Request for Qualifications (RFQ)

Professional Engineering Services to Perform Groundwater Replenishment Feasibility Study

Qualifications Due: March 20, 2015
I. Request for Qualifications

The Soquel Creek Water District (District) is soliciting a Statement of Qualifications (SOQ) from qualified engineering consulting firms (Consultant) to provide professional engineering services for the District’s Groundwater Replenishment Feasibility Study (Feasibility Study).

II. Overview

A. Background

Soquel Creek Water District (District) is a nonprofit, local government agency formed under the County Water District Law (Water Code, Division 12, Section 30000 et. seq.) that provides potable water service and groundwater resource management within its service area. The District’s service area encompasses seven miles of shoreline along Monterey Bay, and extends from one to three miles inland into the foothills of the Santa Cruz Mountains, essentially following the County Urban Services Line. The District provides water to meet the needs of approximately 37,000 residents, 18,000 jobs (many in education, hospitality/tourism and public services), 22 parks, and 18 schools.

The District relies entirely on groundwater from the Soquel-Aptos area, which is currently being pumped at an unsustainable rate and is thus in a state of overdraft. If the total groundwater extractions from the District and other pumpers (including the City of Santa Cruz, the Central Water District, small mutual water companies, and private well owners) continue based on current practices, the groundwater levels will continue to be too low to protect against seawater intrusion. In order to increase the amount of groundwater to protective levels by allowing the basin to naturally recover, the District needs to reduce its groundwater pumping. Recent hydrologic modeling and evaluations indicate that restoring groundwater levels to provide protection against seawater intrusion will likely take at least 20 years. This assumes that annual District pumping is limited to no more than 2,900 acre-feet per year (afy and other users do not further increase groundwater pumping in the over drafted portion of the basin. This limit of 2,900 afy has been established by the District as the recovery pumping goal.

Taking into consideration anticipated conservation savings, approximately 1,500 afy of supplemental supply is needed to allow the District to reduce its pumping to the recovery pumping goal (2,900 afy). The recovery pumping goal of 2,900 afy cannot be implemented without sufficient supplemental supply(ies) or additional conservation is enacted, which would allow the District to reduce and sustain its groundwater pumping to this level.

Given the groundwater overdraft conditions in the Soquel-Aptos area, as well as threats from climate change and changing water quality requirements that may affect the use of a portion of the District’s groundwater sources, the District has been actively pursuing a supplemental water supply, along with conservation and groundwater management. Over the last 20 years, a number of supply alternatives have been investigated during open and public planning processes and were determined not to be viable.

To ensure a long-term, safe, and reliable water supply, the District began working with its community in September 2013 to develop back-up supplemental supply options to the scwd Regional Seawater Desalination Project through a series of public meetings. To date, the District has held 13 public meetings to discuss back-up water supply options and have developed six back-up water supply options. The back-up supplemental supply options were grouped in three categories: seawater desalination, groundwater replenishment using recycled water, and surface water transfers. Most recently, the Board commissioned a Peer Review Study to review the information prepared during this assessment and
focused on (1) the project definition and appropriateness of the defined project components, (2) the reasonableness of the presented capital and operation and maintenance cost for each option, (3) identification of any fatal flaws, and (4) identification of areas where additional definition is needed that could have material effect on the options. The draft Peer Review Study is attached (See Attachment C).

On August 26, 2014 the Board of Directors directed its staff to conduct a feasibility study on groundwater replenishment using recycled water.

The purpose of this Feasibility Study is to support further development and evaluation of the groundwater replenishment using recycled water option(s).

B. Project Description

Of the total six back-up water supplies, the District has developed two groundwater replenishment with recycled water options – the Mid-County Groundwater Replenishment Project and the Santa Cruz Regional Groundwater Replenishment Project. The District has retained an independent firm to serve as the District’s Technical Advisor for Recycled Water Supply Options. The Technical Advisor will assist the District by providing technical input in evaluating and implementing projects related to recycled water, including: Consultant selection, oversight on the Feasibility Study, coordination with project stakeholders and relevant ongoing studies (e.g. Santa Cruz Regional Recycled Water Facilities Planning Study), and development/implementation of the overall program.

The Feasibility Study will focus primarily on the Mid-County Groundwater Replenishment Project, which will provide recycled water to the District for groundwater replenishment. The Santa Cruz Regional Groundwater Replenishment Project will be developed separately by the City of Santa Cruz within their investigative work to be conducted in 2015-2016. The Consultant will need to assist the District and the District’s Technical Advisor to incorporate key findings of the City of Santa Cruz’s Recycled Water Facilities Planning Study to ensure there is no duplication in work. The two studies will have some similar components and features such as potential injection well location(s), delivery infrastructure, treatment technology and treatment train selection, and source water control.

The Mid-County Groundwater Replenishment Project involves treating raw sewage through wastewater and advanced water purification treatment technologies to produce approximately 1.3 million gallon per day (mgd) or 1,500 acre-feet per year (AFY) of purified water for groundwater recharge. The wastewater collection system within the District’s service boundary is currently owned and operated by the Santa Cruz County Sanitation District. The District currently does not own or operate any wastewater treatment or collection facilities. Major components of the Mid-County Groundwater Replenishment Project include:

- Tie-in to existing sewer lift station with a new conveyance pipeline to a new treatment facility with the following:
  - Biological wastewater treatment.
  - Advanced water purification through RO and advanced oxidation process (AOP) using hydrogen peroxide and ultra violet (UV) light.
- Route new wastewater discharge line to the existing sewer.
- Storage, pumping station, conveyance system, monitoring wells, and injection wells for groundwater recharge.

Conceptual level project definition for the Mid-County Groundwater Replenishment Project has already been developed by the District and is available on the District’s website. The District has pursued grant
funding from the State Water Resource Control Board’s (SWRCB) Water Recycling Program to support this Feasibility Study and has submitted an application in January 2015. (See Attachment D - Plan of Study). The District and District’s Technical Advisor will be responsible for submitting and obtaining the grant funding.

III. Requested Scope of Work

A sample proposed scope of work is outlined below. A detailed scope of work will be developed with the selected Consultant. Any additional scope of work items proposed by the Consultant that may provide additional value to the Feasibility Study are encouraged and should be labeled as “Optional Tasks” in the Consultant’s response to the RFQ. Consideration will be given to added value of each optional task for Consultant selection and inclusion in the final scope of work for the District’s Study.

Task 1 – Project Management and Quality Assurance/Quality Control (QA/QC)

- Conduct Project Kick-Off Meeting
- Conduct monthly progress meetings and participate in conference calls, stakeholder meetings, etc. as required to keep the project on schedule and budget
- Prepare monthly progress reports
- Provide for internal QA/QC on all work products and submittals (e.g. reports, calculations, opinion of probably cost, etc.)

Task 2 – Collect Background Information

- Prepare an information request for gathering relevant information (e.g. previous studies, reports, presentations, drawings, etc.) from the project stakeholders to aid in evaluation and project definition for the Feasibility Study.
- The Consultant shall summarize the Feasibility Study area characteristics, water supply, wastewater supply as it relates recycled water and groundwater replenishment with purified recycled water within the District’s service area. The Consultant shall quantify available wastewater flows for treatment and potential offset to local groundwater sources.

Task 3 – Recycled Water Market Assessment

- The emphasis of the recycled water market assessment should focus on IPR and DPR opportunities, as non-potable demands (e.g. irrigation and commercial/industrial demands) have already been documented in the District’s 2009 Water Recycling Facilities Planning Study. The Consultant shall build on previous studies conducted by the District (e.g. 2009 Water Recycling Facilities Planning Study) to update any changes to the previous data collected, as necessary, with input from the District and the District’s Technical Advisor.
- The Consultant shall develop a map based on the information gathered (in the above bullet item) highlighting each potential customer’s geographical location and relative water demands. At a minimum, the following demands should be considered: 1) irrigation demand, 2) commercial/industrial demands, 3) indirect potable reuse (IPR) applications, and 4) direct potable reuse (DPR) opportunities. The recycled water market assessment shall consider both supply and demand of recycled water.

Task 4 – Treatment Evaluation

- The Consultant shall provide a summary of expected water quality objectives and regulatory requirements for various potential recycled water uses identified in the District’s service area (e.g. Title 22 and potable reuse).
The Consultant shall provide a summary of the expected source water quality and key constituents of concern to meet each recycled water quality objective.

- A technology assessment shall be conducted for proven treatment technologies as well as for technologies currently under development for recycled water treatment, with an emphasis on advanced treatment technologies and treatment trains for potable reuse. A summary of the technology evaluation shall be provided and a baseline treatment train selected, using proven treatment technologies, to be used for this Feasibility Study in developing site requirements and cost estimates.
- The treatment technology assessment shall include, at a minimum, treatment efficiency, waste streams produced, energy requirements, and potential for by-product formation.
- The Consultant shall also consider and address the impacts that constituents of emerging concern (CEC), endocrine disruptor compounds (EDCs), etc. have on treatment technology selection and treatment train development considering current and potential future contaminants.

Task 5 – Alternatives Analysis

- The Consultant shall identify and perform preliminary screening for all recycled water alternatives to select a minimum of three (3) alternative(s) for detailed evaluation. A No Project Alternative shall be included in addition to the three (3) alternatives selected for detailed evaluation. Preliminary screening criteria will be developed with the District’s and the District’s Technical Advisor’s input.
- Consideration shall be given to potential cost-sharing alternatives during alternatives development and analysis to determine if this is a feasible alternative for the District (e.g. partnership between County of Santa Cruz Sanitation District and the District).
- For each of alternatives selected for detailed evaluation, the Consultant shall develop, at a minimum, conceptual level facility design (e.g. site layout, major structures, and treatment processes), visual/mapping to show proposed facility location and supporting infrastructure (e.g. conveyance pipe routes and injection well locations), capital cost, operation and maintenance (O&M) cost, and life-cycle costs to facilitate alternatives analysis. Cost evaluation of the scalping plant shall include an estimate of the capital costs and O&M impact of dewatering the sewer line discussing the adjustment in treatment methods that would occur at the Santa Cruz WWTF with City Public Works staff. Conceptual facility design shall include, at a minimum, source water conveyance/diversion requirements, treatment facility, conveyance system, and/or groundwater injection facilities. All cost estimates shall meet the requirements of AACE Level 4 Cost Estimate.
- The Consultant shall hold two workshops with the District and the District’s Technical Advisor, one to discuss the preliminary screening process and a second one for detailed alternatives analysis.
- For alternatives selected for detailed analysis, an environmental analysis shall be performed to quantify impacts on endangered/threatened species, public health or safety, natural resources, regulated waters, and cultural resources for each alternative. The information quantified will be used to assist in California Environmental Quality Act (CEQA) compliance in the future.
- For groundwater replenishment projects, the Consultant shall identify information needed from the District’s hydrogeologist to aid in alternatives development and analysis.

Task 6 – Stakeholder Coordination

- The Consultant shall assist the District and the District’s Technical Advisor to identify relevant project stakeholders (e.g. agencies who own the source sewage water or secondary-treated wastewater and end users of the recycled water). At this time, it is anticipated that the project stakeholders will also include the City of Santa Cruz and Santa Cruz County Sanitation District.
For groundwater replenishment with recycled water alternatives, coordination may be required with the local groundwater sustainability agency, which is in the process of being formed under the provisions of the Sustainable Groundwater Management Act, but may not be finalized during this Feasibility Study.

- The District’s Technical Advisor, with assistance from the Consultant, will be responsible for coordinating with relevant project stakeholders and the City of Santa Cruz’s regional project during the alternatives analysis to ensure consensus amongst all stakeholders for the alternatives developed for analysis.
- The Consultant shall include presentation/attendance at two public meetings to present the results of the alternatives analysis.

Task 7 – Recommended Facilities Project Plan

- The Consultant shall prepare a Draft Recommended Facilities Project Plan for the recommended alternative, including implementation schedule, phasing, project costs, and permitting requirements.
- A Workshop shall be held with District staff (and SWRCB Grant Project Manager) to discuss the Draft Recommended Facilities Project Plan.
- A Final Recommended Facilities Project Plan shall be prepared by the Consultant. A total of five (5) hard copies and one electronic copy shall be provided to the District.

Task 8 – Construction Financing and Revenue Program Development

- The Consultant shall develop a construction financing plan and identify potential sources of funding (e.g. State Revolving Funds, loan programs from SWRCB, federal grants, Proposition 1, United States Bureau of Reclamation, etc.) for the recommended project to meet SWRCB’s grant requirements. Please refer to the attachments for a link to the SWRCB’s grant requirements.
- The Consultant shall assist the District in developing a revenue program for the project to determine how the District can pay for construction, annual O&M costs, and replacements costs with and without outside funding assistance.
- Please refer to SWRCB Water Recycling Program Funding Criteria (attached for reference).

Task 9 – Final Feasibility Study Report

- An administrative draft report will be prepared for the District’s review that summarizes the work completed in Tasks 1 through 7. The work performed and the contents of the report will need to meet the District’s requirements as well as the SWRCB Water Recycling Program Funding Criteria (attached for reference).
- Five copies of the Draft Feasibility Study Report will be submitted to the District. The District will submit the Draft Report to SWRCB for review and comments.
- The Consultant will be responsible for addressing any comments from the SWRCB and the District. The Consultant shall prepare a Final Feasibility Study Report and submit five (5) hard copies and one (1) electronic copy to the District.

IV. Project Schedule

The anticipated project schedule from notice to proceed (NTP) is approximately 12 months.

V. Fee Estimate

The District will negotiate the final scope and fee after contract award to the best qualified Consultant.

VI. Proposal Requirements
Request for Qualifications
Professional Engineering Services to Perform Groundwater Replenishment Feasibility Study
Soquel Creek Water District

The proposal should be concise, well-organized and demonstrate the Consultant’s and the individual team members’ qualifications related to the proposed nature of the Feasibility Study and Scope of Work.

For the sake of efficient review, please restrict the Proposal to a total not-to-exceed limit of 20 pages, 8½ by 11 pages including preprinted material, charts, design write-up, graphics, forms, pictures, etc. The minimum font size for the proposal is 12-point. For exhibits such as the fee proposal and the proposed project schedules, the use of 11 x 17 pages is allowed and welcomed. The 20 page limit does not include the cover letter, dividers, resumes, appendices, front cover or back cover included in the proposal.

Parties interested in being considered for this project are requested to submit their Statements of Qualifications by 2:00 p.m., March 20, 2015 to:

Soquel Creek Water District
5180 Soquel Drive
Soquel, CA 95073
Attention: Melanie Schumacher

Proposals must be prepared simply and economically, providing a straightforward, concise description of the methodology and approach utilized to satisfy the requirements of this solicitation. Emphasis should be on completeness and clarity of content with sufficient detail to allow for accurate evaluation and comparative analysis.

District will not be liable for costs incurred by the respondents in preparing this Statement of Qualifications (SOQ).

At a minimum, the Consultant’s Proposal shall include:

A. **Cover Letter**

This letter shall be a brief formal letter from the Consultant that provides information regarding the firm and its ability to perform the requirements of this solicitation. This letter must include the following information:

- Complete legal company name (as it should appear in a contract).
- Company Address.
- Contact person, telephone number, and email address.
- Identify all materials and enclosures being forwarded in response to this solicitation.
- The letter must be signed by an individual authorized to bind the proposing entity

B. **Project Understanding**

The statement of qualification shall include a description of the Consultant’s understanding of the Feasibility Study goals, including background, purpose, key issues, and inter-relationship with other District and regional projects. The Consultant shall demonstrate an understanding of the District’s goals and objectives as related to the Feasibility Study.

C. **Technical Approach**

A thorough description of the Consultant’s approach and methodology to complete the work tasks outlined in this RFQ. The Consultant is encouraged to identify additional tasks that may benefit the Feasibility Study. Please include a preliminary schedule for the Feasibility Study.
D. Project Team

Provide a brief overview of the firm and identify local and regional branch offices, including subconsultants that will be participating in the Feasibility Study. Provide a specific organizational chart identifying key project personnel by name, title, work office location, California Professional Registrations and the areas of expertise for which each team member will be responsible. A list of subconsultants to be used, if any, will be identified along with their expertise related to the Feasibility Study. A description of how the firm will utilize its resources to start and complete the project in a timely manner shall be included.

E. Experience

Describe the specific projects that the proposed personnel for this Feasibility Study have worked on within the past five (5) years, with contact names and phone numbers of clients. Please provide a minimum of three (3) projects of similar scope. For each project, please indicate which proposed team member worked on the projects and describe the role/work they performed. Emphasis should be placed on recycled water feasibility studies, recycled water treatment, and potable reuse evaluations/implementation. Please restrict project experience listings and descriptions to the team members that are a part of this proposal team.

F. Project References

In addition to the description of project experience, please provide three (3) specific project reference contacts for your firm on similar projects.

G. Resumes

Please include resumes for each proposed team member. Please limit each resume to two (2) pages.

H. Fee Schedule

Provide fee schedules for your firm and proposed subconsultants which include an hourly rate for each category of employee (i.e., principal, project manager, etc.) and fee for related support costs (mileage, blueprint, reproduction, etc.). Provide proposed rate schedules for consecutive years.

VII. Evaluation Criteria and Selection

A. Selection Process

SOQs will be evaluated based on the criteria established below. Top rated firms will be invited to interview with an Evaluation Committee comprised of District board members, District staff, and the District’s Technical Advisor. During the interview process, the firms may be asked to:

- Make an oral presentation by responding to pre-established questions.
- Prepare a proposal and detailed scope of work for the purpose of negotiating a contract.
- Provide additional information to assist the District in determining the best value firm.

All top rated firms will be given equal opportunity to provide the requested information to the District. Any oral presentations and/or demonstrations being conducted in an interview will be scheduled on a mutually agreed upon date and will be at no cost to the District. The Evaluation Committee will use all information collected to rank the semi-finalists in order of their ability to best meet the requirements of the District.
B. Timeline

Solicit Proposals February 23, 2015
Last Day for Respondent’s Questions March 9, 2015
SOQ Due March 20, 2015
Interviews April 9, 2015
Project Award May 5, 2015

C. Information Disclosure to Third Parties

SOQs are a matter of public record and are open to inspection under the California Public Records Act. If any respondent claims any part of its SOQ is exempt from disclosure and copying, they shall so indicate in the transmittal letter. By responding to this RFQ, respondents waive any challenge to the District’s decision in this regard.

If any SOQ contains confidential information, the respondent shall clearly label and stamp the specific portions that are to be kept confidential. The respondent is urged to identify the truly confidential portions of the SOQ and not simply mark all or substantially all response as confidential. Notwithstanding the foregoing, respondents recognize that the District will not be responsible or liable in any way for loses that the respondents may suffer from the disclosure of information or materials to third parties.

D. District Rights and Options

The District, at its sole discretion, reserves the following rights:

1. To determine which respondents, if any, shall be included on a short list of semi-finalists based on the criteria set forth in the RFQ;
2. To reject any, or all SOQs or information received pursuant to this RFQ;
3. To supplement, amend, substitute or otherwise modify this RFQ at any time by means of written addendum;
4. To cancel this RFQ with or without the substitution of another RFQ or prequalification process;
5. To request additional information;
6. To verify the qualifications and experience of each respondent;
7. To require one or more respondents to supplement, clarify or provide additional information in order for the District to evaluate SOQs submitted;
8. To hire multiple contractors to perform the necessary duties and range of services if it is determined to be in the best interests of the District;
9. To use any techniques or concepts included in the submitted SOQ regardless of firm’s selection; and
10. To waive any minor defect or technicality in any SOQ received.
E. Questions/Clarification Request

The respondent shall, in the SOQ, identify the Project Manager and key staff. The Project Manager shall be the primary contact for the District.

For the District, the primary contact is:

Melanie Schumacher, PE
Special Projects/Community Dialogue Manager
Soquel Creek Water District
5180 Soquel Drive
Soquel, CA 95073
Email: MelanieS@soquelcreekwater.org
Phone: (831) 475-8501 x 153

During the SOQ process, interested parties shall direct all questions via email to the District’s primary contact listed above.

F. Selection Criteria

Firms will be evaluated on the information presented in the SOQ. Final selection will be based on the SOQ as well as an interview with top rated firms. Evaluation factors shall include the following:

1. Qualifications as they relate to this project (40%).
   a. Firm’s experience with similar projects.
   b. Qualifications of proposed key personnel.
   c. Communication skills.
2. Consultant’s project understanding and technical approach to complete the tasks outlined in the RFP, including any optional tasks proposed by the Consultant (30%).
3. Apparent ability to provide the required services in a timely matter (15%).
   a. Accessibility of staff.
   b. Flexibility and readiness for completing specified work.
4. Firm’s reputation for integrity and competence (15%).

Contract negotiations will begin immediately with the first choice candidate after the interview process. If an agreement on cost is not reached within five (5) working days, the next highest ranked candidate will be contacted and negotiations with that candidate will begin. This process will continue until an agreement is reached or it is decided to re-advertise.

If a clear choice is not evident, interviews will be scheduled with those firms of exceptional rating.

VIII. Attachments and Resources

A. Sample Professional Services Agreement (attached)
Request for Qualifications
Professional Engineering Services to Perform Groundwater Replenishment Feasibility Study
Soquel Creek Water District


C. Draft Peer Review by Black and Veatch on District’s Back-Up Supply Options (attached)

D. State Water Resources Water Recycling Funding Program- Plan of Study for Soquel Creek Water District (attached)


THIS AGREEMENT is entered into on the _____ day of ____________, 2015, by and between SOQUEL CREEK WATER DISTRICT, hereinafter called "District," and , hereinafter called "Consultant."

RECATALS

(A) District desires certain services hereinafter described; and

(B) Consultant is capable of providing and desires to provide such services.

NOW, THEREFORE, District and Consultant agree as follows:

SECTION I
SCOPE OF SERVICES

The services to be performed under this Agreement are as described in Appendix One hereunto attached and made a part hereof.

SECTION II
DUTIES OF CONSULTANT

All work performed by Consultant or under its direction shall be sufficient to meet the purposes specified and shall be rendered in accordance with the accepted practices and to the standards of profession.

Consultant shall not undertake any work beyond the scope of this Agreement unless such additional work is approved in advance and in writing by District. The cost of such additional work shall be reimbursed to Consultant by District on the same basis as provided in Section IV.

If in the performance of the services hereunder, it is necessary to conduct investigations or other operations in the field, security and safety of the area of such field operations under the control of the Consultant will be the responsibility of Consultant,
excluding, nevertheless, the security and safety of any area of facility of District under the control of District's contractor or agent and not under the control of Consultant.

Where services hereunder include preparation of drawings and other contract documents by Consultant and where, notwithstanding acceptance and approval by District thereof, in the opinion of the General Manager, drawings and other contract documents so prepared are found during the course of construction to require modifications due to omissions, error, or lack of detail, such modifications shall be made by Consultant without additional compensation.

Consultant shall meet with the General Manager, or other personnel of District, or third parties as necessary, on all matters connected with carrying out of Consultant's services described in Appendix One. Such meetings will be held at the request of either party hereto. Review and District approval of completed work shall be obtained monthly or at such intervals as may be mutually agreed upon, during the course of this work.

In accordance with the provisions of Section 3700 of the California Labor Code, Consultant is required to secure the payment of worker's compensation to its employees.

Consultant shall obtain and keep in full force and effect worker's compensation insurance necessary in connection with the performance of this Agreement to protect Consultant and its employees under the Worker's Compensation Insurance and Safety Act, including coverage under United States Longshoremen's and Harbor Worker Act, when applicable. Such insurance shall be in a standard form and shall relieve District of all responsibility therefore. Consultant shall, prior to undertaking the work contemplated herein, supply District with a certificate of insurance evidencing that said requirements hereinabove are fully in effect.

Every firm having ten or more employees, including principals, and all firms providing a professional service to District for compensation greater than $10,000.00 shall provide equal opportunity to all persons regardless of race, creed, color, sex, age, national origin or physical handicap in conformance with applicable Fair Employment Practices Commission and Equal Employment Opportunity Commission guidelines.
The District requires the consultant to submit an electronic version of all data files and an electronic file of any and all reports.

SECTION III
DUTIES OF DISTRICT

District shall make available to Consultant all data and information in the possession of District, which District deems necessary to the preparation of the work, and District shall actively aid and assist Consultant in obtaining such information deemed necessary as aforesaid from other agencies and individuals. Consultant has the right to rely on the information so supplied by the District.

The General Manager of the District may authorize a staff person as his or her representative to confer with Consultant relative to Consultant services hereunder. The work in progress hereunder shall be reviewed and inspected from time to time by District at the discretion of District or upon the request of Consultant. If the work is satisfactory, it will be approved. If the work is not satisfactory, District will inform Consultant of the changes or revisions necessary to secure approval.

The District reserves the right to cancel the contract with the Consultant with 30 days advance written notice.

SECTION IV
FEES AND PAYMENT

Payment for the services hereinabove described shall be made upon a schedule and with the limit or limits shown upon Appendix Two hereunto attached and made a part hereof, and such payment shall be considered as full compensation for all personnel, materials, supplies and equipment used in carrying out the work.

Unless otherwise specified in said Appendix Two, Consultant's fees shall be payable on monthly statements; such statements shall give a detail of time worked by
each class of employee and the expenses incurred for which billing is made and shall contain the following form of affidavit signed by a principal of the firm of Consultant:

"I hereby certify as principal of the firm ___ that the charge of $____________ as summarized above and shown in detail on the attachments is fair and reasonable, is in accordance with the terms of the Agreement dated ________________, and has not been previously paid."

It is understood and agreed that payment is not to exceed the total amount in Appendix Two without prior District approval.

SECTION V

TIME OF BEGINNING AND SCHEDULE FOR COMPLETION

Consultant shall begin work upon receipt by it of written Notice to Proceed from District which said notice shall not be issued until after this Agreement has been approved and authorized by District's governing body.

The schedule for completion of the work shall be as shown upon Appendix Three hereunto attached and made a part hereof.

SECTION VI

CHANGES IN WORK

District may order changes in scope of character of work, either, decreasing or increasing the amount of Consultant's services. Increased compensation, if any, for changes shall be determined in accordance with Appendix Two hereof; provided, however, that in the event major changes are ordered, the Scope of Services, Fees and Schedule of Completion, as stated in the Appendices, will be adjusted by negotiation between Consultant and District.

In the event work is terminated, District shall pay all compensation earned prior thereto.
SECTION VII

DELAYS AND EXTENSIONS

In the event Consultant is delayed in performance of its services by circumstances beyond its control, it will be granted a reasonable adjustment in the Schedule of Completion as described in Appendix Three. All claims for adjustments in Schedule of Completion must be submitted to District by Consultant within thirty (30) calendar days of the time of occurrence of circumstances necessitating the adjustment.

SECTION VIII

MISCELLANEOUS PROVISIONS

District reserves the right to approve the project manager assigned by Consultant to said work.

This Agreement shall not be assigned without first obtaining the express written consent of the District.

Consultant is employed to render a service only and any payments made to Consultant are compensation solely for such services as Consultant may render.

Any discretion or right to approve given to any party herein shall be exercised in a reasonable manner.

All work performance pursuant hereto shall, upon completion, become the property of District. In the event the work is not completed, the completed portion thereof shall become the property of the District. However, District agrees that any reuse of any materials so furnished by Consultant shall be at District's own risk unless prior written approval has been given by Consultant for such reuse.

Note: No representative of District is authorized to obligate District to pay the cost or value of services beyond the scope thereof as herein described; such authority is retained solely by District's Board of Directors.
SECTION IX
CERTIFICATION

Pursuant to Section 1861 California Labor Code, Consultant certifies:

"I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract."

SECTION X
INDEMNIFICATION

Consultant shall be responsible for any injury or damage to any person or property howsoever occasioned by or arising out of Consultant's willful misconduct or negligent performance of the work hereunder. The Consultant shall assume the defense of, and indemnify and save harmless the District, the Board, each member of the Board, and their officers, agents, and employees from all liability and claims of any kind arising from the negligence or willful misconduct of the Consultant or its agents to the proportion that said liability and claims result from Consultant’s negligence or misconduct.

SECTION XI
LIMITATION OF LIABILITY

To the maximum extent permitted by law, the Client agrees to limit the Consultant's liability for the Client's damages to the sum of $1,000,000 or the Consultant's fee shown in Appendix Two, whichever is greater. This limitation shall apply regardless of the cause of action or legal theory pled or asserted.

SECTION XII
INSURANCE

Insurance requirements, if any, shall be as set forth in Appendix Four hereto.
IN WITNESS WHEREOF, the parties have executed this Agreement the day first
hereinabove written.

SOQUEL CREEK WATER DISTRICT

By

Bruce Daniels, Board President

ATTEST:

_________________________________
Secretary of Said Board

Firm Address:

By_________________________________

Federal I.D. Number
APPENDIX ONE

SCOPE OF SERVICES

Consultant’s scope to perform Consulting Services for [ ]
Consultant’s estimate to perform Consulting Services for .
APPENDIX THREE

SCHEDULE

This contract is in effect until the final task as defined in the scope in Appendix One is complete.
APPENDIX FOUR

INSURANCE

Without limiting Consultant's responsibility for injury or damage, as aforesaid, Consultant will at its sole cost and expense keep in force at all times during the performance of this contract, public liability insurance and provide a certificate of said insurance which shall have attached thereto an executed copy of an additional insured endorsement naming District, its officers, agents and employees as additional insured on the General and Auto Liability policies. If the standard ISO Form wording "OTHER INSURANCE" is not contained in Consultant's Insurance Policy, an endorsement must be provided that said insurance will be primary insurance and no insurance of the additional insured will be called upon to contribute to a loss. Said insurance will be to limits not less than those shown below and shall be Comprehensive or Commercial General and Auto Liability Insurance covering all operations and use of automobiles, including coverage for completed operations and for contractual liability (liability assumed under “an insured” Contract).

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bodily Injury</td>
<td>$1,000,000/Occurrence</td>
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<tr>
<td>And</td>
<td>$2,000,000/Aggregate</td>
</tr>
<tr>
<td>Property Damage</td>
<td></td>
</tr>
<tr>
<td>Combined Single Limit</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Errors &amp; Omissions</td>
<td>$1,000,000 each claim and aggregate</td>
</tr>
</tbody>
</table>

Said insurance shall be underwritten by a company satisfactory to District and the certificate of insurance shall contain a condition or endorsement precluding cancellation prior to District's being given at least thirty (30) days advance written notice thereof.

Prior to starting work hereunder, Consultant shall furnish to District evidence that the requirements indicated hereinabove are in effect.
DRAFT Technical Memorandum No.2 Groundwater Replenishment with Recycled Water Alternatives

To: Melanie Schumacher, Soquel Creek Water District

From: Todd Reynolds, PE and Dawn Taffler, PE LEED<sup>AP</sup>, Kennedy/Jenks Consultants

Subject: Mid-County and Santa Cruz Regional Groundwater Replenishment with Recycled Water
SqCWD Technical Advisor Services
K/J 1368027.00

Summary
This memorandum provides a conceptual-level analysis of implementing groundwater replenishment project using recycled water to meet the supplemental water supply objectives for the Soquel Creek Water District (District). As part of the District Integrated Resources Plan (IRP, 2006, 2012), the District’s supplemental water supply objective is to provide an estimated average of 1,500 acre feet per year (AFY), 1.3 million gallons per day (mgd), of potable water every year for at least 20 years to protect and recover over-drafted aquifers. This Technical Memorandum No. 2 (TM #2) provides a conceptual-level evaluation of facilities and cost for a Mid-County Regional and Santa Cruz Regional Groundwater Replenishment Project alternatives using Recycled Water. The potential location and requirements for groundwater recharge with recycled water within the District’s service area would be the same for both projects.

Objective
The objective of the Mid-County Regional Groundwater Replenishment Project (Mid-County GWR Project) would be to develop facilities within the District’s service area to provide an average of 1,500 AFY (1.3 mgd) of advanced-treated recycled water that could be use for groundwater replenishment to provide a supplemental potable water supply to meet the District’s objectives. A mid-county Advanced Recycled Water Treatment Facility (ARWTF) and associated facilities would provide groundwater replenishment every year for 20 years to supplement the groundwater supply and help recover the aquifer and protect it from seawater intrusion.

The objective of the Santa Cruz Regional Groundwater Replenishment Project (Santa Cruz Regional GWR Project) would be to participate in a larger regional project, with an estimated capacity of 4,000 AFY (3.6 mgd), or more, where the District contributes to a proportional share of the costs for facilities located outside of the District’s service area. The District would receive an average of 1,500 AFY (1.3 mgd) of advanced-treated recycled water that could be use for groundwater replenishment to provide a supplemental potable water supply to meet the District’s objectives. Recycled water produced at the Regional ARWTF would be conveyed to
the District to provide groundwater replenishment every year for 20 years to supplement the groundwater supply and help recover the aquifer and protect it from seawater intrusion.

**Mid-County Regional GWR Project**

**Description**
A satellite ARWTF would be located in the District’s service area and use municipal wastewater from the Santa Cruz County sewer collection system. The facility would be located near a Santa Cruz County sewer pump station, which has sufficient flow to produce up to 1.3 mgd of advanced-treated recycled water. The recycled water would then be pumped to groundwater injection wells to recharge the aquifer. This approach reduces the amount of conveyance piping required for the project and provides for a Mid-County regional ownership approach. Irrigation with recycled water is not included as part of this project, however, advanced-treated water could be used for irrigation at the sports fields near the injection points.

The Santa Cruz County, DA Porath sewer pump station, located off of Lode Street could provide sufficient source water and appears to have adequate space to construct a 1.3 mgd capacity ARWTF. Approximately 1.6 mgd of the municipal wastewater would be withdrawn from the average 4.5 mgd flow through the pump station. The wastewater would undergo screening, biological treatment, membrane filtration, ozonation, reverse osmosis treatment and advanced oxidation with ultraviolet light to meet the California Department of Public Health (CDPH) requirements for groundwater injection. The solids, backwash and other waste streams from the treatment process would be returned to the sanitary sewer system for treatment and discharge through the regional wastewater treatment plant at the City of Santa Cruz.

Withdrawal of wastewater at the DA Porath Pump Station would also provide benefits to the County including reducing the volume of flows in the system at that location and helping to reduce the potential for stormwater overflow events. The proposed new stormwater storage basin for the DA Porath Pump Station could be connected to the equalization basin for the proposed ARWTF to provide additional operational flexibility and overflow protection for the system.

An alternate location could be on an open property near the Santa Cruz County Soquel sewer pump station, located near the intersection of Bay Avenue and Highway 1. This location requires less distribution piping but the wastewater source flows are lower at this location. The average flows at the Soquel pump station are 1.4 mgd. The advanced water production from the Soquel pump station may be approximately 1 mgd based on treatment system recoveries and the need to leave some flow in the sewer to carry solids through the system.

Figure 1 shows potential facility locations for the Mid-County GWR Project. The proposed ARWTF locations and pipeline alignments are conceptual and based on aerial photography,
direction from the District, and professional experience. Additional geotechnical, geophysical and engineering studies would be necessary to confirm these project concepts. Additional alignments would also be explored in future project phases should this alternative be selected for further study.

Project Elements and Assumptions
A brief listing and discussion of the Mid-County GWR Project elements and assumptions for this TM are provided below.

• Mid-County GWR Project could provide an average of approximately 1,500 AFY (1.3 mgd) of potable drinking water.
• Advanced-treated recycled water would be injected into the groundwater to replenish the aquifer. The water would mix with native groundwater and be withdrawn by the District’s existing wells.
• The proposed injection locations would help fill existing depressions in the aquifer.
• The underground residence time from injection to extraction is estimated to be greater than 6 months and potentially up to 1 year.
• The ARWTF would consist of biological treatment and membrane filtration, ozone, reverse osmosis, and advanced oxidation with ultraviolet light. The waste streams from the treatment processes would be returned to the sanitary sewer.
• The ARWTF could be located at or near the Santa Cruz County, DA Porath sewer pump station. The average base wastewater flow (4.5 mgd) at this pump station would be sufficient to produce up to 1.3 mgd of advanced-treated recycled water.
• An alternative location for the ARWTF could be near the Santa Cruz County, Soquel sewer pump station. This pump station has an average base wastewater flow of 1.4 mgd. Depending on daily flow variations, it may be possible to produce up to 1 mgd of advanced-treated recycled water at this location.

Santa Cruz Regional GWR Project

Description

The Santa Cruz Regional GWR Project would consist of a larger capacity ARWTF to produce recycled water for potential use in Scotts Valley, the City of Santa Cruz, County of Santa Cruz and the District service areas. The location of the capacity and uses of recycled water in areas outside the District are not defined as part of this effort. For the purpose of this TM, it is assumed that the ARWTF would be located at the Santa Cruz WWTP and the source water would be secondary effluent from the existing Santa Cruz WWTP. The District would contribute to a proportional share of the costs for advanced-treatment facilities and conveyance to the District’s service area. The District would receive an average of 1,500 AFY (1.3 mgd) of
advanced-treated recycled water that would be pumped to groundwater injection wells to recharge the aquifer. This approach requires significantly more conveyance piping and relies on a larger Santa Cruz County regional ownership approach. Irrigation with recycled water in the District is not included as part of this project, however, advanced-treated water could be used for irrigation at the sports fields near the injection points.

Figure 2 shows potential facility locations for the Santa Cruz Regional GWR Project. The proposed ARWTF location at the Santa Cruz WWTP and pipeline alignments are conceptual and based on aerial photography, and professional experience. Additional geotechnical, geophysical and engineering studies would be necessary to confirm these project concepts. Additional alignments would also be explored in future project phases should this alternative be selected for further study.

Project Elements and Assumptions
A brief listing and discussion of the Santa Cruz Regional GWR Project elements and assumptions for this TM are provided below.

- Santa Cruz Regional GWR Project could provide an average of approximately 1,500 AFY (1.3 mgd) of potable drinking water.
- Advanced-treated recycled water would be injected into the groundwater to replenish the aquifer. The water would mix with native groundwater and be withdrawn by the District’s existing wells.
- The proposed injection locations would help fill existing depressions in the aquifer.
- The underground residence time from injection to extraction is estimated to be greater than 6 months and potentially up to 1 year.
- The ARWTF capacity is assumed to be 4,000 AFY (3.6 mgd) and would consist of coagulation, ozone, membrane filtration, reverse osmosis, and advanced oxidation with ultraviolet light. The waste streams from the treatment processes would be returned to the sanitary sewer.
- The ARWTF could be located at the Santa Cruz WWTP, or on the westside of Santa Cruz. Source water would be from the Santa Cruz wastewater plant secondary effluent.
- A new, dedicated recycled water (“purple pipe”) conveyance system and a dedicated pump station would be required to deliver recycled water to the District’s service area.
- Additional distribution system components to deliver recycled water for use in the Santa Cruz service area are not included in this assessment.

Potential Groundwater Recharge Locations

Kennedy/Jenks worked with the District’s Groundwater Consultant, Hydrometrics, to evaluate potential groundwater recharge locations to meet the CDPH requirements for underground
residence time. A minimum of two months of groundwater travel time separation is required between the advanced-treated recycled water injection and a potable water well. Based on the District’s 2002 Drinking Water Source Assessment Study, the groundwater travel time near the Main Street Well and the Estates Well was approximately 1,100 feet for two years of travel time. Therefore, this TM assumes that approximately 500 feet separation is required for a range of six months to one year groundwater travel time separation.

The potential Mid-County groundwater recharge locations and requirements would be the same for the Mid-County GWR and Santa Cruz Regional GWR Projects.

Anna Jean Cumming Park Location

Advanced-treated recycled water could be injected in the area between the Anna Jean Cummings Park and the Soquel High School sports fields to help recharge the Purisima AA and TU groundwater units. These are deeper groundwater basin units that supply the District’s Main Street Well. This area provides for locating an injection well and provides greater than 500 feet (6 months to 1 year separation) from the District’s Main Street Well and from private wells located along Greenbrae Lane.

This TM assumes that approximately 250 to 300 gpm could be injected into the groundwater aquifer at this location, based on a 2003 injection study conducted for the District.

Cabrillo College Location

Advanced-treated recycled water could be injected in the central campus area of Cabrillo College to help recharge the Purisima BC and A groundwater units. These are groundwater basin units that supply the District’s Estates Well. This area provides for locating an injection well and provides greater than 500 feet (6 months to 1 year separation) from the District’s Estates Well and from private wells located along Porter Gulch Road.

This TM assumes that approximately 700 to 800 gpm could be injected into the groundwater aquifer at this location, based on a 2003 injection study conducted for the District.

Additional Locations

If an additional injection well is required to achieve the full 1.3 mgd injection (910 gpm), then a third injection well could be evaluated near the intersection of Park Avenue and Highway 1 or at the District’s Monterey Street well facility. Injection at the District’s property near Monterey Street and Kennedy Drive could also be accomplished and provide both a seawater barrier as
well as replenishment. Based on the 2003 injection study conducted for the District, up to approximately 400 gpm could be injected at the Monterey Street location.

**Conceptual Evaluation of Costs**

The conceptual level construction and operating costs are based on the project elements described above and use information developed in previous technical studies conducted by the District, and are supplemented with cost estimates from similar projects and professional experience.

The proposed project costs have been developed to a planning level, with conceptual design criteria, conceptual site locations and pipeline routes and a basic understanding of project alternative elements and limitations. Therefore, the costs are intended to be used for comparison purposes between other alternatives explored by the District, and the level of accuracy for the capital and operating cost estimates presented should be considered to represent a Class 5 estimate with an estimate accuracy contingency of -30 to +50 percent (AACE, 1997).

**Summary of Regional GWR Projects Conceptual Costs**

The Mid-County GWR Project would be operated to provide up to 1,500 AFY (1.3 mgd) of groundwater replenishment water to the District, which would blend with native groundwater, withdrawn through existing wells and delivered to existing water distribution networks to meet potable demands.

The Santa Cruz GWR Project would be operated to provide up to 4,000 AFY (3.6 mgd) of advanced-treated recycled water. For the purpose of this TM, the District would contribute a proportional share of the capital and O&M costs based on receiving an average of 1,500 AFY (1.3 mgd) of potable water every year. In addition, the District costs would include pumping and conveyance of treated water from the Santa Cruz WWTP to the area identified for groundwater replenishment.

Table 1 summarizes the conceptual capital and operational costs for the Mid-County GWR Project with a ARWTF capacity of 1,500 AFY (1.3 mgd). For cost development, the facility was assumed to be located at the DA Porath Pump Station with two injection well locations at AJC Park and Cabrillo College.
Table 1: Conceptual Costs for Mid-County GWR Project (1,500 AFY)

<table>
<thead>
<tr>
<th>Facility</th>
<th>Conceptual Cost ($mil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARWTF at DA Porath PS</td>
<td>$27</td>
</tr>
<tr>
<td>Distribution Pipelines</td>
<td>$9</td>
</tr>
<tr>
<td>Injection Facilities</td>
<td>$5</td>
</tr>
<tr>
<td>Management, Engineering and Legal</td>
<td>$5</td>
</tr>
<tr>
<td>CEQA and Permitting</td>
<td>$7</td>
</tr>
<tr>
<td><strong>Total Capital Costs</strong></td>
<td><strong>$54</strong></td>
</tr>
<tr>
<td>Annual O&amp;M (1.3 mgd)</td>
<td>$1.2</td>
</tr>
<tr>
<td><strong>Annualized Unit Costs</strong></td>
<td><strong>$2,700</strong></td>
</tr>
</tbody>
</table>

Based on the average base wastewater flows at the DA Porath sewer pump station, the Project capacity could be increased to produce up to approximately 3 mgd (3,300 AFY) of advanced-treated recycled water suitable for irrigation or groundwater recharge for the District and to other agencies in the region. The maximum capacity for the Project would be limited by the amount of flow in the sewer that can serve as a source water for the ARWTF.

Table 2 summarizes the conceptual capital and operational costs for the Santa Cruz Regional GWR Project, with a capacity of 4,000 AFY (3.6 mgd) and the District’s proportional share based on the delivery of 1,500 AFY (1.3 mgd) of advanced-treated recycled water.

Table 2: Conceptual Costs for Santa Cruz Regional GWR Project (1,500 AFY)

<table>
<thead>
<tr>
<th>Facility</th>
<th>Conceptual Cost ($mil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Santa Cruz ARWTF (District’s Share)</td>
<td>$20</td>
</tr>
<tr>
<td>Distribution Pipelines</td>
<td>$13</td>
</tr>
<tr>
<td>Injection Facilities</td>
<td>$5</td>
</tr>
<tr>
<td>Management, Engineering and Legal</td>
<td>$5</td>
</tr>
<tr>
<td>CEQA and Permitting</td>
<td>$7</td>
</tr>
<tr>
<td><strong>Total Capital Costs</strong></td>
<td><strong>$51</strong></td>
</tr>
<tr>
<td>Annual O&amp;M (District’s Share)</td>
<td>$1.2</td>
</tr>
<tr>
<td><strong>Annualized Unit Costs</strong></td>
<td><strong>$2,600</strong></td>
</tr>
</tbody>
</table>
References


Santa Cruz County Sanitation District, System Capacity Evaluation Report. (Arcadis); October 2013.


Communications with Hydrometrics regarding Soquel Creek Water District, 2002 Drinking Water Source Assessment analysis of groundwater well influence zones and groundwater travel times.
Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community.
Note:
See Figure 1 for locations of existing wells.

Legend
- New RW Injection Well
- Advanced Treatment Facility
- RW Pipeline
- Santa Cruz Water Department
- Soquel Creek Water District
- 500ft Radius = 6mo-1yr Underground Residence Time

Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

Kennedy/Jenks Consultants

Santa Cruz Regional GWR
for GW Recharge
1368027*00
July 2014
Figure 2
PEER REVIEW ASSESSMENT OF BACK-UP OPTIONS EVALUATION

B&V PROJECT NO. 186220

PREPARED FOR

Soquel Creek Water District

11 FEBRUARY 2015
To: Melanie Schumacher, Soquel Creek Water District, Special Projects/CD Manager

Prepared by: Sunny Wang, P.E., Black & Veatch
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   Jennifer Enson, P.E., Black & Veatch

Reviewed by: David Carlson, P.E., Black & Veatch
   Ashu Shirolkar, P.E., Black & Veatch

Submitted by: Sunny Wang, P.E., Black & Veatch, Senior Process Engineer
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<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AACE</td>
<td>Association for the Advancement of Cost Engineering</td>
</tr>
<tr>
<td>AFY</td>
<td>acre-feet per year</td>
</tr>
<tr>
<td>AOP</td>
<td>advanced oxidation process</td>
</tr>
<tr>
<td>AWPF</td>
<td>Advanced Water Purification Facility</td>
</tr>
<tr>
<td>Cal AM</td>
<td>California American Water</td>
</tr>
<tr>
<td>CEQA</td>
<td>California Environmental Quality Act</td>
</tr>
<tr>
<td>DAF</td>
<td>dissolved air flotation</td>
</tr>
<tr>
<td>District</td>
<td>Soquel Creek Water District</td>
</tr>
<tr>
<td>DWD</td>
<td>Deep Water Desalination Project</td>
</tr>
<tr>
<td>GMP</td>
<td>Groundwater Management Plan</td>
</tr>
<tr>
<td>IRP</td>
<td>Integrated Resources Plan</td>
</tr>
<tr>
<td>JPA</td>
<td>Joint Power Authority</td>
</tr>
<tr>
<td>K/J</td>
<td>Kennedy/Jenks Consultants</td>
</tr>
<tr>
<td>MBR</td>
<td>membrane bioreactor</td>
</tr>
<tr>
<td>mgd</td>
<td>million gallons per day</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>operations &amp; maintenance</td>
</tr>
<tr>
<td>RO</td>
<td>reverse osmosis</td>
</tr>
<tr>
<td>SWRO</td>
<td>seawater reverse osmosis</td>
</tr>
<tr>
<td>UV</td>
<td>ultra-violet light</td>
</tr>
<tr>
<td>WMP</td>
<td>Well Master Plan</td>
</tr>
<tr>
<td>WTISR</td>
<td>Water Transfer Infrastructure Summary Report</td>
</tr>
<tr>
<td>WWTP</td>
<td>wastewater treatment plant</td>
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</table>
EXECUTIVE SUMMARY

The Soquel Creek Water District (District) has been proactively exploring back-up water supply options to diversify its water supply portfolio and reduce groundwater pumping and return the local groundwater aquifer to sustainable levels. The District has developed a total of six back-up water supply options aimed to diversify its water supply portfolio in the following categories: seawater desalination, advanced purified recycled water for groundwater replenishment, and surface water transfers. The six back-up water supply options are:

- Mid-County Desalination Project (located within the District’s boundary)
- Deep Water Desalination (DWD) Project (participating in a regional seawater desalination project located in Moss Landing)
- Mid-County Groundwater Replenishment Project
- Santa Cruz Regional Groundwater Replenishment Project
- Surface Water Transfer with Existing Infrastructure Project (transferring excess San Lorenzo River water during winter periods through existing infrastructure)
- Surface Water Transfer with Infrastructure Upgrade Project (transferring excess San Lorenzo Water during winter periods through upgraded infrastructure)

Conceptual level project definitions and cost estimates were developed by District staff and Kennedy/Jenks Consultants (K/J) for each back-up water supply option for preliminary comparison of the six options. This information was presented to the District Board in July 2014. To ensure independent confirmation on the reasonableness of the project definition and associated opinion of cost, the District staff contracted Black & Veatch to conduct a peer review assessment of the back-up water supply options. The peer review focused primarily on:

- Assessment of each project definition and appropriateness of the defined project components.
- Assessment of the reasonableness of the presented capital and operation and maintenance (O&M) costs for each option.
- Identification of any fatal flaws or areas of concern identified for any of the options.
- Identification of areas where additional definition is needed that could have a material effect on the evaluation of the options.

The information reviewed for the back-up supply options was developed to aid the District in making high level decisions to determine if additional project definition and/or studies are needed for each back-up supply option. Black & Veatch did not generate any new design information or cost information as part of the peer review. A summary of the peer review assessment of the six back-up supply options is provided in Table ES-1.
<table>
<thead>
<tr>
<th>BACK-UP SUPPLY OPTION</th>
<th>OVERALL ASSESSMENT</th>
<th>PROJECT COST ASSESSMENT</th>
<th>NEW AND CONTINUED AREAS OF CONCERN</th>
<th>AREAS OF ADDITIONAL DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-County Desalination Project</td>
<td>• Project definition and components for the Mid-County Desalination Project are relatively well defined (based on pre-design of scwd seawater desalination plant). Overall project implementation costs appear to be within reasonable range at this level.</td>
<td>• The estimated project cost is on the high side and may be outside the -20%/30 percent estimating accuracy range. • Cost for the 1.3 mgd seawater desalination plant component appears to be high.</td>
<td>• Ability to obtain regulatory approval for the proposed new open intake structure</td>
<td>• Extent of infrastructure upgrades required to introduce the new supply into the existing distribution system • Details of the intake and brine outfall approach (e.g. depth and configuration)</td>
</tr>
<tr>
<td>Deep Water Desalination Project</td>
<td>• The project definition and project costs are within reason based on the information provided and used for conceptual level comparison. Key concerns for this option’s feasibility that should be defined further include: Joint Power Authority (JPA) agreement, Water Purchase Agreement, and DWD’s financial model.</td>
<td>• The overall capital and O&amp;M cost prepared by DWD are within reasonable range for conceptual level evaluation. • The make-up and number of public water agencies participating in the JPA and terms of Water Purchase Agreement with DWD may impact overall cost to the District.</td>
<td>• Make-up, number, and contract terms of participating public water agencies in the JPA • Regulatory approval for the proposed once-through cooling system • Water Purchase Agreement between the DWD and JPA • Financial model of the overall DWD Project</td>
<td>• Design criteria for the DWD Project • Definition of “take or pay” contract arrangement with DWD • Financial model for the DWD Project • History and background of the DWD Project investor</td>
</tr>
<tr>
<td>Mid-County Groundwater Replenishment Project</td>
<td>• It is recommended that additional studies be completed to further define the project requirements and refine project costs. • This option involves the most treatment components since as it involves treating raw wastewater through biological wastewater treatment processes and advanced water purification processes.</td>
<td>• The current project definition may lack key project components that may increase the total project costs.</td>
<td>• Public acceptance and support associated with groundwater replenishment • Implementation and jurisdiction over source control program • Groundwater aquifer characteristics and if it is able to support groundwater replenishment objectives</td>
<td>• Implementation approach with the Santa Cruz County Sanitation District on source water control program • Assess decreased sewer flow on collection system and brine disposal • Suitable hydrogeological conditions to meet regulatory requirements for groundwater replenishment</td>
</tr>
<tr>
<td>Santa Cruz Regional Groundwater Replenishment Project</td>
<td>• Project is relatively well defined for conceptual level evaluation given that secondary effluent is already available for this option. • The regional groundwater replenishment approach has more stakeholders involved and should also be further studied as some key stakeholder requirements may impact project definition and total project costs.</td>
<td>• The project cost prepared is within reasonable range for conceptual level evaluation. • It appears the project cost is currently estimated based on only the District partnering with the City of Santa Cruz to produce 1.3 mgd of purified water. The cost could be lower if additional partners join the project, resulting in savings from economy of scale.</td>
<td>• Public acceptance and support associated with groundwater replenishment • Implementation and jurisdiction over source control program • Groundwater aquifer characteristics and if it is able to support groundwater replenishment objectives</td>
<td>• Implementation approach with the Santa Cruz County Sanitation District on source water control program • Regional public perception and support for groundwater replenishment projects • Suitable hydrogeological conditions to meet regulatory requirements for groundwater replenishment • Location and land acquisition for the AWPF</td>
</tr>
<tr>
<td>Surface Water Transfer with Existing Infrastructure Project</td>
<td>• The project components of the two surface water transfer projects are both relatively well defined. • Further investigation is needed to confirm water quality impacts, environmental impacts, and availability of water during the winter time for the District.</td>
<td>• The project cost prepared is within reasonable range for conceptual level evaluation. • Project components beyond facility and infrastructure requirements needs (e.g. winter time water availability and amount of water to be maintained for natural habitat in the river) should be investigated to confirm that the conceptual level cost is complete. • Cost estimate should consider variability of available winter time water and impacts of winter water quality (e.g. intensity and duration of turbidity spikes).</td>
<td>• Impact of water to be maintained in the river for protection of endangered species, which may impact available excess water supply during winter • Winter time City demands and consideration for supply to Scotts Valley, which may impact water available to the District • Water rights and water transfer agreement terms with the City of Santa Cruz • Impact of hydrologic conditions and water quality in San Lorenzo River on treatment cost and water availability</td>
<td>• Validation of the 445 and 1500 AFY for the two projects should be conducted to ensure sufficient excess winter flows is available • Water rights and environmental impacts need to be clarified to ensure sufficient water is available for the District</td>
</tr>
</tbody>
</table>
No fatal flaws were found in the work completed by K/J for a conceptual level evaluation and the conclusions drawn were appropriate. Project definition and costs for the two seawater desalination and two surface water transfer back-up water supply options were developed using studies completed previously. The two groundwater replenishment options using recycled water were developed by K/J, using reasonable assumptions to support a conceptual level comparison with the other back-up supply options. However, the studies did identify areas of concern. These continuing, along with additional areas of concerns identified by Black & Veatch include permitting, water rights, funding capacity, and stakeholder agreements. These new and continuing concerns could be a barrier to project implementation if unresolved or not addressed.

In summary, four out of the six back-up water supply options are fairly well defined for conceptual level evaluation and comparison. It is recommended that the District conduct additional studies for the two recycled water options, the Mid-County Groundwater Replenishment Project and Santa Cruz Regional Groundwater Replenishment Projects. Further project definition for the two recycled water options is warranted to better educate the general public and increase understanding of groundwater replenishment and indirect potable reuse with recycled water.
1.0 Background

The Soquel Creek Water District (District) receives 100 percent of its water from two local groundwater aquifers; the Purisima Formation and Aromas Red Sands Aquifers. The District is proactively monitoring and managing its groundwater resources by implementing recommendations from its Integrated Resources Plan (IRP), Groundwater Management Plan (GMP), and Well Master Plan (WMP) to ensure the quality and reliability of its groundwater supply. In an effort to reduce groundwater pumping and return the local groundwater aquifer to sustainable levels, the District is actively exploring and evaluating the feasibility of alternative water supplies and conservation measures to diversify its water supply portfolio.

Since late 2013, the District has conducted a series of open forum discussions to engage the community in developing local and regional alternative water supply options that could be pursued should the scwd2 Regional Seawater Desalination Project no longer be considered. As a result of the open forum discussions, the District has developed a total of six back-up water supply options in the following categories: seawater desalination, advanced purified recycled water for groundwater recharge, and surface water transfers. The six back-up water supply options are:

- Mid-County Desalination Project (located within the District's boundary)
- Deep Water Desalination (DWD) Project (participating in a regional seawater desalination project located in Moss Landing)
- Mid-County Groundwater Replenishment Project
- Santa Cruz Regional Groundwater Replenishment Project
- Water Transfer with Existing Infrastructure Project (transferring excess San Lorenzo River water during winter periods through existing infrastructure)
- Water Transfer with Infrastructure Upgrade Project (transferring excess San Lorenzo Water during winter periods through upgraded infrastructure)

2.0 Project Goals and Objectives

Conceptual level project definitions and cost estimates were developed by District staff and Kennedy/Jenks Consultants (K/J) for each back-up water supply option for preliminary comparison of the six options. This information was presented to the District Board in July 2014. To ensure independent confirmation on the reasonableness of the project definition and associated opinion of cost, the District staff contracted Black & Veatch to conduct a peer review assessment of the back-up water supply options. The peer review focused primarily on:

- Assessment of each project definition and appropriateness of the defined project components.
- Assessment of the reasonableness of the presented capital and operation and maintenance (O&M) costs for each option.
- Identification of any fatal flaws or areas of concern identified for any of the options.
- Identification of areas where additional definition is needed that could have a material effect on the evaluation of the options.
3.0 Peer Review of Back-Up Options

The peer review was conducted on the six back-up water supply options based on the information prepared by K/J and board presentations from the District's Board Meetings. The information reviewed for the back-up supply options was developed to aid the District in making high level decisions to determine if additional project definition and/or studies are needed for the back-up supply options. The cost estimates for each back-up water supply option prepared by K/J were treated as AACE Class 5 estimates for conceptual level comparison. However, project definition was already developed previously for the two seawater desalination and two surface water transfer back-up supply options. Thus, the cost information used for the two seawater desalination and two surface water transfer back-up supply options were based on an AACE Class 4 estimate. Black & Veatch did not generate any new design information or cost information as part of the peer review. An assessment of the six back-up water supply alternatives is provided below.

3.1 MID-COUNTY DESALINATION PROJECT

The Mid-County Desalination Project is a District only seawater desalination facility located within the District's boundary. The project will produce approximately 1.3 million gallons per day (mgd), or 1,500 acre-feet of water per year (AFY), of desalinated seawater for potable use. Key components of the Mid-County Desalination Project include:

- Seawater intake screen and conveyance pipeline from Soquel Cove to seawater desalination plant
- 1.3 mgd seawater desalination plant (based on the pre-design prepared by CDM for the scwd^2 Regional Seawater Desalination Plant but without dissolved air flotation [DAF] pretreatment and brine concentrate equalization basin)
- Brine discharge line to Soquel Cove and discharged through mixing nozzles without any additional dilution stream provided for the brine, which is different than the scwd^2 Desalination Plant pre-design.

3.1.1 Assessment of Project Definition and Components

Overall, project definition and components for the Mid-County Desalination Project is relatively well defined since the treatment facility is based on the pre-design already completed for the regional scwd^2 Seawater Desalination Plant. An assessment of the project definition and its associated risk for the Mid-County Desalination Project is summarized in Table 1.

Table 1: Assessment of Project Definition and Components for the Mid-County Desalination Project

<table>
<thead>
<tr>
<th>ITEM NO.</th>
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<th>RISK</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>DAF Pretreatment Maintain Production During Severe Algal Blooms. DAF pretreatment for algae removal should be considered for the Mid-County Desalination Project at the current conceptual/planning level until it is confirmed that the facility design and operation will not be impacted by severe algal blooms (e.g. intake depth/type and occurrence and intensity of algal blooms in the area).</td>
<td>• Mitigated through operation adjustments to increase production to make-up for shortfalls during severe algal blooms</td>
</tr>
<tr>
<td>2</td>
<td>Feasibility of Brine Diffusers. Alternative brine discharge method may be required if use brine diffusers for brine dispersion into the</td>
<td>• Risk already addressed by the District and K/J’s evaluation that identified</td>
</tr>
</tbody>
</table>
### 3.1.2 Assessment of Reasonableness of Capital and O&M Costs

The total project cost for the Mid-County Desalination Project appears to be on the high side, in particular, the $45 million cost for the desalination treatment plant itself, which translates to approximately $34.6 million per mgd production. As a reference point, the recently bid design-build delivery of California American Water’s (Cal Am) Monterey Seawater Desalination Plant (not include intake or brine discharge components) had a range of $85-99 million for the 9.6 mgd plant capacity option (approximately $8.9-10.4 million per mgd production) and $78-89 million for the 6.4 mgd plant capacity (approximately $11.7-13.9 million per mgd production) option. The proposed treatment process for the Cal Am Monterey Seawater Desalination Plant consists of single stage pressure filtration, two pass seawater reverse osmosis (SWRO), post-treatment, and solids handling facilities. The cost reference point should not be used for linear extrapolation to gauge the overall facility cost for the Mid-County Desalination Project as economy of scale should also be considered.

The estimated annual O&M cost needs to include operation staff cost and routine mechanical equipment maintenance costs. Other O&M costs seem appropriate for this level of estimate.
3.1.3 New and Continued Areas of Concerns

The areas of concern for the Mid-County Desalination Project are listed below. If not addressed or resolved, these items may become a fatal flaw to the project option.

- Ability to obtain regulatory approval for new brine outfall or convey the brine for discharge via the City of Santa Cruz WWTP outfall
- Ability to obtain regulatory approval for the proposed new open intake structure

3.1.4 Areas for Additional Definition

Areas of additional definition should be investigated to update the project definition and/or estimated cost is listed below.

- Rationale for excluding DAF pretreatment from the project component when it was included in the pre-design for the regional scwd² Seawater Desalination Plant.
- Tie-in location and system hydraulic requirements to introduce the supplemental supply into the existing water distribution system. The extent of infrastructure upgrades required at this time are unclear
- Details of the intake and brine outfall approach (e.g. depth and configuration) to refine proposed costs.

3.1.5 Assessment Summary of Mid-County Desalination Project

Project definition and components for the Mid-County Desalination Project are relatively well defined since the treatment facility was based on completed pre-design for the regional scwd² Seawater Desalination Plant. In addition, the proposed treatment technology for the Mid-County Desalination Plant is based on proven technologies implemented at many seawater desalination plants around the world. However, the cost appears to be high for the 1.3 mgd seawater desalination plant component of the project and should be re-evaluated. Overall project cost summarized for the Mid-County Desalination Project appears to be reasonable given the level of detail developed for this option.

3.2 DEEP WATER DESALINATION PROJECT

The DWD Project is a regional project to diversify water supply portfolio for various water agencies in the Monterey and Santa Cruz Counties. The DWD Project would be a co-located Seawater Desalination Facility that would share infrastructure, primarily seawater intake and outfall facilities, with an adjacent 150 megawatt Data Center. The Data Center would utilize seawater for cooling. DWD will be financing the capital cost of the intake and outfall system and a Joint Powers Authority (JPA), made up of public water agencies, will be formed to finance and operate the Seawater Desalination Facility. The DWD Project would be located near Moss Landing, California, and produce approximately 9 mgd (or approximately 10,000 AFY) of potable water initially. The DWD Project could be expanded up to 22 mgd (or 25,000 AFY) production capacity in a future phase. Key components of the DWD Project include:

- Screened, “deep water” intake system with dual offshore pipelines to provide up to 48 mgd of raw seawater to the intake pump station that serves the DWD Data Center and JPA Seawater Desalination Facility
- Heat exchange system that provides cooling water to the DWD Data Center and water to the JAP Seawater Desalination Facility
Main electrical substation for the DWD Data Center and JPA Seawater Desalination Facility

DWD Data Center

JPA Seawater Desalination Facility (9 mgd initially and expandable up to 22 mgd)

Brine heat exchange and discharge pipelines, with offshore diffusers, to return the mixture of brine and spent cooling water back to the ocean

The proposed treatment technology for the JPA Seawater Desalination Facility is common to seawater desalination plants around the world.

### 3.2.1 Assessment of Project Definition and Project Costs

Project components and scope of the JPA Seawater Desalination Plant are well defined within the overall DWD Project. However, several variables associated with contract arrangements (e.g. JPA and water purchase agreement), operation responsibility, and financial model may impact on the feasibility and cost of the DWD Project. A summary of these variables and its risks is provided in Table 2.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
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<tbody>
<tr>
<td>1</td>
<td>Uncertainty of Capital Cost Distribution. It is unclear how many public water agencies would be taking part in the JPA. The outcome of the JPA formation would have a direct impact on the District’s financial commitment to the project. In addition, potential conflicts or issues within the JPA members may arise that may impact operations and/or water production. The JPA arrangement and participating members need to be better defined.</td>
<td>• May increase District’s financial contribution to the JPA Seawater Desalination Plant • Could be a fatal flaw is not enough public water agencies are willing to participate in the JPA</td>
</tr>
<tr>
<td>2</td>
<td>Need for Better Definition of “Take or Pay” Water Purchase Agreement. A water purchase agreement can be written in many different ways that are amenable to both seller and purchaser. Two examples are: 1. Contract can be written for shorter period of time, with higher tariff. That will be same as lower tariff over longer period of time. A clear definition on these conditions would better define financial requirements for the District 2. Take or Pay contract can be written in a way that, when the water is not needed, the tariff will do down, since the seller has not incurred costs of consumables. Thus, the buyer can only pay fixed costs and assumed profit.</td>
<td>• Risk identified by K/J and District staff, additional details on potential risks is provided • Could potentially be a financial risk to the District • Could be a fatal flaw if all members of the JPA cannot agree to the water purchase agreement terms</td>
</tr>
<tr>
<td>3</td>
<td>Challenges To Increase District’s Share in Production Capacity. It was suggested in the Memo to the Board of Directors (July 15, 2014) that the District could potentially purchase additional spare capacity in the JPA Seawater Desalination Plant, if available. The purchase of additional capacity would be difficult since the financial model of a JPA is often based on the number of water purchasers determined a priori, with the contract capacity and terms signed by each party before financing is provided by the banks.</td>
<td>• No risk to current option of purchasing 1,500 AFY • Inability to acquire additional capacity once the JPA is formed</td>
</tr>
<tr>
<td>4</td>
<td>Ownership of Intake/Outfall May Impact Production Reliability. Since the JPA does not own the intake and outfall structures, it would need to rely on DWD to ensure intake and outfall operations</td>
<td>• Risk identified by K/J and District staff, additional details on potential risks is provided</td>
</tr>
<tr>
<td>ITEM NO.</td>
<td>DESCRIPTION</td>
<td>RISK</td>
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<tr>
<td>4</td>
<td>are optimized to benefit the treatment plant. For example, the timing of cleaning and maintenance may impact production capacity during peak demands (e.g. summer months). As a “worst case,” the JPA may need to purchase or take over operation of the intake and outfall should the Data Center shut down.</td>
<td>• May impact production reliability • Could potentially increase overall financial responsibility of the JPA</td>
</tr>
<tr>
<td>5</td>
<td>Uncertainty of Regulation Approval of Using Seawater for Once-Through Cooling. Power plants in California using once-through cooling are all being phased out and switching to more efficient cooling technologies that are more environmentally friendly. The proposed once-through cooling approach for the Data Center may not receive approval from regulatory agencies.</td>
<td>• Risk identified by K/J and District staff, additional details on potential risks is provided • Could be a fatal flaw to the project if once-through cooling is not approved since numerous power plants along the California coast are phasing out this cooling approach to more efficient systems</td>
</tr>
<tr>
<td>6</td>
<td>Minimal Overall Savings Associated With “Warmer” SWRO Feed Water. Although warmer water feeding the SWRO system may require less pressure, it also results in the SWRO membranes to be more permeable and potentially degrading the SWRO permeate water quality. This may result in more water being treated by the second pass SWRO to meet water quality objectives.</td>
<td>• May result in reduced O&amp;M cost savings associated with treating “warmer” water at the JPA Seawater Desalination Plant</td>
</tr>
<tr>
<td>7</td>
<td>Public Outreach Program To Gain Public Acceptance. A public outreach and education program would be implemented by the District and should be included in project costs.</td>
<td>• Public outreach to gain public acceptance is key component in project feasibility</td>
</tr>
</tbody>
</table>

### 3.2.2 Assessment of Reasonableness of Capital and O&M Costs

The total project cost for the JPA Seawater Desalination Plant is summarized in the "Draft Evaluation of the Deep Water Desalination Project Costs (July 2014)," prepared by K/J, the estimated cost of $99 million prepared initially by the DWD Group for the 9 mgd facility is closer to that of the recently bid 9.6 mgd Cal Am Seawater Desalination Plant (range of bids received for design-build delivery is between $85 and $99 million). The adjusted DWD Project cost of $117 million, prepared by K/J, may be on the higher side depending on the final project delivery method selected for the JPA Seawater Desalination Plant. In addition, the cost benchmarking approach used by K/J in the July 2014 Draft Evaluation of the Deep Water Desalination Project Costs has considerable variability for the proposed plant capacity of 9 mgd (ranging from $5 million to $27 million for seawater desalination facilities of similar capacities) and may not be a good benchmark.

### 3.2.3 New and Continued Areas of Concerns

The areas of new and continued concern for the DWD Project are listed below. If not addressed or resolved, these items may become a fatal flaw to the project option.

- Make-up, number, and contract terms of participating public water agencies in the JPA
- Regulatory approval for the proposed once-through cooling system for the Data Center as well as intake approach
3.2.4 Areas for Additional Definition
Areas of additional definition should be investigated to update the project definition and/or estimated cost is listed below.

- Preliminary treatment design criteria used to develop the capital and O&M costs should be reviewed to ensure completeness and accuracy.
- Definition of “take or pay” contract arrangement with DWD should be clarified as it can be written numerous ways that is amenable to both seller and purchaser of the water.
- The financial model for the proposed DWD Project should be reviewed before any consideration is given to joining the JPA.
- History and background of the DWD Project investor should be reviewed.

3.2.5 Assessment Summary of DWD Project
The project definition, with respect to treatment facility and infrastructure requirements, and project costs are within reason based on the information provided and used for conceptual level comparison. However, additional investigation is recommended for the following key components that could impact on both project definition and total project costs:

- JPA make-up and agreement terms
- Water purchase agreement with DWD
- Regulatory approval process associated with proposed intake approach, brine discharge, and using ocean water for once through cooling
- DWD’s financial model for the overall project

In addition, the total project cost of $99 million estimated for DWD is more consistent with recent costs for seawater desalination plants of similar capacity. The $117 million estimated by K/J could be on the high side.

3.3 MID-COUNTY GROUNDWATER REPLENISHMENT PROJECT
The Mid-County Groundwater Replenishment Project involves treating raw sewage through advanced wastewater and water purification treatment technologies to produce approximately 1.3 mgd or 1,500 AFY of purified water for groundwater recharge. The wastewater collection system within the District’s service boundary is currently owned and operated by the Santa Cruz County Sanitation District. Key components of the Mid-County Groundwater Replenishment Project include:

- Tie-in to existing sewer lift station and a new conveyance pipeline to the Advanced Water Purification Facility (AWPF)
- Biological wastewater treatment through membrane bioreactors (MBR)
- Ozone pretreatment for advanced water purification
- Advanced water purification through reverse osmosis (RO) and advanced oxidation process (AOP) using hydrogen peroxide and ultra violet (UV) light
Brine line connection to the existing sewer
- Storage, pumping station, and conveyance system for purified water to groundwater injection wells
- Two groundwater injection wells at Soquel High School and Cabrillo College along with four additional groundwater monitoring wells

3.3.1 Assessment of Project Definition and Project Costs

Although the treatment process and technologies for the Mid-County Groundwater Replenishment Project is well established in the industry, the project definition is likely the least defined of the six back-up water supply options. An assessment of the project definition and its associated risk is summarized in Table 3.

Table 3: Assessment of Project Definition and Components for the Mid-County Groundwater Replenishment Project

<table>
<thead>
<tr>
<th>ITEM NO.</th>
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<tbody>
<tr>
<td>1</td>
<td>Applicability of Ozone at the AWPF. Ozone pretreatment is currently only used at one facility as a pretreatment step to minimize biological fouling on membrane separation processes. The applicability of ozone pretreatment is based on source water quality and is site specific.</td>
<td>• No risk to overall project feasibility</td>
</tr>
<tr>
<td>2</td>
<td>Need for Source Water Control Program To Support Advanced Water Purification. Source control measures are required and should be included in annual O&amp;M costs for groundwater replenishment projects. Measures would include source water characterization, monitoring, and potentially pre-treatment for contaminants of emerging concern, industrial discharges, etc. In addition, the District does not own and operate the sewer collection system currently. Thus, the District would need to rely on the Santa Cruz County Sanitation District to implement and enforce the Source Control Program. Based on discussions with K/J, only capital cost is provided for source water control.</td>
<td>• Requires negotiations with Santa Cruz County Sanitation District to obtain raw wastewater and assist in source control measures • May impact O&amp;M cost of the treatment facility depending on compounds that may be present in the wastewater</td>
</tr>
<tr>
<td>3</td>
<td>Need for Continuous Public Outreach Program To Gain Public Acceptance. A continuous public outreach and education program would be implemented by the District and should be included in annual O&amp;M costs associated with groundwater replenishment projects.</td>
<td>• Public outreach to gain public acceptance is key component in project feasibility</td>
</tr>
<tr>
<td>4</td>
<td>Missing Ancillary Cost Component In Cost Estimate. An ancillary cost line item of 10 percent should be included in the cost estimate to be consistent with the cost estimate developed for the Santa Cruz Regional Groundwater Replenishment Project.</td>
<td>• Low risk to overall project feasibility • Would increase capital cost for the facility</td>
</tr>
<tr>
<td>5</td>
<td>Odor Control for Biological Treatment Process (MBR). The estimated building size does not appear to include a building over the biological treatment process basins associated with the MBR process. At a minimum, covers are recommended to minimize odors to surrounding neighborhoods.</td>
<td>• Medium risk to overall project feasibility due to public acceptance or approval of a new wastewater treatment plant within the District’s boundary</td>
</tr>
<tr>
<td>6</td>
<td>Uncertainty of Treatment Quality and Reliability. In review of the</td>
<td>• Medium risk to the</td>
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</table>
### 3.3.2 Assessment of Reasonableness of Capital and O&M Costs

The capital and O&M cost prepared for the Mid-County Groundwater Replenishment Project appears to be low as it is unclear if critical project components (e.g., post-treatment) have been included in the overall project scope and cost estimate. If the additional project components summarized in Table 3 are not included, it would impact the overall project cost. The costs prepared represent a true Class 5 level cost estimate since additional project definition is recommended since this option involves treatment of raw sewage in addition to providing advanced recycled water treatment to produce purified water for groundwater replenishment.

### 3.3.3 New and Continued Areas of Concerns

The areas of concern for the Mid-County Groundwater Replenishment Project are listed below. If not addressed or resolved, these items may become a fatal flaw to the project option.

- Public acceptance and support associated with groundwater replenishment
- Implementation and jurisdiction over source control program

### 3.3.4 Areas for Additional Definition

Areas of additional definition should be investigated to update the project definition and/or estimated cost is listed below.

- Implementation approach and agreement with the Santa Cruz County Sanitation District on source control program
- Confirmation that sufficient sewer flow is available to dilute RO brine to prevent corrosion of sewer collection system
- Current public perception and support for groundwater replenishment projects
- Suitable hydrogeological conditions to ensure the local groundwater aquifer could meet regulatory requirements for groundwater replenishment

### 3.3.5 Assessment Summary for Mid-County Groundwater Replenishment Project

The Mid-County Groundwater Replenishment Project is likely the least defined and developed of the six back-up supply options being considered. Other back-up supply options evaluated were built on work completed previously by others (e.g., scwd, DWD, and City of Santa Cruz) while this option was developed by K/J, without any prior studies completed, for conceptual
level evaluation. This option has the most treatment components since it involves treating raw wastewater through biological wastewater treatment processes and advanced water purification processes to meet regulatory requirements for groundwater replenishment. The assessment of project definition and components summarized in Table 3 may have an impact on overall project costs (capital and O&M costs). Additional studies are recommended to better define project components and refine total project costs.

### 3.4 SANTA CRUZ REGIONAL GROUNDWATER REPLENISHMENT PROJECT

The Santa Cruz Regional Groundwater Replenishment Project involves treating secondary effluent at the City of Santa Cruz’s WWTP to produce purified water for groundwater recharge. The advanced treated purified water could be used by Scotts Valley, the City of Santa Cruz, the County of Santa Cruz, and the District. The AWPF would be located at the City of Santa Cruz WWTP and use secondary effluent as the source water. Key components of the Santa Cruz Regional Groundwater Replenishment Project include:

- Ozone pretreatment for advanced water purification
- Microfiltration pretreatment system
- Advanced water purification through RO membranes
- AOP using hydrogen peroxide and UV light.
- Brine line connection to the existing sewer
- Storage, pumping station, and conveyance system for purified water to groundwater injection wells
- Two groundwater injection wells at Soquel High School and Cabrillo College along with four groundwater monitoring wells.

#### 3.4.1 Assessment of Project Definition and Project Costs

The Santa Cruz Regional Groundwater Replenishment Project is relatively well defined since it utilizes secondary effluent from an existing WWTP and only advanced water purification technologies are required. An assessment of the project definition and its associated risk is summarized in Table 4.

**Table 4: Assessment of Project Definition and Components for the Santa Cruz Regional Groundwater Replenishment Project**

<table>
<thead>
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<td><strong>Applicability of Ozone at the AWPF.</strong> Ozone pretreatment is currently only used at one facility as a pretreatment step to minimize biological fouling on membrane separation processes. The applicability of ozone pretreatment is based on source water quality and is site specific.</td>
<td><strong>No risk to overall project feasibility</strong></td>
</tr>
<tr>
<td>2</td>
<td><strong>Need for Source Water Control Program To Support Advanced Water Purification.</strong> Source control measures are required and should be included in annual O&amp;M costs for groundwater replenishment projects. Measures would include source water characterization, monitoring, and potentially pre-treatment for</td>
<td><strong>Requires negotiations with Santa Cruz County Sanitation District to obtain raw wastewater and assist in source control measures</strong></td>
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</tbody>
</table>
3.4.2 Assessment of Reasonableness of Capital and O&M Costs

The total project cost for the District’s share of the Santa Cruz Regional Groundwater Replenishment Project could potentially be lower if additional participants join the regional project. The savings would be a result of economy of scale since it appears the cost estimate was prepared assuming only 1.3 mgd capacity of the AWPF was going to be built. However, including if the additional project components highlighted in Table 4 would impact the overall project cost for this option.

3.4.3 New and Continued Areas of Concerns

The areas of concern for the Santa Cruz County Regional Groundwater Replenishment Project are listed below. If not addressed or resolved, these items may become a fatal flaw to the project option.

- Public acceptance and support associated with groundwater replenishment
- Implementation and jurisdiction over source control program

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<td></td>
<td>contaminants of emerging concern, industrial discharges, etc. In addition,</td>
<td>the treatment facility depending on compounds that may be present in</td>
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<td></td>
<td>the District does not own and operate the sewer collection system currently.</td>
<td>the wastewater</td>
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<td></td>
<td>Thus, the District would need to rely on the Santa Cruz County Sanitation</td>
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<td></td>
<td>District to implement and enforce the Source Control Program.</td>
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<tr>
<td>3</td>
<td>Need for Continuous Public Outreach Program To Gain Public Acceptance. A</td>
<td>Public outreach to gain public acceptance is key component in project</td>
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<td>continuous public outreach and education program would be implemented by</td>
<td>feasibility</td>
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<td>the District and should be included in annual O&amp;M costs associated with</td>
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<td></td>
<td>groundwater replenishment projects.</td>
<td></td>
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<tr>
<td>4</td>
<td>Additional Treatment Processes to be Considered to Ensure Treatment Quality</td>
<td>Medium risk to the project as adding the additional items would</td>
</tr>
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<td></td>
<td>and Reliability. In review of the project components, it is unclear if the</td>
<td>increase overall project cost and O&amp;M cost</td>
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<td></td>
<td>following treatment processes have been included. It should be clarified if</td>
<td>Post-treatment is required ensure the final treated water quality is</td>
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<td></td>
<td>these components are included, otherwise it should be added. • Flow</td>
<td>non-corrosive and meets requirements for groundwater recharge/</td>
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<td></td>
<td>equalization/diversion structure – to ensure constant flow, minimize</td>
<td>potable use</td>
</tr>
<tr>
<td></td>
<td>diurnal flow variations, and maintain average production. • Inter-stage</td>
<td></td>
</tr>
<tr>
<td></td>
<td>storage and pump station – for ease of operation associated with the RO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>system • Post-treatment – decarbonation and chemical addition to stabilize</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the RO permeate and meet regulatory/injection requirements</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Need for Stakeholder Agreements with City of Santa Cruz, Santa Cruz</td>
<td>Could potentially be a fatal flaw if the District and the City of</td>
</tr>
<tr>
<td></td>
<td>County Sanitation District, and Others (e.g. Scotts Valley). As this</td>
<td>Santa Cruz and other stakeholders cannot agree to ownership and</td>
</tr>
<tr>
<td></td>
<td>option is a regional project, more stakeholders are involved in decision</td>
<td>operation responsibility of the AWPF</td>
</tr>
<tr>
<td></td>
<td>making, project definition, and project implementation. Project feasibility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>is likely dependent on all stakeholder agreeing on contract terms</td>
<td></td>
</tr>
</tbody>
</table>
Agreements with City of Santa Cruz, Santa Cruz County Sanitation District, and other potential project stakeholders

3.4.4 Areas for Additional Definition
Areas of additional definition should be investigated to update the project definition and/or estimated cost is listed below.

- Implementation approach and agreement with the Santa Cruz County Sanitation District on source control program
- Current regional public perception and support for groundwater replenishment projects
- Suitable hydrogeological conditions to ensure the local groundwater aquifer could support regulatory requirements for groundwater replenishment
- Location and land acquisition for the AWPF

3.4.5 Assessment Summary of Santa Cruz Regional Groundwater Replenishment Project
The Santa Cruz Regional Groundwater Replenishment Project is relatively well defined compared to the Mid-County Groundwater Replenishment Project. One of the key differences between the two options is that the Santa Cruz Regional option takes advantage of existing wastewater treatment infrastructure at the City’s WWTP. Thus, only advanced water purification treatment is needed to produce purified water for groundwater replenishment. The treatment facility component of this option is relatively well defined since it only requires the addition of advanced water purification technologies at the existing WWTP. The total project cost prepared for this option is reasonable for conceptual level comparison. However, between the two groundwater replenishment options, the Santa Cruz Regional option has more stakeholders involved and should also be further studied to define the key impact of each key stakeholder on project definition and total project costs.

3.5 SURFACE WATER TRANSFER WITH CITY OF SANTA CRUZ
Two surface water transfer options, Surface Water Transfer with Existing Infrastructure and Surface Water Transfer with Infrastructure Upgrade, with the City of Santa Cruz were considered. Both surface water transfer options rely on treating excess winter flows from the San Lorenzo River and transferring the excess flows to the District. Because these two options are very similar in nature and are covered under the same evaluation by K/J (Water Transfer Infrastructure Summary Report, October 2013), the evaluation of these options is considered jointly below.

3.5.1 Assessment of Project Definition and Project Costs
An assessment of the project definition and associated risk for the Surface Water Transfer Projects is summarized in Table 5.
Table 5: Assessment of Project Definition and Risk for the Surface Water Transfer Projects

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
<th>RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Accuracy of CEQA and Permitting Costs. The costs shown for CEQA and Permitting in TM#3 – Water Transfer Infrastructure Summary Report, Table 1, for the option with existing infrastructure versus the option with infrastructure upgrades is equivalent. This should be reviewed to confirm, as it is likely that additional permitting will be required for the infrastructure upgrade project.</td>
<td>• Potential cost increase to satisfy additional regulatory/permitting requirements</td>
</tr>
<tr>
<td>2</td>
<td>Probability of Water Transfers at 55 percent. TM#3 indicates that the probability of water transfers occurring is 55 percent. However, elsewhere in TM#3 it is indicated that this figure of 55 percent is based on an evaluation of past hydrologic cycles. It does not take into account the additional factors of potential increased winter time City of Santa Cruz demand or portion of additional flow that may go to Scotts Valley Water District. The figure of 55 percent could be lower if these items were taken into consideration. Further, it is not clear that the capital or O&amp;M costs take into account this 55 percent probability and the estimates could therefore be higher than required.</td>
<td>• Less than 55 percent flow delivered to the District • Variability of actual water transferred to the District would impact overall water costs for the surface water transfer options</td>
</tr>
<tr>
<td>3</td>
<td>Clarification of Existing Capacity of Tait Street Diversion. Existing capacity of Tait Street Diversion needs to be clarified for consistency. References to 7.8 mgd and 7.5 mgd are made in different documents.</td>
<td>• Low impact to overall project feasibility</td>
</tr>
<tr>
<td>4</td>
<td>Cost Escalation. It needs to be confirmed that cost escalation has been included in all estimates where previous estimates from 2009 were considered.</td>
<td>• May increase overall project costs</td>
</tr>
<tr>
<td>5</td>
<td>Clarification of Capital Cost for Tait Street Diversion Improvements under Existing Infrastructure Project. The value provided in Table 1, TM#3 is $2.8M. However, the value from the cost backup in the WTISR is $2.4M.</td>
<td>• Low impact on project feasibility</td>
</tr>
<tr>
<td>6</td>
<td>Clarification of Potential Annual Transfer Potential. The Conceptual Level Assessment of Costs sheet indicates that the potential annual transfer to Soquel Creek is 39 MG (existing infrastructure) and 384 MG (upgraded infrastructure). These numbers are not consistent with the 445 AF and 1500 AF indicated in other documents. Inconsistent project definition should be resolved to ensure project cost estimates were prepared appropriately</td>
<td>• Reasonable estimate of annual transfer potential has a direct impact on project definition and potentially increase project costs</td>
</tr>
</tbody>
</table>

3.5.2 Assessment of Reasonableness of Capital and O&M Costs

Additional information and/or evaluation is required to determine if the cost summarized for the two surface water transfer options are complete and accurate, even at this conceptual level project definition. A sensitivity analysis may be beneficial to understand the cost variability as a result of available excess winter flows for surface water transfer.
3.5.3 New and Continued Areas of Concerns

The areas of concern for the Surface Water Transfer options are listed below. If not addressed or resolved, these items may become a fatal flaw to the project option.

- There is mention of a need to leave water in the San Lorenzo River for protection of endangered species in TM#3, but there is not sufficient information to understand how this impacts the quantity or probability of water transfer. Further investigation should be undertaken to determine if this is a viable alternative considering this requirement.

- Wintertime City of Santa Cruz demands and consideration for supply to Scotts Valley, as well as hydrologic conditions and water quality in San Lorenzo River could have a dramatic impact on the viability and cost/AF of these alternatives. Further investigation with the City of Santa Cruz should be undertaken to determine potential contract language and potential commitments prior to next stage of study.

- A water rights and permitting timeline is not provided in sufficient detail to determine if water transfer is a viable option. The information presented in the documents WTISR and TM#3 are conflicting in their assessment of length of time that permitting could take. One document references potentially 20 years which is outside of the project life according to TM#3. These inconsistencies need to be resolved.

3.5.4 Areas for Additional Definition

Areas of additional definition should be investigated to update the project definition and/or estimated cost is listed below:

- Validation of the 445 and 1500 AFY for the two projects is not possible with the information provided. For example, 445 AFY/181 days of winter period = 2.45 AF/day. TM#3 indicates that 2 mgd could be available for the existing infrastructure option which equates to approximately 6 AF/day. Reconciliation is important to confirm the project basis and cost estimates.

3.5.5 Assessment Summary for Surface Water Transfer Projects

The project definition and components (treatment and infrastructure requirements) for the two Surface Water Transfer Projects are relatively well defined for conceptual level comparison. However, additional investigations or clarifications are warranted on the following items:

- Confirm variability on availability of water during winter time that is available for the District and how that would impact project costs

- Confirm impact of hydrologic conditions and water quality variability (e.g. intensity and duration of turbidity spikes during winter) on project costs

- Confirm stream flow requirements of the San Lorenzo River for natural habitat and impact on excess water availability during the winter to be transferred to the District

- Review water rights and water transfer agreement

Clarification of the above item would aid in confirming that 445 AFY and 1,500 AFY are available for water transfer to the District.
4.0 References

The following references were used in conducting the peer review:

- Kennedy/Jenks Consultants; *Draft Technical Memorandum No. 3 Surface Water Transfer Alternatives*; July 10, 2014.
- Kennedy/Jenks Consultants; *SqCWD Recycled Water Supply Alternatives Conceptual Level Assessment of Costs*; October 27, 2014.
- Soquel Creek Water District, Kennedy/Jenks Consultants; *Memo to the Board of Directors for Back-Up Supplemental Supply Options – Overview of the Process and Scoring/Ranking Exercise*; August 26, 2014.
Soquel Creek Water District
Regional Recycled Water Feasibility Study

Plan of Study

January 30, 2015

Prepared for

Soquel Creek Water District
5180 Soquel Drive
Soquel CA 95073
# Table of Contents

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Plan of Study Application
Section 1: Background

The Santa Cruz Region (Figure 1) relies entirely on rainfall, surface water, and groundwater within watersheds located in the County (Figure 2); no water is imported from outside the region. A regional goal that has been defined in the 2014 Integrated Regional Water Management (IRWM) Plan with respect to water supply is to ensure a reliable and sustainable local water supply through strategies that diversify the supply portfolio, develop production from alternative/supplemental sources, protect and enhance surface and ground water, protect against seawater intrusion, and maximize efficient delivery and use (County of SC, 2014; Ch4-8).

Two of the primary water management challenges in the region are the lack of adequate surface water supply during droughts, and depletion of the aquifers. Additional water is not readily available from these sources to support current levels of demand or even modest future growth. To remedy this situation, local water agencies are actively pursuing supplemental supply alternatives.

The City of Santa Cruz (City), Soquel Creek Water District (District) and County of Santa Cruz (County), herein referred to as the Regional Partners, are further exploring the use of recycled water as a supplemental supply through a collaborative effort to define regional recycled water alternatives. The District and City are submitting independent applications to the State Water Resource Control Board (SWRCB) for the Water Recycling Facilities Planning Grant Program (FPGP) to produce standalone documents that overlap to address regional opportunities.

- The District intends to prepare a Regional Recycled Water Feasibility Study (District RWFS) focused on evaluating indirect potable reuse through groundwater recharge of advanced purified water within the District's service area and assess potential opportunities for expanded use and/or regional participation that includes the City of Santa Cruz and the County of Santa Cruz.
- The City intends to prepare a Regional Recycled Water Facilities Planning Study (City RWFPS) to explore a broader range of potential non-potable and potable reuse projects and the potential opportunities for Regional participation.

The District previously developed a Water Recycling Facilities Planning Study (WRFPS) (B&V 2009) to evaluate the feasibility of providing non-potable recycled water to select customers through satellite reclamation plants within the District’s service area. The study found that non-potable reuse, while technically feasible, is not a cost-effective alternative to pursue.

Recent environmental and legislative circumstances have prompted the District to re-evaluate potential opportunities for local and regional recycled water alternatives due to:

- the current drought in California,
- the recently finalized regulations for Groundwater Replenishment Reuse Projects (GRRP) (June 2014),
- the new Sustainable Groundwater Management Act (September 2014)
- the suspension of the scwd² Regional Desalination Project (August 2013), and
• the decision by the District Board of Directors to develop a feasibility study for groundwater replenishment using advanced purified water after conducting a yearlong evaluation of alternate new water supplies (September 2013-August 2014)

This section provides background information for the Regional Partners.
Figure 1: Major Water Agencies in the Santa Cruz Region

Source: County of Santa Cruz, Health Services Agency, Environmental Health Division, Water Resources Program, *Santa Cruz Integrated Regional Water Management Plan*, 2014
Figure 2: Major Water Resources in Santa Cruz County

Source: County of Santa Cruz, Health Services Agency, Environmental Health Division, Water Resources Program, *Santa Cruz Integrated Regional Water Management Plan*, 2014
1.1 City of Santa Cruz
The City of Santa Cruz provides water service to an area approximately 20-square-miles in size, including the entire City and adjoining unincorporated areas. Water service is also provided to a small portion of the City of Capitola along 41st Avenue, which is predominantly commercial. The service area includes the developed portion of UC Santa Cruz campus, Live Oak, Pasatiempo, and some other unincorporated areas surrounding the city. The current sources of water supply include surface water from the San Lorenzo Watershed and from north coast streams (~90-100% of total supply). SCWD utilizes Loch Lomond, an 8,600 acre-foot (2,817 million gallons) capacity reservoir on Newell Creek, a major tributary to the San Lorenzo River. The remaining ~0-4% percent of the City’s water supply comes from groundwater, all of which is extracted from wells in the Purisima Formation in the mid-county area. The City serves ~24,351 connections of which 88% are residential. The City serves approximately 94,000 customers.

Several of the challenges the City faces are 1) a lack of adequate water supply during periods of drought, 2) reduced supply due to fisheries in-stream flow requirements, 3) unknown climate change impacts. Because the City is primarily supplied by surface water, it has surplus water in wet years and is seriously impacted during periods of drought. The City acknowledges that it would only be able to service approximately half of the normal dry season demand during a worst case multiple-year drought. In the face of drought and long term uncertainty with regard to water supplies, the City is evaluating its treatment and operations to ensure its customers continue to receive high quality water.

The City of Santa Cruz operates a regional WWTF that provides service to approximately 130,000 people in the cities of Santa Cruz and Capitola, and portions of unincorporated Santa Cruz County. The service areas beyond the City of Santa Cruz include: (1) the Santa Cruz County Sanitation District (Sanitation District), which includes the Live Oak, Capitola, Soquel, and Aptos areas; and (2) Community Services Areas 10 and 57, which include a portion of the Graham Hill Road corridor. Municipal wastewater generated within the City limits is delivered to the WWTF via 160 miles of wastewater mains and 21 pumping stations (City, 2011).

1.2 Soquel Creek Water District
The District provides potable drinking water and groundwater resource management within its service area in mid-Santa Cruz County, which includes the City of Capitola and the unincorporated communities of Aptos, La Selva Beach, Rio Del Mar, Seascape, Seacliff Beach and Soquel. The District serves approximately 13,570 connections, of which 94% are residential, and a total population of approximately 37,000.

The District obtains 100 percent of its water supply from groundwater aquifers within the Soquel-Aptos Groundwater Management area. The groundwater aquifers are located within two geologic
formations that underlie the District service area, the Purisima Formation and the Aromas Red Sands aquifer. The Purisima Formation provides the majority of the District’s annual water needs.

These aquifers provide groundwater to the District as well as other County residents and municipal utilities (such as the City, Central Water District, and the City of Watsonville), small mutual water districts or companies, and private well owners. The primary threat to those who solely rely on groundwater, such as the District customers and other County residents, is the groundwater supply is in a state of overdraft and the cumulative impact of pumping more than can be naturally recharged by rainfall has led to seawater intrusion being detected at the coastline; if left unresolved, this will eventually lead to contamination of the groundwater drinking wells.

The District’s 2012 Integrated Resources Plan (IRP) Update is a long-term water plan that offers a diversified strategy emphasizing water-use efficiency through demand management (e.g. conservation efforts), groundwater management, evaluation of recycled water and supplemental supply development. The IRP serves as a roadmap through 2030 for maintaining water supply reliability for the District’s customers and protecting the local environment by establishing water supply planning objectives to recover the groundwater basin and maintain protective levels. As part of the 2012 IRP, the District’s supplemental water supply objective is a project that can provide an average of 1,500 AFY (~1.33 mgd) of new water every year to recover and protect over drafted groundwater basin.

### 1.3 County of Santa Cruz

The County is situated at the northern end of Monterey Bay, 65 miles south of San Francisco, 35 miles north of Monterey, and 35 miles southwest of the Silicon Valley. The County encompasses 388,950 acres (446 square miles) of which 6.7 square miles are covered by water. Although it does not have a centralized water supply agency, the County of Santa Cruz has historically coordinated countywide water management efforts through long range water supply planning, watershed management programs, and development and implementation of strong General Plan policies and programs for water resource protection and management.

The Environmental Health Services (EHS), a division of the Health Services Agency, has been designated as responsible for coordinating the County’s water resource management efforts. The Water Resources Program works in collaboration with other county departments, agencies, special districts and non-governmental organizations to solve water resources and environmental issues through long-range water supply planning, water quality protection, and watershed management.

The Santa Cruz County Sanitation District is a special district operated through the Santa Cruz County Public Works Department. The Santa Cruz County Sanitation District collects wastewater from the Live Oak, Capitola, Soquel, Aptos and Seacliff Areas through a system of approximately 200 miles of wastewater mains and 34 pumping stations for treatment at the City's WWTF. The Sanitation District has treatment capacity rights of 8 million gallons per day in the WWTF. Under an agreement between the Sanitation District and the City, the Sanitation District is required pay part
of the project costs for treatment modifications. Operation and maintenance costs at the City’s WWTF are split in proportion to various factors affecting the discharge by each agency. The treated wastewater is discharged to Monterey Bay Sanctuary over 1 mile offshore through an outfall which is also used by the City of Scotts Valley. Outfall costs, including ocean monitoring, are split in proportion to the total flow of the three agencies.

The County is interested in participating as a Regional Partner in both the District RWFS and the City RWFPS to explore how recycled water can help address regional issues such as: increasing wastewater treatment costs, dwindling potable water supplies, sewer capacity limitations due to infiltration and inflow (I&I) and impacts due to septic systems.
Section 2: Plan of Study Information

The following Plan of Study is presented as outlined in the State’s, “Water Recycling Funding Guidelines.” The District and the City are submitting independent applications but intend to collaborate on evaluation of regional recycled water alternatives in addition to District or City specific alternative(s). This application focuses on the Plan of Study for the District RWFS from the District’s perspective, though regional considerations and alternatives applicable to both applications are included herein.

1. A description of the recycled water service area that will be investigated.

The Soquel Creek Water District Regional Recycled Water Feasibility Study (District RWFS) will focus on evaluating the potential for implementing indirect potable reuse through groundwater recharge of advanced purified water within the District’s service area and also investigate potential opportunities for expanded use within areas that include the City of Santa Cruz, Soquel Creek Water District and portions of the County of Santa Cruz, as described in the previous section. These participants are collectively referred to as the Regional Partners.

2. The sources of recycled water that will be investigated and a brief summary of the unit processes currently in use at existing treatment facilities.

The District RWFS will investigate the following sources of recycled water:
- Use of secondary effluent from the Santa Cruz Wastewater Treatment Facility (Santa Cruz WWTF)
- Use of raw wastewater from the County Sanitation District’s wastewater collection system

The City of Santa Cruz Public Works Department operates the Santa Cruz WWTF. The Santa Cruz WWTF is located next to Neary Lagoon, just inland from the City’s Main Beach. The Santa Cruz WWTF is designed to treat an average dry-weather flow of 17 million gallons per day (mgd), and a peak wet-weather flow of 81 mgd. Municipal wastewater is treated to secondary standards for discharge through an outfall to the Pacific Ocean via a 10,000+ foot outfall/diffuser system that terminates approximately 1 mile offshore at a depth of 110 feet. Santa Cruz operates under a current NPDES permit. The typical daily flow rate of treated secondary effluent is approximately 8 million gallons per day.

The raw wastewater (or sewage) flow and quality in the County Sanitation District’s wastewater collection system varies significantly depending on the location and time of day. The study will focus on extracting raw water from sewer pump stations and large collection pipelines where flows are greater and more consistent throughout the day. Raw wastewater does not receive existing
treatment, and would therefore require new treatment facilities, such as a membrane bioreactor (MBR) with ultraviolet (UV) disinfection and other advanced treatment as-needed.

For each potential recycled water sources considered, appropriate treatment and disinfection processes would be employed to meet regulatory requirements for the desired end use.

3. A description of the current fate of the effluent that could be recycled.

All raw wastewater that is collected by the County Sanitation District and the City of Santa Cruz is conveyed to the Santa Cruz WTTF whereby it is treated to secondary effluent standards and discharged to the Monterey Bay via an ocean outfall.

4. A map of the study area showing the sources of recycled water and potential service area.

Figure 3 shows the boundaries of the District and City water service areas and highlights the potential sources of recycled water: (1) secondary effluent from the Santa Cruz WWTF and (2) raw wastewater extraction at one of the County Sanitation District’s sewer pump stations. Other locations for sewage scalping will be evaluated as part of the District’s RWFS. Non-potable application of recycled water would likely be within the boundaries of the City and District service areas. The evaluation of non-portable reuse in the District’s service area will build on, but not overlap the work conducted as part of the 2009 WRFPS. Potable reuse applications, particularly indirect potable reuse will be explored for groundwater replenishment and seawater intrusion barrier in the local groundwater basin.
5. **Identification of the water supply and wastewater agencies having jurisdictions over the sources of recycled water or the potential service area.**

The District is responsible for potable water supply in the District’s service area and operates a total of fifteen groundwater wells and eight groundwater treatment facilities. The District’s customers are either connected to the County Sanitation District’s sewer collection system or have septic systems. Those connected to the County’s municipal wastewater system ultimately have their wastewater treated at the regional wastewater treatment facility run by the City of Santa Cruz and dispersed as secondary effluent out to the Monterey Bay.

The City’s Water Department is responsible for potable water supply in the City’s water service area. The City’s Public Works Department is responsible for wastewater and operates the Santa Cruz WWTF.
The Santa Cruz County Sanitation District is a special district operated through the Santa Cruz County Public Works Department that collects wastewater and delivers it to the City's WWTF for treatment. The Sanitation District has treatment capacity rights of 8 million gallons per day in the WWTF.

Since additional potential recycled water users outside the District's service area will also be investigated, coordination with the City of Santa Cruz Water Department and Public Works Department, Scotts Valley Water District and Santa Cruz County may be required.

6. General description of existing freshwater supplies in the study area

The District's water supply portfolio relies solely on local groundwater for potable use. The District is entirely dependent on groundwater from two aquifers, drawing approximately 60% of its water supply from the Purisima Formation and 40% from the Aromas Red Sands aquifer, with all water being treated at the wellheads. These aquifers are shared with adjoining water agencies and a multitude of private well users. Increasing salt concentrations have been detected in coastal monitoring wells for much of the Aromas and at limited locations in the Purisima Formation. With the basin experiencing long term overdraft and seawater intrusion occurring at the coastline, the District's pumping needs to be reduced in order to recover the basin. In 2012, the District set a target total pumping goal of no more than 2,900 AFY for 20 years, beginning as early as 2018.

The City is primarily dependent on surface water (~96% of total supply), all of which is derived from the northern county watersheds. In addition to surface diversions on four north coast streams, the City utilizes Loch Lomond Reservoir, an 8,600 acre-foot capacity reservoir, to store surface water and approximately 500 acre-feet per year (AFY) of water is derived from groundwater. The City currently has a total treated water storage capacity of 44.4 acre-feet (~15mgd), or 1.3 times average daily demand. In multiple dry years, or drought conditions, very low surface water flows in the San Lorenzo River and North Coast creeks and springs, combined with depleted supply stored in Loch Lomond reservoir, reduces the City's available supply to a level that cannot support water demand.

Along with conservation and use curtailment, there are several local planning documents (2006 and 2012 District IRPs, 2003 City Integrated Water Plan (IWP), and 2014 Integrated Resources Water Management Plan (IRWM)) that identified seawater desalination as the preferred alternative to provide supplemental water supply. The District and City had been pursuing a joint regional desalination facility; however, in the face of community concerns, it was decided to pause work on the proposed scwd2 Regional Seawater Desalination Project in order for the City to facilitate a community discussion about water supply, demand, and alternatives, including an assessment of the potential for non-potable and potable reuse.
The District just completed a year-long back-up water supply process\(^1\); should the City of Santa Cruz choose not to continue evaluating desalination and the scwd\(^2\) is no longer an option to further consider.

In August 2014, the District Board of Directors identified recycled water and water transfer projects for further evaluation. Staff is moving forward with supplemental supply evaluation that will provide additional information related to feasibility, cost, environmental and legal considerations. In addition, the District will continue to work with our customers and community stakeholders to identify the best path forward to securing an additional water supply.

7. *General description of water recycling alternatives that will be evaluated.*

Though there have been other studies that have explored potential reuse opportunities for the District, regionally focused recycled water feasibility studies for indirect and/or direct potable use have not been pursued. This study for the District will build on information developed in previous recycled water planning efforts with a focus on:

- the potential for regional coordination,
- implementation of the recently finalized regulations for GRRP (also referred to as indirect potable reuse), and
- anticipated opportunities for potable reuse in the study area.

Table 1 lists a wide range of potential recycled water alternatives in the Santa Cruz Region, including those that would benefit the District, City, County and various combinations of the three stakeholders. As previously noted, this application focuses on the Plan of Study for the District RWFS, from the District's perspective.

Water recycling may offer the following opportunities for the District and other groundwater users within the basin:

- offset potable supplies for landscape irrigation,
- establish a seawater barrier to protect groundwater supplies within the lower basin area where groundwater overdraft has resulted in seawater intrusion detected at our coastline,
- replenish the upper groundwater basin in the District's service area,
- supplement raw water supplies to the Graham Hill Water Treatment Plant via potable reuse, if and when permittable.

\(^1\) This process is documented on the District's website at http://www.soquelcreekwater.org/planning-our-water-future/back-supplemental-supply-options
### Table 1: Potential Recycled Water Alternatives for the District RWFS

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Involvement</th>
<th>Recycled Water Use</th>
<th>Source Water(^2)</th>
<th>Treatment</th>
<th>Project Area(s)</th>
<th>Primary Benefit(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>District and County</td>
<td>Landscape Irrigation(^1)</td>
<td>Sewer Water</td>
<td>MBR Tertiary</td>
<td>County or District</td>
<td>Reduce Potable Demands</td>
</tr>
<tr>
<td>1b</td>
<td>City, District, and County</td>
<td></td>
<td>Santa Cruz WWTF</td>
<td>Tertiary</td>
<td>City, District and County</td>
<td></td>
</tr>
<tr>
<td>2a</td>
<td>District and County</td>
<td>Seawater Barrier</td>
<td>Sewer Water</td>
<td>MBR + Advanced Treatment</td>
<td>Lower Groundwater Basins</td>
<td>Protection from Seawater Intrusion</td>
</tr>
<tr>
<td>2b</td>
<td>City, District, and County</td>
<td></td>
<td>Santa Cruz WWTF</td>
<td>Advanced Treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a</td>
<td>District and County</td>
<td>Groundwater Replenishment</td>
<td>Sewer Water</td>
<td>MBR + Advanced Treatment</td>
<td>Upper Groundwater Basins</td>
<td>Supplemental Potable Supply</td>
</tr>
<tr>
<td>3b</td>
<td>City, District, and County</td>
<td></td>
<td>Santa Cruz WWTF</td>
<td>Advanced Treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3c</td>
<td>City, District, and County</td>
<td>Direct Potable Reuse</td>
<td>Santa Cruz WWTF</td>
<td>Advanced Treatment</td>
<td>City, District and County</td>
<td>Supplemental Potable Supply</td>
</tr>
</tbody>
</table>

**Notes:**
1. The recycled water market assessment developed in the District’s 2009 WRFPS will be referenced and confirmed, as-appropriate
2. Sewer water = raw wastewater
   Santa Cruz WWTF = secondary effluent

The District has conceptually looked at several of these scenarios (separately and in combination) during the District’s back-up water supply planning process and during public, open board meetings ([http://www.soquelcreekwater.org/planning-our-water-future/back-supplemental-supply-options](http://www.soquelcreekwater.org/planning-our-water-future/back-supplemental-supply-options)]. Specifically:

- A meeting was held on February 4, 2014 on Recycled Water Options with presentations by Dave Smith (then-Managing Director for WateReuse Association), Mark Dettle (City of SC Public Works Department Director), Todd Reynolds (Kennedy/Jenks), and a local citizen. Todd Reynolds’s presentation addressed the four scenarios above. ([http://www.soquelcreekwater.org/sites/default/files/documents/Back_Up_Options/Presentation-Todd_Reynolds-final-animation.pdf](http://www.soquelcreekwater.org/sites/default/files/documents/Back_Up_Options/Prese ntation-Todd_Reynolds-final-animation.pdf)
- A meeting was held on July 15, 2014 that presented technical memorandums on various supply options (desalination, recycled water, surface water transfers) and introduced a screening alternatives process. Technical Memorandum #2: Mid-County and Santa Cruz Regional Groundwater Replenishment Alternatives focused on Scenarios 2a/2b, and
Scenarios 3a/3b/3c, summarized above in Table 1. 

As a next step, the District would like to take a more in-depth feasibility evaluation of scenarios 2a/2b, 3a/3b/3c as well as look at opportunities to incorporate 1a/1b if large irrigated areas are within the path of a recycled water pipeline conveyance system as well as scenario 4, should direct potable reuse become permissible in the future by the state.

8. A description of the opportunities for participation of the public, potential recycled water users, and other affected agencies in the study.

Outreach efforts will include relevant stakeholders, including the general public, private well users, state and local agencies, local homeowners/neighborhood associations, environmental groups, and potential recycled water irrigation customers and potential industrial or institutional customers, if identified in the market assessment.

Outreach and engagement activities are likely to include public meetings and workshops, email distribution lists, social media, articles in local news media (i.e., newspapers, websites, etc.) and site specific information sent to potential recycled water users. The District has an established network of outreach mechanisms through their work over the last decade as part of other water planning efforts.

There is a potential that a technical working group will be established to participate in the development of the District RWFS though the evaluation of alternatives and to serve as a peer review group.

Agencies that may be contacted include, but are not limited to:

- County of Santa Cruz/County Sanitation District and Environmental Health Services Water Resources Division
- City of Scotts Valley/Scotts Valley Water District
- Central Water District
- City of Capitola
- City of Santa Cruz
- Pajaro Valley Water Management Agency
- State Water Resource Control Board
- California Regional Water Quality Control Board
- California Division of Drinking Water (formerly California Department of Public Health)
- California Department of Fish and Wildlife
- California Department of Transportation (if state Highway crossing is required)
Santa Cruz County Regional Transportation Commission (if rail trail easements are required)

Other potential agencies/stakeholders may include:

- Community Foundation of Santa Cruz County/ Integrated Regional Water Management (IRWM) Partner Agencies
- Monterey Bay National Marine Sanctuary/ Partner Agencies
- NGOs such as: Ecology Action, Save Our Shores, Surfrider Foundation and Sierra Club
- Coastal Watershed Council
- Santa Cruz City Council Water Supply Advisory Committee
- Resource Conservation District of Santa Cruz County
- Soquel-Aptos Groundwater Management Area Basin Implementation Group (BIG)
- Private well owners
- Mid-County Groundwater Stakeholder Group

9. **A schedule with the starting and completion dates of specific tasks associated with the facilities planning study.**

The District will complete the RWFS in 2016, within 18 months from receipt of the SWRCB grant commitment letter. A preliminary schedule of major tasks for the study is illustrated in Figure 4 and a more detailed implementation schedule is provided in Section 3.3.
**Figure 4: Potential District RWFS Implementation Schedule**

<table>
<thead>
<tr>
<th>Task and Key Deliverables</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWRCB Grant Commitment Letter</td>
<td></td>
<td></td>
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<tr>
<td>SWRCB Meeting</td>
<td></td>
<td></td>
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<tr>
<td>RFP, Selection and NTP</td>
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<tr>
<td>Task 1 - PM &amp; QA/QC</td>
<td></td>
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<tr>
<td>Task 2 - Collect Background Information</td>
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<tr>
<td>Task 3 - Market Assessment</td>
<td></td>
<td></td>
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<tr>
<td>Task 4 - Treatment Evaluation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 5 - Alternatives Analysis</td>
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<tr>
<td>Task 6 - Recommended Facilities Project Plan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 7 - Construction Financing and Revenue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task 8 - RW Feasibility Study Report</td>
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<td></td>
</tr>
</tbody>
</table>

**Notes:**
- The first SWRCB meeting will occur in Santa Cruz area once a preferred alternative is identified.
- The second SWRCB meeting will include a presentation of the Draft District RWFS.
- Task 8 includes an Admin Draft Report for District review, a Draft Report for SWRCB review and a Final Report for SWRCB submittal.
10. A list of potential problems that could cause delays in the progress of the study and description of the means to reduce the impact of these potential problems.

The District anticipates few problems that could cause delays during the preparation of this District RWFS. These include:

- Communication with the general public will occur during the public outreach process. Since the District Board of Directors selected recycled water as a supply option to further consider, there have been several community members who have vocalized their concern of emerging contaminants. The District will be conducting a phone survey in early 2015 as a follow up to its phone survey conducted in 2014 (which included a few recycled water questions) to better gauge current perspectives of residents on recycled water. Following, it is anticipated a strategic public outreach plan will be developed to address customer concerns with selected alternatives.

- Data gathering delays may extend the project timeline; however, the District has already been working and coordinating with the City of Santa Cruz and County Sanitation District in discussions about indirect potable reuse through groundwater recharge of advanced purified water. We anticipate that we will continue to be able to work together with them and gather data, as needed but we recognize that delays may occur.

Any potential delays will be evaluated and if it appears that preparation of the final report will be delayed Water Resource Control Board staff will be notified.

11. Identification of the entities that will be conducting the study and description of their roles; description of proposed subcontracts with consultants of interagency agreements with other agencies, and any force account work.

The District recently hired Black and Veatch Consultants on December 16, 2014 with a $280,000 contract to be the technical advisor for evaluating indirect potable reuse through groundwater recharge of advanced purified water. Black and Veatch’s scope includes, but isn’t limited to, developing a comprehensive work plan and schedule, preparing an RFQ for a feasibility study, providing general technical expertise, and conducting a peer review of the feasibility study. Black and Veatch has begun working with the District to prepare a request for qualifications (RFQ) to select a consultant to conduct the District RWFS and it is anticipated that a consultant will be selected and hired by end of March 2015.

The District will be coordinating with the City and the County on the regional components of this study. When a draft of the District RWFS is generated, District staff will provide the City and County copies for review and input and requesting letters of support from both agencies to continue furthering work on a proposed project.
The District's proposed budget for this study is $150,000, as shown in Table 2.

**Table 2: District RWFS Task Budget**

<table>
<thead>
<tr>
<th>Description</th>
<th>District Estimated Budget</th>
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</thead>
<tbody>
<tr>
<td>Task 1 - Project Management &amp; QA/QC</td>
<td>$20,000</td>
</tr>
<tr>
<td>Task 2 - Collect Background Information</td>
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<td>Task 3 - Market Assessment</td>
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</tr>
<tr>
<td>Task 4 - Treatment Evaluation</td>
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</tr>
<tr>
<td>Task 5 - Alternatives Analysis</td>
<td>$18,000</td>
</tr>
<tr>
<td>Task 6 - Recommended Facilities Project Plan</td>
<td>$40,000</td>
</tr>
<tr>
<td>Task 7 - Construction Financing and Revenue</td>
<td>$10,000</td>
</tr>
<tr>
<td>Task 8 - RW Feasibility Study Report</td>
<td>$35,000</td>
</tr>
<tr>
<td><strong>Tasks 1-8 Total</strong></td>
<td><strong>$150,000</strong></td>
</tr>
</tbody>
</table>

1. Non-potable demands from the District's 2009 RWFPS will be confirmed and a hydrogeological assessment of groundwater recharge potential will be conducted (under a separate groundwater modeling effort) to support Task 3.
2. A wastewater treatment feasibility study and an advanced water purification technology study will be incorporated into Task 4.
3. A treatment facility siting analysis will be performed in Task 5.
4. An initial CEQA checklist and public outreach strategy will be integrated as part of Task 6.
5. A funding study will be integrated into Task 7.

The District would fund at least $75,000 of the study and has been included in the District's FY 2014-2015 budget, to serve as the matching funds for the RWFS; given this is a feasibility level study, the District may choose to fund additional work to support the RWFS, which will be incorporated as appropriate to enhance the Project while meeting the SWRCB grant requirements. The total level of effort will depend on the upcoming Request for Qualifications (RFQ) process the District will be undertaking this during the first quarter of 2015. Future funding for the design and construction of the recommended project would be included in the District's Capital Improvement Plan. Future funding mechanisms could include grants, loans, bonds or customer rate changes to the existing rate schedule.
References

