South Weber City Corporation

Sanitary Sewer Capital Facilities Plan and Impact Fee Facilities Plan

Prepared: June 2017
Adopted: August 22, 2017

SOUTH WEBER city

Prepared by
JONES & ASSOCIATES
Consulting Engineers

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Consulting Engineers

ORDINANCE NO. 17-12

AN ORDINANCE OF THE SOUTH WEBER CITY COUNCIL ADOPTING A CAPITAL FACILITIES PLAN, AN IMPACT FEE FACILITIES PLAN AND AN IMPACT FEE ANALYSIS FOR SEWER; PROVIDING FOR THE CALCULATION AND COLLECTION OF SUCH FEES

WHEREAS, On January 30, 2017, South Weber City, Utah (the "City") posted notice as to its intention to prepare capital facility plans ("Capital Facilities Plan"), impact fee facilities plans ("Impact Fee Facilities Plan") and impact fee analyses ("Impact Fee Analysis") for utilities, including Sewer, and invited all interested parties to participate in the impact fee preparation process, in compliance with UCA Section 11-36a-501;

WHEREAS, South Weber City is a municipality in the State of Utah, authorized and organized under the provisions of Utah law and is authorized pursuant to the Impact Fees Act, Utah Code Ann. 11-36a-101 et seq. to adopt impact fees; and

WHEREAS, on August 4, 2017, the City posted notice of a public hearing on the Utah's Public Notice Website, at the City's administrative building, South Weber Elementary School, and South Weber City Family Activity Center to consider the assumptions and conclusions of the Sewer Capital Facilities Plan, Impact Fee Facilities Plan and the Impact Fee Analysis;

WHEREAS, the South Weber City Council (the "Council") met in regular meeting on August 22, 2017, and convened a public hearing to consider adopting the Capital Facilities Plan, Impact Fee Facilities Plan and Impact Fee Analysis, imposing updated Sewer impact fees, providing for the calculation and collection of such fees, and providing for an appeal process, accounting and reporting method and other related matters; and

WHEREAS, on August 22, 2017, Jones and Associates, Consulting Engineers ("CFP and IFFP" consultant) the Capital Facilities Plan and Impact Fee Facilities Plan Consultant, provided written certification for its impact fee facilities plan in compliance with UCA Section 11-36a-306(1);

WHEREAS, on August 22, 2017, Zions Public Finance, Inc. ("IFA Consultant") certified its work under UCA Section 11-36a-306(2);

WHEREAS, on August 22, 2017, after considering the input of the public and stakeholders and relying on the professional advice and certification of the Capital Facilities Plan and Impact Fee Facilities Plan Consultants and Impact Fee Analysis Consultant, South Weber City adopted the findings, conclusions, and recommendations of the Capital Facilities Plan and Impact Fee Facilities Plans prepared by Jones and Associates and Impact Fee Analysis prepared by Zions Bank Public Finance; and

WHEREAS, on August 23, 2017, a copy of the Capital Facilities Plan, Impact Fee Facilities Plan and the Impact Fee Analysis, along with a summary of the analysis that was designed to be understood by a lay person, were made available to the public and deposited at, the City's administrative building, South Weber Elementary School, South Weber City Family Activity Center and on the public notice website; and

WHEREAS, after careful consideration and review of the comments at the public hearing, the Council has determined that it is in the best interest of the health, safety and welfare of the inhabitants of South Weber City to adopt the findings and recommendations of the Capital Facilities Plan, Impact Fee Facilities Plan and Impact Fee Analysis for Sewer, to address the impacts of development upon the Sewer utility, to adopt the Capital Facilities Plan as proposed, Impact Fee Facilities Plan as proposed, to approve the Impact Fee Analysis as proposed, and to provide for the calculation and collection of such fees.

NOW, THEREFORE, BE IT ORDAINED by the South Weber City Council as follows:

The Council hereby adopts the Sewer Capital Facilities Plan and Impact Fee Facilities Plan prepared by Jones and Associates and Sewer Impact Fee Analysis prepared by Zions Bank Public Finance. The CFP, IFFP and IFA are attached hereto as Exhibit A and incorporated by this reference as if fully set forth herein.

PASSED AND ADOPTED by the City Council of South Weber, Davis County, on 22 day of August 2017.

ATTEST:

Elyse Greiner

Elyse Greiner, City Recorder

SOUTH WEBER CITY * 1938 * 1911 * DAVIS COUNTY, UTAH OFFICIAL SEAL

Tamara Long

MAYOR: Tamara Long

Roll call vote is as follows:			
Mr. Casas	Yes	No	
Mr. Winsor	Yes	No	
Mr. Hyer	Yes	No	excused
Mrs. Sjoblom	Yes	No	
Mr. Taylor	Yes	No	

CERTIFICATE OF POSTING

I, the duly appointed recorder for the City of South Weber, hereby certify that:

ORDINANCE 17-12: AN ORDINANCE OF THE SOUTH WEBER CITY COUNCIL ADOPTING A CAPITAL FACILITIES PLAN, AN IMPACT FEE FACILITIES PLAN AND AN IMPACT FEE ANALYSIS FOR SEWER; PROVIDING FOR THE CALCULATION AND COLLECTION OF SUCH FEES

was passed and adopted the 22 day of August 2017, and certifies that copies of the foregoing Ordinance 17-12 were posted in the following locations within the municipality this 23 day of August, 2017.

1. South Weber Elementary, 1285 E. Lester Drive
2. South Weber Family Activity Center, 1181 E. Lester Drive
3. South Weber City Building, 1600 E. South Weber Drive

Elyse Greiner

Elyse Greiner, City Recorder

Exhibit A

SANITARY SEWER
CAPITAL FACILITIES PLAN AND
IMPACT FEE FACILITIES PLAN

for

SOUTH WEBER CITY

June 2, 2017

Prepared by

JONES & ASSOCIATES
Consulting Engineers

1716 East 5600 South
South Ogden, Utah 84403
801-476-9767

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CFP	Capital Facilities Plan
CWSID	Central Weber Sewer Improvement District
DWQ	Division of Water Quality
d/D	(flow) depth to (pipe) Diameter ratio
ERU	Equivalent Residential Unit
GIS	Geographic Information System
gpcpd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
IFA	Impact Fee Analysis
IFFP	Impact Fee Facilities Plan
lf	linear foot or linear feet
SSA	(Autodesk®) Storm and Sanitary Analysis
UAC	Utah Administrative Code
UDEQ	Utah Department of Environmental Quality

1.0 EXECUTIVE SUMMARY

South Weber City's sanitary sewer collection system was analyzed to check for compliance with State regulations. A model of the existing system was created to analyze current conditions and identify deficiencies. State-mandated flows were utilized. Then, estimated future flows were added based on the City's Future Land Use Map to identify where deficiencies will occur with development.

Based on the model, the existing sewer system's main trunk line contains many segments that are unable to carry the theoretical flows. These segments are located on Old Fort Road, Canyon Drive, 1700 East, and South Weber Drive. Nearly the entirety of this line will become deficient as development occurs. Other segments in the system that show to be unable to convey the existing flows are 1900 East between 7550 S and South Weber Drive, and along 2100 East between Cherry Farm Park and about 7875 South. Three (3) other areas are expected to become deficient as development occurs.

Costs of projects needed to correct existing problems are used in the calculation of user rates. Costs of projects needed to accommodate future development are used in the calculation of impact fees. A full list of recommended projects is found in Section 7 of this report.

Table 1.1 below gives the total costs associated with these projects. A cost breakdown for each of the five (5) projects can be found in Appendix A. These projects can be broken down into smaller projects if necessary.

Table 1.1 – Projects Cost Summary

	Cost Breakdown		
Estimated Total Cost	Existing Deficiency	Future Development	Developer Participation
$ 4,374,305	$ 2,300,965	$ 2,004,090	$ 69,250

2.0 INTRODUCTION

2.1 Background

The Utah Code 11-36a, Impact Fees Act, requires jurisdictions, which desire to charge impact fees, to adopt an Impact Fee Facilities Plan (IFFP) and Impact Fee Analysis (IFA). The IFFP and IFA must serve as a basis for justification of any impact fees currently in place or to be imposed in the future. Therefore, South Weber City requested that Jones and Associates Consulting Engineers develop a Capital Facilities Plan (CFP) and Impact Fee Facilities Plan for the City's sanitary sewer collection system, in preparation for an IFA based upon the findings of the plan.

Since that time, Jones and Associates has met with South Weber City to discuss details of the existing and proposed sanitary sewer system in order to analyze existing functionality and plan for future expansion.

2.2 Land Use and Service Area

South Weber City is located in northeast Davis County at the mouth of Weber Canyon. It is bounded by the Weber River on the north and Layton City on the south. Highway 89 and Interstate 84 are the two major transportation corridors that pass through the City. Land use is primarily residential with some agriculture and commercial uses. The City's vision for future land use remains primarily residential; however, the City would like to include a higher percentage of commercial development than they have had in the past.

The City provides sanitary sewer collection service within the current city boundaries and will eventually serve the areas identified for future annexation. Future needs have been estimated based on currently planned land use classifications. It is understood that the service boundary or the proposed land use densities may change depending upon development. Changes in land use and annexation areas may require periodic adjustments to this plan and the recommended sanitary sewer capital facilities projects.

2.3 System Overview

South Weber City converted from septic systems to a sanitary sewer collection system in the early 1990s. Compared to other cities' collection systems, South Weber's system is relatively young.

The sanitary sewer system generally flows from the southeast to the northwest via collection lines and larger interceptor or trunk lines. All of the City's wastewater eventually flows into Central Weber Sewer Improvement District's (CWSID) trunk line which crosses I-84 from Uintah City near the Posse Grounds, follows 6650 S to 475 E, then continues northwestwardly, generally following I-84. The City operates one lift station located on Cottonwood Drive. This lift station collects the wastewater from the residents on that street, and then lifts the sewage into the CWSID trunk line. A schematic of the sewer system can be found in Exhibit 1.

The following table is a summary of the collection system's components and ownership:

Table 2.1 – Sanitary Sewer Collection System Summary

Component	Size	Quantity (miles)	Jurisdiction
Pipe	8-inch	30.1	South Weber City
Pipe	10-inch	2.1	South Weber City
Pipe	12-inch	0.8	South Weber City
Pipe	15-inch	1.4	South Weber City
Pipe	18-inch	0.25	South Weber City
Pipe	21-inch	0.5	South Weber City
Pipe	21-inch	0.2	CWSID
Pipe	30-inch	2.2	CWSID
Manhole	4-ft & 5-ft diameter	829	South Weber City
Manhole	5-ft diameter	25	CWSID
Lift Station	n/a	1	South Weber City

The City's wastewater is treated at the Central Weber Sewer Improvement District wastewater treatment plant. CWSID charges a fee to the communities whose wastewater is treated at their facility. CWSID also charges a sanitary sewer impact fee which is separate from the impact fee charged by the City. **CWSID's impact fee is not included in this report.**

3.0 ERU AND POPULATION ESTIMATES

3.1 Introduction

All master planning requires actual counts for current connections or ERUs and estimates for future population and ERUs. An ERU, otherwise known as an Equivalent Residential Unit, is the discharge into the system that is equivalent to one (1) single family residential unit. The US Census reports the average household size in South Weber to be 3.54 persons[1]; therefore, it was determined that:

$$1\ ERU = 3.54\ persons$$

Large sewer system users may be the equivalent of many ERUs. The Weber Basin Job Corps, for example, had 225 full-time residents. At 3.54 persons/ERU, it can be concluded that the Job Corps is the equivalent of 63.5 ERUs:

$$225\ persons \div \frac{3.54\ persons}{ERU} \approx 63.5\ ERUs$$

3.2 Population and Growth Estimates, and ERUs

The growth rate in South Weber City since 1880 has been very sporadic, bouncing between growth and decline. However, starting around 1960, the growth rate remained positive and started to create a trend.

Table 3.1 –Population Data

Year	Population[1]	Annual Growth Rate
1960	382	5.66%
1970	1,073	18.09%
1980	1,575	4.68%
1990	2,863	8.18%
2000	4,260	4.88%
2010	6,051	4.20%

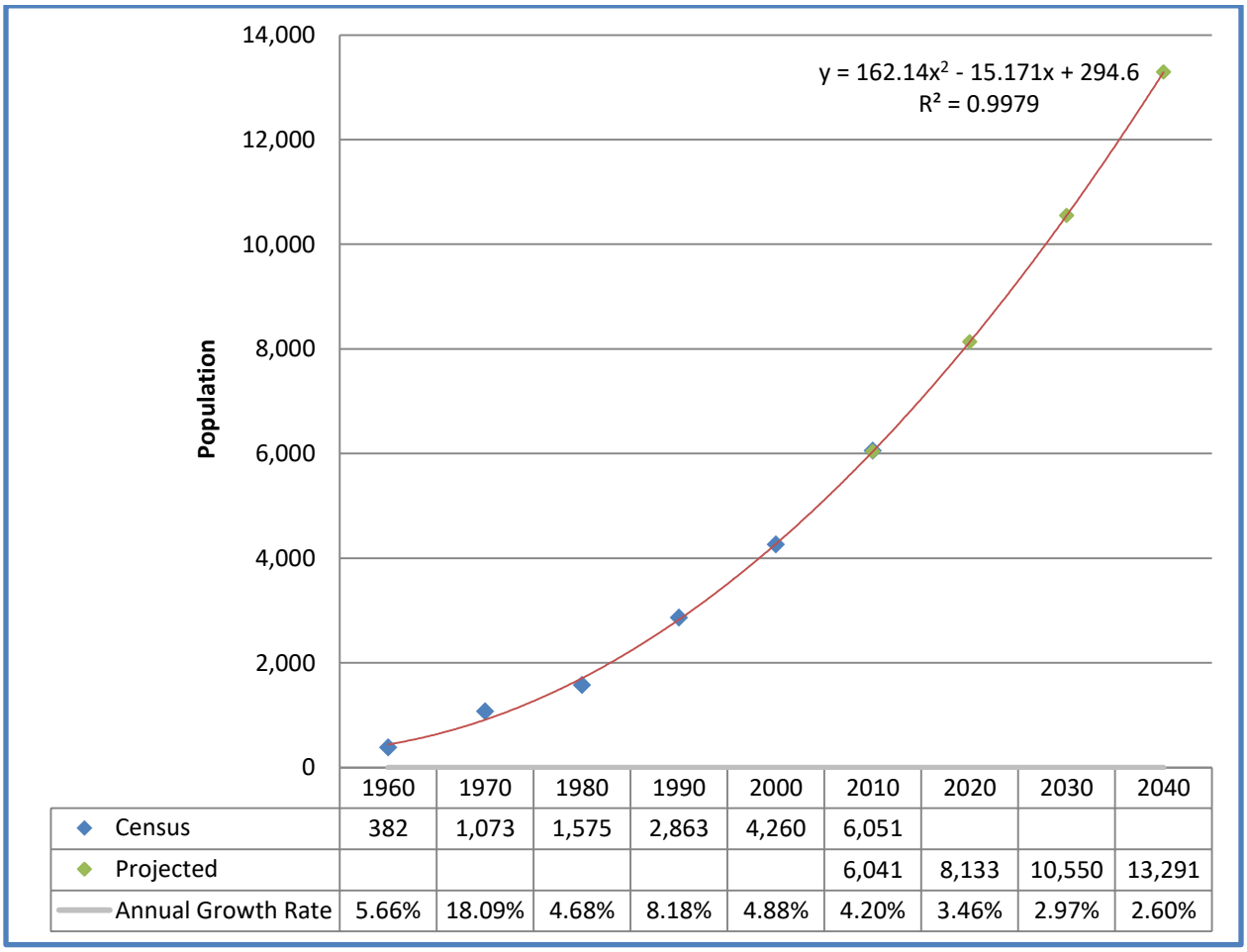
The above data were plotted, and a trendline was best fitted to the data, as illustrated in Figure 3.2. The regression (best fit) equation of the trendline was determined to be:

$$y = 162.14x^2 - 15.171x + 294.6$$

The R^2 value of a trendline represents how close the equation fits the data, with a value of 1.000 representing a perfect fit. This equation has an associated R^2 value of 0.9979; therefore, this trendline is a very good fit.

[1] US Census Bureau website, accessed February 9, 2017.

Figure 3.2 –Population and Growth



	1960	1970	1980	1990	2000	2010	2020	2030	2040
Census	382	1,073	1,575	2,863	4,260	6,051			
Projected						6,041	8,133	10,550	13,291
Annual Growth Rate	5.66%	18.09%	4.68%	8.18%	4.88%	4.20%	3.46%	2.97%	2.60%

Using this trendline equation, population projections were calculated. These projections are shown above.

The 2014 South Weber City General Plan estimates a build-out population of about 12,662. Based on the population projections shown above, this build-out condition should occur around 2038. The General Plan also estimates that 3,620 residential dwelling units will occupy South Weber City at build-out. This equates to approximately 3.5 persons/unit, which is consistent with the results of the 2010 Census. The General Land Use Map and Developable Ground and ERUs Map are Exhibits 2 and 3, respectively.

The number of non-residential customers will vary greatly and is difficult to estimate; therefore, assumptions were made in order to estimate the projected ERU values. Metered water usage data analyzed between 2013 and 2015 showed that non-residential water usage equated to approximately 302 ERUs, with 226 of these ERUs are attributed to the Parsons gravel pit, which uses water for dust control. Omitting Parsons, as that water is not discharged to the sanitary sewer system, 76 ERUs are estimated for non-residential use in 2015.

Table 3.3 below summarizes the population and ERU projections through build-out. For the purposes of this study, the Equivalent Residential Unit (ERU) growth, both residential and non-residential, was projected at the same growth rate as the population.

Table 3.3 – Population and ERU Projections

Year	Population Projection	Projected Residential ERUs	Projected Non-Residential ERUs	Projected Total ERUs
2015	7,046	2,013	76	2,089
2020	8,133	2,323	88	2,411
2025	9,301	2,657	100	2,757
2030	10,550	3,014	114	3,128
2035	11,880	3,394	128	3,522
2038 (build-out)	12,717	3,633	137	3,770

Overall, it is estimated that the City will reach build-out in about 20 years and **add approximately 1,681 ERUs** to the existing customers. Due to changes in the economy and growth rate, it is recommended that this plan be reviewed and updated approximately every five (5) years.

4.0 ANALYSIS INFORMATION

4.1 Analysis Background and Data

Jones and Associates keeps and maintains a Geographic Information System (GIS) database for South Weber City. New infrastructure is added to the database after surveying new features that are constructed. This up-to-date database is useful to City personnel when locations of infrastructure are needed, and to engineers when performing studies and designing projects.

Autodesk® Storm and Sanitary Analysis 2016 was used to model the existing sewer system. Data for the model came from the existing GIS database consisting of the majority of the manhole locations and pipe sizes, many of the manhole rim elevations, and some pipe flowline elevations. Where manhole elevations were unknown, Google Earth© was used to estimate the elevation. Manholes were assumed to be 10-ft deep when the actual depths or pipe flowlines elevations where unknown. Where it became critical to model more precisely, survey shots and depths were taken to obtain accurate rim and flowline elevations.

ERUs contributing to the sewer system were estimated based on counts of homes and businesses using the most current aerial photography.

Four modeling scenarios were developed and evaluated for the Capital Facilities Plan:

1. **Existing** – This model of the existing sewer collection system was used to identify deficiencies in the collection system under current conditions.
2. **Existing Corrected** – This model contained corrections to the existing system and was used to establish a baseline for future conditions
3. **Future** – Adding the future ERU flows to the Existing Corrected model identified where capacity problems will occur based on future development.
4. **Future Corrected** – The Future Corrected model contained corrections to the Future model and was used to verify that the proposed projects will adequately address the future needs of the City.

4.2 Flows Used in Analysis

Item 1 of the Utah Administrative Rule R317-3-2 Sewers states:

> *Per Capita Flow: New sewer systems shall be designed on the basis of an annual average daily rate of flow of 100 gallons per capita per day [gpcpd](0.38 cubic meter per capita per day) unless there are data to indicate otherwise. The per capita rate of flow includes an allowance for infiltration/inflow. The per capita rate of flow may be higher than 100 gallons per day (0.38 cubic meter per day) if there is a probability of large amounts of infiltration/inflow entering the system.*

As stated in Section 3.1, an average of 3.54 persons per ERU was used for purposes of this study. From the rule quoted above, the annual average daily flowrate is then **354 gallons per ERU per day**.

"Infiltration is groundwater entering a sanitary sewer system through joints, porous walls, and cracks. Inflow is extraneous flow that enters a sanitary sewer from sources other than infiltration such as connections from roof [downspouts], basement drains, land drains, and manholes covers. Inflow typically results directly from rainfall or irrigation runoff." (ASCE/WEF, 2007)

Infiltration in the South Weber sewer system is relatively low due to the system being new and constructed mainly of plastic pipe. As the system ages, however, more infiltration is typical due to aging components. Inflow has been kept to a minimum by watching new construction closely for illegal connections to the sewer system.

4.3 Peaking Factors and Time Patterns

Utah Administrative Rule R317-3-2, item 2 goes on to state:

Design Flow

a. *Laterals and collector sewers shall be designed for 400 gallons per capita per day (1.51 cubic meters per capita per day).*
b. *Interceptors and outfall sewers shall be designed for 250 gallons per capita per day (0.95 cubic meter per capita per day), or rates of flow established from an approved infiltration/inflow study.*

Since the rules state that the average flow is 100 gpcpd, and the design flow is 400 gpcpd, then it can be concluded that lateral and collector sewer lines should be designed with a peaking factor of 4, while interceptor and outfall sewer lines, at 250 gpcpd, should be designed with a peaking factor of 2.5.

While the rules do not specify how to classify a lateral, collector, interceptor (a.k.a. trunk line), or outfall line, it is generally accepted that a lateral is the service line from the dwelling, the lateral connects into collector lines, and collector lines come together to interceptors. "Outfall" is generally used to describe the discharge from a wastewater treatment plant; however, in South Weber's case, the outfall is where the City's interceptor(s) discharge into CWSID's line.

Although unusual, extraordinary flows do occasionally occur, such as the "Super Bowl® Sunday half-time flush" and on holidays such as Christmas and Thanksgiving. It was assumed that any unaccounted-for extraordinary flow events could be accommodated by the reserve pipe capacity provided by the recommended maximum ratio of flow depth to pipe diameter, or d/D. The recommended d/D for pipe less than 15-inch is 0.5 and the recommended d/D for pipes 15-inch and greater is 0.7 (ASCE/WEF, 2007). A depth-to-diameter ratio of 0.7 is the equivalent of approximately 82% of flow capacity.

A dynamic model was used for this plan; therefore, time patterns were developed and applied to the flows as described below.

Studies have found that typical daily residential water use and hence wastewater discharge have the greatest peak around 7:00 a.m. and a lesser peak at 7:00 p.m., as shown in Table 4.1. This table shows that the highest average flow multiplier is 1.9. Since the rules require collector sewers to be designed for a peaking factor of 4, the average time pattern was multiplied by a factor of 2.11 (4.0÷1.9) to achieve

the peaking factor of 4.0. This average flow and peak flow time patterns are shown graphically in Figure 4.1.

For commercial and industrial users in the City, the same time pattern concept was applied. While commercial and industrial use/discharge varies based on the business type, a generalized trend was created to mimic a standard 8-5 business. This time pattern is shown in Table 4.2 and illustrated in Figure 4.2.

Table 4.1 – Residential Time Pattern

Time	Average Flow Multiplier		Peak Flow Multiplier
12 AM	0.70		1.47
1 AM	0.60		1.26
2 AM	0.40		0.84
3 AM	0.30		0.63
4 AM	0.35		0.74
5 AM	1.00		2.11
6 AM	1.80		3.79
7 AM	1.90	x 2.11 =	4.00
8 AM	1.80		3.79
9 AM	1.25		2.63
10 AM	0.80		1.68
11 AM	0.70		1.47
12 PM	0.60		1.26
1 PM	0.60		1.26
2 PM	0.60		1.26
3 PM	0.60		1.26
4 PM	1.00		2.11
5 PM	1.40		2.95
6 PM	1.50		3.16
7 PM	1.60		3.37
8 PM	1.50		3.16
9 PM	1.20		2.53
10 PM	1.00		2.11
11 PM	0.80		1.68
Average	**1.00**		**2.11**

Table 4.2 – Commercial Time Pattern

Time	Average Flow Multiplier		Peak Flow Multiplier
12 AM	0.10		0.20
1 AM	0.10		0.20
2 AM	0.10		0.20
3 AM	0.10		0.20
4 AM	0.10		0.20
5 AM	0.10		0.20
6 AM	0.10		0.20
7 AM	0.70		1.40
8 AM	1.20		2.40
9 AM	2.00	x 2.0 =	4.00
10 AM	2.00		4.00
11 AM	2.00		4.00
12 PM	2.00		4.00
1 PM	2.00		4.00
2 PM	2.00		4.00
3 PM	2.00		4.00
4 PM	2.00		4.00
5 PM	2.00		4.00
6 PM	1.50		3.00
7 PM	1.00		2.00
8 PM	0.50		1.00
9 PM	0.20		0.40
10 PM	0.10		0.20
11 PM	0.10		0.20
Average	**1.00**		**2.00**

Figure 4.1 – Residential Time Pattern

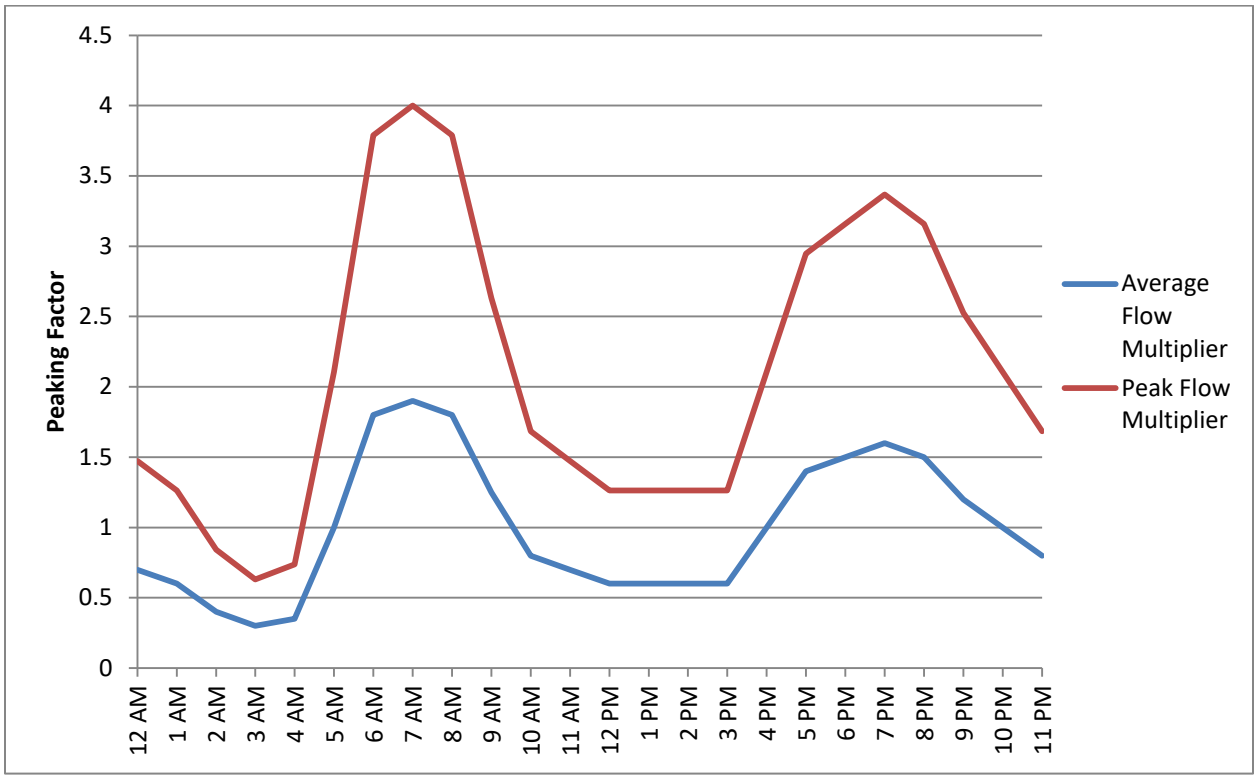
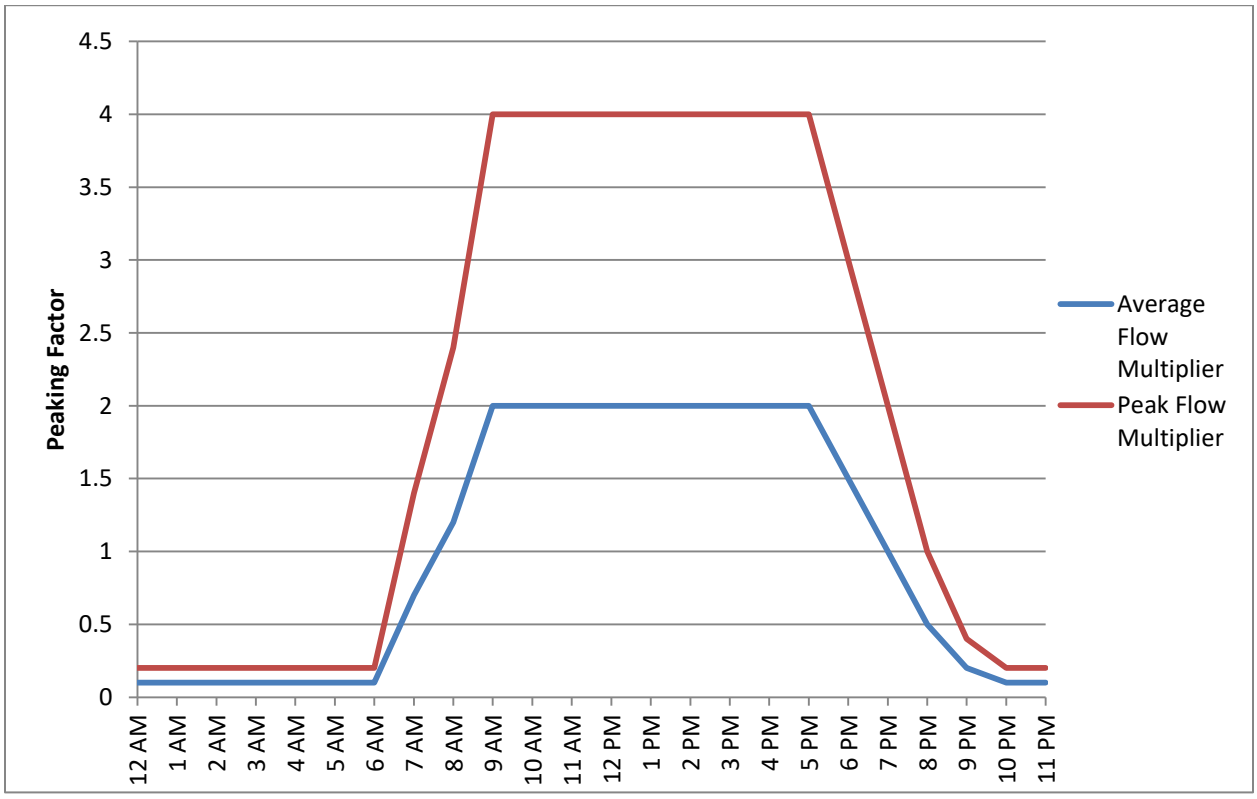


Figure 4.2 – Commercial/Industrial Time Pattern



4.4 Considerations for Sewer Modeled Data

It should be noted that the flows used in this analysis may not accurately represent what the system actually conveys. Reasons are as follows:

1. In the Culinary Water Capital Facilities Plan (Jones & Associates, 2017), it was found that the average water use for an ERU was 210 gpd, approximately 50% of the State's estimate of 400 gpd. This likely equates to approximately 50% less wastewater discharge.
2. As stated previously, South Weber's sewer collection system is relatively new, and is therefore, likely, in good condition. This means that inflow and infiltration should be relatively low. However, as the system ages, infiltration will likely to become more relevant when modeling the system.

This conservative approach identifies potential problems. Actual observations and monitoring should be considered when looking to implement the results of this report.

As partially quoted previously, paragraph 2 of the Utah Administrative Rule R317-3-2 states:

Design Flow

a. Laterals and collector sewers shall be designed for 400 gallons per capita per day (1.51 cubic meters per capita per day).
b. *Interceptors and outfall sewers shall be designed for 250 gallons per capita per day (0.95 cubic meter per capita per day), or rates of flow established from an approved infiltration/inflow study.*
c. The Director will consider other rates of flow for the design if such basis is justified on the basis of supporting documentation.

As with the Division of Drinking Water, the Division of Water Quality (DWQ) allows for variances to the rules, with "supporting documentation." Presumably for sewer flows, a metering device and data collection device could be installed to measure and record flows. Data collected would be analyzed to determine flow per ERU and the peaking factor. If submitted and considered by the Director of the DWQ, any approved revised flows would likely contain a factor of safety as determined by the Director. This may account for aging of the system or fluctuations in the data. The approved, revised flows and peaking factors could then be input into the model, and the model re-run to obtain revised results. This may or may not change the recommended projects contained in this report.

5.0 EXISTING COLLECTION SYSTEM

5.1 Existing System Model and Analysis

The GIS database for the existing sewer system was imported into Autodesk® Storm and Sanitary Analysis (SSA). As briefly described in Section 4.1, where elevations for manhole rims and pipe flowlines where unknown, assumptions where made. The model was then checked to assure all pipes contained positive slopes. Where assumptions proved to be incorrect, field data was obtained and input into the model.

Using the latest aerial photography available, ERU counts for homes and businesses were determined for individual manholes (nodes). For example, if a cul-de-sac contains seven (7) homes, then seven (7) ERUs were assigned to the downstream node receiving the flows from those homes. ERUs were generally grouped; therefore, not all nodes contained inflows. The number of ERUs was multiplied by the average flow per ERU (0.246 gpm/ERU) and added to the model as an "external inflow" for the corresponding node (manhole).

$$354 \frac{gpd}{ERU} \div \frac{1440\ min.}{day} = 0.246\ gpm/ERU$$

The time patterns described in Section 4.3 were then applied to each of the external inflows. Intuitively, the residential time pattern was applied to inflows that contained homes, and the commercial time pattern was applied to inflows containing businesses and industries.

The model was then run for a simulation time of four (4) days to determine where hydraulic problems occur. The model identifies where flows exceed the pipes' capacities and where flows backup in manholes.

5.2 Existing System Deficiencies and Recommendations

Based on the model, the majority of the surcharging occurs in the main trunk line serving the eastern portion of the City. The density of existing development compounded with the majority of the users producing peak flows at the same time results in the trunk line receiving peak flows without much dissipation. As a result, the peak factor in this trunk line is closer to 4.0 rather than the state-mandated design peak factor of 2.5. In contrast, larger systems have peak flows that are mitigated by longer travel times and typically experience a lesser peak (e.g. 2.5 vs. 4.0).

Pipe segments where the depth-to-diameter ratio ("d/D") exceeded 0.7 were also identified. These pipes were deemed deficient in order to retain reserve capacity and keep with the standard of practice to maintain this factor of safety.

The analysis performed resulted in several areas identified as having possible hydraulic deficiencies. Initially, pipes around 1900 East and eastward were shown to be deficient; however, as these pipes were "fixed" and made to carry the flows, problems downstream presented themselves. The pipes were "fixed" until no deficiencies were shown. (See Watchlist project for exception.)

Projects #1 and #2

Based on the model, the existing sewer system's main trunk line contains many segments that are unable to carry the theoretical flows or have a d/D greater than 0.7. These segments are located on Old Fort Road, Canyon Drive, 1700 East, and South Weber Drive up to 2100 East. In order to convey existing flows, the most downstream 430 lf of sewer line should to be upsized to an 18-inch sewer line, but the remainder of the deficiencies can be corrected by replacing sections of the 15-inch sewer line at more favorable slopes.

To make the project more manageable in size, this section of the trunk line has been broken into two (2) projects. If needed, it can be broken into even smaller sections.

Project # 3

The model also shows surcharging occurring in the 12-inch trunk line along 1900 East between South Weber Drive and 7550 South. This line collects the majority of the system east of 1700 East, about 475 acres. This area of the City is largely built-out with moderate density, and the resulting peak flows reach the trunk line quickly. It is recommended that the 12-inch trunk line be replaced with a 15-inch sewer line for the 1,100 feet. (See Exhibit 4.)

Project # 4

Project #4 is the continuation of replacement/upsizing of the trunk line past 1900 East towards 2100 East. Four (4) out of eight (8) segments of this line need to be corrected in order to carry the existing flows. The remaining segments of 10-inch line contain great-enough slopes to accommodate the existing flows.

Watchlist

The last section of collection system showing to be potentially problematic is along 2100 East, between 7875 East and the Cherry Farms Park. While the model shows this section to be problematic, with the potentially overestimated flows (as described in the previous section); there is no additional development projected upstream of this line. Therefore, no project is recommended at this time. It is recommended, however, that the City monitor the flows in this sewer line. If flows become a problem, a replacement project should be considered. (See Exhibit 4.)

6.0 FUTURE COLLECTION SYSTEM

6.1 Future System Model and Analysis

The future system model started with the existing system model corrected as though Projects #1 and #4 have been completed in order to remedy those existing deficiencies. Pipes were upsized and slopes corrected in order to convey the existing flows.

Then, using the Developable Ground and ERUs map prepared from the Future Land Use Map (see Exhibits 2 and 3), flows and time patterns associated with the proposed land use were assigned to nodes. We assumed that development west of the Posse Grounds would tie directly into the CWSID trunk line. The model was then run in order to identify where the future development would cause the capacity of the pipes to be exceeded.

6.2 Future System Capacity Needs and Recommendations

Exhibit 4 contains an illustration that shows where the model has identified potential problems. It is evident that the City's main trunk line experiences the majority of the deficiencies. As stated previously, the peak flows reach the trunk line without much dissipation. This causes the trunk line to become overloaded.

Projects #1 and #2

Previously mentioned Projects #1 and #2 contain improvements to fix the existing deficiencies; however, these lines should be replaced in whole and upsized to accommodate future flows. For the segments of the sewer line not required to be replaced for the existing population, the full cost of the new installation should be shouldered by the future residents via impact fees. For the segments of the sewer line slated for correction for the existing residents, the cost to upsize the line is listed as impact fee eligible.

Project #4

Approximately half of the sewer line along South Weber Drive from 1900 East to 2100 East is in need of correction to meet current conditions. The entirety of this section will need to be upsized to a 12-inch line for future flows. As with Projects #1 and #2, the correction of the existing deficiencies is listed as a system improvement, while the costs for upsizing and replacing the remaining sewer line segments are accounted for in the impact fee eligible costs.

Project #5

When the south bench area (above the Davis and Weber Canal at approximately 1375 East) develops, the receiving sewer line will likely need to be rerouted in order to move the interception point on the trunk line further downstream. As it currently exists, flow from that area would follow 1375 East to Lester Drive, then to 1250 East and make its way to 1200 East at Old Fort Road. In this scenario, the lines in 1250 East and Old Fort Road would become overwhelmed. Therefore, it is recommended to divert flows from 1250 East westwards along Lester Drive, to 925 East, and eventually to 7240 South or

700 East. This project will help take the pressure off of the upstream section of the Old Fort Road trunk line. (See Exhibit 4.) Alternatively, the sewer line could be installed in the proposed road that would tie into 1160 East. While this is a longer route, access, installation, and maintenance of the sewer line would be easier and likely less costly long-term.

7.0 CAPITAL FACILITIES PLAN

7.1 Summary and Recommendations

This report contains an evaluation of South Weber City's sanitary sewer system. The Capital Facilities Plan outlines the planned improvement projects needed for the City's immediate replacement needs and for future growth through build-out. It does not attempt to identify the sewer lines that will be in need of replacement in the future due to the life expectancy of the pipe. It is expected that depreciation costs, which should be budgeted and set aside, will be sufficient for these problems. It also does not show any of the infill sewer lines. The model of future flows anticipates connections to the nearest collector lines.

It is recommended that the City continue to clean and maintain the sewer system on a frequent basis and pay special attention to areas where deficiencies have been noted in this study.

The recommended capital facilities projects are schematic in nature. The recommended projects should be constructed as needed or as development dictates. The exact location and perhaps the scope of the projects, especially those that are shown on undeveloped ground, may change according to development layouts. Consequently, this Capital Facilities Plan should be updated regularly in response to growth changes. Our recommendation is that this should be done every five years.

This Capital Facilities Plan is a valuable planning tool and contains information needed for the development of an Impact Fee Facilities Plan (IFFP) and Impact Fee Analysis (IFA). The Impact Fee Facilities Plan, contained in Section 8 of this report, creates a short-term list of projects from the Capital Facilities Plan based on priority to be used in the calculation of the impact fee. That information is then relayed to a financial analyst for use in the creation of the IFA.

7.2 Projects

Exhibit 4 (Projects Map) identifies the projects associated with the overall Capital Facilities Plan. Brief descriptions explaining the needs of these projects are found in Sections 5.2 and 6.2. Any of the projects can be broken into small phases, with proper planning. Design of the entire sewer line may be required to assure that the segment being installed is done so at the correct elevations needed for the long-term working of the sewer line. It should be noted, however, that due to sanitary sewer being gravity flow, all improvements should be constructed from downstream to upstream in order to avoid any elevation conflicts.

Estimated construction dates for each of the projects are shown in the following Table 7.1. Elements of Projects 1 through 4 are existing deficiencies and need to be prioritized. Estimated construction years have been assigned to the projects. Should favorable economic conditions spark interest in the south bench, Project #5 may need to be expedited.

Table 7.1 – Estimated Capital Improvement Projects Construction Dates

Project No.	Project Description	Estimated Construction Year
1	Replace trunk line along Old Fort Road and Canyon Dr, to 1475 E	2018-2020
2	Replace trunk line along Canyon Dr, 1700 E, and South Weber Dr, from 1475 E to 1900 E	2020-2021
3	Replace trunk line along 1900 E from South Weber Dr to 7550 S	2021-2023
4	Replace trunk line along South Weber Dr from 1900 E to 2100 E	2023-2026
5	Sewer line from South Bench, re-route Lester Drive to CWSID trunk line via 7240 S	2023-2026

A summarized list of the projects with their estimated costs is shown in Table 7.2. Itemized cost estimates and descriptions for each of the projects are included in Appendix A. Project costs are shown as being attributed to an existing deficiency and/or needed for future development.

Table 7.2 – Summary of Capital Improvement Projects

Project No.	Project Description	Existing Deficiency	Future Development	Developer Participation
1	Replace trunk line along Old Fort Road and Canyon Dr, to 1475 E	$ 695,650	$ 239,230	$ 69,250
2	Replace trunk line along Canyon Dr, 1700 E, and South Weber Dr, from 1475 E to 1900 E	1,065,075	258,300	-
3	Replace trunk line along 1900 E from South Weber Dr to 7550 S	242,000	-	-
4	Replace trunk line along South Weber Dr from 1900 E to 2100 E	298,240	258,810	-
5	Sewer line from South Bench, re-route Lester Drive to CWSID trunk line via 7240 S	-	1,247,750	-
	Totals	**$ 2,300,965**	**$ 2,004,090**	**$ 69,250**
	GRAND TOTAL		**$4,374,305**	

8.0 IMPACT FEE FACILITIES PLAN

8.1 Introduction

The Sanitary Sewer Impact Fee will be enacted as a means for new development to pay for their impact on the existing sanitary sewer system. Utah state law requires that an Impact Fee Facilities Plan (IFFP) be prepared before an Impact Fee can be implemented. The law requires that the IFFP only contain the costs for short term (6-10 year) growth, and must not include improvements which would raise the existing level of service. This section will summarize information from the previous sections of this report as it pertains to the enactment of the impact fee.

Title 11-36a, Section 300, of the Utah State Code outlines the requirements of the Impact Fee Analysis (IFA), which is also required to be prepared before an Impact Fee can be implemented. The City's financial consultant will prepare the IFA.

8.2 Growth Projections

Long term growth projections for South Weber City are discussed in Section 3.2. This section will focus on the growth during the next decade.

As stated in Section 3.2, South Weber City is expected to reach a build-out population of about 12,700 around 2038. The Equivalent Residential Unit (ERU) growth rate is projected to mimic the population growth rate, equating to approximately 1,681 additional ERUs at the build-out condition. The following table contains the projected population and ERUs for the next 10 years as applicable to the IFFP:

Table 8.1 – Population and ERU Projections (IFFP)

Year	Population	ERUs	Increase from 2017
2017	7,471	2,215	
2018	7,689	2,279	64
2019	7,909	2,345	130
2020	8,133	2,411	196
2021	8,360	2,479	264
2022	8,591	2,547	332
2023	8,824	2,616	401
2024	9,061	2,686	471
2025	9,301	2,757	542
2026	9,545	2,830	615
2027	9,791	2,903	**688**

8.3 Service Area

The existing sanitary sewer collection system serves all of the residents in the city boundary with one, generally interconnected system. In the future, it is expected that all of the annexed areas will be added to the existing system. Much of the system additions will be completed by developers.

8.4 Level of Service

For a sanitary sewer collection system, the reasonable expectation of the residents is that they can use the sewer system under normal operating conditions, including peak use times, without the connection backing up. Unique situations such as blockages, unforeseen extreme infiltration from surface flooding, line breaks, and other unexpected problems are not considered in this analysis.

The existing collection system was analyzed using the parameters outlined in Sections 4.2 and 4.3. The expectation is that all pipes will serve the City during peak hours. Any trunk line flowing over 70% full (by depth) during those times was considered to be deficient. The same parameters were applied to the future system model.

8.5 Excess Capacity

Future growth will utilize the excess capacity in existing facilities as well as the capacity in new projects contained in the Capital Facilities Plan. Sewer projects constructed using City funds were examined to determine the excess capacity. In this section, excess capacity, if any, will be determined and evaluated.

Utah Code 11-36a-202 Prohibitions on impact fees states:

*(1) A local political subdivision or private entity may **not**:*

(a) impose an impact fee to:

(i) cure deficiencies in a public facility serving existing development;

(ii) raise the established level of service of a public facility serving existing development;

(iii) recoup more than the local political subdivision's or private entity's costs actually incurred for excess capacity in an existing system improvement; or

(iv) include an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with:

(A) generally accepted cost accounting practices; and

(B) the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement.

The only project found to be eligible under the above rule is the 2016 Sewer Outfall Replacement Project. In order to accommodate future growth, South Weber City chose to replace and upsize part of the existing sewer trunk line along Old Fort Road. This project will serve a large majority of future development. Since this project was completed solely to accommodate future growth, 100% may be reimbursed by impact fees.

1. **Future ERUs served – 1,385** (weighted average)
    a. 32.5% of project (18-inch sewer line) will serve 770 additional ERUs more than previous 15-inch sewer line
    b. 67.5% of project (21-inch sewer line) can serve 1,870 additional ERUs more than previous 15-inch sewer line, therefore, it will serve all 1,681 additional ERUs expected at build-out

2. **Cost of project - $626,450**
    a. Engineering - $39,544
    b. Construction - $586,906

No other sanitary sewer projects were found to be eligible under the excess capacity provision.

8.6 Future Development Needs

The bulk of development is expected to occur on the western end of the City. The east side will see fill-in development, especially along the main corridors of South Weber Drive and US 89.

Table 8.2 below shows the projects most likely to be constructed in the next 10 years. Should considerable development occur on the east side of South Weber City in the next several years, this list of projects should be re-evaluated and re-prioritized. Refer to Section 7.2 for additional explanation.

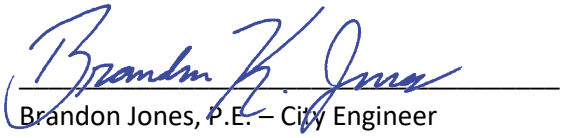
Table 8.2 – IFFP Projects

Project No.	Project Description	Future Development	Additional ERUs Served	Estimated Construction Year
1	Replace trunk line along Old Fort Road and Canyon Dr, to 1475 E	$ 239,230	854	2018-2020
2	Replace trunk line along Canyon Dr, 1700 E, and South Weber Dr, from 1475 E to 1900 E	258,300	854	2020-2021
4	Replace trunk line along South Weber Dr from 1900 E to 2100 E	258,810	266	2023-2026
5	Sewer line from South Bench, re-route Lester Drive to CWSID trunk line via 7240 S	1,247,750	869	2023-2026
	Total	**$ 2,004,090**		

8.6 Certification

"I certify that the attached impact fee facilities plan:

1. includes only the costs of public facilities that are:
    a. allowed under the Impact Fees Act; and
    b. actually incurred; or
    c. projected to be incurred or encumbered within six years after the day on which each impact fee is paid;
2. does not include:
    a. costs of operation and maintenance of public facilities;
    b. costs for qualifying public facilities that will raise the level of service for the facilities, through impact fees, above the level of service that is supported by existing residents; or
    c. an expense for overhead, unless the expense is calculated pursuant to a methodology that is consistent with generally accepted cost accounting practices and the methodological standards set forth by the federal Office of Management and Budget for federal grant reimbursement; and
3. complies in each and every relevant respect with the Impact Fees Act."



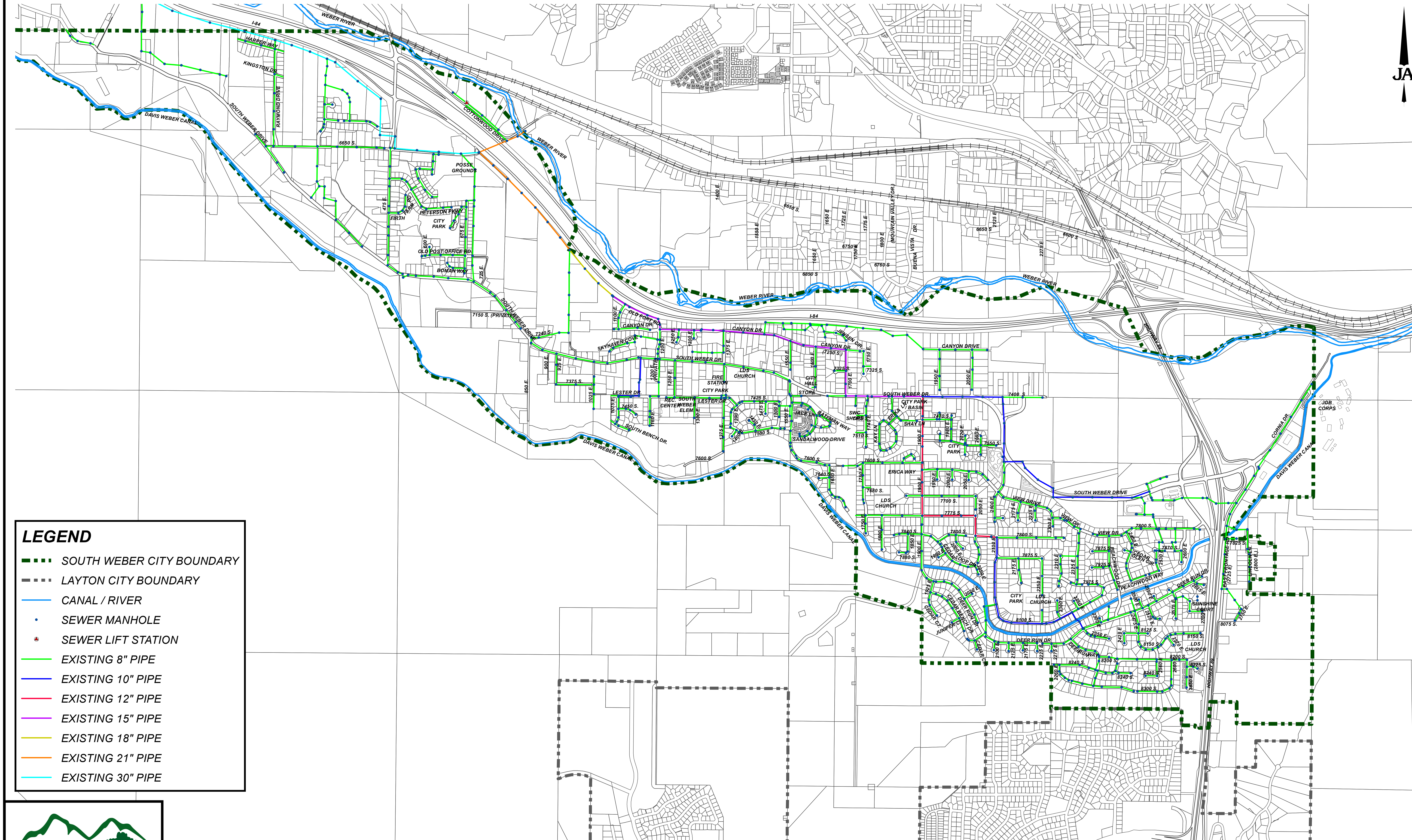
Brandon Jones, P.E. – City Engineer

Works Cited

ASCE/WEF. (2007). *Gravity Sanitary Sewer, Design and Construction.* (P. Bizier, Ed.) Reston, VA: ASCE.

Jones & Associates. (2017). *Culinary Water Capital Facilities Plan.*

EXHIBITS



SOUTH WEBER city

NOTES:

SCALE:	
1 in = 1,800 ft	
MM/DD/YYYY	
03/30/2017	

DESIGNED	BEB
DRAWN	BEB
CHECKED	BKJ

JA JONES & ASSOCIATES CONSULTING ENGINEERS
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South Ogden, Utah 84403 (801) 476-9767

SOUTH WEBER CITY CORPORATION
SEWER CAPITAL FACILITIES PLAN

EXISTING SEWER SYSTEM MAP

EXHIBIT 1

0

GENERAL LEGEND

- SOUTH WEBER CITY BOUNDARY
- LAYTON CITY, UINTAH CITY, AND WEBER COUNTY BOUNDARIES
- SOUTH WEBER CITY ANNEXATION BOUNDARY
- CANAL / RIVER

JA

MAINTAIN PUBLIC ACCESS TO RIVER WHEN THIS AREA IS DEVELOPED

LAND USE LEGEND

- VISUAL BUFFER BETWEEN HOUSING AND I-84
- MIXED USE OVERLAY
- HAFB RESTRICTED DEVELOPMENT
- RESIDENTIAL PATIO - GENERAL LOCATIONS (6.00 UNITS/ACRE = APPROX. 1/5 ACRE LOTS) *10 ACRES MAX. IN EACH LOCATION
- VERY LOW DENSITY RESIDENTIAL (0.10-0.90 UNITS/ACRE = APPROX. 1 ACRE LOTS)
- LOW DENSITY RESIDENTIAL (1.45 UNITS/ACRE = APPROX. 1/2 ACRE LOTS)
- LOW MODERATE DENSITY RESIDENTIAL (1.85 UNITS/ACRE = APPROX. 1/3 ACRE LOTS)
- MODERATE DENSITY RESIDENTIAL (2.80 UNITS/ACRE = APPROX. 1/4 ACRE LOTS)
- RESIDENTIAL PATIO - SPECIFIC LOCATIONS (6.00 UNITS/ACRE = APPROX. 1/5 ACRE LOTS)
- HIGH DENSITY RESIDENTIAL - SPECIFIC LOCATIONS (13.0 UNITS/ACRE)
- COMMERCIAL
- COMMERCIAL - HIGHWAY
- BUSINESS COMMERCE
- LIGHT INDUSTRIAL
- INSTITUTIONAL
- RECREATION - SPECIFIC LOCATIONS
- COMMERCIAL RECREATION
- OPEN LANDS

SOUTH WEBER city

REFERENCE: **South Weber City General Plan Project Land Use Map Created: 09/23/2014**

SCALE: 1 in = 1,800 ft

MM/DD/YYYY 03/30/2017

DESIGNED BEB
DRAWN BEB
CHECKED BKJ

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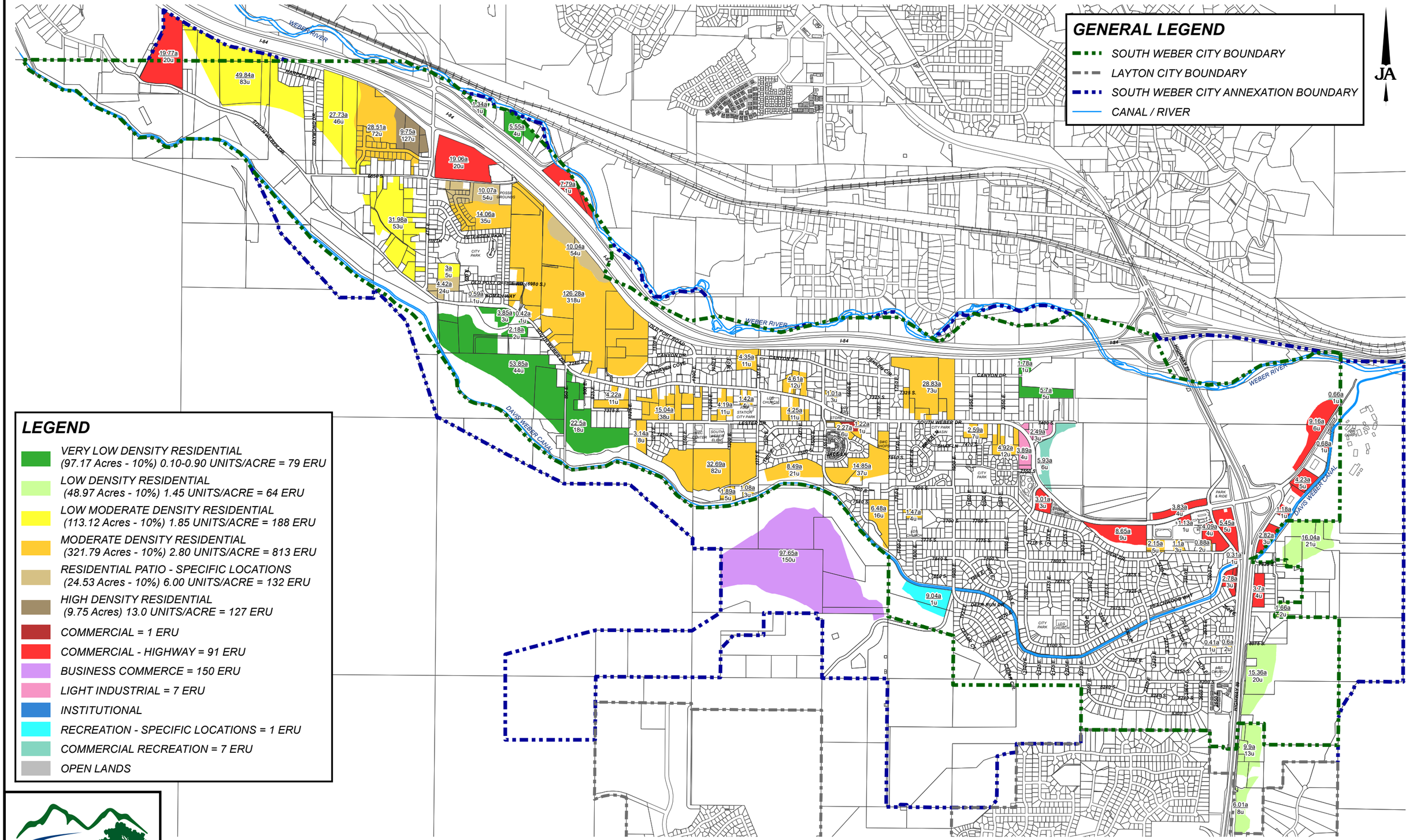
SOUTH WEBER CITY CORPORATION
SEWER CAPITAL FACILITIES PLAN

GENERAL PLAN LAND USE & BOUNDARIES

EXHIBIT 2



SOUTH WEBER city

NOTES: #a / #c = # Acres / # ERU (Equivalent Residential Units)

TOTAL FUTURE RESIDENTIAL UNITS = 1403
TOTAL FUTURE NON-RESIDENTIAL UNITS = 257

SCALE: 1 in = 1,800 ft

MM/DD/YYYY 03/30/2017

DESIGNED BEB
DRAWN BEB
CHECKED BKJ

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SOUTH WEBER CITY CORPORATION
SEWER CAPITAL FACILITIES PLAN

DEVELOPABLE GROUND & ERUs

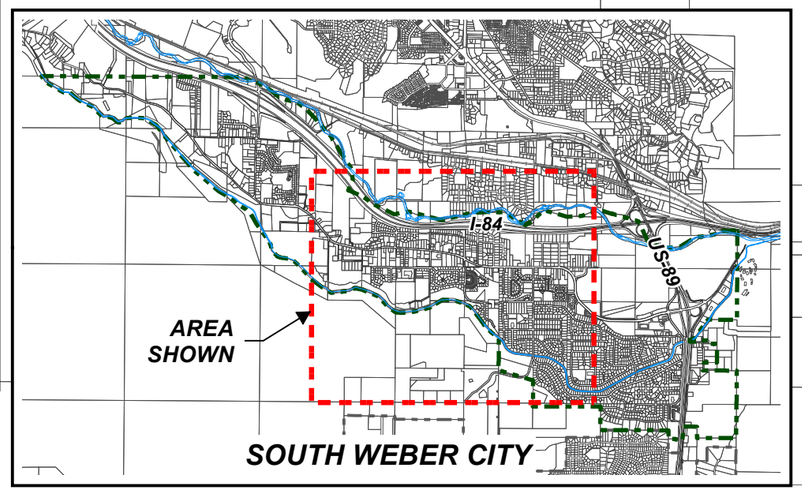
EXHIBIT 3

GENERAL LEGEND

- SOUTH WEBER CITY BOUNDARY
- LAYTON CITY BOUNDARY
- CANAL / RIVER
- RAILROAD

SANITARY SEWER LEGEND

- SEWER MANHOLE
- SEWER LIFT STATION
- EXISTING 8" PIPE
- EXISTING 10" PIPE
- EXISTING 12" PIPE
- EXISTING 15" PIPE
- EXISTING 18" PIPE
- EXISTING 21" PIPE
- EXISTING 30" PIPE
- EXISTING SEWER SYSTEM DEFICIENCIES



SOUTH WEBER city

NOTES:

SCALE: 1 in = 1,000 ft

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SOUTH WEBER CITY CORPORATION
SEWER CAPITAL FACILITIES PLAN

EXISTING DEFICIENCIES MAP

EXHIBIT 4

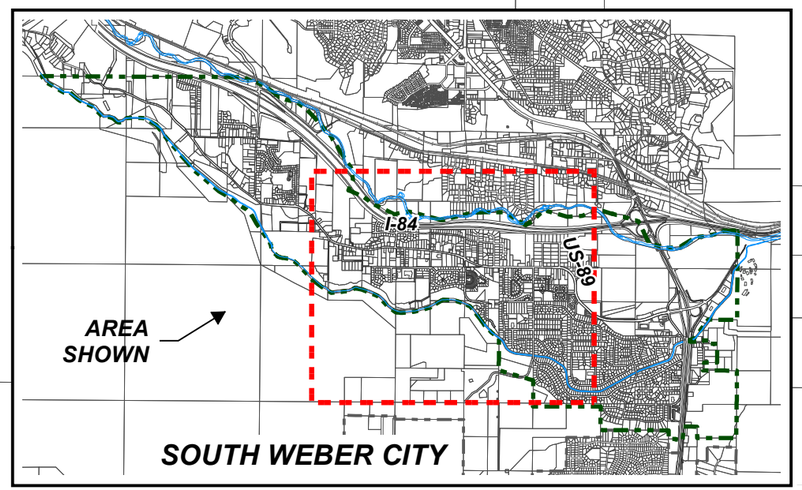
0

GENERAL LEGEND

- SOUTH WEBER CITY BOUNDARY
- LAYTON CITY BOUNDARY
- CANAL / RIVER
- RAILROAD

SANITARY SEWER LEGEND

- SEWER MANHOLE
- SEWER LIFT STATION
- EXISTING 8" PIPE
- EXISTING 10" PIPE
- EXISTING 12" PIPE
- EXISTING 15" PIPE
- EXISTING 18" PIPE
- EXISTING 21" PIPE
- EXISTING 30" PIPE
- EXISTING SEWER SYSTEM DEFICIENCIES
- FUTURE SEWER SYSTEM DEFICIENCIES



SOUTH WEBER city

NOTES:

SCALE: 1 in = 1,000 ft

MM/DD/YYYY 03/30/2017

DESIGNED BEB
DRAWN BEB
CHECKED BKJ

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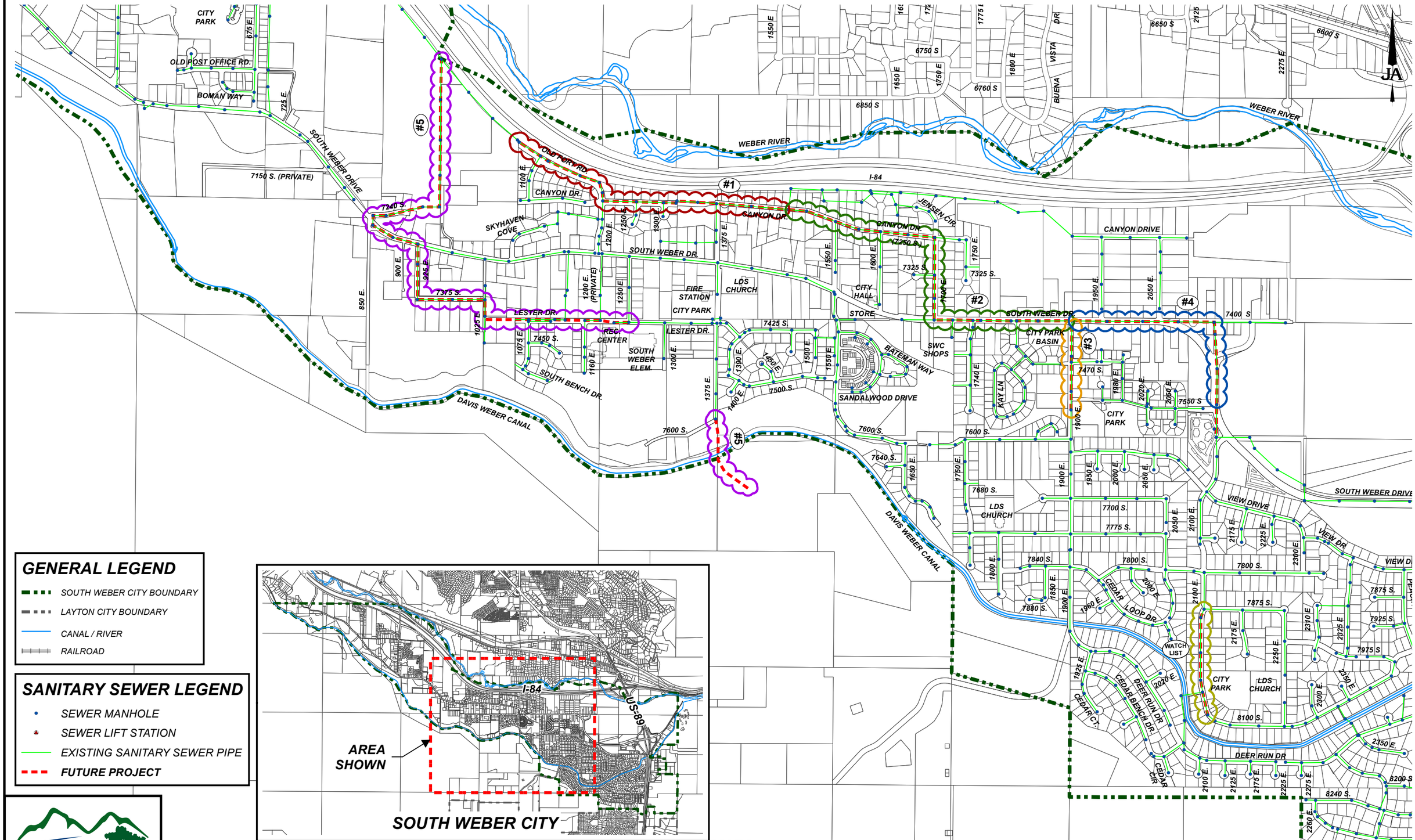
SOUTH WEBER CITY CORPORATION
SEWER CAPITAL FACILITIES PLAN
FUTURE DEFICIENCIES MAP

EXHIBIT 5

0



GENERAL LEGEND

- SOUTH WEBER CITY BOUNDARY
- LAYTON CITY BOUNDARY
- CANAL / RIVER
- RAILROAD

SANITARY SEWER LEGEND

- SEWER MANHOLE
- SEWER LIFT STATION
- EXISTING SANITARY SEWER PIPE
- FUTURE PROJECT

SOUTH WEBER city

NOTES:

SCALE: 1 in = 1,000 ft

MM/DD/YYYY 03/30/2017

DESIGNED BEB
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SOUTH WEBER CITY CORPORATION
SEWER CAPITAL FACILITIES PLAN

PROJECTS MAP

EXHIBIT 6

0

APPENDIX A

PROJECTS COST ESTIMATES

Capital Improvement Projects

Project #1
Trunk Line along Old Fort Road and Canyon Dr, to 1475 E

Description	Quantity	Unit Price	Total Price	Existing Deficiency (System Improvement)		Future Development (Impact Fee Eligible)		Developer Participation	
Mobilization/demobilization	1 ls	$ 100,000	$ 100,000	0.75	$ 75,000	0.25	$ 25,000	-	$ -
Install 18" sewer line	1,255 lf	95	119,225	430	40,850	825	78,375	-	-
Install 15" sewer line	2,160 lf	85	183,600	1,710	145,350	-	-	450	38,250
Upgrade to 18" sewer line	2,160 lf	10	21,600	-	-	2,160	21,600	-	-
Install 5' manhole	13 ea	7,500	97,500	9	67,500	2	15,000	2	15,000
Reconnect 4" service lateral	38 ea	800	30,400	22	17,600	16	12,800	-	-
Perform City asphalt repair	4,750 lf	20	95,005	4,750	95,000	0.25	5	-	-
Perform by-pass pumping	1 ls	25,000	25,000	0.75	18,750	0.25	6,250	-	-
Perform dewatering	1 ls	75,000	75,000	0.75	56,250	0.25	18,750	-	-
Coordination with Questar HPG	1 ls	25,000	25,000	0.75	18,750	0.25	6,250	-	-
		Subtotal	$ 772,330		$ 535,050		$ 184,030		$ 53,250
		Engineering and Construction Management (15%)	115,800		80,300		27,600		8,000
		Contingency (15%)	115,800		80,300		27,600		8,000
		TOTAL	**$ 1,003,930**		**$ 695,650**		**$ 239,230**		**$ 69,250**

Capital Improvement Projects

Project #2

Trunk Line along Canyon Dr, 1700 E, and South Weber Dr, from 1475 E to 1900 E

Description	Quantity	Unit Price	Total Price	Existing Deficiency (System Improvement)		Future Development (Impact Fee Eligible)		Developer Participation	
Mobilization/demobilization	1 ls	$ 125,000	$ 125,000	0.80	$ 100,000	0.20	$ 25,000	-	$ -
Install 18" sewer line	590 lf	95	56,050	-	-	590	56,050	-	-
Install 15" sewer line	3,615 lf	85	307,275	3,615	307,275	-	-	-	-
Upgrade to 18" sewer line	3,615 lf	10	36,150	-	-	3,615	36,150	-	-
Install 5' manhole	16 ea	7,500	120,000	13	97,500	3	22,500	-	-
Reconnect 4" service lateral	45 ea	800	36,000	40	32,000	5	4,000	-	-
Perform City asphalt repair	5,600 lf	20	112,000	5,350	107,000	250	5,000	-	-
Perform UDOT asphalt repair	2,010 lf	50	100,500	1,510	75,500	500	25,000	-	-
Perform by-pass pumping	1 ls	25,000	25,000	0.80	20,000	0.20	5,000	-	-
Perform dewatering	1 ls	75,000	75,000	0.80	60,000	0.20	15,000	-	-
Coordination with Questar HPG	1 ls	25,000	25,000	0.80	20,000	0.20	5,000	-	-
		Subtotal	$ 1,017,975		$ 819,275		$ 198,700		$ -
		Engineering and Construction Management (15%)	152,700		122,900		29,800		-
		Contingency (15%)	152,700		122,900		29,800		-
		TOTAL	**$ 1,323,375**		**$ 1,065,075**		**$ 258,300**		**$ -**

Capital Improvement Projects

Project #3
Trunk Line along 1900 E from South Weber Dr to 7550 S

Description	Quantity	Unit Price	Total Price	Existing Deficiency (System Improvement)		Future Development (Impact Fee Eligible)		Developer Participation	
Mobilization/demobilization	1 ls	$ 20,000	$ 20,000	1	$ 20,000	-	$ -	-	$ -
Install 15" sewer line	1,100 lf	85	93,500	1,100	93,500	-	-	-	-
Install 5' manhole	4 ea	7,500	30,000	4	30,000	-	-	-	-
Reconnect 4" service lateral	8 ea	800	6,400	8	6,400	-	-	-	-
Perform City asphalt repair	1,340 lf	20	26,800	1,340	26,800	-	-	-	-
Perform by-pass pumping	1 ls	7,500	7,500	1	7,500	-	-	-	-
Perform dewatering	1 ls	2,000	2,000	1	2,000	-	-	-	-
		Subtotal	$ 186,200		$ 186,200		$ -		$ -
		Engineering and Construction Management (15%)	27,900		27,900		-		-
		Contingency (15%)	27,900		27,900		-		-
		TOTAL	**$ 242,000**		**$ 242,000**		**$ -**		**$ -**

Capital Improvement Projects

Project #4
Trunk Line along South Weber Dr from 1900 E to 2100 E

Description	Quantity		Unit Price	Total Price	Existing Deficiency (System Improvement)		Future Development (Impact Fee Eligible)		Developer Participation	
Mobilization/demobilization	1	ls	$ 40,000	$ 40,000	0.66	$ 26,400	0.34	$ 13,600	-	$ -
Install 12" sewer line	1,238		75	92,850	-	-	1,238	92,850		
Install 10" sewer line	1,612	lf	70	112,840	1,612	112,840	-	-	-	-
Upsize to 12" sewer line	1,612		5	8,060	-	-	1,612	8,060		
Install 5' manhole	10	ea	7,500	75,000	2	15,000	8	60,000	-	-
Reconnect 4" service lateral	26	ea	800	20,800	10	8,000	16	12,800	-	-
Perform UDOT asphalt repair	1,600	lf	45	72,000	1,200	54,000	400	18,000	-	-
Perform trench repair, unimproved	850	lf	10	8,500	-	-	850	8,500	-	-
Perform by-pass pumping	1	ls	15,000	15,000	0.66	9,900	0.34	5,100	-	-
Perform dewatering	1	ls	5,000	5,000	0.66	3,300	0.34	1,700	-	-
			Subtotal	$ 450,050		$ 229,440		$ 220,610		$ -
			Engineering and Construction Management (15%)	67,500		34,400		33,100		-
			Contingency (15%)	67,500		34,400		33,100		-
			TOTAL	**$ 585,050**		**$ 298,240**		**$ 286,810**		**$ -**

Capital Improvement Projects

Project #5

Sewer Line from South Bench, Lester Drive Re-Route to CWSID Trunk Line via 7240 S

Description	Quantity		Unit Price	Total Price	Existing Deficiency (System Improvement)		Future Development (Impact Fee Eligible)		Developer Participation	
Mobilization/demobilization	1	ls	$ 50,000	$ 50,000	-	$ -	1	$ 50,000	-	$ -
Install 12" sewer line (direct replacement)	4,510	lf	65	293,150	-	-	4,510	293,150	-	-
Install 12" sewer line	420	lf	75	31,500	-	-	420	31,500	-	-
Install 10" sewer line	1,300	lf	70	91,000	-	-	1,300	91,000	-	-
Install 8" sewer line (down from bench)	1,200	lf	100	120,000	-	-	1,200	120,000	-	-
Instal 8" sewer line by bore under canal	100	lf	200	20,000	-	-	100	20,000	-	-
Install 5' manhole	17	ea	7,500	127,500	-	-	17	127,500	-	-
Install 4' manhole	10	ea	6,000	60,000	-	-	10	60,000	-	-
Reconnect 4" service lateral	25	ea	800	20,000	-	-	25	20,000	-	-
Perform City asphalt repair	3,330	lf	20	66,600	-	-	3,330	66,600	-	-
Perform UDOT asphalt repair	600	lf	45	27,000	-	-	600	27,000	-	-
Perform trench repair, unimproved	2,300	lf	10	23,000	-	-	2,300	23,000	-	-
Perform by-pass pumping	1	ls	15,000	15,000	-	-	1	15,000	-	-
Perform dewatering	1	ls	15,000	15,000	-	-	1	15,000	-	-
			Subtotal	$ 959,750		$ -		$ 959,750		$ -
			Engineering and Construction Management (15%)	144,000		-		144,000		-
			Contingency (15%)	144,000		-		144,000		-
			TOTAL	**$ 1,247,750**		**$ -**		**$ 1,247,750**		**$ -**