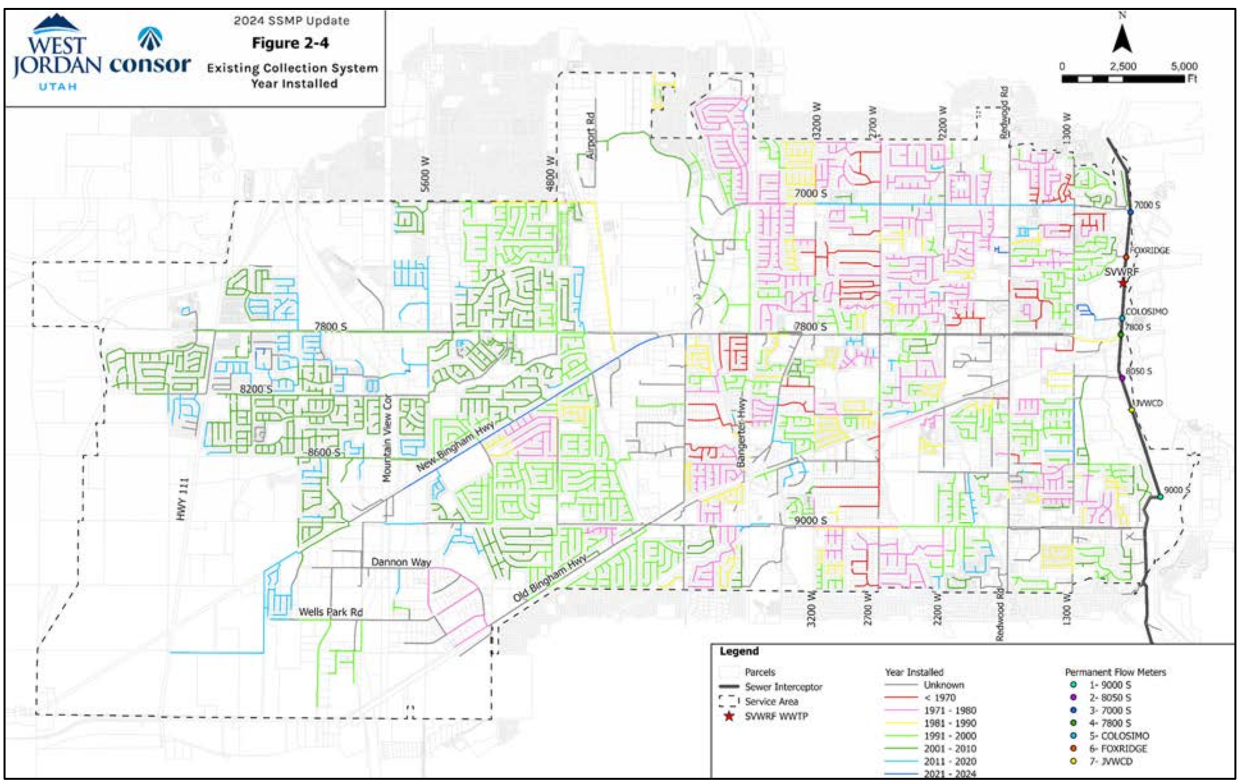

Figure 4 | Existing Collection System - Age Map *(Corresponds to **Figure 2-4**)*

Population Projections

According to the most recent data from the American Community Survey (ACS) - U.S. Census Bureau, West Jordan's estimated population for 2022 was 116,662 residents. The average household size was revised from 3.41 people (in 2019) to 3.30 based on updated 2022 census data. The future buildout flow projection in this master plan report focuses on densities and land use maps rather than direct population figures to estimate future wastewater demands.

Existing Sewer System Flows

Key components of the wastewater flows include Base Wastewater Flow (BWF), Groundwater Infiltration (GWI), and Rainfall-Dependent Infiltration/Inflow (RDII). This study used 2022 billed water meter data provided by the City for the residential, commercial, industrial, and institutional connections to evaluate these flows.

Residential users were observed to be the largest contributors to the BWF, estimated at 66 gpcd based on winter water usage. Non-residential flows were calculated using winter water meter data, with February 2023 data showing the highest average daily flow.

GWI was notably higher, particularly during the irrigation season, most probably due to infiltration through pipes under canals. This is somewhat consistent with the findings of the 1992 Sewer System Infiltration Study. When reviewing the flow meter data from 2022, the base flow increased by an average of 0.06 cfs during the month of June. After discussion with the City staff, the GWI were applied to the same manholes as in the previous sewer master plans (see Figure 5).

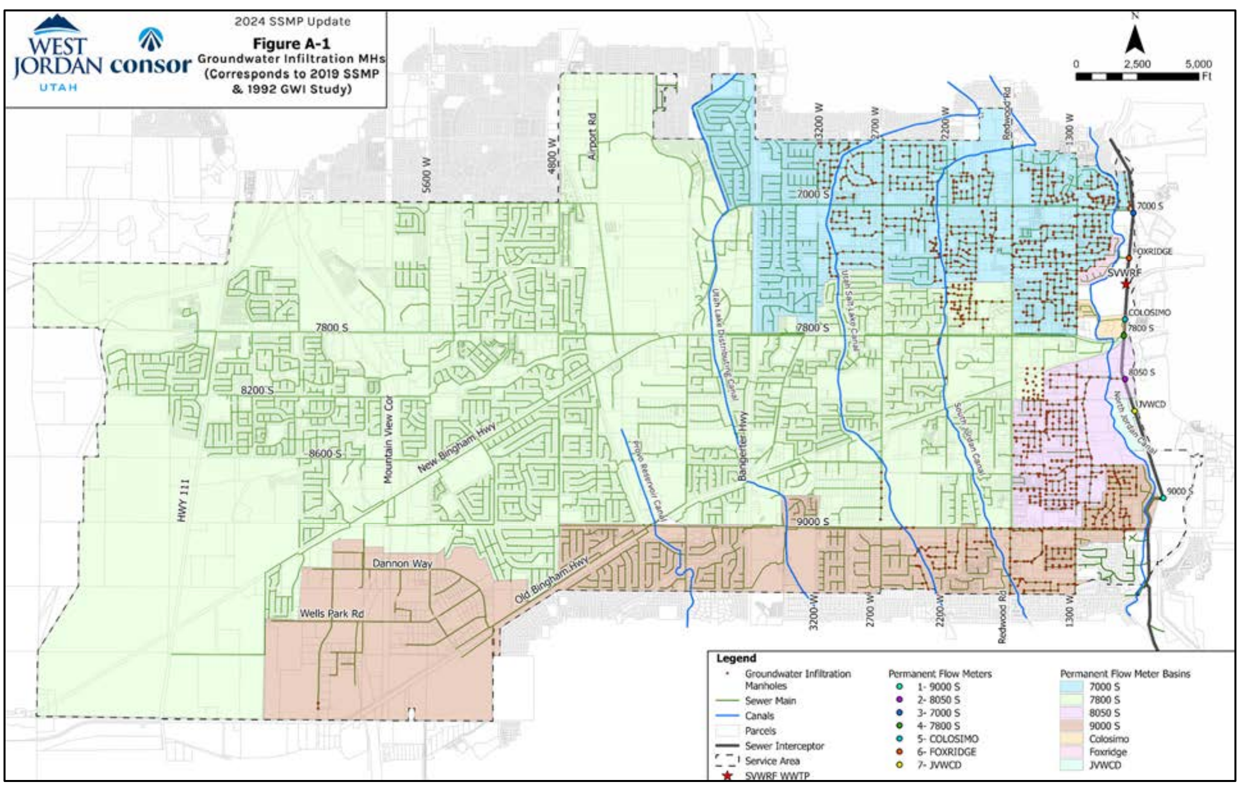

Figure 5 | Groundwater Infiltration Manholes (Corresponds to previous master plans)

RDII flows were observed during a significant rain event on August 6, 2022, contributing to peak system loads. These peak RDII flows were added distributed into manholes in the model as an additional loading to simulate peak wet-weather flow conditions.

After calibrating the model for existing conditions, the design flow inputs were determined following the Utah Admin. Code 317 guidelines. According to these guidelines, sewer pipelines must be designed to accommodate a Level of Service (LOS) of 100 gpcd, with a peaking factor of 2.5. To get these design flows, each residential loading in the model was converted to an equivalent count of people (using 66 gpcd), and then scaled to meet the 100 gpcd standard. The peaking factors were then adjusted in the model to peak to 2.5 to meet the state requirements.

Future Flow Projection

Future flow estimates were developed based on the City's 2023 General Plan and input from City staff. For undeveloped parcels, the anticipated development densities outlined in the general plan were applied. Overlay Zones, such as the Interchange Overlay Zone (IOZ) and Transit-Oriented Development (TOD), were included to ensure accurate future flow projections. After discussions with the City, overlay zones including Interchange Overlay Zone (IOZ) or Transit Oriented Development (TOD) density overlays were limited to 25 Equivalent Residential Units (ERUs)/acre. Although the General plan calls out the High-Density Residential density to be as high as 75 units/acre, after discussions with the City, this was also reduced to maximum of 25 units/acre to match more realistic expectations. After discussions with the City, the 5600 W Old Bingham TOD and neighboring station communities were also not included in the buildout scenario.

Table 4 | Land Use Density Ranges

Land Use	Density Range (ERUs/acre)
Very Low Density Residential	1-3
Low-Density Residential	3.1-5
Medium-Density Residential	5.1-10
High-Density Residential	10.1-25
IOZ/ TOD Overlay	Max. 25

Residential flow projections were based on an average household size of 3.30 people, with a base flow of 100 gpcd and a peaking factor (PF) of 2.5, consistent with the current service levels. Non-residential flows were estimated using gallons per day per acre for undeveloped commercial and industrial areas.

It was assumed for this SSMP that the projected infiltration will remain constant over time.

Table 5 | System-Wide Wastewater Flow Projections

Scenario	Wastewater Flow		
	Unit	Measured Existing (2023)	Buildout
Average Dry Weather Flow	gpm[1]	6,390	11,640
	mgd[2]	9.20	16.76

[1] gpm = Gallons per minute.

[2] mgd = Million gallons per day.

System Analysis

The sewer system capacity was analyzed using flow depth to pipe diameter (d/D) ratios. After discussions with City staff, the following parameters were set as the evaluation criteria, also called the Level of Service.

1. 10-inch and smaller: 0.50 d/D
2. 12-inch and larger: 0.75 d/D

The collection system analysis includes a hydraulic model calibration followed by deficiency analysis on the collection system. Sewer basins were developed as part of this SSMP update and were used to assist in describing deficiency locations. Basin locations are presented in Figure 2. These general conclusions were developed through the system analysis and subsequent validation with City staff:

- The existing piping system has adequate capacity to serve existing peak dry weather and peak design flows, with the exceptions of Campus View Drive, 5600 W/Ranches Loop Rd, Bingham Creek between 8050 S and 8200 S, and Damascus Way.

- A few key upgrades will be necessary to accommodate anticipated future demands. Specifically, sewer main upgrades along 9000 S, 7800 S, and 5600 W are required to ensure the system can handle buildout flows efficiently. Additionally, a few minor improvements to address deficient pipes throughout the system have been identified.

- The minimum slope criteria recommended for new sewers are based on the Ten States Standards and Utah Admin. Code 317. Pipe slopes over 20% require anchoring. Minimum slope criteria are presented in Table 6.

Table 6 | Minimum Pipe Slope

Nominal Sewer Size (inches)	Minimum Slope (feet per 100 feet)[1,2]
8	0.4
10	0.28
12	0.22
15	0.15
18	0.12
21-48	0.10
>48	Designed to give mean velocities, when flowing full, of not less than 3.0 feet per second

[1] *Minimum slope for pipes less than 48 inches based on a mean velocity of 2 ft/s under full pipe flow conditions.*
[2] *Based on Manning's formula using a Manning's roughness coefficient (n) value of 0.013.*

Capital Improvement Program

The CIP describes projects identified to address existing and future capacity deficiencies and to plan for ongoing repair and replacement of aging infrastructure. Recommended projects are prioritized so the existing deficiencies are handled first, followed by projects required for adequately conveying flows for the future developments anticipated within the City boundaries.

Implementation timeframes for these projects include immediate, 10-year, 20-year and beyond 20 years (buildout). Regular SSMP updates are also recommended and budgeted for approximately every five years.

The total expected cost by timeframe, per category and infrastructure type, is shown in Table 7. All CIP projects are presented in Figure 6.

In general, the existing gravity system is adequately sized to serve flows over the next 20 years. This CIP includes $22,259,744 in improvements required to remove all existing deficiencies.

Table 7 | Capital Improvements Projects Summary List

CIP ID	Ex Dia (in)	Prop Dia (in)	Location	Length (ft)	Cost Estimate[2]	Project Timeline
P-1	8”-10”	12”-15”	North-south along Campus View Drive and Cobble Ridge Drive, extending northeast along Jordan Landing Boulevard	3,320	$ 4,433,677	0-10 YR
P-2	12”	15”	Along 5600 W, north of Window Ranch Way, then heading west along Ranches Loop Road and turning north along 5490 W, discharging into 7800 S	1,855	$ 2,654,376	0-10 YR
P-3	10”	12”	West of Bingham Creek between 8200 S and 8050 S	600	$ 775,750	0-10 YR
P-4	18”	24”	Along 7800 S, approximately 350 feet west of 1300 W	410	$ 3,154,257	10-20 YR
	36”	36”	Along 7800 S, from approximately 120 feet west of 1300 W to approximately 280 feet east of Gardner Stop Wy	1,010		10-20 YR
P-5	12”	15”	Along Grizzly Way, just south of 7800 S intersection	275	$ 435,030	10-20 YR
P-6	8”	10”	Along 3200 W, between Caraway Bay and 9000 S	545	$ 682,436	10-20 YR
P-7	15”	18”	Along 9000 S, south of Mountain View Golf Course, between Okubo Drive and 1870 W	1,140	$ 2,076,037	10-20 YR
P-8	8”	10”	South of Wells Park Drive, heading southeast along Hawley Park Road, then east for approximately 350 feet along Axel Park Road	1,250	$ 1,420,215	10-20 YR
P-9	8”	10”-15”	Along 9000 S, from 6400 W to Duck Ridge Way	1,885	$ 2,465,332	10-20 YR
P-10	12”	15”	Along 7800 S, from Sycamere Drive to Highway 111	660	$ 900,087	10-20 YR
P-11	15”	18”	Along 7800 S, from Fallwater Drive to Copper Rim Drive	2,300	$ 4,276,412	10-20 YR

[1] *Budget Estimate based on 2025 dollars. For unit costs, and cost projection adjusted for inflation in future years, refer to Appendix B.*

Apart from the CIP projects, the City would require approximately $5.2 million for the easement elimination projects, and approximately $105 million for future pipeline projects needed to serve the City to build out.

The City also has the responsibility to contribute its share of maintenance and upgrade of the South Valley Water Reclamation Facility. The SVWRF Capital Facilities Plan, developed by Carollo Engineers, Inc. (see Chapter 6 for details), estimates that WJC's share of these costs will amount to approximately $1.8 million in 2022 dollars annually from 2024 to 2038.

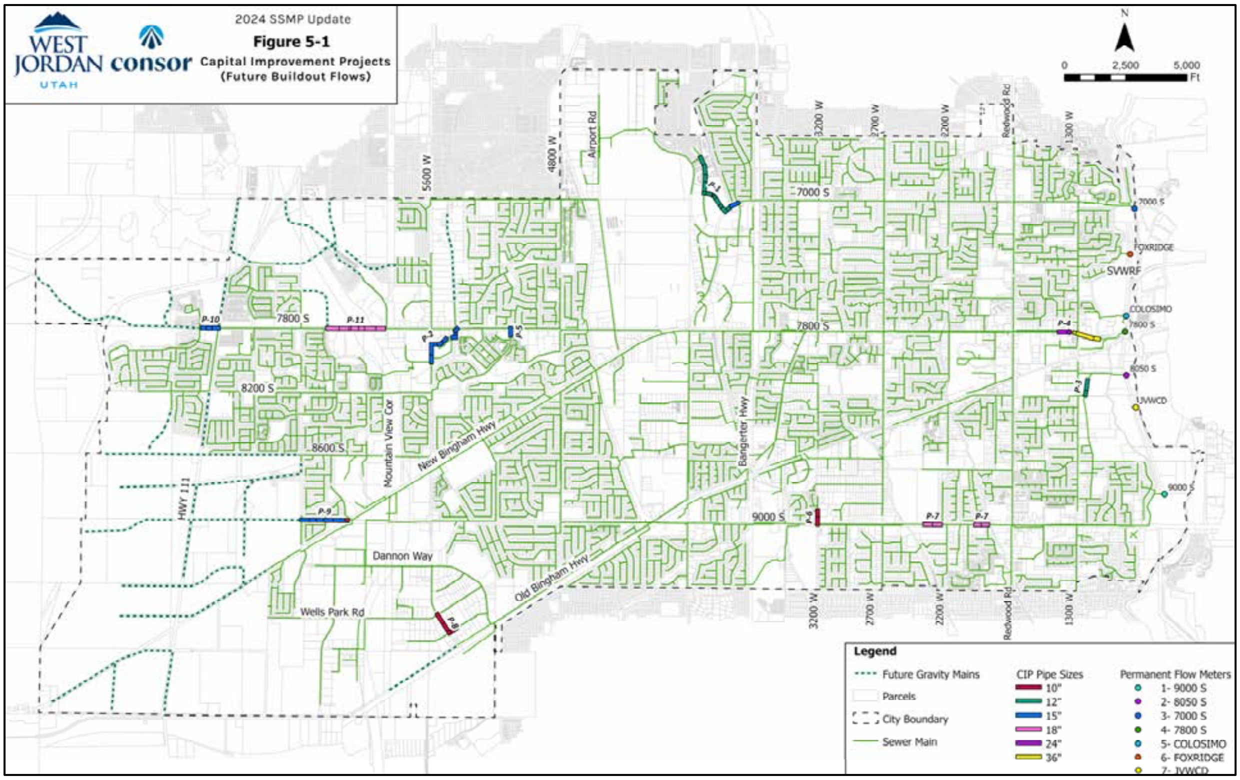

Figure 6 | CIP Projects *(Corresponds to Figure 5-1)*

Condition Assessment Program & Capital Maintenance Projects (CMP)

In order to tackle the problem of aging sewer infrastructure, a condition assessment and maintenance program is also recommended. Also 22% of the city's sewer lines are more than 50 years old. Replacing these pipes would cost an estimated $300 million over the next decade, but trenchless rehabilitation methods like Cured-In-Place Pipe could reduce the cost to approximately $30 million.

A comprehensive condition assessment program is essential, focusing on concrete and clay sewer trunk lines. CCTV inspections should be conducted to evaluate the structural and operational state of the system, following NASSCO standards. This would allow the City to prioritize rehabilitation efforts and manage long-term risks.

The City should prioritize rehabilitation of their concrete and clay pipelines older than 50 years. CIPP lining will be the primary method for rehabilitating these aging pipelines, particularly those 10 inches or larger in diameter. Manhole rehabilitation should also be considered for manholes connected to larger pipes.

Table 8 | CIPP Costs to Rehabilitate all Clay and Concrete Pipes (Pre 1975)

Diameter (in)	Unit Cost ($/LF)	Length (ft)	Pipe Lining Cost	Cost per year
8	80	310,160	$ 24,812,786	$ 2,481,279
10	90	19,672	$ 1,770,492	$ 177,049
12	95	9,238	$ 877,599	$ 87,760
15	120	714	$ 85,700	$ 8,570
18	160	468	$ 74,946	$ 7,495
36[1]	400	19,077	$ 6,486,119	$ 648,612
Total		340,252	$ 34,107,642	$ 3,410,764

Apart from the aging sewer infrastructure, cost estimates for CIPP lining all the concrete and clay pipes were also developed using reference data from a neighboring district's assessment (see Section 5.4.4 for detail). The City should expect to line about 235,920 linear feet of pipe over the next decade. Additionally, approximately 115,609 linear feet of pipelines with unknown material may require rehabilitation. The City should budget about $2.2 million annually for CIPP lining projects, with initial rehabilitation costs estimated at $3.4 million for pipes older than 50 years.

Table 9 | Cost to Rehabilitate Concrete and Clay pipes based on Condition Assessment (Approximate)

Diameter (in)	Unit Cost ($/LF)	Total Length (ft)	38% of Total Length (ft)	Lining Cost	Cost per year
8	80	440,182	167,269	$ 13,381,542	$ 1,338,154
10	90	45,496	17,288	$ 1,555,951	$ 155,595
12	95	29,369	11,160	$ 1,060,228	$ 106,023
15	120	29,113	11,063	$ 1,327,546	$ 132,755
18	160	2,631	1,000	$ 159,967	$ 15,997
21	250	18,189	6,912	$ 1,727,997	$ 172,800
24	300	9,254	3,517	$ 1,054,963	$ 105,496
30	325	2,304	876	$ 284,592	$ 28,459
36	400	13,331	5,066	$ 1,722,346	$ 172,235
Total		589,870	224,151	$ 22,275,132	$ 2,227,513

SVWRF Capital Facility Plan

The City of West Jordan discharges its wastewater into the South Valley Water Reclamation Facility (SVWRF) through four major trunklines: 7000 S, 7800 S, 8050 S, and 9000 S. The City of West Jordan is one of the largest contributors to SVWRF, with an ownership of approximately 18.22 mgd of annual average daily flow, accounting for roughly 36.44% of the total plant capacity.

Carollo Engineers, Inc. (Carollo) completed a Capital Facilities Plan (CFP) to guide the identification, selection, prioritization, and implementation of critical improvements at the SVWRF over the next 20 years, with a primary focus on the next 5 years. The recommended implementation plan, including the associated projects and costs, is presented in Table 10.

Table 10 | Recommended Implementation Plan [1]

Project	Prioritization	Construction Year	Class V Project Cost Estimate (2022 Dollars)	Class V Project Cost Estimate (@ Midpoint of Construction)
MCC Replacement	1	2024	$3,800,000	$4,800,000
VFD Replacement	2	2024	$900,000	$1,200,000
Main Switchgear Protective Relays Replacement	3	2024	$420,000	$500,000
Bio 5 Anoxic Zone Mixing Improvements	4	2025	$330,000	$400,000
Bio 5 Process Control Improvements	4	2025	$2,500,000	$3,400,000
UV Replacement	5	2026	$5,000,000	$7,000,000
Effluent Channel	5	2026	$850,000	$1,200,000
Entrance Bridge Replacement / Access Improvements	6	2027	$1,300,000	$1,900,000
48-inch Interceptor CIPP	7	2027	$4,200,000	$6,200,000
Bio 2-5 Diffuser and Piping Replacement	8	2029	$8,700,000	$14,000,000
Standby Power Improvements	9	2031	$13,800,000	$24,000,000
Grit Chamber Rehab	11	2032	$2,900,000	$5,200,000
Influent Flow Meter	12	2032	$1,400,000	$2,500,000
Step Screen Replacement	13	2033	$3,800,000	$7,100,000
Tertiary Filters (Regulation Driven)	14	2035	$19,600,000	$38,700,000
Bio 1 A20 Upgrades & Aeration Piping Replacement	15	2037	$7,300,000	$15,200,000

[1] *This table corresponds to the 2023 South Valley Water Reclamation Facility Capital Facilities Plan Table 5.4*

The City is expected to contribute approximately $1.8 million annually toward improvements at the SVWRF from 2024 through 2038. This allocation reflects the city's share of the costs as part of the facility's long-term capital improvement plan.

The City's projected average buildout flows are estimated at 16.76 mgd (see Table 5), indicating that WJC's ownership capacity of 18.22 mgd should be sufficient to accommodate average daily flows through buildout. However, additional studies will be necessary to assess the facility's capacity to manage peak flow conditions effectively.

Summary and Overall SSMP Recommendations

This SSMP utilized industry standard approaches by compiling and converting information to a Geographic Information System (GIS) database and utilizing hydraulic modeling software to assess system performance. The hydraulic model was used to evaluate the collection system's capacity under both the existing and projected flow conditions. Based on this analysis, a series of capital improvement projects have been identified to help the City address capacity needs and infrastructure upgrades.

Based on the findings in this SSMP, the following recommendations are made:

- Implement the improvements in the short term (1-10 years) as identified in the CIP to address existing capacity and condition issues.

- In order to maintain infrastructure an annual repair and replacement program should be implemented.
- Reassess long-term improvements (beyond 10 years) using future SSMP updates: the GIS, hydraulic model and flow monitoring information
- Continue improving the quality of available collection system information, specifically:
    - Continue to collect flow monitoring information to understand the impact of wet weather events and groundwater/canal influence on available capacity and system performance
    - Continue collecting closed circuit television information related to pipe condition and link to the GIS database
    - Continue utilizing the hydraulic model as a tool for predicting flows in the system

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CHAPTER 1

Introduction

The City of West Jordan (City) has engaged Consor Engineers, LLC (Consor) to update its existing Sanitary Sewer Master Plan (SSMP). The previous update was completed in 2019, and the City now seeks to revise the plan by updating the sewer model, the Capital Facilities Plan (CFP), and associated cost estimates through the City's future buildout.

The City owns and manages a sewer collection system that serves residents and businesses within its service area. The SSMP serves as a guiding document to assess current system deficiencies and plan for future growth.

1.1 How This Plan Should Be Used

This SSMP should serve as a foundational document for planning and implementing collection system improvements. The City should:

- Review the SSMP annually in coordination with other utility systems to prioritize and allocate budgets for necessary improvements.
- Regularly update the SSMP to reflect ongoing development and construction.
- Treat system improvement recommendations as conceptual, as project details like location, size, and timeline may change with further analysis in the preliminary engineering phase.
- Update and refine cost estimates as preliminary and final engineering designs are completed.
- The SSMP should be shared with new developments to ensure proper sizing and planning with collector and above street designs.

1.2 Scope of Work

The scope of the SSMP update includes the following key tasks and deliverables:

- Update the InfoSWMM sewer model using GIS maps, survey data, and as-built data provided by the City.
- Calibrate the model using flow monitoring data from key locations.
- Project future wastewater flows based on future land-use zoning.
- Recommend updates to capital projects to enhance system capacity.
- Revise maintenance projects for aging infrastructure and estimate their costs.
- Propose operational efficiency improvements.
- Incorporate treatment capital costs from South Valley Water Reclamation Facility (SVWRF) into the financial projections.

- Present the updated CFP and SSMP to the City Council for approval.
- Train City staff on the updated model and system improvements.

1.3 Organization of the SSMP

The SSMP is organized into five sections, as summarized in Table 1-1. Detailed technical information is provided in the appendices.

Table 1-1 SSMP Organization

Section	Description
1 – Introduction	Overview of the SSMP update, its purpose, objectives, and the City's need for system improvements.
2 – Existing System Description	Description of the service area and overview of the existing system and facilities.
3 –Wastewater Flow Projections	Dry weather and wet weather estimates for existing and future sewer flows.
4 – System Analysis	Calibration methodology and results, overview of the evaluation criteria and approach, discussion of hydraulic deficiencies for existing and future planning horizons.
5 – Capital Improvement Program	Improvement recommendations including cost opinions and timeframe for implementation.

1.4 Definitions

Sewer Collection System: The network of pipes, manholes, pump stations, and other infrastructure used to collect and transport wastewater from homes, businesses, and industries to the treatment facility.

1988 North American Vertical Datum (NAVD88): A standard reference point used in surveying and mapping, providing a consistent vertical datum (elevation) for the United States. It is the baseline for determining the height of water levels and ground elevations relative to sea level.

Major Trunk Line: A large-diameter sewer pipeline that collects wastewater from smaller sewer lines and transports it to regional treatment facilities or larger interceptor sewers.

Sewer Laterals: Smaller sewer pipes that connect individual properties to the main sewer lines (sewer mains). Laterals transport wastewater from homes or businesses to the public sewer system.

Sewer Mains: Primary sewer pipelines that transport wastewater from lateral connections to larger trunk lines or treatment plants.

Interceptor Sewer: A large sewer line designed to collect wastewater from multiple trunk lines or major collector sewers and transport it to a treatment plant. These sewers are typically located at the downstream end of the collection system.

Lift Station: A facility used to pump wastewater from a lower elevation to a higher elevation in the sewer system. Lift stations are often used when gravity flow is not feasible due to topography or system design.

Diurnal Pattern: The variation in wastewater flow that occurs throughout a 24-hour period, typically higher during the day due to residential and commercial activities and lower at night when there is less water usage.

Dry Weather Flow (DWF): The amount of wastewater flow in the sewer system during dry weather conditions, representing typical daily flows without the influence of rainfall or other weather-related factors.

Rainfall Dependent Infiltration and Inflow (RDII): The increased flow in the sewer system during or after rainfall events, caused by stormwater entering the system through cracks, leaks, or illegal connections. RDII can significantly increase the volume of water the system needs to handle.

Base Flows: The typical, consistent flow of wastewater in the sewer system that occurs during dry weather. It includes DWF and groundwater flow. It excludes any stormwater runoff or infiltration due to rain.

Level of Service (LOS): The desired standard of performance for a sewer system, which may include capacity, reliability, and responsiveness. The LOS is determined by factors such as system design, customer expectations, and regulatory requirements.

Capital Improvement Plan (CIP): A long-term planning document that outlines and prioritizes capital projects needed to upgrade a city's infrastructure. The CIP typically identifies projects, timelines, and estimated costs.

Capital Maintenance Program (CMP): An ongoing initiative focused on the routine upkeep and preservation of a utility system. Unlike a Capital Improvement Plan (CIP), which funds major infrastructure upgrades and expansions, the CMP is dedicated to cleaning, inspection, and minor repairs necessary for maintaining system functionality and extending asset life. The CMP is typically included as a line item within the CIP budget, ensuring that regular maintenance activities are funded and prioritized alongside larger capital projects.

BuildOut: The point at which a city or sewer system reaches its maximum planned development or population, meaning that all planned land use and infrastructure improvements have been completed. Buildout is often used to determine the future capacity needs of the system.

CIPP (Cured-In-Place Pipe): A trenchless rehabilitation method used to repair existing sewer pipes. A flexible liner is impregnated with resin, inserted into the damaged pipe, and then cured (hardened) to form a new pipe within the old one, improving the pipe’s structural integrity and extending its lifespan.

Impact Fees: Charges levied on developers or property owners to finance infrastructure improvements necessitated by new development. Impact fees are used to fund projects that expand or upgrade the sewer system to accommodate increased demand from growth.

CHAPTER 2

Existing System Description

This section provides an overview of the City existing sanitary sewer collection system location, management structure, service areas, and existing collection system infrastructure.

2.1 Location, Climate, and Soil Characteristics

The City of West Jordan is located in northern Utah, approximately 12 miles south of Salt Lake City. The City is situated in Salt Lake County along the Jordan River, southwest of the Wasatch Mountains. It covers an area of approximately 32 square miles and has a semi-arid climate with a mean annual precipitation of 19 inches and a mean annual air temperature of 52°F. Temperatures range from an average high of 92°F in the summer to an average low of 23°F in the winter.

West Jordan's elevation varies from 4,300 to 5,400 feet above Mean Sea Level (MSL). Unless noted otherwise, all elevations reported in this SSMP are on the 1988 North American Vertical Datum (NAVD88), the City's officially adopted vertical datum.

According to the Natural Resources Conservation Service (NRCS), soils within West Jordan are generally composed of sandy loam and clay loam and are well-drained, with a restrictive clay layer at 30 to 50 inches beneath ground level. The parent material in this area primarily consists of alluvium and lake sediments.

2.2 Service Area and System Overview

The City owns and operates the sanitary sewer collection and transmission systems servicing the City, and the City is also a joint owner of the regional sewer treatment plant serving West Jordan and neighboring communities called the South Valley Water Reclamation Facility (SVWRF).

The collection system service area shown in Figure 2-2Error! Reference source not found. includes all areas within the City limits that are either currently served by the City's collection system or will be served by the collection system under buildout conditions. The sewer system in certain locations south of 9000 S near the east side of the City is collected and operated by the South Valley Sewer District. Taylorsville – Bennion Improvement District owns and maintains the collection system in limited areas along the northern border of the City. Also, Kearns Improvement District owns and maintains sewer collection within the City in the Oquirrh Shadows and Woods Ranch areas. The City Boundary was used as the boundary for all buildout projections within this SSMP. No annexation is anticipated in the near future.

At present, the collection system includes nearly 365 miles of pipeline ranging in size from 4 inches to 36 inches, and approximately 7,039 manholes. The collection system generally flows by gravity downhill from the west toward the east and has three major trunk lines located in: 7000 S, 7800 S, and 9000 S. Additionally, there is one smaller trunk line on 8050 S (see Figure 2-2). Other major collector trunk lines on the west side of the City are in the New Bingham Highway which discharges into 7800 S trunkline, and the Old Bingham Highway which discharge into 9000 S trunkline. The trunk lines connect to interceptor sewers that carry the flows to the SVWRF located near the Jordan River at approximately 7500 S and 1300 W.

The collection system transports flows that range between a low-flow of 4 mgd to a peak high-flow of 14 MGD. The current average daily flow is approximately 8 mgd as measured at the seven permanent meter locations. The collection system has approximately 24,275 connections serving individual residents, multi-family residences, businesses, and a variety of commercial and industrial users. Almost 22,714 of these connections are residential, and 1,561 are non-residential connections. The flows are monitored and measured at four permanent metering stations located on four major trunklines servicing the City. Two other permanent flow meters, Foxridge and Colosimo, measure flows from the small residential areas directly discharging into the sewer interceptors. Another permanent flow meter from JVWCD measures flow from the water conservancy district. Figure 2-1Error! Reference source not found. shows the collection system infrastructures.

The City does not currently operate or maintain any public lift stations.

Figure 2-1 Existing Collection System

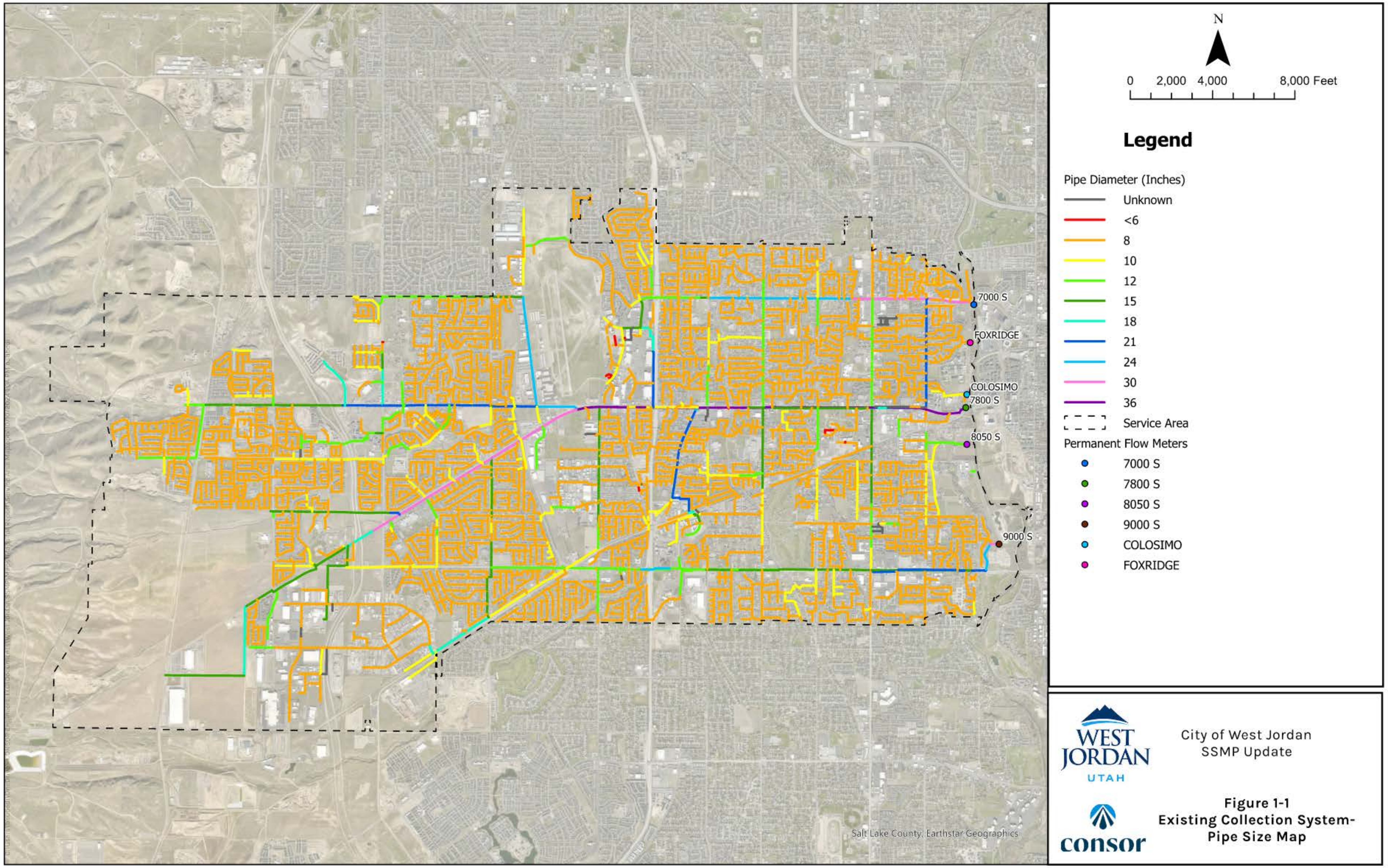
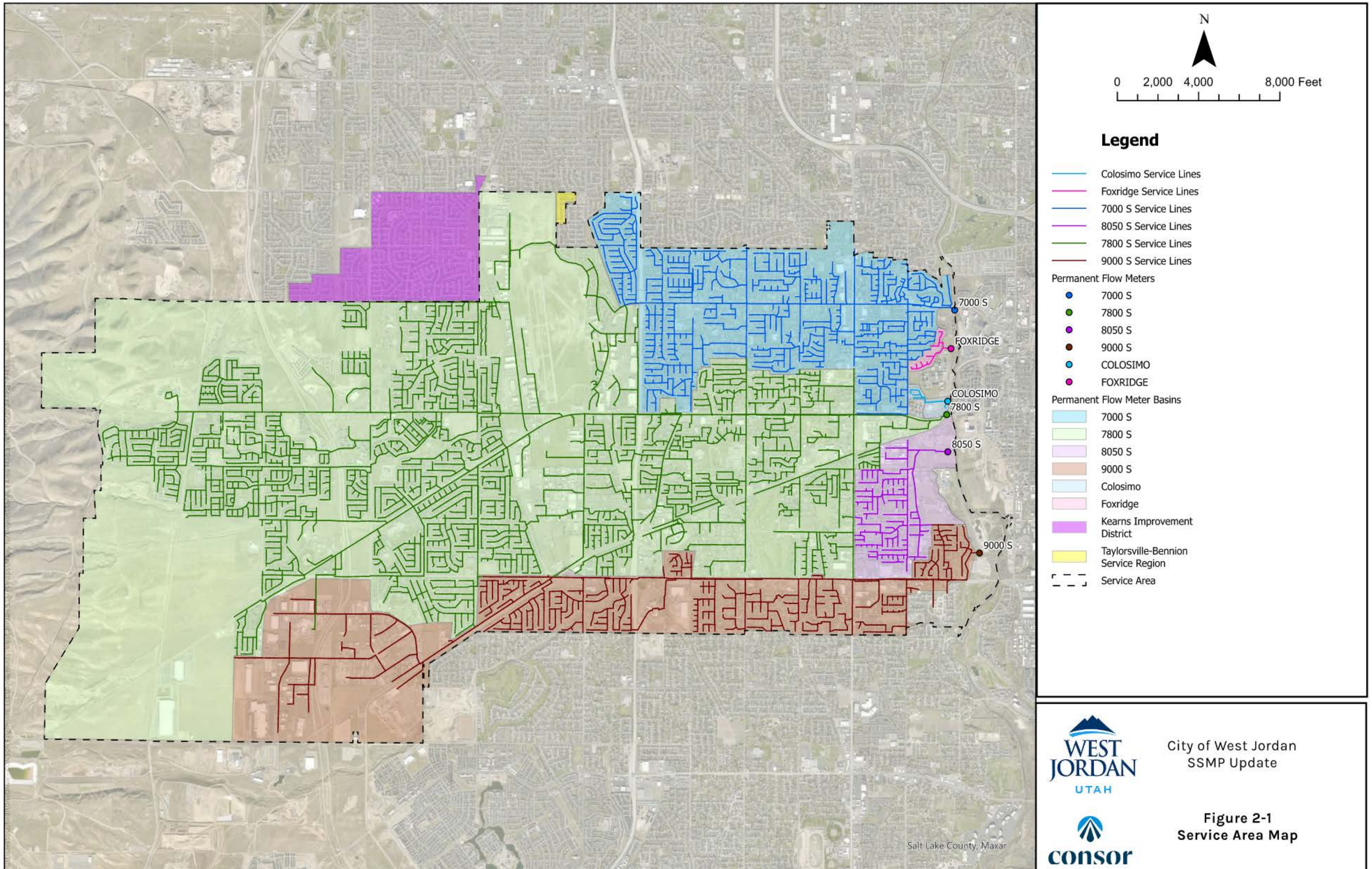


Figure 2-2 Service Area Map



2.3 Inventory of Existing System and Facilities

The City's collection system consists primarily of manholes, and gravity pipelines. Generally, gravity pipelines convey wastewater from the residential, commercial, and industrial areas and route them to the sewer interceptor along Jordan River to the east of the City. The City also has approximately 126 septic tanks in parcels that are not yet connected to the sewer mains.

Each of the basins and infrastructure components are summarized in the following sections:

2.3.1 Sewer Basins

The four major trunklines along 7000 S, 7800 S, 8050 S, and 9000 S divide the City's collection system into four major sewer basins. Together, these trunklines convey approximately 97% of the City's existing total sewer flow. Each of these main trunklines receive flows from collector sewers and outfall into the large sewer interceptor running N-S along Jordan River, ultimately discharging into the SVWRF). Apart from these four major basins, as a part of the calibration process, the City installed 14 temporary flow meters in various areas of the City. These 14 temporary flow meter basins are described in detail in Chapter 4.2.

2.3.2 Gravity Piping

The City's collection system currently includes approximately 365 miles of gravity piping ranging from 4 to 36 inches in diameter. The physical characteristics of the collection system are summarized based on information in the City's Geographic Information System (GIS). Piping materials in the system include polyvinyl chloride (PVC), high density polyvinyl chloride (HDPE), concrete, asbestos cement, and clay. Some pipes have also been slip lined or CIPP lined. The most common reported pipe materials were PVC and concrete; comprising 57% and 22% of the system, respectively. Table 2-1 and Figure 2-3Error! Reference source not found. summarize the collection system's gravity piping by material and diameter. It should be noted that the full 365 miles of pipeline is not included in the summary table. Within the reference data that was used to calculate the lengths below, various segments of pipe were not labeled with a material or date of installation. Therefore, additional analysis should be completed by the City to determine the exact numbers to supplement the information in the table below.

Table 2-1 Gravity Pipe Materials & Diameter

Dia (inches)	Length (ft)									
	Unknown	CIPP	CLAY	Concrete	HDPE	PVC	RCP	SLIP	Total	%
Unknown	3,135	0	0	0	0	8,280	0	0	11,415	1%
4 to 8	219	0	0	0	0	1,880	0	0	2,100	0%
8	41,935	2,597	167,875	272,088	2,378	810,743	220	2,956	1,300,791	77%
10	12,461	0	25,239	20,256	0	63,525	0	367	121,849	7%
12	19,146	0	4,383	24,986	0	36,673	0	0	85,189	5%
15	16,974	0	1,365	27,747	1,131	25,331	0	0	72,547	4%
18	2,490	0	0	2,631	3,187	6,483	0	0	14,791	1%
21	3,110	0	2,477	15,713	9,112	6,441	0	0	36,852	2%
24	1,357	0	1,862	7,392	152	8,434	0	0	19,197	1%
30	423	0	0	2,304	0	3,683	0	0	6,411	0%
36	5,746	0	8,731	4,600	0	0	0	0	19,077	1%
Total	**106,996**	**2,597**	**211,933**	**377,717**	**15,959**	**971,474**	**220**	**3,323**	**1,690,219**	**100%**
%	6%	0%	13%	22%	1%	57%	0%	0%	100%	

Pipe installation year is based on the GIS data provided by the City. Almost 30% of the gravity mains were installed before 1990. Majority of the pipes are about 20-25 years old, with over 50% being installed after 1990. The year of installation of nearly 19% of pipes is unknown. Pipe installation year and diameter is summarized in **Table 2-2** and shown in **Figure 2-4**Error! Reference source not found..

Table 2-2 Gravity Pipe Diameter & Installation Date

Diameter (inches)	Length (ft)									
	Before 1950	1950-1959	1960-1969	1970-1979	1980-1989	1990-1999	2000-2010	2010-2024	Unknown	Grand Total	%
0	0	0	0	0	0	1,581	529	2,166	7,139	11,415	1%
<8	0	0	0	0	0	0	0	49	123,575	123,624	7%
8	1,747	2,837	41,030	295,439	103,610	342,445	257,708	132,401	48,537	1,225,752	73%
10	0	0	6,007	13,665	5,998	15,924	21,430	10,287	49,086	122,397	7%
12	0	0	547	12,975	4,130	1,555	10,850	6,046	31,198	67,301	4%
15	0	0	414	301	7,605	11,242	15,266	6,524	9,863	51,214	3%
18	0	0	0	521	0	2,673	0	1,734	24,467	29,395	2%
21	0	0	0	0	0	7,498	1,538	3,350	5,385	17,770	1%
24	0	0	0	0	5,378	0	0	8,434	2,728	16,540	1%
30	0	0	0	0	0	0	0	3,683	14,581	18,264	1%
36	0	0	0	0	2,991	994	511	0	2,051	6,547	0%
Grand Total	**1,747**	**2,837**	**47,997**	**322,900**	**129,713**	**383,912**	**307,831**	**174,673**	**318,610**	**1,690,219**	**100%**
%	0%	0%	3%	19%	8%	23%	18%	10%	19%	100%	

2.3.3 Septic Tanks

The City currently has approximately 126 septic tanks located in parcels that are not yet connected to the sewer mains. These septic systems are primarily concentrated in the eastern half of the City. As part of the City's long-term infrastructure plans, there is a clear initiative to gradually phase out these septic tanks and transition the properties to the sewer system. This effort aligns with the City's commitment to improving water quality, reducing environmental impact, and enhancing overall public health and sanitation. The removal of these septic tanks and their connection to the sewer mains will ensure a more sustainable and efficient wastewater management system for the future. A map of the existing septic tanks is included in Appendix A as Figure A-2.

Figure 2-3 Pipe Material Map

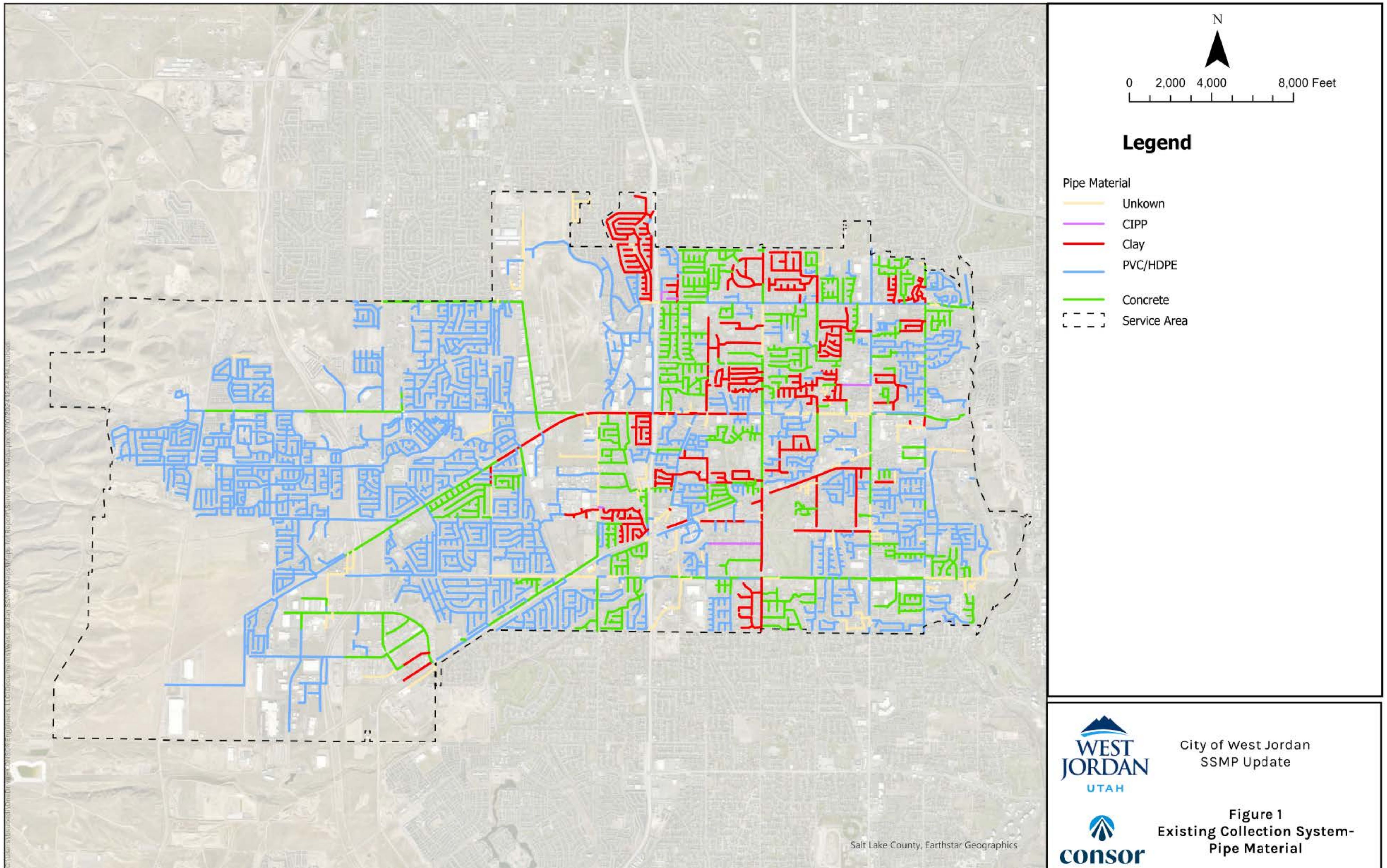
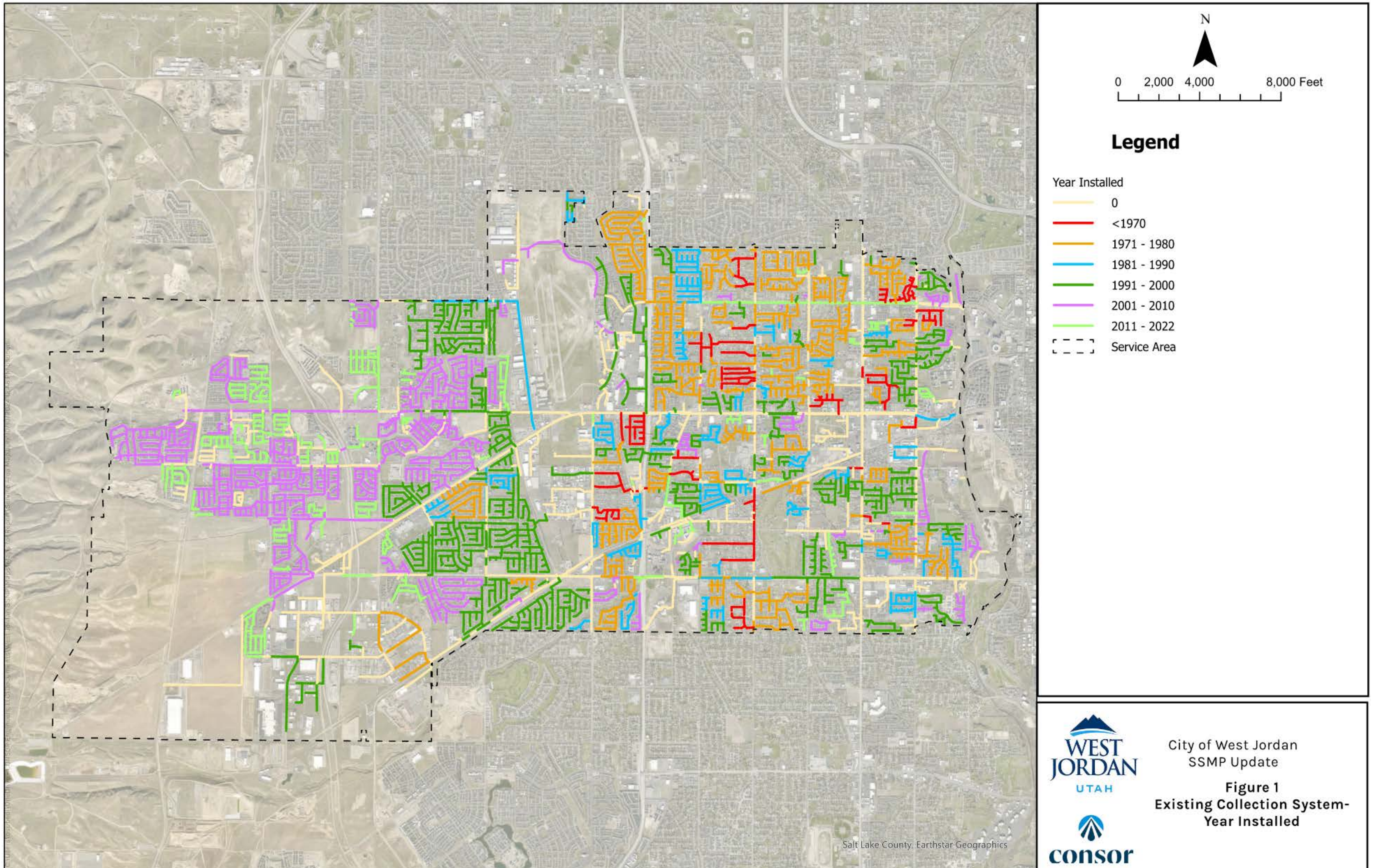


Figure 2-4 Sewer Pipe Year Install Map



CHAPTER 3

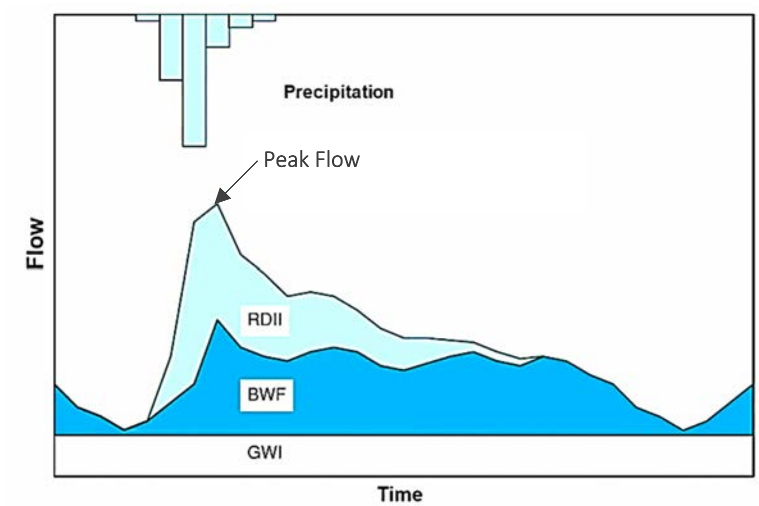
Wastewater Flow Projections

Prior to modeling and evaluating the City's sewer collection systems hydraulically, it is crucial to have an accurate understanding of the existing and the future wastewater flows. The goal of this chapter is to outline the assumptions and processes involved in calculating these existing and anticipated wastewater flows.

Wastewater flows for the City's sewer system is mainly made up of three components: base wastewater flows (BWF), groundwater infiltration (GWI) and rainfall-dependent infiltration/inflow (RDII). BWF is the average domestic wastewater from residential, commercial, industrial and institutional sources. GWI is groundwater entering the collection system unrelated to a rain event. RDII is storm water that enters the collection system through infiltration and inflow.

Together, the average BWF and GWI make up average dry weather flow (DWF). Peak DWF is the peak hour of DWF during a typical day with maximum GWI contribution. Peak RDII from the design storm that occurs at the same hour as peak DWF results in the peak design flow (PDF).

Figure 3-1 Components of wet-weather wastewater flow



3.1 Existing Wastewater Flows

3.1.1 Base Wastewater Flows (BWF)

Base wastewater flow refers to the domestic wastewater from sewer connection points. This flow primarily consists of residential, commercial, and industrial wastewater discharges. Base wastewater flow are essential for sewer system design and capacity planning, as they represent the minimum flow levels that treatment plants must handle. In the City, residential users contribute the largest share of the base wastewater flow. A breakdown of flow contributions by user type is provided in Table 3-1.

Table 3-1 Existing Base Wastewater Flow Contributors

User Type	Average Daily Flow (cfs)	% of Total Flow
Residential Users	9.31	69%
Commercial Users	2.17	16%
Industrial Users	1.61	12%
Institutional Users	0.43	3%
Total	**13.44**	**100 %**

3.1.1.1 Residential Flow

Existing residential dry weather flows are best assessed using winter water meter records. In the 2012 and 2019 Sanitary Sewer Master Plans, average residential water usage was determined to be 66 gpcd. This calculation was based on measured sanitary sewer flows, total population, the number of households, and the average household size derived from census data at the time. The findings were reaffirmed in 2023 using updated water meter data provided by the City. Notably, the calculated average residential water usage of 66 gpcd aligns closely with estimates from the American Water Works Association (AWWA) and averages reported by neighboring cities.

In addition to water meter data, temporary flow meter data was analyzed in basins with predominantly residential users to further approximate average residential water usage. Given the residential nature of these basins, this approach provides a reliable indication of sewer usage patterns. Flow meter data revealed an average flow per residential unit of approximately 217 gallons per day (gpd). Using an average household size of 3.30 people, this equates to an average residential sewer flow of approximately 66 gpcd, consistent with previous findings.

3.1.1.2 Non-Residential Flow

Non-residential flows were calculated based on 2022-2023 winter water meter data provided by the City. Because meter readings were taken by the City only once per month, average daily flows were calculated for each non-residential connection by dividing the total flow between meter readings by the number of days between meter readings. Throughout the data, some meter reading corrections were made by the City, which resulted in the billed water usage differing slightly from the meter readings. To ensure the most accurate calculations possible, billed water usage was used in place of the meter readings in the average daily flow calculations for non-residential connections.

After calculating the average daily flow for each of the non-residential connections for the winter months, it was determined the overall average daily flow for February 2023 was the highest of the winter months. As a result, the average daily flows from February 2023 were used in the model for the non-residential connections. Each non-residential connection within the model was assigned a unique average daily flow based upon the calculated February 2023 average daily flows.

3.1.2 Additional Flows

3.1.2.1 Rainfall-Dependent Infiltration/Inflow (RDII)

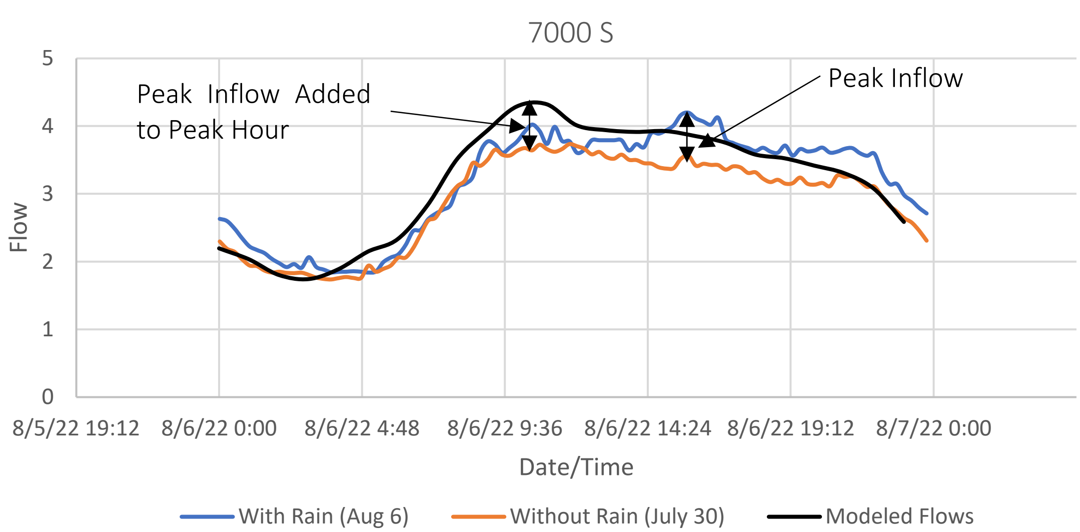
Rainfall-Dependent Infiltration/Inflow is stormwater that enters the sewer system. Stormwater inflow reaches the collection system by direct connections, such as roof downspouts connected to sanitary sewers, yard and area drains, holes in manhole covers, or cross-connections with storm drains or catch basins. Rainfall-dependent infiltration includes flow that enters defective pipes, pipe joints and manhole walls after percolating through the soil.

During the permanent flow meter monitoring period, a significant rain event occurred on August 6, 2022, with a rainfall depth of 0.55 inches and a peak intensity of 0.45 inches per hour. This rain event caused a notable increase in flow throughout the collection system. To assess the impact, data from the four major permanent flow meters were analyzed. The dry weather flow curves from the previous dry week were overlaid with the wet weather flow data to compare changes in both average and peak flows. The inflow volume as shown in Table 3-2, proportional to the storm event, was incorporated into the model. To simulate the worst-case scenario, the RDII peaks were shifted to coincide with the peak time of the day as shown in Figure 3-2.

Table 3-2 RDII Volume by Sewer Basin

Sewer Basin	RDII Volume (gallons per day)
7000 S Trunkline	299,168
7800 S Trunkline	1,365,925
8050 S Trunkline	80,776
9000 S Trunkline	28,465

Figure 3-2 Wet Weather Flow Graph for 7000 S Trunkline



3.1.2.2 Groundwater Infiltration (GWI)

Groundwater Infiltration refers to groundwater entering the sewer collection system that is not associated with any specific rainfall event. This occurs when groundwater levels rise to or above the sewer pipe invert, seeping through defective pipes, joints, and manhole walls. In the City's collection system, groundwater infiltration is mostly a seasonal component, and is primarily attributed to irrigation infiltration from nearby canals. Five major irrigation canals run south to north and either pass through or terminate in the eastern half of the City. The pipelines where low infiltration occurs are generally located west of 4000 W as the groundwater table is deeper and canals are not present. The City also receives groundwater recharge flow from a secondary recharge area located on the east side of the Oquirrh Mountain Range. Due to the slope of the land from west to east, groundwater is conveyed west from the Oquirrh Mountains to the Jordan River, creating higher groundwater levels in the eastern portion of the City (See Appendix E: *City of West Jordan Sewer System Infiltration Study*, CRS, 1992).

An extensive infiltration study conducted by the City in 1992 (See Appendix E) revealed that most infiltration occurred east of 2200 W, with the majority concentrated east of 1700 W. Focusing on repairing pipes in this area would significantly reduce flows to the treatment plant. This was largely due to sewer pipes running beneath canals. The infiltration was most prominent during the irrigation season, lasting two to three months, and was estimated at 1.06 mgd.

The 2024 SSMP update did not include a new infiltration study; instead, groundwater infiltration values from previous master plans were retained. The 2019 SSMP model estimated approximately 0.56 cfs of base groundwater infiltration distributed across the eastern part of the City. During the irrigation season, an additional 0.97 cfs of infiltration was identified near manholes located closer to irrigation canals, consistent with the 1.06 mgd estimate from the 1992 study. Flow meter data from 2022 and 2023 supported these findings, showing similar seasonal patterns with a comparable increase in sewer flows during the irrigation season. After discussion with the City staff, the GWI were applied to the same manholes as in the previous sewer master plans (see Appendix A).

3.2 Projecting Future Wastewater Flows

A future buildout wastewater flow projection was performed to determine the deficiencies in the system with the future flows as development occurs. Buildout is defined as the condition when all the area to be served by the collection system has developed to the planned densities. The zoning densities of the future developable land, city council approved development densities (at the time of writing this memo), and future land use map were used to estimate wastewater flows.

3.2.1 Land Use and Population Densities

Future wastewater demands were projected for buildout using the City's 2023 Land Use Map zoning designations (see Figure 3-4) along with the most recent General Plan developed by the City. The City of West Jordan Planning Department outlines the estimates of residential dwelling unit densities and occupancy rates (people per household). While an approximate population number can be determined from this data, the buildout scenario used in the SSMP utilizes the densities, occupancy rates, and the approved land use map to calculate future wastewater demands.

Table 3-3 shows the density ranges presented in the most recent City General Plan. After discussions with the City staff, overlay zones including Interchange Overlay Zone (IOZ) or Transit Oriented Development (TOD) density overlays were limited to 25 ERUs/acre. Although the General Plan calls out the High-Density Residential density to be as high as 75 units/acre, after discussions with the city staff, this was reduced to maximum of 25 units/acre. The 5600 W Old Bingham TOD and neighboring station communities were also not included in the buildout scenario per City comments.

Table 3-3 Density Ranges

Land Use	Density Range (ERUs/acre)
Very Low Density Residential	1-3
Low-Density Residential	3.1-5
Medium-Density Residential	5.1-10
High-Density Residential	10.1-25
IOZ/ TOD Overlay	Max. 25

3.2.2 Future Residential Flow

Future residential flows for currently undeveloped parcels were calculated based on the estimated future ERUs per acre, the corresponding acreage of the undeveloped land, and 3.30 people per ERU. The future contribution per capita is based on the established LOS of 100 gpcd with a peaking factor of 2.5. Maintaining consistency in LOS between the existing system future service provides the City a reliable method to develop an Impact Fee Facility Plan (IFFP).

The future ERUs per acre were calculated based on the high dwelling units per acre that were established by the City as shown in Table 3-3. Following the calculation of the future residential flows based on land use, the future flows were assigned to the nearest future sewer manholes within the model.

3.2.3 Future Non-Residential Flow

Future non-residential wastewater from currently undeveloped portions of the City are difficult to forecast because each type of non-residential connection consumes and discharges different amounts of wastewater. Future flows for the non-residential land use areas were calculated based on the proposed commercial sewer use in gallons per day per acre, and the acreage of undeveloped land. A summary of the residential and non-residential flow projections for the City buildout are shown in Table 3-4.

3.2.4 Future Flow Allocations

Adequately estimating the quantity of this wastewater is an important process in maintaining and sizing collection system facilities, both for existing conditions and future developments. The type of land use in an area will affect the volume and characteristic of the DWF being generated.

Once estimated, all future flows were incorporated into the buildout model using the flow allocation tool. This process began by creating a new GIS layer that combined City parcel data with land use information, ensuring each parcel was assigned a designated land use type. A second GIS layer was then developed, where points were assigned to represent each land use type within the parcels. These points contained key attributes, including land use type, total area, total ERUs, and calculated flow based on land use and ERUs.

After establishing these GIS layers, flows were allocated to the nearest manhole using the flow allocation tool. Additionally, new sewer pipes and manholes were strategically placed along future roadway alignments per the City's Transportation Master Plan, and flows were routed down the future trunklines, allowing for a more accurate estimation of future sewer flows.

Table 3-4 Future Flow for Residential, Commercial and Industrial Areas

Land Use	Low Dwelling Units per Acre (du/ac)	High Dwelling Units per Acre (du/ac)	People per household (pph)	Gallons per Capital per Day (gpcd)	Residential Future Sewer Use per Parcel (gpd)	Commercial Sewer Use (gpd/ac)	Residential Sewer Use for Future Development (gpd/ac)	Future ERUs Per Acre
Very Low Density Residential	1	3	3.3	100	330		990	3.00
Low Density Residential	3.1	5	3.3	100	330		1,650	5.00
Medium Density Residential	5.1	10	3.3	100	330		3,300	10.00
High Density Residential	10.1	25	2.64	100	264		6,600	25.00
Mixed Use	0	25	2.64	100	264	2,450	6,600	25.00
Neighborhood Commercial						850		2.58
Community Commercial						850		2.58
Regional Commercial						850		2.58
Professional Office						850		2.58
Light Industrial						1,230		3.73
Public Facilities						1,260		3.82
Agricultural Open Space						0		0.00
Future Park								4 [1]
Research Park						1,230		3.73
Parks and Open Land (Trails)								4 [2]
Transit Oriented Development		25	2.64	100	264		6,600	25.00
Master Planned Community								5.00
Southwest Quadrant								5.00

[1] *2 ERUs for Parks < 40 ac & 4 ERUs for parks bigger than 40 ac*

[2] *Assuming one restroom at each trailhead; Each trailhead restroom assumed to be equivalent to two (2) ERUs*

3.2.5 Diurnal Flow Patterns and Peaking Factors

DWF flows vary throughout the day. Residential peak flows typically occurring in the morning and evening on weekdays, and the heaviest residential usage is generally observed on Saturdays and Sundays. Commercial DWF typically begin around 8:00 a.m., peaking in late morning or early afternoon and again in the late afternoon or evening. Industrial and light industrial flows generally occur during the workday, with occasional sporadic evening peaks, but their afternoon flows tend to dominate.

Flow meter data also showed that the system experiences higher flows on weekends compared to weekdays. Consequently, the model was calibrated to reflect weekend flows, as the highest flows are driven by residential users on Saturdays and Sundays. This approach ensures the model captures the peak flow patterns observed during these periods, rather than the lower flow levels typical of weekdays.

To simulate flow variations throughout the day, unit diurnal curves were developed and assigned to each flow value within the InfoSWMM software. These curves quantify flow patterns based on specific land-use activities. The diurnal curve patterns utilized in the model are illustrated in Figure 3-3.

Table 3-5 and Figure 3-3 show the hourly flow patterns that are multiplied by the average demand to create hourly and peak flow values, correlating with actual metered flow data.

Figure 3-3 Collection System Diurnal Curve

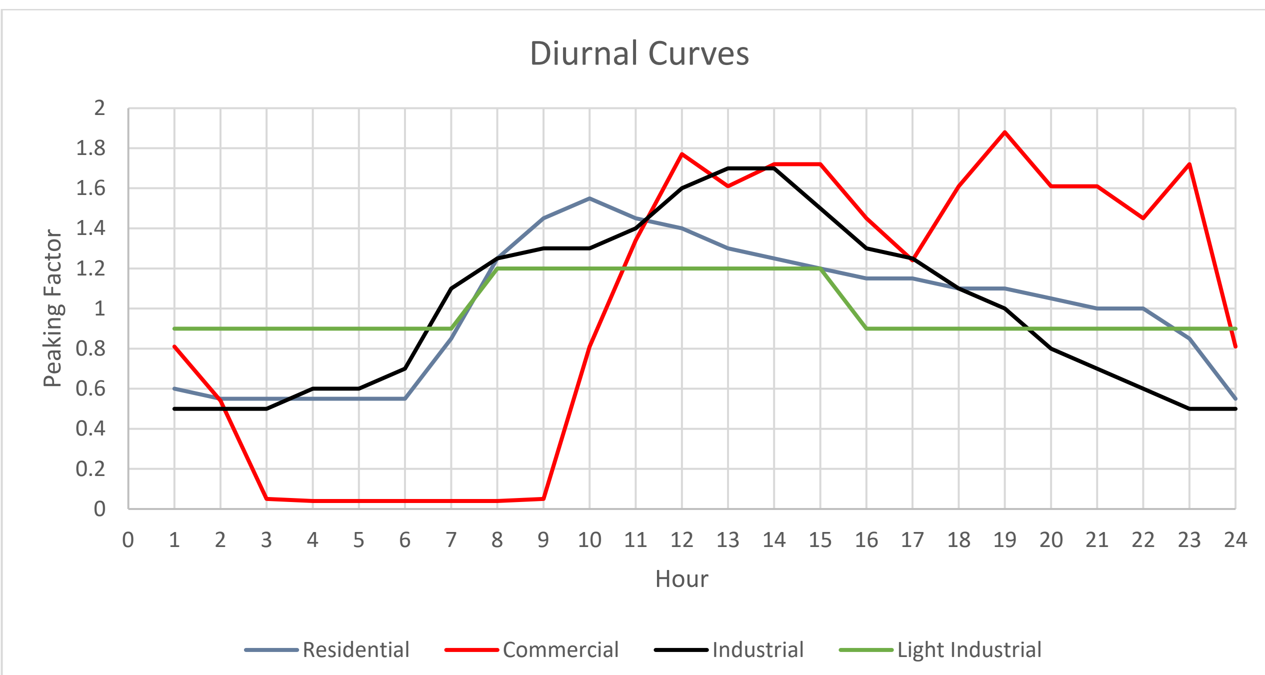


Table 3-5 Peaking Factors

Hour	Model Residential Pattern	Model Commercial Pattern	Model Industrial Pattern	Model Light Industrial Pattern
1	0.6	0.81	0.5	0.9
2	0.55	0.54	0.5	0.9
3	0.55	0.05	0.5	0.9
4	0.55	0.04	0.6	0.9
5	0.55	0.04	0.6	0.9
6	0.55	0.04	0.7	0.9
7	0.85	0.04	1.1	0.9
8	1.25	0.04	1.25	1.2
9	1.45	0.05	1.3	1.2
10	1.55	0.81	1.3	1.2
11	1.45	1.34	1.4	1.2
12	1.4	1.77	1.6	1.2
13	1.3	1.61	1.7	1.2
14	1.25	1.72	1.7	1.2
15	1.2	1.72	1.5	1.2
16	1.15	1.45	1.3	0.9
17	1.15	1.24	1.25	0.9
18	1.1	1.61	1.1	0.9
19	1.1	1.88	1	0.9
20	1.05	1.61	0.8	0.9
21	1	1.61	0.7	0.9
22	1	1.45	0.6	0.9
23	0.85	1.72	0.5	0.9
24	0.55	0.81	0.5	0.9

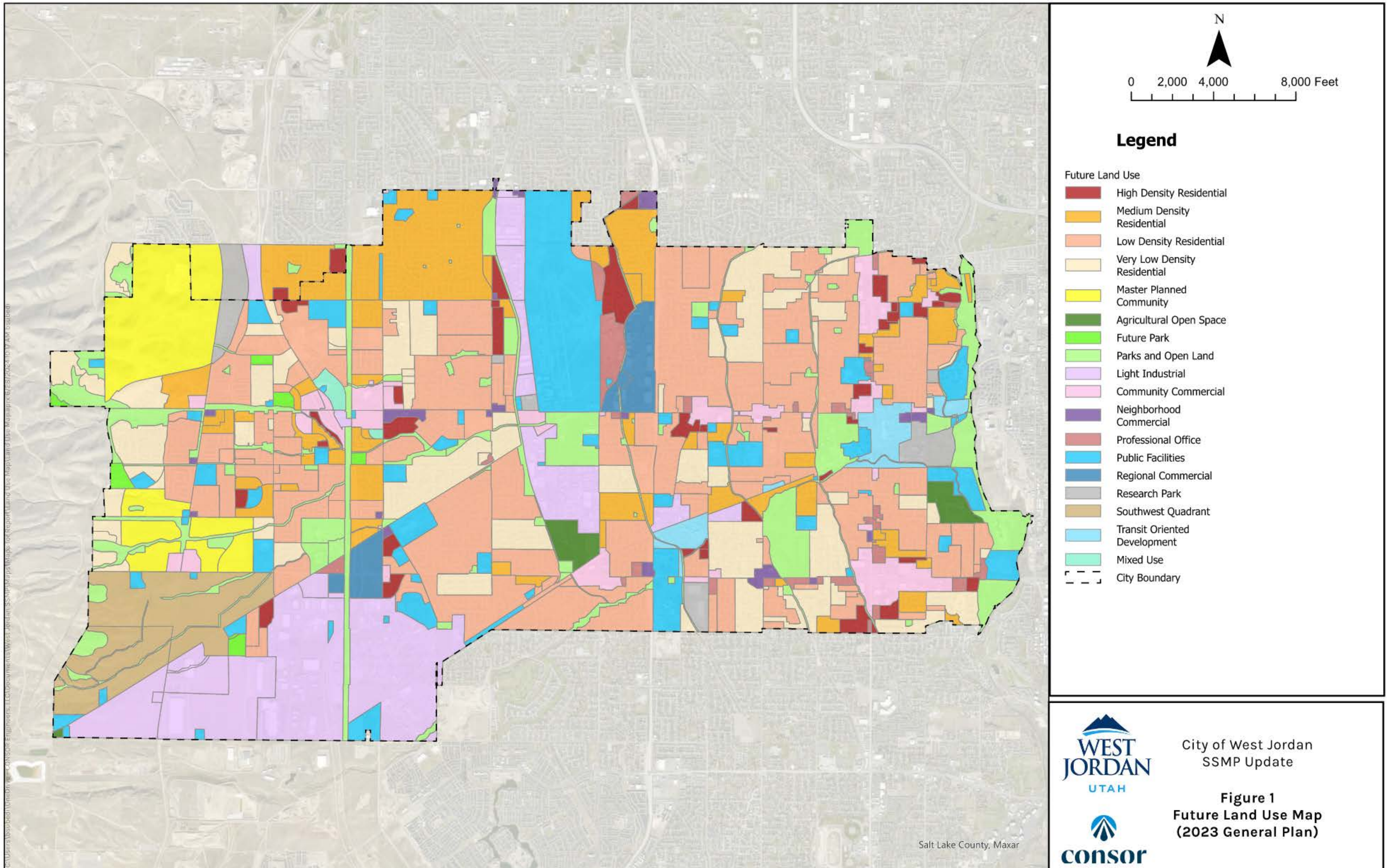
3.3 Existing Flow Estimate Planning Period and Buildout Projections

Current population estimate of 116,662 was obtained from the 2022 population estimate provided by American Community Survey (ACS)- U.S. Census Bureau. Per the census data, the number of people per household (pph) is estimated to be 3.17 with a margin of error of ± 0.13. Including the margin of error, the household size is assumed to be 3.30 pph.

Buildout occurs when all available land has been developed to the target density anticipated for each land use or zoning designation. Buildout projections were included primarily to provide an understanding of long-term infrastructure sizing requirements.

The developable land future zoning densities, city council approved development densities (at the time of writing this memo), and future land use map (see Figure 3-4) were used to estimate future wastewater flows. After discussions with the City, overlay zones including Interchange Overlay Zone (IOZ) or Transit Oriented Development) TOD density overlays were not included in this SSMP update. See Chapter 3 for details regarding flow assumptions.

Figure 3-4 Future Land Use Map



CHAPTER 4

System Analysis

This section summarizes the hydraulic model calibration, criteria, methodology, and results of the collection system analysis conducted on the City's sewer system.

A calibrated hydraulic model predicted the system response under dry and wet weather conditions. The City's collection system was evaluated for existing and future loading conditions, using the data summarized in Chapter 3—Wastewater Flow Projections. The results of the system analysis were compared with planning and design criteria to determine system deficiencies. The identified deficiencies were then used to develop the recommended system improvements presented in Chapter 5—Capital Improvement Program.

4.1 Hydraulic Model Development

A hydraulic model of the City's primary sewer conveyance network, focusing on the larger sewer lines (excluding most neighborhood line/lateral), was initially developed as a part of the 2019 SSMP efforts. The model was developed using InfoSWMM—an ArcGIS-integrated hydrologic and hydraulic simulation software.

For the 2024 update, the same InfoSWMM model was utilized and enhanced with updated inventory data, including the location, size, and elevations of system facilities. Additionally, the model was refined using construction as-built records and survey information collected by the City. In areas where manholes lacked reliable invert information, interpolations were made based on upstream and downstream elevations.

To complete the hydraulic model development, the dry weather loads, daily patterns, and wet weather parameters described in Section 3 were assigned to the model.

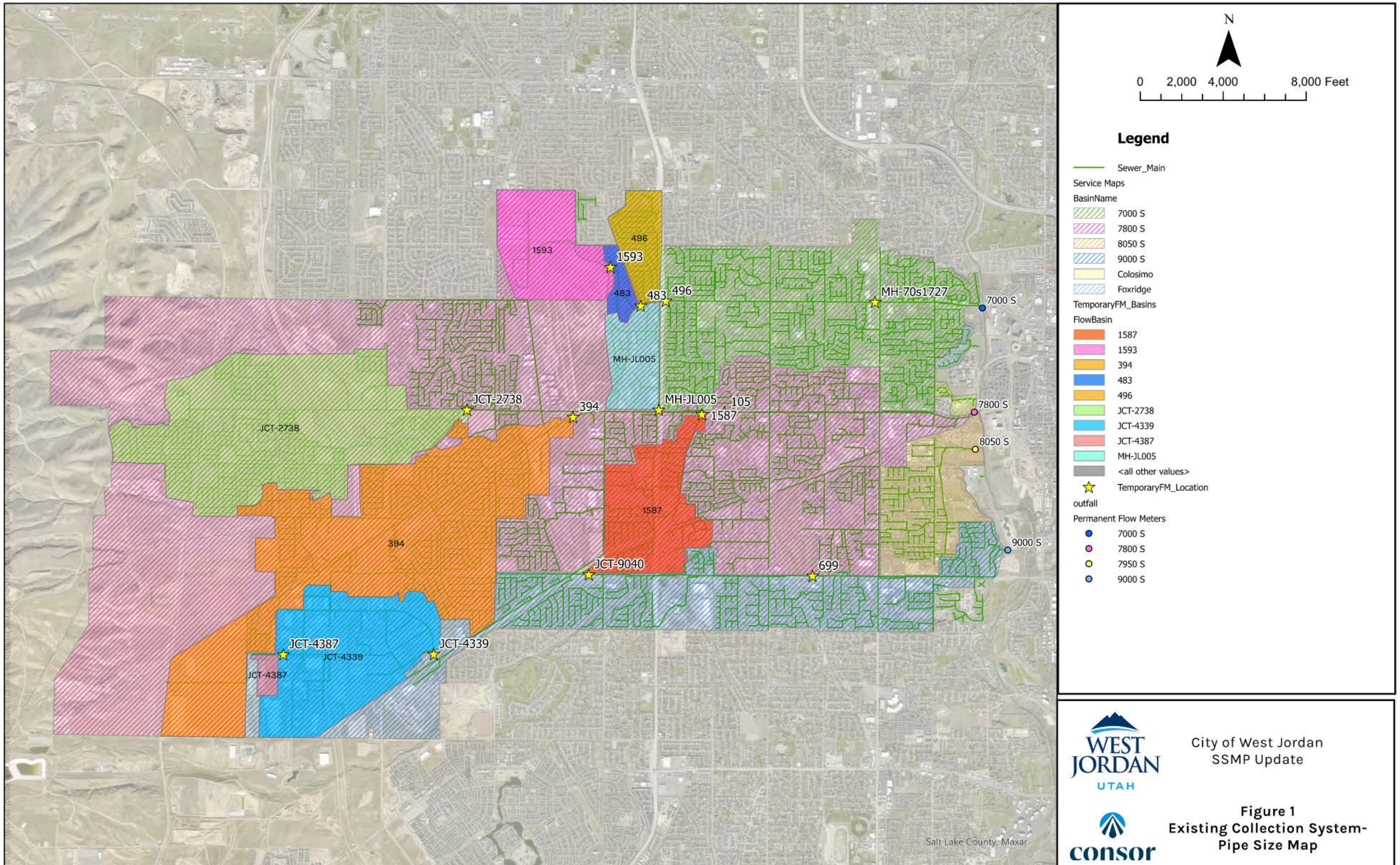
4.2 Flow Meters

The four main trunklines along 7000 S, 7800 S, 8050 S, and 9000 S divide the City's collection system into four major sewer basins. Each of these main trunklines receive flows from collector sewers and outfall into the sewer interceptor. The flows are continuously monitored and measured at seven permanent meter stations: four located along the main trunklines, two (Foxridge and Colosimo) measure flows from small residential areas that discharge directly into the interceptor, and one (JVWCD) monitors flows from the Jordan Valley Water Conservancy District (JVWCD). Flow data was collected at these locations from January 2022 to March 2024. During this timeframe, the impact of 55 storms that delivered more than 0.1 inches in a 24 hour period were measured.

Apart from the permanent flow meters, 14 smaller temporary flow meters were placed in strategic locations to obtain localized flow information. Monitored flow was recorded every fifteen minutes using the City's Flo-Dar meters. These records of actual collection system flows were then correlated with the flows in the hydraulic model. The monitors were left in place for periods of over one week to capture the differences in weekday and weekend flows. The locations of these temporary flow meters installed in 2023 are presented in Figure 4-1 and are discussed below:

1. MOID-342: This flow meter calibrates flows from Grizzly Way before they connect into 7800 S. The flows mainly consist of residential and some institutional units. The flow meter serves the purpose of verifying the necessity of the CIP project along Grizzly Way, which was recommended in the 2019 SSMP.
2. JCT-2738: This flow meter calibrates flows from the Northwest quadrant of the city. The basin primarily consists of low- to medium-density residential zoning, with some commercial land use. The purpose of this basin is to help calibrate the 7800 S trunkline flows. Additionally, as the area is primarily residential, this basin helps approximate residential flow per ERU, which can be applied citywide for calibration purposes.
3. MH-100242: This flow meter observes flows from the Southwest light-industrial area, developed after the 2019 SSMP was completed. It includes flows from the Amazon Fulfillment Center and nearby storage units. The basin discharges into New Bingham Highway trunkline.
4. JCT-4388: This flow meter, located at the manhole downstream of the NOVVA Data Center, verifies the flows from the data center and helps check the previously recommended CIPs along Well Park Road.
5. JCT-4339: This flow meter calibrates flows from Wells Park Rd and Bagley Park Rd. It will be used to calibrate this area better to verify the CIPs recommended in this area, and to calibrate the flows being discharged into the 9000 S trunkline.
6. JCT-9040: This flow meter is used to verify flows along the 9000 S trunkline. They also serve as a check for all upstream flow meters along 9000 S.
7. JCT-699: This flow meter is used to verify flows along the 9000 S trunkline. They also serve as a check for all upstream flow meters along 9000 S.
8. MOID-1587: This flow meter tracks flow along Old Bingham Highway before being discharged into the 7800 S trunkline. The basin includes residential, industrial, commercial, and institutional flows, along with a few newly developed apartment buildings in the Jordan Valley TOD area.
9. MOID-105: This flow meter verifies flows along the 7800 S trunkline and serves as a check for all upstream flow meters along 7800 S.
10. MOID-1593: This flow meter monitors flows from the commercial areas in the Northwest corner of South Valley Regional Airport and some residential areas in the Northeast corner. It also checks the CIPs recommended along Campus View Drive in the 2019 SSMP.
11. MOID-483: This flow monitor includes flows from MOID-1593, plus additional residential units north of the Jordan Landing area. It also helps verify the CIPs recommended along Campus View Drive in the 2019 SSMP.
12. MH-JL005: This flow monitor captures sewer flow from the Jordan Landing sewer main before it discharges into the 7800 S trunkline. It will play a critical role in calibrating flow data from the Jordan Landing area and verifying flows from the manholes at MOID-1593 and MOID-483.
13. MOID-496: Located just east of Bangerter Highway along 7000 S, this flow meter helps verify the need of the CIP project between Bangerter and 3200 W recommended in the 2019 SSMP. The flow meter also serves the purpose of calibrating the flows for the large residential area north of the Jordan Landing area.
14. MH-70S1727: This flow meter verifies flows along the 7000 S trunkline and serves as a check for all upstream flow meters.

Figure 4-1 Temporary Flow Meter Location



4.3 Model Calibration

Calibration is the process of adjusting a model's hydraulic and hydrologic parameters until a reasonable representation of the wastewater flows measured throughout the system is obtained. Flows at each metering site are then compared to model flow rates for an extended period of time (usually 24 hours).

The City's collection system model was calibrated under both dry weather and wet weather conditions. The dry weather component was calibrated using the flow metering data recorded during days without precipitation between January 2022 and February 2024. Temporary Flow meter data was used to supplement the permanent flow meter data for areas of high interest (Figure 4-1). The dry weather flows were calibrated with adjustments to the model loading and diurnal patterns until field and model flows reasonably matched.

The wet weather flows were calibrated using the flow metering data recorded during a storm event on August 6, 2022 (see Section 4.6 for details). Influent flows measured at the permanent flow meters were used for calibration. The methodology, results, and details of the calibration process follow.

4.4 Dry Weather Calibration Methodology

The hydraulic model utilizes two parameters to represent the dry weather wastewater flow at a specific loading point: a daily average dry weather flow and a unit diurnal pattern. The diurnal pattern describes the fluctuation of the loading during a typical 24-hour period. For the City's collection system, these parameters were estimated from flow meter data and then adjusted until an acceptable system response during dry conditions was obtained.

The calibration procedures involved:

- Determining the contributing manholes to each flow metering location.
- Developing diurnal patterns.
- Estimating average dry weather contribution in each manhole – The initial existing average contribution was estimated using average winter water demand, obtained from water billing records and meter locations. The diurnal curves used in the model are shown in Section 3.2.5.
- Adjusting average base wastewater flow – The average contribution at each manhole in the contributing flow meter area was adjusted to match the total average measured flow at the flowmeter location.

4.5 Dry Weather Calibration Results

Dry weather calibration was performed for the temporary flow meters as well as at the permanent flow meter locations at the four major trunklines.

The results of the dry weather calibration are summarized in Table 4-1 and Table 4-2. Figure 4-2 shows the model results at the each of the major outfall locations. The dry weather flows are shown as a solid black line and labeled as "Dry Day Flowmeter".

Table 4-1 | Temporary Flow Meter Dry Weather Calibration Results

Discharging Trunkline	Flow Meter Location	MHID	Metered Average	Model Average	% Variation	Metered Peak	Model Peak	% Variation
7000 S	Watkins Way	1593	0.07	0.10	29%	0.14	0.14	4%
	Jordan Landing Blvd	483	0.77	0.75	-3%	0.99	0.92	-7%
	7000 S Bangerter	496	0.65	0.75	16%	0.89	0.90	2%
	7000 S Redwood	MH-70S1727	1.84	1.66	-10%	2.49	2.21	-11%
7800 S	7825 S Grizzly Way	342	0.41	0.41	0%	0.63	0.62	-2%
	5000 W 7800 S	JCT-2738	2.11	2.15	2%	3.15	3.19	2%
	Jordan Landing 7800 S	MH-JL005	0.69	0.72	4%	1.10	1.02	-8%
	7825 S Old Bingham	1587	0.34	0.36	8%	0.46	0.52	13%
	7800 S 3100 W	105	4.45	6.62	49%	6.79	9.63	42%
9000 S	New Bingham Hwy	MH-100242	0.09	0.10	15%	0.16	0.16	-2%
	6350 W Wells Park	JCT-4388	0.01	0.02	82%	0.12	0.12	5%
	5230 W Bagley Park	JCT-4339	0.23	0.26	9%	0.38	0.40	4%
	4075 W 9000 S	JCT-9040	0.43	0.36	-16%	0.54	0.53	-1%
	2225 W 9000 S	699	1.32	1.36	3%	1.73	1.80	4%

Table 4-2 | Permanent Flow Meter Dry Weather Calibration Results (Outfall Location)

Basin	Average Dry Weather Flow				Peak Dry Weather Flow				Dry Weather Volume			
	Modeled (cfs)	Measured (cfs)	Difference (cfs)	Error (%)	Modeled (cfs)	Measured (cfs)	Difference (cfs)	Error (%)	Modeled (cft)	Measured (cft)	Difference (cft)	Error (%)
7000 S	2.82	2.89	-0.07	-2.39%	3.86	3.87	-0.01	0%	4,057.40	4,156.77	-99.37	-2%
7800 S	8.08	8.28	-0.20	-2.36%	11.75	11.52	0.23	2%	11,638.05	11,919.17	-281.11	-2%
8050 S	0.98	0.98	0.00	-0.03%	1.17	1.18	-0.01	-1%	1,410.01	1,410.38	-0.37	0%
9000 S[1]	2.31	2.08	0.23	11 %	3.21	2.69	0.51	19%	3,333.22	3,002.25	330.97	11%
Avg				1.6%				5.0%				1.6%

[1] *High flow estimate for 9000 S trunkline could be due to the diversion structure MH 659 at Redwood Rd and 9000 S. The model currently has all flows from Redwood Road going East along the 9000 S trunkline.*

4.6 Wet Weather Calibration Methodology

To perform a wet weather calibration, inflow volumes were quantified by observing peak flow data during storm events and comparing this to a dry weather monitoring data of the same flow meter basin.

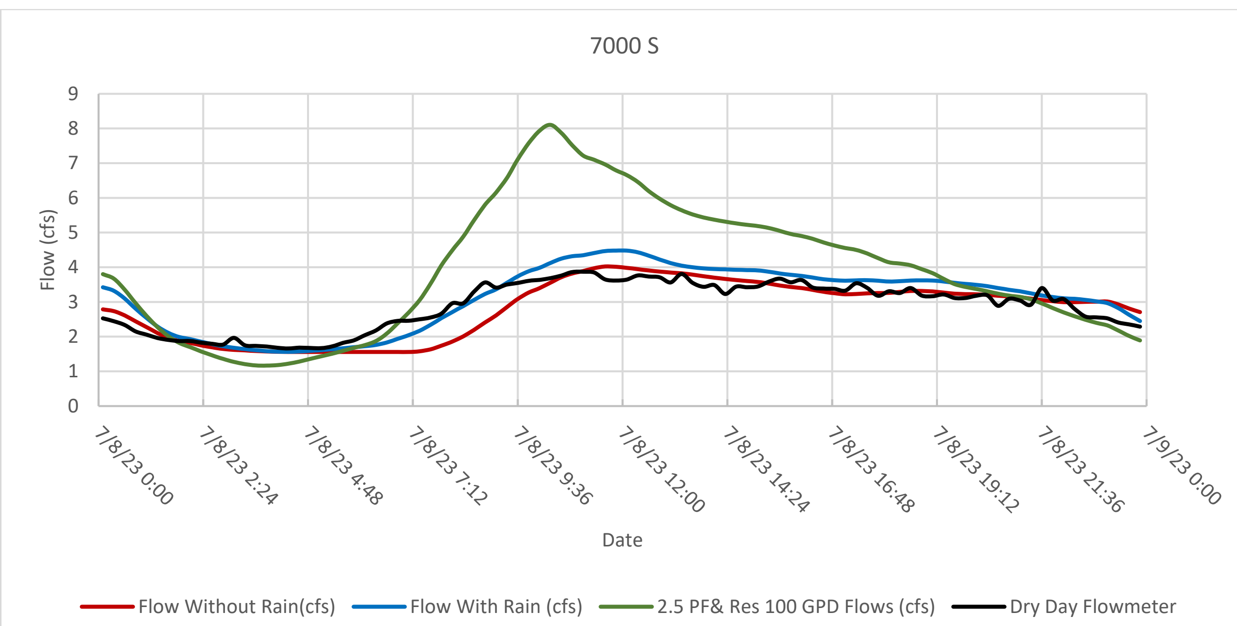
Rainfall events from 2021 to 2023 were analyzed to identify the storm that caused the highest inflow into the sewer systems. The analysis revealed that the storm on August 06, 2022, had a significant impact on the flows at each of the permanent flow meter locations. This storm, which lasted nearly 3 hours, recorded an hourly peak rainfall of 0.45 inches.

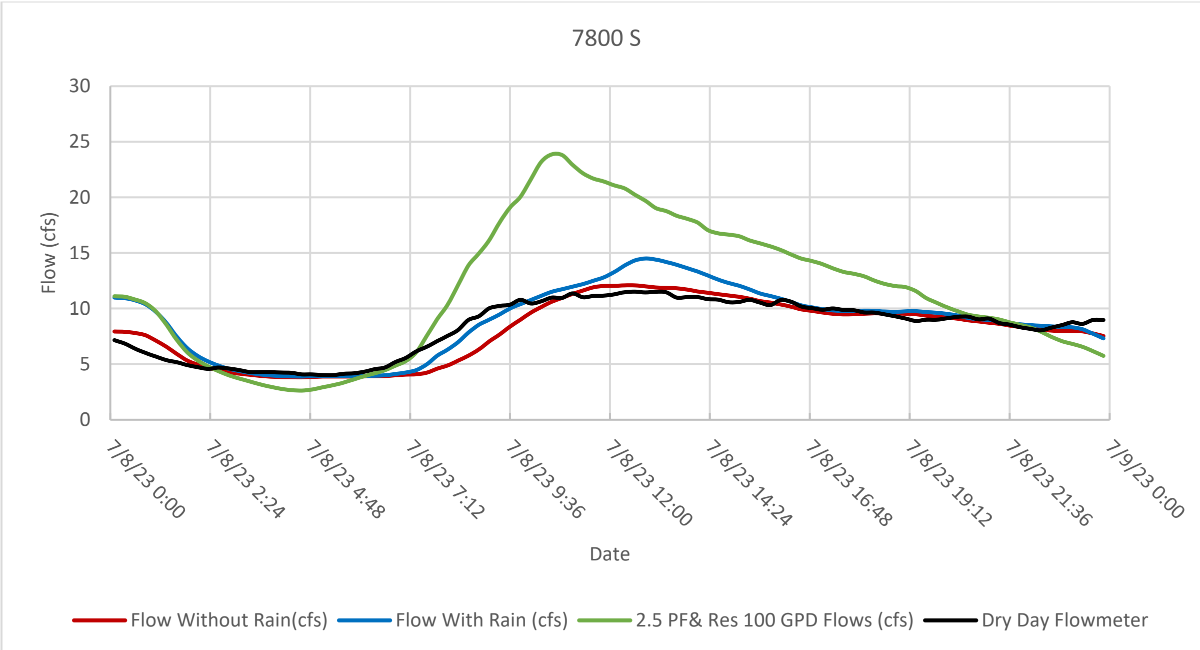
For each of the four major flow meter basins, dry weather monitoring curves from the previous dry week were overlaid with wet weather flows to observe changes in the average flow and determine the amount of inflow proportional to the storm event. The increase in volume due to this storm was uniformly distributed across all manholes within each outfall basin. RDII patterns were adjusted to ensure that the storm's peak coincided with the peak of the daily dry weather flows, allowing for an accurate assessment of the system's response under such conditions. See section 3.1.2 for RDII parameters and flows added to the model.

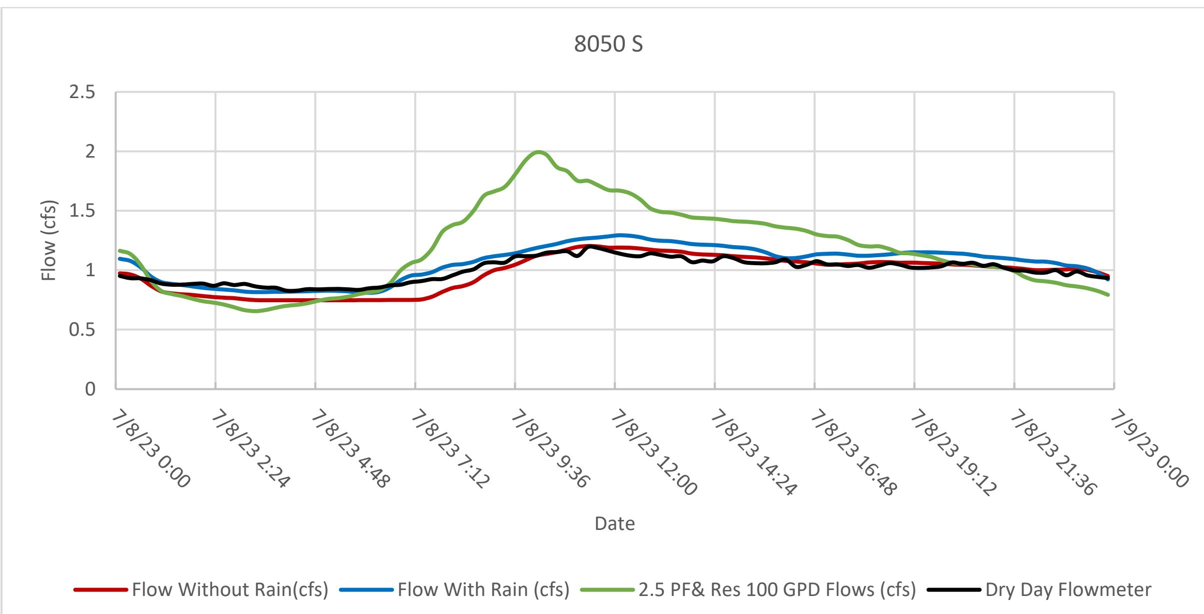
4.7 Utah Admin Code 317-3-2 Requirements

Once the model has been calibrated, it is important to also account for state guidelines governing collection system design. Several factors influence peak flows within a collection system. To address this, the Utah Administrative Code (UAC) R317 provides design criteria for sanitary sewer flows, specifying an annual average daily rate of flow of 100 gpcd with a peaking factor of 2.5 for all sewer interceptors. This includes an allowance for RDII.

To meet this requirement, once the model calibration was complete, all the residential dry weather flows were converted to a daily average flow of 100 gpcd. New diurnal curves were created with a peaking factor of 2.5. These standard flows were compared against the calibrated model flows and are represented as "Existing (100 gpcd & 2.5 PF)" in green within the calibration graphs in Figure 4-2.




7800 S
Flow (cfs)
30
25
20
15
10
5
0
7/8/23 0:00
7/8/23 2:24
7/8/23 4:48
7/8/23 7:12
7/8/23 9:36
7/8/23 12:00
7/8/23 14:24
7/8/23 16:48
7/8/23 19:12
7/8/23 21:36
7/9/23 0:00
Date
Flow Without Rain(cfs)
Flow With Rain (cfs)
2.5 PF& Res 100 GPD Flows (cfs)
Dry Day Flowmeter


8050 S
Flow (cfs)
2.5
2
1.5
1
0.5
0
7/8/23 0:00
7/8/23 2:24
7/8/23 4:48
7/8/23 7:12
7/8/23 9:36
7/8/23 12:00
7/8/23 14:24
7/8/23 16:48
7/8/23 19:12
7/8/23 21:36
7/9/23 0:00
Date
Flow Without Rain(cfs)
Flow With Rain (cfs)
2.5 PF& Res 100 GPD Flows (cfs)
Dry Day Flowmeter

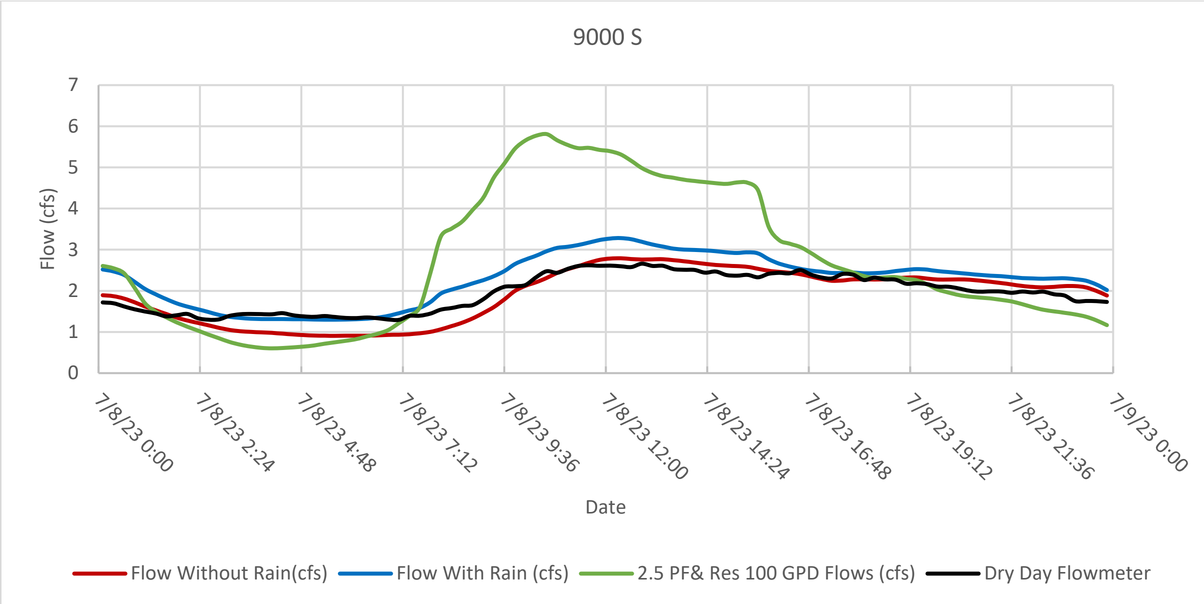


Figure 4-2 Calibration Graphs

4.8 Design and Planning Criteria

4.8.1 Minimum Pipe Diameters for Gravity Sewers

Utah Admin Code R317-3-2 and the 10 States Standards indicate that no gravity sewer mains less than eight inches in diameter shall be installed, with the exception of sewer mains serving only one connection.

4.8.2 Pipe Slope for Gravity Sewers

The minimum slope criteria for new sewers are based on the 10 States Standards and Utah Admin Code R317-3-2.3 (D)(4). Pipe slopes over 20% require anchoring. Minimum slope criteria are presented in Table 4-3.

Table 4-3 Design Criteria- Minimum Slopes

Nominal Sewer Size (inches)	Minimum Slope (feet per 100 feet)[1,2]
8	0.4
10	0.28
12	0.22
15	0.15
18	0.12
21-48	0.10
> 48	Designed to give mean velocities, when flowing full, of not less than 3.0 feet per second

[1] *Minimum slope for pipes less than 48 inches based on a mean velocity of 2 ft/s under full pipe flow conditions.*

[2] *Based on Manning's formula using a Manning's roughness coefficient (n) value of 0.013.*

4.9 System Capacity Analysis Criteria

4.9.1 Flow Depth over Pipe Diameter (d/D)

The capacity analysis highlights areas within the collection system where flow restrictions exist or where pipe capacity is inadequate to handle peak flows. Pipes lacking sufficient capacity to convey peak flows can result in backwater conditions and potentially lead to sanitary sewer overflows (SSOs). An effective way to assess remaining pipe capacity is by using the ratio of maximum flow depth to pipe diameter (d/D) or comparing peak flows to full pipe flow. A pipe flowing at its full capacity has a d/D value of 1.0, indicating no reserve capacity, while a pipe flowing at half capacity has a d/D value of 0.5, indicating some available reserve capacity. This metric helps determine whether a pipe may need to be upgraded. Based on the "Ten States Standards" and after discussions with City staff, the following parameters were set as the evaluation criteria or LOS.

1. 8-inch and smaller: 0.50 d/D
2. 10-inch : 0.55 d/D
3. 12-inch and larger: 0.75 d/D

Once an existing pipe exceeds this LOS, it is considered deficient and may need to be upsized.

4.10 Capacity Analysis Methodology

Once the system calibration was complete and buildout scenarios were created, the City's collection system was analyzed for deficiencies. As previously noted, a pipeline is considered at full capacity when the flow reaches a depth-to-diameter (d/D) ratio as outlined in Section 4.9. To address any pipelines operating beyond this threshold pipe upsize, or new sewers, whether through parallel installations or replacements-are recommended.

The following scenarios were modeled to assess the d/D capacity of all pipelines in the City:

- Existing Wet Weather Calibrated System Evaluation (See Figure 4-3)
    - Existing scenario with dry weather flows (base flow and groundwater), and rainfall derived inflow and infiltration
- Existing Scenario with State Required LOS Evaluation (See Figure 4-4)
    - Assumes a 100 gpcd residential flow with 2.5 Peaking Factor
- Future Buildout System Evaluation (See Figure 4-5)
    - Reflects land use designations from the current West Jordan Land Use Plan at the time of the report, analyzing the existing pipe network along with possible future pipelines and anticipated loads.

4.11 Deficiency Analysis Results

The deficiencies identified in each of the scenario runs are presented in this section.

4.11.1 Existing Wet Weather Calibrated System

The existing system appears to be appropriately sized, with no significant deficiencies identified based on the Existing Wet Weather calibrated model. Most of the deficiencies shown in Figure 4-3 correspond to pipes that the City suspects have incorrect invert data or are recorded as reverse grade in the GIS, and require further investigation.

4.11.2 Existing Scenario with State Required LOS

The existing collection system was assessed using the state-recommended standard of 100 gpcd, which has been established as the current LOS) to ensure alignment with future loading expectations. Overall, the capacity of the existing piping system is generally sufficient under these conditions; however, certain areas require attention due to exceeding or nearing capacity limits. The modeled capacity for each pipeline is illustrated in Figure 4-4. The identified deficiencies are as follows:

1. Campus View Drive: The 8-inch and 10-inch diameter pipes on Campus View Drive are at capacity, primarily because of the high-density residential developments nearby.
2. 5600 W: The 12-inch diameter pipe along 5600 W and Ranches loop Road are at capacity, primarily because of the removal of the flow diversion at JCT-82 upstream.
3. Bingham Creek: The 10-inch diameter pipe just west of Bingham Creek between 8200 S and 8050 S are at capacity possibly due to some residential developments in the area.
4. Damascus Way: The 8-inch sewer main along Damascus Way between Midvalley Drive and 9000 S is under capacity due to the flows backing up because of the high flows along the 9000 S trunkline. Based on discussions with the City, regular cleaning and maintenance has been working out for this deficiency and no upgrade is anticipated at the time.
5. Edenbrook Way: The 8-inch sewer main along Edenbrook Way, approximately 700 feet south of 9000 S is at capacity because of the high flows along the 9000 S trunkline. Based on discussions with the City, regular cleaning and maintenance has been working out for this deficiency and no upgrade is anticipated at the time.

In addition, various isolated short segments of pipe throughout the system (indicated in red in Figure 4-4) may be experiencing capacity issues or require updates to their invert elevation or pipe size data. These localized areas necessitate further investigation through field monitoring to verify whether they indeed represent problem areas.

Figure 4-3 Existing Scenario WWF Deficiencies

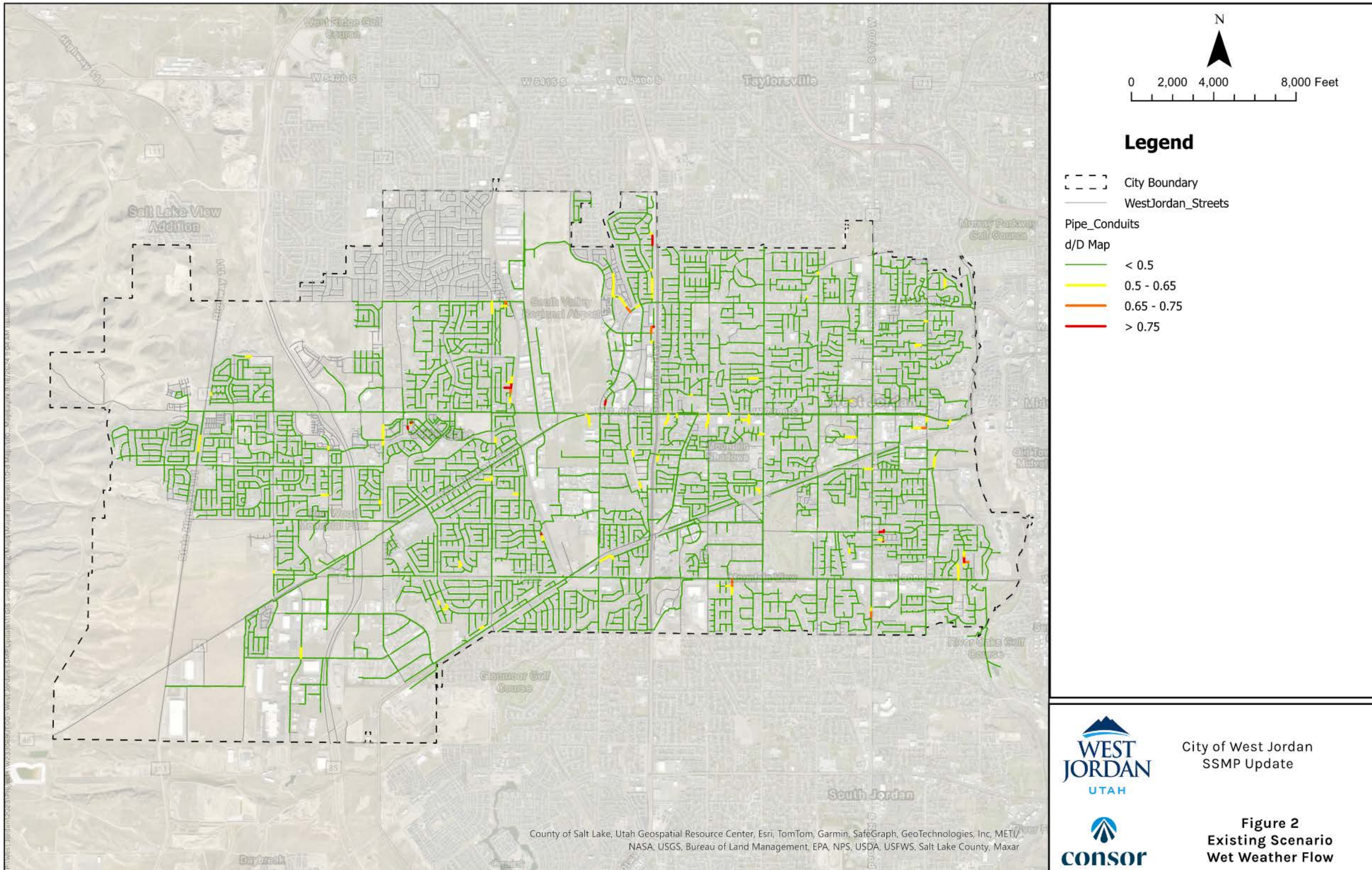
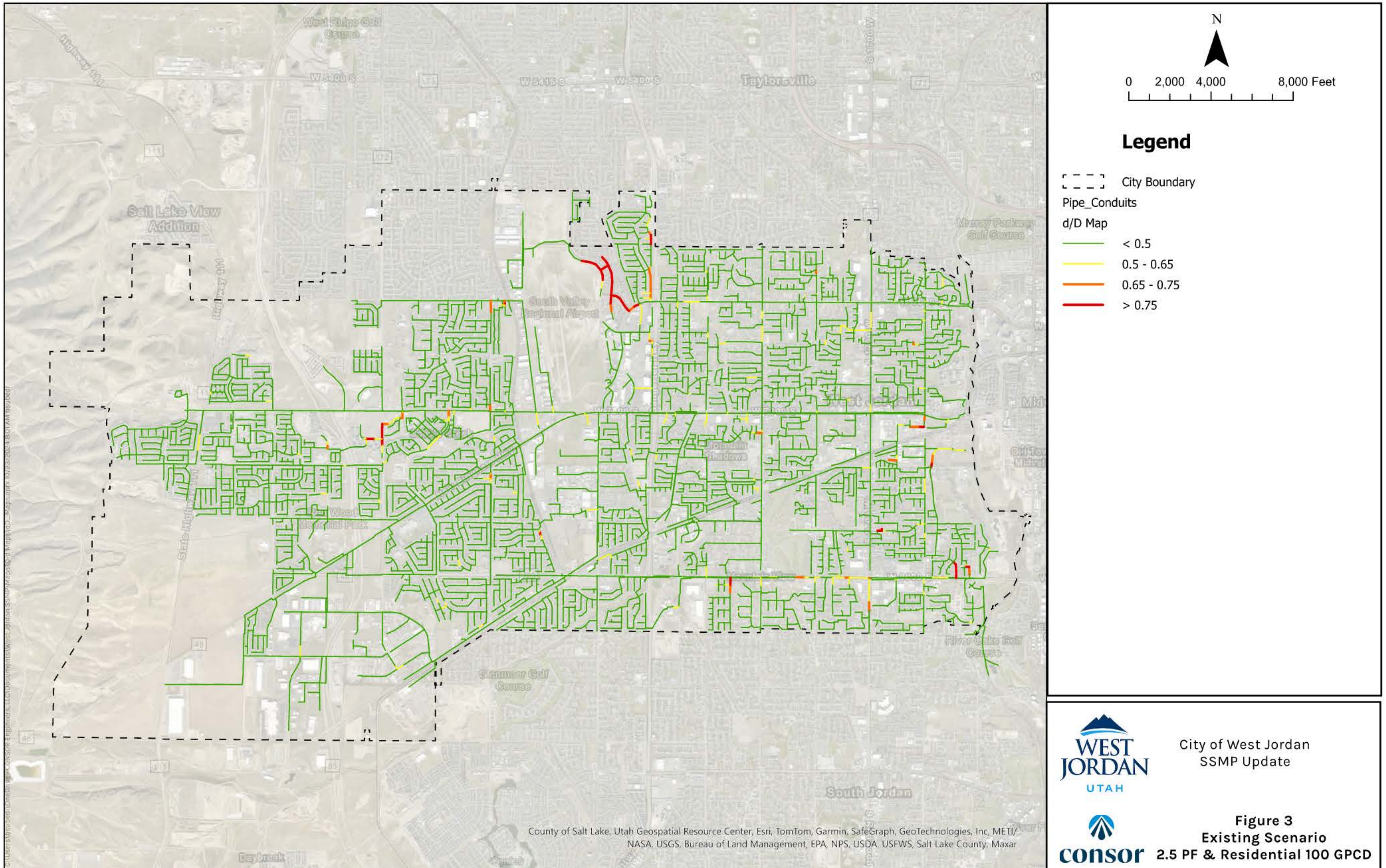


Figure 4-4 Existing Deficiencies at State Defined LOS



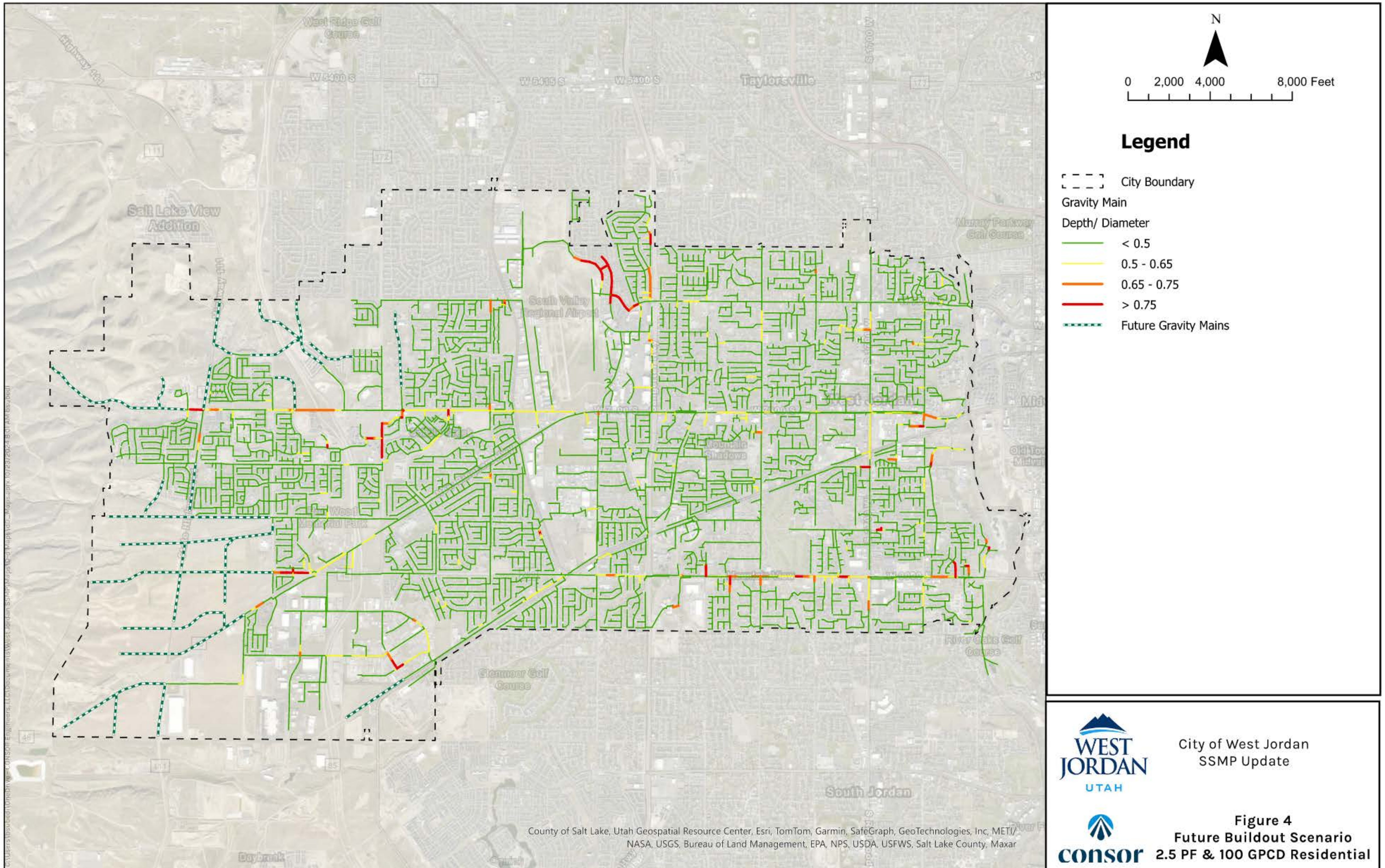
4.11.3 Buildout Conditions

The buildout flows from each developable parcels were calculated, and the InfoSWMM model was used to assign, and route the flows through the sewer network. New pipes were added to the western portion of the City, and other large developable areas based on the future streets configuration per the 2024 Transportation Master Plan. Proposed pipes were sized to accommodate the predicted flow. Additionally, the buildout scenario accounts for the Dannon Yogurt Plant operating at its full future peak effluent discharge rate of 1,699 gpm. The capacity analysis results are shown in Figure 4-5 and the observed deficiencies are as follows:

1. Campus View Drive: The 8-inch and 10-inch diameter pipes on Campus View Drive are at capacity, primarily because of the high-density residential developments nearby.
2. 5600 W & Ranches Loop Rd: The 12-inch diameter pipe along 5600 W and Ranches loop Road are at capacity, primarily because of the removal of the flow diversion at JCT-82 upstream.
3. Bingham Creek: The 10-inch diameter pipe just west of Bingham Creek between 8200 S and 8050 S are at capacity possibly due to some residential developments in the area.
4. Damascus Way: The 8-inch sewer main along Damascus Way between Midvalley Drive and 9000 S is under capacity due to the flows backing up because of the high flows along the 9000 S trunkline. Based on discussions with the City, regular cleaning and maintenance has been working out for this deficiency and no upgrade is anticipated at the time.
5. Edenbrook Way: The 8-inch sewer main along Edenbrook Way, approximately 700 feet south of 9000 S is at capacity because of the high flows along the 9000 S trunkline. Based on discussions with the City, regular cleaning and maintenance has been working out for this deficiency and no upgrade is anticipated at the time.
6. 7800 S (1): The 18-inch pipe, approximately 350 feet west of 1300 W will become deficient at buildout due to shallow slopes that limit the capacity of the existing pipeline.
7. 7800 S (2): The 36-inch pipe, from 7800 S & 1300W to Gardner Stop Wy needs to be replaced due to shallow slopes that limit the capacity of the existing pipeline.
8. Grizzly Way: The 12-inch pipeline on Grizzly Way, just upstream of 7800 S, is approaching capacity in the existing scenario. With increased future flow along 7800 S, the pipe segment will start backing up and will need to be upsized.
9. 3200 W: The 8-inch pipeline on 3200 W, between Caraway Bay and 9000 S, will be over capacity in the buildout condition. With increased future flow along 9000 S, the pipe segment will start backing up and will need to be upsized.
10. 9000 S (1): Few segments of 15-inch sewer trunkline along 9000 S, south of Mountain View Golf Course is already approaching capacity in the existing condition and will need to be upsized in the future. The developments in the Southwest quadrant will convey a large amount of flow into 9000 S which will require upsizing of these deficient pipes.
11. 9000 S (2): The 15-inch sewer main along 9000 S, from 2040 W to S Jordan Canal will be deficient once the Southwest quadrant is developed.
12. 5600 W and Wells Park Rd: Existing 8-inch sewer main, heading southeast of Wells Park Rd, along Hawley Park Road/5600 W, then east for approximately 350 feet along Axel Park Road needs to be upsized to have adequate capacity for future developments in the area.
13. 7800 S (3): The existing 12-inch pipeline between Sycamere Drive and Hwy 111, will be under capacity after the future developments will occur in the Northwest quadrant of the City.
14. 7800 S (4): The existing 15-inch pipeline between Fallwater Drive and Copper Rim Drive will be under capacity after the future developments will occur in the Northwest quadrant of the City. The pipes need to be upsized to provide the required LOS as growth occurs.

15. 9000 S (3): The existing 8-inch pipeline between 6400 W to Duck Ridge Way Rim Drive will be under capacity after the future developments will occur in the Southwest quadrant of the City.

Figure 4-5 Deficiencies at Future Buildout



CHAPTER 5

Capital Improvement Program

This section presents the Capital Improvement Program (CIP) for the City of West Jordan's collection system. It summarizes the recommended system improvement projects to address deficiencies identified in Chapter 4 and any other operations and maintenance type improvements that are capital in nature. The CIP includes design recommendations, estimated planning-level costs, and projected schedules, which can then be used by the City to forecast the capital expenditure that will be for the City to meet its water infrastructure needs for existing and future customers.

The recommended facility sizes, capacity and locations should be considered preliminary and schematic. A Preliminary Engineering Report (PER) should be completed for each improvement project to identify the final sizing and location. A PER looks at a specific project in more detail than the analysis conducted within this SSMP. This comprehensive approach ensures that each project is thoroughly planned and aligned with the City's long-term infrastructure goals. Appendix D includes an outline for creating a PER tailored to individual projects.

5.1 Project Cost Estimate Criteria

An estimated project cost for each identified improvement was developed in conjunction with this SSMP. Cost estimates represent opinions of cost only, acknowledging that final costs of individual projects will vary depending on actual labor and material costs, market conditions for construction, regulatory factors, final project scope, project schedule and other factors.

Each cost estimate contained herein represents a Class 5 budget estimate, as established by Association for the Advancement of Cost Engineering (AACE) International. This preliminary estimate class is used for conceptual screening. The expected accuracy range of Class 5 estimates is -30% to +50%. As the project is better defined, the accuracy level of the estimates can be increased.

The planning level cost estimate for the CIP projects were developed using unit costs outlined in Appendix B, which are derived from recent construction bids for similar projects across the Midwest. Several assumptions were made when calculating these costs, including:

- Construction was assumed to occur under "typical" conditions, with stable soil and an average pipe depth of 11 feet to the invert.
- The costs cover pipes, and pipe bedding.
- Manholes (every 400 feet) and other appurtenances
- Trench excavation is based on depths ranging from 11 to 20 feet, and includes backfilling
- Roadway asphalt repairs account for 4-inch thick patches on subdivision roads, 6-inch thick patches on collector roads, and 8-inch thick patches on arterials and UDOT roads.
- Asphalt repair is assumed to cover a width of 20 feet.
- Shoring requirements are factored in.
- Dewatering is factored in for all projects east of 3200 W.
- Contractor overhead and profit are also considered.

Land or right-of-way acquisitions have not been accounted for in any cost estimates.

5.2 Funding Sources

The City could use a number of possible funding sources available for installing new sewer lines and maintenance of existing sewer systems. The majority of sewer facility improvement projects are expected to be funded by the City through user rates. A smaller portion of funding will come from new developments via impact fees. It is important to note that impact fee funds are restricted to improvements necessitated by new developments or growth. These funds cannot be used for maintaining existing facilities, addressing current deficiencies, or enhancing the existing level of service. Consequently, not every proposed improvement project qualifies for impact fee funding. Additional funding sources may include infrastructure grants, general obligation bonds, revenue bonds, state/federal grants and loans including WIFIA loans. Certain projects could also be funded by developers and finance which can be reimbursable by impact fees. In certain cases, a combination of multiple funding sources may be employed to finance the projects effectively.

5.3 Prioritization

Identified CIP piping projects are prioritized according to the criteria described below, and the timing of anticipated development in the area.

- Existing system capacity issues
- Known continued maintenance issues
- City input on future planned development

Identified CIP projects are grouped into two implementation timeframes: 0 - 10 years and Buildout. The 0 - 10 year timeframe includes all the CIPs that are a result of existing deficiencies as well as the CIPs due to developments that the City expects to occur within the next ten year timeframe. The City has committed to updating their SSMP every 5-years allowing for adjustments to their capital plan to be made depending on future conditions. Ongoing repair and replacement programs are included in all timeframes.

5.4 Capacity Projects

The deficiencies were identified under three distinct scenarios. The first scenario, the existing wet weather calibrated model, reflects deficiencies based on actual system calibration, where flows were calculated from the calibrated model, representing real-world system limitations. The second scenario considers the State-Required LOS, highlighting sewer pipes that do not meet the required LOS standards, even if they are not currently experiencing operational issues. The third scenario, buildout deficiencies, includes all sewer pipes that will become deficient as the City moves toward full buildout, accounting for future growth and increased flow demands. The capacity projects are shown in Figure 5-1

5.4.1 Projects to Address Existing Deficiencies in the Wet Weather Calibrated Model (Non-Growth Related)

The existing system seems to be adequately sized under this scenario run. No projects are recommended based on the Existing Wet Weather calibrated model. Most of the deficiencies shown on Figure 4-3 are pipes that require further investigation and are placed under Section 5.4.3.1 (Requires Further Investigation).

5.4.2 Projects to Address Existing Deficiencies at State Required LOS (2.5 PF & 100 GPCD Residential)

These deficiencies are based on the state required level of service with all residential loads set at 100 gpcd with a peaking factor of 2.5 (USA R317-3).

Table 5-1 Existing Deficiencies at State Required LOS

CIP ID	Ex Dia (in)	Prop Dia (in)	Location	Length (ft)	Cost Estimate[1]	Project Timeline
P-1	8"-10"	12"-15"	North-south along Campus View Drive and Cobble Ridge Drive, extending northeast along Jordan Landing Boulevard	3,320	$ 4,433,677	0-10 YR
P-2	12"	15"	Along 5600 W, north of Window Ranch Way, then heading west along Ranches Loop Road and turning north along 5490 W, discharging into 7800 S	1,855	$ 2,654,376	0-10 YR
P-3	10"	12"	West of Bingham Creek between 8200 S and 8050 S	600	$ 775,750	0-10 YR

[2] Costs are shown in 2025 dollars. See Appendix B for detailed cost estimate and future costs with inflation

5.4.3 Projects to Address Growth Related Deficiencies[1]

These projects are based on the buildout model of their City and address growth related deficiencies in the existing collection system. These deficiencies are based on the state required level of service with all residential loads set at 100 gpcd with a peaking factor of 2.5 (USA R317-3). All future residential, commercial, and industrial loads are calculated based on the future densities shown in Table 3-4.

Table 5-2 Growth Related Deficiencies

CIP ID	Ex Dia (in)	Prop Dia (in)	Location	Length (ft)	Cost Estimate[2]	Project Timeline
P-1	8"-10"	12"-15"	North-south along Campus View Drive and Cobble Ridge Drive, extending northeast along Jordan Landing Boulevard	3,320	$ 4,433,677	0-10 YR
P-2	12"	15"	Along 5600 W, north of Window Ranch Way, then heading west along Ranches Loop Road and turning north along 5490 W, discharging into 7800 S	1,855	$ 2,654,376	0-10 YR
P-3	10"	12"	West of Bingham Creek between 8200 S and 8050 S	600	$ 775,750	0-10 YR
P-4	18"	24"	Along 7800 S, approximately 350 feet west of 1300 W	410	$ 3,154,257	10-20 YR
	36"	36"	Along 7800 S, from approximately 120 feet west of 1300 W to	1,010		10-20 YR

CIP ID	Ex Dia (in)	Prop Dia (in)	Location	Length (ft)	Cost Estimate[2]	Project Timeline
			approximately 280 feet east of Gardner Stop Wy			
P-5	12”	15”	Along Grizzly Way, just south of 7800 S intersection	275	$ 435,030	10-20 YR
P-6	8”	10”	Along 3200 W, between Caraway Bay and 9000 S	545	$ 682,436	10-20 YR
P-7	15”	18”	Along 9000 S, south of Mountain View Golf Course, between Okubo Drive and 1870 W	1,140	$ 2,076,037	10-20 YR
P-8	8”	10”	South of Wells Park Drive, heading southeast along Hawley Park Road, then east for approximately 350 feet along Axel Park Road	1,250	$ 1,420,215	10-20 YR
P-9	8”	10”-15”	Along 9000 S, from 6400 W to Duck Ridge Way	1,885	$ 2,465,332	10-20 YR
P-10	12”	15”	Along 7800 S, from Sycamere Drive to Highway 111	660	$ 900,087	10-20 YR
P-11	15”	18”	Along 7800 S, from Fallwater Drive to Copper Rim Drive	2,300	$ 4,276,412	10-20 YR

[1] All existing deficiencies are expected to be exacerbated at future buildout flows
[2] Costs are shown in 2025 dollars. See Appendix B for detailed cost estimate and future costs with inflation

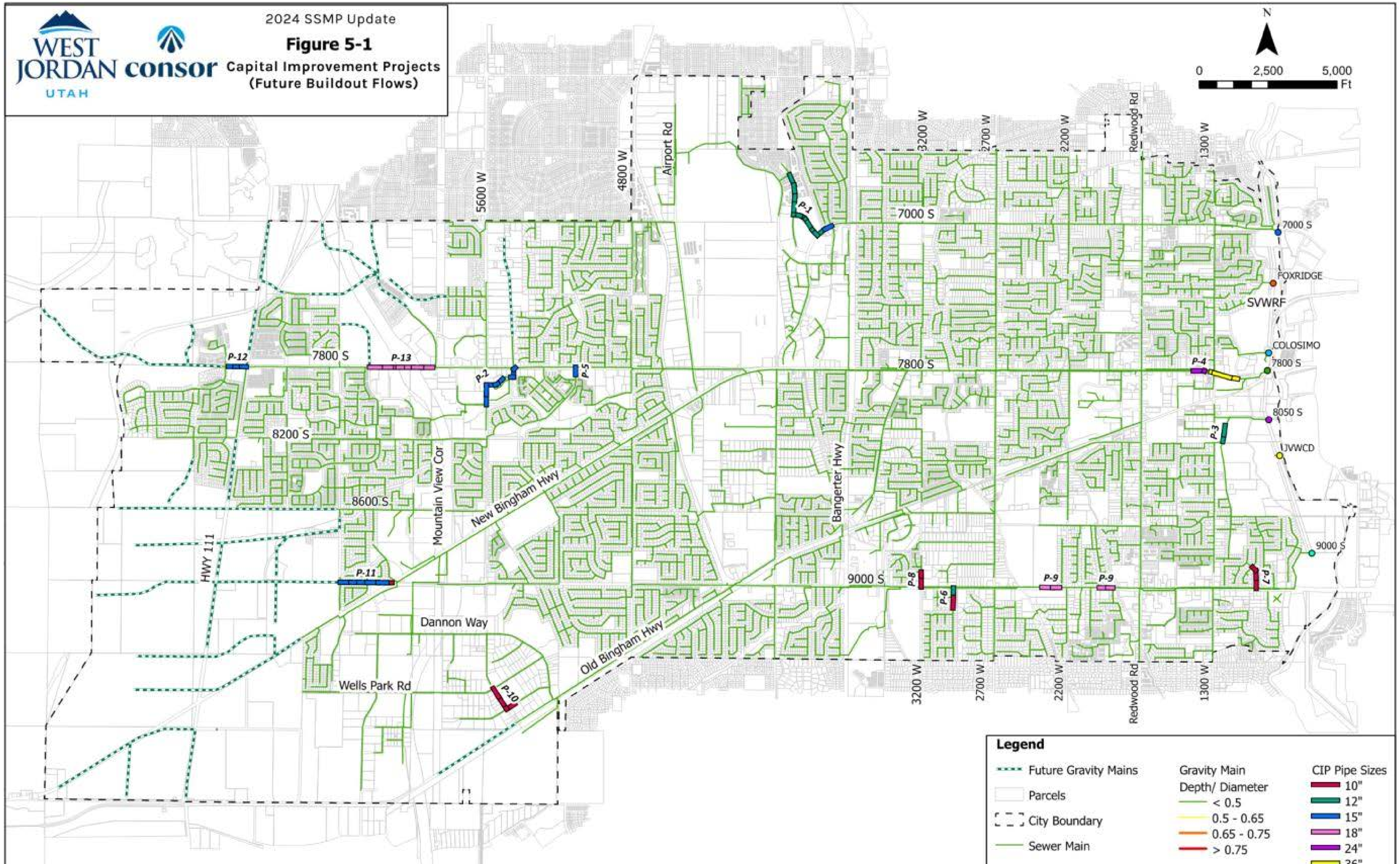
5.4.3.1 Other Possible Deficiencies – Requires Further Investigation

Some system deficiencies identified in the model are likelydue to the available elevation data being incorrect and GIS data having reversed pipe slopes. These are currently not added to the CIP list and should be further investigated and watched in the coming years.

Table 5-3 List of Possible Deficiencies Requiring Further Investigation

CIP ID	Ex Dia (in)	Location	Length (ft)
S-1	8”-10”	Along Kentucky Drive from Oskaloosa Drive to Carolina Drive	600
S-2	8”	Along 7900 S from 1410 W to 1300 W	683
S-3	8”	Along 1095 W from 8780 S to 8870 S	775
S-4	10”	Along 8660 S from Gansen Ln to Eggli Farms Cir	900
S-5	8”	Copper Pot Ln	420
S-6	8”	Along Greensand Drive just south of 7000 S	200

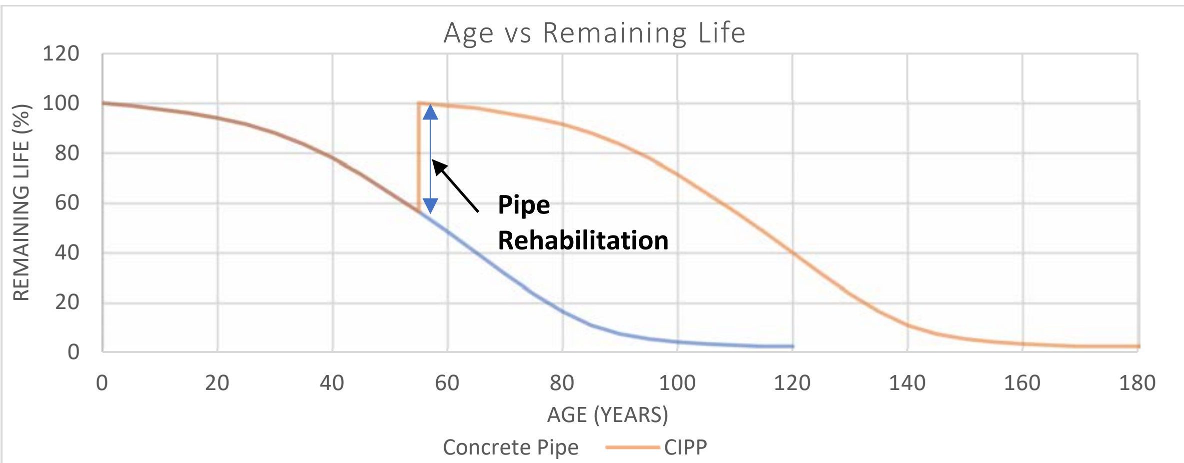
Figure 5-1 CIP Projects



5.4.4 Condition Assessment Program & Capital Maintenance Program (CMP)

The City of West Jordan's sanitary sewer system is facing significant challenges due to aging infrastructure. Over 22% of the city's sewer lines, totaling nearly 71 miles, are more than 50 years old (refer to Table 2-2). Sewer pipes typically reach 50% of their functional capacity once they surpass the 50-year mark, as shown in Figure 5-2. The rate of deterioration can be accelerated by various factors such as construction quality, operational practices, maintenance schedules, and environmental conditions. This makes the aging infrastructure a critical concern for the City's long-term asset management.

Figure 5-2 Typical Pipe Deterioration Curve



If the City were to replace all these aging sewer lines, at an estimated cost of $800 per linear foot, the total replacement cost would approach $300 million over the next decade (not including inflation). This amount does not account for the fact that more sewer lines will continue to reach the 50-year threshold each year, further increasing the future replacement costs. Given the financial constraints, the City should prioritize rehabilitation efforts, focusing on methods like CIPP lining, also known as slip-lining, wherever possible. CIPP is primarily used to rehabilitate and extend the life of existing pipes by creating a seamless, watertight liner within the existing pipe. This method strengthens the structural integrity of the pipe, reduces infiltration and exfiltration, and mitigates leaks or cracks. This approach would reduce the cost to about $150 per linear foot, bringing the total rehabilitation cost to approximately $30 million over the next 10 years.

A key priority for the City should be a comprehensive condition assessment of its concrete and clay sewer trunk lines and pipes where infiltration is the highest. The main objective of this program would be to conduct CCTV inspections to assess and rate the structural and operational condition of the sewer infrastructure, following NASSCO standards. These assessments would enable the City to better understand the risks associated with its aging sewer system by quantifying both the likelihood and consequences of potential failures. By proactively identifying weaknesses, the City can prioritize maintenance and rehabilitation efforts, enhancing long-term resilience and managing costs effectively. Data gathered from these assessments will also be critical in refining and updating the CIP for the sewer system, ensuring that spending is optimized, and long-term wastewater management planning is improved.

It is important to note that while CIPP is an efficient and cost-effective tool to rehabilitate and extend the life of existing pipes, it does not increase the hydraulic capacity of pipes. It therefore cannot be paid for with impact fees. If sewer capacity concerns exist, such as the need to accommodate increased flow due to population growth or changes in land use, additional measures(e.g., upsizing the sewer lines or constructing parallel pipelines) are necessary to address those issues.

The CMP focuses on maintaining and improving the reliability and performance of the sewer system, rather than expanding its capacity. While CMP projects are primarily classified as maintenance, which may disqualify them from impact fee funding, exceptions can be made under certain circumstances often as a percentage of the project. These projects can also be spread over multiple years, allowing for a more manageable annualized budget that supports long-term financial planning and sustainability. The following steps are recommended for CMP projects:

- Step 1: Conduct a detailed condition assessment of concrete and clay sewer pipelines with a diameter of 8 inches or larger.
- Step 2: Rehabilitate or replace pipelines that are unsuitable for trenchless lining methods, such as those that are severely deformed, heavily corroded, or have significant root intrusion, large offsets, severe bellies, or leaks. Small, shallow bellies (less than 10 feet long and 1 inch deep) may not require immediate replacement if they are not causing recurring issues.
- Step 3: Implement CIPP lining for pipelines identified for rehabilitation based on the condition assessment.
- Step 4: Include manhole rehabilitation as part of the program, particularly for manholes connected to pipes with a diameter larger than 10 inches. Based on Consor's extensive experience with pipe and manhole lining in the Salt Lake Valley, manholes connected to pipes smaller than 8 inches are typically found to be in good condition and may not require immediate rehabilitation. However, conducting a thorough manhole condition assessment is recommended to better understand the current state of these structures. This will provide critical data for determining which manholes require rehabilitation, ensuring a targeted and efficient approach to infrastructure maintenance.

As discussed in Chapter 2, about 35-40% of the City's sewer pipelines are made of clay or concrete, with more than 22% installed before 1975. City officials and the sewer maintenance team have reported significant corrosion in many of these older pipelines. Timely intervention using trenchless technologies like slip-lining or CIPP is necessary to extend their service life. Table 5-4 provides the estimated costs of CIPP lining all 10-inch and larger concrete and clay pipes installed before 1975.

Table 5-4 CIPP Costs to Rehabilitate all Clay and Concrete Pipe (Pre 1975)

Diameter (in)	Unit Cost ($/LF)	Length (ft)	Pipe Lining Cost	Cost per year
8	80	310,160	$ 24,812,786	$ 2,481,279
10	90	19,672	$ 1,770,492	$ 177,049
12	95	9,238	$ 877,599	$ 87,760
15	120	714	$ 85,700	$ 8,570
18	160	468	$ 74,946	$ 7,495
36[1]	400	19,077	$ 6,486,119	$ 648,612
Total		**340,252**	**$ 34,107,642**	**$ 3,410,764**

[1]*7800 S trunkline from 4100 W to 1000 W. Critical Infrastructure- Needs to be assessed first.*

Although lining pipes based on age is a common practice, without a detailed condition assessment, it is difficult to prioritize the lining needs. To better prioritize and get a reasonable estimate of the cost of lining all concrete and clay pipes in the City using CIPP technology, a condition assessment conducted by Consor in 2020 for a neighboring sewer district, Jordan Basin Improvement District, was used as a reference. Given the similarities between JBID and the City of West Jordan, such as the age of their sewer systems, environmental conditions, and user base, it is reasonable to apply the same findings to City's sewer infrastructure.

In JBID's assessment, out of 121,250 linear feet (LF) of concrete and clay pipes evaluated, nearly 46,000 LF (38% of total pipes) were found to require rehabilitation within 0-10 years. Applying this same rate to West Jordan's sewer system, an estimated 224,151 linear feet of concrete and clay pipes will likely require CIPP lining over the next decade (see Table 5-5).

This cost estimate does not include manhole rehabilitation. Once pipes are slip-lined, hydrogen sulfide gas tends to concentrate in manholes, which could accelerate deterioration. Therefore, lining manholes may also be a prudent step to include in future rehabilitation planning. It is recommended that the City also conduct a manhole condition assessment.

Table 5-5 Cost to Rehabilitate Concrete and Clay pipes based on Condition Assessment (Approximate)

Diameter (in)	Unit Cost ($/LF)	Total Length (ft)	38% of Total Length (ft)	Lining Cost	Cost per year
8	80	440,182	167,269	$ 13,381,542	$ 1,338,154
10	90	45,496	17,288	$ 1,555,951	$ 155,595
12	95	29,369	11,160	$ 1,060,228	$ 106,023
15	120	29,113	11,063	$ 1,327,546	$ 132,755
18	160	2,631	1,000	$ 159,967	$ 15,997
21	250	18,189	6,912	$ 1,727,997	$ 172,800
24	300	9,254	3,517	$ 1,054,963	$ 105,496
30	325	2,304	876	$ 284,592	$ 28,459
36	400	13,331	5,066	$ 1,722,346	$ 172,235
Total		589,870	224,151	$ 22,275,132	$ 2,227,513

Additionally, there are approximately 103,643 linear feet of pipelines with unknown material. It is assumed that roughly 50% of these are clay or concrete and will require lining (see Table 5-6).

Table 5-6 CIPP Costs to Rehabilitate Unknown Pipe Material (Assuming 50% Needs Lining)

Diameter (in)	Unit Cost ($/LF)	Total Length (ft)	50% of Total Length (ft)	Lining Cost	Cost per year
8	80	41,935	20,967	$ 1,677,386	$ 167,739
10	90	12,461	6,230	$ 560,737	$ 56,074
12	95	19,146	9,573	$ 909,456	$ 90,946
15	120	16,974	8,487	$ 1,018,428	$ 101,843
18	160	2,490	1,245	$ 199,215	$ 19,921
21	250	3,110	1,555	$ 388,811	$ 38,881
24	300	1,357	679	$ 203,558	$ 20,356
30	325	423	212	$ 68,758	$ 6,876
36	340	5,746	2,873	$ 976,815	$ 97,682
Total		103,643	51,821	$ 6,003,164	$ 600,316

Table 5-4, Table 5-5, and Table 5-6 should be used for budgeting purposes for pipe rehabilitation of old and aging pipes. Based on these tables, the City's initial priority should be to rehabilitate all deteriorating pipes older than 50 years in age. This should cost the City approximately $3.4 million (refer to Table 5-4). Apart from this, it is also recommended that the City prioritize a detailed condition assessment of their sewer infrastructures and budget approximately $2.2 million each year to CIPP line all their concrete and clay infrastructure within the next 10 years.

In particular, the 36-inch trunkline along 7800 S is a critical infrastructure asset serving a large portion of the City and should be prioritized for assessment and rehabilitation. Additionally, the City plans to line the North Sewer Interceptor pipe to the SVWRF, another vital component of the sewer system. This project is further detailed in Section 5.4.5.1.

Pipes that have root intrusion should be treated every 3 years to prevent clogging. Treatment options include mechanical root removal by hydro-jetting or root-cutting or chemical root treatment.

5.4.5 SVWRF Capital Facility Plan

The City discharges its wastewater into the SVWRF through four major trunklines: 7000 S, 7800 S, 8050 S, and 9000 S, and three smaller sewer mains. SVWRF is a water reclamation facility with a treatment capacity of 50 mgd and is located in West Jordan, Utah. The facility is managed by the South Valley Water Reclamation Board, which is composed of several entities, each holding a share of the facility's capacity to treat wastewater from their respective collection systems (referred to as "owner entities"). These entities include:

- City of West Jordan.
- Midvale City.
- Sandy Suburban Improvement District.
- Midvalley Improvement District.
- South Valley Sewer District.

The City of West Jordan is one of the largest contributors to SVWRF, with an ownership of approximately 18.22 mgd of annual average daily flow (AADF), accounting for roughly 36.44% of the total plant capacity.

The City's projected average buildout flows are estimated at 16.76 mgd (see Table 5), indicating that the its ownership capacity of 18.22 mgd should be sufficient to accommodate average daily flows through buildout. However, additional studies will be necessary to assess the facility's capacity to manage peak flow conditions effectively.

Recently, Carollo completed a Capital Facilities Plan (CFP) to guide the identification, selection, prioritization, and implementation of critical improvements at the SVWRF over the next 20 years, with a primary focus on the next 5 years. This CFP is specifically focused on the water reclamation facility (WRF) and the sewer interceptors entering the facility, excluding the collection system pipelines, which are owned and operated by the individual entities.

Carollo conducted a condition assessment, identified deficiencies, and developed an implementation plan based on calculated risk scores for required improvements at the plant. The recommended implementation plan, including the associated projects and costs, is presented in Table 5-7.

Table 5-7 Recommended Implementation Plan [1]

Project	Prioritization	Construction Year	Class V Project Cost Estimate (2022 Dollars)	Class V Project Cost Estimate (@ Midpoint of Construction)
MCC Replacement	1	2024	$3,800,000	$4,800,000
VFD Replacement	2	2024	$900,000	$1,200,000
Main Switchgear Protective Relays Replacement	3	2024	$420,000	$500,000
Bio 5 Anoxic Zone Mixing Improvements	4	2025	$330,000	$400,000
Bio 5 Process Control Improvements	4	2025	$2,500,000	$3,400,000
UV Replacement	5	2026	$5,000,000	$7,000,000
Effluent Channel	5	2026	$850,000	$1,200,000
Entrance Bridge Replacement / Access Improvements	6	2027	$1,300,000	$1,900,000
48-inch Interceptor CIPP	7	2027	$4,200,000	$6,200,000
Bio 2-5 Diffuser and Piping Replacement	8	2029	$8,700,000	$14,000,000
Standby Power Improvements	9	2031	$13,800,000	$24,000,000
Grit Chamber Rehab	11	2032	$2,900,000	$5,200,000
Influent Flow Meter	12	2032	$1,400,000	$2,500,000
Step Screen Replacement	13	2033	$3,800,000	$7,100,000
Tertiary Filters (Regulation Driven)	14	2035	$19,600,000	$38,700,000
Bio 1 A20 Upgrades & Aeration Piping Replacement	15	2037	$7,300,000	$15,200,000

[1] *This table corresponds to the 2023 South Valley Water Reclamation Facility Capital Facilities Plan Table 5.4*

Table 5-8 presents annual funding requirements from each owner-entity based on capacity rights totaling approximately $4.97 million per year (2024 to 2038). Note that costs are shown in 2022 dollars. Future value cost for any given year should be adjusted by actual annual escalation.

Table 5-8 Annual Funding Requirements from Owner Entities (in 2022 Dollars)

Entity	Capacity Rights	2023	2024-2038
City of West Jordan	36.44 %	$1,348,280	$ 1,811,757
South Valley Sewer District	38.72 %	$ 1,432,640	$ 1,925,116
Sandy Suburban Improvement District	11.00 %	$ 407,000	$ 546, 908
Midvalley Improvement District	7.68 %	$ 227,920	$ 306,269
Midvale City	6.16 %	$284,160	$ 381,841
Total	100 %	$3,700,000	$ 4,971,892

[1] *This table corresponds to the 2023 South Valley Water Reclamation Facility Capital Facilities Plan Table 5.4*

The City is expected to contribute approximately $1.8 million plus inflation annually toward improvements at the SVWRF from 2024 through 2038. This allocation reflects the City's share of the costs as part of the facility's long-term capital improvement plan.

5.4.5.1 CIPP Lining of North Interceptor Pipe to SVWRF

The (SVWRF is also planning for the rehabilitation of an aging 48-inch sewer interceptor pipe that transports flows from the northern section of the Salt Lake Valley to the SVWRF wastewater treatment plant. This interceptor, approximately 2,500 linear feet in length, runs along the Jordan River. The total cost of lining the pipe is estimated at $4.2 million, accounting for future inflation. The City would be responsible for approximately 36.44% of the total cost, amounting to roughly $1.53 million.

5.4.5.2 Wastewater Byproducts Disposal

Apart from these CFP projects, the City also anticipates significant changes to its wastewater byproducts disposal program. Currently, the City partners with Trans-Jordan Landfill for waste disposal, but this arrangement may change in the coming years. The City expects potential large-scale modifications to its existing disposal methods and/or the acquisition of new landfill areas. These changes are projected to require an additional budget of approximately $150 million to $200 million, subject to regulatory actions and requirements.

5.4.6 Future Sewer Lines

As the City moves toward full buildout, additional sewer mains will need to be constructed to convey flows into the existing main trunklines. The preliminary locations of these future mains are based on the 2024 City Transportation Master Plan, with their alignments generally following the roadways outlined in the plan. The sizing of these mains has been determined based on projected flow estimates as discussed in Chapter 3. However, it is important to note that both the location and sizing of these sewer lines are preliminary, and further detailed studies will be required to finalize their design and alignment. See Appendix D for figure and cost estimates.

Table 5-9 Future Sewer Main Projects

CIP ID	Ex Dia (in)	Discharging Trunkline	Length (ft)	Preliminary Cost Estimate[1]
F-1	10”	7800 S	10,080	$ 10,861,950
F-2	10”-12”	7800 S	12,620	$ 13,854,870
F-3	8”-12”	7800 S	12,940	$ 14,136,291
F-4	10”-12”	7800 S	10,800	$ 12,511,747
F-5	10”	7800 S	8,000	$ 9,411,285
F-6	10”	7800 S	4,220	$ 4,563,119
F-7	10”	7800 S	11,150	$ 11,959,177
F-8	10”-15”	7800 S	12,610	$ 14,079,379
F-9	10”	7800 S	2,475	$ 2,687,484
F-10	10”	7800 S	2,370	$ 2,551,456
F-11	10”	7800 S	3,650	$ 3,942,489
F-12	10”	9000 S	3,390	$ 3,653,818

[1] Costs are shown in 2025 dollars. See Appendix B for preliminary cost estimate for each project and future costs with inflation

5.4.7 Operations Improvement Projects

1. Flow Meter Station Rehabilitation: The City operates seven aging permanent flow meters that continuously monitor sewer discharge into the SVWRF sewer interceptor. While a comprehensive assessment of these flow meter stations has not yet been conducted, the City anticipates the need for repair and rehabilitation in the near future. Due to the uncertainty regarding the extent of rehabilitation needed, associated costs have not been included in this Master Plan.

2. Easement Elimination Projects: These proposed easement elimination projects identified by the City staff prioritize the relocation of existing sewer lines to eliminate sewer alignment and easements through backyards. The new layout will place all sewer infrastructure within public roadways, ensuring improved access for future maintenance and reducing disruptions to private properties. This approach enhances long-term operational efficiency by consolidating access points within public rights-of-way, minimizing the potential for damage to residential landscaping or structures during repairs. Furthermore, placing the sewer lines in the road aligns with best practices for utility management, improving safety and accessibility for maintenance crews while fostering a more predictable and streamlined system for future infrastructure upgrades. The easement elimination projects are shown in Figure 5-3.

Table 5-10 Easement Elimination Projects

Phase	Prop Dia (in)	Description	Length (ft)	Cost Estimate[1]
1	10”-12”	Bluegrass Easement Elimination: This project involves upsizing the existing sewer along 8250 S to accommodate increased flows from the proposed west connections. The sewer line will be rerouted from existing easements into the center of the roadway for improved access and maintenance. Lateral reconnections will be required.	1,045	$ 1,634,331

Phase	Prop Dia (in)	Description	Length (ft)	Cost Estimate[1]
2	8”	Mountain View Park Easement Elimination: The project includes installing a new sewer line along Spaulding Ln to reroute flows from Dunlop Dr into Spaulding Ln and ultimately into 2700 W. Lateral reconnections for affected properties will be necessary.	600	$ 842,087
3	8”	Skyview Easement Elimination: This phase includes the installation of new sewer lines to reroute flows to the east from Skyvue Circle, crossing the Utah Salt Lake Canal, and connecting to the existing manhole at 2900 W. Easement acquisitions will be required for this phase.	527	$ 1,356,112
4	8”-10”	Meadow Green Farms Easement Elimination: This project includes installing new sewer lines to connect to the existing sewer system along Meadow Green Way, enabling the abandonment and removal of sewer lines running through backyards. Additionally, it includes constructing a new sewer line across the Utah Salt Lake Canal and along Canal Road to integrate with the Phase 3 sewer system.	834	$ 1, 777, 247

[1] *Costs are shown in 2025 dollars. See Appendix C for detailed cost estimate and future costs with inflation*

Figure 5-3 Easement Elimination Project