CITY OF SANTA CRUZ
City Hall
809 Center Street
Santa Cruz, California 95060

Water Department

WATER COMMISSION

Regular Meeting

December 2, 2019
UPDATED 12/2/19

7:00 P.M. GENERAL BUSINESS AND MATTERS OF PUBLIC INTEREST, COUNCIL CHAMBERS

*Denotes written materials included in packet.

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 public 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 arrangements can be made. The Cal-Relay system number: 1-800-735-2922.

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.

Call to Order

Roll Call

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.

Consent Agenda (Pages 1.1 – 4.102) 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 the Water Department (Pages 1.1 – 1.3)

   Accept the City Council Actions Affecting the Water Department.

2. Water Commission Minutes from October 7, 2019 (Pages 2.1 – 2.5)

   Approve the October 7, 2019 Water Commission Minutes.

3. Information Item: Loch Lomond Accessibility Improvements (Pages 3.1 - 3.7)

   Receive information on Loch Lomond Recreation Area Accessibility Improvements.

4. WSAS Quarterly Report (Pages 4.1 – 4.102)

   Accept the WSAS Quarterly Report.

Items Removed from the Consent Agenda

General Business (Pages 5.1 – 6.7) 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.

The below item was updated to correct the recommendation language.

5. FY19 Fourth Quarterly and FY20 First Quarterly Financial Reports (Pages 5.1 - 5.11)

   Accept the FY19 Fourth Quarterly Financial Report.

   Accept the FY20 First Quarterly Financial Report.

6. Information Item: Best Value Charter Amendment (Pages 6.1 - 6.7)

Receive information on the Charter Amendment measure that will appear on the March 2020 ballot.

Subcommittee/Advisory Body Oral Reports - No action shall be taken on these items.

7. Ad Hoc Committee on City of Santa Cruz– Soquel Creek Water District Contracting Related to the PWS Project

8. Santa Cruz Mid-County Groundwater Agency

9. Santa Margarita Groundwater Agency

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

Adjournment

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WATER COMMISSION
INFORMATION REPORT

DATE: 11/27/2019

AGENDA OF: December 2, 2019

TO: Water Commission

FROM: Rosemary Menard, Water Director

SUBJECT: City Council Actions Affecting the Water Department

RECOMMENDATION: That the Water Commission accept the City Council actions affecting the Water Department.

BACKGROUND/DISCUSSION:

October 22, 2019

Coast Pump Station Raw Water Pipeline Replacement Project – Adoption of a Mitigated Negative Declaration, Adoption of a Mitigation Monitoring and Reporting Program, and Project Approval (WT)

Resolution No. NS-29,584 was adopted adopting the Mitigated Negative Declaration for the Coast Pump Station Raw Water Pipeline Replacement Project, adopting the Mitigation Monitoring and Reporting Program, and approving the Coast Pump Station Raw Water Pipeline Replacement Project.

Resolution Calling an Election to be Held on March 3, 2020 at the Statewide Presidential Primary Election in the City of Santa Cruz for a Ballot Measure Submission to Amend Section 1415, Contracts For Public Works, of the Charter of the City of Santa Cruz (WT)

Resolution No. NS-29,588 was adopted calling an election to be held on March 3, 2020 at the Statewide Presidential Primary Election in the City of Santa Cruz for a ballot measure submission to amend Section 1415, Contracts For Public Works, of the Charter of the City of Santa Cruz.

Motion carried to ask that the Mayor designate a responsible party and signers to work on a ballot argument.

November 12, 2019

Award of Contract for Master Service Agreement for Revegetation and Site Restoration Services for Water Department Capital Projects (WT)

Motion carried to:

• Authorize the City Manager to execute a Master Service Agreement with Ecological Concerns Inc. (ECI) of Santa Cruz, CA for Revegetation and Site Restoration Services for Water Department Capital Projects in a form accepted by the City Attorney; and

• Authorize the City Manager to execute Contract Amendment NCD-1 under the Master Service Agreement with ECI for services for the Newell Creek Dam Inlet/Outlet Replacement Project in a form accepted by the City Attorney.

Guidance for City's Use of Green Bonds (WT)

Motion carried to approve and adopt Guidance for the City's Use of Green Bonds in Financing Projects that address environmental sustainability or support projects that provide for mitigation of or adaptation to climate change.

Water Revenue Bond Sale (WT)

Resolution No. NS-29,594 was adopted authorizing the issuance and sale of Water Revenue Bonds in the maximum amount of $30,000,000 to support implementation of the Water Department's Capital Investment Plan (Improvements to the Graham Hill Water Treatment Plant, Replacement of University Tank No. 5, Improvements to Newell Creek Pipeline and other capital projects), and approving related documents and actions, in substantially the form on file with the City Clerk; and

Resolution No. NS-29,595 was adopted amending Council Policy 34.4, Water Department Financial Reserve Policy, to provide for the use of funds from the Rate Stabilization Fund (Fund 713) to meet the minimum annual debt service requirements in the event that annual Water revenues are inadequate to do so.

Revisions to the Council Approved Water Supply Augmentation Strategy (WT)

Motion carried to approve an adaptation to and adopt a revised work plan for the November 24, 2015 City Council approved Agreements and Recommendations of the Santa Cruz Water Supply Advisory Committee to integrate new information, to take advantage of near-term low-regrets opportunities for supply augmentation, and to change the timeline for decision-making about additional source augmentation strategies from 2020 to 2022.

November 26, 2019

Coast Pump Station Raw Water Pipeline Replacement Project - Approval of Plans and Specifications, Exemption from Local and Apprentice Employment and Authorization to Advertise for Bids and Award Contract (WT)

Motion carried to approve the Plans, Specifications and Contract Documents for the Coast Pump Station Raw Water Pipeline Replacement Project, authorize an exemption from local and apprentice employment requirements, and authorize staff to advertise for bids and award the contract in a form to be approved by the City Attorney. The City Manager is hereby authorized and directed to execute the contract, as authorized by Resolution No. NS-27,563.

Recycled Water Facilities Planning Study – Phase 2 (WT)

Motion carried to authorize the City Manager to execute an agreement in the amount of $260,000 with Kennedy/Jenks Consultants of San Francisco, CA for Phase 2 of the Recycled Water Feasibility Planning Study, in a form approved by the City Attorney.

PROPOSED MOTION: Motion to accept the City Council actions affecting the Water Department.

ATTACHMENTS: None.

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Water Department

Water Commission
7:00 p.m. – October 7, 2019
Council Chambers
809 Center Street, Santa Cruz

Summary of a Water Commission Meeting

Call to Order: 7:00 PM

Roll Call

Present: D. Engfer (Chair), W. Wadlow (Vice Chair), J. Mekis, S. Ryan, D. Schwarm, L. Wilshusen

Absent: D. Baskin (with notification)

Staff: R. Menard, Water Director; J. Becker, Finance Manager; C. Coburn, Deputy Director/Operations Manager; T. Goddard, Water Conservation Manager; H. Luckenbach, Deputy Director/Engineering Manager; J. Martinez-McKinney, Associate Planner II; S. Easley Perez, Associate Planner II; I. Rivera, Associate Civil Engineer; S. Mathavan, Consultant (HDR, Inc.); K. Fitzgerald, Administrative Assistant III

Others: 4 members of the public.

Presentation: None.

Statement of Disqualification: None.

Oral Communications: Two members of the public spoke.

Announcements: None.

Consent Agenda

1. City Council Items Affecting the Water Department
2. Water Commission Minutes from August 26, 2019
3. FY2020-2021 Work Plan
4. Water Department Large Project CEQA Review Outlook

Commissioner Wilshusen moved the Consent Agenda. Commissioner Schwarm seconded.

Items removed from the Consent Agenda – None

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: None

General Business

5. Coast Pump Station 20-Inch Raw Water Pipeline Replacement Project, Initial Study/Mitigated Negative Declaration (IS/MND), Water Commission Consideration and Recommendation

Ms. Luckenbach introduced Ms. Perez for the presentation and discussion of the IS/MND for the Coast Pump Station 20-Inch Raw Water Pipeline Replacement Project.

Are there any open issues between the City and the Amah Mutsun Tribal Band?

- Presently, there are no current issues. The Amah Mutsun Tribal Band's interest in this project arose because of its proximity to the river. The concerns relate to the potential discovery of unknown resources due to the proximity of the river and the treatment of any discovered remains or artifacts.

Is light pollution an issue for these projects?

- The MND did not include light issues however there are provisions that limit construction in the evening during the installation of the borings.

What is the bidding climate like for this project?

- It is optimistic for construction projects. HDR, Inc. Engineer Sathya Mathavan responded that potential contractors have been contacted as part of starting the prequalification process and several have expressed interest in submitting bids for this project.

What are the anticipated groundwater conditions at during construction?

- Dewatering is expected in the pits on either side of the river.

Commissioners commented that the cost of the project should be clarified.

Commissioners suggested that staff clarify that the "Holocene-epoch" is also known as the current epoch on page 5.20 under Mitigation Measures.

How has staff prepared the City Council for the impacts of construction on the 1120 River Street which is the location for the River Street Camp?

- When the Council made the decision to reinstate the River Street Camp at 1120 River Street this last summer, there was discussion on the availability of this site for this project. When staff made the decision to move the construction schedule past the wet season, it was made clear to the Council that the site needed to be vacated by mid-March of next year for the start of construction.

Is it appropriate to have a no impact item in regards to the River Street Camp?

- It is a unique situation, but we feel that it appropriate.

Commissioners commented positively on staff's thorough preparation of the IS/MND packet.

One member of the public spoke.

How deep are the shafts of the micro-tunneling and what distance below the river beds?

- The shafts will 70ft on one side and 50ft deep on the other side and will be 15ft below the river bed.

How will water from the dewatering process be disposed of?

- Sathya Mathavan responded that the City and contractor will be compliant with the Santa Cruz County and state regulations for the treatment and discharge of the water before it is disposed into the sewer system.

Commissioner Wilshusen moved the staff recommendation that City Council adopt the Mitigated Negative Declaration for the Coast Pump Station Raw Water Pipeline Replacement Project; adopt the Mitigation Monitoring and Reporting Program; and approve the Coast Pump Station Raw Water Pipeline Replacement Project. Commissioner Mekis seconded.

VOICE VOTE: MOTION CARRIED
AYES: All
NOES: None
ABSTAIN: None

6. WSAS Quarterly Report

Ms. Luckenbach introduced Mr. Rivera who would be participating in the presentation of the WSAS Quarterly Report item covering Water Transfers and Aquifer Storage and Recovery.

Mr. Goddard discussed Element 0 of the WSAS Quarterly Report.

How are the water losses of $1 million estimated and how does it compare industry wide?

- The water loss is not a physical loss because water is still being used by the customer, however, the use is not being registered through a meter. This water is valued at the retail rate as opposed to water that is valued at the rate it costs to produce. While there is not a specific water loss rate comparison throughout the industry, aging meter infrastructure is a common issue that affects most utilities.

Are certain brands of meters more reliable than others?

- There is not a significant difference in brands that we have experienced.

Has there been any assessment of risk that the state may change its requirements or guidelines for the mandated Water Shortage Contingency Plan after staff has completed the planned work ahead of schedule?

- At this time, we have determined that there will not any major changes to the current requirements.

Mr. Rivera discussed the Water Transfers with Soquel Creek Water District (the District) and Aquifer Storage and Recovery (ASR).

Can the City increase the amount of water transferred to meet the District's off-peak season demand?

- No, not entirely. The intertie has a hydraulic capacity limitation of 1.4 mgd and the pilot has authorization to operate only during the November 1st to April 30th timeframe. There is also a cap based on certain conditions in the amount of water that can be transferred per the existing agreement with the District. The existing places of use for the San Lorenzo River under current water rights also prevent us from transferring more water.

Have there been comments or complaints from the public on the quality of the transferred water?

- There were four reports during the pilot transfer project of discolored water that were likely due to changes in flow direction.

What is occurring in Scenario 11?

- The four existing wells in the Beltz area are being converted into ASR wells and additional wells are being added. The wells in Scenario 11 are also being studied to determine how the wells can to be used to protect groundwater levels at the coast while meeting our supply needs.

Why are the climate change model assumptions being changed starting at scenario 10?

- The climate change assumptions were changed to match the climate change assumptions being used in the Groundwater Sustainability Plan (GSP), which was based on the Catalogue Climate scenario.

What work was the firm Hopkins previously contracted to do?

- Hopkins was a consultant that the Department contracted with in the early 2000's to identify well sites for ASR.

Commissioners commented positively on the thoroughness on the information.

Two members of the public spoke.

Is the Soquel Creek a connected stream?

- Yes.

Do the City's wells have any noticeable impacts on the stream flows in Soquel Creek?

- No.

7. Draft Staff Report for the November 12th Joint Meeting with City Council

Ms. Menard introduced the discussion on the draft staff report and goals of the joint meeting with City Council on November 12, 2019.

Do the diamond markers that say "Additional Supply Increment" on the chart on page 7.23 indicate decision points?

- No.

Commissioners provided the following feedback to staff:

- That staff include continuous feedback loops to show that climate modeling and analysis is ongoing.
- That staff fix the typo under the construction timing of the new Beltz facilities.
- That staff provide more specific information on the decision making process in the motion of the staff report for the Joint meeting with City Council.
- That staff specify that the Council will be deliberating and taking action instead of "all" as currently indicated.
- That staff highlight the additional supply increments on the revised work plan on page 7.23.
- That staff include more discussion on financial aspects.
- That staff include "or adequate" after "should surface water resources prove infeasible" in the staff report on page 7.3 to Council.
- That staff include a summary to explain why we are deviating from the WSAC schedule and what the Council's decision will mean.

- That staff include framework to characterize the impacts of this decision on the increments.

How does staff plan to present this information to the Council?

- We plan to provide the Council with a presentation of the WSAC work accomplished thus far which will lead to a discussion of why the adaptation to the work plan is needed.

No public comments were received.

8. Ad Hoc Committee on City of Santa Cruz – Soquel Creek Water District Contracting Related to the Pure Water Soquel Project

The current strategy is to focus on scheduling land lease agreements and encroachments for the treatment facility. The goal is to have the schedule worked out by the first quarter of next year. The operations plan is slowed because of the District's operations and design-build contractors not being online.

9. Santa Cruz Mid-County Groundwater Agency

Comments and questions on the draft groundwater management plan have been received and do not require CEQA-type responses. There are several issues including surface water and groundwater interaction, expectations on data from several agencies, and questions on the overall management of the plan. The board will get this document with responses to questions in November 21 with an action item to approve and submit the final document.

10. Santa Margarita Groundwater Agency

The last meeting was in September and reviewed a preliminary map of sustainability goals. The group is now meeting monthly and have agreed to meet as a whole group instead of forming separate committees to draft separate pieces of the plan.

Director's Oral Report: Chris Berry will be receiving a 25 year service pin at the Oct 8th City Council meeting at 11:40 am. The Newell Creek Dam Inlet/Outlet specifications and plans will likely be going to Council for approval in December. This will not be brought to the Commission prior.

How is the Department going to be affected by the PSPS event scheduled by PG&E?

- We expect to lose power at several key sites, including the Felton Booster Station which brings water between Loch Lomond and the GHWTP, and will be powered by generators. A request was received from Soquel Creek Water District to transfer water during the shutdown as needed on an emergency basis.

Adjournment Meeting adjourned at 9:13 PM.

Respectfully submitted,

Katy Fitzgerald, Staff

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WATER COMMISSION
INFORMATION REPORT

DATE: 11/25/19

AGENDA OF: 12/02/19

TO:: Water Commission

FROM: Heidi Luckenbach and Ryan Ernst

SUBJECT: Informational Item on Loch Lomond Recreation Area Accessibility Improvements

BACKGROUND: The 175-acre Loch Lomond Recreation Area (project site) is located at 100 Loch Lomond Way in Felton, California in the County of Santa Cruz, approximately 10 miles north of the City of Santa Cruz. Constructed in the 1960s as part of the Newell Creek Dam project, both the state's Davis-Grunsky grant for building the facility and the Newell Creek water rights require recreational uses and facilities at the Recreation Area. Facilities provide visitors access to boating, fishing, hiking, and picnicking. Many of these activities are focused around the five picnic areas accessed by vehicle (Eagle Dell, Glen Corrie, Glen Brea, Upper and Lower Loch View) and the Park Store parking lot.

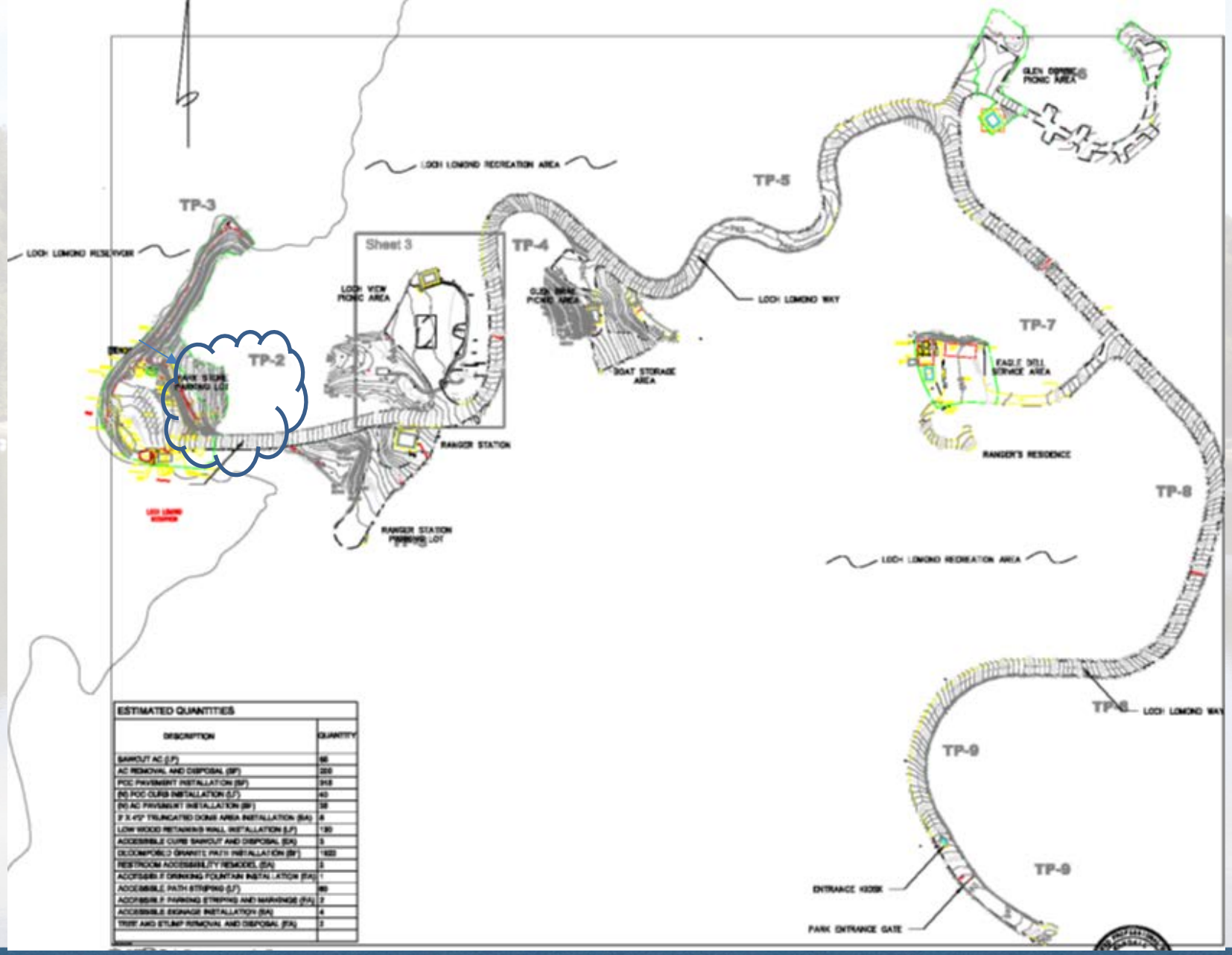
Since 2017, the Water Department has implemented four projects specifically targeting accessibility improvements to parking, picnic facilities, restrooms, fishing, and the Park Store. The most recent project, completed in September 2019, focused on the Upper Loch View area and included upgrades to the restrooms, parking and picnic areas, and modifying the path connecting these facilities. Similar improvements were completed in previous years at the Glen Corrie picnic area and the Park Store parking lot area. Of particular note is a beautiful large deck that extends over the lake at the edge of the Park Store parking lot. Constructed by the Water Department's Recreation staff, this facility provides a unique experience for fishing and picnicking for all visitors. See Attachment for several photos of all the improvements.

DISCUSSION: The Water Department has been working with the Public Works Department to understand and comply with state and federal standards in terms of ensuring appropriate access for people with disabilities. While no additional accessibility improvements are planned at this time, staff will continue to work with other city departments to meet the needs and interests of all potential visitors. Of note is the Santa Cruz City ADA Improvement and Accessibility Program, an ongoing city-wide initiative that includes coordination by department for continuous improvement of accessibility issues for staff and the public. In 2019, the City performed an accessibility self-audit; the next task is to update the City website with a complaint process and accessibility contacts for each department, and to prepare a request for proposals for Consultant accessibility/ADA evaluations in 2020. All future improvements will, of course, meet accessibility requirements.

ATTACHMENT(S):

1. Loch Lomond Recreation Area Accessibility Improvements Photo Project Summary

LOCH LOMOND RECREATION AREA ACCESSIBILITY IMPROVEMENTS PROJECT SUMMARY


LOCH LOMOND RECREATION AREA
TP-3
LOCH LOMOND RESERVOIR
Sheet 3
TP-4
TP-5
LOCH VIEW PICNIC AREA
GLEN SHEE PICNIC AREA
LOCH LOMOND WAY
TP-7
EAGLE SCOUT SERVICE AREA
BOAT STORAGE AREA
TP-2
RANGER STATION
RANGER'S RESIDENCE
TP-8
RANGER STATION PARKING LOT
LOCH LOMOND RECREATION AREA
TP-9
TP-9
ENTRANCE KIOSK
PARK ENTRANCE GATE
ESTIMATED QUANTITIES
DESCRIPTION
QUANTITY

3.4

Park Store Parking Lot

3.5

Glen Corrie Picnic Area

3.6

Upper Loch View

3.7

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WATER COMMISSION
INFORMATION REPORT

DATE: 11/18/2019

AGENDA OF: December 2, 2019

TO: Water Commission

FROM: Heidi Luckenbach, Deputy Director/Engineering Manager

SUBJECT: Water Supply Augmentation Strategy, Quarterly Work Plan Update

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RECOMMENDATION: Receive information regarding the status of the various components of the Water Supply Augmentation Strategy and provide feedback.

BACKGROUND and DISCUSSION: Following the completion of the Water Supply Advisory Committee (WSAC) process, the City Council accepted the Final Report on Agreements and Recommendations that included a detailed Implementation Plan and Adaptive Management Strategy. The WSAC work was adopted as part of the 2015 Urban Water Management Plan and is currently referred to as the Water Supply Augmentation Strategy (WSAS) that includes an Implementation Work Plan (Work Plan).

As per the Final Agreements and Recommendations of the Water Supply Advisory Committee (WSAC), the Water Commission shall receive quarterly updates on the status of the various elements of the recommended plan. This is the sixteenth quarterly update.

The content and format of this report will continue to be modified to provide a comprehensive overview of the progress, findings, obstacles, etc. of the various elements of work. Commissioner requests are shown throughout this document; new items will be shown in italics, ongoing items will be in normal font, completed items will be struck for one quarterly report and then removed. There are no new items in this report and none have been removed.

- Develop a spreadsheet that shows all the supply projects and portfolios of projects with all the metrics related to decision-making. The WSAS work plan will be modified in the coming months once more meaningful data is available and this spreadsheet developed.
- Develop a narrative and/or spreadsheet that shows the nexus between water supply projects specifically spelled out in the WSAC report and other projects and studies being performed by the Water Department. This is an ongoing effort. Narratives are added to each section below as appropriate. As the work plan is modified over the coming months, the process of capturing the nexus will be developed more fully.

The Water Supply Augmentation Strategy (WSAS) consists of the following elements as defined by the WSAC:

- Element 0: Demand Management. Implementation of the Long Term Water Conservation Master Plan is foundational to the WSAS.
- Element 1: In Lieu. This alternative could include the sale of water to other agencies with or without the assumption of additional water back to the City during droughts.
- Element 2: Aquifer Storage and Recovery. Evaluations of both the Mid-County and Santa Margarita Groundwater Basins are being conducted.
- Element 3: Advanced Treated Recycled Water or Seawater Desalination

Progress and status of the various WSAS-related work are described in detail below as well as that of other projects related to but not specifically articulated in the WSAS.

In general however it should be noted that the joint meeting of the City Council and Water Commission held on November 12, 2019 was successful. The objective of this meeting was to discuss the status of the Water Supply Augmentation Strategy Work Plan following three years of implementing the work plan. The objectives were as follows.

- Background on the Water Supply Advisory Committee and its Recommendations;
- Update on WSAC's assumptions about supply, demand and climate change;
- Update on surface water augmentation strategies and analyses; and
- Update on recycled water and desalination strategies
- Present the requested adaptation of the plan.

Staff is developing the process by which the WSAC Final Report and Recommendations will reflect adjustments and adaptations.

ELEMENT 0: DEMAND MANAGEMENT

Overview: Element 0 of the City's Water Supply Augmentation Strategy consists of ongoing demand management activities. The primary goal of this element is to generate an additional 200 to 250 million gallons per year in demand reduction by year 2035 from expanded water conservation.

Summary: Regarding outreach and education, conservation staff participated in a Water Conservation Coalition-sponsored lawn conversion workshop and staffed a booth at the Water Harvest Festival hosted by Soquel Creek Water District in October. Staff also presented to City Government Academy members, a group launched this year by the City Parks Department, to learn about City roles, responsibilities, and challenges. And, a bill insert announcing the hot water recirculation rebate program and reminding customers to reduce irrigation was sent to all customers with the October utility bills.

The following is a summary of the status of selected measures in the Water Conservation plan.

No. 5 Home Water Use Reports. The Home Water Use Report program has just concluded for the year. An opinion survey is going out this week, to be followed by a rigorous statistical analysis of treatment and control groups to evaluate the impact the program has had on influencing higher water users. People that are registered will still be able to use the WaterSmart portal to view their water use online.

No. 6 Water and Energy-Saving Assistance Program. This program offers free toilet replacement to qualifying low-income households, in conjunction with free weatherization and energy efficiency services funded by PG&E. Contractors began work screening households and replacing fixtures in October.

No. 13 Toilet Retrofit at Time of Sale. This is an ongoing program in which older plumbing fixtures are required to be replaced with high-efficiency toilets and showerheads when a property is sold. A total of 367 properties have been successfully certified so far this year (as of mid-November). Staff recently received a rare appeal of this requirement by the buyer of a property on 30th Avenue. This appeal may come before the Water Commission early in 2019. The Water Commission is the entity identified in the ordinance that is responsible for handling such appeals. Staff has begun to have conversations about rescinding the ordinance and winding the program down in 2020, consistent with the schedule in the Water Conservation Master Plan.

The Water Conservation section has also been active over the past two months on the following projects:

- Water Shortage Contingency Plan update,
- Assisting Water Engineering with a large development application to remodel portions of the Capitola Mall,
- Preparation of the Water Department's 2018 Annual Report
- Emergency Response Plan Update
- Assisting the Customer Service with forms and webpage development

ELEMENT 1: WATER TRANSFERS AND/OR WATER EXCHANGES

Overview: This work is considering the feasibility of sending excess City surface water to neighboring agencies for the purpose of passively recharging the groundwater basin(s). In-Lieu is now described as follows.

- Water Transfers: Selling water to neighboring agencies for the purpose of augmenting their supplies and possibly (passively) recharging the groundwater basin.
- Water Exchanges: Negotiating an agreement whereby water provided to neighboring agencies would, by allowing the groundwater basins to recharge, provide additional groundwater back to the City during water supply shortages.

Summary: The City and Soquel Creek Water District (SqCWD) staff worked with Black & Veatch to generate a final Technical Memorandum (TM) documenting the results of the water quality monitoring program from Phase 1 of the pilot test, along with some of the operational challenges and limitations noted during the water transfers. A copy of the final TM is attached along with a copy of a PowerPoint Presentation given by Black & Veatch to the Soquel Creek Water District Board on October 15th. Key conclusions from the TM include the following.

- Water transfers during this pilot phase were considered successful based on water quality results.
- Bench-Scale testing performed ahead of piloting was validated by the pilot results.
- Water quality in SqCWD's system can change based on the proportion of the City's sources being treated at the time of transfers.

- As expected, some water quality parameters such as TTHMs and HAA5 increased during the water transfer. Estimated Locational Running Annual Averages (LRAA) were about half of the Maximum Contaminant Levels (MCLs) for TTHMs and HAA5.
- Lead and copper tap samples were below action levels.
- Several analytes in the distribution system including lead, copper, iron and manganese were non-detect.
- Based on water quality results from the initial pilot, SqCWD will plan to expand the zone within their service area that could receive water from the City as part of Phase II of the water transfers.
- Distribution System Monitoring of the expanded zone for Phase II will include:
    - Continued water quality monitoring prior to the transfer (baseline), during the transfer, and after the transfer.
    - Modify monitored parameters based on non-detected analytes from Phase 1.
    - Select additional sample stations in consultation with the Division of Drinking Water (DDW); additional sampling to include at least one water storage tank.

Next Steps: City and SqCWD staff continue to prepare for a second round (Phase II) of piloting this upcoming winter. Continued water quality monitoring to establish the baseline prior to the transfers starting. This additional pilot in the expanded area within SqCWD's service area was initially anticipated to begin on or around November 1, 2019; however, due to the current weather forecast and lack of rain, initiation of the water transfers is currently on hold. Water transfers will begin after receiving some rainfall and is expected to last through April 30, 2020.

As with the initial pilot, the volume of water to be transferred and the length of time in which transfers are to occur will be dependent on the City's excess water supply and SqCWD's system demand in the expanded service area. The volume of water that SqCWD has currently budgeted for purchase for the next round of piloting is 98 MG (300acre feet); the demand in the expanded service area will exceed this budgeted amount.

Contract Update(s)

Purchase Order Agreement with SqCWD for cost sharing of Water Quality Sampling and Development of Water Quality Results TM

- PO Opened: January 2017
- Project Partner(s): Soquel Creek Water District
- Engaged Stakeholders: None at this time.
- Original PO Amount: $60,000
- Amount Spent: $37,915
- Amount Remaining: $22,085

ELEMENT 2: AQUIFER STORAGE AND RECOVERY

Overview: Aquifer Storage and Recovery is being evaluated as a form of actively recharging the groundwater basin(s). Work in this area includes the Mid-County Groundwater Basin (MGB) and the Santa Margarita Groundwater Basin (SMGB).

Summary: As previously mentioned, while a large portion of the Phase I work (which includes groundwater modeling) in the MGB is complete, the groundwater modeling will continue through the completion of Phase II as part of the iterative process to ensuring project success. Groundwater modeling scenarios aimed at determining how much can be injected and recovered from the Beltz area have recently been run through the groundwater model. Preliminary results from these modeling iterations indicate that an ASR project in the Beltz area will have an injection capacity of 2.0 mgd and an extraction capacity of 3.0 mgd. These modeling scenarios include the conversion of the 4 existing wells to ASR wells and 4 new ASR wells for a total of 8 ASR wells. In addition, these scenarios are run assuming 2016-2018 water demand projections as well as under the GFDL2.1 climate scenario hydrology. A modeling iteration that includes SqCWD's Pure Water Soquel and a Beltz area ASR project has not been run through the groundwater model, but will be in the next month or so. Confluence modeling performed on this Beltz area ASR project indicates that this scenario reduces the City's water supply shortfall (the "gap") by about half and achieves a maximum storage volume of roughly 1.67 billion gallons (BG).

Active injection under Phase II work at Beltz 12 began in the MGB on January 18, 2019, and ended on July 31, 2019 when active recovery of Cycle 3 ended. Since then, staff from the City and Pueblo Water Resources continue evaluating the data and will work to generate a TM documenting results of the pilot. It is anticipated that a DRAFT of this TM will be prepared by the end of December 2019. However, as previously mentioned, preliminary results appear to be favorable regarding the long term viability of ASR at the Beltz 12 well site.

Over the last couple of months, City staff continued working with Pueblo to develop a test plan for pilot testing of ASR at the City's Beltz 8 well; a draft work plan was prepared in October and is attached as a reference. With a draft work plan, staff has initiated the permitting process of an ASR pilot at Beltz 8 and hopes to enter into a professional services contract with Pueblo Water Resources to perform ASR cycles between March 2020 and August 2020.

Sustainable Groundwater Management Act

Planning efforts over the last two years by the MGA (Mid-County Groundwater Agency) and an MGA Board appointed Groundwater Sustainability Plan (GSP) Advisory Committee resulted in a draft GSP for the MGB released for public comment in mid-July 2019. Comments were received through September 19, 2019 and between September and November staff made changes to the GSP to respond to many of those comments. The revised plan was released to the public on Saturday, November 16th. A required public hearing to consider adoption of the GSP was held on Thursday, November 21, 2019 and following this final opportunity for public comment, the MGA unanimously approved the GSP for submittal to the California Department of Water Resources (DWR). The MGA Board's November 21st action will allow the MGA to submit its GSP to DWR ahead of the January 31, 2020 deadline established by DWR for submittal of GSPs for High Priority basins such as the Santa Cruz Mid-County Basin. In addition to ongoing actions like conservation, and future projects like recycled water and/or desalination, the GSP describes the Pure Water Soquel (PWS) project as well the City's Aquifer Storage and Recovery project (using existing infrastructure) as two near-term projects to reach Basin sustainability.

More details of the work done to date can be found on the MGA's website: www.midcountygroundwater.org.

Work on the SMGWB's plan is just getting underway and interested parties can keep abreast of the details by accessing its website at www.smgwa.org.

Next Steps: Work over the next few months will include:

- Continue working with Pueblo Water Resources to develop a TM that discusses results (water quality and water levels) of the ASR pilot test at Beltz 12 and provides a recommendation as to the long term viability at the site with sustainable injection and extraction rates.
- Working with Pueblo to finalize the work plan for pilot testing of ASR at the City's Beltz 8 well.
- Continue with discussions on climate change modeling efforts that are used in the HCP (Habitat Conservation Plan) process, ASR groundwater modeling and the work being done for both the Santa Cruz Mid-County Groundwater Agency and the Santa Margarita Groundwater Basin.

Contract Update(s):

Consultant: Pueblo Water Resources (PWR) – Phase I

- Contract Signed: February 2016
- Project Partners: None at this time.
- Engaged Stakeholders: SqCWD, County of Santa Cruz, Scotts Valley Water District, San Lorenzo Valley Water District
- Original Contract Amount: $446,370
- Contract Amendment No. 1: $377,615
- Contract Amendment No. 2: $35,000
- Amount Spent: $694,929
- Amount Remaining: $164,056
- Status: On schedule for work in MCGB and delayed approximately 18 months for work in the SMGB.

Consultant: Pueblo Water Resources (PWR) – ASR Phase II – Beltz 12 ASR Pilot Test

- Contract Signed: October 2018
- Project Partners: None at this time.
- Engaged Stakeholders: SqCWD, County of Santa Cruz
- Original Contract Amount: $458,085
- Amount Spent: $399,214
- Amount Remaining: $58,871
- Status: On Schedule.

ELEMENT 3: ADVANCED TREATED RECYCLED WATER AND DESALINATION

Overview: Advanced Treated Recycled Water and Desalination were included within the same Element with the intention that, following feasibility-level work, just one would proceed for further evaluation and preliminary design.

Summary: In November 2018, City Council took action to prioritize recycled water over desalination. The Water Commission provided comments on a draft Phase 2 scope of work with Kennedy/Jenks Consultants Inc. to perform additional analyses of recycled water alternatives. The scope of work includes alternatives that consider Scotts Valley Water District (SVWD) as a partner or a customer. Kennedy/Jenks assisted staff with these discussions with SVWD staff.

Next Steps: The City Council will consider the Agreement at their November 26 meeting.

Contract Update(s):
Consultant: Kennedy/Jenks Consultants, Regional Recycled Water Facilities Planning Study (RWFPS) – Phase 1

- Contract Signed: February 2016
- Amount Spent: $569,174
- Amount Remaining: $18,133
- Schedule: The RWFPS is complete.

Consultant: Kennedy Jenks, Recycled Water Feasibility Planning Study – Phase 2

- Contract Signed: TBD
- Contract Amount: $260,000
- Amount Spent: $0.00
- Amount Remaining: $0.00
- Schedule: 9-10 months once started

OTHER

The projects and programs reported below were not specifically identified in the WSAC work plan but are related in various ways. Staff is in the process of organizing this quarterly report in a manner that clearly describes the relationship, or nexus, between these items with those above. This is a work in progress and the format of this quarterly report will continue to evolve.

Source Water Monitoring
The Source Water Monitoring project addresses the City's interest in learning more about water quality in the San Lorenzo River, especially during high-flow, winter months. The third year of sampling has been completed; an update will be provided next quarter. CEC (contaminants of emerging concern) monitoring is ongoing and will be incorporated into the annual Source Water Monitoring report in the future.

Santa Cruz Water Rights Project
This project involves the modification of existing City water rights to increase the flexibility of the water system by improving the City's ability to utilize surface water within existing allocations. In addition to improved flexibility, the success of this project is necessary to facilitate future regional water supply projects.

Work is continuing on the development of the Draft EIR, with current work still focusing on refining the scope and extent of the project and associated impact modeling. An update presentation to the Water Commission is planned for spring. The Draft EIR is now expected to

be circulated for public review in summer 2020, and the Final EIR is expected to be completed in winter of 2020/2021.

Outreach and Communication

Outreach during this quarter has included the following:

- Monthly email newsletters to WSAC email list.
- Imagine A Day Without Water discussion on KSCO morning show, October 16.
- Imagine A Day Without Water City Proclamation, October 22
- Citizens Government Academy class, November 7
- Santa Cruz City Council Adopts Strategy to Increase Water Supply, November 13 https://www.santacruzsentinel.com/2019/11/13/santa-cruz-city-council-adopts-strategy-to-increase-water-supply/
- KSCO presents (live, call-in), November 20

FISCAL IMPACT: None.

PROPOSED MOTION: Receive information on the Water Supply Augmentation Strategy, Quarterly Work Plan Update.

ATTACHMENT(S):

1. Phase I Water Transfer Technical Memorandum (Black & Veatch, October 9, 2019)
2. Status Update on Phase I Pilot Surface Water Purchase from the City of Santa Cruz Water Department (Black & Veatch, October 15, 2019)
3. Santa Cruz ASR Project – ASR Pilot Test Work Plan for Beltz 8, Draft (Pueblo Water Resources, October 18, 2019)

FINAL

PHASE I WATER TRANSFER TECHNICAL MEMORANDUM

B&V PROJECT NO. 402214

PREPARED FOR

Soquel Creek Water District

9 OCTOBER 2019

BLACK & VEATCH

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Acronyms and Abbreviations

AF	Acre-feet
City	City of Santa Cruz
DBP	Disinfection Byproduct
DDW	Division of Drinking Water
District	Soquel Creek Water District
DLR	Detection Limit for Purposes of Reporting
DOC	Dissolved Organic Carbon
HAA5	Haloacetic Acids 5
HPC	Heterotrophic Plate Count
LCR	Lead and Copper Rule
LRAA	Locational Running Annual Average
MCL	Maximum Contaminant Level
MDL	Minimum Detection Limit
MG	Million Gallons
MPN	Most Probable Number
ND	Non-Detect
SMCL	Secondary Maximum Contaminant Level
TDS	Total Dissolved Solids
TOC	Total Organic Carbon
TTHM	Total Trihalomethanes

1 Executive Summary

The City of Santa Cruz (City) has entered into a pilot agreement with Soquel Creek Water District (District) to sell excess winter water supply from the City's surface water treatment plant. The pilot water transfer project supplied the District with 53.9 million gallons (MG) or 165 acre-feet (AF) of treated City water at the O'Neill Ranch intertie from December 2018 through April 2019. The transferred water was limited to an isolated Phase I Zone in Service Area 1 of the District's distribution system. An extensive water quality monitoring program began on October 24, 2018 and provided a baseline prior to the water transfer and tracked changes to water quality during and after the water transfer had concluded. The project was a success with respect to water quality results and it validated earlier bench-scale testing and it supports the District's and City's plan for additional expanded testing (Phase II) in November 2019 to April 2020 based on the City's excess supply.

Additional lead and copper tap samples were collected during and after the water transfer and all samples were below the respective action levels and all but one lead result were below the detection limit for the purpose of reporting (DLR). All distribution system sampling station samples were below respective DLRs for metals such as lead, copper, iron and manganese.

As expected, some water quality parameters such as total trihalomethanes (TTHMs) and haloacetic acids (HAA5) increased during the water transfer due to higher total organic carbon (TOC) in the City's water and the additional water age by introducing the water to the District's system. A locational running annual average (LRAA) was estimated using the highest disinfection byproduct (DBP) data for each quarter (worst-case) at each of the sample stations in Phase I Zone and the results for both TTHM and HAA5 LRAA were approximately half of the respective MCLs. This outcome is due to the seasonality of the water transfer combined with the historically low DBPs in the District's system.

The success of Phase I of the water transfer project has prompted the District and City to prepare for Phase II of this project, which will expand the area able to receive the City's water to encompass Service Area 1 of the District's distribution system. A similar monitoring plan will be used that creates a baseline prior to the transfer and then monitors trends in water quality throughout the transfer and after the transfer has concluded. Additional coordination with State Division of Drinking Water (DDW) will identify compliance sampling sites to meet regulatory standards. The volume of water supplied throughout Phase II of the water transfer and the length of time that the transfer occurs will be dependent on the City's excess supply, the District's demand, and the budgeted volume of water that the District has approved to purchase from the City (currently 98 MG or 300 AF).

2 Introduction

2.1 BACKGROUND

The Soquel Creek Water District (District) and City of Santa Cruz (City) have conducted evaluations to determine if the City could transfer excess water supply seasonally to the District without creating water quality issues. These evaluations used desktop water quality modeling and hydraulic modeling to predict the impact on water quality from either blending the City's treated surface water with the District's groundwater sources or fully replacing the water source. The promising results of the desktop study prompted bench-scale testing with harvested piping materials from the District's distribution system along with new copper pipe with lead solder.

Bench-scale testing used small coupons of piping materials exposed to seven water conditions including the City's treated surface water, the District's groundwater, and various chemistry adjustments to the City's and District's sources. Bench-scale testing used a dump-and-fill method to replace the water exposed to the coupons three times a week. Samples of water were analyzed for metals and other water quality parameters after being poured off to determine the aggressiveness of the water quality towards materials known to be present in the District's system. Throughout bench-scale testing the water sources were switched monthly for all but the control jars to determine if the seasonal operation of the water transfer would have a negative impact on water quality from receiving City's water and then receiving District's water exclusively.

The results of bench-scale testing were a success and identified that the City's treated surface water did not have a significant impact on water quality when compared to the District's water, which was the baseline for testing. The promising results of bench-scale testing did not indicate the need to adjust the pH of the City's water nor the need to add orthophosphate to the District's groundwater sources. Pipe-loop testing was not necessary since chemical adjustments were not recommended and switching between City's and District's sources did not have significant impacts on water quality. Instead an isolated area of the District's distribution system was recommended for a pilot water transfer along with an extensive monitoring program.

The City has entered into a pilot agreement with the District to sell excess winter water supply from the City's surface water treatment plant. The pilot water transfer project was limited to an isolated zone of the District's distribution system referred to as Phase I Zone in Service Area 1 during the winter of 2018 and spring of 2019 (see Figure 1). Extensive distribution system monitoring took place prior to the water transfer to develop a baseline for water quality in the Phase I Zone and continued during the water transfer and after the transfer of water was stopped to evaluate if there were any impacts on water quality.

The entire monitoring program lasted from October 24, 2018 through July 31, 2019. The intent was to isolate Phase I Zone for the entire monitoring program, but the limited number of available wells in the isolated zone were unable to meet demands without creating negative impacts on both the isolated zone and the remainder of the District's distribution system including main breaks. These complications resulted in only isolating the zone during the water transfer. This report details the results of distribution system water quality monitoring and compliance sampling in Phase I Zone.

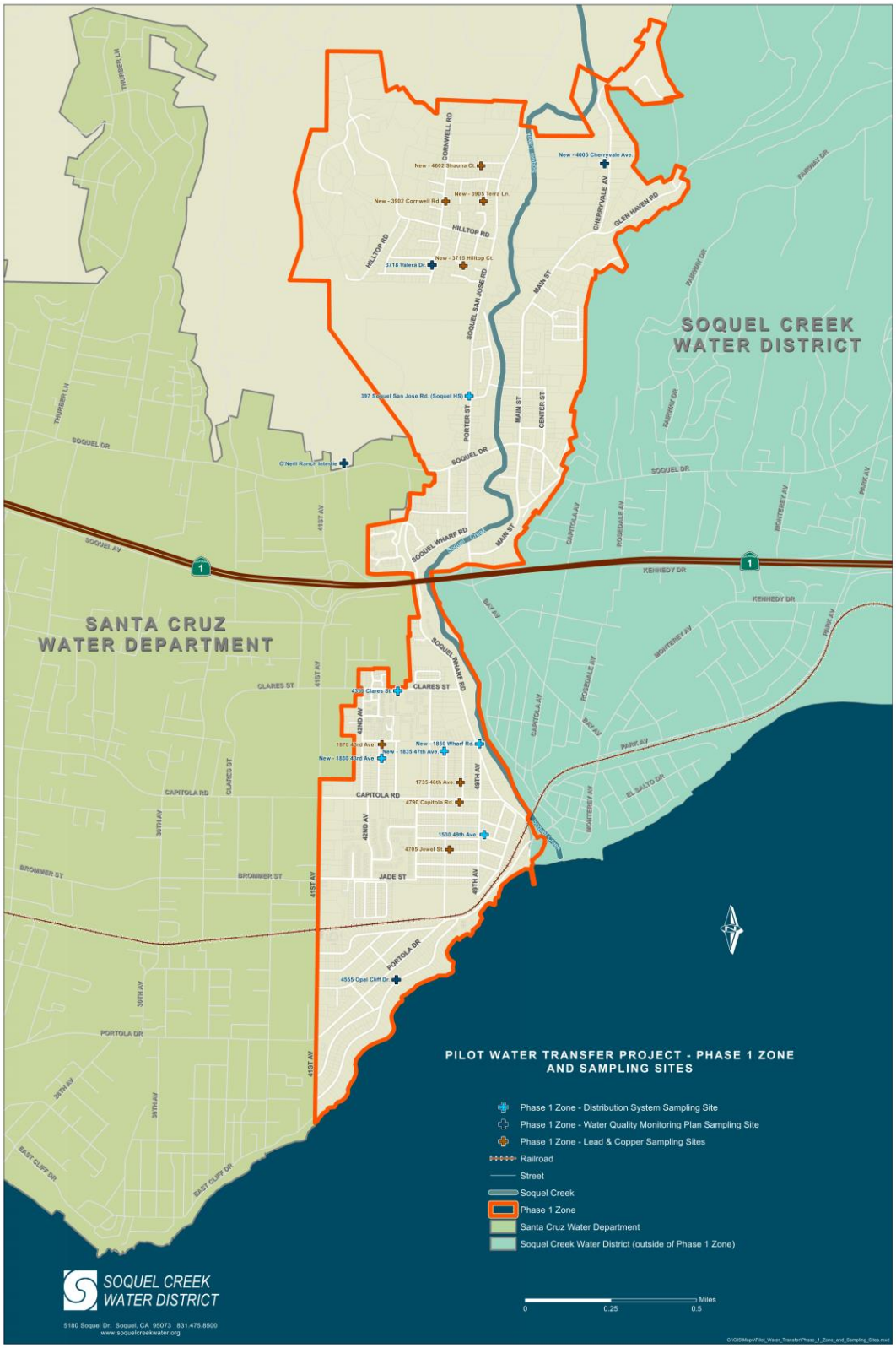

Figure 1 Map of Phase I Zone and Sampling Sites for Pilot Water Transfer Project

2.2 WATER TRANSFER OVERVIEW

The water transfer at the O'Neill Ranch intertie began on December 4, 2018 and ended on April 30, 2019. The City supplied a total of 53.9 million gallons (MG) or 165 acre-feet (AF) to the District. During the water transfer, the District produced supplemental water from the Main Street well and O'Neill Ranch well intermittently as shown in Figure 2 along with water volumes imported from the City. The average total water usage by the isolated zone of the District was 450,000 gallons per day during the transfer with a daily average of 78 percent of water volume imported from the City.

The water transfer is based on the City providing excess supply to the District, which means that the available supply for the District could vary based on fluctuations in the City's demand and operational constraints. There were periods where the transfer of water from the City was less than 250,000 gallons per day from December 18, 2018 through January 16, 2019 and again from February 6, 2019 through February 18, 2019. These periods that required substantial production from the District's wells are evident on the water quality graphs in Section 3.1.

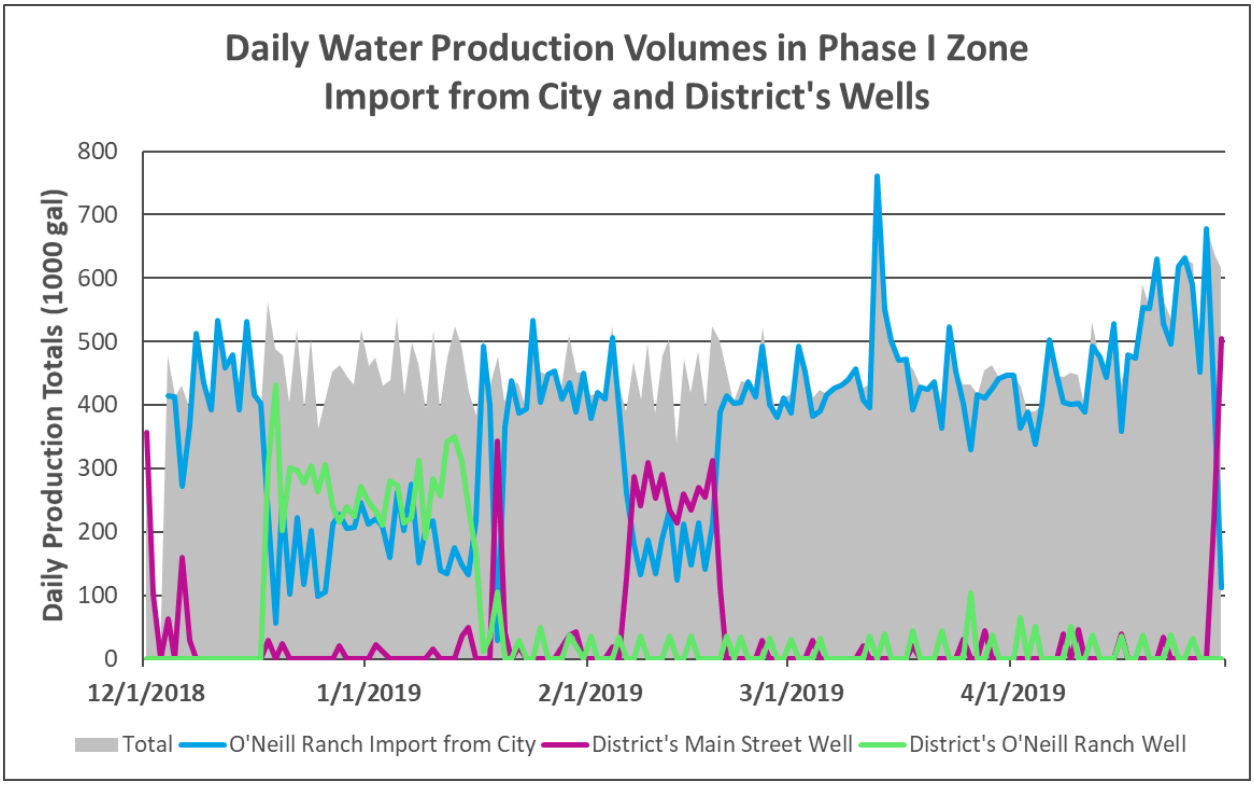

Figure 2 Daily Production Volumes in the District's Phase I Zone During the Water Transfer

One additional point to note is the increased volume of water transferred from the City on March 13, 2019, which corresponds to peaks in total organic carbon (TOC) and disinfection byproducts (DBPs) on this date. The City treats multiple sources with differing water qualities at its water treatment plant and the finished water quality is a direct result of the proportion of the sources treated. The increased TOC observed at the O'Neill Ranch intertie on March 13, 2019 is explained by a break in the City's Coast raw water main, which supplies the City with a lower TOC water source.

Due to the Coast Main break, the City had to rely on treating their other source waters that have higher TOC levels.

Rare occurrences like this cannot be planned, but if a main break were to happen during future water transfers the District could choose to limit the accepted water to prevent water sources with higher DBP formation potential from entering the District's system. The reason for the peak in the District's daily water usage on March 13, 2019 is unknown as it does not correspond to a main break or distribution system operational activity.

3 Water Quality Evaluation

Three distribution system sampling sites were selected to evaluate water quality in mains throughout Phase I Zone prior to the water transfer, during the water transfer, and after the water transfer (See Figure 1). Additionally, water quality was sampled at the O'Neill Ranch intertie during the water transfer to evaluate if water quality changed as the water passed throughout the District's distribution system. Separate samples were selected through discussions with State Division of Drinking Water (DDW) for lead and copper sampling at customer taps.

3.1 DISTRIBUTION SYSTEM WATER QUALITY

The Cherryvale Ave 4005 sampling site was the most isolated from imported City water as shown in Figure 3 with a distinct water quality when the volume of City water was lower in mid-February and had to be supplemented by more District groundwater. This is illustrated by peaks when flow from the City increases and valleys when flow from the City decreases below 250,000 gallons per day for water quality parameters like orthophosphate, TOC, and DBPs. In early February 2019, the volume of water imported from the City decreased to less than half of the typical volume throughout the transfer and the corresponding decrease in TOC and orthophosphate show similar patterns with Cherryvale sample station receiving the smallest percent of the City's water followed by Opal Cliff sample station and then Valera sample station. All three sample stations showed lower concentrations of TOC when compared with the O'Neill Ranch intertie indicating that the imported City's water was blending with various amounts of the District's well water during this time (see Figure 3). Almost all TOC was in the dissolved form as seen by the comparison of Figure 3 with Figure 24 in the Appendix.

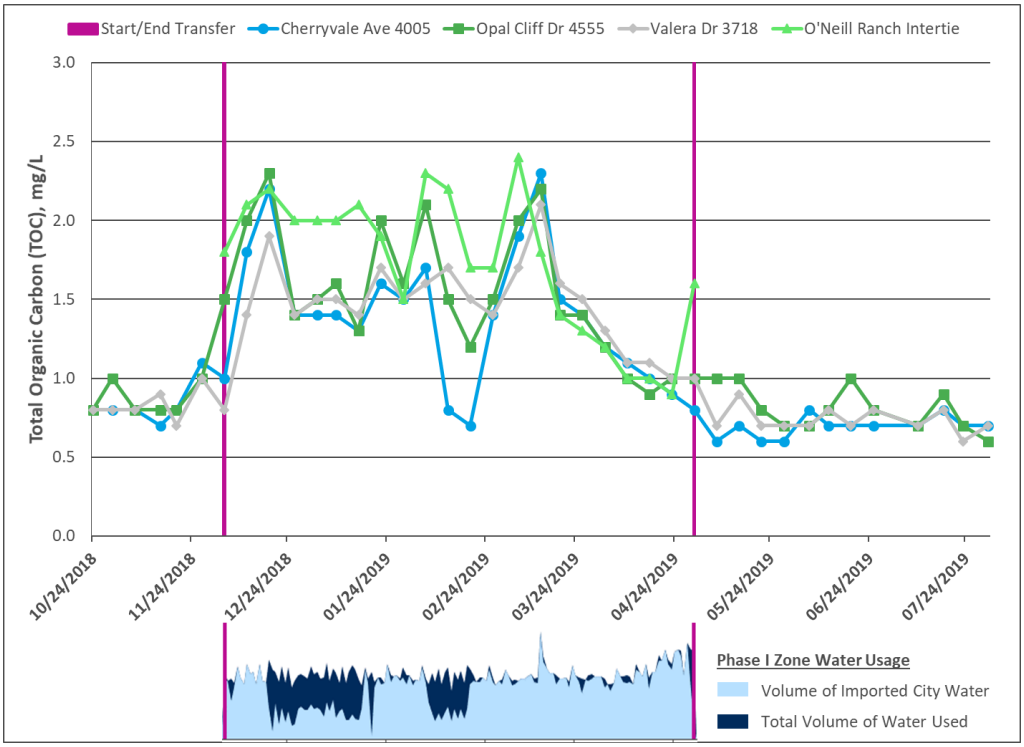

Figure 3 TOC from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

This change in water quality was expected since the City treats surface water and the District uses groundwater that has lower levels of TOC. One main difference between the City's and District's finished waters is the presence of orthophosphate, as the City adds orthophosphate to limit the corrosivity of its water.

Promising bench-scale testing results were validated during the pilot water transfer as samples for metals like lead, iron and copper were all below the detection limit for the purpose of reporting (DLR) at the distribution system sample stations prior to the transfer, during the transfer, and after the transfer. The lack of metals leaching indicates that seasonally switching between the City's water with orthophosphate and the District's water without orthophosphate or allowing the two sources to blend does not have a lasting effect on the pipe interior as the orthophosphate levels returned to the baseline values after the water transfer ended as shown in Figure 4.

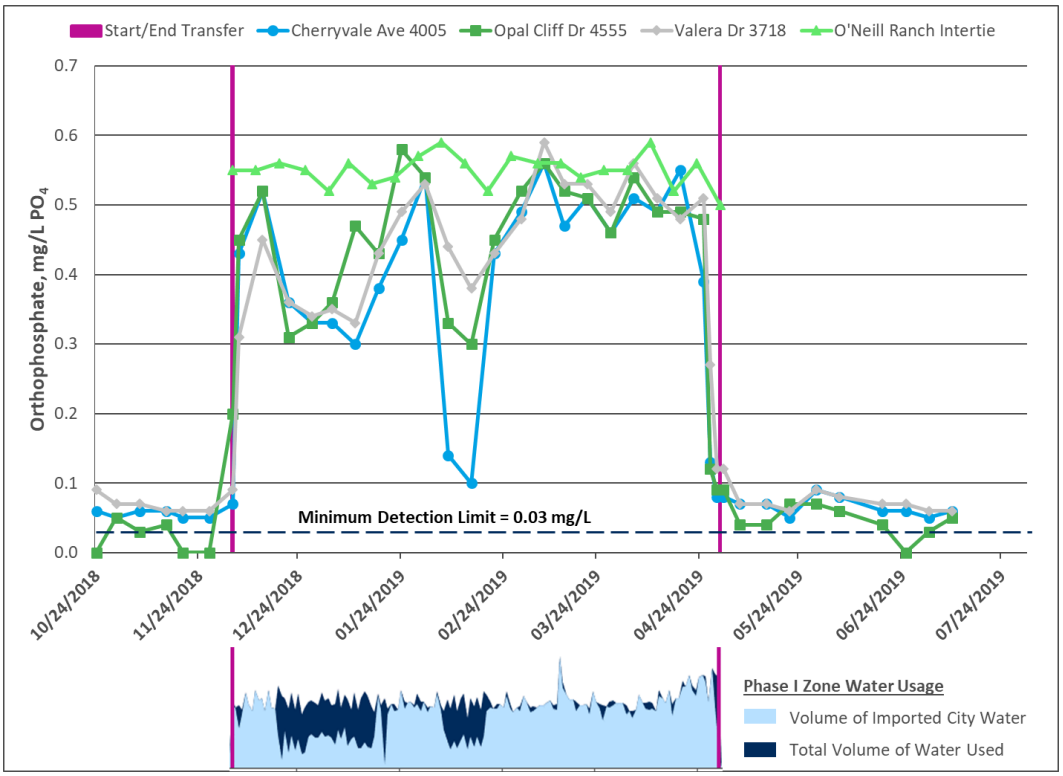

Figure 4 Orthophosphate from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

The pH at sample stations throughout Phase I Zone was typically within 0.2 units of the pH measured at the intertie as seen in Figure 5. In recent years the pH of the City's finished water has ranged from 7.1 to 7.7 with an average pH of 7.4, which matches the water quality during the transfer. The District's pH for Service Area 1, which includes Phase I Zone has recently ranged from 7.0 to 8.1 depending on the active wells with an average pH of 7.5.

During the water transfer the sample sites in Phase I Zone were isolated from the remainder of the District's system and were limited to imported City water or the two District wells in Phase I Zone based on their availability. After the water transfer the sample sites were no longer isolated from the rest of the District's system due to operational constraints and could have received water from different wells based on daily demands. Historically, the Main Street Well had a pH of approximately 7.8, while the Garnett Well and Rosedale Well had a pH of approximately 7.5.

The variation in pH between the sample sites is a result of the different source waters received at each location. The decreasing trend in pH in July of 2019 was observed at all three sample stations, indicating a change in water quality for a source feeding all three sites in different proportions or a change in multiple sources at the same time. The decreasing pH trend has the potential to increase the corrosivity of the finished water, but all key metals have been below DLRs during the monitoring. Additional distribution system monitoring is recommended to ensure that the pH does not continue to decrease.

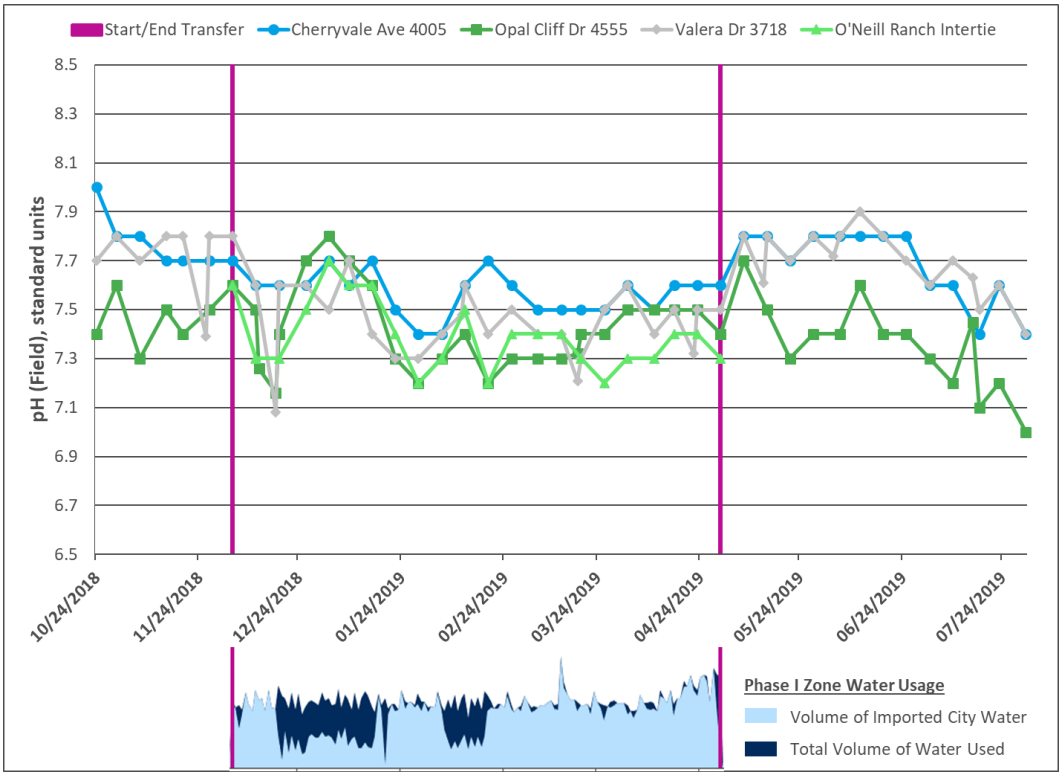

Figure 5 pH from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

Free chlorine residual was measured at the intertie and Phase I Zone sample stations. During 2018, the average free chlorine residual for the City and District were 0.9 mg/L and 0.72 mg/L, respectively. Both the City and District recorded free chlorine residuals of 1.5 mg/L in 2018, which explains some of the variability in distribution system samples. Results from the pilot water transfer matched chlorine decay bench-scale testing showing a more stable chlorine residual in the District's sources when compared to the chlorine residual in the City's treated water. During the first month of the water transfer, chlorine residuals decreased slightly as a result of a lower residual at the intertie in addition to the decreased volume of water supplied by the City as shown in Figure 6, but there were no observed negative impacts on water quality. Except for one measurement at the Valera sample station in January, all chlorine residuals were greater than 0.2 mg/L and thus provided secondary disinfection.

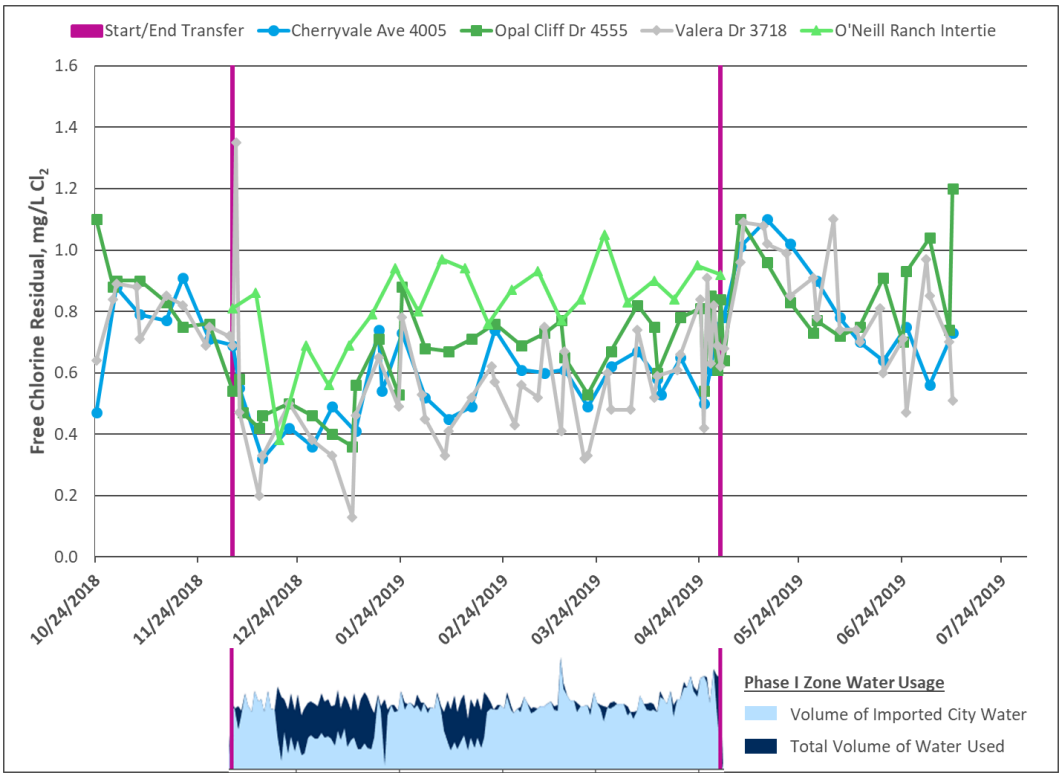

Figure 6 Free Chlorine Residual from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

Water samples were collected and tested for heterotrophic plate counts (HPCs) to examine microbiological activity in the distribution system (See Figure 7). Almost all samples showed HPC values below the minimum detection limit (MDL) of 2 most probable number (MPN)/mL, except for Cherryvale samples in March and April of 2019. The increased phosphate levels could have provided a food source for microbial activity, but the lack of spikes at other locations decreases the likelihood of this alternative. Since this was a short-lived isolated spike in HPCs, it is likely a result of bacteria at or near the sample station or some biofilm that sloughed off and was caught in the sample station connection and just needed flushed out. There were no spikes in turbidity or iron, and no decrease in chlorine residual during this time, and there were no customer complaints. Since the issue resolved itself by the end of the water transfer and has not returned during post-

transfer monitoring, HPCs do not appear to be a concern. As a precautionary measure HPCs will be monitored at the Cherryvale sample station during Phase II of the water transfer to verify if the results were an anomaly or if water quality is impacted and further actions are needed.

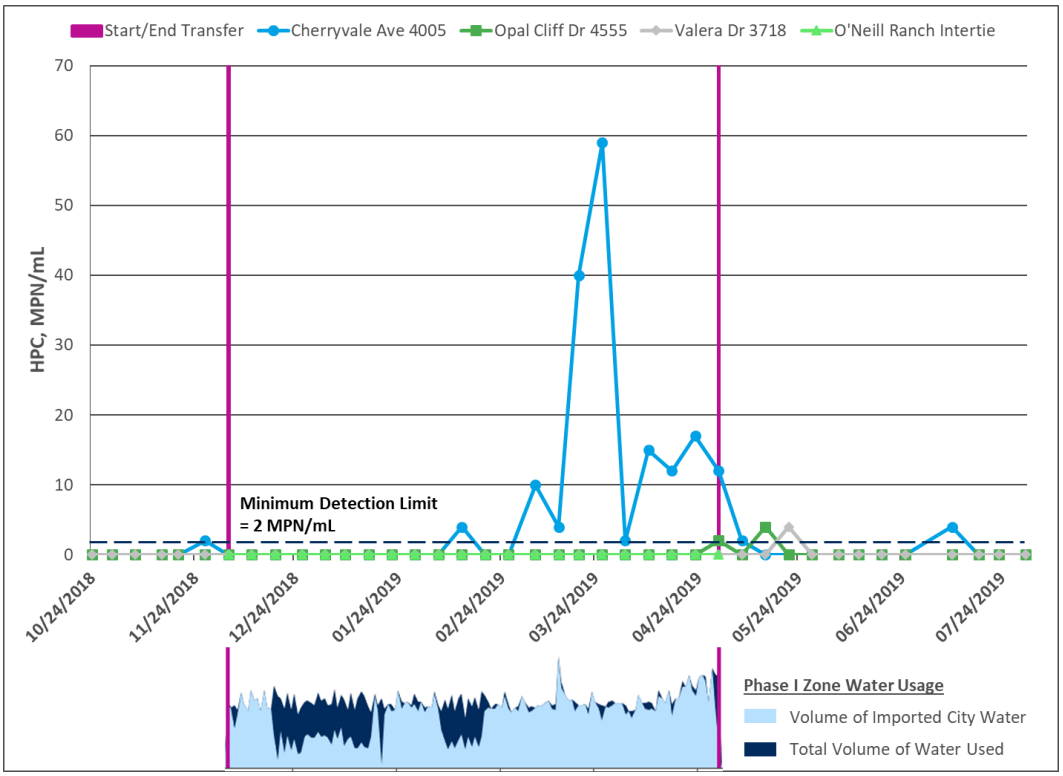

Figure 7 HPCs from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

Results of the extensive water quality monitoring program are displayed in Table 1, where the data are broken up into pre-transfer, during transfer, and post-transfer. The average value accounts for results from all three sample stations as well as the intertie (during the transfer) except when the data were below the respective DLR or MDL for each constituent and recorded as non-detect. Only constituents that had results above respective DLRs or MDLs are shown in Table 1.

All constituents included in Table 1 are also shown graphically throughout the report or in the Appendix. Some measured parameters showed no to limited change as a result of the water transfer such as oxidation reduction potential (ORP) and zinc, while parameters like total dissolved solids (TDS), calcium, magnesium, and total hardness increased at Opal Cliff sampling station when District well water was the only source. These distinctions are shown graphically in the Appendix and illustrate the variability in water quality from the District's wells.

Table 1 Water Quality Comparison All Locations Pre-, During and Post-Transfer

PARAMETER	UNITS	DLR	PRE-TRANSFER				DURING TRANSFER				POST-TRANSFER			
			AVG[2]	MIN	MAX	# ND	AVG[2]	MIN	MAX	# ND	AVG[2]	MIN	MAX	# ND
pH[1]	s.u.	-	7.7	7.3	8	0	7.5	7.08	7.8	0	7.6	7	7.9	0
Free Chlorine[1]	mg/L Cl_2	0.02 (MDL)	0.78	0.47	1.1	0	0.61	0.13	1.35	0	0.81	0.47	1.2	0
Orthophosphate	mg/L PO_4	0.03 (MDL)	0.07	ND	0.2	3	0.47	0.1	0.59	0	0.08	ND	0.27	2
Dissolved Organic Carbon (DOC)	mg/L	0.3 (MDL)	0.9	0.7	1.5	0	1.5	0.7	2.4	0	0.7	ND	1.1	1
Total Organic Carbon (TOC)	mg/L	0.3 (MDL)	0.9	0.7	1.5	0	1.5	0.7	2.4	0	0.7	0.6	1	0
Alkalinity (Total)	mg/L as $CaCO_3$	-	176	150	200	0	115	77	181	0	179	159	201	0
Hardness (Total)	mg/L as $CaCO_3$	-	-	-	-	0	157	106	216	0	216	140	442	0
Cadmium (Total)	µg/L	1	2.0	ND	5.3	8	1.3	ND	1.4	84	2.0	ND	2.6	28
Calcium	mg/L	-	-	-	-	-	47	33	64	0	58	35	131	0
Cobalt (Total)	µg/L	0.1 (MDL)	0.1	0.1	0.3	0	0.1	ND	0.2	70	0.2	ND	0.2	21
Magnesium	mg/L	-	-	-	-	-	10	6	16	0	17	11	28	0
Molybdenum (Total)	µg/L	0.1 (MDL)	2.8	1.8	3.4	0	1.6	ND	2.9	2	2.7	1.9	3.3	0
Zinc (Total)	µg/L	50	-	ND	ND	21	-	ND	172	85	-	ND	ND	34
Heterotrophic Plate Count (HPC)	MPN/mL	2 (MDL)	2	ND	2	20	16	ND	59	74	4	ND	4	32
Bicarbonate	mg/L as HCO_3^-	-	215	183	244	0	141	94	221	0	218	194	245	0
ORP[1]	mV	-	644	524	713	0	668	460	778	0	728	611	795	0
Temperature[1]	°C	-	19.4	15.4	23.6	0	15.6	12.5	21.2	0	22.2	18.4	25.4	0

4.24

PARAMETER	UNITS	DLR	PRE-TRANSFER				DURING TRANSFER				POST-TRANSFER			
			AVG[2]	MIN	MAX	# ND	AVG[2]	MIN	MAX	# ND	AVG[2]	MIN	MAX	# ND
Total Dissolved Solids (TDS)	mg/L	-	429	322	663	0	286	194	438	0	437	280	978	0
Turbidity	NTU	0.1	0.1	ND	0.2	12	0.1	ND	0.7	19	0.2	ND	0.75	10
Disinfection Byproducts														
Total Trihalomethanes (TTHM)	µg/L	-	18	4	44	0	47	20	73	0	16	6	30	0
Bromodichloromethane	µg/L	1	5	ND	15	2	14	5	22	0	4	1	11	0
Bromoform	µg/L	1	3	ND	5	1	3	ND	8	22	4	ND	8	1
Chloroform	µg/L	1	6	ND	18	2	25	5	53	0	3	ND	8	3
Dibromochloromethane	µg/L	1	5	2	8	0	6	3	15	0	6	2	10	0
Haloacetic Acids (HAA5)	µg/L	-	7	ND	29	3	32	8	79	0	4	1	14	0
Dibromoacetic Acid	µg/L	1	2	ND	3	5	2	ND	7	22	3	1	4	0
Dichloroacetic Acid	µg/L	1	2	ND	4	6	7	ND	18	2	2	ND	3	11
Monobromoacetic Acid	µg/L	1	1	ND	1	9	1	ND	2	38	-	ND	ND	17
Monochloroacetic Acid	µg/L	2	-	ND	ND	12	2	ND	3	38	-	ND	ND	17
Trichloroacetic Acid	µg/L	1	11	ND	22	9	24	4	59	0	2	ND	7	13

[1] Data measured in the field.
[2] If ND values are present, the Average does not account for these values.
DLR: Detection Limit for purposes of Reporting from California Division of Drinking Water (DDW)
MDL: Minimum Detection Limit
MPN: Most Probable Number
ND: Non-Detect (less than DLR or MDL)

4.25

Many of the water quality parameters assessed throughout Phase I Zone of Service Area 1 were below DDW's DLR for all samples collected pre-transfer, during transfer, and post-transfer and a list of these non-detect analytes are shown in Table 2.

Table 2 Water Quality Parameters Below DLR for All Samples (Pre-, During, and Post-Transfer)

PARAMETER	UNITS	DLR
Antimony (Total)	µg/L	6
Arsenic (Total)	µg/L	2
Barium (Total)	µg/L	100
Beryllium (Total)	µg/L	1
Chromium (Total)	µg/L	10
Copper (Total)	µg/L	50
Iron (Total)	µg/L	100
Lead (Total)	µg/L	5
Manganese (Total)	µg/L	20
Mercury (Total)	µg/L	1
Nickel (Total)	µg/L	10
Selenium (Total)	µg/L	5
Silver (Total)	µg/L	10
Thallium (Total)	µg/L	1
Vanadium (Total)	µg/L	3

3.2 CUSTOMER TAP LEAD AND COPPER RESULTS

Sample sites were selected within the Phase I Zone to monitor the impact of water transfer from the City to the District on lead and copper measured at customer taps. Samples were collected from some locations that had historically been used for Lead and Copper Rule (LCR) monitoring, and additional sample sites were added based on discussions with DDW to ensure that water quality continues to meet regulations during and after the transfer. All copper and lead results from Phase I Zone, both during and after the water transfer, were below respective action levels.

The four sample sites that were historically used for LCR monitoring have data dating back to 1992. The tap samples collected as part of this monitoring program are the last two sets of data points shown on Figure 8 and Figure 9. The second to last set of data points represent the water quality during the water transfer collected in January and February of 2019, and the last set of data points represent the water quality after the water transfer when on the District's wells were exclusively suppling water to these sites in July 2019.

As shown in Figure 8, there was a short-term increase in copper concentrations during the water transfer for three of the four sites that had historically been sampled, but all copper results decreased after the water transfer ended. It should be noted that the four historical locations have not been monitored for approximately 10 years and thus do not provide an accurate pre-transfer baseline for comparison. Sample sites that only have data during the transfer and after the transfer showed a decrease in copper release when the water transfer ended, which could be due to the slightly higher pH in the District's sources as copper release is directly related to pH. All copper results were below the copper action level of 1.3 mg/L.

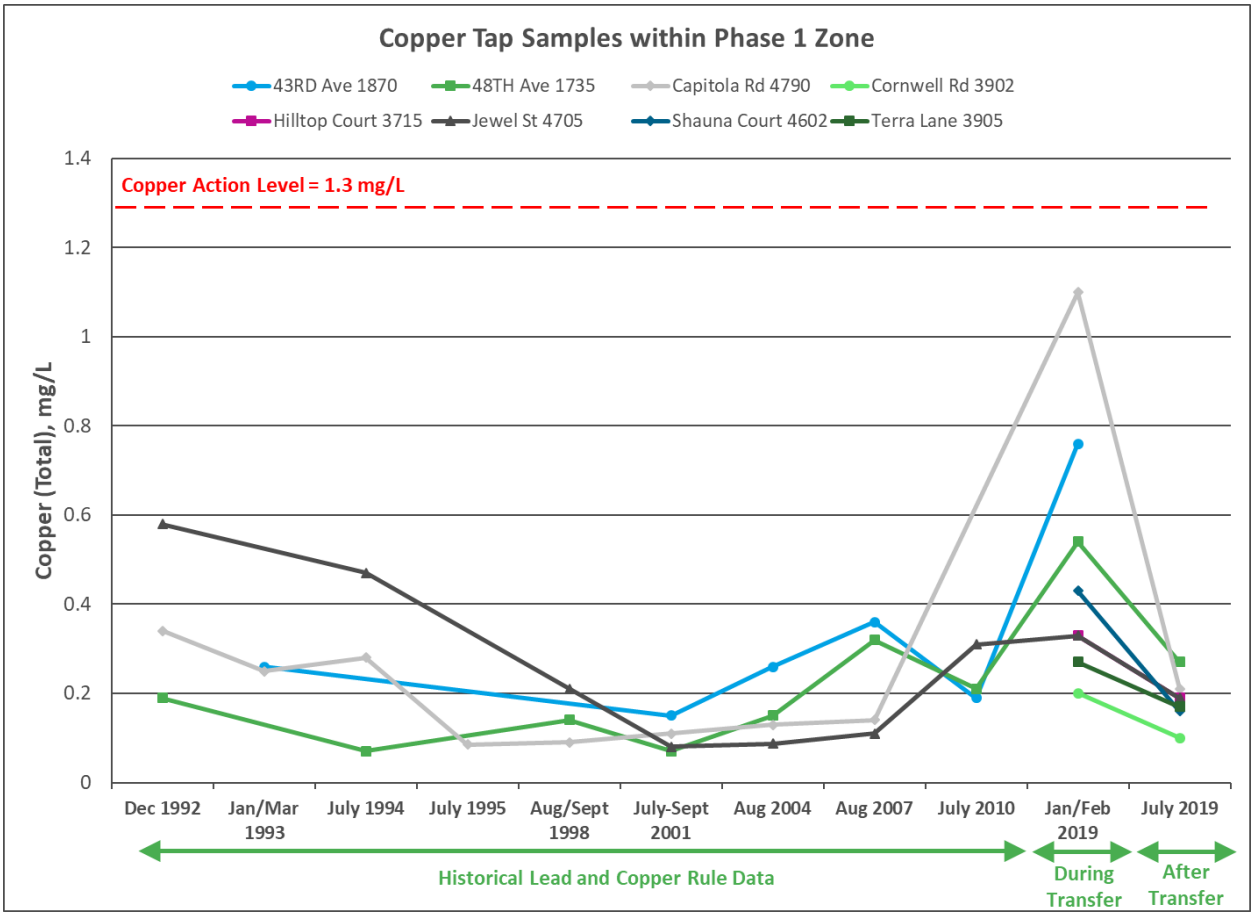

Figure 8 Historical Copper Tap Samples Collected within Phase I Zone (Water Transfer 12/4/18 – 4/30/19)

As shown in Figure 9, all lead samples were below the DLR during the water transfer and after the transfer except for one location that was just barely above the DLR at 0.0057 mg/L, which corresponded to the highest copper result. The lead and copper tap samples validated the results of bench-scale testing that did not predict a regulatory concern with the LCR as a result of importing water from the City.

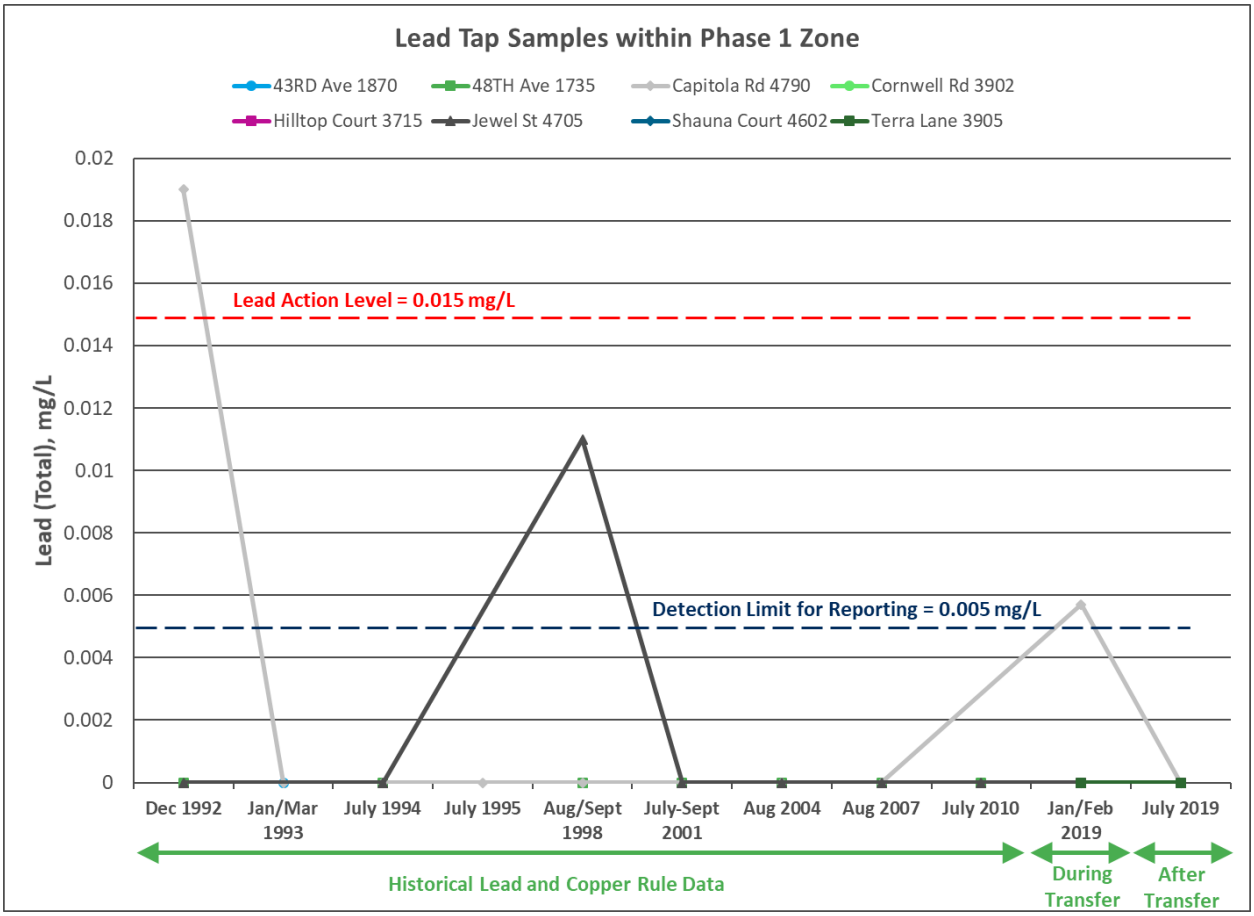

Figure 9 Historical Lead Tap Samples Collected within Phase I Zone (Water Transfer 12/4/18 – 4/30/19)

3.3 DBP COMPLIANCE RESULTS

Regulatory compliance for DBPs use locational running annual average (LRAA) values that must meet the respective MCL based on the average of four quarterly samples at each designated sampling location. Throughout this monitoring period samples were analyzed for total trihalomethanes (TTHMs) and haloacetic acids 5 (HAA5) prior to the water transfer, during the water transfer and after the water transfer from three sampling stations. Additionally, samples were collected from the O'Neill Ranch intertie during the water transfer to examine how DPBs changed throughout Phase I Zone as supplemental water from two of the District's wells were occasionally used. The results of frequent DBP testing in Phase I Zone are shown in Figure 10 for TTHMs and in Figure 11 for HAA5, but these do not represent LRAA values.

The three sample stations used throughout the monitoring period were not historic sample stations for the District, so a worst-case scenario LRAA was estimated using the highest TTHM and HAA5 value from each quarter at each location using the typical range of dates for each quarter as shown in Table 3 for TTHMs and Table 4 for HAA5. The estimated worst-case scenario LRAA for both TTHMs and HAA5 were approximately half of the respective MCLs for all three sample locations in Phase I Zone. Both TTHMs and HAA5 values increased during the water transfer as expected due to

increased total organic carbon (TOC) in the imported City water, but there were no regulatory compliance issues with the estimated worst-case data for the three sample locations in Phase I Zone. This outcome is due to the seasonality of the water transfer combined with the historically low DBPs in the District's system.

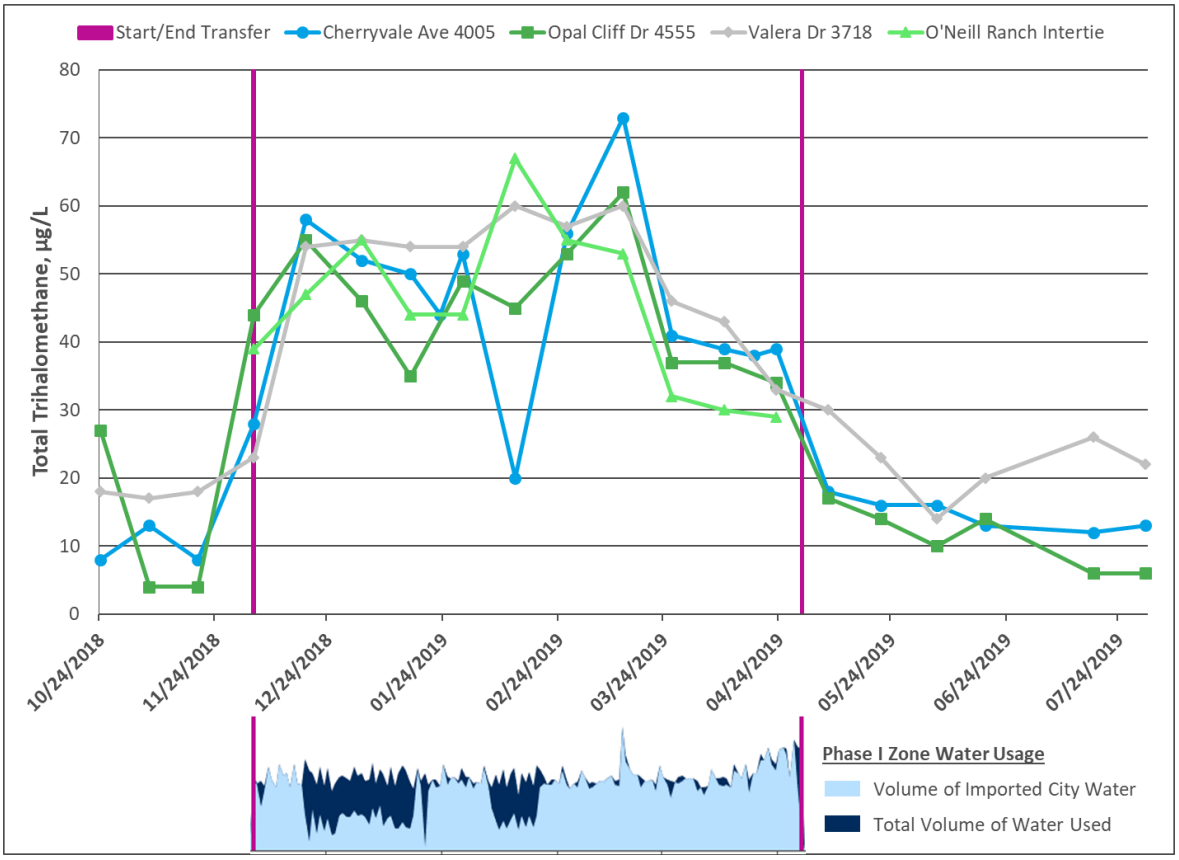

Figure 10 TTHMs from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie (Not LRAA)

Table 3 Estimated Conservative TTHM LRAA for Phase I Zone Sample Locations

SAMPLE LOCATION	QUARTERLY MAXIMUM TTHM VALUES				CONSERVATIVE TTHM LRAA (µg/L)	TTHM LRAA MCL (µg/L)
	Q 4 2018	Q 1 2019	Q 2 2019	Q 3 2019		
Cherryvale Ave 4005	58	73	39	13	**46**	**80**
Opal Cliff Dr 4555	55	62	37	6	**40**	
Valera Dr 3718	54	60	43	26	**46**	
O'Neill Ranch Intertie	47	67	30	-	-	

For this estimate the range of dates for each quarter were as follows: Quarter 4 2018 (10/24/18 – 12/31/18); Quarter 1 2019 (1/1/19 – 3/31/19); Quarter 2 2019 (4/1/19 – 6/30/19); Quarter 3 2019 (7/1/19 – 9/30/19. LRAA: Location Running Annual Average; MCL: Maximum Contaminant Level

Variability in DBPs at the O'Neill Ranch intertie were a result of different proportions of water sources treated at the City's water treatment plant due to operational constraints. The sources vary in TOC concentrations and therefore DBP formation potential will vary in the treated water. Additionally, the impact of temperature, chlorine residual and water age have an impact on the formation of DBPs. On March 13, 2019, the City had a main break that forced the City to treat more of their higher TOC source water.

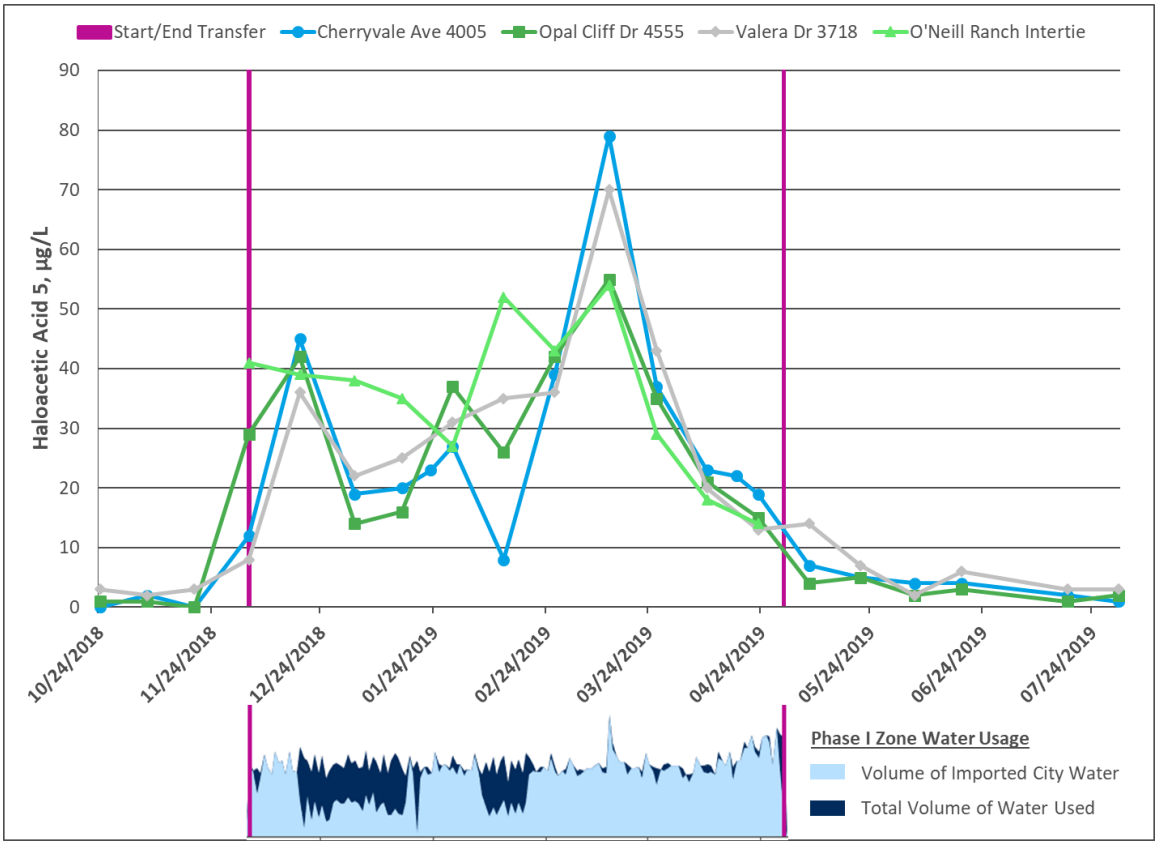

Figure 11 HAA5 from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie (Not LRAA)

Table 4 Estimated Conservative HAA5 LRAA for Phase I Zone Sample Locations

SAMPLE LOCATION	QUARTERLY MAXIMUM HAA5 VALUES				CONSERVATIVE HAA5 LRAA (µg/L)	HAA5 LRAA MCL (µg/L)
	Q 4 2018	Q 1 2019	Q 2 2019	Q 3 2019		
Cherryvale Ave 4005	45	79	23	2	**37**	**60**
Opal Cliff Dr 4555	42	55	21	2	**30**	
Valera Dr 3718	36	70	20	3	**32**	
O'Neill Ranch Intertie	41	54	18	-	-	

For this estimate the range of dates for each quarter were as follows: Quarter 4 2018 (10/24/18 – 12/31/18); Quarter 1 2019 (1/1/19 – 3/31/19); Quarter 2 2019 (4/1/19 – 6/30/19); Quarter 3 2019 (7/1/19 – 9/30/19. LRAA: Location Running Annual Average; MCL: Maximum Contaminant Level

The major component of TTHMs was chloroform followed by bromodichloromethane as seen from a comparison of Figure 27, Figure 28, Figure 29, and Figure 30 in the Appendix. The major component of HAA5 was trichloroacetic Acid as seen from a comparison of Figure 31, Figure 32, Figure 33, Figure 34, and Figure 35 in the Appendix.

3.4 CUSTOMER COMPLAINTS

During Phase I of the water transfer pilot project, the District received three customer complaints about water quality. The District followed up with the customers to quickly resolve the complaints and conduct additional water quality testing. The complaint information and the response from the District are described in Table 5.

Table 5 Description of Customer Complaints During the Water Transfer and the District's Responses

LOCATION (DATE)	COMPLAINT	DISTRICT'S RESPONSE
Wharf Road (1/29/19)	More frequent replacement of RO filters; dark streaks in toilet	Wharf road was flushed; follow up call with customer and no more streaks in toilet
43rd Ave (2/21/19)	Brownish water from all spigots; noticed first in the bath	Checked chlorine residual and it was normal and no iron was detected; follow up call with customer had no more brownish water
47th Ave (3/7/19)	Overflowing toilet with cloudy water and particles; sink water also had particles	Most of the sediment was not present when the District's staff arrived for inspection; local plumber onsite to fix toilet said it looked like rust from galvanized piping; measured chlorine residual was normal (0.62 mg/L) and no discoloration or rust when flowing; 47th Ave was flushed the next day

The complaints were quickly resolved by the District and it is thought that the source of the complaints was due to a change in flow direction as a result of importing water from the City. The typical follow up to these complaints involved flushing the mains in that area. On March 8, 2019, the District initiated additional weekly field testing for chlorine residual and iron at four locations near the addresses with complaints. The results of the additional sampling showed typical chlorine residuals of approximately 0.7 mg/L and all iron measurements were below the DLR.

4 Conclusions and Next Steps

The pilot water transfer project that supplied the District with treated City water at the O'Neill Ranch intertie from December 2018 through April 2019 was a success with regards to water quality and it validated earlier bench-scale testing. The extensive water quality monitoring plan throughout the isolated Phase I Zone of Service Area 1 of the District's distribution system provided a baseline prior to the water transfer and tracked changes to water quality during and after the water transfer had concluded.

As expected, some water quality parameters such as TTHMs and HAA5 increased during the water transfer due to higher TOC in the City's water and the additional water age by introducing the water to the District's system. Regulatory MCLs for DBPs are based on LRAA values, and the worst-case LRAA was estimated using the highest quarterly DBP data gathered at each of the sample stations in Phase I Zone and the results for both TTHM and HAA5 LRAA were approximately half of the respective MCLs due to the seasonality of the water transfer and the historically low DBPs in the District's system.

Samples were analyzed for metals such as lead, copper, iron, manganese, etc. in the distribution system and all results were below DLR. Additional lead and copper tap monitoring locations were selected through discussions with DDW to monitor for lead and copper at residences. All lead and copper samples were below the respective action levels and all but one lead sample were below the DLR.

pH is a critical water quality parameter and the observed pH was within 0.2 units of the imported City water and similar to the District's water before and after the transfer. The pH at the three sample stations was decreasing in July 2019 after the transfer and should be monitored to ensure that the pH does not continue to decrease as this could increase the aggressiveness of the water towards metals and distribution system materials.

The Cherryvale sample station measured a short-term spike in HPCs that returned to non-detect levels after the transfer ended. Since the other sites did not measure HPCs, it is unlikely to be a result of importing City water, but additional sampling will be conducted during Phase II of the water transfer to verify if the spike in HPCs was an anomaly or if there is an issue that needs attention.

The City and District are planning to begin Phase II of the water transfer this winter due to the stable water quality results and no issues with sustaining regulatory compliance with lead and copper and DBPs within Phase I Zone of Service Area 1. The District is planning to expand the zone that could receive water imported from the City to include all of Service Area 1 as shown on Figure 12.

The water demand for Service Area 1 of the District's system from November 2017 through April 2018 ranged from 32 to 40 MG/month (98 to 123 AF/month) and the capacity of the O'Neill Ranch intertie is approximately 40 to 45 MG/month (123 to 138 AF/month). The volume of water supplied throughout the water transfer and the length of time that the transfer occurs will be

dependent on the City's excess supply, the District's demand, and the budgeted volume of water that the District has approved to purchase from the City (currently 98 MG or 300 AF).

Continued water quality monitoring is recommended prior to the transfer, throughout the upcoming water transfer, and after the water transfer concludes. After consultation with DDW, additional sample stations will be selected throughout Service Area 1. There is an opportunity to limit the parameters tested since many constituents were below respective DLRs for all samples collected as shown earlier in Table 2 or there was no to limited variation observed during the transfer and thus did not affect water quality. The recommended parameters for the next round of monitoring at the intertie and selected distribution system sampling stations are detailed in Table 6 in addition to lead and copper customer tap monitoring sites that will be selected through discussions with DDW.

Table 6 Recommended Water Quality Parameters for Phase II Distribution System Monitoring

PARAMETERS RECOMMENDED FOR PHASE II MONITORING			
Frequent Monitoring – Same as Phase I			
pH	Temperature	TTHM	Chloride [1]
Alkalinity (Total)	TOC	HAA5	Sulfate [1]
Free Chlorine Residual	Calcium	HPC	
Orthophosphate	Magnesium	Turbidity	
Iron [2]	Manganese [2]	TDS	
Monthly Monitoring [3]			
Cadmium	Cobalt	Molybdenum	Zinc

[1] Added for Phase II Monitoring
[2] Included in monitoring even though all results were below DLR
[3] Monthly Monitoring was recommended for parameters that had at least one result greater than the DLR or MDL during Phase I monitoring
Additional monitoring of HPCs at the Cherryvale sample station will determine if the spike observed during Phase I was an anomaly or an issue that needs further attention.

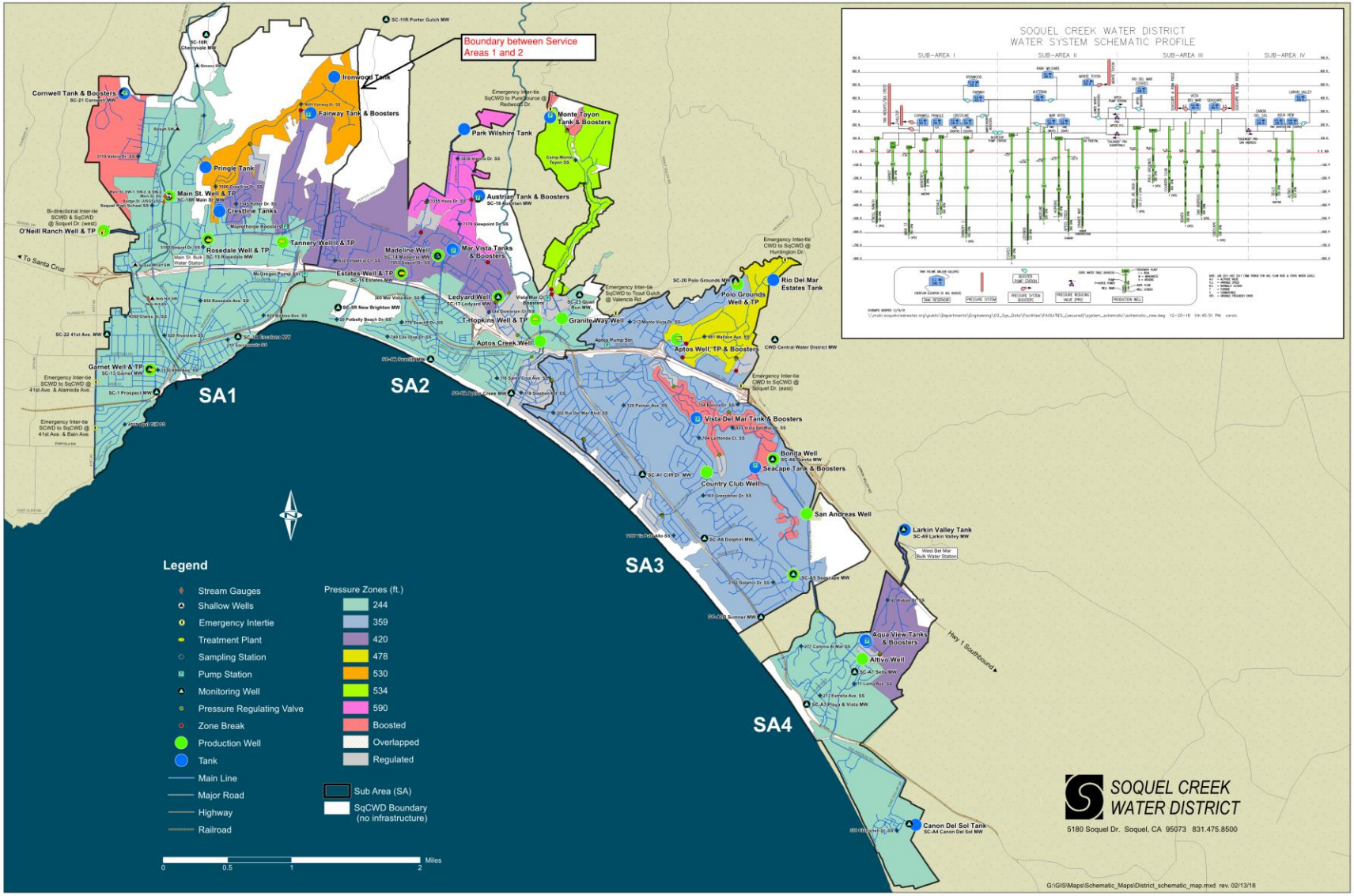

Figure 12 Map of Phase II Zone (Service Area 1) for Water Transfer Project

4.34

Appendix A. Additional Water Quality Graphs

The following graphs detail the results of sampling at three locations before the transfer, during the transfer, and after the transfer along with results for the intertie during the transfer for measured constituents with results that were greater than non-detect for all samples. Graphs show results for metals, disinfection byproducts, and other important water quality parameters.

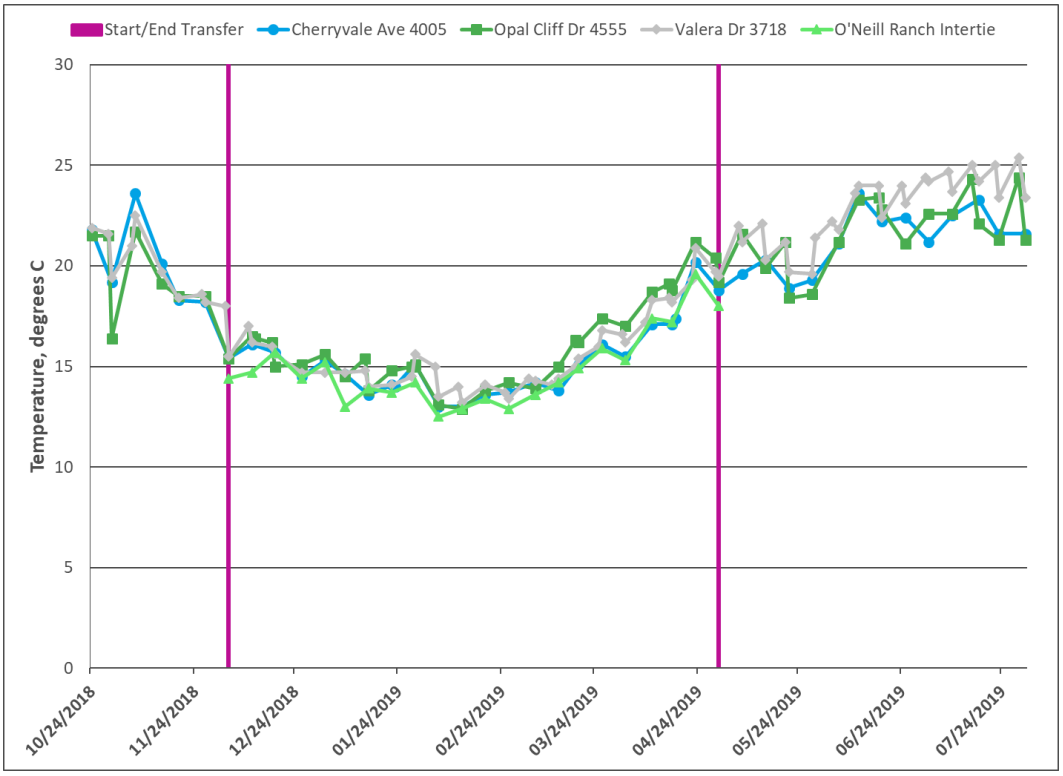

Figure 13 Temperature from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

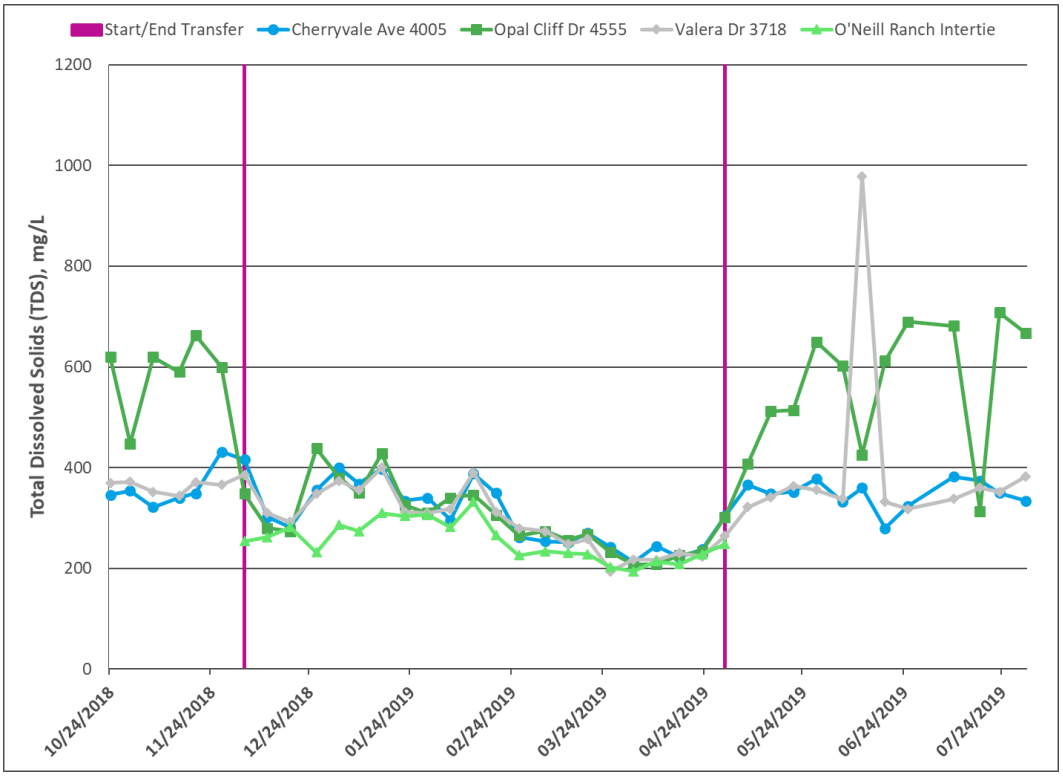

Figure 14 TDS from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

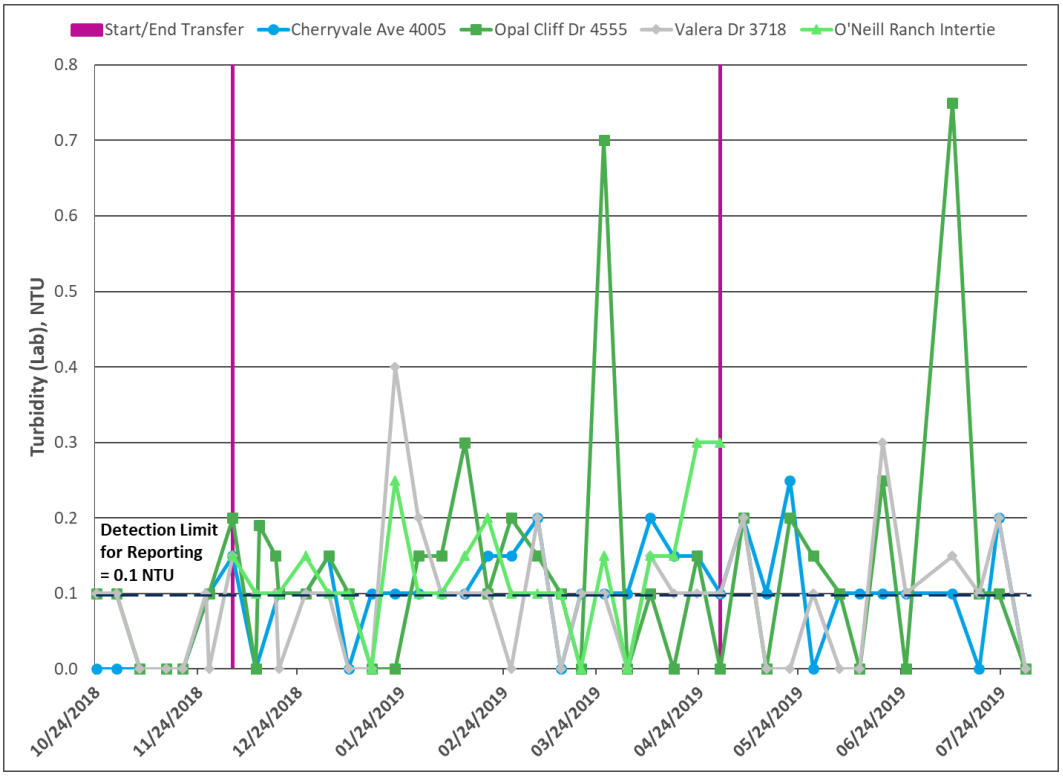

Figure 15 Turbidity from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

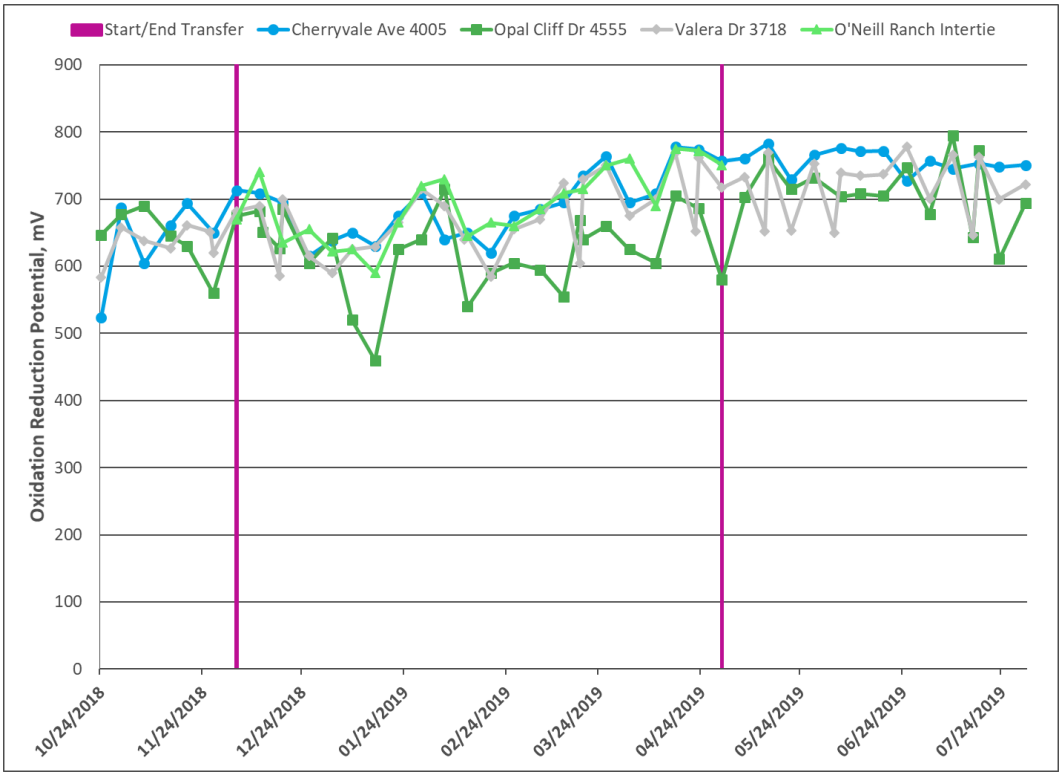

Figure 16 ORP from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

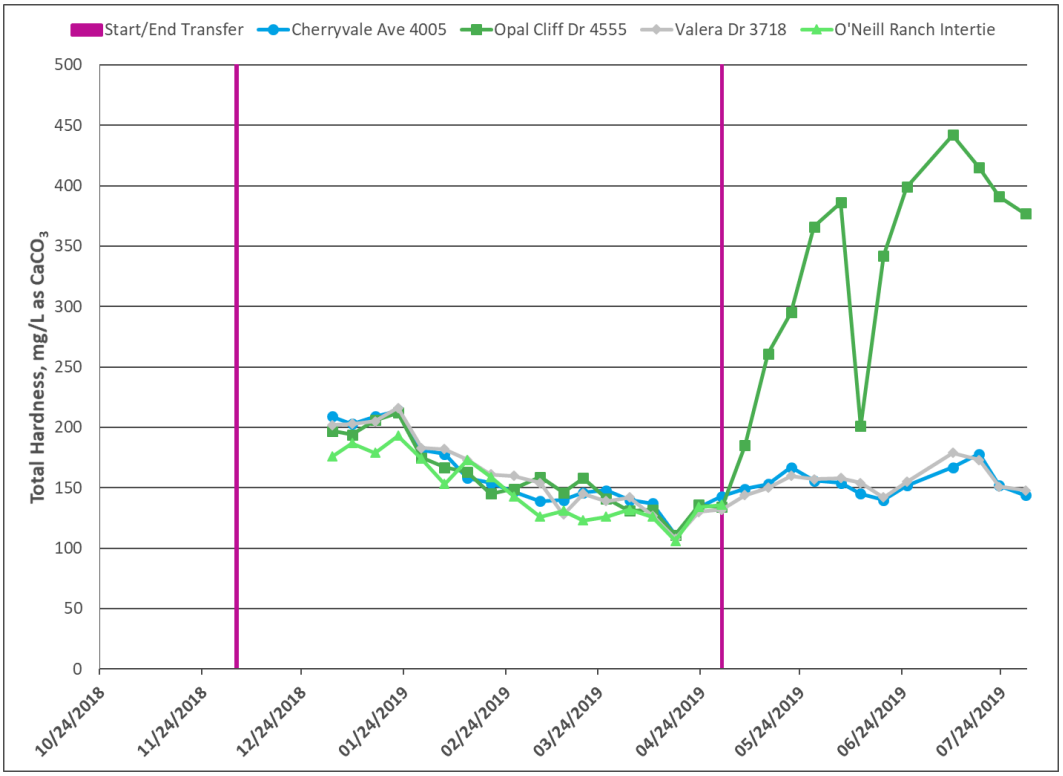

Figure 17 Total Hardness from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

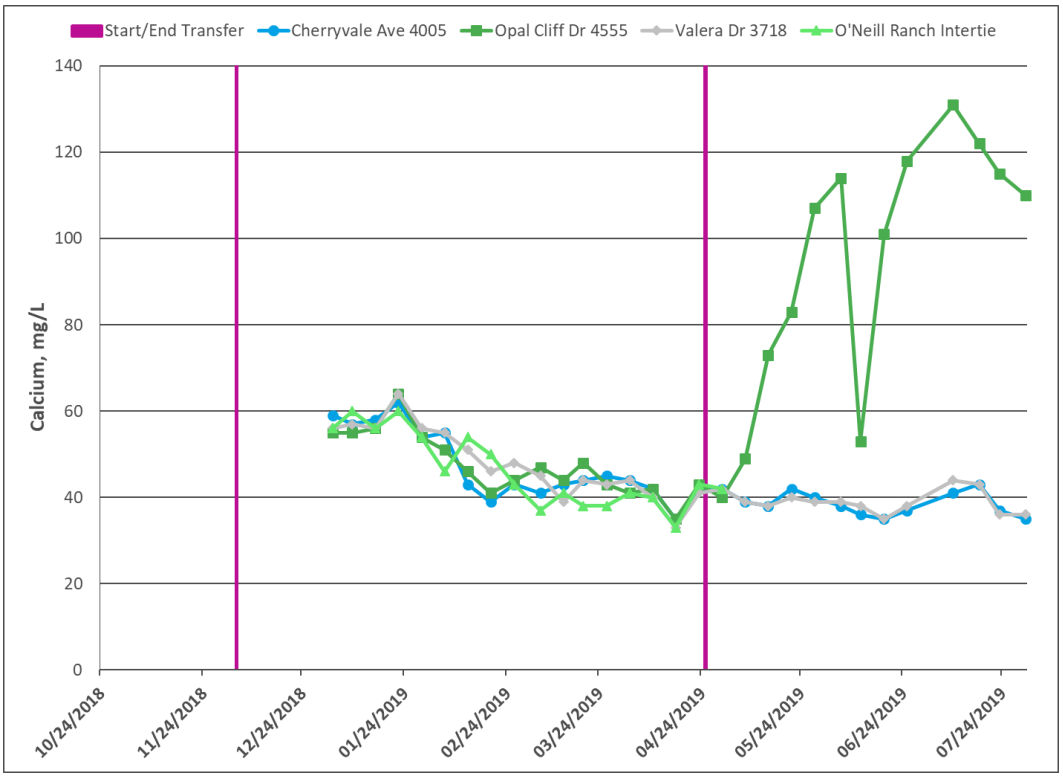

Figure 18 Calcium from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

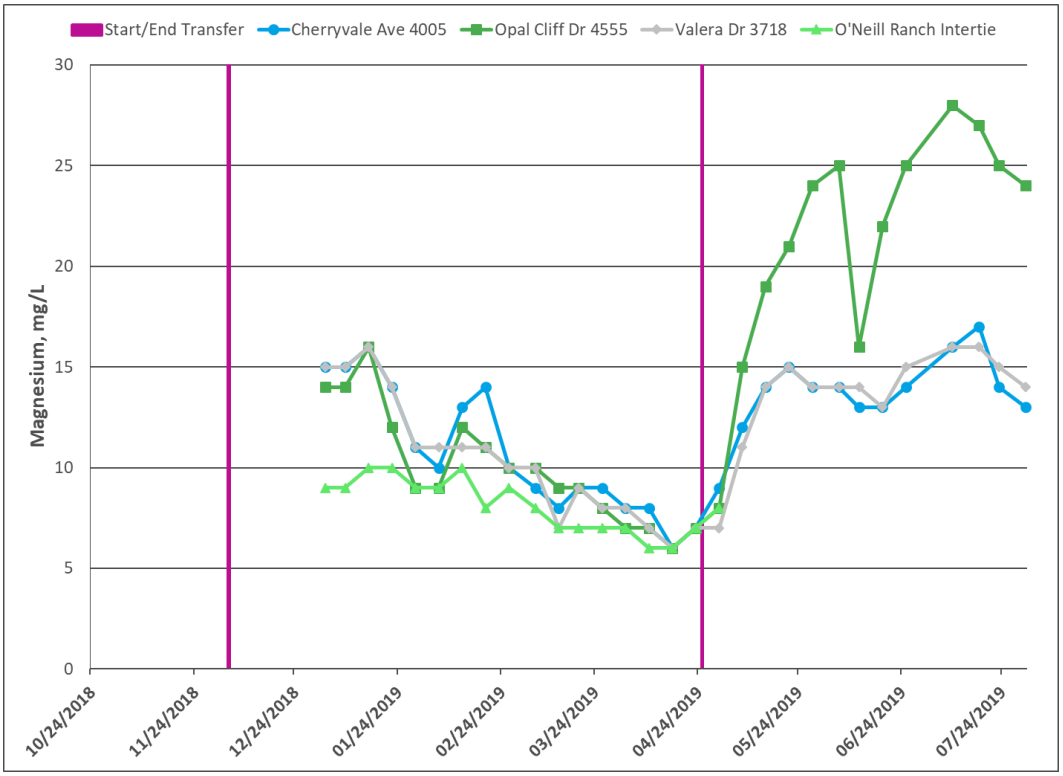

Figure 19 Magnesium from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

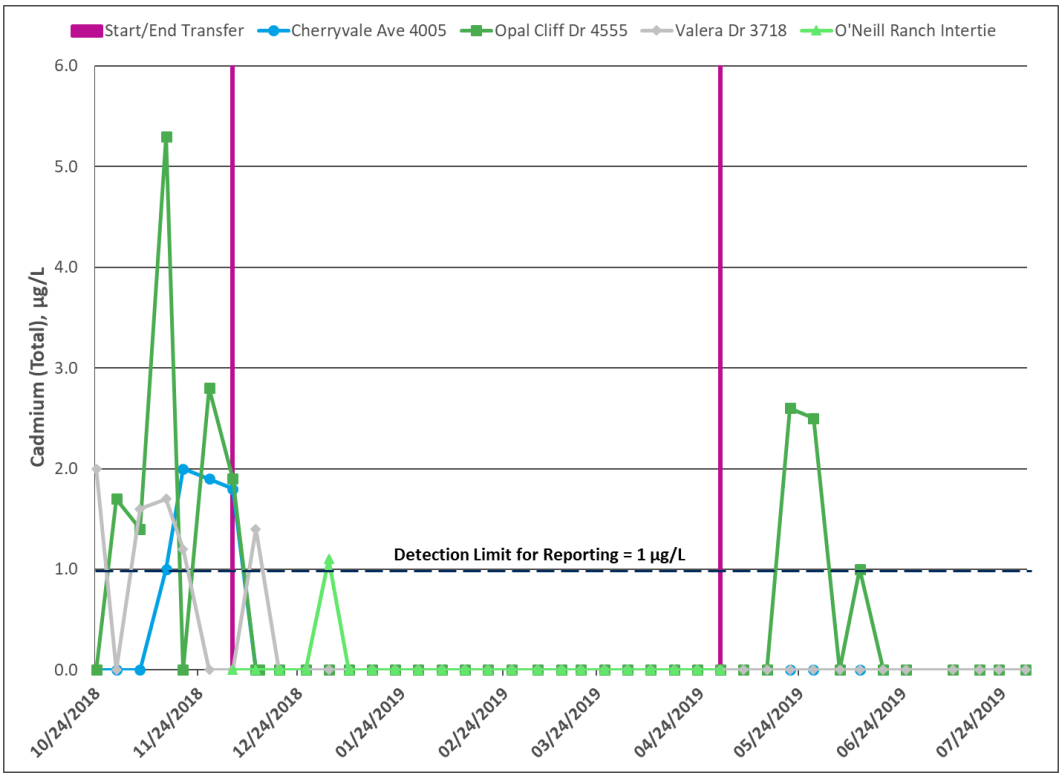

Figure 20 Cadmium from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

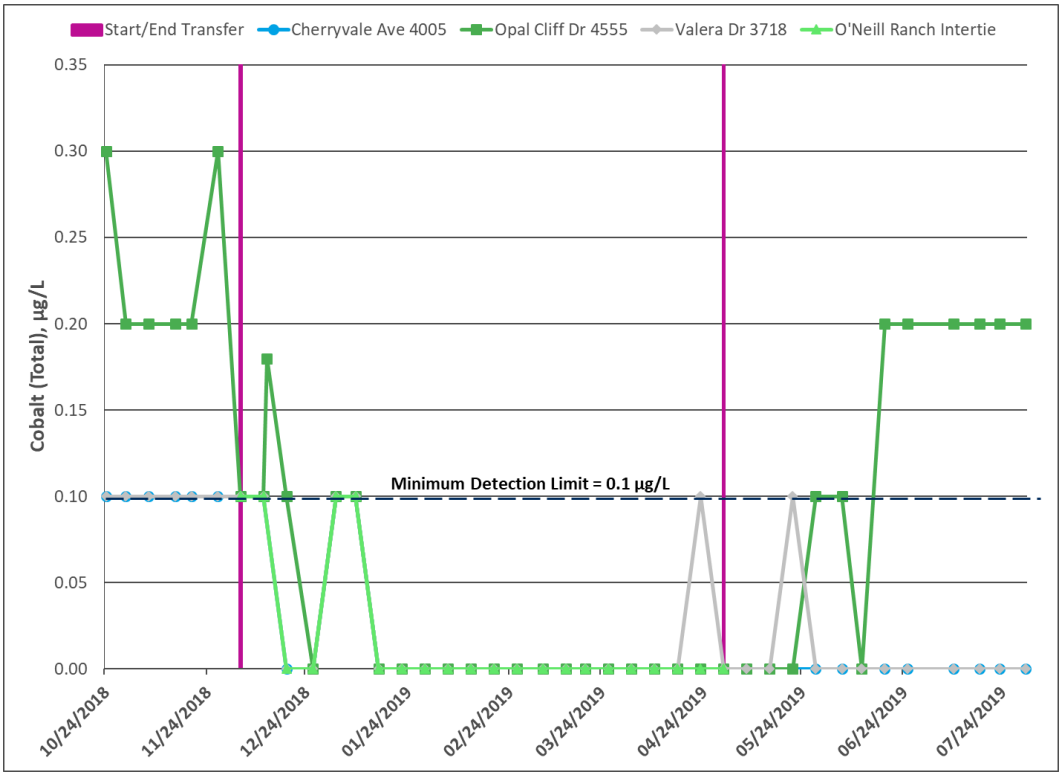

Figure 21 Cobalt from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

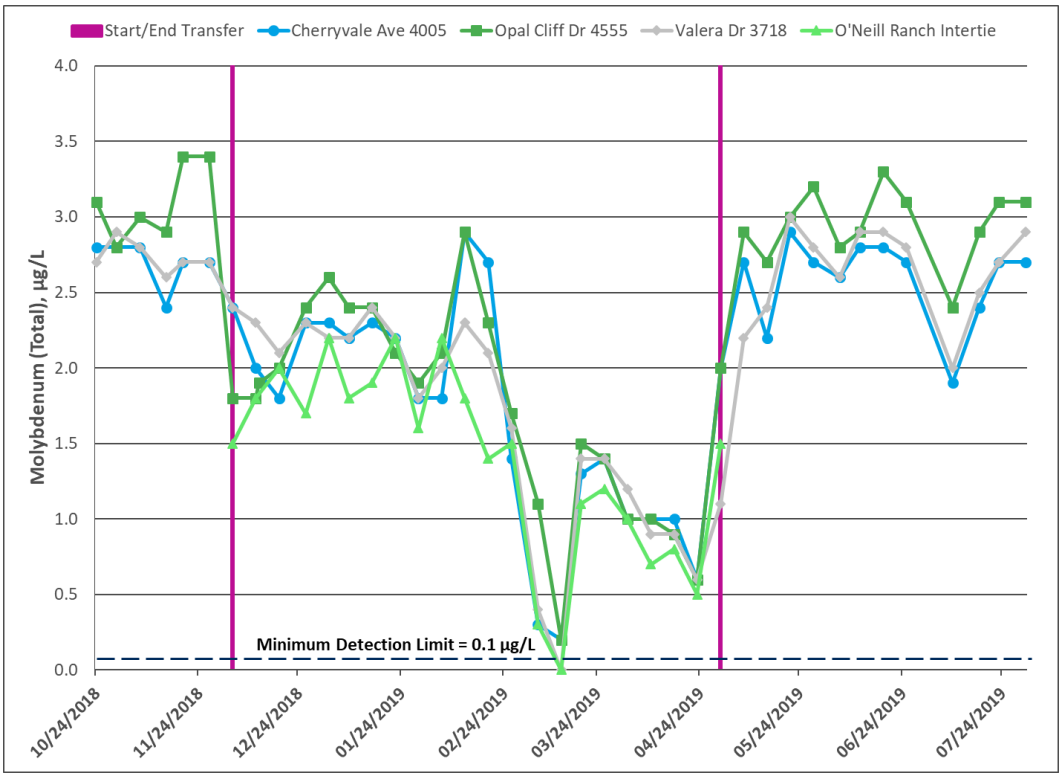

Figure 22 Molybdenum from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

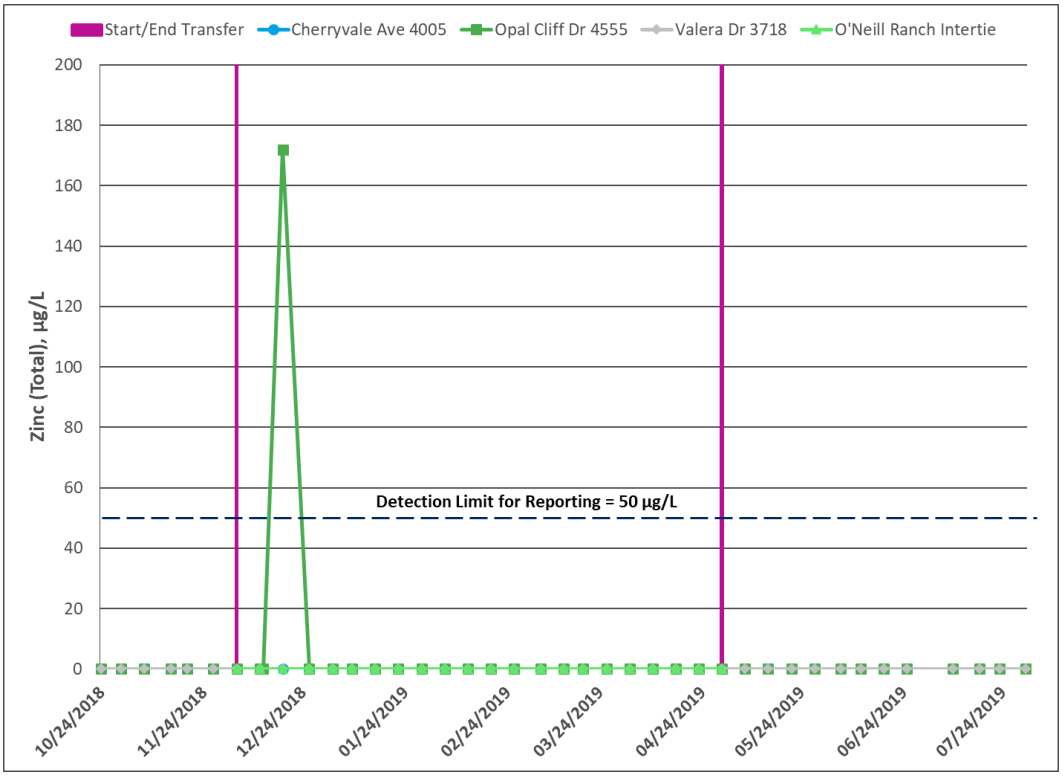

Figure 23 Zinc from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

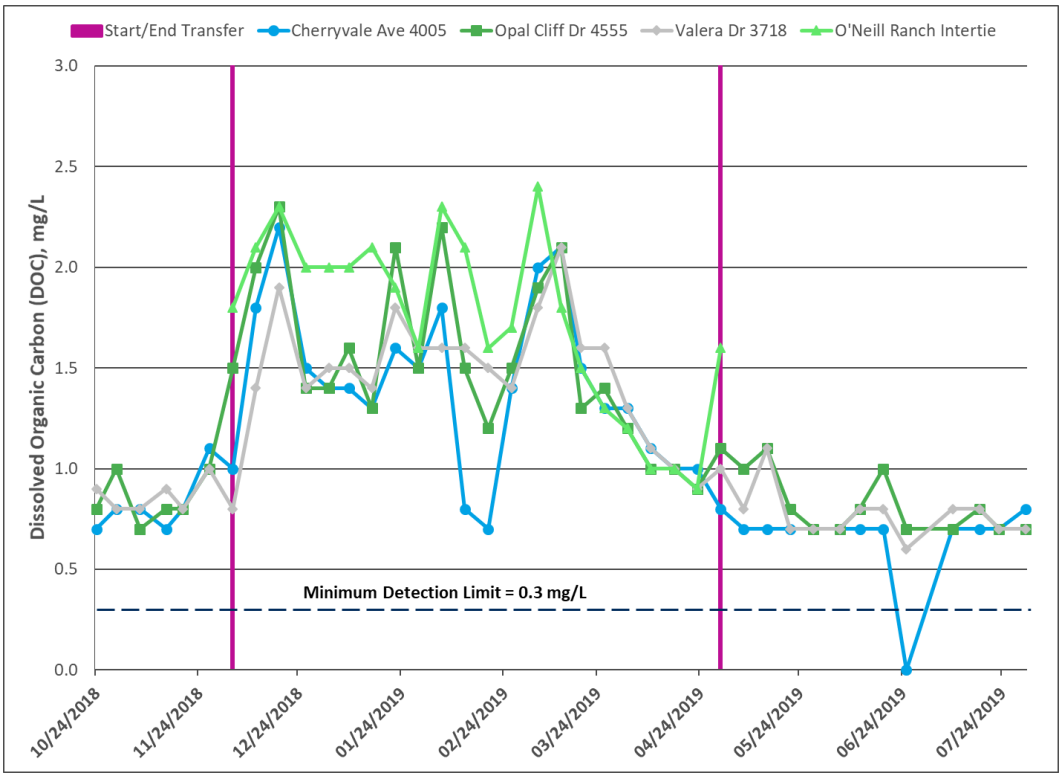

Figure 24 DOC from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

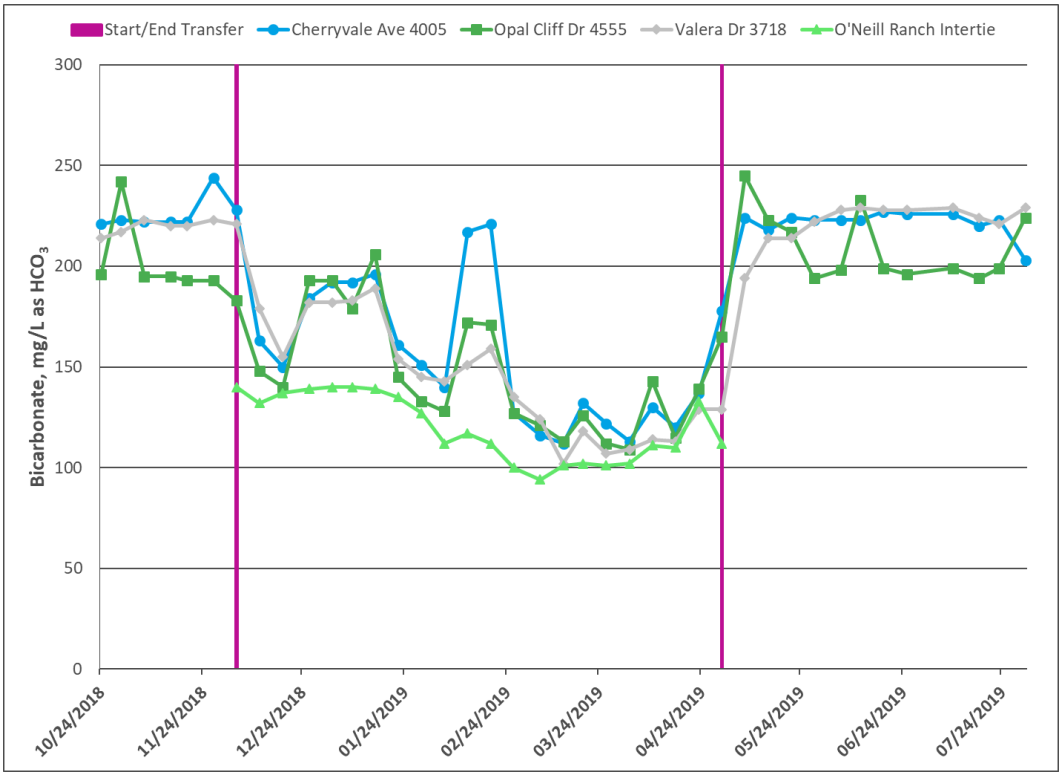

Figure 25 Bicarbonate from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

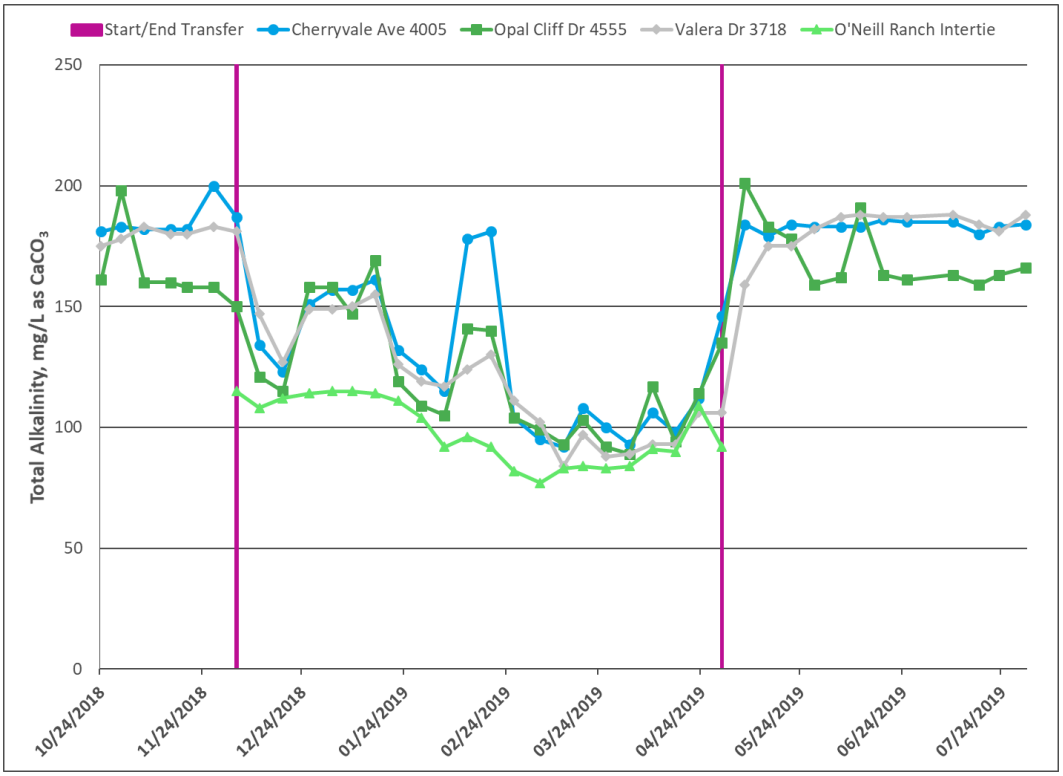

Figure 26 Alkalinity from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

The following four graphs detail the breakdown of the four constituents included in total trihalomethanes for compliance monitoring (i.e., bromodichloromethane, bromoform, chloroform, and chlorodibromomethane).

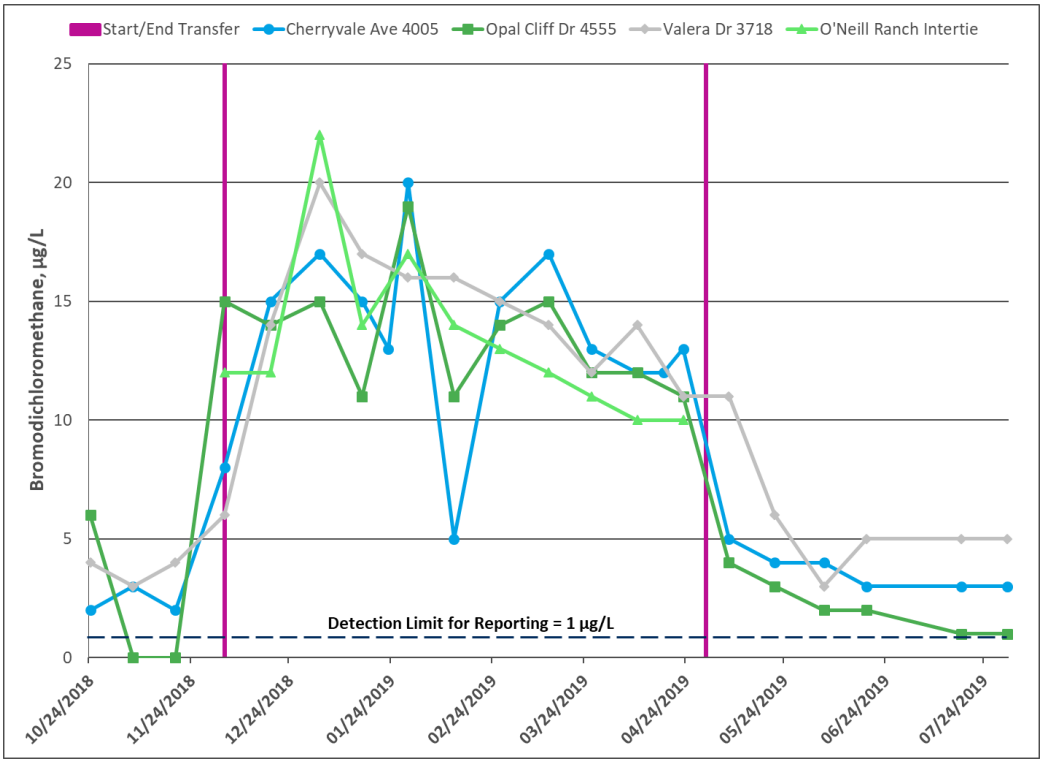

Figure 27 Bromodichloromethane from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

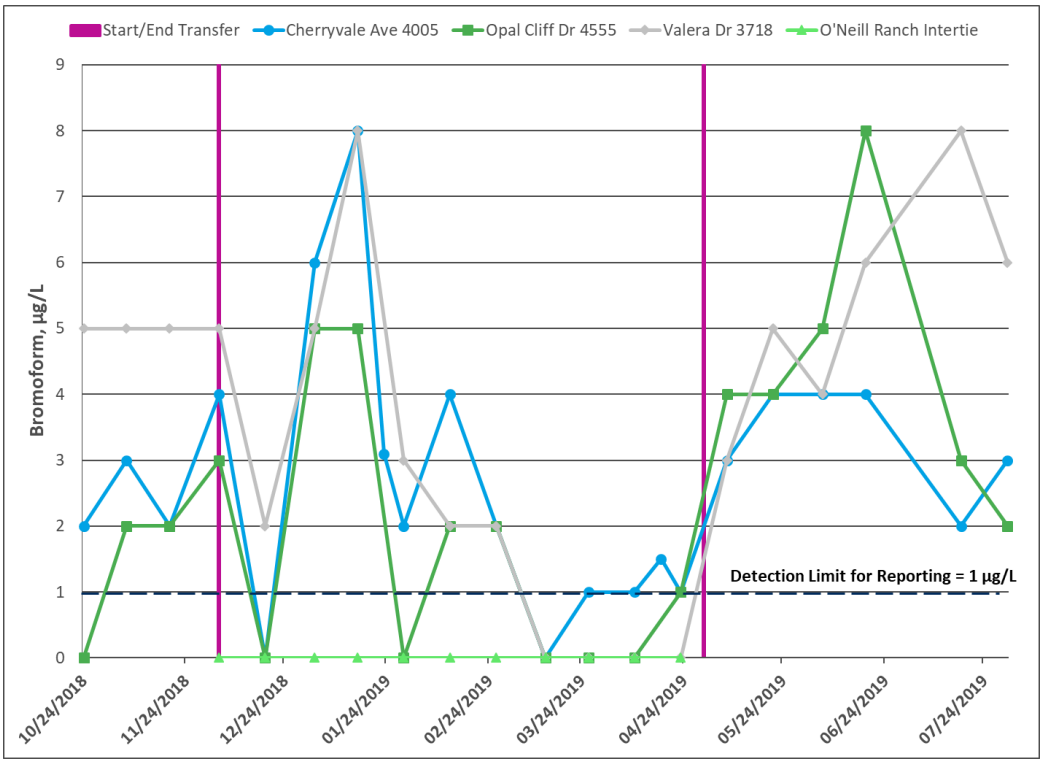

Figure 28 Bromoform from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

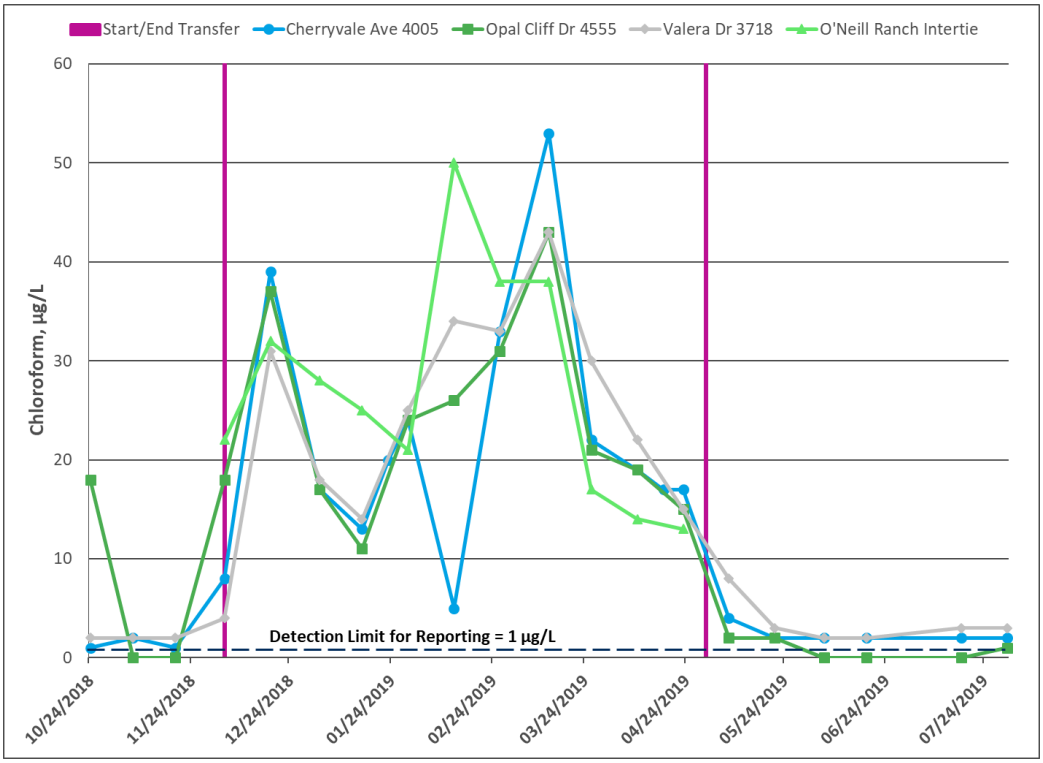

Figure 29 Chloroform from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

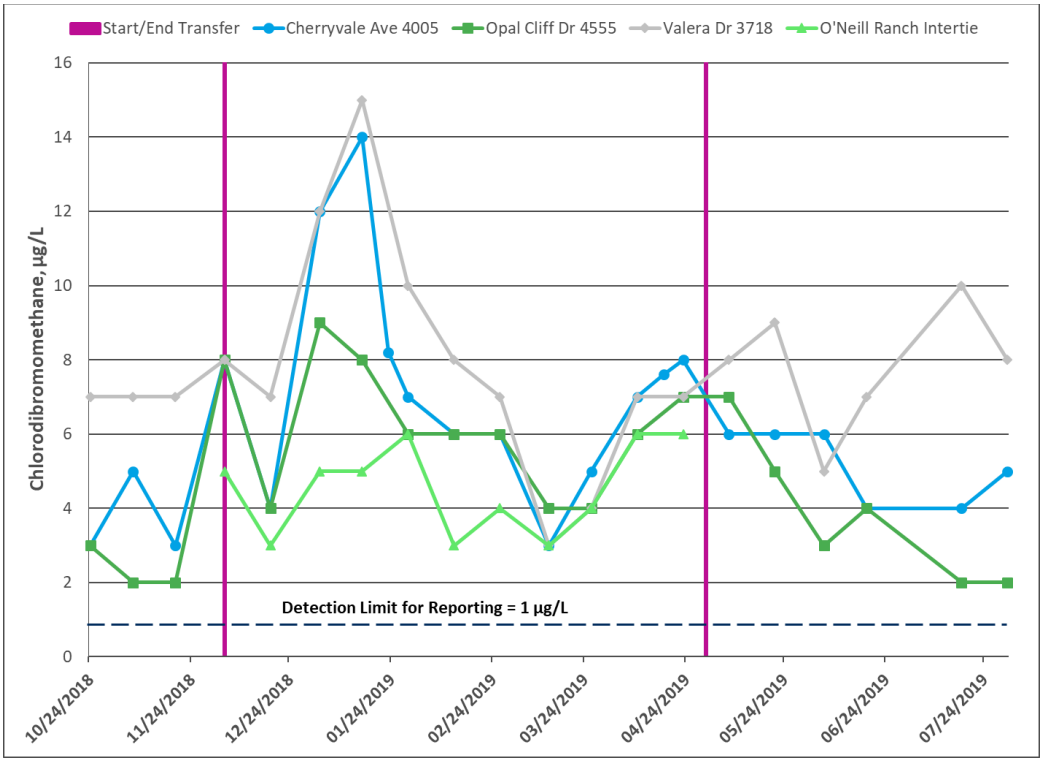

Figure 30 Chlorodibromomethane from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

The following five graphs detail the breakdown of the five constituents included in haloacetic acids 5 for compliance monitoring (i.e., dibromoacetic acid, dichloroacetic acid, monobromoacetic acid, monochloroacetic acid, and trichloroacetic acid).

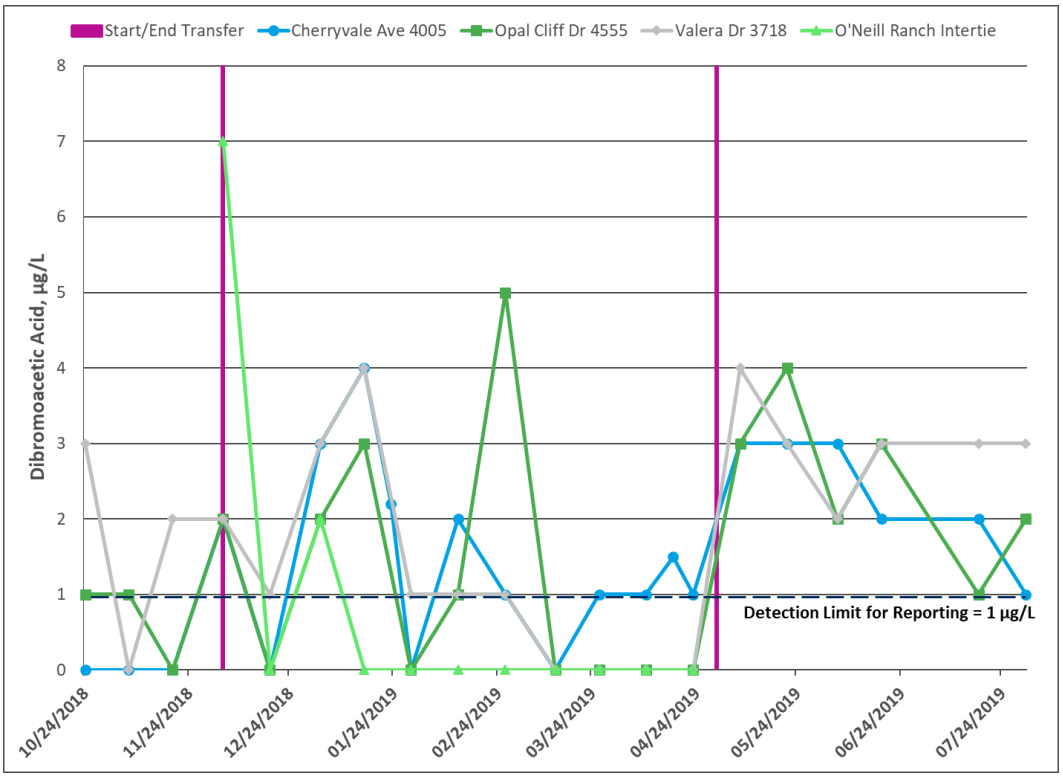

Figure 31 Dibromoacetic Acid from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

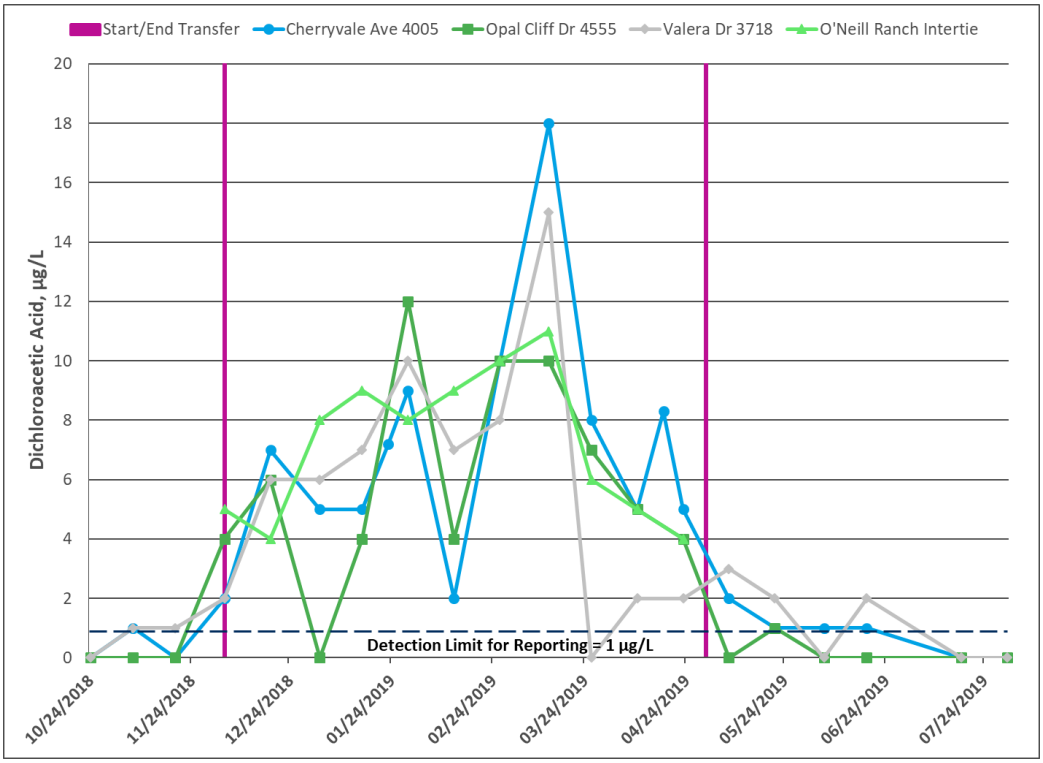

Figure 32 Dichloroacetic Acid from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

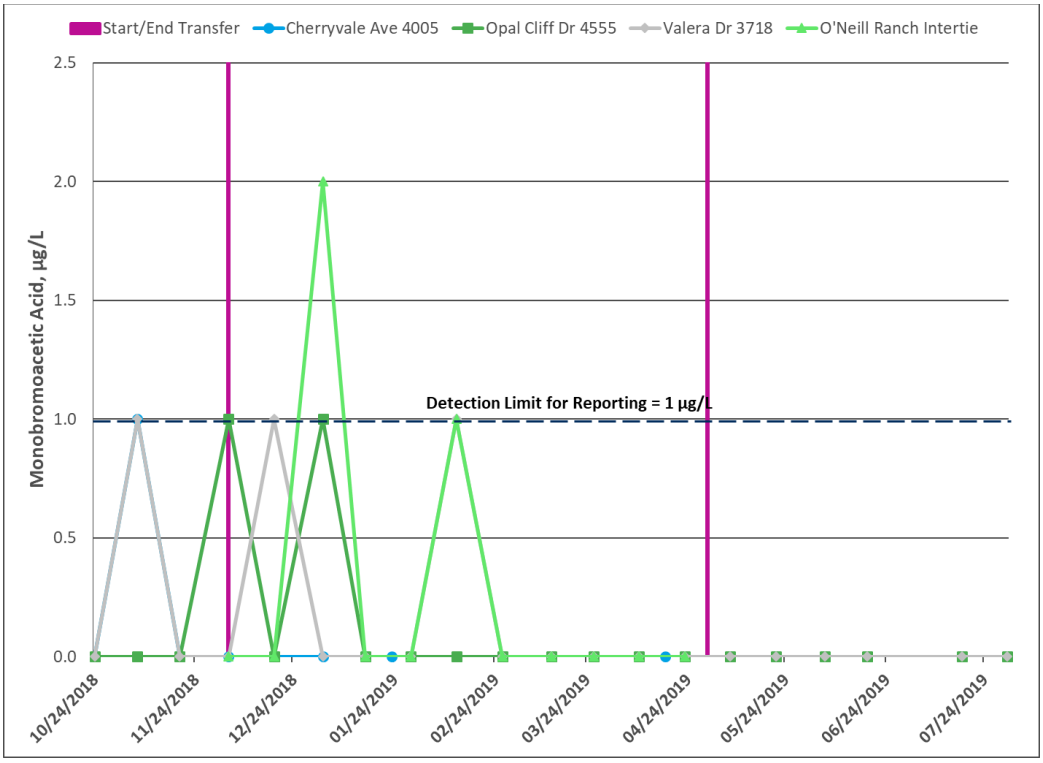

Figure 33 Monobromoacetic Acid from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

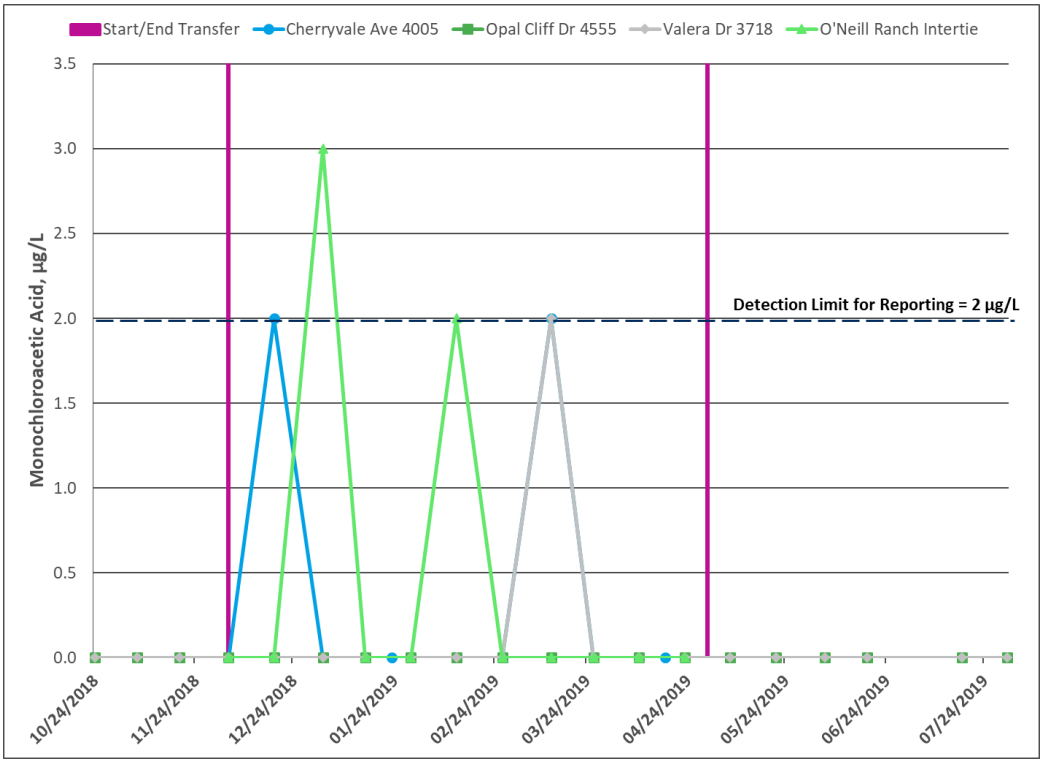

Figure 34 Monochloroacetic Acid from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

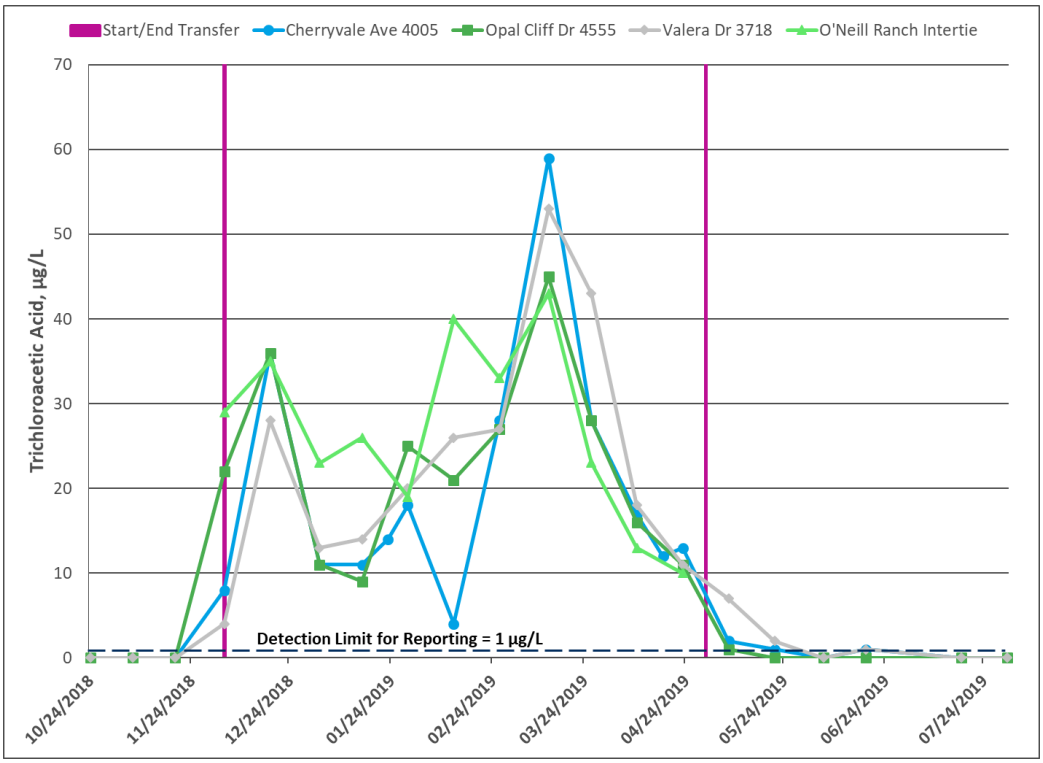

Figure 35 Trichloroacetic Acid from Phase I Zone Distribution System Sampling Stations and O'Neill Ranch Intertie

Status Update on Phase I Pilot Surface Water Purchase from the City of Santa Cruz Water Department

October 15, 2019

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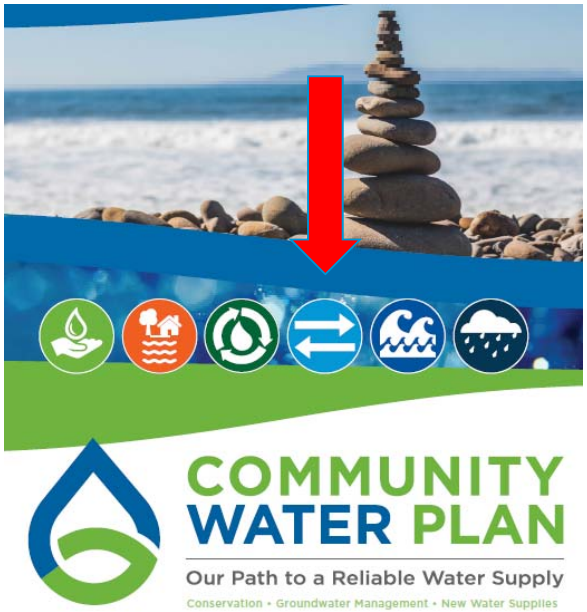
Community Water Plan (14 mo.+ effort)

- Maximizing Conservation
- Groundwater Management
- New Water Supplies
  - Water Reuse
  - River Water Transfers/Purchase
  - Desalination
  - Stormwater Capture



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District's Guiding Principles for River Water Purchase/ Transfer:

- Increase public education and outreach that the District is evaluating river water transfers for the two different options: The North Coast Option (short-term) and the San Lorenzo River Option (long-term) which the City of Santa Cruz is currently evaluating based on their water supply advisory committee efforts.

- Continue working with the City of Santa Cruz on the North Coast Option (5-year, short-term pilot project) to investigate and resolve potential issues related to water quality and blending of groundwater and river water within the District's system. Amend the District's Domestic Water Supply permit from the Division of Drinking Water to add the City of Santa Cruz's surface water as a supply source.

- Ready to receive City water by November 1st.

- Continue working with the City to better understand the benefits, issues, and constraints of the City's long-term San Lorenzo River Option that includes in-lieu recharge with dry-summer groundwater returns and aquifer storage and recovery.

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Cooperative Water Transfer Pilot Project Agreement (excerpt)

for Groundwater Recharge and Water Resource Management
(August 1, 2016-December 31, 2020)

G. Purchasing and using this treated surface water to meet some part of the DISTRICT's demand would enable the DISTRICT to reduce its groundwater pumping, reduce the potential for accelerating seawater intrusion, and contribute to the beginnings of a longer term process to ameliorate the overdraft condition of the groundwater basin that impacts both entities and other pumpers of groundwater from the Soquel-Aptos basin.

H. The period during which this agreement operates can be viewed as an opportunity to begin to assess the effects of reduced pumping of the basin by the DISTRICT on the shared groundwater basin. During this pilot project, the CITY and the DISTRICT intend to use this opportunity to collect information related to:

1) the physical operating system issues;
2) system water quality;
3) response of groundwater levels from in-lieu recharge; and
4) the potential opportunity of developing a longer term agreement in which the groundwater basin would be used for a combined in lieu and aquifer storage and recovery program that would help resolve the basin overdraft that would protect CITY and DISTRICT wells from addition seawater intrusion and provide needed drought storage for the CITY.

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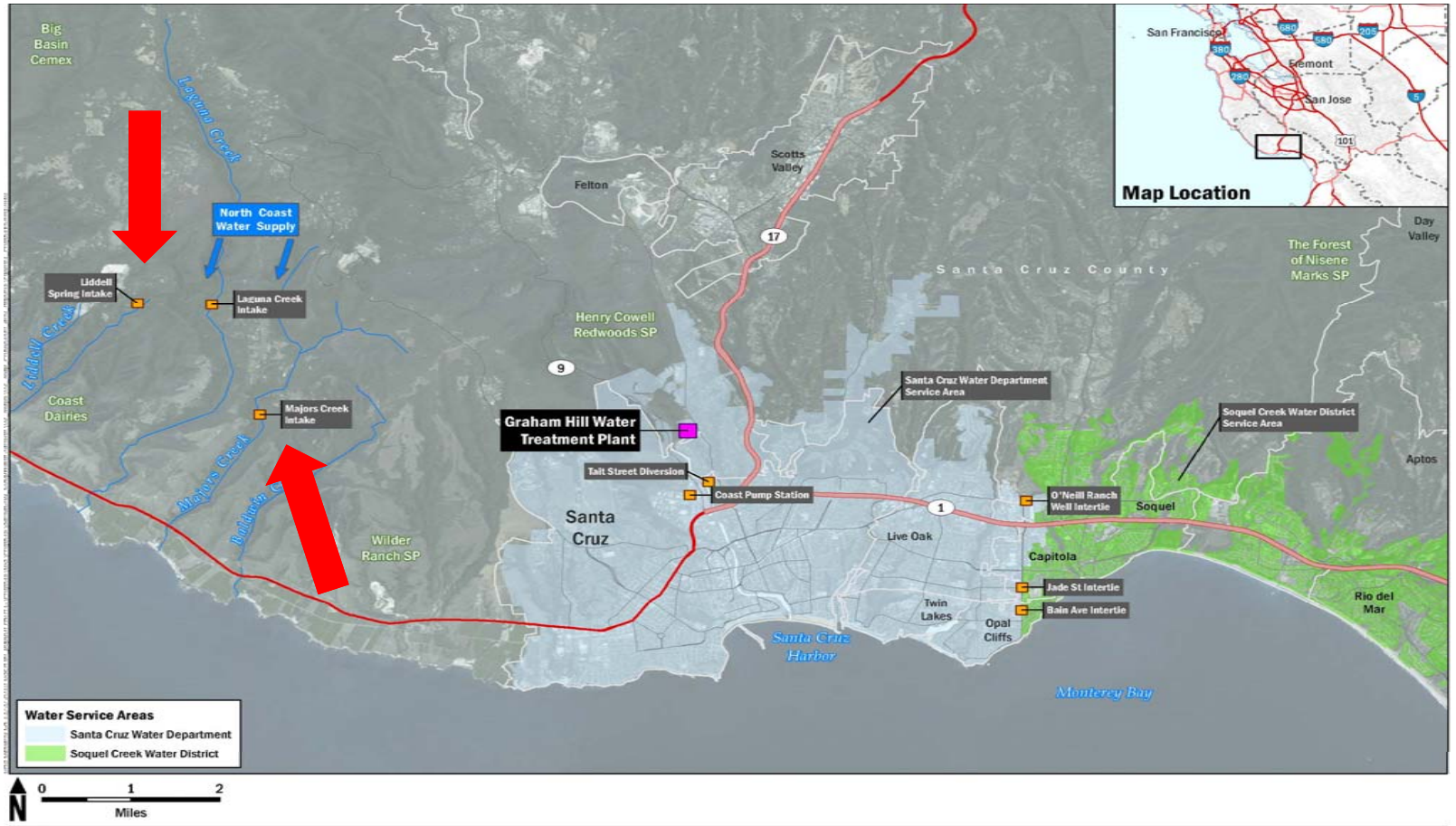
City's North Coast Sources



AECOM
Cooperative Water Transfer,
Purchase and Resource Management Pilot Project

FIGURE 1
Regional and Project Vicinity Map

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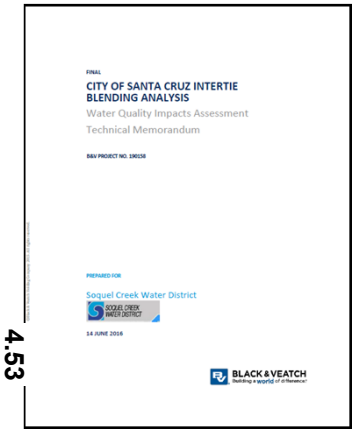
Work completed and underway



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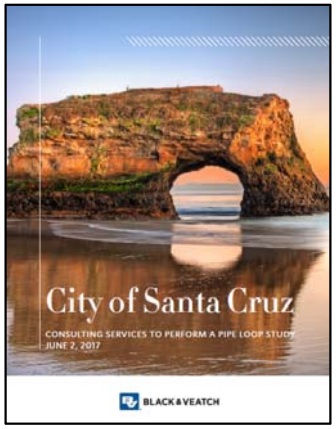
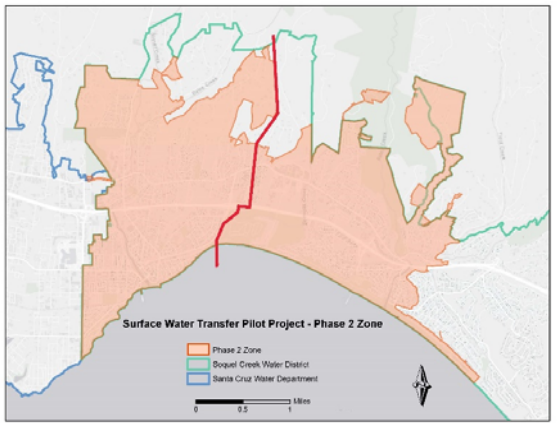
Desktop Intertie Blending Analysis
June 14, 2016

CEQA Analysis
January 2016



Bench scale and Jar Testing
September 2016-June 2018

Phase I Pilot Water Transfer
165 AF
2,300 customers
December 4, 2018-April 30, 2019
(Included WQ monitoring October 2018-July 2019)



Phase II Pilot Water Transfer
November 1, 2019-April 30, 2020
SA 1 Winter Demand:
500 AF
SA 1 & 2 Winter Demand:
800 AF

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Phase I Pilot Water Transfer Results

Emily Tummons, PhD, PE

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Agenda

- Background Refresher
- Phase I Pilot Water Transfer
  - Plan
  - Water Volumes
  - Results
  - Conclusions
- Next Steps – Phase II Water Transfer

Background Refresher

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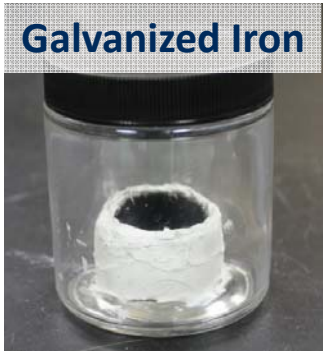
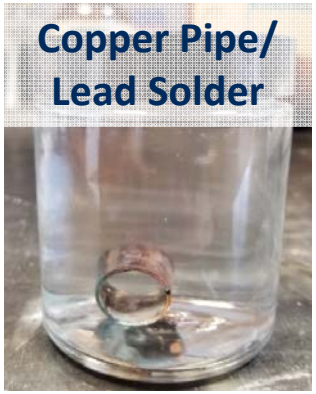
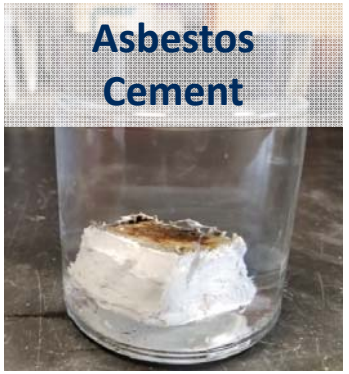
Previous Projects – How We Got Here

- Desktop water quality analysis ✓
- Hydraulic modeling ✓
- Bench-scale corrosion testing ✓
  - Harvested materials
  - Scale analysis
- Pipe-loop testing – not necessary







Results indicated that no water chemistry adjustments were necessary and switching seasonally from City to District water would not have a significant impact on water quality.

Phase I
Pilot Water Transfer

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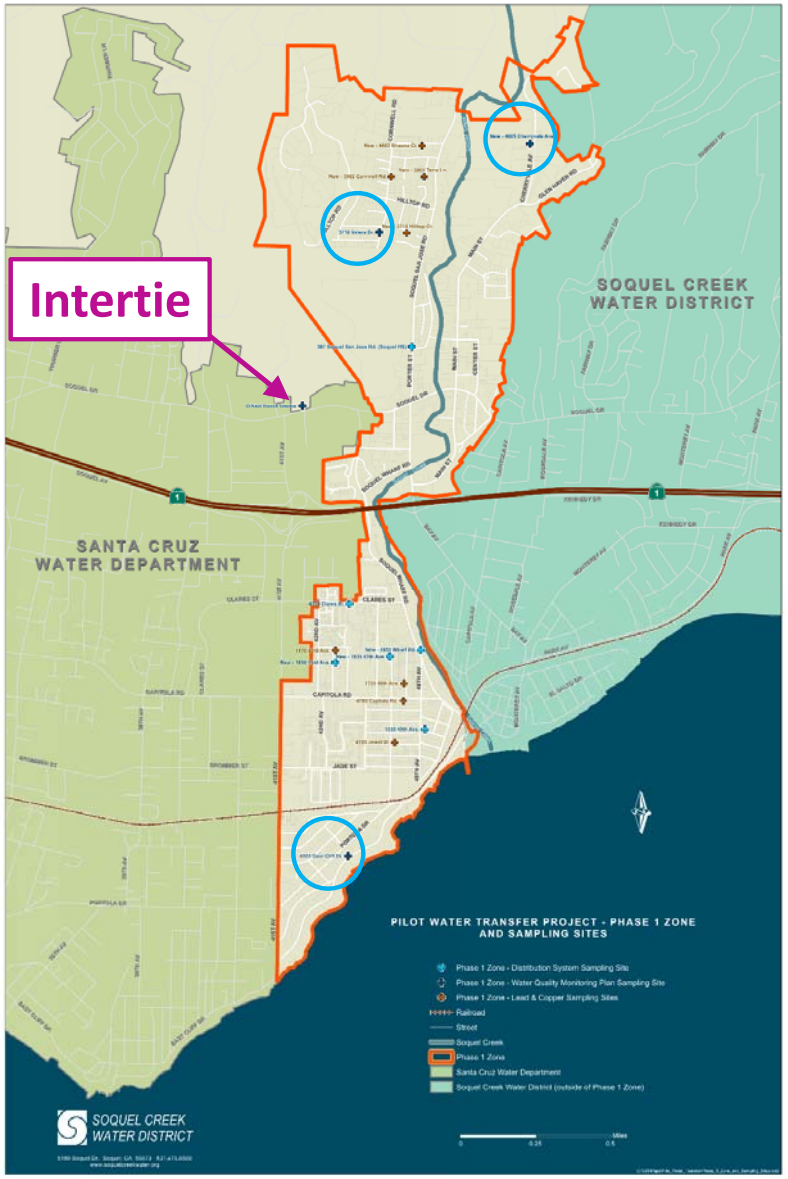
Phase I Pilot Water Transfer

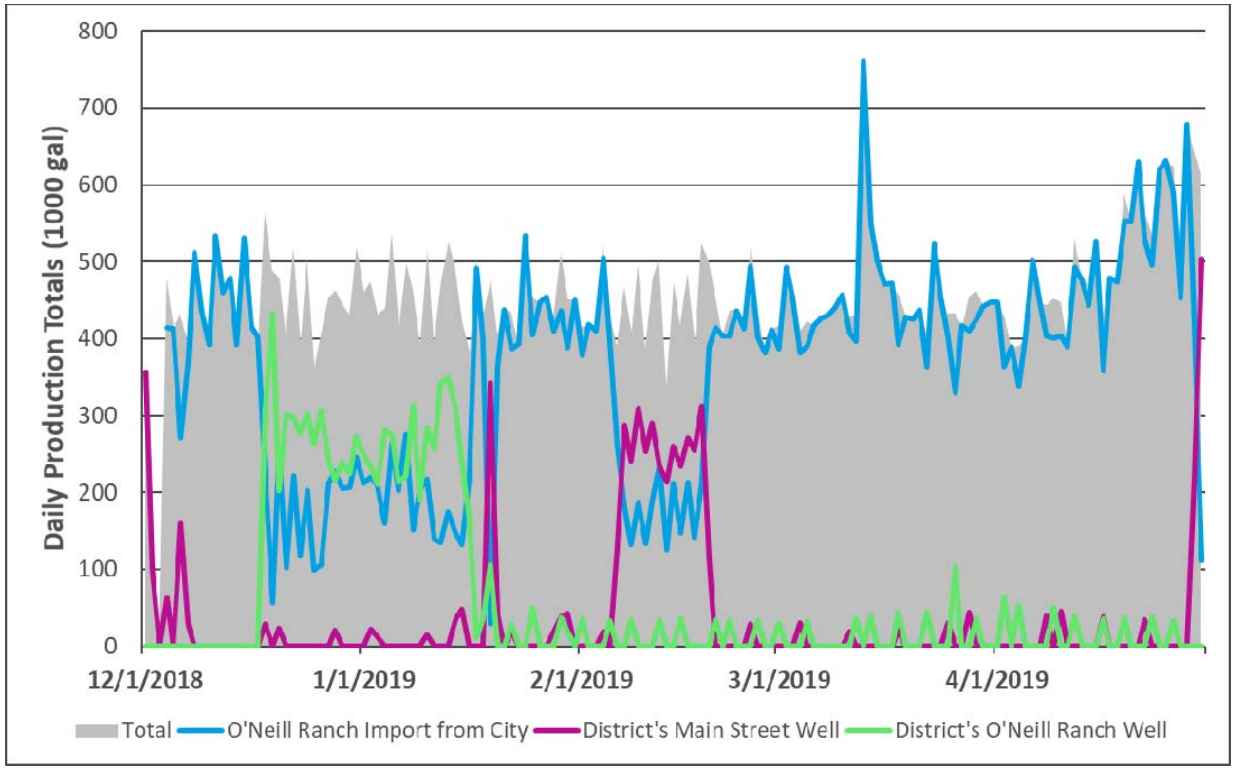
- Isolated Phase I Zone in Service Area 1
- Monitoring Plan
  - Pre-transfer – 10/24/18
  - During transfer – 12/4/18
  - Post-transfer – 5/1/19
- 3 water quality monitoring sites + intertie
  - 38 parameters measured
- 8 lead and copper tap sample sites



Water Production Volumes During Transfer

- Avg. usage = 450,000 gal/day
- City's excess supply fluxes based on operational constraints
- Supplemental water from District wells to meet demands
- Total water volume transferred from City = 53.9 MG (165 AF)

MG= million gallons



City's treated water is mix of multiple sources – water quality varies based on sources

Results – Total Organic Carbon (TOC)

- City's water has higher TOC
- ↑TOC = ↑Disinfection Byproduct (DBP) Formation Potential
- Cherryvale is most isolated sample site

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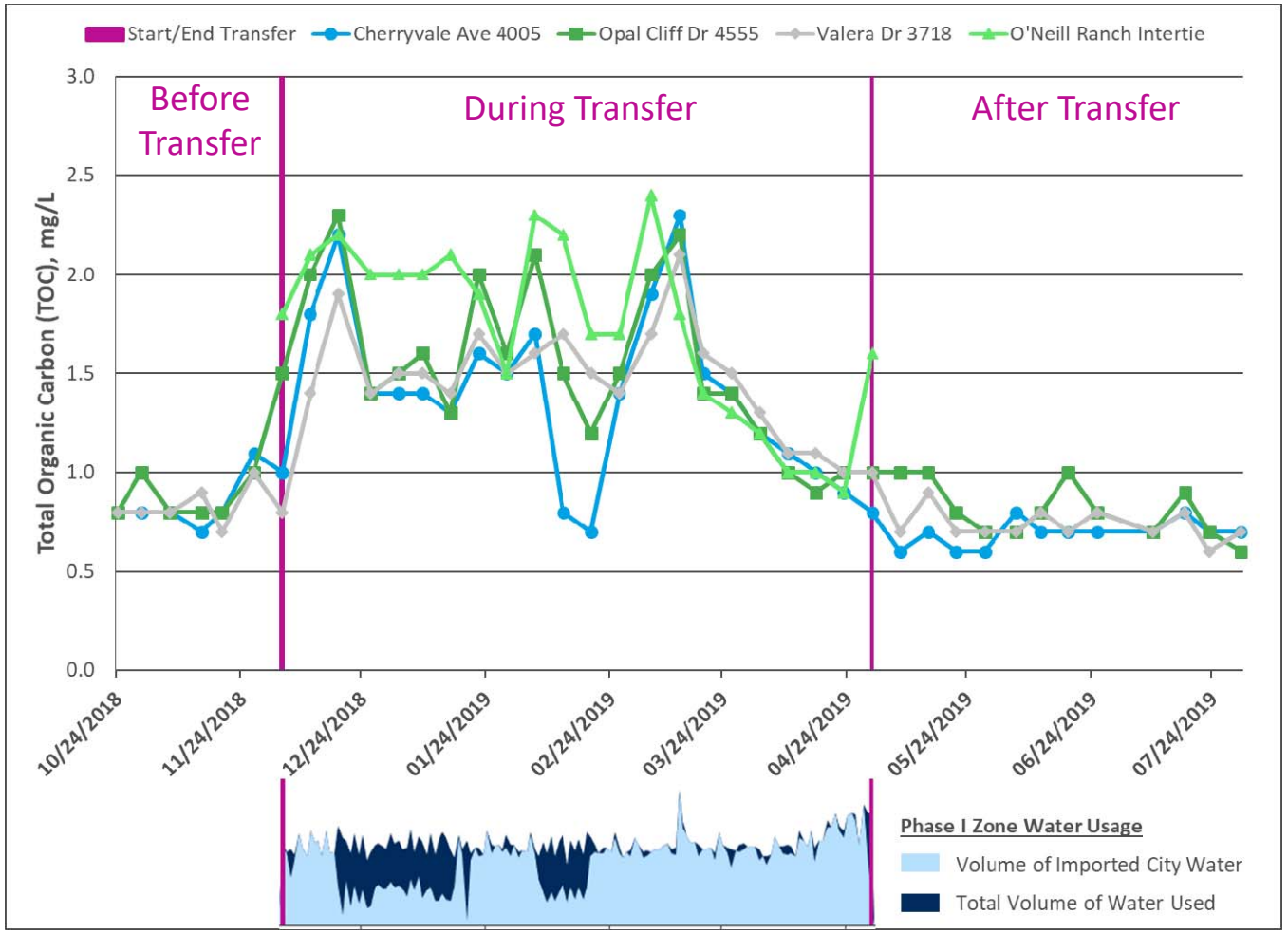
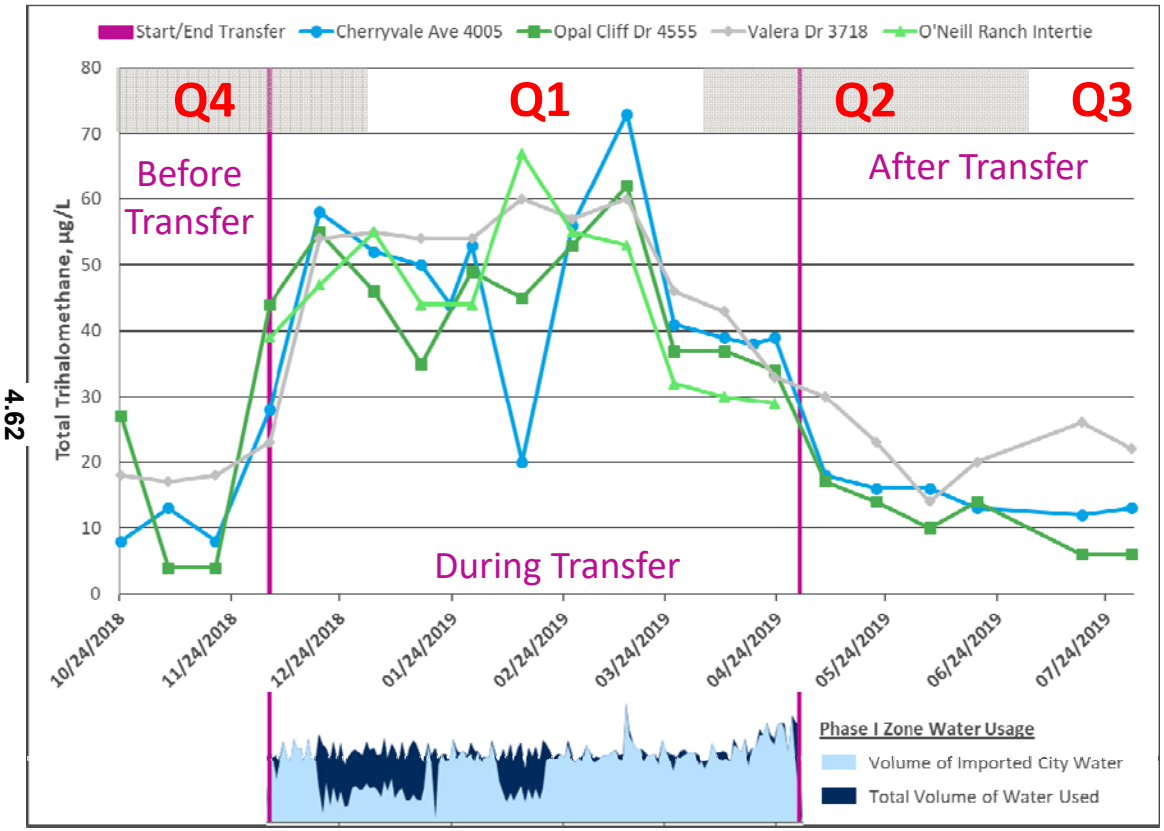


Disinfection Byproducts – Total Trihalomethanes (TTHM's)



- Maximum Contaminant Level (MCL) is based on locational running annual average (LRAA)
- Seasonal water transfer is key as City water forms more TTHMs

SAMPLE LOCATION	CONSERVATIVE TTHM LRAA (µg/L)	TTHM LRAA MCL (µg/L)
Cherryvale Ave 4005	46	80
Opal Cliff Dr 4555	40	
Valera Dr 3718	46	
O'Neill Ranch Intertie	-	

Estimated worse-case TTHM LRAA values were about half of the MCL in Phase I Zone

(LRAA)=locational running annual average

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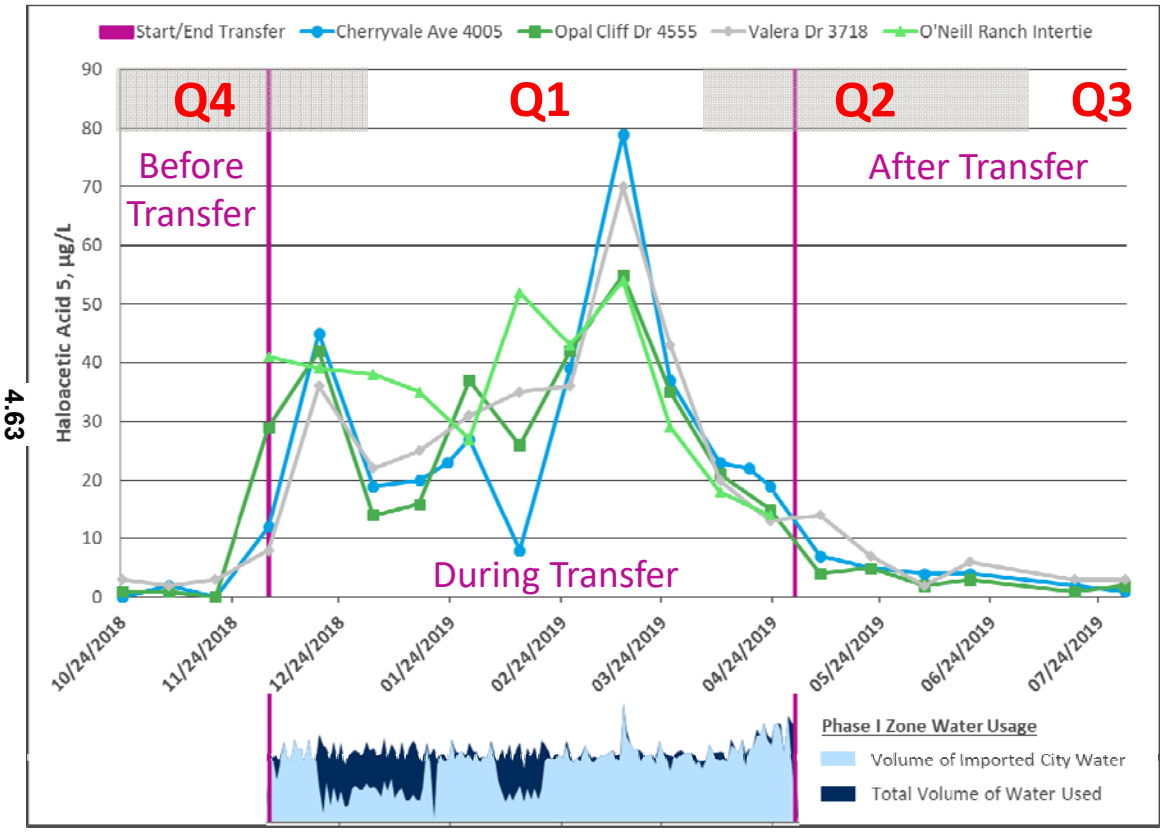
Disinfection Byproducts – Haloacetic Acids (HAA5's)



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- Spike on 3/13/19 – City main break forced treatment of higher TOC sources
- Seasonal water transfer is key as City water forms more HAA5

SAMPLE LOCATION	CONSERVATIVE HAA5 LRAA (µg/L)	HAA5 LRAA MCL (µg/L)
Cherryvale Ave 4005	37	60
Opal Cliff Dr 4555	30	
Valera Dr 3718	32	
O'Neill Ranch Intertie	-	

Estimated worse-case HAA5 LRAA values were about half of the MCL in Phase I Zone

(LRAA)=locational running annual average

Lead and Copper Tap Samples

- All lead and copper tap samples were **below the action level***
- Copper levels decreased after the water transfer
- All but one lead sample were **below detection limits**

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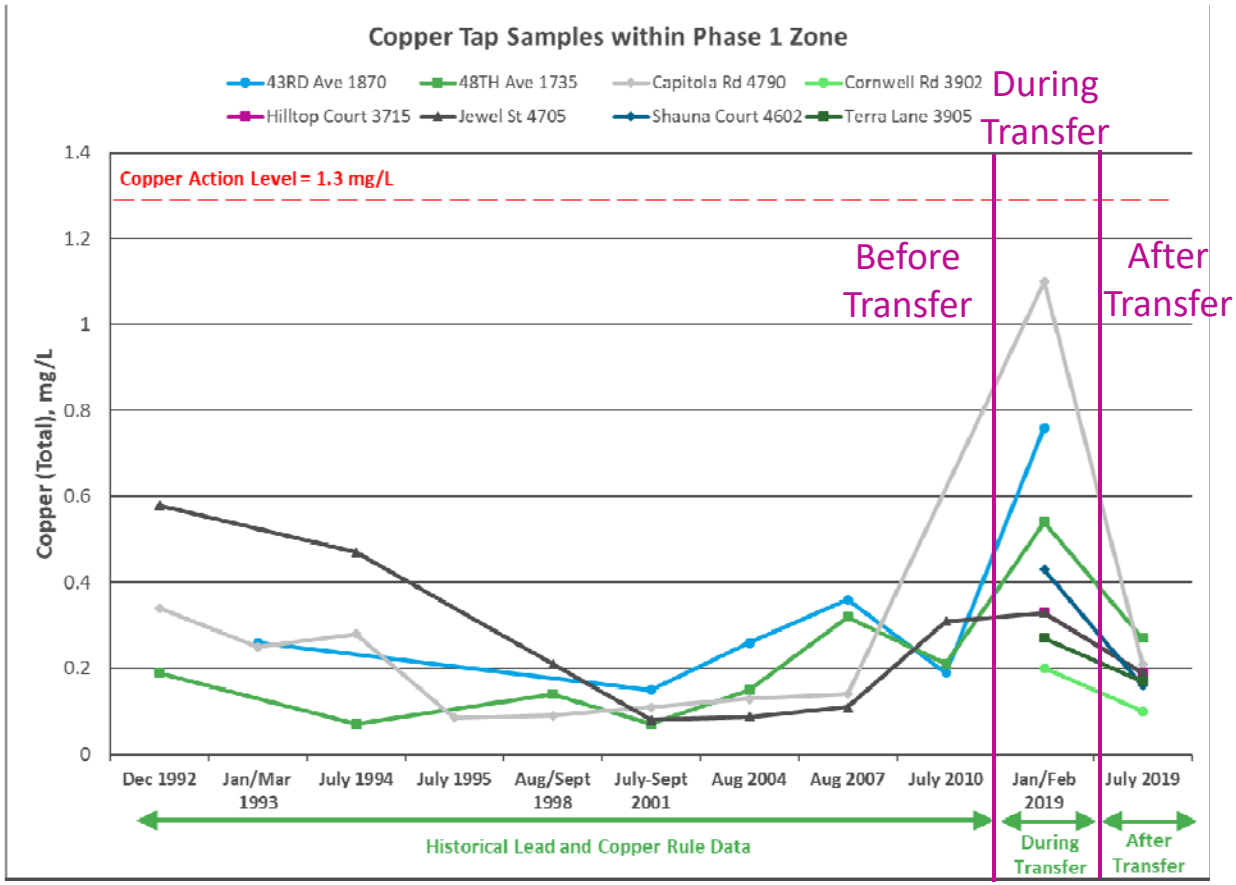

***The action level (AL) is the concentration of a contaminant which, if exceeded, triggers treatment or other requirements which the District must follow.**

Notable Distribution System Sampling Results

- Analytes below detection limit for reporting for all samples:
  - Antimony
  - Arsenic
  - Barium
  - Beryllium
  - Chromium
  - Copper
  - Iron
  - Lead
  - Manganese
  - Mercury
  - Nickel
  - Selenium
  - Silver
  - Thallium
  - Vanadium

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- Avg. turbidity 0.1-0.2 NTU (Nephelometric Turbidity Unit)
- Three customer complaints
  - Quickly resolved with flushing
- One short-term spike in Heterotropic Plate Count (HPCs)
  - Returned to non-detect levels
- No sudden changes in pH
  - Decrease after transfer in July

Water Quality Conclusions from Pilot Test Phase I

- Successful water transfer based on water quality results
- Validated bench-scale testing
- City's excess water volume is based on operational constraints and demands
- Water quality can change based on proportion of City's sources treated

- Estimated LRAA with highest quarter values were about half of MCLs for TTHMs and HAA5
  - Seasonality of water transfer and District's low DBPs are critical
- Lead and copper tap samples were below action levels
- Non-detect Pb, Cu, Fe and Mn in distribution system

Supports plan to continue with Phase II of the Water Transfer in Nov. 2019

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Next Steps – Phase II Water Transfer

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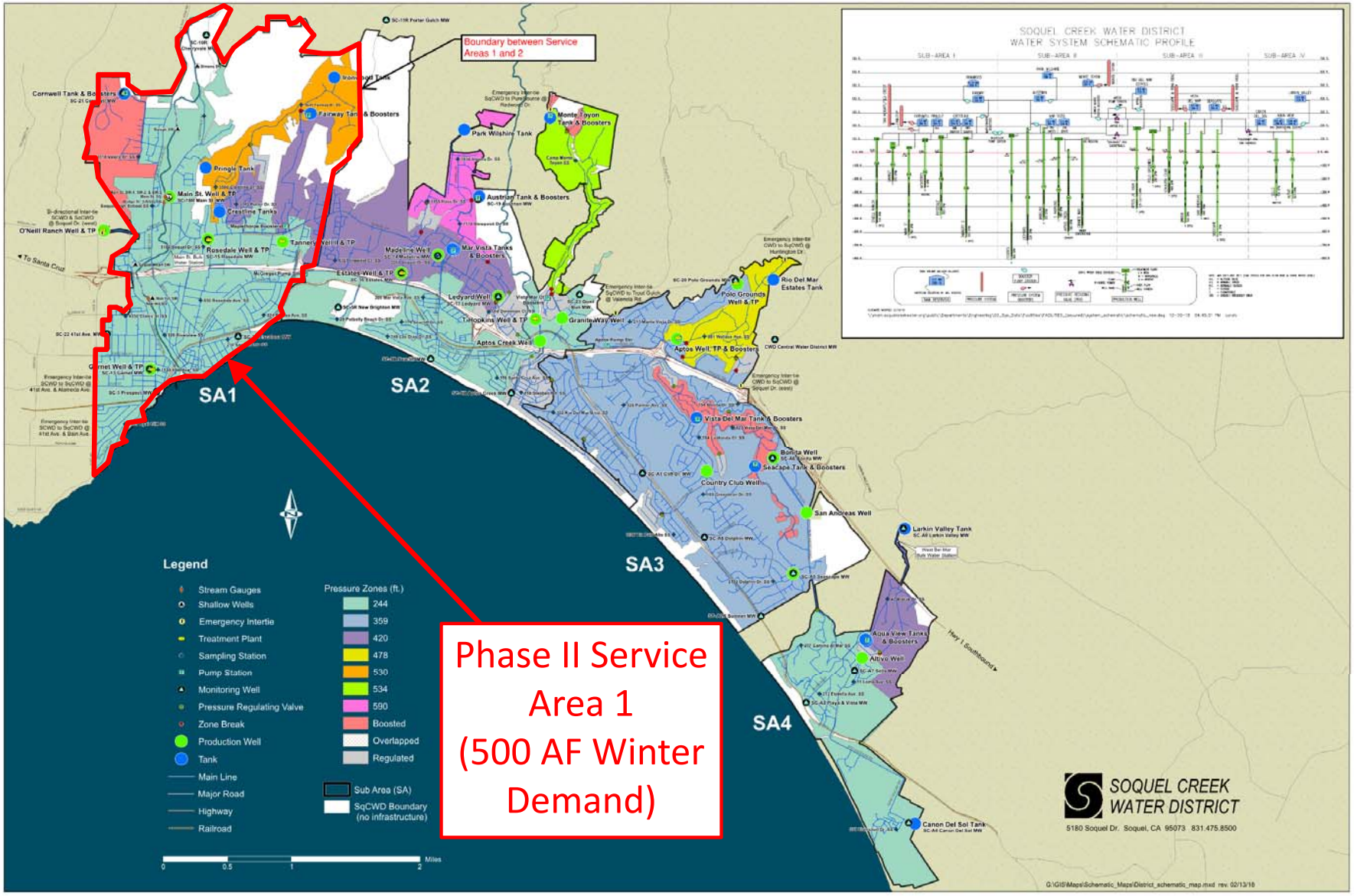
Boundary between Service Areas 1 and 2
SA1
SA2
SA3
SA4
Phase II Service Area 1 (500 AF Winter Demand)
SOQUEL CREEK WATER DISTRICT
WATER SYSTEM SCHEMATIC PROFILE
Legend
Stream Gauges
Shallow Wells
Emergency Intertie
Treatment Plant
Sampling Station
Pump Station
Monitoring Well
Pressure Regulating Valve
Zone Break
Production Well
Tank
Main Line
Major Road
Highway
Railroad
Pressure Zones (ft.)
244
359
420
478
530
534
590
Boosted
Overlapped
Regulated
Sub Area (SA)
SqCWD Boundary (no infrastructure)
SOQUEL CREEK WATER DISTRICT
5180 Soquel Dr. Soquel, CA 95073 831.475.8500

Phase II – Distribution System Monitoring

- Monitor water quality parameters:
  - Pre-transfer – create the baseline
  - During transfer
  - Post-transfer
- Modify monitored parameters based on extensive list of non-detect analytes

- Monitoring Locations (selected with input from DDW):
  - 3 new sampling stations in Service Area 1 + intertie
  - Disinfection byproduct sample sites

4.69

Increase imported water volume based on City's supply (current plan 98 MG or 300 AF)

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Things to Plan for Beyond Water Quality:

- Water Supply Reliability
- Water Quantity
- Temporary Pilot Project Water Cost
- Hydraulics
- Well Operation and Interference
- Electrical Costs

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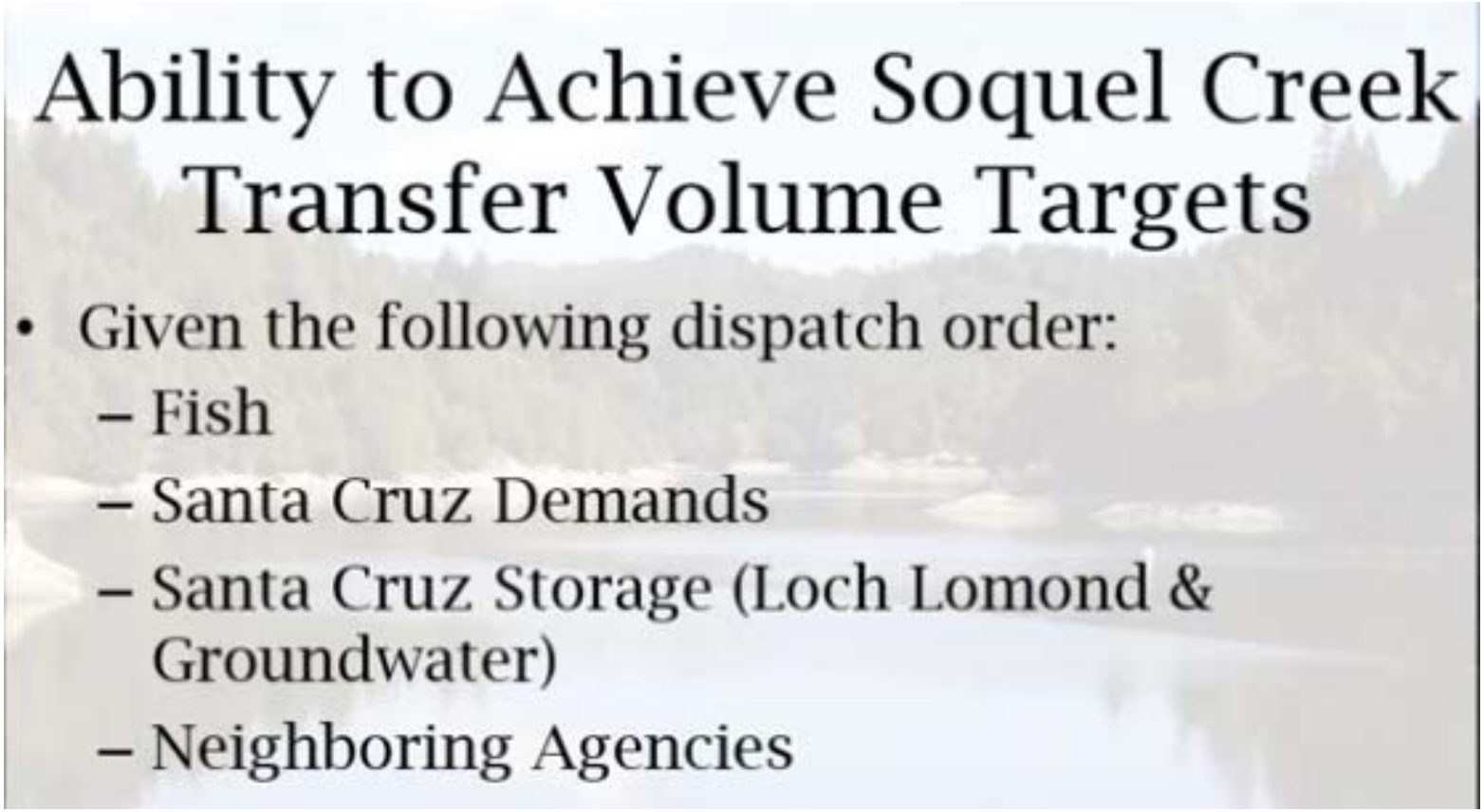
Water Reliability and Quantity



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Water Reliability and Quantity Con't

Both agencies optimistically working to maximize what is available and view water transfers as a very important component of a diversified water supply portfolio.

"… in no case can the city consistently provide that amount of water (1,500 AFY) to Soquel Creek Water. It's just not there once all the other priorities to meet the City's own needs have been met." Gary Fiske, 4-1-19

Be thankful for what we have available.

Ability to Achieve Soquel Creek Transfer Volume Targets

FLOWS	DEMAND	FRACTIONS OF WATER YRS ACHIEVING VOLUME TARGETS					
		Current GHWTP			Improved GHWTP		
		Annual 1500 AF	Off-Pk 500 AF	Off-Pk 300 AF	Annual 1500 AF	Off-Pk 500 AF	Off-Pk 300 AF
Historical	3.2 bg	0%	15%	60%	15%	70%	90%
	2016-18 2.[illegible] bg	30%	95%	98%	45%	96%	99%
GFDL CC	3.2 bg	0%	2%	3%	15%	85%	100%
	2016-18 2.[illegible] bg	10%	98%	100%	55%	100%	100%
CMIP5 CC	3.2 bg	15%	45%	55%	40%	55%	80%
	2016-18 2.[illegible] bg	45%	95%	100%	55%	99%	100%
Catalog CC	3.2 bg	N/A	N/A	N/A	N/A	N/A	N/A
	2016-18 2.[illegible] bg	0%	5%	20%	20%	80%	85%

Water Reliability and Quantity Con't

- North Coast Pipeline is backbone for source water
- Current supply is conveyed through Coast Pump Station, vulnerable to flooding.
- City pursuing EIR and change petition to State amending place of use for San Lorenzo River water right. Pilot transfer to District must consider North Coast streams.
- City considering upgrades to Graham Hill Water Treatment Plant to increase ability to treat turbid water
- District wells are ready as needed
- Flow rate varies depending on pressure difference- reliably met 1,000 gpm
- Amount of water driven by winter demand of District customers

Pilot Cost of Water

- Temporary pricing subject to increase after Pilot Project
- Proposition 218 and Proposition 26 prohibit subsidizing certain customers with rates from other customers
- Sustainable Groundwater Management Act (SGMA) does NOT allow water agencies the ability to forego Proposition 218 to sell wholesale water to the District, particularly if it results in other retail customers paying more than their cost of service

4.75

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Lessons and Observations

- Flow rate varies depending on pressure differential
  - Daily average flow: 1,032 gallons per minute (gpm)
  - Range: 800gpm-1,400gpm

- O'Neill Ranch Well Ammonia challenges

- Increased electric rate: price per kWh ~700% at Main St and 250% at Garnet; no increase at O'Neill

Next Steps

- Water supply permit amendment pending from State Water Resources Control Board Division of Drinking Water
- 10,000+ physical addresses notified with an additional ~5,000 property owners
- November 1, 2019 start date for Phase II pilot study
- Pre-transfer sampling underway
- Expect to transfer 300 AF this coming winter if supply is available

Summary

- Quantity: City can't solve entire shortfall (1,500 AFY) reliably. District and City recognize benefits of a diversified portfolio of water supplies, thus continue to work together to maximize available surface water sources

- Price: Existing low pilot study price of $1,000/MG ($326/AF) will be recalculated upon pilot study completion

- Pilot Study: Initial water quality results look favorable (with respect to corrosion) and existing system hydraulics appear to support the transfer. Monitor for increased disinfection by-products due to increased water age

*MG=million gallons, MGD= million gallons/day, AF= acre-ft (326, 851 gallons)

TECHNICAL MEMORANDUM
Pueblo Water Resources, Inc.
4478 Market St., Suite 705
Ventura, CA 93003
Tel: 805.644.0470
Fax: 805.644.0480

To:	Santa Cruz Water Department	Date:	October 18, 2019
Attention:	Isidro Rivera, P.E. Associate Civil Engineer	Project No:	15-0111
Copy to:			
From:	Robert C. Marks, P.G., C.Hg. Principal Hydrogeologist		
Subject:	Santa Cruz ASR Project – Phase 1 Feasibility Investigation; Task 1.4 - ASR Pilot Test Work Plan for Beltz 8 **DRAFT**		

INTRODUCTION

Presented in this TM is a detailed Work Plan for implementing an Aquifer Storage and Recovery (ASR) pilot test program at the Santa Cruz Water Department (SCWD) Beltz 8 well. Beltz 8 is located in the Santa Cruz Mid-County Groundwater Basin (MCGB) and is screened in the so-called A Unit of the Purisima Aquifer system. The location of the subject well is shown on **Figure 1** and an As-Built Schematic of the well is shown on **Figure 2**. The overall purpose of the Work Plan is to develop and present the information required to scope, budget, permit and implement an ASR pilot test program at Beltz 8. The Work Plan consists of the following main sections:

- Permitting Requirements
- Site Preparation Details
- ASR Pilot Test Program
- Sampling and Analysis Plan
- Preliminary Project Schedule

BACKGROUND

The SCWD is investigating the feasibility of an (ASR) project to meet projected shortfalls in City water supplies during extended droughts. The project would involve the diversion of "excess"[1] winter and spring flows from the San Lorenzo River (SLR) via the Tait Street and/or Felton Diversion facilities, which would be 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 Santa Cruz Mid-County Groundwater Basin (MCGB) and/or the Santa Margarita Groundwater Basin (SMGB) for injection, storage and later recovery when needed.

[1] "Excess" flows are those flows that exceed SCWD demands and in-stream flow requirements and are within City water rights.

The SCWD's ASR Project is being implemented in phases, as follows:

- Phase 1 – Technical Feasibility Investigation
- Phase 2 – ASR Pilot Testing
- Phase 3 – Permanent Project Design, Permitting, and Implementation

The Phase 1 Technical Feasibility Investigation is near completion (groundwater modeling is ongoing) and Phase 2 ASR Pilot Testing has been successfully implemented at the existing Beltz 12 well (the test program was completed in July 2019). Based on the favorable results of both the Phase 1 Technical Feasibility Investigation and Phase 2 ASR Pilot Testing at Beltz 12, the SCWD desires to further advance the Phase 2 ASR Pilot Testing program to the existing Beltz 8 well.

The overall objective of the Phase 2 pilot testing is to field verify the findings developed from Phase 1 and empirically determine specific hydrogeologic and water quality factors that will allow a technical and economic viability assessment of ASR technology at the Beltz 8 well. If feasible, the data gathered may also be used to complete CEQA documentation for a full scale or permanent ASR project and provide design basis information for the permanent project.

PURPOSE

The primary purpose of the Beltz 8 ASR Pilot Test is to field demonstrate the potential application of ASR in the A Unit of the Purisima Aquifer system in the MCGB. The data will be used to assess both the economic and logistical viability of ASR and will provide the basis for the design, environmental planning, and permitting for a long-term full-scale ASR project. Primary issues to be investigated in the ASR pilot test include the following:

- Determination of well efficiency and specific capacity and injectivity
- Evaluation of injection well plugging rates (both active and residual)
- Determination of optimal rates, frequency, and duration of backflushing to maintain injection capacity
- Determination of long-term sustainable injection rates
- Determination of local aquifer response to injection at Beltz 8
- Monitor ion exchange and redox reactions
- Evaluate water-quality changes during aquifer storage and recovery pumping
- Monitor Disinfection Byproducts (DBPs) Trihalomethanes (THM) and Haloacetic Acid (HAA) ingrowth and degradation during aquifer storage
- Monitor recovery efficiencies (with particular emphasis on manganese concentrations)

FINDINGS

PERMITTING REQUIREMENTS

The State Water Resources Control Board (SWRCB) has adopted general waste discharge requirements for ASR projects that inject drinking water into groundwater (Order No. 2012-0010-DWQ or ASR General Order). The ASR General Order provides a consistent statewide regulatory framework for authorizing both pilot ASR testing and permanent ASR projects, and the Beltz 8 ASR Pilot Test will be permitted under the ASR General Order. Oversight of these regulations is done through the Regional Water Quality Control Boards (RWQCBs) and obtaining coverage under the General ASR Order requires the preparation and submission of a Notice of Intent (NOI) application package to the local RWQCB. The NOI package for the Beltz 8 ASR pilot test program will be modeled on the NOI submitted to the Central Coast RWQCB for the Beltz 12 ASR pilot test, and include the following components:

- NOI application fee
- Complete Form 200 (RWQCB general information form for Waste Discharge Requirements or NPDES Permit)
- Technical Report
- US EPA Underground Injection Control registration
- CEQA compliance documentation

The main body of the NOI package consists of the Technical Report, which would be based largely on the findings developed from the Phase 1 Investigation, including the ASR pilot test Work Plan presented herein. The Beltz 8 well will need to be registered as a Class V Injection Well[2] with the US EPA Underground Injection Control (UIC) Program. This registration is a straight-forward process done via the EPA's on-line UIC Inventory Form.

In addition, the ASR General Order allows that a pilot test may be exempt from provisions of the California Environmental Quality Act (CEQA) under CEQA Guidelines Section 15306, which exempts basic data collection that does not result in a serious or major disturbance to an environmental resource. Accordingly, the City should plan to file a Notice of Categorical Exemption (CE) from CEQA for the ASR pilot test under CEQA Guidelines Section 15306 (including the drilling on an on-site monitoring well).

SITE PREPARATION DETAILS

The Beltz 8 well facility will need some preparatory work performed in order to maximize the potential for a successful the ASR pilot test program, including the following activities:

- Installation of a proximate monitoring well;
- Rehabilitation of the Beltz 8 well, and;

[2] A Class V well is used to inject non-hazardous fluids underground.

- Installation of various temporary site improvements at the Beltz 8 facility.

Each of these activities are described in further detail in the following sections.

Monitoring Well

A proximate monitoring well that is located within the radius of injected water predicted to surround the subject well (i.e., within the injection "bubble") during the ASR pilot test well and that is completed in the same aquifer zones as the pilot test well is needed for monitoring of both water-level responses and water-quality interactions during the ASR pilot test program. Such a monitoring is particularly important for the following investigative issues:

- Monitoring or ion exchange and redox reactions;
- Evaluation of water-quality changes during aquifer storage and recovery pumping, and;
- Monitoring of DBPs ingrowth and degradation during aquifer storage.

The existing monitoring well at the Beltz 8 facility is a converted former production well (Beltz 6); however, the screened interval of this existing monitoring well only partially penetrates the aquifer that is screened by Well 8 and, therefore, would not provide adequately representative data for the test program goals. Accordingly, a new monitoring well will need to be drilled at the site prior to initiating the ASR pilot test program and having the following key parameters:

- Located within 80 feet of Beltz 8 (i.e., within the planned radius of injected water influence);
- Completed to a total depth of approximately 190 feet with screens placed between depths of approximately 100 to 180 feet (i.e., matching the Well 8 screened interval);
- Constructed of 2-inch-diameter (minimum) Schedule 40 PVC casing and machine-cut horizontal slot screen;
- Sealed to a depth of approximately 80 feet, and;
- Completed in a grade-level traffic-rated monitoring well vault.

The proposed MW location is shown on **Figure 3** (note: the proposed MW location shown is approximate and may change slightly depending on logistical considerations at the time of drilling but is anticipated to be within 25 feet of the shown location).

Well Rehabilitation

Beltz 8 was drilled in 1998. Following its construction, a constant-rate pumping test was performed, and the well was pumped at a rate of approximately 1,200 gallons per minute and it

displayed a 24-hour specific capacity[3] of approximately 22.8 gpm per foot of drawdown (gpm/ft). It is our understanding that the well has not been rehabilitated since its construction, and the performance has declined significantly with the recent specific capacity at 9.8 gpm/ft[4]. This represents an approximate 60 percent decline in performance.

Performing an ASR pilot test at the well with its current performance would be limited in terms of the injection and extraction rates that could be achieved and would not be representative of the ASR capacity that the aquifer system at the site is capable of supporting; therefore, it is recommended that the well undergo formal rehabilitation to restore some of the lost performance and maximize the ASR capacity for the pilot test program. To be effective, the rehabilitation program should consist of both mechanical and chemical well rehabilitation techniques and consist of the following tasks:

1. Performance of pre-rehabilitation pumping test
2. Removal of the existing pump and appurtenances from the well
3. Pre-rehabilitation downhole video surveying
4. Nylon brushing the well screen
5. Bailing the well to bottom
6. Installation of temporary piping, valving and storage tanks to allow for solids settling and acid neutralization of the discharge water
7. Pre-chemical simultaneous air-lift pumping/zone swabbing of the well screen
8. Chemical treatment with combination of hydrochloric and glycolic acids
9. Periodic agitation by “dry” swabbing screen while chemicals remain in well for 48 hours
10. Post-chemical simultaneous air-lift pumping/zone swabbing of the well screen
11. Post-rehabilitation acceptance downhole video surveying
12. Installation of temporary pump and appurtenances (this pump will remain in the well for the ASR pilot test)
13. Well disinfection and flushing
14. Performance of post-rehabilitation pumping test

Project discharges would be routed to the nearest storm drain inlet and maintained in compliance with the existing Statewide NPDES Permit for Drinking Water System Discharges (Order WQ 2014-0194-DWQ, General Order No. CAG140001).

[3] Specific capacity is the ratio of discharge rate to drawdown, typically expressed in terms of gallons per minute per foot of drawdown (gpm/ft). The value is useful for tracking the performance of a given well over its service life and comparing performance between wells.

[4] Pueblo Water Resources, Inc., *Santa Cruz ASR Project – Phase 1 Feasibility Investigation, Task 1.2 Site-Specific Injection Capacity Analysis*, Technical Memorandum prepared for Santa Cruz Water Department, dated May 11, 2017.

It is noted that the Beltz 8 well has not been rehabilitated since its construction nearly 20 years ago and the performance has declined significantly (by approximately 60 percent). Formal well rehabilitation of municipal production wells is typically recommended to be performed every 5 years or when the performance (as measured by specific capacity) has declined by 25 percent from baseline, whichever occurs first. Given these conditions, it is unlikely that rehabilitation will be capable of restoring 100 percent of the lost performance and capacity at this stage of the well's service life. For planning purposes, therefore, it is assumed that rehabilitation will restore 50 percent of the lost capacity. This assumption has been utilized in estimating the injection and extraction capacities for the ASR pilot test program (discussed in a below section).

Site Improvements

Several temporary modifications will be necessary at the Beltz 8 site for implementation of the ASR pilot test, including the following:

- Removal of the existing 20 HP pump assembly and installation of a temporary 30 HP pump and injection drop tubes.
- Connection of temporary injection supply pipeline to the City's distribution system as the source of the injection water (injectate).
- Setup of backflush water and recovered test water pipelines
- Setup of connection to existing on-site reclaim tanks for backflush water solids settling and dichlorination prior to discharge to storm drain

A schematic of the preliminary piping plan is shown in **Figure 4**, which shows the locations of various valves, meters, sampling ports, pressure gauges, etc., in addition to the direction of flows during the recharge and pumping phases of the test program.

Based on the results of the revised site-specific injection capacity analysis for Beltz 8 incorporating an assumed improvement in well performance from well rehabilitation (as noted above), a nominal injection rate of **400 gpm** is recommended for planning purposes. For an injection rate of 400 gpm, a minimum backflush pumping capacity of 800 gpm will be required (i.e., twice the rate of injection) in order to limit well plugging during the test program (refer to the Task 1.2 – Site-Specific Injection Capacity Analysis TM for a discussion of backflushing requirements).

The existing 20 HP pump assembly in Beltz 8 is only rated for approximately 400 gpm @ 100 ft Total Dynamic Head (TDH). The test program will require a pump that is rated for 800 gpm @ 100 ft of TDH for backflushing of the well during the pilot test; therefore, a temporary pump assembly will need to be installed in Beltz 8 with the following general specifications:

1. Removal of the existing 20 HP pump assembly (and cleaned and inspected by the pump contractor).
2. Fabrication of special temporary wellhead seal plate.

3. Installation of temporary submersible pump (Grundfos 800S300-1 [30 HP], or approved equal) set to a depth of approximately 190 ft with a cooling shroud.
4. Installation of three (3) 2-in-dia Sch 40 PVC injection drop tubes. Injection drop tubes shall be F480 flush-threaded set to a depth approximately 80 ft. Special orifice caps for each tube will be provided by PWR for injection flow control.
5. Installation of two (2) 1-in-dia Sch 40 PVC water-level sounding tubes set to a depth of approximately 190 ft.

ASR PILOT TEST PROGRAM

ASR operations generally consist of three steps:

1. Injection of potable-quality drinking water into the aquifer;
2. Storage of the injected/recharged water within the aquifer, and;
3. Recovery of the stored water.

The ASR pilot test program for Beltz 8 presented herein is modeled on the program that was successfully implemented at Beltz 12 but modified for the Beltz 8 site-specific conditions. The structure of the ASR pilot test program includes numerous incremental steps of ASR operations to provide multiple checkpoints in the event that pilot operations deviate significantly from the predicted responses. The program will generally involve three repeated ASR cycles of operations and monitoring, each of larger volume and duration than the preceding cycle, so that if adverse conditions are encountered at any point, the program can be adjusted, if needed.

Summary of ASR Cycles

The ASR pilot test program generally consists of a 1-day hydraulic “pre-test” to establish injection system hydraulics, followed by three (3) repeated cycles of injection-storage-recovery, with each cycle of greater duration and volume. A robust dataset of aquifer response and water quality information will be developed, while minimizing the risk of adverse effects to the well or aquifer system. A summary of the planned ASR cycles is presented in **Table 1** below:

Table 1. Summary of ASR Cycles

ASR Cycle No.	Injection					Storage	Recovery				
	Period (days)	Rate (gpm)	Total Volume (mg)	Total Volume (af)	Radius (ft)	Period (days)	Period (days)	Rate (gpm)	Volume (mg)	Volume (af)	Discharge Location
1	1	400	0.58	1.77	18	2	1	700	1.01	3.09	Storm Drain
2	7	400	4.03	12.4	46	14	6	700	6.05	18.6	Storm Drain
3	30	400	17.3	53.0	96	60	30	400	17.3	53.0	Distribution

Total Active Duration (days): 151
Total Injection Volume (mg): 21.9
Total Recovery Volume (mg): 24.3

As shown, the amount of water injected during each ASR Cycle will vary from approximately 0.6 mg (1.8 af) to 17 mg (53 af), with aquifer storage periods ranging from 2 to 60 days before the water is recovered. Recovery volumes for Cycles 1 and 2 are approximately 150 percent of the previously injected water and will vary from approximately 1 mg (3.1 af) to 7 mg (22 af). The recovery volume for Cycle 3 will be the same as the injected volume (17 mg / 53 af) and will essentially mimic a permanent project typical ASR cycle.

Although no adverse reactions were predicted by the Task 1.3 Geochemical Interaction Analysis[5], it is planned to discharge recovered water during ASR Cycles 1 and 2 to the storm drain system to allow for the collection and analysis of water-quality data to ensure that no adverse reactions are occurring during aquifer storage that would affect the potability of recovered water. It is our understanding that the water-quality results from Cycles 1 and 2 will need to be provided to the local Department of Drinking Water (DDW) for their review and approval to pump Cycle 3 recovery flows into the SCWD distribution system.

Assuming no adverse reactions are observed during ASR Cycles 1 and 2, the temporary test pump and injection drop tubes will be removed from the well (following thorough backflushing of the well) and the permanent pump assembly reinstalled prior to the recovery period of Cycle 3, allowing the well to be operated under normal conditions (which includes manganese treatment prior to distribution). It is also noted that the recovery rate for ASR Cycle 3 is limited to 400 gpm (refer to **Table 1 above**), compared to 700 gpm (approximately 1 mgd) for Cycles 1 and 2. This is due to the capacity of the permanent pump and manganese treatment system at the Beltz 8 facility.

The primary test objectives for each ASR Cycle are summarized below:

ASR Cycle 1

- Establish short-term injection hydraulics
- Monitor short-term ion exchange reactions

[5] Assuming GHWTP water is maintained at pH of 7.6 or less to prevent calcite precipitation.

ASR Cycle 2

- Measure well plugging rates (active and residual)
- Evaluate backflushing efficacy
- Monitor longer-term ion exchange reactions
- Monitor redox reactions
- Evaluate water chemistry changes during storage
- Monitor recovery efficiency (the percentage of recharged water that is recovered during each cycle)
- Monitor DBPs during recovery
- Define volume of potential "buffer zone" around ASR well

ASR Cycle 3

- Evaluate longer-term well performance and plugging rates
- Monitor injected water quality stability during storage
- Monitor DBP ingrowth/degradation during storage
- Monitor recovered water for re-chlorination and DBP reformation
- Determine economic factors of permanent ASR operations

The total duration of the ASR pilot test program is anticipated to require approximately 6 months and is tentatively scheduled to begin in February 2019 (refer to the preliminary schedule presented in a following section).

Specific procedures for well injection and backflushing during the Beltz 8 ASR Pilot Test Program are outlined below:

Injection Procedures

1. Adjust valving to flush the potable system supply to the storm drain. Set de-chlorination equipment as needed.
2. Initiate system flow to storm drain to flush the distribution system of pipe scale/residue/particulates. Flushing rate should be at least 125 % of maximum ASR injection rate.
3. Perform Silt Density Index (SDI) test on flowing water stream. Record flush meter reading, time, and SDI value.
4. Repeat SDI test after 20-30 minutes. When two successive results of SDI < 3.0 are achieved, injection operations can be initiated.

5. Upon initiation of injection operations for the test program, perform a backflush 24 hours after commencement of injection to ensure material sloughed off system piping from flow reversals in the distribution system is backflushed out of the well.
6. Regularly monitor SDI. If SDI > 5.0, immediately stop injection operations, backflush the well, and flush the distribution system to waste until SDI < 3.0 is restored.

Backflushing Procedures

1. Record all meter readings and water levels.
2. Stop injection flow to well, being careful to avoid both water hammer to the distribution system (i.e., by closing valves to quickly) and prolonged negative pressure/cascading water conditions in the well as practical.
3. Record all meter readings and water levels.
4. Adjust valving to 'backflush position', routing well production to the on-site tanks.
5. Start well at backflush rate setpoint (800 gpm) and pump for 15 minutes. Measure and record Turbidity at 1, 2, 5, 10 and 15 minutes of elapsed pumping time. Observe visual water clarity and particulate content and note observations. Turn pump off, noting the minimum 'off-time' (restart delay) for the specific pump motor in service.
6. Repeat Step 5 a total of 3 times, or until the discharge water is visually clear and less than 10 NTU within 1 minute of pump start-up.
7. When static water level has stabilized (15-minute minimum), start pump and set flow to normal recovery rate (700 gpm for Cycles 1 and 2, and 400 gpm for Cycle 3). Record 10-minute pumping water level and flow rate, calculate and record 10-minute specific capacity.
8. Record all meter readings and water levels.
9. Adjust valving as needed to next ASR operation (e.g., return to injection, storage, or recovery mode).
10. Following sufficient storage period to allow for solids settling and de-chlorination to meet discharge requirements, drain clear water from tanks to storm drain and ready for next backflushing event.

SAMPLING AND ANALYSIS PLAN

During the Beltz 8 ASR Pilot Test Program, a variety of water-level and water-quality data are to be collected. Water levels in the aquifer system are to be monitored during all phases at the ASR pilot testing well (Beltz 8) as well as several existing, proximate monitoring wells owned by both SCWD and Soquel Creek Water District (SqCWD). In addition, periodic samples of the injected, stored, and recovered waters are to be collected from the Beltz 8 pilot test well and the to-be-constructed Beltz 8 monitoring well (discussed above) and analyzed for a variety of water-quality constituents. The purpose of the Sampling and Analysis Plan (SAP) described below is to identify the locations, sample collection frequency, and parameters to be monitored as part of the ASR pilot test project data collection program.

Project Wells

The Beltz 8 well facility is located in the western portion of the City's service area. Several proximate existing monitoring wells owned both by the SCWD and SqCWD will also be utilized as monitoring wells during the project. The locations of the project wells are shown on **Figure 5** and a summary of project well completion parameters are presented in **Table 2** below:

Groundwater Monitoring Equipment

The equipment required to perform the groundwater monitoring as prescribed in this SAP includes:

- Pressure Transducers/Data Loggers
- Electric Water-Level Sounder
- Sampling Pumps
- Field Water-Quality Monitoring Devices
- Flow-Thru Cell Device(s)
- Sample Containers
- Coolers and Ice

Beltz 8 will be equipped with a temporary 30 Hp electric submersible pump. Flow for all process streams will be measured using in-line rate and totalizing flow meters. Sampling ports on the well-head piping allow for the collection of grab samples during recharge and pumping operations. In addition, a submersible sampling pump (Grundfos Redi-Flo2) will be installed in the to-be-constructed on-site Beltz 8 monitoring well and utilized to collect periodic water-quality samples from the aquifer.

Field water-quality monitoring is to be performed using various instruments that allow for the field analysis of a variety of constituents, including but not limited to: chlorine residual, conductivity, dissolved oxygen, pH, temperature, redox/ORP, and Silt Density Index (SDI). The field water-quality monitoring devices are to be routinely calibrated as prescribed in the operating procedures manual for each device.

The pilot test well, as well as the monitoring wells listed in **Table 2**, will be instrumented with dedicated pressure/level transducers and dataloggers[6]. Reference-point elevations will be established by existing survey records for the wells. Static water-levels will be manually measured with an electric sounder on a monthly basis (minimum) and the transducers calibrated accordingly. The transducers are to be programmed with the reference static water-level and the appropriate data-collection intervals.

[6] Most of the project monitoring wells have existing water level transducers / dataloggers programmed on hourly data collection intervals, which will be maintained and utilized during the pilot test; Beltz 8 and the on-site monitoring well will have supplemental instrumentation installed by PWR and programmed with variable data collection intervals (i.e., depending on the phase of testing and particular well).

Table 2. Project Well Construction Summary

Well	Distance from Beltz 8 (ft)	Depth (ft bgs)	Dia (in)	Screen Intervals (ft bgs)	Tp Unit(s) Completed
Beltz 8	--	210	14	100 - 180	A
Beltz 8 MW	50	190	2	100 - 180	A
Beltz 4 MW	945				
shallow		90	2	50 - 80	A (upper?)
deep		135	2	115 - 125	A (lower?)
Beltz 10	1010	362	8	100 - 357	AA
Beltz 9	2120	230	14	110 - 200	A
30th Ave	2385				
shallow		240	2	200 - 240	A
medium		410	2	370 - 410	AA
deep		800	2.5	720 - 800	Tu
Pleasure Pt	2565				
shallow		140	2	110 - 130	A (upper)
medium		240	2	210 - 230	A (lower)
deep		355	2	325 - 345	AA (upper?)
Corcoran Lagoon	2740				
shallow		40	2	30 - 40	A (upper)
medium		100	2	80 - 100	A (lower)
deep		195	2	175 - 195	AA (upper?)
SC-1A*	3670	320	2.5	113 - 320	A
SC-22 *	3675				
shallow		240	2	150 - 230	A
medium		500	2	460 - 490	AA (upper)
deep		705	2	640 - 700	AA (lower)
SC-13*	3745	820	2	760 - 770	AA/A
Moran Lake	4025				
shallow		170	2	130 - 170	A (upper)
medium		225	2	205 - 225	A (lower)
deep		295	2	255 - 295	AA (upper?)
Soquel Pt	4190				
SP-3		130	2	110 - 130	A (upper)
SP-2		270	2	250 - 270	AA (lower)
SP-1		330	2	310 - 330	AA (upper?)

Notes:

Tp - Purisima Formation

* - SqCWD monitoring well

Purging and Sampling

During injection periods, samples of the recharge water will be collected directly at the Beltz 8 wellhead while active injection is occurring. During storage periods, the well will be periodically purged and sampled per the below Sampling Schedule. During recovery periods, the well pump will be operating, therefore sample purging is continuous and sustained.

The sampling pumps will be used to purge a volume equivalent to a minimum of three (3) casing volumes from each well prior to sampling. Purge water from the pilot well during backflushing and sampling is to be discharged to holding tanks on site (existing Reclaim tanks) for surge suppression and analysis prior to discharge to the on-site storm drain system. Water produced by the well during Cycles 1 and 2 recovery operations will also be discharged to the storm drain. The water-quality data collected during Cycles 1 and 2 are intended to demonstrate the potability of recovered water - assuming the results are favorable, Cycle 3 recovery operations will pump into the distribution system (i.e., to minimize “wasting” of water during the pilot test program).

During purging and prior to sampling, field water-quality parameters of temperature, pH and specific conductance are to be monitored. Stabilization of these water-quality parameters will indicate when collection of a representative sample is allowable.

Laboratory Program

A complete list of constituents and constituent “groups” to be monitored as part of the Beltz 8 ASR Pilot Test Project for injected, stored, and recovered waters is presented in **Table 3** below:

Table 3. Analytic Testing Program Constituent Summary

Parameter	Location of Analysis	Method	Unit	PQL	Field Parameters	Geo-chemical	Disinfection By-Products	Supple-mental
Group ID					**F-1**	**G-1**	**DBPs**	**S-1**
Field Parameters								
Cl Residual	on-site	Hach	mg/L	0.05	x			
Diss O2	on-site	Hach	mg/L	0.2	x			
EC	on-site	EPA 120.1	umho/cm	10	x			
ORP	on-site	USGS	mV	10	x			
pH	on-site	EPA 150.1	Std Units	0.01	x			
SDI	on-site		Std Units	0.01	x			
Temperature	on-site	SM 2550	°C	0.5	x			
Turbidity	on-site	Hach 2100Q	NTU	0.1	x			
General Mineral Analysis								
Alkalinity (Total)	Lab	SM2320B	mg/L	5		x		x
Ca	Lab	EPA 200.7	mg/L	0.03		x		x
Cl	Lab	EPA 300.0	mg/L	0.5		x		x
EC	Lab	EPA 120.1	umho/cm	10		x		x
F	Lab	EPA 300.0	mg/L	0.1		x		
Fe (Dissolved)	Lab	EPA 200.7	mg/L	0.05		x		x
Fe (Total)	Lab	EPA 200.8	mg/L	0.05		x		x
K	Lab	EPA 200.8	mg/L	1		x		x
MBAS	Lab	SM 5540C	mg/L	0.05		x		
Mg	Lab	EPA 200.8	mg/L	0.5		x		x
Mn (Dissolved)	Lab	EPA 200.7	mg/L	0.05		x		x
Mn (Total)	Lab	EPA 200.9	mg/L	0.05		x		x
Na	Lab	EPA 200.7	mg/L	0.05		x		x
NH3	Lab	EPA 350.1	mg/L	0.05		x		
NO2	Lab	EPA 300.0	mg/L	0.1		x		x
NO3 (as N)	Lab	EPA 300.0	mg/L	0.1		x		x
P (Total)	Lab		mg/L	0.001		x		
pH	Lab	EPA 150.1	Std Units	0.01		x		x
SiO2	Lab	EPA 370.1	mg/L	2		x		
SO4	Lab	EPA 300.0	mg/L	0.5		x		x
Sulfides (Total)	Lab	EPA 376.2	mg/L	0.1		x		
TDS	Lab	SM2540C	mg/L	5		x		x
TKN	Lab	EPA 351.2	mg/L	0.2		x		

Table 3. Analytic Testing Program Constituent Summary (con't)

Parameter	Location of Analysis	Method	Unit	PQL	Field Parameters	Geo-chemical	Disinfection By-Products	Supple-mental
Group ID					**F-1**	**G-1**	**DBPs**	**S-1**
Inorganic Trace Metals								
Ag	Lab	EPA 200.8	ug/L	10		x		
Al	Lab	EPA 200.8	ug/L	10		x		
As	Lab	EPA 200.8	ug/L	1		x		x
B	Lab	EPA 200.8	ug/L	50		x		
Ba	Lab	EPA 200.7	ug/L	1		x		
Be	Lab	EPA 200.8	ug/L	1		x		
Br	Lab	EPA 200.9	ug/L	100		x		x
Cd	Lab	EPA 200.8	ug/L	1		x		
Co	Lab	EPA 200.8	ug/L	1		x		
Cr	Lab	EPA 200.8	ug/L	10		x		
Cu	Lab	EPA 200.8	ug/L	5		x		
Hg	Lab	EPA 200.8	ug/L	0.025		x		x
I	Lab	EPA 200.8	ug/L	100		x		
Li	Lab	EPA 200.7	ug/L	1		x		
Mo	Lab	EPA 200.8	ug/L	5		x		
Ni	Lab	EPA 200.8	ug/L	1		x		
Pb	Lab	EPA 200.8	ug/L	1		x		
Sb	Lab	EPA 200.8	ug/L	1		x		
Se	Lab	EPA 200.8	ug/L	5		x		
Sr (Total)	Lab	EPA 200.7	ug/L	1		x		
Sr 86/Sr 87 (ratio)	Lab	EPA 200.8	ug/L	0.1 (ratio acuracy)		x		
Tl	Lab	EPA 200.8	ug/L	1		x		
U	Lab	EPA 200.8	ug/L	0.5		x		
V	Lab	EPA 200.8	ug/L	1		x		
Zn	Lab	EPA 200.8	ug/L	10		x		
Bio / Organics								
Coliform	Lab		CFU	<1		x		
HAA5's	Lab	EPA 552.2	ug/L	1			x	
HPCs	Lab	SM9215B	CFU	<1		x		
Organic Carbon (Dissolved)	Lab	SM5310B	mg/L	0.1			x	
Organic Carbon (Total)	Lab	SM5310B	mg/L	0.1			x	
TTHM's	Lab	EPA 502.2	ug/L	1			x	
Miscellaneous								
CH4	Lab	RSK-175	ug/L	5		x		
Gross Alpha	Lab	EPA 900.0	pCi/L			x		
Color	Lab	SM2120B	Color Units	3		x		
Hardness	Lab	SM2340B	mg/L	10		x		
Tu	Lab	EPA 180.1	NTU	0.1		x		
TSS	Lab	EPA 160.2	mg/L	1		x		

Notes:

F-1 parameters to be measured concurrently with collection of G-1, DBP and S-1 samples.

Sampling Schedule

The planned sample constituent group frequencies for each source for the injection, storage, and recovery periods for each ASR Cycle are summarized below.

Baseline. Prior to Cycle 1 injection, samples will be collected from Beltz 8 and the to-be-constructed on-site monitoring well (MW) and analyzed for F-1, G-1 and DBPs Group parameters to establish baseline conditions.

ASR Cycle 1. The sampling schedule for Cycle 1 is presented in **Table 4** below:

Table 4. Sampling Schedule – ASR Cycle 1

Analyte Group	Injection		Storage		Recovery	
	Injectate	MW	Beltz 8	MW	Beltz 8	MW
F-1	Once	--	@end	--	@ 25, 50, 75, 100, 125 & 150%	--
G-1	Once	--	@end	--	@ 50 and 100%	--
DBP	Once	--	@end	--	@ 100%	--
S-1	--	--	--	--	@ 25, 75, 125, & 150%	--

As shown, the full suite of parameters (F-1, G-1, and DBPs) will be collected of the injectate once during the 1-day injection period of Cycle 1. One sample of the stored water will be collected from Beltz 8 at the end of the 2-day storage period. During recovery pumping, G-1 samples will be collected at 50 and 100 **percent recovery of the injection volume**, supplemented with the shorter S-1 group at 25, 75, 125 and 150 percent. No samples are planned to be collected from the on-site monitoring well during Cycle 1 due to the limited volume of injection not anticipated to be sufficient to arrive at the well during the cycle.

ASR Cycle 2. The sampling schedule for Cycle 2 is presented in **Table 5** below:

Table 5. Sampling Schedule – ASR Cycle 2

Analyte Group	Injection		Storage		Recovery	
	Injectate	MW	Beltz 8	MW	Beltz 8	MW
F-1	Once	--	Weekly	@end	@ 0, 25, 50, 75, 100, 125 & 150%	@end
G-1	Once	--	Weekly	@end	@ 0, 50 and 100%	@end
DBP	Once	--	Weekly	@end	@ 0 & 100%	@end
S-1	--	--	--	--	@ 25, 75, 125, & 150%	--

As shown, the sampling schedule for Cycle 2 is similar in scope to Cycle 1 but expanded somewhat and also includes some limited sampling of the on-site monitoring well. During the 1-week injection period, again only one sample is needed. During the 2-week storage period, two samples will be collected from Beltz 8 and one sample collected from the on-site monitoring well at the end of the period. During recovery pumping, samples will be collected from Beltz 8 at

similar percent recovery points as described above for Cycle 1, with one sample collected from the on-site monitoring well at the end of the period.

ASR Cycle 3. The sampling schedule for Cycle 3 is presented in **Table 6** below:

Table 6. Sampling Schedule – ASR Cycle 3

Analyte Group	Injection		Storage		Recovery	
	Injectate	MW	Beltz 8	MW	Beltz 8	MW
F-1	Weekly	Weekly	Weekly	Weekly	@0, 25, 50, 75, & 100%	Weekly
G-1	Once	Once	Once	Once	@ 0, 50 and 100%	@ 0, 50 and 100%
DBP	Weekly	Weekly	Weekly	Weekly	@0, 25, 50, 75, & 100%	Weekly
S-1	Weekly	Weekly	Weekly	Weekly	@ 25 & 75%	Weekly

As shown, the sampling schedule for Cycle 3 is the most intensive. This is due to both the extended duration and larger volumes of injection and recovery during Cycle 3. In particular, it is anticipated that the injected water will fully envelope the on-site monitoring well during the injection period; therefore, sampling at this monitoring well is more relevant during Cycle 3 than the previous cycles. During the 30-day injection period, weekly samples will be collected from both Beltz 8 and the monitoring well for the F-1, DBP and S-1 groups, with one sample of the full G-1 suite collected. A similar schedule is planned for the 60-day storage period. During the 30-day recovery period, samples will be collected from Beltz 8 at similar percent recovery levels as the previous cycles, with weekly samples collected from the on-site monitoring well.

PRELIMINARY PROJECT SCHEDULE

A preliminary schedule for the Beltz 8 ASR Pilot Test Program is presented in **Table 7** below:

Table 7. Preliminary Project Schedule

Task / Activity	Time Period	Duration (months)
CEQA and Permitting	Nov 2019 - Jan 2019	3
Monitoring Well Drilling	Jan 2020	0.75
Well Rehabilitation	Jan - Feb 2020	1
Site Preparation	Feb 2020	0.25
ASR Cycles	Mar 2020 - Aug 2020	6
Data Analysis and Reporting	Sep 2020 - Oct 2020	2
	Total:	**12**

As shown, the ASR cycles are planned to be implemented during the winter/spring of the 2020 water year when excess SLR flows are anticipated to be available (i.e., through the month of May 2020). There is an estimated 4 months of CEQA/permitting and site preparatory work

(including monitoring well drilling and well rehabilitation) to be completed prior to implementing the test program; therefore, this work will need to be initiated no later than November 2019. Data analysis, reporting and project completion are anticipated by October of 2020, for a total project duration of approximately 1 year.

CLOSURE

This memorandum has been prepared exclusively for the City of Santa Cruz Water Department for the specific application to the City of Santa Cruz ASR Feasibility – Phase 1 Investigation. The findings and conclusions presented herein were prepared in accordance with generally accepted hydrogeologic practices. No other warranty, express or implied, is made.

FIGURES

4.98

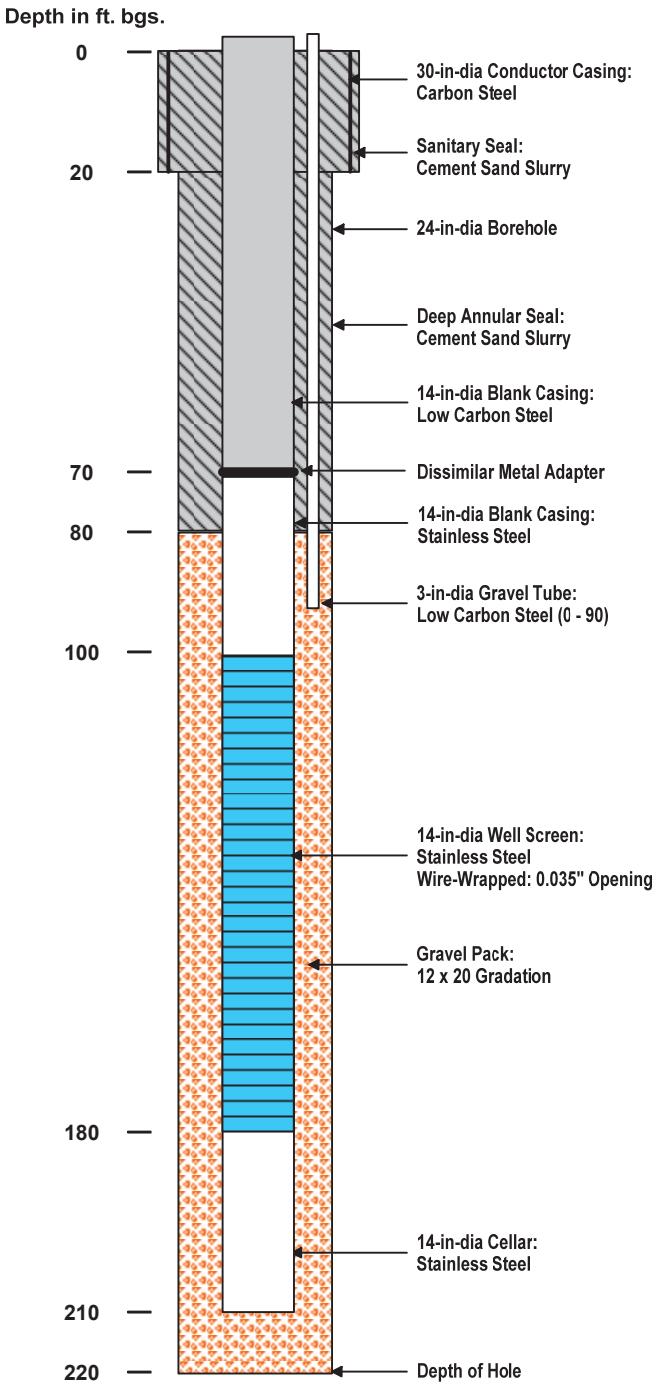
PUEBLO water resources

N
W E
S

1 inch = 50 feet

0 25 50 100 Feet

FIGURE 1. SITE LOCATION MAP
ASR Pilot Test Work Plan - Beltz 8
Santa Cruz ASR Project - Phase 1 Feasibility Investigation
City of Santa Cruz Water Department



NOT TO SCALE

FIGURE 2. AS-BUILT WELL SCHEMATIC
ASR Pilot Test Work Plan - Beltz 8
Santa Cruz ASR Project - Phase 1 Feasibility Investigation
City of Santa Cruz Water Department

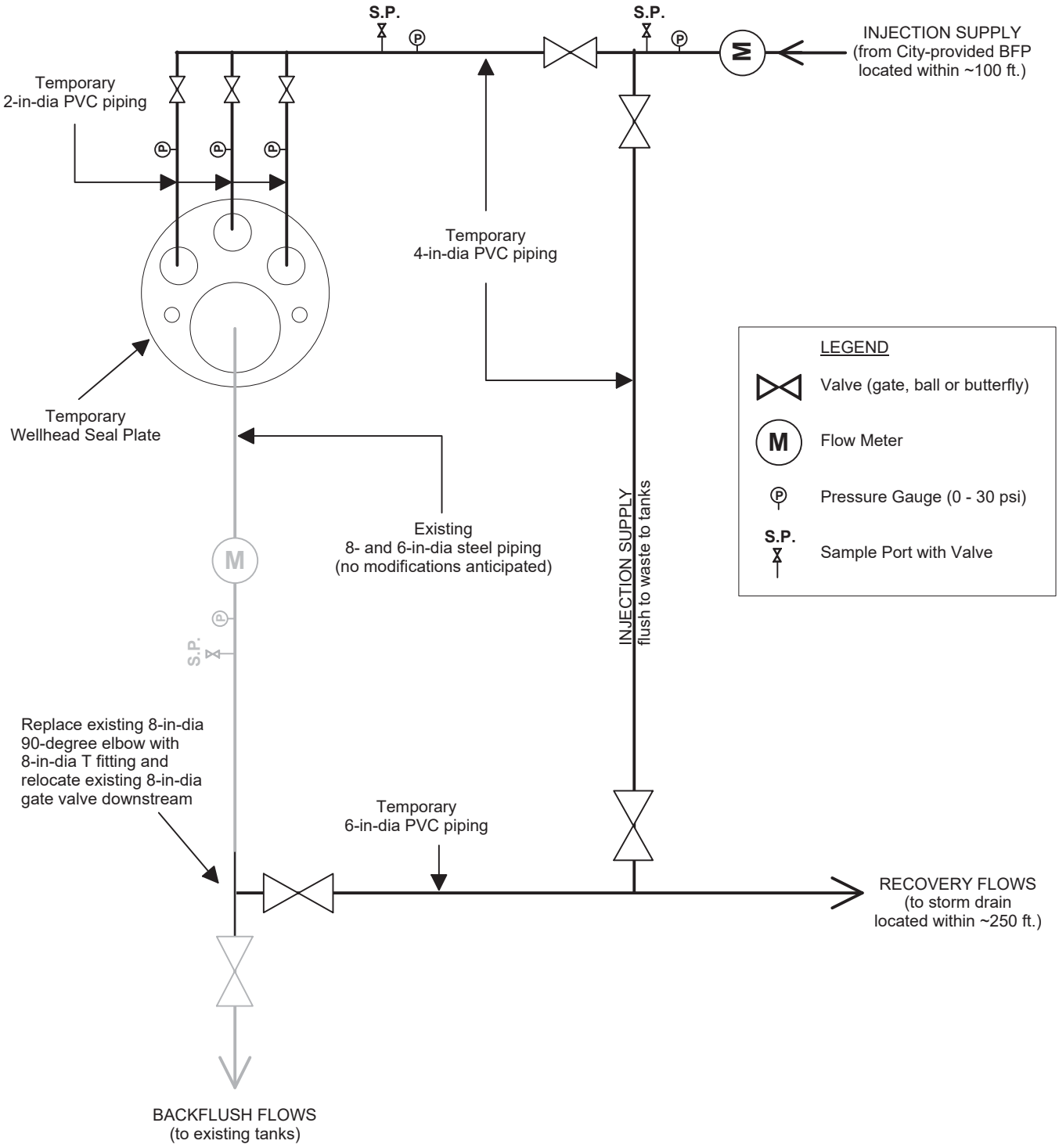
PUEBLO water resources

N
W E
S

1 inch = 25 feet

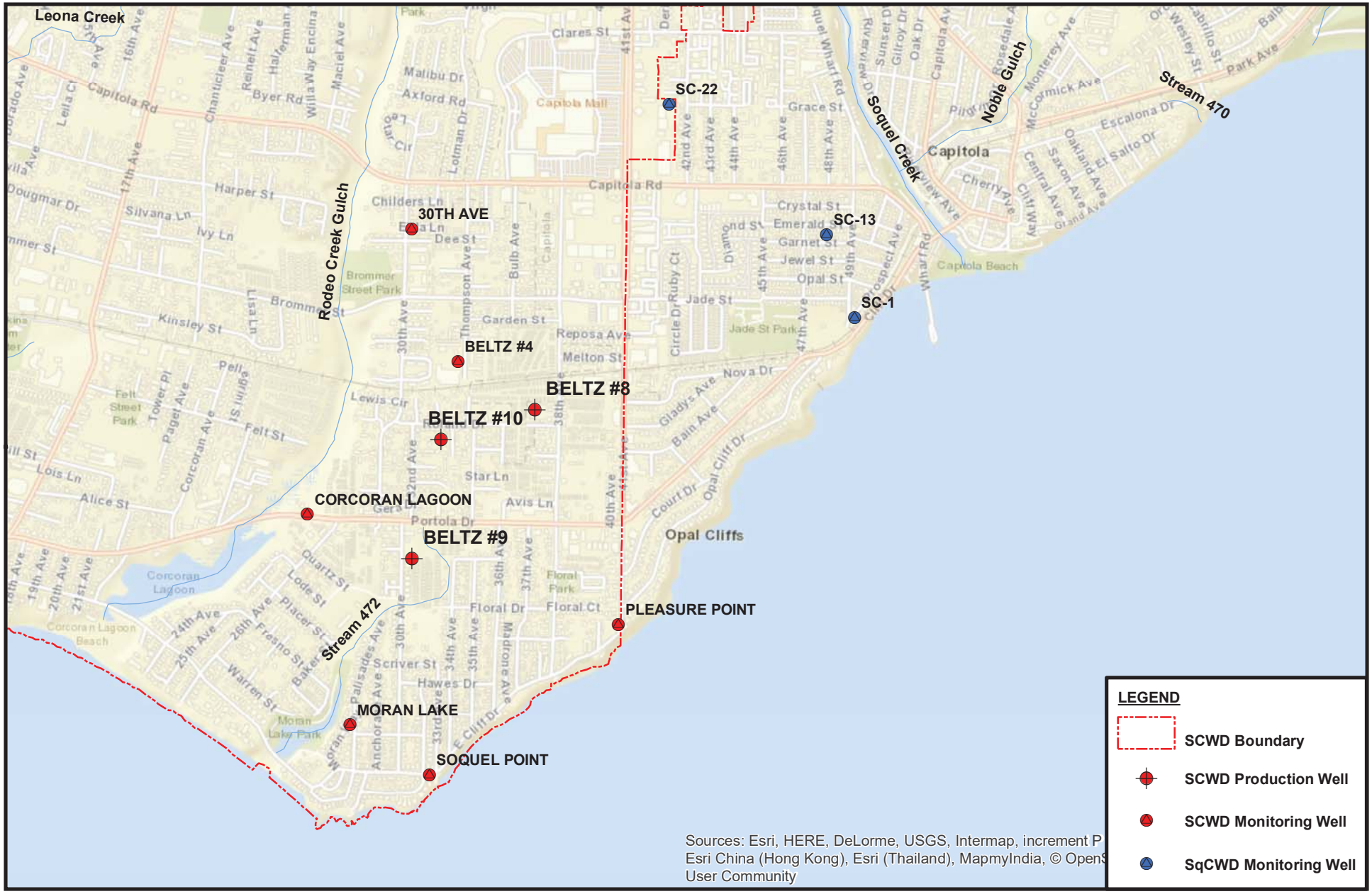
0 12.5 25 50 Feet

FIGURE 3. BELTZ 8 MW LOCATION MAP
ASR Pilot Test Work Plan - Beltz 8
Santa Cruz ASR Project - Phase 1 Feasibility Investigation
City of Santa Cruz Water Department



Note: existing piping is shown in grey and temorary piping is shown in **black**

FIGURE 4. PRELIMINARY PIPING SCHEMATIC
ASR Pilot Test Work Plan - Beltz 8
Santa Cruz ASR Project - Phase 1 Feasibility Investigation
City of Santa Cruz Water Department



4.102

PUEBLO water resources

N
W E
S

1 inch = 1,500 feet

0 750 1,500 3,000 Feet

FIGURE 5. WELL LOCATION MAP
ASR Pilot Test Work Plan - Beltz 12
Santa Cruz ASR Project - Phase 1 Feasibility Investigation
City of Santa Cruz Water Department

WATER COMMISSION
INFORMATION REPORT

DATE: 11/26/2019

AGENDA OF: December 2, 2019

TO: Water Commission

FROM: Jeremy Becker, Finance Manager

SUBJECT: 4th Quarter Fiscal Year (FY) 2019 Financial Report

RECOMMENDATION: Accept the 4th Quarter FY 2019 Financial Report.

BACKGROUND: On June 6, 2016, the Water Commission approved the Water Department's Long Range Financial Plan (LRFP) which created a framework to ensure financial stability and maintain the credit rating needed to debt finance major capital investments planned for the utility. The LRFP includes financial targets for debt service coverage ratio (1.5x), a combined 180 days cash on hand, $3.1 million in an Emergency Reserve, and a $10.0 million Rate Stabilization reserve.

The data in the Quarterly Financial Reports provides a snapshot in time. The City operates on a fiscal year basis and allows transactions to post to any period of the year until the books are formally closed in preparation of the Certified Annual Financial Report (CAFR). Typically, this occurs in the fall after the close of the fiscal year (FY). Accordingly, the attached report is a snapshot of the transactions posted within all twelve months of FY 2019 and is based on unaudited information. While the vast majority of transactions for the year are recorded, the Department does not expect any major changes during annual audit process.

DISCUSSION:
The Department is presenting the quarterly financial report for the fiscal year ending on June 30, 2019.

Revenues
Total FY 2019 rate revenues were slightly under budget by approximately 5%. For FY 2019, water rate revenues were based on 2.5 billion gallons (BG) of sales, while actual sales were 2.4 BG. Water rate revenues have remained flat when compared to the previous fiscal year despite a scheduled 6% rate increase levied in July 2018. In FY 2019, water rate revenues dampened due to two factors.

- Pasatiempo Golf Course closed most of their irrigation accounts with the City at the beginning of the year and switched to recycled water service with the Scotts Valley Water District and the City of Scotts Valley.
- FY 2018 had an extra week of revenue due to an accounting estimate change made to extend the year-end accrual entry for water rates by one week. This was done to better account for the water sold in the appropriate fiscal year.

Staff will continue to closely monitor water sales to discern trends to inform any needed changes in the FY 2020 water sales projections. Also, the Department had $11.9 million in net operating revenue remaining after $4.9 million of non-cash charges for depreciation expense and a loss on disposition of assets were added back to the net total amount of $7.0 million.

The Department also utilized $7 million of loan proceeds through the Bank of America line of credit and the account is now a little less than half drawn at $10.5 million of the $25 million available. These proceeds went to fund a variety of capital projects including Main Replacements on 7th Avenue and Water Street, Graham Hill Water Treatment Plant improvements such as the tube settler and flocculator replacement projects and the University Tank No. 5 replacement. The planned revenue bond issuance this coming fall will allow the Department to rollover the loan balance and close out the account with Bank of America.

Expenses

The operating and maintenance expenses came in 1% below budget for the year. The primary reason for actual personnel expenses nearly matching the budget is due to a one-time payment of $1.45 million made to CalPERS to reduce future pension costs. The Finance Department has informed the Department if one-time payments continue they are not likely to be as large going forward.

One cause of the Services, Supplies and Other object code being over budget was due to a loss on disposition of assets mentioned earlier. A charge of $2.2 million was taken for feasibility studies relating to the work of the Water Supply Advisory Committee being incorrectly identified as a capital asset too early in the planning process. The Department should no longer be experiencing these prior year write-offs now that expenses are occurring after the feasibility stage has been reached and are allowed to be accounted for in the Capital Investment Plan (CIP).

Capital Investment Program

The Department has departed from the previous method for budgeting CIP projects. The Department will budget only those expenses that are anticipated to be spent in the fiscal year. This is a change from budgeting the costs for a CIP project in its entirety thus creating large carryover authority fiscal year to fiscal year. For FY 2020 budget, this resulted in $29 million in carryover authority left at fiscal year-end. Nevertheless, the Department did increase spending on capital projects by a sizeable 52% over the previous year. The bulk of the $17.5 million in spending was for planning and construction of the following list of projects shown in Table 1.

Table 1

NCD I/O Replacement Project	3,666,530
University Tank No. 5 Replacement	2,010,311
Newell Creek Dam Property Acquisition	1,849,355
GHWTP (tube settler and flocculator replacements)	1,492,570
GHWTP CC Tanks Replacement	1,141,675

FISCAL IMPACT: None.

PROPOSED MOTION: Accept the un-audited 4th Quarter FY 2019 Financial Report.

ATTACHMENTS: 4th Quarter FY 2019 Financial Report

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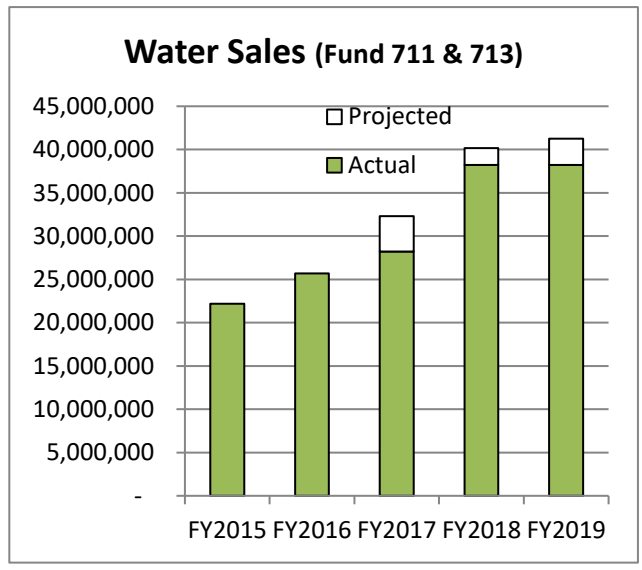
Water Department
4th Quarter FY 2019 Financial Report
Preliminary, Unaudited, as of 6/30/2019

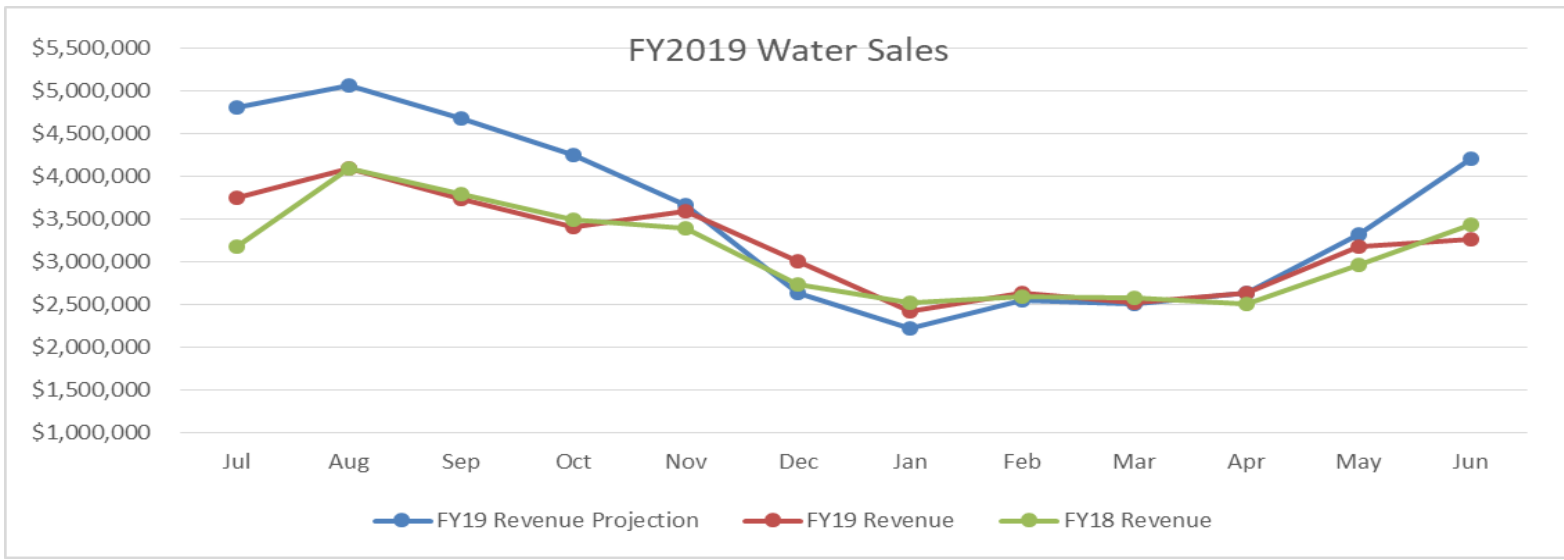
Financial Status for Enterprise Operation Fund (Fund 711) & Rate Stabilization Fund (Fund 713)

	FY 2019 Adopted Budget	FY 2019 Adjusted Budget	Actual YTD Thru 6/30/19	YTD % of Budget
Revenues				
Fund 711 - Water Operations	43,886,000	39,451,000	37,586,000	95%
Fund 713 - Rate Stabilization	3,342,000	3,366,000	3,273,000	97%
Total Revenues	**47,228,000**	**42,817,000**	**40,859,000**	**95%**
Expenses (Fund 711 Only)				
Personnel	14,724,000	14,724,000	14,173,000	96%
Services, Supplies, and Other	15,049,000	16,417,000	17,329,000	106%
Capital Outlay	438,000	604,000	202,000	33%
Debt Service	2,536,000	2,536,000	2,122,000	84%
Total Expenditures	**32,747,000**	**34,281,000**	**33,826,000**	**99%**
NET Total	14,481,000	8,536,000	7,033,000	

Fund Balances

	Balance as of 6/30/19	Target for FY end
711- Enterprise Operations	8,066,000	7,741,000
713- Rate Stabilization	8,936,000	9,020,000
715-System Development Charges	3,924,000	N/A
716- 90-Day Operating Reserve	6,733,000	7,741,000
717- Emergency Reserve	3,137,000	3,100,000
718- MHJB Endowment	145,000	144,000
719- Equipment Replacement	702,000	750,000





CIP Projects Overview, as of 6/30/2019

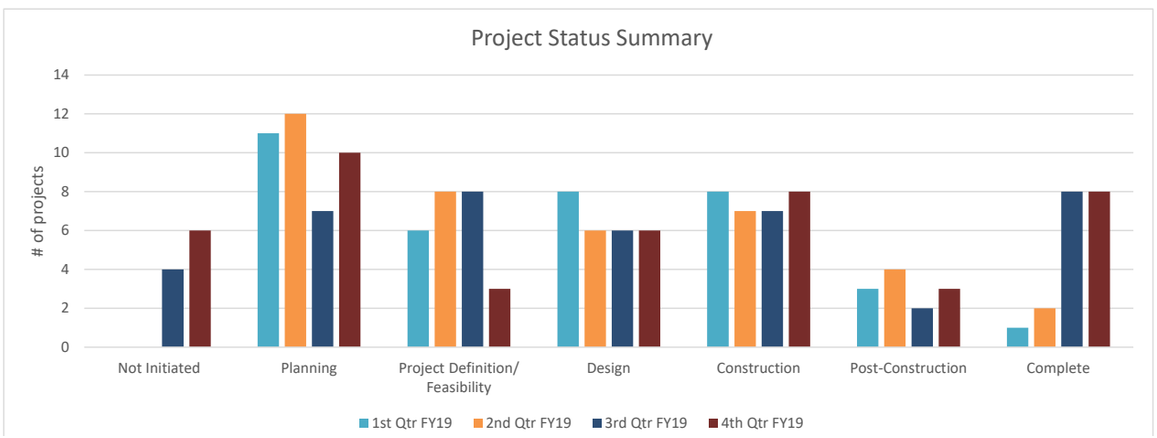
Rehab or Replacement Projects	Project #	Projected Cost Thru FY2028	Spend Thru 6/30/19	Project Duration	Current Status
Aerators at Loch Lomond	c701706	550,000	8,588	2017-2020	Design
Bay Street Reservoir Reconstruction	c700313	25,375,072	25,269,800	2007-2019	Post-Constr
Beltz 10 & 11 Rehab & Development	c700026	509,243	182,145	2017-2019	PD/Feasibility
Carbonera Tank Access Rd	e701706	511,084	42,312	2018-2019	Construction
CPS 20" RW Pipeline Replacement	c701707	3,355,120	601,322	2018-2020	Design
Felton Div. Pump Station Assess.	c701906	2,671,000	32,666	2019-2022	Planning
Felton Diversion Bladder Replacement	c701602	454,900	450,036	2016-2019	Complete
GHWTP CC Tanks Replacement	c701501	29,586,320	2,729,970	2014-2022	Design
GHWTP Facilities Improvement Project	c700025	102,538,527	2,332,648	2019-2025	PD/Feasibility
GHWTP Flocculator Rehab/Replacement	c701502	2,227,000	120,697	2018-2020	Design
Graham Hill WTP Tube Settler Replacement	c701708	2,025,200	220,653	2018-2020	Construction
Laguna Creek Diversion Retrofit Project	c701801	1,906,000	105,774	2018-2023	Planning
N Coast System Repair/Replace: Phases 2&3	c709835	13,945,259	13,898,165	2003-2018	Complete
N Coast System Repair/Replace: Phase 4	c701908	10,989,000	195,119	2021-2026	Not Initiated
N. Coast System Rehab- Majors Diversion	c701802	2,099,000	111,571	2024-2026	Planning
NCD I/O Replacement Project	c701606	82,064,744	7,090,944	2016-2023	Design
Newell Creek Pipeline Rehab/Replacement	c701701	25,924,600	605,915	2016-2023	Planning
Pressure Regulating Stations	c701703	260,000	131,436	2017-2021	Construction
San Lorenzo River Diversion & Tait Wells	c709872	1,975,014	1,957,155	2002-2018	Complete
Spillway Bridge Replacement	c701807	1,018,050	930,908	2018	Complete
Tait Diversion Retrofit Project	c701903	1,656,000	95,953	2019-2020	Planning
University Tank No. 4 Rehab/Replace	c701505	1,139,000	36,881	2025-2026	Not Initiated
University Tank No. 5 Replacement	c701506	4,428,000	2,387,779	2014-2019	Construction
WTP Filter Rehabilitation & Upgrades	c701303	5,837,300	5,819,026	2013-2018	Post-Constr
		323,045,433	**65,357,466**		

Upgrades or Improvement Projects	Project #	Projected Cost Thru FY2028	Spend Thru 6/30/19	Project Duration	Current Status
Advanced Metering Infrastructure (AMI)	c701603	11,342,000	164,198	2017-2022	PD/Feasibility
Bay Street Reservoir Storage Building	c701910	150,000	-	2019	Design
Brackney Landslide Risk Reduction	c701803	70,100	49,312	TBD	Not Initiated
Coast Pump Station Flood Reduction	c701804	67,300	48,575	TBD	Not Initiated
Facility & Infrastructure Improvements	c701907	3,985,000	-	On-going	Not Initiated
NEW > Felton Diversion Pipeline Valve	c701911	120,000	40,314	2019	Complete
Loch Lomond Facilities Improvements	c701301	225,000	162,658	2013-2019	Construction
Newell Creek Access Rd Bridge	c701904	150,000	72,185	2019	Construction
Newell Creek Dam Property	c701902	1,849,000	1,849,355	2018	Complete
Photovoltaic Systems	c701607	821,000	821,195	2016-2018	Complete
Programmable Logic Controllers	c701905	160,000	155,574	2019	Construction
Security Camera & Building Access Upgrades	c701704	330,000	176,996	2016-2019	Construction
Spoils and Stockpile Handling Facilities	c701508	350,000	250,009	2015-2019	Post-Constr
Union/Locust Building Expansion	c701805	905,000	863,315	2017-2018	Complete
Water Resources Building	c701702	31,000	31,290	2017	Not Initiated
		20,555,400	**4,684,975**		

Water Supply Reliability & Studies	Project #	Projected Cost Thru FY2028	Spend Thru 6/30/19	Project Duration	Current Status
Aquifer Storage and Recovery	c701609 & -10	44,437,000	1,475,622	2016-2022	Planning
Recycled Water	c701611 & -12	798,692	551,247	2016-2020	Planning
River Bank Filtration	c701806	1,925,000	289,657	2018-2027	Planning
Source Water Evaluation	c701608	525,000	438,050	2016-2019	Planning
Water Supply Augmentation Strategy	c701705	3,480,352	280,402	2020-2025	Planning
		51,166,044	**3,034,978**		

Water Program Admin & Contingency	Project #	Projected Cost Thru FY2028	Spend Thru 6/30/19	Project Duration	Current Status
Water Program Admin & Contingency	c701901	24,563,000	-	2018-2028	On-going
		24,563,000	**-**		

Water Main Replacements	Project #	FY2019 Budget	Spend For 7/1/18 - 6/30/19	Project Duration	Current Status
Main Replacements - Engineering Section	c700002 +	2,250,000	955,574	Annual - Ongoing Programs	
Main Replacements - Customer Initiated	c700004	50,000	-		
Main Replacements - Distribution Section	c701507	325,000	249,904		
Main Replace.- Outside Agency Initiated	c700003	250,000	61,602		
		2,875,000	**1,267,080**		



WATER COMMISSION
INFORMATION REPORT

DATE: 11/27/2019

AGENDA OF: December 2, 2019

TO: Water Commission

FROM: Jeremy Becker, Finance Manager

SUBJECT: 1st Quarter Fiscal Year (FY) 2020 Financial Report

RECOMMENDATION: Accept the 1st Quarter FY 2020 Financial Report.

BACKGROUND: On June 6, 2016, the Water Commission approved the Water Department's Long Range Financial Plan (LRFP) which created a framework to ensure financial stability and maintain the credit rating needed to debt finance major capital investments planned for the utility. The LRFP includes financial targets for debt service coverage ratio (1.5x), a combined 180 days cash on hand, $3.1 million in an Emergency Reserve, and a $10.0 million Rate Stabilization reserve.

The data in the Quarterly Financial Reports provides a snapshot in time. The City operates on a fiscal year basis and allows transactions to post to any period of the year until the books are formally closed after June 30th. The attached report is a snapshot of the transactions posted within the first three months of FY 2020.

DISCUSSION:
The Department is presenting the first quarterly financial report for the FY ending June 30, 2020. Over the last few months an ad hoc sub-committee of the Water Commission and Water Department staff worked together to update the quarterly financial report developed a few years ago. The members of the Water Commission ad hoc subcommittee were Linda Wilshusen, Sierra Ryan and James Mekis.

The purpose of the update was to provide clearer picture of financial trends and results to the Water Commission. By conveying better information we are able to show success, identify problem areas and provide information to demonstrate that appropriate responses are being implemented. The report is focused on making presentation of the Department's fiscal outlook more informative, understood and relevant. We have broken out the financial summary into greater detail to show sources of the revenues and provide more information about expenses. In addition, more information is being provided about cash flow (sources and uses) to give a clear

picture of how we are meeting our primary financial ratio of debt service coverage and fund balance needs.

Other changes include providing more information about prior year revenues, water sales and expenses. This information provides context on variances and allows us to report on those as they arise. The final change is to the Capital Investment Program (CIP) report. Subtle changes were made by adding a fiscal year column that allows the Commission to see how the CIP is progressing by comparing our planned annual spending to actual spending.

Revenues

Water sales billings came in just below $8.99 million for the quarter of FY 2020, which is in line with the previous year of $9.03 million at the same point in time. The water sales variance for actual versus year-to-date budget is deceptive since there is a lag between the date rate increases go into effect at the beginning of the fiscal year and when those changed billings arrive as receipts usually in late September. The Department is now forecasting water consumption based on the previous year amount (2.4 BG) rather than the former practice of 2.5 BG of consumption put into effect the last few years. Thus far water consumption is 900 thousand CCF compared to the first quarter totals of 954 thousand CCF in FY 2019 and 994 thousand CCF in FY 2018. Staff will continue to closely monitor water sales to discern trends to inform any needed changes to FY 2020 water sales projections.

The line of credit through Bank of America (BofA) is continuing to be utilized. The account is now a little less than half drawn at $10.5 million of the $25 million available and there is no expectation of another draw for the rest of the calendar year. The Days Cash Ratio for our cash reserve funds, Water Operating Fund (Fund 711) and 90-Days Cash Reserve Fund (Fund 716), is a healthy 213 days. The plan is to rollover the principal amount of $10.5 million in the line of credit to long term debt once our water revenue bond issuance is completed later in the year. The BofA line of credit will then be closed.

Lastly, several grants are in process. A Beltz Well Recharge/Saltwater Intrusion Barrier Well Project is in the last application phase for the Integrated Regional Water Management Grant for the Santa Cruz region. $275,000 in grant assistance will assist testing the viability of using an existing groundwater extraction well as a recharge/salt water intrusion barrier well. Additionally, the Brackney Landslide Pipeline Risk Reduction Project, submitted to the Federal Emergency Management Agency Hazard Mitigation Grant program after the 2017 winter storm damage, is nearing the completion of its review. This grant for $3.0 million will remove an existing pipe and replace it with a steel pipe enclosed in a 36-inch steel casing buried deep into the bedrock.

Expenses

The operating and maintenance expenses came in well below the year to date budget amounts. The primary cause is the accrual of previous year expenses out of the current year and into the previous one as part of the year-end closing process. The Finance Department expects to release the City financial statements in December after the completion of its yearly audit.

The $5.9 million in quarterly expenses are much lower when compared to the previous $7.0 million in FY 2019 and slightly higher than the $5.7 million in FY 2018. The stark contrast from

the previous year is primarily caused by a one-time payment made to CalPERS by the City to reduce our unfunded liability for pension costs. These payments are not expected to take place in the foreseeable future due to other fiscal pressures on the City. Operating & Maintenance costs will now gradually increase in line with our ratios outlined in the Long Range Financial Plan.

Capital Investment Program

The Department has updated the Capital Investment Plan (CIP) Report. It now includes the total estimated project costs through FY 2028 as approved by the Water Commission during the last budget cycle. The total actual project costs are compared to the total projected as a frame of reference on overall project completion. And another set of columns was added to show the fiscal year planned costs compared to the actual accumulated costs for the year. These planned costs are forecasted costs for the year and not based on the numbers submitted to the City as part of the CIP budget. Also attached is a current, 10-year Capital Investment Program (CIP) schedule. This schedule provides details regarding individual projects phasing. The Department had $29 million in rollover authority that is being adjusted by Finance to match the forecasted costs. There will be a mid-year budget adjustment to increase the CIP for costs relating to the Management Reserve and Water Program Administration.

FISCAL IMPACT: None

PROPOSED MOTION: Accept the un-audited 1st Quarter FY 2020 Financial Report.

ATTACHMENTS:
1) 1st Quarter FY 2020 Financial Report
2) 10-year Capital Investment Program Schedule

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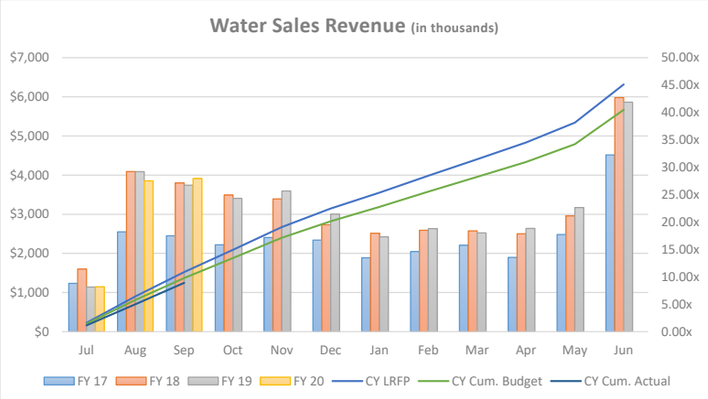
SANTA CRUZ WATER DEPARTMENT FINANCIAL REPORT

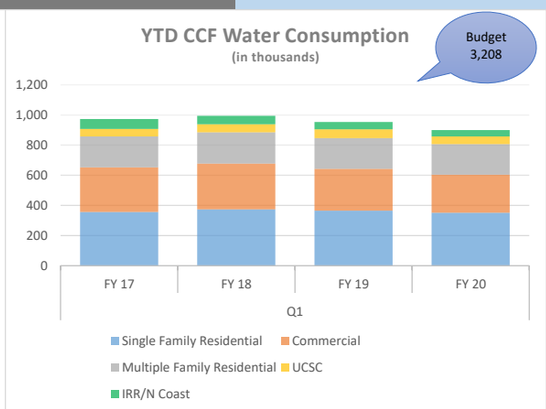
Fiscal Year 2019/20 through September 30, 2019

Financial Summary

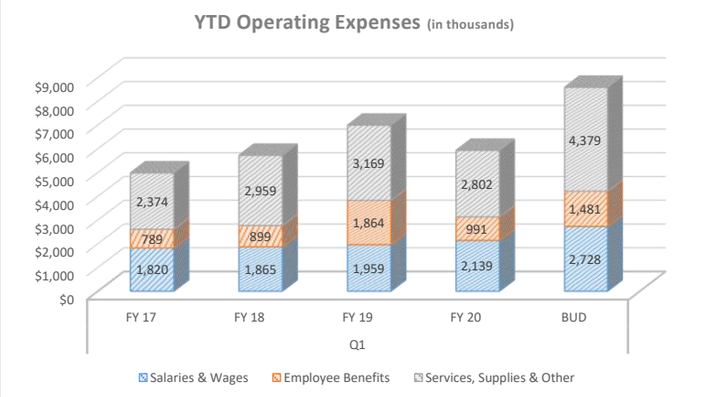
	FY 2020 Budget	YTD Budget	Actual	Actual vs. YTD Budget Variance $ +/(-)	Actual vs. YTD Budget Variance % +/(-)
Operating Revenues					
Water Sales	40,681,000	10,170,250	8,989,948	(1,180,302)	-12%
Other Charges for Services	1,079,268	269,817	267,349	(2,468)	-1%
System Development Charges	820,000	205,000	197,763	(7,237)	-4%
Other Revenues	452,842	113,211	202,231	89,021	79%
Total Operating Revenues	43,033,110	10,758,278	9,657,291	(1,100,987)	-10%
Operating Expenses					
Salaries & Wages	10,912,454	2,728,114	2,138,734	(589,380)	-22%
Employee Benefits	5,924,882	1,481,221	990,610	(490,611)	-33%
Services, Supplies & Other	16,739,933	4,184,983	2,788,563	(1,396,420)	-33%
Capital Outlay	775,246	193,812	13,811	(180,000)	-93%
Total Operating Expenses	34,352,515	8,588,129	5,931,718	(2,656,411)	-31%
Net Operating Revenue (Loss)	8,680,595	2,170,149	3,725,572	1,555,424	72%
Non Operating Sources (Uses)					
Bond Proceeds	12,000,000	3,000,000	-	(3,000,000)	-100%
Intergovernmental Grants & Loans	300,000	75,000	-	(75,000)	
Investment earnings	433,320	108,330	5,825	(102,505)	-95%
Debt Service - Principal & Interest	(2,688,026)	(672,007)	(1,204,961)	(532,955)	79%
Capital Projects	(30,895,800)	(7,723,950)	(2,676,445)	5,047,505	-65%
Total Non Operating	(20,850,506)	(5,212,627)	(3,875,581)	1,337,045	-26%
Net Income	(12,169,911)	(3,042,478)	(150,009)	2,892,469	-95%
Debt Service Coverage (Target >= 1.50x)	3.23x	3.23x	3.09x		

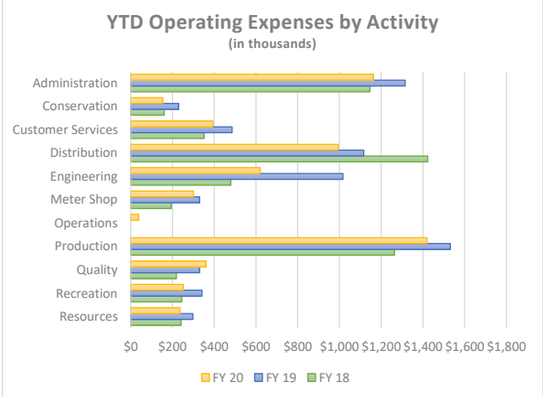
Revenues





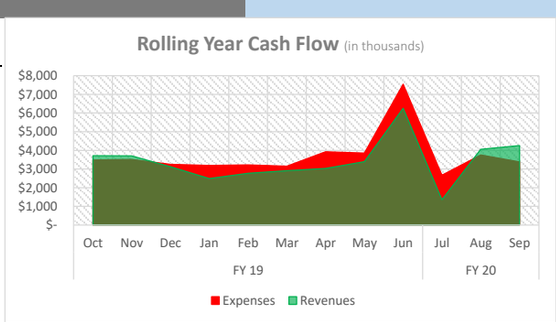
Expenses





Cash

Fund Balances	YTD Actual Balance	Year End Target Balance
711 - Enterprise Operations	7,109,000	8,470,000
713 - Rate Stabilization	9,620,000	10,000,000
715 - System Development Charges	4,042,000	N/A
716 - 90 Day Operating Reserve	6,733,000	8,470,000
717 - Emergency Reserve	3,137,000	3,100,000
718 - Mount Herman June Beetle Endowment	146,000	144,000
719 - Equipment Replacement	702,000	700,000
Days' Cash (Includes only Funds 711 & 716)	212.9	180.0
Days' Cash Target	180.0	180.0

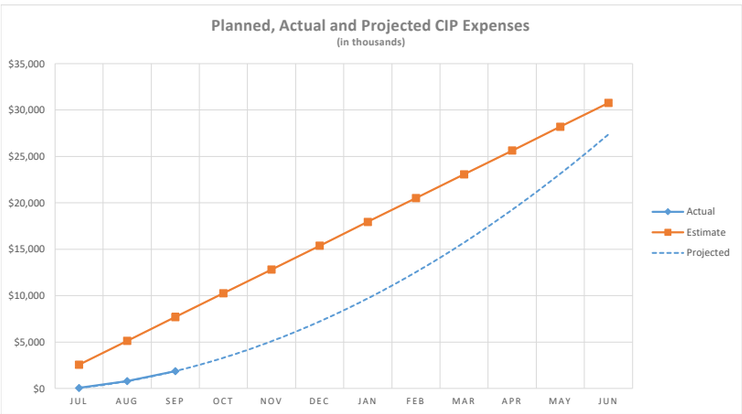


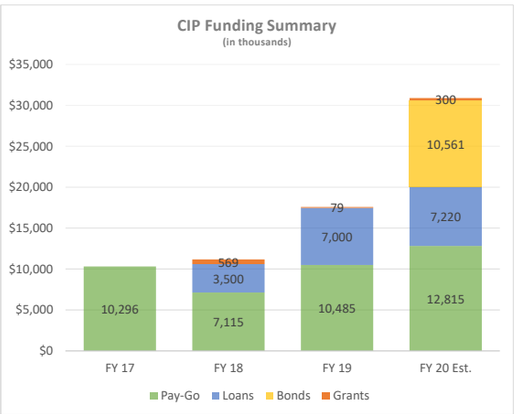
SANTA CRUZ WATER DEPARTMENT CAPITAL INVESTMENT PROGRAM REPORT

Fiscal Year 2020 through September 30, 2019

		Total		Fiscal Year to Date			
Infrastructure Resiliency and Climate Adaptation Projects	**Project #**	**Estimated Project Costs**	**Costs thru Sep. 2019**	**Planned Expenditures**	**Actual Expenditures**	**Project Duration**	**Current Status**
Advanced Metering Infrastructure (AMI)	c701603	11,342,000	164,198	1,000,000	-	2017-2022	PD/Feasibility
Aerators at Loch Lomond	c701706	550,000	8,588	300,000	-	2017-2020	Design
Bay Street Reservoir Reconstruction	c700313+	25,375,072	25,269,800	100,000	7,643	2007-2020	Post-Constr
Bay Street Reservoir Storage Building	c701910	150,000	-	150,000	-	2019	Design
Beltz 10 & 11 Rehab & Development	c700026	509,243	126,320	312,000	-	2017-2019	Construction
Brackney Landslide Risk Reduction	c701803	70,100	-	-	-	TBD	Not Initiated
Carbonera Tank Access Rd	e701706	511,084	44,923	380,000	2,611	2018-2019	Construction
Coast Pump Station Flood Reduction	c701804	67,300	48,575	-	-	TBD	Not Initiated
CPS & SLR Diversion Rehab	c701903	1,656,000	95,953	92,047	-	2019-2020	PD/Feasibility
CPS 20" RW Pipeline Replacement	c701707	3,355,120	612,873	1,377,333	11,551	2018-2020	PD/Feasibility
Distribution System Water Quality Impr.	c702001	75,000	-	75,000	-	2019-2020	Planning
Facility & Infrastructure Improvements	c701907	3,985,000	-	-	-	On-going	Planning
Felton Div. Pump Station Assess.	c701906	2,671,000	32,666	234,334	-	2019-2022	PD/Feasibility
Felton Diversion Bladder Replacement	c701602	454,900	450,036	-	-	2016-2019	Complete
GHWTP CC Tanks Replacement	c701501	29,586,320	2,760,684	2,820,000	10,335	2014-2022	Design
GHWTP Facilities Improvement Project	c700025	102,538,527	2,337,564	1,936,974	4,916	2019-2025	PD/Feasibility
GHWTP Flocculator Rehab/Replacement	c701502	2,227,000	150,034	1,826,503	29,337	2018-2020	PD/Feasibility
Graham Hill WTP Tube Settler Replacement	c701708	2,025,200	565,571	1,383,047	344,918	2018-2020	Construction
Loch Lomond Facilities Improvements	c701301	225,000	195,975	45,000	33,317	2013-2019	Construction
Main Replacements - Engineering Section	c700002 +	26,736,128	10,978,929	4,340,000	518,115	Annual - Ongoing Programs	
Main Replacements - Customer Initiated	c700004	351,259	301,259	-	-		
Main Replacements - Distribution Section	c701507	3,930,000	1,065,182	550,000	40,842		
Main Replace.- Outside Agency Initiated	c700003	2,381,792	1,315,936	150,000	-		
N Coast System Repair/Replace: Phases 1-3	c709835	13,945,259	13,898,165	-	-	2003-2018	Complete
N Coast System R/R: Phases >4	c701908	10,989,000	195,199	670,000	-	2021-2026	Not Initiated
N. Coast System Rehab- Laguna Diversion	c701801	1,906,000	117,112	715,500	11,338	2018-2023	Planning
N. Coast System Rehab- Majors Diversion	c701802	2,099,000	116,156	-	4,585	2024-2026	Planning
NCD I/O Replacement Project	c701606	82,064,744	7,194,182	4,400,897	103,238	2016-2023	Design
Newell Creek Access Rd Bridge	c701904	150,000	94,328	248,400	22,143	2019	Design
Newell Creek Dam Property	c701902	1,849,000	1,849,355	-	-	2018	Complete
Newell Creek Pipeline Rehab/Replacement	c701701	25,924,600	606,862	799,000	947	2016-2023	PD/Feasibility
Photovoltaic Systems	c701607	821,000	821,195	-	-	2016-2018	Complete
Pressure Regulating Stations	c701703	260,000	168,515	50,000	37,079	2017-2021	Construction
Programmable Logic Controllers	c701905	160,000	162,331	75,000	6,457	2019	Construction
San Lorenzo River Diversion & Tait Wells	c709872	1,975,014	1,957,155	-	-	2002-2018	Complete
Security Camera & Building Access Upgrades	c701704	330,000	176,996	150,000	-	2016-2019	Construction
Source Water Evaluation	c701608	525,000	438,624	50,000	574	2016-2019	Complete
Spillway Bridge Replacement	c701807	1,018,050	930,908	-	-	2018	Complete
Spoils and Stockpile Handling Facilities	c701508	350,000	250,009	50,000	-	2015-2019	Design
Transmission System Improvements	c700017	2,424,531	759,130	-	-	On-going	Design
Union/Locust Building Expansion	c701805	905,000	868,387	3,000		2017-2018	Complete
University Tank No. 4 Rehab/Replace	c701505	1,139,000	36,881	-	-	2025-2026	Not Initiated
University Tank No. 5 Replacement	c701506	4,428,000	2,979,093	1,729,600	591,314	2014-2020	Construction
Water Program Admin & Contingency	c701901	24,563,000	-	3,500,000	-	2018-2028	On-going
WTP Filter Rehabilitation & Upgrades	c701303	5,837,300	5,819,026	18,000	-	2013-2018	Post-Constr
		404,436,543	**85,964,674**	**29,531,635**	**1,781,260**		

Water Supply Reliability and Climate Adaptation Projects		**Estimated Project Costs**	**Costs thru Sep. 2019**	**Planned Expenditures**	**Actual Expenditures**	**Project Duration**	**Current Status**
Aquifer Storage and Recovery	c701609 & -10	44,437,000	1,555,758	907,500	80,136	2016-2022	PD/Feasibility
Recycled Water	c701611 & -12	798,692	554,937	155,358	3,690	2016-2020	Planning
River Bank Filtration	c701806	1,925,000	289,856	427,000	199	2018-2027	Planning
Water Supply Augmentation Strategy	c701705	3,480,352	280,402	140,000	-	2020-2025	Planning
		50,641,044	**2,680,953**	**1,629,858**	**84,025**		





PROGRAM MANAGEMENT SERVICES - CITY OF SANTA CRUZ WATER DEPARTMENT

Activity ID	Activity Name
	PROGRAM MANAGEMENT SERVICES - CITY OF SANTA CRUZ WATER DEPARTMENT
	1.1 - Laguna Creek Diversion Retrofit Project
	1.2 - North Coast System Majors Diversion Rehab
	1.3.1 - Tait Diversion Rehab/Replacement Project
	1.3.2 - Coast Pump Station Replacement / Rehab
	1.4 - Felton Diversion and Pump Station Assessment
	1.5 - Newell Creek Dam Inlet / Outlet Replacement Project
	1.5.1 - Newell Creek Dam Inlet / Outlet Project - Spillway Bridge Replacement
	2.1 - North Coast System Repair and Replacement Project
	2.2 - Newell Creek Pipeline Rehab / Replacement
	2.3 - Coast Pump Station 20-inch Raw Water Pipeline Replacement
	3.1 - Water Supply Augmentation
	3.2 - Recycled Water Feasibility Study
	3.3 - ASR in Mid County Groundwater Basin (MCGB)
	3.4 - ASR in Santa Margarita GW Basin (SMGB)
	5 - Pipe Loop Study
	6 - In-Lieu Water Transfers and/or Exchanges
	4.1 - Graham Hill WTP Tube Settlers Replacement
	4.2 - Graham Hill WTP Flocculator Rehab / Replacement
	4.3 - Graham Hill WTP Concrete Tanks Project
	4.4 - Graham Hill WTP Facilities Improvements Project
	4.5 - River Bank Filtration Study
	5.2 - Advanced Metering Infrastructure
	6.1 - University Tank No.4 Rehab / Replacement
	6.2 - University Tank No.5 Replacement
	WA - Distribution System Water Age
	4.6 - Source Water Data Collection and Management
	5.1 - Main Replacement Model Development
	7.1 - Water Rights Amendments
	7.2 - Habitat Conservation Plans

19 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029

5.11

SCZ - Planning | SCZ - Design | SCZ - Permits | SCZ - Procurement | SCZ - Construction | SCZ - Post Construction

HDR Project Manager : TBD; Schedule Updated as of **30-Sep-19**

WATER COMMISSION
INFORMATION REPORT

DATE: 11/25/19

AGENDA OF: December 2, 2019

TO: Water Commission

FROM: Kevin Crossley

SUBJECT: Informational Item on Status of Ballot Measure to Amend the City Charter and Allow the Use of Alternative Forms of Contracting for Project Delivery.

BACKGROUND:
Currently, Section 1415 of the City Charter mandates all public works contracts be awarded to the lowest responsible bidder under a traditional design-bid-build method in which design, procurement and construction of the project proceed sequentially. Under this method, the preparation of plans and specifications are completed typically by an architect or engineer. Then the project is advertised for bids and a construction contract is awarded to the lowest responsible bidder.

Under California Public Contract Code § 22160, et seq., cities and other public entities are authorized to use alternative approaches to public works contracting, commonly referred to as "design-build" or "best value" project delivery methods. These alternative project delivery methods are different from the conventional design-bid-build method in that the engineering, design and construction services can be procured from a single entity (typically composed of engineering, architecture and construction firms) through a competitive request for proposal process. A comparison table of the most common alternative project delivery methods is included as Attachment A for reference.

Throughout California and the nation, many government agencies are utilizing various forms of best value contracting and report numerous advantages over conventional design-bid-build, such as the following.

- Reduced project costs
- Expedited schedules for project completion
- Innovative solutions to design and construction challenges
- Improved quality and owner satisfaction with the projects

The Public Contract Code currently allows award of construction contracts in excess of one million dollars either on the basis of low bid or "best value" for "a building or buildings," but excludes "other infrastructure, including, but not limited to, streets and highways, public rail transit, or water resources facilities and infrastructure." Therefore, best value is currently not an option for delivery of many types of upcoming City capital improvement projects, such as major upgrades,

repairs and replacement of the City's water storage, treatment and transmission infrastructure. Santa Cruz's status as a Charter City allows the City to exempt itself from this limitation.

On October 22, 2019, City Council unanimously approved the proposed resolution (included as Attachment B) which would amend the City Charter to enable the City to use the various forms of best value project delivery methods for public works construction. The proposed charter amendment will be added to the March 3, 2020 ballot, and needs to be approved by a simple majority of the voters.

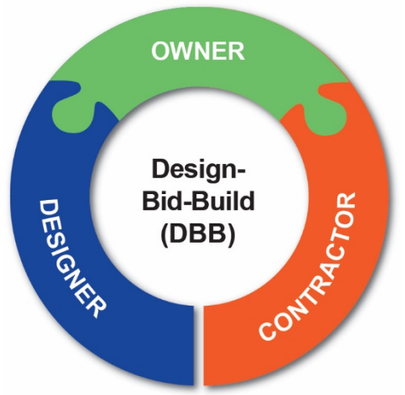
DISCUSSION:
If the ballot measure is approved by the voters on March 3, 2020, City Council will be authorized to adopt an ordinance allowing the City to use best value delivery methods and establish the regulations for the award, use, and evaluation of best value contracts.

In addition to this report, staff will provide a brief presentation and discussion on the various delivery methods summarized in the attached table, and the process for screening and matching projects to a particular delivery method.

ATTACHMENT(S):
Project Delivery Alternatives
Draft Resolution

Design-Build

Design-Bid-Build (DBB)



Features/Process:

- ✓ Owner selects Designer
- ✓ Designer designs project, develops plans and specifications, and assists with evaluating bids
- ✓ Construction awarded to Contractor with lowest responsive bid
- ✓ Construction monitored by Designer or 3rd party construction manager

PROS

- Owner retains control of design
- Open bidding for construction contracts
- Independent oversight of construction contractor
- Well understood delivery method

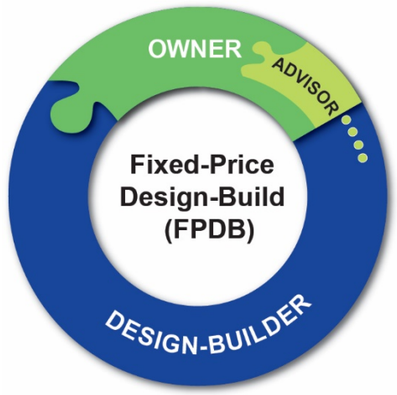
CONS

- Owner maintains majority of risk for changes
- Finger-pointing between designer and contractor
- Longer schedule
- Higher potential for claims and change orders
- Later certainty of construction cost
- Multiple contracts for Owner to manage

WORKS BEST WHEN

- Owner desires high level of involvement in design
- Schedule is not a priority
- Owner has limited enabling legislation for collaborative delivery methods

Fixed-Price Design-Build (FPDB)



Features/Process:

- ✓ Owner selects Advisor to prepare preliminary design (to 10-30% design completion)
- ✓ Competitive procurement to select Design-Builder (fixed-price is a significant selection criteria)
- ✓ Design-Builder finalizes design and builds the project

PROS

- One contract for Owner to manage
- Competitive pricing factors into selection
- Owner retains some involvement in design
- Earlier identification of total initial construction price

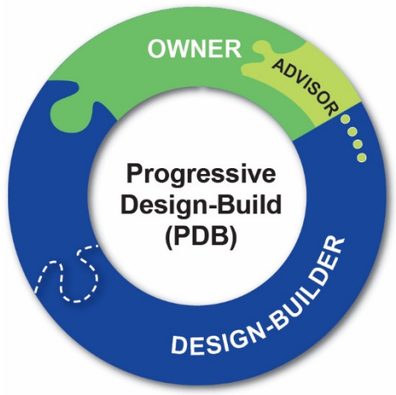
CONS

- Does not foster collaborative design innovation
- Potential less access/selection of designer
- Higher potential for unmet Owner expectations
- Higher potential for claims and change orders than Progressive D-B and DBB

WORKS BEST WHEN

- Project elements can be well defined during preliminary design
- Predominantly a construction project
- Schedule and early price identification are high priorities to Owner
- Owner does not want to be too involved in design development details

Progressive Design-Build (PDB)



Features/Process:

- ✓ Owner selects Advisor (optional) to prepare conceptual design and procurement documents
- ✓ Owner selects Design-Builder, primarily on qualifications and other factors
- ✓ Design-Builder prepares design (approx. 60% design completion) and prepares a Guaranteed Maximum Price (GMP) – Part 1 Agreement
- ✓ After GMP is accepted, Design-Builder finishes design and builds the project – Part 2 Agreement

PROS

- Relatively easy procurement process
- Design-Builder selection primarily on qualifications
- Pricing is open book and transparent
- "Exit" or "Off Ramp" if GMP is not acceptable to Owner
- Ability to design to budget

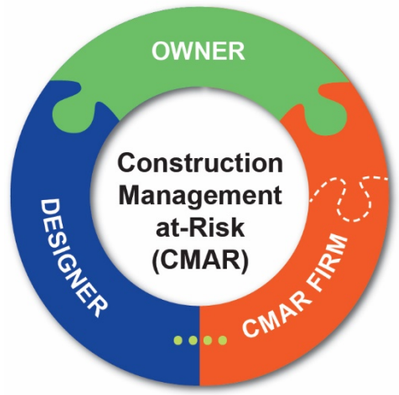
CONS

- Construction price is not know or guaranteed at initial contract signing
- Pricing requested during selection process is limited
- Requires procurement and project delivery knowledge transfer

WORKS BEST WHEN

- Qualifications and approach are more important than price
- Complicated design elements
- Owner desires high degree of involvement in design development details
- Flexibility to make modification during implementation

Construction Manager at Risk (CMAR)



Features/Process:

- ✓ Owner selects Designer and CMAR on qualifications and other factors
- ✓ Designer designs project with collaborative input from CMAR (constructability, value engineering, cost estimating, scheduling)
- ✓ Owner and CMAR negotiate GMP at a certain point during design (approx. 60% complete)
- ✓ Construction can be self-performed or competitively bid by CMAR

PROS

- Contractor (CMAR) involved during design
- Earlier certainty on construction price than DBB
- Pricing is open book and transparent
- "Exit" or "Off Ramp" if GMP is not acceptable to Owner
- Ability to design to budget

CONS

- Construction price is not known or guaranteed at initial CMAR contract signing
- Does NOT eliminate designer-contractor conflicts
- Owner retains most of performance risk
- More Owner resources required to manage multiple contracts

WORKS BEST WHEN

- Complex construction project
- Construction input during design development is critical
- CMAR self-performance is desired by Owner
- Owner desires to maintain a traditional relationship with its designer

RESOLUTION NO. ___

RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SANTA CRUZ CALLING AN ELECTION TO BE HELD ON MARCH 3, 2020 AT THE STATEWIDE PRESIDENTIAL PRIMARY ELECTION IN THE CITY OF SANTA CRUZ FOR A BALLOT MEASURE SUBMISSION OF A PROPOSED CHARTER AMENDMENT TO SECTION 1415 (CONTRACTS FOR PUBLIC WORKS)

WHEREAS, pursuant to authority provided by California Constitution, Article XI, Government Code, Title 4, Division 2, Chapter 2 (commencing at § 34450) and the Election Code Division 9, Chapter 3, Article 3 (commencing at § 9255) of the State of California, the City Council of the City of Santa Cruz desires to submit to the voters a proposed charter amendment relating to Section 1415 (contracts for public works); and

WHEREAS, the City Council is authorized and directed by statute to submit the proposed charter amendment to the voters; and

WHEREAS, pursuant to Elections Code Section 10002, the governing body of any city may by resolution request the Board of Supervisors of the county to permit the county elections official to render specified services to the city relating to the conduct of an election; and

WHEREAS, the resolution of the governing body of the city shall specify the services requested;

WHEREAS, pursuant to Elections Code Section 10002, the city shall reimburse the county in full for the services performed upon presentation of a bill to the city; and

WHEREAS, pursuant to Elections Code Section 10400, whenever two or more elections, including bond elections, of any legislative or congressional district, public district, city, county, or other political subdivision are called to be held on the same day, in the same territory, or in territory that is in part the same, they may be consolidated upon the order of the governing body or bodies or officer or officers calling the elections; and

WHEREAS, pursuant to Elections Code Section 10400, such election for cities and special districts may be either completely or partially consolidated; and

WHEREAS, pursuant to Elections Code Section 10403, whenever an election called by a district, city or other political subdivision for the submission of any question, proposition, or office to be filled is to be consolidated with a statewide election, and the question, proposition, or office to be filled is to appear upon the same ballot as that provided for that statewide election, the district, city or other political subdivision shall, at least 88 days prior to the date of the election, file with the board of supervisors, and a copy with the elections official, a resolution of its governing board requesting the consolidation, and setting forth the exact form of any question, proposition, or office to be voted upon at the election, as it is to appear on the ballot. Upon such request, the Board of Supervisors may order the consolidation; and

WHEREAS, the resolution requesting the consolidation shall be adopted and filed at the same time as the adoption of the ordinance, resolution, or order calling the election; and

WHEREAS, various district, county, state and other political subdivision elections may be or have been called to be held on March 3, 2020.

WHEREAS, Section 1415 of the City Charter mandates all public works contracts be awarded to the lowest responsible bidder under the more traditional design-bid-build method under which design, procurement and construction of the project proceed sequentially: first the preparation of plans and specifications are completed, and second an award of the construction contract with a contractor entity separate from the designer being made to the lowest responsible bidder; and

WHEREAS, design-build project delivery is a method of public works construction delivery in which the design and construction functions are contracted by a single "design-build" entity; as opposed to the more traditional design-bid-build method,

WHEREAS, California general law and charter cities that have utilized the design-build, and other types of "best value" project delivery methods for the completion of public works projects. Examples of best value project delivery methods include but are not limited to: Fixed Price Design Build, Progressive Design Build, and Construction Manager at Risk. Public agencies have experienced numerous benefits from utilizing this best value delivery methods, including reduced costs to the public agencies, expedited schedules for project delivery and completion, development of innovative solutions to construction and design challenges, and improved quality and satisfaction with public works construction projects; and

WHEREAS, on September 30th, 2014, Governor Brown approved Senate Bill No. 785, repealing and amending various provisions of the California Government Code, Health and Safety Code, and Public Contract Code to authorize various California state and local agencies to use the design-build procurement process for specified public works projects; and

WHEREAS, under its home rule authority as a charter city, the City may exempt itself from certain limitations otherwise imposed upon general law cities by the statues codified under Senate Bill No. 785; and

WHEREAS, while the City plans to utilize elements of the procurement process outlined under relevant sections of the Public Contract Code as amended under Senate Bill No. 785, (i.e., Public Contract Code Sections 22160, et seq.) in the drafting of Requests for Qualifications and Requests for Proposals soliciting qualified design-build entities under the design-build delivery process authorized by this proposed charter amendment, the City is not bound by the limitations on design-build authority contained in those statutes, including, but not limited to, limitations on the use of design-build-operate contracts.

NOW THEREFORE, BE IT RESOLVED AND ORDERED by the City Council of the City of Santa Cruz that it hereby orders an election be called and consolidated with any and all elections also called to be held on March 3, 2020 insofar as said elections are to be held in the same territory or in a territory that is in part the same as the territory of the City of Santa Cruz,

and hereby requests the Board of Supervisors of the County of Santa Cruz to order such consolidation under Elections Code Section 10401 and 10403; and

BE IT FURTHER RESOLVED AND ORDERED that the City Council of the City of Santa Cruz hereby requests the Board of Supervisors to permit the Santa Cruz County Elections Department to provide any and all services necessary for conducting the election and agrees to pay for said services; and

BE IT FURTHER RESOLVED AND ORDERED that the Santa Cruz County Elections Department shall conduct the election for the following CHARTER AMENDMENT MEASURE to be voted on at the March 3, 2020 election; and

BE IT FURTHER RESOLVED AND ORDERED as follows:

SECTION I: That pursuant to California Constitution, Article XI, Government Code, Title 4, Division 2, Chapter 2 (commencing at § 34450) and Election Code Division 9, Chapter 3, Article 3 (commencing at § 9255) of the State of California there is called and ordered to be held in the City of Santa Cruz, California, on Tuesday, March 3, 2020 the Statewide Presidential Primary Election for the purposes of submitting the following proposed charter amendment:

Ballot Question:
In order to allow the City of Santa Cruz greater flexibility in contracting for public works construction projects, such as major planned improvements in City infrastructure, shall the City of Santa Cruz Charter be amended to allow for the use of design-build or other best value procurement for public works construction, to be established by ordinance?

Yes _____ No _____

SECTION 2: That the text of the charter amendment submitted to the voters is attached as Exhibit A.

SECTION 3: That the City of Santa Cruz City Council hereby directs staff to place the measure on the ballot for the March 3, 2020 Statewide Presidential Primary Election; and

SECTION 4: The City Clerk Administrator shall certify the passage and adoption of the resolution and enter it into the book of original resolutions.

EXHIBIT A
OF THE CITY OF SANTA CRUZ

That Section 1415 of the City Charter be amended to read as follows:

SECTION 1415 CONTRACTS FOR PUBLIC WORKS.

Any public works or improvements costing more than such amount as may be prescribed by ordinance shall be executed by contract, except where a specific work or improvement is authorized by the Council to be performed directly by a City department or officer in conformity with detailed plans, specifications and estimates. ~~All such contracts shall be awarded to the lowest responsible bidder after such public notice and competition as may be prescribed by ordinance or resolution, provided the Council or the City Manager, when so authorized, shall have the power to reject all bids and may readvertise in its discretion. All advertisements as to such contract shall so provide.~~

Notwithstanding any provision to the contrary in the California Public Contracts Code, or any other law or regulation of the City of Santa Cruz, the use of best value alternative project delivery methods including, but not limited to, progressive design-build, construction manager at risk, fixed-price design-build, and design-build-operate contracts is authorized for all public works projects. The City Council shall establish, by ordinance, regulations for the award, use and evaluation of such contracts.

All contracts entered into by the City shall be signed by the City Manager or other officer or officers as the Council may by ordinance or resolution prescribe.