SOUTH SALT LAKE
CITY ON THE MOVE

CITY COUNCIL

MEMBERS:
LEANNE HUFF
COREY THOMAS
SHARLA BYNUM
NICK MITCHELL
PAUL SANCHEZ
RAY DEWOLFE
CLARISSA WILLIAMS

ARIEL ANDRUS
CITY RECORDER
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South Salt Lake City Council
REGULAR MEETING AGENDA

Public notice is hereby given that the South Salt Lake City Council will hold a Regular Meeting on **Wednesday, January 14, 2026,** in the City Council Chambers, 220 East Morris Avenue, Suite 200, commencing at **7:00 p.m.,** or as soon thereafter as possible.

To watch the meeting live click the link below to join:
https://zoom.us/j/93438486912

Watch recorded City Council meetings at: youtube.com/@SouthSaltLakeCity

Conducting	LeAnne Huff, District 1
Council Chair	Sharla Bynum
Sergeant at Arms	South Salt Lake PD

Opening Ceremonies

1. Welcome/Introductions — LeAnne Huff
2. Pledge of Allegiance — Corey Thomas
3. Special Recognition — Chief Croyle
    a. Newly Promoted Sergeants Aprato & Calvario

Approval of Minutes

December 10th, Regular Meeting

No Action Comments

1. Scheduling — City Recorder
2. Public Comments/Questions
    a. Response to Comments/Questions
    (at the discretion of the conducting Council Member)
3. Mayor Comments
4. City Attorney Comments
5. City Council Comments
6. Information
    a. Police Department Accreditation Process — Chief Croyle
    b. 2025 Stormwater Utility Report — Corby Talbot

Action Items
Unfinished Business

1. A Resolution of the South Salt Lake City Council Adopting an Updated South Salt Lake Wastewater Collection System Master Plan — Craig Giles
2. An Ordinance of the South Salt Lake City Council Amending Chapter 12.30 and Chapter 13.74 of the South Salt Lake City Municipal Code Updating Definitions and Making Technical Changes — Jenny Diersen

New Business

1. Council Rule Discussion: Attendance — City Council

See page two for continuation of Agenda

Public Hearing – 7:30 (Or As Soon Thereafter as Possible)

To receive public input regarding proposed improvements to State Street as a part of the "Life on State" project. South Salt Lake is proposing the following traffic control measures to increase safety and reduce accidents including closing the left turn lane from Haven Avenue northbound onto State Street by installing a new center median on State Street at the Haven Avenue intersection and installing corner bulb outs to shorten pedestrian crossings and slow vehicle speeds turning onto local streets.

1. Sharen Hauri, for the City, to present information and answer questions
2. Open Public Hearing
3. Receive Public input
4. Close Public Hearing
5. Discussion by the City Council

Motion for Closed Meeting

Adjourn

Posted January 9, 2026

Those needing auxiliary communicative aids or other services for this meeting should contact Ariel Andrus at 801-483-6019, giving at least 24 hours' notice.

In accordance with State Statute and Council Policy, one or more Council Members may be connected electronically.

Public Comments/Question Policy

Time is made available for anyone in the audience to address the Council and/or Mayor concerning matters pertaining to City business. When a member of the audience addresses the Council and/or Mayor, they will come to the podium and state their name and City they reside in. The Public will be asked to limit their remarks/questions to three (3) minutes each. The conducting Council Member shall have discretion as to who will respond to a comment/question. In all cases the criteria for response will be that comments/questions must be pertinent to City business, that there are no argumentative questions and no personal attacks. Some comments/questions may have to wait for a response until the next regular council meeting. The conducting Council Member will inform a citizen when they have used the allotted time. Grievances by City employees must be processed in accordance with adopted personnel rules.

Have a question or concern? Call the connect line 801-464-6757 or email connect@sslc.gov

CITY OF SOUTH SALT LAKE
CITY COUNCIL MEETING

COUNCIL MEETING	Wednesday January 14, 2026 7:04 p.m.
CITY OFFICES	220 East Morris Avenue South Salt Lake, Utah 84115
PRESIDING:	Council Chair Sharla Bynum
CONDUCTING:	LeAnne Huff
PLEDGE OF ALLEGIANCE:	Corey Thomas
SERGEANT AT ARMS:	Spencer Redden, Carson Aprato

COUNCIL MEMBERS PRESENT:
LeAnne Huff, Corey Thomas, Sharla Bynum,
Nick Mitchell, Clarissa Williams, and Ray deWolfe

COUNCIL MEMBERS ABSENT:
Paul Sanchez

STAFF PRESENT:
Mayor Wood
Josh Collins, City Attorney
Danielle Croyle, Police Chief
Terry Addison, Fire Chief
Jared Christensen, Deputy Fire Chief
Craig Giles, Public Works Director
Sharen Hauri, Neighborhoods Director
Charee Peck, Human Resources Director
Corby Talbot, Capital Improvements Plan Manager
Micah Semon, Stormwater Division Supervisor
Jenny Diersen, Senior Program Manager
Jonathan Weidenhamer, Community & Economic Development Director
Crystal Makin, Finance Director
Yasmin Abbyad, Emergency Management Coordinator
Tyler Cluff, Police Lieutenant
Spencer Cawley, Senior Planner
Larissa Goodrich, Senior Administrative Assistant
Jacob Hansen, Wastewater Supervisor
Lee Garbett, Neighborhoods Deputy Director
Ariel Andrus, City Recorder
Sara Ramirez, Deputy City Recorder

OTHERS PRESENT:
See list

SPECIAL RECOGNITION

Police Chief Croyle presented newly promoted Sergeant Aprato and Sergeant Calvario to the Council Members and noted their dedication and hard work.

APPROVAL OF MINUTES

December 10th, Regular Meeting

Council Member Thomas made a motion to approve the minutes listed above.

MOTION: Corey Thomas
SECOND: Clarissa Williams

Voice Vote:

Bynum:	Yes
Huff:	Yes
Mitchell:	Yes
deWolfe:	Yes
Thomas:	Yes
Williams:	Yes
Sanchez:	Absent

NO ACTION COMMENTS

1. **SCHEDULING.** The City Recorder informed those at the meeting of upcoming events, meetings, activities, etc. **Next Council Meeting—January 28th @ 7pm.**

   City offices will be closed on Monday, January 19th in observance of Martin Luther King Jr. Day.

   The Co-Op, located inside the South Salt Lake Community Center has several free programs:

   January 15th – Opioid Public Health Crisis Workshop.

   January 31st – Homebuyer Education class.

   February 9th – Computer Fundamentals digital literacy course.

   More information can be found at sslc.gov

2. **PUBLIC COMMENTS/QUESTIONS.**
   None

3. **MAYOR COMMENTS.**
   Mayor Wood shared a statement addressing the concerns of residents over feeling unsafe due to recent nationwide and political events. The City remains committed to kindness and being welcoming to all who call it home. She also emphasized that the City's police department is there to prevent crime, protect residents, and do not function to inquire about the legal status of anyone. Residents are encouraged to reach out with questions or concerns.

4. **CITY ATTORNEY COMMENTS.**
None

5. **CITY COUNCIL COMMENTS.**
Council Member deWolfe thanked Mayor Wood for her statement and the importance of the City showing that it's living by its values.

Council Member Williams emphasized that everyone belongs in the community and that diversity is important.

Council Member Thomas thanked Mayor Wood for her statement and congratulated the new police sergeants.

Council Member Bynum thanked Mayor Wood for her statement and said that creating kindness was important.

Council Member Huff thanked Mayor Wood for her statement and congratulated the new police sergeants.

6. **INFORMATION.**
   a. **Police Department Accreditation Process**
   Chief Croyle, along with Utah Chiefs of Police Association Executive Director, Val Shupe, presented the police department's recent accomplishment of becoming accredited. There are 35 city police departments in Utah that are accredited. The process entails city ordinances, state law, federal law, and a requirement to meet 177 standards. Supporting evidence must show how each police department meets each criterion. Chief Croyle added that this accomplishment will include an annual report and a re-accreditation every five years. She also thanked the senior staff who worked alongside her to help the department incorporate the policies and accomplish this goal.

   b. **2025 Stormwater Utility Report**
   Stormwater Division Supervisor, Micah Semon, gave a report of the division's annual review. The division went from being a Co-Permittee on the Jordan Valley MS4 permit to operating under its own Phase II permit. They also went through regulation and legislative changes brought by H.B. 507 and S.B. 220. Approximately 50 cubic yards of debris were removed from the City's storm sewer system. Additionally, the division completed the process of adding all of the 5,954 utility accounts and has been successful in collecting a majority of the previous debt from 99 accounts sent to the Salt Lake County tax collections in 2024.

Action Items

Unfinished Business

1. **A Resolution of the South Salt Lake City Council Adopting an Updated South Salt Lake Wastewater Collection System Master Plan.**
   Public Works Director, Craig Giles, along with Wastewater Supervisor, Jacob Hansen, reviewed the item that was first presented to the Council last fall. The master plan covers the existing water infrastructure, the infiltration study that was done in 2021, as well as the necessary projects going forward.

   A copy of the Resolution is attached and incorporated by this reference.

   Council Member Bynum made a motion to approve the Resolution.

MOTION: Sharla Bynum
SECOND: Clarissa Williams

Roll Call Vote:

Bynum:	Yes
Huff:	Yes
Mitchell:	Yes
deWolfe:	Yes
Thomas:	Yes
Williams:	Yes
Sanchez:	Absent

2. **An Ordinance of the South Salt Lake City Council Amending Chapter 12.30 and Chapter 13.74 of the South Salt Lake City Municipal Code Updating Definitions and Making Technical Changes.**
   Senior Program Manager, Jenny Diersen, reviewed the proposed Ordinance that was discussed in the preceding Work Meeting. This would the exemption of non-profits in the City's newly adopted transportation utility fee that would begin in February.

   Council Member deWolfe asked how excluding non-profits impacts the City's revenues and the projects that it needs to do.

   Ms. Diersen said that this year's projections, with the non-profits exemptions, show around 2.6 million dollars. If they were to come significantly lower than that, then the City would need to review possible adjustments.

   Council Member Williams asked how many non-profits exist in the City.

   Ms. Diersen said that there are around 100 non-profits, however, there are some non-profits that are not in standing with the IRS.

   Council Member Mitchell asked if there was a projected number of how much the City could potentially make if the non-profits were included in the transportation utility fee.

   Ms. Diersen said it would be around $155,000 more.

Council Chair Bynum said that this exemption makes sense to her and agrees with an earlier statement that the City partners with a lot of non-profits to provide aid and resources to its residents.

Council Member deWolfe asked when this exemption would go into place, if passed.

Ms. Diersen said that it would go into effect on February 1st. Any of the account holders who were first noticed in July will receive the February bills starting in March.

Additionally, the City will have more information about the transportation utility fee on its website at sslc.gov

A copy of the Ordinance is attached and incorporated by this reference.

Council Member deWolfe made a motion to approve the Ordinance.

MOTION: Ray deWolfe
SECOND: Clarissa Williams

Roll Call Vote:

Bynum:	Yes
Huff:	Yes
Mitchell:	Yes
deWolfe:	Yes
Thomas:	Yes
Williams:	Yes
Sanchez:	Absent

Public Hearing

1. **To receive public input regarding proposed improvements to State Street as a part of the "Life on State" project. South Salt Lake is proposing the following traffic control measures to increase safety and reduce accidents including closing the left turn lane from Haven Avenue northbound onto State Street by installing a new center median on State Street at the Haven Avenue intersection and installing corner bulb outs to shorten pedestrian crossings and slow vehicle speeds turning onto local streets.** Neighborhoods Director, Sharen Hauri, spoke about the 'Life on State' local project that is led by the City and partly funded by the transportation tax that is collected and distributed by Salt Lake County.

   The Public Hearing comes as a requirement from Utah State Code R930-2 for any local government project that affects a U-DOT road.

   The need for the project comes from safety upgrades that include:
   a. Traffic control measures to reduce accidents
   b. A center median with protected mid-block refuge at Parley's Trail
   c. Corner bulb outs to shorten pedestrian crossing at local cross streets

d. Corner bulb outs to slow speed of vehicles turning onto local cross streets

The proposal is to eliminate the north-bound left turning lane from Haven Avenue onto State Street. The traffic control median is what is proposed to accomplish this.

The timeline of this includes a Public Hearing, final construction drawings in January, bidding and contracting from February through April, and construction to begin during the summer.

As part of state noticing requirements, a Public Hearing is required to allow any residents or interested parties the opportunity to give comments, however, there is no action necessary by the Council.

The Public Hearing opened at 7:39 p.m.

Business Owner, Robert Azarvand, shared his concerns over letting City take the left turn away from Haven Avenue to State Street that could open the possibility of taking the left turn from State Street to Haven Avenue in the future. His business has three access points off State Street, Haven Avenue, and Truman Avenue and wants to keep it that way so that his business remains accessible to the public.

The Public Hearing closed at 7:42 p.m.

Ms. Hauri and Community & Economic Development Director, Jonathan Weidenhamer, addressed Mr. Azarvand's concerns. The City must get all construction drawings approved by all the agencies. In the conversations that have been had on this matter, there is no interest in closing the access points that Mr. Azarvand mentioned. This action was led by a traffic study that was done in anticipation of the Blaser development to provide public access to its parking garage.

Council Chair Bynum reassured Mr. Azarvand that any changes like this require a tedious process so as not to worry about that happening at this time.

Council Member Williams asked if the Wasatch Front Regional Council (WFRC) is involved in this project.

Ms. Hauri said that the WFRC is typically involved in the funding stages of these projects but not in the construction phase.

A copy of the presentation is attached and incorporated by this reference.

Council Chair Bynum made a motion to Adjourn.

MOTION: Sharla Bynum
SECOND: Nick Mitchell
Voice Vote:

Bynum:	Yes
Huff:	Yes
Mitchell:	Yes
deWolfe:	Yes
Thomas:	Yes
Williams:	Yes
Sanchez:	Absent

The meeting adjourned at 7:43 p.m.

Sharla Bynum, Council Chair

Ariel Andrus, City Recorder

14-Jan-26

Please sign in for each meeting

CITY COUNCIL - REGULAR MEETING

LIST OF ATTENDEES

NAME	CITY/TOWN	REPRESENTING
Lauryn Koncar	Salt Lake	citizen
VAL SHUPE	OGDEN	UTAH CHIEFS
Catherine Taylor	SSLC	self
Joy Glad	SSLC	self
Kevin Miller	SSLC	Self
H. Stone	SSL	Self
Robert Azarvand	SSL	2312 S. State Street Tesla

Annual Stormwater Utility Report 2024-2025

- Micah Semon

Year in Review

- The City of South Salt Lake transitioned from a Co-Permittee on the Jordan Valley MS4 (Municipal Separate Storm Sewer System) permit to operating under its own Phase II permit.
- We have successfully navigated the complexities of HB 507 and SB 220, adjusting to the evolving Stormwater rules and regulations.
- Throughout these changes we have continued to operate and maintain our MS4.

Fun Facts:

- 1284 Inlets (inspected 563)
- 28 Illicit Discharges Ceased
- 14 active Construction sites greater than or equal to 1 Acre
- Removed approximately 50 Cubic yards of Debris from the Storm Sewer System

Utility Billing

- Completed the process of adding all of the accounts, for a grand total of 5954 accounts

- In 2024 we sent 99 accounts, for a total of $202K, to Salt Lake County tax collections and we have collected $199K. This includes the principal, interest, penalties, and admin fees.

Fund Balance

- We were able to build our fund balance to $2,532,704.00 since implementation of the Stormwater Fees, and added $250,000 to our Replacement Reserve

Note From Utility Billing

- We have approximately--8,655 parcels in South Salt Lake City.
  - We have tackled some small issues with parcels, such as
    - Some parcels are missing important information on Salt Lake County records.
    - Small or nested parcels that needed special attention.
    - Parcels changing hands, being combined or divided. Obsolete parcel numbers that needed to be updated in our system.
- The monthly base rate billed is $6.00 for a single-family home (3,700 Sq.ft. = 1 ERU)

- Duplexes are billed $12.00 a month

- Commercial lots are billed by the amount of impervious area that is on the parcel; 3,700 sq.ft.= 1 ERU

“Get your mind in the GUTTER, let’s keep it clean”

Because “WE ALL LIVE DOWNSTREAM”

SALT LAKE COUNTY STORMWATER COALITION

WE ALL LIVE DOWNSTREAM

RESOLUTION NO. R2026-1

A RESOLUTION OF THE SOUTH SALT LAKE CITY COUNCIL ADOPTING AN UPDATED SOUTH SALT LAKE WASTEWATER COLLECTION SYSTEM MASTER PLAN.

WHEREAS, the City of South Salt Lake (the "City") is a political subdivision of the State of Utah, authorized and organized under the provisions of Utah law;

WHEREAS, the City owns and operates a wastewater collection system;

WHEREAS, the City adopted a wastewater collection system master plan in 2014 and 2016;

WHEREAS, the City is proposing adoption of an updated wastewater management plan, as shown in Exhibit A, in order to provide efficient and reliable wastewater collection service to the City's customers now and in the future at the lowest reasonable cost;

WHEREAS, the City recognizes an updated wastewater collection system master plan is beneficial: a) in the near term to obtain an understanding of low-cost actions and best practices that will allow the City to keep utility costs low and improve wastewater collection system operations, b) to identify system improvements needed within 10 years to provide capacity for anticipated new development, and c) to help the City secure key pieces of land and work with developers to properly plan for infrastructure that is compatible with the future needs of the City's wastewater collection system;

NOW, THEREFORE, BE IT RESOLVED, by the South Salt Lake City Council that the updated South Salt Lake Wastewater Collection System Master Plan, attached as Exhibit A, is hereby approved and adopted.

BE IT FURTHER RESOLVED, that a copy of the updated South Salt Lake Wastewater Collection System Master Plan be publicly available at the City offices and published on the City website.

(signatures on following page)

PASSED AND APPROVED by the City Council of the City of South Salt Lake, Utah on this 14th day of January 2026.

BY THE CITY COUNCIL:

Sharla Bynum, Council Chair

City Council Vote as Recorded:

Huff:	Yes
Thomas:	Yes
Bynum:	Yes
Mitchell:	Yes
Sanchez:	ABSENT
deWolfe:	Yes
Williams:	Yes

ATTEST:

Ariel Andrus, City Recorder

Exhibit A

UPDATED SOUTH SALT LAKE WASTEWATER COLLECTION MASTER PLAN

CITY OF SOUTH SALT LAKE

WASTEWATER COLLECTION SYSTEM MASTER PLAN UPDATE

(HAL Project No.: 126.63.100)

August 2025

HANSEN ALLEN & LUCE INC ENGINEERS

CITY OF SOUTH SALT LAKE

WASTEWATER COLLECTION SYSTEM MASTER PLAN UPDATE

(HAL Project No.: 126.63.100)

Kai Krieger, P.E.
Project Manager

HANSEN ALLEN & LUCE INC
ENGINEERS

August 2025

ACKNOWLEDGEMENTS

Successful completion of this master plan update was made possible by the cooperation and assistance of many individuals, including the Mayor of South Salt Lake, City Council Members, and City Staff personnel as shown below. We sincerely appreciate the cooperation and assistance provided by these individuals.

City of South Salt Lake

Mayor

Cherie Wood

City Council

Clarissa J. Williams, Councilperson
Ray deWolfe, Councilperson
LeAnne Huff, Councilperson
Corey Thomas, Councilperson
Sharla Bynum, Councilperson
Nick Mitchell, Councilperson
Paul Sanchez, Councilperson

City Staff

Corby Talbot, Waste Water Division Manager
Craig Giles, Public Works Director
Christopher Merket, City Engineer

Hansen, Allen & Luce, Inc.

Kai Krieger, P.E., Project Manager
Steve Jones, P.E., CEO
Jason Biesinger, P.E., Staff Engineer

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EXECUTIVE SUMMARY

PURPOSE OF STUDY

The purpose of this study is to help the City of South Salt Lake (City) provide efficient and reliable wastewater collection service to its customers, both now and into the future, at the lowest reasonable cost.

PLANNING HORIZONS

The ultimate planning horizon for this study is the buildout condition of the City. However, this report provides guidance applicable at the following time intervals:

1. Near future: low-cost actions and best practices the City can implement to reduce costs and improve operations.
2. 10-year: system improvements needed within 10 years to provide capacity for anticipated new development. The cost of these improvements will be used to set impact fees and guide the formulation of near-term budgets.
3. Buildout: all system improvements necessary to serve the City when it is developed at the density defined by the City's current general plan and zoning ordinances. These recommendations will help the City secure key pieces of land and work with developers to properly plan for infrastructure that is compatible with the future system.

COMPONENTS OF A WASTEWATER COLLECTION SYSTEM

The following components of a wastewater collections system were analyzed to determine the capacity and ability of the water system to meet existing and future loading:

1. Collection network – gravity and force mains that convey wastewater through the system.
2. Lift stations – used to pump wastewater from low-elevation points in the system up to higher-elevation gravity mains and the outfall to Central Valley Water Conservancy District (CVWCD).

Each of these components must have enough capacity and capability to serve existing and future loading.

METHODS

The existing wastewater collection facilities, including pipelines and lift stations, were evaluated for performance. Flow monitoring was performed at a few locations in the City to assist with system evaluation and calibration. Flows within the collection system were characterized based on available data. Hydraulic models were then constructed to evaluate the system under existing and expected future scenarios.

EVALUATION CRITERIA

A range of potential evaluation criteria and values were suggested by HAL and reviewed by the City. The criteria and values adopted for this master plan and the modeling effort are included in Table ES-1.

TABLE ES-1 EVALUATION CRITERIA

CRITERIA	VALUE OR ASSUMPTION
System Loading	Existing system loading was developed based on a level of service (LOS) of 165 gpd per ERU and observed infiltration and inflow. Future hydraulic loading was developed based on growth projections and the LOS of 165 gpd per ERU.
Daily Flow Variation	Diurnal curves were developed from winter drinking water production data and validated using data from the wastewater SCADA system.
Peak Flow	Peaking factors were developed from diurnal water demand curves. Predicted peak flows were developed from the AutoCAD SSA model.
Inflow and Infiltration	The City experiences significant inflow and infiltration due to seasonal water table fluctuation and precipitation. Inflow and infiltration were studied extensively in the Sewer Inflow and Infiltration Study prepared in 2021 (HAL, 2021) and were distributed throughout the City. Modeled values are as follows: Inflow = 2.04 MGD Acceptable Infiltration = 0.8 MGD
Future Planning Periods	Years 2034 (10-year) and estimated buildout.
Land Use & Population Projections	Land uses in undeveloped areas were assumed to occur as specified in the South Salt Lake City General Plan. Where available, development plans were used to further refine projections for future land use. Population projections were based on historic trends and projected rates and timing of growth as identified by the Community Development Department.
Pipe Capacity (Depth/Diameter)	Roughness Coefficient = 0.013 Manning's n Maximum d/D = 0.5 for all pipes smaller than 15 inches in diameter; Maximum d/D = 0.75 for all pipes larger than or equal to 15 inches in diameter.

SYSTEM VULNERABILITIES

The system was analyzed to identify existing vulnerabilities and areas which will need improvements to support future growth. Table ES-2 contains a summary of system vulnerabilities. Further information about these vulnerabilities is described in subsequent sections.

TABLE ES-2
SYSTEM VULNERABILITIES

ID	Description	Notes
V1	**Growth**	The City is currently experiencing growth and is expected to re-develop the TOD areas into high-density regions.
V2	**Infiltration and Inflow**	The City experiences significant inflow and infiltration due to the seasonal water table fluctuation and precipitation. Inflow and infiltration were studied extensively in 2021 (HAL, 2021). Infiltration and inflow consume capacity in pipes and lift stations and lead to increased treatment volumes.

Recommended solutions to these vulnerabilities are shown in Table ES-3 and described in further detail in subsequent Chapters.

TABLE ES-3
PROPOSED SOLUTIONS TO SYSTEM VULNERABILITIES

Description	Notes	Vulnerabilities Addressed
Modeling Reviews	Periodically conduct a review of hydraulic models to update them with new information and re-calibrate them to current conditions. Use updated models to help identify unknown deficiencies, determine timing of projected projects, and find any changes needed to the projected projects.	V1
Inflow & Infiltration Mitigation	Reduce infiltration by finding and disconnecting residential sump pumps that pump stormwater into the sewer system. Reduce inflow by improving stormwater conveyance. Consider discontinuing use of vented manholes in problem areas. Recommendations from the Sewer Inflow and Infiltration Study (HAL, 2021): - Enhance pipe inspection program. - Increase annual rehabilitation. - Incentivize sewer lateral replacement. - Update sewer specifications. - Install long-term flow monitoring.	V2

CAPITAL FACILITY PLAN

Projects necessary to support growth over the next 20 years are identified and described in the Capital Facility Plan. Conceptual-level cost estimates were prepared for each project. Projects recommended to address existing deficiencies are summarized in Table ES-4.

TABLE ES-4 EXISTING IMPROVEMENT PROJECTS AND COST ESTIMATES

PROJECT ID	DESCRIPTION	COST[1]
E-1	30" Jack and bore under State Street and install 15" gravity line.	**$531,000**
	TOTAL	**$531,000**

[1] All costs include 20% for engineering, administrative costs, and contingencies. Costs are shown in 2024 dollars.

Projects recommended to accommodate future growth are summarized in Table ES-5.

TABLE ES-5 FUTURE IMPROVEMENT PROJECTS & COST ESTIMATES

PROJECT ID	DESCRIPTION	COST[1]
10-Year Projects		
10-1	Install 800 ft of 10" gravity line.	**$336,418**
10-2	Install 1,100 ft of 10" gravity line.	**$462,575**
Buildout Projects		
B-1	Install 130 ft of 15" gravity line.	**$72,000**
B-2	Install 980 ft of 15" gravity line.	**$546,000**
	TOTAL	**$1,416,993**

[1] All costs include 20% for engineering, administrative costs, and contingencies. Costs are shown in 2024 dollars.

Locations recommended to be monitored as future growth occurs are summarized in Table ES-6.

TABLE ES-6 MONITOR LOCATIONS

PROJECT ID	LOCATION	POSSIBLE ISSUES
M-1	900 W and Parley's Trail	Very flat slopes.
M-2	2305 S 900 W	Flatter slopes, high inflow effects from storm events, and backwater from the larger downstream pipe.
M-3	Along 1030 W and down 2610 S until 900 W	Flatter slopes and high inflow effects from storm events.
M-4	State Street from 2150 S to Commonwealth Ave	Flatter slopes and backwater effects from the larger downstream pipe.

PROJECT ID	LOCATION	POSSIBLE ISSUES
M-5	Main St from Haven Ave to Truman Ave, and Truman Ave from Main St to West Temple Street	Flatter slopes and future development could create deficiency in the existing pipes.

CONCLUSIONS

Key conclusions from the master plan are as follows:

1. Capital projects are necessary to improve the performance of the existing system and accommodate future growth.
2. Continue to clean the entire system every other year.
3. Continue to use video inspection on the entire system every four years to identify repair and inflow/infiltration issues.
4. Work to conform to the Utah Sanitary Sewer Management Plan to minimize sewer overflows.
5. Monitor lift stations to analyze capacity during significant precipitation events.
6. Implement the recommended improvement projects to solve existing and future issues in the Capital Facilities Plan (Tables 7-1 and 7-2).
7. Infiltration and inflow contribute to flows in the wastewater collection system. Actions taken to reduce infiltration and inflow can extend the capacity of the collection system pipes and reduce treatment costs. See Appendix B for the Sewer Inflow and Infiltration Study (HAL, 2021) for more information.
8. Offer incentives for installing water wise fixtures.
9. Work on installing manholes to replace clean-outs during road maintenance and other opportunities of convenience.
10. It is recommended that the City add text to municipal code 13.36.020 specifying that the size, slope alignment, materials of construction of a POTW sewer, and the methods to be used in excavating, placing of the pipe, jointing, testing and backfilling the trench shall all conform to the requirements set forth in Utah Administrative Code R317-3.

CHAPTER 1
INTRODUCTION

PURPOSE

The purpose of this master plan update is to revise the growth projections and recommended projects in the previous wastewater collection master plan (2016) based on revised development projections.

The results of this study are limited by the accuracy of the development projections and other assumptions used in preparing the master plan. It is expected that the City will continue to review and update this master plan every 5-10 years, or more frequently if the assumptions included in this effort change significantly.

Updates were made to the placement, density, and magnitude of future growth, to the model identified capacity deficiencies, and to the Capital Facility Plan. The existing system model was updated with existing system demands.

BACKGROUND

The City is located in Salt Lake County. The City was incorporated in 1938 due to the need for water and sewer services (City of South Salt Lake, 2011). In 1998 the City annexed an area south of the City. The City Wastewater Collection System services areas of the City between Mill Creek and 2100 South.

The City wastewater collection system collects wastewater from a diverse mix of single and multi-family residences, commercial, and industrial areas. All wastewater collected by the sewer system is conveyed to Central Valley Water Reclamation Facility (CVWRF) where it is treated. CVWRF charges the City for treatment based on the flow quantity and the flow composition. The sewer system provides services to approximately 2,600 connections. Drinking water in the sewer service area is provided by South Salt Lake's Water Department, Salt Lake City Department of Public Utilities, and private wells.

The 2020 US census states that the City's population in 2020 was above 26,700 (U.S. Census Bureau, 2020). Growth estimates from the Governor's Office of Planning and Budget project a population of 44,560 by the year 2050 (GOPB, 2008). This growth is expected to occur in four redevelopment areas in the City. The redevelopment areas are expected to contain a total of approximately 9,498 Equivalent Residential Units (ERUs), 8,488 of which will contribute to the sanitary sewer system.

SCOPE

The scope of this Sanitary Sewer Master Plan Update includes the following:

1. Communicating and coordinating and with City personnel and other relevant entities
2. Evaluating results of wastewater flow monitoring

3. Analyzing flow data and characterizing the flow
4. Investigating and characterizing inflow and infiltration
5. Updating hydraulic models
6. Identifying existing system deficiencies
7. Projecting future wastewater generation and flow rates in the sewer system
8. Identifying the capital facilities necessary to correct existing deficiencies and accommodate future growth
9. Preparing the capital facilities plan

AUTHORIZATION

The City selected Hansen, Allen, & Luce, Inc. (HAL) during May 2024 to complete a master plan update of the City’s wastewater collection system. Work began on the master plan update during June 2024.

CHAPTER 2
EXISTING WASTEWATER SYSTEM

SERVICE AREA

The service area of South Salt Lake's wastewater collection system includes the area in the northern half of the City, extending south to Mill Creek (approximately 3000 South). The service area of the sewer system is not expected to expand, although future redevelopment will increase the loading in specific areas of the City.

EXISTING WASTEWATER SYSTEM

Information describing the wastewater collection system was compiled for the 2014 master plan from Geographic Information System (GIS) data provided by the City, a manhole survey provided by the City, and a manhole survey completed by Hansen, Allen, & Luce, Inc. The data were sorted and merged into GIS shapefiles of sewer manholes and sewer pipes.

The collection areas and pipe shapefile layers were updated in 2024 and added to the GIS data by HAL. The existing City wastewater collection system is shown on Figure 2-1.

Pipe Network

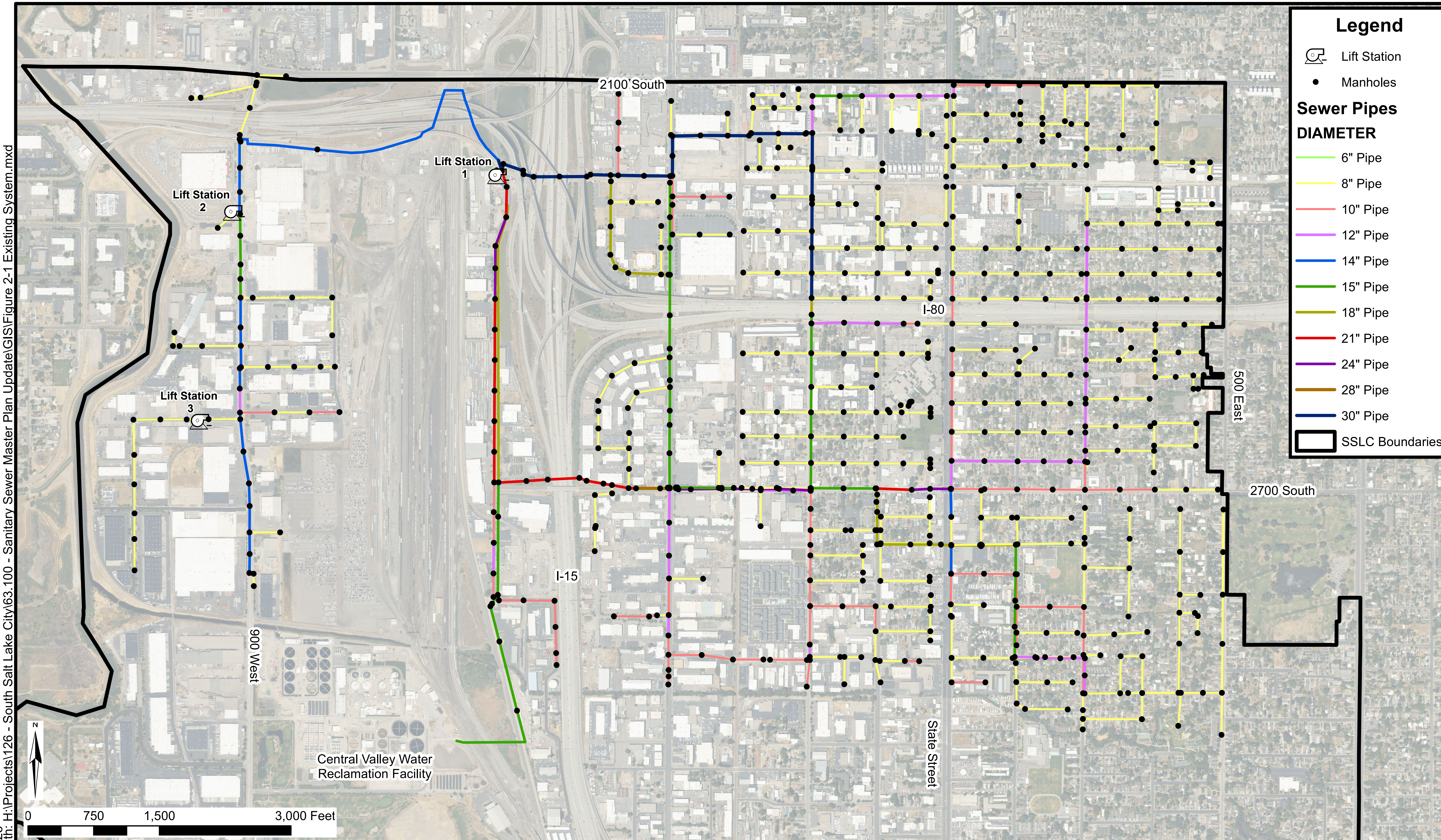
The existing City wastewater collection system consists of approximately 38 miles of pipeline and approximately 680 manholes as shown on Figure 2-1. The pipe sizes range from 6-inch to 33-inch diameter pipe. The system also has force main piping ranging from 4-inch to 18-inch diameter pipe.

Treatment Plant

Wastewater in the collection system flows to the CVWRF located at approximately 800 West Central Valley Road in the City. CVWRF has a current capacity of 75 million gallons per day (CVWRF, 2008). The future design average daily capacity of the treatment plant after upgrades will be 84 million gallons per day. CVWRF treats wastewater from Cottonwood Improvement District, Granger Hunter Improvement District, Kearns Improvement District, Murray City, Mt. Olympus Improvement District, The City of South Salt Lake, and Taylorsville-Bennion Improvement District.

Lift Stations

Due to the relatively flat topography of the City and the configuration of the original sewer system, the wastewater collection system has three lift stations. All three lift stations are in a series with the third lift station upstream from the second lift station which is upstream from the main lift station. The locations of the lift stations are shown on Figure 2-1. Approximately 40% of the service area flows by gravity to the CVWRF with the rest of the service area flowing through lift stations. Table 2-1 is a list of each lift station with addresses, pump capacities in gpm, the total dynamic head (TDH) at the pump in feet of water, and the pump horsepower.



Date: 8/21/2025
Document Path: H:\Projects\126 - South Salt Lake City\63.100 - Sanitary Sewer Master Plan Update\GIS\Figure 2-1 Existing System.mxd

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WASTEWATER COLLECTION SYSTEM MASTER PLAN UPDATE

EXISTING SYSTEM

FIGURE 2-1

TABLE 2-1
LIFT STATION INVENTORY

ID	PUMP TYPE	QUANTITY	LOCATION	PUMP CAPACITY	PUMP TDH (ft)	HORSEPOWER (hp)
1	Flygt	5	2250 S 600 W	5,070 gpm	114 ft	110 hp
2	Flygt	3	2280 S 900 W	1,100 gpm	40 ft	15 hp
3	Flygt	2	949 W 2610 S	260 gpm	15 ft	2.3 hp

CHAPTER 3
FLOW MONITORING

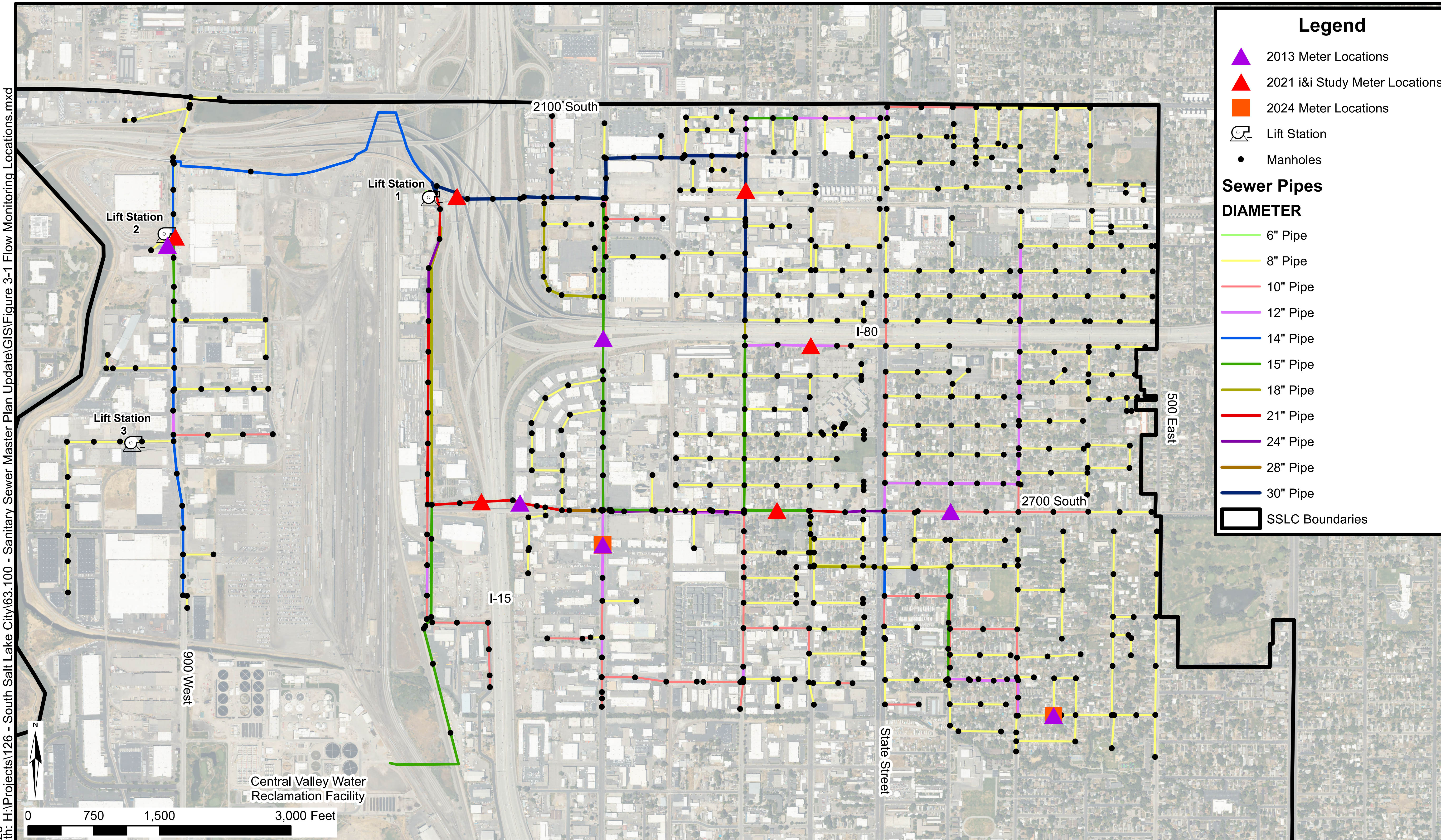
FLOW MONITORING

The purpose of flow monitoring is to obtain flow data at several locations throughout the City to provide the basis for flow characterization, construction of a model, and calibration of the model to real values. Flow monitoring sites for the 2014 master plan, 2021 Sewer Inflow & Infiltration Study (HAL, 2021), and 2025 master plan update were selected by the City and HAL to provide representative data to achieve the stated purposes. Selected flow monitoring locations are shown on Figure 3-1.

The flow monitoring that occurred in 2014 was accomplished using one American Sigma 910 Flow Meter owned by HAL and five Marsh-McBirney FLO-DAR meters with HACH FL900 Flow Loggers procured by the City. Both the Sigma 910 and the FLO-DAR meters determine average flow velocity and flow depth. The flow monitoring that occurred in 2021 and 2024 was accomplished using an American Sigma 910 Flow Meter owned by HAL.

The flow rate Q is calculated based on the equation $Q = VA$, where V is the velocity and A is the flow area calculated from the measured depth of flow and the diameter of the pipe. A typical Sigma 910 meter installation is shown on Figure 3-2 and a typical FLO-DAR meter installation is shown on Figure 3-3. The Sigma 910 includes a data logger and a sensor connected by a data cable with an air tube. The sensor is attached to a ring that is inserted in the pipe. The ring is adjusted to fit tightly against the inner walls of the pipe with the pressure sensor located at the flow line or invert of the pipe. The FLO-DAR meter uses digital Doppler radar to sense the velocity in the open channel and ultrasonic pulse echo sensing to measure the depth in the open channel. This information is sent to the flow logger where the flow rate is calculated based on the flow area and velocity.

The flow meters are typically installed at each site for approximately one week. The 2014 metering data were used to create the diurnal curve used in the model and to calibrate the model. Graphs showing the recorded flow data used in the report for the monitoring locations are located in Appendix A.



Date: 8/21/2025
Document Path: H:\Projects\126 - South Salt Lake City\63.100 - Sanitary Sewer Master Plan Update\GIS\Figure 3-1 Flow Monitoring Locations.mxd

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SOUTH SALT LAKE CITY
WASTEWATER COLLECTION SYSTEM MASTER PLAN UPDATE

FLOW MONITORING LOCATIONS

FIGURE 3-1

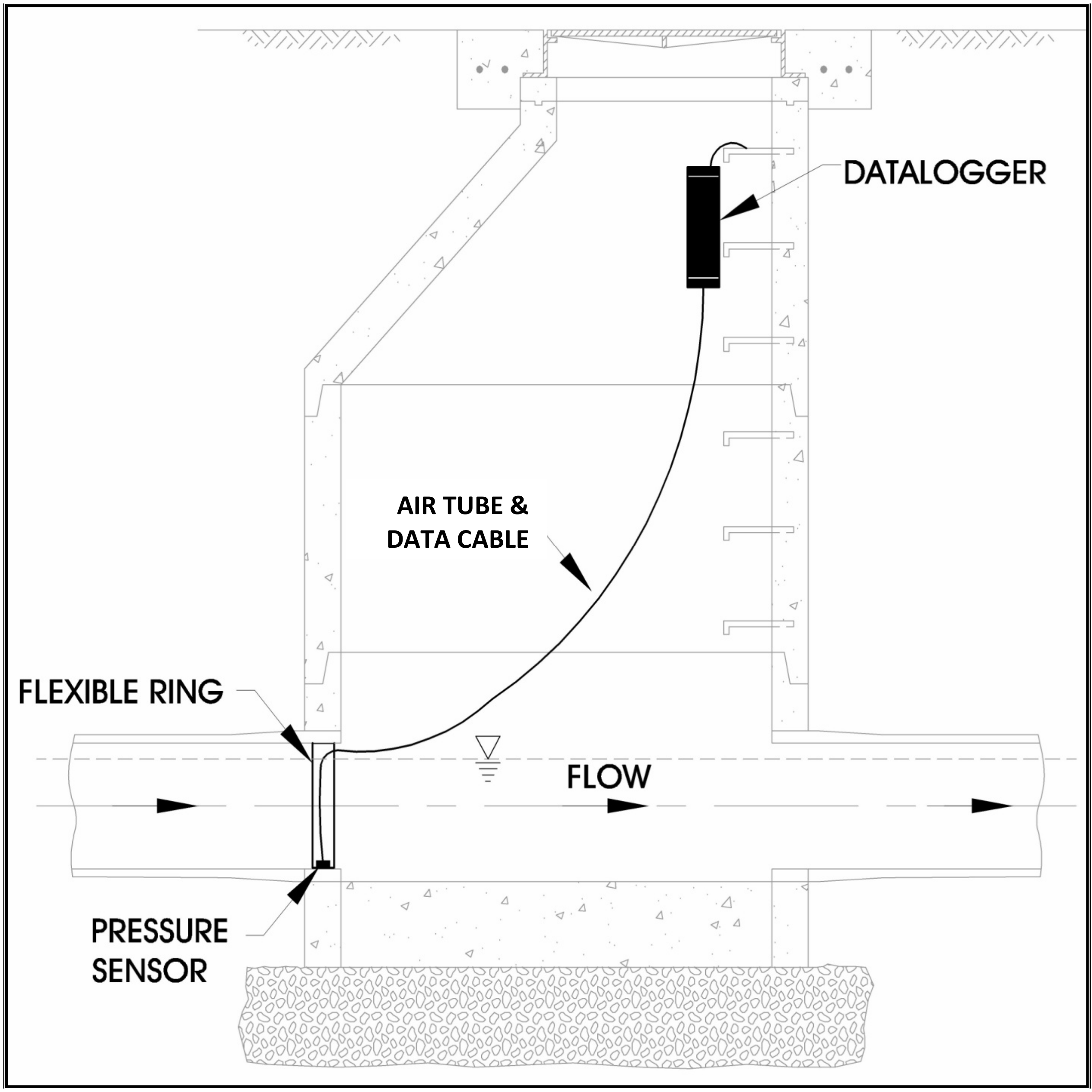


FIGURE 3-2: TYPICAL SIGMA 910 FLOW METER INSTALLATION

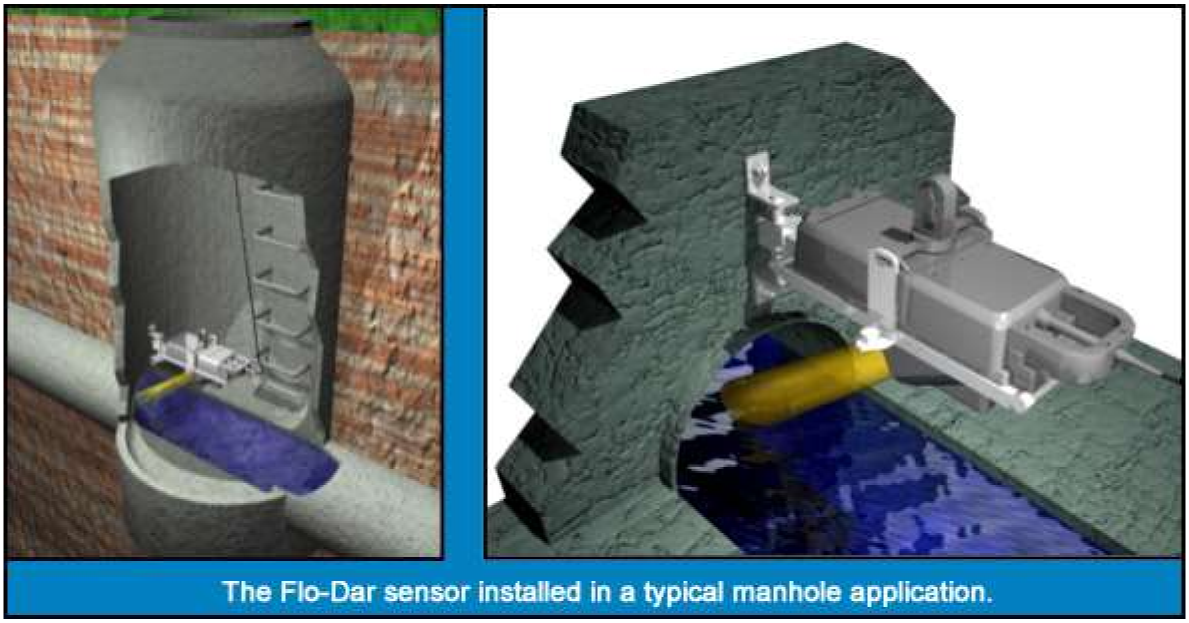


FIGURE 3-3: TYPICAL FLO-DAR METER INSTALLATION (HACH COMPANY, 2014)

CHAPTER 4
FLOW CHARACTERIZATION

METHODOLOGY

The purpose of flow characterization is to determine the flow patterns and variations experienced by a wastewater system so that pipelines, lift stations, and the treatment facility can be evaluated and sized appropriately. The methodology used in 2014 was also used in the 2025 master planning effort, which included evaluation of the following wastewater flow characteristics:

- Unit Flows
- Daily Flow Variation
- Annual Flow Variation
- Long Term Flow Variation
- Extraordinary Flows

UNIT FLOWS

Unit flows were estimated within the City and are expressed in terms of ERUs. An ERU represents the flow generation of an average residential unit. Flow generation for commercial, industrial, and other types of uses can be expressed in ERUs. For example, a commercial development that generates a flow 5 times that of an average residence will be designated as representing 5 ERUs. This does not account for inflow and infiltration.

An average flow rate per ERU was developed using drinking water billing data. With virtually no irrigation occurring in the winter, it is assumed that winter water use is representative of indoor water use. With little consumptive use of water indoors, it is assumed that the volume of water used indoors is roughly equal to the volume of water discharged to the wastewater collection system. This evaluation showed an average unit flow rate of 165 gpd/ERU.

Hydraulic Loading / ERU = 165 gallons/day

DAILY FLOW VARIATION

Flow in a wastewater collection system varies throughout the day. In the City the minimum flow generally occurs during the early morning between 1:00 and 5:00 AM. Maximum or peak flow typically occurs during the morning between 7:00 AM and 11:00 AM with a smaller peak in the evening between 5:00 and 8:00 PM.

Peaking factors were used to determine whether the City's daily flow variation was in line with those of similar entities in the State and to create diurnal curves for the Autodesk Storm and Sanitary Analysis (SSA) model. Diurnal curves were used to quantify daily flow variations in the model.

Peaking Factors

The peaking factor is the ratio between the peak instantaneous flow and the average daily flow. Flow monitoring data downstream of residential and commercial areas were evaluated to determine the flow patterns at each flow monitoring site. The data were averaged throughout the week to create an average day pattern made of 15-minute increments. The flow rates were then divided by the average daily flow to determine a peaking factor at each time interval, creating a diurnal curve. The diurnal curves were input into the model and adjusted to account for attenuation until the model hydrograph at the flow monitoring location matched the flow monitoring data. The diurnal curves can be seen on Figure 4-1.

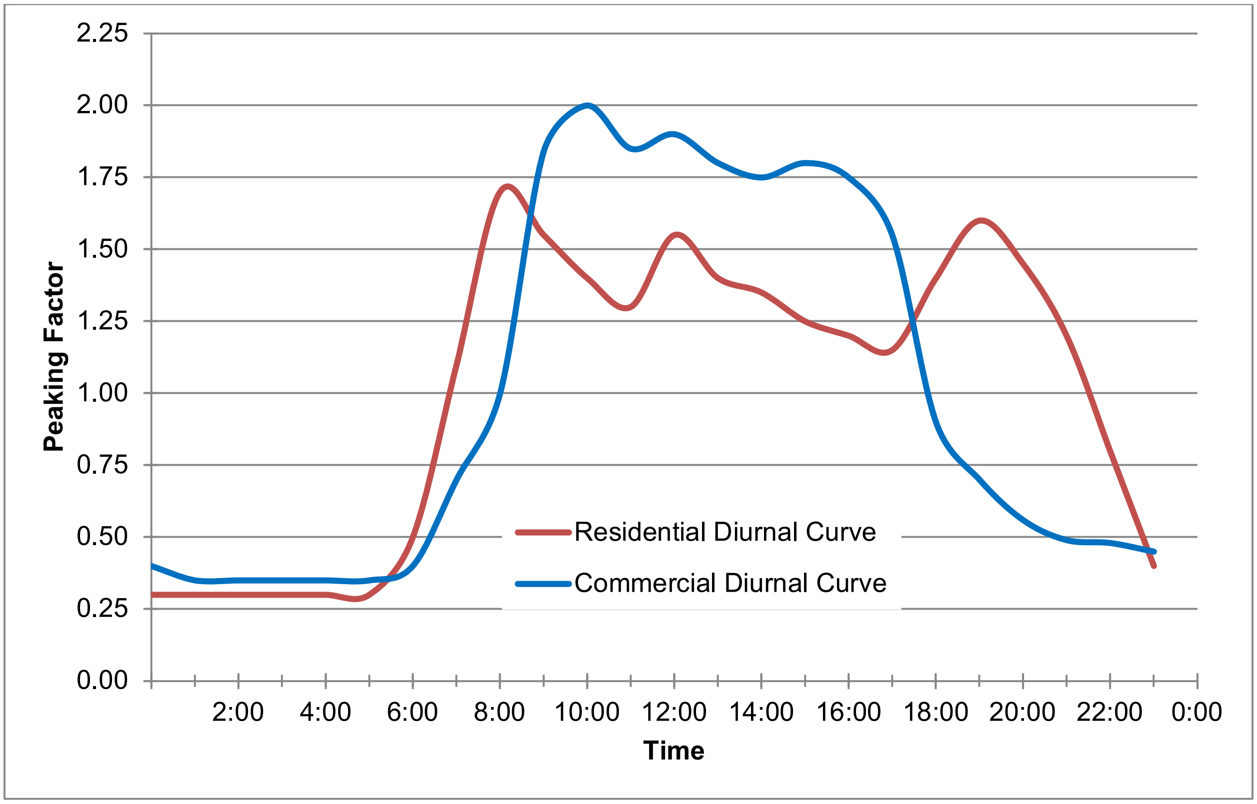


FIGURE 4-1 DIURNAL CURVES

Peaking factors based on average flow for each flow monitoring site were plotted against the average daily flow on a log-log graph. The City peaking factors were compared to peaking factors developed during past HAL master planning efforts for Murray City, Springville City, Orem City, and Granger Hunter Improvement District as shown on Figure 4-2. Differences between communities can be explained by a variety of factors, including variations in infiltration and water use patterns. Possible explanations for the lower peaking factors seen in the City include a larger than average infiltration rate and an average household size smaller than the other cities.

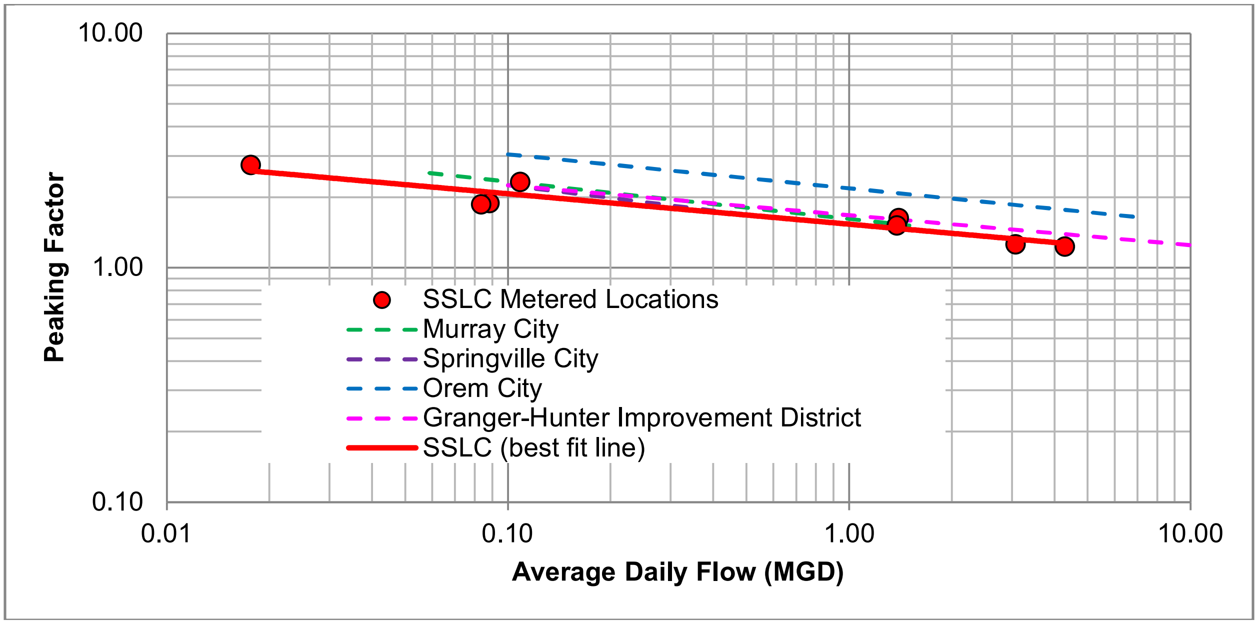


FIGURE 4-2 PEAKING FACTOR CITY COMPARISON

Hydrographs

The loading for the model was developed by geocoding the winter drinking water use for individual water meters throughout the City, and then assigning those flows to a wastewater manhole based on the collection areas. This method assumes that winter water use is representative of indoor water use, and that there is little consumptive use of water indoors, allowing us to equate the sewer loading and the indoor water use. The diurnal curves developed for the residential and commercial areas are then applied to each sewer manhole load. Additional baseflows representing inflow and infiltration were distributed throughout the City based on measured inflow and infiltration values found in the City's Sewer Inflow and Infiltration Study (HAL, 2021). The diurnal curves for each of the hydrographs can be seen on Figure 4-1.

ANNUAL FLOW VARIATION

Wastewater systems can experience annual flow variation due to infiltration and other seasonal inflows such as irrigation or precipitation events. The City experiences a significant amount of annual flow variation due to infiltration and inflow. CVWRF flows from the City wastewater collection system between January 2021 and April 2024 were plotted on Figure 4-3 to verify the magnitude and variation of annual flows due to infiltration and inflow. According to this data, the maximum recorded flow of approximately 5.5 MGD occurred on April 7, 2023, and May 7, 2024.

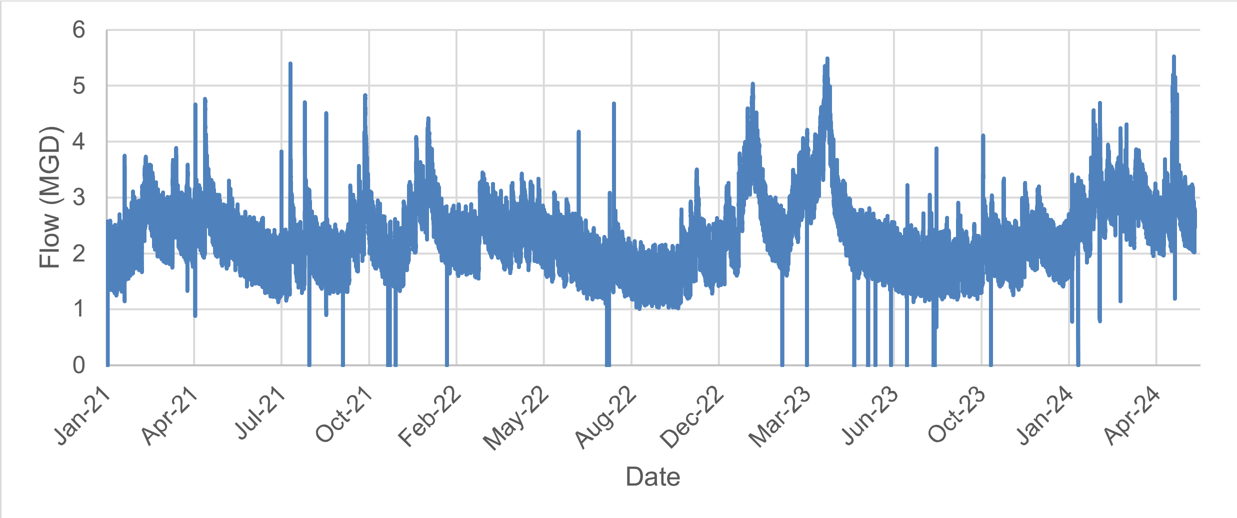


FIGURE 4-3 CITY SEWER FLOWS TO CVWRF, 2021-2024

The highest flows in the wastewater system occur during significant precipitation events or snowmelt during the spring runoff when the water table is seasonally high. The existing system design flow was chosen to conservatively represent seasonally high flows seen in spring.

According to R317-3-2, an average per capita per day flow rate of 100 gallons is required when sizing sewer pipes which "includes an allowance for infiltration/inflow." However, the actual flow, including baseflow, throughout the City exceeds the flow rate of 100 gallons per capita per day. A more conservative value representing measured baseflows during spring precipitation events was used in the City wastewater collection system sewer model.

Infiltration

Infiltration is defined as groundwater which enters a sewer system through pipe joints, cracks in the pipe, and leaks in manholes or building connections. Upon review of Figure 4-3 it is clear that high water table levels during the spring melt contribute to infiltration into the wastewater collection system. Precipitation events that raise the water table also contribute to infiltration.

Figure 4-4 shows hourly flow data during April of 2024. Water use in most systems is minimal during the night. Therefore, the majority of flow occurring during the night time hours is made up of inflow and infiltration. Figure 4-4 displays a large baseflow, approximately 2.5 times as large as the fluctuation seen in the system.

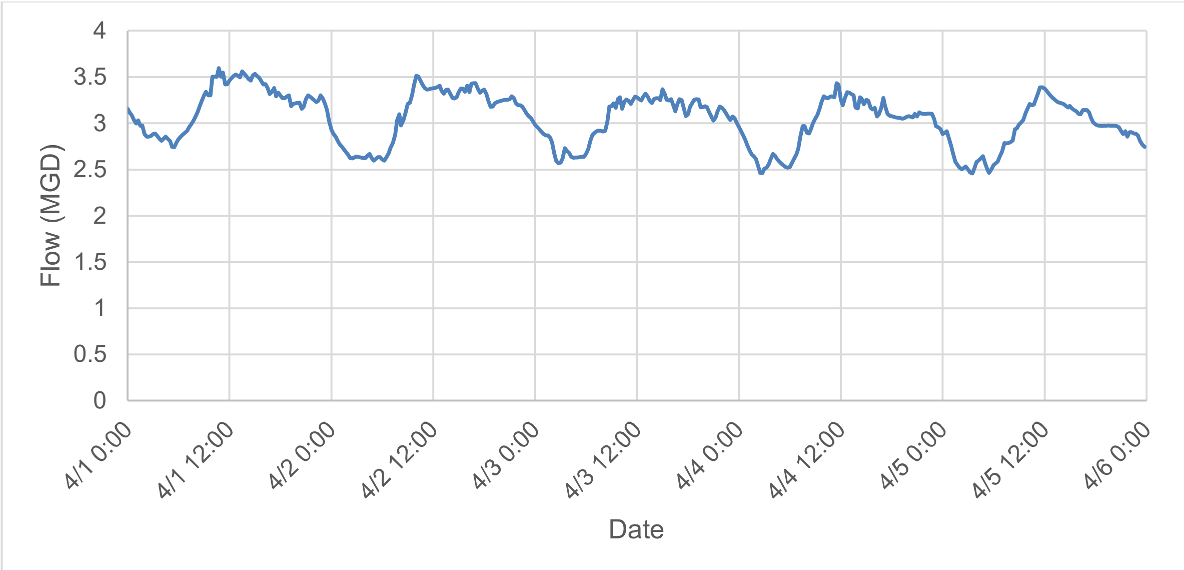


FIGURE 4-4 CVWRF HOURLY FLOWS FROM THE CITY

As calculated in the Sewer Inflow and Infiltration Study (HAL, 2021), the yearly average infiltration rate for the system is 1.06 MGD, and the peak infiltration rate is 1.68 MGD, occurring in the spring. For sewer systems, it's important to design for the peak flows. The study also found that the City's wastewater balance is about 42% wastewater flow and 58% inflow and infiltration (where infiltration was 39% of the total flow).

Infiltration does not occur uniformly throughout the system. Flow monitoring results from 2014, 2021, and 2024 show that infiltration amounts depended upon the water table depth, proximity to surface water, sewer depth, and condition of the sewer pipe.

The max infiltration value of approximately 1.60 MGD, found in the Sewer Inflow and Infiltration Study (HAL, 2021), was assumed to be representative of existing conditions and added as a component of the baseflow.

Inflow

Inflow is defined as surface water that enters a sewer system (including building connections) through roof leaders, cellars, foundations, yards, area drains, cooling water discharges, manhole covers, cross connections from storm drains, etc. According to City personnel, the wastewater collection system does experience inflow due to precipitation events.

According to the Sewer Inflow and Infiltration Study (HAL, 2021), peak inflow rates were measured to be 2.04 MGD, also occurring in the spring. For sewer systems, it's important to design for the peak flows. As noted above, the study also found that the City's wastewater balance is about 42% wastewater flow and 58% inflow and infiltration (where inflow was 19% of the total flow).

The max inflow value of 2.04 MGD, found in the Sewer Inflow and Infiltration Study (HAL, 2021), was assumed to be representative of existing conditions and added as a component of baseflow.

I&I MITIGATION

The City should take action to reduce the effects of inflow and infiltration on the sewer system. It's recommended that the City reduce infiltration by finding and disconnecting residential sump pumps that pump stormwater into the sewer system. The City can also reduce inflow by improving stormwater conveyance.

Further, the Sewer Inflow and Infiltration Study (HAL, 2021), gave the following recommendations to mitigate inflow and infiltration:

- Enhance pipe inspection program
- Increase annual rehabilitation
- Incentivize sewer lateral replacement
- Update sewer specifications
- Install long-term flow monitoring

The 2021 study recommended establishing a budget of at least $500,000 per year to rehabilitate 1.5 miles of sewer pipe (4% of the total system length) and manholes each year, and to start east of State Street. Typical rehabilitation reduces infiltration by 25% (HAL, 2021). However, it is now estimated that an annual budget of about $3,000,000 would allow the entire system to be rehabilitated in 25 years.

If the City were to provide incentives for residents to replace their sewer laterals, then replacement costs would be spread among residents and the City, and the effects of infiltration would be expected to decrease.

LONG TERM FLOW VARIATION

Average annual wastewater flows usually vary from year to year, although the variation between years is typically not extreme. The most predictable changes in average annual flows are typically associated with changes in population. Long-term variations may also be caused by changes in weather patterns which may last several years.

Changes in weather patterns can result in changes in infiltration and water use patterns. Decreased precipitation results in lower groundwater levels and less infiltration. Water conservation measures implemented during droughts result in reduction in both indoor and outdoor water use. A reduction in indoor use results in less domestic wastewater. A reduction in outside use for watering lawns and gardens may lead to lowering of the groundwater table and less infiltration. Weather pattern changes are not expected to significantly impact the long-term flow rates of the City wastewater collection system.

Population change is the largest factor in estimating long term flow variation. The population projection for the City for the year 2050 is 44,560 (GOPB, 2008). The population projection, in conjunction with detailed growth projections from the City, was used with the winter water meter usage and baseflow to assess the system's ability to handle future loading and design for new growth.

EXTRAORDINARY FLOWS

Extraordinarily high flows may occasionally occur due to industrial activities or large gatherings of people. HAL evaluated the City's flow data and did not find any unusual flows except those attributable to storms. It is recommended that some excess capacity be included in the sewers for such unexpected events (see further discussion in Chapter 6).

CHAPTER 5
WASTEWATER FLOW PROJECTIONS

PLANNING PERIOD

The periods of time evaluated using the hydraulic model include existing conditions, year 2034 (10-year scenario), and the projected buildout condition. Growth areas and growth projections were developed based on the best available data and in cooperation with City personnel. Growth is focused in areas of redevelopment called Transit Oriented Development (TOD) areas.

Growth areas were updated from the 2016 master plan to reflect specific planned developments. The growth projections in the update exceed the growth projected by the Governor's Office of Planning and Budget (GOPB, 2008).

GROWTH PROJECTIONS

Future population growth rates were estimated based on an evaluation of the planned TOD areas as indicated by personnel from the City's planning department. Total ERUs in the wastewater collection system were projected for each planning period. See Table 5-1. Projections by year are listed in Appendix C.

TABLE 5-1 EXISTING CONDITIONS AND PROJECTIONS

Approximate Year	Cumulative Additional ERUs	Total ERUs	Description
2024	0	5,702	Existing System
2034 (10-Year)	1,097	6,799	10-Year Development
Buildout	8,488	14,190	System at Buildout

EXISTING SYSTEM LOADING

Wastewater typically consists of two components: sewage directly from the connection and inflow/infiltration. Wastewater loading was calculated using winter water use and inflow and infiltration values found in the Sewer Inflow and Infiltration Study (HAL, 2021).

Drinking water usage data were obtained from the City for the winter of 2023-2024 and Salt Lake City 2019 water usage (HAL, 2021). Sewer billing data were also obtained from the City to show users that provide their own water through private wells and are connected to the City wastewater system. The drinking water usage data were geocoded to create a point shapefile showing the address-based location and the amount of winter water use. The 900 West SLCDPU sewer billing data and private wells data as reported in the Sewer Inflow and Infiltration Study (HAL, 2021), were distributed in the model according to location of use. Table 5-2 shows the existing system loading (HAL, 2021).

TABLE 5-2
EXISTING SYSTEM LOADING

Water Source	Winter Water Use (MGD)
South Salt Lake	0.90
Salt Lake City	0.15
Private Wells	0.08
Total	**1.13**

Geocoded water use data were linked to sewer manholes based on relative location. The compiled water use data were used to represent direct sewer loads at each individual manhole. Inflow and infiltration loads were also distributed throughout the City as baseflows.

FLOW PROJECTIONS

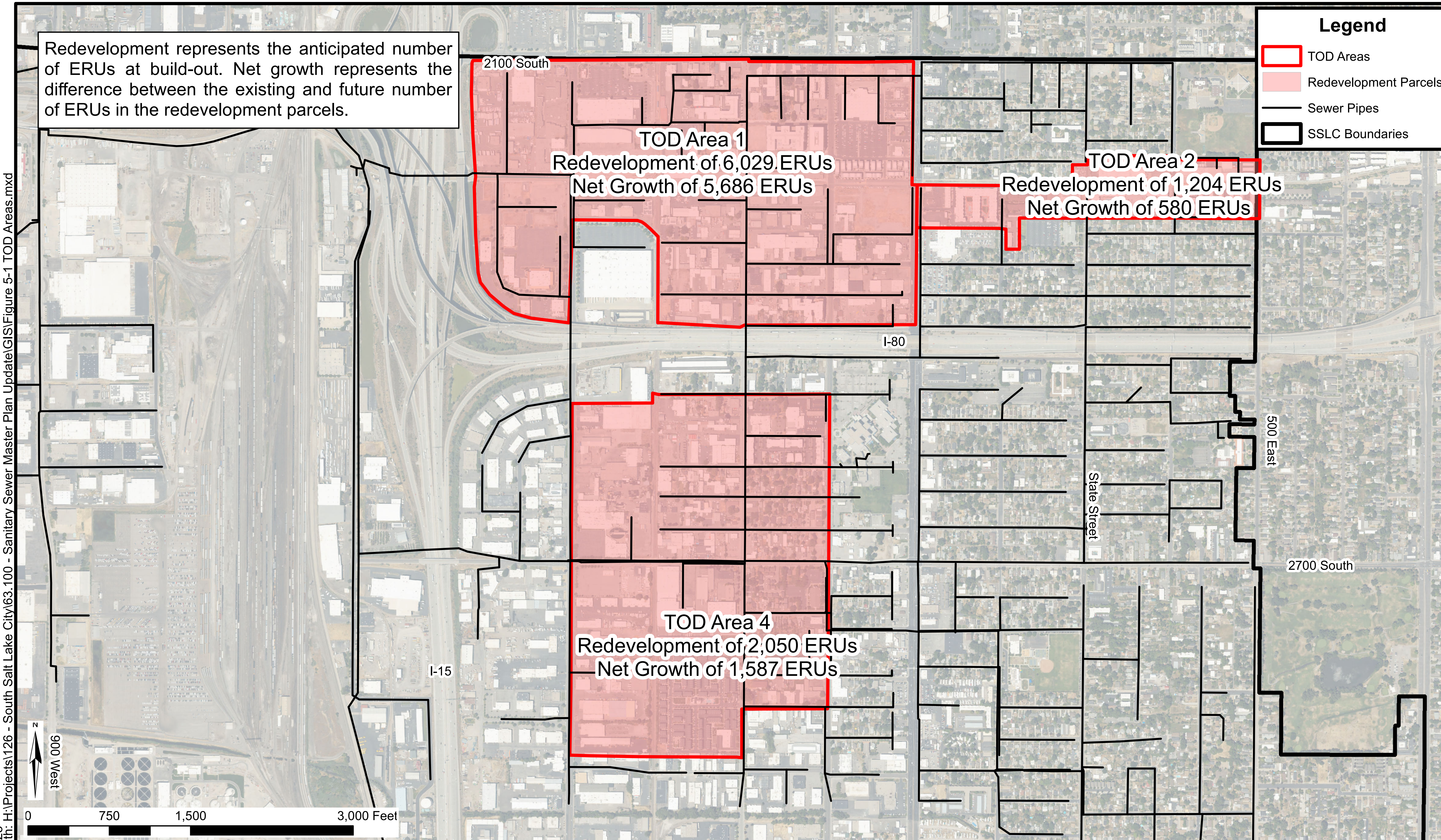
The magnitude and location of projected future wastewater flows were estimated based on ERU projection and estimated inflow and infiltration. These projections considered future land use projections, the acreage of projected future development areas, the estimated wastewater generation for each land use type (expressed as ERUs/acre), and the level of service of 165 gpd/ERU.

The TOD areas can be seen on Figure 5-1 and Figure 5-2. The number of estimated re-development ERUs contributing to the sewer system at buildout was calculated to be approximately 8,488. Detailed growth estimates for TOD 1 and 2 were provided by the City and are shown on Figure 5-2. It is important to note the difference between redevelopment ERUs, which are an estimate of future redeveloped ERUs in an area after the existing loads have been removed, and net growth which is an estimate of the ERUs added to an area above the existing loads in that area. This explains why TOD 1 has a total redevelopment of 6,029 ERUs while the net growth is only 5,686 ERUs.

Buildout Flows

Future wastewater flow rates were projected for the entire service area at buildout. For each TOD area in the City, future wastewater flow projections were forecasted on a per-acre basis based on the density of the planned land.

Table 5-3 shows the existing and projected average wastewater generated in the areas treated by CVWCD. The flows presented include the influence of inflow and infiltration but are not peaked.



Date: 8/14/2025
Document Path: H:\Projects\126 - South Salt Lake City\63.100 - Sanitary Sewer Master Plan Update\GIS\Figure 5-1 TOD Areas.mxd

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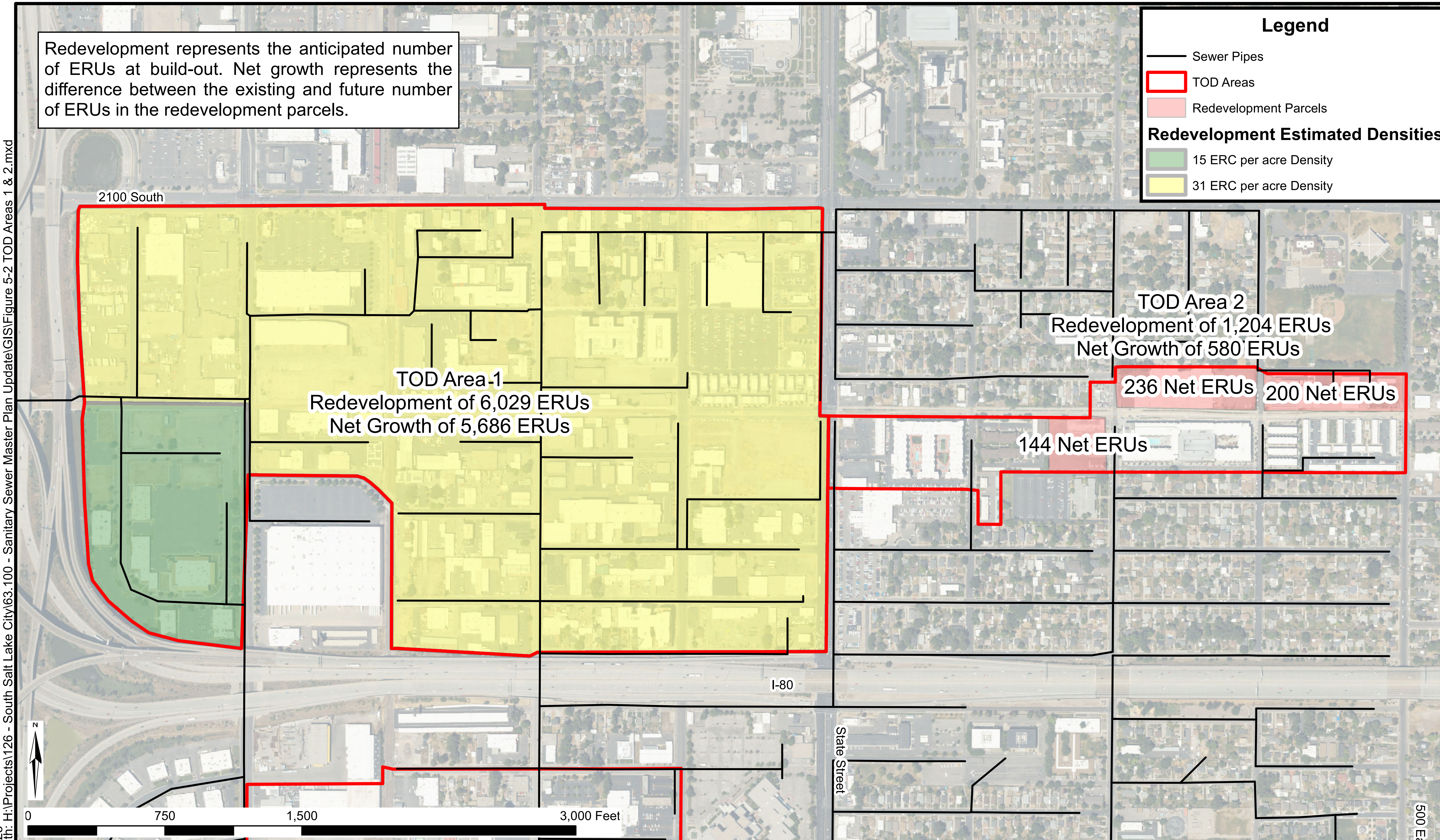
TRANSIT ORIENTED DEVELOPMENT (TOD) AREAS

FIGURE 5-1



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Document Path: H:\Projects\126 - South Salt Lake City\63.100 - Sanitary Sewer Master Plan Update\GIS\Figure 5-2 TOD Areas 1 & 2.mxd

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TRANSIT ORIENTED DEVELOPMENT (TOD)
AREAS 1 & 2 REDEVELOPMENT ERUs

FIGURE
5-2

TABLE 5-3 SYSTEM FLOW PROJECTIONS TO CVWRF

Approximate Year	Total ERUs	Customer Flow Generation (MGD)	Inflow (MGD)	Infiltration (MGD)	Projected Peak Daily Flow (MGD)
2024	5,702	0.94	2.04	1.60	4.58
2034 (10-Year)	6,799	1.12	2.04	1.60	4.76
Buildout	14,190	2.34	2.04	1.60	5.98

It is important to note that flow rates to the plant fluctuate significantly throughout the year due to inflow and infiltration which can be seen in Figure 4-3. CVWRF is expected to have enough capacity to handle growth in the City through buildout.

Lift Station Flow Projections

Table 5-4 shows the capacities of the lift stations compared to the future projected flow rates to the lift stations. Because no redevelopment is expected west of I-15, only flow rates to the Main Lift are expected to increase due to future growth. Lift Station 1, Lift Station 2, and Lift Station 3 have adequate capacity for existing and buildout conditions. It is recommended that the City monitor flows to the lift stations in order to analyze pump capacities during precipitation events. Refer to Table 2-1 for existing lift station inventory.

TABLE 5-4
LIFT STATION FLOW RATE PROJECTIONS

ID	Lift Station	Pump Manufacturer	Capacity	Existing Modeled Peak Flow	Future Modeled Peak Flow
1	Main Lift	Flygt	5,070 gpm	2,810 gpm	4,286 gpm
2	2280 S. Lift	Flygt	1,100 gpm	700 gpm	700 gpm
3	2610 S. Lift	Flygt	260 gpm	170 gpm	170 gpm

CHAPTER 6
WASTEWATER COLLECTION SYSTEM EVALUATION

MODEL SELECTION

It was decided by HAL and City personnel to use the SSA Model for the master plan because of the model's ability to import GIS data, export models to EPA SWMM, and because the model runs on an Autodesk platform.

SYSTEM LAYOUT

The layout of the wastewater collection system was provided by the City based on a GIS data inventory of the collection system. A map of the City wastewater collection system, as included in the model, is shown in Figure 2-1. Wastewater loading within the model was performed using GIS. Billing addresses were used to link winter drinking water meter data to meter location, which were then linked to sewer collection areas and sewer manholes as a load. Inflow and infiltration loads were determined from the Sewer Inflow and Infiltration Study (HAL, 2021) and distributed throughout the City. HAL previously met with City personnel to determine flow direction in locations with bypass pipes and multiple connections. HAL also collaborated with the City to retrieve additional system data during the 2014 model creation.

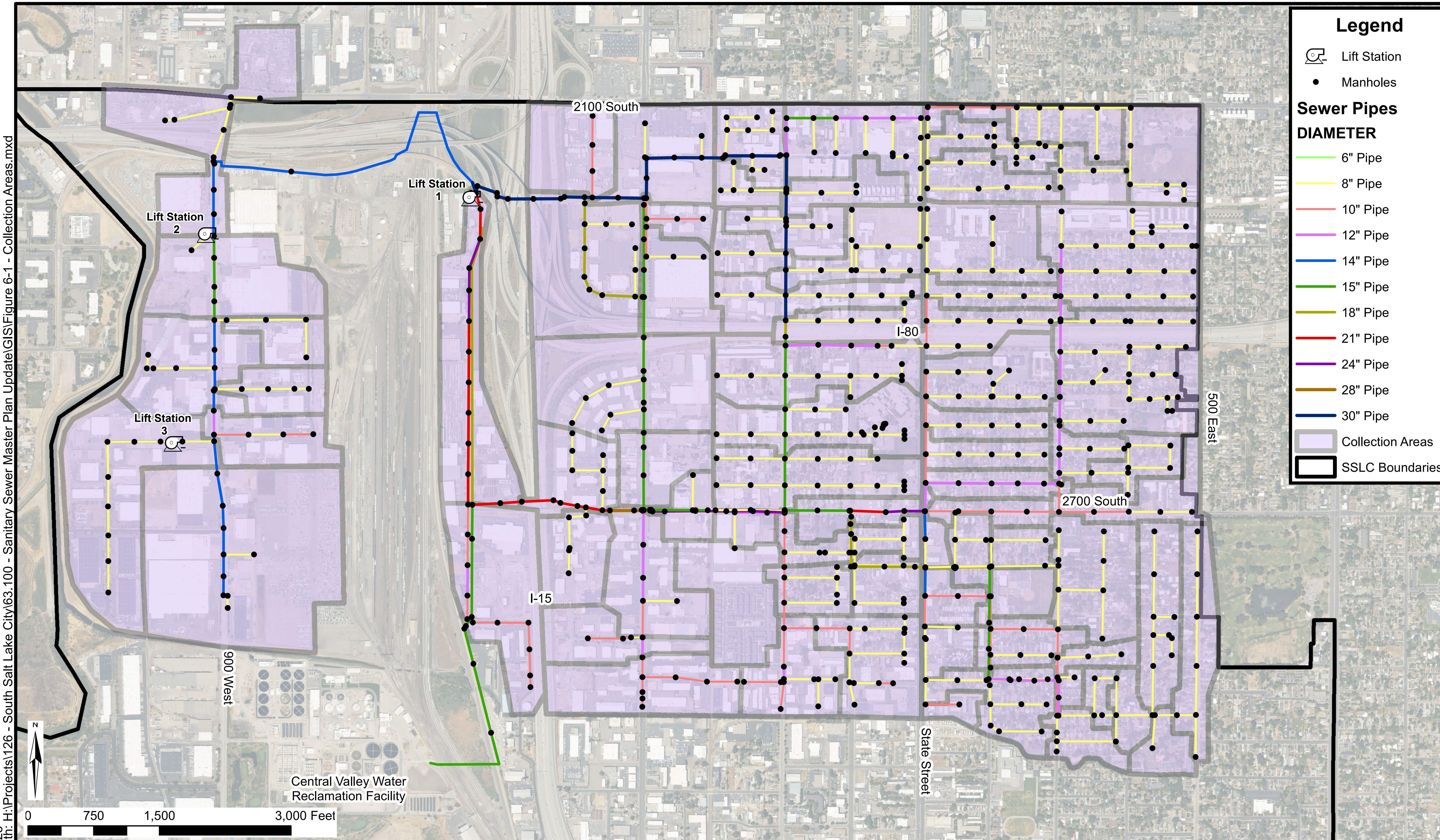
Pipe and manhole data were imported into the SSA model from GIS shapefiles. Some of the smaller collectors and laterals were not modeled because of the lack of survey data for less significant manholes.

COLLECTION AREAS

A collection area is defined as a geographic area that contributes flow to a common point in the collection system. Collection areas were delineated in the 2014 master plan using sewer manholes, topography, parcels, and water meters, and updated in 2024. Water meters were used in the collection area delineation because sewer flow rates were estimated using winter water use data. The collection areas provide information on where the flow from each existing water meter was assigned in the wastewater collection system model. City personnel reviewed the collection areas to verify the water meters were in the correct collection area. The delineated collection areas are shown on Figure 6-1.

FLOW ALLOCATION

Wastewater flow was spatially allocated in the model to match flow values and projections listed in Chapter 5. Infiltration and inflow were distributed across the system at locations shown on Figure 6-2. For the existing model, flows were distributed using billed wintertime drinking water sales data. Using this data assumes that winter water use is representative of indoor water use, and that there is little consumptive use of water indoors, which equates the sewer loading and the indoor water use. For future projections, wastewater flow generated by customers was allocated based on the planned TOD areas and the projected density of ERUs per acre.



Date: 8/21/2025
Document Path: H:\Projects\126 - South Salt Lake City\63.100 - Sanitary Sewer Master Plan Update\GIS\Figure 6-1 - Collection Areas.mxd

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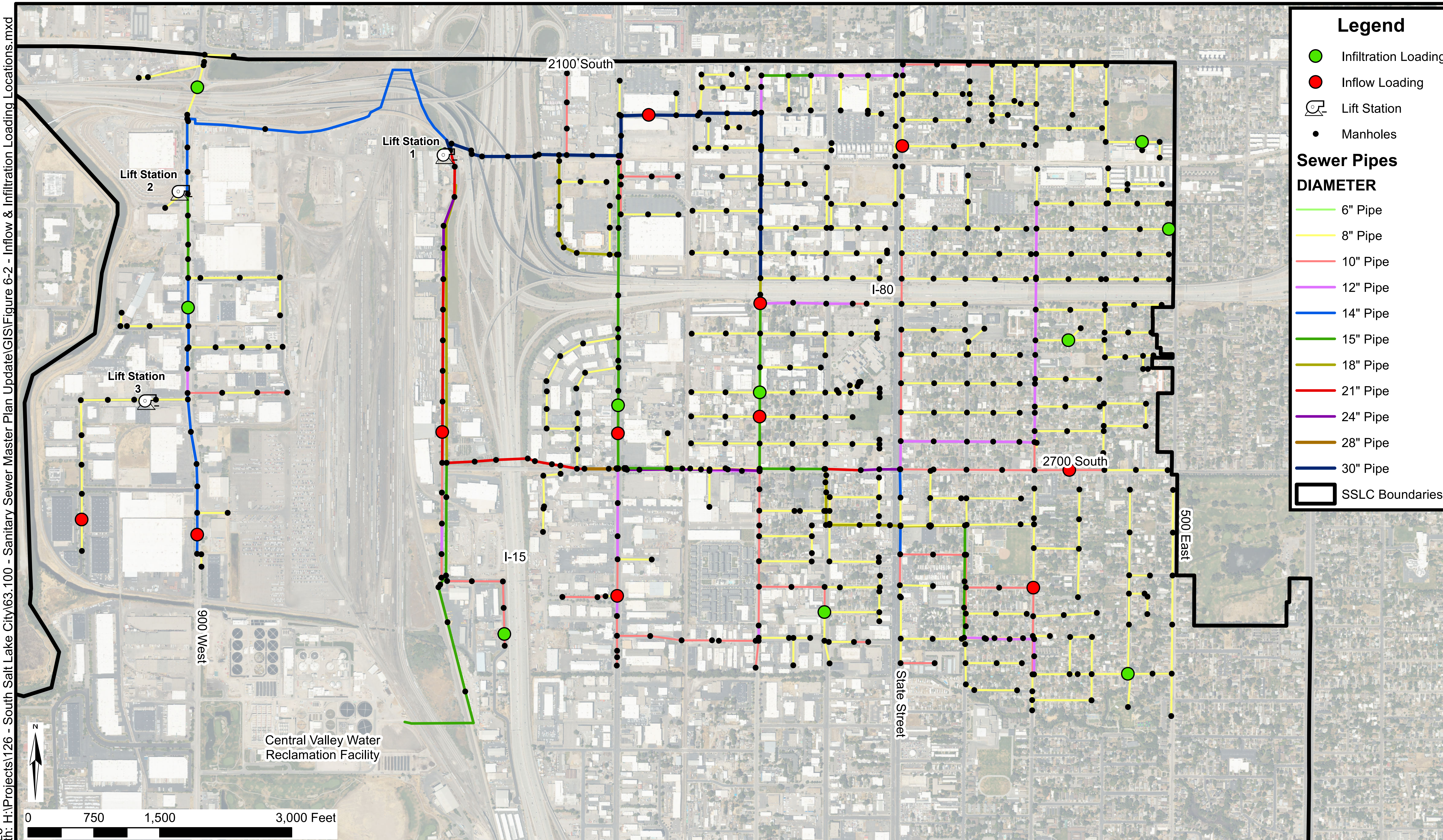
COLLECTION AREAS

FIGURE 6-1



Date: 8/21/2025
Document Path: H:\Projects\126 - South Salt Lake City\63.100 - Sanitary Sewer Master Plan Update\GIS\Figure 6-2 - Inflow & Infiltration Loading Locations.mxd

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WASTEWATER COLLECTION SYSTEM MASTER PLAN UPDATE

INFLOW & INFILTRATION LOADING LOCATIONS

FIGURE 6-2

MODELING CRITERIA

A range of potential modeling criteria and values were suggested by HAL and reviewed by the City. The criteria and values adopted for this modeling effort are included in Table 6-1.

TABLE 6-1
MODELING CRITERIA

CRITERIA	VALUE OR ASSUMPTION
System Loading	System loading was developed using winter water use data for each meter and inflow/infiltration based on the Sewer Inflow and Infiltration Study (HAL, 2021).
Daily Flow Variation	Diurnal curves were developed from 2014 flow monitoring (see Figure 4-1).
Peak Flow	Peaking factors were developed with diurnal curves and peak flows were developed from the AutoCAD SSA model.
Inflow and Infiltration	The City experiences very significant inflow and infiltration due to the seasonal water table fluctuation and precipitation. Inflow and infiltration were studied extensively in 2021 (HAL, 2021) and were distributed throughout the City. Modeled values are as follows: Inflow = 2.04 MGD Acceptable Infiltration = 0.8 MGD
Extraordinary Flows	Due to the significant amount of inflow and infiltration, extraordinary flows were modeled using a design flow representative of a high-water table with a recent precipitation event.
Model Calibration	The model was calibrated by comparing the modeled flow rates to the measured flow rates at the monitoring locations throughout the City.
Planning Period	Years 2034 (10-year) and estimated buildout.
Land Use & Population Projections	Land uses in undeveloped areas were assumed to occur as specified in the South Salt Lake City General Plan. Where available, development plans were used to further refine projections for future land use. Population projections were based on historic trends and projected rates and timing of growth as identified by the Community Development Department.
Wastewater Flow Projections	Estimated from future ERU projections and created using 165 gpd/ERU as the average flow with the residential and commercial diurnal curves to estimate the peak flow rates and added and distributed the inflow and infiltration component throughout the City.
Pipe Capacity	Roughness Coefficient = 0.013 Manning's n Recommended Maximum d/D = 0.75 for pipe diameters over 12 inches Recommended Maximum d/D = 0.50 for pipe diameters 12 inches and less
Lift Stations	Pump types and curves were provided by the City in the Operation and Maintenance Manual (Hansen, Allen, & Luce, Inc., 2010). Because the two larger pumps in the system have variable speed drives, they were modeled as theoretical pumps.

MODEL CALIBRATION

Model calibration includes comparing hydrographs generated by the model with actual flows measured in the collection system, followed by adjusting the model to better reflect measured flows. As discussed in Chapter 3, flow data observations and the total wastewater flow were available at each of the flow monitoring sites. Flow monitoring locations can be seen on Figure 3-1. Graphs showing the measured flows compared to metered flows can be seen in Appendix A.

MODEL SCENARIOS

Three modeling scenarios were developed and evaluated for the City wastewater collection system as shown in Table 6-2.

TABLE 6-2
MODEL SCENARIOS

SCENARIO	DESCRIPTION
Existing	The Existing scenario was used to identify deficiencies in the wastewater collection system under 2024 development conditions, and to establish a baseline for evaluation of future conditions.
Buildout	The Buildout scenario was used to identify deficiencies in the wastewater collection system under buildout development conditions.
Buildout Corrected	This scenario was used to verify the effectiveness of the capital improvements recommended in Chapter 8 under buildout development conditions.

PEAK HYDRAULIC LOADING

The hydraulic models were used to analyze the collection system. For each scenario, projected average daily flow rates, infiltration, and inflow were spatially allocated in the model. The models applied peaking factors to generate peak flow rates at the lift stations. The existing and future peak flow rates are listed in Table 6-3.

TABLE 6-3
PEAK HYDRAULIC LOADING

Planning Period	System Hydraulic Loading to CVWRF (MGD)
Existing Conditions	5.7583[1]
2034	5.9393[2]
Buildout	8.1236[1]

1. Modeled peak flow rates at modeled outfall.
2. Calculated peak flow rates.

It should be noted that results listed in Table 6-3 are peak instantaneous system hydraulic loading, whereas results in Table 5-4 are daily hydraulic loading values (including infiltration and inflow) but are not peaked.

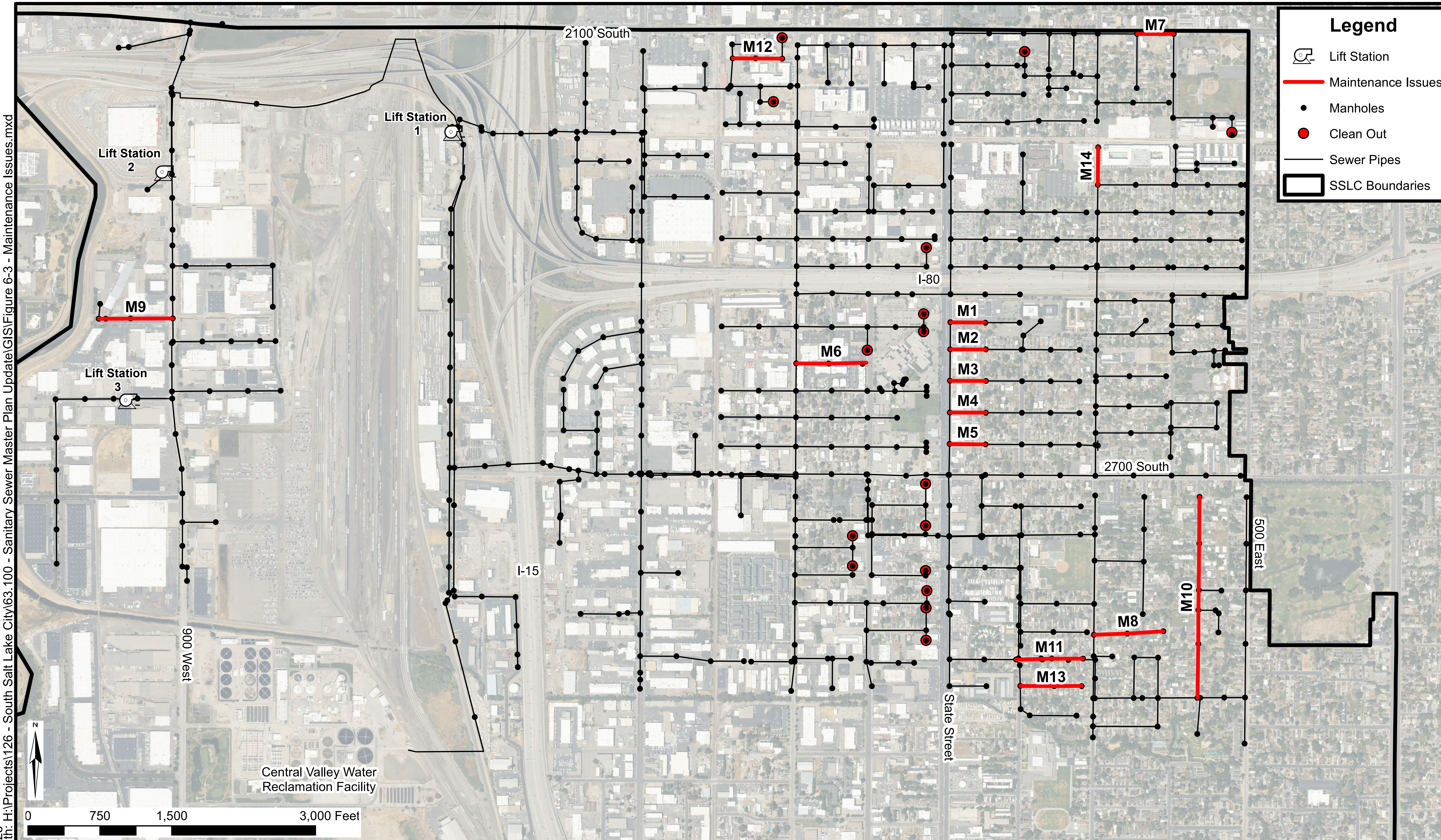
EXISTING DEFICIENCIES

Deficiencies were identified through modeling, past maintenance, and CCTV inspections. Maintenance issues noted by City personnel are summarized in Table 6-4. Deficiencies with an ID starting with "M" refer to a maintenance issue. Maintenance issues are shown on Figure 6-3.

Many of the maintenance issues are due to low velocities. In places where the maximum pipe velocity is less than 2 feet per second, sediment will begin to settle out of the flow. Due to elevation restrictions, replacement of the pipes will not always increase the maximum velocities. Therefore, it is recommended that the City continue their system cleaning schedule to manage sedimentation in the system, with select locations cleaned more frequently as needed.

TABLE 6-4
EXISTING MAINTENANCE ISSUES

ID	LOCATION	DIAMETER LENGTH	MAINTENANCE ISSUES
M1	Oakland Ave. from 150 East to State St.	8-in 360 ft	Flat slope and presence of roots require frequent cleaning
M2	Whitlock Ave. from 150 East to State St.	8-in 370 ft	Flat slope requires frequent cleaning
M3	Beryl Ave. from 150 East to State St.	8-in 375 ft	Flat slope requires frequent cleaning
M4	Vidas Ave. from 150 East to State St.	8-in 375 ft	Flat slope requires frequent cleaning
M5	Leslie Ave. from 150 East to State St.	8-in 375 ft	Flat slope requires frequent cleaning
M6	Whitlock Ave. from Main St. to West Temple St.	8-in 735 ft	High grease load requires frequent cleaning
M7	2100 South from 400 East to Blair St.	8-in 385 ft	Flat slope requires frequent cleaning
M8	Maxwell Ln. from 400 East to 300 East	8-in 725 ft	Flat slope requires frequent cleaning
M9	Beardsley Pl. from 1000 West to 900 West	8-in 775 ft	Flat slope requires frequent cleaning
M10	Adams St. from 2725 South to Welby Ave.	8-in 2,095 ft	Flat slope requires frequent cleaning
M11	Garden Ave. from 290 East to 200 East	8-in 700 ft	Flat slope requires frequent cleaning
M12	Commonwealth Ave. from 125 East to 175 East	8-in 520 ft	High grease load requires frequent cleaning
M13	Welby Ave. from 290 East to 200 East	8-in 645 ft	Flat slopes and high grease load require frequent cleaning



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Document Path: H:\Projects\126 - South Salt Lake City\63.100 - Sanitary Sewer Master Plan Update\GIS\Figure 6-3 - Maintenance Issues.mxd

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MAINTENANCE ISSUES

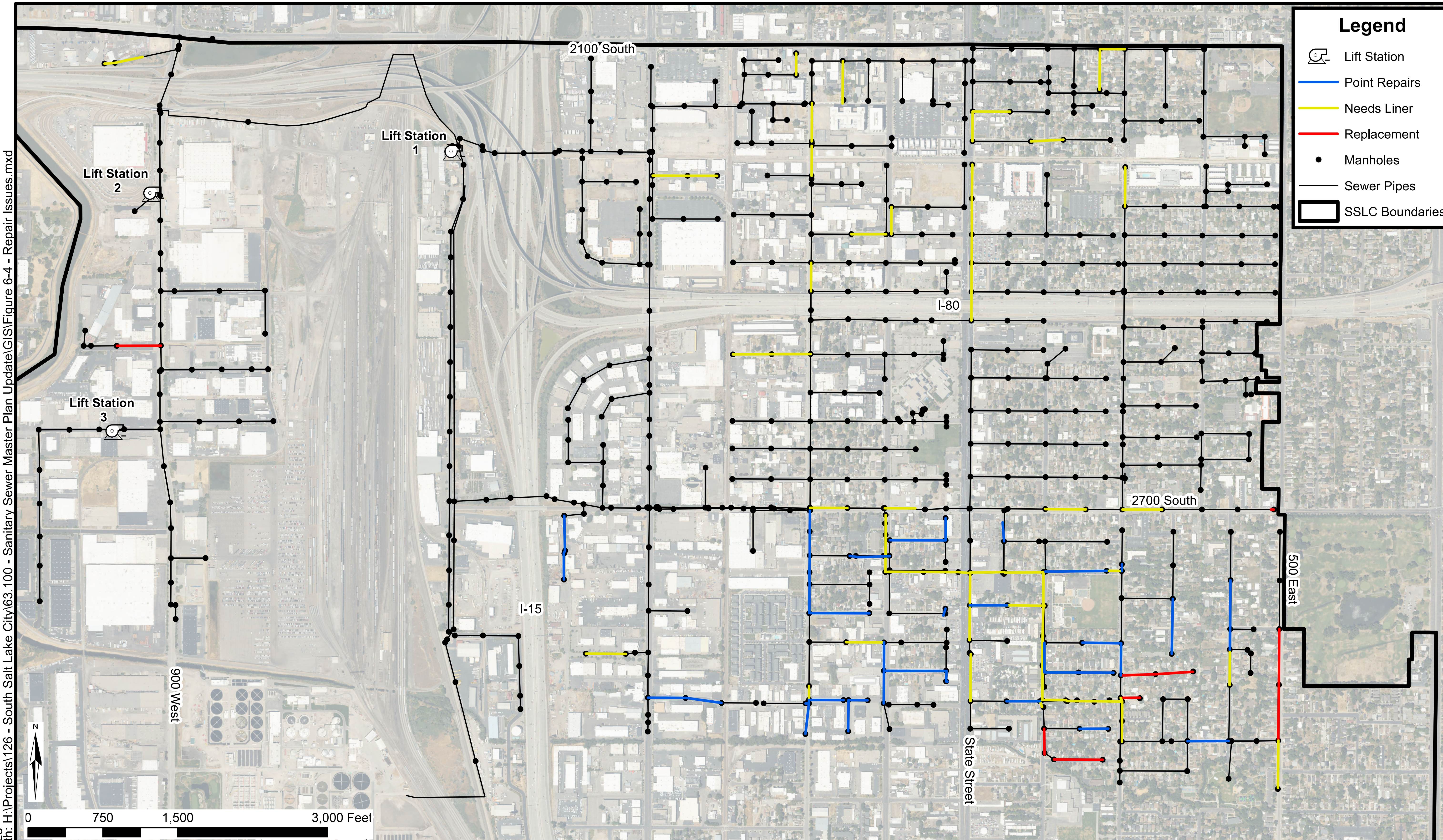
FIGURE 6-3

ID	LOCATION	DIAMETER LENGTH	MAINTENANCE ISSUES
M14	300 East from 2200 South to Haven Ave.	8-in 390 ft	60 ft long belly in pipe requires frequent cleaning

According to the repair data from the City there are pipes which need liners and pipes which need point repairs. The repair locations can be seen on Figure 6-4.

CONTINUED MODEL UPDATES

In order to ensure that the hydraulic model is up to date and is providing accurate collection and system performance information, the model should continually be updated with new information and re-calibrated to match current conditions. The model can then continue to be used to evaluate planned developments and refine the timing and characteristics of master planned projects as additional information becomes available.



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REPAIR ISSUES

FIGURE 6-4

CHAPTER 7
IMPROVEMENT ALTERNATIVES & PROJECTS

Recommendations for key operations and maintenance procedures have been developed. Many of these recommendations are a continuation of procedures already in effect. A discussion is included below, along with a recommendation for continued practice.

SYSTEM MONITORING

It is difficult to determine the condition of the wastewater collection system based on age alone. The typical design life for a sanitary sewer is between 50 and 100 years. Factors affecting design life may include pipe material, soil conditions and quality of construction. The City uses sewer video inspection technology to evaluate the structural integrity of the pipes in the sewer network. Sewer video inspection is very useful at identifying cracks, holes, offset joints, erosion, low points in pipes, and significant inflow/infiltration. It is recommended that the City continue the system video schedule and use the inspection to plan for future repair projects.

PIPELINE IMPROVEMENTS

The following improvement alternatives are typically considered when addressing pipeline deficiencies.

Cleaning

If the slope of the pipe is insufficient to provide adequate flow velocity, deposition of solids will occur. Solids deposition decreases pipe capacity. Several locations within the City's collection system are relatively flat, resulting in slopes less than that necessary to produce scour velocity. It is recommended that City crews continue cleaning pipes in the system on a regular schedule. Problem areas should be cleaned more frequently.

Clean outs are sometimes installed to clean sewer pipes. However, cleanouts are easily buried or often become unusable. Access manholes are preferred for cleaning and maintenance purposes. It is recommended that access manholes be installed at any clean out locations for cleaning and maintenance purposes.

Replacement Sewers

Historically, where pipe capacity has been identified as being insufficient, the typical solution has been to provide additional capacity by replacing the existing sewer with a larger sewer. Portions of the recommended projects are replacement projects.

Bypass Sewers/Re-routing Flows

While replacement of an existing sewer may be appropriate when the existing sewer is structurally inadequate, construction of a bypass or parallel sewer to supplement the capacity of the existing sewer is generally a less expensive alternative.

The City has several existing locations where bypass sewer connections allow excessive flow to be carried in alternate sewer lines.

New Sewers

New sewers are often the only option to collect flows from future development or previously inaccessible areas. Because some future growth within City's service area is expected to occur in some areas without existing sewer networks, new sewer networks are expected to be constructed in the foreseeable future.

Alternative Construction Technologies

Within the last few years, several alternative technologies have become popular when sewers need to be replaced, when pipeline capacity needs to be increased, or when there are significant constraints to more conventional construction methods. Typical alternative technologies include:

New Construction

- Steered Auger Boring (Directional Drilling)
- Micro-tunneling

Sewer Pipe Rehabilitation

- Cured-in-Place Pipe
- Slip Lining
- Pipe Bursting
- Pipe Eating (drilling away the old pipe as a new pipe is installed)
- Thermoforming (Fold and Form)

A description of these alternative construction technologies is included in Appendix E.

COMPARISON OF IMPROVEMENT ALTERNATIVES

Sewers

For the purposes of this report, sewer replacements were assumed to be either open-cut or jack and bore.

Lift Stations

Lift Station 1, Lift Station 2, and Lift Station 3 have adequate capacity for existing and buildout conditions. It is recommended that the City install meters at lift stations 1 and 2 to monitor flows during significant precipitation events. Peak inflows should be compared to the existing capacity of the lift stations.

Efforts should also be made to identify any cross connections between storm drains and the sewer system. Some cities implement smoke detection programs to find illegal or old drain connections. However, smoke detection can be controversial and is generally viewed negatively by the public. Any use of smoke detection should include a strong public awareness campaign to inform the public of the process.

Future Considerations

During design of the recommended improvements, the City will review all assumptions, compare improvement alternatives, and will decide on the most cost-effective and appropriate improvement method at that time.

RECOMMENDED EXISTING SYSTEM PROJECTS

The maximum depth ratio is the ratio between the maximum flow depth in the sewer and the diameter of the pipe (d/D). Pipes 12 inches or less in diameter were considered deficient if, in the model, the d/D exceeded 0.5 during peak flow conditions. Pipes greater than 12 inches in diameter were considered deficient if, in the model, the d/D exceeded 0.75 during peak flow conditions or if the pipe is surcharged.

Pipe capacity deficiencies identified in the Existing Scenario models are summarized in Table 7-1 along with the recommended solutions. Existing projects are shown on Figure 7-1.

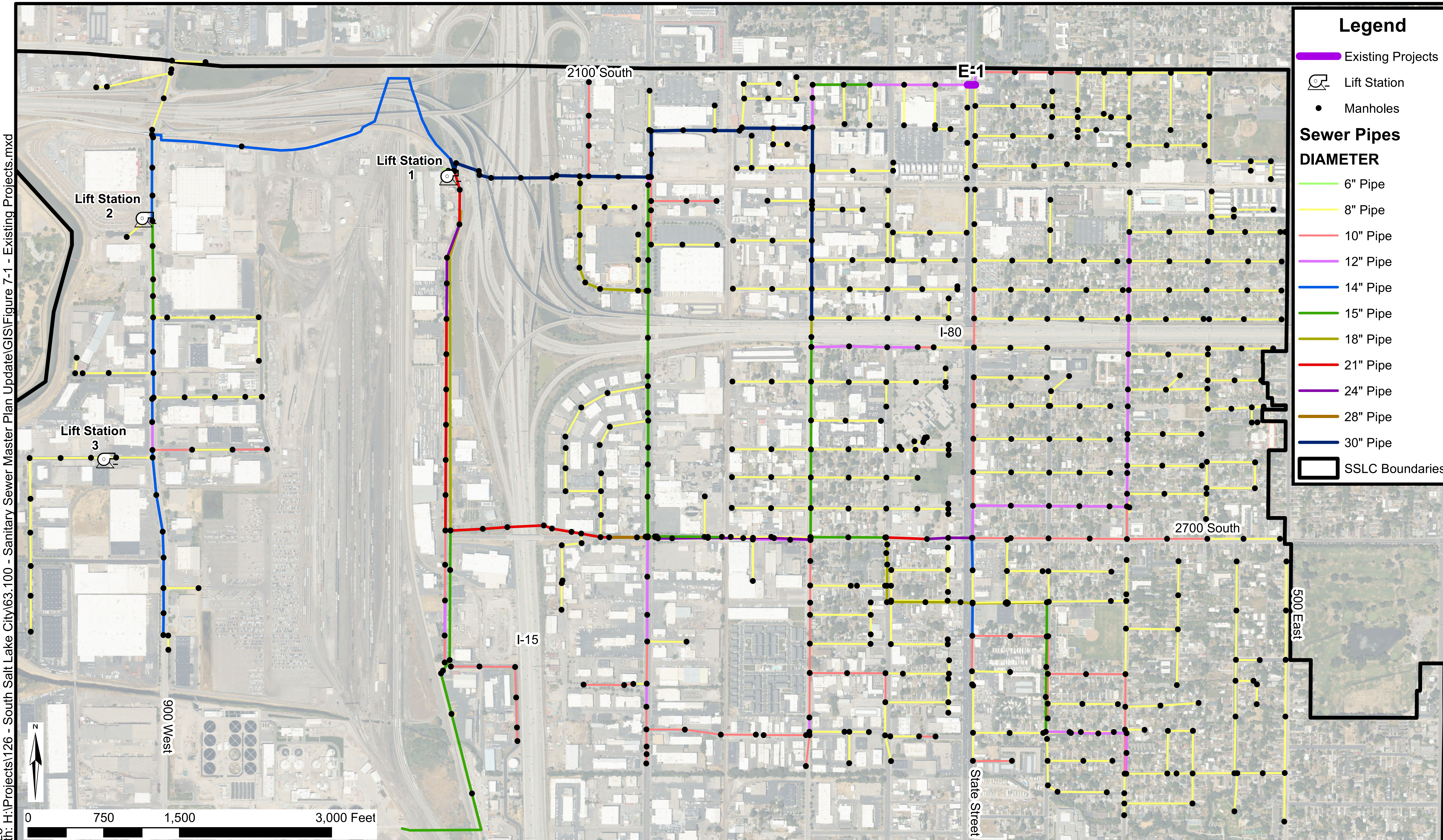
TABLE 7-1
EXISTING IMPROVEMENT PROJECTS

PROJECT ID	LOCATION	ISSUE	RECOMMENDED SOLUTION
E-1	2120 South across State Street	d/D > 0.5 (0.62)	Jack and bore under State Street with a 30” casing. Replace 80 ft of existing 12” gravity line with 15” gravity line.[1]

1. Lengths are approximate. Alignments should be refined with further study.

RECOMMENDED FUTURE SYSTEM PROJECTS

Future improvements were identified using the hydraulic model and are designed to accommodate projected future wastewater flows. Pipe capacity improvements required to serve projected 10-year and buildout growth are shown on Figure 7-2 and are summarized in Table 7-2.



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Document Path: H:\Projects\126 - South Salt Lake City\63.100 - Sanitary Sewer Master Plan Update\GIS\Figure 7-1 - Existing Projects.mxd

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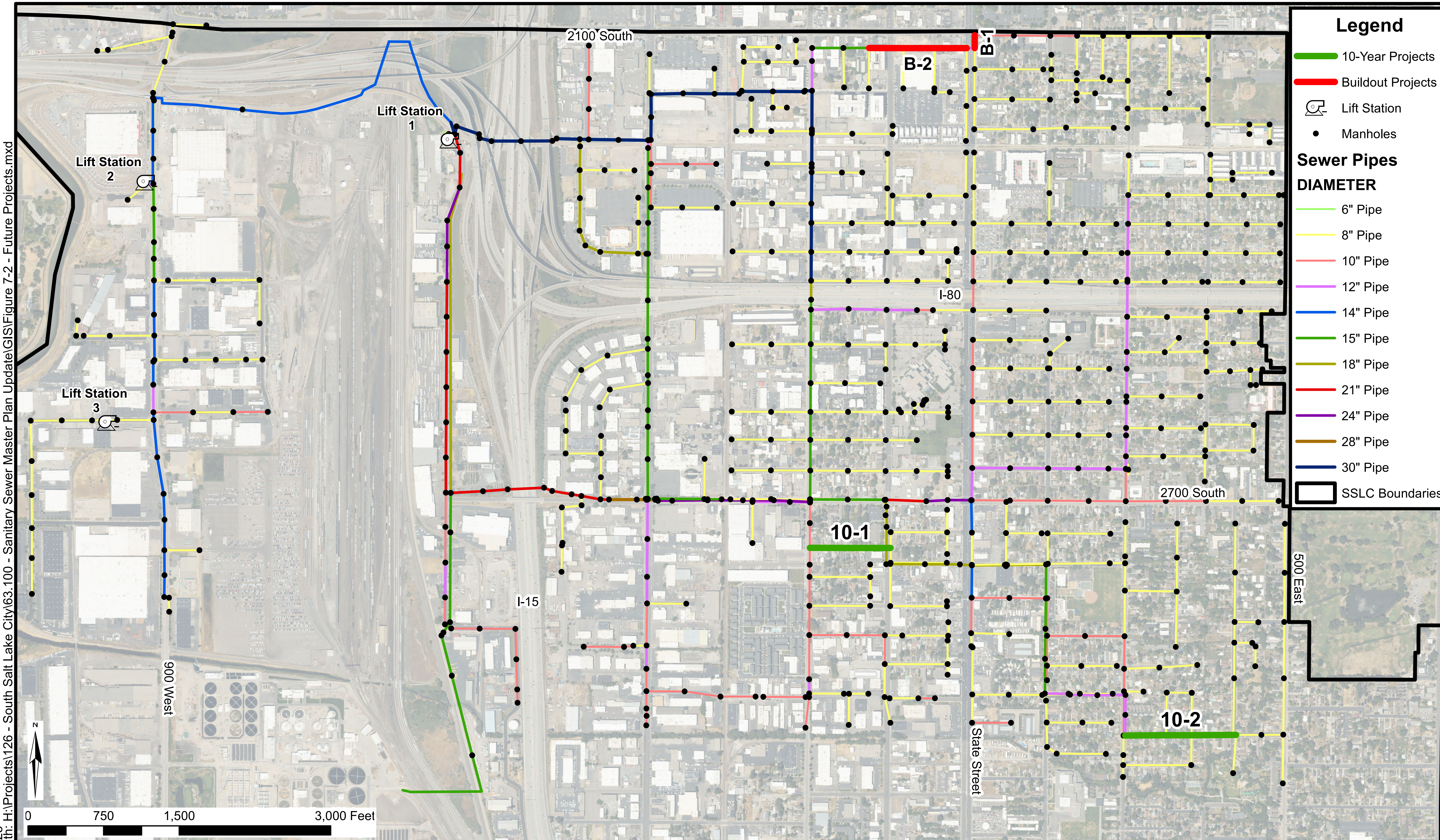
EXISTING PROJECTS

FIGURE 7-1



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Document Path: H:\Projects\126 - South Salt Lake City\63.100 - Sanitary Sewer Master Plan Update\GIS\Figure 7-2 - Future Projects.mxd

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FUTURE PROJECTS

FIGURE 7-2

TABLE 7-2
FUTURE 10-YEAR AND BUILDOUT IMPROVEMENT PROJECTS

PROJECT ID	LOCATION	ISSUE	SOLUTION
10-Year Projects			
10-1	Shelley Ave from West Temple St to Main St	Future development	Install 800 ft of 10” gravity line.[1]
10-2	Welby Ave from 300 E to Adam St	Future development	Install 1,100 ft of 10” gravity line.[1]
Buildout Projects			
B-1	State St from 2100 S to 2150 S	Future development	Install 130 ft of 15” gravity line.[1]
B-2	Approximately 2150 S from State St to Panama St	Future development	Install 980 ft of 15” gravity line.[1]

1. Lengths are approximate and will be refined further as development plans in these areas are better defined.

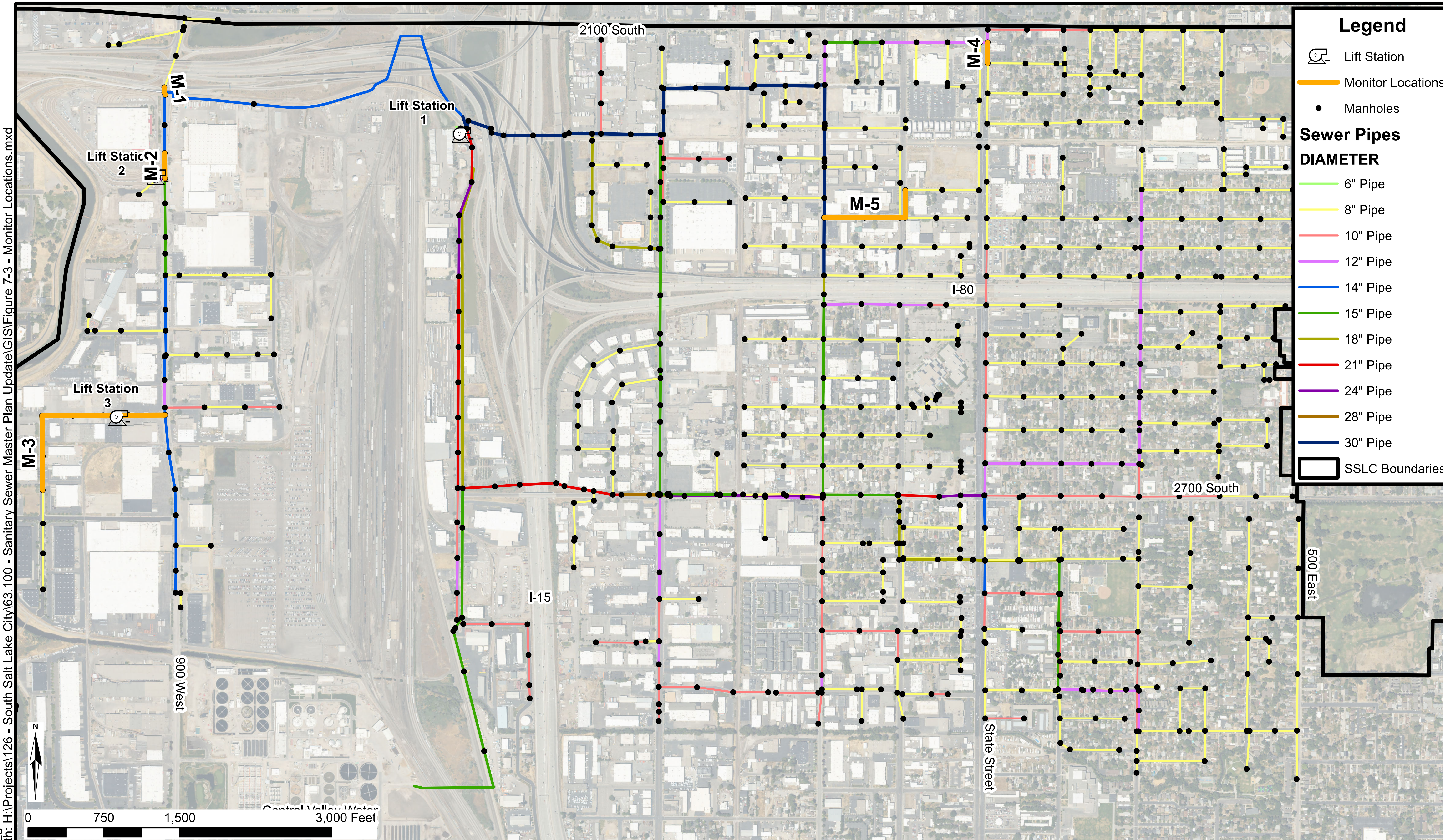
Recommended Project Schedule

As growth in one TOD area is completed, it is expected to continue in the next TOD area. Therefore, projects due to growth in an area need to be completed before growth starts in that area.

LOCATIONS TO MONITOR

The model shows several areas that show slight deficiencies related to pipe slope. These may be actual deficiencies or may be the result of limitations in the accuracy of available data. In these areas, flow monitoring is recommended to verify the occurrence or extent of any deficiency. Elevation data should also be verified to confirm that the model represents the pipes correctly.

For these areas, a “monitor list” was created. Capital projects to address these types of deficiencies should only be planned for after the deficiency has been field-verified. These recommended locations to monitor are found in Table 7-3 and on Figure 7-3.



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Document Path: H:\Projects\126 - South Salt Lake City\63.100 - Sanitary Sewer Master Plan Update\GIS\Figure 7-3 - Monitor Locations.mxd

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MONITOR LOCATIONS

FIGURE
7-3

TABLE 7-3
LOCATIONS TO MONITOR

PROJECT ID	LOCATION	POSSIBLE ISSUES
M-1	900 W and Parley's Trail	Very flat slopes.
M-2	2305 S 900 W	Flatter slopes, high inflow effects from storm events, and backwater from the larger downstream pipe.
M-3	Along 1030 W and down 2610 S until 900 W	Flatter slopes and high inflow effects from storm events.
M-4	State Street from 2150 S to Commonwealth Ave	Flatter slopes and backwater effects from the larger downstream pipe.
M-5	Main St from Haven Ave to Truman Ave, and Truman Ave from Main St to West Temple Street	Flatter slopes and future development could create deficiency in the existing pipes.

CHAPTER 8
CAPITAL IMPROVEMENTS PLAN

Recommended capital improvements and their estimated construction costs were identified based on the findings described in the previous chapters. These recommendations are intended to correct existing deficiencies and support population growth and development.

PROJECT COST ESTIMATES

Typical representative unit costs were used to develop the project construction cost estimates. Sources of typical unit costs included HAL's bid tabulation records for similar recent projects in Utah, and the 2023 RS Means Heavy Construction Cost Index. Project cost estimates and related material are included in Appendix D.

ACCURACY OF COST ESTIMATES

When considering cost estimates, there are several levels or degrees of accuracy, depending on the purpose of the estimate and the percentage of detailed design that has been completed. The following levels of accuracy are typical:

Type of Estimate	Accuracy
Master Plan	-50% to +100%
Preliminary Design	-30% to +50%
Final Design or Bid	-10% to +10%

For example, at the master plan level (or conceptual or feasibility design level), if a project is estimated to cost $1,000,000, then the accuracy or reliability of the cost estimate would typically be expected to range between approximately $500,000 and $2,000,000. While this may not seem very accurate, the purpose of master planning is to develop general sizing, location, cost and scheduling information on a number of individual projects that may be designed and constructed over a period of many years. Master planning also typically includes the selection of common design criteria to help ensure uniformity and compatibility among future individual projects. Details such as the exact capacity of individual projects, the level of redundancy, the location of facilities, the alignment and depth of pipelines, the extent of utility conflicts, the cost of land and easements, the construction methodology, the types of equipment and material to be used, the time of construction, interest and inflation rates, permitting requirements, etc., are typically developed during the more detailed levels of design.

At the preliminary design level, some of the aforementioned information will have been developed. Major design decisions such as the size of facilities, selection of facility sites, pipeline alignments and depths, and the selection of the types of equipment and material to be used during construction, will typically have been made. At this level of design, the accuracy of the cost estimate for the same $1,000,000 project would typically be expected to range between approximately $700,000 and $1,500,000.

After the project has been completely designed, and is ready to bid, all design plans and technical specifications will have been completed and nearly all of the significant details about the project should be known. At this level of design, the accuracy of the cost estimate for the same $1,000,000 project would typically be expected to range between approximately $900,000 and $1,100,000.

RECOMMENDED IMPROVEMENT PROJECTS

Development of the recommended improvement projects includes consideration of a number of factors including the following:

- Input by City sewer system operation personnel regarding their experience with, and opinions regarding, the deficiency and potential solutions
- Input from City management regarding a wide range of issues including: development schedules, budgeting issues, coordination with other public works projects, etc.
- Priority indicated by the consulting engineer's modeling efforts and by the operational personnel's experience with the repair projects
- Consulting engineer's project cost estimates

Table 8-1 identifies projects recommended to correct existing deficiencies. Table 8-2 identifies projects recommended to provide capacity for projected future 10-year and buildout flows in the wastewater system.

TABLE 8-1 EXISTING IMPROVEMENT PROJECTS AND COST ESTIMATES

PROJECT ID	DESCRIPTION	COST[1]
E-1	30" Jack and bore under State Street and install 15" gravity line.	**$531,000**
	TOTAL	**$531,000**

[1] All costs include 20% for engineering, administrative costs, and contingencies. Costs are shown in 2024 dollars.

TABLE 8-2 FUTURE IMPROVEMENT PROJECTS & COST ESTIMATES

PROJECT ID	DESCRIPTION	COST[1]
10-Year Projects		
10-1	Install 800 ft of 10” gravity line.	**$336,418**
10-2	Install 1,100 ft of 10” gravity line.	**$462,575**
Buildout Projects		
B-1	Install 130 ft of 15” gravity line.	**$72,000**
B-2	Install 980 ft of 15” gravity line.	**$546,000**
	TOTAL	**$1,416,993**

[1] All costs include 20% for engineering, administrative costs, and contingencies. Costs are shown in 2024 dollars.

Before constructing each of these projects, additional flow monitoring and data collection (including survey to verify elevations) should occur to verify current conditions and confirm the need for the project.

FINANCIAL CONSIDERATIONS

Cost for construction, materials, and labor have changed significantly in the last several years. To maintain adequate funding for the wastewater collection system, the following actions are recommended:

- Periodically review and update wastewater collection system rates
- Regularly update impact fees to fund projects to meet future needs

WASTEWATER COLLECTION SYSTEM CLEANING

Wastewater collection system maintenance problems can occur in sewers with flatter slopes, sewers with root problems, and sewers with grease problems. Costs for maintenance and replacement of these sewers should be included in the sewer budget.

SEWER SYSTEM OPERATION AND MAINTENANCE

The City has a budget to operate and maintain the sewer system. This budget includes the cost of wastewater treatment at the CVWRF, employee compensation, equipment costs, office expenses, line repair costs, professional services, training costs, and utility costs. The line repair budget is used to maintain the system (cleaning, video inspection, emergency repairs, pump repairs, etc.).

UTAH SEWER MANAGEMENT PROGRAM

The State of Utah Water Quality Board has developed a Utah Sewer Management Program (USMP) to reduce sanitary sewer overflows (SSO) by giving added emphasis to collection system maintenance, collection system analysis and program documentation. The USMP is intended to meet forthcoming Capacity, Management, Operation, and Maintenance requirements (CMOM) of the Environmental Protection Agency (EPA). The USMP prohibits SSOs, outlines enforcement, and guidelines for reporting SSOs when they occur. It requires all public agencies that own or operate sanitary sewer collection systems in Utah to enroll for coverage with the Utah State Division of Water Quality (DEQ) under the USMP. The enrollees are required to provide a plan and schedule to properly manage, operate, and maintain all parts of the sanitary sewer system to help reduce and prevent SSOs as well as mitigate any SSOs that do occur. Enrollees must prepare, submit, and certify this Sewer System Management Plan (SSMP) to the DEQ within the time period specified in the USMP after its adoption. Enrollees must then take all feasible steps to comply with the conditions of the USMP and follow their own SSMP including: report SSOs, submit an annual report as part of the Utah Municipal Wastewater Planning Program, and resubmit an updated SSMP at least every five years (R317-801). It is recommended that the City enroll in and comply with the USMP.

Sewer Ordinance

It is recommended that the City add text to municipal code 13.36.020 specifying that the size, slope alignment, materials of construction of a POTW sewer, and the methods to be used in excavating, placing of the pipe, jointing, testing and backfilling the trench shall all conform to the requirements set forth in Utah Administrative Code R317-3.

ELIMINATE UNNECESSARY WASTEWATER

One way to increase capacity and reduce treatment costs in the wastewater collection system is to identify and eliminate inflow and infiltration. The City produces about 2.04 MGD of inflow and another 1.6 MGD of infiltration. During a peak event, approximately 58% of the wastewater collected comes from inflow and infiltration (HAL, 2021).

Inflow

Inflow often occurs from cross connections with storm drains, accidental drainage into the system, or from illegal connections at homes. Strategic metering will often reveal the general location of precipitation related inflow. Smoke testing can also identify problematic connections to the sewer system. If connections to the storm drain are identified, efforts should be made to separate storm drain and sewer piping. See Appendix B for the Sewer Inflow and Infiltration Study (HAL, 2021).

Infiltration

Locations where significant infiltration enters the system can be identified through metering and videoing sewer pipes. Because infiltration appears to be the largest unnecessary wastewater source, it is recommended that efforts should be undertaken to identify and repair locations with infiltration. Many locations with infiltration have already been identified in the Sewer Inflow and Infiltration Study (HAL, 2021). See Appendix B for more information.

Direct Sewage

Another example of eliminating unnecessary wastewater is to offer incentives to homeowners for replacing older water wasting fixtures and appliances with new water efficient models. Not only do efficient fixtures and appliances save drinking water, they also reduce wastewater flow. It is recommended that the City offer incentives for installing water wise fixtures and appliances.

FUNDING OPTIONS

Funding options for the recommended projects, in addition to sewer use fees, could include the following options: general obligation bonds, revenue bonds, State/Federal grants and loans, and impact fees. In reality, the City may need to consider a combination of these funding options. The following discussion describes each of these options.

Sewer Service Fees

The sewer service fee is used to pay for the operation and maintenance of the sewer system. As part of the maintenance of the sewer system, it is recommended that sewer systems set aside a part of the budget (including depreciation) into a capital facilities replacement account.

General Obligation Bonds

This form of debt enables the City to issue general obligation bonds for capital improvements and replacement. General Obligation (GO) Bonds would be used for items not typically financed through the Revenue Bonds. GO bonds are debt instruments backed by the full faith and credit of the City which would be secured by an unconditional pledge of the City to levy assessments, charges or ad valorem taxes necessary to retire the bonds. GO bonds are the lowest-cost form of debt financing available to local governments and can be combined with other revenue sources such as specific fees, or special assessment charges to form a dual security through the City's revenue generating authority. These bonds are supported by the City as a whole, so the amount of debt issued for the sewer system is limited to a fixed percentage of the real market value for taxable property within the City.

Revenue Bonds

This form of debt financing is also available to the City for utility related capital improvements. Unlike GO bonds, revenue bonds are not backed by the City as a whole, but constitute a lien against the sewer service charge revenues of a Sewer Utility. Revenue bonds present a greater risk to the investor than do GO bonds, since repayment of debt depends on an adequate revenue stream, legally defensible rate structure and sound fiscal management by the issuing jurisdiction. Due to this increased risk, revenue bonds generally require a higher interest rate than GO bonds, although current interest rates are historically very low. This type of debt also has very specific coverage requirements in the form of a reserve fund specifying an amount, usually expressed in terms of average or maximum debt service due in any future year. This debt service is required to be held as a cash reserve for annual debt service payment to the benefit of bondholders. Typically, voter approval is not required when issuing revenue bonds.

State/Federal Grants and Loans

Historically, both local and county governments have experienced significant infrastructure funding support from state and federal government agencies in the form of block grants, direct grants in aid, interagency loans, and general revenue sharing. Federal expenditure pressures and virtual elimination of federal revenue sharing dollars are clear indicators that local government may be left to its own devices regarding infrastructure finance in general. However, state/federal grants and loans should be further investigated as a possible funding source for needed sewer system improvements.

It is also important to assess likely trends regarding federal/state assistance in infrastructure financing. Future trends indicate that grants will be replaced by loans through a public works revolving fund. Local governments can expect to access these revolving funds or public works trust funds by demonstrating both the need for and the ability to repay the borrowed monies, with interest. As with the revenue bonds discussed earlier, the ability of infrastructure programs to wisely manage their own finances will be a key element in evaluating whether many secondary funding sources, such as federal/state loans, will be available to the City.

Rocky Mountain Power Energy Incentive

Rocky Mountain Power will provide financial incentives for utilities to reduce energy use.

Impact Fees

Impact fees can be applied to water related facilities under the Utah Impact Fees Act. The Utah Impacts Fees Act is designed to provide a logical and clear framework for establishing new development assessments. It is also designed to establish the basis for the fee calculation which the City must follow in order to comply with the statute. However, the fundamental objective for the fee structure is the imposition on new development of only those costs associated with providing or expanding water infrastructure to meet the capacity needs created by that specific new development.

SUMMARY OF RECOMMENDATIONS

1. Capital projects are necessary to improve the performance of the existing system and accommodate future growth.
2. Continue to clean the entire system every other year.
3. Continue to use video inspection on the entire system every four years to identify repair and inflow/infiltration issues.
4. Work to conform to the Utah Sanitary Sewer Management Plan to minimize sewer overflows.
5. Monitor lift stations to analyze capacity during significant precipitation events.
6. Implement the recommended improvement projects to solve existing and future issues in the Capital Facilities Plan (Tables 7-1 and 7-2).
7. Infiltration and inflow contribute to flows in the wastewater collection system. Actions taken to reduce infiltration and inflow can extend the capacity of the collection system pipes and

reduce treatment costs. See the Sewer Inflow and Infiltration Study (HAL, 2021) for more information on the following recommendations:

   a. Enhance pipe inspection program.
   b. Increase annual rehabilitation.
   c. Incentivize sewer lateral replacement.
   d. Update sewer specifications.
   e. Install long-term flow monitoring.

8. Offer incentives for installing water wise fixtures.
9. Work on installing manholes to replace clean-outs during road maintenance and other opportunities of convenience.
10. It is recommended that the City add text to municipal code 13.36.020 specifying that the size, slope alignment, materials of construction of a POTW sewer, and the methods to be used in excavating, placing of the pipe, jointing, testing and backfilling the trench shall all conform to the requirements set forth in Utah Administrative Code R317-3.

REFERENCES

Central Valley Water Reclamation Facility (CVWRF). 2008. *A Brief History*. 2 Feb. 2014 <http://www.cvwrf.org/brochure/page3.php>

City of South Salt Lake, 2011. *History of South Salt Lake*. 14 Jan. 2014 <http://www.southsaltlakecity.com/department-listings/history>.

City of South Salt Lake. 2024. *City of South Salt Lake Municipal Code*. 22 Oct. 2024 <http://library.municode.com/index.aspx?clientID=16638&stateID=44&statename=Utah>

City of South Salt Lake. 2015. *Downtown South Salt Lake Master Plan*. South Salt Lake, UT

Governor's Office of Planning & Budget (GOPB). 2008. *Population Projections*. 1 Jan. 2011 <http://governor.utah.gov/dea/popprojections.html>.

HACH Company. 2012. *Marsh-McBirney FLO-DAR Area/Velocity Radar Flow Meter Sensor Data Sheet.* Frederick, MD: Hach Company

HACH Company. 2014. *GSWW Provides Innovative Solution to a Difficult Flow Monitoring Problem*. 2 Feb. 2014 <http://www.hachflow.com/articles/articledetail.cfm?id=1037>

Hansen, Allen, & Luce, Inc. 2021. *The City of South Salt Lake Sewer Inflow and Infiltration Study.* South Jordan, UT: Hansen, Allen, & Luce, Inc.

Hansen, Allen, & Luce, Inc. 2010. *The City of South Salt Lake Wastewater Collection System Operation and Maintenance Manual.* Midvale, UT: Hansen, Allen, & Luce, Inc.

Hansen, Allen, & Luce, Inc. 2013. *The City of South Salt Lake Drinking Water System Master Plan*. Midvale, UT: Hansen, Allen, & Luce, Inc.

Hansen, Allen, & Luce, Inc. 2014. *The City of South Salt Lake Sanitary Sewer System Master Plan*. Midvale, UT: Hansen, Allen, & Luce, Inc.

Hansen, Allen, & Luce, Inc. 2016. *The City of South Salt Lake Sanitary Sewer System Master Plan*. Midvale, UT: Hansen, Allen, & Luce, Inc.

RSMeans, 2024. *RSMeans Heavy Construction Cost Data*. Norwell, MA: Construction Publishers & Consultants.

U.S. Census Bureau, 2020. *American Fact Finder*. 22 Oct. 2022 <https://data.census.gov/profile/South_Salt_Lake_city,_Utah?g=160XX00US4971070>

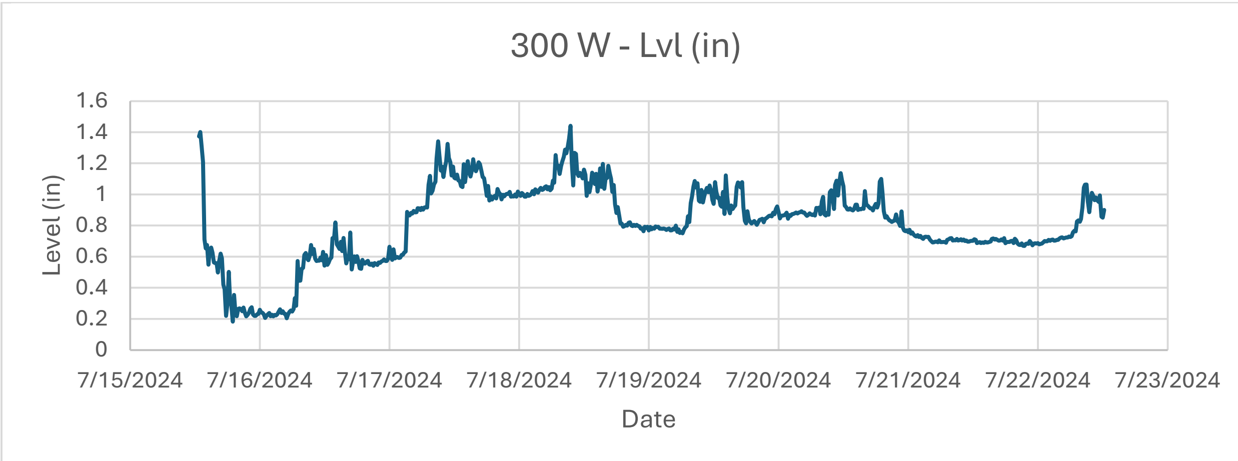
Utah Division of Administrative Rules. 2014. *Utah Administrative Code, R317-3*. The Department of Administrative Services.

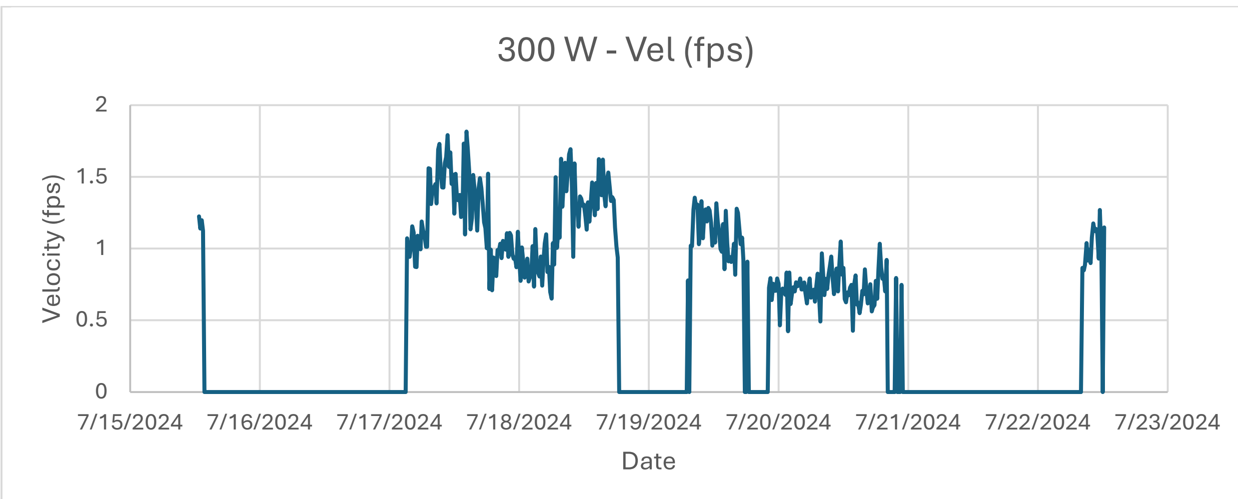
APPENDIX A

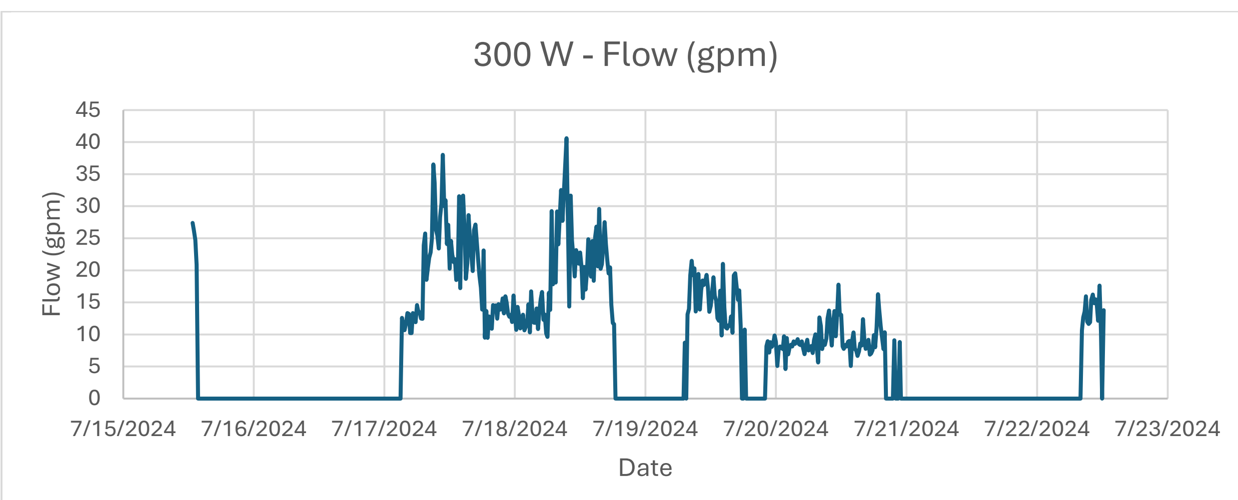
Flow Study Results

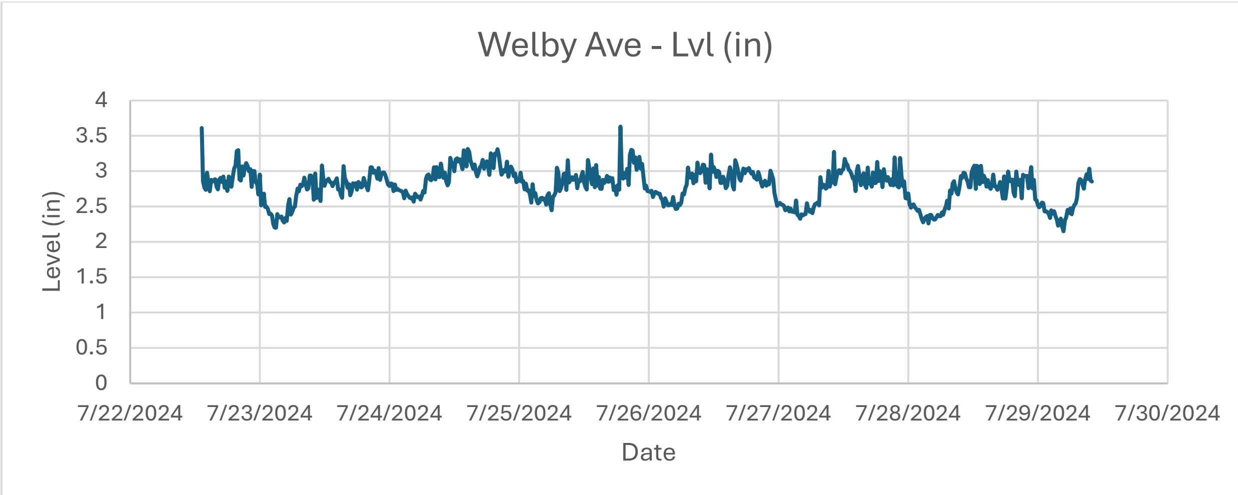
Appendix A

2024 Flow Study Results








Welby Ave - Lvl (in)
Level (in)
4
3.5
3
2.5
2
1.5
1
0.5
0
7/22/2024
7/23/2024
7/24/2024
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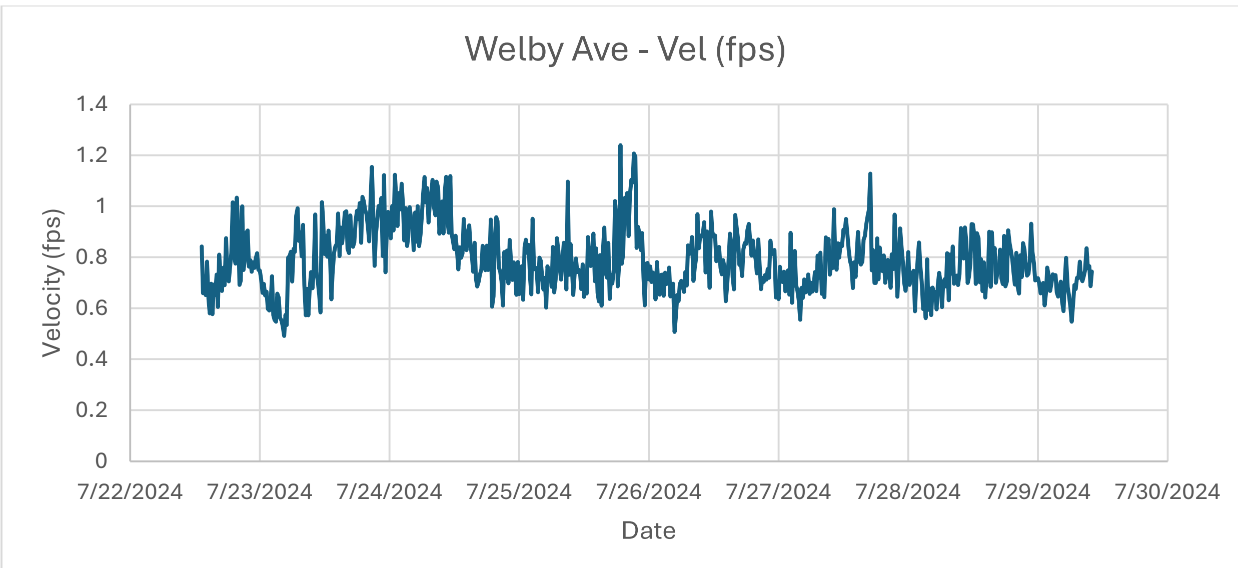
7/29/2024
7/30/2024
Date


Welby Ave - Vel (fps)
Velocity (fps)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
7/22/2024
7/23/2024
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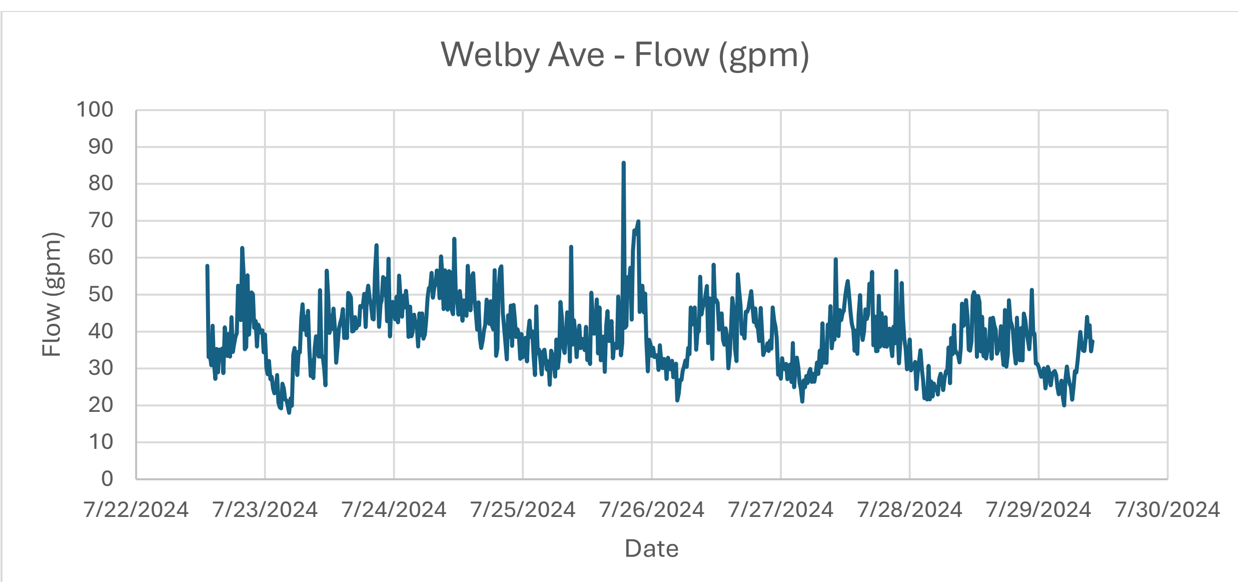
7/30/2024
Date


Welby Ave - Flow (gpm)
Flow (gpm)
100
90
80
70
60
50
40
30
20
10
0
7/22/2024
7/23/2024
7/24/2024
7/25/2024
7/26/2024
7/27/2024
7/28/2024
7/29/2024
7/30/2024
Date

APPENDIX B

Sewer Inflow and Infiltration Study

SOUTH SALT LAKE

SEWER INFLOW AND INFILTRATION STUDY

(HAL Project No.: 126.45.100)

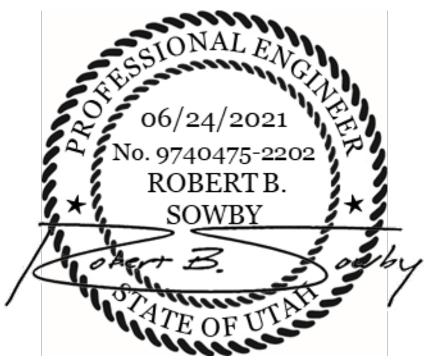
June 2021

HANSEN ALLEN & LUCE INC
ENGINEERS

CITY OF SOUTH SALT LAKE

SEWER INFLOW AND INFILTRATION STUDY

(HAL Project No.: 126.45.100)



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June 2021

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Bryan Mansell, P.E., Plant Engineer

Hansen, Allen & Luce, Inc.
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Stephen E. Sowby, P.E. Project Advisor

TABLE OF CONTENTS

ABBREVIATIONS AND UNITS

EPA	U.S. Environmental Protection Agency
CVWRF	Central Valley Water Reclamation Facility
dia.	diameter
°F	degrees Fahrenheit [temperature]
ft	foot [length]
GIS	geographic information system
gpm	gallons per minute [flow rate]
HAL	Hansen, Allen & Luce, Inc
hr	hour [time]
I&I or I/I	inflow and infiltration
in.	inch [length]
MG	million gallons [volume]
MGD	million gallons per day [flow rate]
MH	manhole
mi	mile [length]
MOID	Mount Olympus Improvement District
NOAA	National Oceanic and Atmospheric Administration
RCP	reinforced concrete pipe
PVC	polyvinyl chlorine [pipe]
psi	pounds per square inch [pressure]
SLC	Salt Lake City
SLCDPU	Salt Lake City Department of Public Utilities
SSL	South Salt Lake

EXECUTIVE SUMMARY

PURPOSE

South Salt Lake's sewer system collects wastewater and conveys it away for treatment. Along the way, the system also picks up considerable rainwater and groundwater—known as inflow and infiltration, respectively. These extra loads affect the capacity, cost, and operation of the sewer system. This study quantifies inflow and infiltration, recommends actions to reduce them, and establishes daily flow patterns for future planning. The study is a major step toward providing more efficient, cost-effective sewer services.

FINDINGS

1. In 2019, 42% of the annual wastewater that the City conveyed to CVWRF was legitimate sanitary flow and the remaining 58% was inflow and infiltration.
2. Infiltration appears to be greatest in residential areas east of State Street (and particularly north of I-80), where pipes are old and brittle and where ground cover is more pervious. It is more likely that infiltration comes through customer laterals rather than the mainline pipe.
3. Inflow appears to be greatest in industrial areas west of State Street where large buildings, parking lots, and streets contribute runoff responsible for peak flows.
4. Precipitation influences sewer flows in two ways: the immediate runoff causes short-team peaks within a few hours of a storm (direct inflow), and precipitation soaking into the ground affects sewer flows for up to two weeks afterward (delayed inflow).

RECOMMENDATIONS

The following actions are recommended to reduce inflow and infiltration into the sewer system:

Enhance pipe inspection program. Using the City's new camera equipment, deliberately look for cracks, corrosion, and live flows that indicate high infiltration. Start with clay pipes east of State Street and north of I-80. Develop pipe ratings to prioritize rehabilitation.

Increase annual rehabilitation. Establish a budget of at least $500,000 per year to rehabilitate 1.5 miles of sewer pipe (4% of the total system length) and manholes each year. Begin east of State Street. Typical rehabilitation reduces infiltration by 25%.

Incentivize sewer lateral replacement. With such large infiltration amounts, it is likely that customer laterals are more to blame than mainline pipe. Set aside funds to incentivize customers to replace their own sewer laterals.

Update sewer specifications. Strengthen specifications, contractor prequalifications, and construction observation for pipe joints and manhole coatings. Consider fusion-welded HDPE as standard for diameters over 20 inches or in areas of high groundwater.

Install long-term flow monitoring. Install permanent flow meters at 2700 South near I-15 and at the proposed Downtown Sewer Pump Station. This divides the system into three roughly equal areas to facilitate future flow characterization.

Use information in future studies and designs. The study characterizes the typical timing, magnitude, and location of sewer flows in greater detail than previous efforts. Use the information to simulate sewer loads and plan future infrastructure.

Over time, with these actions, the City can reduce total wastewater flows by 15%, save about $45,000 per year in treatment costs, reduce the size of future sewer infrastructure, improve the integrity of sewer facilities, and work toward a more sustainable sewer system.

CHAPTER 1 – INTRODUCTION

PURPOSE

The collection, conveyance, treatment, and disposal of municipal wastewater constitute a necessary chain of services to protect public health and the environment. South Salt Lake's (SSL's) sewer system collects wastewater from customers north of Mill Creek and conveys it to Central Valley Water Reclamation Facility (CVWRF). Along the way, the sewer system also picks up considerable rainwater and groundwater—known as inflow and infiltration, respectively. These extra loads significantly influence the size, cost, and operation of the sewer system.

This study, begun in July 2020, quantifies inflow and infiltration in SSL's sewer system, recommends actions to reduce them, and establishes daily flow patterns for future planning. The study is a major step toward providing more efficient, cost-effective sewer services.

This study relates to current designs and forthcoming plans. The Downtown, West Temple, and Third East Sewer Improvements are under way. When these projects are complete, SSL will update its Sewer Master Plan, using data collected during this study.

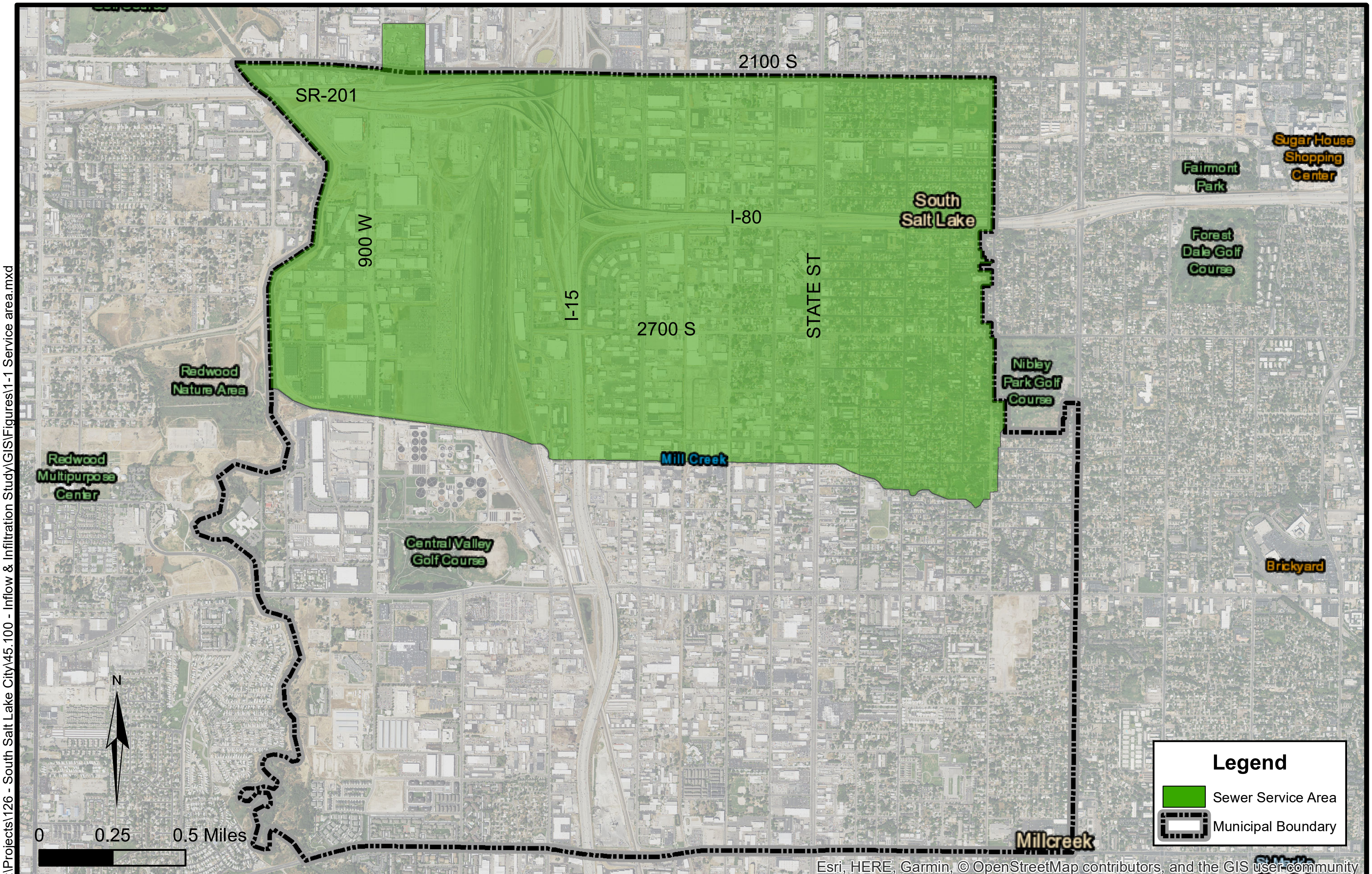
BACKGROUND

SSL's own sewer system serves the part of the city north of Mill Creek. See Figure 1-1. Mount Olympus Improvement District (MOID) serves the remainder and is not addressed in this study.

The western part of SSL's sewer system (west of I-15) collects to 2280 Lift Station, from which wastewater is pumped into a force main to the Main Lift Station. The rest of the system, east of I-15, is divided into two main parts, south and north. The southern part collects by gravity, flowing west into a large pipeline in 2700 South. The northern part collects by gravity, flowing west to the Main Lift Station. From there, a force main conveys wastewater south along 600 West to CVWRF. See Figure 1-2. According to SSL staff and historic aerial imagery[1], the northeast section of the service area is the oldest.

Current data from SSL's geographic information system (GIS) describe the sewer facilities.[2] Figure 1-2 shows the existing system, consisting of 37 mi of pipe, 680 manholes, and 3 lift stations. Pipe diameters range from 6 in. to 30 in.; most pipe is 8 in. (Figure 1-3). Most pipe is made of clay material, though concrete and PVC materials are also present (Figure 1-4).

[1] Utah Geological Survey, Aerial Imagery Collection, https://geodata.geology.utah.gov/imagery/.
[2] Emails from BJ Allen (SSL), Sept. 14–15, 2020.



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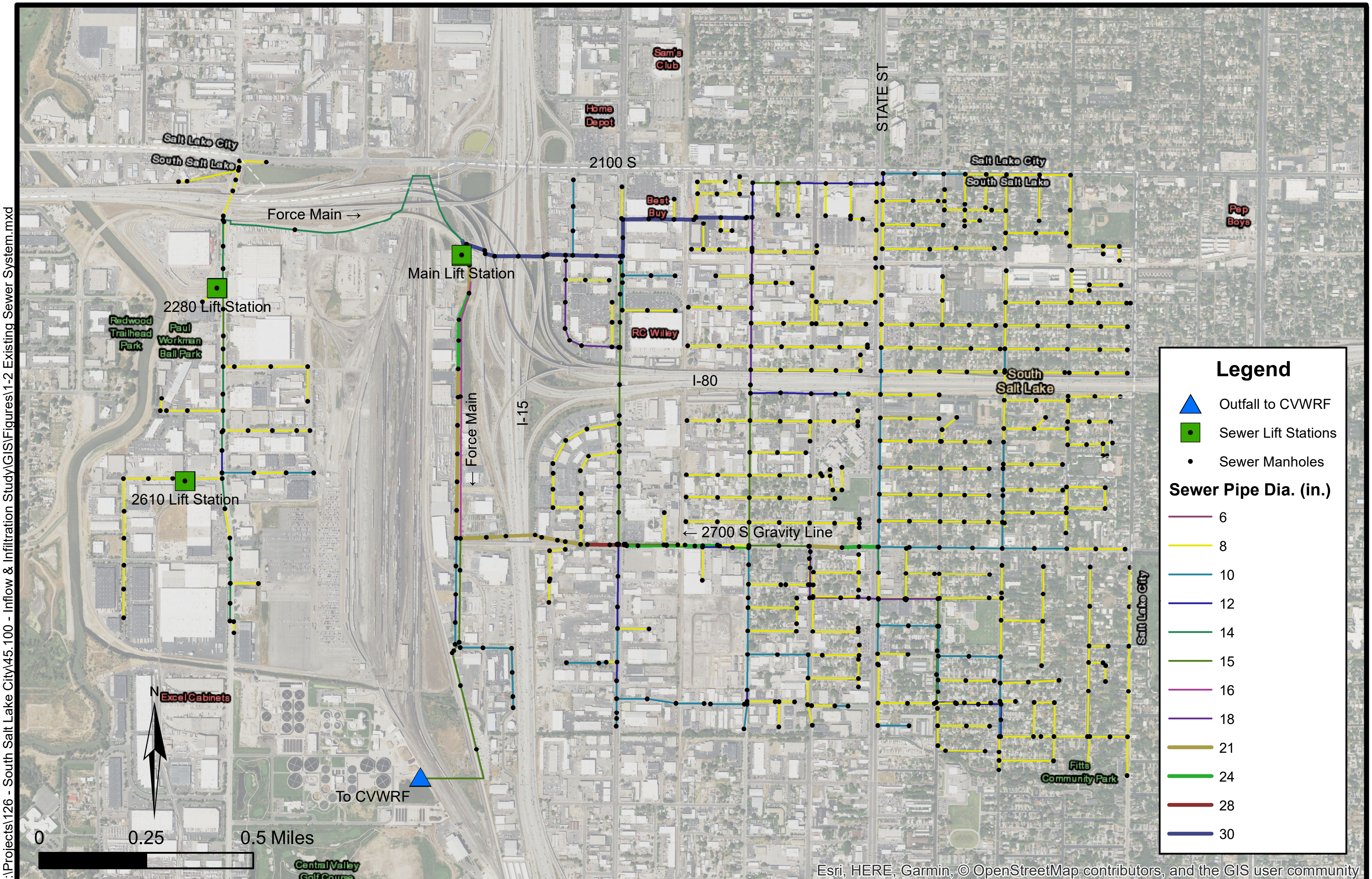
HANSEN ALLEN & LUCE INC ENGINEERS

CITY OF SOUTH SALT LAKE
SEWER INFLOW & INFILTRATION STUDY

SEWER SYSTEM SERVICE AREA

FIGURE 1-1



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CITY OF SOUTH SALT LAKE
SEWER INFLOW & INFILTRATION STUDY

EXISTING SEWER SYSTEM

FIGURE 1-2

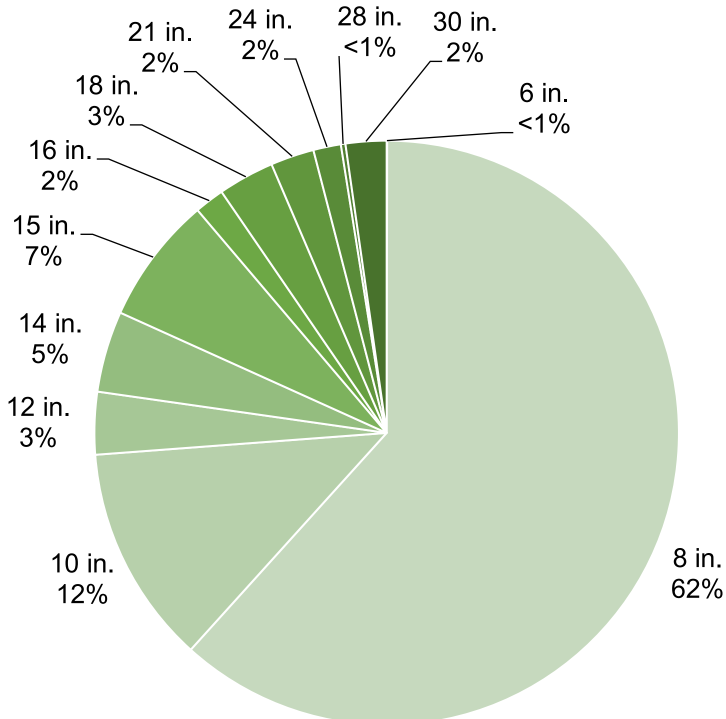

Figure 1-3: Sewer Pipe Length by Diameter

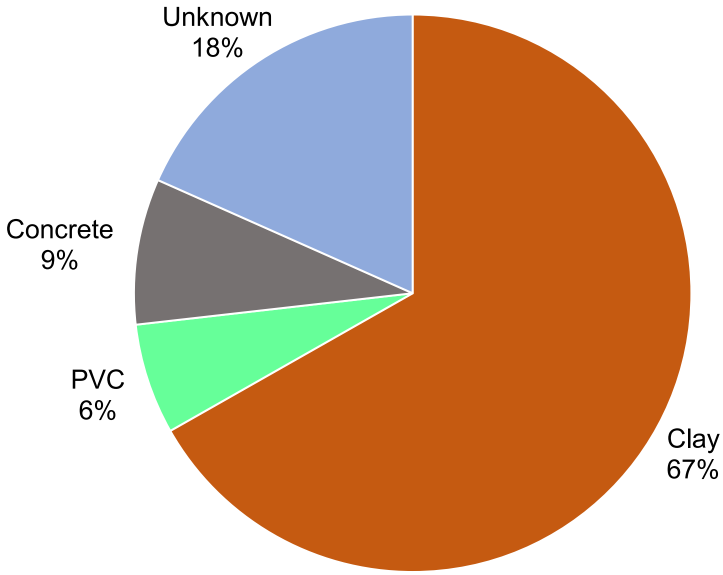

Figure 1-4: Sewer Pipe Length by Material

CHAPTER 2 – METHODS

This chapter describes the terms, data sources, methods, and investigations employed in this study.

DEFINITIONS

Municipal wastewater is composed of sanitary flow, inflow, and infiltration as defined below according to guidance from the U.S. Environmental Protection Agency.[1] Figure 2-1 illustrates the differences between inflow and infiltration and highlights common sources.

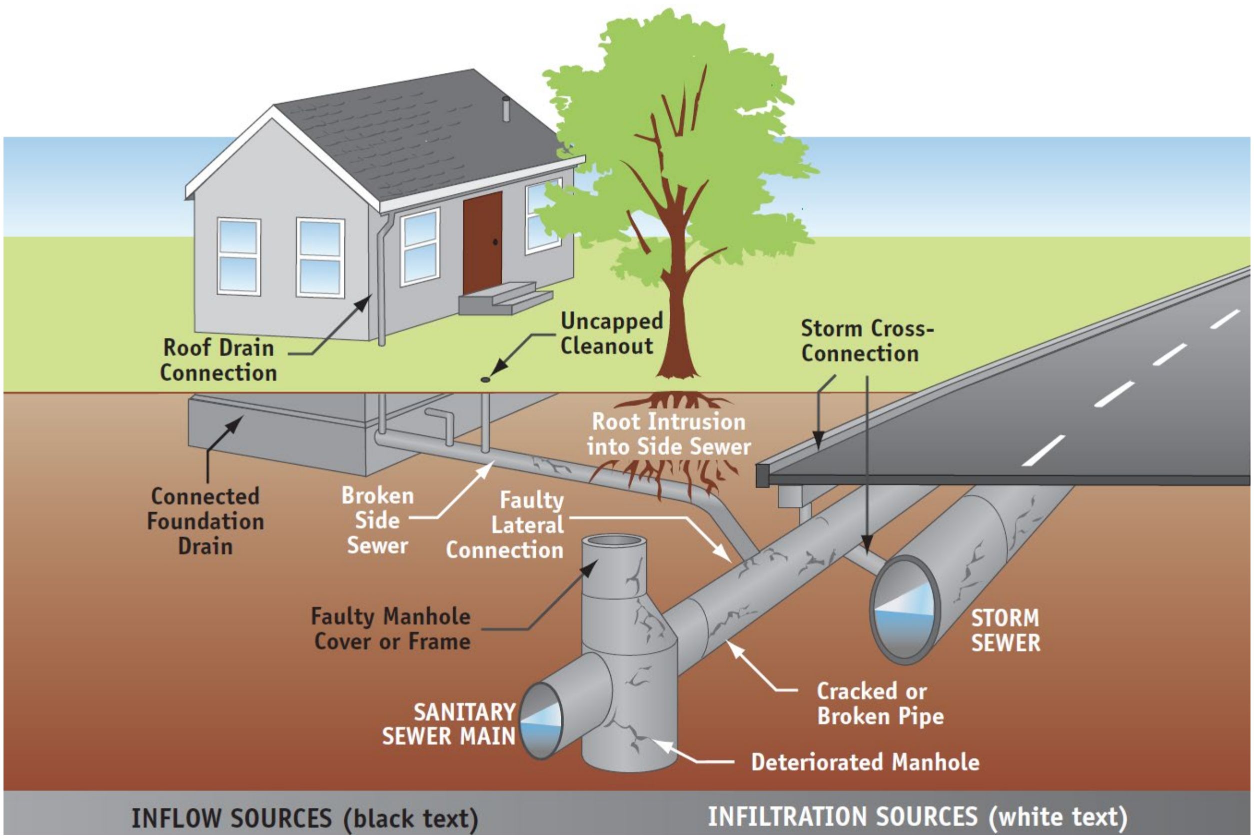

Figure 2-1: Inflow and Infiltration Sources

King County, WA, Department of Natural Resources and Parks, Wastewater Treatment Division. Used with permission.

Sanitary Flow

"The portion of wastewater which includes domestic, commercial, institutional, and industrial sewage and specifically excludes infiltration and inflow." This is legitimate wastewater from sinks, showers, toilets, bathtubs, etc.

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[1] U.S. Environmental Protection Agency, New England Water Infrastructure Outreach, "Guide for Estimating Infiltration and Inflow," June 2014, https://www3.epa.gov/region1/sso/pdfs/Guide4EstimatingInfiltrationInflow.pdf; U.S. Environmental Protection Agency, New England Water Infrastructure Outreach, "Quick Guide for Estimating Infiltration and Inflow," June 2014, https://www3.epa.gov/region1/sso/pdfs/QuickGuide4EstimatingInfiltrationInflow.pdf.

Infiltration (Groundwater)

"Water other than sanitary wastewater that enters a sewer system from the ground through defective pipes, pipe joints, connections, or manholes." Infiltration can occur through pipe joints (especially concrete pipe, which has joints every 6 or 8 feet), pipe cracks (especially clay pipe), manhole cracks, poor grouting at pipe and manhole transitions, and defective laterals. Infiltration is primarily groundwater.

Inflow (Stormwater)

"Water other than sanitary wastewater that enters a sewer system from sources such as roof leaders, cellar/foundation drains, yard drains, area drains, drains from springs and swampy areas, manhole covers, cross connections between storm sewers and sanitary sewers, and catch basins." In contrast to infiltration, which is groundwater, inflow is stormwater, comprised of direct and delayed inflow as defined below.

Direct Inflow

"The portion of total inflow volume which is from direct connections to the collection system such as catch basins, roof leaders, manhole covers, etc. These inflow sources allow stormwater runoff to rapidly impact the collection system." This is the immediate response precipitation.

Delayed Inflow

"The portion of total inflow which is generated from indirect connections to the collection system or connections which produce inflow after a significant time delay from the beginning of a storm. Delayed inflow sources include: sump pumps, foundation drains, indirect sewer/drain cross-connections, etc. … Delayed inflow sources have a gradual impact on the collection system and flow decreases gradually upon conclusion of the rainfall event, and after peak inflow caused by direct connections." Delayed inflow is something in between the fast response of direct inflow and slow response of infiltration. The main feature is the lagged response after precipitation.

DATA SOURCES

Staff Experience

SSL's sewer personnel were a key source of information for this study. Their long experience and familiarity with the sewer system were invaluable in describing the facilities, understanding flow and timing patterns, locating specific manholes, selecting metering sites, and narrowing down likely inflow and infiltration hotspots. Their theories guided the data collection, fieldwork, and analysis that HAL conducted during this study.

CVWRF Flows

SSL has one outfall to CVWRF, at which point CVWRF measures total wastewater flow every 15 minutes. CVWRF initially provided three years of data (2017–2019) from this meter.[1] HAL reviewed the three years and determined 2019 to be most complete. Figure 2-2 shows the raw data for the three years. Partway through the study, a depth error was discovered in CVWRF's historic measurements.[2] CVWRF's consultant surveyed the upstream slope to the meter vault[3] and HAL subsequently corrected the 2019 flow measurements by reconstructing the resulting flow from equations of open-channel hydraulics. The corrected 2019 data appear in Figure 2-3. Over the whole year, the corrections constitute a reduction of 30% from the previous 2019 values. The corrected 2019 measurements are the basis for annual characterizations of sanitary flow, inflow, and infiltration in this study.

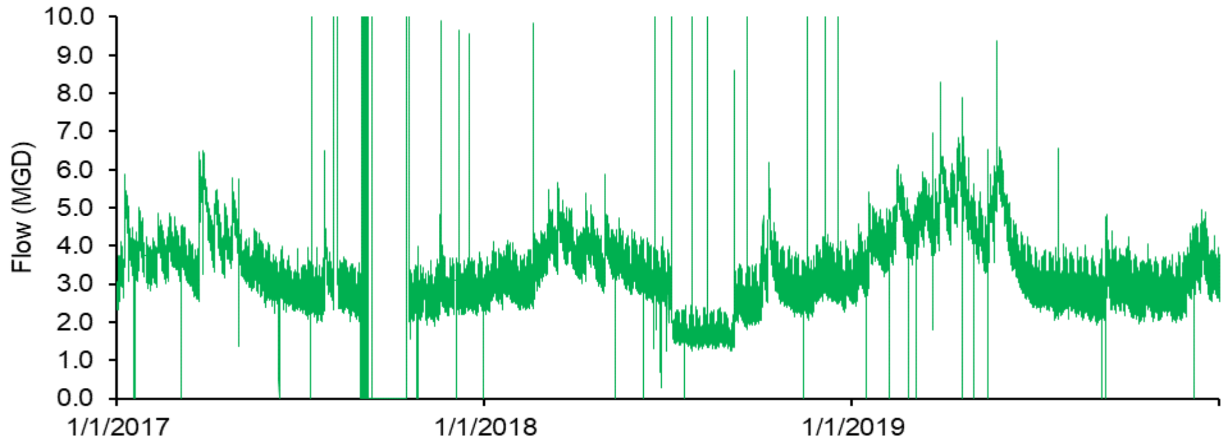

Figure 2-2: SSL Sewer Flows to CVWRF, 2017–2019

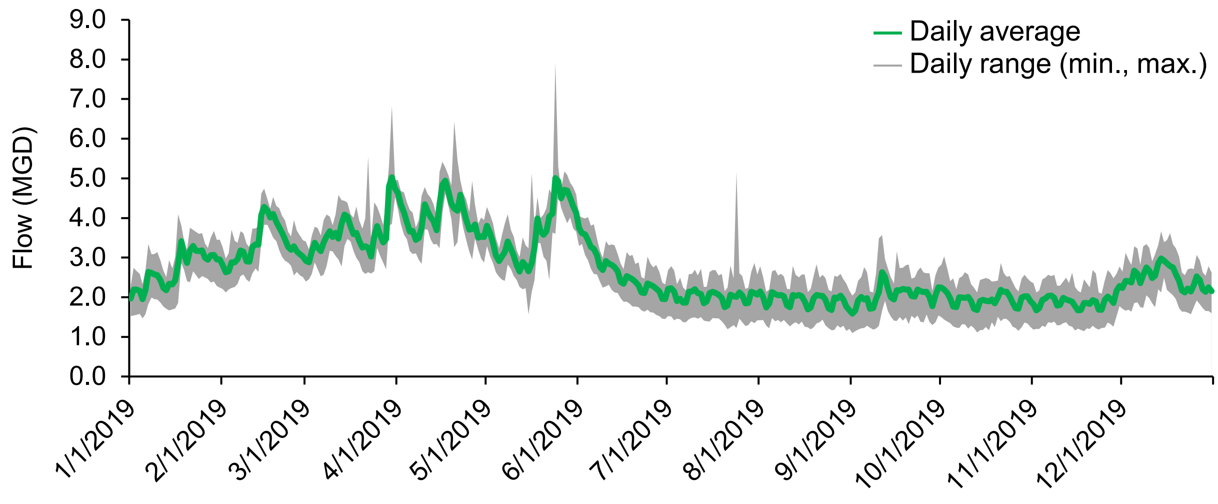

Figure 2-3: SSL Sewer Flows to CVWRF, 2019 (Corrected)

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[1] Email from Bryan Mansell (CVWRF), July 10, 2020.
[2] Email from Bryan Mansell (CVWRF), Oct. 20, 2020.
[3] Email from Bryan Mansell (CVWRF), Jan. 27, 2021.

Three patterns appear in Figure 2-3. The first is the seasonal pattern of generally high flows through the spring, corresponding to seasonally high groundwater. The second is the sharp peaks that punctuate the graph, corresponding to storms. The third is that of weekdays and weekends/holidays, which is most noticeable in August, when the average flow drops on weekends.

Winter Water Use

A good indicator of the sanitary flow is the winter water use within the sewer service area. One may assume that in the winter, water is used only indoors and all indoor water goes into the sewer system.

Water service in SSL's sewer service area comes from three sources (Table 2-1). SSL's own water system serves most of the area, Salt Lake City Department of Public Utilities (SLCDPU) serves the area along 900 West, and private wells serve a few residential and industrial users. SSL and SLCDPU provided the applicable February 2019 water sales at HAL's request.[1] The SSL data (1.43 MGD) covered the whole city, so HAL geocoded the billing records and extracted only those records in the sewer service area, which constituted 0.90 MGD, or 63% of SSL's total water sales. SLCDPU provided water sales for the 900 West area in question, which amounted to 0.13 MGD. HAL then researched active water rights in the sewer service area whose uses would result in discharges to the sewer system. These included 35 domestic uses and 1 industrial use. HAL quantified their likely winter use as 0.08 MGD according to the water rights.

[1] Email from Christie Bascom (SSL), Aug. 10, 2020; email from Tamara Wambeam (SLCDPU), Oct. 1, 2020.

Table 2-1: Winter Water Use in SSL Sewer Service Area

Water Source	Winter Water Use (MGD)
South Salt Lake	0.90
Salt Lake City	0.15
Private Wells	0.08
Total	**1.13**

From this analysis HAL determined the winter water use in SSL's sewer service area to be 1.13 MGD. This is taken to be the year-round average sanitary flow.

Precipitation

Precipitation data are necessary to correlate storm events with wastewater flows and determine inflow contributions. In the past, the closest precipitation gauge to SSL was NOAA's gauge at the Salt Lake City International Airport, but since 2018, Salt Lake County has been establishing its own network as part of its Watershed Gauging Program. One new precipitation gauge is on the roof of the Salt Lake County Government Center, which is 6.5 mi closer to SSL than the airport and almost within its municipal boundary (2001 S. State St.) and therefore a much better representation of precipitation over SSL's sewer service area. Daily precipitation increments for 2018 and 2019 were downloaded from the county's website.[1] The 2019 data appear in Figure 2-4 and correspond with observed peaks in Figure 2-3.

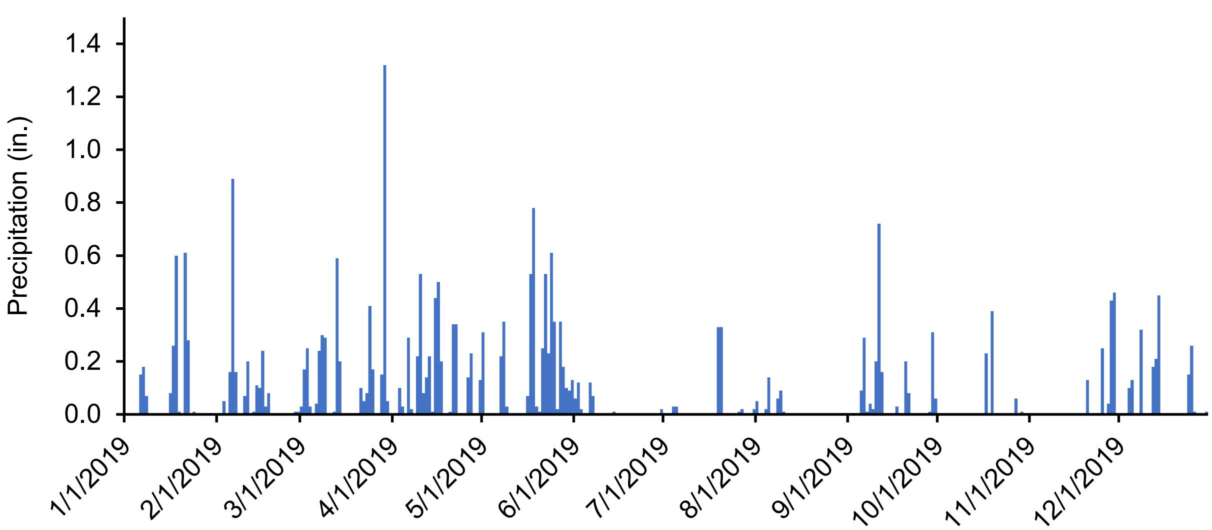


Figure 2-4: Daily Precipitation at Salt Lake County Government Center

[1] Salt Lake County Watershed's Streamflow and Precipitation Page, Salt Lake County Watershed Gauging Program, https://rain-flow.slco.org/.

The year 2019 is excellent for analysis of inflow and infiltration because there were several extended wet periods and several extended dry periods which can be compared. That said, 2019 was an unusually wet year. Local precipitation was the highest since 1998 and the second highest since 1990, according to records from Salt Lake City International Airport weather station.[1] This is fortuitous since the analysis captures what is likely to be a worst-case hydrologic scenario when the effects of inflow and infiltration are most apparent.

Groundwater Levels

HAL reviewed well logs, water rights, and groundwater monitoring sites in the study area but found no significant data for the surficial aquifer. While several wells exist in the area, they penetrate to deeper, confined aquifers and do not affect infiltration into the sewer system. A few observation wells historically maintained by the U.S. Geological Survey had only sparse and outdated water level records. In the absence of firm data, the role of groundwater was inferred through the regression model described later.

2016 Metering

The most recent flow metering occurred in December 2016 in conjunction with a master plan update.[2] Six sites, selected to characterize residential and non-residential sewer patterns, were monitored for about two weeks. The minimum nighttime flows recorded during this period varied from about 5 gpm to 400 gpm and suggested where the collection areas could be further subdivided in future metering.

NIGHT WATCH

Past flow monitoring indicated high overnight flows in some parts of the city, notably the industrial and commercial areas west of State Street. To help distinguish sanitary flow versus groundwater infiltration, HAL staff and City staff observed flows overnight on two occasions.

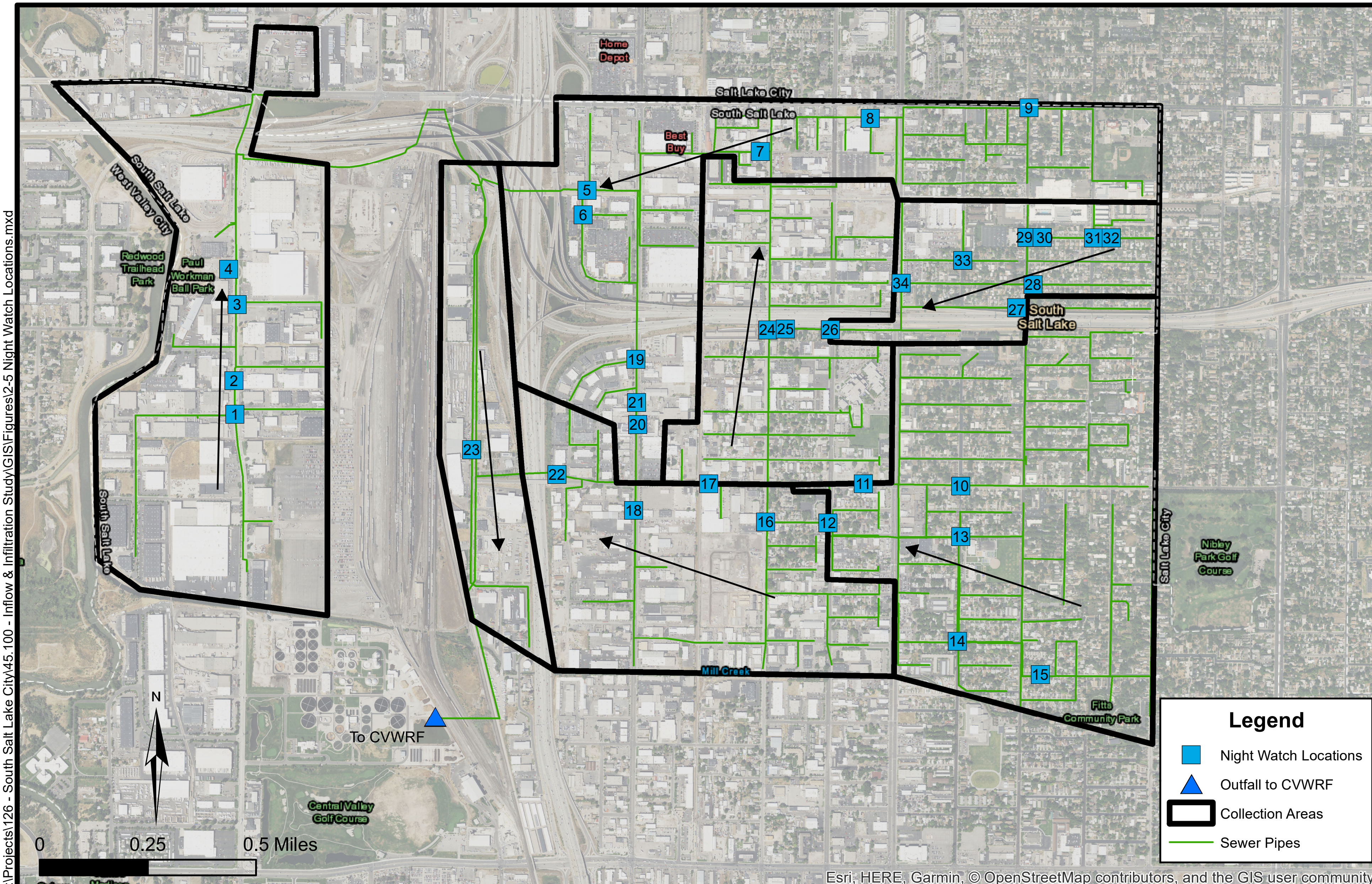
On Aug. 26, 2020, between 1:00 and 3:00 AM, the team pulled 24 manholes throughout the city, strategically selected according to their collection areas (Figure 2-5). Flows were visually observed from the street level and a short video was recorded at each location for later recollection and analysis. The observed flows were strictly a combination of sanitary flow and groundwater. The night watch occurred after extended dry weather; no precipitation was recorded at the nearby Salt Lake County Government Center in the 30 days prior, so direct inflow (and even delayed inflow) could be ruled out. Even after accounting for a few known 24 hr users (e.g., food processing operations) and some nominal sanitary flow from residential areas, most of the flow during this time appeared to be from groundwater infiltration.

A follow-up night watch took place on May 4, 2021, in the area upstream from Robert Avenue and State Street. Metered flows at Robert Avenue suggested unusually high baseflows, even

[1] National Weather Service, NOWData, Salt Lake City, UT, https://w2.weather.gov/climate/xmacis.php?wfo=slc.
[2] Hansen, Allen & Luce, Inc., *City of South Salt Lake—Sanitary Sewer Master Plan Update* (Proj. No. 126.28.200), May 2016.

overnight (described later). The minimum metered flow occurred between 4:00 and 5:00 AM, and during this time the team pulled an additional 10 manholes and observed flows as before. Some precipitation had occurred in the two weeks prior, and groundwater levels were likely elevated due to the springtime conditions. Still, clear flows suggested groundwater infiltration here.

While no flow measurements were made during the night watch, the observations helped the team determine where installing temporary flow meters in the following weeks would be most worthwhile. These would be locations where significant flows were observed and/or where past monitoring indicated that further division of certain collection areas was needed. Further, the videos captured the magnitude and color of the observed flows; small sanitary flows can be clear or cloudy, but large, clear flows are more likely to be groundwater and large, cloudy flows are more likely to be sanitary flow (Table 2-2). This qualitative analysis of the video footage helped the team determine which locations are more susceptible to groundwater infiltration and refine where metering and intervention are warranted.



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HANSEN ALLEN & LUCE INC ENGINEERS

CITY OF SOUTH SALT LAKE
SEWER INFLOW & INFILTRATION STUDY

NIGHT WATCH LOCATIONS

FIGURE 2-5

Table 2-2: Night Watch Analysis

Location	Date	Time	Address	Manhole	Flow Rank*	Color
1	8/26/2020	12:59 AM	900 W 2610 S	R14	0	Clear
2	8/26/2020	1:02 AM	900 W BEARDSLEY	R9	1	Clear
3	8/26/2020	1:04 AM	900 W 2400 S	R7	1	Clear
4	8/26/2020	1:07 AM	900 W 2200 S (2280 LS)	R1	1	Clear
5	8/26/2020	1:15 AM	ANDY 400 W	S6	3	Cloudy
6	8/26/2020	1:19 AM	BEARCAT BUGATTI	T4	3	Cloudy
7	8/26/2020	1:25 AM	UTPOIA W TEMPLE	S14-2	3	Clear
8	8/26/2020	1:30 AM	2100 S MAJOR ST	?	2	Clear
9	8/26/2020	1:35 AM	2100 S 200 E	S23-20	1	Clear
10	8/26/2020	1:41 AM	2700 S 200 E	W38	1	Clear
11	8/26/2020	1:44 AM	2700 S STATE	W33	2	Clear
12	8/26/2020	1:49 AM	SHELLEY MAIN	X3	2	Mostly clear
13	8/26/2020	1:53 AM	200 E CLAYBOURNE	?	2	Clear
14	8/26/2020	1:56 AM	GARDEN AVE 200 E	X15	2	Clear
15	8/26/2020	2:00 AM	WELBY GARDEN CIR	X22	1	Clear
16	8/26/2020	2:08 AM	SHELLEY W TEMPLE	W27-3	2	Clear
17	8/26/2020	2:11 AM	2700 S TRAX	W24	3	Cloudy
18	8/26/2020	2:14 AM	300 W 2700 S	W20-1	0	Clear
19	8/26/2020	2:17 AM	300 W I-80	T15	2	Clear
20	8/26/2020	2:20 AM	300 W 2620 S	T19	1	?
21	8/26/2020	2:22 AM	300 W 2600 S	T18	2	Mostly clear
22	8/26/2020	2:27 AM	2700 S I-15	W13	3	Mostly clear
23	8/26/2020	2:30 AM	600 W 2600 S	T1-11	0	Clear
24	8/26/2020	2:36 AM	W TEMPLE I-80	V10	3	Mostly clear
25	5/4/2021	4:25 AM	W TEMPLE I-80	V10	3	Clear
26	5/4/2021	4:28 AM	MAIN ST ROBERT AVE	?	3	Clear
27	5/4/2021	4:35 AM	2400 S 200 E	V10-13	3	Clear
28	5/4/2021	4:39 AM	300 E BURTON	V10-15	2	Clear
29	5/4/2021	4:42 AM	300 E HAVEN (#1)	V10-20HF?	3	Clear
30	5/4/2021	4:43 AM	300 E HAVEN (#2)	V10-20HF?	2	Clear
31	5/4/2021	4:45 AM	400 E HAVEN (#1)	V10-27	2	Clear
32	5/4/2021	4:45 AM	400 E HAVEN (#2)	V10-28	2	Clear
33	5/4/2021	4:50 AM	200 E TRUMAN	V10-41	2	Clear
34	5/4/2021	4:55 AM	STATE ST & BURTON	V10-34	2	Clear

* 0 = none or low; 1 = low; 2 = medium; 3 = high

METERING

Planning and Setup

Informed by the results of past flow monitoring, the observations of the night watch, the videos recorded during the night watch, and insights from City personnel, HAL proposed six flow metering sites. The new data complement past monitoring data to create a more complete picture of sanitary flow, inflow, and infiltration, as well as the timing and contributions of certain residential and non-residential areas.

Figure 2-6 shows the metering sites and approximate collection areas. Each site was monitored for two weeks during September and October 2020 and/or April 2021. The fall timeframe was selected for three reasons. First, it occurred during extended dry weather when inflow would be near zero (no precipitation occurred during the observation period). Second, it was late in the year when the groundwater level, and therefore groundwater infiltration, was lowest (but still present). Third, analysis of both 2018 and 2019 data indicated that this period has the lowest wastewater flows of the year.

Three flow meters and data loggers were deployed: one from HAL, one from SSL, and one rented. The HAL flow meter was a submerged area–velocity (AV) sensor and the other two were FLO-DAR. The data loggers recorded measurements every 15 minutes. Sites A, B, and C were monitored simultaneously from Sept. 10 to 24, 2020. The meters were then relocated and Sites D, E, and F were monitored simultaneously from Sept. 24 to Oct. 8, 2020. HAL personnel set up the meters with assistance from City staff. The initial data from Site F were incomplete due to failure of the equipment, so measurements were repeated in April 2021 with better success.

The installation and calibration of each of the flow meters was consistent between the six sites. First, SSL removed manhole lids and safety conditions were inspected. Once the site was deemed safe to enter, HAL verified conditions including pipe diameter and flow level then calibrated the data logger. When installing the FLO-DAR, a member of HAL entered the manhole to set up a temporary flow meter bracket. Ensuring the bracket was level, the FLO-DAR unit was then lowered in the manhole, secured to the bracket, and installed to measure flow conditions upstream of the manhole. Installation of the submerged AV sensor was similar but did not require a temporary bracket as the sensor was fastened to the mounting ring and placed directly in the pipe upstream of the manhole. Figure 2-6 shows the typical installation of a FLO-DAR unit and Figure 2-7 shows the AV sensor setup.

Figure 2-6: Typical FLO-DAR Installation (MH-W11)

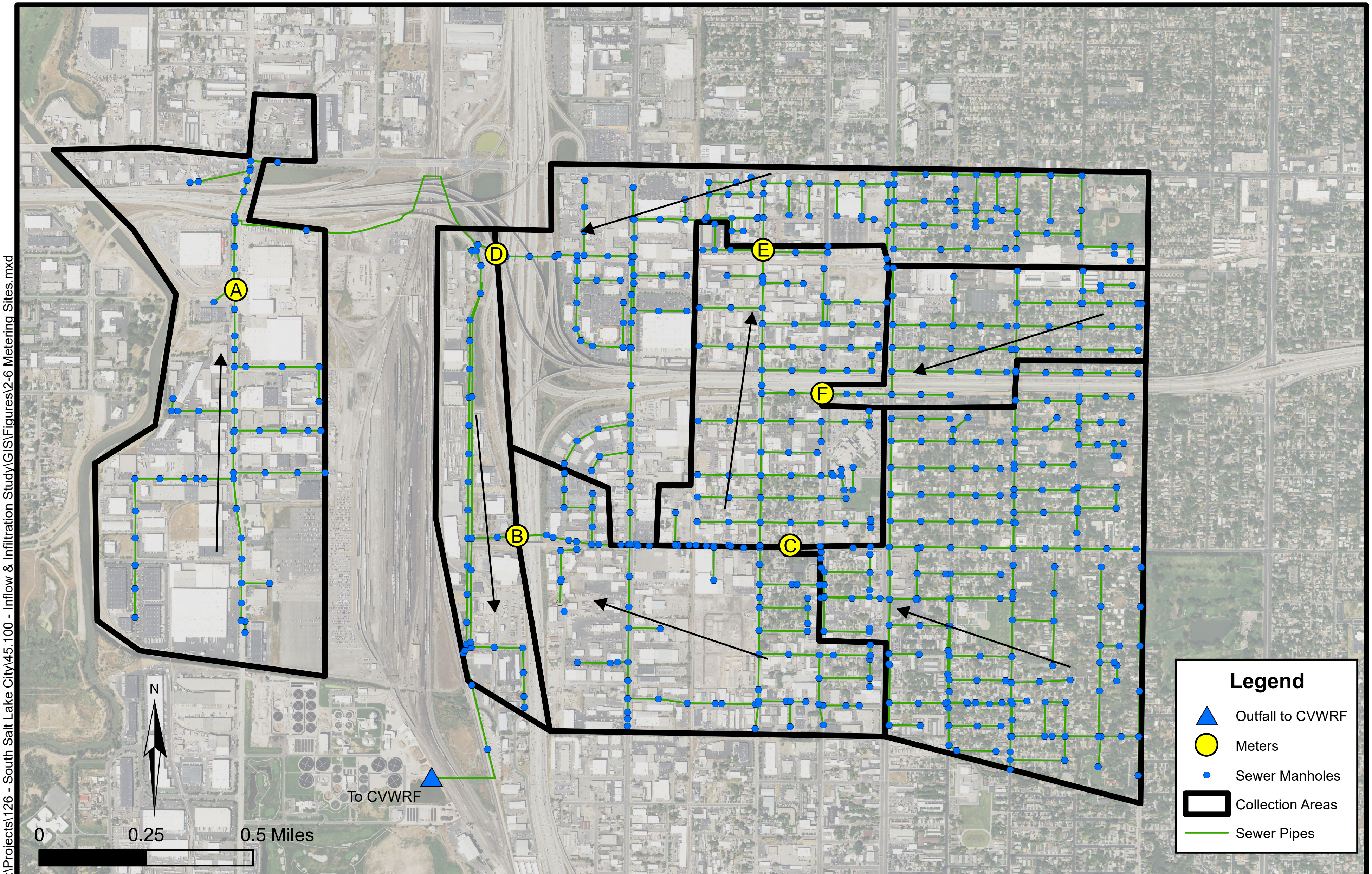
Figure 2-7: Typical Submerged AV Installation (Influent to 2280 Lift Station)

Table 2-3 summarizes the flow meter setup.

Table 2-3: Flow Meter Setup

Site	Address	Manhole	Equipment	Dates
A	900 W @ 2280 S	Influent to 2280 LS	Submerged AV	Sept. 10–24, 2020
B	2700 S @ I-15	W11	Rented FLO-DAR	Sept. 10–24, 2020
C [1]	2700 S @ 50 W	W30	City FLO-DAR	Sept. 10–24, 2020
D	Andy Ave @ I-15	T2A	Rented FLO-DAR	Sept. 24–Oct. 8, 2020
E	W Temple @ 2260 S	V1A	City FLO-DAR	Sept. 24–Oct. 8, 2020
F	Robert Ave @ Main St	V10-2	Rented FLO-DAR	April 9–26, 2021

1. Data after Sept. 19, 2020, were unusable because the manhole surcharged.



Document Path: H:\Projects\126 - South Salt Lake City\45.100 - Inflow & Infiltration Study\GIS\Figures\2-6 Metering Sites.mxd
Date: 2/16/2021

HANSEN ALLEN & LUCE INC ENGINEERS

CITY OF SOUTH SALT LAKE
SEWER INFLOW & INFILTRATION STUDY

METERING SITES

FIGURE 2-8

Analysis

HAL analyzed the flow measurements for each site. Table 2-4 summarizes their flow statistics and Appendix A contains the complete data.

Table 2-4: Flow Measurement Summary

Site	Max. Flow (MGD)	Min. Flow (MGD)	Avg. Flow (MGD)
A	0.23	0.01	0.06
B	1.01	0.27	0.51
C	0.60	0.26	0.43
D	1.22	0.59	0.98
E	0.68	0.38	0.54
F	0.61	0.23	0.42

The quantitative measurements from the flow meters correspond well to the qualitative observations from the night watch.

Sites B and C are located on the same gravity line in 2700 South; Site B is downstream of Site C. The two flows mostly coincide and show a clear diurnal pattern.

Results from Site F on Robert Avenue are surprising. First, the flow is very high even though the collection area is the smallest of the six metered sites and is mostly residential. Second, the pipe was flowing almost half full, day and night, during the metering period, indicating a constant and significant baseflow. Despite the potential for wetter conditions in April, both of these features match the observations from the first night watch in August 2020 (Location 24 in Table 2-2 is located immediately downstream). As described earlier, a second night watch occurred on May 4, 2021, during which time HAL and City personnel started at Site F and proceeded upstream to (Table 2-2, locations 25–34). All flows were clear, suggesting infiltration more than sanitary flow.

Numerous clues point toward most infiltration occurring east of State Street:

1. **Little baseflow at Site A.** Site A (influent to 2280 Lift Station) on the west side showed only small minimum overnight flows, consistent with the night watch observations. There seems to be little or no infiltration upstream of this site, or anywhere west of the railroad corridor. By elimination, most of the infiltration must occur elsewhere.
2. **Similarity of flows between upstream and downstream sites.** Flows were similar at Sites B and C and Sites E and F. If infiltration were occurring farther west at the other sites, the downstream flows (Sites B and E) would be much higher than their upstream counterparts. Instead, there are only moderate differences, suggesting most of the flow occurs upstream.
3. **Substantial baseflows at upstream sites.** Flows at the most upstream sites (Sites C and F) were high, even in the middle of the night, which is unusual for the residential neighborhoods that constitute most of their respective collection areas.

4. **Clear flows.** The generally clearer flows observed east of State Street noted in the night watches (Table 2-2 and Figure 2-5) imply groundwater rather than sanitary flow.
5. **Susceptible pipes and manholes.** Most sewer pipe east of State Street is old, 8 in. dia., clay pipe, and several brick manholes were observed during the night watch. Both are susceptible to cracking and infiltration, especially in the older, northeast part of the city, where installation was of lower quality than it is today.
6. **Pervious area.** As apparent on the aerial images and confirmed in the field, the ground surface in the residential areas east of State Street is more pervious than the industrial and commercial areas west of State Street, so more precipitation soaks through the ground (and into the sewer system) instead of running off directly. The opposite is true on the west side. Along 900 West, for example, very little baseflow was observed at Site A and the ground cover is almost entirely impervious. (These same features, incidentally, suggest that direct inflow could be more problematic west of State Street.)

REGRESSION MODEL

Overview

To determine drivers of wastewater flow and its respective components, HAL developed a regression model of SSL's 2019 daily average wastewater flows to CVWRF. The model is an ordinary least squares (OLS) regression model similar to those developed by others.[1]

Several variables immediately suggested themselves. Numerous combinations were tested until the following predictors achieved a satisfactory fit:

- Intercept (sanitary flow and some groundwater infiltration)
- Groundwater seasonality (some groundwater infiltration)
- Same-day precipitation above freezing (direct inflow)
- 14-day moving average precipitation (delayed inflow)
- Weekday indicator (sanitary flow adjustment)

Each is described below. While local streams have been known to closely influence infiltration in other cities, daily discharge from Mill Creek, which forms the southern border of SSL's sewer collection area, was rejected because of poor fit. It showed similar peaks after storms, but has a much larger tributary area than the sewer system and upstream withdrawals affect its natural hydrograph during the summer. Likewise, outdoor water use in SSL was rejected for poor fit, though, by the same logic as precipitation, one would suppose it would infiltrate and enter the sewer system. It has little effect, however, since most of the applied water seems to be depleted through evapotranspiration before it can infiltrate to deeper groundwater.

[1] Christian Karpf and Peter Krebs, "Quantification of Groundwater Infiltration and Surface Water Inflows in Urban Sewer Networks Based on a Multiple Model Approach," *Water Research* 45 (2011): 3129–3136, http://dx.doi.org/10.1016/j.watres.2011.03.022.

Terms

Intercept. The intercept is a constant term that includes sanitary flow and some groundwater infiltration. The year-round average sanitary flow of 1.13 MGD was estimated from winter water use as described earlier.

Groundwater seasonality. Groundwater infiltration into the pipe network is proportional to the head of the water table above it (Darcy's law). Due to recurring seasonal patterns, long-term groundwater levels are often represented in research as sine waves.[1] In Utah, it is reasonable to suppose that groundwater levels peak around the same time as mountain snowpack, being around April 1 each year, according to the Natural Resources Conservation Service's Utah Snow Survey. Accordingly, a sine wave with a 1 yr period and an April 1 maximum was defined as the groundwater function.

Same-day precipitation above freezing. Direct inflow is proportional to precipitation occurring at approximately the same time. Here, it was taken as same-day precipitation when the minimum ambient temperature was above 32 °F and liquid runoff could occur.

14-day moving average precipitation. Somewhere between direct inflow and groundwater infiltration is delayed inflow: precipitation that percolates into the soil and then enters the sewer system after some delay. HAL discovered that the 14-day moving average precipitation depth is an excellent surrogate for delayed inflow in SSL. This is consistent with research elsewhere that has linked moving average precipitation to shallow groundwater levels because the moving average captures both the amount and the duration of precipitation.[2] In SSL the lag was particularly apparent after the extended wet period in May and June 2019, where wastewater flows were still receding for several days after the storms ended. Including the 14-day moving average precipitation was the breakthrough in predicting total wastewater flows, making up most of the remaining variability that the other variables could not explain.

---

[1] M. O. Cuthbert, "An Improved Time Series Approach for Estimating Groundwater Recharge from Groundwater Level Fluctuations," *Water Resources Research* 46, no. 9 (2010), https://doi.org/10.1029/2009WR008572; G. Tison, "Fluctuations of Ground-Water Levels," *Advances in Geophysics* 11 (1965): 303–326, https://doi.org/10.1016/S0065-2687(08)60498-7; J. D. Mackay, C. R. Jackson, and L. Wang, "A Lumped Conceptual Model to Simulate Groundwater Level Time-Series," *Environmental Modelling & Software* 61 (2014): 229–245, https://doi.org/10.1016/j.envsoft.2014.06.003; Francis X. Ashland, Richard E. Giraud, and Greg N. McDonald, "Ground-Water-Level Fluctuations in Wasatch Front Landslides and Adjacent Slopes, Northern Utah," Open-File Report 448, Utah Geological Survey (2005).

[2] Robert A. Smail, Aaron H. Pruitt, Paul D. Mitchell, and Jed B. Colquhoun, "Cumulative Deviation from Moving Mean Precipitation as a Proxy for Groundwater Level Variation in Wisconsin," *Journal of Hydrology X*, 5 (2019): 100045, https://doi.org/10.1016/j.hydroa.2019.100045; Philip M. Gardner and Victor M. Heilweil, "Evaluation of the Effects of Precipitation on Ground-Water Levels from Wells in Selected Alluvial Aquifers in Utah and Arizona, 1936–2005," Scientific Investigations Report 2008-5242, U.S. Geological Survey (2008), https://pubs.usgs.gov/sir/2008/5242/pdf/sir2008-5242.pdf; Zhuoheng Chen, Stephen E Grasby, and Kirk G Osadetz, "Predicting Average Annual Groundwater Levels from Climatic Variables: An Empirical Model," *Journal of Hydrology*, 260, nos. 1–4 (2002): 102–117, https://doi.org/10.1016/S0022-1694(01)00606-0; Stanley A. Changnon, Floyd A. Huff, and Chin-Fei Hsu, "Relations between Precipitation and Shallow Groundwater in Illinois," *Journal of Climate* 1, no. 12 (1988): 1239–1250, https://doi.org/10.1175/1520-0442(1988)001%3C1239:RBPASG%3E2.0.CO;2; [2] Christian Karpf and Peter Krebs, "Quantification of Groundwater Infiltration and Surface Water Inflows in Urban Sewer Networks Based on a Multiple Model Approach," *Water Research* 45 (2011): 3129–3136, http://dx.doi.org/10.1016/j.watres.2011.03.022.

Weekday indicator. As in most wastewater models, the difference of weekdays versus weekends and holidays was significant. Total wastewater flow on weekends and holidays, on average, was 0.18 MGD less than other days. It also peaked about 4 hr later.

Regression Fit and Accuracy

The resulting regression model yielded an adjusted R^2 of 0.91, meaning that it explains 91% of the variation in the average daily wastewater flow. See Figure 2-9. All variables are individually significant at the 99% confidence level ($p < 0.01$), meaning there is less than a 1% chance that the relationship is random.

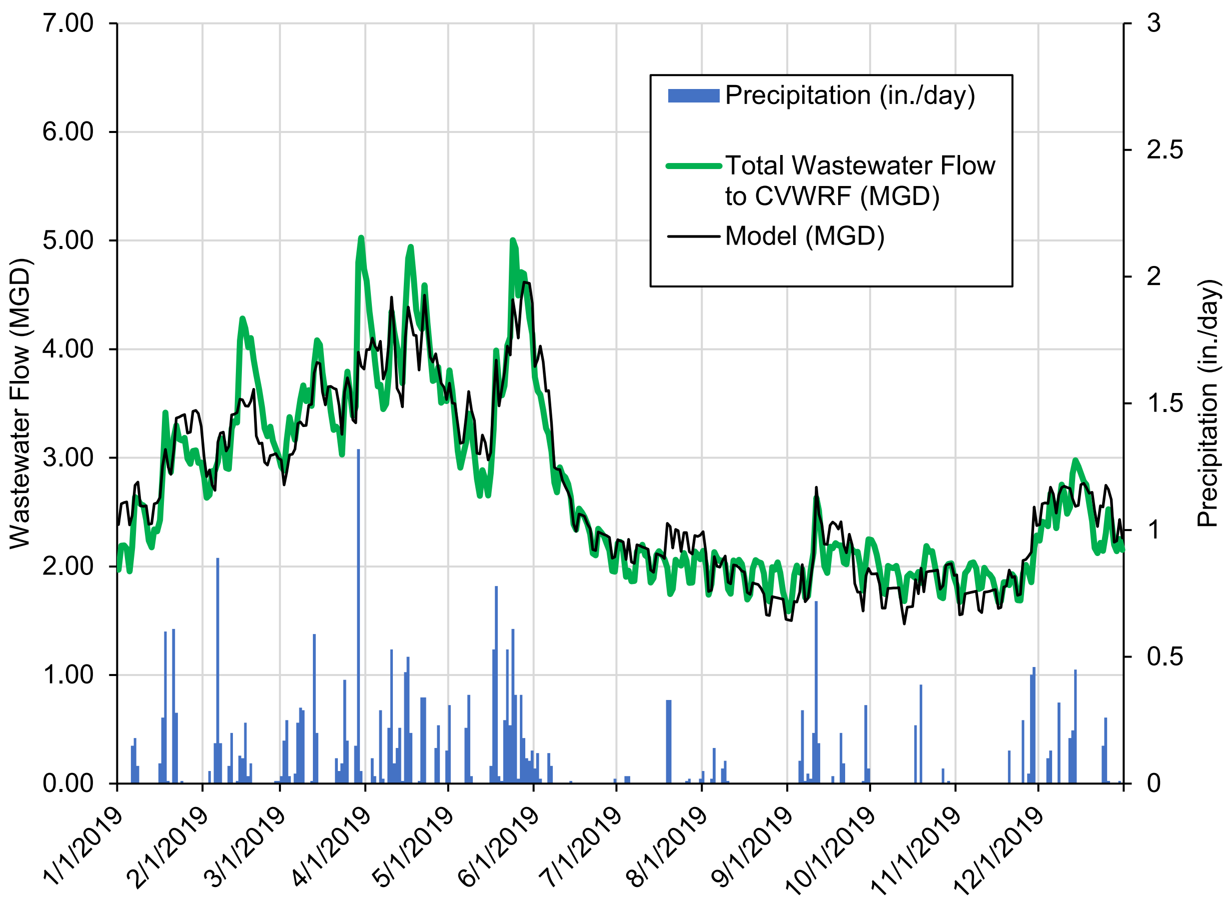


Figure 2-9: Regression Model of Daily Wastewater Flow

The model equation for daily average flows is:

$$SSL\ wastewater\ flow\ (\mathrm{MGD}) = 2.05 + 0.62 \sin\left(\frac{2\pi}{365}D\right) + 0.57P_0 + 6.87P_{14} + 0.18W$$

Where D is the day of the year (1–365), P_0 is the same-day precipitation when the minimum ambient temperature is above freezing (in.), P_{14} is the 14-day moving average precipitation (in.), and W is the weekday indicator (1 for weekday and 0 for weekend or holiday).

CHAPTER 3 – RESULTS

ANNUAL WASTEWATER BALANCE

Based on the regression model and on analysis of winter water use (both described in Chapter 2), HAL determined SSL's 2019 wastewater balance to be 42% sanitary flow and 58% inflow and infiltration. (This seems extreme, but no more sanitary flow could be accounted for based on the winter water use.) See Figures 3-1 and 3-2. To be clear, the breakdown of direct inflow, infiltration, and delayed inflow in these figures was not observed but was predicted based on the foregoing statistical analysis, but it is nonetheless helpful in determining how to manage them.

In fairness, 2019 was a particularly wet year. In fact, local precipitation was the highest since 1998 and the second highest since 1990, according to records from Salt Lake City International Airport weather station.[1] In normal or dry years, inflow and infiltration could be much less. Still, it is fortunate that the analysis occurred for such a wet year because the effects were so apparent and the analysis captures something close to the worst-case scenario, at least from the hydrologic perspective.

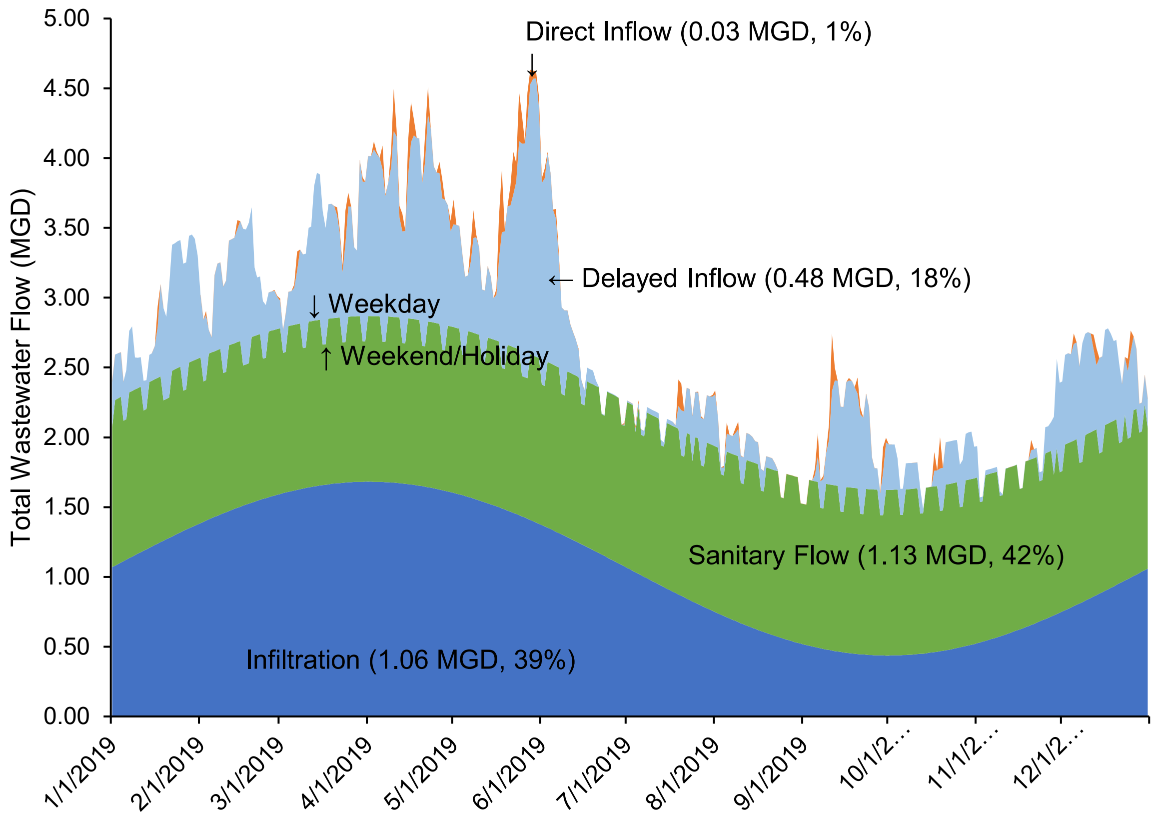


Figure 3-1: 2019 Annual Wastewater Balance (Time Series)

[1] National Weather Service, NOWData, Salt Lake City, UT, https://w2.weather.gov/climate/xmacis.php?wfo=slc.

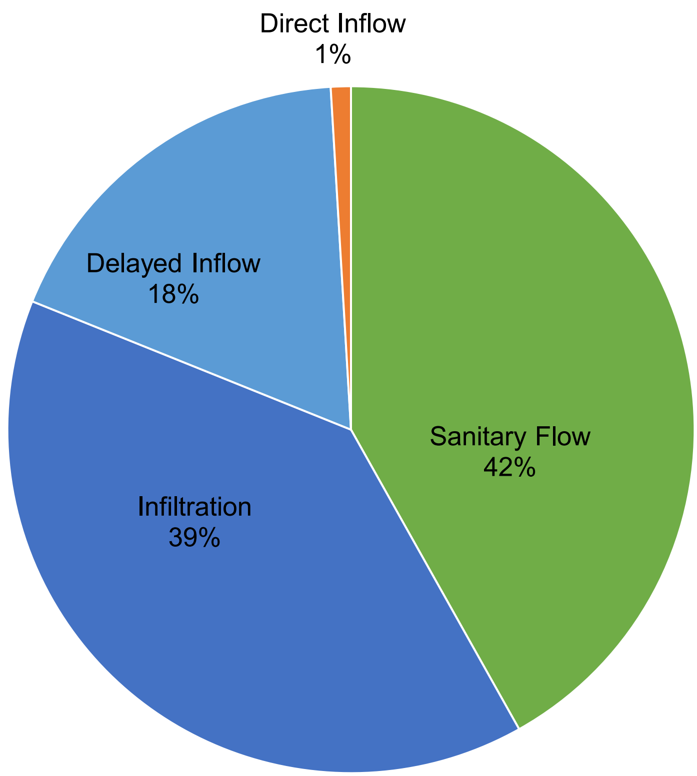


Figure 3-2: 2019 Annual Wastewater Balance

Infiltration and inflow make up 58% of the wastewater that SSL sends to CVWRF. Only 42% is legitimate sewage. SSL is paying about twice as much as it should to treat this water and should increase its efforts to mitigate these environmental intruders. Granted, treatment costs also depend on turbidity, and inflow and infiltration serve to dilute the wastewater stream, but the volume is still a problem.

INFILTRATION HOTSPOTS

Infiltration is more likely *east* of State Street. Significant, clear flows were observed overnight, even in these residential areas where overnight use should be minimal. The ground cover is more pervious and the pipes are older and more brittle. (Both research and common sense suggest that the age, material, and condition of the pipe are important indicators of infiltration potential.[1]) Accordingly, SSL should focus further study and rehabilitation east of State Street, particularly north of I-80 in the oldest part of the sewer system. Specifically, Haven Avenue stands out, which is short but still produced significant, clear, overnight flows.

[1] Christian Karpf and Peter Krebs, "Quantification of Groundwater Infiltration and Surface Water Inflows in Urban Sewer Networks Based on a Multiple Model Approach," *Water Research* 45 (2011): 3129–3136, http://dx.doi.org/10.1016/j.watres.2011.03.022.

It is worth mentioning that drinking water leaks may be contributing to apparent infiltration and/or inflow. In 2019, the City reported a 21% water loss to the Utah Division of Water Rights.[1] Drinking water pipes are shallower than sewer pipes and are pressurized, so leaks may be captured by sewer pipes underneath them. However, HAL cannot make a definite conclusion without further analysis.

INFLOW HOTSPOTS

Inflow is more likely *west* of State Street where the ground cover is mostly impervious due to large buildings, parking lots, and streets. While no precipitation occurred during the new flow metering conducted as part of this study, past data show an immediate sewer system response to rainstorms. SSL should consider actions to reduce peak runoff, such as ponds, rain gardens, and mild slopes.

HOURLY, DAILY, AND SEASONAL PATTERNS

According to the metering conducted with this study, SSL wastewater has a clear diurnal pattern with a minimum flow around 5 AM and a maximum flow around 12 PM. This general pattern was consistent throughout the study area, with some local variation. Diurnal curves and peaking factors from the six metered sites are included in Appendix B and may be used in future sewer models.

Weekend/holiday effects were also observed; the daily weekend/holiday volume was about 15% less than weekdays and the morning hydrograph shifted about 1 hr later.

As described above, sewer flows are generally elevated in the spring, presumably due to groundwater infiltration. Neighboring cities and several research studies have observed the same behavior.

[1] Utah Division of Water Rights, Public Water Supplier Information, South Salt Lake Culinary Water, https://www.waterrights.utah.gov/asp_apps/viewEditPWS/pwsView.asp?SYSTEM_ID=1339.

CHAPTER 4 – RECOMMENDATIONS

Based on the foregoing analysis, HAL recommends the following actions to mitigate inflow and infiltration:

- **Enhance pipe inspection program.** Using the City's new camera equipment, deliberately look for cracks, corrosion, and live flows that indicate high infiltration. Start with clay pipes east of State Street and north of I-80. Develop pipe and manhole ratings, using the rating system by the National Association of Sewer Service Companies (NASSCO), to prioritize rehabilitation.[17]

- **Increase annual rehabilitation.** Establish a budget of at least $500,000 per year to rehabilitate 1.5 mi of sewer pipe (4% of the total system length) and manholes each year. Begin east of State Street. Typical rehabilitation reduces infiltration by 25%.

- **Incentivize sewer lateral replacement.** With such large infiltration amounts, it is likely that customer laterals are more to blame than mainline pipe. It is both risky and expensive for the City to replace laterals, but the City might instead set aside funds to incentivize customers to replace their own sewer laterals.

- **Update sewer specifications.** Strengthen specifications, contractor prequalifications, and construction observation for pipe joints and manhole coatings. Consider fusion-welded HDPE as standard for diameters over 20 in. or in areas of high groundwater.

- **Install long-term flow monitoring.** Install permanent flow meters at 2700 South near I-15 and at the proposed Downtown Sewer Pump Station. This divides the system into three roughly equal areas to facilitate future flow characterization.

- **Use information in future studies and designs.** The study characterizes the typical timing, magnitude, and location of sewer flows in greater detail than previous efforts. Use the information to simulate sewer loads and plan future infrastructure.

It is not possible, or advisable, to eliminate all inflow and infiltration. First, the expense is too great. Second, some inflow and infiltration are beneficial since they dilute the wastewater stream. Accordingly, mitigation is recommended in prioritized areas where inflow and infiltration are the greatest. Further, some inflow and infiltration may be accounted for in the level of service for each customer. This will be determined in a future master plan.

Pipe rehabilitation can reduce infiltration by 18% to 35%.[18] For the purposes of this study, a 25% reduction is assumed for all the actions listed above. This means that about 15% of the total

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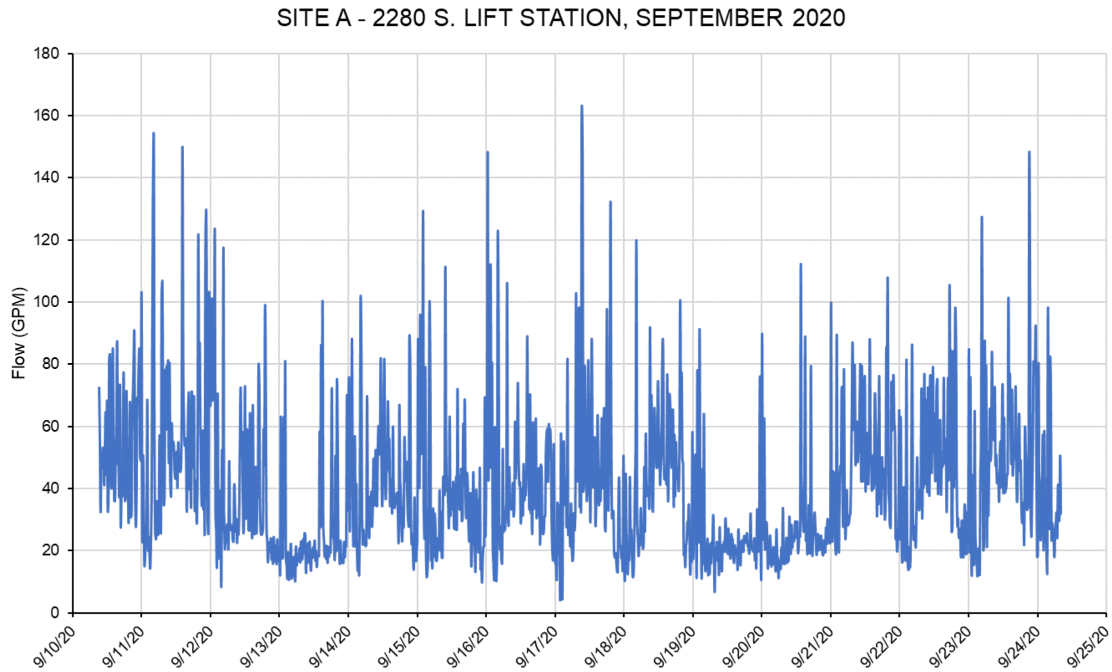
[17] NASSCO, Pipeline Assessment Certification Program, https://www.nassco.org/content/pipeline-assessment-pacp.

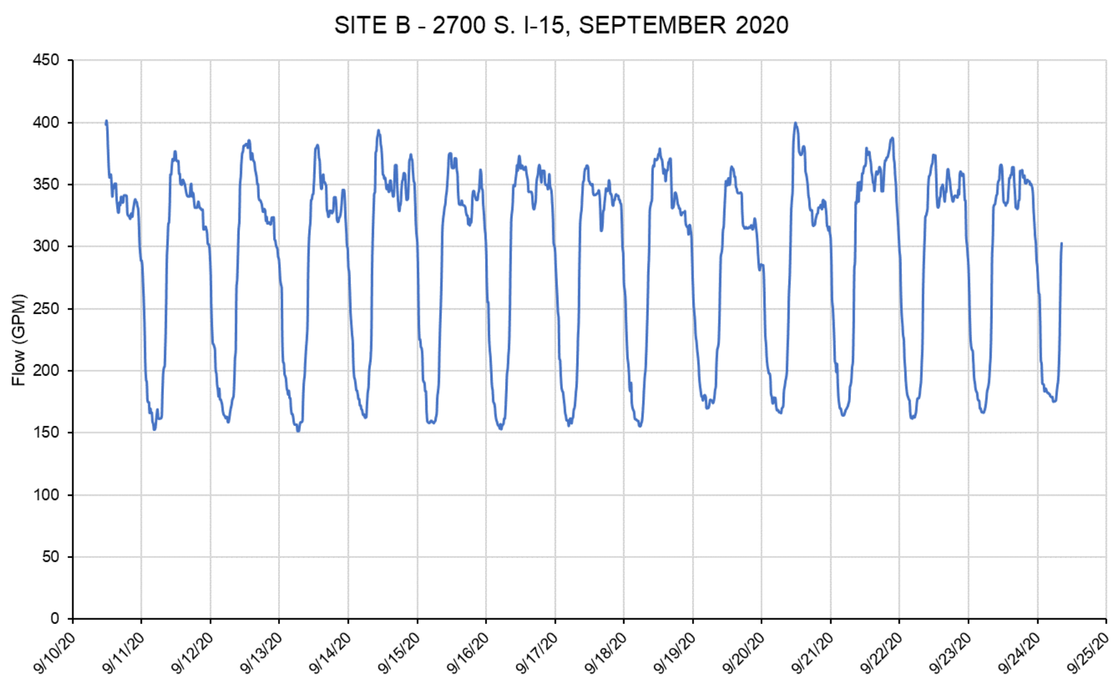
[18] P. Staufer, A. Scheidegger, and J. Rickermann, "Assessing the Performance of Sewer Rehabilitation on the Reduction of Infiltration and Inflow," *Water Research* 46 (2012): 5185–5196, http://dx.doi.org/10.1016/j.watres.2012.07.001; Falmouth (MA) Wastewater Division, "Woods Hole Infiltration Reduction Project," http://www.falmouthmass.us/371/Woods-Hole-Infiltration-Reduction-Projec; City of Naperville (IL), "Inflow and Infiltration Reduction," https://data.naperville.il.us/stories/s/Inflow-Infiltration-Reduction/bvsp-km75/; Jared Raney, "Study Suggests Ongoing Rehab Is Necessary for Significant Inflow and Infiltration Reduction," *I&I* (May 22, 2019), https://www.iandimag.com/online_exclusives/2019/05/study-suggests-ongoing-rehab-is-necessary-for-significant-i-i-reduction.

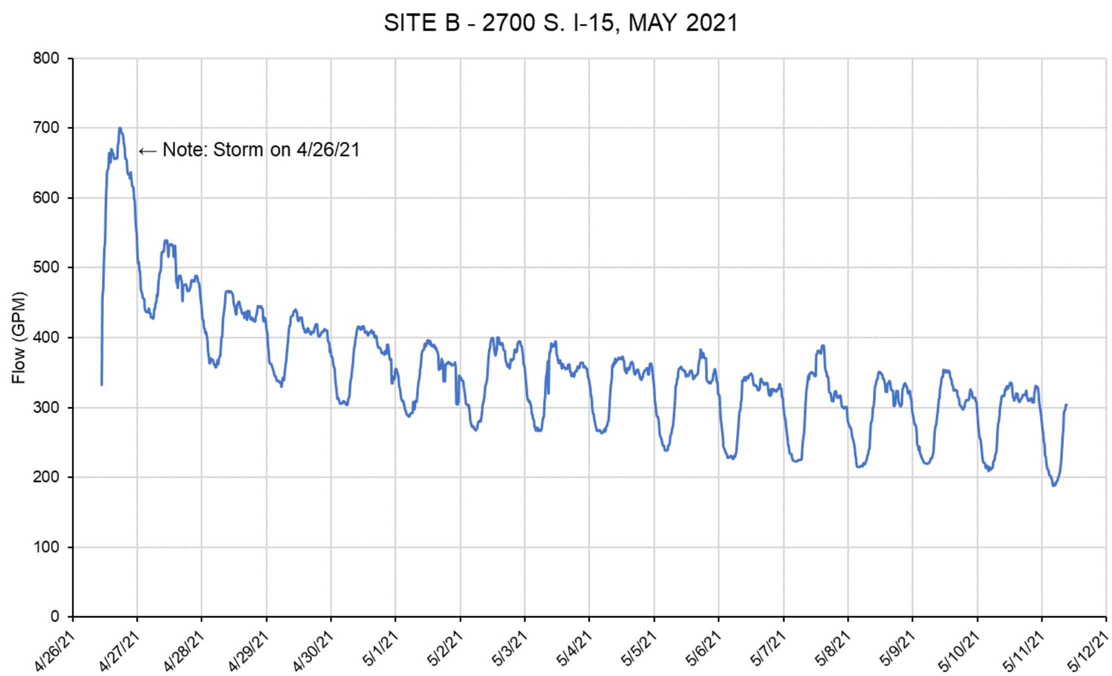
annual wastewater volume can be eliminated, with associated savings in treatment costs ($45,000, based on $280/MG) and pipe sizes. (Treatment costs also depend on turbidity, which is reduced with high inflow and infiltration, but the volume is still the largest expense.)

APPENDIX A: FLOW METER DATA

See spreadsheet for complete data.







SITE B - 2700 S. I-15, MAY 2021
Flow (GPM)
← Note: Storm on 4/26/21
0
100
200
300
400
500
600
700
800
4/26/21
4/27/21
4/28/21
4/29/21
4/30/21
5/1/21
5/2/21
5/3/21
5/4/21
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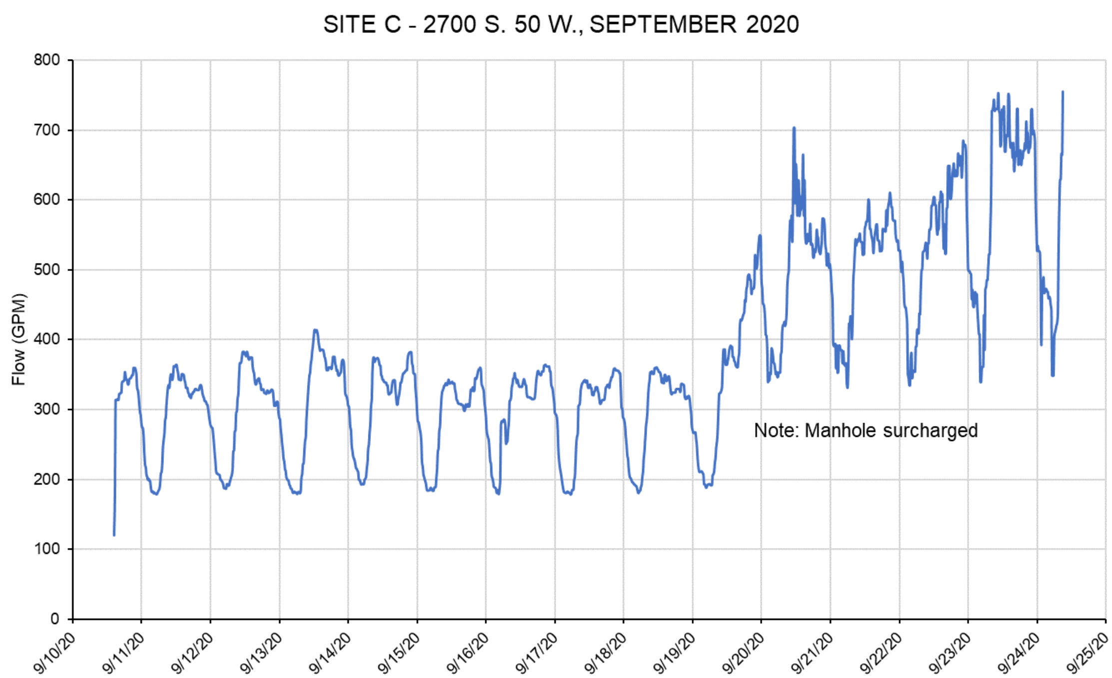
5/11/21
5/12/21



SITE C - 2700 S. 50 W., SEPTEMBER 2020
Flow (GPM)
Note: Manhole surcharged
0
100
200
300
400
500
600
700
800
9/10/20
9/11/20
9/12/20
9/13/20
9/14/20
9/15/20
9/16/20
9/17/20
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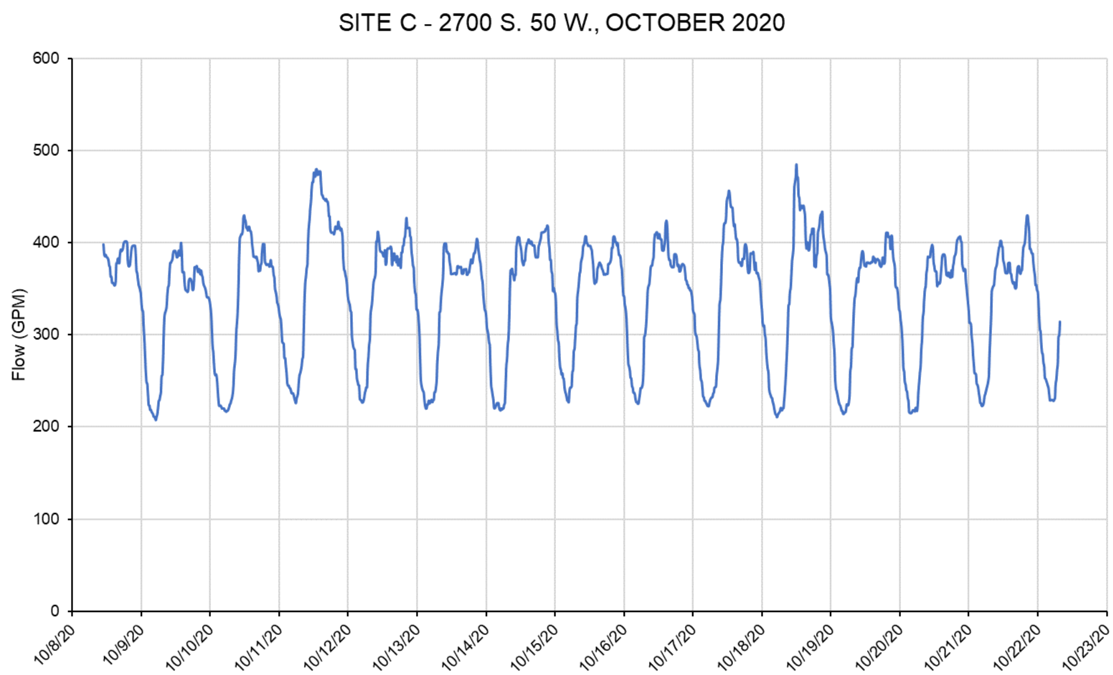
9/24/20
9/25/20



SITE C - 2700 S. 50 W., OCTOBER 2020
Flow (GPM)
0
100
200
300
400
500
600
10/8/20
10/9/20
10/10/20
10/11/20
10/12/20
10/13/20
10/14/20
10/15/20
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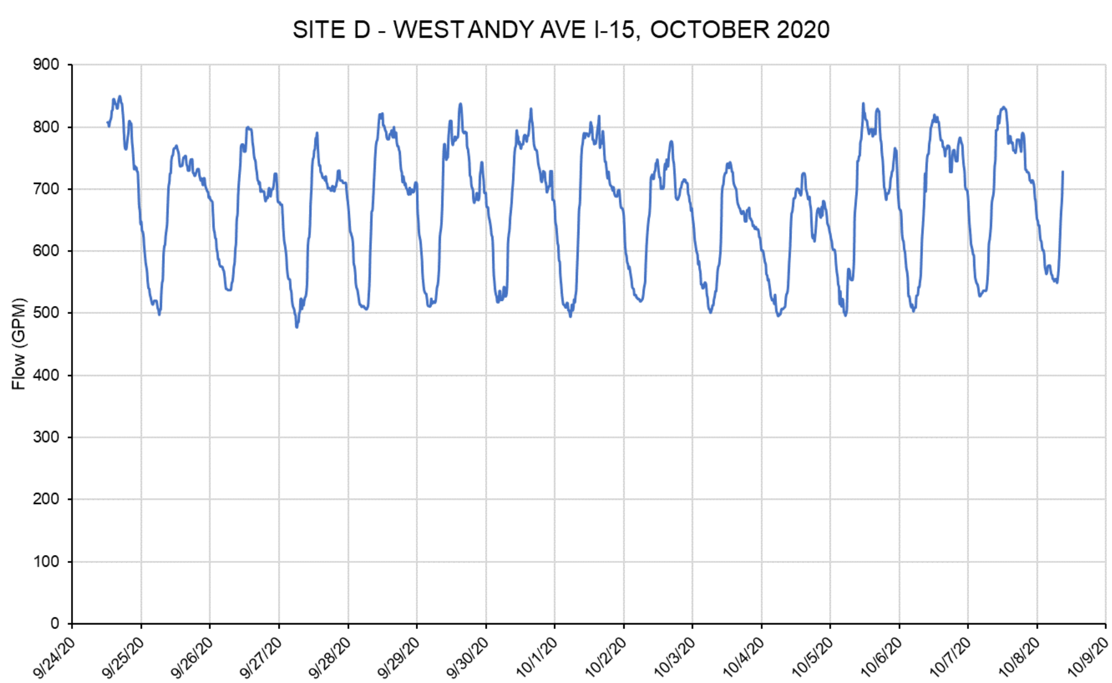
10/22/20
10/23/20



SITE D - WEST ANDY AVE I-15, OCTOBER 2020
Flow (GPM)
0
100
200
300
400
500
600
700
800
900
9/24/20
9/25/20
9/26/20
9/27/20
9/28/20
9/29/20
9/30/20
10/1/20
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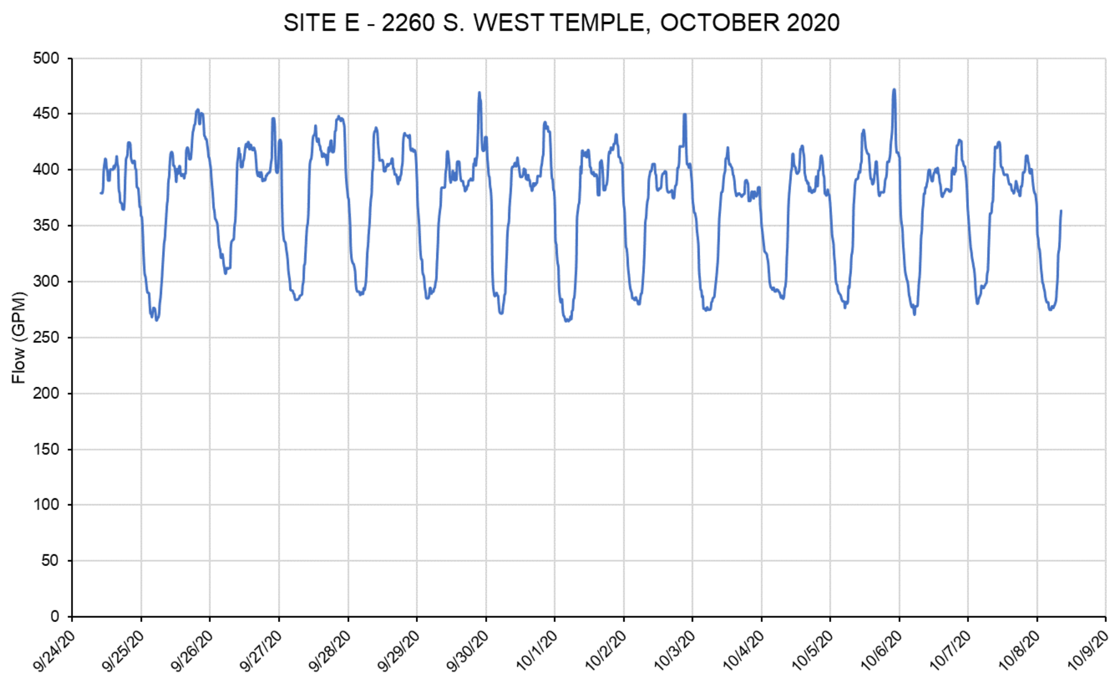
10/8/20
10/9/20



SITE E - 2260 S. WEST TEMPLE, OCTOBER 2020
Flow (GPM)
500
450
400
350
300
250
200
150
100
50
0
9/24/20
9/25/20
9/26/20
9/27/20
9/28/20
9/29/20
9/30/20
10/1/20
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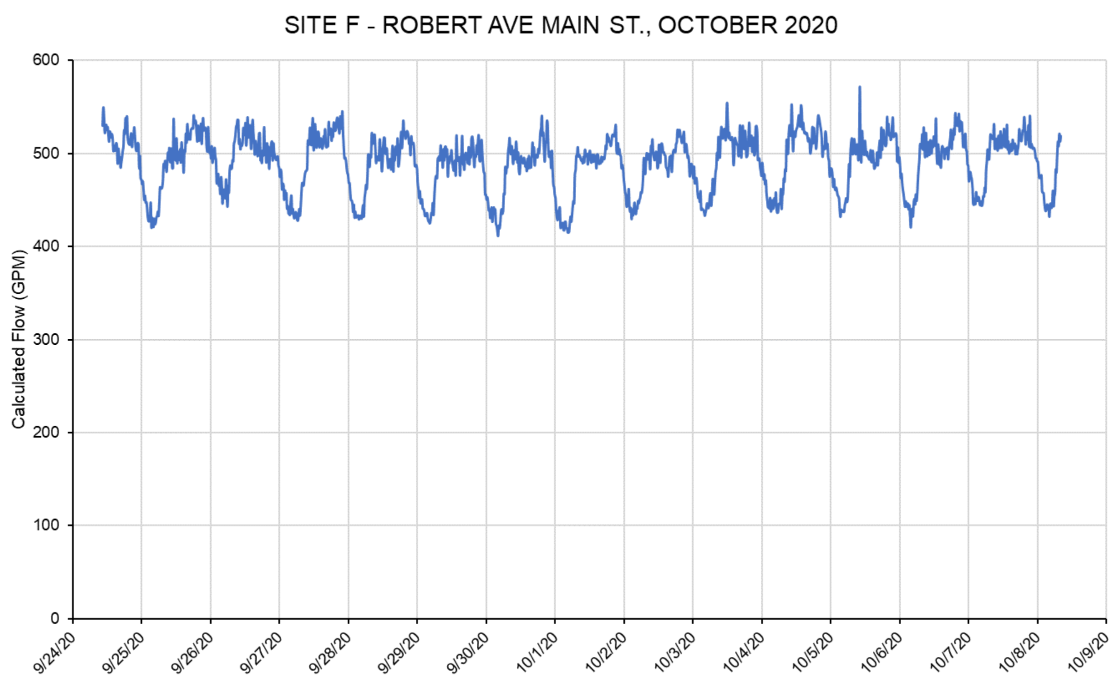
10/8/20
10/9/20



SITE F - ROBERT AVE MAIN ST., OCTOBER 2020
Calculated Flow (GPM)
600
500
400
300
200
100
0
9/24/20
9/25/20
9/26/20
9/27/20
9/28/20
9/29/20
9/30/20
10/1/20
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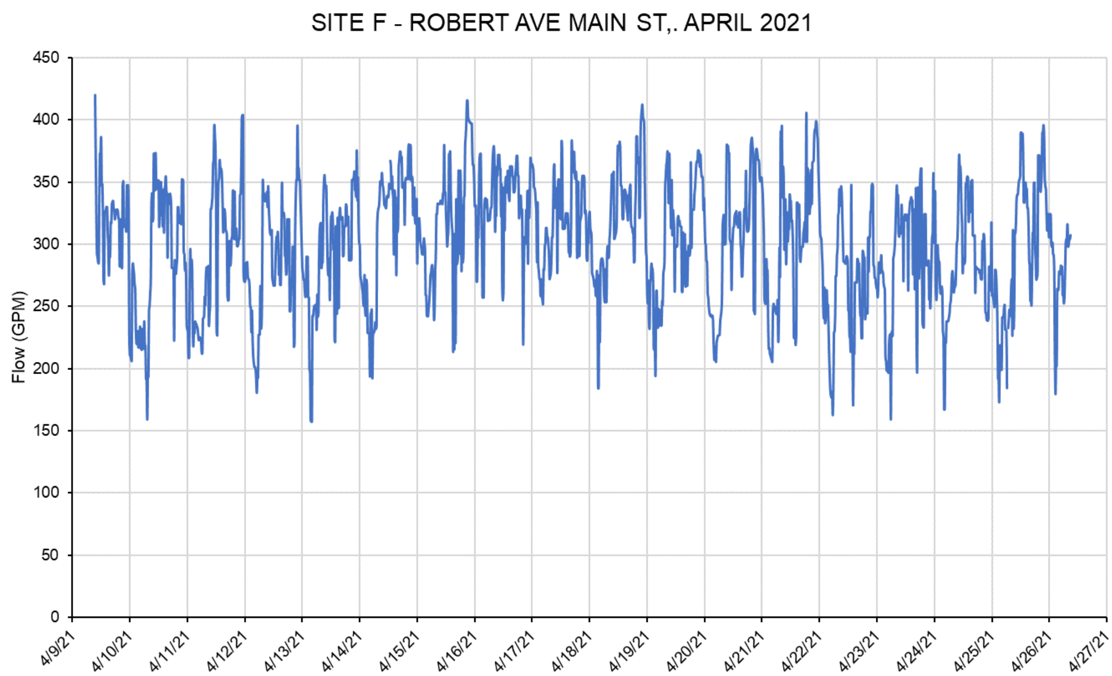
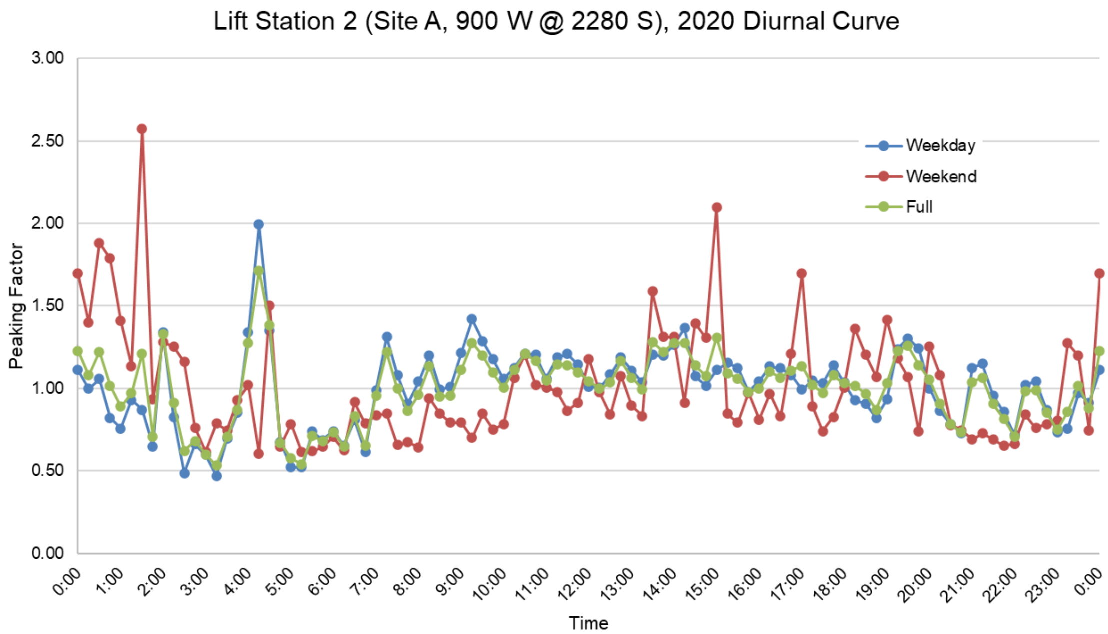
10/8/20
10/9/20

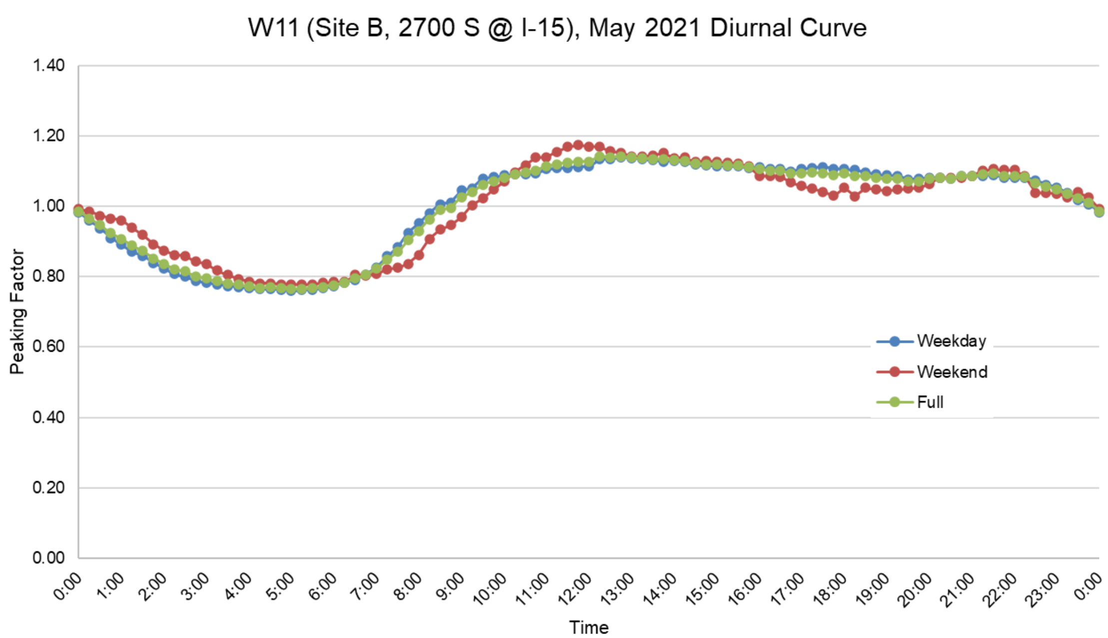


SITE F - ROBERT AVE MAIN ST,. APRIL 2021
Flow (GPM)
450
400
350
300
250
200
150
100
50
0
4/9/21
4/10/21
4/11/21
4/12/21
4/13/21
4/14/21
4/15/21
4/16/21
4/17/21
4/18/21
4/19/21
4/20/21
4/21/21
4/22/21
4/23/21
4/24/21
4/25/21
4/26/21
4/27/21

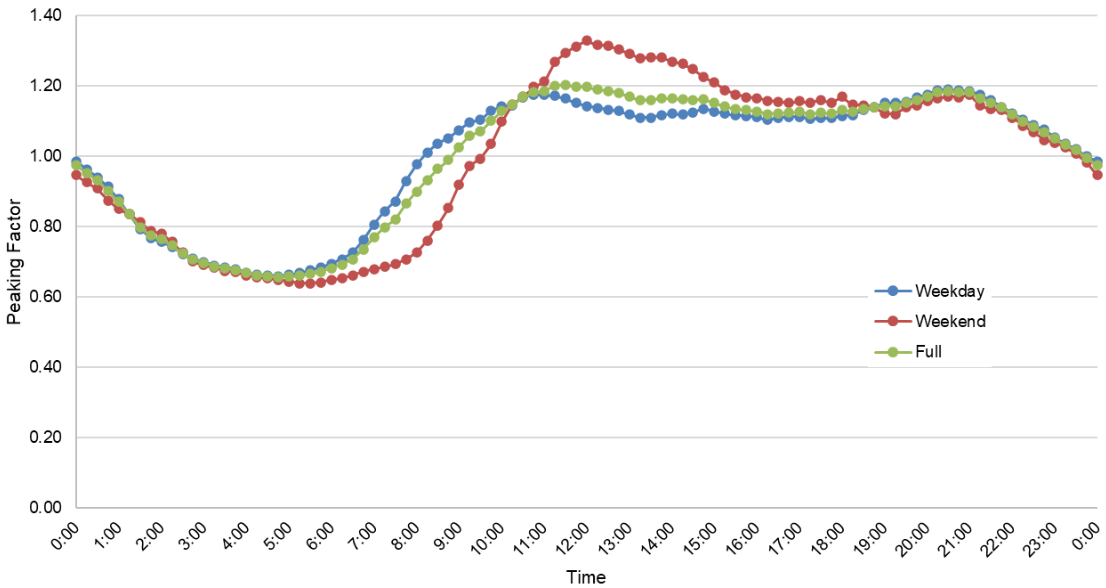
APPENDIX B: DIURNAL CURVES

See spreadsheet for complete data.

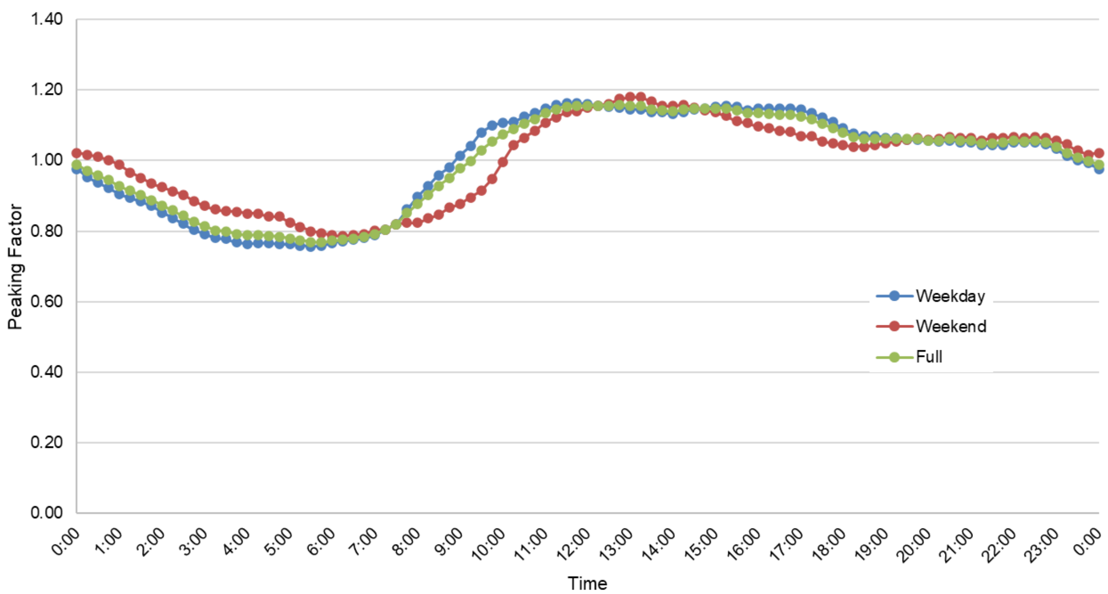


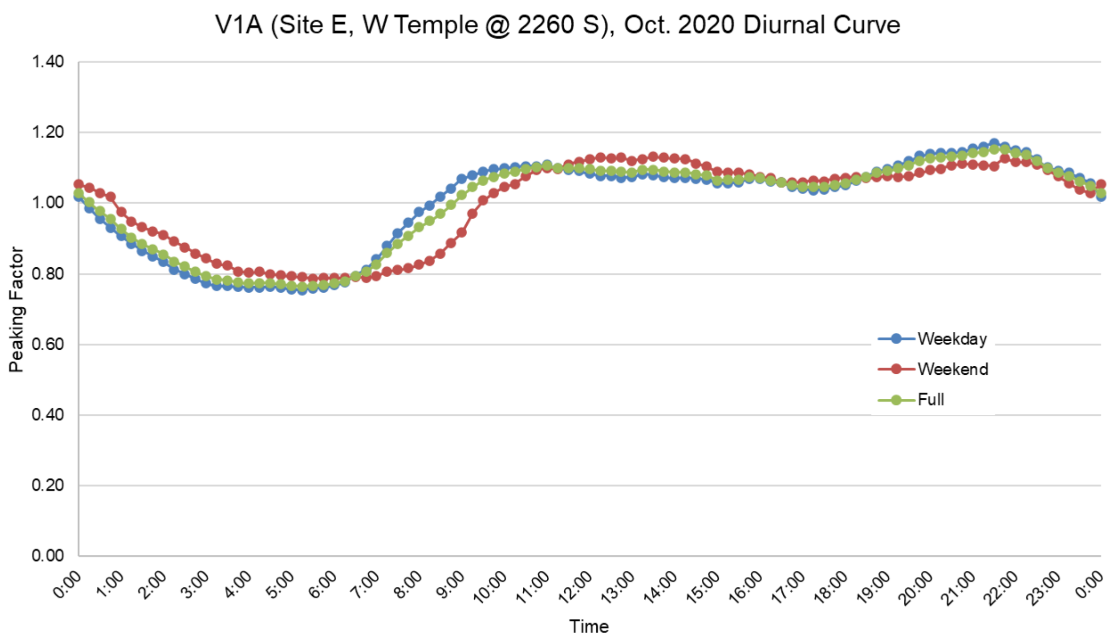


W30 (Site C, 2700 S @ 50 W), Oct. 2020 Diurnal Curve



T2A (Site D, Andy Ave @ I-15), Oct. 2020 Diurnal Curve




V1A (Site E, W Temple @ 2260 S), Oct. 2020 Diurnal Curve
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
Peaking Factor
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
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13:00
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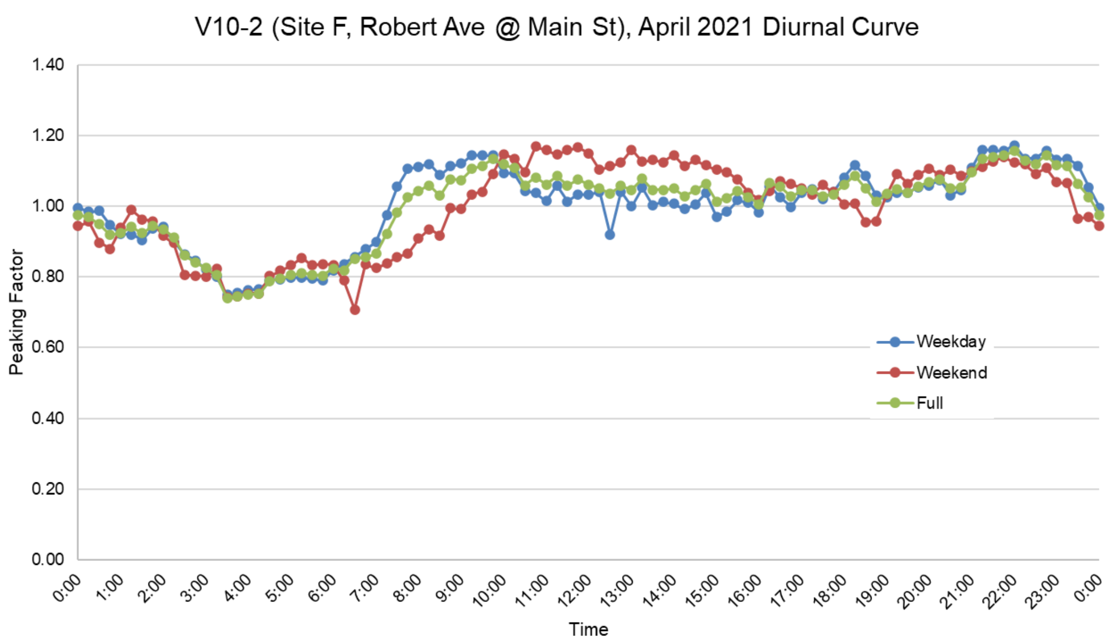
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00
Time
Weekday
Weekend
Full


V10-2 (Site F, Robert Ave @ Main St), April 2021 Diurnal Curve
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1.00
0.80
0.60
0.40
0.20
0.00
Peaking Factor
0:00
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
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21:00
22:00
23:00
0:00
Time
Weekday
Weekend
Full

APPENDIX C

Growth Projections

SSLC Wastewater Collection System Master Plan Update
Appendix B - Growth Projections

Year	ERUs
2024	5702
2025	5811
2026	5921
2027	6031
2028	6141
2029	6251
2030	6361
2031	6471
2032	6581
2033	6690
2034	6799
2035	7083
2036	7368
2037	7652
2038	7936
2039	8220
2040	8505
2041	8789
2042	9073
2043	9357
2044	9642
2045	9926
2046	10210
2047	10494
2048	10779
2049	11063
2050	11347
2051	11632
2052	11916
2053	12200
2054	12484
2055	12769
2056	13053
2057	13337
2058	13621
2059	13906
2060	14190

APPENDIX D

Cost Estimates

South Salt Lake City Capital Facility Plan
Wastewater Existing Recommended Improvements
Preliminary Engineers Cost Estimates

	Item	Unit	Unit Price	Quantity	Total Price
E-1.	***State Street Sewer Line***				
	Install 15" gravity line	LF	$ 464	80	$ 37,136
	30" Jack and Bore State Street	LF	$ 4,500	90	$ 405,000
				Total	$ 442,136
			Engineering & Admin. (10%)		$ 44,214
			Contingency (10%)		$ 44,214
			Total to State Street Sewer Line		**$ 531,000**

Total Costs $ 531,000

City of South Salt Lake Capital Facility Plan
Wastewater 10-Year and Buildout Recommended Improvements
Preliminary Engineers Cost Estimates

	Item	Unit	Unit Price	Quantity	Total Price
10-1.	***Shelley Ave Sewer Improvements****				
	Install 10" gravity line	LF	$ 421	800	$ 336,418
				Total	$ 336,418
			Total to Shelley Ave Sewer Improvements*		**$ 336,418**
10-2.	***Welby Ave Sewer Improvements****				
	Install 10" gravity line	LF	$ 421	1100	$ 462,575
				Total	$ 462,575
			Total to Welby Ave Sewer Improvements*		**$ 462,575**
B-1.	***State St Sewer Improvements****				
	Install 15" gravity line	LF	$ 557	130	$ 72,416
				Total	$ 72,416
			Total to State St Sewer Improvements*		**$ 72,000**
B-2.	***2120 South Sewer Improvements****				
	Install 15" gravity line	LF	$ 557	980	$ 545,903
				Total	$ 545,903
			Total to 2120 South Sewer Improvements*		**$ 546,000**

*Contingency and engineering was included in the unit cost of the pipe.

Total Costs $ 1,416,993

APPENDIX E

Trenchless Technologies

TRENCHLESS TECHNOLOGIES

TRENCHLESS TECHNOLOGIES OVERVIEW

Trenchless technologies are divided into two main categories, construction methods and renewal methods. Construction methods involve installation of a new pipeline, while renewal methods involve rehabilitating existing pipelines. The various technologies used in gravity flow applications on small to mid-size pipe diameters are briefly described in the following sections.

NEW PIPE CONSTRUCTION

Steered Auger Boring (Directional Boring)

Steered auger boring is a method of installing a steel casing pipe where it crosses a road, highway, or railroad track. This process simultaneously jacks a steel casing from a drive pit through the earth while removing the spoil inside the encasement by means of a rotating flight auger. The auger is a flighted tube having couplings at each end that transmit torque to the cutting head from the power source located in the bore pit and transfers spoil back to the machine. The casing supports the soil around it as spoil is being removed. Usually, after installation of the casing, a product pipe is installed and the annular space is filled with grout.

Microtunneling

Microtunneling boring machines are mainly used for installation of a gravity pipeline for wastewater or storm drain. These machines are laser-guided, remotely controlled, and permit accurate monitoring and adjusting of the alignment and grade as the work proceeds so that the pipe can be installed on a precise line and grade.

Microtunneling is not commonly used in Utah.

PIPE RENEWAL

Cured-In-Place

The cured-in-place process involves the insertion of a resin-impregnated fabric tube into an existing pipe by the use of water or air inversion or winching. Usually, the fabric is polyester felt material, fiberglass reinforced, or similar. Normally, water or air is used for the inversion process with hot water or steam used for the curing process. The pliable nature of the resin-saturated fabric prior to curing allows installation around curves, filling of cracks, bridging of gaps, and maneuvering through pipe defects. The cured-in-place process can be applied for structural and non-structural purposes. Additionally, systems using felt impregnated polyester resin or fiberglass provide very good corrosion resistance. The cured-in-place process also has excellent strength, and can be designed as a stand-alone system to sustain entire loading on an existing pipe.

Advantages

- Grouting is not normally required.
- No joints, so very smooth interior improves hydraulic capacity.
- Conforms to non-circular shapes, bends, and deformations.
- Can be inserted via existing manholes or through minor excavations.

Limitations

- The tube or hose must be custom-constructed for each project.
- The existing flow must be rerouted during the installation process.
- Sealing may be required at liner pipe ends to prevent infiltration.
- The amount and type of resin is a contractor's function, so specifications and inspection are required to ensure proper resin quality and handling.
- The curing process must be carefully monitored, inspected, and tested.
- Chemical contaminants are introduced into the curing water during the curing process that cannot be discharged into the environment. Discharging the curing water to a POTW is acceptable.
- Obstructions in the existing pipeline inhibit the lining process.
- The cost of the cured-in-place process is relatively expensive.

Slip Lining

Slip lining is mainly used for structural applications when the existing pipe does not have joint settlements or misalignments. In this method, a new pipeline of smaller diameter is inserted into the existing pipeline and usually the annulus space between the existing pipe and new pipe is grouted.

Advantages

- No specialized equipment is required.
- The same jacking pipes and fittings, as used in other trenchless construction methods, may be used.
- It is a conceptually simple technique.
- It can be used for structural and non-structural applications.
- The existing flow can be maintained (live insertion) during the installation process.

Limitations

- Less hydraulic capacity, due to smaller diameter, than the original larger pipeline had when it was new.
- Pit excavation is required.
- Grouting is generally required.

Pipe Bursting

Pipe bursting is considered when the capacity of an existing pipeline is determined to be inadequate. Pipe bursting uses a hammer to break the old pipe and force particles into the surrounding soil while a new pipe is simultaneously pulled and/or pushed in its place.

Advantages

- It can be used on a wide range of existing pipe materials and diameters.
- The new pipeline can be larger than the existing pipeline if there is enough cover.
- The existing pipeline serves as a guide to for the new pipeline.

Limitations

- Drive and reception excavations are required.
- Above-ground working space is required for ancillary construction equipment.
- Laterals must be replaced by open excavations.
- The existing flow must be rerouted during the installation process.
- Ground movement and vibration could damage nearby facilities.

Pipe Eating

Pipe eating is considered when the capacity of an existing pipeline is determined to be inadequate. Pipe eating is performed using a boring machine. In this method, the old pipe is broken into small pieces and taken out by means of slurry or auger.

Advantages

- It can be used on a wide range of existing pipe materials and diameters.
- The new pipeline can be larger than the existing pipeline if there is enough cover.
- The existing pipeline serves as a guide to for the new pipeline.

Limitations

- Drive and reception excavations are required.
- Above-ground working space is required for ancillary construction equipment.
- Laterals must be replaced by open excavations.
- The existing flow must be rerouted during the installation process.

Thermoforming

Thermoforming involves inserting a folded (for reduced cross section) pipeline into an existing pipeline and subsequently heating the inserted pipeline to conform to the existing pipeline dimensions. The inserted folded pipeline is made of either polyvinyl chloride or polyethylene.

Advantages

- Very smooth interior improves hydraulic capacity.

- Few field joints, so construction is faster.
- It is a chemically-inert process.
- It solves corrosion problems.
- It controls groundwater infiltration, product exfiltration, and root intrusion.
- The new pipe is structurally-independent.
- Installation can be accomplished via existing manholes.
- It can be used on large radius bends.
- Internal lateral connections are possible

Limitations

- A large above-ground working space is required for laying out the string of butt-fused pipeline.
- The existing flow must be rerouted during the installation process.
- For water mains, valves and connections usually require excavation.

SUMMARY OF BENEFITS OF TRENCHLESS TECHNOLOGY

- Minimizes the need to disturb the existing environment, traffic, or congested living and working areas.
- Uses predetermined paths provided by existing piping, thereby reducing the steering and control problems associated with open-cut.
- Requires less space underground, thereby minimizing chances of interfering with existing utilities or abandoned pipelines.
- Provides the opportunity to upsize a pipeline (within technology limits) without open trench construction.
- Requires less-exposed working area, and therefore, is safer for both workers and the community
- Eliminates the need for spoil removal and minimize damage to the pavement (the life expectancy of pavements have been observed to be reduced by up to 60 percent with open-cut repairs), and disturbance to other utilities.

TABLE 1 - COMPARISON OF TRENCHLESS TECHNOLOGIES

Method	Diameter Range (in)	Maximum Installation (ft)	Pipe Material[1]	Accuracy (in)
New Pipe Construction				
Steered Auger Boring	4 to 60	600	Steel	± 12
Microtunneling	6 to 136	500 to 1,500	RCP, GRP, VCP, DIP, Steel, PCP	± 1
Pipe Renewal				
Cured-In-Place	4 to 108	3,000	All	Not Applicable
Slip Lining	4 to 63	1,000	PE, PP, PE/EPDM, PVC	Not Applicable
Pipe Bursting	4 to 48	1,500	PE, PP, PVC, GRP	Not Applicable
Pipe Eating	4 to 36	300	PE, PP, PVC, GRP	Not Applicable
Thermoform	4 to 30	1,500	HDPE, PVC	Not Applicable

1. RCP = Reinforced Concrete Pipe
   GRP= Glass Reinforced Plastic
   VCP=Vitrified Clay Pipe
   DIP=Ductile Iron Pipe
   PCP=Polymer Concrete Pipe
   PE=Polyethylene
   PP=Polypropylene
   EPDM=Ethylene Propylene Diene Monomer
   PVC=Polyvinyl Chloride
   HDPE=High Density Polyethylene

ORDINANCE NO. 2026-1

AN ORDINANCE OF THE SOUTH SALT LAKE CITY COUNCIL AMENDING CHAPTER 12.30 AND CHAPTER 13.74 OF THE SOUTH SALT LAKE CITY MUNICIPAL CODE UPDATING DEFINITIONS AND MAKING TECHNICAL CHANGES.

WHEREAS, the South Salt Lake City Council (the "City Council") is authorized to enact and amend ordinances establishing regulations related to the health, safety, and welfare of the residents of the City of South Salt Lake (the "City"); and

WHEREAS, the City engaged a consultant to conduct a study of the City's streets in order to determine the current condition of the streets throughout the city and to determine how to provide sufficient revenue to continue to maintain the City's streets, develop proportional and cost-based rates that reflect customer and system characteristics, and reflect prudent financial planning criteria including funding renewal and replacement needs; and

WHEREAS, the City's consultant studied key issues such as how to adequately fund annual operating expenses and provide sufficient annual maintenance, renewal and replacement funding; and

WHEREAS, deferred maintenance of the City's streets and related facilities ultimately results in increased maintenance, renewal, and replacement costs; and

WHEREAS, the City's consultant reviewed and analyzed the key issues using accepted responsible methodology; and

WHEREAS, on June 11, 2025, the City's consultant presented the results of the study to the Council; and

WHEREAS, on July 23, 2025, the Council adopted the code enacting a Transportation Utility Fee (TUF) in its regular meeting; and

WHEREAS, the City Council desires to amend the TUF Code by adding a definition for non-profit organizations and exempting those organizations from the TUF; and

WHEREAS, the City Council finds that amending the municipal code to clarify and improve the dispute process will promote fairness, transparency, and administrative efficiency by providing applicants with a clear, consistent and accessible method to request review of City TUF decisions; and

WHEREAS, the City Council finds that amending the TUF code is in the best interests of the City.

NOW THEREFORE, BE IT ORDAINED, by the City Council of the City of South Salt Lake as follows:

SECTION 1. **Enactment.** Chapter 12.30 is hereby amended, as attached hereto and incorporated by reference in "Exhibit A." Chapter 13.74 is hereby amended, as attached hereto and incorporated by reference in "Exhibit B".

SECTION 2. **Severability.** If any section, subsection, sentence, clause, phrase, or portion of this ordinance is, for any reason, held invalid or unconstitutional by any court of competent jurisdiction, such provision shall be deemed a separate, distinct, and independent provision, and such holding shall not affect the validity of the remaining portions of this ordinance.

SECTION 3. **Conflict with Existing Ordinances, Resolutions, or Policies.** To the extent that any ordinances, resolutions, or policies of the City of South Salt Lake conflict with the provisions of this ordinance, this ordinance shall prevail.

SECTION 4. **Effective Date.** This ordinance shall become effective upon Mayor's signature and publication, or after fifteen days of transmission to the office of the Mayor if neither approved nor disapproved by the Mayor, and thereafter, publication.

[signatures appear on next page; remainder of page intentionally left blank]

DATED this 14th day of January, 2026.

BY THE CITY COUNCIL:

Sharla Bynum, Council Chair

ATTEST:

Ariel Andrus, City Recorder

City Council Vote as Recorded:

Huff	yes
Thomas	yes
Bynum	yes
Mitchell	yes
Sanchez	ABSENT
deWolfe	yes
Williams	yes

CITY OF SOUTH SALT LAKE CORPORATE Seal SALT LAKE COUNTY, UTAH

Transmitted to the Mayor's office on this 15 day of January 2026.

Ariel Andrus, City Recorder

MAYOR'S ACTION: Approve

Dated this 16th day of January, 2026.

Cherie Wood, Mayor

ATTEST:

Ariel Andrus, City Recorder

Exhibit A:

12.30 - Transportation Utility

Sections:

12.30.010 - Policy and purpose.

The City has determined and hereby declares that the use of the city's streets and related facilities benefits and services all property within the incorporated limits of the City of South Salt Lake and that the public necessity to provide maintenance, upkeep, improvement, and repair of the City's streets and related facilities within the rights-of-way protects the health, safety, and welfare of the city and its residents, businesses, and visitors by reducing hazards to life and property and by reducing undesirable street, right-of-way, or other easement conditions through regular maintenance.

12.30.020 - Definitions.

For purposes of this Chapter the following definitions apply:

"Base rate" means the standard transportation utility user's fee set forth in the consolidated fee schedule for the City of South Salt Lake.

"City" means the City of South Salt Lake.

"Council" means City of South Salt Lake Council.

"Customer" or "person'" means any individual; public or private corporation and its officers; partnership; association; firm; trustee; executor of an estate; the state or its departments, institutions, bureaus, agencies; county; city; political subdivision; or any other governmental or legal entity recognized by law.

"Dwelling Unit" means a single unit that provides living space for one or more people. One Dwelling Unit is the standard measure of an Equivalent residential unit.

"Equivalent residential unit" or "ERU" for purposes of the Transportation utility fee means the standard trip ends for a dwelling unit adjusted for axel weight.

"Industrial" means use of a Parcel, Lot, or Building or a portion thereof for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair, or processing operations including manufacturing, processing, generation, or storage of hazardous and non-hazardous materials.

"Multi-family residential" means a residential building or buildings sharing a common Owner and containing more than one Dwelling Unit.

"Non-profit organization" means an entity that is organized and operated exclusively for charitable, educational, religious, scientific, literary, veterans, or social welfare that is recognized as tax exempt by the Internal Revenue Service, and that does not distribute income or profits to its members, directors, or officers. This definition specifically includes organizations qualified under sections 501(c)(3), 501(c)(4), 501(c)5 and 501(c)(19) of the Internal Revenue Code.

"Office" means a Building, or portion thereof containing housing firms or organizations and offices and facilities for professional services to individuals and businesses and where a majority of client contact occurs at the office including, but not limited to, advertising, accounting, architecture, law, insurance, real estate, investment, engineering, medical, dental, or psychiatric services, and computer services.

"Owner" has the same meaning as that term is defined in Title 4 of this Code, or successor provision.

"Place of worship" has the same meaning as that term is defined in Title 17 of this Code, or successor provision.

"Residential user" means an owner or resident of a residential dwelling unit.

"Retail/Commercial" means the sale of goods or services directly to the consumer, that generates point-of-sale sales tax revenues for South Salt Lake City.

"Single-family residential" means any one parcel of land containing no more than one single-family dwelling unit.

"Street" or "Streets" means any street, avenue, boulevard, road, lane, parkway, viaduct, alley, or other way for the movement of vehicular traffic, or a street or way shown upon a plat, heretofore approved, pursuant to law or approved by official action; and includes the land between street lines, whether improved or unimproved, and may comprise pavement shoulders, gutters, parking areas, and other areas within the rights-of-way.

"Transportation utility fund" means the fund created by this ordinance to receive Transportation utility user fees and operate, maintain, repair, and improve the city's streets, rights-of-way and related facilities.

"Transportation utility" means the utility created by this chapter which operates, maintains, regulates, and improves streets and related facilities within the city.

"Transportation utility user fee" means the fee(s) calculated pursuant to this chapter and codified in the City of South Salt Lake Consolidated Fee Schedule, Title 3, Chapter 11.

12.30.030 Transportation utility.

A. Creation. There is hereby created and established a Transportation utility operated by the City and funded by a service fee rate structure.

B. Enterprise Fund. There is hereby established a Transportation utility enterprise fund ("Transportation utility fund") to record all revenue, expenses, asset, and liability information as well as other financial transactions related to the Transportation utility. All fees and other revenue collected in accordance with this ordinance shall be recorded into the Transportation utility fund accounts and shall be used exclusively for the Transportation utility. All revenue and expenses and other financial information shall be reported as prescribed by the State of Utah's Uniform Fiscal Procedures Act for Utah Cities, or its successor provisions.

C. Administration. The Public Works Director of the City shall administer and enforce this Transportation utility ordinance and all regulations and procedures adopted relating to the design, construction, maintenance, operation, and alteration of the streets and associated facilities unless otherwise designated by the Mayor.

12.30.040 Transportation utility user fee.

A. Fee Imposed. All users of City utilities not expressly exempted by this Chapter shall pay the Transportation utility fee as established herein.

B. Base Rate. The council, by ordinance or resolution, shall establish, and periodically adjust, the base rate for the Transportation utility to ensure adequate revenues to fund the costs of street maintenance and management. The base rate shall be set forth in the City of South Salt Lake Consolidated Fee Schedule, available at Title 3, Chapter 11.

C. Amount of Charge. The Transportation utility user fee rate imposed shall be established based on the intensity of use as shown by a study commissioned by the City and overseen by the Public Works Director. The Public Works Director shall present the findings of the study to the Council who will then establish the rate by ordinance in the City of South Salt Lake Consolidated Fee Schedule, Title 3, Chapter 11.

D. Property Owners Responsible for Charges. The property owner of record is responsible for the Transportation utility user fee and retains all obligations for payment of those fees.

E. Exemptions. Transportation utility fees shall not be assessed by the City against <u>the following:</u>

<u>1.</u> Places of Worship; ~~or against~~

2. Residential Users;, Or

3. Non-profit organizations.

F. Policies. The city may adopt policies and rules to assist in applying, administering, and interpreting any other provisions related to the Transportation utility.

G. Appeals. Any person or property owner who is aggrieved by the provisions of this chapter, or the application and calculation of the service charge to their property may appeal to the City pursuant to Section 13.74.090 and Title 2.22 of the South Salt Lake City Code.

12.30.050 Billing and collection.

A. The City shall bill users of City utilities for the Transportation utility user fee via a separate line item on existing utility bills or a separate invoice, consistent with the procedures set forth in Section 13.74.04 of the South Salt Lake City Code. Charges and fees shall be considered delinquent if not paid as determined by rules, policies, and procedures established by the City. Such delinquent fees shall be subject to recovery, with any assessed delinquent charges and fees, by civil action or otherwise pursuant to Section 13.74.040(H).

B. Alternative Billing Arrangement. Owners may assign the payment of the Transportation utility user fee to non-owners by signing an "alternate billing agreement" with the City.

12.30.060 Annual report.

The City's Public Works Director shall develop an annual report on the Transportation utility, to be made available to the Council and Transportation utility Customers each year by the first Council meeting in October. This report shall summarize the financial activities of the utility and the major areas of expenditure, activities, accomplishments, and the upcoming year's priorities.

12.30.070 Severability.

If any section of this chapter is determined to be illegal, invalid, or superseded by other lawful authority, including any federal or state legislative, regulatory, or administrative action, such section shall be deemed a separate, distinct, and independent provision, and such determination shall have no effect on the validity of any other section.

Haven Ave Traffic Median

SOUTH SALT LAKE

January 14, 2026

Utah State Code R930-2

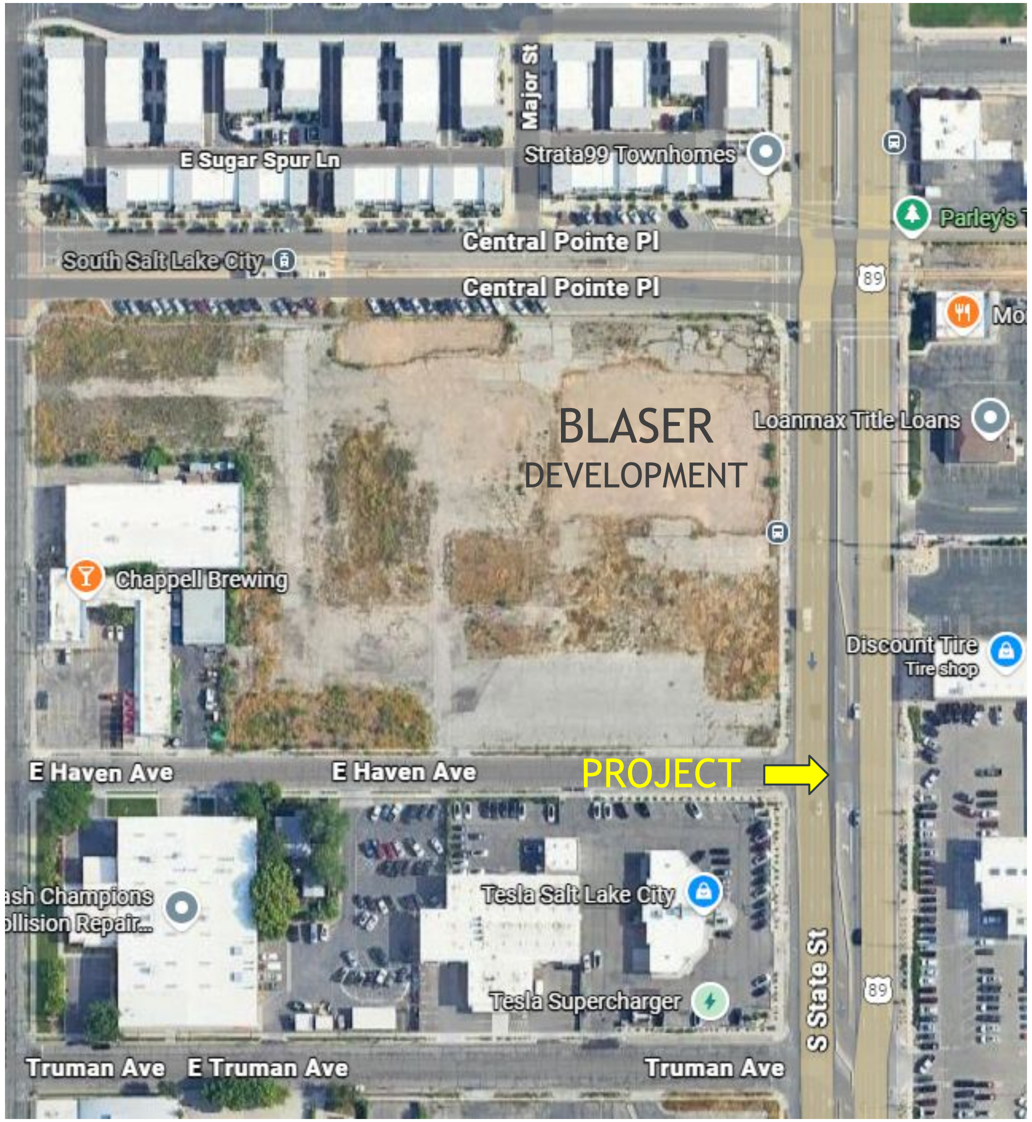
- Requires an opportunity for a public hearing for local government project affecting UDOT roads.
- State St. is a UDOT road
- Hearing is subject to the requirements of section R930-2
- The *Life on State* project is local project, led by South Salt Lake City, using SL County funds.

Purpose and Need

Life on State Project—Safety upgrades:

- Traffic control measures, to reduce accidents, including new median at Haven Ave.
- Center median with protected mid-block refuge at Parley's Trail
- Corner bulbouts to shorten pedestrian crossings at local cross streets
- Corner bulbouts also slow speed of vehicles turning onto local cross streets

Current conditions



Current conditions

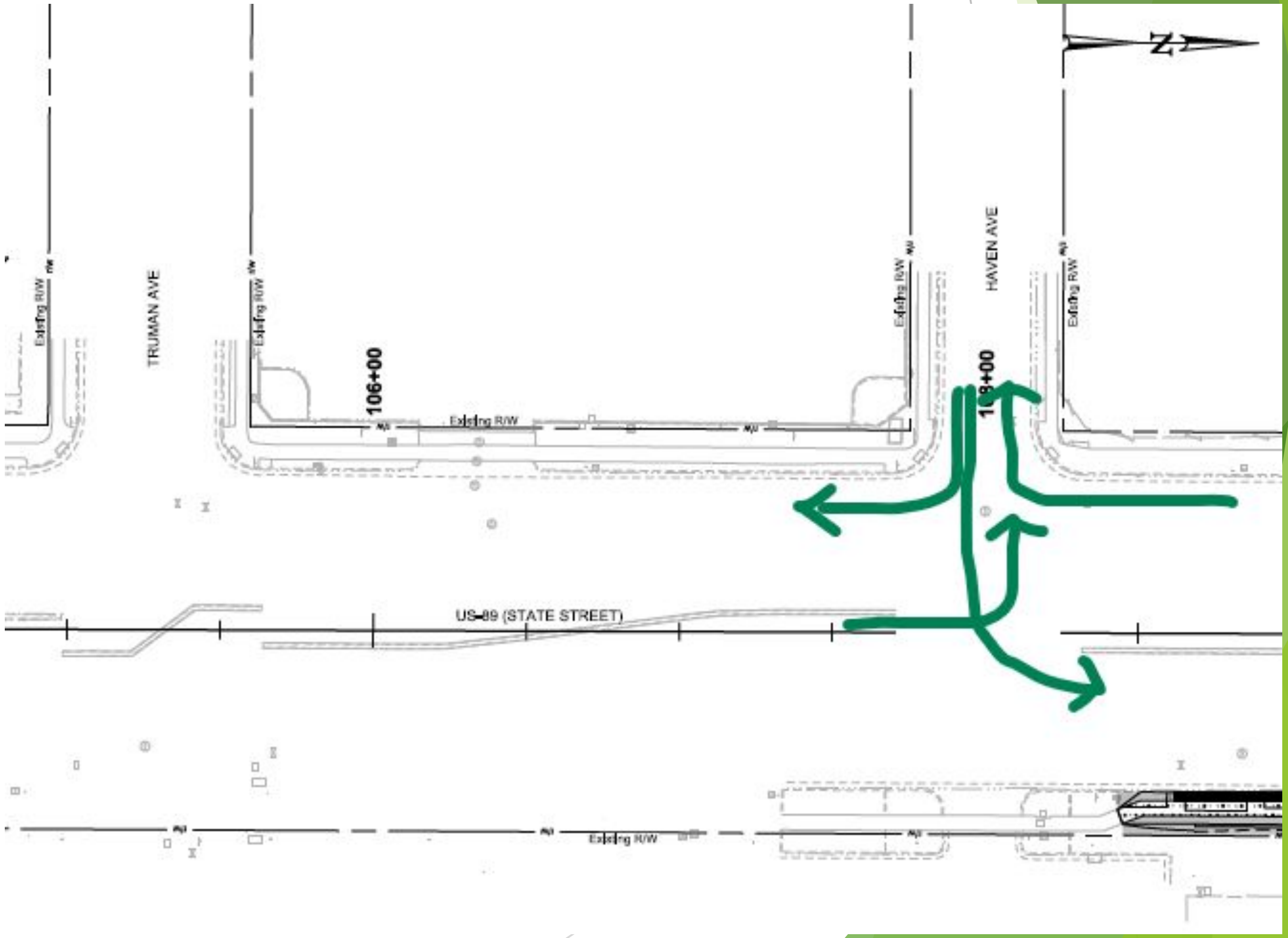
State Street looking at northbound turn lane onto Haven Ave

Haven Ave looking at eastbound turn lane onto State Street

Haven Avenue:

ALLOWED turn movements today:

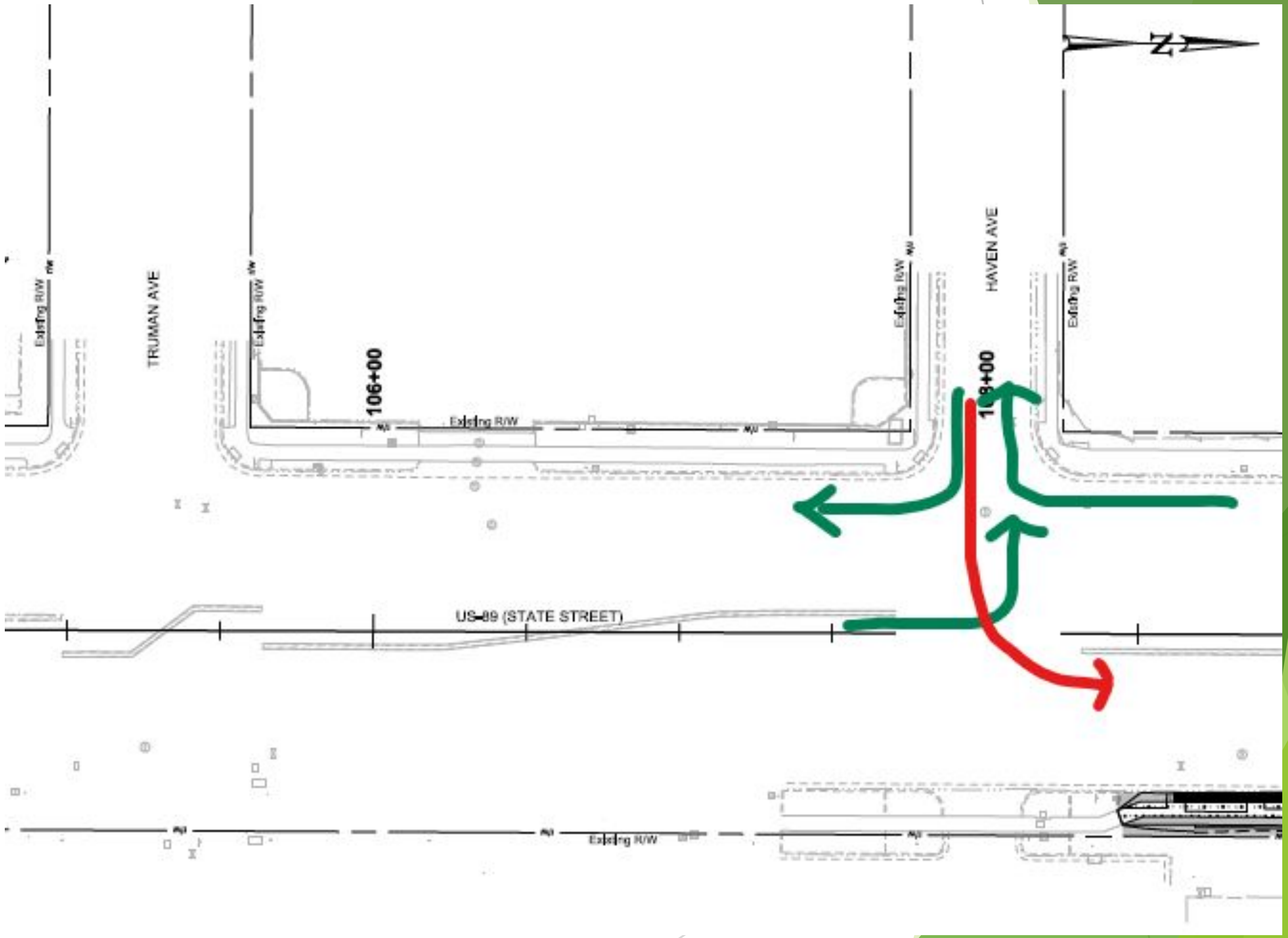
- WB right onto Haven
- WB left onto Haven
- NB left onto State
- SB right onto State



Haven Avenue:

Proposal: ELIMINATE

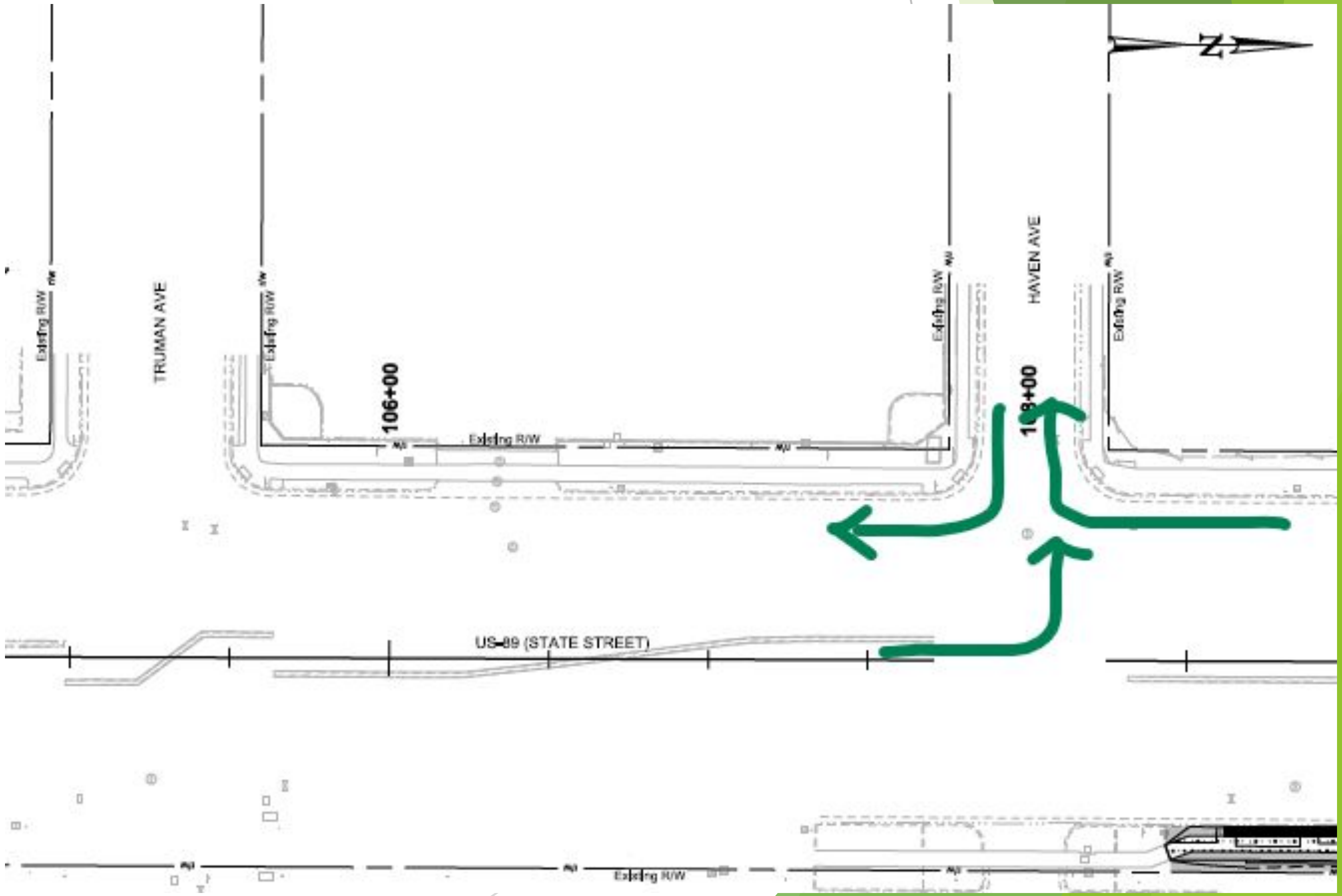
- NB left onto State



Haven Avenue:

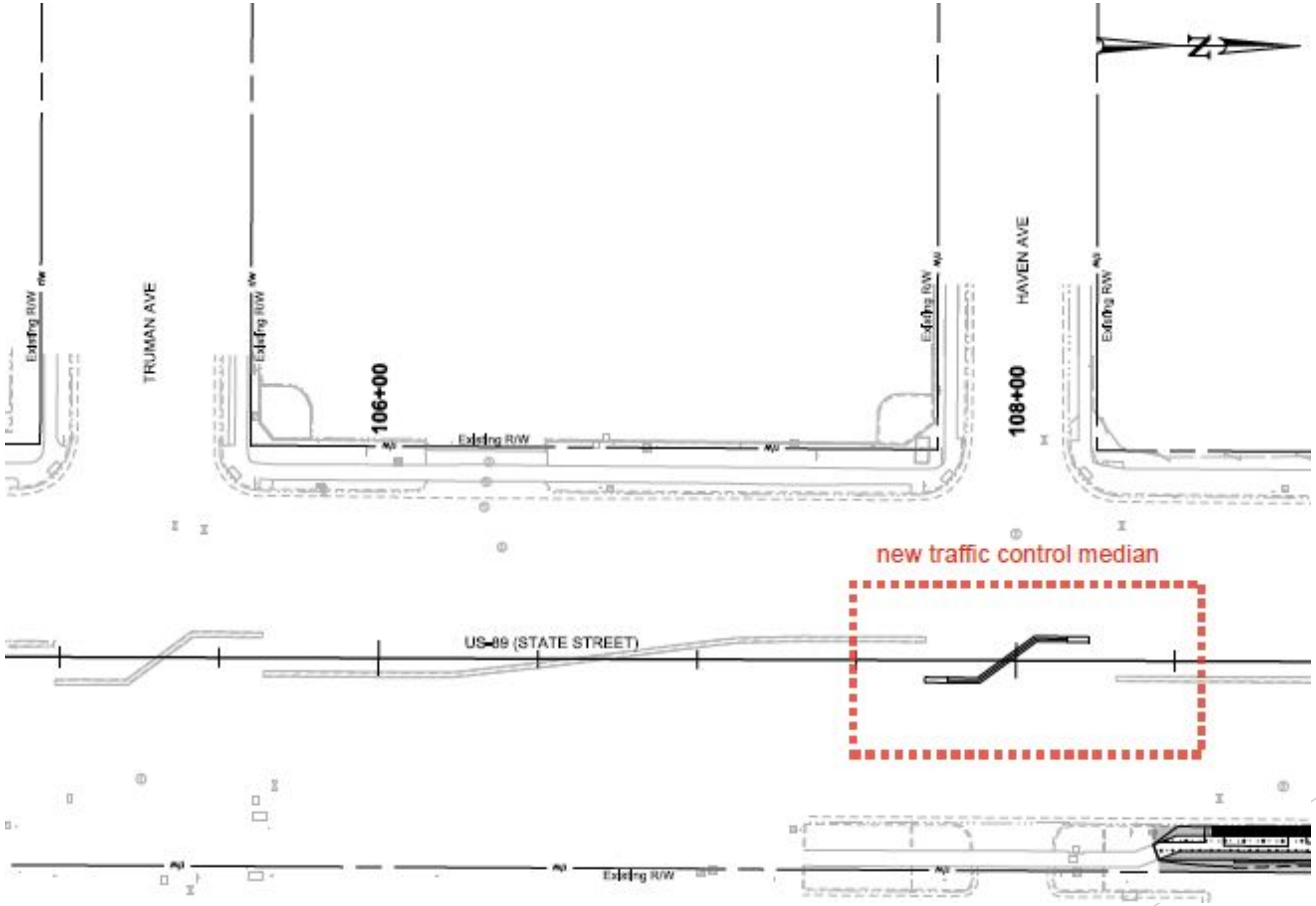
ALLOWED turn movements proposed future:

- WB left onto Haven
- SB right onto State
- EB right onto State



Haven Avenue:

PROPOSED traffic control median:



Timeline

- Public Hearing (today)
- Final construction drawings (January)
- Bidding and contracting (February-April)
- Construction (summer 2026)

Comments