CHAPTER 3 WATER QUALITY STATUTORY AND REGULATORY COMPLIANCE OVERVIEW

Table
3-1 Proposed Project Treatment Barriers

As described in **Chapter 2, Project Description**, the Pure Water Monterey Groundwater Replenishment Project (Proposed Project) would create a reliable source of water supply by collecting a variety of new source waters that would be combined with existing incoming raw wastewater flows for conveyance to and treatment at MRWPCA's Regional Wastewater Treatment Plant (Regional Treatment Plant). The Regional Treatment Plant effluent not further treated to tertiary levels and used for agricultural irrigation in northern Salinas Valley would be conveyed to a new advanced water treatment facility (AWT Facility) that would produce highly-treated purified recycled water (purified recycled water). The purified recycled water would be used to replenish the Seaside Groundwater Basin (Seaside Basin) by injecting this high quality water into a series of shallow and deep injection wells. Once injected into the Seaside Basin, the purified recycled water would mix with the groundwater present in the aquifers and be stored for future extraction from existing potable water supply wells.

The Proposed Project would enable California American Water Company (CalAm) to reduce its diversions from the Carmel River system by up to 3,500 acre-feet per year (AFY) by injecting the same amount of purified recycled water into the Seaside Basin. CalAm is under a State order to secure replacement water supplies and cease over-pumping of the Carmel River by January 2017.

The Proposed Project would also result in additional recycled water supply for agricultural irrigation in northern Salinas Valley. Currently, the only sources of supply for the existing recycled water are municipal wastewater and small amounts of urban dry weather runoff.[1] The recycled water produced by MRWPCA for crop irrigation is treated to a tertiary level in accordance with the statutory and regulatory requirements of the California Water Code Sections 13500 – 13577 and California Code of Regulations, Title 22, Sections 60301 – 60357. The recycled water is produced at the Salinas Valley Reclamation Plant, which is located within the Regional Treatment Plant. Municipal wastewater flows have declined in recent years due to aggressive water conservation efforts by the MRWPCA member entities. By increasing the amount and type of source waters entering the existing wastewater collection system, additional recycled water can be provided for use in the Castroville Seawater Intrusion Project's agricultural irrigation system. It is anticipated that during normal and wet years, approximately 4,500 to 4,750 AFY of additional recycled water supply could be created for Castroville Seawater Intrusion Project irrigation purposes as part of the Proposed Project. During drought conditions, up to 5,900 AFY of recycled water could be

[1] Salinas River water is stored and used for irrigation during the period April 1 to October 31, but is not a source of supply for the tertiary treatment facility.

created for crop irrigation. Some modifications would be made to the water recycling facility to optimize and enhance the delivery of recycled water to growers.

The Proposed Project would also include a drought reserve component. The Proposed Project would provide for an additional 200 AFY of purified recycled water that would be injected in the Seaside Basin in wet and normal years up to a total of 1,000 acre feet (AF). Thus, the Proposed Project would inject up to 3,700 AF into the Seaside Basin in some years, rather than the 3,500 AF needed for CalAm supplies. This would result in a "banked" drought reserve. During dry years, less than 3,500 AF of Proposed Project purified recycled water would be delivered to the Seaside Basin, and the source waters that are not sent to the AWT Facility would be treated to tertiary recycled water specification by the SVRP to increase irrigation supplies for agricultural irrigation. CalAm would be able to extract the banked water to make up the difference to its supplies, such that its extractions and deliveries would not fall below 3,500 AFY.

Planning for the Proposed Project has included a pilot study of some of the source waters and treatment technologies intended to be part of the new AWT Facility. The proposed full-scale AWT Facility would consist of pre-treatment (using ozone, and potentially biologically activated filtration); membrane filtration; reverse osmosis; advanced oxidation using ultraviolet light and hydrogen peroxide; and post-treatment stabilization. In addition, hydrogeologic modeling and soil and geochemical analyses have been performed for the Proposed Project (as described in **Section 4.10, Hydrology and Water Quality: Groundwater Resources**). The California State Water Resources Control Board Division of Drinking Water, the Central Coast Regional Water Quality Control Board, and a National Water Research Institute Independent Advisory Panel have provided oversight for these studies and project planning. The California Division of Drinking Water has conditionally approved the Proposed Project's design based on MRWPCA's proposal, which presented the general concepts of the project (MRWPCA, 2014). More information must be provided as part of the Proposed Project's Engineering Report for Division of Drinking Water approval.

In conjunction with the EIR, the **Water Quality Statutory and Regulatory Compliance Technical Report, Appendix D**, (Nellor Environmental, 2015) was prepared to present pertinent information related to the following: (1) the status of recycled water regulations pertaining to groundwater replenishment; (2) studies of other similar projects that have assessed the effects of using recycled water for groundwater replenishment on groundwater quality and public health; (3) studies that have been specifically conducted for the project related to the AWT Facility design and performance; (4) studies that have been specifically conducted for the project regarding protection of groundwater quality and quantity; (5) Proposed Project compliance with applicable statutes, policies, and regulations; (6) Proposed Project effects on groundwater; and (7) the relevant information and conclusions for the EIR groundwater and other relevant water quality analyses.

This regulatory compliance evaluation has concluded that:

- California has established numerous state laws, regulations and policies governing the use of recycled water for groundwater replenishment to protect groundwater quality and the health of individuals who drink groundwater that is replenished using recycled water, including:
    - Comprehensive regulations for the use of purified recycled water for replenishment of groundwater (Groundwater Replenishment Regulations);
    - State policies related to maintaining high quality water;

  - A Water Quality Control Plan (Basin Plan) implemented by the Central Coast Regional Water Quality Control Board including standards, objectives, and guidelines for the protection of groundwater quality in the GWR Project area; and
  - Effective July 1, 2014, consolidation of the regulatory structure for water, recycled water and wastewater under one agency, the State Water Resources Control Board, to protect public health and promote comprehensive protection of drinking water and other beneficial uses of the state's waters.

- Studies have been conducted for other similar potable reuse projects, including epidemiology studies, risk assessments, and investigations that analyze and compare the toxicological properties of recycled water to those of drinking water. These studies have shown:
  - There is no association between the use of recycled water and adverse health outcomes in individuals consuming groundwater containing recycled water; and
  - Purified recycled water from an appropriately designed and operated AWT Facility presents less risk in terms of regulated chemicals, pathogens, and trace organics compared to the risk from conventional drinking water sources.
- Based on the analytical results of monitoring the source waters to be used for the Proposed Project, the water quality results of the pilot plant testing (using ozone, membrane filtration, and reverse osmosis), information on the predicted performance and water quality of the proposed full-scale AWT Facility based on other existing groundwater replenishment projects and related research/studies:
  - The Proposed Project would comply with the State's Groundwater Replenishment Regulations and would meet all Central Coast Basin Plan standards, objectives, and guidelines.
  - An Independent Advisory Panel and the Division of Drinking Water have reviewed the Proposed Project concept. The Division of Drinking Water has conditionally approved the Proposed Project proposal, pending submittal of additional information per the Groundwater Replenishment Regulations.
- The full-scale proposed AWT Facility and recharge of the purified recycled water would provide reliability and redundancy through the use of multiple treatment barriers. Including the Regional Treatment Plant in combination with the AWT Facility, the integrated treatment system would achieve chemical constituent removal redundancy by employing at least two treatment processes for each constituent type and at least four treatment processes for each pathogen category, as shown in Table 3-1 below.

Table 3-1
Proposed Project Treatment Barriers

Process	Chemical Constituents					Pathogenic Microorganisms		
	Nitrogen	TOC[a]	DPBs[b]	Inorganics	CECs[c]	Bacteria	Viruses	Protozoa
Regional Treatment Plant Primary/ Secondary	✓	✓		✓	✓	✓	✓	✓
Ozone			✓		✓	✓	✓	✓
Membrane Filtration		✓		✓		✓		✓
Reverse Osmosis	✓	✓	✓	✓	✓	✓	✓	✓
Advanced Oxidation Process			✓		✓	✓	✓	✓
Underground Residence Time						✓	✓	✓

a. Total organic carbon – TOC.
b. Disinfection by-products – DBPs.
c. Constituents of emerging concern - CECs

- To evaluate compliance with the State Recycled Water Policy, studies were conducted to (1) analyze the recharge components of the Proposed Project, including recharge wells, operational facilities, and the fate and transport of the purified recycled water in the groundwater basin, and (2) conduct geochemical modeling to test stabilized RO pilot test water[2] compatibility with ambient groundwater. The studies found that:
  - No documented groundwater contamination or contaminant plumes were identified in the Proposed Project area. Therefore, injection of purified recycled water associated with the Proposed Project would not exacerbate existing groundwater contamination or cause plumes of contaminants to migrate.
  - When two water types with different water chemistry are mixed (such as the Proposed Project purified recycled water and groundwater), geochemical reactions could occur in the groundwater system that could potentially result in leaching of natural or anthropogenic constituents, which could also potentially impact groundwater quality. The risk of geochemical impacts from incompatibility would be addressed at the proposed AWT Facility by including a treatment process to ensure that the purified recycled water is stabilized and non-corrosive. The design of the treatment stabilization process will be informed by the geochemical modeling studies.

[2] The samples were reverse osmosis permeate collected from the MRWPCA pilot plant. The reverse osmosis permeate was stabilized using a bench-scale post-treatment stabilization unit to better approximate the water quality anticipated for the proposed AWT Facility.

- A Salt and Nutrient Management Plan has been prepared for the Seaside Groundwater Basin to comply with the Recycled Water Policy.[3] As documented in the Salt and Nutrient Management Plan, ambient groundwater generally exceeds the Basin Plan groundwater objective for total dissolved solids in many areas of the Seaside Basin, while nitrate and chloride concentrations generally meet Basin Plan objectives. Studies conducted to evaluate the water quality of the stabilized reverse osmosis pilot test water found that the concentrations of total dissolved solids, nitrate, and chloride in the reverse osmosis water met all Basin Plan objectives. Further, these concentrations were generally lower than average concentrations in groundwater. As such, replenishment of the Seaside Basin using the Proposed Project purified recycled water would not degrade, but would provide benefits to, local groundwater quality.
- Based on the source water sampling, results of the pilot testing and hydrogeologic studies, other relevant research, and information from other groundwater replenishment projects operating in California, the following conclusions are offered with regard to the Proposed Project's effect on groundwater resources:
    - The Proposed Project purified recycled water would meet groundwater quality standards in the Basin Plan and state drinking water quality standards. A monitoring program would document project performance.
    - The Proposed Project purified recycled water would contain much lower concentrations of total dissolved solids and chloride than ambient groundwater and would be expected to provide a benefit to the basin groundwater quality.
    - No documented groundwater contamination or contaminant plumes have been identified in the Proposed Project area. Therefore, injection associated with the Proposed Project would not exacerbate existing groundwater contamination or cause plumes of contaminants to migrate.
    - Injection of AWT Facility purified recycled water would not degrade groundwater quality.
    - The Proposed Project purified recycled water would be stabilized as part of the AWT Facility to ensure no adverse geochemical impacts in the Seaside Basin. Geochemical modeling will be used to inform the AWT Facility stabilization procedures, which can be adjusted as needed.
    - The Proposed Project would result in both higher and lower water levels in wells throughout the Seaside Basin at various times. Although water levels would be slightly lower during some time periods, the difference in water levels between the Proposed Project and the No Project modeling results were generally small and judged insignificant. Basin modeling indicates that the Proposed Project would not lower water levels below protective levels in coastal wells and would not exacerbate seawater intrusion.

[3] Hydrometrics, WRI, 2014. Salt and Nutrient Management Plan, prepared for Monterey Peninsula Water Management District (http://www.mpwmd.dst.ca.us/programs/Seaside_Salt_Nutr_Plan_FINAL.PDF)

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