CITY OF SANTA CRUZ
Water Department

Water Commission Agenda
Regular Meeting
7:00 p.m. – March 7, 2016
Council Chambers
809 Center Street, Santa Cruz

Agenda

Call to Order

Roll Call

Presentation *Organized groups may make presentations to the Water Commission. Presentations that require more than three minutes should be scheduled in advance with Water Department staff.*

Statements of Disqualification *Section 607 of the City Charter states that "…All members present at any meeting must vote unless disqualified, in which case the disqualification shall be publicly declared and a record thereof made."*

The City of Santa Cruz has adopted a Conflict of Interest Code, and Section 8 of that Code states that no person shall make or participate in a governmental decision which he or she knows or has reason to know will have a reasonably foreseeable material financial effect distinguishable from its effect on the public generally.

Oral Communications No action shall be taken on this item.

Announcements No action shall be taken on this item.

Consent Agenda (Pages 1-16)

Items on the consent agenda are considered to be routine in nature and will be acted upon in one motion. Specific items may be removed by members of the advisory body or public for separate consideration and discussion. Routine items that will be found on the consent agenda are City Council Items Affecting Water, Water Commission Minutes, Information Items, Documents for Future Meetings, and Items initiated by members for Future Agendas. If one of these categories is not listed on the Consent Agenda then those items are not available for action.

1. City Council Actions Affecting Water ☆ (accept info) (Pages 1-2)
2. Approve the February 1, 2016 Water Commission Minutes ☆ (accept info) (Pages 3-12)
3. Financial Status of the Utility (mid-year update & BA)☆(Pages 13-16)

Items Removed from the Consent Agenda

General Business (Pages 17-115)

Any document related to an agenda item for the General Business of this meeting distributed to the Water Commission less than 72 hours before this meeting is available for inspection at the

Water Administration Office, 212 Locust Street, Suite A, Santa Cruz, California. These documents will also be available for review at the Water Commission meeting with the display copy at the rear of the Council Chambers.

1. WSAC Work Plan Update ✯ (Pages 17-112)

Recommendation: Receive Information, Provide Feedback
(this will be a three part presentation and discussion)

A. Heidi's presentation of the two contracts the Council Approved on 2/9;
B. Rosemary's discussion on the agreement for the exchange of water with Soquel (and the status of that effort);
C. Toby's presentation of the updated Water Conservation Master Plan tech memo.

2. Updated Water Commission Work Plan – Rates and Financial Plan work is not going to be completed on the schedule originally projected. Will provide an updated schedule with some additional details for the summer months ✯ (Pages 113-115)

Recommendation: Receive Information, Provide Feedback

Subcommittee/Advisory Body Oral Reports

Director's Oral Report No action shall be taken on this item.

Adjournment The next meeting of the Water Commission is tentatively scheduled for April 4, 2016, at 7:00 p.m. in Council Chambers.

✯Denotes written materials included in packet

APPEALS - Any person who believes that a final action of this advisory body has been taken in error may appeal that decision to the City Council. Appeals must be in writing, setting forth the nature of the action and the basis upon which the action is considered to be in error, and addressed to the City Council in care of the City Clerk.

Other - Appeals must be received by the City Clerk within ten (10) calendar days following the date of the action from which such appeal is being taken. An appeal must be accompanied by a fifty dollar ($50) filing fee.

The City of Santa Cruz does not discriminate against persons with disabilities. Out of consideration for people with chemical sensitivities, please attend the meeting fragrance free. Upon request, the agenda can be provided in a format to accommodate special needs. Additionally, if you wish to attend this meeting and will require assistance such as an interpreter for American Sign Language, Spanish, or other special equipment, please call Water Administration at 831-420-5200 at least five days in advance so that arrangement can be made. The Cal-Relay system number: 1-800-735-2922.

WATER COMMISSION
REPORT

DATE: March 3, 2016

TO: Water Commission

FROM: Rosemary Menard
Water Director

SUBJECT: City Council Items Affecting Water

February 9, 2016

Evaluation of Water Supply Alternatives – Award of Contracts, and Fiscal Year 2016 Mid-Year CIP Budget Adjustment (WT)
Resolution No. NS-29,054 was adopted amending the FY2016 Capital Improvement Program budget and appropriating $1,924,500 from Water Enterprise Fund 711 and $310,500 from Water System Development Charges Fund 715 to fund new and on-going water supply and infrastructure projects and evaluations.

Motion **carried** authorizing the City Manager to execute an agreement with Pueblo Water Resources (Ventura, CA) in the amount of $446,370 for the evaluation of Aquifer Storage and Recovery opportunities in Santa Cruz, in a form approved by the City Attorney.

Motion **carried** authorizing the City Manager to execute an agreement with Kennedy/Jenks Consultants (San Francisco, CA) in the amount of $486,000 for the evaluation of recycled water opportunities in Santa Cruz, in a form approved by the City Attorney.

Cooperative Water Transfer, Groundwater Recharge, and Resource Management Pilot Project Negative Declaration (WT)
Resolution No. NS-29,055 was adopted to adopt a Negative Declaration for the Cooperative Water Transfer, Groundwater Recharge, and Resource Management Pilot.

Motion **carried** to authorize the City Manager to execute an agreement with Soquel Creek Water District for the Cooperative Water Transfer, Groundwater Recharge and Resource Management Pilot Project, in a form approved by the City Attorney.

Emergency Water Main Repair for Santa Cruz Municipal Wharf - Budget Adjustment (WT)
Resolution No. NS-29,056 was adopted amending the Water Department's FY 2016 Capital Improvement Program budget and appropriating $500,000 to make emergency repairs to the water main serving the Santa Cruz Municipal Wharf.

Motion **carried** to authorize the City Manager to execute a construction agreement with Anderson Pacific Engineering Construction, Inc. (Santa Clara CA), in a form approved by the City Attorney, once the pipeline replacement design has been finalized.

Final Joint Powers Agreement for Santa Cruz Mid-County Groundwater Management Issues (WT)
Motion **carried** to approve a Joint Powers Agreement with the Soquel Creek and Central water districts and the County of Santa Cruz for the creation of the Santa Cruz Mid-County Groundwater Management Agency and authorize the City Manager to sign the Agreement in a form acceptable to the City Attorney on behalf of the City of Santa Cruz.

Resolution No. NS-29,057 was adopted appointing Santa Cruz Directors to the new Joint Powers Agency as required by Section 6.3.2 of the Agreement.

Resolution Authorizing the Incurring of Debt for Capital Improvement Projects on Behalf of the Water Department (WT)
Resolution No. NS-29,058 was adopted authorizing the incurring of an obligation of debt, payable to the California Infrastructure and Economic Development Bank (IBank) for financing specific capital improvement projects on behalf of the Water Department.

Ordinance Amendments to Chapter 16.16 of the Santa Cruz Municipal Code Pertaining to Water Efficient Landscaping (WT)
This item was **referred back** to staff for additional modifications to the ordinance and **continue** item to a date not yet determined in the future.

February 23, 2016

North Coast System Rehabilitation Project-Phase 3 – Approval of Drawings and Specifications, and Authorization to Advertise for Bids and Award Contract (WT)

Motion **carried** to approve the drawings, specifications and contract documents, including updated front-end specifications per verbal report presented by staff and City Attorney, for the North Coast System Rehabilitation Project-Phase 3 and authorize staff to advertise for bids. The City Manager is hereby authorized and directed to execute the contract as authorized by Resolution No. NS-27,563, in a form approved by the City Attorney.

Study Session on Water Financial Planning and Rate-Making Work (WT)
Council **received** information and participated in a study session about Water Department financial planning and rate-making processes and provided direction to staff as needed.

Water Department

Water Commission
7:00 p.m. –February 1, 2016
Council Chambers
809 Center Street, Santa Cruz

Minutes of a Water Commission Meeting

Call to Order: Chair D. Baskin called the meeting to order at 7:02 p.m. in the City Council Chambers.

Roll Call

Present: D. Baskin, D. Schwarm, A. Schiffrin, W. Wadlow, L. Wilshusen, and D. Engfer
Absent D. Stearns (with notification)

Staff: R. Menard, Water Director; H. Luckenbach, Deputy Director/Engineering Manager; T. Goddard, Administrative Services Manager; D. Culver, Chief Financial Officer; N. Dennis, Principal Management Analyst, A. Poncato, Administrative Assistant III

Election of Officers:
Chair Baskin opened the floor for nominations for Water Commission Chair.

Commissioner Schiffrin nominated Commissioner Wadlow.

Commissioner Schiffrin moved to close nominations and by acclamation elect Commissioner Wadlow as Water Commission Chair for 2016. Commissioner Wilshusen seconded.

VOICE VOTE: MOTION CARRIED
AYES: D. Baskin, D. Schwarm, A. Schiffrin, W. Wadlow, L. Wilshusen, and D. Engfer
NOES: None
ABSENT: D. Stearns

Chair Wadlow opened the floor for nominations for Water Commission Vice-Chair.

Commissioner Schiffrin nominated Commissioner Wilshusen.

Commissioner Schiffrin moved to close nominations and by acclamation elect Commissioner Wilshusen as Water Commission Vice-Chair for 2016. Commissioner Baskin seconded.

VOICE VOTE: MOTION CARRIED
AYES: D. Baskin, D. Schwarm, A. Schiffrin, W. Wadlow, L. Wilshusen, and D. Engfer
NOES: None
ABSENT: D. Stearns

Others: 3 members of the public.

Presentation: There were no presentations.

Statement of Disqualification: There were no statements of disqualification.

Oral Communications: Oral communications made by D. Spelce.

Announcements: None

Consent Agenda

1. City Council Actions Affecting Water
3. Landscape Ordinance

Commissioner Schiffrin moved the consent agenda as amended. Commissioner Baskin seconded.
AYES: D. Baskin, D. Schwarm, A. Schiffrin, W. Wadlow, L. Wilshusen, and D. Engfer
NOES: None
ABSENT: D. Stearns

Items Removed from the Consent Agenda

2. Approve the January 4, 2016, Water Commission Minutes

Commission Questions/Comments

- Correct the spelling of CEQA under general business item 3. Water Supply Augmentation Strategy, Initial Work Plan.
- Correct the sentence in the first comment under general business item 3. Water Supply Augmentation Strategy, Initial Work Plan to state, “We are working to finalize CEQA if California Fish and Wildlife lets us finish the process to be able to start a trial in February, assuming we have water.”
- Correct the sentence in the third comment under general business item 1. Cost of Service Analysis and Rate Structure Design to state, “In other words, once we have a methodology for the cost of service it won't matter what the revenue requirements are. Different revenue requirement levels would affect what the cost is but not the way it’s going to be distributed.”

Commissioner Schiffrin moved the minutes as amended. Commissioner Baskin seconded.
VOICE VOTE: MOTION CARRIED
AYES: All.
NOES: None
ABSENT: D. Stearns

4. Update Initial Water Supply Outlook

Commission Questions/Comments

Should we seek to extend the petition that allows us to reduce our required flow release amounts and if we realize that we do not need the extension can we advise the Board, rather than the other way around? How does staff conclude that we do not need another extension when the data presented appears as though we may need another extension?

- The feedback we received from the State suggests that they would not be open to another extension at this point. We can request an extension in the event we realize that we need one and can have it in place within two to three weeks after we submit a request.

Can you project when Loch Lomond would spill?

- We are unable to make that projection at this time.

What information do we have about the flows on North Coast streams?

- There are stream gauges on the north coast but the data are not summarized in the same way - in terms of mean monthly flow – as they are as on the San Lorenzo River, however, we will focus more on the north coast in March when we create a water balance for 2016.

It seems as though we have been able to get more water out in greater drought conditions than in the past. How have we been able to effectively optimize our take from the river in terms of the ability to pump water this year? Does the strategy tie into the analysis from Gary Fiske, and has it provided any information that might tell us how we can continue in this direction going forward?

- One of the issues that Mr. Fiske brought to our attention was the first flush constraint, as mentioned in his evaluation presented to WSAC. We also have a constraint on the pipe that runs from the Felton Diversion to Loch Lomond which prohibits us from pushing large amounts of water to Loch Lomond. Additionally, it is unknown what the quality of the water is after the first flush. All of these factors are on the radar of things to keep an eye on, but the most important improvement that has helped us optimize our use of the river is that staff is more aware of how much water can be taken at the Felton Diversion and pumped into Loch Lomond.

Is that different than what has been occurring?

- The data we have has shown that the Felton Diversion was seldom used over the past 10-15 years. The dam was inflated during this period but the pumping did not occur. Maybe the water was not pumped during that timeframe because it was spilling, but we do know that the Felton Diversion was not routinely used over the past 15 years.

Additional Comments

- We are pumping water from the Felton Diversion Dam to Loch Lomond storage when we can.
- As of January 26, 2016, our region was downgraded from Extreme Drought to Severe Drought on the US Drought monitor.

Commissioner Schiffrin moved the staff recommendation. Commissioner Wilshusen seconded.
VOICE VOTE: MOTION CARRIED
AYES: All.
NOES: None
ABSENT: D. Stearns

General Business

1. Inputs and Outputs of Capital Financing Plan and Water Rate Increase Work:
   Ms. Menard provided a brief presentation summarizing the Capital Financing Plan and Water Rate Increase work. Ms. Menard, Mr. Culver and Brian Thomas of Public Financial Management responded to Commission questions.

Commission Questions/Comments

- The Rate Increase information is not available at this time.

Appendix A Questions and Comments

Line 26 Ending Cash Balance: Since these totals are what are carried over, shouldn't the Ending Cash Balances in both the 2017-2021 and 2017-2026 columns be $0?

- Yes, they should be zero.

Line 27-28 Debt Service Coverage & Targets: Are these numbers going to be expressed as percentages or as a ratio?

- They will be expressed as a ratio so the number should be 1.5 times.

Lines 17 – 19 Capital Project Costs & Funding: The capital expenditure estimates change frequently over a number of years in this spreadsheet. The amounts in this section are far different than indicated in the current fiscal city budget. Please explain how these match the city budget.

- The numbers do not match the current city budget because the work that was done to create this plan was being fine-tuned during the fiscal year. Our goal is to create a consistent financial plan beginning FY 2017.

Line 17 Capital Project Costs & Funding: Once we get into the out years, after 2019, the capital improvement budget balloons from 83% to 120% of the total operating budget. Please explain.

- There are two major projects in years 2019 – 2021 and 2023 – 2025, which are having this impact: the dam repair project and the water supply project. The repair of the dam is scheduled to occur over 3 years but will likely be finished in 18 months – 2 years. We hope construction of the water supply project to be complete in 3 years, but the water supply project has not been defined yet so it is difficult to say. Something the department is looking into is how to deliver these two projects that are anomalies. We don't necessarily want to staff up for this relatively brief timeframe. One example may be hiring construction/program managers.

Do we worry about going to the market too often?

- No, given the nature of the work we're doing, going to the market every two years would be considered normal.

Line 4 Volumetric Revenue from Rate Increases w/Baseline Demand: What percentage increase was used for these calculations?

- 15% for the first year and 8.5% for the other years.

If the operating, maintenance, and capital improvement cost estimates are realistic, aren't the rate increases going to have to be something along this line?

- Yes and no. Yes, because we need to generate this sort of money. No, because the price per unit will change dramatically based on the cost of service and the amount of water we estimate we are going to sell.

Line 21 Debt Service as a % of Rate Revenue: Is there an industry standard of what the debt service as a percentage of rate revenue should be?

- No, there is not.

Shouldn't the total for Line 19 Debt Funded 2017-2021 be the same amount indicated in Table 4 on page 70 for Total Uses in years 2017-2021?

- This apparent disconnect is the result of issuing debt in 2021 and some of the proceeds not being spent until 2022.

Line 21 Debt Service as a % of Rate Revenue: What are the key factors that are considered by rating agencies and can we have a list of those factors in the future?

- Cash reserves, debt service coverage ratios, the relative age of our facilities, history of rate increases, willingness and ability to raise rates, and affordability. They will look at the water bill as a percent of median income in our service area. The higher the bill, the worse it is for your credit rating because there is more pressure not to raise rates.

Are non-financial factors that are considered?

- Yes, such as the board, council, and management of the utility.

Do they look at our ability to produce water?

- Yes.

Line 19 Debt Funded: There is $7.4 million dollars debt funded in 2017. Is this amount a portion of the $25 million dollar I-Bank loan?

- Yes.

<u>Appendix B Questions and Comments</u>

Included in the financial plan, there should be language that states what factors lead to issuing debt. What are the triggers for issuing debt?

- Generally the debt is issued in lump sums of $25 million dollars. The debt will be issued when we are ready to generate $25 million worth of constructions costs.
- The utility should also utilize reimbursement resolutions as a tool for the timely issuing of debt to make sure that debt is not issued and then not properly spent because this results in paying interest on money you're not using.

The numbers for Aquifer Storage and Recovery for 2016 in Appendix B show $535,000 but the numbers in the Capital Improvement Plan we received at the last Water Commission meeting state that the Aquifer Storage and Recovery numbers were $350,000. The Recycled Water numbers in Appendix B state $480,000 but the numbers in the Capital Improvement Plan we received at the last Water Commission meeting stated $160,601. Why are the numbers so different?

- The numbers that the Water Commission saw in January were draft budget estimates used as placeholders while the contracts were being negotiated with Pueblo Water Resources for Phase 1 of the ASR work and Kennedy/Jenks for the recycled water work, both of which were approved by City Council at their February 9th meeting. These are both two year studies and it may be worth noting that the spreadsheet included in the Water Commission's packet in January on this topic spread the draft budget estimates over two fiscal years to reflect spending. The draft budget estimate for ASR was $370,000 and for RW $325,202.

There are no Water Supply, Collection, Treatment, or Storage projects budgeted in fiscal years 2022-2026 and no money set aside for any projects. Should we put a generic placeholder in those years to set aside money for future, unforeseen, projects?

- This model is structured to complete critical projects at the front end while continuing to plan for future projects in the first five years. The second five years will be focused on construction of water supply project(s). One of the benefits of the debt service coverage ratio is that it requires us to generate additional revenue each year that is not allocated to any specific project and is available to be used the following year. We can use this generated revenue to help us get debt service coverage to fund pay as you go capital on an on-going basis.

Is the $9.6 million dollar fee for the Water Treatment Plant Tank Assessment the cost of the entire project or just the assessment?

- The amount is a total cost for the assessment, the preliminary design, design and construction, and all associated consolidated costs. The assessment portion of this project is complete and in the next fiscal year, we will spend $600,000 on the design of the new tanks. The $9.6 million dollars if for the entire project.

<u>Final Comments</u>

Are we comfortable with the 1.5 ratio?

- When you issue debt, you are going to have a debt covenant in which you will agree that you will always maintain revenues sufficient to cover your costs and typically some specific debt service coverage ratio (DSCR) service. The debt service coverage will range between 1.15 times coverage to 1.25 times coverage. Having a policy to maintain

1.5 x DSCR means you have a margin of safety so that if something unexpected happens you won't find yourself in technical default.

By debt covenant, do you mean an agreement with our lenders as to what our default standards are?

- Yes, that is your legal pledge.

In regards to coverage targets, when we talk about revenue, are we talking about net?

- Yes, net operating revenues divided by your debt services.

Please explain: Pay-as-you-go capital funding versus debt-financed capital – There is no industry standard or best practice for this metric. The factors that should be considered are debt capacity, day's cash on hand and intergenerational equity.

- Debt capacity goes back to our previous discussion about what bonding companies want from us. Day's cash on hand is making sure we have enough cash on hand to pay the bills. Intergenerational equity is spreading the cost of the reinvestment cycle over a longer period of time so that the people who benefit from them will pay a portion of the cost of that reinvestment.

Does each additional capital improvement become added intergenerationally and backed into the rate structure?

- Yes.

How important is it for us to meet the July 1, 2016, rate implementation deadline?

- That is unknown at this time.

I-Bank was presented as a reimbursement but it is not clear what it is reimbursement for.

- In April 2014, we took a reimbursement resolution to the city council to debt finance any additional capital costs that were generated from that day forward. At that time, we were in the middle of the 2nd phase of the Bay Street Reservoir project and we were preparing for the filter rehab project. We expect to receive reimbursement for both of these projects.

We are applying for a $25 million dollar loan from I-Bank with $15.5 million going towards replenishing the fund balance and two reserves which will leave us with $9.5 million left. How will that $9.5 million be spent?

- Think of the I-Bank package as two parts: one part is reimbursement for capital expenditures that we have already made, which is the $15.5 million dollar figure, and the second part is for capital expenditures we plan to make in the coming 18-24 months. The I-Bank loan is going to three areas:
    1. build up the fund balance to repay the fund balance for capital projects already spent,
    2. create reserves to reach our reserve goals,
    3. fund capital projects in 2017.

Please explain the percentages of Annual Inflation Factors in Table 2 on page 66.

- The numbers are estimates drawn from historical experience and industry trend. Operating Supplies & Chemicals along with Energy expenses have traditionally increased at a rate greater than inflation. Some of these numbers came from the rate model we worked on several years ago. Employee benefits include PERS and health care costs. Personnel costs include employee salaries. Due to several failed recruitment and/or retention issues, the City recently completed an assessment and implemented compensation changes for our many of the positions within our Operations, Production, Water Quality, Distribution, Conservation, and Recreation Divisions by increasing salaries to retain good employees. These numbers were budgeted into the future forecast with the addition of 3 additional positions each year for the first 3 years.

Requests for Follow Up:

- Provide year to year percentage growth figures and percentage of revenue in key accounts.
- Insert footnotes explaining why budget numbers for projects have changed from month to month.
- Define projects so Commissioners know what they are.
- Separate the CIP project from the new water supply when the financial planning and rate discussion items return.
- Present CIP existing facilities and CIP new facilities with a comparison of what the impacts of those two different capital improvement plans are going to have on the overall revenue needs and rate increases.
- Add a fourth primary goal to the draft financial plan to include rate affordability.
- Separate operation and capital costs.
- Add both reserve numbers to the spreadsheet A.

Commissioner Schiffrin moves that the Water Commission accept the draft Financial Plan and request the staff to include the following when the Plan returns:

1. Incorporate a trigger for issuing debt;
2. Consider the addition of a rate payer affordability policy;
3. Clarify the distribution of the I-Bank loan;
4. Separate the CIP into existing capital projects and new capital projects;
5. Include a sensitivity analysis, and
6. Incorporate other Commission comments and respond to Commission questions;

Commissioner Wilshusen seconded.

AYES: D. Baskin, D. Schwarm, A. Schiffrin, W. Wadlow, L. Wilshusen, and D. Engfer
NOES: None
ABSENT: D. Stearns

4. Cost of Service Analysis and Rate Structure Design:
   Ms. Menard provided the presentation summarizing the Cost of Service Analysis and Rate Structure Design and responded to Commission questions.

Commission Questions/Comments

- In the recommended motion, the word ‘transparency’ should be replaced with ‘clearly defined’.
- Add a fourth bullet to state: “Results in sufficient revenue to fund ongoing operations and to accomplish the department’s financial plan”.

Commissioner Schiffrin moved to accept the staff recommendation with the following changes to the bullet points to say:

- Methodologies used in the analyses are clearly defined and legally defensible;
- Results are equitable and likely to be perceived to be fair by customers; and
- Results effectively encourage water conservation and efficient use while reflecting cost of service;
- Results in sufficient revenue to fund ongoing operations and accomplish the department’s financial plan;

Commissioner Wilshusen seconded.

AYES: D. Baskin, D. Schwarm, A. Schiffrin, W. Wadlow, L. Wilshusen, and D. Engfer
NOES: None
ABSENT: D. Stearns

Subcommittee/Advisory Body Oral Reports: None

Directors Oral Report No action shall be taken on this item.

- Last month Ms. Menard presented information about the Water Supply Advisory Committee recommendations to the Board of Directors for Soquel Creek Water District and Scotts Valley Water District and received a friendly reception.
- In regards to the supply augmentation project, we have several contracts moving forward. ASR is in phase 1 and the recycled water project is an analysis of all alternatives using recycling water. Additional information will follow in March when we present our quarterly report.

Request

- Include updates on the progress of WSAC projects in the next quarterly report.

Adjournment Meeting adjourned at 10:31 p.m. The next regular meeting of the Water Commission is scheduled for March 7, 2016, at 7:00 p.m. in the Council Chambers.

Respectfully submitted,

Amy Poncato
Digitally signed by Amy Poncato
DN: cn=Amy Poncato, o=Water Department, ou=Administration, email=aponcato@cityofsantacruz.com, c=US
Date: 2016.03.08 11:06:00 -08'00'

Staff

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WATER COMMISSION
INFORMATION REPORT

DATE: 2/29/2016

AGENDA OF: March 7, 2016

TO: Water Commission

FROM: Nicole B. Dennis
Fiscal Officer

SUBJECT: FY 2016 Mid-Year Financial Status of the Water Utility

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RECOMMENDATION: Accept report regarding the FY 2016 Mid-Year Financial Status of the Water Utility.

BACKGROUND: At their November and December meetings in 2015, the Water Commission was provided with information related to the impact of the second year of drought on the Water Department's revenues. From that discussion, a request to provide a mid-year update of the utility's financial status was directed to staff. This report will serve as the update.

DISCUSSION: For purposes of this analysis, figures from the first six months of the fiscal year 2016 were used. The analysis is broken into two parts by the primary funds used by the Department: first, the Water Enterprise Fund (Fund 711) which represents the majority of activity and second, the System Development Charge Fund (Fund 715) which is used for capital expenditures and conservation rebates. Please refer to the attached spreadsheet for specific dollars amounts in the categories discussed below.

Water Enterprise Fund (Fund 711)
We began FY 2016 with $4.3 million in fund balance. Revenues collected in the first six months of FY 2016 are tracking slightly lower than projected. Most important are water sales figures, which are tracked monthly and total $12,285,311 for this period or 46.8% of the $26.3 million that was budgeted. Assuming there are no additional water restrictions this summer, projections indicate we should finish the fiscal year near our budget target.

Expenditures are tracking below the amounts budgeted for the current fiscal year due in large part to salary savings. While non-personnel expenditures are tracking higher than 50% at the mid-point, this is due to a number of factors:

1) All contracts are encumbered at the contract ceiling amount when these funds may not all be necessary to complete the work;

2) Many fees and charges (i.e.: maintenance contracts, government fees, vehicle purchases) are paid at the beginning of the fiscal year which tends to overstate expenditures early in the fiscal year; and,
3) Non-personnel expenditures are largely controllable therefore, we can reduce spending in these categories should the need arise later in the year to keep expenditures within the budgeted amounts.

Water System Development Charges Fund (Fund 715)
We began FY 2016 with $2.5 million in fund balance. Although the first half of the new System Development Charges (SDC) rates took effect on July 1, 2015, revenue collections continue to trend downward as they have for the prior four years:

Title	FY 2012 Actuals	FY 2013 Actuals	FY 2014 Actuals	FY 2015 Actuals	FY 2016 Projected
SDC Charges	632,397	643,768	687,753	701,101	250,000
Interest	89,000	59,798	45,055	28,030	21,000
Capital Contributions (SqCWD)	470,186	99,847	123,747	0	0
Total	1,191,583	803,413	856,555	729,131	271,000

It is difficult to project revenues in this area because the figures are based on development activity which can vary greatly. Although staff has access to will-serve letters and building permits, it is difficult to know when a project will be ready to pay their SDC.

On the expenditure side, we have spent 57.6% of the allocation for conservation rebates and have recommended an increase to $350,000 for FY 2017. The Capital Improvement Program (CIP) projects are the largest category of expenditures in Fund 715 and include Main Replacements, Bay Street Reservoir and Water Supply projects. Staff continues to track revenues and expenditures in this fund closely and may need to make further adjustments in the way we use these limited funds going forward.

Mid-Year Actions
The Water Department did include an augmentation of $501,641 in the mid-year budget adjustment approved by the City Council on 1-26-16 and is not yet reflected in figures presented here. $104,000 was added to the personnel budget to begin addressing the issue of salary equity issues in the operation sections of the Department. Another $255,000 was added to the Production section's budget to hire qualified technical staff to perform key maintenance roles as well as unanticipated costs to repair the aerators at Loch Lomond. An $80,000 correction to Customer Service's budget was included as was additional funds for financial consulting services. All these items were one-time in nature with the exception of the salary adjustment.

FISCAL IMPACT: There is no fiscal impact as the result of this report. The report provides an update of the financial status of the Water Department at the midpoint of FY 2016.

PROPOSED MOTION: Accept report regarding the Financial Status of the Water Utility.

FY 2016 Mid-Year Expenditure Status
Water Commission 3-7-16

Fund 711 Water Enterprise Fund

Object	Title	FY 16 Adopted Budget	Year-To-Date Adjustments	FY 16 Adjusted Budget	Year-To-Date Actual Revenues		Bdgt. to Act. Variance	Pct. Spent
42000	LICENSES AND PERMITS	3,600	-	3,600	-	-	3,600	-
43000	GRANTS	20,000	-	20,000	-	-	20,000	-
44000	CHARGES FOR SERVICES	27,079,075	-	27,079,075	12,689,779	-	14,389,296	46.9%
45000	FINES AND FORFEITS	-	-	-	408,774	-	(408,774)	-
46000	MISCELLANEOUS REVENUES	264,595	-	264,595	40,802	-	223,793	15.4%
49000	OTHER FINANCING SOURCES	30,000,000	-	30,000,000	5,809	-	29,994,191	0.0%
	Total	57,367,270	-	57,367,270	13,145,163	-	44,222,107	22.9%
	Water Sales	26,251,013		26,251,013	12,285,113		13,965,900	46.8%

Object	Title	FY 16 Adopted Budget	Year-To-Date Adjustments	FY 16 Adjusted Budget	Year-To-Date Actual Expenditures	Year-To-Date Encumbrances	Bdgt. to Act. Variance	Pct. Spent
51000	PERSONNEL SERVICES	11,879,181	-	11,879,181	4,903,254	-	6,975,927	41.3%
52000	SERVICES	7,040,746	646,121	7,686,867	3,030,639	1,186,083	3,470,145	54.9%
53000	SUPPLIES	2,653,099	-	2,653,099	928,600	789,024	935,475	64.7%
54000	OTHER MATERIALS AND SERVICES	2,168,650	286,713	2,455,363	1,123,882	932,321	399,160	83.7%
56000	OTHER CHARGES	140,700	9,125	149,825	22,017	9,125	118,683	20.8%
57000	CAPITAL OUTLAY	338,500	28,984	367,484	162,356	72,130	132,999	63.8%
58000	DEBT SERVICE	1,623,943	-	1,623,943	74,089	-	1,549,854	4.6%
59000	OTHER FINANCING USES	159,153	291,804	450,957	199,845	-	251,112	44.3%
	Total less CIP	25,844,819	970,944	26,815,763	10,244,838	2,988,683	13,582,242	49.3%
	CIP	8,810,000	8,898,490	17,708,490	3,442,642	4,954,699	9,311,148	47.4%
	Grand Total	34,654,819	9,869,434	44,524,253	13,687,480	7,943,382	22,893,391	48.6%
	Net	22,712,451	(9,869,434)	12,843,017	(542,317)		21,328,716	(0.7)

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Fund 715 System Development Charges Fund

Object	Title	FY 16 Adopted Budget	Year-To-Date Adjustments	FY 16 Adjusted Budget	Year-To-Date Actual Expenditures	Year-To-Date Encumbrances	Bdgt. to Act. Variance	Pct. Spent
44000	CHARGES FOR SERVICES	850,000	-	850,000	212,982	-	637,019	25.1%
46000	MISCELLANEOUS REVENUES	35,000	-	35,000	10,490	-	24,510	30.0%
	Total	885,000	-	885,000	223,472	-	661,528	25.3%

Object	Title	FY 16 Adopted Budget	Year-To-Date Adjustments	FY 16 Adjusted Budget	Year-To-Date Actual Expenditures	Year-To-Date Encumbrances	Bdgt. to Act. Variance	Pct. Spent
52000	SERVICES	74,106	24,952	99,058	33,716	7,364	57,978	41.5%
56000	OTHER CHARGES	300,000	-	300,000	172,654	-	127,346	57.6%
58000	DEBT SERVICE	138,609	-	138,609	18,522	-	120,087	13.4%
59000	OTHER FINANCING USES	68	-	68	68	-	-	0.0%
	Total less CIP	512,715	24,952	537,667	224,892	7,364	305,410	43.2%
	CIP	300,000	1,268,513	1,568,513	289,043	132,614	1,146,856	26.9%
	Grand Total	812,715	1,293,465	2,106,180	513,936	139,978	1,452,266	31.0%
	Net	72,285	(1,293,465)	(1,221,180)	(290,464)	(139,978)	(790,738)	35.2%

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WATER COMMISSION
INFORMATION REPORT

DATE: 2/26/16

AGENDA OF: March 7, 2016

TO: Water Commission

FROM: Heidi Luckenbach, Deputy Water Director/Engineering Manager

SUBJECT: Water Supply Augmentation Strategy Work Plan Update – Part 1a: Aquifer Storage and Recovery, Recycled Water, Infrastructure and Operational Constraints Analyses.

RECOMMENDATION: Receive information and provide any feedback to staff.

BACKGROUND: The Water Commission is scheduled to receive quarterly updates about the progress the Water Department is making in implementing the Council adopted Water Supply Augmentation Strategy (WSAS). This part of the quarterly update focuses on the following items of work.

- Phase 1 Aquifer Storage and Recovery;
- Recycle Water alternatives analysis;
- Additional recommendations related to infrastructure and operating constraints.

DISCUSSION: Following is a brief discussion of the progress and status of the three items mentioned above.

Aquifer Storage and Recovery

At their February 9, 2016 meeting the City Council authorized the City Manager to execute an agreement with Pueblo Water Resources Inc. (Pueblo) in the amount of $446,370 for Phase 1 of the evaluation of Aquifer Storage and Recovery (ASR) opportunities in Santa Cruz. The fully-executed contract is attached which includes scope, schedule and budget.

In addition to providing technical information to the Water Supply Advisory Committee (WSAC) on topics related to groundwater management, Pueblo is part of the technical advisory panel for the development of the local groundwater model, and has consulted to the City for several years on well construction, operation and maintenance. As a result of this background and knowledge, and in the interest of meeting the schedule recommended by the WSAC, staff recommended and Council approved a sole-source contract with Pueblo Water Resources Inc. for Phase 1 of the work.

Consistent with the timeline developed by the WSAC, Phase 1 will require approximately 2 years to complete and has a budget that is lower than that estimated during the WSAC process ($630,000). A schedule of the major tasks is shown below.

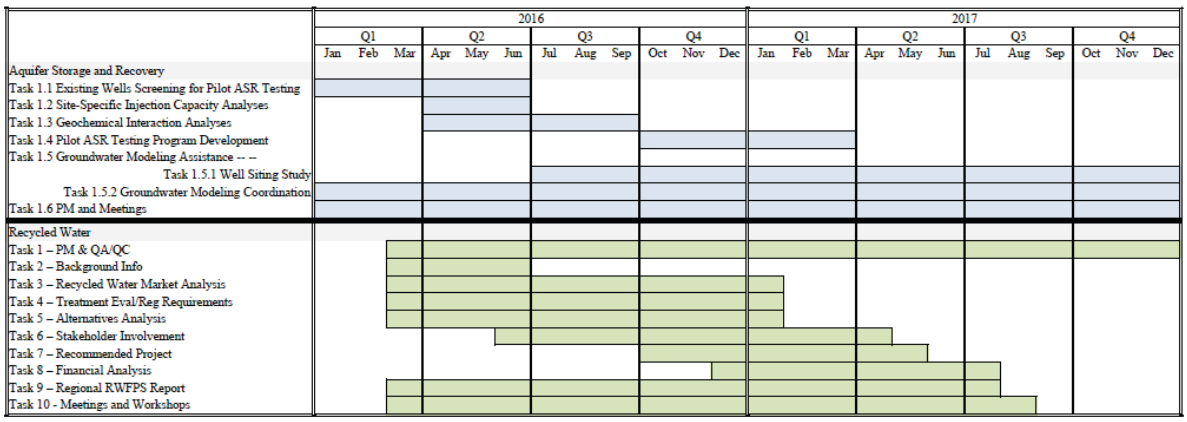
Recycle Water alternative

At their February 9, 2016 meeting the City Council authorized the City Manager to execute an agreement with Kennedy/Jenks Consultants (K/J) in the amount of $486,000 for the evaluation of recycled water opportunities. The fully-executed contract is attached which includes scope, schedule and budget. A public bidding process was conducted in spring 2015. Following the selection of K/J by the evaluation team the process was put on hold until the conclusion of the WSAC process so as to ensure the study was consistent with the WSAC recommendations.

This study will require approximately two years to complete due to the information needed to be able to 1) adequately compare with the other elements of the WSAC recommendations: in-lieu, ASR, desalination, and 2) establish other beneficial uses of advanced treated recycled water other than a water supply. A schedule of the major tasks is shown below.

This study is being funded in part by the City's Public Works Department and the State of California through a grant with the State Water Resources Control Board.

Schedule for Phase 1 Aquifer Storage and Recovery and Recycled Water Evaluations
updated 02/29/16



Additional recommendations related to infrastructure and operating constraints

The WSAC recommendations included a declaration of support for the Water Department's further evaluation of the potential infrastructure and operational limitations shown below. While these issues do not present conflicts with how the department currently operates the water system, they may become issues depending upon the water supply portfolio in the future, the regional partnerships, and impacts of climate change on water supply quality and quantity.

Below are the constraints as described in the WSAC final report. Also included are the corresponding project numbers, titles and descriptions of the related projects as shown in the Department's Capital Improvement Program; and the fiscal year work is scheduled to begin.

Pipeline between Felton Diversion and Loch Lomond.
Project No. c701701 Newell Creek Pipeline Rehabilitation. Conduct a condition assessment and program level environmental review followed by full or partial replacement of the pipeline between the base of Loch Lomond Reservoir and the Graham Hill Water Treatment Plant. FY2017.

Pumping Capacity at Felton Diversion.
Project No. c701602 Felton Diversion Replacement and Pump Station. This project consists of evaluation of the existing dam and pump station with recommendations to rehabilitate or replace existing facilities. Alternate diversions may be considered, such as horizontal collector wells or other subsurface intake(s). FY2018

Treatment of Higher-turbidity water at the Graham Hill Water Treatment Plant.
Project No. c701608 Source Water Evaluation. Evaluate source water quality, operational and infrastructure alternatives to maximize use of surface water. FY2016.

Operational Protocols of Loch Lomond Reservoir
Project No. c701608 Source Water Evaluation. Evaluate source water quality, operational and infrastructure alternatives to maximize use of surface water. FY2016.

Note: The scope of the Source Water Evaluation project is currently being developed by staff. The intention however is to develop a study that answers and/or refines the understanding of the following questions.

How are the water supplies operated and why?
How are source waters treated and why?
How does source water quality change throughout the year?
How could future operations and/or treatment be changed to optimize the use of the resource?
What physical infrastructure do we improve and/or add to more efficiently operate the system?

FISCAL IMPACT: None.

PROPOSED MOTION: Move to accept the report.

ATTACHMENTS:
1A1 Proposed Capital Improvement Plan, 2017 – 2021
1A2 Professional Services Agreement for Aquifer Storage and Recovery
1A3 Professional Services Agreement for Recycled Water

Projects by Category	FY2017	FY2018	FY2019	FY2020	FY2021	Subtotal
WATER SOURCES						
Felton Diversion Replacement & Pump Station		$ 1,500,000	$ 1,500,000	$ 1,500,000		
Aquifer Storage & Recovery		$ 1,075,000	$ 325,000	$ 300,000		
Water Supply- WSAS Implementation				$ 1,200,000	$ 7,200,000	
Sources Subtotal	*0*	*2,575,000*	*1,825,000*	*3,000,000*	*7,200,000*	***14,600,000***
COLLECTION						
Newell Creek Pipeline Rehabilitation	$ 1,000,000	$ 1,000,000	$ 8,000,000	$ 8,000,000		
Newell Creek Dam I/O Pipeline	$ 2,000,000	$ 2,000,000	$ 14,000,000	$ 12,000,000	$ 12,000,000	
North Coast System Rehab	$ 4,150,000					
Collection Subtotal	*7,150,000*	*3,000,000*	*22,000,000*	*20,000,000*	*12,000,000*	***64,150,000***
TREATMENT OF WATER						
Beltz 11	$ 70,000	$ 300,000				
WTP Concrete Tank Evaluation & Replacement	$ 600,000	$ 3,000,000	$ 3,000,000	$ 3,000,000		
WTP Solids Handling	$ 500,000					
Source Water Evaluation & Implementation	$ 400,000	$ 500,000	$ 3,000,000	$ 3,000,000		
Water Treatment Upgrades	$ 100,000					
Treatment Subtotal	*1,670,000*	*3,800,000*	*6,000,000*	*6,000,000*	*0*	***17,470,000***
DISTRIBUTION OF WATER						
Water Main Replacements - City Engineering	$ 1,395,000	$ 1,440,000	$ 1,440,000	$ 1,440,000	$ 1,500,000	
Water Main Replacements - Outside Agency	$ 250,000	$ 250,000	$ 250,000	$ 250,000	$ 250,000	
Water Main Replacements - Customer Initiated	$ 50,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000	
Water Main Replacements - c701507	$ 325,000	$ 325,000	$ 325,000	$ 325,000	$ 325,000	
Pressure Regulating Stations	$ 10,000	$ 60,000	$ 60,000	$ 60,000		
Distribution Subtotal	*2,030,000*	*2,125,000*	*2,125,000*	*2,125,000*	*2,125,000*	***10,530,000***
FACILITIES						
Advance Metering Infrastructure (AMI)					50,000	
Loch Lomond Rec Improvements			165,000	1,000,000		
Photovoltaic/SolarProjects	500,000					
Water Resources Building	$ 1,000,000					
Security Camera & Building Access Upgrades	$ 95,000					
Facilities Subtotal	*1,595,000*	*0*	*165,000*	*1,000,000*	*50,000*	***2,810,000***
STORAGE OF WATER						
Recoat University Reservoir No. 4	$ 75,000	$ 1,300,000				
Recoat University Reservoir No. 5	$ 1,750,000					
Storage Subtotal	*1,825,000*	*1,300,000*	*0*	*0*	*0*	***3,125,000***
Total Projects	**14,270,000**	**12,800,000**	**32,115,000**	**32,125,000**	**21,375,000**	**112,685,000**
Handy-Whitman Construction Inflation Factor	**3%**	**3%**	**5%**	**5%**	**5%**	
Cumulative Inflation	**103.00%**	**106.09%**	**111.39%**	**116.96%**	**122.81%**	
Total Projects with Cumulative Inflation	**14,698,100**	**13,579,520**	**35,774,344**	**37,574,757**	**26,251,158**	**127,877,879**

PROFESSIONAL SERVICES AGREEMENT FOR REGIONAL RECYCLED WATER FACILITIES PLANNING STUDY

THIS AGREEMENT for professional services is made by and between the City of Santa Cruz ("City") and Kennedy / Jenks Consultants ("Consultant") (together referred to as the "Parties") as of February 9, 2016 (the "Effective Date").

SECTION 1: SCOPE OF WORK

The services to be performed under this Agreement are set forth in the attached 21 page Scope of Work for City of Santa Cruz Regional Recycled Water Facilities Planning Study ("Appendix A"), 3 page Fees and Payment ("Appendix B"), and 1 page Work Schedule ("Appendix C").

SECTION 2: RESPONSIBILITIES OF CONSULTANT

All work performed by Consultant, or under its direction, shall satisfy the City's objectives for entering into this Agreement and shall be rendered in accordance with the generally accepted practices, and to the standards of, Consultant's profession.

Consultant shall not undertake any work beyond the Scope of Work set forth in Appendix A unless such additional work is approved in advance and in writing by City. The cost of such additional work shall be reimbursed to Consultant by City on the same basis as provided for in Section 4.

If, in the prosecution of the work, it is necessary to conduct field operations, security and safety of the job site will be the Consultant's responsibility excluding, nevertheless, the security and safety of any facility of City within the job site which is not under the Consultant's control.

Consultant shall meet with Rosemary Menard, Water Director, hereinafter called "Director", or other City personnel, or third parties as necessary. Such meetings shall be held at the request of any party.

SECTION 3: RESPONSIBILITIES OF THE CITY

City shall make available to Consultant all necessary data and information in the City's possession and shall actively assist Consultant in obtaining such information from other agencies and individuals as needed.

The Director may authorize a staff person to serve as his or her representative. The work in progress shall be reviewed at such intervals as may be mutually agreed upon between the parties. The City will be the sole judge of acceptable work. If the work is not acceptable, City will inform Consultant of the changes or revisions necessary to secure approval.

SECTION 4: FEES AND PAYMENT

For the services performed, the City will pay the Consultant on a time-charge plus expense basis, monthly as charges accrue, the sum of Consultant's salary expenses and non-salary expenses. For the purposes of this Agreement, Consultant's salary expenses and non-salary expenses will be compensated at the rates set forth in the attached 2 page fee schedule, Appendix B, and in accordance with the terms set forth therein. Where conflicts may occur, the provisions of this section apply. Payment for the Consultant's services in carrying out the entire the Scope of Work shall be made within the budget limit, or limits shown, upon Appendix B. Such payment shall be considered the full compensation for all personnel, materials, supplies, and equipment used by Consultant in Scope of Work.

Salary expenses include the actual pay of personnel assigned to the project plus payroll taxes, insurance, sick leave, holidays, vacation, other fringe benefits, overhead costs, and fees. Chargeable time does not include time for meals or other personal time. Consultant shall not charge the City for personnel overtime salary at rates higher than those set forth in the attached fee schedule without the City's prior written authorization.

Non-salary expenses include travel, meals and lodging while traveling, materials other than normal office supplies, shipping and reproduction costs, equipment rental, services of sub-consultants and subcontractors, and other direct, identifiable project related expenses. Markups shall not be charged for sub-consultants or subcontractors.

The use of vehicles for travel, including rental vehicles, shall be paid at the maximum rate of the current standard business mileage rate as established by the U.S. Internal Revenue Service. Commercial airline travel shall be reimbursed at coach class rates. Lodging, meals, and incidental expenses shall be reimbursed at the current per diem rates established by the U.S. General Services Administration. Per diem expenses in excess of $75 require submittal of acceptable substantiating documentation for each such expense. Consultants shall be entitled to 75% of the prescribed meals and incidental expenses for the first and last day of travel and for one day travel if it is longer than 12 hours. It is expected that all expenses associated with travel incurred by the Consultant, while conducting activities on behalf of the City, will be at reasonable rates and that the Consultant will exercise prudence in incurring such expenses.

Variations from the budget for each task which are justified by statements indicating personnel time expended and submittal of a revised budget are allowed with City approval; however, in no event shall the total fee charged for the scope of work set forth in Appendix B exceed the budget of $486,000 without advance written City authorization in the form of an amendment or change order.

Invoices shall detail the time worked by each class of employee on each task and the expenses incurred for which billing is made. Invoices shall indicate the percentage completion of each work task as identified in the Scope of Work in Appendix A and the overall percentage of completion of the total required services. Payments shall be made monthly by the City based on itemized invoices from the Consultant which list the actual costs and expenses.

All invoices shall contain the following affidavit signed by a principal of the Consultant's firm:

> "I hereby certify as principal of the firm of (Insert Firm Name), that the charge of (Insert invoice amount) as summarized above and shown in detail on the attachments is a fair and reasonable use of public funds, is in accordance with the terms of Agreement dated (Insert Agreement Date), and has not been previously paid."

SECTION 5: CHANGES IN WORK

City may negotiate changes in the Scope of Work. No changes in the Scope of Work shall be made without the City's written approval. Any change requiring compensation in excess of the sum specified in Appendix B shall be approved in advance in writing by the City.

SECTION 6: TIME OF BEGINNING AND SCHEDULE FOR COMPLETION

Consultant shall begin work upon its receipt of a written Notice to Proceed. The Notice to Proceed shall not be issued until after this Agreement has been approved and authorized by the City.

The schedule for completion of the work shall be as shown upon Appendix C. In the event that major changes are ordered, the schedule for completion as stated in Appendix C will be adjusted by City so as to allow Consultant a

reasonable period of time within which to complete any additional work which may be required as a result of the ordered changes.

Neither party will be held responsible for delay or default caused by declared emergencies, natural disasters, or any other cause which is beyond the party's reasonable control. Vendor will, however, make all reasonable efforts to remove or eliminate such a cause of delay or default and will, upon the cessation of the cause, diligently pursue performance of its obligations in this agreement.

The City reserves the right to obtain the item(s) covered by this contract from another source during any on-going suspension of service due to the circumstances outlined above.

Consultant acknowledges that it is necessary for Consultant to complete its work on or before the completion date set forth in Appendix C in order to allow the City to achieve its objectives for entering into this Agreement. The parties therefore agree that time is of the essence in the performance of this Agreement.

SECTION 7: TERMINATION

The City or Consultant may terminate the agreement for convenience by providing written notice to the other party not less than 30 calendar days prior to an effective termination date.

The City or Consultant may terminate the agreement for material breach of agreement by providing written notice to the other party not less than 14 calendar days prior to an effective termination date.

Upon notice of termination, the Consultant will immediately take action not to incur any additional obligations, costs or expenses, except as may be reasonably necessary to terminate its activities. The City's only obligation to the Consultant will be just and equitable payment for services authorized by, and received to the satisfaction of, the City up to and including the effective date of termination. All finished or unfinished work or documents procured or produced under the agreement will become property of the City upon the termination date. The City reserves the right to obtain Professional Services for Aquifer Storage and Recovery elsewhere, and the defaulting Consultant will be liable for the difference between the prices set forth in the terminated agreement and the actual cost to the City. In no event will the City be liable for any loss of profits on the resulting agreement or portion thereof so terminated. After the effective date of termination, Consultant will have no further claims against the City under the agreement. Termination of the agreement pursuant to this paragraph may not relieve the Consultant of any liability to City for damages sustained by City because of any breach of agreement by Consultant, and City may withhold any payments to Consultant for the purpose of set-off until such time as the exact amount of damages due City from Consultant is determined

The rights and remedies provided in this section will not be exclusive and are in addition to any other rights and remedies provided by law or under the agreement.

SECTION 8: INSURANCE

Prior to the beginning of and throughout the duration of the agreement, the Vendor will maintain insurance in conformance with the requirements set forth below. The Vendor will insure the City against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the Vendor, his agents, representatives, employees or subcontractors.

CERTIFICATE REQUIREMENTS

The City will be issued a Certificate of Insurance (a Memorandum of Understanding will not be accepted) with the following minimum requirements:

- Certificate(s) will show current policy number(s) and effective dates,
- Coverage and policy limits will meet, or exceed, requirements below,

- The Certificate Holder will be City of Santa Cruz, Risk Management, 809 Center St, Rm 7, Santa Cruz, CA 95060,
- Certificate will be signed by an authorized representative,
- An endorsement will be provided to show the City, its officers, officials, employees, and volunteers as additional insured.

MINIMUM SCOPE AND LIMITS OF INSURANCE

The Vendor acknowledges that the insurance coverage and policy limits set forth in this section constitute the minimum amount of coverage required. The City will be entitled to coverage for the highest limits maintained by the Vendor. Coverage will be at least as broad as:

- PROFESSIONAL LIABILITY (ERRORS AND OMISSIONS): $1,000,000 PER OCCURRENCE OR CLAIM, $2,000,000 AGGREGATE.
  The Vendor will maintain insurance appropriate to the Vendor's profession; with limit no less than $1,000,000 per occurrence or claim, $2,000,000 aggregate. Insurance must be maintained and evidence of insurance must be provided for at least five years after date of completion of the agreement work. The Vendor agrees to purchase an extended period coverage for a minimum of five years after completion of agreement work.

- COMMERCIAL GENERAL LIABILITY (CGL): $1,000,000 (Including products and completed operations)
  Proof of coverage for $1 Million per occurrence for bodily injury, personal injury and property damage will be provided on Insurance Services Office (ISO) Form CG 00 01 12 07 covering CGL. If a general aggregate limit applies, either the general aggregate limit will apply separately to this project/location or the general aggregate limit will be twice the required occurrence limit.

- AUTOMOBILE LIABILITY: $1,000,000
  Proof of coverage for $1 Million will be provided on ISO Form Number CA 00 01 covering any auto (Code 1), or if Contractor has no owned autos, hired, (Code 8) and non-owned autos (Code 9), per accident for bodily injury and property damage.

- WORKERS' COMPENSATION AS REQUIRED BY THE STATE OF CALIFORNIA, WITH STATUTORY LIMITS, AND EMPLOYER'S LIABILITY INSURANCE: $1,000,000 per accident for bodily injury or disease. Must include a waiver of subrogation.

OTHER INSURANCE PROVISIONS

The insurance policies are to contain, or be endorsed to contain, the following provisions:

- ADDITIONAL INSURED STATUS
  The City, its officers, officials, employees, and volunteers are to be covered as insured on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Vendor including materials, parts, or equipment furnished in connection with such work or operations. General liability coverage will be provided in the form of an endorsement to the Vendor's insurance at least as broad as ISO Form CG 20 10 11 85, or if not available, through the addition of both CG 20 10 and CG 20 37 (if a later edition is used).

- PRIMARY COVERAGE
  For any claims related to this agreement, the Vendor's insurance coverage will be primary insurance as respects the City, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees, or volunteers will be excess of the Vendor's insurance and will not contribute with it.

- NOTICE OF CANCELLATION

Each insurance policy required above will provide that the City will be notified of any coverage canceled with 30 days' prior written notice (10 days for non-payment).

- WAIVER OF SUBROGATION
  Vendor hereby grants to the City a waiver of any right to subrogation which any insurer of said Vendor may acquire against the City by virtue of the payment of any loss under such insurance. Vendor agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation, but this provision applies regardless of whether or not the City has received a waiver of subrogation endorsement from the insurer.

  The Worker's Compensation policy will be endorsed with a waiver of subrogation in favor of the City for all work performed by the Vendor, its employees, agents and subcontractors.

- DEDUCTIBLES AND SELF-INSURED RETENTIONS
  Any deductibles or self-insured retentions must be declared to and approved by the City. The City may at its option allow the Contractor to purchase coverage with a lower deductible or retention, or require the Contractor to provide a financial guarantee satisfactory to the City guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

- ACCEPTABILITY OF INSURERS
  Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII, unless otherwise acceptable to the Entity.

- VERIFICATION OF COVERAGE
  Vendor will furnish the City with original certificates and amendatory endorsements or copies of the applicable policy language effecting coverage required by this clause. All certificates and endorsements are to be received and approved by the City before work commences. However, failure to obtain the required documents prior to the work beginning will not waive the Vendor's obligation to provide them. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

SECTION 9: INDEMNIFICATION

Consultant agrees to indemnify, defend, and hold harmless the City, its officers, agents and employees, from and against any and all claims, demands, actions, damages, or judgments, including associated costs of investigation and defense arising in any manner from consultant's negligence, gross negligence, recklessness, or willful misconduct or patent or copyright violation in the performance of this agreement.

SECTION 10: EQUAL EMPLOYMENT OPPORTUNITY

The City of Santa Cruz strongly supports equal employment opportunities for all and requires its Consultants to ensure that effective policies and procedures concerning the prevention of illegal discrimination and harassment exist in their companies. In addition, all Consultants must be in compliance with all applicable Federal and State and local equal employment opportunity acts, laws, and regulations. The City's current Equal Employment Opportunity and Anti-Discrimination policies to which this provision applies may be viewed at http://www.codepublishing.com/CA/SantaCruz/?SantaCruz09/SantaCruz0983.html.

SECTION 11: LEGAL ACTION/ATTORNEYS' FEES

If any action at law or in equity is brought to enforce or interpret the provisions of this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees in addition to any other relief to which he or she may be entitled. The laws of the State of California shall govern all matters relating to the validity, interpretation, and effect of this

Agreement and any authorized or alleged changes, the performance of any of its terms, as well as the rights and obligations of Consultant and the City.

SECTION 12: ASSIGNMENT

This Agreement shall not be assigned without first obtaining the express written consent of the Director or after approval of the City Council.

SECTION 13: MISCELLANEOUS PROVISIONS

1. Project Manager. Director reserves the right to approve the project manager assigned by Consultant to said work. No change in assignment may occur without prior written approval of the City.

2. Consultant Services Only. Consultant is employed to render professional services only and any payments made to Consultant are compensation solely for such professional services.

3. Subcontractors. Subcontracting of work without prior approval of the City, may result in contract termination. If at any time, the City determines any subcontractor is incompetent or undesirable, Vendor will be notified and will be expected to immediately cancel the subcontract.

4. Licensure. Vendor warrants that it has complied with any and all federal, state, and local licensing requirements and agrees to provide proof of a current City of Santa Cruz Business Tax Certificate if:
   - Vendor is located in the City of Santa Cruz;
   - Will perform physical work in the City of Santa Cruz for 6 or more days annually; or
   - Will use company vehicles to deliver within the City of Santa Cruz for 6 or more days annually.

   For additional information and licensing requirements, view the City's Business Licenses and Permits webpage or call the Revenue and Taxation division at 831/420-5070.

5. Other Agreements. This Agreement supersedes any and all other agreements, either oral or in writing, between the parties with respect to the Scope of Work specified in Appendix A.

6. City Property. The work, or any portion, of Consultant in performing this Agreement shall become the property of City. The Consultant shall be permitted to retain copies or such work for information and reference in connection with the City's use; however, such work shall not be used by the Consultant on other projects, except by agreement in writing by the City.

7. Consultant's Records. Consultant shall maintain accurate accounting records and other written documentation pertaining to the costs incurred for this project. Such records and documentation shall be kept available at Consultant's office during the period of this Agreement, and after the term of this Agreement for a period of three years from the date of the final City payment for Consultant's services.

8. Independent Contractor. In the performance of its work, it is expressly understood that Consultant, including Consultant's agents, servants, employees, and subcontractors, is an independent contractor solely responsible for its acts and omissions, and Consultant shall not be considered an employee of the City for any purpose.

9. Consultant Not an Agent. Except as City may specify in writing, Consultant shall have no authority, express or implied, to act on behalf of City in any capacity whatsoever as an agent. Consultant shall have no authority, express or implied, pursuant to this Agreement to bind City to any obligation whatsoever.

10. Conflicts of Interest. Consultant stipulates that corporately or individually, its firm, its employees and subcontractors have no financial interest in either the success or failure of any project which is, or may be, dependent on the results of the Consultant's work product prepared pursuant to this Agreement.

11. MacBride Principles/Peace Charter. City of Santa Cruz Resolution NS-19,378 (7/24/90) encourages all companies doing business in Northern Ireland to abide by the MacBride Principles and Peace Charter.

12. Storm Water Requirements. The Contractor, and all subcontractors, are required to abide by the applicable City of Santa Cruz Storm Water Best Management Practices (BMPs) for the duration of the work. The City's mandatory Storm Water BMPs, which are listed according to the type of work, operations, or business, are located on the City website at: http://www.cityofsantacruz.com/index.aspx?page=138.

13. Notices. If either party shall desire or is required to give notice to the other such notice shall be given in writing, via facsimile and concurrently by prepaid U.S. certified or registered postage, addressed to recipient as follows:

To CITY:	To CONSULTANT:
Water Engineering	Kennedy/Jenks Consultants
Heidi Luckenbach, Engineering Manager	Dawn Taffler
212 Locust St Ste C	300 N Lake Ave, Ste 1020
Santa Cruz CA 95060	Pasadena, CA 91101

Changes to the above information shall be given to the other party in writing ten (10) business days before the change is effective.

Technical Review:

By: Heidi R Luckenbach Date: 1/25/2016

Heidi Luckenbach, P.E
Deputy Water Director/Engineering Manager

Approved As To Form:

By: _____ Date: 1/26/16

City Attorney

CONSULTANT

By: Craig W. Lichty Date: 1/28/16

Printed: Craig W. Lichty Title: Vice President

CITY OF SANTA CRUZ WATER DEPARTMENT

By: Rosemary Menard Date: 2/1/2016

Rosemary Menard
Water Department Director

CITY OF SANTA CRUZ

By: Date: 2-2-16

Martín Bernal
City Manager

Appendix A
Scope of Work for the City of Santa Cruz
Regional Recycled Water Facilities Planning Study

Detailed Scope of Work for City of Santa Cruz-Kennedy/Jenks Consultants Agreement

The following Tasks summarize the proposed scope of work to develop a Santa Cruz Regional Recycled Water Facilities Planning Study (RWFPS), which is prepared to meet the goals posed by the City of Santa Cruz (City) and satisfies the project report requirements under the State Water Resource Control Board (SWRCB) Water Recycling Funding Program Guidelines. The primary purpose of the RWFPS for the Water Department is to meet the timeline outlined in the WSAC Agreements and Recommendations Report with the development of information on recycled water alternatives by December 2016, and to develop information about the recommended recycled water alternative early in 2017 for inclusion in a separate evaluation of In Lieu/ASR, recycled water, and seawater desalination, which will be completed by the end of 2017. The primary purpose of the RWFPS for the Department of Public Works is to develop a plan to reduce wastewater discharge into the Monterey Bay by determining the footprint and cost effectiveness of its treatment, distribution, and sale to potential new customers of the regional wastewater resource managed by the City of Santa Cruz and the County of Santa Cruz Sanitation District. The Santa Cruz Regional RWFPS will also meet the requirements of the SWRCB planning grant, which will position the City to apply for future grants and financial incentives available for recycled water projects, should a recommended recycled water project rise to the top in the analysis of the three water supply options noted above. The purpose for public outreach in the Santa Cruz Regional RWFPS is to share information with the public about the topics in the RWFPS as directed by the Santa Cruz City Council, to involve stakeholders in the progress of the study, and to satisfy the requirements of the SWRCB recycled water planning grant with regard to public outreach.

Additionally, the Santa Cruz Regional RWFPS will bring together information from former and newer studies of recycled water regarding opportunities in the region, incorporating the feasibility studies that are nearing completion. Seasonal demands also require thought to make full use of the recycled water resource, which is climate independent. For example, the City may elect to implement direct potable reuse, groundwater replenishment, irrigation water of North Coast agriculture and golf courses, and/or surface water augmentation with recycled water in dry years from the Spring to the Fall. However, there could be some evaluation of utilizing more surface water from Loch Lomond reservoir during the winter season to meet regional potable water demands and rest groundwater pumping to make room for purified recycled water when dilution water is available, and bank the groundwater for use in the dry season. Kennedy/Jenks will evaluate the efficiency of using recycled water year-round for multiple end-uses, taking into consideration the combination of several end uses for tertiary and purified recycled water in the region. This work will efficiently build on previous planning and design documents by the City and other Regional entities, including the Soquel Creek Water District (District), County of Santa Cruz (County), Scotts Valley Water District (SVWD) and other

local agencies, as appropriate. This work will also build on the technical work described in the Water Supply Advisory Committee Agreements and Recommendations Final Report (City of SC, October 2015).

Summary of Work

The scope of work for the Regional RWFPS is organized to follow the State Water Resource Control Board's (SWRCB) Water Recycling Program Funding - Recommended Planning Outline for Water Recycling Projects (Appendix B). The scope is organized into ten tasks, as shown in Table 1, which align with chapters recommended in the SWRCB outline. A more detailed discussion of each task is provided in the Scope of Work section. Table 2 provides additional detail about each task, including subtasks, key deliverables, the associated format for each deliverable, the Regional RWFPS Chapter the work will feed into, the City's role, key Subconsultant roles and dependencies.

Table 1: Task Structure

Task	Regional RWFPS Chapter
Task 1 - Project Management & QA/QC	
Task 2 - Background Information	Chapter 1 – Study Area Characteristics Chapter 2 – Water Supply Characteristics and Facilities
Task 3 - RW Market Analysis	Chapter 3 – Wastewater Characteristics and Facilities Chapter 5 – Recycled Water Market
Task 4 - Treatment Evaluation / Reg Requirements	Chapter 4 – Treatment Requirements for Discharge and Reuse
Task 5 - Alternatives Analysis	Chapter 6 – Project Alternative Analysis
Task 6 – Stakeholder Involvement	Chapter 5 – Recycled Water Market
Task 7 - Recommended Project	Chapter 7 – Recommended Facilities Project Plan
Task 8 – Financial Analysis	Chapter 8 – Construction Financing Plan and Revenue Program
Task 9 – Regional RWFPS Report	
Task 10 - Meetings and Workshops	

Table 2: Sub-Task Structure, Deliverables, Roles and Dependencies

Task	Key Deliverable	Presentation Format	RWFPS Chapter(s)	Lead	City Role	Dependent on
Task 1 – PM & QA/QC						
1.1 Monthly Status Reports and Invoices	18 invoices	Email to City	n/a	K/J - Dawn	Approve Invoices	Effort to date
1.2 Status Calls/Web Meetings	36 - 1 hr calls	Conf Call/Web	n/a	K/J - Dawn	Participation	Include participants involved in current task as-needed
1.3 Subonctracting Agreements	n/a	n/a	n/a	K/J - Dawn	n/a	Scope of Work
1.4 Schedule	Monthly schedule update	digital	n/a	K/J - Dawn	Review / Comment, Schedule mtgs with Regional Stakeholders and TWG	TWG milestones and Stakeholder Mtgs
1.5 Project Setup and Establish QA/QC Program	Project Work Plan	Update as-needed	n/a	K/J - Dawn	Review / Comment	n/a
Task 2 – Background Info						
2.1 Data Collection and Review	Data Request	Tracking Table	n/a	Team	Respond/Fulfill	Availability and speed of acquisition
2.2 Study Area Characteristics	Summary Table/Figure	Draft	Chapter 1	K/J	Review and provide updated information	Data Collection and Review
2.3 Water Supply and Facilities	Summary Table/Figure	Draft	Chapter 2	K/J	Review and provide updated information	
Task 3 – Recycled Water Market Analysis						
3.1 WWTF Facility and Supply Analysis	Summary Table/Figure	Draft	Chapter 3	Trussell - K/J	Coordination with WWTF and Santa Cruz County Sanitation District (SCCSD)	SqCWD Groundwater Replenishment Recycled Water Feasibility Study
3.2 NPR Demand Analysis	Summary Tables/ Chapter Text	Draft	Chapter 5	K/J	Coordination with City Staff who will identify and communicate with customers	Available meter data from City, input from customers, input from CA State Parks and farmers regarding recycled water use on the North Coast
3.3 Recycled Water Market Survey Map	Market Survey Map	Draft	Chapter 5	K/J	Provide GIS files	RW IPR maps would include SVWD and SqCWD; Loch Lomond; RW NPR maps would include North Coast Ag, and irrigation/industrial
3.4 IPR Potential - GW Replenishment	Tech Memo #1	Draft	Chapter 5	K/J	Coordination with Groundwater Stakeholders (SVWD, SqCWD, and the Soquel-Aptos Groundwater Management Committee)	Available hydrogeologic assessments, In-Lieu ASR Feasibility Study Consultant Input from SqCWD on Mid-County GWR Project and from SVWD on RW Hansen Quarry project
3.5 IPR Potential - Reservoir Augmentation	Tech Memo #2	Draft	Chapter 5	Welch - K/J	Coordination with Stakeholders	
3.6 Streamflow Augmentation	Tech Memo #3	Draft	Chapter 5	K/J - Smith	Coordination with Stakeholders / Regulators	Input from Regulators
3.7 DPR Potential	Tech Memo #4	Draft	Chapter 5	K/J	Coordination with Stakeholders	Input from Brown and Caldwell on DPR Project
Task 4 – Treatment Eval/Reg Requirements						
4.1 Define Water Quality Objectives for Uses	Summary Tables	Draft	Chapter 4	K/J	Coordination with customers	Input from potential users
4.2 Summarize Regulatory Requirements	Summary Tables	Draft	Chapter 4	K/J		
4.3 Treatment Evaluation	Tech Memo #5	Draft	Chapter 4	Trussell - K/J	Coordination with WWTF	Input from WWTF
Task 5 – Alternatives Analysis						
5.1 Refine Long-List of Alternatives	Summary Table/Figure	Draft	Chapter 6	K/J	Coordination with Regional Stakeholders	Input from City & Regional Partners and TWG
5.2 Preliminary Screening	Summary Table	Draft	Chapter 6	K/J - GHD	Coordination with Regional Stakeholders/ Regulators	
5.3 Evaluate Short List of Alternatives	Screening Tables	Draft	Chapter 6	K/J	Coordination with Regional Stakeholders	
5.4 Alternative Capital, O&M and Life Cycle Costs	Cost Tables	Draft	Chapter 6	K/J		
Task 6 – Stakeholder Involvement						
6.1 Outreach Strategy and Advice	Materials as requested	Draft	Chapter 5	DI - K/J	Development of strategy for maintaining stakeholder communication	May include input from stakeholders and potential users
6.2 Outreach Materials and Support	Materials as requested	Draft	Chapter 5	DI - K/J	Coordination/Logistics/Materials for meetings	Questions/Requests received, collection of data for report regarding customer commitments
Task 7 – Recommended Project						
7.1 Preliminary Facilities Design Criteria	Summary Table/Figure	Draft	Chapter 7	K/J	Facilities Input	Outcome of Task 5 and City Preferences
7.2 Implementation Plan	Summary Table/Figure	Draft	Chapter 7	K/J	Operational Input	
Task 8 – Financial Analysis						
8.1 Anticipated Financing Plan	Tech Memo #6	Draft	Chapter 8	RFC	City Staff or Contract with Raftelis Financial Consultants, Inc	Cost Tables from Task 5
8.2 Revenue Projection Program	Tech Memo #6	Draft	Chapter 8	RFC	City Staff or Contract with Raftelis Financial Consultants, Inc	Cost Tables from Task 5
Task 9 – Regional RWFPS Report						
9.1 Admin Draft for City	Admin Draft	digital	n/a	K/J	Distrbute, coordinate and compile comments from City, Regional Partners and Stakeholders	
9.2 SWRCB Draft	Draft	digital/hard copy	n/a	K/J		
9.3 Final Report	Final	digital/hard copy	n/a	K/J	Distribute final document	
Task 10 - Meetings and Workshops						
10.1 Kick-off Meeting (1)	Meeting Materials	digital/hard copy	n/a	K/J	Meeting Minutes	
10.2 F2F Meeting (w/ City PW and Water, TWG & Regional Partners) (2)	Meeting Materials / ppt	Draft/Final	Chapter 4/5	K/J	Create/manage TWG, logistics for workshops (coordinate, distribute materials, meeting minutes), facilitate workshop, team meeting before and after workshop	Task 3 & 4
10.3 Workshops - Alternatives Analysis/Recommmended Project (2)	Meeting Materials / ppt	Draft/Final	Chapter 6	K/J		Task 5
10.4 Present Final RWFPS (1)	Meeting Materials / ppt	Draft/Final	Chapter 6	K/J		Task 5
10.5 SWRCB Mid-Course Mtg - Draft Report (1)	Meeting Materials / ppt	Draft/Final	Chapter 7	K/J		Task 7

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General Assumptions

The general assumptions used to prepare this Scope of Work are summarized as follows.

- Regional Partners for this study include the Soquel Creek Water District, Scotts Valley Water District and the County of Santa Cruz Sanitation District.
- Project geographic area includes the City of Santa Cruz service area and portions of each Regional Partners service area and/or jurisdiction.
- This work will build on the technical team work described in the WSAC Agreement and Recommendations Final Report, other City and SqCWD consultants, and prior and ongoing planning work.
- Draft technical memoranda (TM), summary tables and figures produced under each task will be presented during meetings/workshops and are intended to be incorporated in the Regional RWFPS as-appropriate. Comments received will be integrated into a revised version to be incorporated into the Admin Draft Regional RWFPS for further review by the City and Regional Partners.
- Each subtask deliverable will include a draft presented during a conference call or meeting, and a final incorporating any comments. Summary tables, figures and associated text will be integrated into the Regional RWFPS as appropriate.
- The Regional RWFPS Report will include (1) administrative initial draft for review by the City and Regional Partners, (2) second draft for review by the City, Regional Partners and the SWRCB and (3) final Report for publication.
- For each deliverable, the City will provide a set of combined written comments from City and/or Regional Partners. The project schedule has been developed assuming all review comments will be received within two weeks of the draft documents' date. Comments will be discussed as required and incorporated into the final document as appropriate.
- The Kennedy/Jenks team will provide verbal progress updates to City staff during scheduled conference calls and a monthly status report will accompany each invoice for work.
- The work under this task order is assumed to be performed over an 18-month period starting upon receipt of the Notice to Proceed (NTP). If the work extends beyond this time period due to delays caused by others, the project management budget shall be increased as-required based on discussions with the City. This budget will be used to cover additional effort associated with additional meetings, invoices and coordination, etc resulting from the schedule extension.
- The Scope of Work shall be managed to be within the overall budget established for the project. Some tasks and subtasks may require more or less effort to complete, based on conditions that may be unforeseen at the time of scoping. Kennedy/Jenks reserves the right to move budget between tasks/subtasks for the base scope.
- Sampling and other field work is not included in this scope of work.
- Design or implementation of a pilot study is not included in this scope of work. Treatment technologies and facilities sizing will be evaluated using existing effluent water quality data from the Santa Cruz Wastewater Treatment Facility (WWTF), and other information provided by the City. Recommendations for bench-scale and/or pilot-scale treatment technology studies may be provided depending on the recommended project.

Public Outreach Assumptions

- Outreach activities will be coordinated with existing City Communications staff, who will provide services as described in the scope of work.
- The Kennedy/Jenks Team will prepare and present outreach materials within the scope described herein.

- As needed graphic support (layout, text & design) for collateral outreach materials and public meeting support materials such as posters, PowerPoint presentations and handouts is included up to the budgets established herein.

Services Provided by the City

The scope of work, schedule and budget assumes that the following services will be provided by City:

- The City will designate one or more individuals (as-needed) to:
  - Serve as a point of contact to assist the Kennedy/Jenks Team in obtaining needed data and scheduling meetings, workshops, site visits as defined in the scope of work.
  - Coordinate with other City Departments, other City consultants, potential customers, groundwater (GW) stakeholder groups, regulators and other stakeholders as-requested to support the scope of work.
  - Coordinate, schedule and provide logistics for meetings with potential users, workshops and meetings with Regional Partners.
  - Create and manage the Technical Working Group (TWG) and provide coordination and logistics for TWG workshops.
  - Distribute materials, take meeting minutes and provide support as-needed during meetings/workshops.
  - Distribute deliverables and coordinate the review process with the Regional Partners and other reviewers, and to provide consolidated comments and information to the Kennedy/Jenks team within the durations shown on the project schedule.
- The City will provide prior reports, technical memoranda, presentations and other information from prior planning efforts upon request, and in digital format if available.
- Aerial photos, GIS shapefiles, AutoCAD files and other facility information from previous planning and design efforts, or other City sources will be made available at no additional cost to the Kennedy/Jenks Team.
- The City Water Engineering and Public Works Staff will provide draft report text/tables/figures from previous planning efforts and will provide data to assist K/J GIS staff with the production of graphics for workshops as-requested.
- The City will provide relevant customer water use data including all meter data and previous demand estimates, at the start of the project to facilitate confirmation of the market assessment demands. These data will be provided in a digital format. If data input for hard copy information is required, additional scope and budget will be required.

Work by Subconsultants

- Merritt Smith Consulting– Regulatory Strategy Support
- Data Instincts – Stakeholder Outreach
- Trussell Technologies – WWTF Facility/Supply Analysis, Treatment Technologies and QA/QC Support
- Stratus Consulting/Abt Associates – Triple Bottom Line Analysis
- GHD Inc. – CEQA/Environmental Compliance Support
- Michael Welch, PhD. – Reservoir Augmentation

Scope of Services

Task 1 – Project Management & QA/QC

Project management includes submittal of monthly project status reports, bi-monthly check in calls, internal coordination to keep the project on schedule and budget, development of a project schedule and QA/QC program to be applied throughout the duration of the project.

1.1 Monthly Status Reports and Invoices

The scope assumes an 18-month contract duration with submittal of 18 status reports and invoices.

1.2 Status Calls/Web Meetings

The scope assumes 18 conference calls between the Kennedy/Jenks Project Manager and/or Engineer and the City. Kennedy/Jenks will provide conference call-in information and web-desktop sharing when appropriate. Supporting team members and/or subconsultants may be invited to participate as-needed. A running-action item list will be developed and updated during each call to keep track of the status of key action items.

1.3 Subcontracting Agreements

This subtask includes internal coordination to develop and execute Subconsultant agreements.

1.3 Schedule

This subtask includes the development of a project schedule as part of the initial work plan and periodic updates to discuss during check-in calls with the City.

1.4 Project Setup and Establish QA/QC Program

Based on the project approach, task description, and the fee schedule submitted with the proposal, Kennedy/Jenks will prepare a Project Team Work Plan to lay the groundwork for efficient execution of services for this Project. The Project Team Work Plan includes development of a QA/QC Program for conducting internal QA/QC prior to presenting deliverables to the City.

Established QA/QC procedures, to be employed by all team members, shall address the use of quality control review, calculation checking, conceptual design checking, ARC View or AutoCAD interference and interface checking, construction and operation issues, and other measures necessary to maintain a consistent, complete, high quality, and compatible deliverable. Quality reviews will be conducted prior to draft and final submittals. A concept and criteria review C&CR (internal to Kennedy/Jenks team) will be conducted at an early stage of the planning process. The C&CR is an important quality control tool that gives the team an early opportunity to review the project concepts with experienced staff.

Task 1 Key Assumptions: City to schedule key meetings with regional stakeholders and the TWG.
Task 1 Deliverables: Kennedy/Jenks to submit 18 invoices and status reports, project schedule and updates, Project Team Work Plan.

Task 2 - Background Information

Work performed in Task 2 builds on previous work performed by Kennedy/Jenks, the City, Regional Partners, and other consultants. The Regional RWFPS will consider recent City of Santa Cruz water supply planning discussions, public input, and the WSAC Agreements and Recommendations Final Report recycled water alternatives while also considering other beneficial uses of recycled water. Existing studies, reports, presentations, drawings, and data will be provided by the City and County upon request and if available reviewed as part of this task. Task 2 will consist of the following three sub-tasks to meet the SWRCB grant guidelines requirement for **Chapter 1 – Study Area Characteristics** and **Chapter 2 – Water Supply Characteristics**. Tasks discussed below are generally limited to updating the existing data on file, summarizing information from prior studies and revising existing project mapping documents.

2.1 Data Collection and Review

Kennedy/Jenks will prepare an information request for gathering relevant information (e.g. previous studies, reports, presentations, drawings, etc.) from the project stakeholders to aid in evaluation and project definition for the Study. This study will build on existing information that Kennedy/Jenks has compiled for previous projects, prior recent studies from: other consultants, City led studies and Regional Partner studies, which will be provided to Kennedy/Jenks. Existing information will be reviewed, as needed, to inform the team of current conditions and previous recycled water efforts. Early consultation with other consultants who previously developed or are currently developing information on reuse water supply alternatives will be necessary to avoid duplication of work. Information to be reviewed includes, but is not limited to:

- Relevant studies and information from recent water supply planning efforts (to be identified by the City)
- Geographic Information System (GIS), maps, aerial photos, drawings and other available information
- 2015 Urban Water Management Plan (UWMP) information as-developed
- Previous recycled water studies
- Existing wastewater quality, quantity, flows, NPDES permit, and other supply analyses
- Delineation of sewer and water service areas
- Information on recycled water ownership and rights to use the water

The City will work with Kennedy/Jenks to obtain appropriate levels of demand information by customer class. Aerial photos, GIS shape files, AutoCAD files and other available facility information from previous planning and design will be made available to the project team. Information collected and reviewed in this task will be used to meet the SWRCB grant funding requirements. The information is assumed to be provided within 3 weeks of the information request in order to meet the time schedule. Kennedy/Jenks will maintain a tracking table to document when data is requested and received.

2.2 Study Area Characteristics

In this task, information provided in Task 2.1 will be used to summarize background information to meet the SWRCB grant guidelines requirement for **Chapter 1 – Study Area Characteristics**. This

section will include maps, diagrams, study area characteristics such as hydrologic features, groundwater basins, land use and land use trends, population projections and the regional framework for wastewater treatment and disposal, imported water, and recycled water in the area. Kennedy/Jenks will develop draft summary tables and figures for discussion during project meetings and integration into the Regional RWFPS. The City will produce the draft content for **Chapter 1** of the Report based on information in existing studies and reports. Kennedy/Jenks will provide preliminary guidance and review of the draft section of the report and integrate it into the Regional RWFPS.

2.3 Water Supply and Facilities

In this task, information provided in Task 2.1 will be used to summarize background information to meet the SWRCB grant guidelines requirement for **Chapter 2 – Water Supply Characteristics and Facilities**. This section will include a description of wholesale and retail entities, sources of water supplies. The City will provide relevant information to summarize major facilities and their costs (fixed and variable), subsidies, and customer prices, capacities of present facilities, existing flows, and estimated years when capacities to be reached for major components (WWTF, major transmission and storage facilities). The section will summarize use trends, groundwater management and recharge, overdraft problems, surface water diversions, surface and ground water quantity, quality and beneficial uses. Kennedy/Jenks will develop draft summary tables and figures for discussion during project meetings and integration into the Regional RWFPS. The City will produce the draft content for **Chapter 2** of the Report. Kennedy/Jenks will provide preliminary guidance and review of the draft section of the report and integrate it into the Regional RWFPS.

Task 2 Key Assumptions: The City will respond to requests for information within 3 weeks of the information request. The City will produce the draft content for **Chapters 1 and 2** for review and integration into the Regional RWFPS.

Task 2 Deliverables: Kennedy/Jenks to submit a request for information, maintain a tracking table for information requests, develop draft summary tables and figures for **Chapters 1 and 2**, and provide review comments of **Chapter 1 and Chapter 2**.

Task 3 – Recycled Water Market Analysis

Under this task the available recycled water supply and potential market for recycled water will be evaluated. Potential non-potable customers and demands will be estimated and described in Chapter 5, opportunities for potable reuse will be explored (i.e. groundwater replenishment, reservoir augmentation and direct potable reuse). Four Technical Memorandum (TM) will be developed under this task and included as appendices to the Regional RWFPS as appropriate.

- TM #1 Groundwater Replenishment
- TM #2 Surface Water Augmentation
- TM #3 Streamflow Augmentation
- TM #4 Direct Potable Reuse

3.1 WWTF Facility and Supply Analysis

This task will summarize information to meet the SWRCB grant guidelines requirement for **Chapter 3 – Wastewater Characteristics and Facilities.** This section will include a description of wastewater

and recycled water facilities and capacities, quality, flow variations, facility needs, rights, agreements and pricing. The source water supply analysis will primarily be based on the following studies, to be provided by the City:

- SqCWD Groundwater Replenishment Recycled Water Feasibility Study Report Tech Memo 1 Treatment Evaluation of City WWTF (Carollo Engineers)
- WWTF excess capacity and treatment footprint "black box" calculations (Brown and Caldwell)

This task may also consider updates being developed for the 2015 UWMP and information provided by the City's Department of Public Works. Draft summary tables and figures will be developed for discussion during project meetings and integration into the Regional RWFPS.

3.2 NPR Demand Analysis

This task will provide information to meet the SWRCB grant guidelines requirement for **Chapter 5 – Recycled Water Market.** The non-potable reuse analysis will estimate potential non-potable demands based on current water meter data, estimates from previous studies for the City of Santa Cruz and SqCWD's service area, as well as high-level planning information developed in the Final WSAC Report and Appendices, Cost Data and Analysis Appendix 8. Kennedy/Jenks will review the assumptions related to the estimation of annual and peak irrigation, commercial and industrial demands and work with City staff to identify potential recycled water customers. Draft summary tables and figures will be developed for discussion during project meetings and integration into the Regional RWFPS, with information that could be used to identify customers obscured as appropriate. This task does not include direct contact with customers, though the City may elect to initiate outreach to those customers identified in the recommended alternative.

3.3 Recycled Water Market Survey Map

Kennedy/Jenks will produce a recycled water survey map to illustrate the geographic distribution of potential customer sites and relative demands. The map will highlight each potential customer's geographical location and relative water demands based on the database of customers and demands from prior work provided by the City under Task 3.2 and discussions with City staff. Due to the size of the study area, up to three "zoom in" maps may be necessary to clearly identify customers or use sites.

3.4 IPR Potential - GW Recharge Reuse

A high-level evaluation of groundwater recharge with recycled water (also referred to as indirect potable reuse or IPR) will rely on existing hydrogeologic studies for the Santa Margarita and Purisima basins, information developed in the Final WSAC Report and Appendices, Cost Data and Analysis Appendix 8, and planning work performed under a separate contract with Pueblo Water Resources groundwater team, as well as Hydrometrics for ASR wells in the Purisima. The Kennedy/Jenks Team will review information and assumptions from these studies, and other IPR efforts being explored by Regional Partners, evaluate treatment and conveyance requirements and integrate IPR into the alternatives analysis. It is assumed that these studies will estimate the capacity of the groundwater environment to accept recycled water, identify potential locations and types of recharge facilities, and estimate the sustainable extraction rate based on the capacity of existing wells and infrastructure to ultimately determine the project's potential to supplement potable water supplies. Kennedy/Jenks will

coordinate with City staff and other consultants performing the In Lieu/ASR feasibility study work to stay informed of new data and current plans for implementing groundwater recharge. This task will also consider opportunities for seasonal uses for recycled water for different end users (i.e. serving adjacent irrigation sites in the summer and maximizing recharge in the winter).

Draft summary tables and figures will be developed for discussion during project meetings and document the findings in **TM #1 Groundwater Recharge Reuse**. The analyses will be integrated into **Chapter 5 – Recycled Water Market** as-appropriate, and the TM #1 will be included as an appendix in the Regional RWFPS.

3.5 IPR Potential - Reservoir Augmentation

The Kennedy/Jenks Team will develop a high-level concept for reservoir augmentation at Loch Lomond Reservoir, including treatment and conveyance requirements, building on prior studies by Kennedy/Jenks, information from the Final WSAC Report and Appendices and the most recent understanding of regulatory requirements. Draft summary tables and figures will be developed for discussion during project meetings and document the findings in **TM #2 Surface Water Augmentation.** The analyses will be integrated into **Chapter 5** as-appropriate, and TM #2 will be included as an appendix in the Regional RWFPS.

3.6 Streamflow Augmentation

The Kennedy/Jenks Team will develop a high-level concept for streamflow augmentation building on prior studies by Kennedy/Jenks, information from the Final WSAC Report and Appendices and the most recent understanding of regulatory requirements for this unique use. This task will provide an overview of the potential treatment technologies available for this purpose, examples of where streamflow augmentation with recycled water has been pursued in other areas and the challenges and benefits to this beneficial reuse in Santa Cruz. Draft summary tables and figures will be developed for discussion during project meetings and document the findings in **TM #3 Streamflow Augmentation.** The analyses will be integrated into **Chapter 5** as-appropriate, and TM #3 will be included as an appendix in the Regional RWFPS.

3.7 DPR Potential

The Kennedy/Jenks Team will develop a high-level concept for Direct Potable Reuse (DPR) that summarizes potential concepts for source water blending or direct pipe-to-pipe delivery within the City's service area, and the forthcoming regulatory guidance to be issued in September 2016. The evaluation will identify necessary facilities and potential locations to tie into the raw water source or potable water system, using information from the Final WSAC Report and Appendices. This task includes considerations for the development of robust treatment methods to address public concerns about the risks, reliability and quality of recycled water for DPR. Draft summary tables and figures will be developed for discussion during project meetings and document the findings in Draft **TM #4 Direct Potable Reuse.** The analyses will be integrated into **Chapter 5** as-appropriate, and TM #4 will be included as an appendix in the Regional RWFPS.

Task 3 Key Assumptions: The City will lead coordination with appropriate City staff (i.e. Public Works Department or individuals who would communicate with customers), Consultants from prior and ongoing studies, groundwater stakeholder groups and other potential stakeholders or customers as appropriate.

Task 3 Key Subconsultant Roles:

- Dave Smith will advise on permitting strategy and potable reuse regulations.
- Trussell Technologies will contribute to the review and development of potable reuse concepts related to recycled water quality, treatment technologies, natural attenuation, risk and the most current state of research.
- Michael Welch will update the reservoir augmentation concept based on the most up to date surface water augmentation criteria.

Task 3 Deliverables: Kennedy/Jenks Team to develop draft summary tables and figures for **Chapters 3 and 5**, a Recycled Market Survey Map (up to three zoom in areas may be developed), Draft TM #1 Groundwater Replenishment, Draft TM #2 Surface Water Augmentation, Draft TM #3 Streamflow Augmentation and Draft TM#4 Direct Potable Reuse.

Task 4 - Treatment Evaluation and Regulatory Requirements

This task will provide a summary of typical water quality objectives for potential uses identified in the market assessment and the regulatory requirements to serve those uses. Using this information, treatment trains will be developed to produce recycled water to meet each use. The work performed will meet the SWRCB grant guidelines requirement for **Chapter 4 – Treatment Requirements for Discharge and Reuse. TM #5 Treatment Evaluation** will be developed under this task and included as an appendix to the Regional RWFPS.

4.1 Define Water Quality Objectives for Uses

This task will summarize water quality objectives for the non-potable and potable uses described in Task 3. Draft Summary tables will be developed for discussion during project meetings and integration into the Regional RWFPS.

4.2 Summarize Regulatory Requirements

Regulatory requirements for non-potable uses will be summarized based on Title 22 of the California Code of Regulations. Requirements for potable uses will be summarized base on the most recent guidelines for potable reuse currently under development. Draft Summary tables will be developed, as appropriate, for discussion during project meetings and integration into the Regional RWFPS.

4.3 Treatment Evaluation

This task will provide a conceptual assessment of various treatment processes and concentrate disposal options and their associated capacities, footprints, capital and O&M costs, and energy requirements. This task will build on previous evaluations of treatment technologies, including the Draft TM on IPR currently being prepared by Carollo for the SqCWD, and other recently produced documents developed for the City Department of Public Works and the Water Department, SqCWD, Scotts Valley and other relevant recycled water studies.

The treatment technology evaluation will look at a variety of processes to treat secondary water from the Santa Cruz WWTF. Treatment technologies to be evaluated included but are not limited to, ozone and biologically activated carbon before microfiltration, tertiary media filters, microfiltration, advanced treatment technologies, such as reverse osmosis (RO) membranes or electrodialysis reversal (EDR), and disinfection options (chlorination and ultraviolet radiation). The advanced treatment analysis will include an evaluation of the percent bypass and the need for concentrate disposal.

The Kennedy/Jenks Team will work closely with the City to understand the City's preference for treatment technologies, facility siting and integration with other regional programs. Draft summary tables and figures will be developed for discussion during project meetings and the findings will be documented in Draft **TM #5 Treatment Evaluation.** The analyses will be integrated into **Chapter 4** as-appropriate, and TM #5 will be included as an appendix in the Regional RWFPS.

Task 4 Key Assumptions: The City will lead coordination with the Department of Public Works), Consultants from prior and ongoing studies, and regional partners to obtain recent studies, data and information as-needed.

Task 4 Key Subconsultant Roles:

- Trussell Technologies will lead the review and development of treatment concepts related to removal rates and treatment train evaluations (including footprint, energy, and costs).

Task 4 Deliverables: Kennedy/Jenks Team to develop draft summary tables for **Chapter 4** and Draft TM #5 Treatment Evaluation.

Task 5 - Alternatives Analysis

This task will build on the project and regional alternatives developed as part of previous studies. The preliminary list of potential recycled water alternatives shown in Table 3 will be reviewed and refined to develop a **long-list of projects**. A preliminary screening will be applied to eliminate less viable alternatives from further considerations. A **short list of alternatives** will then be identified for further evaluation. The evaluation of the short-list will result in the identification of a recommended project for further analysis, which maximizes potential benefits from the reuse program. This task will meet the SWRCB grant guidelines requirement for **Chapter 6 – Project Alternative Analysis.**

Table 3: Preliminary List of Recycled Water Projects for the Santa Cruz Regional Recycled Water Facilities Planning Study

Long-List of Projects	Recycled Water Use	Source Water	Treatment	Project Area(s)
1a	Industrial Use/ Landscape Irrigation	Santa Cruz WWTP	Tertiary	City, District and County
1b		Local Raw Wastewater	MBR Tertiary	UC Santa Cruz
2	North Coast Agricultural Irrigation	Santa Cruz WWTP	Tertiary	North Coast
3	Seawater Barrier	Santa Cruz WWTP	Advanced Treatment	Lower Groundwater Basins
4a	Groundwater Replenishment	Santa Cruz WWTP	Advanced Treatment	Upper Groundwater Basins
4b				
5	Reservoir Augmentation	Santa Cruz WWTP	Advanced Treatment	Loch Lomond Reservoir
6	Streamflow Augmentation	Santa Cruz WWTP	Tertiary or Advanced Treatment	San Lorenzo River
7	Direct Potable Reuse	Santa Cruz WWTP	Advanced Treatment	City, District and County

Work performed in Task 5 builds on previous work performed by Kennedy/Jenks, the City, Regional Partners, and other consultants. The Regional RWFPS will consider recent City of Santa Cruz water supply planning discussions, public input, and the WSAC Agreements and Recommendations Final Report recycled water alternatives while also considering other beneficial uses of recycled water.

5.1 Refine Long-List of Projects

This task will build on work on prior and current recycled reports and studies to develop a **long-list of projects** in the study area. Regional projects that may offer opportunities for Santa Cruz to beneficially reuse its local raw wastewater may be added to the long-list of projects in Table 3. Permutations of projects may also be considered, such as combining potable reuse with seasonal non-potable reuse to maximize reuse and acceptability to the public. For this preliminary assessment, a high-level approach will be used to describe each project with available quantitative and qualitative information to conduct preliminary screening in Task 5.2.

Information on facility siting and sizing will be integrated if available from previous studies. Facility sizing for new project permutations will be based on conceptual-level engineering considerations and professional experience. A siting analysis or detailed hydraulic analyses will not be conducted under this task; however significant obstacles to site or deliver recycled water will be identified and incorporated into the preliminary screening analysis in Task 5.2. The refinement of projects may include identification of high-level phasing approaches (i.e. near-term and long-term) for consideration in the preliminary screening analysis.

This task will include coordination with regional stakeholders and input from the City, Regional Partners and the TWG to define the long-list of projects. Stratus Consulting will provide advisory support to develop the long-list of projects and draw in part on insights and materials developed as

part of the WSAC process. Draft summary tables and figures will be developed for the resulting long-list of project alternatives, which will be integrated into **Chapter 6** as-appropriate.

5.2 Preliminary Screening

This task will consider the project **goals and objectives** described on page 1 of this Scope of Work and the vision of the City's Water and Public Works Departments to define the appropriate goals and objectives for this Regional RWFPS.

A set of **screening criteria** will be developed (similarly building on criteria developed through the WSAC process that are vetted with the City) to compare the relative benefits and limitations of the long-list of projects developed in Task 5.1. The screening criteria should encompass a range of issues that could affect implementation of the alternative, including but not limited to regulatory, environmental, construction, operations and public acceptance.

Stratus Consulting will identify Triple Bottom Line (TBL) possibilities, key benefits, and point out data collection needs at a high-level and provide advice based on a qualitative discussion of relative magnitude and importance of key benefits.

GHD will provide a high-level assessment of environmental considerations based on a review of existing aerial mapping, CEQA documents, biological studies, or other studies applicable to the proposed project types. This analysis would include a general review of up to seven project types: (1) Landscape Irrigation, (2) Agricultural Irrigation, (3) Seawater Barrier, (4) Groundwater Replenishment, (4) Reservoir Augmentation, (5) Streamflow Augmentation, and (6) Direct Potable Reuse, to identify fatal flaws, including potential challenges and issues associated with CEQA and permitting; potential mitigation options and costs; and the type of additional studies needed. The results of this review will be provided in tabular format.

This task assumes:

- no plant or wildlife surveys will be conducted,
- no specific mitigation plans will be developed, and
- no resource agency permits or cultural resources evaluation, mitigation, and monitoring will be conducted.

A **short-list** of up to 3 alternatives will be identified for more detailed evaluation using a fatal flaw approach to remove from consideration alternatives that are less feasible or do not meet the project goals and objectives. Fatal flaws may be defined based on institutional, engineering or implementation obstacles that would impede the ability of the City to pursue the alternative.

Draft Summary tables will be developed to quantitatively and/or qualitatively illustrate the results of the preliminary screening analysis and to summarize the findings of the fatal flaw analysis, which will be integrated into **Chapter 6** as-appropriate.

5.3 Evaluate Short List of Alternatives

The **short list of alternatives** (up to 3) identified in Task 5.2 will be further evaluated through:

- Mapping each alternative to illustrate the location of treatment, pumping and storage facilities, pipeline alignments, and customers served.
- Development of facility sizing criteria summarizing the required capacity of the proposed treatment facility, treated water storage reservoirs, pipelines, and pump stations for each alternative based on the average daily, peak daily, and peak hourly demands for the customers served.
- Comparing alternatives based on quantitative and qualitative evaluation criteria.
- Developing an approach to distribute the relative costs and benefits between the City, District and County.
- Presenting the alternatives analysis in public meetings, workshops or to the appropriate stakeholders as identified by the City to solicit input and provide a transparent process (to be aligned with those meetings identified in Task 10).
- Working with the City to apply a "scorecard" approach to analyze a range of alternatives across several criteria.

Stratus Consulting will perform a simplified TBL analysis for up to 3 alternatives[1]. The goal of the analysis will be to help provide TBL information that will help distinguish between project options -- not to provide comprehensive TBL economic analysis. Concentrating on key economic benefits such as avoided residential or business shortages, or avoided energy use and associated GHG emissions, or avoided impact on endangered fish species, will provide the highest value from TBL economic insights for a limited budget allocation.

The TBL effort will:

- rely on methods and approaches already developed in the literature,
- build on knowledge from the previous work supporting the WSAC process,
- be supplemented by Santa Cruz data if readily available,
- include only key business subsectors most useful in distinguishing between recycled water options,
- acknowledge that there is a greater range of economic value that may not be fully captured, and
- include the most appropriate geographic scope and regional perspective in a way that best suits the City's goals while staying within our budget allocation.

The SWRCB Guidelines include identification of the **No Project Alternative** in **Chapter 6.** The selection of a No Project Alternative is also an important consideration in setting up a baseline for the TBL economic analyses. Santa Cruz has been through an extensive water supply planning process in order to help avoid future shortage conditions to residential and business water users during

[1] If more than 3 alternatives area identified additional budget will be requested or the level of effort per alternatives will be reduced or further simplified to stay within the budget allocation.

prolonged drought while meeting the City's environmental stewardship goals. As part of that process, groundwater recharge (passive/in-lieu as well as active/aquifer storage and recovery) was selected as the preferred option. This Task assumes that groundwater recharge (passive recharge and active aquifer storage and recovery), which has been selected as the preferred water supply option, is the No Project Alternative. This task will define the No Project Alternative to meet the SWRCB requirements and provide the baseline for the TBL analysis. If more than one baseline alternative are necessary, the depth of analysis will be adjusted to remain within the budget allocated.

The evaluation of the short-list of alternatives under this task will be presented in a workshop (Task 10) to identify a **Recommended Alternative** for further development in Task 7.

Draft Summary tables will be developed to quantitatively and/or qualitatively illustrate the results of the short-list screening analysis, which will be integrated into **Chapter 6** as-appropriate.

5.4 Alternative Capital, O&M and Life Cycle Costs

This task will include the refinement and development of capital, operating, and life cycled costs for the long-list and short-list of alternatives, respectively.

- The costs for the long-list of projects will rely primarily on capital cost information provided in prior studies with modifications at a high-level to reflect project permutations identified in Task 5.1. Appraisal-level capital costs will be amortized over the life of the project and divided by the anticipated volume of recycled water delivered to provide an estimate of the unit capital cost per acre-foot ($/AF) for preliminary screening in Task 5.2.
- The costs for the short-list of alternatives will be developed based on a Class 5 level representing Planning to Feasibility level information with an estimated accuracy range between -30 percent and +50 percent. Capital, O&M and life cycle costs will be developed for each short-listed alternative and a unit life cycle cost per acre-foot ($/AF) for the alternatives evaluation in Task 5.3.

Detailed and summary cost tables will be developed and integrated into **Chapter 6** and/or included in an appendix of the Regional RWFPS as-appropriate.

Task 5 Key Assumptions: The City Water Department staff will lead coordination with staff from the Department of Public Works Public Works Department), Consultants from prior and ongoing studies, and Regional Partners to obtain recent studies, data and information as-needed. For groundwater replenishment projects, Kennedy/Jenks shall identify information needed from the City's hydrogeologist, SVWD's hydrogeologist, and the Soquel Creek Water District's hydrogeologist to aid in alternatives development and analysis. The City will provide cost spreadsheets from the 2014-2015 water supply planning evaluations and where possible from other regional studies to Kennedy/Jenks where possible. No field work or measurements will be conducted as part of this task.

Task 5 Key Subconsultant Roles:

- Merritt-Smith Consulting will advise on the preliminary screening and fatal flaw analysis.
- GHD will provide environmental perspective to support the preliminary screening as described in Task 5.2

- Stratus will provide advising support and perform a simplified TBL analysis as described in Tasks 5.1, 5.2 and 5.3.

Task 5 Deliverables: Kennedy/Jenks Team to develop draft summary tables and figures for **Chapter 6**.

Task 6 - Stakeholder Involvement

This task will serve to provide opportunities for participation of the public, potential recycled water users, and other affected agencies and build on the interest, knowledge and momentum gained over the last 18 months through the water supply planning process. The City will address stakeholder communications during the development of the City RWFPS, providing information to the Water Commission and the City Council when requested. The City may choose to assemble an interdisciplinary Water Reuse Technical Working Group (WRTWG) to contribute to the alternatives analysis portion of the development of the City RWFPS and operate as a technical peer review group. The tasks and level of effort under this task may be scaled up or down depending on the results of the alternative analysis and interest in the study.

6.1 Outreach Strategy and Advice

This task will define the appropriate outreach activities to meet the SWRCB grant requirements and communicate information from the Regional RWFPS to City staff, Regional Partners, groundwater agencies, regulatory agencies and other stakeholders or advisory committees. The Kennedy/Jenks Team will work closely with the City's outreach staff to define an approach that will efficiently supplement your ongoing stakeholder involvement efforts, and to align with the recommended project (once identified). This task includes one public meeting that may be combined with a Water Commission Meeting.

6.2 Outreach Materials and Support

This task will provide for the development of materials for meetings, workshops and other outreach efforts to communicate the process and recommendations for the Regional RWFPS (i.e. graphic support (layout, text & design) for collateral outreach materials and public meeting support materials such as posters, PowerPoint presentations and handouts). When appropriate, pertinent materials readily available from collaborative research projects, such as the WaterReuse Research Foundation's (WRRF) "Model Communication Plans for Increasing Awareness and Fostering Acceptance of Potable Reuse" (WRRF-13-02) and "Risk Assessment Study of PPCPs in Recycled Water to Support Public Review (WRF-09-07)" will be used to support your outreach efforts. Similarly, materials developed for the WSAC may be valuable to reuse through this process to provide consistent terminology and messaging to the public.

Task 6 Key Assumptions: The Kennedy/Jenks Team will work closely with the City's outreach staff to define the appropriate outreach strategy to meet the SWRCB requirements and level of effort for outreach support.

Task 6 Key Subconsultant Roles: Data Instincts will provide advice on the outreach strategy and lead the development of public outreach and communication materials as-needed.

Task 6 Deliverables: The Kennedy/Jenks Team will develop materials as requested within proposed budget.

Task 7 - Recommended Project

It is recognized that the **Recommended Alternative**, identified through the alternatives analysis in Task 5 and the workshop process in Task 10, may be defined as one or more phased projects. Under this task, the recommended alternative will be refined through discussions with the City to develop a **Recommended Project** and a **Facilities Project Plan** that meets the SWRCB grant guidelines requirement for **Chapter 7 – Recommended Facilities Project Plan.**

- It is understood, through conversations with the SWRCB Funding Division, that the Regional RWFPS should result in a Facilities Project Plan for a recommended project that is intended to be implemented and the study would be the first step to getting funding through the State Revolving Fund (SRF)
- It is assumed that the City would be able to lead and/or make critical decisions regarding the recommended project to allow for the development of the Facilities Project Plan within the schedule and scope for the Regional RWFPS.
- It is recognized that regional components of the recommended alternative may be outside of the City's control, and therefore a plan for development of regional facilities may only be presented at a high-level.

7.1 Preliminary Facilities Design Criteria

A facilities project plan will be developed that describes all proposed facilities and the basis for selection. The recommended project will be summarized based on preliminary design criteria, customers and their associated uses and demands, conveyance requirements and costs, and reliability of facilities as compared to user requirements. Draft summary tables and figures will be developed for discussion during project meetings and the findings will be integrated into **Chapter 7.**

7.2 Implementation Plan

Under this task, a recommended plan for implementation and phasing of the recommended project will be described. The implementation plan will identify future activities that would be necessary for the development and implementation of the project, such as; CEQA compliance, regulatory permitting, right-of way, design/construction efforts and ongoing O&M responsibilities. Retrofit considerations for recommended customers will be described, as-appropriate. Coordination with water suppliers and the need for institutional agreements, ordinances, rules and regs, and development of contracts will be discussed at a planning level.

Task 7 Key Assumptions: The Kennedy/Jenks Team will work closely with the City Water Department and Department of Public Works to understand preferred design criteria, operational considerations and implementation preferences for the City's recommended project. Design criteria and implementation requirements for regional facilities outside of the City's control may be described at a high-level unless specific information is provided by the Regional Partners from prior or ongoing studies that can be integrated with minimal effort.

Task 7 Deliverables: The Kennedy/Jenks Team will develop draft summary tables and figures to describe the recommended project in **Chapter 7**.

Task 8 – Financial Analysis

This task will meet the SWRCB grant guidelines requirement for **Chapter 8 – Construction Financing Plan and Revenue Program**, through the development of a construction financing plan and revenue program.

8.1 Anticipated Financing Plan

An anticipated **construction financing plan** will identify potential sources and timing of funds for design and construction, based on costs for the recommended project identified in Task 7 and discussions with City Staff. This task will also summarize potential existing and future funding opportunities for the design and construction of recycled water projects, including State and Federal grant and loan programs.

8.2 Revenue Projection Program

The **revenue program** will estimate a potential pricing policy for recycled water and other costs that could be allocated to the project. **Raftelis Financial Consultants (RFC)** will be contracted separately by the City, or City financial staff may develop a pricing policy for recycled water and provide an annual projection of water prices for each user category. RFC or City financial staff will develop annual revenue requirements for the recycled water project and allocate these costs to water supply, water pollution control and recycled water users as appropriate. Kennedy/Jenks will review the scope of work provided by RFC to clarify the information needed by the Kennedy/Jenks Team and the deliverable required to meet the SWRCB requirements. It is assumed that RFC, or City financial staff would submit a memo to Kennedy/Jenks and the City for review, integration into **Chapter 8** and inclusion as an appendix to the Regional RWFPS.

Task 8 Key Assumptions: The appropriate individuals at the City's financial department will be made available to provide information on the City's preferred approaches to finance projects.
Task 8 Key Subconsultant Roles: RFC will be contracted directly by the City under another contract and will work with Kennedy/Jenks to obtain information developed for the recommended project (in **Task 7**), develop a memo on the revenue projection program that meets the SWRCB requirements, and respond to comments and questions related to the integration of their work into **Chapter 8**.
Task 8 Deliverables: The Kennedy/Jenks Team to develop draft summary tables and figures to describe the construction financing and revenue program for the recommended project in **Chapter 8**.

Task 9 – Regional RWFPS Report

Work under all previous tasks will be compiled in a Regional RWFPS Report that meets the requirements of the SWRCB Water Recycling Program Funding criteria. The report will incorporate the final table and figure deliverables (listed in Table 2) and provide a description of the assumptions, criteria, and methodology for creating alternatives and performing calculations. An outline of the

report will be developed and shared with the City early in the project to solicit input and obtain agreement with our approach for reporting on this effort. The Regional RWFPS Report will include:

1. An administrative initial draft for review by the City and Regional Partners,
2. A second draft for review by the City, Regional Partners and the SWRCB and
3. A final report for publication.

Task 9 Key Assumptions: The City will distribute, coordinate and compile comments from City, Regional Partners and Stakeholders within two weeks of submitting a deliverable. Comments will be submitted in a digital format (i.e. track changes in word, pdf comments and/or a matrix identifying the comment for an identified section/page/figure/table).
Task 9 Key Subconsultant Roles: Draft TMs, summary tables, figures and other work performed by the Kennedy/Jenks Team or City contracted subconsultants under separate tasks will be summarized in the Regional RWFPS and reviewed by the original authors or QA/QC as appropriate.
Task 9 Deliverables: A digital copy (pdf and word) will be submitted for all deliverables. Up to five hard copies of the second Draft and final Report will be produced by the Kennedy/Jenks Team.

Task 10 – Meetings and Workshops

Meetings and workshops will be conducted throughout the project to present updates on the Regional RWFPS and solicit input from City departments, Regional Partners, Stakeholders, TWG Members, the City Water Commission and other groups as appropriate.

The scope of work assumes the following meetings and workshops:

- **Kick-Off Meeting with City (1):** The kick-off meeting will be conducted at the beginning of the project with the Kennedy/Jenks Team Project Manager and Project Engineer. A driving tour of the sites identified in prior planning efforts may be conducted in conjunction with the Kick-Off meeting if possible.
- **In Person Meetings (2):** Includes up to two face-to-face meetings with City departments, TWG Members and/or Regional Partners with the Kennedy/Jenks Team Project Manager and up to two technical staff (depending on the focus topic).
- **Workshop (2):** Includes up to two workshops with City departments, TWG Members and Regional Partners to discuss the alternatives analysis and recommended project; to be attended by the Kennedy/Jenks Team Project Manager and up to two technical staff (depending on the focus topic). One of these may be conducted at a Water Commission meeting.
- **Present Final RWFPS (1):** Includes one face-to-face meeting to present the findings of the Regional RWFPS.
- **SWRCB Mid-Course Meeting (1):** Includes one face-to-face meeting with the SWRCB to present the findings of the Draft Regional RWFPS.

Task 10 Key Assumptions: The City will create and manage the TWG, provide logistics for meetings and workshops (coordinate, provide venue, provide phone/internet service, distribute

materials, take meeting minutes), and facilitate a team meeting before and after each meeting/workshop. Kennedy/Jenks will develop technical materials, provide conference call number and link for desktop sharing, develop agenda to distribute to the City in advance of the meeting and review meeting minutes.

Task 10 Key Subconsultant Roles: Key subconsultants may be asked to attend meetings and workshops under defined budgets under separate tasks. Dave Smith will serve as a strategic advisor and possible facilitator for key workshops. Mark Milan is available provide outreach support during or in preparation of events with key stakeholders or the general public. Trussell Technologies is available to serve as a technical expert for key meetings or workshops. Other subconsutlants may attend meetings using budgets under other tasks if requested and if suitable funds are available.

Task 10 Deliverables: A digital copy (pdf and word) will be submitted for all meeting materials. Hard copies can be provided upon request.

Appendix B Fees and Payment

Task Budget

Tasks	Total Est Hours	Total KJ Labor	SUBCONSULTANTS						Total Expenses	Total Labor + Subs + Expenses
			Merritt-Smith	Data Instincts	Trussell Tech	GHD	Michael Welch	Stratus		
Task 1 – PM & QA/QC	186	$40,070	$0	$0	$0	$0	$0	$0	$801	$40,871
Task 2 – Background Info	112	$22,550	$0	$0	$0	$0	$0	$0	$451	$23,001
Task 3 – Recycled Water Market Analysis	220	$44,910	$5,000	$0	$24,000	$0	$7,000	$0	$4,498	$85,408
Task 4 – Treatment Eval/Reg Requirements	56	$12,040	$0	$0	$12,000	$0	$0	$0	$1,441	$25,481
Task 5 – Alternatives Analysis	272	$54,580	$5,000	$0	$0	$10,000	$0	$35,000	$6,092	$110,672
Task 6 – Stakeholder Involvement	38	$7,990	$0	$20,000	$0	$0	$0	$0	$2,160	$30,150
Task 7 – Recommended Project	102	$20,860	$0	$0	$0	$0	$0	$0	$417	$21,277
Task 8 – Financial Analysis	44	$10,520	$0	$0	$0	$0	$0	$0	$210	$10,730
Task 9 – Regional RWFPS Report	338	$67,240	$4,000	$0	$0	$0	$0	$0	$2,299	$73,539
Task 10 - Meetings and Workshops	160	$35,020	$6,000	$5,000	$4,000	$0	$0	$2,500	$12,350	$64,870
Task 1-10 Total	**1528**	**$315,780**	**$20,000**	**$25,000**	**$40,000**	**$10,000**	**$7,000**	**$37,500**	**$30,720**	**$486,000**

Sub-Task Budget

Tasks	Total K/J Estimated Hours	Total Estimated K/J Labor	SUBCONSULTANTS						Total Est. Expenses *(incl sub markup)*	Total Estimated Labor + Expenses
			Merritt-Smith	Data Instincts	Trussell Tech	GHD	Michael Welch	Stratus		
Task 1 – PM & QA/QC										
1.1 Monthly Status Reports and Invoices	36	$6,480	$0	$0	$0	$0	$0	$0	$130	$6,610
1.2 Status Calls/Web Meetings	90	$20,250	$0	$0	$0	$0	$0	$0	$405	$20,655
1.3 Subonctracting Agreements	12	$2,640	$0	$0	$0	$0	$0	$0	$53	$2,693
1.4 Schedule	20	$4,300	$0	$0	$0	$0	$0	$0	$86	$4,386
1.5 Project Setup and Establish QA/QC Program	28	$6,400	$0	$0	$0	$0	$0	$0	$128	$6,528
Task 1 - Subtotal	**186**	**$40,070**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$801**	**$40,871**
Task 2 – Background Info										
2.1 Data Collection and Review	80	$16,170	$0	$0	$0	$0	$0	$0	$323	$16,493
2.2 Study Area Characteristics	18	$3,550	$0	$0	$0	$0	$0	$0	$71	$3,621
2.3 Water Supply and Facilities	14	$2,830	$0	$0	$0	$0	$0	$0	$57	$2,887
Task 2 - Subtotal	**112**	**$22,550**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$451**	**$23,001**
Task 3 – Recycled Water Market Analysis										
3.1 WWTF Facility and Supply Analysis	28	$6,020	$0	$0	$4,000	$0	$0	$0	$520	$10,540
3.2 NPR Demand Analysis	42	$8,090	$0	$0	$0	$0	$0	$0	$162	$8,252
3.3 Recycled Water Market Survey Map	36	$6,860	$0	$0	$0	$0	$0	$0	$137	$6,997
3.4 IPR Potential - GW Replenishment	34	$7,880	$1,000	$0	$7,000	$0	$0	$0	$958	$16,838
3.5 IPR Potential - Reservoir Augmentation	20	$4,270	$0	$0	$0	$0	$7,000	$0	$785	$12,055
3.6 Streamflow Augmentation	34	$6,150	$2,000	$0	$0	?	$0	$0	$323	$8,473
3.7 DPR Potential	26	$5,640	$2,000	$0	$13,000	$0	$0	$0	$1,613	$22,253
Task 3 - Subtotal	**220**	**$44,910**	**$5,000**	**$0**	**$24,000**	**$0**	**$7,000**	**$0**	**$4,498**	**$85,408**
Task 4 – Treatment Eval/Reg Requirements										
4.1 Define Water Quality Objectives for Uses	20	$4,000	$0	$0	$0	$0	$0	$0	$80	$4,080
4.2 Summarize Regulatory Requirements	22	$4,490	$0	$0	$0	$0	$0	$0	$90	$4,580
4.3 Treatment Evaluation	14	$3,550	$0	$0	$12,000	$0	$0	$0	$1,271	$16,821
Task 4 - Subtotal	**56**	**$12,040**	**$0**	**$0**	**$12,000**	**$0**	**$0**	**$0**	**$1,441**	**$25,481**
Task 5 – Alternatives Analysis										
5.1 Refine Long-List of Alternatives	48	$10,010	$1,000	$0	$0	$0	$0	$3,000	$600	$14,610
5.2 Preliminary Screening	30	$6,350	$3,000	$0	$0	$10,000	$0	$7,000	$2,127	$28,477
5.3 Evaluate Short List of Alternatives	114	$22,050	$1,000	$0	$0	$0	$0	$25,000	$3,041	$51,091
5.4 Alternative Capital, O&M and Life Cycle Costs	80	$16,170	$0	$0	$0	$0	$0	$0	$323	$16,493
Task 5 - Subtotal	**272**	**$54,580**	**$5,000**	**$0**	**$0**	**$10,000**	**$0**	**$35,000**	**$6,092**	**$110,672**
Task 6 – Stakeholder Involvement										
6.1 Outreach Strategy and Advice	20	$4,240	$0	$10,000	$0	$0	$0	$0	$1,085	$15,325
6.2 Outreach Materials and Support	18	$3,750	$0	$10,000	$0	$0	$0	$0	$1,075	$14,825
Task 6 - Subtotal	**38**	**$7,990**	**$0**	**$20,000**	**$0**	**$0**	**$0**	**$0**	**$2,160**	**$30,150**
Task 7 – Recommended Project										
7.1 Preliminary Facilities Design Criteria	66	$13,380	$0	$0	$0	$0	$0	$0	$268	$13,648
7.2 Implementation Plan	36	$7,480	$0	$0	$0	$0	$0	$0	$150	$7,630
Task 7 - Subtotal	**102**	**$20,860**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$417**	**$21,277**
Task 8 – Financial Analysis										
8.1 Anticipated Financing Plan	26	$6,040	$0	$0	$0	$0	$0	$0	$121	$6,161
8.2 Revenue Projection Program	18	$4,480	$0	$0	$0	$0	$0	$0	$90	$4,570
Task 8 - Subtotal	**44**	**$10,520**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$210**	**$10,730**
Task 9 – Regional RWFPS Report										
9.1 Admin Draft for City	154	$30,480	$2,000	$0	$0	$0	$0	$0	$810	$33,290
9.2 SWRCB Draft	104	$20,930	$1,000	$0	$0	$0	$0	$0	$743	$22,673
9.3 Final Report	80	$15,830	$1,000	$0	$0	$0	$0	$0	$747	$17,577
Task 9 - Subtotal	**338**	**$67,240**	**$4,000**	**$0**	**$0**	**$0**	**$0**	**$0**	**$2,299**	**$73,539**
Task 10 - Meetings and Workshops										
10.1 Kick-off Meeting (1)	24	$5,220	$0	$0	$0	$0	$0	$0	$1,204	$6,424
10.2 F2F Meeting (w/ City PW and Water, TWG & Regional Pa	48	$10,530	$2,000	$0	$2,000	$0	$0	$0	$3,691	$18,221
10.3 Workshops - Alternatives Analysis/Recommmended Proje	48	$10,530	$3,000	$2,500	$2,000	$0	$0	$2,500	$3,851	$24,381
10.4 Present Final RWFPS (1)	18	$3,750	$1,000	$2,500	$0	$0	$0	$0	$2,405	$9,655
10.5 SWRCB Mid-Course Mtg - Draft Report (1)	22	$4,990	$0	$0	$0	$0	$0	$0	$1,200	$6,190
Task 10 - Subtotal	**160**	**$35,020**	**$6,000**	**$5,000**	**$4,000**	**$0**	**$0**	**$2,500**	**$12,350**	**$64,870**
Task 1-10 Total	**1528**	**$315,780**	**$20,000**	**$25,000**	**$40,000**	**$10,000**	**$7,000**	**$37,500**	**$30,720**	**$486,000**

Client/Address: City of Santa Cruz
212 Locust St., Suite C
Santa Cruz, CA 95060

Contract/Proposal Date: ContractProposalDate

Schedule of Charges

January 1, 2016

PERSONNEL COMPENSATION

Classification	Hourly Rate
CAD-Technician	$120
Designer-Senior Technician	$155
Engineer-Scientist-Specialist 1	$130
Engineer-Scientist-Specialist 2	$150
Engineer-Scientist-Specialist 3	$165
Engineer-Scientist-Specialist 4	$180
Engineer-Scientist-Specialist 5	$195
Engineer-Scientist-Specialist 6	$220
Engineer-Scientist-Specialist 7	$245
Engineer-Scientist-Specialist 8	$260
Engineer-Scientist-Specialist 9	$280
Project Administrator	$115
Administrative Assistant	$95
Aide	$75

In addition to the above Hourly Rates, a four percent Communications Surcharge will be added to Personnel Compensation for normal and incidental copies, communications and postage.

Direct Expenses

Reimbursement for direct expenses, as listed below, incurred in connection with the work, will be at cost plus ten percent for items such as:

a. Maps, photographs, 3rd party reproductions, 3rd party printing, equipment rental, and special supplies related to the work.
b. Consultants, soils engineers, surveyors, contractors, and other outside services.
c. Rented vehicles, local public transportation and taxis, travel and subsistence.
d. Project specific telecommunications and delivery charges.
e. Special fees, insurance, permits, and licenses applicable to the work.
f. Outside computer processing, computation, and proprietary programs purchased for the work.

Reimbursement for vehicles used in connection with the work will be at the federally approved mileage rates or at a negotiated monthly rate.

Reimbursement for use of computerized drafting systems (CAD), geographical information systems (GIS), and other specialized software and hardware will be at the rate of $12 per hour.

Rates for professional staff for legal proceedings or as expert witnesses will be at rates one and one-half times the Hourly Rates specified above.

Excise and gross receipts taxes, if any, will be added as a direct expense.

The foregoing Schedule of Charges is incorporated into the agreement for the services provided, effective January 1, 2016 through December 31, 2017.

Appendix C Work Schedule

Regional RWFPS Implementation

Task and Key Deliverables	2016													2017							
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
SWRCB Grant Commitment Letter	✓																					
SWRCB Meeting					✳											⭘						
Notice to Proceed				✓																		
Task 1 – PM & QA/QC					☽	☽	☽	☽	☽	☽	☽	☽	☽	☽	☽	☽	☽	☽	☽	☽	☽	☽
Task 2 – Background Info																						
Task 3 – Recycled Water Market Analysis																						
Task 4 – Treatment Eval/Reg Requirements																						
Task 5 – Alternatives Analysis																						
Task 6 – Stakeholder Involvement																						
Task 7 – Recommended Project																						
Task 8 – Financial Analysis																						
Task 9 – Regional RWFPS Report																◆			◆		✓	
Task 10 - Meetings and Workshops					🗋			🗋			🗋		🗋			🗋						🗋
					Kickoff			*Long-List*			*Short-List*		*Reccommended*			*Admin Draft*			*Draft*			*Final*
								Prelim Screening			*Ranking*		*Facilities Plan*									

✳ SWRCB Scoping Call
⭘ SWRCB Meeting
🗋 F2F Meeting/Workshop
☽ Conf Call/Web
◆ Draft Deliverable
✓ Final Deliverable

PROFESSIONAL SERVICES AGREEMENT FOR
AQUIFER STORAGE AND RECOVERY

THIS AGREEMENT for professional services is made by and between the City of Santa Cruz ("City") and Pueblo Water Resources ("Consultant") (together referred to as the "Parties") as of February 10 2016 (the "Effective Date").

SECTION 1: SCOPE OF WORK

The services to be performed under this Agreement are set forth in the attached 12 page proposal for Hydrogeologic Services; Santa Cruz ASR Project - Phase 1 Feasibility Investigation dated January 20, 2016 ("Exhibit A").

SECTION 2: RESPONSIBILITIES OF CONSULTANT

All work performed by Consultant, or under its direction, shall satisfy the City's objectives for entering into this Agreement and shall be rendered in accordance with the generally accepted practices, and to the standards of, Consultant's profession.

Consultant shall not undertake any work beyond the Scope of Work set forth in Exhibit A unless such additional work is approved in advance and in writing by City. The cost of such additional work shall be reimbursed to Consultant by City on the same basis as provided for in Section 4.

If, in the prosecution of the work, it is necessary to conduct field operations, security and safety of the job site will be the Consultant's responsibility excluding, nevertheless, the security and safety of any facility of City within the job site which is not under the Consultant's control.

Consultant shall meet with Rosemary Menard, Water Director, hereinafter called "Director", or other City personnel, or third parties as necessary. Such meetings shall be held at the request of any party.

SECTION 3: RESPONSIBILITIES OF THE CITY

City shall make available to Consultant all necessary data and information in the City's possession and shall actively assist Consultant in obtaining such information from other agencies and individuals as needed.

The Director may authorize a staff person to serve as his or her representative. The work in progress shall be reviewed at such intervals as may be mutually agreed upon between the parties. The City will be the sole judge of acceptable work. If the work is not acceptable, City will inform Consultant of the changes or revisions necessary to secure approval.

SECTION 4: FEES AND PAYMENT

For the services performed, the City will pay the Consultant on a time-charge plus expense basis, monthly as charges accrue, the sum of Consultant's salary expenses and non-salary expenses. For the purposes of this Agreement, Consultant's salary expenses and non-salary expenses will be compensated at the rates set forth in Exhibit A and in accordance with the terms set forth therein. Where conflicts may occur, the provisions of this section apply. Payment for the Consultant's services in carrying out the entire the Scope of Work shall be made within the budget limit, or limits shown, upon Exhibit A. Such payment shall be considered the full compensation for all personnel, materials, supplies, and equipment used by Consultant in Scope of Work.

Salary expenses include the actual pay of personnel assigned to the project plus payroll taxes, insurance, sick leave, holidays, vacation, other fringe benefits, overhead costs, and fees. Chargeable time does not include time for meals or other personal time. Consultant shall not charge the City for personnel overtime salary at rates higher than those set forth in the attached fee schedule without the City's prior written authorization.

Non-salary expenses include travel, meals and lodging while traveling, materials other than normal office supplies, shipping and reproduction costs, equipment rental, services of sub-consultants and subcontractors, and other direct, identifiable project related expenses. Markups shall not be charged for sub-consultants or subcontractors.

The use of vehicles for travel, including rental vehicles, shall be paid at the maximum rate of the current standard business mileage rate as established by the U.S. Internal Revenue Service. Commercial airline travel shall be reimbursed at coach class rates. Lodging, meals, and incidental expenses shall be reimbursed at the current per diem rates established by the U.S. General Services Administration. Per diem expenses in excess of $75 require submittal of acceptable substantiating documentation for each such expense. Consultants shall be entitled to 75% of the prescribed meals and incidental expenses for the first and last day of travel and for one day travel if it is longer than 12 hours. It is expected that all expenses associated with travel incurred by the Consultant, while conducting activities on behalf of the City, will be at reasonable rates and that the Consultant will exercise prudence in incurring such expenses.

Variations from the budget for each task which are justified by statements indicating personnel time expended and submittal of a revised budget are allowed with City approval; however, in no event shall the total fee charged for the scope of work set forth in Exhibit A exceed the budget of $446,370 without advance written City authorization in the form of an amendment or change order.

Invoices shall detail the time worked by each class of employee on each task and the expenses incurred for which billing is made. Invoices shall indicate the percentage completion of each work task as identified in the Scope of Work in Exhibit A and the overall percentage of completion of the total required services. Payments shall be made monthly by the City based on itemized invoices from the Consultant which list the actual costs and expenses.

All invoices shall contain the following affidavit signed by a principal of the Consultant's firm:

> "I hereby certify as principal of the firm of (Insert Firm Name), that the charge of (Insert invoice amount) as summarized above and shown in detail on the attachments is a fair and reasonable use of public funds, is in accordance with the terms of Agreement dated (Insert Agreement Date), and has not been previously paid."

SECTION 5: CHANGES IN WORK

If any changes or modifications to Consultant’s scope of services are proposed by City, Consultant shall, upon receipt of such written change or modification, determine the impact on both time and compensation and notify City in writing. Upon agreement between City and Consultant as to the extent of said impacts to time and compensation, an amendment to this agreement shall be prepared describing such changes. Execution of the amendment by City and Consultant shall constitute the Consultant’s notice to proceed with the changed scope.

SECTION 6: TIME OF BEGINNING AND SCHEDULE FOR COMPLETION

Consultant shall begin work upon its receipt of a written Notice to Proceed. The Notice to Proceed shall not be issued until after this Agreement has been approved and authorized by the City and signed and dated by both City and Consultant.

The schedule for completion of the work shall be as shown upon Exhibit A. In the event that major changes are ordered, the schedule for completion as stated in Exhibit A will be adjusted by City so as to allow Consultant a reasonable period of time within which to complete any additional work which may be required as a result of the ordered changes.

Neither party will be held responsible for delay or default caused by declared emergencies, natural disasters, or any other cause which is beyond the party's reasonable control. Vendor will, however, make all reasonable efforts to remove or eliminate such a cause of delay or default and will, upon the cessation of the cause, diligently pursue performance of its obligations in this agreement.

The City reserves the right to obtain the item(s) covered by this contract from another source during any on-going suspension of service due to the circumstances outlined above.

Consultant acknowledges that it is necessary for Consultant to complete its work on or before the completion date set forth in Exhibit A in order to allow the City to achieve its objectives for entering into this Agreement unless Consultant is delayed due to causes beyond Consultant's reasonable control. The parties therefore agree that time is of the essence in the performance of this Agreement.

SECTION 7: TERMINATION

The City or Consultant may terminate the agreement for convenience by providing written notice to the other party not less than 30 calendar days prior to an effective termination date.

The City or Consultant may terminate the agreement for material breach of agreement by providing written notice to the other party not less than 14 calendar days prior to an effective termination date.

Upon notice of termination, the Consultant will immediately take action not to incur any additional obligations, costs or expenses, except as may be reasonably necessary to terminate its activities. The City's only obligation to the Consultant will be just and equitable payment for services authorized by, and received to the satisfaction of, the City up to and including the effective date of termination. All finished or unfinished work or documents procured or produced under the agreement will become property of the City upon the termination date subject to the terms outlined in Section 13.6. of this agreement. If Consultant materially breaches this agreement, the City reserves the right to obtain Professional Services for Aquifer Storage and Recovery elsewhere, and the defaulting Consultant will be liable for the difference between the prices set forth in the terminated agreement and the actual cost to the City. In no event will the City be liable for any loss of profits on the resulting agreement or portion thereof so terminated. After the effective date of termination, Consultant will have no further claims against the City under the agreement. Termination of the agreement pursuant to this paragraph may not relieve the Consultant of any liability to City for damages sustained by City because of any breach of agreement by Consultant.

The rights and remedies provided in this section will not be exclusive and are in addition to any other rights and remedies provided by law or under the agreement.

SECTION 8: INSURANCE

Prior to the beginning of and throughout the duration of the agreement, the Vendor will maintain insurance in conformance with the requirements set forth below. The Vendor will insure the City against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder and the results of that work by the Vendor, his agents, representatives, employees or subcontractors.

CERTIFICATE REQUIREMENTS

The City will be issued a Certificate of Insurance (a Memorandum of Understanding will not be accepted) with the following minimum requirements:

- Certificate(s) will show current policy number(s) and effective dates,
- Coverage and policy limits will meet, or exceed, requirements below,
- The Certificate Holder will be City of Santa Cruz, Risk Management, 809 Center St, Rm 7, Santa Cruz, CA 95060,
- Certificate will be signed by an authorized representative,
- An endorsement will be provided to show the City, its officers, officials, employees, and volunteers as additional insured.

MINIMUM SCOPE AND LIMITS OF INSURANCE

The Vendor acknowledges that the insurance coverage and policy limits set forth in this section constitute the minimum amount of coverage required. The City will be entitled to coverage for the highest limits maintained by the Vendor. Coverage will be at least as broad as:

- PROFESSIONAL LIABILITY (ERRORS AND OMISSIONS): $1,000,000 PER OCCURRENCE OR CLAIM, $2,000,000 AGGREGATE.
  The Vendor will maintain insurance appropriate to the Vendor's profession; with limit no less than $1,000,000 per occurrence or claim, $2,000,000 aggregate. Insurance must be maintained and evidence of insurance must be provided for at least five years after date of completion of the agreement work. The Vendor agrees to purchase an extended period coverage for a minimum of five years after completion of agreement work.

- COMMERCIAL GENERAL LIABILITY (CGL): $1,000,000 (Including products and completed operations)
  Proof of coverage for $1 Million per occurrence for bodily injury, personal injury and property damage will be provided on Insurance Services Office (ISO) Form CG 00 01 12 07 covering CGL. If a general aggregate limit applies, either the general aggregate limit will apply separately to this project/location or the general aggregate limit will be twice the required occurrence limit.

- AUTOMOBILE LIABILITY: $1,000,000
  Proof of coverage for $1 Million will be provided on ISO Form Number CA 00 01 covering any auto (Code 1), or if Contractor has no owned autos, hired, (Code 8) and non-owned autos (Code 9), per accident for bodily injury and property damage.

- WORKERS' COMPENSATION AS REQUIRED BY THE STATE OF CALIFORNIA, WITH STATUTORY LIMITS, AND EMPLOYER'S LIABILITY INSURANCE: $1,000,000 per accident for bodily injury or disease. Must include a waiver of subrogation.

OTHER INSURANCE PROVISIONS

The insurance policies are to contain, or be endorsed to contain, the following provisions:

- ADDITIONAL INSURED STATUS
  The City, its officers, officials, employees, and volunteers are to be covered as insured on the CGL policy with respect to liability arising out of work or operations performed by or on behalf of the Vendor including materials, parts, or equipment furnished in connection with such work or operations. General liability coverage will be provided in the form of an endorsement to the Vendor's insurance at least as broad as ISO Form CG 20 10 11 85, or if not available, through the addition of both CG 20 10 and CG 20 37 (if a later edition is used) or equivalent if approved, in writing, by the City.

- PRIMARY COVERAGE
  For any General Liability or Automobile Liability claims related to this agreement, the Vendor's insurance coverage will be primary insurance as respects the City, its officers, officials, employees, and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees, or volunteers will be excess of the Vendor's insurance and will not contribute with it.

- NOTICE OF CANCELLATION
  Each insurance policy required above will provide that the City will be notified of any coverage canceled with 30 days' prior written notice (10 days for non-payment).

- WAIVER OF SUBROGATION
  Vendor hereby grants to the City a waiver of any right to subrogation which any insurer of said Vendor may acquire against the City by virtue of the payment of any loss under such insurance. Vendor agrees to obtain any endorsement that may be necessary to effect this waiver of subrogation, but this provision applies regardless of whether or not the City has received a waiver of subrogation endorsement from the insurer.

  The Worker's Compensation policy will be endorsed with a waiver of subrogation in favor of the City for all work performed by the Vendor, its employees, agents and subcontractors.

- DEDUCTIBLES AND SELF-INSURED RETENTIONS
  Any deductibles or self-insured retentions must be declared to and approved by the City. The City may at its option allow the Contractor to purchase coverage with a lower deductible or retention, or require the Contractor to provide a financial guarantee satisfactory to the City guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

- ACCEPTABILITY OF INSURERS
  Insurance is to be placed with insurers with a current A.M. Best's rating of no less than A:VII, unless otherwise acceptable to the Entity.

- VERIFICATION OF COVERAGE
  Vendor will furnish the City with original certificates and amendatory endorsements or copies of the applicable policy language effecting coverage required by this clause. All certificates and endorsements are to be received and approved by the City before work commences. However, failure to obtain the required documents prior to the work beginning will not waive the Vendor's obligation to provide them. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements required by these specifications, at any time.

SECTION 9: INDEMNIFICATION

Consultant agrees to indemnify, defend, and hold harmless the City, its officers, agents and employees, from and against any and all claims, demands, actions, damages, or judgments, including associated costs of investigation and defense arising in any manner from consultant's negligence, gross negligence, recklessness, or willful misconduct or patent or copyright violation in the performance of this agreement.

SECTION 10: EQUAL EMPLOYMENT OPPORTUNITY

The City of Santa Cruz strongly supports equal employment opportunities for all and requires its Consultants to ensure that effective policies and procedures concerning the prevention of illegal discrimination and harassment exist in their companies. In addition, all Consultants must be in compliance with all applicable Federal and State and local equal employment opportunity acts, laws, and regulations. The City's current Equal Employment Opportunity and Anti-Discrimination policies to which this provision applies may be viewed at http://www.codepublishing.com/CA/SantaCruz/?SantaCruz09/SantaCruz0983.html.

SECTION 11: LEGAL ACTION/ATTORNEYS' FEES

If any action at law or in equity is brought to enforce or interpret the provisions of this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees in addition to any other relief to which he or she may be entitled as part of prevailing party's total damages as determined by a court of competent jurisdiction. The laws of the State of

California shall govern all matters relating to the validity, interpretation, and effect of this Agreement and any authorized or alleged changes, the performance of any of its terms, as well as the rights and obligations of Consultant and the City.

SECTION 12: ASSIGNMENT

This Agreement shall not be assigned without first obtaining the express written consent of the Director or after approval of the City Council.

SECTION 13: MISCELLANEOUS PROVISIONS

1. Project Manager. Director reserves the right to approve the project manager assigned by Consultant to said work. No change in assignment may occur without prior written approval of the City.

2. Consultant Services Only. Consultant is employed to render professional services only and any payments made to Consultant are compensation solely for such professional services.

3. Subcontractors. Subcontracting of work without prior approval of the City, may result in contract termination. If at any time, the City determines any subcontractor is incompetent or undesirable, Vendor will be notified and will be expected to immediately cancel the subcontract.

4. Licensure. Vendor warrants that it has complied with any and all federal, state, and local licensing requirements and agrees to provide proof of a current City of Santa Cruz Business Tax Certificate if:
   - Vendor is located in the City of Santa Cruz;
   - Will perform physical work in the City of Santa Cruz for 6 or more days annually; or
   - Will use company vehicles to deliver within the City of Santa Cruz for 6 or more days annually.

   For additional information and licensing requirements, view the City's Business Licenses and Permits webpage or call the Revenue and Taxation division at 831/420-5070.

5. Other Agreements. This Agreement supersedes any and all other agreements, either oral or in writing, between the parties with respect to the Scope of Work specified in Exhibit A.

6. City Property. The work, or any portion, of Consultant in performing this Agreement shall become the property of City. The Consultant shall be permitted to retain copies or such work for information and reference in connection with the City's use; however, such work shall not be used by the Consultant on other projects, except by agreement in writing by the City.

7. Consultant's Records. Consultant shall maintain accurate accounting records and other written documentation pertaining to the costs incurred for this project. Such records and documentation shall be kept available at Consultant's office during the period of this Agreement, and after the term of this Agreement for a period of three years from the date of the final City payment for Consultant's services.

8. Independent Contractor. In the performance of its work, it is expressly understood that Consultant, including Consultant's agents, servants, employees, and subcontractors, is an independent contractor solely responsible for its acts and omissions, and Consultant shall not be considered an employee of the City for any purpose.

9. Consultant Not an Agent. Except as City may specify in writing, Consultant shall have no authority, express or implied, to act on behalf of City in any capacity whatsoever as an agent. Consultant shall have no authority, express or implied, pursuant to this Agreement to bind City to any obligation whatsoever.

10. Conflicts of Interest. Consultant stipulates that corporately or individually, its firm, its employees and subcontractors have no financial interest in either the success or failure of any project which is, or may be, dependent on the results of the Consultant's work product prepared pursuant to this Agreement.

11. MacBride Principles/Peace Charter. City of Santa Cruz Resolution NS-19,378 (7/24/90) encourages all companies doing business in Northern Ireland to abide by the MacBride Principles and Peace Charter.

12. Storm Water Requirements. The Contractor, and all subcontractors, are required to abide by the applicable City of Santa Cruz Storm Water Best Management Practices (BMPs) for the duration of the work. The City's mandatory Storm Water BMPs, which are listed according to the type of work, operations, or business, are located on the City website at: http://www.cityofsantacruz.com/index.aspx?page=138.

13. Notices. If either party shall desire or is required to give notice to the other such notice shall be given in writing, via facsimile and concurrently by prepaid U.S. certified or registered postage, addressed to recipient as follows:

To CITY:
Water Engineering
Heidi Luckenbach, Engineering Manager
212 Locust St, Ste C
Santa Cruz CA 95060

To CONSULTANT:
Pueblo Water Resources
Robert C Marks, Principal Hydrogeologist
4478 Market St, Ste 705
Ventura, CA 93003

Changes to the above information shall be given to the other party in writing ten (10) business days before the change is effective.

Technical Review:

By: Heidi R Luckenbach Date: 2/1/2016

Heidi Luckenbach, P.E
Deputy Water Director/Engineering Manager

Approved As To Form:

By: [signature] Date: 2/2/16

City Attorney

CONSULTANT

By: [signature] Date: 2/4/16

Printed: Robert Marks Title: Principal Hydrogeologist

CITY OF SANTA CRUZ WATER DEPARTMENT

By: Rosemary Menard Date: 2/5/16

Rosemary Menard
Water Department Director

CITY OF SANTA CRUZ

By: _____ Date: 2-10-16

Martín Bernal
City Manager

January 20, 2016
Project No. 15-0111

City of Santa Cruz Water Department
212 Locust St., Suite C
Santa Cruz, California 95060

Attention: Ms. Heidi Luckenbach, P.E., Engineering Manager

Subject: Proposal for Hydrogeologic Services; Santa Cruz ASR Project - Phase 1 Feasibility Investigation

Dear Ms. Luckenbach:

In accordance with your request, Pueblo Water Resources, Inc. (PWR) is pleased to submit this proposal for hydrogeologic services related to the City of Santa Cruz Water Department's (SCWD) Aquifer Storage and Recovery (ASR) Project - Phase 1 Feasibility Evaluation. Presented in this proposal is a detailed scope of work, estimated costs, and a schedule to implement the subject project.

BACKGROUND

ASR is a form of managed aquifer recharge (MAR) that involves the enhanced conjunctive use of existing surface and groundwater resources. ASR is a method of "banking" water in an aquifer during times when excess surface water is available (typically wet periods), and subsequent recovery of the water from the aquifer when needed (typically dry periods). ASR utilizes dual-purpose injection/recovery wells for the injection of water into aquifer storage and the subsequent recovery of the stored water by pumping. In order to feasibly implement ASR, the following four basic project components are required:

1. A supply of excess surface water for injection.
2. A system for the diversion, treatment and conveyance of water between the source and groundwater storage basin.
3. A suitable groundwater basin with available storage space.
4. Wells to inject and recover the stored water.

As conceptually applied to Santa Cruz, ASR would involve the diversion of "excess" winter and spring flows from the San Lorenzo River via the Tait Street Diversion facility, treated to potable standards at the Graham Hill Water Treatment Plant (GHWTP), then conveyed through the existing (and/or improved) water distribution system(s) to ASR wells located in the Soquel-Aptos Groundwater Basin (S-AGB) and/or the Santa Margarita Groundwater Basin

(SMGB) in Scotts Valley. In this context, “excess” flows are those flows that exceed SCWD demands and in-stream flow requirements and are within water rights.

As a subconsultant to the Water Supply Advisory Committee (WSAC) Technical Team, PWR performed an initial reconnaissance-level study (Recon-Study) of the feasibility, potential yields, and costs of ASR for the SCWD. The scope of the Recon-Study was limited to evaluating readily available existing information to develop conceptual components of an ASR project for the WSAC to consider. Based on the available information, the Recon-Study findings indicated that ASR appears to be technically feasible with no obvious fatal flaws. Below are four key findings developed the Recon-Study feasibility evaluation; the main focus of the subject Phase 1 work is to verify these initial findings:

- **Availability of Excess Water.** Analysis of available excess San Lorenzo River flows, as constrained by existing water rights, in-stream flow requirements, and demands shows that approximately 558 million gallons per year (mgy) or more may be available.

- **Diversion / Treatment / Conveyance Capacities.** The existing excess capacity of the Tait Street Diversion and GHWTP is limited to 2 million gallons per day (mgd), equivalent to approximately 145 mgy on average. With significant system modifications and upgrades to the existing Tait Street Diversion and GHWTP, average annual diversions of up to 558 mgy could be achieved.

- **Available Aquifer Storage Space.** Based on existing estimates of historical groundwater storage depletion, approximately 3,290 mg of potentially available aquifer storage space exists in the Purisima Aquifer and approximately 2,355 mg may be available in the Scotts Valley Subarea (approximately 5,645 mg combined).

- **Per Well Injection Capacities.** Based on the results of a screening-level analysis of the theoretical injection capacities of existing wells, per-well injection capacities of 350 gpm (0.5 mgd) for new ASR wells in both the Purisima Aquifer and Scotts Valley Subarea appear feasible.

Understanding the following is also required to determine the technical feasibility of ASR and included in the Phase 1 work.

- The hydraulic capacity of the existing distribution system(s) to convey the required diverted San Lorenzo River flows from GHWTP to potential ASR wells sites in the various distribution systems under consideration.

- The potential for adverse geochemical interactions between the source waters, native groundwater, and aquifer mineral matrices.

- The potential for, and quantification of, hydraulic losses to either the ocean or local creeks that would result from increased aquifer water levels / piezometric head that could limit overall project yields.

Based on the findings of the Recon-Study and consideration of the other available supply alternatives, the WSAC developed a water supply augmentation plan that combined in-lieu recharge (Element 1) in either or both the Soquel Creek Water District (SqCWD) and the Scotts Valley Water District (SVWD) with ASR (Element 2) in SCWD, SqCWD and SVWD service areas. The plan is part of an overall strategy to address the identified worst-year supply gap of 1.2 billion gallons during an extended drought.

The full-scale ASR system, as assumed and considered by the WSAC, is envisioned to consist of a total of eight (8) 0.5 million gallon per day (mgd) ASR wells; four (4) wells are planned within the SCWD service area (i.e., the Beltz well field) and two (2) wells each are tentatively planned for the SqCWD and SVWD service areas.

Based on these recommendations, an implementation strategy for the ASR element was developed through the WSAC that consisted of three basic phases:

- **Phase 1 – Higher-Level Feasibility Analyses**: Performance of higher-level technical feasibility investigations that were beyond the scope of the Recon-Study, including the use of groundwater modeling, completion of site-specific injection capacity and geochemical interaction analyses, and development of a pilot ASR testing program.

- **Phase 2 – Pilot ASR Testing**: Performance of pilot ASR testing program and assessment of probable ASR system performance, cost and schedule to complete build-out of the ASR system.

- **Phase 3 – Project Implementation**: Development of full-scale ASR project basis-of-design, construction of ASR system facilities (perhaps incrementally), establishment of ASR project operational parameters, and long-term operation of project to achieve target storage volumes.

The subject of this proposal is to implement the above-noted Phase 1 higher-level feasibility investigation. It is important to note that ASR program development is necessarily an iterative process – continuing to be refined in response to investigative findings and input from the City (and other interested parties) and in response to more focused (or re-focused as needed) data analyses. The scope of work described in this proposal represents the next step in that process, and (assuming no fatal flaws emerge) will form the basis for developing the scope of Phase 2 needed for advancing the investigation.

PURPOSE AND SCOPE

The overall purpose of the Santa Cruz ASR Feasibility – Phase 1 Project is to confirm and/or refine the initial ASR feasibility findings developed from the Recon-Study of ASR performed for the WSAC and to develop the technical information necessary for planning of pilot ASR testing operations at selected existing wells (Phase 2). The Phase 1 scope of work consists of the following main tasks:

1. Screening and selection of existing wells for potential pilot ASR testing (Phase 2)
2. Detailed site-specific analyses of the theoretical ASR capacities of selected wells
3. Geochemical interaction analysis
4. Development of ASR pilot testing work plans
5. Groundwater modeling of various ASR project scenarios
6. Project management and meetings

Upon completion of the subject Phase 1 Feasibility Investigation, sufficient information will have been developed that will allow the City to make "Go No-Go" decisions regarding the advancement of the project. A detailed scope of work to perform the above tasks is presented below.

Scope of Services

Task 1.1 – Existing Wells Screening and Selection for Pilot ASR Testing

The purpose of this task it to identify three (3) existing wells (one in each service area) as candidates for Phase 2 pilot ASR testing. Combined, there are approximately twenty (20) existing wells in the three service areas. Each of the existing well sites will be evaluated and ranked based on a variety of factors, including (but not limited to) the following:

- Aquifer completion/screen intervals
- Theoretical injection capacity
- Well age
- Well construction features
- Hydraulic abilities of distribution systems to deliver/accept water for pilot ASR testing
- Proximity to suitable existing monitoring wells
- Proximity to backflush water disposal lines/pits
- Availability of retained drill cutting samples (for laboratory mineralogy analyses)
- Other site logistical factors

It is assumed that PWR will be provided access to existing well data (well logs, as-builts, water-levels, production/aquifer testing, etc.,) and well site facility information (site plans, piping and instrumentation diagrams, etc.) for all three service areas.

Deliverable: Technical Memorandum (TM) documenting the results and providing recommendations for existing wells identified as potential candidates for Phase 2 pilot ASR testing.

Task 1.2 – Site-Specific Injection Capacity Analyses

This task consists of in-depth analyses of the various site-specific factors affecting potential ASR well capacity at the three selected well sites within the SCWD, SqCWD and SVWD service areas (i.e., the wells identified in Task 1.1). The purpose is to establish theoretical sustainable injection rates for the selected wells, which will be used as a basis for developing ASR pilot testing work plans (Task 1.4). Site-specific factors to be analyzed include (but not limited to) the following:

- Well and aquifer hydraulic response under pressurized and non-pressurized casing scenarios
- Downhole velocity constraints
- Backflush pumping capacity
- Aquifer "Hydrofracturing" potential
- Offsite impact limitations

Deliverable: TM documenting the results and providing recommendations for anticipated pilot testing injection rates at each of the three (3) identified wells.

Task 1.3 – Geochemical Interaction Analysis

This task consists of evaluating the potential for adverse geochemical interactions to occur due to mixing of injected surface waters and native groundwaters. Potential reactions of concern generally fall into two categories: 1) precipitation reactions that can lead to well plugging, and 2) dissolution reactions that can negatively impact water-quality in the storage zone and/or recovered water. Specialized water-quality sampling will be performed at the GHWTP and each of the three (3) candidate wells identified/selected in Task 1.1 for pilot ASR testing. Utilizing these data, 3-component geochemical interaction modeling (PHREEQC-2) will be performed simulating various mixes of native groundwater and injected surface water within the target aquifer mineral matrices. If geochemical incompatibility is indicated, source water enhancement options or operational alternatives will be evaluated and discussed. The overall purpose of this task is to ensure that adverse geochemical reactions at the selected pilot testing wells are unlikely to occur prior to any injection testing.

This task assumes PWR will be provided with the following:

- Access to City historical water-quality data to evaluate recharge source water-quality variability during the injection season.
- Access to City GHWTP product water and selected Beltz well for specialized field and laboratory water-quality testing and analyses.
- Access to SqCWD and SVWD selected wells for specialized field and laboratory water-quality testing and analyses.
- Samples of representative target aquifer cuttings and/or cores (as available) from existing wells in all three service areas for laboratory mineralogy analyses.

Deliverable: TM documenting results and providing conclusions and recommendations regarding geochemical compatibility.

Task 1.4 – Pilot ASR Testing Program Development

Based on results of above Tasks 1.1 – 1.3, PWR will develop pilot ASR testing work plans for each of the three (3) identified wells. Work plans will include identification of temporary facility improvements needed for testing (e.g., piping/valving modifications, test pumps, backflushing settling tanks/pits, etc.,) and ASR pilot testing programs designed to demonstrate/verify ASR well operational viability and parameters. The overall purpose of this task is to develop the information required to scope, budget and permit the pilot ASR testing program (Phase 2).

This task assumes PWR will be allowed to make site visits to the selected well facilities to evaluate site logistics for pilot testing for all three service areas.

Deliverable: Three (3) individual site-specific pilot ASR work plans. Each work plan will include the following minimum components:

- Overview of site-specific data and findings developed from Tasks 1.1 – 1.3.
- Facility preparation needs for pilot ASR testing
- Pilot ASR testing operational plans
- Monitoring programs (water-quality and hydraulic)

Task 1.5 – Groundwater Modeling Assistance

This task consists of coordinating and overseeing the utilization of existing calibrated three-dimensional groundwater flow models of the S-AGB and SMGB to simulate various ASR project operational scenarios (pilot testing and full-scale permanent project). This includes the performance of a well siting study to identify potential ASR well locations. The overall purpose of this task is to evaluate the ability of target aquifer systems to:

1. Receive recharge water via injection wells at the required rates and durations,
2. Temporarily store the recharged water until needed without unacceptable hydraulic losses (e.g., outflow to the ocean and/or local streams), and,
3. Allow recovery of the stored water when needed without unacceptable negative impacts to other basin users (e.g., compromise the ability to pump at needed rates).

It is noted that the actual modeling is outside this scope and is assumed will be performed by the consultants who are currently engaged with the existing S-AGB and SMGB model development and calibration activities (under separate contracts with the City and/or the other agencies). PWR's role as part of this task includes the following subtasks:

Task 1.5.1 - Well Siting Study. This subtask consists of performing a Well Siting Study for permanent full-scale ASR wells in each of the three service areas. The identified ASR well

site location options will then be utilized in various ASR model scenarios to evaluate / define the most favorable locations.

Task 1.5.1.1 – Review Hydrogeologic Literature. Literature regarding the regional and site-specific geology and hydrogeology in the three service areas will be obtained and reviewed as a basis for identifying available data and data gaps.

Task 1.5.1.2 – Prepare Existing Water Well Database. Available lithologic and geophysical logs from wells constructed in the area will be compiled. Well depths, construction details, and well performance data will be tabulated in a spreadsheet format. Aquifer parameter data including transmissivity and storativity data will be collected and tabulated from available data sources. Available water quality data will be tabulated and reviewed. Where adequate data is available, seasonal and spatial variations (both vertically and horizontally) in physical and chemical parameters will be identified.

Task 1.5.1.3 – Compile and Review GIS Databases. Available GIS coverages from our and City, SqCWD and SVWD databases will be compiled and reviewed. Existing and potential well locations will be plotted on an appropriate scale base map using GIS databases. This is anticipated to include, at a minimum; property boundaries/parcel maps, existing well locations, infrastructure information (i.e., water and sewer distribution systems, roadways, etc.,), and topographic information. The GIS information will be utilized to prepare appropriate base maps and to assist in the site screening process.

Task 1.5.1.4 – Possible Contaminating Activities Assessment. This task will include the review of potential sources of groundwater contamination in the areas where potential well sites might be considered. This review would be limited to screening of the State and local databases on areas of known release. This would include listings of underground storage tanks (UST and LUST), hazardous material generators (RCRIS), Superfund (CERCLIS) sites, and other reported waste sites. Areas with potential contamination risk will be identified and, if not discarded from further consideration, be subject to additional investigation.

Task 1.5.1.5 – Field Surveys. This task consists of a field survey of potential well sites identified. Each potential parcel will be visited to assess the feasibility of drilling and well construction at the site. Logistical factors to be considered include; potential for noise nuisance, access for drilling and pump rig equipment, discharge location for development and test pumping water, and source of water for construction. Other factors to be considered include the compatibility of a municipal production well on the parcel with the existing use.

Task 1.5.1.6 – Potential Well Site Ranking. Based on the developed data and analyses, siting criteria will be developed and each of the potential ASR well sites will be ranked. The potential sites will be initially ranked based on hydrogeologic favorability, and then from this ranking the other identified factors will be considered. The selection of potential well sites will involve the balancing of logistical, infrastructural, and hydrogeologic considerations; as such, we envision that the siting process will be iterative, being progressively refined in responding to input from the City and other agencies, and in response to more focused data analysis.

Task 1.5.2 – Groundwater Modeling Coordination. This subtask consists of coordinating and overseeing the utilization of existing calibrated three-dimensional groundwater flow models of the S-AGB and SMGB to simulate various ASR project operational scenarios (pilot testing and full-scale permanent project).

Task 1.5.2.1 – Confluence Model Coordination. This task consists of coordinating with Gary Fiske to develop the needed information regarding the timing and availability of excess surface water flows from the Confluence Model. This will include determining the timing, duration and rates of injection/storage/recovery (ISR) cycles to be simulated with the groundwater models.

Task 1.5.2.2 – ASR Model Scenario Development. This task consists of the development of various ASR system operational scenarios to be simulated with the groundwater models. It is noted that groundwater modeling is often an iterative process, with scenarios being developed and refined in response to initial model results. For budgetary purposes, it is assumed that three (3) variants of ASR system operational scenarios will be developed for each basin / model (6 scenarios total).

Task 1.5.2.3 – Outside Modeling Consultant Coordination. This tasks consists of coordinating with the outside groundwater modeling consultants on the development and implementation of model scenarios and the interpretation of results.

It is noted the development of ASR operational model scenarios will necessarily need to consider other MAR activities planned in each of the basins. For example, the in-lieu recharge component of the WSAC recommendations (Element 1) will need to be simulated as occurring simultaneously with ASR operations. Similarly, both SqCWD and SVWD are evaluating the potential for Indirect Potable Reuse (IPR) of recycled water via injection wells within their service areas. All of these projects are intended to utilize portions of the same available groundwater storage space as ASR would; therefore, the potential for interference between these projects to result in unacceptable injection rate limitations and/or hydraulic losses needs to be evaluated with the groundwater models. PWR will not develop the information regarding the other planned MAR activities independently (e.g., rates, duration, locations, etc.), but will rely on existing information and/or information provided by others about these planned activities in developing the ASR model scenarios.

It is currently assumed that ASR would be limited to the Purisima Aquifer in the S-AGB and the Scotts Valley subarea in the SMGB; however, it is noted that the results of the Phase 1 work may find that the recharge capacity of these two aquifers is too limited to achieve the project goals and that additional local aquifer systems may be recommended to be pursued further (e.g., the Aromas aquifer in the S-AGB).

Deliverables: Two (2) Well Siting TM's will be prepared, one for each groundwater basin. The Well Siting TMs will document the development of siting criteria and the methods utilized, and will provide conclusions and recommendations regarding the availability of sites for ASR well facilities required to meet the full-scale ASR project objectives.

Two (2) Modeling Results TMs will be also prepared (one for each basin / model) documenting ASR modeling scenario development and evaluating the modeling results.

Conclusions and recommendations will be provided regarding the modeling findings and their implications on the scope of the Phase 2 investigation as well as the technical hydrogeologic feasibility of the full-scale permanent ASR project envisioned by the WSAC.

Task 1.6 – Project Management and Meetings

This task consists of overall project management, coordination of subconsultants, budget and schedule tracking, invoicing, and attendance at various project-related meetings. The overall purpose is to ensure effective management of project implementation, schedule and budget. This will include the coordination and attendance at various meetings over the course of the project to facilitate cooperation among project participants and communicate progress and findings to the City and other interested parties. For budgetary purposes, the following meetings are assumed:

- Project Kick-Off (1)
- Draft Task Deliverable Reviews (5)
- Technical Working Group (3)
- Pilot ASR Testing Plans Coordination with SqCWD and SVWD (2)
- Water Commission Quarterly Updates (8)
- Enrichment Session Presentations (4)

Each meeting will be attended by one to two PWR Principal Hydrogeologists, depending on the meeting agenda.

Services Not Included

Services which are (or may be) necessary for the completion of this project, which are not included in our proposal include the following:

- Distribution system hydraulic modeling (assumed provided by others)
- Groundwater flow and transport modeling (assumed provided by others).
- Cost of water, electricity, or other utilities;
- Any others items not specifically included in PWR's scope of services.

Estimated Fees and Schedule

Based on the scope of services presented herein, we estimate the fees for our services will be approximately $446,370, which will be billed on a time-plus-expenses basis in accordance with our current Fee Schedule (attached). An estimated fee summary worksheet is attached summarizing the estimated man-hours and costs per task/work item.

We understand that in order to authorize this work, your City Council must first approve a formal contract. Based on our current workload, we believe that we can commence work

within two weeks of your authorization. An estimated task-by-task schedule is presented in the table below:

Estimated Project Schedule

Task No.	Description	Task Duration	
		Start	Finish
1.1	Existing Wells Screening for Pilot ASR Testing	2016 Q1	2016 Q2
1.2	Site-Specific Injection Capacity Analyses	2016 Q2	2016 Q2
1.3	Geochemical Interaction Analyses	2016 Q2	2016 Q3
1.4	Pilot ASR Testing Program Development	2016 Q4	2017 Q1
1.5	Groundwater Modeling Assistance	--	--
1.5.1	Well Siting Study	2016 Q3	2016 Q4
1.5.2	Groundwater Modeling Coordination	2016 Q1	2017 Q4
1.6	PM and Meetings	2016 Q1	2017 Q4

As shown, the estimated project duration is approximately two years. The project schedule is generally consistent with the implementation schedule developed by PWR through the WSAC, with the work anticipated to be completed by the end of the calendar year 2017. It is envisioned that a more detailed Gantt Chart project schedule will be developed cooperatively between PWR and City staff as part of the Project Kickoff Meeting, which will be maintained and routinely updated by PWR during execution of the project.

We appreciate the opportunity to provide assistance to the City on this important community water supply project. If you require additional information regarding this or other matters, please contact us.

Sincerely,

PUEBLO WATER RESOURCES, INC.

Robert C. Marks, P.G., C.Hg
Principal Hydrogeologist

RCM:msb:mbf

Attachments: Cost Estimation Spreadsheet
2016 Fee Schedule

CITY OF SANTA CRUZ WATER DEPARTMENT

Professional Services for Santa Cruz ASR Project

Phase 1 Feasibility Investigation

PWR Project No.: 15-0111

ESTIMATED FEE SUMMARY

LABOR		Principal Professional	Senior Professional	Project Professional	Illustrator	WP	Hours by Task	Estimated Task Cost
	Hourly Fee	$195	$180	$165	$110	$90		
Task No.	Task Description							
1.1	Existing Wells Screening for Pilot ASR Testing	40	60	20	8	2	130	$22,960
1.2	Site-Specific Injection Capacity Analyses	150	60	20	4	2	236	$43,970
1.3	Geochemical Interaction Analysis	350	150	100	20	2	622	$114,130
1.4	Pilot ASR Testing Program Development	150	50	20	30	6	256	$45,390
1.5	Groundwater Modeling Assistance	-	-	-	-	-	-	-
1.5.1	Well Siting Study	150	60	20	10	2	242	$44,630
1.5.2	Groundwater Modeling Coordination	310	40	30	30	6	416	$76,440
1.6	Project Management and Meetings	250	50	-	20	10	330	$60,850
		-	-	-	-	-		
		-	-	-	-	-		
		-	-	-	-	-		
		-	-	-	-	-		
	Hours by Labor Category:	1400	470	210	122	30		
	Costs by Labor Category:	$273,000	$84,600	$34,650	$13,420	$2,700		
						Total Labor Hours:	2232	
						Total Labor Costs:	$408,370	

OTHER DIRECT COSTS (ODC's)	Units	Unit Price	No. of Units	Fee
Vehicle	Daily	$75	25	$1,875
Travel Per Diem	Daily	$185	25	$4,625
Field WQ Meter	Daily	$75	5	$375
ORP/pH/Temp Probe	Daily	$75	5	$375
			Subtotal ODCs:	$7,250

OUTSIDE SERVICES	Units	Unit Price	No. of Units	Fee
Outside Lab Analyses - WQ	Each	$2,500	6	$15,000
Outside Lab Analyses - Mineralogy	Each	$1,750	9	$15,750
			Subtotal Outside Services:	$30,750
			Subtotal Outside Services w/ Markup (0%):	$30,750

COST SUMMARY	
Labor	$408,370
Other Direct Costs	$7,250
Outside Services	$30,750
TOTAL ESTIMATED PROJECT COST:	$446,370

PUEBLO WATER RESOURCES, INC
2016 FEE SCHEDULE

Professional Services

Principal Professional.....$195/hr
Senior Professional.....$180/hr
Project Professional.....$165/hr
Staff Professional.....$135/hr
Technician.....$125/hr
Illustrator.....$110/hr
Word Processing.....$90/hr

Other Direct Charges

Subcontracted Services..... Cost Plus 15%
Outside Reproduction..... Cost Plus 15%
Travel Expenses.....Cost Plus 15%
Per Diem*.....$185/day
Vehicle $75/day

Equipment Charges

Drilling Fluid Test Kit..... $100/day, $400/week
Field Water Quality Meter (Hach DR890) $75/day, $275/week
Orion ORP/pH/Temp Probe..... $75/day, $275/week
Water Level Probes (In-Situ Mini-Troll/Level Troll) $100/day, $300/week
Fuji Ultrasonic Flowmeter.....$200/day, $750/week

*Regionally specific to project.

WATER COMMISSION
INFORMATION REPORT

DATE: 2/26/16

AGENDA OF: March 7, 2016

TO: Water Commission

FROM: Rosemary Menard, Water Director

SUBJECT: Water Supply Augmentation Strategy Work Plan Update – Part 2: Collaboration with Regional Partners

RECOMMENDATION: Receive information and provide any feedback to staff.

BACKGROUND: The Water Commission is scheduled to receive quarterly updates about the progress the Water Department is making in implementing the Council adopted Water Supply Augmentation Strategy (WSAS). This part of the quarterly update focuses on collaboration with regional partners to explore opportunities for using winter water to provide in lieu water to offset local pumping and the potential for partnerships in developing aquifer storage and recovery projects.

DISCUSSION: Water Director, Rosemary Menard made contact with staff from both the Scotts Valley Water District and the Soquel Creek Water District during December 2015 to arrange an opportunity to present the Water Supply Advisory Committee's City Council approved recommendations. Presentations were made to the Scotts' Valley Water District's Board of Directors on January 14, 2016 (see meeting agenda (minutes not posted yet) at http://svwd.org/sites/default/files/documents/board-meetings/agendas/01-14-16%20Agenda%20Packet_0.pdf) and to the Soquel Creek Water District Board of Directors on January 19, 2016 (see video at http://vp.telvue.com/preview?id=T02695&video=263091 – agenda item 7.5 which starts on the video at about 116 on the counter to the left of the timer bar at the bottom of the image – this file takes a long time to load, so if you want to watch it, you'll need to be patient.)

The presentation used with the Soquel Creek and Scotts Valley water district boards is included as Attachment A to this staff report.

In response to these presentations, members of both district boards of directors indicated an openness to continuing discussions with the City about potential projects that would be mutually beneficial. However, neither board directed its staff to stop pursuing other alternatives for addressing their water supply sustainability work. Rather, their attitudes reflected an interest in keeping options open and actively working on a number of options that might ultimately be implemented in some combination to provide regional water security.

In addition to these two formal presentations, there have been ongoing staff-to-staff discussions on opportunities for regional collaboration and joint project planning. Topics discussed have included:

- The short term water exchange project for the sale of winter water to Soquel Creek from the Water Department's sources with pre-1914 water rights;
- Water quality issues that need to be assessed and managed prior to and during water transfers;
- What each agency is planning to do regarding supply augmentation, including work plans and timeframes;
- Aquifer Storage and Recovery strategies, potential locations, and evaluation and pilot testing plans and timeframes; and
- Opportunities for collaborative projects with Scotts Valley and the San Lorenzo Valley Water districts.

With respect specifically to the proposed short-term water transfer to Soquel Creek, three factors have kept this project from proceeding this winter:

1. The CEQA review was not completed until February 9th;
2. The water supply conditions were not amenable with the condition of Loch Lomond at 80% as of 2/23/16 (see http://www.cityofsantacruz.com/departments/water/drought/weekly-water-conditions and cumulative run-off of the San Lorenzo system being still in the Critically Dry water year classification (see http://www.cityofsantacruz.com/departments/water/drought/weekly-water-conditions) as of early February with little rain to drive conditions to a better classification during the month.
3. A determination by the Soquel Creek Water District, based on the input of its consultant, that prior to any full implementation of even the proposed more limited water transfer, that its system should be thoroughly flushed. The District has a special flushing truck on order and wants to delay flushing until it has arrived. When the City flushes its system, it typically limits flushing to the time frame when the water that will be used for flushing would otherwise simply run to the ocean. In groundwater systems, it hasn't historically been feasible to do flushing without having an impact on the available resource. This new truck will allow the District to flush water out of one hydrant, treat it, and put it back into the water system at another hydrant.

The work reported here is the beginning of what will be an ongoing process during at least the next year or so. The timeframe for moving to develop any formal agreement with other agencies will be driven by the identification of projects that will meet mutual needs of the organizations involved.

FISCAL IMPACT: None

PROPOSED MOTION: Move to accept the report.

ATTACHMENTS:
1B1 Water Supply Advisory Committee Recommended Water Supply Augmentation Strategies

City of Santa Cruz

Water Supply Advisory Committee

Recommended Water Supply Augmentation Strategies

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Background/Context

- October 2013 City Council directed staff to develop a Community Engagement Program to address Santa Cruz' water supply issues
- November 2013 City Council accepts framework recommended by staff to establish a "Drought Solutions Citizen Advisory Committee"
- February 2014 Council approves membership of the "Water Supply Advisory Committee"
- April 2014 - October 2015 WSAC meets

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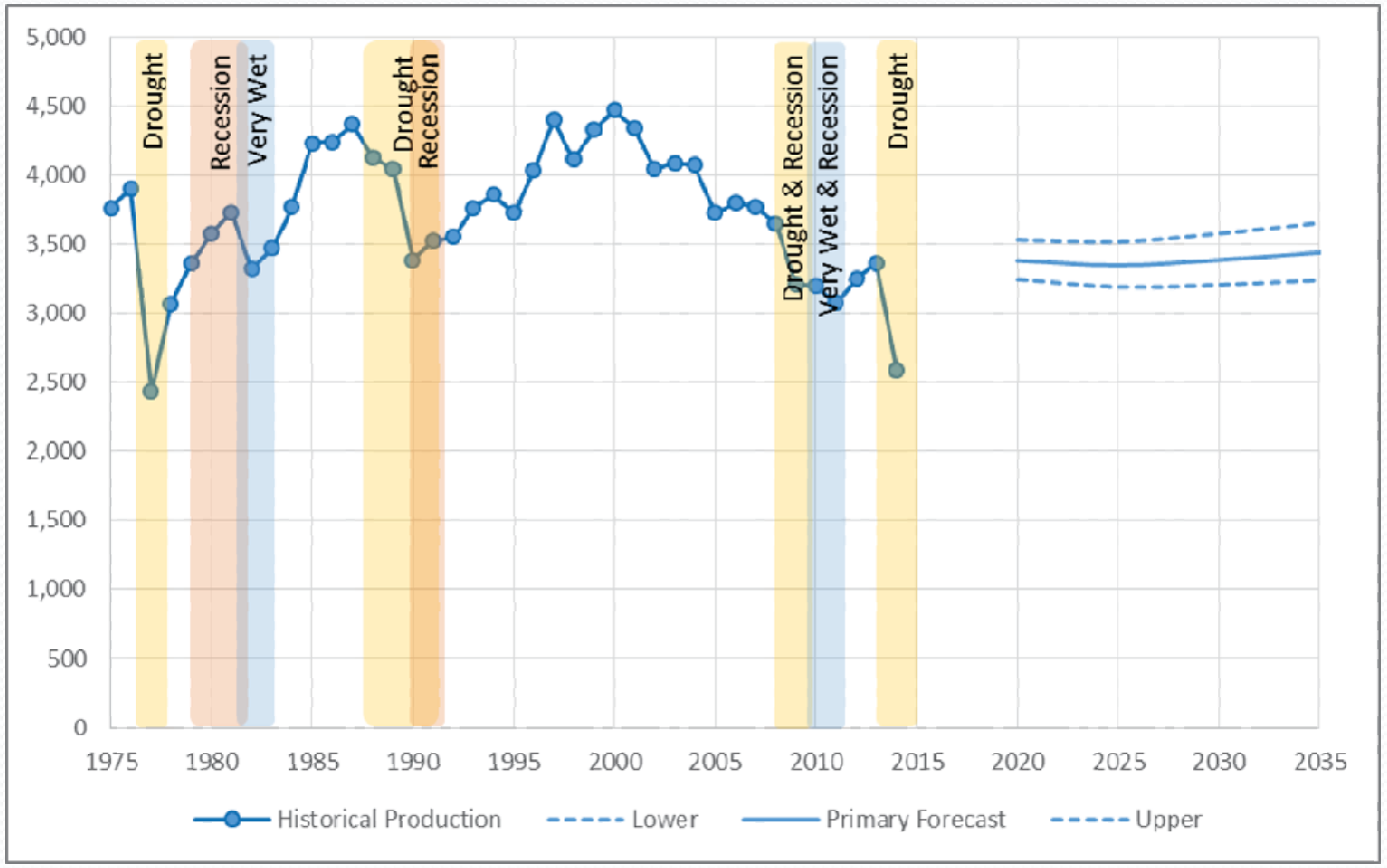
Demand Forecast Findings



- Flat expected demand thru 2035
  - 3,400 MGY
  - Population up 23%

- Falling per capita demand
  - 2010: 96 gpcd
  - 2035: 84 gpcd

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Key Challenges Facing our Water Supply

- Limited storage
- Fish flows
- Climate change
- Potential for seawater intrusion

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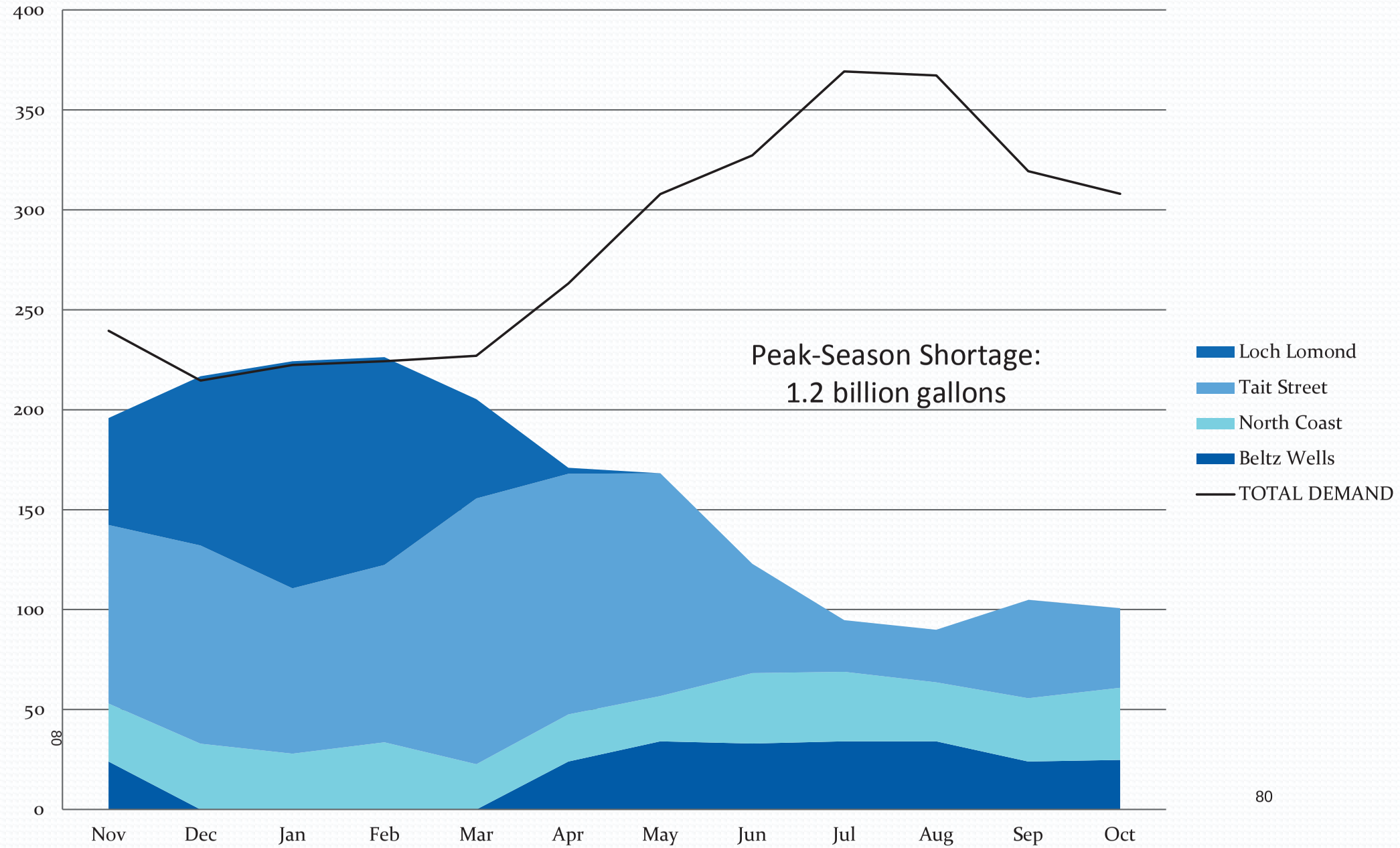
Projected Worst Year Gap

DFG-5 Flows, Final Demands, Climate Change
(millions of gallons per month)



WSAC's Problem Statement
July 2015

- Limited Storage
- Fish Flow Requirements & Potential climate change impacts
- Resulting peak-season gap: 1.2 billion gallons worst case
- Water conservation alone is not enough

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WSAC Recommendations

Continued and increased conservation programs.

Groundwater strategies using available winter flows:

- In-lieu water exchange with Soquel Creek and/or Scotts Valley Water Districts.
- Aquifer storage and recovery (ASR).

Supplemental supply augmentation strategies:

- Advanced treated recycled water.
- Desalination.

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Rationale for the Groundwater Storage and Retrieval Strategy Preference

- More fully utilizes winter water flows in the San Lorenzo River
- Can contribute water to storage in many years. Even in dry years winter water may be available to store in local aquifers.
- May start returning water before the entire groundwater system is built out.
- May help reduce the threat of seawater intrusion.
- Groundwater strategies are regional strategies. Regional strategies may help the regional economy and thus the local economy.
- In-lieu recharge strategies can start immediately with existing infrastructure & can grow over time.
- Together the ASR wells create a flexible, resilient & scalable system that can be included in SC's overall water supply portfolio.
- Water stored underground is much less affected by evaporation.
- Aquifer restoration may improve base flows from groundwater to local streams & may offset some fish flow requirements.
- May eliminate future water use curtailments during extended droughts.
- Groundwater strategies are believed to be politically feasible.

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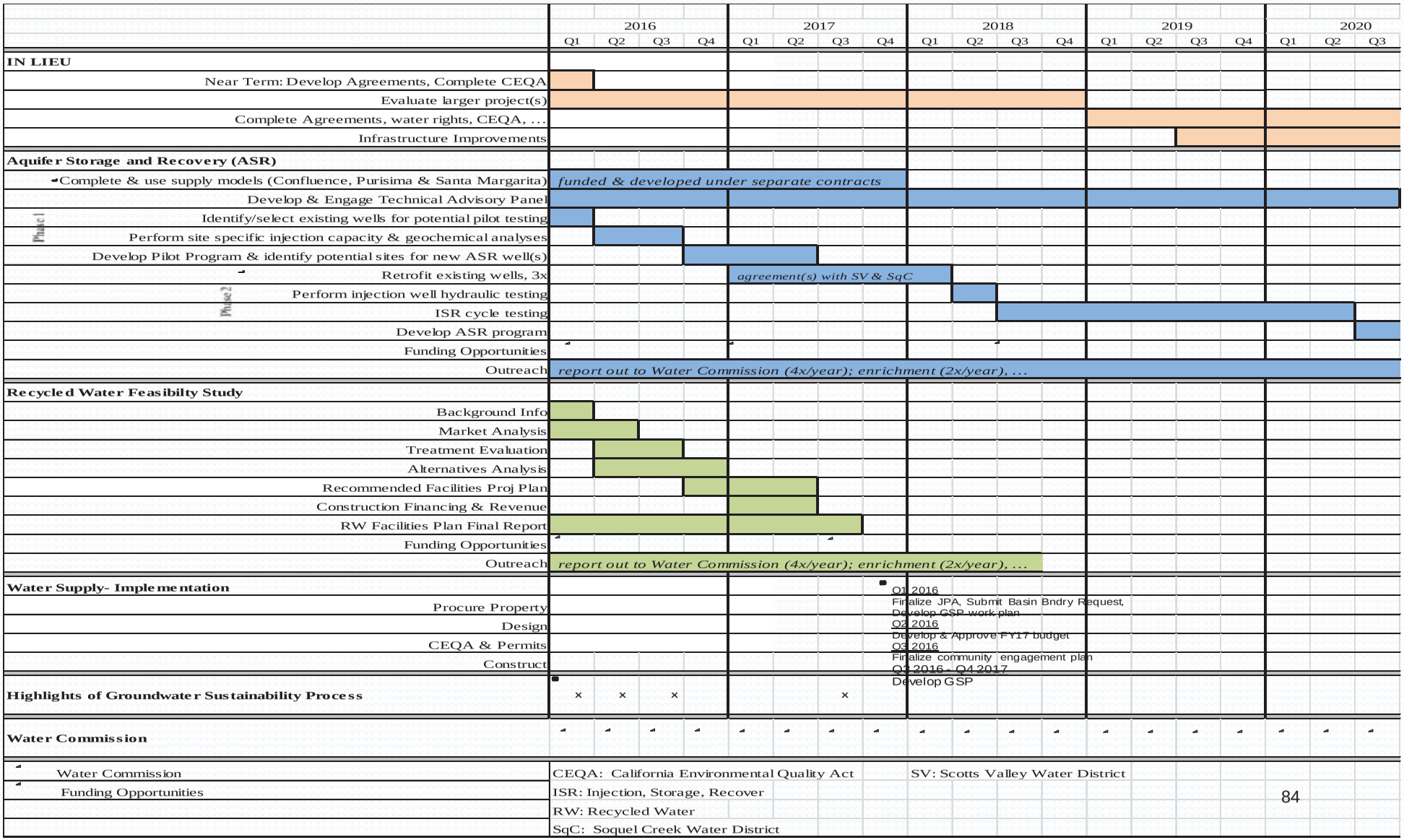
Recommendations Approved by City Council 11/24/15.

Next Steps:



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WATER COMMISSION
INFORMATION REPORT

DATE: 02/29/16

AGENDA OF: March 7, 2016

TO: Water Commission

FROM: Toby Goddard, Administrative Services Manager

SUBJECT: Water Conservation Master Plan Technical Memorandum

RECOMMENDATION: Presentation and discussion on the Water Conservation Master Plan – Recommended Program.

BACKGROUND: On September 8, 2015 the City Council authorized a contract amendment with Maddaus Water Management, Inc., adding a Phase 2 to the Water Conservation Master Plan project. The project had been put on hold for about one year due to the ongoing water shortage emergency and because additional efforts taken to address stakeholder input in the summer of 2014 had depleted the budget. Up to that point, the Water Commission had played a very active role in the project, facilitating public input, establishing goals, selecting measures, and identifying a preferred package of measures.

While the project was on hold, a number of developments occurred that altered the original scope of work. First, the Water Supply Advisory Committee (WSAC) expressed a strong interest in exploring whether even more water conservation investments could be made to address the City's water supply/demand gap. In June 2015, the WSAC formed a working group to examine additional demand reduction strategies focused primarily on the peak season uses of water. This working group developed several recommendations that needed to be incorporated and modeled alongside all the other measures to better understand water savings and costs involved. The WSAC included a number of recommendations regarding demand management in its final report that helped shape this second phase of work[1].

The other major change affecting this project was the development of a new econometric demand forecast that extends from 2020 out to 2035. The demand forecast was developed as part of the WSAC process with the intention that it would be used as the demand forecast for the update to the City's 2015 Urban Water Management Plan. As a result, additional work was needed to recalibrate the Maddaus model used in water conservation planning with the new water demand forecast, and extend the analysis from 2030 to 2035.

[1] Refer to Section 3.16 beginning on page 43 of the October 15, 2015 City of Santa Cruz Water Supply Advisory Committee Final Report on Agreements and Recommendations

DISCUSSION: Over the past several months, staff has been working with Maddaus Water Management to revise the model, incorporate recommendations from WSAC, and cycle back to review all recommended measures with added emphasis on peak season savings. One fortunate development associated with delaying this project was a fresh assessment of plumbing code savings. Several new code changes were adopted by the California Energy Commission in 2015, as part of a larger statewide drought response. These new changes were factored into the Phase 2 work and are seen to have a much more significant impact accelerating savings and reducing future water demand than previously estimated.

The WSAC recommendations resulted in seven additional modeled measures and some changes to the measures previously endorsed by the Water Commission, known then as 'Program C-REC". The new "Recommended Program" as it is now called consists of a suite of 35 individual measures that strongly reflect the public input received throughout the entire planning process.

Attached is a technical memorandum whose purpose is to summarize the findings from the water conservation planning effort to date. This document replaces a previous tech memo that the Commission reviewed in October 2014. Staff will present the key findings at the March 7, 2016 meeting, which is intended as an opportunity for discussion and deliberation by the Water Commission, given all the changes that have ensued since it was last involved. The matter will be scheduled to come back in April for Water Commission action and a recommendation to proceed with production of the final report.

Some of the key findings of the Phase 2 work are as follows:

1. The additional, incremental water savings from the Recommended Program, compared to the City's recent demand forecast, is 220 million gallons per year in 2035. The WSAC sought to save an additional 200 to 250 million gallons per year beyond what was captured in the econometric demand forecast as one of its recommendations to the City Council. The Recommended Program would achieve the WSAC stated goal.

2. Instead of remaining steady at 3.4 billion gallons per year, the estimated total annual demand for water will decline over time to about 3.2 billion gallons per year in 2035, in contrast to the trend in service area population, which is forecast to continue growing slowly.

3. Water savings attributable to existing and new plumbing codes are estimated to be on the order of 329 million gallons per year in 2035, over 100 million gallons more than previously estimated.

4. The overall cost of water saved to the utility of the Recommended Program is $4,572 per million gallons, about half the $10,000/mg maximum threshold set by the WSAC in its written recommendations.

5. Gross per capita water use[2] is expected to gradually decline to less than 80 gpcd by 2035.

[2] Total annual amount of treated water entering the distribution system, divided by the estimated service area population, and expressed in gallons per person per day.

Although this project is not yet finalized, the reduction in future water demand from both the plumbing code and the Recommended Program is information that needs to be factored into the analysis and production of the 2015 Urban Water Management Plan. Staff recommends continuing to move forward following the discussion with the Water Commission to incorporate the findings of the Water Conservation Master Plan into the 2015 Urban Water Management Plan. Further changes at this point, if any, would probably not have a significant impact on overall demand in future years.

FISCAL IMPACT: Annual cost of implementing the Recommended Program ranges from $1.0 million to $1.5 million per year. The final report will flesh out implementation details and serve as a basis for future operating budget requests, but resources included in the Department's proposed FY 2017 budget are adequate to support planned implementation of the program.

ATTACHMENTS:
1C1 Technical Memorandum, Maddaus Water Management, March 3, 2016

Technical Memorandum

Prepared for:	The City of Santa Cruz
Project Title:	Water Conservation Master Plan, Phase 2
Subject:	Overview of Current Findings from Water Conservation Master Planning Effort
Date:	March 3, 2016
To:	Toby Goddard, City of Santa Cruz Water Department
From:	Lisa Maddaus, Maddaus Water Management Inc.
	Bill Maddaus, Maddaus Water Management Inc.

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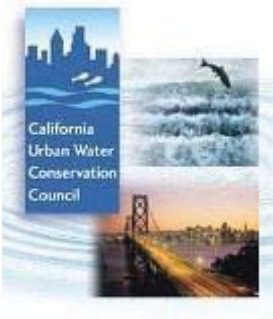
1. INTRODUCTION

This technical memorandum provides an overview of current findings from the water conservation master planning effort.

1.1 Background

Water is a precious natural resource that is vital to the health and welfare and to the economy of the Central Coast region. The City of Santa Cruz relies entirely on local sources for the community's drinking water supply. Because water supplies are limited, it is important that everyone uses water efficiently. The City of Santa Cruz has had a long-standing commitment to water conservation and offers a variety of programs, informational materials, and incentives to help City water customers become more water-efficient.



In 2000, the City adopted a Water Conservation Plan, the goal of which was to reduce water demand system-wide by 282 million gallons per year in 2010. Through plumbing fixture and appliance rebate programs, technical assistance, regulations, and other strategies, residential and commercial customers have saved over 330 million gallons of water per year so far. The City is also a member of the California Urban Water Conservation Council (CUWCC) and is active in promoting water conservation statewide.

In 2013, the Water Conservation Office contracted with Maddaus Water Management (MWM) to develop an updated Water Conservation Master Plan. The goal of the updated plan is to define the next generation of water conservation activities and serve as a roadmap to help our community achieve maximum, practical water use efficiency. Strengthening water conservation efforts has been identified as top priority by the City Council, the City's Water Commission, and more recently by the City's Water Supply Alternatives Committee in its effort aimed at delivering a safe, adequate, affordable, and environmentally sustainable water supply.

1.2 Need and Plan Objectives

The City of Santa Cruz's Water Conservation Master Plan (WCMP or Plan) strives to maximize the community's efficient use of water in the most equitable and cost-effective manner to the extent practical for implementation by City staff.

Key priorities of the WCMP include the following:

- Capitalize on opportunities to meet the future water needs of the Santa Cruz Water Department customers through cost-effective and sustained water conservation and water use efficiency efforts
- Demonstrate environmental stewardship and foster innovative, responsible and efficient practices
- Commit to and implement a water conservation program that supports the health of rivers, streams, and groundwater integral to the region's quality of life and economy
- Monitor and measure performance to ensure conservation potential is being met as forecasted

Achieving these goals will allow the Water Department to:

- Maintain and exceed the water savings already achieved by the City of Santa Cruz as well as identify the best path to achieve those savings and to monitor commitments to the CUWCC Memorandum of Understanding (MOU) Regarding Urban Water Conservation;
- Maintain a long-term plan for compliance with SB X7-7 to meet the gallons per capita per day (GPCD) target by 2020; and
- Meet the City's integrated water resource management goals to reduce peak season demands.

1.3 WSAC Recommended Approach to Demand Management

The City's Water Supply Advisory Committee (WSAC) was supported by City staff and Maddaus Water Management in its review of remaining conservation potential to future goals for the City's Conservation Program. In the WSAC's Final Report

published in October 2015, the following key assumptions about the demand management program (Recommended Program) were presented:

- "The Econometric Demand Forecast [building on previous assumptions prepared by MWM in the DSS Model] includes significant demand reductions associated with the implementation of existing plumbing and building codes, the continuation of existing demand management programs (as a baseline) and as a function of the effect on demand of expected increases in water rates.
- "A focus of new demand management programs will be on peak season demand reduction, which is also a significant focus of the expected demand reduction associated with anticipated price increases.
- "New and enhanced demand management programs will be developed to build on the Water Department's current program that has contributed to reducing per capita demand in Santa Cruz to one of the lowest levels in the state.
- "The programs to be implemented in the coming decade[s] are a mix of lower cost and some higher cost measures. Those higher cost measures are meant as small-scale experiments that may be broadened if they prove popular and their costs decline over time. Together these measures incur an average total program cost of no more than $10,000 per million gallons of water saved. This figure is lower than the expected cost of supply augmentation projects recommended to be pursued as a result of WSAC's work."

2. PLAN DEVELOPMENT (SUMMARY OF PROCESS)

Work on the Water Conservation Master Plan began with a kick-off meeting in January 2013. Since that time, the Water Commission has developed the goals of the planning effort; identified and selected a suite of potential quantifiable conservation measures for technical analysis; and evaluated system-wide conservation potential through selection of a recommended program scenario.

In preparation for this project, the City completed a Residential and Commercial Baseline Water Use Survey in May 2013 to assess the current status of plumbing fixtures, appliances, and landscape characteristics present in the City's water service area.

There have been two (2) main phases in the City's planning process separated by an intervening year that included an in-depth review of the work by WSAC. The process followed in the Plan is summarized as follows:

Phase 1: January 2013-October 2014

- Analyze water use and review City's Baseline Survey for remaining conservation potential
- Identify, screen, and prioritize measures, with significant public input via Water Commission Meetings and workshops
- Model measures
- Formulate programs, leading to a recommended Program "C" to maximize total annual water savings based on conservation potential
- Present outcomes to Water Commission on October 6, 2014

WSAC Review: October 2014-September 2015

- Review prior Phase 1 analytical results from the Least Cost Decision Support System Model (DSS Model – Model described in Appendix A) and seek to answer additional questions with City and MWM technical assistance
- Shift conservation program emphasis to peak season (April-October) water savings rather than maximizing overall higher annual volume and/or more cost-effective water efficiency savings to better address the City's supply-demand gap.
- Prepare and adopt a new econometric-based demand forecast

- Produce recommendations for additional conservation measures to be included in the Final Water Conservation Master Plan

Phase 2: October 2015-present

- Recalibrate model to updated econometric demand forecast and reset planning horizon to 2015-2035
- Incorporate input (changes to existing measures and adding new measures) from WSAC process, with focus on peak season demand reduction
- Incorporate new plumbing code changes based on the State's Emergency Drought Regulations, effective December 1, 2015
- Formulate the "Recommended Program" into the DSS Model and evaluate results

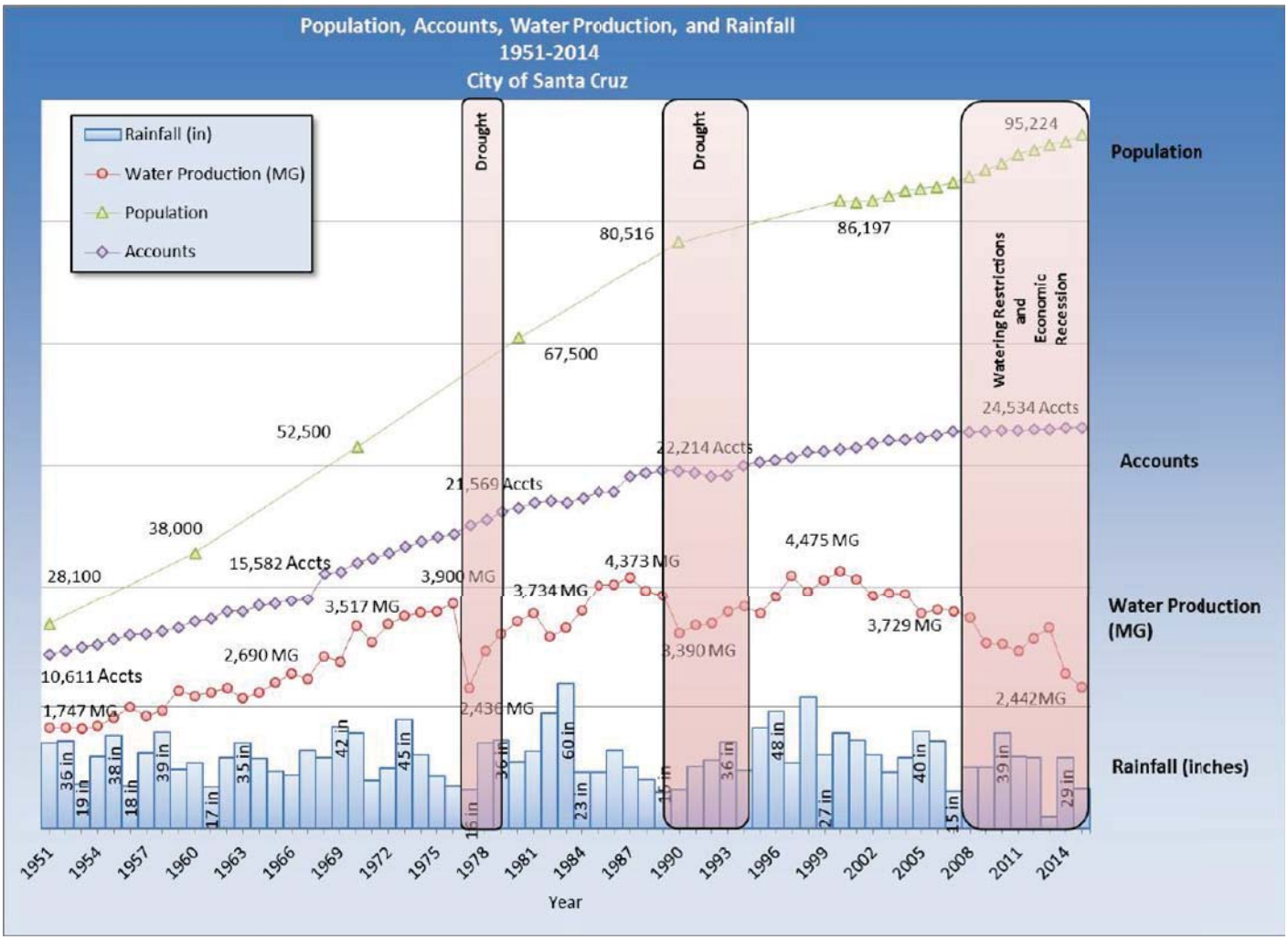
3. BASELINE DEMANDS

The WCMP process comprises four distinct steps: 1) input/analysis of system-wide demand projections to establish demand planning baseline with and without plumbing and building codes; 2) evaluation of system-wide conservation potential; 3) identification and study of potential conservation measures; and 4) deliberation and adoption of preferred long-term conservation program. Each of these steps is described in more detail in the following sections. This section presents a summary of the City's historical demand trends as well as the basis for the demand forecast.

3.1 Historical Trends

As seen in Figure 3-1, the historic trend in system water use paralleled account growth and population, except during two major drought periods. Around 2000, the pattern changed and system demand began a long period of decline, accelerated in 2009 by drought, economic downturn, and other influencing factors. The City has not seen a full demand recovery since the recent economic recession due to the ongoing drought. In 2013 system-wide demand was 3,364 million gallons per year, with Stage 1 water shortage regulations and restrictions in effect. In 2015 with the full rationing scheme in place, the City reduced production to 2,442 million gallons on the level not seen since the drought in the 1970s. Water demands are projected to remain depressed after the year 2015 due to persistent drought conditions and long-term behavioral changes related to water use. While it is prudent to assume that future demands will eventually recover when rainfall patterns/drought conditions and the economy normalize, it might not be to the same level as before due to widespread, long-term conservation measures taken in response to drought and ongoing adjustments in water rates.

Figure 3-1. Historical Trends for City of Santa Cruz



3.2 Basis for Demand Forecast

Maddaus Water Management (MWM) employed its Least Cost Planning Decision Support System Model (DSS Model) for the technical analysis. In addition to considering historical demand trends based on billing consumption data, the DSS Model takes into account the following parameters: total population, single family population, multifamily population, UC Santa Cruz population, commercial employment, business-industrial growth, and municipal growth.

In the M.Cubed August 2015 "City of Santa Cruz Water Demand Forecast," David Mitchell conducted an econometric analysis of water demand and forecasts of class-level customer demands and total system production through 2035. The report was commissioned by the City of Santa Cruz Water Department and the City's Water Supply Advisory Committee. Its purpose was to update the Department's existing demand forecast adopted as part of the 2010 UWMP to reflect current information on water usage and to account for effects of current conservation (using DSS Model Program A), water rates, and other factors expected to impact the future demand for water. With the start of Phase 2, MWM's DSS Model was carefully updated to incorporate this econometric analysis by inputting the regression equations and data sets used by M.Cubed and calibrated to ensure consistency between the two demand forecast models.

The updated DSS model starts with a "baseline" demand forecast, which is <u>not</u> the same forecast as presented by M.Cubed. It differs in that it backs out the earlier estimates for plumbing code savings and the estimated future water saving associated with the City's current water conservation program that were provided by MWM to M.Cubed in 2015 and embedded in that final demand forecast. All other variables, including average water use per account, forecasts of account growth, and economic factors used to forecast water use in the M.Cubed report, were taken directly from that model and used to populate the DSS model.

Table 3-1 below compares the primary water demand forecast presented by M.Cubed without the code savings and program savings that were previously generated from the DSS Model analysis completed in October 2014 compared to the updated DSS "baseline" demand completed in February 2016.

Table 3-1. Comparison of M.Cubed Demand Forecast and DSS "Baseline" Forecast (MG)

Demand (MG)	2020	2025	2030	2035
M.Cubed Final Demand Forecast, October 2015	3,385	3,351	3,388	3,442
2014 Estimate of Plumbing Code Savings (Prior DSS Model version)	65	132	197	235
2014 Estimate of Conservation Program Savings – Program "A" (Prior DSS Model version)	110	143	139	134
M.Cubed Final Demand Forecast without Plumbing Code or Conservation Program Savings	3,560	3,626	3,724	3,811
DSS Model "Baseline" Demand	3,560	3,636	3,743	3,838
Difference, MG	0	10	19	27
Difference, %	0.0%	0.3%	0.5%	0.7%

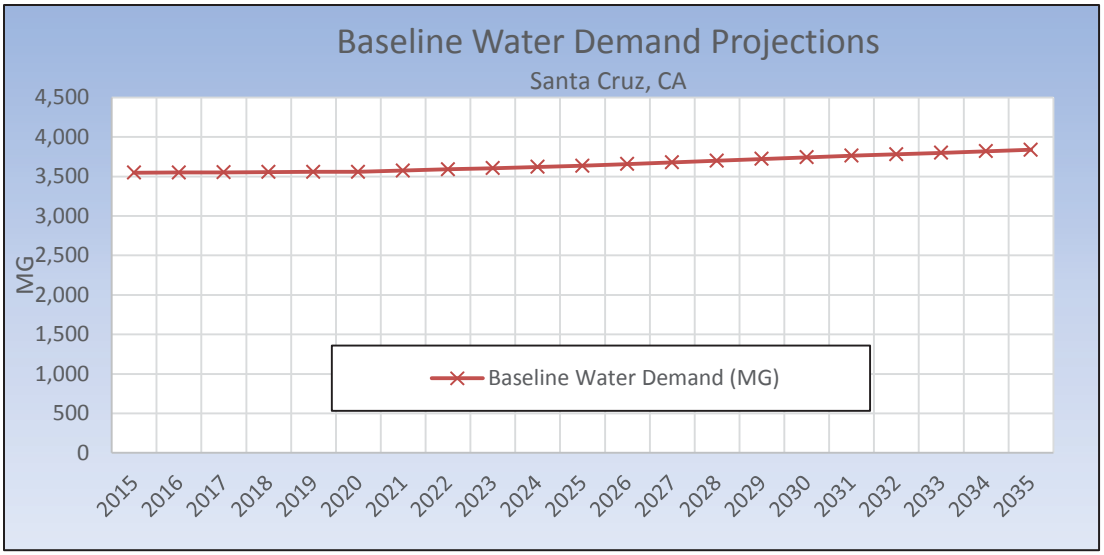
Note: Plumbing code and program savings: M.Cubed, 2015, Attachment 8, were originally based on results from the DSS Model prior work in 2014 by Maddaus Water Management, which are updated with the most recent DSS Model results from February 2016.

As can be seen in the above table, the two models are in close agreement and in all years differ by less than 1%.

The baseline demand forecast is shown in the following Figure 3-2. As referenced in the M Cubed report, the baseline forecast is predicated on average weather and normal economic conditions and is not expected to match realized demand, especially in the short term. City staff will continue to monitor production and consumption through and following the drought.

The next step involves calculating the effect of passive savings against the "baseline" demand. The results differ from earlier estimates of plumbing code savings presented in 2014-15 for two reasons: 1) lower baseline demand and 2) additional passive savings due to recent changes in California codes resulting from 2015 emergency conservation regulations adopted in California, effective December 1, 2015 (after the publication of the M.Cubed report).

Figure 3-2. Baseline Demand Forecast Without Plumbing Code Savings



Source: City of Santa Cruz. DSS Model, Section: Demand Analysis, Feb 16, 2016.

4. BASELINE DEMANDS WITH PASSIVE SAVINGS 2015-2035

Future community-wide conservation savings will be achieved by implementing both passive and active measures. Passive measures are federal and state codes and standards that increase conservation savings as older appliances and fixtures are replaced over time naturally with more water efficient models. Active measures are those in which the City will invest to promote water conservation, such as incentives and educational programs.

4.1 Basis for Plumbing Code Savings

Since it is beneficial to model the impact of the natural changes in the mix of types of appliances, the DSS Model forecasts service area water fixture use. In the codes and standards part of the DSS Model, specific fixture end-use type (point of use fixture or appliance), average water use, and lifetime are compiled. Additionally, state and national plumbing codes and appliance standards for toilets, urinals, showers, and clothes washers are modeled by customer category. These fixtures and plumbing codes can be added to, edited, and/or deleted by the user. This yields two demand forecasts – one with and one without plumbing code savings.

A key input in the model is fixture water use and life, as well as the initial proportions of individual fixtures in each customer class. The following Figure 4-1 presents an example of the initial proportions used in existing single family accounts. Table 4-1 on the following page provides the list of fixtures, average water use, and assumptions for fixture life used in this analysis.

Figure 4-1. Initial Fixture Proportions for Single Family Toilets (screen shot from the DSS Model)

Initial Fixture Proportions - Single Family Toilets	
1.28 gpf HET Residential	7.2%
1.6 gpf ULFT Residential	82.7%
High Use Toilet Residential	10.1%
<1.0 gpf Toilet Residential	0.0%
Total	100.0%

Data collected from the recently completed City of Santa Cruz Water Use Baseline Survey was used for this purpose. Other input parameters include estimates for annual replacement rate and assumed market share for both replacement and new equipment at various points in the planning horizon.

The scope of analysis involved assessing the rate of change of toilets, shower heads, lavatory and non-lavatory/kitchen faucets, and clothes washers in both existing single family and multifamily accounts, and toilets, urinals, and lavatory and non-lavatory/kitchen faucets in commercial accounts. Fixture characteristics are also tracked in new accounts, which are subject to the requirements of the 2015 California Green Building Code and 2015 California Code of Regulations Title 20 Appliance Efficiency Regulations adopted by the California Energy Commission (CEC) on September 1, 2015. This was an update in Phase 2, from the prior work in Phase 1, of preparing the DSS Model.

The controlling law for **toilets** is Assembly Bill (AB) 715. This bill requires high efficiency toilets (1.28 gpf) to be exclusively sold in California beginning January 1, 2014. The controlling law for wall-mounted urinals is the 2015 CEC efficiency regulations requiring that ultra-high efficiency pint **urinals** (0.125 gpf) be exclusively sold in California beginning January 1, 2016. This is an efficiency progression for urinals from AB 715's requirement of high-efficiency (0.5 gpf) urinals starting in 2014 that was modeled during WCMP Phase 1.

Standards for **residential clothes washers** fall under the regulations of the U.S. Department of Energy. Even though both front loading and top loading models will still be available for the foreseeable future, national water efficiency standards for both types are becoming more stringent over time, in steps. In March 2015, the federal standard reduced the maximum water factor for non-Energy Star certified top- and front-loading washing machines to 8.4 and 4.7, respectively. In 2018, the maximum water factor for standard top-loading machines will be further reduced to 6.5. Beginning in 2015, the maximum water factor for Energy Star certified washers was 4.3 for top-loading machines and 3.7 for front-loading.

Showerhead flow rates are newly regulated under the 2015 California Code of Regulations Title 20 Appliance Efficiency Regulations adopted by the CEC, which requires the exclusive sale in California of 2.0 gpm showerheads at 80 psi as of July 1, 2016 and 1.8 gpm showerheads at 80 psi as of July 1, 2018. The WaterSense specification applies to showerheads that have a

maximum flow rate of 2.0 gallons per minute (gpm) or less. This represents a 20% reduction in showerhead flow rate over the current federal standard of 2.5 gpm, as specified by the Energy Policy Act of 1992.

Faucet flow rates have likewise been recently regulated by the 2015 CEC Title 20 regulations. This standard requires that the residential faucets and aerators manufactured on or after July 1, 2016 be exclusively sold in California at 1.2 gpm at 60 psi; and public lavatory and kitchen faucet/aerators sold or offered for sale on or after January 1, 2016 be 0.5 gpm at 60 psi, and 1.8 gpm at 60 psi (with optional temporary flow of 2.2 gpm), respectively. Previously, all faucets had been regulated by the 2010 California Green Building Code at 2.2 gpm at 60 psi.

Plumbing code related water savings are considered reliable, long-term savings, and can be counted on over time to help reduce the City's overall system water demand. This projection further assumes no active involvement by the City, and that the costs of purchasing and installing replacement equipment (and new equipment in new construction) are borne solely by the customers, occurring at no direct utility expense. The inverse of the Fixture Life is the natural replacement rate, expressed as a percent (i.e., 10 years is a rate of 10% per year).

Table 4-1. List of Fixtures

Fixture Name	End Use	Average Water Use	Units	Fixture Life (yrs.)
Efficient Front Loader	Clothes Washers	13.0	gal per use	10
Medium Efficient Front Loader	Clothes Washers	19.0	gal per use	10
Top Loader	Clothes Washers	34.0	gal per use	10
0.5 gpm Non-Residential Lavatory Faucet	Lavatory Faucets	0.1	gal per use	15
1.2 gpm Residential Lavatory Faucet	Lavatory Faucets	0.3	gal per use	10
2.2 gpm Residential Lavatory Faucet	Lavatory Faucets	0.6	gal per use	10
2.2 gpm Non-Residential Lavatory Faucet	Lavatory Faucets	0.6	gal per use	15
2.5 gpm Residential Lavatory Faucet	Lavatory Faucets	0.6	gal per use	10
2.5 gpm Non-Residential Lavatory Faucet	Lavatory Faucets	0.6	gal per use	15
>2.5 gpm Residential Lavatory Faucet	Lavatory Faucets	0.9	gal per use	10
>2.5 gpm Non-Residential Lavatory Faucet	Lavatory Faucets	0.9	gal per use	15
1.8 gpm Residential Non-Lavatory/Kitchen Faucet	Non-Lavatory/Kitchen Faucets	1.8	gal per use	10
1.8 gpm Non-Residential Non-Lavatory/Kitchen Faucet	Non-Lavatory/Kitchen Faucets	1.8	gal per use	15
2.2 gpm Residential Non-Lavatory/Kitchen Faucet	Non-Lavatory/Kitchen Faucets	2.2	gal per use	10
2.2 gpm Non-Residential Non-Lavatory/Kitchen Faucet	Non-Lavatory/Kitchen Faucets	2.2	gal per use	15
2.5 gpm Residential Non-Lavatory/Kitchen Faucet	Non-Lavatory/Kitchen Faucets	2.5	gal per use	10
2.5 gpm Non-Residential Non-Lavatory/Kitchen Faucet	Non-Lavatory/Kitchen Faucets	2.5	gal per use	15
>2.5 gpm Residential Non-Lavatory/Kitchen Faucet	Non-Lavatory/Kitchen Faucets	3.5	gal per use	10
>2.5 gpm Non-Residential Non-Lavatory/Kitchen Faucet	Non-Lavatory/Kitchen Faucets	3.5	gal per use	15
High Efficiency 1.5 gpm	Showers	10.4	gal per use	25
High Efficiency 1.8 gpm	Showers	12.5	gal per use	25
High Efficiency 2 gpm	Showers	13.9	gal per use	25
Low Flow 2.5 gpm	Showers	18.3	gal per use	25
High Flow > 3 gpm	Showers	23.5	gal per use	25

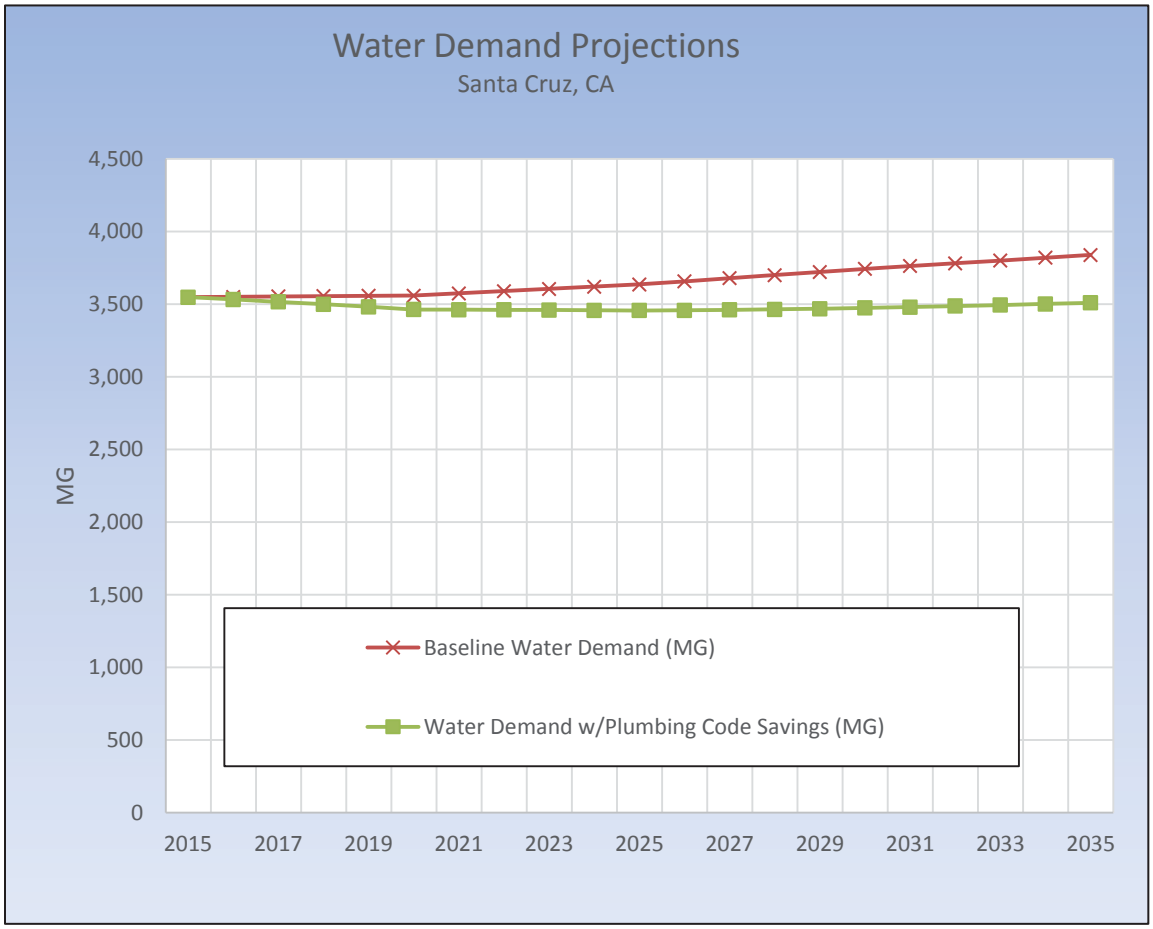
Table 4-1. List of Fixtures (continued)

Fixture Name	End Use	Average Water Use	Units	Fixture Life (yrs.)
<1.0 gpf Toilet Non-Residential	Toilets	1.0	gpf	50
1.28 gpf HET Residential	Toilets	1.3	gpf	50
1.28 gpf HET Non-Residential	Toilets	1.3	gpf	50
1.6 gpf ULFT Residential	Toilets	1.8	gpf	33
1.6 gpf ULFT Non-Residential	Toilets	1.8	gpf	50
High Use Toilet Residential	Toilets	3.5	gpf	25
High Use Toilet Non-Residential	Toilets	3.5	gpf	33
Waterless Urinal	Urinals	0.0	gpf	50
Pint Urinal	Urinals	0.1	gpf	50
Quart Urinals	Urinals	0.3	gpf	50

4.2 Baseline Demands with Passive Savings 2015-2035

The DSS Model estimates total cumulative plumbing code savings of 329 million gallons/year in 2035. As seen in Figure 4-2 below, water savings from fixture and appliance codes alone is expected to reduce total water demand (without plumbing code) from approximately 3.8 million gallons per year to about 3.5 million gallons by 2035, a reduction of about 8.6% due to plumbing code savings. Table 6-3 in section 6.1 shows the water savings in 5-year increments due to plumbing codes. Table 6-4 in section 6.2 presents projected water demands with plumbing code savings in 5-year increments.

Figure 4-2. Demand Forecast With and Without Plumbing Code Savings



Source: City of Santa Cruz. DSS Model, Section: Demand Analysis, Feb 16, 2016.

5. RECOMMENDED MEASURES

Maddaus Water Management (MWM) employed its Least Cost Planning Decision Support System Model (DSS Model) for the technical analysis. The following sections describe key elements used in the analysis that were reviewed during past Water Commission Meetings with public input along with both a webinar and two in-person workshops, including interested local community stakeholders, Water Commission members, and Water Supply Advisory Committee members. This section also presents a summary of the proposed measures, including their descriptions and estimated water savings. Background information on MWM's DSS Model can be found in Appendix A.

The initial process to identify and thoroughly evaluate potential conservation measures was iterative. First, an extensive list of more than 90 potential measures was generated based on input from City staff, consultants, Water Commissioners, and the public. This task included a review of the current active water conservation measures and the identification of new measures that may be appropriate for the City's service area. Next, the list of potential measures was screened to set aside measures that may not be appropriate for myriad reasons to seek those that would be included in the future program. The following criteria were used to narrow the list of potential measures:

- Water Saving Potential – emphasize measures that reduce average daily water use the most within the Santa Cruz community
- Sustainable Water Savings – emphasize measures that have long-term reliability
- Quantifiable Water Savings – emphasize measures where water savings can be accurately predicted
- Widespread Community and Social Acceptance – emphasize measures with high participation rates, low out-of-pocket expenses, and are equitable across customer type and social demographics
- Feasibility of Implementation/Secondary Impacts – emphasize measures that can achieve objectives
- Ancillary Benefits – emphasize measures that achieve additional goals, such as reducing energy/greenhouse gases (GHGs), reducing peak-season use, providing valuable customer service, and other non-quantifiable benefits (behavioral change, public awareness, etc.)

Further details about this process as well as a list of all the 90 potential measures are available from City staff. From the screening, the Water Commission added to and approved the recommended list of measures for the technical analysis phase of the project.

During the WSAC Report development, several additional measures were considered and added to the program. The result of the WSAC work on demand management was to shift the focus more toward reducing peak season use to increase supply reliability. It did so by considering measures to reduce outdoor use in residences and large landscapes, but also by enhancing base or indoor measures that lessen overall demand or that target specific uses, including visitor-serving uses, and thereby help reduce the City's peak season water use. The recommended program now matches the recommended measures list published in the October 2015 Water Supply Advisory Committee Final Report on Agreements and Recommendations, Table 14. The following table presents a basic description of each measure and the types of customers each measure targets. More detailed information and assumptions are described in the DSS Model.

Table 5-1. Basic Measure Descriptions

No.	Measure Name	Type of Customer	Description
1	System Water Loss Reduction	System	This measure's purpose is to identify and reduce water losses in the City's water system. The City is currently doing a water loss control study to review its annual water audit, look at water losses, and design a cost-effective water loss control program. The City currently loses an average of 7.5% of all treated water due to leaks, meter inaccuracies, and other problems. The goal of this measure is to reduce the City's system water losses on a long-term basis by an average of 1%. A new state law passed in 2015 that will require water suppliers to conduct water system audits, verify, and report water losses every year to the state beginning in 2017.
2	Advanced Metering Infrastructure (AMI)	Single Family (SF), Multifamily (MF), Commercial (COM)	This measure involves a major investment to upgrade meter reading technology and data management abilities. The City currently uses an Automatic Meter Reading system (AMR) in which water meters are read monthly by radio equipment that then transmits the information back to the City. This system may increase the frequency of meter reading from once a month to once an hour. The main water conservation (savings) benefits are for customer in-home or outdoor leak detection and increased customer awareness of water use. Other benefits include more action in enforcing the drought restrictions and more efficient customer service. Utility billing would continue to be on a monthly basis.
3	Large Landscape Budget-Based Water Rates	Irrigation (IRR)	This measure includes the development of individual monthly water budgets for irrigation customers. Water budgets are connected to a water rate schedule where water rates increase when a customer goes above their landscape water budget, or decreases if they are below budget. Budgets are typically based on factors like the size of the irrigated area, plant material and changes in weather conditions.
4	General Public Information	SF	This measure addresses opportunities to use public information programs as an effective tool to inform customers about the need for water conservation and conservation-related benefits. The current campaign is called "*Surf City Saves"* program. This measure includes paid and public service advertising, newsletters, bill inserts, information on the utility bill, a website, flyers and brochures, media campaigns, community meetings, direct mailings, community engagement at local activities, and other techniques. Public information is often carried out and coordinated with other agencies, groups, and schools.
5	Public Information (Home Water Use Report)	SF	This measure involves contracting with a firm to produce a detailed water billing report for high use customers that is in addition to their normal utility bill. This billing report compares water use in the neighborhood and offers suggestions to customers on ways to reduce water use.
6	Residential Leak Assistance	SF, MF	Customer leaks can go uncorrected at homes where owners are not able to pay the costs of repair. This measure would involve the City either paying part of the repair or paying the entire cost of the repair with funds that are paid back from customer water bills over time. This measure may also include an option to replace inefficient plumbing fixtures at low-income residences.
7	Single Family Residential Surveys	SF	This measure provides an outdoor water survey for existing single family residential customers. High water users will be targeted. This measure may include giving away water-efficient showerheads, faucet aerators, and toilet devices. This measure would provide a basic outdoor survey (look for leaks, irrigation problems and scheduling, plant information, etc.) and promote landscape and irrigation programs and improvements to reduce peak season water use.
8	Plumbing Fixture Giveaway/ Opt	SF, MF	The City would buy large amounts of efficient showerheads, kitchen and lavatory faucet aerators, shower timers and hose timers. Hose nozzles and leak detection tablets would be available for distribution at the Utility office and at community events.
9	Residential Ultra High Efficiency Toilet Rebates	SF, MF	This measure provides a rebate or voucher for the installation of an ultra-high efficiency toilet (UHET) that uses 1.0 gallons of water or less per flush (gpf).
10	High Efficiency Clothes Washer Rebates	SF, MF	The City would provide a rebate for high-efficiency clothes washing machines (HECW) to single family homes and in-unit condo/apartment complexes that do NOT have common laundry rooms. This program would be similar to the City's current program, except that higher rebate amounts would be increased for qualifying machines that are listed as Energy Star "Most Efficient" Clothes Washers.
11	High Efficiency Clothes Washer - New Development	SF, MF, COM	This measure would involve amending the City's building regulations to require building developers to install an efficient clothes washer (meeting certain water efficiency standards, such as gallons per load). Inspections would be coordinated with City and County building departments to make sure that an efficient washer is installed before the new home or building is occupied.
12	Hot Water On Demand - New Development	SF, MF, COM	The City would work to pass an ordinance requiring developers and permitted building remodels to equip new homes or buildings with efficient hot-water-on-demand systems. These systems use a pump placed under the sink to recycle water sitting in the hot water pipes to the water heater or to move the water heater into the center of the house and/or reduce hot water waiting times by having an on-demand pump on a recirculation line looping back to the hot water heater.
13	Toilet Retrofit at Time of Sale	SF, MF, COM	This measure involves tracking real estate sales within the City's water service area and working with buyers, sellers, and the real estate industry to retrofit older, inefficient toilets, showerheads, and urinals are upgraded with the most efficient fixtures when real estate is sold. A property inspection by either City staff or a licensed plumbing/general building would be required to verify compliance with the regulation.

No.	Measure Name	Type of Customer	Description
14	COM MF Common Laundry Room High Efficiency Clothes Washer	MF, COM	This measure provides a rebate for the installation of a high efficiency commercial washer (HEW) in COM laundromats and MF common area laundry rooms.
15	COM Incentives	MF, COM	After getting a free water use survey (Measure 17), the City will analyze the survey recommendations and determine if the MF or COM site qualifies for a financial incentive (reward). Financial incentives will be provided after analyzing the cost-benefit ratio of each proposed project. Incentives are designed to fit each individual site as each site has varying water savings potentials. Incentives will be given based on the decisions of the City specifically and while the money lasts.
16	Pre-Rinse Spray Nozzle Installation	COM	The City will provide free 1.3 gpm (or lower) pre-rinse spray nozzles, and possibly free installation of nozzles, in restaurants and other commercial kitchens.
17	COM Surveys	MF, COM	This measure will offer top MF and COM water customers a professional water survey that would evaluate ways for the site to save water and money. The surveys would be for large accounts (accounts that use more than 5,000 gallons of water per day, or the top 3%), such as hotels, restaurants, stores, and schools.
18	High Efficiency Urinal Program	COM, Municipal (MUN), Industrial (IND)	The City will provide a rebate or voucher for the replacement of older, high use urinals with high efficiency urinals (HEU) and flush valves using 0.125 gpf (1 pint) or less.
19	Public Restroom Faucet Retrofit - MUN	MUN	This measure includes the direct installation of high efficiency (0.5 gpm) sensor faucet fixtures in institutional (public) buildings, such as schools, hospitals, etc. High-use municipal building will be focused on first.
20	Public Restroom Faucet Retrofit - COM	COM	This measure includes the direct installation of high efficiency (0.5 gpm) sensor faucet fixtures in commercial buildings, such as businesses. High-use commercial buildings will be focused on first.
21	School Retrofit	MUN	This school retrofit program involves a school receiving funding to replace non-efficient fixtures, retrofit mixed use meters to dedicated irrigation meters, and upgrade irrigation systems.
22	Water Efficient Landscape Ordinance	SF, MF, COM, MUN, IND	This measure accounts for the lower irrigation water use that new accounts have due to their more efficient landscape designs, which are a result of the City's Landscape Code (implementation of Statewide Model Landscape Ordinance). The City is in the process of updating this code to keep up with new state regulations and technology for irrigation controllers and irrigation equipment.
23	Single Family Residential Turf Removal	SF	This measures provides a per-square-foot incentive to SF customers to remove and replace turf (grass) with low-water-use plants or permeable hardscape (pavers, concrete, etc. that allows water to soak through and into the ground). This is modeled after the City's current program. The rebate is currently $0.50 per square foot and capped at $500 for a single family residence. To increase participation, this measure would increase the rebate to $1 per square foot and a $1,000 maximum, or more in both cases.
24	Multifamily Residential/CI I Turf Removal	MF, COM, MUN, IRR	This measure provides a per-square-foot incentive to MF, COM, MUN, and IRR customers to remove and replace turf with low-water-use plants or permeable pavers (or other permeable hardscape). The rebate is currently $0.50 per square foot of turf removed and capped at $2,500 for multifamily or commercial residences. This measure would increase the rebate to $1 per square foot and a $5,000 maximum, or more to increase participation.
25	Expand Large Landscape Survey/Water Budgets	IRR	This measure expands on the City's existing landscape water budget program to include more dedicated irrigation accounts Outdoor water audits will be offered for existing customers with problems of overwatering or water waste. Normally those with high water use are focused on and provided a customized report telling them how to save water. All multifamily residential, CII, and public irrigators of large landscapes would be eligible for free landscape water audits upon request. This measure is connected to Measure 3 above, Large Landscape Budget-Based Water Rates.
26	Sprinkler Nozzle Rebates	SF, MF, COM	The City will provide rebates to replace standard spray sprinkler nozzles with more efficient rotating nozzles. Nozzles cost about $6 each.
27	Gray Water Retrofit	SF	The City will hold a workshop to support a Gray Water Challenge or similar program. A rebate will be offered that will help to cover a portion of the cost to single family homeowners per year who install gray water systems. A gray water kit/package, available from local hardware stores, would be supported by this City rebate.
28	Residential Rain Barrels	SF	The City will provide an incentive for the installation of rain barrels. This could involve rebates, purchasing rain barrels in high quantities, and giveaways of barrels, as well as workshops on proper installation and use of captured rain water for landscape irrigation.
29	Climate Appropriate Landscaping	SF, MF, COM, MUN	This measure will provide incentives for the installation of climate-appropriate and rainwater infiltration landscape (soaks up water on-property as opposed to running off-property). This measure will provide rebates to Home Owners Associations (HOAs), businesses, and institutions that increase their outdoor water use efficiency

No.	Measure Name	Type of Customer	Description
	and Rainwater Infiltration		by replacing qualifying high water use landscape and/or upgrading to qualifying high efficiency irrigation equipment or climate appropriate landscape. To qualify, sites must participate in a pre-inspection before beginning their project or purchasing materials. Single family homes, multifamily homes, and business properties with qualifying irrigated landscape (i.e., irrigated turf or a functional swimming pool) can receive rebates for replacing high-water-use landscape (e.g., irrigated turf grass) with a minimum of 50% plant coverage consisting of low-water-use plants from the Approved Plant List. Recommendations from the Water Supply Alternatives Committee (WSAC) Report include: • Increase turf conversion rebate • Require conversion of spray to drip for shrub irrigation • Discourage runoff through rainwater infiltration features (i.e., permeable pavers) • Support local actions for climate-appropriate landscaping • Focus on landscape narrower than 10 feet – no spray irrigation and/or next to hardscapes
30 SF	SF Conservation Pricing - Water and Sewer	SF	This measure is awaiting the results of an ongoing rate study conducted by Rafetlis Financial Consultants, Inc. in 2016.
30 MF	MF Conservation Pricing - Water and Sewer	MF	This measure is awaiting the results of an ongoing rate study conducted by Rafetlis Financial Consultants, Inc. in 2016.
30 COM	COM Conservation Pricing - Water and Sewer	COM	This measure is awaiting the results of an ongoing rate study conducted by Rafetlis Financial Consultants, Inc. in 2016.
31	Single Family Multifamily Dishwasher Rebates	SF, MF	This measure provides incentives for the purchase of water efficient dishwashers (Residential WF of 6.25 or less).
32	Hot Water Recirculation Systems	SF, MF, COM	This measure provides incentives for the installation of a hot water recirculation system. Having hot water discharge promptly is important for energy and water use efficiency. A hot water recirculating system enables the cold water in the hot water pipes to be continually returned to the water heater and reheated before the hot water faucet is turned on. Rebates would be available to the following water customer groups: - single family dwellings, including townhomes and mobile homes - apartment complexes - commercial institutions - commercially zoned businesses or institutions Maximum rebates allowable: (a) $300 per single family account per year and (b) $3,000 per commercial, industrial, or institutional account (e.g., as laundromats and apartments) per year.
33	Rewarding Businesses For Adopting Best Practices	COM	This measure offers commercial customers who employ best practices an increased water supply reliability and a lower price. For a business, the difficulty of rationing water during severe drought years can have a negative effect on its profits. This measure proposes that the City's Water Shortage Contingency Plan be changed so that businesses who adopt best practices, such as efficient plumbing fixtures, hotel laundry recycling, and climate-appropriate landscaping, would get a lower level of water usage reduction during a severe drought. For example, in a Stage 4 drought, with a system-wide goal of 35% reduction, the current plan is to have the water allotment of businesses be 87% of their normal year water use. Under this measure, businesses adopting best practices would be expected to cut back to only 95% of normal use, rather than 87%. These businesses could also be rewarded with a lower rate for their water use.
34	Additional Building Code Requirements for New Development	SF, MF, COM, MUN, IND	New CalGreen Building Codes already included in DSS Model (see Section 4 above) already takes many of the items recommended by WSAC into account. This measure currently cannot be measured with regard to future additional CalGreen updates and water savings. This measure involves the coming together of a working group of planners, builders, conservation groups, and Water Department personnel to evaluate possible additions to current codes and fee structures that would encourage water conservation. Some examples include: (1) requiring high efficiency washers in new development and (2) requiring hot water on demand/structured plumbing in new development. It is also intended that the work group track and incorporate new technologies in future City codes.
35	Innovation Incubator Program	SF, MF, COM, MUN	This measure would establish an Innovation Incubator Program allowing Santa Cruz to continue its leadership in water management by creating a program that supports new developments in: • New technologies, customer financing programs, and customer outreach programs; and • Pilot projects to promote popular adoption of rainwater for toilets & washers, new technology toilets in institutional buildings, onsite recycling of graywater, rainwater irrigated lawns, and promotion of native plant landscapes. Small grants would be offered to local businesses and/or working with state and national organizations like California Urban Water Conservation Council, California Water Foundation, California Urban

No.	Measure Name	Type of Customer	Description
			Water Agencies, University of California (Santa Cruz or Davis), Alliance for Water Efficiency, Water Research Foundation, US Bureau of Reclamation, or other coalitions of utilities or research-focused organizations.

Notes:		
AMI – Advance Metering Infrastructure	HECW – high efficient clothes washing machine	MF – multifamily
AMR – Automatic Meter Reading System	HEU – high efficiency urinal	MUN – municipal
COM – commercial	HEW – high efficiency commercial washer	SF – single family
gpf – gallons per flush	HOA – Home Owners Association	UHET – ultra-high efficiency toilet
gpm – gallons per minute	IND – industrial	WF – water factor, gallons per cubic foot
	IRR – irrigation	WSAC – Water Supply Alternatives Committee

A total of 35 individual measures are evaluated in the current Santa Cruz DSS Model. This number counts the three pricing measures as one measure (which is yet to be fully defined until the City's Water Rate Study is complete). For each measure selected to be modeled, a measure description, as well as details on each measure's utility and customer costs, time period, and targets can be found in the DSS Model's measure inputs. More detailed information on model inputs for each measure is available from City staff. Some of the key assumptions used in evaluating the water savings, benefits, and costs include the following:

- Applicable customer class
- Applicable end use
- Estimated annual account participation rates
- Evaluation start and end year
- Measure length, years
- Measure life, years
- Utility unit cost, $
- Customer unit cost, $
- Estimated annual administration and marketing overhead, %

These measures listed in Table 5-1 make-up the City's Recommended Program which consists of both passive and active elements. Plumbing code measures account for 53% of the future conservation potential achieved and are independent of any program – the savings are based on customers following applicable current local, state and federal laws, building codes and ordinances. Recommended Program active measures fall within one of four categories: 1) general measures, 2) residential measures (indoor), 3) commercial measures (indoor), and 4) irrigation measures (outdoor).

6. RECOMMENDED PROGRAM RESULTS

This section presents the Recommended Program water savings as well as projected demand and per capita water use with these savings. The Recommended Program's overall cost of water saved and proposed schedule is also shown.

6.1 Total Water Savings

Table 6-1 below presents each Recommended Program measure's water savings in million gallons (MG) per year for year 2035 as a result of each measure's design and implementation schedule. Year 2035 savings include ongoing savings still valid since the measure's start. Savings per measure presented in the Table assume the measures are implemented on a stand-alone basis (i.e., without interaction or overlap from other measures that might address the same end use or uses).

It is important to understand that the savings from measures presented in the table, which address the same end use(s) are not simply additive. The DSS Model uses impact factors to avoid double counting in estimating the water savings from programs of measures. For example, if two measures are planned to address the same end use and both save 10% of the prior water use, then the net effect is not the simple sum (20%). Rather it is the cumulative impact of the first measure reducing the use to 90% of what it was without the first measure in place and then reducing the use another 10% to result in the use being 81% of what it was originally. In this example the net savings is 19%, not 20%. Using impact factors, the model computes the reduction as follows, 0.9 x 0.9 = 0.81 or 19% water savings.

Since interaction between measures has not been accounted for in Table 6-1 below, it is not appropriate to include a total in the bottom row. However, the table is useful to give a close approximation of the savings of each individual measure.

Table 6-1. Recommended Program Individual Measure Cost of Water Saved and 2035 Water Savings (MGY)

No.	Measure Name	Cost of Water Saved ($/MG)	2035 Water Savings (MG)
1	System Water Loss Reduction	$3,923	34.87
2	Advanced Metering Infrastructure	$1,269	45.94
3	Large Landscape Budget-Based Water Rates	$194	12.83
4	General Public Information	$8,334	5.73
5	Public Information (Home Water Use Report)	$2,518	11.39
6	Residential Leak Assistance	$2,117	22.03
7	Single Family Residential Surveys	$7,735	2.78
8	Plumbing Fixture Giveaway/Opt	$1,479	2.03
9	Residential Ultra High Efficiency Toilet Rebates	$5,316	2.91
10	High Efficiency Clothes Washer Rebates	$2,794	36.20
11	High Efficiency Clothes Washer - New Development	$1,368	12.53
12	Hot Water On Demand - New Development	$7,849	4.46
13	Toilet Retrofit at Time of Sale	$1,516	8.70
14	CII MF Common Laundry Room High Efficiency Clothes Washer	$4,258	3.07
15	CII Incentives	$533	18.39
16	Pre-Rinse Spray Nozzle Installation	$153	9.16
17	CII Surveys	$4,056	19.24
18	High Efficiency Urinal Program	$5,220	3.22
19	Public Restroom Faucet Retrofit - MUN	$23,467	0.29
20	Public Restroom Faucet Retrofit - COM	$9,780	8.47
21	School Retrofit	$1,883	2.88
22	Water Efficient Landscape Ordinance	$602	6.66
23	Single Family Residential Turf Removal	$22,157	4.18
24	Multifamily Residential/CII Turf Removal	$32,186	2.39
25	Expand Large Landscape Survey/Water Budgets	$20,948	1.97
26	Sprinkler Nozzle Rebates	$13,643	3.35
27	Gray Water Retrofit	$15,742	0.24
28	Residential Rain Barrels	$4,672	3.42
29	Climate Appropriate Landscaping and Rainwater Infiltration	$33,221	8.26
30SF	SF Conservation Pricing - Water and Sewer[1]	N/A	N/A
30MF	MF Conservation Pricing - Water and Sewer[1]	N/A	N/A
30COM	COM Conservation Pricing - Water and Sewer[1]	N/A	N/A
31	Single Family Multifamily Dishwasher Rebates	$29,602	0.20
32	Hot Water Recirculation Systems	$15,650	1.38
33	Rewarding Businesses For Adopting Best Practices	$6,030	3.64
34	Additional Building Code Requirements for New Development[2]	N/A	N/A
35	Innovation Incubator Program	$121,679	1.08

[1]Pricing measure costs and savings are not yet available. These measures are awaiting the results of an ongoing rate study scheduled to be completed in 2016.
[2] New CalGreen Building codes, effective as of January 2016, are already modeled. This measure is awaiting support from a Working Group yet to be formed.

Notes:

1. This table does not contain a total in the bottom row intentionally. It is not applicable since interaction between measures has not been accounted for in this table but is at the program level.
2. Source: City of Santa Cruz. DSS Model, Section: Conservation Analysis, Feb 16, 2016.

Table 6-2 presents the benefit cost analysis summary for the Recommended Program, which includes all the measures listed in the previous Table 6-1.

Cost categories are defined as follows:

- Utility Costs – those costs that the City as a water utility will incur to operate the measure including administrative costs

- Utility Benefits – the avoided cost of producing water

The column headings in Table 6-2 are defined as follows:

- Average Cost of Water Saved ($/MG) = average cost to implement the program divided by the water savings over the life of the conservation measure.
- Water Savings in 2035 (MGY) = water saved in million gallons. The year 2035 is presented as this represents the end of the planning horizon for both the 2015 UWMP and this analysis effort.

Table 6-2. Recommended Program Costs and Savings

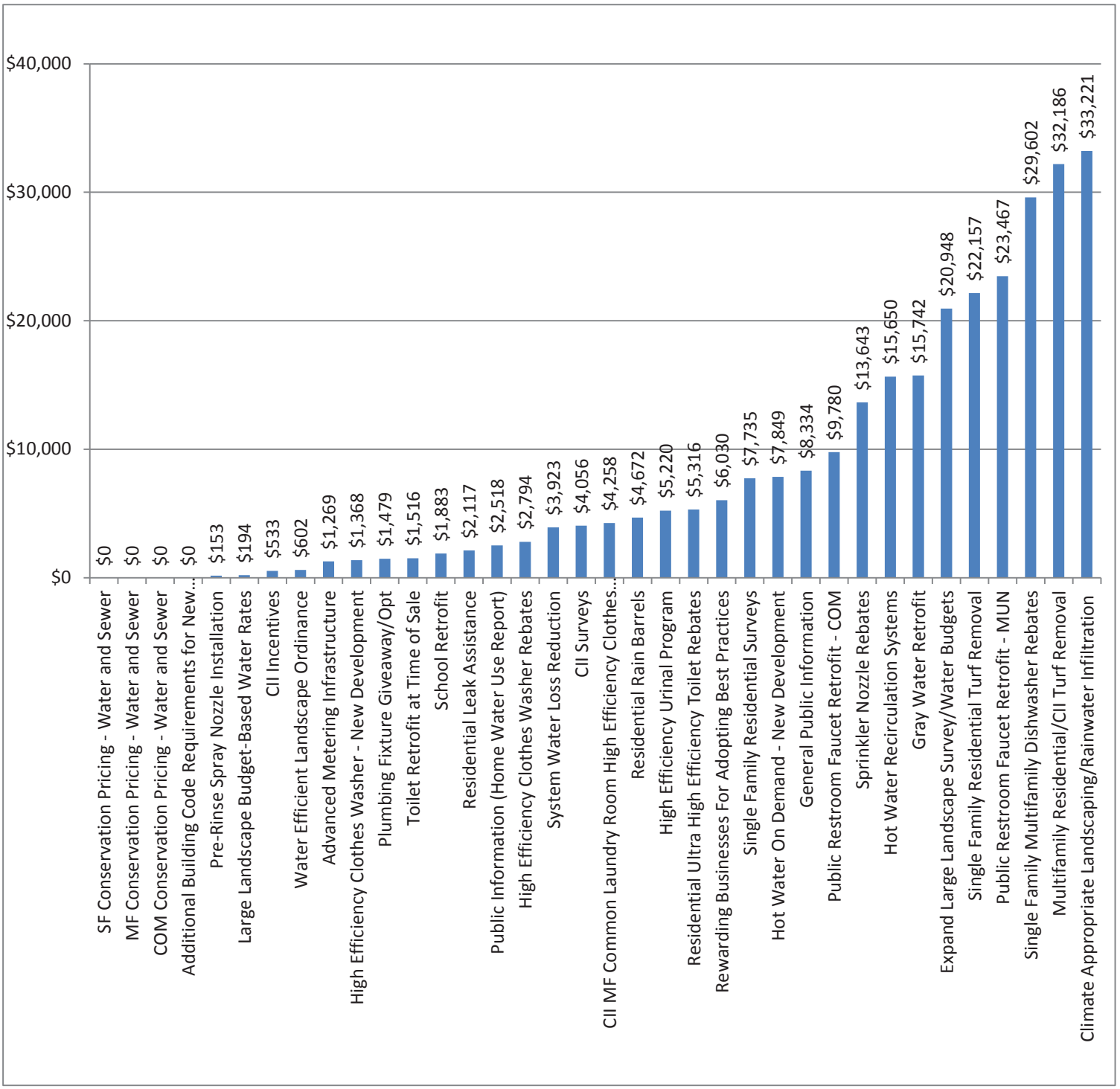
Conservation Program	Average Cost of Water Saved $/MG	Water Savings over "Baseline" Demand in 2035 (MGY)
Recommended Program with Plumbing Code Savings	$4,572/MG	619

Notes:

1. Across the modeling time period of 2015-2035, administrative costs average approximately 22% of total utility costs annually.
2. Source: City of Santa Cruz. DSS Model, Section: Results, Feb 16, 2016.

Figure 6-1 shows the costs of water saved for individual measures ranked from lowest to highest (excluding Measure 35). The measures to be implemented in the next several years are a mix of some lower cost and some higher cost measures. Several of the measures addressing peak season water use have the highest unit costs, but, together as a package, the Recommended Program is $4,572/MG, well below the $10,000/MG the maximum level established by the WSAC which is lower than the expected unit cost of supply augmentation projects recommended to be pursued as a result of the WSAC's work.

Figure 6-1. Conservation Measures Unit Cost of Water Saved ($/MG)



Source: City of Santa Cruz. DSS Model, Section: Results, Feb 16, 2016.

Table 6-3 below shows the savings in 5-year increments for the plumbing codes, Recommended Program, and the Recommended Program with plumbing code savings.

Table 6-3. Long Term Conservation Program Savings over "Baseline" Demand (MG/Year)

Conservation Program	2020	2025	2030	2035
Plumbing Code	96	179	269	329
Recommended Program	137	232	269	291
Recommended Program with Plumbing Code Savings	233	411	538	619

Source: City of Santa Cruz. DSS Model, Section: Results, Feb 16, 2016.

The Recommended Program consists of both passive (plumbing codes which include state and Federal legislation for efficient fixture requirements for customers served by the City) and active elements. Plumbing code measures account for 53% of the future conservation potential achieved and are independent of any active conservation program.

6.2 Water Demand with Projected Savings

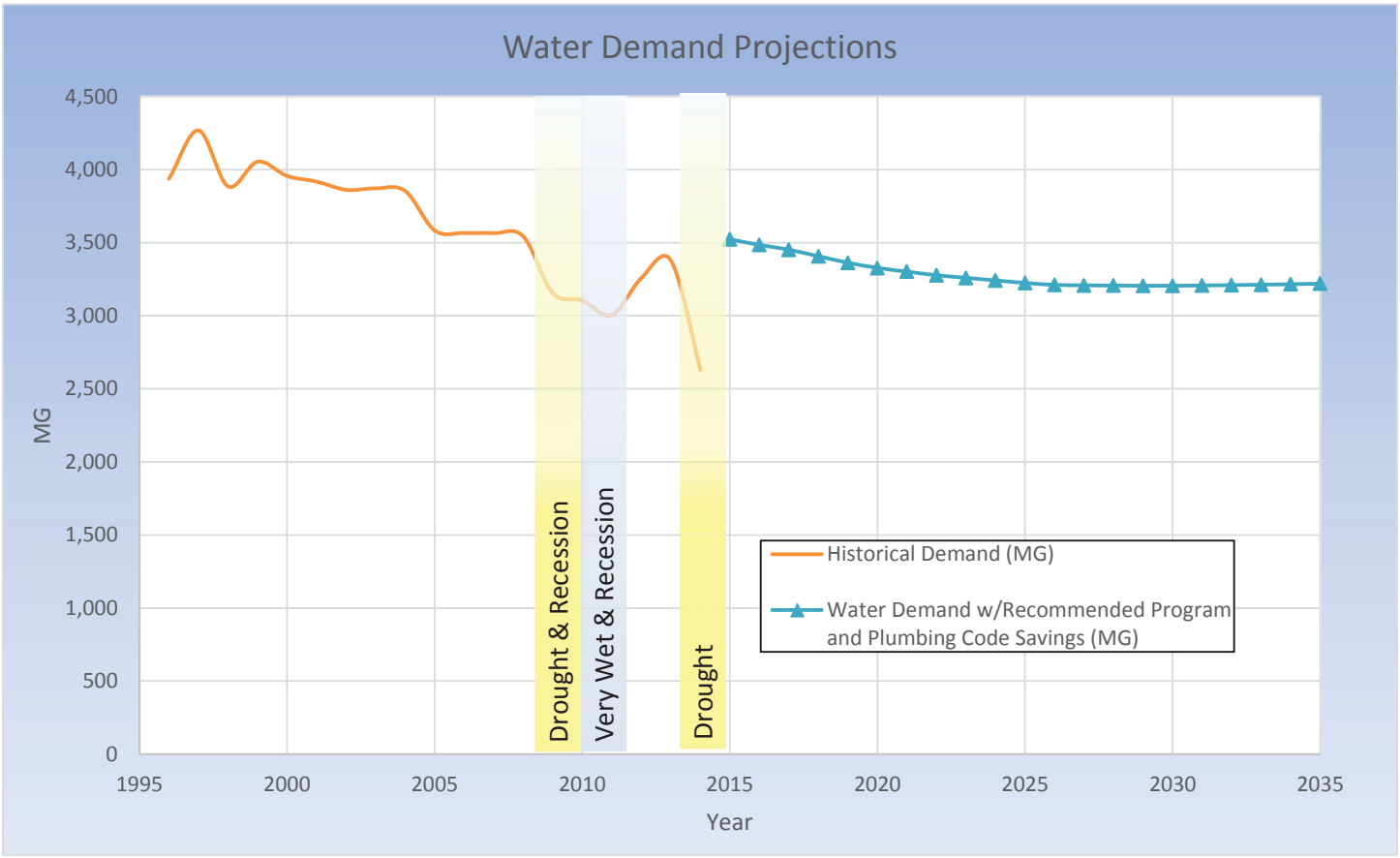
The Recommended Plan is envisioned to include strong customer participation to support additional planned growth while keeping total water use relatively constant for the next 20 years. New development will be built to water efficient standards following the 2015 CalGreen Plumbing Code, 2015 CEC Code, and other local ordinances (e.g., City's landscape ordinance). Water use in new homes should be less and more efficient than existing homes on comparable lot sizes. Table 6-4 and Figure 6-2 below present the Recommended Program projected water demands. Note that the Recommended Program with Plumbing Code is lower than the Demand Forecast by M.Cubed shown in Table 3-1. The Recommended Program forecast is 222 MGY lower (6%) than the M.Cubed forecast in 2035. This is due to increased savings by the new plumbing codes and new conservation programs that would be added over time.

Table 6-4. Water Use Projections (MG/Year)

	2020	2025	2030	2035
Demand with Plumbing Code (MGY)	3,464	3,456	3,474	3,510
Demand with Plumbing Code and Recommended Program (MGY)	3,327	3,225	3,205	3,220

Source: City of Santa Cruz. DSS Model, Section: Results, Feb 16, 2016.

Figure 6-2. Recommended Program Projected Water Demands



Source: City of Santa Cruz. DSS Model, Section: Results, Feb 16, 2016.

6.3 Per Capita Water Use

With two possible conservation target tracks to follow, the City has selected to aim to achieve SB X7-7 Method 3: 95% of State Hydrological Region Target by 2020. The City's baseline and target GPCD are as follows:

- Baseline GPCD = 113 GPCD
- 2015 Interim Target = 111 GPCD
- 2020 target = 110 GPCD
- CUWCC 2018 target = 101 GPCD

Table 6-5 below shows the projected per capita water use in gallons per day per person (GPCD) in 5-year increments for the projected demand with no plumbing code savings, projected demand with plumbing code savings, and projected demand with Recommended Program implementation and plumbing code savings.

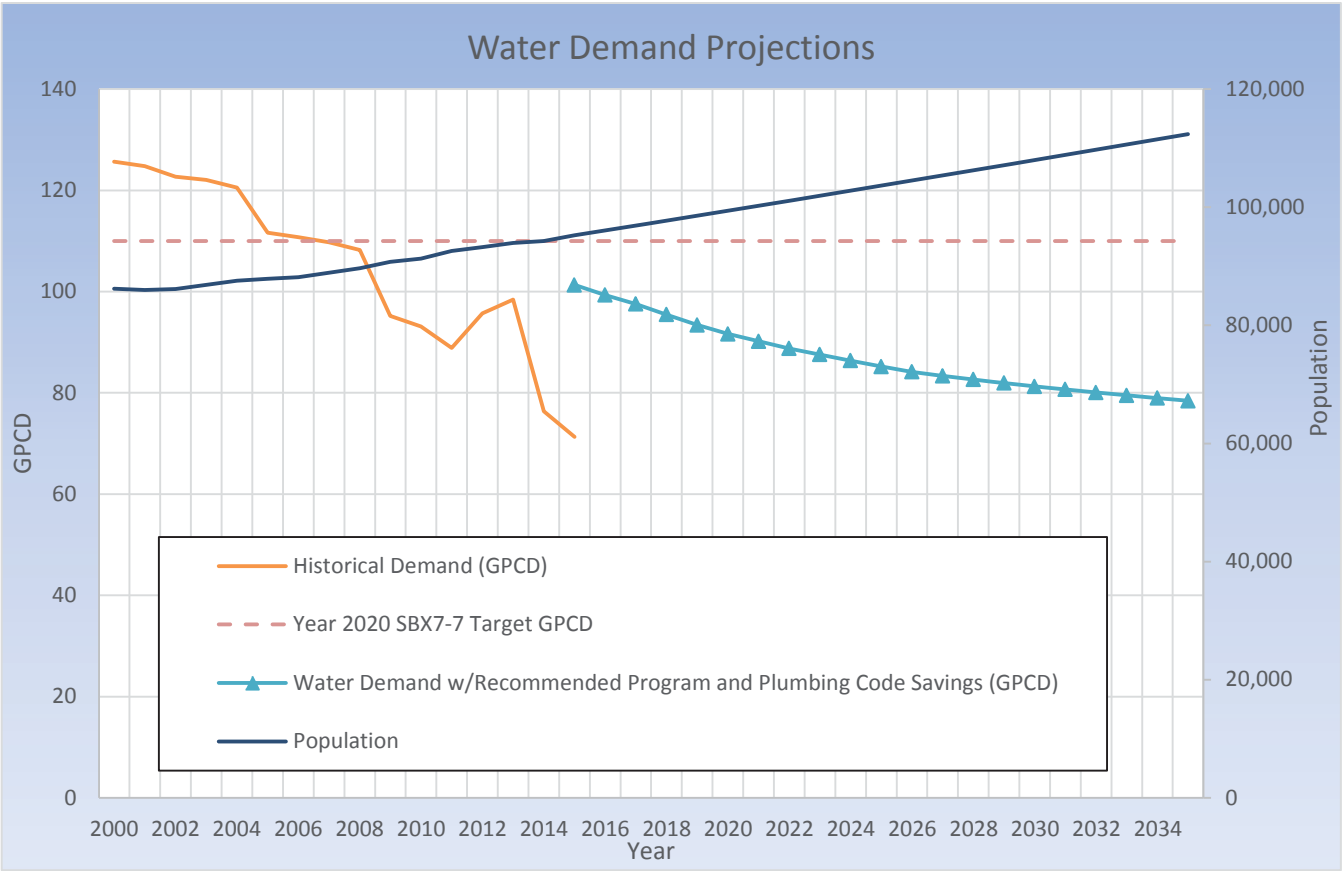
Table 6-5. Projected Population and Per Capita Water Use (GPCD)[1]

	2020	2025	2030	2035
Population [2]	99,403	103,620	107,989	112,390
"Baseline" Demand without Plumbing Code (GPCD)	98	96	95	94
Demand with Plumbing Code (GPCD)	95	91	88	86
Demand with Plumbing Code and Recommended Program (GPCD)	92	85	81	78

[1] City of Santa Cruz. DSS Model, Section: Results, Feb 16, 2016.
[2] WSAC Final Report, October 2015.

The following Figure 6-3 presents the SB X7-7 year 2020 GPCD target and historical and projected GPCD estimates with plumbing codes and Recommended Program savings. As seen below, the City has already met its state-mandated 2020 target and surpassed its voluntary CUWCC 2018 goal. The goal of the City's plan is to press beyond these state targets and instead maximize conservation savings to help meet local resource needs for current and future water demands.

Figure 6-3. Water Conservation Program Savings Projections – SB X7-7 Target, GPCD



Source: City of Santa Cruz. DSS Model, Section: Results, Feb 16, 2016.

6.4 Overall Cost of Water Saved

The cost of water saved per unit volume ($/MG) for the Recommended Program is $4,572/MG. This is below the Water Supply Alternatives Committee's recommended threshold for overall cost of water saved, which is $10,000/MG.

The cost of water saved for the Recommended Program can be compared to the City's avoided cost of water as one indicator of the cost effectiveness of the conservation program. It should be noted that the cost of water saved value somewhat undervalues the cost of savings because program costs are discounted to present value and the water benefit is not.

6.5 Key Findings

As a result of this comprehensive analysis here are some summary observations and conclusions:

1. The additional, incremental water savings from the Recommended Program, compared to the City's recent demand forecast, amount to about 220 million gallons in 2035.
2. The estimated annual demand will decline over time to about 3.2 billion gallons per year (bgy) in 2035, versus about 3.4 bgy estimated in the demand study. That estimate is comparable to the actual level of water production experienced in the late 1960s, when the service area population was around 50,000.
3. The impact on water savings from 2015 changes in the fixture plumbing codes prompted by the emergency conservation regulations (which would not have been factored in but for the delay associated with the Water Supply Advisory Committee's process) is over 100 million gallons more than previously estimated.
4. The overall cost of water saved by the Recommended Program is about half of what the WSAC set as a recommended threshold.
5. Gross per capita water use is expected to gradually decline to a level of less than 80 GPCD in 2035.

6.6 Proposed Schedule

The following Figure 6-4 presents the proposed Recommended Program implementation schedule.

Figure 6-4. Recommended Program Proposed Implementation Schedule

No.	Measure	Time Period	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
1	System Water Loss Reduction	2015 - 2035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
2	Advanced Metering Infrastructure	2021 - 2035							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
3	Large Landscape Budget-Based Water Rates	2018 - 2020				■	■	■															
4	General Public Information	2015 - 2035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
5	Public Information (Home Water Use Report)	2018 - 2035				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
6	Residential Leak Assistance	2018 - 2035				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
7	Single Family Residential Surveys	2015 - 2035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
8	Plumbing Fixture Giveaway/Opt	2015 - 2017	■	■	■																		
9	Residential Ultra High Efficiency Toilet Rebates	2015 - 2020	■	■	■	■	■	■															
10	High Efficiency Clothes Washer Rebates	2015 - 2026	■	■	■	■	■	■	■	■	■	■	■	■									
11	High Efficiency Clothes Washer - New Development	2021 - 2035							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
12	Hot Water On Demand - New Development	2021 - 2035							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
13	Toilet Retrofit at Time of Sale	2015 - 2019	■	■	■	■	■																
14	CII MF Common Laundry Room High Efficiency Clothes Washer	2015 - 2024	■	■	■	■	■	■	■	■	■	■											
15	CII Incentives	2021 - 2026							■	■	■	■	■	■									
16	Pre-Rinse Spray Nozzle Installation	2015 - 2016	■	■																			
17	CII Surveys	2021 - 2026							■	■	■	■	■	■									
18	High Efficiency Urinal Program	2015 - 2018	■	■	■	■																	
19	Public Restroom Faucet Retrofit - MUN	2021 - 2023							■	■	■												
20	Public Restroom Faucet Retrofit - COM	2021 - 2030							■	■	■	■	■	■	■	■	■	■					
21	School Retrofit	2021 - 2030							■	■	■	■	■	■	■	■	■	■					
22	Water Efficient Landscape Ordinance	2015 - 2035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
23	Single Family Residential Turf Removal	2015 - 2035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
24	Multifamily Residential/CII Turf Removal	2015 - 2035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
25	Expand Large Landscape Survey/Water Budgets	2018 - 2035				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
26	Sprinkler Nozzle Rebates	2018 - 2035				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
27	Gray Water Retrofit	2015 - 2035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
28	Residential Rain Barrels	2015 - 2035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
29	Climate Appropriate Landscaping and Rainwater Infiltration	2015 - 2035	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
30SF	SF Conservation Pricing - Water and Sewer	2018 - 2035				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
30MF	MF Conservation Pricing - Water and Sewer	2018 - 2035				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
30COM	COM Conservation Pricing - Water and Sewer	2018 - 2035				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
31	Single Family Multifamily Dishwasher Rebates	2018 - 2022				■	■	■	■	■													
32	Hot Water Recirculation Systems	2018 - 2022				■	■	■	■	■													
33	Rewarding Businesses For Adopting Best Practices	2020 - 2035						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
34	Additional Building Code Requirements for New Development	2018 - 2035				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
35	Innovation Incubator Program	2021 - 2035							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Source: City of Santa Cruz. DSS Model. Section: Conservation Analysis, Feb 16, 2016.

6.7 Monitoring

The Plan is intended to be dynamic and changes and adjustments are expected. Monitoring progress on implementing recommended programs should be a priority. Costs, participation rates, and water use should be tracked to ensure that the plan is on target to meet goals. As new promising technologies emerge, they should be tested and possibly replace programs that are underachieving. Summary reports should be issued citing progress and recommending changes in program content.

7. NEXT STEPS

Obtain Commission approval and support to gain City Council direction to proceed with completion of writing the Water Conservation Master Plan document.

8. REFERENCES

California Assembly Bill 715. October 11, 2007. Online: http://www.water.ca.gov/urbanwatermanagement/docs/ab_715-Laird_chaptered.pdf

California Energy Commission. Appliance Efficiency Regulations, California Code of Regulations, Title 20, Sections 1601-1609, Toilet, Urinal, Faucet, and Showerhead Regulations, September 2015.
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California Green Building Standards Code (CALGreen). Online: http://www.usgbc-ncc.org/index.php?option=com_content&view=article&id=401&Itemid=90

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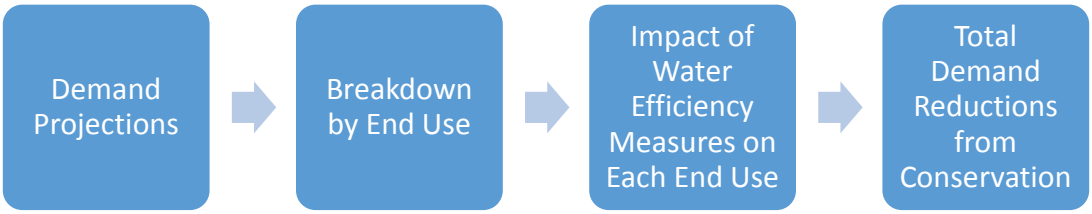
Ibid. Water Supply Advisory Committee (WSAC), Agenda Item 6: Summary of WSAC Work on Demand Management Options and Options for Integrating Demand Management into Potential Water Supply Advisory Committee Recommendations and Agreement, July 17, 2015.
Online: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwja9urN8frKAhUY5GMKHUhZDQQQFggfMAA&url=http%3A%2F%2Fwww.santacruzwatersupply.com%2Ffile%2F970%2Fdownload%3Ftoken%3DwhhI9_KX&usg=AFQjCNEAP7l1z_F7za4JGt-m65VjS-v--A&sig2=_DVOzhQhRPXTEptA-mD5DQ&bvm=bv.114195076,d.cGc&cad=rja

Ibid. Water supply Advisory Committee. Water Supply Advisory Committee Final Report on Agreements and Recommendations, Table 14. October 2015.

M.Cubed. City of Santa Cruz Water Demand Forecast, prepared by David Mitchell, August 2015.
Online: http://www.santacruzwatersupply.com/file/972/download?token=dNx08zIf

Western Policy Research. BMP Cost and Savings Study Update, A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices, prepared for the California Urban Water Conservation Council, July 2014 update.
Online: http://cuwcc.org/Portals/0/Document%20Library/Resources/Publications/Cost%20and%20Savings%20Studies/BMP%20Cost%20and%20Savings%20Report%20Update%202014%20-%20%20Phase%201.pdf

APPENDIX A: DESCRIPTION OF THE DSS MODEL



The DSS Model prepares long-range, detailed demand projections. The purpose of the extra detail is to enable a more accurate assessment of the impact of water efficiency programs on demand. A rigorous modeling approach is especially important if the project will be subject to regulatory or environmental review.

The DSS Model is an end-use model that breaks down total water production (water demand in the service area) to specific water end uses. The model uses a bottom-up approach that allows for multiple criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. The DSS Model may also use a top-down approach with a utility prepared water demand forecast.

To forecast urban water demands using the DSS Model, customer demand data is obtained from the water agency being modeled. The demand data is reconciled with available demographic data to characterize the water usage for each customer category in terms of number of users per account and per capita water use. The data is further analyzed to approximate the split of indoor and outdoor water usage in each customer category. The indoor/outdoor water usage is further divided into typical end uses for each customer category. Published data on average per-capita indoor water use and average per-capita end use is combined with the number of water users to calibrate the volume of water allocated to specific end uses in each customer category. In other words, the DSS Model checks that social norms from end studies on water use behavior (e.g., flushes per person per day) are not exceeded.

The DSS Model evaluates conservation measures using benefit cost analysis with the present value of the cost of water saved ($/Acre-Foot). Benefits are based on savings in water and wastewater facility operations and maintenance (O&M). The figures above and to the left illustrate the processes for forecasting conservation water savings, including the impacts of fixture replacement due to plumbing codes and standards already in place.

The DSS Model has been used for practical applications of conservation planning in over 230 service areas representing 20 million people, including extensive efforts nationally in California, Colorado, Hawaii, Utah, Georgia, Florida, North Carolina, Oregon, and Ohio, and internationally in Australia, New Zealand, and Canada.

WATER COMMISSION
INFORMATION REPORT

DATE: 2/26/16

AGENDA OF: March 7, 2016

TO: Water Commission

FROM: Rosemary Menard, Water Director

SUBJECT: Update on Draft Water Commission Work Plan for Calendar Year 2016

RECOMMENDATION: Receive and accept Draft Water Commission Work Plan as a framework to focus Water Commission Efforts in Calendar Year 2016 and provide feedback as needed.

BACKGROUND: The Water Commission reviewed and gave input on a working draft of its 2016 work plan at its January 4, 2016, meeting.

DISCUSSION: The work plan presented at the January meeting was intended to be updated as needed to adapt to the evolving nature of the Water Department's work. The changes proposed are chiefly focused on work plan items related to water rates and financial planning efforts. These changes are needed to provide additional time for staff (and consultants) to develop the water rate proposals.

Under the revised work plan, new rates would be implemented in September or October and the Proposition 218 process would be completed in July and early August. Water Commission recommendations to Council on water rates would occur at the Commission's June 6th meeting, with a presentation and discussion of rates occurring at the May 2nd meeting.

Two additional items have been added to the work plan:

1. An item on the July meeting (date to be determined) focusing on the performance metrics of that will be used in evaluating aquifer storage and recovery during the two phases of the planned study on this approach; and
2. A suggested Water Commission sponsored/hosted enrichment session on regional groundwater management and the status of implementing the Sustainable Groundwater Management Act in Santa Cruz County in August.

I expect to update this work plan roughly quarterly and to bring it to the Water Commission for your review. If you have items you would like to see included on a future Water Commission agenda, please send me a note and I will work to include suggestions in future work plans.

FISCAL IMPACT: None.

PROPOSED MOTION: Accept staff's working draft of an updated Water Commission work plan for calendar year 2016.

2-26-16 Working Draft – Calendar 2016 Water Commission Work Plan

Water Commission Work Plan Item	Date of Anticipated City Council Action on Water Commission Recommendations
March 7, 2016	
➢ WSAS Work Plan Quarterly Update (presentation and discussion)	
○ ASR and Recycled Water Study Project Plans ○ Update on Regional Partnerships Initiative ○ Water Conservation Master Plan Tech Memo	
➢ Water Commission Work Plan Update	
April 4, 2016	
➢ Recommendations on Water Conservation Master Plan (action)	➢ April 26th, Council action on Water Conservation Master Plan
➢ 2016 Water Supply Outlook and recommendations regarding water supply 2016 peak season demand management (action if needed)	➢ April 12th, Council report and action if/as needed on 2016 peak season demand management
➢ Recommendations FY 2017 Operating Budget (action) and FY 2017 – 2020 Capital Improvement Program (action)	➢ May 24th Council Budget Hearings on FY 17 Budget and CIP ➢ June 14th Council Action on City of Santa Cruz FY 17 Budget and CIP
➢ Progress report on work on the Urban Water Management Plan	
May 2, 2016	
➢ Water Rate Increase Proposal (presentation and discussion)	➢
➢ Review of Urban Water Management Work Plan (presentation and discussion)	
June 6, 2016	
➢ Recommendations to City Council on Department Financing Strategy (action)	➢ June 14th, Council action on Department Financing Strategy (including cost of service, rate structure design and
➢ Recommendations on Proposed Water Rate Increases (Action)	➢ June 14th, Council Authorization of 218 Notice for Water Rate Increases ➢ August 23rd City Council Public Hearing on Water Rate Increases
➢ Recommendations to Council on Urban Water Management Plan	➢ June 28th Public Hearing on Urban Water Management Plan
July 4, 2016	
➢ WSAS Quarterly Review – focus on Progress Report on status of in lieu recharge and performance metrics for ASR	
August 1, 2016	
➢ Water Commission Sponsored Forum on Implementation of the Sustainable Groundwater Management Act in Santa Cruz County	
September 7, 2016	
➢ WSAS Quarterly Review – focus Soquel-Aptos Groundwater Model and Regional Partnerships	
➢ System Water Loss Evaluation (presentation and discussion)	
October 3, 2016	
November 7, 2016	
December 5, 2016	
➢ WSAS Quarterly Review – focus on treatment processes and effectiveness for advanced treated recycled water or climate change update	