CITY OF SANTA BARBARA

POTABLE REUSE FEASIBILITY STUDY

TECHNICAL MEMORANDA NOS. 1 and 2

Technical Memorandum No. 1:
Introduction, Background, and Project Alternatives
FINAL – DECEMBER 2015

Technical Memorandum No. 2:
Regulatory and Permitting Requirements
FINAL – DECEMBER 2015

CITY OF SANTA BARBARA

POTABLE REUSE FEASIBILITY STUDY

TECHNICAL MEMORANDUM NO. 1 INTRODUCTION, BACKGROUND, AND PROJECT ALTERNATIVES

FINAL
December 2015

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City of Santa Barbara

Potable Reuse Feasibility Study

TECHNICAL MEMORANDUM
NO. 1
Introduction, Background, and Project Alternatives: Potable Reuse

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1.0 INTRODUCTION

This report presents the background and findings associated with a potable reuse feasibility study completed by the City of Santa Barbara, California. This section of the report presents the background, study scope and goals, study methods, and a summary of alternatives considered.

1.1 Background

On September 23, 2014 the City of Santa Barbara City Council directed Public Works Department staff to report back on a plan to evaluate the feasibility of subsurface desalination intakes (subsurface intake) and potable reuse, including indirect and direct potable reuse options. The direction given by City Council was to report back with a plan for this evaluation following award of the desalination plant contract in April 2015. Furthermore, on January 30, 2015, the Central Coast Regional Water Quality Control Board (RWQCB) adopted an amendment to the City's El Estero Wastewater Treatment Plant (WWTP) Waste Discharge Requirements (WDR) that included a condition that the City should report back to the RWQCB by August of 2015 with a Work Plan that will result in completed feasibility studies by June 2017.

The City subsequently retained the services of Carollo Engineers, Inc. (Carollo) to complete these studies. Carollo will deliver the work for these feasibility studies under three work authorizations:

- **Work Authorization 1:** The Work Plans for both the subsurface desalination intake and potable reuse studies.
- **Work Authorization 2:** Subsurface desalination intake initial screening analysis and potable reuse feasibility study.
- **Work Authorization 3:** Subsurface desalination intake feasibility study.

This document presents only the work associated with the potable reuse feasibility study. A programmatic workflow diagram for this study (i.e., Work Authorizations 1 and 2) is presented in Figure 1.1.

1.2 Scope

The City Council meeting minutes from September 23, 2014, Agenda Item 16: *Authorize Actions and Adopt a Resolution for Reactivating the Charles E. Meyer Desalination Facility*, state that there was an additional motion "to direct staff to return to the City Council after the [Desalination Plant Reactivation] contract decision is made in April [2015] to begin

exploring a range of alternatives, including subsurface intake and potable reuse options." To determine City Council's intent as to the scope of this study, the verbal transcript of the meeting was examined. In review of this transcript, Council's intent can be more clearly discerned from their discussion which included the comment to "direct staff…[to evaluate the] feasibility, cost, and timeline associated with both converting the offshore facility to a subsurface intake and look at the options about potable reuse".[1]

This motion was further adopted by the Central Coast RWQCB, who on January 30, 2015 amended the City's NPDES Permit (AMENDED ORDER NO. R3-2010-0011, NPDES NO. CA0048143) and in Section VI Paragraph C.6.c.iii (Special Provisions, Desalination Facility) adopted a provision to require the City to "Analyze the feasibility of a range of alternatives, including subsurface intake and potable reuse options".

Therefore, the direction given by both the City Council and RWQCB, relative to the scope of this study was to evaluate the feasibility of:

1. A replacement of the City's open ocean intake using a subsurface intake.
2. Potable reuse alternatives, also in the context of a replacement of desalination plant's open ocean intake use.

1.3 Study Methods

The City was required to submit a Work Plan for evaluating potable reuse alternatives to the RWQCB by August 2015. On August 31, 2015, the City submitted the Work Plan, which is presented in Appendix A. The objective of the Work Plan is to present the methodology and procedures that were used to perform the potable reuse feasibility study. Objectives of the Work Plan include:

1. Establish the project schedule.
2. Establish the methods to determine the design basis. Design basis includes production capacity and site alternative evaluation.
3. Establish the types of potable reuse alternatives to be studied.
4. Establish procedure to identify sites for treatment, storage, and distribution facilities to evaluate when considering both direct potable reuse (DPR) and indirect potable reuse (IPR) alternatives.
5. Establish the scope of cost estimates and cost estimating procedures.
6. Establish and define feasibility screening criteria.

[1] Mayor Schneider, as documented on September 23, 2014 City Council Meeting video recording (available on the City's website): http://media-07.granicus.com:443/OnDemand/santabarbara/santabarbara_d2343df5-8a20-499d-b1fb-5dda1f9e0414.mp4 at 2 hours and 33 minutes.

7. Establish and define initial screening criteria that may limit further consideration of project sites and potable reuse alternatives.
8. Establish technical advisory panel role, procedures, and objectives.
9. Establish the role of outside agencies (e.g., RWQCB, California Coastal Commission, etc.) and City residents.

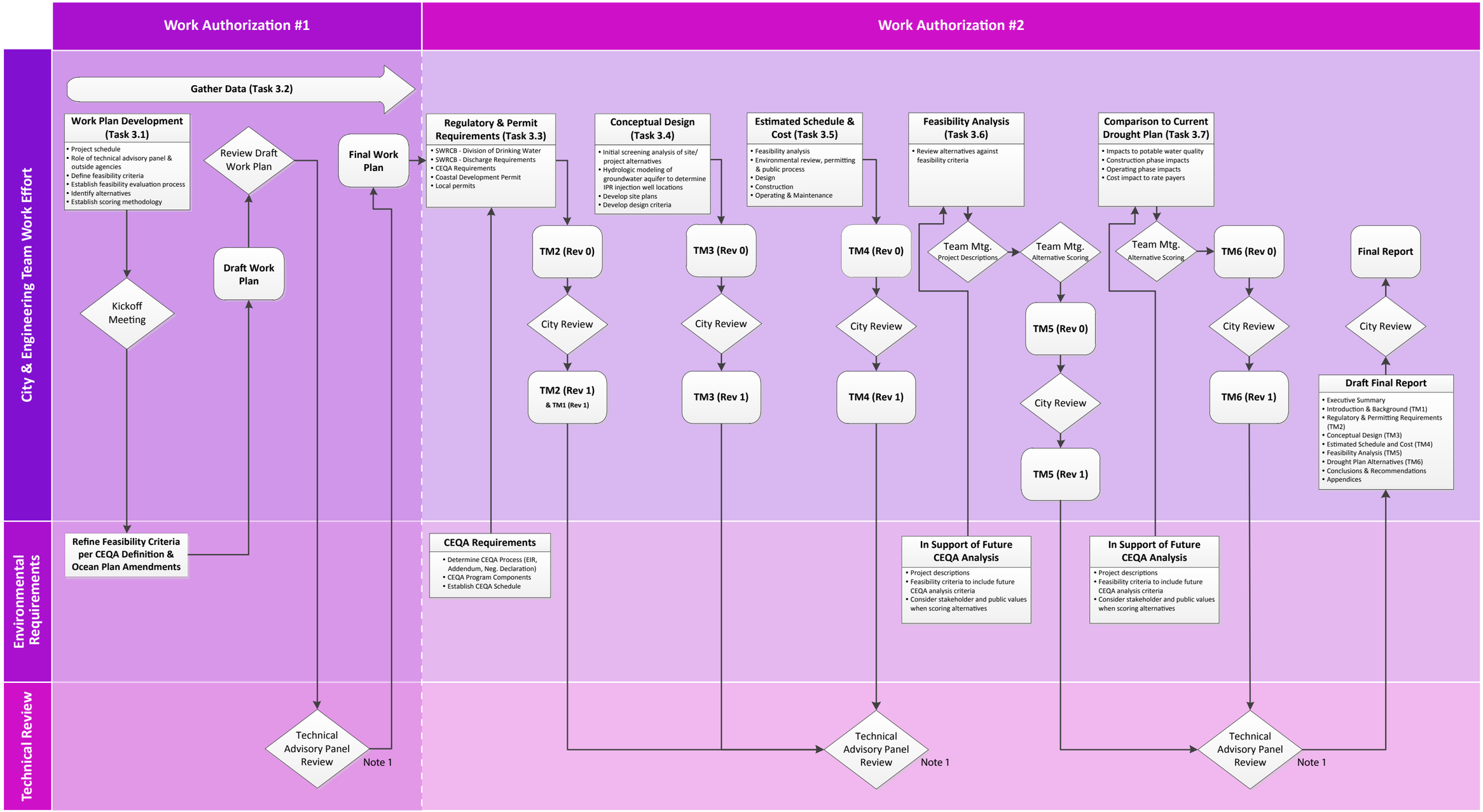
The potable reuse feasibility study Work Plan, presented in Appendix A, is organized into the following sections:

- Introduction
- Basis of Design
- Feasibility and Initial Screening Criteria
- Implementation Schedule Development
- Cost Estimating Methodology
- Feasibility Analysis
- Technical Advisory Process

The City's subsurface desalination intake feasibility study is addressed as separate Work Plan.

The programmatic workflow diagram presented in Figure 1.1 shows the chronology that project work product was developed and reviewed for each of the potable reuse feasibility study's work authorizations. As noted in Figure 1.1, only potentially feasible alternatives are evaluated in as part of subsequent tasks. Initial screening was performed and if enough data was available to determine that the alternative does not pass initial screening, no further feasibility analysis was performed for that potable reuse alternative.

A complete project schedule including the anticipated dates of all project milestones and deliverables is presented in Figure 1.2.



Notes:
1. It is envisioned that the technical advisory process includes a public meeting where stakeholders will be given a chance to state their interests in the City's study effort and comment upon the direction of the City's work product.

Figure 1.1 - Potable Reuse Feasibility Study Programmatic Work Plan

Subsurface Desalination Intake & Potable Reuse Feasibility Studies

ID	Task Name	Duration	Start	Finish
1	**Notice to Proceed (Work Authorization 1)**	1 day	Fri 5/1/15	Fri 5/1/15
2	Notice to Proceed (Work Authorization 2)	1 day	Tue 9/22/15	Tue 9/22/15
3	Notice to Proceed (Work Authorization 3)	1 day	Mon 11/23/15	Mon 11/23/15
4	**TASK 1 - SUBSURFACE DESALINATION INTAKE FEASIBILITY STUDY**	**526 days**	**Fri 5/1/15**	**Fri 5/5/17**
5	**1.1 Work Plan Development**	**114 days**	**Fri 5/1/15**	**Wed 10/7/15**
6	Kickoff Meeting	1 day	Wed 5/20/15	Wed 5/20/15
7	Draft Work Plan	36 days	Fri 5/1/15	Fri 6/19/15
8	City Review	5 days	Mon 6/22/15	Fri 6/26/15
9	Submit Draft Work Plan to RWQCB	1 day	Mon 6/29/15	Mon 6/29/15
10	RWQCB Approval/Comments	1 day	Tue 7/21/15	Tue 7/21/15
11	Final Work Plan	10 days	Thu 8/13/15	Wed 8/26/15
12	TM1 (Revision 0): Intro, Background & Project Alternatives	15 days	Thu 8/27/15	Wed 9/16/15
13	City Review	5 days	Thu 9/17/15	Wed 9/23/15
14	TM1 (Revision 1): Intro, Background & Project Alternatives	10 days	Thu 9/24/15	Wed 10/7/15
15	**1.2 Literature Review**	**106 days**	**Fri 5/1/15**	**Fri 9/25/15**
16	Collect Literature	99 days	Fri 5/1/15	Wed 9/16/15
17	Data Collection List Updates	**105 days**	**Mon 5/4/15**	**Fri 9/25/15**
18	Weekly Data Collection Updates	16 days	Mon 5/4/15	Mon 5/25/15
23	Monthly Data Collection Updates	66 days	Fri 6/26/15	Fri 9/25/15
28	**1.3 Basis of Design & Initial Screening Analysis**	**55 days**	**Wed 9/23/15**	**Tue 12/8/15**
29	**1.3.1 Prelim. Geophysical Studies (Tsunami, Sea Level Rise & Sediment Transport)**	**35 days**	**Wed 9/23/15**	**Tue 11/10/15**
33	**1.3.2 Basis of Design and Initial Screening**	**35 days**	**Wed 10/21/15**	**Tue 12/8/15**
37	**1.4 Regulatory Requirements**	**30 days**	**Wed 9/23/15**	**Tue 11/3/15**
41	**1.5 - Geotechnical & Subsurface Studies**	**220 days**	**Tue 11/24/15**	**Mon 9/26/16**
42	**1.5.1 Permitting for Subsurface Data Collection/Sampling**	**35 days**	**Tue 11/24/15**	**Mon 1/11/16**
52	**1.5.2 Field Activities for Geotechnical and Subsurface Data Collection/Sampling**	**125 days**	**Tue 3/8/16**	**Mon 8/29/16**
57	**1.5.3 Groundwater Modeling**	**35 days**	**Tue 8/9/16**	**Mon 9/26/16**
61	**1.6 Conceptual Design**	**45 days**	**Tue 9/6/16**	**Mon 11/7/16**
65	**1.7 Estimated Schedule and Cost**	**25 days**	**Tue 10/4/16**	**Mon 11/7/16**
69	**1.8 Feasibility Analysis**	**113 days**	**Tue 11/8/16**	**Thu 4/13/17**
79	**1.9 Subsurface Desalination Intake Feasibility Report**	**35 days**	**Fri 4/14/17**	**Thu 6/1/17**
83	**TASK 2 - NOT USED**	**333 days**	**Tue 11/24/15**	**Thu 3/2/17**
108	**TASK 3 - POTABLE REUSE FEASIBILITY STUDY**	**248 days**	**Fri 5/1/15**	**Tue 4/12/16**
109	**3.1 Work Plan Development**	**109 days**	**Fri 5/1/15**	**Wed 9/30/15**
110	Kickoff Meeting	1 day	Wed 5/20/15	Wed 5/20/15
111	Draft Work Plan	36 days	Fri 5/1/15	Fri 6/19/15
112	City Review	5 days	Mon 6/22/15	Fri 6/26/15
113	Submit Draft Work Plan to RWQCB	1 day	Mon 6/29/15	Mon 6/29/15
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118	TM1 (Revision 1): Intro, Background & Project Alternatives	5 days	Thu 9/24/15	Wed 9/30/15
119	**3.2 Literature Review**	**106 days**	**Fri 5/1/15**	**Fri 9/25/15**
120	Collect Literature	99 days	Fri 5/1/15	Wed 9/16/15
121	Data Collection List Updates	105 days	Mon 5/4/15	Fri 9/25/15
122	Weekly Data Collection Updates	16 days	Mon 5/4/15	Mon 5/25/15
127	Monthly Data Collection Updates	66 days	Fri 6/26/15	Fri 9/25/15
132	**3.3 Regualtory and Permit Requirements**	**30 days**	**Thu 8/27/15**	**Wed 10/7/15**
136	**3.4 Conceptual Design**	**45 days**	**Thu 8/27/15**	**Wed 10/28/15**
140	**3.5 Estimated Schedule and Cost**	**25 days**	**Thu 9/24/15**	**Wed 10/28/15**
144	**3.6 Feasibility Analysis**	**70 days**	**Thu 12/31/15**	**Wed 4/6/16**
154	**3.7 Potable Reuse Feasibility Report**	**7 days**	**Mon 4/4/16**	**Tue 4/12/16**
158	**TASK 4 - TECHNICAL ADVISORY PROCESS**	**453 days**	**Wed 8/12/15**	**Fri 5/5/17**
159	Workshop 1: Work Plan	1 day	Wed 8/12/15	Wed 8/12/15
160	Workshop 2: Initial Screening	1 day	Wed 12/30/15	Wed 12/30/15
161	Workshop 3: Feasibility Analysis (Potable Reuse Study)	1 day	Fri 5/5/17	Fri 5/5/17
162	Workshop 4: Feasibility Analysis (Subsurface Study)	1 day	Fri 4/1/16	Fri 4/1/16
163	**RWQCB FINAL REPORT DEADLINE**	1 day	Fri 6/2/17	Fri 6/2/17

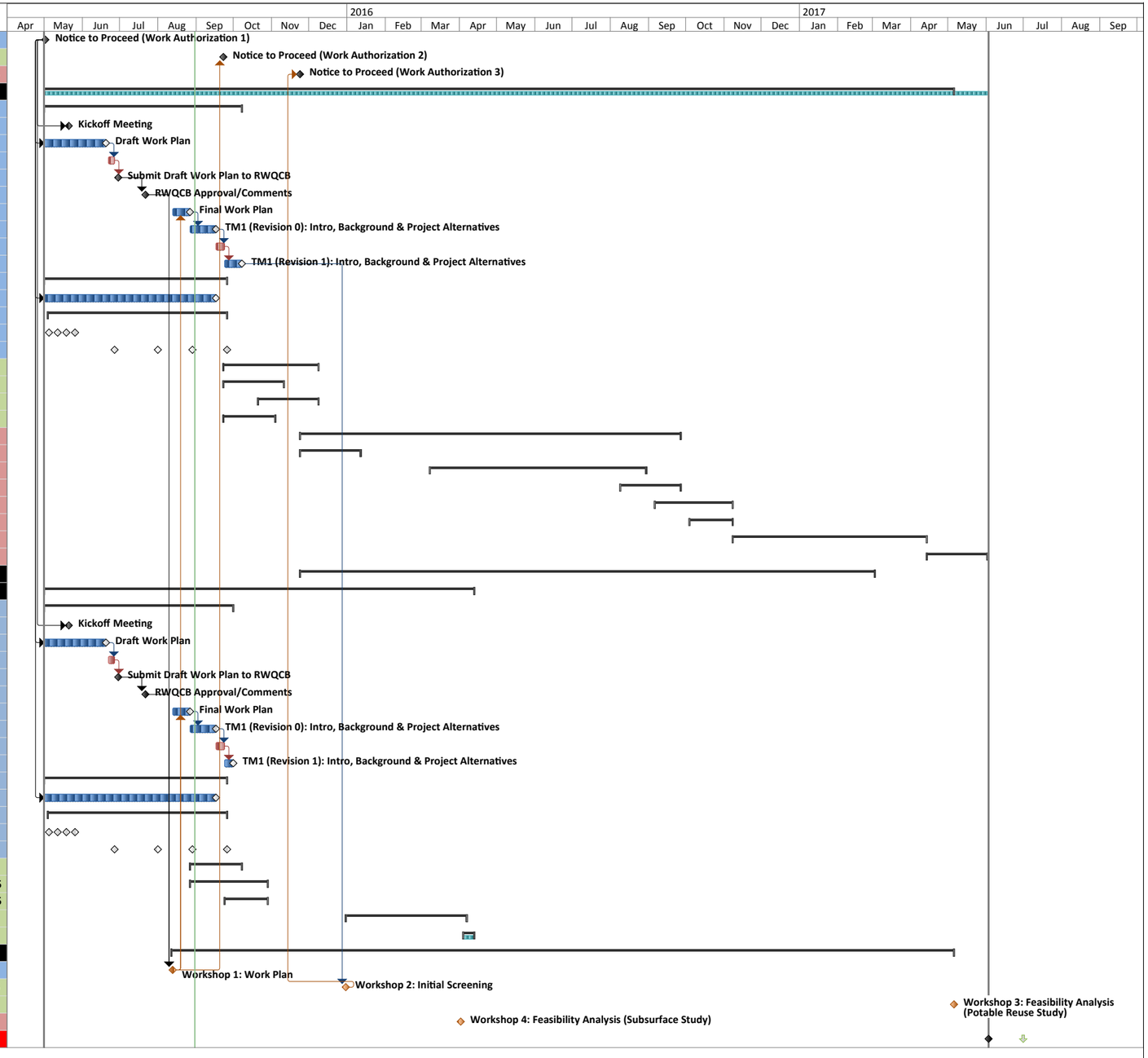

Figure 1.2 - Project Schedule

1.4 Goal of Study

The goal of this study is to meet the requirements set forth by City Council and the RWQCB that were described in Section 1.2. However, this study may also inform future studies including future updates to the City's Long Term Water Supply Plan. The City's primary water source is Cachuma Reservoir, which provides over 50 percent of the City's water supply during a normal (non-drought) year. The City's water supply allocation from Cachuma could be reduced in the future due to pending federal environmental decisions on a revised Biological Opinion for the Cachuma Project, reduced operational yield due to siltation in the reservoir, and reduced drought yield as a result of the current historic drought. The City's supply planning will need to be updated to address shortages caused by such reductions to the City's existing Cachuma supply. Options for replacing a reduced Cachuma supply may include desalination and potable reuse.

Because the amount of the reduction from the City's Cachuma supply is unknown at this time, it is premature for the City to evaluate exact desalination and potable reuse capacity options that may or may not meet the City's needs. The timing for this analysis would be more appropriate following the final federal environmental decisions and operational yield analyses that determine the future Cachuma allocations. Therefore, the direction given by City Council and the RWQCB (as presented in Section 1.3) is appropriate at this time because it determines the maximum capacity that is technically feasible from subsurface intakes and potable reuse without requiring the City to invest in developing many project concepts that may or may not meet the City's future needs pending forthcoming environmental and operational yield decisions.

Thus, the goal of this study is to understand the maximum yield that is technically feasible for potable reuse alternatives and subsurface intake alternatives (i.e., the subject of a separate feasibility study report). The maximum yield will provide information on whether the alternatives could replace the open ocean intake independently, and potentially combined. How the City will use of these technically feasible maximum yields needs to be informed by the City's need, which will follow at a later date. Therefore, the information developed in this study will inform future studies, such as an update to the City's Long Term Water Supply Plan.

Feasibility and initial screening criteria are presented in Section 3 of the Work Plan. Alternatives are first subjected to initial screening criteria, which are based on technical feasibility criteria and capacities defined under current project objectives. It is anticipated that alternatives may end up in the following three general categories:

1. **Infeasible** – The alternative does not pass the initial screening criteria and is fatally flawed due to technical criteria.

   Action: The alternative shall not be considered further in this study and is not recommended for inclusion in future studies.

2. **Potentially feasible, does not meet Study goals** – The alternative meets technical screening criteria and is potentially feasible. However, the alternative's capacity does not meet the current Study goals.

   Action: The alternative shall not be considered further in this study but is potentially feasible and may be considered in future studies. Information collected during the screening process is useful to inform future studies.

3. **Potentially feasible** – The alternative passes through the initial screening stage and is considered potentially feasible.

   Action: The alternative shall be considered further in this study under current objectives and is subject to the work sequence laid out in the Work Plan.

1.5 Technical Advisory Process

The technical advisory process described in the Work Plan (Appendix A) provides an independent, third party review of the project work product at key intervals throughout the project duration, as the work product is developed. The technical advisory process shall achieve the following objectives:

1. Provide timely review of project work product by experts in the required subject matter to advise and guide the City's feasibility study.
2. Facilitate input from project stakeholders that can be used to inform the City's comparison of potentially feasible alternatives.
3. Create a record of the review and stakeholder process to be included as an appendix to the feasibility study report.

To assist the Central Coast Regional Water Quality Control Board administer the technical advisory process, the City retained the services of the National Water Research Institute (NWRI). NWRI is a California non-profit organization whose activities include ensuring safe, reliable sources of water now and for future generations through a variety of research, education, and public out-reach activities. NWRI has facilitated similar technical advisory programs on subsurface intake and potable reuse feasibility projects in California, including programs for both municipal and state regulatory agencies. NWRI retained the services of the experts that reviewed the work, facilitated the project meetings (i.e., that included an opportunity for stakeholder comments) and completed the documentation of the technical review and stakeholder process. Refer to the Work Plan (Appendix A) for additional information regarding the technical advisory process.

1.6 Potable Reuse Project Alternatives

The purpose of this section is to present the project alternatives considered for this study. The basis for establishing and evaluating project alternatives is presented in the Work Plan (Appendix A) and subsequently in Section 3 of this report.

1.6.1 Capacity

As stated in the Work Plan (Appendix A), to meet the study's scope requirements stated in Section 1.2, project alternatives must be able to produce between 10,000 and 11,400 AFY to be considered a replacement for the City's open ocean intake. However, consistent with the project goals stated in Section 1.3, maximum yield was determined through initial screening and this information can be used to inform future studies.

1.6.2 Potable Reuse Treatment Criteria

This study considers the following treatment for potable reuse alternatives:

- Indirect potable reuse (IPR), as defined by:
  - Title 22, Article 5.1 - Groundwater Replenishment - Surface Application: requires advanced treatment (as defined by Title 22, §60301.320 and §60301.230).
  - Title 22, Article 5.2 - Groundwater Replenishment - Subsurface Application: requires Full Advanced Treatment (FAT), as presented in Figure 1.3.

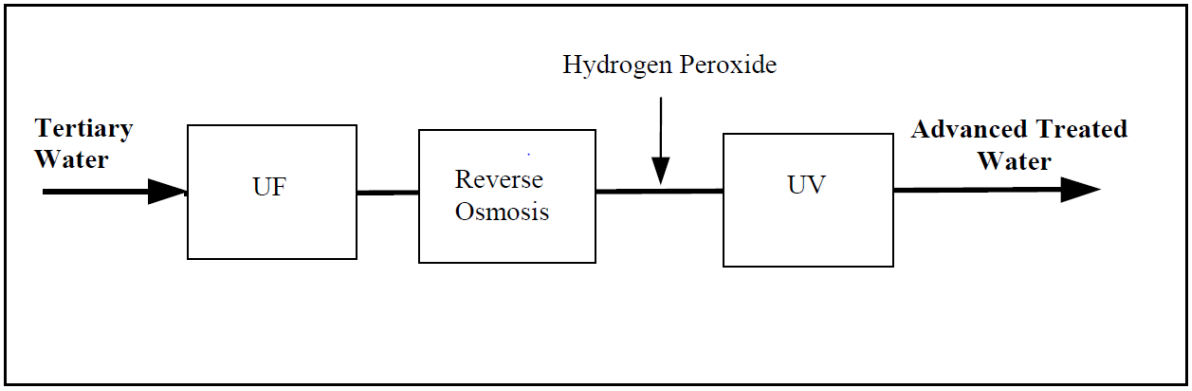

Figure 1.3 Typical Full Advanced Treatment (FAT) Schematic

- Direct potable reuse (DPR)
  - The state of California does not have regulations for DPR. However, this does not mean that DPR cannot be implemented in California. In September 2010, the Governor of the State of California signed into law Senate Bill 918 which mandated the State Water Resources Control Board, Division of Drinking Water

(DDW) to investigate the feasibility of developing regulatory criteria for DPR and to provide a final report on that investigation to the legislature by the end of 2016. DDW has held a series of workshops on this topic, and has also worked with a number of agencies, including the City of San Diego to review DPR projects on a case by case basis. DDW has indicated through these meetings and project reviews that in addition to the IPR requirements stated in Title 22, Article 5.1 and 5.2 (as amended in June 2014), DPR projects will likely be required to incorporate the following features:

- Treatment for pathogenic microorganisms may likely be required in excess of the treatment required by Title 22 Article 5.1 and 5.2 (i.e., 12 log enteric virus reduction, 10 log Giardia reduction and 10 log Cryptosporidium reduction (12/10/10) using at least 3 treatment processes, each being credited with no less than 1.0-log reduction may likely be required). Recent statements made by the DDW staff charged with implementing DPR regulations, have indicated 14/12/12-log reduction of virus/Giardia/Cryptosporidium may be required.
- Engineered storage – so that advanced treated wastewater can be held (i.e., not distributed) until the results of various water quality parameters can be tested to establish the water is safe.

For the purpose of this study, the basis of design for treatment and finished water quality goals for DPR will be based upon the most recent regulatory activity and comparable precedent activity in California.

1.6.3 Potable Reuse Project Site Alternatives

Possible potable reuse treatment facility location options may include:

- 401 E. Yanonali Street (i.e., City Corporation Yard, APN #017-540-006).
- 103 S. Calle Cesar Chavez (APN #017-113-020).
- Repurposing the Charles Meyer Desalination Plant located at 525 E. Yanonali Street.

Possible groundwater replenishment (a.k.a., recharge) locations for IPR may include:

- Injection wells (i.e., subsurface application) in the Foothill basin (near Route 154 and Highway 101)
- Injection wells (i.e., subsurface application) in groundwater basin referred to as “Storage Unit 1” (north of Highway 101).
- Surface application of water (i.e., a spreading basin) in Mission Creek from just above Rocky Nook Park to Oak Park, to recharge Storage Unit 1.
- Surface application of water (i.e., a spreading basin) in or near the Foothill basin.

Project site alternatives are generated based on existing city infrastructure, proximity to existing City wells, and proximity to City owned or patrolled land. It is possible that additional production wells may be required to fully recover the water stored. Therefore, identification of any new groundwater production well sites follows a similar process as for locating groundwater replenishment wells.

Possible direct potable reuse options may include (but may not be limited to):

- Discharge of advanced treated wastewater into Lauro Canyon Reservoir (a.k.a., raw water production).
- Dilution and off-setting the intake volume of seawater flowing to the Charles Meyer Desalination Plant.

Figure 1.4 presents the locations of the City's existing wells, groundwater basins, and water treatment facilities.

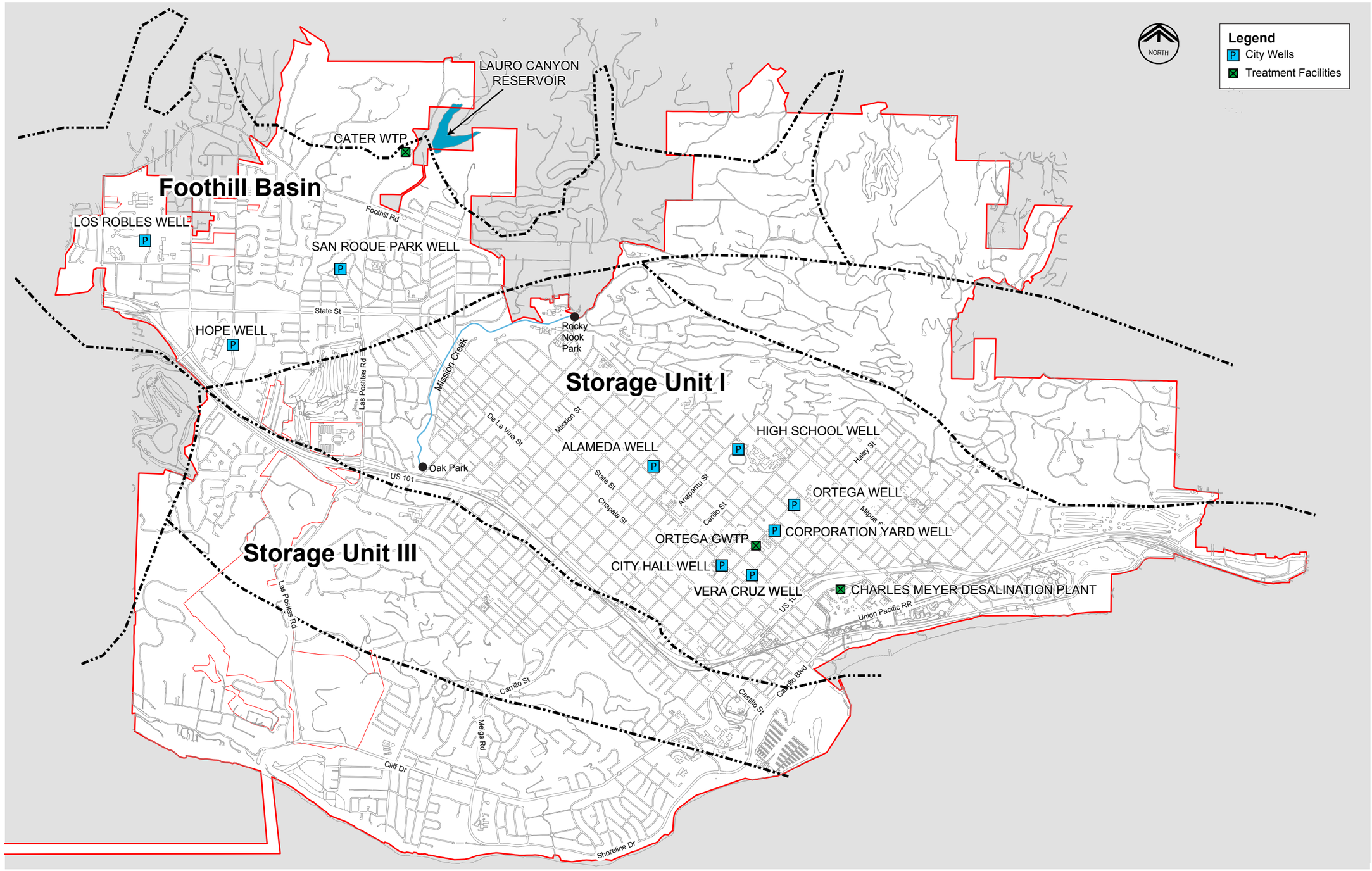

Figure will be updated with USGS data showing potential IPR surface and recharge locations

Figure 1.4 - Potential Areas for Potable Reuse Project Alternatives

APPENDIX A – POTABLE REUSE FEASIBILITY STUDY WORK PLAN

CITY OF SANTA BARBARA

POTABLE REUSE FEASIBILITY STUDY

TECHNICAL MEMORANDUM NO. 2
REGULATORY AND PERMITTING REQUIREMENTS

FINAL
December 2015

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City of Santa Barbara

Potable Reuse Feasibility Study

TECHNICAL MEMORANDUM NO. 2

Regulatory and Permitting Requirements: Potable Reuse

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2.0 REGULATORY AND PERMITTING REQUIREMENTS

2.1 Introduction

This section provides a summary of the relevant environmental, regulatory, and permitting requirements related to developing a potable reuse project in the City of Santa Barbara. The material in this section includes a summary of:

- Definition of the types of potable reuse;
- Regulatory requirements for indirect potable reuse;
- Regulatory status of direct potable reuse; and
- General regulatory or permitting process requirements.

The following regulatory requirements and permits are required to implement a potable reuse project in the City of Santa Barbara:

- Environmental Review
  - California Environmental Quality Act (CEQA)
- California Coastal Commission (CCC)
  - Coastal Development Permits
- State Water Resources Control Board (SWRCB)
  - Division of Drinking Water (DDW)
    - Public Water System (PWS) Permit
  - Regional Water Quality Control Board (RWQCB)
    - National Pollutant Discharge Elimination System (NPDES)
- Santa Barbara County Public Health Department
  - Water Well Permit
- United States Environmental Protection Agency (U.S. EPA)
  - Underground Injection Control (UIC) Program
- City of Santa Barbara
  - Local Coastal Development Permit
  - Industrial Pretreatment Permit
  - Building permits

2.2 Types of Potable Reuse

As described in the Work Plan (Appendix A), potable reuse applications include either indirect potable reuse (IPR) or direct potable reuse (DPR) and may be defined as: [1]

- *Indirect potable reuse (IPR):* The introduction of ***advanced treated water*** into an environmental buffer such as a groundwater aquifer or surface water body (e.g., spreading basin or reservoir) before being withdrawn for potable purposes. Indirect potable reuse can also be accomplished with ***tertiary effluent*** when applied by spreading (i.e., groundwater recharge - "surface application") to take advantage of a natural process known as “soil aquifer treatment”, however, more stringent requirements for the environmental buffer apply (e.g., increased residence time and mixing with other sources).

- *Direct potable reuse (DPR):* There are two forms of direct potable reuse. In the first form, ***advanced treated water*** is introduced into the raw water supply upstream of a drinking water treatment facility with limited storage time before use (i.e., raw water supply augmentation). In the second form, finished drinking water from an advanced water treatment facility (i.e., permitted as a drinking water treatment facility) is introduced directly into a potable water supply distribution system.

California Code of Regulations, Title 22, Article 5.1 and 5.2 classifies two types of IPR, both referred to as “Groundwater Replenishment” and defined below[2].

- *Groundwater replenishment by surface application:* The application of recharge water to a spreading area (e.g., spreading basin, surface spreading, etc.). [3]

- *Groundwater replenishment by subsurface application:* The application of recharge water to a groundwater basin(s) by a means other than surface application (e.g., injection wells, groundwater recharge, etc.). [3]

No regulations currently exist for DPR, though surface water augmentation regulations are under development.

The following potable reuse applications will be considered as part of this study:

- IPR for groundwater recharge - both groundwater replenishment by surface and subsurface application in the Foothill Basin and Storage Unit 1.

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[1] Independent Advisory Panel. 2015. Framework for Direct Potable Reuse. WateReuse. American Water Works Association. Water Environment Federation. National Water Research Institute. September 10, 2015.
[2] California Department of Public Health. 2014. Title 22 Code of Regulations. June 18, 2014.
[3] “Recharge water” means recycled municipal wastewater, or the combination of recycled municipal wastewater and credited diluent water, which is utilized by a (Groundwater Replenishment Reuse Project (GRRP) for groundwater replenishment.

- DPR - raw water supply augmentation at the Lauro Canyon Reservoir (supplying water to the Cater Water Treatment Plant) and at the Charles Meyer Desalination Plant.

2.3 Regulatory Requirements for Indirect Potable Reuse

Water quality and treatment requirements for IPR alternatives are specified in the California Code of Regulations, Title 22. Article 5.1 presents IPR regulations for groundwater replenishment by surface application (e.g., spreading basins). Article 5.2 presents IPR regulations for groundwater replenishment by subsurface application (e.g., injection wells). All IPR alternatives evaluated by the City as part of this study are required to comply with the regulations set forth in Title 22 by providing adequate treatment and producing water conforming to requirements:

- Title 22, Article 5.1 - Groundwater Replenishment - Surface Application (i.e., for spreading): requires, at minimum, disinfected tertiary treatment (as defined by Title 22, §60301.320 and §60301.230).[4]

- Title 22, Article 5.2 - Groundwater Replenishment - Subsurface Application: requires full advanced treatment (FAT), as presented in Figure 2.1.

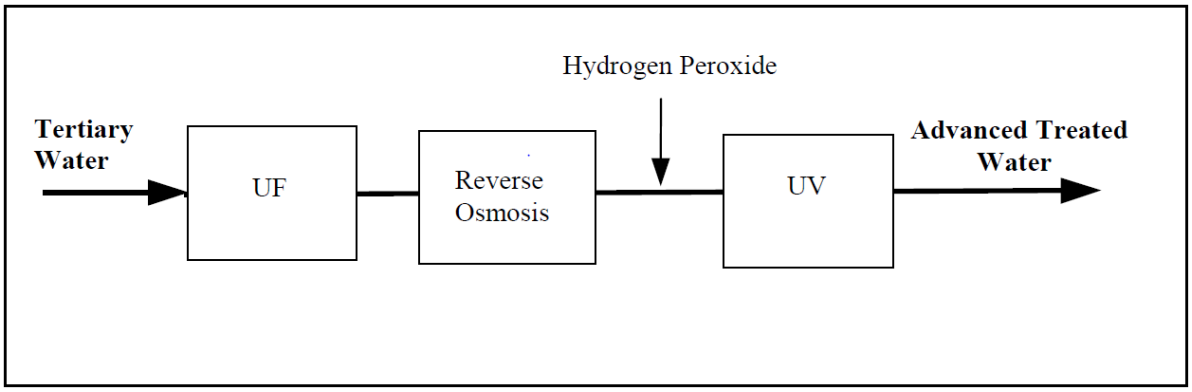

Figure 2.1 Full Advanced Treatment Process Flow Schematic

Key requirements for potable reuse, as found in Title 22, Articles 5.1 and 5.2, are listed below.

Travel Time Requirements:

An environmental buffer is required, between the location where treated effluent is recharged and the point where it is withdrawn for potable use, to provide adequate time to evaluate the quality of IPR water. As presented in table 2.1, the required travel time varies based upon the treatment provided by an engineered process or by the environment (e.g.,

[4] Although not required, Title 22 does allow surface application to be performed using FAT water. This reduces travel time and response retention time requirements.

soil aquifer treatment). Minimum travel time requirements are based upon the "Response Retention Time" (RRT), as defined by Title 22 (a.k.a., "Failure Response Time" (FRT), as defined by other industry publications) and represents the minimum time required for analytical procedures to be completed so that the quality and health effects of IPR water can be determined.

Table 2.1 Minimum Travel Time Requirements for Groundwater Replenishment

Application	Travel Time Demonstrated by Added Tracer	Travel Time Demonstrated by Intrinsic Tracer	Travel Time Calculated by Darcy's Law	Travel Time Calculated by Complex Numerical Model
Surface Application - Disinfected Tertiary Water(1)	6 Months	9 Months	24 Months	12 Months
Surface Application - Advanced Treated Water(1)	2 Months	3 Months	8 Months	4 Months
Subsurface Application - Advanced Treated Water(2)	2 Months	3 Months	8 Months	4 Months

Notes:
(1) Title 22, Article 5.1.
(2) Title 22, Article 5.2.

Diluent Water Requirements – referred as Recycled Municipal Wastewater Contribution (RWC)[5] Requirements [§60320.116 and §60320.216]

Where advanced treatment is not provided, Title 22 requires wastewater total organic carbon (TOC) at the point of potable use to be reduced by dilution using other acceptable water sources. This requirement limits public consumption of wastewater derived TOC to a maximum value of 0.5 mg/L, which is intended to protect public health and safety by limiting exposure to trace level pollutants. Wastewater effluent TOC concentrations can range from approximately 5 mg/L to >10 mg/L. Performance data from Southern California spreading basins suggest that TOC removal through spreading may range from <50% to 75%. Thus, for an effluent TOC of 10 mg/L, the TOC could be reduced to 2.5 mg/L after spreading and soil aquifer treatment. Therefore, a minimum dilution requirement of 4:1 dilution (20% recycled water, 80% diluent water) would bring the wastewater TOC concentration to the goal of 0.5 mg/L. The following requirements for dilution water are stated in Title 22 [§60320.116, §60320.118, §60320.216, and §60320.218].

[5] As defined in Title 22, a Recycled Municipal Wastewater Contribution or RWC means the faction equal to the quantity of recycled municipal wastewater applied at the Groundwater Replenishment Reuse Project (GRRP) divided by the sum of the quantity of recycled municipal wastewater and credited diluent water.

1. Spreading disinfected tertiary wastewater (Groundwater Replenishment – Surface Application): 4:1 blending with another water supply. The requirement constitutes an **RWC of 0.2** [§60320.116].
    a. This is the initial RWC maximum, or an alternative approved by DDW. DDW approval can be sought for up to 1.0 after the project is operational if various requirements set forth in Title 22 are met [§60320.116 (c)].
2. Spreading a full advanced treated (FAT) water (Groundwater Replenishment – Surface Application): There is no dilution requirement (i.e., dilution is not necessary). The **RWC can be up to 1.0** [§60320.216].
3. Groundwater Injection of a full advanced treated (FAT) water (Groundwater Replenishment – Subsurface Application): There is no dilution requirement (i.e., dilution is not necessary). **The RWC can be up to 1.0** [§60320.216].

Diluent water requirements are specified in Title 22 §60320.114 and §60320.214 for surface and subsurface application, respectively.

Treatment Requirements

The control of pathogenic microorganisms and trace pollutants for indirect potable reuse projects is described in Title 22 of the California Code of Regulations. This includes final regulations for groundwater replenishment. Key water quality criteria are shown in Table 2.2.

Table 2.2 Potable Water Reuse Key Treatment Criteria

Parameter	Criteria
Pathogen Microorganism Control	
Enteric Virus	12 - log[1] reduction
Giardia cyst	10 - log[1] reduction
Cryptosporidium oocysts	10 - log[1] reduction
Total Organic Carbon (TOC)	Maximum 0.25 mg/L in 95% of samples within first 20 weeks / Maximum 0.5 mg/L 20-week running average
1,4-dioxane[2]	0.5 - log reduction by an advanced oxidation process
NDMA	10 ng/L Notification Level (NL)
Total Nitrogen (TN)	10 mg/L

Notes:
(1) 1-log is 90% reduction, 2-log is 99% reduction, etc.
(2) Indicator compounds can be substituted for 1,4-dioxane with approval from DDW.

2.3.1 Regulatory Process for IPR

IPR is currently regulated by the SWRCB and the Regional Water Quality Control Board (RWQCB) through the issuance of National Pollutant Discharge Elimination System (NPDES) permits and Waste Discharge Requirements (WDR). For a groundwater recharge and surface water augmentation projects, there are two central permitting documents for potable water reuse:

- The Engineering Report, which is focused on public health protection, and
- The Report of Waste Discharge (ROWD), which is focused on the protection of groundwater quality or surface water quality.

Content and development of these two reports have substantial overlap. Components of these two reports include:

- Developing an industrial pretreatment and pollutant source control program that is focused on protecting water quality for advanced treatment and potable water reuse.
- Demonstration of water quality (raw wastewater, secondary effluent, and tertiary effluent that has undergone advanced treatment) in accordance with regulated values.
- Developing a SWRCB-approved plan that provides an alternative source of domestic water supply or a SWRCB-approved treatment mechanism in the event that the reuse project causes the drinking water source to become unusable.
- Conducting a public hearing for reuse projects, with specific requirements for public notification via various methods.
- Develop of an operations plan for the advanced treatment system.
- Development of a monitoring plan for the advanced treatment system, the groundwater basin, and the surface water reservoir.
- Groundwater and/or surface water quality monitoring and documentation of background water quality.
- Groundwater anti-degradation analysis.
- Hydraulic modeling of groundwater basin and/or surface water reservoir to document travel time (and thus residence time).

Based upon prior IPR permitting experience in California, the regulatory process described above is estimated to require a minimum of 12 months, potentially longer depending upon groundwater modeling efforts and the industrial source control efforts. The permitting above is in addition to standard environmental permitting done as part of the CEQA process, the

California Coastal Commission process, and other permitting efforts detailed further on in this document.

2.3.2 Future IPR Regulations

The State Water Resources Control Board (SWRCB), Department of Drinking Water (DDW) is developing rules for surface water augmentation in a manner that can classify the reuse application as IPR with the following additional requirements:[6]

- The reservoir must have an average retention time of 6 months, which is calculated as the volume of the reservoir divided by the monthly reservoir discharge;
- The volume of water withdrawn in 24 hours contains 1% or less by volume the purified water delivered to the reservoir during the same 24 hour period; or
- The volume of water withdrawn in 24 hours contains 10% or less by volume the purified water delivered to the reservoir during the same 24 hour period; and an extra 1-log (90%) pathogen reduction is provided via an independent treatment process.

For the purposes of this study, because Lauro Canyon Reservoir has low residence time, application of reuse water to this reservoir cannot be considered IPR by these anticipated future criteria.[7]

Future Water Quality Requirements

Potable water reuse projects are held to stringent water quality standards that exceed the rigor of conventional water projects. The proposed water quality monitoring program for the City of Oxnard's forthcoming potable reuse project is included as Appendix B. This monitoring program includes contaminants of emerging concern (CECs), which includes chemicals such as 1,2,3-trichloropropane (1,2,3-TCP), and N-Nitrosodimethylamine (NDMA), pharmaceuticals, endocrine-disrupting compounds such as hormones, and other environmentally persistent chemicals that enter the wastewater system through human use.

2.4 Regulatory Status Direct Potable Reuse

As stated previously, the State of California has not adopted regulations for DPR at this time. However, DPR guidelines are now complete and can be used as a starting point, and the State is moving ahead with a rigorous evaluation of DPR as a water supply alternative which will likely be informed by these newly published guidelines.[8] California Senate Bill 918 (SB 918), signed into law on September 30, 2010 by the Governor, provided funding

[6] 2015. Correspondence between Carollo Engineers, Inc. and DDW staff.
[7] The Lauro Canyon Reservoir has a storage capacity of approximately 640 AF (208 MG) and supplies water to the 37 MGD Cater Water Treatment Plant.
[8] Independent Advisory Panel. 2015. Framework for Direct Potable Reuse. WateReuse. American Water Works Association. Water Environment Federation. National Water Research Institute. September 10, 2015.

and deadlines to complete regulations for indirect potable reuse projects and to evaluate direct potable reuse. The law required the California Department of Public Health (CDPH) Drinking Water Program (now the SWRCB Division of Drinking Water [DDW]) to adopt uniform water recycling criteria for potable water reuse for groundwater replenishment by December 31, 2013. These draft regulations were completed and adopted on June 18, 2014, as 22 CCR Division 4, Chapter 3, Articles 5.1 and 5.2, “Indirect Potable Reuse: Groundwater Replenishment – Surface Application / Subsurface Application” (refer to Section 2.3). The law also requires DDW to develop and adopt uniform water recycling criteria for surface water augmentation by December 31, 2016 (herein otherwise referred to as one of two types of direct potable reuse), if an expert panel convened pursuant to the bill finds that the criteria would adequately protect public health. The SWRCB is required to provide a final report on that investigation to the legislature by the December 31, 2016 deadline. This deadline has been moved "up", and the final report is anticipated by Fall of 2016.

Since the bill has been adopted, DDW has held a series of workshops on this topic and has clearly stated that they are open to review DPR projects on a case by case basis. DDW has indicated that in addition to the IPR requirements stated in Title 22, Article 5.1 and 5.2 (as amended in June 2014), DPR projects will likely be required to incorporate the following features:

- Treatment for pathogenic microorganisms may likely be required in excess of the treatment required by Title 22 Article 5.1 and 5.2 (i.e., 12-log enteric virus reduction, 10-log Giardia reduction and 10-log Cryptosporidium reduction (12/10/10) using at least 3 treatment processes, each being credited with no less than 1-log reduction may likely be required). It is Carollo's expectation that the pathogen reduction requirements will be increased from 12/10/10 to 14/12/12, and the additional pathogen treatment must be completed by a fourth treatment process.
- DDW may opt to require an additional treatment barrier for trace pollutants, which could be in many forms (GAC, ozone/BAC, etc.).
- Engineered storage – The engineered storage buffer (ESB) would hold the water sufficiently long to allow each key process to be monitored and quality verified prior to distribution. The hold time would be determined through a detailed process by process evaluation of the "Failure and Response Time," or FRT.

For the purpose of this study, the regulatory requirements for DPR were based upon the most recent regulatory activity and comparable precedent activity in California. With respect to augmentation of water supply reservoirs using water that has undergone advanced treatment, it is stated in the California Health and Safety Code (Section 116551) that DDW shall not issue a permit to a public water system or amend a valid existing permit for the use of a reservoir as a source of supply that is directly augmented with recycled water unless DDW performs an engineering evaluation of the proposed recycled water treatment process and finds that the proposed treatment process produces recycled water that meets

all applicable primary and secondary drinking water standards, and poses no significant threat to public health. Therefore, source water augmentation at the Lauro Canyon Reservoir should use a purified recycled water meeting the groundwater injection standards.

2.5 Regulatory Requirements and Permitting

2.5.1 Environmental Review

California Environmental Quality Act (CEQA) Requirements

Implementation of an indirect potable reuse or direct potable reuse project will require certain discretionary actions by the City of Santa Barbara and other agencies. Those actions need to be examined in the context of California Code of Regulations, Title 14 ("State CEQA Guidelines"). California Public Resources Code, Sections 21000–21177 comprise the California Environmental Quality Act (CEQA) statute in California, which requires review and consideration of environmental effects when a California public agency, such as a City or County, carries out or approves a project. As defined in the CEQA Statute (Section 21065), "Project" means an activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and which is any of the following:

1. An activity directly undertaken by any public agency.
2. An activity undertaken by a person which is supported, in whole or in part, through contracts, grants, subsidies, loans, or other forms of assistance from one or more public agencies.
3. An activity that involves the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies.

Depending on the potential for significant impacts and feasibility of anticipated mitigation, the appropriate CEQA documentation would either be a Mitigated Negative Declaration (MND) or an Environmental Impact Report (EIR). Generally an MND is easier to prepare and process, requiring a 30-day review period, a scope of work that does not require consideration of alternatives, and a smaller cost required for preparation. However, an MND has a lower standard for legal review and is subject to the "fair argument test" for determining the adequacy of the environmental analysis. For an EIR the scope of analysis similar to an MND, but more thorough and requires a 45 day public review period. An EIR has a higher standard of legal review whereby in the event of a challenge, there is a higher probability that a court will uphold the adequacy of the environmental analysis in an EIR. However, an EIR typically requires review of alternatives, longer preparation, and processing time, and higher associated costs.

Given the scope and effect of an indirect or direct potable reuse project on the City's water supply, the City of Santa Barbara would likely prepare a programmatic EIR based upon an

update to their Long Term Water Supply Plan (LTWSP). This is also based upon the fact that the City has prepared two prior EIRs supporting their previous LTWSPs and any new alternatives as significantly different as a potable reuse project would require a new EIR analysis. The process to prepare this LTWSP update and EIR would require approximately 12 to 18 months and cost approximately $3 to $4 Million, including all costs for engineering concept development and environmental, public, and legal review.

2.5.2 California Coastal Commission

The following subsections summarize regulations, permits, and agreements that that may be involved as part of the potable reuse project(s). The requirements stated herein are based on the current status of regulations at the time of publication.

Coastal Development Permits

The California Coastal Commission (CCC) administers the Federal Coastal Zone Management Act. The most significant provisions of the Coastal Zone Management Act give the CCC primacy over all federal activities and federally licensed, permitted, or assisted activities if the activity affects coastal resources. The CCC retains permanent coastal permit jurisdiction over development proposed on tidelands, submerged lands, and public trust lands. They also act on appeals from certain local government coastal permit decisions, where local governments have been delegated authority to administer a Local Coastal Program. The City of Santa Barbara has a certified Local Coastal Program and administers permits for on-shore areas within the Coastal Zone. Figure 2.2 presents State and local areas of jurisdiction within the City.

The California Coastal Act includes several policies intended to protect water quality. Requirements include controlling runoff and waste discharges to protect water quality and preventing substantial interference with surface water flows in order to sustain biological productivity of coastal waters, and minimizing alteration of riparian habitats and streams.

Facilities associated with indirect potable reuse and direct potable reuse projects may include pipelines, treatment facilities, spreading basins, production wells, and injection wells that would fall into the City's areas of jurisdiction identified in Figure 2.2. Facilities within State or local areas of jurisdiction are required to obtain a Coastal Development Permit (CDP). No beach or offshore facilities that are under the permanent jurisdiction of the CCC are anticipated.

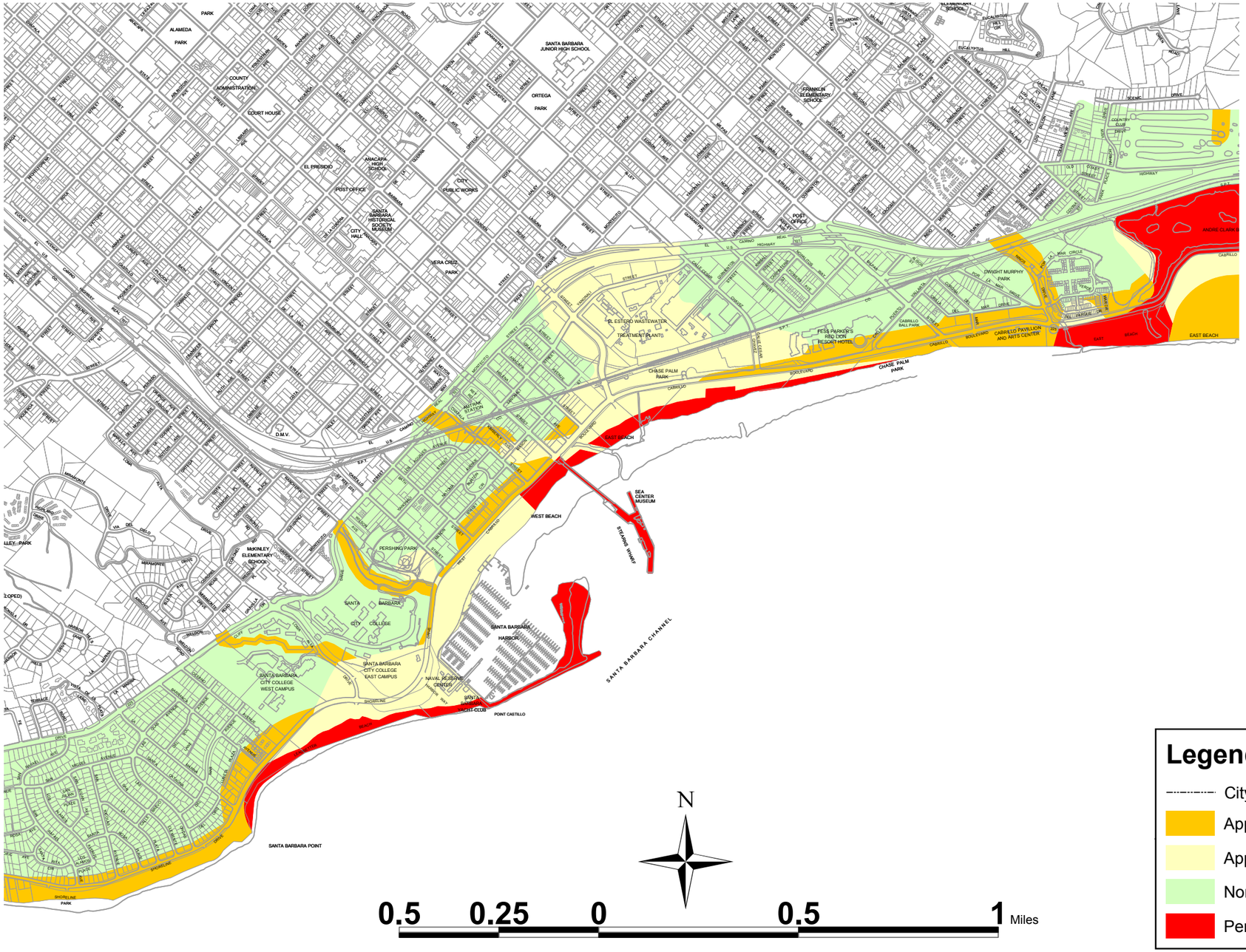

Figure 2.2 - Coastal Zone Areas of Jurisdiction

Section 30601.3 of the Coastal Act authorizes the CCC to process a consolidated CDP application, which requires fewer approvals from the local government, when requested by the local government and approved by the Executive Director of the CCC, for projects that straddle jurisdictions of the CCC and a local government. When a project is located in the Coastal Zone solely within a local government's certified Local Coastal Program jurisdiction, such as the City of Santa Barbara's Local Coastal Program, the local jurisdiction has CDP permit issuance authority, but the State may still appeal for jurisdictional authority due to the nature of the project (i.e., major public works project).

Development of an indirect potable reuse or potable reuse project would likely fall solely within the City of Santa Barbara's Local Coastal Program jurisdiction. As such, potable reuse projects would need a CDP issued from the City that would require a CDP application, a letter detailing CDP application submittal requirements and compliance of the project submittal, a memorandum summarizing the environmental information and technical studies included in the submittal, a Coastal Act/Local Coastal Program policy consistency analysis, and other information required to demonstrate compliance. However, a potable reuse project would be appealable to the CCC, because the approval or denial of a major public works project is appealable to the CCC regardless of location.

The coastal permitting process is estimated to require 2 to 6 months once the CEQA process has been completed. This permitting effort may cost between $100,000 and $400,000, including legal and other reviews.

2.5.3 State Water Resources Control Board (SWRCB)

Division of Drinking Water (DDW)

Public Water System Permits

Public Water System (PWS) permits are issued to each producer or purveyor of drinking water serving a specified minimum number of connections as required by the California Health and Safety Code. The permit covers each source of water used by the system. These permits and their accompanying engineering reports identify the source site, construction, and contaminant threats, and establish the treatment, operational, and monitoring requirements for each source. Almost all permits include special provisions established specifically for the individual water system, setting forth operating requirements that, if not met, could result in a formal enforcement action. Permits do not have expiration dates, but whenever a water system adds a new water source, adds or changes treatment, or has a change in ownership, an amendment to the water permit is required.

In the case of potable reuse, the use of recycled water as a source must be identified in the PWS permit. There are several regulations, draft regulations, and policies that SWRCB uses in its current operations that must be considered in the development of any project involving potable reuse.

A Consumer Confidence Report is required annually for each PWS (22 CCR 64481). Each report must contain information on the source of the water delivered, including:

- The type of water delivered by the water system (e.g., surface water, groundwater, and the commonly used name [if any] and location of the body of water).
- If a source water assessment has been completed, notification that the assessment is available, how to obtain it, the date it was completed or last updated, and a brief summary of the system's vulnerability to potential sources of contamination.

The report is intended to clearly communicate to the public the source of their water, threats to the source, and any water quality problems.

Long Term 2 Enhanced Surface Water Treatment Rule

The Surface Water Treatment Rule and its subsequent amendments were enacted to protect public health and safety by addressing the occurrence of various microbial pathogens and viruses. The Long Term 2 Enhanced Surface Water Treatment Rule (LT2EWSTR) requires a PWS to monitor source water quality for the occurrence of chlorine resistant pathogens and implement watershed protection and treatment accordingly.

The addition of reuse water will require an update to the City's source water assessments and sanitary surveys for production wells affected by IPR water and for the desalination plant or the Cater WTP, depending upon the DPR application point. For well head assessments, the required data is largely already known and monitored through other regulatory requirements and this information need only be conveyed to DDW as part of the potable well's periodic sanitary survey. For DPR alternatives where the reuse water is used for source water augmentation, additional source water assessments will be required. 36 months of source water sampling at each source will be necessary to comply with this requirement and analytical and reporting costs will be approximately $300,000 per source.

2.5.4 Regional Water Quality Control Board (RWQCB)

Domestic Water Supply Permit

The SWRCB provides direction to the RWQCBs, proponents of recycled water projects, and the public regarding the appropriate criteria to be used by the SWRCB and RWQCBs in issuing permits for recycled water projects. The SWRCB developed regulations for Groundwater Replenishment Using Recycled Water that became effective June 18, 2014. Article 5.2, Indirect Potable Ruse: Groundwater Replenishment – Subsurface Application establishes regulations for advanced treatment criteria (e.g., reverse osmosis and oxidation effectiveness), dilution amounts, retention times (minimum two months), acceptable pollutant and pathogenic microorganism concentration levels (e.g., giardia, nitrogen, and physical characteristics), as well as monitoring and reporting requirements. Indirect potable reuse projects used for groundwater replenishment would be required to comply with the

design, testing, and monitoring regulations established by the SWRCB to obtain a Domestic Water Supply Permit.

The SWRCB is in the process of establishing Surface Water Augmentation Using Recycled Water regulations, which are required to be effective December 31, 2016, pursuant to SB 918. Additionally, under SB 918 and SB 322 (Chapter 637, Statutes of 2013), the SWRCB is required to investigate and report on the feasibility of developing uniform water recycling criteria for direct potable reuse by December 31, 2016.

Domestic Water Supply Permit Amendment

The DDW is responsible for the issuance of permits for potable water systems and their sources and treatment, inspection of water systems, tracking of monitoring requirements of water systems to determine compliance, and enforcement actions governing these water systems. Domestic Water Supply Permits are issued by the SWRCB on a one-time basis, do not expire, and typically contain specific operating requirements. Indirect potable water recycling projects operate under permits are also issued by the SWRCB and RWQCBs, which consult with DDW to establish conditions necessary to protect drinking water supplies. As described above for SWRCB requirements, regulations for recycled water projects for groundwater replenishment were adopted and became effective on June 18, 2014. Additionally, the SWRCB is developing regulations for the use of recycled water to supplement surface water supplies.

Amendments to Domestic Water Supply Permits are required if changes in the water system occur. None of the following change can occur unless a permit amendment has been issued:

- Change in ownership of the water system.
- The addition of new water sources.
- Any changes in the method of treatment.
- The addition of any storage reservoirs.
- A major expansion of the service area.
- Any change in the distribution system that does not comply with the waterworks standards.

Indirect potable reuse and direct potable reuse projects would trigger an amendment to the Domestic Water Supply Permit. These projects would be required to comply with the existing regulations governing indirect potable reuse established by the SWRCB. This could include additional advanced treatment methodologies as well as modified operations to meet retention times, and altered designs or operating conditions to meet pollutant and pathogenic levels.

National Pollution Discharge Elimination System (NPDES)

The 1972 amendments to the Clean Water Act (CWA) provide the statutory basis for the National Pollution Discharge Elimination System (NPDES) permit program and the basic structure for regulating the discharge of pollutants from point sources to waters of the United States. Section 402 requires the U.S. EPA to develop and implement the NPDES program. The CWA gives the U.S. EPA authority to set effluent limits on an industry-wide basis and on a water quality basis, which ensures protection of receiving waters. Brine wastes (i.e., from advanced water purification systems) and other side-stream disposal from water treatment plants are regulated as a point source of pollution through the NPDES Permit Program. The CWA allows the U.S. EPA to delegate authority to state governments, enabling states to perform many of the permitting, administrative, and enforcement aspects of the NPDES Program. In states that have been authorized to implement CWA programs, U.S. EPA still retains oversight responsibilities.

In California, the NPDES program is administered by the RWQCB. NPDES permits are also referred to as Waste Discharge Requirements (WDR) permits that regulate discharges into waters of the United States. For a potable reuse project developed by the City, this would include:

- Brine waste discharges resulting from advanced water purification processes used for potable reuse that are discharged to the City's outfall; Industrial pretreatment standards for discharges to the City's wastewater treatment plants (i.e., discussed further in the City administered Industrial Pretreatment Program); and
- NPDES permit and associated Waste Discharge Requirements for Discharges of Groundwater from Potable Water Supply Wells to Surface Water as a part of well construction and testing activities.

As specified in 40 CFR Section 124, a NPDES permit typically includes technology-based effluent limits, water quality-based effluent limits, monitoring requirements for each pollutant, and conditions on discharge operations. Discharge pollutant levels would likely be required to be amended in the NPDES permit to allow for potable reuse projects in consultation with the RWQCB. Regulations limiting discharge of pharmaceutically active compounds, endocrine disrupting compounds (EDCs), and other contaminants of concern (CECs) may be developed in the future to protect the marine environment. However, current regulations do not require removal of these contaminants from brine water produced by advanced water purification processes.

Additionally, a WDR permit is required for the overall indirect potable reuse program (water code section 60320.200 through 60320.230). This permit is jointly issued by the DDW and also includes the regulatory approvals and requirements of DDW. Application for this permit requires a pre-application meeting, preparation of a comprehensive Engineering Report,

compliance with State Board Resolution 68-16 (Anti-Degradation policy) and environmental review under CEQA.

Development of revised effluent limits that reflect the wastes generated by a potable reuse project in consultation with the RWQCB is anticipated to cost $100,000 and require approximately 6 to 12 months of effort.

2.5.5 Santa Barbara County Public Health Department

Water Well Permit

For each injection or production well required as part of a potable reuse alternative, a Well Drilling permit is required from Santa Barbara County, Public Health Department, Environmental Health Services (EHS). The permit is available on the County's website and is for the construction, modification, inactivation, and destruction of water wells as defined and regulated by the County Well Standards Ordinance. The procedures for completing a Water Well Permit application are as follows:

1. Application – Submit a completed application.
2. Plot Plan – Submit a plot plan as part of the permit application. All setback distances from proposed well sites must be accurately depicted.
3. Site Evaluation – Following submittal of application, an EHS representative will conduct a site inspection of the proposed water well site.
4. Permit Issuance – Once determined to be satisfactory, the application may be approved. When approved and signed on the reverse side by the EHS representative, the application shall be considered a permit to perform the proposed work.

2.5.6 United States Environmental Protection Agency (U.S. EPA)

Underground Injection Control (UIC) Program

The use of wells for injection of water is regulated by U.S. EPA's Underground Injection Control (UIC) program as part of the Safe Drinking Water Act. The UIC program regulations prohibit any underground injection except as authorized by rule or permit. Injection wells as contemplated for this project would be considered as "Class V" wells under the UIC program and are currently "authorized by rule", which exempts these types of wells from permitting procedures, although the U.S. EPA may require a permit on a case-by-case basis if they determine it poses a threat to the aquifer's usability as a source of potable water. All owners of injection wells in this category must submit inventory information (such as name/location of facility, owner information, nature of injection well(s) and operational information of the injection well(s) to the U.S. EPA. Compliance with the UIC program is essentially procedural and can be quickly completed.

2.5.7 City of Santa Barbara

Local Coastal Development Permit

As discussed previously, the City of Santa Barbara will likely administer their Certified Local Coastal Program to review and issue a Local Coastal Development Permit for the facilities associated with this project that are located with the Coastal Zone. The City will consult with the State early during the project to determine if the State would like to appeal for jurisdiction over the process as is their option in accordance with the type of project being considered (i.e., major public works project). If the State declines jurisdiction, the Public Works Department would serve as the applicant and the Planning Division will review the application and administer the City's Local Coastal Program.

Industrial Pretreatment Permit

As presented in Section 2.8.3, to implement a potable reuse project, the City must implement an Industrial Pretreatment Program that requires the City to regulate the quality of wastewater discharged to the City's collection system by industrial dischargers, such as the potable reuse facility. The purpose of the Industrial Pretreatment Program is to allow the City to set standards for industrial dischargers to ensure the quality of these discharges will not adversely affect the treatment operations at the City's El Estero WWTP and/or adversely affect the City's ability to meet their NPDES discharge water quality standards, which include standards for non-potable reuse (i.e., currently) and potable reuse (i.e., following a implementation of a potable reuse project).

The City currently has an industrial pretreatment program. This program will require additional review based upon the requirements set forth in Title 22 for potable reuse.

Building Permit Requirements

Construction of indirect potable reuse and direct potable reuse facilities would be required to comply with the applicable building codes and regulations of the City. Pertinent codes that have been adopted are summarized in the City's 2010 Adopting Ordinance:

- **California Building Code 2010 as published by the International Code Council** (also known as Part 2 of Title 24 of the California Code of Regulations), including Appendix Chapters B, G, I and J
- **California Electrical Code 2010 as based on the 2008 National Electrical Code** (also known as Part 3 of Title 24 of the California Code of Regulations)
- **California Mechanical Code 2010 as based on the 2009 Uniform Mechanical Code**, as published by the International Association of Plumbing and Mechanical Officials (also known as Part 4 of Title 24 of the California Code of Regulations)

- **California Plumbing Code 2010 as based on the 2009 Uniform Plumbing Code**, as published by the International Association of Plumbing and Mechanical Officials (also known as Part 5 of Title 24 of the California Code of Regulations), including the Installation Standards and Appendix Chapters G and K
- **California Energy Code 2010 as published by the International Code Council** (also known as Part 6 of Title 24 of the California Code of Regulations)
- **California Historical Building Code 2010 as published by the International Code Council** also known as Part 8 of Title 24 of the California Code of Regulations)
- **California Existing Building Code 2010 as published by the International Code Council** (also known as Part 10 of Title 24 of the California Code of Regulations)
- **California Green Building Code 2010 as published by the International Code** Council (also known as Part 11 of Title 24 of the California Code of Regulations)

All modifications to the facilities will require a plan check from the City's Building Department prior to issuing a building permit. During construction, it is anticipated that the Building Department would provide occasional inspection of the facilities. The contractor will provide a certified Qualified Stormwater Practitioner (QSP) to prepare a construction phase Stormwater Pollution Prevention Plan (SWPPP) to be reviewed and approved by the City. The QSP shall be responsible for all duties (i.e. monitoring, inspection, sampling, etc.) required by the approved SWPPP and the latest version of the State of California General Construction Activity Stormwater Permit. The contractor will submit all required documents to the City for approval.

The costs and schedule associated with the local permitting process are generally included in the design and construction phase activities.

APPENDIX A – POTABLE REUSE FEASIBILITY STUDY WORK PLAN

APPENDIX B – EXAMPLE CHEMICAL MONITORING LISTS FOR POTABLE WATER REUSE

Table B-1 Inorganics with Primary MCLs			
Constituents	**Primary MCL (in mg/L)**	**Constituents**	**Primary MCL (in mg/L)**
Aluminum	1.0	Fluoride	2
Antimony	0.2	Lead	0.015
Arsenic	0.006	Mercury	0.002
Asbestos	7 (MFL)	Nickel	0.1
Barium	1	Nitrate (as NO_3)	45
Beryllium	0.004	Nitrite (as N)	1
Cadmium	0.005	Total Nitrogen (as N)	10
Hexavalent Chromium	0.010	Selenium	0.05
Copper	1.3	Thallium	0.02
Cyanide	0.15		

Notes:

MFL = Million fibers per liter, with fiber lengths > 10 microns.
Regulatory Action Level; if system exceeds, it must take certain actions such as additional monitoring, corrosion control studies and treatment, and for lead, a public education program; replaces MCL.
The MCL for lead was rescinded with the adoption of the regulatory action level.

Table B-2 Constituents / Parameters with Secondary MCLs			
Constituents	**MCL (in mg/L)**	**Constituents[(2)]**	**MCL (in mg/L)**
Aluminum	0.2	TDS	500
Color	15 (units)	Specific Conductance	900 *u*S/cm
Copper	1	Chloride	250
Foaming Agents (MBAS)	0.5	Sulfate	250
Iron	0.3		
Manganese	0.05		
Methyl-tert-butyl-ether (MTBE)	0.005		
Odor Threshold	3 (units)		
Silver	0.1		
Thiobencarb	0.001		
Turbidity	5 (NTU)		
Zinc	5		

Table B-3 Radioactivity			
Constituents	**MCL (in pCi/L)**	**Constituents**	**MCL (in pCi/L)**
Uranium	20	Gross Beta particle activity	50(2)
Combined radium-226 & 228	5	Strontium-90	8(2)
Gross alpha particle activity	15	Tritium	20,000(2)
Notes: MCLs are intended to ensure that exposure above 4 millirem/yr does not occur.			

Table B-4 Regulated Organics			
Constituents	**MCL (in mg/L)**	**Constituents**	**MCL (in mg/L)**
Volatile Organic Compounds			
Benzene	0.001	Monochlorobenzene	0.07
Carbon Tetrachloride	0.0005	Styrene	0.1
1,2-Dichlorobenzene	0.6	1,1,2,2-Tetrachloroethane	0.001
1,4-Dichlorobenzene	0.005	Tetrachloroethylene	0.005
1,1-Dichloroethane	0.005	Toluene	0.15
1,2-Dichloroethane	0.0005	1,2,4 Trichlorobenzene	0.005
1,1-Dichloroethylene	0.006	1,1,1-Trichloroethane	0.2
cis-1,2-Dichloroethylene	0.006	1,1,2-Trichloroethane	0.005
trans-1,2-Dichloroethylene	0.01	Trichloroethylene	0.005
Dichloromethane	0.005	Trichlorofluoromethane	0.15
1,3-Dichloropropene	0.0005	1,1,2-Trichloro-1,2,2-Trifluoroethane	1.2
1,2-Dichloropropane	0.005	Vinyl chloride	0.0005
Ethylbenzene	0.3	Xylenes	1.75
Methyl-tert-butyl ether (MTBE)	0.013		
SVOCs			
Alachlor	0.002	Hexachlorobenzene	0.001
Atrazine	0.001	Hexachlorocyclopentadiene	0.05
Bentazon	0.018	Lindane	0.0002
Benzo(a) Pyrene	0.0002	Methoxychlor	0.03
Carbofuran	0.018	Molinate	0.02
Chlordane	0.0001	Oxamyl	0.05
Dalapon	0.2	Pentachlorophenol	0.001

Table B-4 Regulated Organics			
Constituents	**MCL (in mg/L)**	**Constituents**	**MCL (in mg/L)**
Dibromochloropropane	0.0002	Picloram	0.5
Di(2-ethylhexyl)adipate	0.4	Polychlorinated Biphenyls	0.0005
Di(2-ethylhexyl)phthalate	0.004	Pentachlorophenol	0.001
2,4-D	0.07	Picloram	0.5
Dinoseb	0.007	Polychlorinated Biphenyls	0.0005
Diquat	0.02	Simazine	0.004
Endothall	0.1	Thiobencarb	0.07/0.001(2)
Endrin	0.002	Toxaphene	0.003
Ethylene Dibromide	0.00005	2,3,7.8-TCDD (Dioxin)	$3x10^{-8}$
Glyphosate	0.7	2,4,5-TP (Silvex)	0.05
Heptachlor	0.00001		
Heptachlor Epoxide	0.00001		

Notes:

second value is listed as a Secondary MCL

Table B-5 Disinfection By-products			
Constituents	**MCL (in mg/L)**	**Constituents**	**MCL (in mg/L)**
Total Trihalomethanes	0.080	Bromate	0.010
Total haloacetic acids	0.060	Chlorite	1.0

Table B-6 Constituents with Notification Levels			
Constituents	**NL (in μg/L)**	**Constituents**	**NL (in μg/L)**
Boron	1000	Manganese	500(2)
n-Butylbenzene	260	Methyl isobutyl ketone (MIBK)	120
sec-Butylbenzene	260	Naphthalene	17
tert-Butylbenzene	260	N-Nitrosodiethylamine (NDEA)	0.01
Carbon disulfide	160	N-Nitrosodimethylamine (NDMA) (3)	0.01
Chlorate	800	N-Nitrosodi-n-propylamine (NDPA)	0.01
2-Chlorotoluene	140	Propachlor**	90
4-Chlorotoluene	140	n-Propylbenzene	260
Diazinon	1.2	RDX	3
Dichlorodifluoromethane (Freon 12)	1000	Tertiary butyl alcohol (TBA)	12
1,4-Dioxane(3)	1(3)	1,2,3-Trichloropropane (1,2,3-TCP)	0.005
Ethylene glycol	14000	1,2,4-Trimethylbenzene	330
Formaldehyde	100	1,3,5-Trimethylbenzene	330
HMX	350	2,4,6-Trinitrotoluene (TNT)	1
Isopropylbenzene	770	Vanadium	50

Notes:

Based on http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/documents/notificationlevels/notificationlevels.pdf.

The web link above also contains the levels of the pollutants in this table that must result in a removal of the water source from service.