NOTICE AND AGENDA Amended 10-14-13

Notice is hereby given that the City Council of the City of Santaquin will hold a City Council Meeting on Wednesday, October 16, 2013, in the Council Chambers, 45 West 100 South, at 7:00 p.m.

- 1. ROLL CALL
- 2. PLEDGE OF ALLEGIANCE
- 3. INVOCATION/INSPIRATIONAL THOUGHT
- 4. CONSENT AGENDA
 - a. Minutes
 - 1. October 02, 2013 Work Session Minutes
 - 2. October 02, 2013 Council Meeting Minutes
 - 3. October 09, 2013 Work Session Minutes
 - b. Bills
 - 1. \$141,214.98
- 5. FORUM, BID OPENINGS, AWARDS, AND APPOINTMENTS

Public Forum is held to a 30-minute maximum with each speaker given no more than 5 minutes each. If more than 6 Speakers, time will be adjusted accordingly to meet the 30 minute requirement

- 6. FORMAL PUBLIC HEARING
 - a. Special Service District Roads
- 7. UNFINISHED BUSINESS
 - a. Discussion Continuation from Work Meeting Departmental Budget Review Administrative Services
 - b. Discussion and Possible action with regard to No Parking along 300 West
- 8. BUSINESS LICENSES
- 9. REPORTS OF OFFICERS, STAFF, BOARDS, AND COMMITTES
 - a. City Manager Reeves
 - b. Director Marker
- 10. NEW BUSINESS
 - a. Discussion Presentation of Draft Irrigation Water Master Plan and Capital Facilities Plan
 - b. Discussion Presentation of Draft Irrigation Water Impact Fee Facility Plan
 - c. Discussion and Possible Action Change Order #8 of the Wastewater Reclamation Facility Project
 - d. Discussion and Possible Action Amendment to the Wastewater Reclamation Facility Construction Management Agreement with J-U-B Engineers.

11. INTRODUCTIONS AND ADOPTION OF ORDINANCES AND RESOLUTIONS

- a. Resolution 10-01-2013 "A Resolution Declaring Surplus Property of Santaquin City (Property Associated with the Senior Citizens Department)"
- b. Resolution 10-02-2013 "A Resolution Authorizing a Master Street Lighting Agreement with the Utah Department of Transportation (UDOT)"
- c. Ordinance 10-01-2013 "An Ordinance Modifying Section 1-5-4 Paragraph F of the Santaquin City Code Regarding Electronic Meetings"
- 12. PETITIONS AND COMMUNICATIONS
- 13. REPORTS BY MAYOR AND COUNCIL MEMBERS
 - a. Mayor DeGraffenried
 - b. Council Members
- 14. EXECUTIVE SESSION (May be called to discuss the character, professional competence, or physical or mental health of an individual)
- 15. EXECUTIVE SESSION (May be called to discuss the pending or reasonably imminent litigation, and/or purchase, exchange, or lease of real property)
- 16. CONVENE OF THE COMMUNITY DEVELOPMENT BOARD
- 17. ADJOURNMENT TO A REGULAR COUNCIL MEETING
- 18. ADJOURNMENT

If you are planning to attend this Public Meeting and, due to a disability, need assistance in understanding or participating in the meeting, please notify the City ten or more hours in advance and we will, within reason, provide what assistance may be required.

CERTIFICATE OF MAILING

The undersigned duly appointed City Recorder for the municipality of Santaquin City hereby certifies that a copy of the foregoing Notice and Agenda was e-mailed to the Payson Chronicle, Payson, UT, 84651.

Susan B, Farnsworth, City Recorder

POSTED:
CITY CENTER
POST OFFICE
ZIONS BANK

MINUTES OF A CITY COUNCIL MEETING HELD IN THE COUNCIL CHAMBERS OCTOBER 16, 2013

The meeting was called to order by Mayor James E. DeGraffenried at 7:00 p.m. Council Members attending: Keith Broadhead, Kirk Hunsaker, and James Linford. Rick Steele and Matthew Carr were excused.

Others attending: City Manager Ben Reeves, Director Shannon Hoffman, Director Dennis Howard, Legal Counsel Brett Rich, Cindy Johnson, David Hathaway, J-U-B Representatives Norman Beagley, Lee Cammack, and Mark Christensen, Kirby Snideman, Dale Ashcroft, Hollie Ashcroft, Spencer Johnson, Kenneth Abbott, and other unidentified individuals.

PLEDGE OF ALLEGIANCE

Public Safety Director Dennis Howard led the Pledge of Allegiance.

INVOCATION/INSPIRATIONAL THOUGHT

Council Member Linford Offered an Invocation.

CONSENT AGENDA

Minutes

October 02, 2013 – Work Session Minutes

October 02, 2013 – Council Meeting Minutes

October 09, 2013 - Work Session Minutes

Bills

\$141,214.98

Council Member Linford moved to approve the Consent Agenda. Council Member Hunsaker seconded the motion. Council Members Broadhead, Hunsaker, and Linford voted unanimously in favor of approving the Consent Agenda.

FORUM, BID OPENINGS, AWARDS, AND APPOINTMENTS

Nothina

FORMAL PUBLIC HEARING

Special Service District - Roads

Council Member Broadhead moved to enter into a Public Hearing with regard to a Special Service District for Roads. Council Member Linford seconded the motion. Council Members Broadhead, Hunsaker, and Linford voted unanimously in favor of entering a Public Hearing.

City Manager Reeves reviewed information associated with the proposed Special Service District for Roads as outlined in Resolution 08-05-2013.

Mr. Abbott, a resident of Santaquin City, stated he attended the "tax increase meeting". He thinks it was "a dog and pony show to create a Special Service District". He has come to the conclusion the "elections don't count; the Mayor and Council don't listen". He doesn't "see the point of it".

No additional Public comments were addressed to the Council.

Council Member Linford moved to close the Public Hearing. Council Member Broadhead seconded the motion. Council Members Broadhead, Hunsaker, and Linford voted unanimously in favor of closing the Public Hearing.

UNFINISHED BUSINESS

Discussion Continuation from Work Meeting – Departmental Budget Review – Administrative Services

Discussion continued from the October 16, 2013 Work Session:

Director Hoffman continued with the slide presentation. Director Hoffman reviewed the cuts and savings implemented (see attachment "A" of the Work Session Minutes for the full presentation).

Council Member Broadhead thanked Director Hoffman for her service and hard work as well as that of her staff. He asked to review the Organizational Chart once again. He voiced his concern with the appointed positions of Treasurer and City Recorder reporting to a Director instead of directly to the Mayor and Council Members. As the discussion was being held Legal Counsel Rich indicated that legally there isn't any reason the Organizational Chart needed to be altered.

Director Hoffman said that when the City had a full time Treasurer, her responsibilities were primarily the same as a Billing Clerk. Director Hoffman again thanked the Mayor and Council for the opportunity to present the information to them.

Mayor DeGraffenried stated he has worked very closely over the past 8 years with the City Staff. "Shannon as the director has done a fantastic job as have Ben and Susan". He thanked her for being here.

City Manager Reeves thanked Director Hoffman for being here and for being the "guinea pig". He stated with the demands of his job, he doesn't have time to perform the annual evaluation, coordinating the office staff as well as a number of other things she takes care of.

Mayor DeGraffenried reported "over the years working with Shannon writing grants, most times he receives notes with regard to her grant writing abilities".

Discussion and Possible action with regard to No Parking along 300 West

Council Member Linford reported he has received 5 or 6 e-mails over the past week with regard to this issue. Most do not want one way travel. The majority want the signs left. He feels the signs should be left as is.

Council Member Hunsaker also has received e-mails. One of the e-mails expressed support of one way travel. He agrees with Council Member Linford with leaving the signs as is.

Council Member Broadhead received 2 e-mails. One of the e-mails suggested adding a 4' strip of asphalt. After driving along 300 West, he found adding additional asphalt would not be an option unless the power poles are relocated. Council Member Broadhead said he would like to see the road striped with travel lanes, and traffic restrictions during specific hours.

Council Member Linford suggested restrictions such as 7 a.m. to 7 p.m., with no restrictions nights or weekends.

Mayor DeGraffenried suggested having restrictions during the week, with parking being allowed from 7 p.m. Friday to 7 a.m. Monday.

Council Member Broadhead requested at least a pedestrian lane be added, as well as a center line stripe.

Council Member Linford moved to approve striping the pedestrian lane, adding the words "no parking" to the pedestrian strip, add a center line strip and leave the signs with no additional action. Hunsaker seconded the motion. Council Members Broadhead, Hunsaker and Linford voted unanimously in favor of the motion.

BUSINESS LICENSES

It was reported there was a new Business License issued for Advanced Residential Marketing, door to door sales of security systems.

REPORTS OF OFFICERS, STAFF, BOARDS, AND COMMITTES City Manager Reeves

City Manager Reeves reported he attended the Planning Commission Meeting last week. The Commission held a Public Hearing on the Steele Property Subdivision as well as reviewed the requirements of the R8 Zone.

NEW BUSINESS

Presentation of Draft Irrigation Water Master Plan and Capital Facilities Plan

J-U-B Representative Norm Beagley reviewed the draft Pressurized Irrigation Water Master Plan and Capital Facilities Plan with those in attendance (see attachment "A" for a copy of the presented information).

Presentation of Draft Irrigation Water Impact Fee Facility Plan

Zions Bank Representative Mr. Snideman reviewed the draft Pressurized Irrigation Impact Fee Analysis (see attachment "B" for a copy of the presented analysis).

Change Order #8 of the Wastewater Reclamation Facility Project

Mr. Beagley reviewed Change Order #8 of the Wastewater Reclamation Facility Project with the Mayor and Council Members. After the review Council Member Hunsaker moved to approve Change Order #8 of the Wastewater Reclamation Facility Project. Council Member Linford seconded the motion. Council Members Broadhead, Hunsaker, and Linford voted unanimously in favor of approving Change Order #8.

Discussion and Possible Action – Amendment to the Wastewater Reclamation Facility Construction Management Agreement with J-U-B Engineers

Mr. Cammack reviewed the budgeted and actual Administration costs associated with the Wastewater Treatment Facility (see attachment "C" for the presented information).

Council Member Broadhead was told \$1,052,278 for the projected final cost is a firm number. This reflects an additional \$181,051 for engineering. Mr. Cammack has reviewed the Engineering billings of the project and agrees with the amounts billed. Mr. Cammack said he applauds the City for their efforts. Council Member Hunsaker was told if the "plant doesn't work" J-U-B Engineering will stand behind their plans for the facility. Council Member Linford reported he had been in attendance at most of the weekly meetings. He believes the City, Flatiron and J-U-B Engineering have worked well together.

Council Member Hunsaker moved to agree on a final cost for construction administration of \$1,052,278 and authorize the Mayor to sign the required documents after Legal Counsel's review. Council Member Linford seconded the motion. Council Members Broadhead, Hunsaker, and Linford voted unanimously in favor of the motion.

INTRODUCTIONS AND ADOPTION OF ORDINANCES AND RESOLUTIONS

Resolution 10-01-2013, "A Resolution Declaring Surplus Property of Santaquin City (Property Associated with the Senior Citizens Department)"

Council Member Linford moved to approve Resolution 10-01-2013, "A Resolution Declaring Surplus Property of Santaquin City (property associated with the Senior Citizen's Department). Council Member Broadhead seconded the motion. Through a roll call vote, Council Members Broadhead, Hunsaker, and Linford voted unanimously to approve Resolution 10-01-2013.

Resolution 10-02-2013, "A Resolution Authorizing a Master Street Lighting Agreement with the Utah Department of Transportation (UDOT)"

City Manager Reeves reported such an agreement is required by UDOT when installing street lights on top of a signal pole. This practice was overlooked when the 400 East Light was installed. The agreement also outlines the requirements of the street lights. It was suggested adding all the lighting around Maverik to a meter.

Council Member Broadhead moved to approve Resolution 10-02-2013, "A Resolution Authorizing a Master Street Lighting Agreement with the Utah Department of Transportation (UDOT). Council Member Hunsaker seconded the motion. Through a roll call vote, Council Members Broadhead, Hunsaker, and Linford voted unanimously in favor of approving Resolution 10-02-2013.

Ordinance 10-01-2013, "An Ordinance Modifying Section 1-5-4 Paragraph F of the Santaquin City Code Regarding Electronic Meetings"

Council Member Hunsaker moved to approve Ordinance 10-01-2013, An Ordinance Modifying Section 1-5-4 Paragraph F of the Santaquin City Code Regarding Electronic Meetings". Council Member Linford seconded the motion. Through a roll call vote, Council Members Broadhead, Hunsaker, and Linford voted unanimously to approve Ordinance 10-01-2013.

PETITIONS AND COMMUNICATIONS Nothing

REPORTS BY MAYOR AND COUNCIL MEMBERS

Mayor DeGraffenried

Nothing

City Manager Reeves

City Manager Reeves reported he has not received any Council feedback with regard to Addendum #4 of the Summit Creek Water Management Project. Council Member Hunsaker requested a copy for his review since he was absent the last meeting. The Addendum will be added to a future Council Meeting for approval.

The Utah Lake Commission will be holding a meeting November 7, 2013 from 9:30 to 1:00 at the Utah County Historic Court House. Council Members Broadhead and Carr would like to attend.

The Council Members are interested in ordering Christmas cards to be sent this year. The cards will be ordered and a time for the Mayor and Council Members to sign them will be arranged.

Council Members

Council Member Linford reminded Council Member Hunsaker of the Utah Lake Commission party this next week.

Council Member Broadhead questioned why the budget line item for celebration donations was so low. It was explained a number of donations collected for Santaquin Days were recorded in the prior fiscal year. It was estimated approximately \$26,000 was collected. City Manager Reeves has created a spread sheet with the actual revenues and expenditures which he will forward to Council Member Broadhead.

EXECUTIVE SESSION (May be called to discuss the character, professional competence, or physical or mental health of an individual)

Nothing

EXECUTIVE SESSION (May be called to discuss the pending or reasonably imminent litigation, and/or purchase, exchange, or lease of real property)

At 9:24 p.m. Council Member Linford moved to enter into an Executive Session to discuss the pending or reasonably imminent litigation, and/or purchase, exchange, or lease of real property. Council Member Hunsaker seconded the motion. Council Members Broadhead, Hunsaker, Linford and Steele voted unanimously in favor of entering and Executive Session. Those attending the Executive Session: Mayor DeGraffenried, Council Members Broadhead, Hunsaker, and Linford, City Manager Ben Reeves, City Recorder Susan Farnsworth, Director Howard, and Legal Counsel Brett Rich.

At 9:38 p.m. the regular meeting resumed.

CONVENE OF THE COMMUNITY DEVELOPMENT BOARDNothing

ADJOURNMENT TO A REGULAR COUNCIL MEETING Nothing

CITY COUNCIL MEETING OCTOBER 16, 2013 PAGE 6 OF 6

ADJOURNMENT

At 9:39 p.m. Council Member Linford moved to adjourn. Council Member Hunsaker seconded the motion. Council Members Broadhead, Hunsaker, and Linford voted unanimously in favor of adjournment.

Approved on November 6, 2013.

James E. DeGraffenfied, Mayor

Susan B. Fainsworth, City Recorder

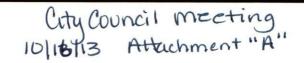


CLOSED EXECUTIVE SESSION AFFIDAVIT

I, James E. DeGraffenried, Mayor of Santaquin City, do hereby certify that t	he
Executive Session held on October 16, 2013 was called to discuss t	he
pending or reasonably imminent litigation, and/or purchase, exchange,	01
lease of real property.	

James DeGraffenfied, Mayor

Date



SANTAQUIN CITY

PRESSURE IRRIGATION SYSTEM MASTER PLAN and CAPITAL FACILITIES PLAN

October 2013

Prepared by:

J-U-B ENGINEERS, INC.

Orem, Utah 84057 (801) 226-0393 www.jub.com

Adopted	by Santaquin	City	Council
on _			





EXECUTIVE SUMMARY

The Santaquin City Pressure Irrigation Master Plan and Capital Facilities Plan plans for future infrastructure improvements to the Santaquin pressure irrigation system. It also provides the foundation for collection of pressure irrigation impact fees. J-U-B Engineers created a computer model of the pressure irrigation system in order to identify what improvements would be needed when Santaquin is built out.

We established a level of service with guidance from standards of the State of Utah for outdoor watering when provided by a culinary water system as well as evaluation of other criteria as described in the plan. The existing pressure irrigation system meets the level of service.

Santaquin City will need one additional well, one additional water tank, two storage reservoirs and several booster pumps and pressure reducing valves. Some of these facilities will likely be installed by land developers. Many water lines installed by land developers will need to be larger than the minimum 6" diameter lines. Santaquin City will need to fund the additional line size. Improvements needed to satisfy the demands of future growth are eligible for payment with impact fees. However the timing of many of these improvements will be driven by specific developments, and the City will likely have to bond for some of them and be reimbursed from future impact fee collections.

Growth will likely trigger the construction of the most expensive infrastructure in the next decade. If other infrastructure is constructed prior to being needed to support growth, impact fees can be collected after construction to reimburse the costs as development consumes the available reserve capacity.

We make the following recommendations:

- 1. Collect impact fees to fund infrastructure to support future growth.
- 2. Make improvements to the pressure irrigation system so that it is not consuming source and storage capacity in the culinary water system, particularly on the east side of the city in the short term and then in the Summit Ridge area.
- 3. Construct the improvements identified within the plan that are necessary to accommodate growth.
- 4. Make operational changes to the system to allow for better overall water management, reduced pumping costs and more efficient and flexible operation of the pressure irrigation system.
- 5. Update the Master Plan/Capital Facilities Plan at least every 5 years, or when significant changes to planned land use, development or water use occur.
- 6. Evaluate long-term water right needs and acquisition policy.
- 7. Periodically review and update user rates.

PRESSURE IRRIGATION MASTER PLAN AND CAPITAL FACILITIES PLAN TABLE OF CONTENTS

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I. INTRODUCTION

A. Purpose

This document is an integrated master plan and capital facilities plan for Santaquin City's pressure irrigation system. It identifies the City's current pressure irrigation system as well as current and future infrastructure needs and provides direction as growth occurs. The recommendations herein are based on conclusions reached using growth projections and computer modeling of the City's pressure system.

B. Background

Previous water master plans prepared for Santaquin City, dating as far back as 1981 (see "Santaquin City Water and Sewer System Study", by Engineering Associates, Inc., dated October 1981) recommended that Santaquin City install a pressure irrigation system to reduce demand on the City's culinary water system for outdoor watering needs.

In the fall of 2004 J-U-B Engineers began working with Santaquin City to study the feasibility of a pressure irrigation system throughout the City. Construction of the citywide system started in 2006 and was completed to its current configuration in 2009.

At the time that the pressure irrigation system was constructed the available funding was not sufficient to construct some of the necessary infrastructure needed. Due to the lack of available funds, the City's culinary water resources were utilized to provide pressure irrigation service in several areas of the City. There are currently four pressure zones that receive pressure irrigation service with "borrowed" culinary water system resources. This situation is now causing heavy strain on the culinary water system. This plan identifies improvements necessary to remove the current pressure irrigation demands from the culinary system.

C. Scope

This master plan includes a discussion of system modeling efforts and summary results and capital facilities planning for the City's pressure irrigation system from 2013 to buildout. It also includes an implementation plan for recommended capital improvement projects.

This plan provides direction for future growth, and the integrated capital facilities plan provides a plan for construction of pressure irrigation system improvements to serve the residents of Santaquin City. The capital improvement projects portion of the plan includes planning level cost estimates as well as an estimated schedule for construction of the recommended improvements

D. Objectives

The objectives of this Pressure Irrigation Master Plan & Capital Facilities Plan are listed below:

- 1. Model the existing pressure irrigation system
- 2. Establish levels of service

- 3. Identify improvements needed to meet existing system deficiencies
- 4. Model the future water system required to service projected build-out conditions based on the City's current General Plan
- 5. Identify improvements needed to meet future demands to build-out
- 6. Prioritize improvement projects
- 7. Estimate the cost of improvements
- 8. Identify potential sources of funding for needed improvements
- 9. Make recommendations for implementation of system improvements

II. APPROACH

A. Existing Conditions

1. Existing Water System

The existing Santaquin Pressure Irrigation System has 2,363 ERUs. Figure A-1 "Existing System" in Appendix A shows the City's existing pressure irrigation system. The system currently has several pressure zones, which are shown in Figure A-2 "Existing Pressure Zones" in Appendix A.

2. Existing Land Use and Pressure Irrigation Connections

Santaquin City's pressure irrigation meters have been located by city staff using mapping grade GPS units. Rather than using existing land use, estimated densities and estimated water use rates to approximate current demand, we used actual water use data and locations. This method bypasses the existing land use component traditionally used for modeling purposes.

Figure A-3 "Existing Pressure Irrigation Connections" in Appendix A shows the Santaquin City boundary, the study area boundary, and existing pressure irrigation connection locations.

3. Existing Population

From 2000 to 2010 Santaquin City experienced tremendous growth. The City's population nearly doubled during that time, from 4,834 in 2000 to 9,128 in 2010, according to US Census data. This type of significant growth can strain the City's infrastructure like the pressure irrigation system. To estimate the 2012 population we started with the actual 2010 census figure and estimated growth rates of 6.56% in 2010, and 8.28% in 2011 through 2012, which are the Santaquin growth rates published by Mountainland Association of Governments, the metropolitan planning organization that covers Utah County. This results in an estimated Santaquin population at the end of 2012 of 10,999.

According to the 2010 US Census, the average household size in Santaquin was 3.93 persons per household. For evaluation purposes we rounded to 3.9 persons per household.

B. Future Conditions

This report identifies two different horizon years for planning purposes. A 10 year horizon was used to determine which capital projects will be needed within that time frame (for impact fee purposes). A buildout horizon was also used to determine capital projects needed between 10 years and buildout.

This report identifies at what number of equivalent residential units (ERUs) each future capital project will be needed. Based upon growth projections it also predicts the approximate year that each project will be needed.

In order for the City to provide new users with the levels of service indicated herein, the pressure irrigation system will need to be expanded and upgraded.

1. Future Land Use

The study area boundary does not coincide with the current Santaquin City boundary. Currently there are approximately 6,700 acres of land within the City limits. The study area boundary defined by Santaquin City includes the current and anticipated future pressure irrigation service areas. The study area boundary includes 8,444 acres of land. Of these 8,444 acres, 1,200 acres is land that will not contribute to future pressure irrigation demand (street right of way, rail road, etc.).

Figure A-4 "Future Land Use" in Appendix A shows the current Santaquin City boundary, the study area boundary, and the anticipated future land uses provided by the Santaquin City Planning Department.

2. Future Population

Santaquin City bases future growth projections on the 2010 US Census and annual growth rates projected by the State of Utah's Governor's Office of Planning and Budget, which are consistent with past actual growth rates in Santaquin City. Table 1 shows anticipated growth projections for the City from 2010 to 2060 (which is considered the buildout population year).

Table 1. Santaquin City Growth Projections

		Estimated			Estimated
Year	Population		Year	Population	Annual Growth
		Rate		·	Rate
2010	9,128	6.56%			
2011	9,381	8.28%	2036	33,089	3.05%
2012	10,158	8.28%	2037	34,098	3.05%
2013	10,999	8.28%	2038	35,138	3.05%
2014	11,910	8.28%	2039	36,209	3.05%
2015	12,896	8.28%	2040	37,314	3.05%
2016	13,963	8.28%	2041	38,027	1.91%
2017	15,120	8.28%	2042	38,753	1.91%
2018	16,371	8.28%	2043	39,493	1.91%
2019	17,727	8.28%	2044	40,247	1.91%
2020	19,195	8.28%	2045	41,016	1.91%
2021	19,907	3.71%	2046	41,799	1.91%
2022	20,645	3.71%	2047	42,598	1.91%
2023	21,411	3.71%	2048	43,411	1.91%
2024	22,206	3.71%	2049	44,241	1.91%
2025	23,030	3.71%	2050	45,086	1.91%
2026	23,884	3.71%	2051	45,811	1.61%
2027	24,770	3.71%	2052	46,549	1.61%
2028	25,689	3.71%	2053	47,298	1.61%
2029	26,642	3.71%	2054	48,060	1.61%
2030	27,631	3.71%	2055	48,834	1.61%
2031	28,473	3.05%	2056	49,620	1.61%
2032	29,342	3.05%	2057	50,419	1.61%
2033	30,237	3.05%	2058	51,231	1.61%
2034	31,159	3.05%	2059	52,055	1.61%
2035	32,109	3.05%	2060	52,893	1.61%

The Santaquin City Planning Department estimated that the majority of the growth over the next 10 years would be primarily in the three areas listed below and that the growth would be distributed among the three areas as indicated:

- a. North of 400 North (45%)
- b. Summit Ridge (40%)
- c. East Bench (15%)

C. Level of Service

Santaquin City established levels of service standards that reflect existing conditions. The level of service is in terms of source, storage, and pressure.

D. Model

J-U-B Engineers Inc. (J-U-B) developed a computer model for the system using InfoWater®, a graphically-based water modeling software that runs within ArcGIS®. The model uses essential hydraulic data input to simulate the effect that input data has on the system under a specified scenario (i.e. peak day, peak hour, average day, etc.). The data used for the model include the graphical layout and connectivity of the system, pipe lengths, pipe diameter, pipe roughness (a Hazen-Williams roughness coefficient of either 130 or 140 was used for all pipes in the model), demand at each node, and elevation of each node. Given the required data, the model determines the flow through each pipe and the pressure at each node that will result when the system meets a given demand at each node. The layout and connectivity of the system is shown in Figure A-1 in Appendix A. The model was not calibrated using flow tests. However, some operational data from the City was used to verify input used in the model.

Existing peak day demands were estimated by evaluating the pressure irrigation meter records for 2012. The highest monthly flow for each individual connection was divided by the number of days in the month, and assumed to be used over a period of approximately 12 hours per day to determine the peak day flow rate.

Future peak day demands were estimated by adding existing peak day demands to demands resulting from future growth. Peak day demands from future growth were estimated to be .25 acres per ERU times 5,702.40 gallons per day per irrigated acre.

Table 2 summarizes the land use, acreage, density, ERUs and the corresponding demand.

Table 2. Area, Connections and Demand Data used in the Model

Land Use Zone	Land Use Description	Total Area (Acres)	Existing ERUs	Estimated Percent of Irrigated Land at Buildout	Number of ERUs per Acre of Future Development	of ERUs at	Total Future Peak Day Demand (Ac-ft)
A1	Agricultural - Production	1,227	0	10%	0.40	491	2.15
A2	Agricultural - Farmsteads	1,218	6	10%	0.40	487	2.13
A3	Agricultural - Business	5	1	15%	0.60	3	0.01
С	Commercial	514	40	15%	0.60	308	1.35
ID	Industrial	673	1	15%	0.60	404	1.77
MU-C	Mixed Use - Commercial	96	42	25%	1.00	96	0.42
MU-R	Mixed Use - Residential	122	77	40%	1.60	195	0.85
OS-P	Open Space - Park	802	19	60%	2.40	1,925	8.42
Р	Public	484	17	80%	3.20	1,549	6.78
PO	Professional Office	158	19	20%	0.80	126	0.55
R1	Residential - Medium	1,211	1,359	60%	2.40	2,908	12.72
R1A	Residential - Low	936	7	65%	2.60	2,434	10.65
R2	Residential - High	865	746	50%	2.00	1,730	7.57
RM	Residential - Multifamily	196	29	30%	1.20	235	1.03
Total:		8,507	2,363			12,891	56.40

Note: The number of ERUs per acre is calculated base on irrigation of 0.25 acres of land per ERU.

Peak hour or peak instantaneous demand for both existing and future conditions were calculated by applying a factor of 2 to the peak day demand.

We evaluated both existing conditions and future conditions using the model to identify instances in which the existing system falls short of the established level of service (existing deficiencies) and what improvements would be needed in order for the future system to provide the established level of service (future needs). These evaluations include various demand scenarios to account for all the conditions represented in the level of service criteria.

E. Capital Improvements

Capital improvements needed to correct existing deficiencies and to meet future needs are identified from the modeling and evaluation results. This plan identifies these as individual capital improvement projects and associated cost estimates are provided (see Section VI "Capital Improvements").

III. LEVEL OF SERVICE

This plan identifies a specific level of service provided for the system. The necessary system improvements listed in this plan will allow the City to provide new users with the same level of service that currently exists.

While there are source, storage and demand criteria in the Utah State Code for outdoor watering provided by a culinary water system, there are none that apply to standalone pressure irrigation systems. In the case of water source we have used the criteria as it applies in a culinary water system; in others cases we have adopted criteria specifically suited for a dedicated pressure irrigation system.

A. System Improvements vs. Project Improvements

Pressure irrigation improvements are categorized according to their function as either system improvements or project improvements.

Project improvements are facilities that are either:

- 1. Minimum improvements which all developers are required (by City Code) to provide, (i.e. in the case of pressure irrigation lines this is a 6" minimum pipe size); or
- 2. Those improvements in excess of that listed above that are needed solely to accommodate new users within the development.

System improvements are those improvements in excess of the minimum improvements needed by the development which is a larger segment of the community than a single development. System improvements include the following:

- 1. Existing improvements that have no reserve capacity
- 2. Existing improvements that have reserve capacity to accommodate future growth
- 3. Future improvements needed to accommodate growth.

For the purposes of this document, the definition of system improvements will be limited to the 2nd and 3rd definitions above, since the definition is irrelevant for those improvements having no reserve capacity.

In the case of the pressure irrigation system it is not unusual for 6" pipes to be needed to meet the pressure needs of a development. We therefore are not considering any pipes 6" or smaller to be system improvements.

B. Level of Service Categories and Magnitude

The level of service criterion for the pressure irrigation system is defined as follows:

1. Source

The level of service related to source is both of the following:

- a. Peak Day Volume: Provide a source capable of supplying 5702.4 gallons (which is equivalent to 3.96 gallons per minute for 24 hours) per irrigated acre on the peak day of use.
- b. Irrigation Season Volume: provide a minimum of 1.87 acre-feet per irrigated acre per irrigation season

For the purposes of evaluating the ability of source infrastructure to satisfy the level of service with regard to peak day volume, we have established the following criteria:

- a. For Summit Creek Irrigation Company shares: 1/180th of the annual yield of 1.8 acre feet per share (or less if limited by the maximum physical capacity of Santaquin Pressure Irrigation system facilities that take delivery of the water from the irrigation company). While the natural surface flow will not provide this water on a peak day (in mid-summer or late-summer), Santaquin takes delivery of water from the Summit Creek Irrigation Company through their wells during this part of the irrigation season, so the water delivered on peak day is not tied to peak day surface water flow rates.
- b. For wells: pumping at full physical capacity for 21 out of 24 hours per day, or in other words pumping at 87.5% capacity.

These criteria are somewhat patterned after the criteria for outdoor watering in a culinary water system as found in the Utah Administrative Code Section 309-510-7, Source Sizing, for Map Zone 4.

2. Storage

Storage in the pressure irrigation system is intended to be sufficient to make up the difference between fluctuating water supply and water demand. This occurs on an hourly basis during the course of a 24 hour period in which demand exceeds supply during the evening, night and morning hours, and supply exceeds demand during the daytime hours. It also occurs on a seasonal basis, when demand exceeds supply during the heat of the summer. There are also longer periods of time when supply exceeds demand – this occurs on a season basis (such as in the spring) and on a daily basis, such as during periods of rain, or during longer wet weather cycles. Storage during these times allows for the water supplied to be saved for use when demand exceeds supply. Storage must serve all areas receiving pressure irrigation to accommodate these fluctuations. The most desirable means of providing this storage is by doing it in a location that also creates the pressure needed for the system. It is possible, however, for storage to be provided at a lower elevation with pumps creating the pressure needed for a particular area. Due to the ongoing pumping costs, this is only done in unusual circumstances in which construction of a storage facility to also provide needed pressure is either impractical or doesn't make sense financially for the city.

The level of service criteria for storage is the larger of the two requirements of 1) hourly fluctuations in which demand exceeds supply and 2) seasonal or daily fluctuations in which supply exceeds demand.

a. Storage for hourly fluctuations in which demand exceeds supply

Demand continually changes as growth occurs, supply of surface water (irrigation company water) is weather dependent, and supply of underground water (well water) is relatively constant except when projects are undertaken that increase it. Therefore, the storage requirement needed to accommodate hourly differences between supply and demand is not a fixed value, or even a value that is directly proportional to ERUs or irrigated acres, but involves a more complex calculation.

The minimum level of service for pressure irrigation storage to accommodate hourly fluctuations is the result of the calculation described below.

- 1) Identify hourly demand on the system:
 - a) Calculate peak day demand as the volume of water required to provide an average of 3.96 gpm per irrigated acre for 24 hours.
 - b) Distribute peak day demand across the 24 hours of a day using the diurnal curve established for the Santaquin City Pressure Irrigation System.
- 2) Identify hourly supply rate of delivery of water to the system as the sum of the following:
 - a) For surface water (i.e. shares in an irrigation company), count the maximum reliable delivery rate of water on the peak day of a dry year, distributed across the 24 hours of a day as it would be delivered.
 - b) For underground water (i.e. wells), count 87.5% of the maximum pumping capacity of the well, evenly distributed throughout the day.
 - c) For other sources of water that have a constant delivery rate, count the rate of delivery.
- 3) Sum, on an hourly basis, the volume of water demand that exceeds the volume of water supply. This is the deficit between peak day demand and supply.
- 4) Increase the above figure by a safety factor to account for the inherent uncertainties related to the input variables of the calculation and variation of system operation. We use a factor of 25%. The result is the minimum level of service for pressure irrigation storage.

A sample of this calculation is shown in Appendix C.

b. Storage for seasonal or daily fluctuations in which supply exceeds demand.

Storage to account for seasonal and daily fluctuations between supply and demand provides for efficient use of water and efficient operation of the pressure irrigation system. The minimum level of service for this criterion is storage of 1.6 times the peak day demand (peak day demand is also the peak day volume required for source) on the system.

This level of service is empirical in nature. It is based upon getting as much storage as is practical on a parcel of land where Santaquin City plans future

storage. In other words, after establishing the elevation at which storage is needed, and identifying a parcel of land at that elevation that could be used for storage, we estimated how much storage could reasonably fit on the site. The resulting total available storage capacity is 1.6 times the buildout peak day demand.

3. Pressure

The level of service related to pressure is 30 psi at peak instantaneous demand (peak hour) of 7.92 gpm per irrigated acre. This is about the lower threshold of satisfactory pressure to operate a lawn sprinkling system.

IV. EXISTING PRESSURE IRRIGATION SYSTEM

A. Overview

The Santaquin City pressure irrigation system consists of sources, booster pumps, storage facilities and transmission/distribution lines. Existing supply, existing demand, existing deficiencies and reserve capacity of system improvements for each category of improvements is described later in this report.

1. General System Description

The pressure irrigation system currently has multiple pressure zones. The existing pressure zones are:

- a. Zone 9N (lowest pressure zone)
- b. Zone 10 (2nd lowest pressure zone)
- c. Zone 11E (2nd highest pressure zone on the east side of town)
- d. Zone 12E (highest pressure zone on the east side of town)
- e. Zone 11W (highest pressure zone in the Summit Ridge area)

Surface water from Summit Creek, located in Santaquin Canyon, is diverted into a Summit Creek Irrigation Company (SCIC) pipeline and gravity flows to the existing pressure irrigation regulating pond (Zone 10 Pond (AKA: Ahlin Pond) near the mouth of Pole Canyon at approximately 1200 South and 100 West). This water is conveyed from Summit Creek part of the way down the canyon through a (SCIC) pipeline into a diversion box near the mouth of Santaquin Canyon, then into a dedicated Santaquin City pipeline that runs through the Utah County debris basin and overflow channel to the Ahlin Pond. There is also an alternate diversion pipeline (located north from that listed previously) that can be used should the need arise (and if Summit Creek Irrigation Company allows it to be used).

Water is also provided to the pressure irrigation system from one or both of two SCIC wells. The first well is located at 400 north and 200 West and the second is located at approximately 150 West and 200 North. From either of these wells water is available to be pumped by an existing Santaquin City booster pump facility located adjacent to the SCIC well at 400 North and 200 West. Water pumped from the booster pump facility is pumped into the pressure irrigation distribution system and is either consumed by users or pumped to the Ahlin pond. The ability of this boosted water making it to the Ahlin Pond is dependent on demand. During times when demand is highest, most if not all of the boosted water is consumed by users and does not reach the pond. When demand is lower, water not consumed by users reaches the Ahlin pond to add to system storage.

In 2012, due to it being a dry water year, Santaquin City found it necessary to add an additional source of water for the pressure irrigation system. The City connected the Center Street well (formerly a culinary water well) to the pressure irrigation system. This source gave the City the ability to provide an additional 560 gpm of pressure irrigation source water for use in the system. Should the need arise, the current piping configuration west of the Center Street pump house can be disconnected from the pressure irrigation system and connected into the culinary system.

2. Summit Ridge

Within the Summit Ridge well house there is a well and a booster pump. Both pumps have the ability to pump water to the Summit Ridge culinary water tank. This is accomplished by opening or closing the appropriate valves inside the well house and within the fenced in area outside of the well house.

During fall, winter & spring months (on average 6 months out of the year depending on the type of water year) the booster pump is used to pump culinary spring water, fed through a 16" pipeline along 500 South, to the Summit Ridge culinary tank. This saves considerable energy in the form of lower pumping costs. Using this booster pump allows that water only needs to be boosted approximately 200 feet in elevation rather than pumping 600 feet in elevation using the well. The Summit Ridge culinary tank is fed through a dedicated pipeline between the Summit Ridge well house and the Summit Ridge tank.

During the summer months (and possibly at other times of large demands, as determined necessary by City staff) the Summit Ridge well pumps to the Summit Ridge tank rather than using the booster pump. Again this is accomplished by opening & closing the appropriate valves within the well house and outside the well house. This well is utilized during the summer months because spring water from Santaquin Canyon is not sufficient to keep up with the high demands on the culinary system.

The above discussion (preceding 3 paragraphs) is carried over from the Santaquin City Culinary Water Master Plan and Capital Facilities Plan being developed concurrently with this plan. Pressure irrigation in the Summit Ridge area of Santaquin is currently "loaned" culinary water resources (source and storage). The pressure irrigation distribution system within Summit Ridge has its own pipelines that are separate from the culinary water system. However, the supply lines to and from the Summit Ridge culinary tank convey both culinary and pressure irrigation water, (there are not separate lines to & from the tank). There is an existing backflow preventer located approximately as shown in Figure A-1 "Existing System" in Appendix A that prevents possible backflow conditions from the pressure irrigation system to the culinary water system, as required by State law.

3. Operations

Figure A-2 in Appendix A shows the existing pressure zones. Only one of the existing higher pressure zones provides water to a lower pressure zone through multiple pressure reducing valve stations (PRVs). Zone 10 provides water to Zone 9N as Zone 9N does not have its own storage or source. **None** of the other existing pressure zones shown in Figure A-2 in Appendix A have the ability to supply water to lower zones.

When all culinary water tanks that can be fed by the culinary spring water are full or near full (i.e. not calling for water to be pumped or diverted to them), the City's spring water overflows into a ditch that directs water to Summit Creek Irrigation network of ditches and pipelines and eventually flows to the Summit Creek Irrigation

reservoir # 2 located near the Summit Ridge area of town. This spring overflow water is then no longer able to be used by the culinary system.

One of the recommendations made in this plan is to capture as much of this overflow water as possible (by accounts of City Staff this could be as much as 200,000 gallons per day) and divert it into the pressure irrigation system. This will be accomplished with piping, automated valves and SCADA controls that will be installed in the near future. This recommended system improvement is discussed in additional detail later in this plan.

The City has the ability to obtain surface or subsurface water from SCIC. However, in past years, the actual quantity of water received and timing by which the City receives that water from SCIC has, at times, been somewhat complicated. SCIC can choose (and has chosen in past years) at any time to reduce flow to the City from any or all SCIC sources depending on SCIC needs to serve other users, availability of water, etc. This has made operating the pressure irrigation system for City staff somewhat of a challenge since a large portion of the pressure irrigation system source water comes from SCIC. During the 2012 irrigation season SCIC worked with the City better than in years past in order to better provide them with water, according to City held shares in SCIC.

Since the inception of the pressure irrigation system in 2006 the standard practice for SCIC providing the City with surface water has been to allow for gravity flows from Summit Creek up until about July 4th of each season. For the remainder of each season, the City was then required to pump water using their booster pumps at 400 North 200 West. However, during the 2012 irrigation season, SCIC did allow the City to take some of the gravity flow water from Summit Creek late in the irrigation season as well as to pump from the booster pumps at 400 North 200 West.

Currently the Center Street well pumps water into the City's pressure irrigation system. Should the need arise for more water in the culinary water system, the current piping configuration west of the Center Street pump house can be disconnected from the pressure irrigation system and connected into the culinary system. If this source is needed for culinary purposes, the Drinking Water Source Protection Plan (DWSP) filed with the State of Utah, Division of Drinking Water (DDW) would need to be updated prior to use for the culinary system.

4. Culinary Water Supply to the Pressure Irrigation System

There is a major concern with the City's culinary water system. The concern is that currently there are four pressure zones within the city where the pressure irrigation system is fed by the culinary water system. This is facilitated using backflow preventers. The four pressure zones are: Zone 11E, Zone 12E, a portion of Zone 10 located within the Summit Ridge development and Zone 11W.

Specifically on the east side of the city (Zones 11E & 12E) this configuration causes significant stress on the culinary system during the hot dry summer months when outside watering demands are high. At present, during summer months, the culinary system is just barely able to provide an adequate amount of water to Zones 11E & 12E to keep up with high summer demands. As more development occurs and

connections are added within these two zones, the system will be **unable** to keep up with increasing demands that are placed on the culinary system.

It is imperative that the City move as quickly as possible to build the necessary infrastructure to enable removing the pressure irrigation system demands from the culinary system.

Due to the small number of existing service connections in the Summit Ridge area the culinary system (in that area) is not currently stressed as heavily by pressure irrigation demands. However, as additional connections are made in that area, the system will also get to the point where it is unable to provide sufficient water for both the pressure irrigation demands and culinary demands with the culinary system. Improvement projects are identified in this plan that will facilitate removing the pressure irrigation demands from the culinary system within the Summit Ride area.

B. Rights

1. Existing Water Rights

Santaquin City holds a total of 554 water shares in Summit Creek Irrigation Company. The shares are held by two different entities: Santaquin City Corporation and Santaquin Special Service District.

Even though the City's culinary water system supplies water to the pressure irrigation system, culinary water rights are not discussed in this master plan. Culinary water rights are discussed and listed in the culinary water master plan being developed concurrent with this plan.

2. Process of Acquiring Water Rights

According to city ordinances, anything annexed prior to November 1994 was required to dedicate water prior to annexation. Between that time and March 2004, water was required at annexation unless a property owner was non-consenting to the annexation or did not intend to develop. After 2004, water was required after annexation and prior to preliminary plats.

The current Santaquin City Code requires that property annexed into the City must be accompanied by sufficient valid water rights to provide water for existing and future needs of the land being annexed (See Santaquin City Code 8-1-10 "Annexation"). The amount of water right required is 3 acre-feet of diversion rights per acre of land annexed. At the City's discretion, as an alternative to providing valid water rights at annexation, City code allows the City to accept "Cash Equivalent of Water Rights". This is sometimes referred to as "Cash in Lieu of Water Rights".

Additionally the City also actively pursues for purchase other water rights that become available. The City purchases both Summit Creek Irrigation Company shares as well as water rights held in area wells when they become available.

3. Water Rights Already Committed but not yet Delivered to Santaquin

There are a number of properties that have committed dedication of water rights to Santaquin City as a condition of annexation. These properties have already been

annexed into the City, however the City has not yet received these water rights. Fulfillment of these commitments should be made prior to development of the land. Figure B-1 "Annexed Land without Committed Water Rights" in Appendix B shows land that has been annexed into the City but no water rights have been surrendered as yet. Figure B-1 also shows land that does not require dedication of water rights at the time of development. In order for the City's annexation policy to be met, the City will need to obtain an appropriate amount of water rights at the time of development of these properties.

C. Sources

1. Existing Sources

Santaquin City currently obtains pressure irrigation water from Summit Creek Irrigation Company, the Center Street well, and the culinary water system. Summit Creek Irrigation Company supplies water to the Ahlin pond during the early and late part of the irrigation season through gravity flows in Summit Creek. The flow from Summit Creek has historically diminished in early July. From that point on, through the hottest part of the summer, Summit Creek Irrigation Company provides water to the pressure irrigation system through wells, one well is located at about 400 North 200 West and the other well is located at about 200 North 150 West. A Santaquin City pressure irrigation booster pump station located at about 400 North 200 West pumps water from either of these wells into the pressure irrigation system, and to the Ahlin Pond, when it is not consumed by system demand. The culinary water system provides pressure irrigation source water and storage to the Summit Ridge area (part of Zone 10 (within the Summit Ridge Development) and all of Zone 11W), Zone 11E and Zone 12E. Water from the Center Street Well and the booster pumps at 400 North 200 West can be delivered to the remaining pressure zones in the system.

Table 3 below shows the capacities of the City's existing pressure irrigation sources.

Table 3. Existing Pressure Irrigation Source Capacities

	Maximum Reliable	Average Volume
Source	Volume on Peak	per Irrigation
	Day (Ac-ft)	Season (Ac-ft)
Center Street Well ¹	2.17	390
Summit Creek Irrigation Company ²	5.22	1662
Culinary Water System ³	3.89	416
Total Pressure Irrigation Sources:	11.28	2468

¹This is based on pumping 560 gpm for 21 out of 24 hours, or at 87.5% capacity. Average volume per irrigation season is based on running 180 days at peak day capacity.

²The maximum reliable volume per day is the lesser of volume based on the number of shares and the volume based on minimal flows during the summer when Santaquin City is only getting water delivered through the irrigation company well, pumped into the pressure irrigation system by the booster pump at 400 N 200 W. While the irrigation company has two wells, the booster pump station cannot pump the flow from both of them, so the irrigation company only runs one at a time to deliver water to the city booster pump station. The well pumping capacity is 1,350 gpm. Santaquin City's SCIC right is based on the proportion of shares held by Santaquin City (554) to the total number of shares (2103) times the reliable discharge of 4 streams of 4 cfs each on a dry year during the middle of the summer (peak day), which is what the irrigation company has known to have historically been able to provide to users at a peak day time - this is 16 cfs, or 8.37 ac-ft for 554 shares. The average volume per irrigation season is 3 acre-feet per share, which is what SCIC has historically considered its annual yield.

³The culinary water provides water to the pressure irrigation system in part of Zone 10 (within the Summit Ridge area) and to all of Zones 11E, 12E, 11NE & 11W, so the source volume is that amount used for outdoor watering.

The average volume per irrigation season is calculated based on the ratio of the level of service values for maximum day volume and irrigation season volume; irrigation season volume (1.87 ac-ft/irrigated acre) reduced to an average daily volume over 180 days would be 3385 gallons, which is 59.36% of the maximum day volume of 5702.4 gallons. Therefore irrigation season volume is 106.8 (59.36% of 180) times maximum day volume.

2. <u>Demand on Existing Sources</u>

The total existing peak day source demand on the pressure irrigation system is 10.34 ac-ft.

A portion of the 10.34 ac-ft of pressure irrigation system source demand is currently provided by the culinary water system. Zones 11E, 12E, 11W and part of Zone 10 (within the Summit Ridge area) currently use the culinary water system to provide 3.89 ac-ft of water to the pressure irrigation system on peak day.

Current demands on the culinary system are varied throughout different areas of the city. In two areas of the city (Zones 11E & 12E) the system is nearing its capacity to supply sufficient source water to meet both culinary and pressure irrigation demands.

This is especially true during the hot, dry summer months. As discussed previously, taking the pressure irrigation system off of the culinary system needs to be accomplished in order to preserve culinary water source resources for indoor use.

The existing total pressure irrigation source demand is 10.34 ac-ft/day. Culinary water sources provide 3.89 ac-ft/day of that amount through the culinary system for the areas using culinary water for outdoor use (in Zones 11E, 12E, 11W and part of Zone 10 (within the Summit Ridge area)). The total source available to meet peak day demand is 11.28 ac-ft/day.

Currently the Ahlin Pond water cannot be delivered to Zones 11E & 12E. The culinary springs and Cemetery well currently provide water to the pressure irrigation system in those zones to meet an outdoor watering demand of 1.57 mgd. The total source available (Springs and Cemetery Well) to Zones 11E & 12E is 2.25 mgd for both culinary and pressure irrigation. This means that during the hottest days in the summer the Cemetery Well has to pump more than 21 hours per day in order to meet demands for indoor use and outdoor watering.

The cemetery well and the springs are currently the only sources that can supply Zones 11E & 12E for both pressure irrigation and culinary water.

3. Existing Source Deficiencies

The Springs and Cemetery Well are the only sources of water for Zones 11E & 12E. If the Cemetery Well is out of service the Springs cannot deliver enough water for these two zones under a peak day condition. The pressure irrigation demand on the existing culinary system for these two zones is 0.96 mgd (2.94 ac-ft/day). When this pressure irrigation demand is taken off the culinary system, the peak day (culinary only) demand will be 0.68 mgd.

The Water Reclamation Facility will be operational before the end of 2013. Reclaimed water from the facility will be stored in the Winter Storage Ponds. As part of the Water Reclamation Facility project, booster pumps are being constructed that will deliver 3.09 acre feet of water to the pressure irrigation system on a peak day. This will be operational for the 2014 irrigation season.

We consider removing the pressure irrigation demand from the culinary system a pressure irrigation system issue, meaning that at the point in time when the pressure irrigation system has the ability to provide its own source of water other than from the culinary water system, the water previously "loaned" to the pressure irrigation system will become a source in the culinary water system to meet future culinary water needs. We consider the booster pumps that will deliver water from the Winter Storage Ponds to the pressure irrigation system a sewer system project.

For the purposes of determining source deficiencies, we do not count the 3.89 acre feet of water provided by the culinary water system, because that capacity is considered available capacity to the culinary water system, but we do count the 3.09 acre feet of water that will be provided by the sewer project. Therefore for these purposes we consider there to be 0.14 acre feet of reserve source capacity in the pressure irrigation system during peak day conditions (11.28 acre feet -3.89 acre feet +3.09 acre feet =10.48 acre feet, which is 0.14 acre feet more than the existing source demand of 10.34 acre feet). Therefore there is no existing source deficiency.

D. Storage

1. Existing Storage

A listing of the existing storage facilities with capacity of each is shown in Table 4. The Summit Creek Irrigation Company Reservoir is not listed because the irrigation company operates it in a way that provides no storage for the Santaquin City Pressure Irrigation System. However, infrastructure exists that could enable storage in the Summit Creek Irrigation Company Reservoir to serve the pressure irrigation system.

Table 4. Existing Pressure Irrigation Storage

Existing Storage Reservoirs	Capacity (Ac-ft)
Ahlin Pond	36.00
Provided in the Culinary Water System ¹	1.94
Total Storage Capacity:	37.94

1The culinary water system provides water to the pressure irrigation system in Zones 11E, 12E and 11W and in part of Zone 10 (within the Summit Ridge Area); this figure represents the number of ERUs present x 0.25 irrigated acres per ERU x 2848 gallons/irrigated acre.

The culinary water system storage serves part of Zone 10 (within the Summit Ridge area) and all of Zones 11E, 12E & 11W; the Ahlin Pond serves the remaining zones.

2. Demand on Existing Storage

Existing storage demand is the larger of a) storage for hourly fluctuations in which demand exceeds supply, and b) storage for seasonal or daily fluctuations in which supply exceeds demand.

a. The case of storage for hourly fluctuations

Pressure irrigation storage demand is the sum of the demand that exceeds the constant source throughout the peak day, increased by a safety factor.

The peak day demand is determined using the number of ERUs, the area of irrigated land per ERU, and the peak day demand of 3.96 gpm per irrigated acre. It is distributed throughout the 24 hours of a day using a diurnal curve.

The constant source is based on the largest dependable flow in a dry year. For existing conditions this would be the Center Street well pumping at full

capacity, and the Summit Creek Irrigation Company pumping their one well and the pressure irrigation system boosting that flow into the system, with no water coming from Summit Creek into the Ahlin Pond.

The safety factor used is 25%.

The existing pressure irrigation storage requirement (to meet hourly fluctuations) is 10.34 acre-feet. The calculation for this figure is shown in Table C-1 in Appendix C.

b. The case of storage for seasonal or daily fluctuations

Existing storage demand is 1.6 times peak day demand (see further discussion of this in Section 3 Level of Service, paragraph B.2.b). Peak day demand is 10.34 acre-feet, so existing storage demand under this criteria is 16.55 acre-feet.

The larger of the two criteria is 16.36 acre-feet, which is the existing storage demand.

3. Existing Storage Deficiencies

With existing storage capacity at 37.94 ac-ft and existing storage demand at 16.36 ac-ft, there are no existing storage deficiencies in the pressure irrigation storage system.

E. Transmission/Distribution System

1. Existing Transmission/Distribution System

Santaquin City has a well-developed existing pressure irrigation distribution system. There are approximately 50 miles of existing pipelines with associated valves, fittings and other related infrastructure.

Figure A-1 in Appendix A shows the extents of the existing transmission/distribution system.

2. Demand on Existing Transmission/Distribution System

The existing transmission/distribution system serves approximately 2,363 ERU's.

Figure C-1 "Existing Pressures at Peak Hour Demand" in Appendix C shows the existing system pressures under peak instantaneous demand conditions of 7.92 gpm per irrigated acre.

3. Existing Transmission/Distribution System Deficiencies

As is evident on Figure C-1, there are no deficiencies in the existing pressure irrigation transmission/distribution system.

V. FUTURE PRESSURE IRRIGATION SYSTEM AT BUILDOUT

A. Overview

Figure E-1 "Buildout System" in Appendix E shows the anticipated pressure irrigation system at buildout.

The pressure irrigation system at buildout will be comprised of the entire existing system infrastructure along with the new improvements identified within this plan. Most, if not all, of the inefficiencies, peculiarities and operational difficulties in the existing system will be overcome and or solved as the improvements identified herein are constructed. These include: removing the pressure irrigation demand from the culinary system and the ability to capture and make use of spring water that currently becomes unavailable for use in the culinary system.

Figure E-2 "Buildout Pressure Zones" in Appendix E shows the pressure zones for the pressure irrigation system at buildout. The following 8 pressure zones or pressure zones with currently isolated areas from existing infrastructure do not currently exist and are planned to become future zones:

- 1. Zone 7N
- 2. Zone 8N
- 3. Zone 9W
- 4. Zone 10W
- 5. Zone 12W
- 6. Zone 11NE
- 7. Zone 13E
- 8. Zone 14E
- 9. Zone 15E

B. Rights

Santaquin City will need additional water rights to meet system demands at buildout. It is anticipated that continuation of the practice of requiring commitment of water shares at the time of annexation, in addition to fulfillment of the commitments already made when land was annexed, will not provide adequate rights to meet buildout demands. We recommend that Santaquin City address long-term water right needs. Santaquin City will need to address the question of adequacy of water rights in the near future.

Santaquin does not require dedication of water rights as a condition of land development, and therefore does not intend to collect impact fees for acquisition of water rights.

C. Sources

1. Future Demand on Sources

Table 5 summarizes the future demand on pressure irrigation sources. This is based on the existing demands plus future modeled demands, which are a function of the future growth rate, development densities, and demand rates.

2. Future Source Needs

Table 5 summarizes the future needs for pressure irrigation sources. Future source needs are the difference between existing source capacity and future source demand. Table 5 shows future source needs at a point 10 years in the future and at buildout.

3. Solutions to Future Source Needs

As shown in Table 5 there will be a need for one additional well. It is planned that this new well would serve several purposes. First, the new well would serve as a recovery well for recharged Type 1 water (see discussion in section D "Storage", Part 3 "Solutions to Future Storage Needs" below) in an amount that exceeds the winter storage capacity of the existing winter storage ponds. It would also serve to deliver additional water from future acquired underground water rights.

The Type 1 water referred to above is Santaquin City's wastewater that will be treated by the City's new Water Reclamation Facility (WRF). This new facility is scheduled to be in operation late in 2013. The Type 1 water from the WRF will be pumped to the City's winter storage ponds (previously sewer lagoon ponds) for storage.

During the irrigation season (approximately 180 days each year) the stored Type 1 water will be pumped into the City's pressure irrigation system for use. The State of Utah issued Santaquin City an Order of the State Engineer for this reuse of Type 1 water (See State of Utah Order of State Engineer NS0105).

For the purposes of this master plan, prior to pumping type 1 water into the pressure irrigation system, all of the Type 1 water infrastructure is considered to be related to the City's sewer system, not the pressure irrigation system. From the time the water is treated at the WRF (to produce Type 1 water), to when it is stored at the winter storage ponds, up until the point in time where it is actually pumped into the pressure irrigation system, we consider these wastewater infrastructure needs. The Type 1 water, until pumped into the pressure irrigation system (by pumps at the winter storage pump station) is considered this way because it is a necessity of the City to treat and dispose of (or in Santaquin City's case, to make use of the Type 1 water) the WRF effluent.

In order to make use of as much Type 1 water during the irrigation season as possible, the booster pumps at the winter storage ponds will need to be upgraded for increased capacities.

Also as shown in Table 5 the City will need to acquire additional Summit Creek Irrigation Company (SCIC) shares to help satisfy the future demand on sources. In conjunction with acquiring additional shares of SCIC water, several booster pump stations will need to be constructed.

Water owned by Santaquin City through the South Utah Valley Municipal Water Association (SUVMWA) to be delivered by the Central Utah Water Conservancy District (CUWCD) is anticipated and planned to help meet future water demands in the pressure irrigation system. Two system turn outs are planned for delivery of this water.

This master plan includes an overall strategy for acquiring future sources of water for the pressure irrigation system. This strategy was formulated by identifying the least expensive and seemingly the most accessible water as the water that should be acquired and used first. The "Solutions to Future Sources Needs" section in Table 5 lists sources of water to be acquired according to this least expensive and seemingly most accessible water first strategy.

At buildout, several smaller pressure zones will be provided with pressure irrigation water through the culinary water system. This is planned in order to conserve resources and to limit future infrastructure that will need to be maintained and eventually replaced by the City. These areas are Zones 11NE, 13E, 14E, 15E and 12W. These zones are areas where there are mostly steep slopes and therefore will have limited buildable areas, larger lots, etc. At buildout there will be approximately 800 ERUs served by the culinary water system. This will require only one set of infrastructure (pumps, tanks and distribution system piping) being installed in these zones. A separate meter would be provided for pressure irrigation to monitor use and for billing purposes.

This master plan addresses necessary infrastructure needed to provide additional sources of water for growth, to build out. This plan does not address acquisition of water rights for these new sources. The City will need to need to pursue and acquire the necessary water rights associated with these new sources.

A detailed tabulation of sources is shown in Table D-1 in Appendix D.

Table 5. Summary of Future Water Source Data

Project No.		Peak Day Flow (Ac-ft)	Irrigation Season Flow (Ac-ft)
	Existing Sources		
	Total Existing Source Demand (Ac-ft)	10.34	1104.70
	Total Existing Source Capacity (Ac-ft)	11.28	2468.00
	Future Source Demands		
	Estimated Source Demand in 2023 (Ac-ft)	21.79	2327.99
	Estimated Source Demand at Buildout (Ac-ft)	56.40	6026.54
	Future Source Needs	A 20.231	
	Additional Source Need in 2023 (Ac-ft)	10.51	0.00
	Additional Source Need at Buildout (Ac-ft)	45.12	3558.54
A - 10 10 10 10 10 10 10 10 10 10 10 10 10	Solutions to Future Source Needs		
	Booster pumps are being constructed as part of the Water Reclamation Facility (WRF) at the Winter	3.09	556.86
N/A	Storage Ponds to deliver water to the Pressure Irrigation System ¹	5: 502	
1	Overflow from culinary springs pipeline to PI system ²	0.61	109.80
2	Booster pump station to draw from SCIC well at 200 N 150 W and piping to 100 W³	5.22	1037.84
3	Booster pump station to draw from SCIC well at 400 S 100 W ³	5.22	1037.84
N/A	The Culinary Water System will eliminate service to the areas of PI Zones 11E, 12E, 11W and part of Zone 10 (within the Summit Ridge area) 4,5	-3.89	-415.17
4	Increase booster station capacity at WRF Winter Storage Ponds ⁶	8.15	1467.70
	Recovery Well at WRF Winter Storage Ponds and piping to system. Additional pipeline into		
	distribution system will also be needed at this time, as the existing 10" line from the booster	9.20	827.71
5	pumps at the Winter Storage Ponds will not be sufficient.7		
6	Booster pump station from Strawberry High Line Canal (or Aqueduct) and piping to system	4.71	936.49
7	North CUP Aqueduct turnout (to Zone 9N) and piping to system8	10.04	903.17
8	South CUP Aqueduct turnout (to Zone 10) and piping to system ⁸	10.04	903.17
N/A	The Culinary Water System will add service to the areas of PI Zones 11NE, 13E, 14E, 15E, and 12W ⁵	3.38	361.67
	Total Future Source Capacity (MGD):	56.41	9182.10

This is a facility that will be operational as soon as the Water Reclamation Facility is operational, which is expected to occur in late 2013. It is considered a Sanitary Sewer System project. The peak day flow is based on pumping 800 gallons per minute for 21 hours per day. The irrigation season flow is the peak day flow pumped each of the 180 days of the irrigation season. This number is less than the volume of water available at the Winter Storage Ponds.

²This is a temporary measure to make use of this water until the culinary water system can make use of it (after additional CW storage facilities are constructed), therefore it is not included in total future source capacity at buildout.

SThe average volume per irrigation season is calculated based on the ratio of the level of service values for maximum day volume and irrigation season volume; irrigation season volume (1.87 ac-ft/irrigated acre) reduced to an average daily volume over 180 days would be 3385 gallons, which is 59.36% of the maximum day volume of 5702.4 gallons. Therefore irrigation season volume is 106.8 (59.36% of 180) times maximum day volume.

⁶The increase in booster capacity needed for peak day flow is the flowrate needed to empty the Winter Storage Ponds in 180 days of pumping plus the delivery rate of water to the ponds from the Water Reclamation Facility at buildout during the same 180 days (minus the pumping rate of the previously constructed booster pump). The irrigation season flow is the peak day flow pumped each of the 180 days of the irrigation season.

This depends on recharge basins having been built for recharging Type 1 water from the WRF facility and anticipates pumping 90 days per season (the hottest days during the summer).

 8 The irrigation season flow is the average flow (1/2 of the peak day flow) x 180 days.

³The irrigation season flow is based on a yield of 3 acre feet per share, which is a number historically used.

⁴The culinary water system will cease to provide this amount of water to the pressure irrigation system in Zones 11E, 12E and 11W.

D. Storage

1. Future Demand on Storage

Currently, existing culinary water system storage tanks are providing the pressure irrigation system with some storage capacity. The storage provided by the culinary system will change over time as land develops. The storage provided to the pressure irrigation system in the various culinary water pressure zones at various times are shown in Table 6. Note that the culinary water and pressure irrigation pressure zones have the same names and are coincident.

Table 6. Culinary Water System Storage Capacity Provided to Pressure Irrigation System

		Day Storage Ca Culinary Wate	
Pressure Zone	Existing	2023	Buildout
Zone 12E	0.31		
Zone 11E	1.16		
Zone 11W	0.48		
Zone 13E			0.59
Zone 14E			0.29
Zone 15E			0.03
Zone 12W			0.73
Zone 11NE			0.05
Total:	1.94	0.00	1.69

Table 7 summarizes the existing and future demand on pressure irrigation system storage. Note that only culinary water system storage permanently used by the pressure irrigation system, at buildout, is included in the required buildout storage figure later in this document.

Table 7. Pressure Irrigation Storage Demand Tabulation

Storage Demand Population **ERCs** (Ac-ft) 2013 10,999 2,363 16.54 2023 21,411 4,980 34.86 12,891 90.24 2060 52,893

2. Future Storage Needs

Table 8 summarizes the future pressure irrigation storage needs. Future storage needs are the difference between existing storage capacity and future storage demand. Table 8 shows future storage needs at a point 10 years in the future and at buildout.

3. Solutions to Future Storage Needs

As shown in Table 8 there will be a need for additional storage ponds and an open top tank to satisfy future demand on storage.

The Zone 11E reservoir on the Hansen property along with the Zone 11E booster pump station (to be constructed on the Ahlin Pond property) and associated piping will be constructed first. Both components of this project need to be constructed concurrently in order to ensure that both are available for use together.

Construction of the Zone 11W open top tank, the Zone 11W booster pump station and approximately 17,000 linear feet of pipe (20" and 24") would follow the reservoir listed above. All three components of this project need to be constructed concurrently in order to ensure that they are available for use together.

The two projects listed in the preceding two paragraphs will provide the necessary infrastructure to remove the pressure irrigation demands from the culinary water system in zones 11E & 11W.

The project for removing pressure irrigation demands from the culinary system in Zone 12E is discussed in "Solutions to Future Transmission/Distribution System Needs" later in this master plan.

The final storage project will be the Zone 10, 40 acre-foot reservoir to be constructed on the west side (planned to be located within the Summit Ridge area) and associated piping.

A detailed tabulation of storage is shown in Table D-2 in Appendix D. Note that in every year the storage demand needed to accommodate daily and seasonal fluctuations, in which supply exceeds demand, is greater than the storage demand needed to accommodate hourly fluctuations in which demand exceeds supply.

As indicated above, with regards to Type 1 water, and for the purposes of this master plan, the City's Type 1 water is considered part of the City's wastewater system up to the point in time where it is pumped into the City's pressure irrigation system. The WFR treatment, pumping (from the WRF to winter storage) and storage are all considered wastewater system components and are not considered nor addressed in this master plan.

At the point in time when the City's wastewater effluent (Type 1 water) reaches approximately 1 million gallons per day (mgd) the City will need to have in place additional storage for their Type 1 water. At that point the winter storage ponds, which have a combined capacity (using the 2 large ponds) of approximately 178 million gallons, will no longer have the capacity to hold the effluent for the typical 180 day non-irrigation period (winter storage).

The City's future strategy for storing Type 1 water (in excess of 1 mdg) is to utilize Aquifer Recharge and Recovery (ASR). Recharge of Type 1 water would typically occur during the winter months. This would be followed by recovery (pumping during the irrigation season) from the underground aquifer in order to make full use of the City's Type 1 water to which they have right. This recharge and recovery

strategy was identified in Santaquin City's 2009 Wastewater Treatment & Collection System Facility Master Plan.

ASR also goes hand in hand with planning efforts over the last several years of the Summit Creek Water Management Project.

The Summit Creek Water Management Project involves 5 organizations within the southern end of Utah County. They include: Summit Creek Irrigation and Canal Company, Santaquin City Corporation, Strawberry Highline Canal Company, Utah County and the Town of Genola. This water management project was undertaken by the above entities in order to better manage water, to try to help alleviate potential flooding concerns, etc. There is a term used to refer to this type of water management. The term is "Conjunctive Management" (See "Conjunctive Management of Surface & Ground Water in Utah, State of Utah, Department of Natural Resources, Division of Water Resources, dated July 2005).

Recharge (and recovery) is also identified as a necessary, long term planning strategy in the 2013 Southern Utah Valley Municipal Water Association's (SUVMWA's) Groundwater Recharge Feasibility Study prepared by Caldwell Richards Sorensen Engineers (CRS).

Future aquifer recharge facilities for underground storage of Type 1 water (for use when WRF effluent reaches 1 mgd) are needed and planned but are not addressed specifically in this master plan. For reasons stated previously, these recharge facilities are considered part of the City's wastewater system and are therefore not addressed nor considered specifically as part of this master planning effort.

As identified in Section C "Source", Part 3 "Solutions to Future Source Needs" above, a future well is planned for use in recovery of the recharged water stored in the underground aquifer. This well is considered part of the pressure irrigation system and is therefore identified as future necessary infrastructure in this master plan. Prior to installation and use of this planned recovery well, Santaquin City plans to recover recharged water using their existing wells.

Table 8. Future Pressure Irrigation System Storage Capacity

oject No.		Storage in Pressure Irrigation Reservoirs (Ac-ft)	Storage in Culinary Water System (Ac-ft)	Total Storage (Ac-ft)
	Existin	g Storage		
	Total Existing Storage Demand	14.60	1.94 1	16.54
	Total Existing Storage Capacity	36.00	1.94 1	37.94
	Future Stor	rage Demands		
	Estimated Storage Demand in 2023	34.86	0.00	34.86
	Estimated Storage Demand at Buildout	88.55	1.69 ²	90.24
	Future St	orage Needs		
	Addition Storage Need in 2023	20.26	-1.94	18.32
	Addition Storage Need at Buildout	52.55	-0.25	52.30
	Solutions to Fut	ture Storage Needs		
9	Zone 11E Pond (10 ac-ft) on Hansen Property and booster station and associated piping	10.00		10.00
10	Zone 11W Summit Ridge open top tank and booster station with transmission pipelines	3.07	-1.94 ³	1.13
11	Zone 10 Summit Ridge Pond (40 ac-ft) and transmission lines	40.00		40.00
	Culinary water system provides this pressure irrigation service in Zones 11NE, 13E, 14E, 15E		*	
N/A	and 12W		1.69 3	1.69
	Total Future Storage Capacity	89.07	1.69	90.76

Notes

¹This is existing PI storage provided by the Culinary Water System to Zones 11E, 12E, 11W and part of Zone 10 (within the Summit Ridge area)

²This is estimated PI storage provided by the culinary water system to Zones 11NE, 12W, 13E, 14E & 15E at buildout

³This value does not reflect pressure irrigation projects, but rather water provided by the buildout culinary water system to users for ourdoor watering purposes in select zones

E. Transmission/Distribution System

1. Future Demand on Transmission/Distribution System

At buildout the transmission/distribution system is estimated to serve 13,105 ERUs.

2. Future Transmission/Distribution System Needs and Modeling

A modeling engineer uses a computer model to design a water system plan that will serve the needs of the community. The process is not one that lends itself to direct calculations, as is the case with water source and storage planning. Due to the finite nature of pipe sizing and the effect that changes in one pipe size have on a pressure pipe network, the process of resolving future network problems and inadequate pressures requires engineering judgment and skill.

We anticipate that the future pipes in the transmission/distribution system will be built by land developers to serve future development as it occurs. The minimum pipe size is 6" in diameter. We plan pipes to transmit and distribute water to areas of future development, knowing that some of these lines will need to be larger than the minimum pipe size.

In the process of developing the buildout model it becomes necessary to adjust lines sizes to find combinations of pipe sizes that meet future needs while maintaining adequate residual pressures. Through this process the modeling engineer eliminates errors generated by the model (when there are negative pressures), and establishes a network that satisfies residual pressure requirements under the level of service criteria.

The modeling engineer also exercises judgment to plan the system in a way that employs best practices, such as avoiding high velocities and unnecessary pumping, and providing looping and redundancy in the system. There will be some internal looping created by development projects that will reduce pressure losses at buildout. The uncertainty of when and where the project-level looping will occur makes depending upon them unreliable, so we neglect their effect when planning future transmission/distribution lines. Including looping and redundancy as is practical reduces the extent of system disruptions when there are operational situations (such as breaks in a pipe) that require flow to a general area to be provided from more than one direction.

3. Solutions to Future Transmission/Distribution System Needs

Future transmission/distribution system projects are shown in Table 10, Pressure Irrigation Improvements, which is located in Part VI, Capital Improvements of this master plan.

Project number nine shown in Table 10 will provide the necessary infrastructure to remove the pressure irrigation demands from the culinary water system in zone 12E.

Figure E-1 in Appendix E shows the buildout system pipes that satisfy the established level of service for the future conditions.

Figure E-3 "Buildout Pressures at Peak Hour Demand" in Appendix E shows the buildout system pressures under peak instantaneous demand conditions of 7.92 gpm per irrigated acre.

As is evident in Figure E-3, these pipe sizes address the level of service needs with regard to pressure in the buildout condition.

Since we expect that the future pipes will be built by land developers, Santaquin City will need to require that the developers install the size of lines shown in Figure E-1. The developer would be responsible for the cost of installing a 6" line, and Santaquin City will be responsible for paying for the incremental costs difference between the required size and a 6" line. As such, these costs are not identified as discrete projects, but as a series of pipe segments for which the city will incur financial obligation when a developer installs them. Tables G-2, G-3 and G-4 in Appendix G contain tabulations of estimated typical pipe installation and upsizing costs.

In order to estimate the upsizing costs that Santaquin City might incur in the next 10 years, we have evaluated the flow in each of these future pipe segments (ones that don't currently exist) in the year 2023, as well as at buildout. A tabulation of these demands is shown in Table D-3 "Future Transmission/Distribution Pipe Flows Tabulation" in Appendix D. We have calculated the total length and weighted average flow for each pipe size at both the year 2023 and at buildout. A summary of those tabulations are shown in Table 9. Table 9 also shows the percentage of buildout pipe capacity that will be needed in the next 10 years. This is shown for impact fee analysis development purposes.

Table 9. Future Transmission/Distribution Pipe Flows Summary

-				Pipe Siz	е		
	8"	10"	12"	14"	16"	20"	24"
Total Length at Buildout (ft)	29,685	36,892	9,693	686	2,505	1,877	307
Buildout Weighted Average Flow (GPM)	410	894	1,425	1,235	1,436	5,218	7,182
2023 Weighted Average Flow (GPM)	108	216	617	27	106	2,414	0
			-				
Percent of Buildout Pipe Capacity Needed in Next 10 Years:	26%	24%	43%	2%	7%	46%	0%

For the purposes of estimating when pipes will be installed, we expect the construction timing to parallel the growth projections, since they will be constructed by future development.

VI. CAPITAL IMPROVEMENTS

A. List of Projects and Priorities

Table 10 shows capital improvement projects necessary to provide for future growth. It also indicates an approximate time frame for when those projects will be needed. For source and storage projects the point at which projects are needed is shown in terms of ERUs and years. We determined the ERU numbers from the model, then applied anticipated growth rates to identify the estimated year when each project will likely be needed. Those projects that are likely very far in the future are shown at the buildout date. Payment to land developers for upsizing from 6" pipes to larger pipes needed as system improvements will gradually occur as land develops from now until buildout.

The likely funding sources are based on project type (to resolve existing deficiency or meet future need) and anticipated year of need. More detailed information about each project and costs associated with each project are found in Appendix G.

Table 10. Pressure Irrigation Improvements

Project Number	Project Name	Estimated Cost	Point at Which Project is Needed (ERUs)	Point at Which Project is Needed (Year)	Funding Source	Comments
Se Nove	Projects to	Satisfy Needs	of Future Growt	h		
	riojetto t	s sadisi y i veeds	or ratare grown			
		Source Proje	ects		Anton House	
1	Overflow from culinary springs pipeline to PI system	\$112,500	2,592	2014	Impact Fees	
2	Booster pump station to draw from SCIC well at 200 N 150 W and piping to 100 W	\$485,313	2,840	2015	Impact Fees	
3	Booster pump station to draw from SCIC well at 400 S 100 W	\$455,313	3,713	2018	Impact Fees	
4	Increase booster station capacity at WRF Winter Storage Ponds	\$350,000	4,423	2020	Impact Fees	
5	Recovery Well at WRF Winter Storage Ponds and piping to system	\$1,773,115	5,386	2025	Impact Fees	
6	Booster pump station from Strawberry High Line Canal (or Aqueduct) and piping to system	\$526,734	6,055	2028	Impact Fees	
7	North CUP Aqueduct turnout (to Zone 9N) and piping to system	\$526,734	9,523	2043	Impact Fees	
8	South CUP Aqueduct turnout (to Zone 10) and piping to system	\$694,234	9,523	2043	Impact Fees	
		Storage Proj	ects			1985
9	Zone 11E Pond (10 ac-ft) on Hansen Property and booster station and associated piping	\$1,546,525	3,713	2018	Impact Fees	
10	Zone 11W Summit Ridge open top tank and booster station with transmission pipelines	\$5,416,959	3,713	2018	Impact Fees	
11	Zone 10 Summit Ridge Pond (40 ac-ft) and transmission lines	\$1,623,663	6,055	2028	Impact Fees	
	Transmiss	sion/Distribution	n System Projec	ts		
12	Booster Pump Station from zone 11E to zone 12E (Variable Frequency Drive (VFD))	\$706,250	3,713	2018	Impact Fees	
	Additional PRVs	\$900,000	We estimate t	hat these costs		
	1 - PRV from zone 11W to zone 10W	\$75,000		over the next		
13	3 - PRVs from zone 10W to zone 9W	\$225,000	3000 CO. C.	d develops, so	Impact Fees	The estimated annual cost
13	3 - PRVs from zone 10 to zone 9N	\$225,000		e cost will be	impace rees	is \$900,000/35, or \$25,714
	4 - PRVs from zone 9N to zone 8N	\$300,000	Manager Market and	e next 10 years.		
	1 -PRV from zone 11E to zone 10	\$75,000				
	Incremental Cost Upsizing Beyond 6" Pipes	\$1,640,203				
	Incremental cost from 6" to 8" pipes	\$207,792	We estimate t	hat these costs		
	Incremental cost from 6" to 10" pipes	\$664,064		l over the next		The estimated annual cost
14	Incremental cost from 6" to 12" pipes	\$319,862	35 years as lan	d develops, so	Impact Fees	is \$1,640,203/35, or
	Incremental cost from 6" to 14" pipes	\$32,245	(10/35) of th	e cost will be	10.	\$46,863
	Incremental cost from 6" to 16" pipes	\$170,356	A STATE OF THE STA	e next 10 years.		22. 0-452-0-0-0
	Incremental cost from 6" to 20" pipes Incremental cost from 6" to 24" pipes	\$198,973 \$46,911				
-	incremental cost from 6 to 24 pipes	240,311				
	Total:	\$17,657,541				

Figure F-1 "System Improvements" in Appendix F shows the projects that need to be constructed to meet future needs.

B. Funding Sources

Section 302 (2) of the Impact Fee Act requires the City to "generally consider all revenue sources, including impact fees and anticipated dedication of system improvements, to finance the impacts on system improvements." By doing so, the City ensures fair and

equitable treatment among users and concludes whether impact fees are the most appropriate method to fund the growth.

There are a number of revenue sources available for managing Santaquin's pressure irrigation system. They are listed below.

1. User Charges

The City collects user fees for water services. User fees pay for water that the City purchases from various sources, as well as the value of water created by the City's own water sources. User fees are the primary source of funding for debt payments, maintenance and operation expenses of the City's water system.

2. Grants, Low Interest Loans and donations

Santaquin City has had grants and low interest loans for water-related projects in the past. It is possible that it may get additional grants for future projects. Additionally some infrastructure is donated, though this typically is at the project improvement level rather than at the system improvement level.

3. Special Assessment Areas

This method of financing growth is acceptable and allocates the cost of the new development to the new development. However, special assessment areas can be expensive to establish and complicated to administer, especially if a large development is being considered. Moreover, the special assessments may not accurately reflect the true cost of the facilities.

4. Bonds

The City may elect to issue bonds to maintain a steady flow of funds to pay for needed facilities. The City has issued bonds in the past, and may determine that bonds are a suitable mechanism for funding future water system facilities. The City may use the revenues from impact fees to pay debt service on bonds for eligible projects, or user fees for other projects. In addition, the City may use impact fees to pay for costs of issuance on future bonding. Bonds may be issued in addition to collecting impact fees.

5. Impact Fees

This source is a common and equitable method of funding new system improvements because it imposes the cost of new growth upon that new growth. The detailed analysis required to impose impact fees accurately allocates the true impact of a system or facility to those creating the impact. Those creating the most impact, therefore, pay more. The speculative nature of these revenues, and their elasticity, however, make cash flows from impact fees unpredictable.

The City may, on a case by case basis, work directly with a developer to adjust the standard impact fee to respond to unusual circumstances and ensure that impact fees are imposed fairly. The City may also, on a case by case basis, adjust the amount of the fee based upon studies and data submitted by a developer.

6. Developer Installed and Financed (Reimbursable by Impact Fees)

This is a source that the City has recently used to help fund infrastructure needs within specific development areas of the city. This type of arrangement is typically accomplished with a development agreement between the City and the developer.

All of the above forms of financing the expenses associated with a water system have a place and are needed. For instance, user rates are needed for ongoing operation and maintenance costs; grants, low interest loans and some bonds are necessary for major infrastructure improvements; special assessment bonds can work well where there is a deficiency in a particular area or as a tool to build infrastructure to spur development; impact fees are the equitable, appropriate and needed means of funding system improvements to accommodate future growth.

VII. CONCLUSION & RECOMMENDATIONS

A. Conclusion

This master plan effort was undertaken to evaluate Santaquin City's existing pressure irrigation system, to identify existing deficiencies, to identify reserve capacities and to identify future system needs related to demands due to growth. Recommendations follow.

B. Recommendations

1. Establish Impact Fees to Fund Projects to Meet Future Needs

This report, in conjunction with the IFFP and IFA, will provide the basis for collection of impact fees necessary to construct the improvements required to support future growth.

We recommend that Santaquin City adopt impact fees in an amount that will fund the projects required to meet future needs without subsidizing the effect of growth using current users.

We recommend that Santaquin City implement a practice of following this plan in constructing the projects anticipated to satisfy the demands of future growth. As growth occurs and other factors affect conditions relative to the assumptions made in this plan the City will need to consider adjusting priorities as needed in order to accommodate changing conditions.

2. Pressure Irrigation System to Provide its own Sources and Storage

As discussed throughout this plan, it is imperative that the City work diligently to build new project improvements for the pressure irrigation system that will allow for removing pressure irrigation demands on the culinary system. This is an urgent need; we recommend that Santaquin City pursue it with diligence.

3. Construct Projects to Provide Additional Source and Storage

There are multiple projects that are necessary to accommodate growth within the next ten years. We recommend that the City fund and construct these projects in order to be able to accommodate future growth. Impact fees could then be used to reimburse costs as the projects are entirely related to growth. The projects are as follows:

- Project No. 1: Overflow from culinary springs pipeline to PI system
- Project No. 2: Booster pump station to draw from SCIC well located at 200 N 150 W and piping to 150 W
- Project No. 3: Booster pump station at SCIC well located at 400 S 100W
- Project No. 4: Increase booster pump capacity at WRF Winter Storage Ponds and piping to system
- Project No. 9: Zone 11 E Pond (10 ac-ft) on Hansen property and booster station and associated piping
- Project No. 10: Zone 11 W Summit Ridge open top tank and booster station with transmission pipelines
- Project No. 12: Booster pump station from Zone 11E to Zone 12E

These projects will provide for more efficient and flexible operation of the pressure irrigation system and provide the necessary storage and pumping capabilities. The projects will also allow for more operational flexibility for providing water from any source to any zone within the system. As these facilities are constructed the IFFP should be updated. As they are constructed these projects will transfer from future projects to system facilities with reserve capacity to serve future growth. At that point impact fees should be adjusted to pay for the reserve capacity.

By constructing project 1 (see Table 10) the City will be able to capture the culinary spring water that is currently diverted down the SCIC ditch and to SCIC reservoir #2, making it no longer available for use in the culinary system. According to staff accounts this could divert as much as 200,000 gallons per day into the Ahlin Pond. This water is currently lost because there is not sufficient storage in the culinary system to capture all the flow coming from the springs. This diversion may be abandoned or not used once additional culinary water storage facilities are constructed allowing for all of the spring water to be stored and then used in the culinary system.

By constructing projects 9, 10 & 12 (see Table 10) the City will be able to remove pressure irrigation demands from the culinary water system. This is something that we encourage the City to pursue with diligence.

By constructing projects 2 & 3 (see Table 10) the system will be able to obtain additional SCIC water as the City continues to acquire additional shares in the irrigation company.

Project 4 (see Table 10) will be necessary once the Type 1 water from the WRF exceeds 1 mgd.

The projects listed above are only those projects that are projected as needed within the next 10 years. There are other future projects listed in this plan that will need to be constructed at the appropriate time when growth requires. See Table 10 for a complete list of all projects required to buildout in order to accommodate growth.

4. Operational Recommendations

As soon as new project improvements are constructed and in operation, several system operational parameters should be addressed. Changing these parameters will allow for better overall water management, reduced pumping costs and more efficient and flexible operation of the pressure irrigation system.

Within the future higher pressure zones (Zones 11NE, 12W, 13E, 14E & 15E) the culinary water system will provide distribution, source and storage for all culinary and pressure irrigation needs. Only a single distribution/transmission pipeline system will be required to be installed within these higher areas. However, each connection will be provided with a pressure irrigation meter and a culinary water meter.

5. Updates to Master Plan and Capital Facilities Plan

We recommend that Santaquin City update this plan as needed but at intervals of not more than every 5 years. An interim update may be needed if planned land uses change significantly.

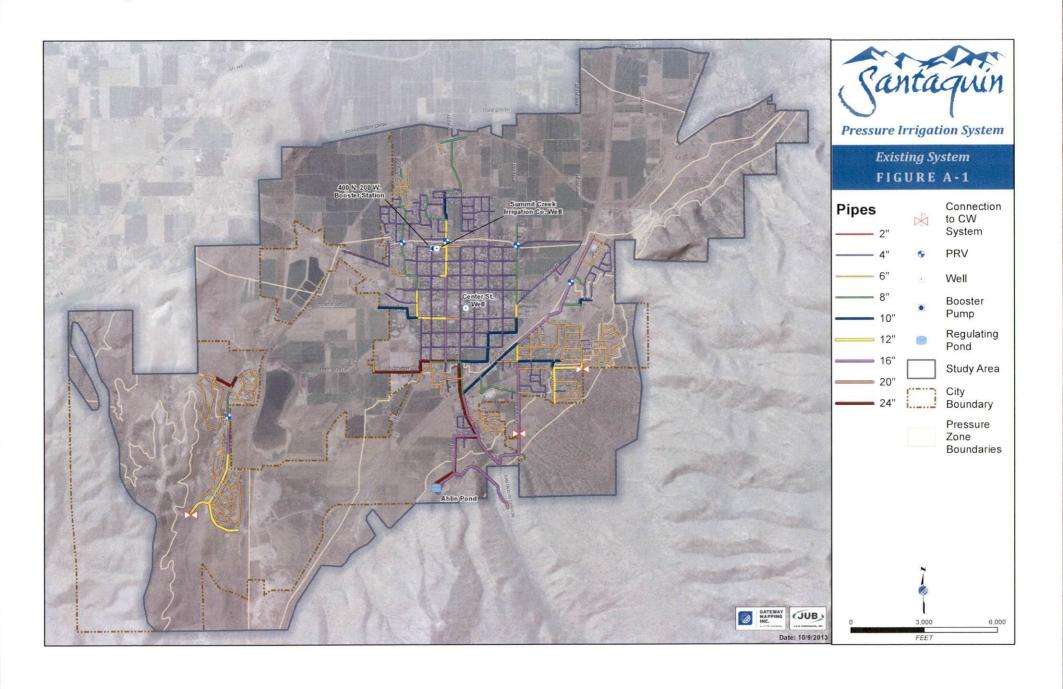
6. Water Rights

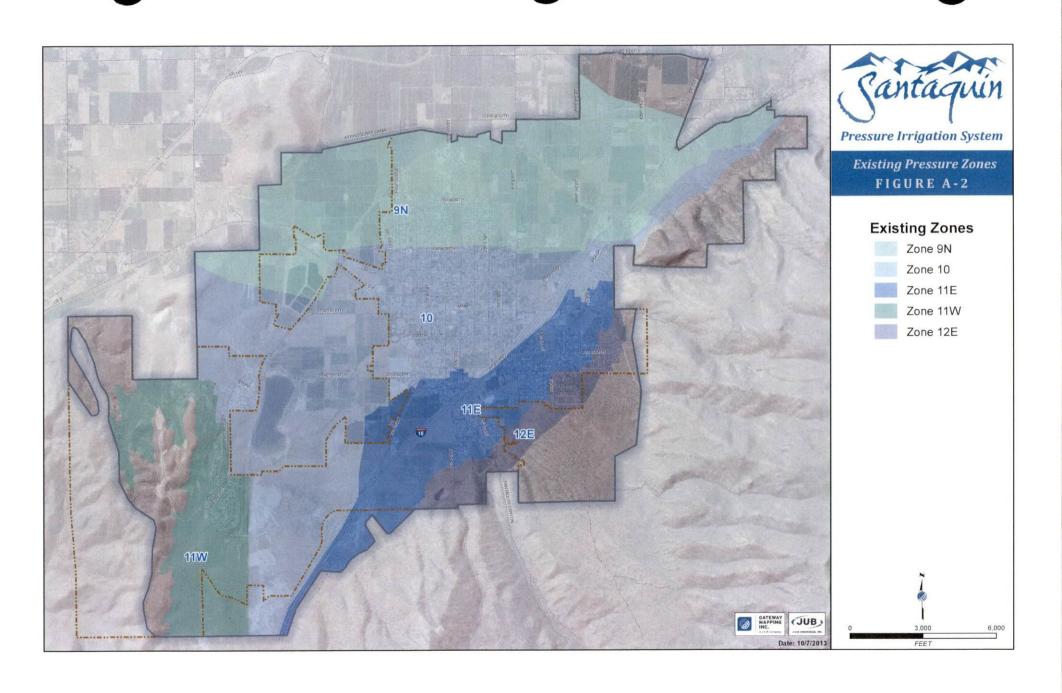
The evaluation of water rights was outside the scope of this study. However, we recommend that in the near future Santaquin City evaluate long-term water right needs and acquisition policy to make sure that there will be sufficient water rights to enable development of the sources and use of water sufficient to meet the demands outlined in this report.

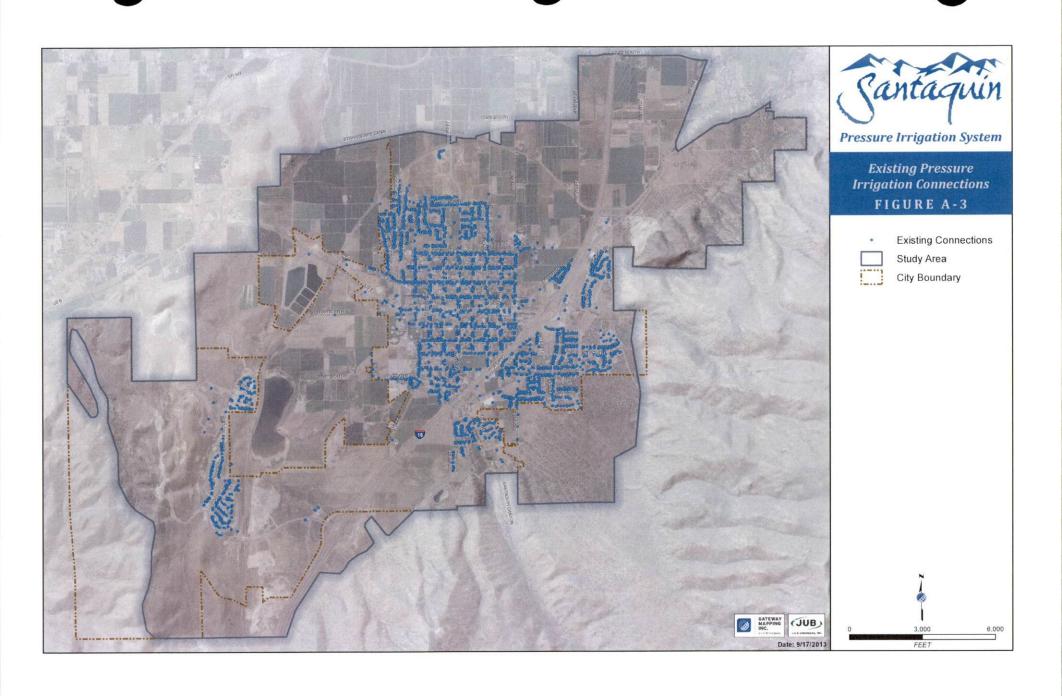
7. Periodic Review of User Rates

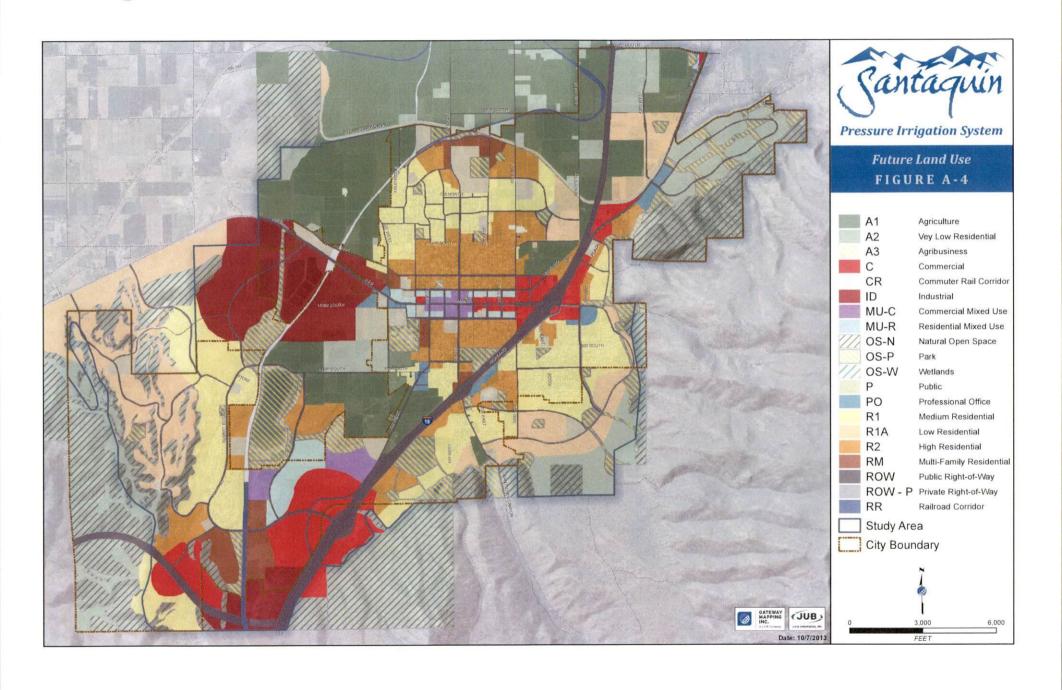
We recommend that Santaquin City periodically review and update their water user rates. User rates cover operation & maintenance for the system. As costs to maintain and operate the system will likely increase over time, user rates need be updated periodically to make sure that revenue generated can cover costs. More frequent smaller adjustments are more tolerable than infrequent large adjustments.

APPENDIX A EXISTING SYSTEM MAPS

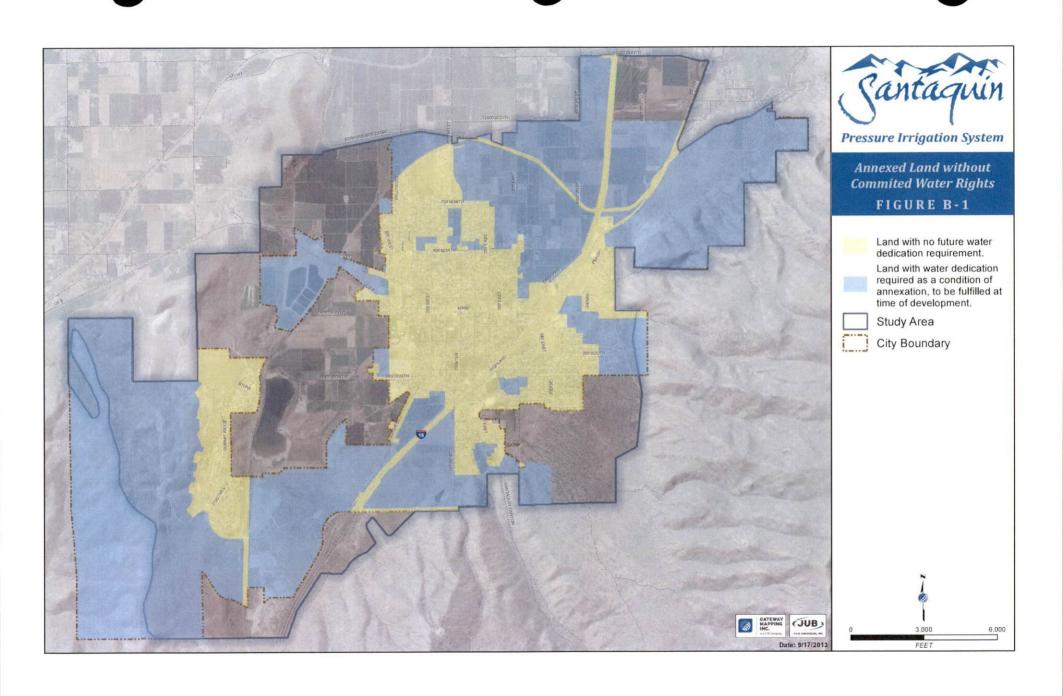








APPENDIX B ANNEXED LAND WITHOUT COMMITTED WATER RIGHTS MAP



APPENDIX C EXISTING SYSTEM

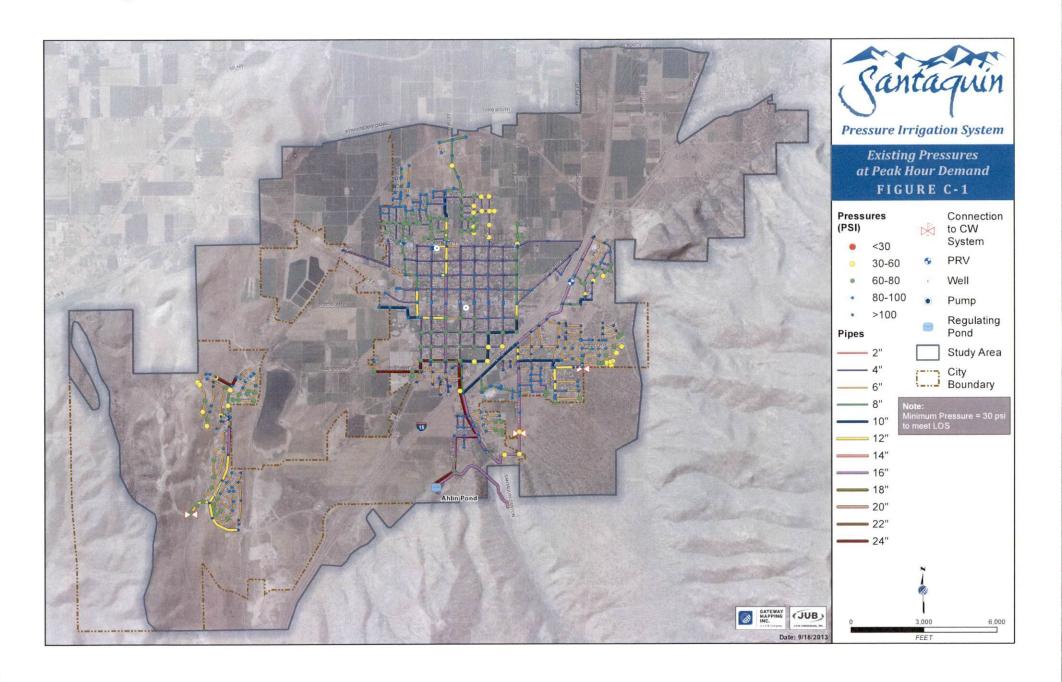


Table C-1. Existing Storage Demand Calculation (based on hourly demand fluctuations)

Maximum Day Den	nand (ac-ft):	10.34
Maximum day dem	and per irrigated acre (gpm):	3.96
Irrigated area per E	RU (acres):	0.25
ERUs in Year:	2013	2363

			Demand	Constant	Constant	Required
	Diurnal Curve	Instantaneous	During Hour	Source	Source During	Storage During
Hour	Multiplier ¹	Demand ² (gpm)	(ac-ft)	(gpm)	Hour (ac-ft)	Hour (ac-ft)
1	0.3	1,421	0.26	2550	0.47	0.00
2	0.4	1,895	0.35	2550	0.47	0.00
3	0.5	2,369	0.44	2550	0.47	0.00
4	0.7	3,317	0.61	2550	0.47	0.14
5	0.9	4,264	0.79	2550	0.47	0.32
6	1	4,738	0.87	2550	0.47	0.40
7	1	4,738	0.87	2550	0.47	0.40
8	0.8	3,790	0.70	2550	0.47	0.23
9	0.6	2,843	0.52	2550	0.47	0.05
10	0.4	1,895	0.35	2550	0.47	0.00
11	0.05	237	0.04	2550	0.47	0.00
12	0.05	237	0.04	2550	0.47	0.00
13	0.05	237	0.04	2550	0.47	0.00
14	0.05	237	0.04	2550	0.47	0.00
15	0.05	237	0.04	2550	0.47	0.00
16	0.05	237	0.04	2550	0.47	0.00
17	0.05	237	0.04	2550	0.47	0.00
18	0.6	2,843	0.52	2550	0.47	0.05
19	0.7	3,317	0.61	2550		0.14
20	0.8	3,790	0.70	2550	0.47	0.23
21	1	4,738	0.87	2550	0.47	0.40
22	0.8	3,790		2550		0.23
23	0.6	2,843	0.52	2550	0.47	
24	0.4	1,895	0.35	2550	0.47	0.00

Total Maximum Day Demand (ac-ft):	10.34	Storage (ac-ft):	2.65
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"Safety Factor" - Percentage of Additional Storage: 25%

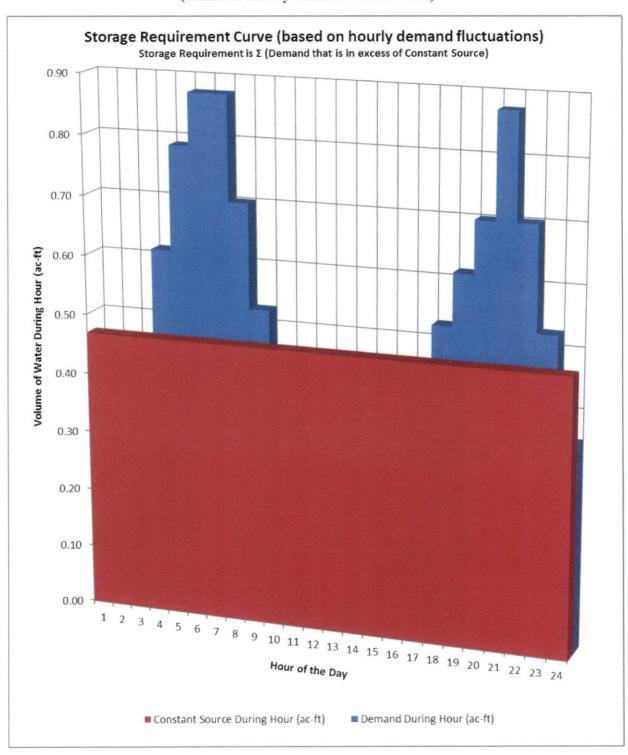
Total Storage (ac-ft): 3.32

¹This dirunal curve shows the distribution of water use during the 24 hours of a day. It was developed by J-U-B Engineers based on actual meter readings at water sources of stand-alone pressure irrigation systems along the Wasatch Front.

²The dirunal curve is scaled by this factor so it represents hourly demand: 4

4737.96

Existing Storage Demand Graph (based on hourly demand fluctuations)



APPENDIX D FUTURE SYSTEM TABLES

Table D-1. Future Source Requirements

							Saura				No. of Contract of
	ya.	ntaquin Gro	Santaquin Growth Projections	5	Source	Source	NIDE Type 1	Source Kequirement and Supply WRF Type Water Se RF Type 1 WRF Type 1 To Rechar	WRF Type 1 Water Sent		
Year	Population	Average Annual Growth Rate	Additional Persons/Yr	ERUs	Required per Season (Ac- ft/Season)	Source Req'd on Peak Day (AF/Day)	WRF Type I Water Generated (Ac-ft/day)	5 7	to Recharge Basins or Land Application During Year	SCIC Shares	SCIC Water (Ac- ft/Season)
A	В	0	D	m	F	6	Ξ	-	(Acre)	_	_
1	,	,		įſ			600,000 gal/day	Smaller of H		554	
							increased	gal/day,		annually by	
						(converted	annually by	over 180 days	(H × 360) -	C, scaled to equal 1350	
					EXAAXAC	to AF/ Day)	(converted	(converted	(N X TOU)	IN 2000	N X AU
2013	10,999	8.28%	841	2,363	1,105	10.34				554	
2014	11,910	8.28%	911	2,592	1,212	12.42	1.84	331.46	106.07	591	1903
2016	13,963	8.28%	1,068	3,108	1,453	13.60	2.16	388.63	220.39		2020
2017	15,120	8.28%	1,156	3,399	1,589	14.87	2.34	420.80	284.75		2156
2018	16,371	8.28%	1,252	3,713	1,736	16.25	2.53	455.65	354.43	210	
2020	19,195	8.28%	1,468	4,423	2,068	19.35	2.97	534.22		874	2621
2021	19,907	3.71%	712	4,602	2,151						N
2022	20,645	3.71%	766	4,787	2,238	20.95	3.19		22.16		y k
2024	22,206	3.71%	794	5,179	2,421			552.44		954	2862
2025	23,030	3.71%	824	5,386	2,518		3.56				2925
2025	24 770	3.71%	886	5,801	2,723	25.48	3.83		136.96	1.019	3057
2028	25,689	3.71%	919	6,055	2,831	26.49	3.97	552.44			(a)
2029	26,642	3.71%	953	6,294	2,943		4.12				n (1)
2031	28,473	3.05%	843	6,754	3,158	29.55		552,44	240.02		3316
2032	29,342	3.05%	868	6,973	3,260					1,123	l l
2033	30,237	3.05%	895	7,197	3,365						3421
2035	32,109	3.05%	950	7,668	3,585	33.55					
2036	33,089	3.05%	979	7,914	3,700	34.63	5.12	552,44		1,195	3585
2037	34,098	3.05%	1,009	8,168	3,818	35.74					3641
2039	36,209	3.05%	1,040	8,698	4,066	38.06			455.33		
2040	37,314	3.05%	1,104	8,976	4,196					1,272	
2041	38,027	1.91%	713	9,155	4,280	40.06	5.88	552,44	505.91		
2043	39,493	1.91%	740	9,523	4,452						3867
2044	40,247	1.91%	754	9,713	4,541		6.22				
2045	41,016	1.91%	769	9,906	4,631		6.34	552.44	589.11	1,300	3901
2047	42,598	1.91%	798	10,304	4,817	45.08	6.59				
2048	43,411	1.91%	814	10,508	4,913		6.71			П	
2049	44,241	1.91%	829	10,717	5,010	46.89	6.84	552.44	702 37	1,324	-1111
2051	45,811	1.61%	726	11,111	5,195	48.62	7.08				
2052	46,549	1.61%	738	11,297	5,281						
2053	47,298	1.61%	749	11,485	5,369	50.25	7.31		785 16		
2055	48,834	1.61%	774	11,871	5,550					1,340	4020
2056	49,620	1.61%	786	12,068	5,642						
2057	50,419	1.61%	799	12,269	5,736	53.68	7.80		850.81		
2059	52,055	1.61%	825	12,680	5,928						
0900	52.893	1.61%	838	12,891	6,027	56.40	8.18	552,44	919.68	1,350	

SEE CONTINUATION OF TABLE ON THE FOLLOWING PAGE

Table D-1. Future Source Requirements (Continued)

10000000000000000000000000000000000000	Excess Source (Ac- ft/Day)	\		×-59					15 7.91									4 5	2 1	212	6t	03	25	74	. 88	90	72	2 50	75	98	*	02	8 88	68	32	25	13	0 8	3 3	30	88	22
	Total Source Available (Ac-ft/Day)	×	G - the sum of N	through W	11.27	15.54	20.41	22.45	24.15	18.22	22.50	22.81	23.24	23.67	25.01	26.4	26.55	27.54	28.63	30.51	31.49			35.74		38.0	39.27	40.05				44.20	45.98	46.89			49.43				53.68	
	Strawberry Highline Canal and CUP Aqueducts (Ac-ft/Day)	×	G-sum of N through V (when it is greater	than zero)	i				10			r	e	14	1	v	e:	0.23	0.53	1.15	1.48	1.82	2.18	2.50	3.35	3.78	4.21	5.00	5.41	5.82	3.63	4.02	4.41	5.22	5.64	6.04	6.46	0.88	7.74	8.19	8.64	60.6
	CW Supplied to PI System (Ac-ft/Day)	>	Data from Culinary Water	Master Plan	3.89	4.45	5.01	6.14	6.71				e.				E.								0				E		2.62	2.67	2.77	2.82	2.88	2.93	2.98	3.03	3.12	3.18	3.23	3.28
	Overflow from Springs (Ac- ft/Day)	ח	200,000	gal/day	ē	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	8				*	٠	•			4				4	,						*			4		i.
e Supply	Center Street Well (Ac-ft/Day)	_	560 gpm x AF (in Ac-	ft/day)	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.1/	2.17	2.17	2.17	2.17
Peak Day Water Source Supply	Recharge & Recovery Well #1 (90% of recharge water over 90 days)	S	06/[×%06	days	•	,	. ,	,	e	900			С		0.89	1.37	1.63	1.89	2.1/	2.64	2.89	3.15	3.41	3.58	4.26	4.55	4.86	5.26	5.47	5.68	5.89	6.11	6.56	6.79	7.02	7.23	7.43	7.84	8.07	8.29	8.51	8.73
Peak Day	Re-use Pump from Winter Storage Pond (Ac- ft/Day)	~	r of	Î		3.09	3.09	3.09	3.09	3.09	5.94	6.26	6.38	6.50	6.63	6.90	7.04	7.19	7.77	7.61	7.74	7.89	8.03	8.19	8.50	8.67	8.84	9.06	9.18	9.29	9.41	9.53	9.78	9.91	10.04	10.15	10.27	10.38	10.62	10.74	10.86	10.99
	SCIC Water- Delivered to Ahlin Pond (Ac- ft/day)	a	Smaller of (M-N-O-P) and 4 cfs (one stream of SCIC	water)													90.0	0.41	1.02	1.28	1.55	1.82	2.09	2.37	2.94	3.23	3.53	3.70	3.79	3.88	3.96	4.05	4.14	4.32	4.41	4.44	4.47	4.50	4.56	4.59	4.62	4.65
		Ь	7.0	and N					1.13	1.91	2.74	3.34	3.64	3.95	4.27	4.94	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22
	SCIC Water - SCIC Water - Delivered Delivered Delivered Uthrough 200 through 400 N 1950 W Booster Booster Booster Scit Well SCIC Well SCIC Well Actificated Incertificated	-	rof	z			4.30	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22
	SCIC Water Delivered through 400 N 200 W Booster Station (Ac-ft/day)	z		to ac-ft/day	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22	5.22
	SCIC Water- Yield Based to on Shares (Ac-ft/Peak Day)	Σ	8	days	8.36	8.92	9.52	10.85	11.58	12.35	13.19	13.78	14.08	14.40	14.72	15.38	15.72	16.07	16.42	16.94	17.21	17.48	17.75	18.03	18.60	18.90	19.19	19.28	19.45	19.54	19.63	19.71	19.80	19.98	20.07	20.10	20.13	20.16	20.22	20.25	20.28	20.31
の対象を	Year	A			2013	2014	2015	2017	2018	2019	2020	2022	2023	2024	2025	2027	2028	2029	2030	2032	2033	2034	2035	2036	2038	2039	2040	2042	2043	2044	2045	2046	2047	2049	2050	2051	2022	2053	2055	2056	2022	2058

AA = Average Yearly Outdoor Use = 1.87 acre-feet per irrigated acre per season
AB = Peak Day Demand = 3.96 gpm per irrigated acre
AC = Irrigated Area per ERU = 0.25 acres per ERU
AD = SCIC Yelled Per Share = 3 acre-feet per season
AE = SCIC Kelled Per Share = 3 acre-feet per season = 4 streams of 4 cfs each for 24 hours (= maximum day delivery of water) per day for 180 days, divided by 2103 SCIC water shares
AF = Number of hours a day pumps are running at the established level of service = 21 hours/day
AE = Number of hours a day pumps are running at the established level of service = 21 hours/day
AG = Capacity of one pump at the type 1 sewer effluent winter storage booster station running 21 hours/day = 3.09 acre-feet/day

Table D-2. Future Storage Requirements

90.7					0	40 004	000	4 540/		
90.73	1.66	89.07		87.77	20.96	12,680	825	1.61%	52,055	2059
90.7					20.62	12,473	812	1.61%	51,231	2058
90.68					20.28	12,269	799	1.61%	50,419	2057
90.6	1.59				19.95	12,068	786	1.61%	49,620	2056
90.6					19.62	11,871	774	1.61%	48,834	2055
90.6					19.30	11,676	762	1.61%	48,060	2054
90.5	1.51				18.98	11,485	749	1.61%	47,298	2053
90.5					18.67	11,297	738	1.61%	46,549	2052
90.53	1.46	89.07	76.91	76.91	18.37	11,111	726	1.61%	45,811	2051
90.5					18.06	10,929	845	1.91%	45,086	2050
90.4					17.71	10,717	829	1.91%	44,241	2049
90.4					1/.3/	ANC'NT	814	1.91%	43,411	2048
20.4			Ī		CO.71	10,500	/30	T.51%	42,390	1407
90.4					17.03	10 204	700	1 010/	41,733	2040
90.4					16 70	10 103	783	1 91%	41 799	2006
90.3	1.31				16.37	9,906	769	1.91%	41,016	2045
89.0		89.07			16.05	9,713	754	1.91%	40,247	2044
89.0					15.74	9,523	740	1.91%	39,493	2043
89.0					15.43	9,337	726	1.91%	38,753	2042
89.0					15.13	9,155	713	1.91%	38,027	2041
89.0					14.84	8,976	1,104	3.05%	37,314	2040
89.0					14.38	8,698	1,072	3.05%	36,209	2039
89.0					13.93	8,429	1,040	3.05%	35,138	2038
89.0		89.07			13.50	8,168	1,009	3.05%	34,098	2037
89.0					13.08	7,914	979	3.05%	33,089	2036
89.0					12.67	7,668	950	3.05%	32,109	2035
89.07			51.42	51.42	12.28	7,429	922	3.05%	31,159	2034
89.0					11.90	7,197	895	3.05%	30,237	2033
89.0					11.52	6,973	868	3.05%	29,342	2032
89.0					11.16	6,754	843	3.05%	28,473	2031
89.0		89.07			10.81	6,543	988	3.71%	27,631	2030
89.0					10.40	6,294	953	3.71%	26,642	2029
89.0					9.97	6,055	919	3.71%	25,689	2028
49.0				40.31	9.02	5,824	886	3.71%	24,770	2027
49.0					8.49	5,601	854	3.71%	23,884	2026
49.0					7.99	5,386	824	3.71%	23,030	2025
49.0					7.91	5,179	794	3.71%	22,206	2024
49.0					7.31	4,980	766	3.71%	21,411	2023
49.07					6.73	4,787	739	3.71%	20,645	2022
49.0					6.18	4,602	712	3.71%	19,907	2021
49.07		49.07			5.71	4,423	1,468	8.28%	19,195	2020
49.07		49.07	28.06		6.38	4,054	1,356	8.28%	17,727	2019
49.0		49.07			1.99	3,713	1,252	8.28%	16,371	2018
38.98		36.00		23.52	1.70	3,399	1,156	8.28%	15,120	2017
38.7		36.00			1.16	3.108	1.068	8.28%	13,963	2016
38.50	2.50	36.00	19.66		0.86	2.840	986	8.28%	12.896	2015
38.2		36.00			1.93	2 592	911	8 28%	11 910	2014
37.94	1.94	36.00	16.36	16.36	3.32	2.363	841	8.28%	10.999	2013
÷	Master Plan	facilities	and G	AA	C-1					
	Water	storage	Larger of F	Table E-1 x	using Table					
	Culinary	capacity of		Column 6 in	generated					
*	_	-	I	G	п	Е	D	C	В	Þ
	1			demand -	exceeds					
(AC-II)	(Ac-ft)	(AC-TI)		exceeds	demand			Kate		
Provided		Provided	∄	supply	hourly		Persons/Yr	Growth		
Storage		Storage	Total Req'd	(when	Req'd	FRIIS	Additional	Annual	Population	У езг
Total	Culinary	PI System		Req'd	Storage			Average		

Table D-3. Future Transmission/Distribution Pipe Flows Tabulation

26%	410	108		lues:	Weighted Average Values:	Weighted
				29,685	th:	Total Length:
		all existing 8 inch pipes	of all existing	Total of		
27%	382	103	0	1,579	8	P895
21%	269	56	0	353	8	P777
4%	355	16	0	1,516	∞	P775
0%	401	0	0	383	œ	P707
0%	403	0	0	1,662	∞	P695
6%	420	27	0	141	∞	P691
2%	359	6	0	344	8	P419
18%	393	69	0	1,055	8	P41
0%	553	2	0	433	8	P407
0%	316	0	0	106	00	P191
0%	414	0	0	299	∞	P11881
0%	421	0	0	399	∞	9091U
0%	316	0	0	139	8	9091D
55%	696	380	0	563	8	819
21%	519	107	0	494	8	2267
12%	355	41	0	203	8	2261
12%	450	56	0	153	8	2225
12%	450	56	0	1,058	8	2221
28%	358	102	0	1,000	8	2205
77%	450	346	0	1,094	8	2203
28%	358	102	0	284	8	2201
0%	529	0	0	264	8	2161
0%	529	0	0	1,070	8	2143
32%	456	145	0	779	8	1625
0%	313	0	0	1,217	8	1617
100%	462	462	0	1,313	8	1613
59%	378	224	0	1,535	8	1599
80%	349	281	0	1,221	8	1433
18%	489	90	0	797	8	1411
52%	545	282	0	742	8	1385
44%	377	167	0	661	8	1363
0%	313	0	0	1,248	8	1359
0%	395	0	0	1,279	8	1357
12%	345	41	0	1,703	8	1343
27%	363	97	0	783	8	1321
14%	549	79	0	865	8	1277
18%	393	69	0	1,216	8	1269
Next 10 Years	Flow (GMP)	(GPM)	Flow (GPM)	Length (ft)	Dia (in)	Segment
% Needed in	Buildout	Flow at 2023	Existing	Segment		Pine

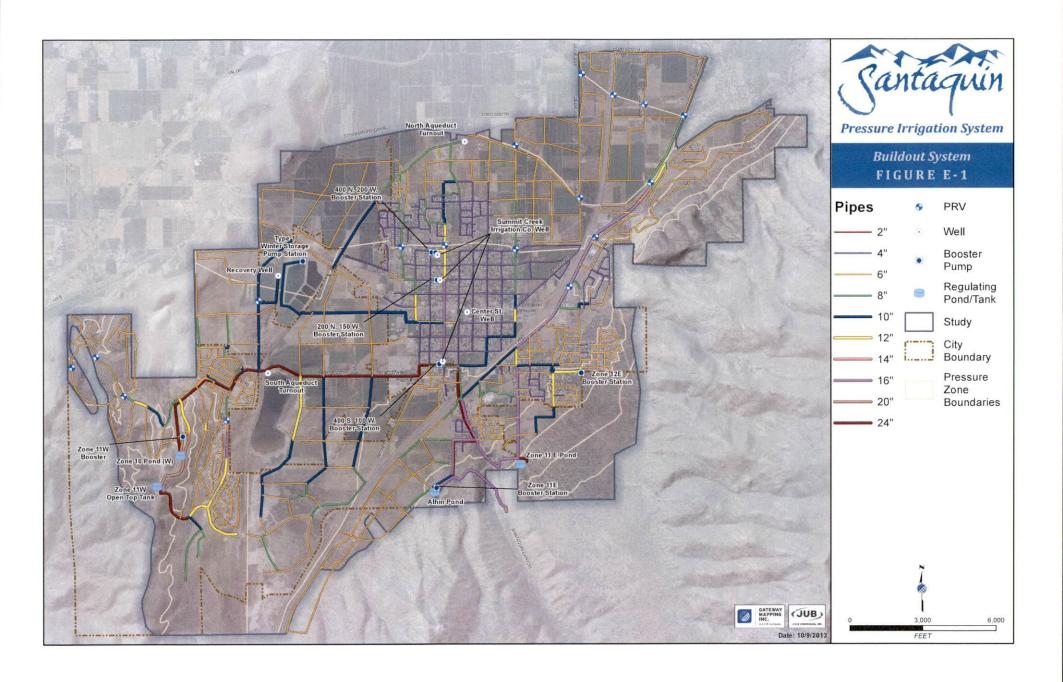
Table D-3. Future Transmission/Distribution Pipe Flows Tabulation (Continued)

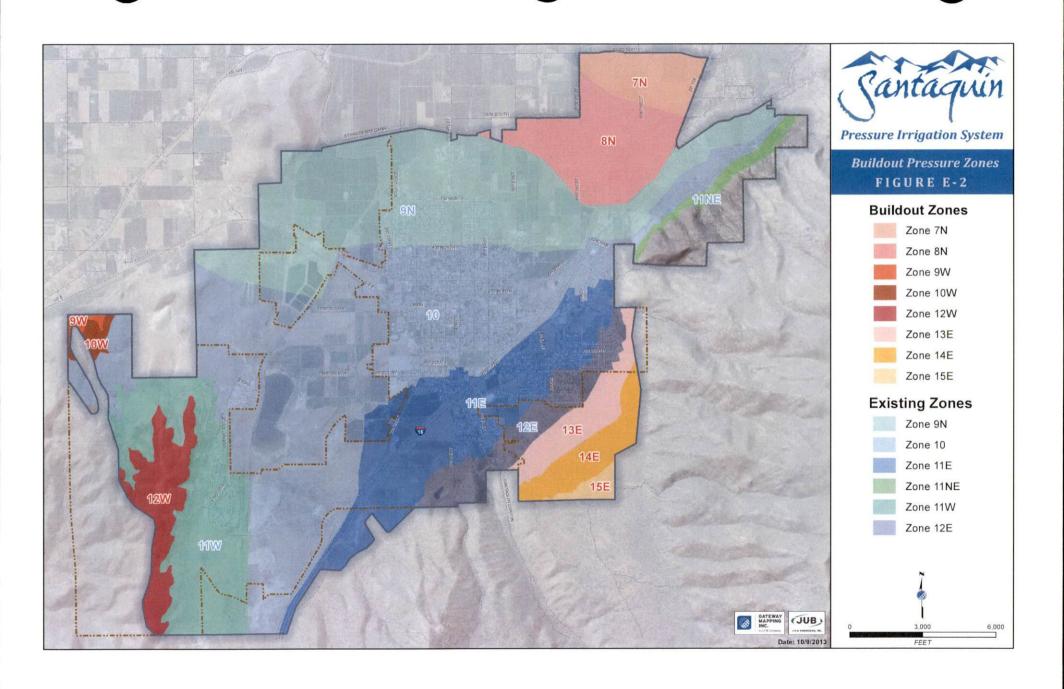
Pipe	Dia (in)	Segment	Existing	Flow at 2023	Buildout	% Needed in
Segment	Dia (in)	Length (ft)	Flow (GPM)	(GPM)	Flow (GMP)	Next 10 Years
1179	10	1,318	0	0	568	0%
1181	10	1,121	0	0	978	0%
1197	10	1,032	0	0	1,040	0%
1227	10	1,294	0	134	1,410	9%
1229	10	1,379	0	136	1,293	11%
1235	10	1,246	0	0	993	0%
1237	10	1,112	0	0	1,244	0%
1271	10	733	0	235	1,107	21%
1273	10	321	0	235	1,107	21%
1287	10	1,321	0	135	1,307	10%
1299	10	155	0	0	772	0%
1315	10	902	0	363	740	49%
1319	10	1,109	0	138	1,294	11%
1413	10	1,124	0	114	1,100	10%
1489	10	413	0	999	1,187	84%
1493	10	773	0	999	1,231	81%
1497	10	686	0	999	1,327	75%
1597	10	982	0	440	801	55%
1845	10	108	0	0	1,040	0%
2163	10	1,125	0	0	525	0%
2199	10	768	0	496	808	61%
849	10	304	0	414	784	53%
861	10	554	0	461	802	57%
9047D	10	72	0	0	1,046	0%
9047U	10	72	0	0	1,040	0%
P229	10	3,531	0	681	681	100%
P399	10	180	0	9	675	1%
P409	10	148	0	0	772	0%
P43	10	1,050	0	163	652	25%
P637	10	183	0	9	877	1%
P761	10	1,440	0	127	1,224	10%
P763	10	1,381	0	235	1,107	21%
P767	10	482	0	290	1,237	23%
P771	10	4,778	0	0	594	0%
P773	10	3,357	0	0	505	0%
P885	10	340	0	822	822	100%
	1147	Total	of all existing	10 inch pipes		
Total Leng	gth:	36,892				
	Average Va			216	894	24%

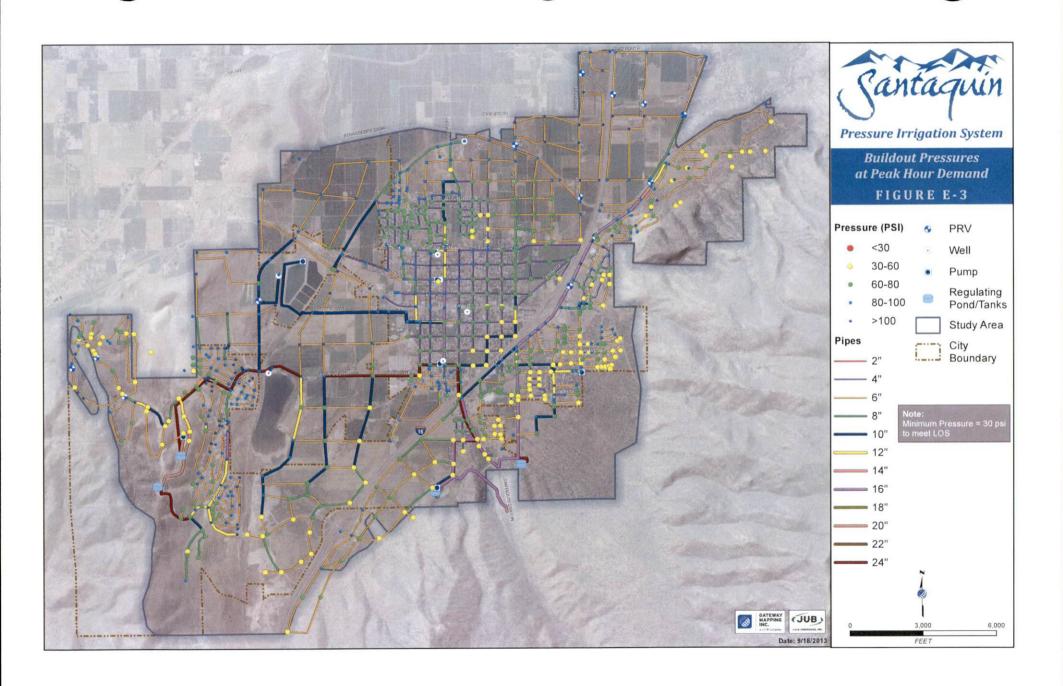
Table D-3. Future Transmission/Distribution Pipe Flows Tabulation (Continued)

Pipe	(·)	Segment	Existing	Flow at 2023	Buildout	% Needed in
Segment	Dia (in)	Length (ft)	Flow (GPM)	(GPM)	Flow (GMP)	Next 10 Years
1207	12	1,840	0	1,400	1,400	100%
1335	12	1,984	0	1,400	1,400	100%
1337	12	1,264	0	219	2,327	9%
1339	12	1,420	0	224	2,158	10%
2147	12	785	0	0	726	0%
2287	12	565	0	0	732	0%
P12399	12	1,154	0	27	821	3%
P345	12	680	0	0	762	0%
		Total	of all existing	12 inch pipes		
Total Leng	th:	9,693				
Weighted Average Values:				617	1,425	43%
P11879	14	686	0	27	1,235	2%
		Total	of all existing	14 inch pipes	v	
Total Leng	th:	686				
Weighted	Average Va	lues:		27	1,235	2%
9069U	16	69	0	169	1,598	11%
B1423	16	572	0	70	1,426	5%
P11747	16	1,106	0	169	1,544	11%
P167	16	46	0	169	1,598	11%
P679	16	713	0	27	1,251	2%
		\$5317//QEIG		16 inch pipes	,	
Total Leng	th:	2,505				
Weighted Average Values:				106	1,436	7%
2173	20	936	0	0	5,476	0%
P653	20	79	0	4,814	4,962	97%
P655	20	862	0	4,814	4,962	97%
		A POSTURE DE LA CONTRACTOR DE LA CONTRAC	2.75	20 inch pipes		
Total Leng	th:	1,877				
Weighted Average Values:				2,414	5,218	46%
2.8					-,	
2155	24	133	0	0	5,516	0%
SRDTT1 I	24	112	0	0	8,453	0%
TRCONTR	24	62	0	0	8,453	0%
- 13 (12)	March &			24 inch pipes		
Total Leng	th:	307		p.p.00		
Weighted Average Values:				0	7,182	0%

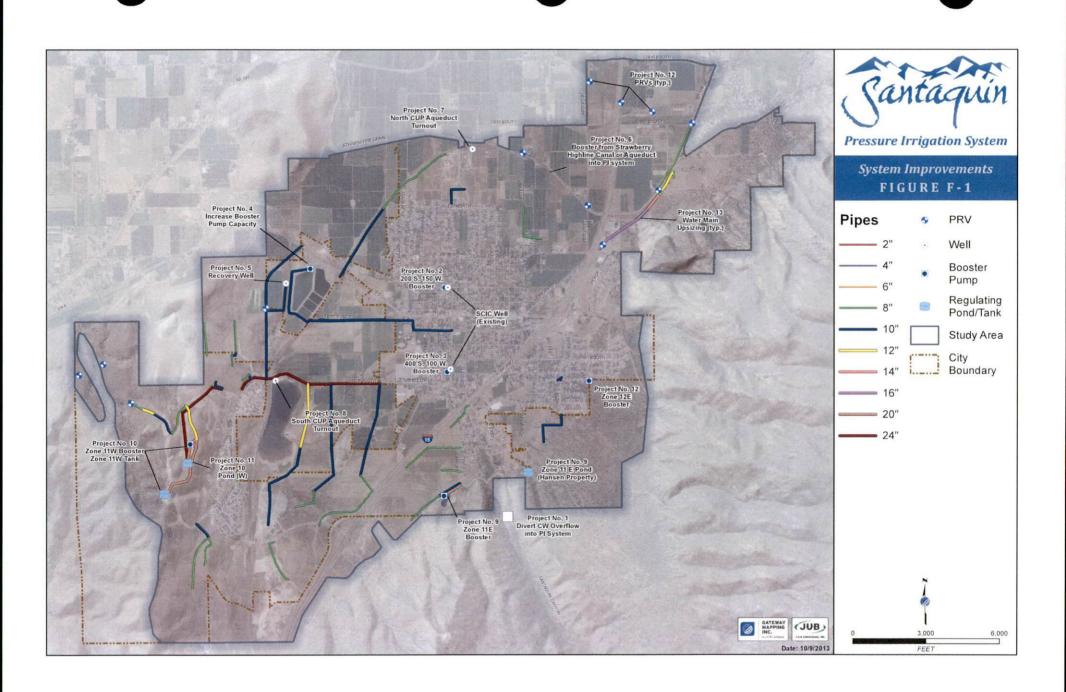
APPENDIX E FUTURE SYSTEM MAPS







APPENDIX F SYSTEM PROJECT IMPROVEMENTS MAP



APPENDIX G OPINION OF CONCEPTUAL PROJECT COSTS

Table G-1. Pressure Irrigation Projects – Opinion of Conceptual Project Costs

Project Number	Project Name										
	Source Projects										
1	Overflow from culinary springs pipeline to PI system		National Association								
	Item Description	Quantity	Unit	Unit Price	Amount						
	Valve Vault		each	\$25,000	\$25,000						
	Piping, Fittings, Valves, Meters, Etc.		each	\$35,000	\$35,000						
	Telemetry/Control/Monitoring	1	each	\$30,000	\$30,000						
	Other Fees: Engineering, Legal, Administrative, Finance										
	25%				\$22,500						
				Total	\$112,500						
2	Booster pump station to draw from SCIC well at 200 N 15	Name and Address of the Owner, where the Owner, which is the Own	ping to 1	the principles of the last of							
	Item Description	Quantity	Unit	Unit Price	Amount						
	Earthwork (Cut)		C.Y.	\$10	\$5,000						
	Earthwork (Fill)	125	C.Y.	\$10	\$1,250						
	Piping, Fittings, Valves, Meters, Etc.		each	\$65,000	\$65,000						
	12 Inch Main Line	450	LF	\$80	\$36,000						
	Booster Pumps	2	each	\$45,000	\$90,000						
	Underground Vault	1	each	\$46,000	\$46,000						
	Electrical	1	each	\$110,000	\$110,000						
	Telemetry/Control/Monitoring	1	each	\$35,000	\$35,000						
	Other Fees: Engineering, Legal, Administrative, Finance										
	25%				\$97,063						
				Total	\$485,313						
3	Booster pump station to draw from SCIC well at 400 S 100 W										
	Item Description	Quantity	Unit	Unit Price	Amount						
	Earthwork (Cut)		C.Y.	\$10	\$5,000						
	Earthwork (Fill)	125	C.Y.	\$10	\$1,250						
	Piping, Fittings, Valves, Meters, Etc.	1	each	\$65,000	\$65,000						
	12 Inch Main Line	150	LF	\$80	\$12,000						
	Booster Pumps	2	each	\$45,000	\$90,000						
	Underground Vault	1	each	\$46,000	\$46,000						
	Electrical	1.00	each	\$110,000	\$110,000						
	Telemetry/Control/Monitoring	1	each	\$35,000	\$35,000						
	Other Fees: Engineering, Legal, Administrative, Finance										
	25%				\$91,063						
				Total	\$455,313						
4	Increase booster station capacity at WRF Winter Storage	Ponds									
	Item Description	Quantity	Unit	Unit Price	Amount						
	Piping, Fittings, Valves, Meters, Etc.	1	each	\$25,000	\$25,000						
	Booster Pumps	2	each	\$55,000	\$110,000						
	Electrical	1	each	\$95,000	\$95,000						
	Telemetry/Control/Monitoring	1	each	\$50,000	\$50,000						
	Other Fees: Engineering, Legal, Administrative, Finance										
	25%				\$70,000						
				Total	\$350,000						

Table G-1. Pressure Irrigation Projects – Opinion of Conceptual Project Costs (Continued)

ject nber	Project Name									
5	Recovery Well at WRF Winter Storage Ponds and piping to system									
	Item Description	Quantity	Unit	Unit Price	Amount					
	Drill New Well	1	each	\$450,000	\$450,0					
	Pump and Motor	1	each	\$175,000	\$175,0					
	10 Inch Main Line	4500	LF	\$65	\$292,5					
	Building	1	each	\$125,000	\$125,0					
	Piping, Fittings, Valves, Meters, Etc.	1.00	each	\$125,000	\$125,0					
	Electrical	1	each	\$150,000	\$150,0					
	Telemetry/Control/Monitoring	1	each	\$55,000	\$55,0					
	Land Acquisition	0.5	Acres	\$30,000	\$15,0					
	Easement Acquisition	4.132231	Acres	\$7,500	\$30,9					
	Other Fees: Engineering, Legal, Administrative, Finance 25%				\$354,6					
	2370			Total	\$1,773,1					
6	Booster pump station from Strawberry High Line Canal (o	r Aqueduc	t) and pi							
0	Item Description	Quantity	_	Unit Price	Amount					
	Earthwork (Cut)	THE CONTRACTOR OF THE	C.Y.	\$10	\$5,0					
	Earthwork (Fill)		C.Y.	\$12	\$1,5					
	Underground Vault		each	\$100,000	\$100,0					
	Piping, Fittings, Valves, Meters, Etc.	572	each	\$125,000	\$125,0					
	10 Inch Main Line	1000		\$65	\$65,0					
	Electrical		each	\$75,000	\$75,0					
	Telemetry/Control/Monitoring		each	\$40,000	\$40,0					
	Land Acquisition		Acres	\$30,000	\$3,0					
	Easement Acquisition		Acres	\$7,500	\$6,8					
	Other Fees: Engineering, Legal, Administrative, Finance 25%	0.5	Acres	\$1,500	10					
	25%			Total	\$105,3 \$526,7					
7	CUP Aqueduct turnout (to Zone 9N) and piping to system		-	TOTAL	\$320,7					
,	Item Description	Quantity	Unit	Unit Price	Amount					
	Earthwork (Cut)		C.Y.	\$10	\$5,0					
	Earthwork (Cdt)	P-14000011	C.Y.	\$12	\$1,5					
	Underground Vault		each	\$100,000	\$100,0					
	Piping, Fittings, Valves, Meters, Etc.		each	\$125,000	\$125,0					
	10 Inch Main Line	1000		\$65	\$65,0					
	Electrical		each	\$75,000	\$75,0					
	Telemetry/Control/Monitoring		each	\$40,000	\$40,0					
	Land Acquisition		Acres	\$30,000	\$3,0					
	Easement Acquisition		Acres	\$7,500	\$6,8					
	Other Fees: Engineering, Legal, Administrative, Finance	0.32	Acres	\$7,500						
	25%		1	1	\$105,3					

Table G-1. Pressure Irrigation Projects – Opinion of Conceptual Project Costs (Continued)

Project Number	Project Name									
8	CUP Aqueduct turnout (to Zone 10) and piping to system									
	Item Description	Quantity	Unit	Unit Price	Amount					
	Earthwork (Cut)	500	C.Y.	\$10	\$5,00					
	Earthwork (Fill)	125	C.Y.	\$12	\$1,50					
	Underground Vault	1	each	\$100,000	\$100,00					
	Piping, Fittings, Valves, Meters, Etc.	1	each	\$125,000	\$125,00					
	24 Inch Main Line	1000	LF	\$199	\$199,00					
	Electrical	1	each	\$75,000	\$75,00					
	Telemetry/Control/Monitoring	1	each	\$40,000	\$40,00					
	Land Acquisition	0	Acres	\$30,000	\$3,00					
	Easement Acquisition	1	Acres	\$7,500	\$6,88					
	Other Fees: Engineering, Legal, Administrative, Finance				4420.04					
	25%				\$138,84					
			With the second second	Total	\$694,23					
	Storage Projects									
9	Zone 11E Pond (10 ac-ft) and booster station and associated piping									
	Item Description	Quantity	Unit	Unit Price	Amount					
	Earthwork (Cut)	8066.667		\$10	\$80,66					
	Earthwork (Fill)	8,067	C.Y.	\$10	\$80,66					
	Pond Liner (Clay)	4000	C.Y.	\$30	\$120,00					
	Pond Structures	1	LS	\$125,000	\$125,00					
	Piping, Fittings, Valves, Meters, Etc.	1	each	\$75,000	\$75,00					
	Valve Vault	1	each	\$40,000	\$40,00					
	24 Inch Main Line	1000	LF	\$199	\$199,00					
	Booster Pumps	2	each	\$45,000	\$90,00					
	Building	1	each	\$100,000	\$100,00					
	Electrical	1	each	\$150,000	\$150,00					
	Telemetry/Control/Monitoring	1	each	\$65,000	\$65,00					
	Land Acquisition	4	Acres	\$30,000	\$105,00					
	Easement Acquisition	0.92	Acres	\$7,500	\$6,88					
	Other Fees: Engineering, Legal, Administrative, Finance 25%				\$309,30					
	1000			Total	\$1,546,5					

Table G-1. Pressure Irrigation Projects – Opinion of Conceptual Project Costs (Continued)

Project Number	Project Name										
10	Zone 11W Summit Ridge open top tank and booster station with transmission pipelines										
	Item Description	Quantity	Unit	Unit Price	Amount						
	Earthwork (Cut)	6235.007	C.Y.	\$10	\$62,35						
	Earthwork (Fill)	3117.503	C.Y.	\$10	\$31,17						
	1 Million Gallon Tank	1	each	\$511,407	\$511,40						
	Piping, Fittings, Valves, Meters, Etc.	1	each	\$65,000	\$65,00						
	Valve Vault	1	each	\$40,000	\$40,00						
	24 Inch Main Line (From 500 S 600 W to Booster Sta)	10600	LF	\$199	\$2,109,40						
	20 Inch Main Line (From Booster Station to Tank)	3400	LF	\$164	\$557,60						
	24 Inch Main Line (From Tank to Distribution System)	3000	LF	\$199	\$597,00						
	Building	1	each	\$100,000	\$100,00						
	Electrical	1	each	\$150,000	\$150,00						
	Telemetry/Control/Monitoring	1	each	\$65,000	\$65,00						
	Land Acquisition	1	Acres	\$30,000	\$30,00						
	Easement Acquisition	1.95	Acres	\$7,500	\$14,63						
	Other Fees: Engineering, Legal, Administrative, Finance 25%				\$1,083,39						
				Total	\$5,416,95						
11	Zone 10 Summit Ridge Pond (40 ac-ft) and transmission lines										
	Item Description	Quantity	Unit	Unit Price	Amount						
	Earthwork (Cut)	24200	C.Y.	\$10	\$242,00						
	Earthwork (Fill)	24200	C.Y.	\$10	\$242,00						
	Pond Liner (Clay)	8000	C.Y.	\$30	\$240,00						
	Piping, Fittings, Valves, Meters, Etc.	1	each	\$65,000	\$65,00						
	Valve Vault	1	each	\$40,000	\$40,00						
	24 Inch Main Line	500	LF	\$199	\$99,50						
	Electrical	1	each	\$35,000	\$35,00						
	Telemetry/Control/Monitoring	1	each	\$35,000	\$35,00						
	Land Acquisition	10	Acres	\$30,000	\$300,00						
	Easement Acquisition	0.1	Acres	\$7,500	\$43						
	Other Fees: Engineering, Legal, Administrative, Finance 25%				\$324,73						
	And I V			Total	\$1,623,66						

Table G-1. Pressure Irrigation Projects – Opinion of Conceptual Project Costs (Continued)

umber	T /Di	D :								
	Transmission/Distribution		The Park Street, or other Designation of the Park Street, or other Designation	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)						
12	Booster Pump Station from zone 11E to zone 12E (Variable Frequency Drive (VFD))									
	Item Description	Quantity	Unit	Unit Price	Amount					
	10 Inch Main Line	1000		\$65	\$65,0					
	Piping, Fittings, Valves, Meters, Etc.		each	\$65,000	\$65,0					
	Booster Pumps		each	\$55,000	\$110,0					
	Building		each	\$100,000	\$100,0					
	Electrical		each	\$125,000	\$125,0					
	Land Acquisition		Acres	\$50,000	\$25,0					
	Telemetry/Control/Monitoring	1.00	each	\$75,000	\$75,0					
	Other Fees: Engineering, Legal, Administrative, Finance									
	25%				\$141,2					
				Total	\$706,2					
13	Various PRV Stations	heave to the same to								
	Item Description	Quantity	Unit	Unit Price	Amount					
	PRV Valve	1	each	\$25,000	\$25,0					
	Valve Vault	1.00	each	\$15,000	\$15,0					
	Piping, Fittings, Valves, Meters, Etc.	1.00	each	\$20,000	\$20,0					
	Other Fees: Engineering, Legal, Administrative, Finance 25%				\$15,0					
				Total (Each)	\$75,0					
			Total F	RV Stations:						
		Tota	l for all P	RV Stations:	\$900,0					
14	Incremental Pipe Costs									
	Item Description	Quantity	Unit	Unit Price	Amount					
	Incremental Costs from 6" to 8" Pipe	29684.56	LF	\$7	\$207,7					
	Incremental Costs from 6" to 10" Pipe	36892.42	LF	\$18	\$664,0					
	Incremental Costs from 6" to 12" Pipe	9692.78	LF	\$33	\$319,8					
	Incremental Costs from 6" to 14" Pipe	686.07	LF	\$47	\$32,2					
	Incremental Costs from 6" to 16" Pipe	2505.24	LF	\$68	\$170,3					
	Incremental Costs from 6" to 20" Pipe	1877.1	LF	\$106	\$198,9					
	Incremental Costs from 6" to 24" Pipe	306.61	LF	\$153	\$46,9					
	Other Fees: Engineering, Legal, Administrative, Finance 25%									
	No. of V			Total	\$1,640,2					
		Total Esti	mated P	Project Costs:	\$16,757,5					

Table G-2. Pressure Irrigation Unit Prices Used for Estimated Pipe Installation and Oversizing Reimbursement

Item	Unit	Unit Price
4" PVC secondary main	L.F.	\$12.57
6" PVC secondary main	L.F.	\$12.77
8" PVC secondary main	L.F.	\$15.09
10" PVC secondary main	L.F.	\$21.87
12" PVC secondary main	L.F.	\$27.53
14" PVC secondary main	L.F.	\$34.00
16" PVC secondary main	L.F.	\$43.25
18" PVC secondary main	L.F.	\$53.00
20" PVC secondary main	L.F.	\$63.00
24" PVC secondary main	L.F.	\$74.89
6" Gate valve	EA.	\$1,000.00
8" Gate valve	EA.	\$1,500.00
10" Gate valve	EA.	\$2,500.00
12" Butterfly valve	EA.	\$3,000.00
14" Butterfly valve	EA.	\$4,000.00
16" Butterfly valve	EA.	\$5,000.00
18" Butterfly valve	EA.	\$6,500.00
20" Butterfly valve	EA.	\$8,000.00
24" Butterfly valve	EA.	\$12,000.00
6" Bend/Fitting	EA.	\$400.00
8" Bend/Fitting	EA.	\$500.00
10" Bend/Fitting	EA.	\$650.00
12" Bend/Fitting	EA.	\$800.00
14" Bend/Fitting	EA.	\$1,000.00
16" Bend/Fitting	EA.	\$1,200.00
18" Bend/Fitting	EA.	\$1,600.00
20" Bend/Fitting	EA.	\$2,000.00
24" Bend/Fitting	EA.	\$2,500.00
6" Cross	EA.	\$1,000.00
8" Cross	EA.	\$1,200.00
10" Cross	EA.	\$1,500.00
12" Cross	EA.	\$1,800.00
14" Cross	EA.	\$2,200.00
16" Cross	EA.	\$2,700.00
18" Cross	EA.	\$3,100.00
20" Cross	EA.	\$3,500.00
24" Cross	EA.	\$4,500.00
Secondary main bedding material	L.F.	\$2.00
Secondary main backfill material	L.F.	\$15.86

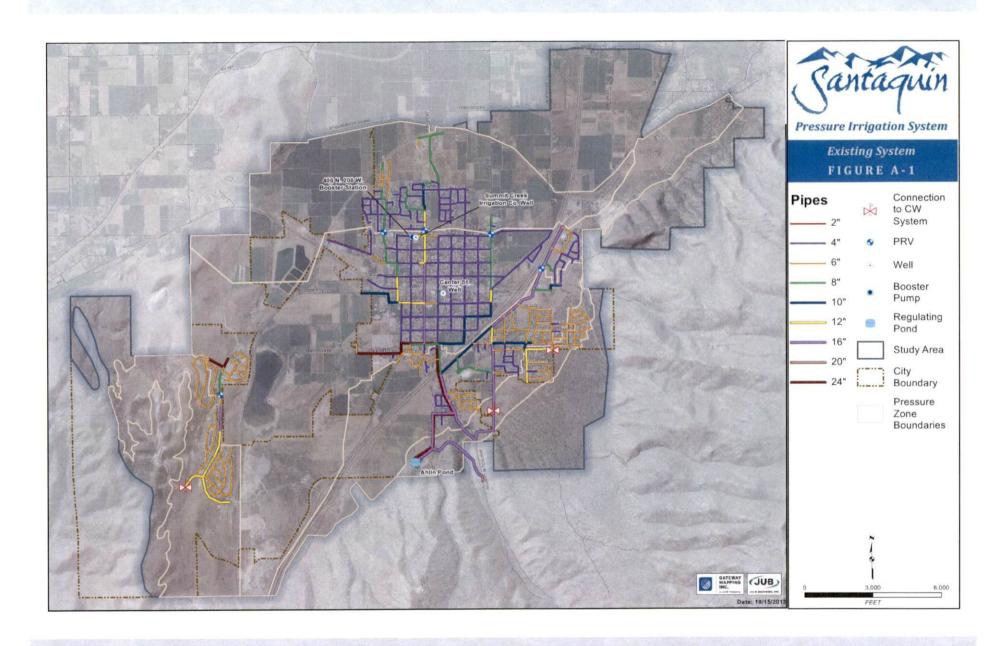
Table G-3. Sample of Detailed Pressure Irrigation Pipe Costs Used for Estimated Pipe Installation and Oversizing Reimbursement

Item	Unit	Quantity	Unit Price	Cost	
12" PVC secondary main	L.F.	10,000	\$27.53	\$275,310	
10" Gate valve	EA.	50	\$2,500.00	\$125,000	
12" Butterfly valve	EA.	20	\$3,000.00	\$60,000	
12" Bend/Fitting	EA.	60	\$800.00	\$48,000	
12" Cross	EA.	25	\$1,800.00	\$45,000	
Secondary main bedding material	L.F.	10,000	\$2.00	\$20,020	
Secondary main backfill material	L.F.	10,000	\$15.86	\$158,640	
Incidentals	%	30%	\$219,590.95	\$65,877	
	SUBTOTA	AL (per 10,00	Oft of length):	\$797,847	
	SUBTOTAL (per 100 ft of length): SUBTOTAL (per ft of length, rounded):				

Table G-4. Pressure Irrigation Pipe Costs Used for Estimated Pipe Installation and Oversizing Reimbursement

Item	Unit	Unit Price
6-inch Main Line PI	L.F.	\$47.00
8-inch Main Line PI	L.F.	\$54.00
10-inch Main Line Pl	L.F.	\$65.00
12-inch Main Line Pl	L.F.	\$80.00
14-inch Main Line Pl	L.F.	\$94.00
16-inch Main Line Pl	L.F.	\$115.00
18-inch Main Line Pl	L.F.	\$138.00
20-inch Main Line Pl	L.F.	\$164.00
24-inch Main Line Pl	L.F.	\$199.00
Oversizing 6 to 8 inch Pipe PI	L.F.	\$7.00
Oversizing 6 to 10 inch Pipe PI	L.F.	\$18.00
Oversizing 6 to 12 inch Pipe PI	L.F.	\$33.00
Oversizing 6 to 14 inch Pipe PI	L.F.	\$47.00
Oversizing 6 to 16 inch Pipe PI	L.F.	\$68.00
Oversizing 6 to 18 inch Pipe PI	L.F.	\$91.00
Oversizing 6 to 20 inch Pipe PI	L.F.	\$106.00
Oversizing 6 to 24 inch Pipe PI	L.F.	\$153.00

SANTAQUIN CITY PRESSURE IRRIGATION MASTER PLAN



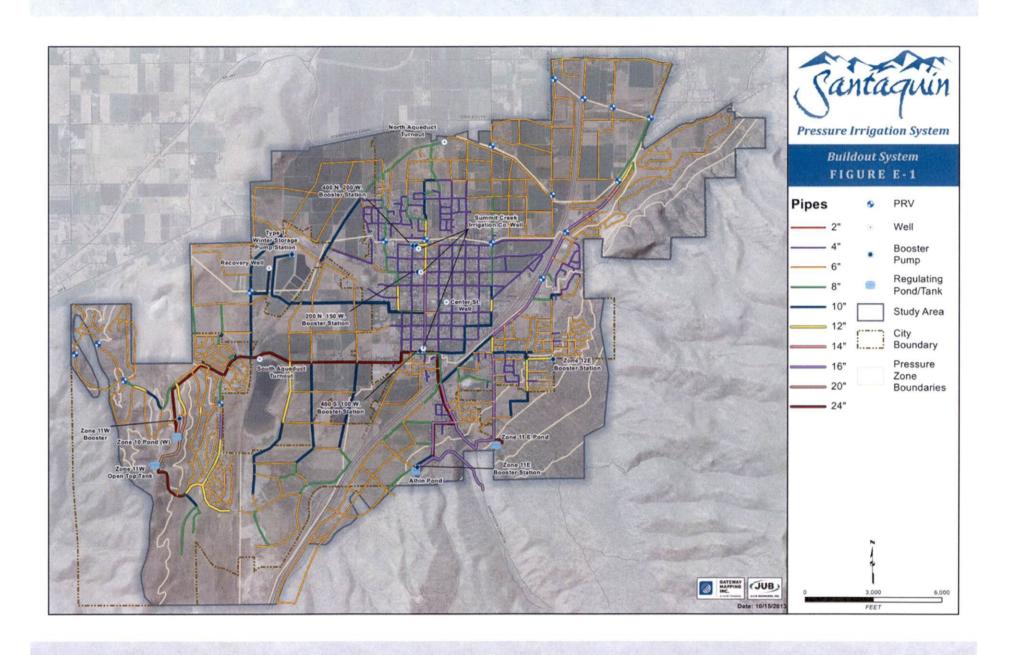
LEVEL OF SERVICE

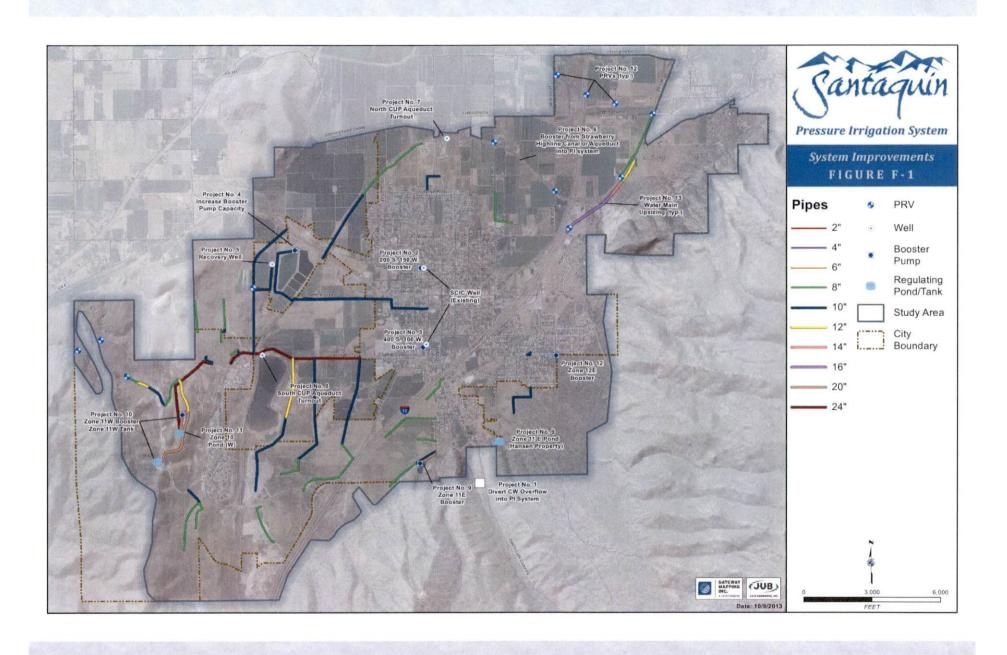
Level of Service Categories and Magnitude

- 1. Source:
 - a. Minimum volume of 5702.4 gallons per irrigated acre on peak day, <u>and</u>
 - b. Minimum volume of 1.87 acre-feet per irrigated acre per irrigation season
- 2. Storage: 1.6 x peak day demand
- 3. **Pressure:** Minimum of 30 psi during peak instantaneous demand

UPDATED FIGURES

(NORTHEAST PRESSURE ZONE BOUNDARY LINES)





Project Iumber	Project Name	Estimated Cost	Point at Which Project is Needed (ERUs)	Point at Which Project is Needed (Year)	Funding Source	Comments
	Projects to	Satisfy Needs	of Future Grow	th		
		Source Proje	ects			
1	Overflow from culinary springs pipeline to PI system	\$112,500	2,592	2014	Impact Fees	
2	Booster pump station to draw from SCIC well at 200 N 150 W and piping to 100 W	\$485,313	2,840	2015	Impact Fees	
3	Booster pump station to draw from SCIC well at 400 S 100 W	\$455,313	3,713	2018	Impact Fees	
4	Increase booster station capacity at WRF Winter Storage Ponds	\$350,000	4,423	2020	Impact Fees	
5	Recovery Well at WRF Winter Storage Ponds and piping to system	\$1,773,115	5,386	2025	Impact Fees	
6	Booster pump station from Strawberry High Line Canal (or Aqueduct) and piping to system	\$526,734	6,055	2028	Impact Fees	
7	North CUP Aqueduct turnout (to Zone 9N) and piping to system	\$526,734	9,523	2043	Impact Fees	
8	South CUP Aqueduct turnout (to Zone 10) and piping to system	\$694,234	9,523	2043	Impact Fees	
		Storage Proj	ects			
9	Zone 11E Pond (10 ac-ft) on Hansen Property and booster station and associated piping	\$1,546,525	3,713	2018	Impact Fees	
10	Zone 11W Summit Ridge open top tank and booster station with transmission pipelines	\$5,416,959	3,713	2018	Impact Fees	
11	Zone 10 Summit Ridge Pond (40 ac-ft) and transmission lines	\$1,623,663	6,055	2028	Impact Fees	
	Transmiss	ion/Distribution	System Projec	ts		
12	Booster Pump Station from zone 11E to zone 12E (Variable Frequency Drive (VFD))	\$706,250	3,713	2018	Impact Fees	
	Additional PRVs	\$900,000	We estimate t	hat these costs		
	1 - PRV from zone 11W to zone 10W	\$75,000	A CHARLES AND A PROPERTY OF	over the next		
13	3 - PRVs from zone 10W to zone 9W	\$225,000	35 years as lan		Impact Fees	The estimated annual co
13	3 - PRVs from zone 10 to zone 9N	\$225,000	AND REPARED BY	e cost will be	impactrees	is \$900,000/35, or \$25,71
	4 - PRVs from zone 9N to zone 8N	5300,000	required in the	STATE OF THE STATE		
	1 -PRV from zone 11E to zone 10	575,000	required in the	Hext 10 years.		
	Incremental Cost Upsizing Beyond 6" Pipes	\$1,640,203				
	Incremental cost from 6" to 8" pipes	\$207,792	We estimate th	hat these costs		
	Incremental cost from 6" to 10" pipes	\$664,064	We estimate that these costs will be spread over the next			The estimated annual co
14	Incremental cost from 6" to 12" pipes	\$319,862	35 years as lan		Impact Fees	is \$1,640,203/35, or
-	Incremental cost from 6" to 14" pipes	\$32,245	A STREET WATER TO SELECT		impact rees	\$46,863
	Incremental cost from 6" to 16" pipes	\$170,356	(10/35) of the cost will be required in the next 10 years.			340,003
	Incremental cost from 6" to 20" pipes	\$198,973	required in the	Heat to years.		
	Incremental cost from 6" to 24" pipes	\$46,911				
			PROPERTY OF STREET, NAME AND ADDRESS.	SHOW THE RESERVE OF THE PARTY O		

SYSTEM RESERVE CAPACITY

Existing Facility	Percent of Existing Facility Capacity Available for Future	Anticipated ERUs to Consume Reserve Capacity	Years from Present when Reserve Capacity is Estimated to be Consumed by Growth		Source of Historic Project Funding ²
Sources					
None				74	
Storage					
Ahlin Pond (Zone 10 Pond (E))	59%	3,057	11	\$407,738	Santaquin City & Grant
Transmission/Distribution					
8" Pipes	63%	10,528	47	\$262,463	Santaquin City & Grant
10" Pipes	67%	10,528	47	\$250,595	Santaquin City & Grant
12" Pipes	45%	10,528	47	\$222,308	Santaquin City & Grant
16" Pipes	67%	10,528	47	\$679,272	Santaquin City & Grant
24" Pipes	73%	10,528	47	\$717,423	Santaquin City & Grant

¹The costs listed as Historic Costs Eligible for Impact Fee Reimbursement represent the portion of historic project costs incurred by Santaquin City associated with reserve pipe capacity that will be consumed as growth occurs. See the tables in Appendices C and D for detailed calculations.

²See Section IV, Existing System Improvements with Reserve Capacity for a discussion of the historic project funding.

SYSTEM IMPROVEMENTS

Project Number	Project Name	Estimated Cost to Accommodate Growth (Buildout)	Estimated Cost to Accommodate Growth (Next 10 Years)		Point at Which Project is Needed (Year)	Funding Source	Comments
	Pr	ojects to Satisfy Ne	eeds of Future Gro	wth			
	Source Projects						
1	Overflow from culinary springs pipeline to PI system	\$112,500	\$112,500	2,592	2014	Impact Fees	
2	Booster pump station to draw from SCIC well at 200 N 150 W and piping to 100 W	\$485,313	\$485,313	2,840	2015	Impact Fees	
3	Booster pump station to draw from SCIC well at 400 S 100 W	\$455,313	\$455,313	3,713	2018	Impact Fees	
4	Increase booster station capacity at WRF Winter Storage Ponds	\$350,000	\$350,000	4,423	2020	Impact Fees	
	Storage Projects				ALC: NO		
9	Zone 11E Pond (10ac-ft) on Hansen Property and	\$1,546,525	\$1,546,525	3,713	2018	Impact Fees	
10	Zone 11W Summit Ridge open top tank and booster	\$5,416,959	\$5,416,959	3,713 2018		Impact Fees	
	Transmission/Distribution System Projects						
12	Booster Pump Station from zone 11E to zone 12E (Variable Frequency Drive (VFD))	\$706,250	\$706,250	3,713	2018	Impact Fees	
	Additional PRVs	\$900,000	\$257,143		that these costs		
	1 - PRV from zone 11W to zone 10W	\$75,000					The estimated
	3 - PRVs from zone 10W to zone 9W	\$225,000		will be spread over the next 35 years as land develops, so (10/35) of the cost will be			annual cost is
13	3 - PRVs from zone 10 to zone 9N	\$225,000				Impact Fees	\$900,000/35, or
	4 - PRVs from zone 9N to zone 8N	\$300,000			e next 10 years.		\$25,714
	1 -PRV from zone 11E to zone 10	\$75,000		required in the	e next 10 years.		
	Incremental Cost of Upsizing Beyond 6" Pipes	\$1,640,203	\$468,629				
	Incremental cost from 6" to 8" pipes	\$207,792		Me estimate t	hat these costs		
	Incremental cost from 6" to 10" pipes	\$664,064			over the next		The estimated
14	Incremental cost from 6" to 12" pipes	\$319,862		TOTAL STATE OF THE	d develops, so	Impact Fees	annual cost is
	Incremental cost from 6" to 14" pipes	\$32,245	No.			mpocrices	\$1,640,203/35, or
	Incremental cost from 6" to 16" pipes	\$170,356		(10/35) of the cost will be required in the next 10 years.			\$46,863
	Incremental cost from 6" to 20" pipes	\$198,973	required in thi	- June Comment	in the flext to years.		
	Incremental cost from 6" to 24" pipes	\$46,911					
	Total:	\$11,613,062	\$9,798,631				

RECOMMENDATIONS

- 1. Collect impact fees to fund infrastructure to support future growth.
- 2. Make improvements to the pressure irrigation system so that it is not consuming source and storage capacity in the culinary water system, particularly on the east side of the city in the short term and then in the Summit Ridge area.
- 3. Construct the improvements identified within the plan that are necessary to accommodate growth.
- 4. Make operational changes to the system to allow for better overall water management, reduced pumping costs and more efficient and flexible operation of the pressure irrigation system.
- 5. Update the Master Plan/Capital Facilities Plan at least every 5 years, or when significant changes to planned land use, development or water use occur.
- 6. Evaluate long-term water right needs and acquisition policy.
- Periodically review and update user rates.

QUESTIONS?

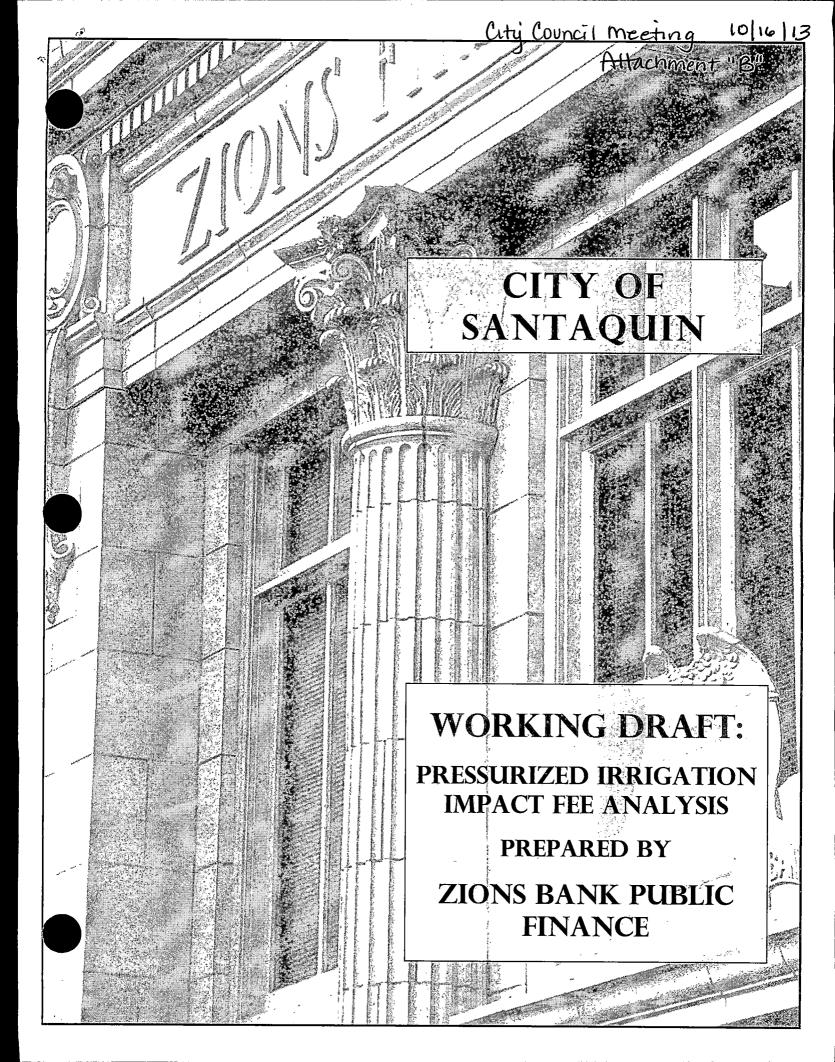




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EXECUTIVE SUMMARY

The City of Santaquin, Utah (the "City") recently commissioned J-U-B Engineers ("J-U-B") to prepare the <u>Santaquin City Pressure Irrigation System Master Plan and Capital Facilities Plan</u> and <u>Santaquin City Pressure Irrigation System Impact Fee Facilities Plan</u> (IFFP) dated October 2013. The City has also retained Zions Bank Public Finance (Zions) to calculate the City's pressure irrigation impact fees in accordance with the IFFP and Utah State Law. An impact fee is a one-time charge to new development to reimburse the City for the cost of developing new pressure irrigation system capacity that will allow development to occur.

The pressure irrigation impact fee will be assessed to a single service area ("service area") which includes the Santaquin City Boundaries as well as some adjacent areas. See Appendix X for a map of the pressurized irrigation service area. The City's Pressure Irrigation System is comprised of a combination of wells, storage and distribution facilities that will provide outdoor pressure irrigation water for homes and businesses located therein. The City has many miles of pressure irrigation distribution lines ranging in size from 8" to 24". Pressures range from 60 to 100 psi depending on which of the seven pressure zones the user is located within.

The original cost of the existing pressure irrigation system was \$12,272,571. Of this total \$5,000,000 was funded by the CUP grant and \$7,272,571 was the CIB loan. The City will need to build another \$12,458,644(FV) in system improvements to allow new growth to connect to a safe and reliable pressure irrigation system. Currently there is one outstanding bond issue, the Series 2012 Pressurized Irrigation Revenue Refunding Bonds, related to the PI system. One future bond is anticipated to be issued within the next ten years, the Series 2018 Pressurized Irrigation Bond. Changes to these assumptions may require an update to the pressure irrigation impact fee analysis. The total impact fee qualifying cost of the future projects is estimated to be \$9,320,923.

On average, approximately 75% of the total cost of existing infrastructure is related to growth.

This system provides the City's pressure irrigation water for outdoor irrigation. The City's pressure irrigation system currently serves 2,363 Equivalent Residential Units ("ERUs") which have connected to the system and are receiving services on demand. In addition to the projects mentioned above, the existing pressure irrigation facilities have capacity to serve future growth that will be assessed an impact fee to reimburse the City for the cost of constructing the system. The estimated demand for buildout, estimated to occur in 2060, is 12,891 ERUs.

Recommended PI Impact Fees per ERU

Figure ES.1 shows the maximum legal pressure irrigation impact fee that the City can assess per ERU and describes the formula that will be used to calculate the impact fee tailored for actual demand.



FIGURE ES.1: MAXIMUM IMPACT FEE SCHEDULE

Units of Measure .	mpact Fee
Per Equivalent Residential Unit	\$ 3,388

Impact Fee Formula

One ERU is equivalent to .25 acres

Step 1: Divide 10,890 (total sf in .25 acres) by impact fee per ERU (\$3,388) = \$0.31 per sf

Step 2: Multiply irrigable area (sf lot size minus sf of hardscape on lot) by Impact Fee per sf (\$ 0.31) to arrive at impact fee

The recommended impact fee structure presented in this analysis has been prepared to satisfy the Impact Fees Act, Utah Code Ann. § 11-36-101 et. Seq. (the "Act"), and represents the maximum pressure irrigation impact fees that the City may assess within the Service Area. The City will be required to use other revenue sources to fund projects identified in the IFFP that constitute repair and replacement, cure any existing deficiencies, or maintain the existing level of service for current users.



CHAPTER 1: OVERVIEW OF THE PRESSURE IRRIGATION IMPACT FEES

What is an Impact Fee?

An impact fee is a one-time fee, not a tax, charged to new development to recover the City's cost of constructing pressure irrigation facilities with capacity that new growth will utilize. The fee is assessed at the time of building permit issuance as a condition of development approval. The calculation of the impact fee must strictly follow the Impact Fees Act to ensure that the fee is equitable, fair, and legally defensible.

This analysis shows that there is a fair comparison, or rational nexus, between the impact fees charged to new development and the impact on the capacity of the system that the new development will utilize. Impact fees are charged to different types of development and the impact fee is scaled according to different levels of demand.

Why Assess an Impact Fee?

Until new development utilizes the full capacity of existing facilities the City can assess an impact fee to recover its cost to overbuild the pressure irrigation facilities to provide latent capacity that is available to serve future development. The general impact fee methodology divides the capacity in existing and future capital projects between the number of existing users and the number of future users that unused capacity can still serve. Capacity is measured in terms of Equivalent Residential Units, or ERUs. An ERU is calculated based on .25 irrigable acres which is equivalent to the typical demand a single family residence would place on the system.

What Costs Can or Cannot be Included in the Impact Fee?

The impact fees proposed in this analysis are calculated based upon:

- New capital infrastructure for PI source, storage, and distribution;
- Professional and planning expenses related to the construction of capital projects; and
- Historic costs of existing improvements that will serve new development.

The costs that cannot be included in the impact fee are as follows:

- Projects that cure existing deficiencies for existing users:
- Projects that increase the level of service above that which is currently provided;
- Operations and maintenance costs:
- Costs of facilities funded by grants or other funds that the City does not have to repay; and
- Costs of reconstruction of facilities that do not have capacity to serve new growth.

How Are the Impact Fees Calculated?

A fair impact fee is calculated by dividing the cost of existing and future capital projects by the number of new ERUs that will benefit from the unused capacity. This cost per ERU is then applied to the potentially irrigable area in square foot for the lot at time of building permit issuance and the impact fee is charged based on cost per square foot.



Description of the Service Area

The City's Pressure Irrigation System is comprised of a combination of wells, storage and distribution facilities that will provide outdoor pressure irrigation water for homes and businesses located therein. A map of this service area is included in the appendices.

There is sufficient existing source and storage capacity to accommodate new growth in the near future. Some distribution capacity exists but new distribution improvements will need to be constructed within the next ten years. These distribution projects will be funded with the use of impact fees.

What is an Equivalent Residential Unit?

An ERU is defined as .25 acres of irrigable area. The impact fee will be calculated according to the demand one ERU places on the pressure irrigation system and the impact fee will be calculated according to actual assessments of irrigable acreage based on lot size and net of building square footage.

Project Costs and Financing

The proposed impact fees are comprised of the costs of future PI capital projects that benefit additional development within the Service Area, and professional expenses pertaining to the regular update of the IFFP and impact fee analysis. Currently there is one outstanding bond issue, the Series 2012 Pressurized Irrigation Revenue Refunding Bonds, related to the PI system. One future bond is anticipated to be issued within the next ten years, the Series 2018 Pressurized Irrigation Bond which will be issued for just under \$17 million.

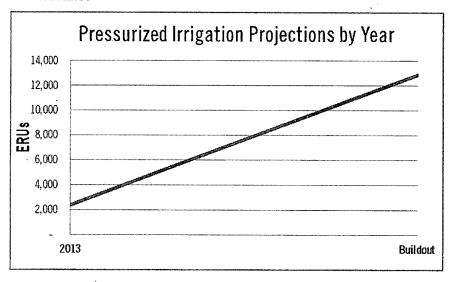


CHAPTER 2 IMPACT FROM GROWTH UPON THE CITY'S FACILITIES AND LEVEL OF SERVICE

Future PI Demand within the Service Area

PI demands within the City will grow as development activity rebounds and homes and businesses are built. Currently there are 2,363 ERUs and the buildout count of ERUs for the service area is estimated to be 12,891.

FIGURE 2.1: PROJECTED GROWTH IN ERUS



Level of Service Analysis

The level of service standard is established in the IFFP and in Figure 1.2 and reflects City policies. The City has the right to increase this established level of service in the future by constructing facilities that will provide greater capacity per ERU but those new facilities with additional capacity cannot be funded with impact fees.

City of Santaquin Pressure Irrigation Impact Fee Analysis October 2013



FIGURE 2.2: LEVEL OF SERVICE

	ERU Demand	Distribution (Gpm)	Storaģe (Gal)	Source (Af)	Supply (Gpm)
Current ERUs	2,363				* * * * * * * * * * * * * * * * * * *
Average Day Demand	12 AF				
# 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					-
Actual Average Day Demand (Gal)	578,462				949,324
Average Day per ERU (Gal)	245				402
Average Day per ERU (gpm)	0.17				0.28
Annual Demand per ERU (AF)	0.27		,		0.45
rrigation Season Volume (180 Days)			(32)		
Peak Day Demand per Irrigated Acre (Af)	0.01750			0.017500	
Peak Day Demand per ERU (Af)	0.00437			0.004375	
Peak Instantaneous Demand			7 (- 2 T)		
	<u> </u>	- 800			
Peak Instantaneous Demand (Gal)		-			
Peak Instantaneous Demand per ERU (gal)	0	0			
Peak Instantaneous Demand per ERU (psi)	30				
		_			·

See Pages 8-11 of Culinary Water Master Plan Prepared by J-U-B for more Information on Level of Service and Master Plan Table 5



CHAPTER 3

FUTURE AND HISTORIC CAPITAL PROJECTS COSTS

The Impact Fees Act allows for the inclusion of various cost components in the calculation of the impact fees. These cost components are the construction costs of growth-driven improvements and appropriate professional services inflated from current dollars to construction year costs. Impact fees can only fund system improvements not project improvements. Project improvements are defined as:

- 1. Minimum improvements which all developers are required (by City Code) to provide, (i.e. in the case of pressure irrigation lines this is an 6" minimum pipe size); or
- 2. Those improvements in excess of that listed above that are needed solely to accommodate new users within the development.

System improvements are those improvements in excess of the minimum improvements needed by the development which is a larger segment of the community than a single development. System improvements include the following:

- 1. Existing improvements that have reserve capacity to accommodate future growth; or
- 2. Future improvements needed to accommodate growth.1

The impact fee calculation considers the interest costs of the City's outstanding Series 2012 Bond as well as the future bond needed to fund future capital projects for the pressure irrigation system. This future bond is anticipated to be issued in 2018 for about \$17 million.

Project Capacities Available for Growth

Culinary Water System

There has been some borrowing of capacity from the culinary water system. In terms of the impact fee calculation we have kept the costs for culinary water and pressure irrigation as separate systems even though the PI master plan has had to show the capacity that is being borrowed from the culinary system to demonstrate that there is sufficient capacity to serve users. The capacity that is being borrowed from the culinary system will become a source in the culinary water system to meet future culinary water needs. Taking the pressure irrigation system off of the culinary system needs to be accomplished in order to preserve culinary water source resources for indoor use.

Sanitary Sewer System

The City's wastewater effluent (Type 1 Water) will be treated by the City's new Water Reclamation Facility which is scheduled to open in late 2013. Type 1 water from the facility will be pumped into the City's winter storage ponds for storage. During the irrigation season Type 1 water will be pumped into the City's PI system for use. For the purpose of the impact fee calculation all of the costs associated with Type 1 water infrastructure, up to the point in time where it is pumped into the City's PI system, are considered to be related to the City's sewer system.

The costs of future capital projects are defined in the corresponding Impact Fees Facilities Plan prepared by J-U-B and are summarized in Figure 3.4.

¹ See Pg. 8 Santaquin City Pressure Irrigation System Master Plan and Capital Facilities Plan prepared by J-U-B Engineers



Source

The engineers at J-U-B have shown that the City's current source capacity is sufficient to serve 1,689 ERUs and future capital projects will add 4,956 ERUs. Considering the 2,363 ERUs currently served there 64% of the capacity available to serve new growth.

FIGURE 3.1: CAPACITIES AND UTILIZATION OF SOURCE

Capacities and Utilization of Source Im	provements
Source Capacity (Af)	29
Af Per ERU	0.0044
ERUs Served	6,645
Current ERUs	2,363
Unused ERUs	4,282
% to Growth	64%

^{*}Based upon calculations for Average Volume per Irrigation Season

Storage

The storage capacity in the pressure irrigation system is 16 MG which will allow 7,089 ERUs to be served by the City. Currently the City has 2,363 ERUs; therefore, there is latent storage capacity available to serve future growth. 67% of the available capacity is available to serve future demands.

FIGURE 3.2: CAPACITIES AND UTILIZATION OF STORAGE

Capacities	and Utilization of Stora	ge Improvements
Storage Capacity		15,989,560
Gallons Per ERU		2,256
ERUs Served		7,089
Current ERUs	y k .	2,363
Unused ERUs		4,726
% to Growth		67%

Distribution

To calculate the distribution fee the costs of the existing system were blended with the 10 year distribution projects to strip out the capacity it will that is beyond the 10 year planning horizon. Given the reserved capacity in the City's existing distribution lines and the future distribution line projects 83% of the overall distribution capacity will be used by future users.

Future Projects

The future projects required for the pressure irrigation system include distribution line upgrades and pressure reducing valves (PRVs), source booster pump stations, and storage open top tank and ponds.

FIGURE 3.4: CAPITAL PROJECT COSTS TO BE FUNDED THROUGH IMPACT FEES

	% Impact Fee	Voor to be	2013 Ten Year	0012 0/ 1	6		
Project Name	Qualifying	Constructed	Construction Cost	2013 % Impac Fee Qualifying	ty Construction Cost		Non Impact Fe Qualifying
		Sour	Ft C. Warmanie France				
Overflow from Culinary Springs Pipeline to Pl System	100%		\$ 112,500	\$ 112,500	\$ 117,225	\$ 117,225	\$
Booster Pump Station to Draw from SCIC Well at 200 N 150 W	1000/	0015	1		, , , , , , , , , , , , , , , , , , , ,	 	
and Piping to 100 W	100%	2015	485,313	485,313	526,935	526,935	
Booster Pump Station to Draw from SCIC Well at 400 S 100 W	100%	2018	455,313	455,313		559.305	<u> </u>
Increase Booster Station Capacity at WRF Winter Storage Ponds	100%	2020	350,000	350,000	466,812	466,812	
Source Totals			\$ 1,403,126			\$ 1,670,277	\$
		Store Store	ige 🥶 💮				
Zone 11E Pond and Booster Station	100%		\$ 1,546,525		\$ 1,979,535	\$ 1,979,535	\$
Zone 11W Summit Ridge Open Top Tank and Booster	100%	2018	5,416,959	5,416,959	6,933,649	6,933,649	
Storage Totals			\$ 6,963,484	\$ 6,963,484	\$ 8,913,184	\$ 8,913,184	\$
		Supr				Tuyat Haller	
	0%			1	1	T	a s. W. S. Langue Co. Co.
Supply Totals			\$ -	\$ -	\$ -	\$ -	\$
		Distrib	ution				
Booster Pump Station from Zone 11E to Zone 12E (Variable	1000/			1	` '		T
Frequency Drive (VFD))	100%	2018	\$ 706,250	\$ 706,250	867,555	\$ 867,555	\$
1 Additional PRV	100%	2013	75.000	75,000	\$75,000.00	75,000	
1 Additional PRV	100%	2016	75,000			84,852	
1 Additional PRV	100%	2019	75,000			95,999	
1 Additional PRV	100%	2023	75,000			113,172	
ncremental Cost of Pipe Upsizing	100%	2013	46,863	46,863	46,863	46,863	
ncremental Cost of Pipe Upsizing	100%	2014	46,863	46,863	48,831	48,831	
ncremental Cost of Pipe Upsizing	100%	2015	46,863	46,863	50,882	50,882	
ncremental Cost of Pipe Upsizing	100%	2016	46,863	46,863	53,019	53,019	
ncremental Cost of Pipe Upsizing	100%	2017	46,863	46,863	55,246	55,246	
ncremental Cost of Pipe Upsizing	100%	2018	46,863	46,863	57,566	57,566	
ncremental Cost of Pipe Upsizing	100%	2019	46,863		59,984	59,984	
ncremental Cost of Pipe Upsizing	100%	2020	46,863		62,503	62,503	
ncremental Cost of Pipe Upsizing	100%	2021	46,863	,	65,129	65,129	
ncremental Cost of Pipe Upsizing	100%	2022	46,863	46,863	67,864	67,864	
ncremental Cost of Pipe Upsizing	100%	2023	46,864	46,864	70,716	70,716	
Distribution Totals			\$ 1,521,743	7 -11	\$ 1,875,182	\$ 1,875,182	\$
			Services				
Master Plan Review 2013	100%	2013	30,000	,	30,000	30,000	
FFP and Impact Fee Analysis Update 2013	100%	2013	10,000		10,000	10,000	
FFP and Impact Fee Analysis Update 2016	100%	2016	10,000	10,000	11,314	11,314	
Master Plan 2018	100%	2018	30,000	30,000	36,852	36,852	
FFP and Impact Fee Analysis Update 2019	100%	2019	10,000	10,000	12,800	12,800	
FP and Impact Fee Analysis Update 2022	100%	2022	10,000	10,000	14,481	14,481	
laster Plan 2023	100%	2023	30,000	30,000	45,269	45,269	
rofessional Services Totals Ten Year Pl	100%		\$ 130,000		\$ 160,716 \$ 12,619,359		\$

*Based on 20 years average cost of inflation using ENR and net of interest earnings

Historic Capital Project Costs

Figure 3.5 classifies the historic capital projects that have been expended to date in the construction of the existing well, storage reservoir, and distribution lines. These costs do not consider standard O&M expenses.

FIGURE 3.5: PROJECT COSTS INCURRED TO DATE (1/31/2013)

Impact Fee Analysis Updates

As development occurs and capital project planning is periodically revised, the future lists of capital projects and their costs may be different than the information utilized in this analysis. For this reason, it is assumed that the City will perform



updates to the analysis every three years. The cost of preparing this analysis, the master plan and the future costs of updating both documents has been included in the impact fee calculations. The 2013 cost for updating the master plan was \$60,000 and will be updated in five years at a cost of \$30,000. The 2013 cost of the impact fee analysis was \$11,000 with \$11,000 updates planned every 3 years throughout the 10 year planning horizon of this analysis.

Bond Debt Service and Grant Funds

There is one outstanding debt issue related to pressure irrigation, the Series 2012 Pressurized Irrigation Revenue Refunding Bonds. Given the future capital project needs, particularly the over \$10 million of projects needed in 2018, one future bond is anticipated within the ten year planning horizon and planned as Series 2018 bonds. Detailed principal and interest for each debt issue are found in Figure 3.7 and 3.8.

FIGURE 3.7: OUTSTANDING SERIES 2012 BOND DEBT SERVICE

. Date	Principal	Interest	Fiscal Total
2013	\$ 324,000	\$ 88,174	\$ 412,174
2014	290,000	142,657	432,657
2015	317,000	135,009	452,009
2016	345,000	126,668	471,668
2017	354,000	117,860	471,860
2018	388,000	108,511	496,511
2019	403,000	98,545	501,545
2020	424,000	88,124	512,124
2021	435,000	77,301	512,301
2022	445,000	66,213	511,213
2023	457,000	54,848	511,848
2024	469,000	43,180	512,180
2025	481,000	31,210	512,210
2026	493,000	18,938	511,938
2027	505,000	6,363	511,363
Total	\$ 6,130,000	\$ 1,203,602	\$ 7,333,602

Percent of Bond Proceeds to Component						
Culinary	, Total	% to Component				
Source	\$ 84,795	7.05%				
Storage	272,342	22.63%				
Supply		0.00%				
Distribution	846,464	70.33%				
Professional		0.00%				
Total	\$ 1,203,602	100%				





FIGURE 3.8: FUTURE SERIES 2018 BOND DEBT SERVICE

Doto	Pelesinal	linkaraak :	Final Tatal
Date	Principal	Interest:	Fiscal Total
2018	\$ 384,000	\$ 457,000	\$ 841,000
2019	399,000	441,640	840,640
2020	415,000	425,680	840,680
2021	432,000	409,080	841,080
2022	449,000	391,800	840,800
2023	467,000	373,840	840,840
2024	485,000	355,160	840,160
2025	505,000	335,760	840,760
2026	525,000	315,560	840,560
2027	546,000	294,560	840,560
2028	568,000	272,720	840,720
2029	591,000	250,000	841,000
2030	614,000	226,360	840,360
2031	639,000	201,800	840,800
2032	664,000	176,240	840,240
2033	691,000	149,680	840,680
2034	719,000	122,040	841,040
2035	747,000	93,280	840,280
2036	777,000	63,400	840,400
2037	808,000	32,320	840,320
Total	\$11,425,000	\$ 5,387,920	\$16,812,920

Gulinary	Total	🕆 % to Component 🗽
Source	\$ 1,026,117	9.22%
Storage	8,913,184	80.06%
Distribution	1,143,608	10.27%
Professional	49,652	0.45%
Total	\$ 11,132,561	100%



CHAPTER 4 PROPORTIONATE SHARE ANALYSIS

The Impact Fees Act requires that the impact fee analysis estimates the proportionate share of the costs for existing capacity that will be recouped as shown in Figures 3.1 to 3.3. The impact fee must be based on the historic costs and reasonable future costs of the system. This chapter will show in Figure 4.1 that the proposed impact fee for system improvements is reasonably related to the impact on the pressure irrigation system from new development activity.

The proportionate share analysis is a consideration of the manner of funding existing public facilities. Historically the City has funded existing infrastructure through several different funding sources including the following:

- Property Tax Revenues
- User Rates
- Bond Proceeds
- Impact fee Revenues

In the future the City will primarily rely upon property tax revenues and user rate revenues to fund the operations and maintenance of the system. Some rate revenues will be used to pay the debt service of the bonds in years when impact fee revenues are insufficient to cover the annual payment to principal and interest. However if rate revenues are used to pay what should be funded through impact fees due to a shortfall in impact fee revenues then the general fund will be repaid with impact fees for what the impact fee fund needed to borrow. Additional grants are not anticipated but if they are received the future impact fees will be further discounted according to the size of grant and what it will be intended to fund.

Developer Credits

If a project included in the Impact Fee Facilities Plan (or a project that will offset the need for a system improvement that is listed in the IFFP) is constructed by a developer then that developer is entitled to a credit against impact fees owed. (Utah Impact Fees Act, 11-36a-304(2)(f)).

Time-Price Differential

Utah Code 11-36a-301(2)(h) allows for the inclusion of a time-price differential in order to create fairness for amounts paid at different times. To address the time-price differential, this analysis includes an inflationary component to account for construction inflation for future projects. Projects constructed after the year 2013 will be calculated at a future value with a 4.20% inflation rate. All users who pay an impact fee today or within the next six to ten years will benefit from projects to be constructed and included in the fee.





FIGURE 4.1: PRESSURE IRRIGATION IMPACT FEE CALCULATION

Pressurized Irrigation	System Cost	% to Component	Total Cost to Component	Total Capacity	Existing Capacity Utilized	% Impact Fee Qualifying	Impact Fee Qualifying Cost	ERUs to be Served	Cost per ERU
Source Impact Fee	100				275 (274)				
IFFP Projects	12,458,644	13%	1,670,277	6,645	2,363	64%	1,076,295	4,282	251
Future Debt	5,387,920	9%	496,619	6,645	2,363	64%	320,011	4,282	74.74
Buy In - Existing Assets	2,539,791	0%	_	6,645	2,363	64%	-	4,282	
Outstanding Debt	1,203,602	0%		6,645	2,363	64%		4,282	
Subtotal	\$ 21,589,957		2,166,896		 		\$ 1,396,306		\$ 326.11
Storage Impact Fee					37 A 45				
IFFP Projects	12,458,644	72%	8,913,184	7,089	2,363	67%	5,942,156	4,726	1,257
Future Debt	5,387,920	80%	4,313,789	7,089	2,363	67%	2,875,876	4,726	608.51
Buy In - Existing Assets	2,539,791	16%	407,738	7,089	2,363	67%	271,827	4,726	58
Outstanding Debt	1,203,602	16%	193,226	7,089	2,363	67%	128,818	4,726	27.26
Subtotal	\$ 21,589,957		13,827,938				\$ 9,218,677		\$ 1,950.60
Distribution Impact Fee		71.33							100
IFFP Projects	12,458,644	15%	1,875,182	3,008	-	100%	1,875,182	3,008	623
Future Debt	5,387,920	10%	553,481.65	3,008	-	100%	553,482	3,008	184.00
Buy In - Existing Assets	2,539,791	84%	2,132,053	10,528		100%	2,132,053	10,528	203
Outstanding Debt	1,203,602	84%	1,010,375	10,528		100%	1,010,375	10,528	96
Subtotal	\$ 21,589,957		5,571,092				\$ 5,571,092		\$ 1,105.88
Professional Services		H-742		8 19 5 P. 19 19 19 19 19 19 19 19 19 19 19 19 19					
Impact Fee/ IFA Update	48,595	100%	48,595	3,008	2,363	21%	10,420	3,008	3.46
Master Plan Update	112,121	100%	112,121	3,008	2,363	21%	24,042	10,528	2.28
Future Debt	5,387,920	0.45%	24,030				,		
Subtotal	\$ 5,548,636		184,746				\$ 34,462		\$ 5.75
Impact Fee Fund Balance Credit									13. 75. 7
Impact Fee Fund Balance Credit									
Total Impact Fee Per ERU	21,589,957		21,589,957				16,220,537		\$ 3,388.34

^{*}The base fees per ERU are not a final fee, the maximum legal fee schedule and how it will be applied is found in Appendix F



Maximum Legal PI Impact Fees per ERU

As shown in Figure 4.1, the maximum legal impact fee per ERU is calculated to be \$3,299.08. This fee is the combination of individual fees for the components of source, storage, distribution and professional fees. Each fee for individual components is based upon the historic and future costs divided by the total and available capacities. This results in a very precise impact fee per ERU and complies with the Impact Fees Act.

Determination of Residential and Non-Residential Impact Fees

An ERU is equivalent to 0.25 irrigable acres. The impact fees to be paid are shown in Figure 4.2.

FIGURE 4.2: MAXIMUM IMPACT FEE SCHEDULE

Units of Measure	Pllm	pact Fee
Per Equivalent Residential Unit	\$	3,388

Impact Fee Formula .

One ERU is equivalent to .25 acres

Step 1: Divide 10,890 (total sf in .25 acres) by impact fee per ERU (\$3,388) = \$0.31 per sf

Step 2: Multiply irrigable area (sf lot size minus sf of hardscape on lot) by Impact Fee per sf (\$ 0.31) to arrive at impact fee

Non-Standard Demand Adjustments

The City reserves the right under the Impact Fees Act (Utah Code 11-36-402(1)(c,d)) to assess an adjusted fee to respond to unusual circumstances and to ensure that the impact fees are assessed fairly. The impact fee ordinance must include a provision that permits adjustment of the fee for a particular development based upon studies and data submitted by the developer that indicate a more realistic and accurate impact upon the City's infrastructure. Each pressurized irrigation impact fee will be assessed based on calculations of impervious area for that particular lot so the impact fee will be tailored to each system user in order to account for non-standard demand.



APPENDICES: CERTIFICATION, SERVICE AREA MAP, IMPACT FEE CALCULATIONS



In accordance with Utah Code Annotated, 11-36a-306(2), Zions Bank Public Finance, makes the following certification:

I certify that the attached impact fee analysis:

- 1. includes only the cost 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. cost of 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;
- 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;
- 3. offset costs with grants or other alternate sources of payment; and
- 4. complies in each and every relevant respect with the Impact Fees Act.

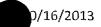
Zions Bank Public Finance makes this certification with the following caveats:

- 1. All of the recommendations for implementations of the Impact Fee Facilities Plan (IFFP) made in the IFFP or in the impact fee analysis are followed in their entirety by City staff and Council in accordance to the specific policies established for the Service Area.
- 2. If all or a portion of the IFFP or impact fee analysis are modified or amended, this certification is no longer valid.
- 3. All information provided to Zions Bank Public Finance, its contractors or suppliers is assumed to be correct, complete and accurate. This includes information provided by the City of Santaquin and outside sources. Copies of letters requesting data are included as appendices to the IFFP and the impact fee analysis.

Dated: 10/16/2013

ZIONS BANK PUBLIC FINANCE





Ε

2,363 12,891

10,528

82%

TABLE A.2: PRESSURE IRRIGATION ERUS

Current ERUs (J-U-B Count)

Buildout ERUs Undeveloped ERUs

% Undeveloped

Pressure Irrigation ERUs

Appendix A: ERU Projections for Pressure Irrigation

CURRENT AND FUTURE ERUS FOR THE PI SERVICE AREA

TABLE A.1: CURRENT AND FUTURE PI ERUS

В С

	Year	Population	ERÚs
2	2013	10,999	2,363
	Buildout	52,893	12,891

See Table 1 of J-U-B Pressure Irrigation Master Plan for Population Growth Rates

See Table 2 of J-U-B Pressure Irrigation Master Plan for

A B C D E

Appendix B: Pressure Irrigation Level of Service (LOS) Analysis

Average Day, Peak Day, and Peak Instantaneous Demand Definitions

В Α D Ε TABLE B.1: PI LOS PER ERU 0.25 Irrigible Acres per ERU **ERU Demand** Distribution (Gpm) Storage (Gal) Source (Af) Supply (Gpm) Current ERUs 2,363 Average Day Demand 949,324 Actual Average Day Demand (Gal) 578,462 Average Day per ERU (Gal) 245 402 Average Day per ERU (gpm) 0.17 0.28 Annual Demand per ERU (AF) 0.27 0.45 Irrigation Season Volume (180 Days) 11 12 Peak Day Demand per Irrigated Acre (Af) 0.017500 0.01750 12 0.004375 13 13 Peak Day Demand per ERU (Af) 0.00437 14 14 15 15 Peak Instantaneous Demand 800 16 16 17 Peak Instantaneous Demand (Gal) 17 18 18 Peak Instantaneous Demand per ERU (gal) 30 19 19 Peak Instantaneous Demand per ERU (psi) 20 20 22 See Pages 8-11 of Culinary Water Master Plan Prepared by J-U-B for more Information on Level of Service and Master Plan Table 5 22 23 Α В D Ε

7.92





Appendix C: Pressure Irrigation Ten Year Capital Projects

A	В	C	D	E	F	G	н	I	J	K	L	М	N
	Inflation Rate*	4.20%											
TABLE C.1: PI CAPITAL PROJECTS								TAB	LE C.2: PRESSURI	E IRRIGATION			
4,4		Year to be			2 2 2 2			[
Project Namé	% Impact Fee	Year to be		2013 % Impact	Construction		Non Impact Fee	В	Component C	2013 Ten Year 20	12 Impact Fee Con		instruction Year
	Qualifying .	Constructed	Construction Cost	tee Chalitying	. Cost	Qualifying Cost	Qualifying			nstruction Cost	Qualitying	,	IF Qualifying
		` Sourc		Pur de la cela	Toron year graphs.	out tope a gift gar. Togs	Mariania a de la Maria de l Maria de la Maria della de	Sour		1,403,126 \$	1,403,126 \$	1.670.277 \$	1.670.277
Overflow from Culinary Springs Pipeline to PI System	100%		\$ 112,500	112,500	\$ 117,225 \$	117,225 \$		Stor		6,963,484	6,963,484	8,913,184	8,913,184
Booster Pump Station to Draw from SCIC Well at 200 N 150 W and			,										
Piping to 100 W	100%	2015	485,313	485,313	526,935	526,935	-	Sup	ply	-	-	-	-
Booster Pump Station to Draw from SCIC Well at 400 S 100 W	100%	2018	455,313	455,313	559,305	559,305	-	Dist	ribution	1,521,743	1,521,743	1,875,182	1,875,182
ncrease Booster Station Capacity at WRF Winter Storage Ponds	100%	2020	350,000	350,000	466,812	466,812	-		essional	130,000	130,000	160,716	160,716
Source Totals			\$ 1,403,126	1,403,126	\$ 1,670,277 \$	1,670,277 \$		Tota	ıl\$	1,651,743 \$	1,651,743 \$	2,035,897 \$	2,035,897
	4 4 1	Stora		T Welst II	the market of the co	e juga e	4 h 4 h						
Zone 11E Pond and Booster Station	100%		\$ 1,546,525	1,546,525		1,979,535 \$							
Zone 11W Summit Ridge Open Top Tank and Booster	100%	2018	5,416,959	5,416,959	6,933,649	6,933,649							
~													
Storage Totals	l		\$ 6,963,484	6,963,484	\$ 8,913,184 \$	8,913,184 \$							
	0%	Supp	iy r	· · · · e			***						
Supply Totals	1 0%		\$ - :	 		- \$							
supply rotals	I	Distribu	Y	- 1	\$ - \$	-13							
Booster Pump Station from Zone 11E to Zone 12E (Variable Frequency	T			ı		<u> </u>							
Drive (VFD))	100%	2018	\$ 706,250	706,250	\$867,555.08	867,555 \$	-						
1 Additional PRV	100%	2013	75,000	75,000	\$75,000,00	75,000							
1 Additional PRV	100%	2016	75,000	75,000	84,852	84,852	-						
1 Additional PRV	100%	2019	75,000	75,000	95,999	95,999							
1 Additional PRV	100%	2023	75,000	75,000	113,172	113,172	-						
				1									
ncremental Cost of Pipe Upsizing	100%	2013	46,863	46,863	46,863	46,863							
ncremental Cost of Pipe Upsizing	100%	2014	46,863	46,863	48,831	48,831	-						
ncremental Cost of Pipe Upsizing	100%	2015	46,863	46,863	50,882	50,882							
ncremental Cost of Pipe Upsizing	100%	2016	46,863	46,863	53,019	53,019							
Incremental Cost of Pipe Upsizing Incremental Cost of Pipe Upsizing	100% 100%	2017 2018	46,863 46,863	46,863 46.863	55,246 57,566	55,246 57,566	-						
Incremental Cost of Pipe Upsizing	100%	2018	46,863	46,863	59,984	59,984							
ncremental Cost of Pipe Opsizing	100%	2020	46,863	46,863	62,503	62,503							
Incremental Cost of Pipe Upsizing	100%	2021	46.863	46,863	65,129	65,129							
ncremental Cost of Pipe Upsizing	100%	2022	46,863	46,863	67,864	67,864							
ncremental Cost of Pige Upsizing	100%	2023	46,864	46,864	70,716	70,716							
Distribution Totals			\$ 1,521,743			1,875,182 \$	-1						
Quinta en en el promino en la calagia		Professional	Services	ALTERNACIONE	an enditte and	57 5-19 4JA 4JS							
Master Plan Review 2013	100%	2013	30,000	30,000	30,000	30,000	-						
FFP and Impact Fee Analysis Update 2013	100%	2013		10,000	10,000	10,000	-						
FFP and Impact Fee Analysis Update 2016	100%	2016	10,000	10,000	11,314	11,314	-						
Master Plan 2018	100%	2018	30,000	30,000	36,852	36,852							
FFP and Impact Fee Analysis Update 2019	100%	2019		10,000	12,800	12,800							
FFP and Impact Fee Analysis Update 2022	100%	2022	10,000	10,000	14,481	14,481	-						
Master Plan 2023	100%	2023	30,000	30,000	45,269	45,269							
<u>-</u>	1		-										
Professional Services Totals	 		\$ 130,000	130,000	\$ 160,716 \$	160,716 \$							
Ten Year Pi	100%		\$ 10.018.353		\$ 12.619.359		-						
	100.76	4.000,0752,7525011	* TO'O TO'O DO 1 -	b 10'010'333	\$ 12,613,333 4	17,019,009 3							
See Santaquin City Pressure Irrigation IFFP Table 5													
م معود بد با به مستخدم مد در ده مصنفه به دیو رستند بوده به بند در ده مستخدم به مستخدم	2013	2014	2015	2016	2017	2018	. 2019	2020	2021	2022	2023		
Source	2013	\$ 117.225	526,935	* X010	2017	559,304,93	ZU13	466,812	2021	ZUZZ	2023		
ource Storage		φ 117,223	320,333		3	8,913,184.49		400,012			l		
sorage Distribution	\$121,862.94	48.831	50,882	137,872	55,246 \$		155,983	62,503	65,129	67,864	183,888		
	40.000	70,001	00,002	11,314	33,270 4	36,851.90	12,800	02,303	05,123	14,481	45,269		
rotessional													
Pofessional Otal Projects Per Year	\$ 161,863	\$ 166,056	\$ 577,817		\$ 55,246 \$	10,434,463 \$	168,783 \$	529,315 \$	65,129 \$	82,345 \$	229,156		

Appendix C: Outstanding Debt and Allocation of Interest Expense A B C D E F TABLE C.1: Series 2012 Pressurized Irrigation Revenue Refunding Bonds TABLE C.2: Series 2012 Pressurized Irrigation Revenue Refunding

2	Date 1	Ľ	Principal	Interest	F	iscal Total
3	2013	\$	324,000	\$ 88,174	\$	412,174
4	2014		290,000	142,657		432,657
5	2015		317,000	135,009		452,009
6	2016		345,000	126,668		471,668
7	2017		354,000	117,860		471,860
8	2018		388,000	108,511		496,511
9	2019		403,000	98,545		501,545
10	2020		424,000	88,124		512,124
11	2021		435,000	77,301		512,301
12	2022		445,000	66,213		511,213
13	2023		457,000	54,848		511,848
14	2024		469,000	43,180		512,180
15	2025		481,000	31,210		512,210
16	2026	Π.	493,000	18,938		511,938
17	2027		505,000	6,363		511,363
18	Total	\$	6,130,000	\$ 1,203,602	\$	7,333,602
19						
~ ~						

		_	_		
TARIF	C3.	Future	Daht.	Cariac	2012

13				
20				
21	TABLE C.3: Futur	e Debt: Series 20	18	
22	Date	• Principal	Interest	Fiscal Total
23	2018	\$ 384,000	\$ 457,000	\$ 841,000
24	2019	399,000	441,640	840,640
25	2020	415,000	425,680	840,680
26	2021	432,000	409,080	841,080
27	2022	449,000	391,800	840,800
28	2023	467,000	373,840	840,840
29	2024	485,000	355,160	840,160
30	2025	505,000	335,760	840,760
31	2026	525,000	315,560	840,560
32	2027	546,000	294,560	840,560
33	2028	568,000	272,720	840,720
34	2029	591,000	250,000	841,000
35	2030	614,000	226,360	840,360
36	2031	639,000	201,800	840,800
37	2032	664,000	176,240	840,240
38	2033	691,000	149,680	840,680
39	2034	719,000	122,040	841,040
40	2035	747,000	93,280	840,280
41	2036	777,000	63,400	840,400
42	2037	808,000	32,320	840,320
43	Total	\$ 11,425,000	\$ 5,387,920	\$ 16,812,920
II.	. A	В	С	D

TABLE C.2: Series 2012 Pressurized Irrigation Revenue Refunding Bonds

	orz riessurizeu irrigation kevende ki					
Percent of Bond Proceeds to Component						
: Pl	Total 📑 S	% to Component				
Source	\$ `````	0.00%				
Storage	193,226	16.05%				
Supply		0.00%				
Distribution	1,010,375	83.95%				
Professional		0.00%				
Total	\$ 1,203,602	100%				

33 34

TABLE C.4: Future Debt: Series 2018

TABLE C.4: Future D	ebt: Series 2018		. 21
P	ercent of Bond Proceeds to Comp	onent:	22
C PI	Total	% to Component	23
Source	\$ 1,026,117	9.22%	24
Storage	8,913,184	80.06%	25
Distribution	1.143.608	10.27%	26
Professional	49,652	0.45%	27
Total	\$. 11,132,561	100%	28
	-		29

Н

Appendix D: Existing Pressurized Irrigation Assets

A E D.1: SOURCE INFORMATION	В	С	D	E	•	
<i></i>	T. I. A. S. H. MITS.		Historic/ Future			
Sources		otal Capacity (ERUs)	Construction Cost	Proportionate Share		
The second secon	Existing Assets			3. 1 (7)]	
enter Street Well	2.17	496	-	- \$		
ummit Creek Irrigation Company	5.22	1,193	-	-		
ulinary Water System		- 1 000	-	-		
kisting Source	7.39		\$			
ater Delivery from the Winter Storage Ponds	Future Capital Project				ļ	
poster Pump Station to Draw from SCIC Well at 200 N 150 W and	3.09 5.22	706		220 547		
ping to 100 W	3.22	1,193	526,935	339,547		
poster Pump Station to Draw from SCIC Well at 400 S 100 W	5.22	1,193	559,305	360,405		
crease Booster Station Capacity at WRF Winter Storage Ponds	8.15	1,863	466,812	300,805		
	1	5,555	,00,012	1		
ture Source	21.68	4,956	\$ 1,553,052	\$ 1,000,757	1	
tal Capacity	29.07	6,645	\$ 1,553,052	\$ 1,000,757	}	
apted from 10B impact Fae Facilities Plan 2013 Table 5	-		_		•	
ABLE D.2: SOURCE CAPACITIES AND UTILIZATION						
Capacities and Utilization of Source Improve	ements			\$ 2,403,880		
ource Capacity (Gal)	· 29			\$ 2,539,791		
f Per ERU	0.0044		,			
RUs Served	6,645					
urrent ERUs	2,363					
	4,282					
to Growth Based upon calculations for Average Volume per Irrigation Season	64%					
Inused ERUS to Growth Based upon calculations for Average Volume per Irrigation Season ABLE D.3: STORAGE TANKS Storage Facilities	64% is Total Capacity (Gal) 1: To	otal <u>Capacity (ERUs)</u>		ta ^{36 p∗} To Growth	1.	
to Growth Based upon calculations for Average Volume per Irrigation Season ABLE D.3: STORAGE TANKS Storage Facilities	64%	otal <u>Capacity (ERUs)</u> 5,201				
to Growth Based upon calculations for Average Volume per Irrigation Season BLE D.3: STORAGE TANKS Storage Facilities	i Total Capacity (Gal) 1 Total Capacity (Gal)	5,201	407,738	\$ 271,826.93		
to Growth Based upon calculations for Average Volume per Irrigation Season IBLE D.3: STORAGE TANKS Storage Facilities lin Pond ting Storage Assets	Existing Assets 11,730,960 11,730,960	5,201 S	407,738			
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities liin Pond ting Storage Assets	i Total Capacity (Gal) 1 Total Capacity (Gal)	5,201 S	\$ 407,738 \$ 407,738	\$ 271,826.93 \$ 271,827		
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities llin Pond ting Storage Assets ond and Booster	i Total Capacity (Gal) 1 Total Capacity (Gal)	5,201 S	\$ 407,738 \$ 407,738 1,979,535	\$ 271,826.93 \$ 271,827 1,319,697.57		
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities llin Pond ting Storage Assets ond and Booster	i Total Capacity (Gal) 1 Total Capacity (Gal)	5,201 S	\$ 407,738 \$ 407,738	\$ 271,826.93 \$ 271,827		
to Growth Based upon calculations for Average Volume per Irrigation Season ABLE D.3: STORAGE TANKS Storage Facilities ilin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster	Existing Assets 11,730,960 11,730,960 Future Capital Projects 3,258,600 1,000,000	5,201 S	407,738 407,738 1,979,535 6,933,649	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51		
to Growth Based upon calculations for Average Volume per Irrigation Season BLE D.3: STORAGE TANKS Storage Facilities lin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster ture Storage Assets	i Total Capacity (Gal) 1 Total Capacity (Gal)	5,201 5,201 5,201 5,201	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57		
to Growth Based upon calculations for Average Volume per Irrigation Season BLE D.3: STORAGE TANKS Storage Facilities lin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster ture Storage Assets tal Capacity	### Total Capacity (Gal) 12 Total Capacity (Gal) 12 Total Capacity (Gal) 12 Total Capacity (Gal) 11,730,960 ####################################	5,201 5,201 5,201 5,201 5	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 - \$ 5,942,156		
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities ilin Pond ting Storage Assets ond and Booster W Summit Ridge IMg Open Tank and Booster ture Storage Assets tal Capacity apted from ABB Impact fee facilities Plan 2013 Tables 5	### Total Capacity (Gal) 12 Total Capacity (Gal) 12 Total Capacity (Gal) 12 Total Capacity (Gal) 11,730,960 ####################################	5,201 5,201 5,201 5,201 5	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 - \$ 5,942,156		
to Growth Based upon calculations for Average Volume per Irrigation Season BLE D.3: STORAGE TANKS Storage Facilities iin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster ture Storage Assets tal Capacity optic from AUB Impact fee facilities Plan 2013 Tables 5	E Total Capacity (Gal) 17.730,960 11,730,960 11,730,960 Future Capital Project: 3,258,600 1,000,000 4,258,600 15,989,560	5,201 5,201 5,201 5,201 5	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 - \$ 5,942,156		
to Growth Based upon calculations for Average Volume per Irrigation Season BLE D.3: STORAGE TANKS Storage Facilities iin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster ture Storage Assets tal Capacity paped from IND Impact fee facilities Plan 2013 Takes 5 BELE D.4: STORAGE CAPACITIES AND UTILIZATION Capacities and Utilization of Storage Improve orage Capacity	E Total Capacity (Gal) 17.730,960 11,730,960 11,730,960 Future Capital Project: 3,258,600 1,000,000 4,258,600 15,989,560	5,201 5,201 5,201 5,201 5	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 - \$ 5,942,156		
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities liin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster ture Storage Assets tal Capacity applied from AIB Impact fee facilities Plan 2015 Table 5 ABLE D.4: STORAGE CAPACITIES AND UTILIZATION Capacities and Utilization of Storage Improvestorage Capacity allons Per ERU	11,730,960 Existing Assets 11,730,960 11,730,960 Future Capital Project: 3,258,600 1,000,000 4,258,600 15,989,560 2,256	5,201 5,201 5,201 5,201 5	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 - \$ 5,942,156		
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities lin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster ture Storage Assets tal Capacity spled from NIB Impact fee facilities Plan 2015 Labra 5 ABLE D.4: STORAGE CAPACITIES AND UTILIZATION Capacities and Utilization of Storage Improverorage Capacity allons Per ERU RUS Served	### Total Capacity (Gal) Total Capacity (Ga	5,201 5,201 5,201 5,201 5	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 - \$ 5,942,156		
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities iin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster ture Storage Assets tal Capacity spited from PUB Impact fee facilities Plan 2013 Takes 5 BBLE D.4: STORAGE CAPACITIES AND UTILIZATION Capacities and AUtilization of Storage Improve to the Capacity and Capacity allons Per ERU RUS Served urrent ERUS	## Total Capacity (Gal) Total Capacity (Gal	5,201 5,201 5,201 5,201 5	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 - \$ 5,942,156		
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities ilin Pond ting Storage Assets ond and Booster W Summit Ridge IMg Open Tank and Booster ture Storage Assets tal Capacity spled from AND Inspect fee facilities Plan 2013 Table 5 ABLE D.4: STORAGE CAPACITIES AND UTILIZATION Capacities and Utilization of Storage Improvesorage Capacity allos Per ERU RUS Served urrent ERUS nused ERUS	Total Capacity (Gal)	5,201 5,201 5,201 5,201 5	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 - \$ 5,942,156		
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities ilin Pond ting Storage Assets ond and Booster W Summit Ridge IMg Open Tank and Booster ture Storage Assets tal Capacity spled from AND Inspect fee facilities Plan 2013 Table 5 ABLE D.4: STORAGE CAPACITIES AND UTILIZATION Capacities and Utilization of Storage Improvesorage Capacity allos Per ERU RUS Served urrent ERUS nused ERUS	## Total Capacity (Gal) Total Capacity (Gal	5,201 5,201 5,201 5,201 5	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 - \$ 5,942,156	·	
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities iin Pond ting Storage Assets ond and Booster W Summit Ridge IMg Open Tank and Booster ture Storage Assets tal Capacity spled from AND Irrocal fee facilities Plan 2013 Taken 5 ABLE D.4: STORAGE CAPACITIES AND UTILIZATION Capacities and Utilization of Storage Improve orage Capacity allons Per ERU RUS Served JUTHER LEUS nused ERUS to Growth	Total Capacity (Gal)	5,201 5,201 5,201 5,201 5	407,738 407,738 1,979,535 6,933,649 8,913,184	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 - \$ 5,942,156		
to Growth Based upon calculations for Average Volume per Irrigation Season BBLE D.3: STORAGE TANKS Storage Facilities ilin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster ture Storage Assets tal Capacity ***********************************	### Total Capacity (Gal) 12 To	5,201 5,201	407,738 407,738 1,979,535 6,933,649 8,913,184 9,320,923	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 \$ 5,942,156 \$ 6,213,983		
to Growth Based upon calculations for Average Volume per Irrigation Season ABLE D.3: STORAGE TANKS Storage Facilities ilin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster ture Storage Assets tal Capacity apted from ABL Impact fee facilities Plan 2015 Takes 5 ABLE D.4: STORAGE CAPACITIES AND UTILIZATION Capacities and AUtilization of Storage Improve torage Capacity allons Per ERU RUS Served urrent ERUs nused ERUs to Growth BLE D.5: DISTRIBUTION FEE Asset*	## Total Capacity (Gal) Total Capacity (ERU) Total Capacity (ERU	5,201 5,201	407,738 407,738 1,979,535 6,933,649 8,913,184 9,320,923	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 \$ 5,942,156 \$ 6,213,983	Eúture ERÚS.	.Costeper Future ERI
to Growth Based upon calculations for Average Volume per Irrigation Season ABLE D.3: STORAGE TANKS Storage Facilities Allin Pond ting Storage Assets ond and Booster W Summit Ridge 1Mg Open Tank and Booster star Capacity sapted from AND Impact fee facilities Plan 2015 Take 5 ABLE D.4: STORAGE CAPACITIES AND UTILIZATION Capacities and AUtilization of Storage Improve torage Capacity allons Per ERU RUS Served urrent ERUs nused ERUs to Growth	### Total Capacity (Gal) 12 To	5,201 5,201	407,738 407,738 1,979,535 6,933,649 8,913,184 9,320,923	\$ 271,826.93 \$ 271,827 1,319,697.57 4,622,458.51 	Future ERUs	Cost per Future ERL \$ 202. 623.

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251 74.74

326.11

Appendix E: Pressurized Irrigation Proportionate Share

D Ε TABLE E.1: PI IMPACT FEE CALCULATION

1	Pressurized Irrigation	System Cost	%-to Companent	Total Cost to Component
2	Source Impact Fee			ATV. 344
3	IFFP Projects	12,458,644	13%	1,670,277
4	Future Debt	5,387,920	9%	496,619
5	Buy In - Existing Assets	2,539,791	0%	-
6	Outstanding Debt	1,203,602	0%	-
7				
8	Subtotal	\$ 21,589,957		2,166,896
9	Storage Impact Fee			
10	IFFP Projects	12,458,644	72%	8,913,184
11	Future Debt	5,387,920	80%	4,313,789
12	Buy In - Existing Assets	2,539,791	16%	407,738
13	Outstanding Debt	1,203,602	16%	193,226
14				
15	Subtotal	\$ 21,589,957		13,827,938
22	Distribution Impact Fee			
23	IFFP Projects	12,458,644	15%	1,875,182
24	Future Debt	5,387,920	10%	553,481.65
25	Buy In - Existing Assets	2,539,791	84%	2,132,053
26	Outstanding Debt	1,203,602	84%	1,010,375
27				
28	Subtotal	\$ 21,589,957		5,571,092
29	Professional Services	100		
30	Impact Fee/ IFA Update	48,595	100%	48,595
31	Master Plan Update	112,121	100%	112,121
32	Future Debt	5,387,920	0.45%	24,030
33	Subtotal	\$ 5,548,636		184,746
34	Impact-Fee Fund Balance Credit			
35	Impact Fee Fund Balance Credit	e		
36	Total Impact Fee Per ERU	21,589,957		21,589,957
27	*The base feet per EDII are not a final feet the maximum local feet	1 - 2 1 1 1 21 - 2		

Total Capacity	Existing Capacity Utilized	% Impact Fee ? Qualifying
0.045	22.5	2-12-1
6,645	2,363	64%
6,645	2,363	64%
6,645	2,363	64%
6,645	2,363	64%
7,089	2,363	67%
7,089	2,363	67%
7,089	2,363	67%
7,089	2,363	67%
3,008	-	100%
3,008		100%
10,528	-	100%
10,528	<u>-</u>	100%
	-	
+	E. 7	
3,008	2,363	21%
3,008	2,363	21%
		90.55 12.57

Impact Fee Qualifying Cost	ERUs to be Served
1,076,295	4,282
320,011	4,282
-	4,282
	4,282
\$ 1,396,306	
	1.
5,942,156	4,726
2,875,876	4,726
271,827	4,726
128,818	4,726
\$ 9,218,677	
1,875,182	3,008
553,482	3,008
2,132,053	10,528
1,010,375	10,528
\$ 5,571,092	
1.5	973
10,420	3,008
24,042	10,528
\$ 34,462	
, ,,,,,,	
16,220,537	

		V-
\$	5.75	33
		34
		35
\$	3,388.34	36

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1,257 608.51 27.26 1,950.60 623 184.00 24 203

1,105.88 28

3.46

2.28 31

^{37 *}The base fees per ERU are not a final fee, the maximum legal fee schedule and how it will be applied is found in Appendix F







Appendix F: Maximum Pressurized Irrigation Impact Fees

	A	В	С	D	
1	TABLE F.1: Pressurized Irrigation Impact Fee				. 1
2	Units of Measure	PI Impact Fee			2
3	Per Equivalent Residential Unit	\$ 3,388			3
4		-			4
5					5
6	TABLE F.2: IMPACT FEE CALCULATION				6
7	Impact Fee Formu	la			7
8	One ERU is equivalent to .25 acres				8
9	Step 1: Divide 10,890 (total sf in .25 acres) by impact fee per ERU (\$3,388)	= \$0.31 per sf			9
10	Step 2: Multiply irrigable area (sf lot size minus sf of hardscape on lot) by In	npact Fee per sf (\$ 0.31) to a	ırrive at impact	fee	10
11		·			11
12					12
13				`	13
14					14
15					15
16					16
17					17
	A	В	С	D	

Santaquin Water Reclamation Facility

Construction Administration Services Presentation
City Council October 16, 2013

Discussion on Construction Administration Costs

Cost Increases Due to Inflation	
Initial Budget (based on 2010 rates)	\$871,227
Projected Final Cost (based on current rates)	\$1,052,278
Difference	\$181,051
Initial Budget (based on 2010 rates)	\$871,227
Projected Final Cost (2010 dollars)	\$981,379
Difference	\$110,152

Discussion on Construction Administration Costs

Cost Increases Due to Change In Project Sc	ope
Project start, stop and restart	\$12,459
Project Scope Revisions/Deletions	\$55,460
Project Scope Additions	\$74,755
Off spec pond at the WRF	\$21,465
Project Extension	\$15,000
	Difference \$179,159

Notes:

- 1. The total net value of the Scope Revisions and deletions was \$978,000. The majority of the engineering cost was in the building revisions. The building revisions saved \$139,000 on materials and labor.
- 2. The total net value of the Scope Additions was \$1,176,136. The majority of the engineering cost was for the CA of the 18-inch including surveying, geotechnical, revisions due to easements, field observation/conformance with specifications, and an additional month on the project schedule.

Discussion on Construction Administration Costs

Percentage Comparisons	
Current Construction Contract (Flatiron)	\$14,960,465
Change in CA Costs as a % of Construction	1.2%
CPI Adjusted Change in CA Costs as a % of Construction	0.72%
Total CA as a percentage of Construction	7.0%
Typical Industry Range for a Project of this Scope	8% - 12%