compliance prior to approval of the building permit. As discussed above, the geotechnical investigations would include recommendations to address geotechnical issues, including seismic shaking and seismically inducted ground failures, such as liquefaction and lateral spreading. With compliance with the regulatory requirements and the implementation of geotechnical design recommendations, impacts relative to seismic shaking and seismically induced ground failure during operations would be **less than significant**.

Mitigation Measure:

None required.

Impact 3.6-2: The proposed project would not result in substantial soil erosion. *(Less than Significant)*

Construction

Construction of the proposed project would have the potential to result in soil erosion during excavation, grading, trenching, and soil stockpiling. Because the overall footprint of construction activities would exceed one acre, the proposed project would be required to comply with the *NPDES General Permit for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities* (Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ) (Construction General Permit) and the local stormwater ordinances, all of which are described above in Section 3.6.2, *Regulatory Framework*. These state and local requirements were developed to ensure that stormwater is managed and erosion is controlled on construction sites. The Construction General Permit requires preparation and implementation of a SWPPP, which requires applications of BMPs to control runon and runoff from construction work sites. The BMPs would include, but would not be limited to, physical barriers to prevent erosion and sedimentation, construction of sedimentation basins, limitations on work periods during storm events, use of infiltration swales, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion from occurring during construction. With compliance with existing regulations, impacts associated with soil erosion during construction would be **less than significant**.

Operations

Once constructed, there would be no further ground disturbance and no potential for erosion. The project would be constructed using BMPs that would provide erosion and sedimentation control measures to maintain the capacity of area storm drains and protect water quality in compliance with the regional MS4 permit. Therefore, there would be **no impact** relative to erosion during operations.

Mitigation Measure:

None required.

Impact 3.6-3: The proposed project would not create direct or indirect substantial risks to life or property due to expansive or corrosive soils. ***(Less than Significant)***

Expansive and corrosive soils can damage structures and buried utilities and can also increase required maintenance. Expansion and contraction of expansive soils in response to changes in moisture content can cause differential and cyclical movements that can result in damage and/or distress to structures and equipment. There would be no construction-related impacts relative to expansive or corrosive soils; impacts would only occur under post-construction and operational conditions, as discussed below.

As listed in Table 3.6-1, the brine disposal pipeline would be constructed in soils with a moderate to high potential for expansive soils, which could result in lateral pipeline stress and stress of structural joints. Lateral stresses could, over time, lead to pipeline rupture or leaks in the coupling joints. However, the brine disposal pipeline would be constructed of relatively flexible and non-corrosive HDPE or PVC (plastic) pipes. Therefore, the impact relative to expansive or corrosive soil would be **less than significant**.

The geotechnical investigation observed some of the fill and clay materials in colluvium beneath the previous Antioch WTP expansion project may be expansive; expansive soils could be present beneath the proposed desalination facility location. The expansive soils could damage aboveground project components at the proposed desalination facility.

As listed in **Table 3.6-1**, the conveyance pipelines would be constructed in soils with the potential to corrode unprotected steel. Soils with high corrosivity can corrode unprotected pipelines, which over time could lead to pipeline failure. The pipelines at the proposed desalination facility would be constructed of ductile iron or cement mortar lined steel. The ductile iron pipe for the 30-inch return water extension pipeline would be susceptible to damage from corrosive soil.

As listed in **Table 3.6-1**, the pump station would be constructed in soils with a moderate potential to corrode unprotected steel. Corrosive soils can corrode unprotected pipelines, which over time could lead to pipeline failure. The pump station would include steel parts that could be susceptible to damage from corrosive soil.

As a requirement of the CBC and local codes, the City would be required to prepare a final geotechnical investigation that would include site-specific recommendations to address potentially expansive and corrosive soils as a condition of permit approval. The site-specific analysis of site foundation soils guides the recommended building foundation design, such that damage from expansive and corrosive soils is minimized and reduced to levels that can be accommodated by the final design. The potential measures could include replacement of native soils with engineered fill, treatment of native soils, or addition of soil amendments which are effective means of reducing the risk from expansive soils. The shallow and flexible nature of pipelines makes them less susceptible to damage from expansive soils. Damage to structures and pipelines due to corrosion can be addressed by removal and replacement of corrosive soils, or by

applying protective coatings to concrete and steel. The pipelines would be constructed using AWWA guidelines, which would include incorporating flexibility in the pipelines to accommodate minor movement and settling. The geotechnical investigation would also evaluate for corrosive soils and provide recommendations to protect the ductile iron pipe such as protective coatings or encasement in cement or concrete. Therefore, implementation of standard geotechnical engineering practices and adherence to building code requirements would reduce potential impacts from expansive soils during operations to **less than significant**.

Mitigation Measure:

None required.

Cumulative Impacts

This section presents an analysis of the cumulative effects of the proposed project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts.

As previously discussed, the proposed project would have no impact with respect to fault rupture, landslides, subsidence or collapse, loss of topsoil, septic tanks or paleontological or unique geological resources. Accordingly, the proposed project could not contribute to cumulative impacts related to these topics and are not discussed further. Disposal of the brine is discussed in Section 3.10b, *Water Quality*.

The geographic area affected by the proposed project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative geologic impacts encompasses and is limited to the project site and its immediately adjacent area. This is because impacts relative to geologic hazards are generally site-specific. For example, the effect of erosion would tend to be limited to the localized area of a project and could only be cumulative if erosion occurred as the result of two or more adjacent projects that spatially overlapped.

The timeframe during which proposed project could contribute to cumulative geologic hazards includes the construction and operations phases. For the proposed project, the operations phase is permanent. However, similar to the geographic limitations discussed above, it should be noted that impacts relative to geologic hazards are generally time-specific. Geologic hazards could only be cumulative if two or more geologic hazards occurred at the same time, as well as overlapping at the same location.

Impact 3.6-C-1: Implementation of the proposed project, in combination with past, present, and reasonably foreseeable future development would not result in a cumulatively significant impact related to geology and soils. ***(Less than Significant)***

Cumulative Impacts during Project Construction

Significant cumulative impacts related to geologic hazard could occur if the incremental impacts of the proposed project combined with the incremental impacts of one or more of the cumulative projects identified in **Table 3-1** to substantially increase risk that people or the environment would be exposed to geologic hazards. The only cumulative project that could be geographically adjacent or overlap components of the proposed project would be project number 15 (East County Bioenergy Project) on **Figure 3-1**. This cumulative project would involve the construction of a new bio-refinery, co-located with the Delta Diablo water resource recovery facilities in Pittsburg. The East County Bioenergy Project would convert food waste and wastewater sludge via an anaerobic digestion process into a range of bio-products and biogas, which can be used to generate energy to provide renewable energy.

If the projects are constructed at the same time, the erosion effects could be cumulatively significant. However, the state Construction General Permit would require each project to prepare and implement a SWPPP. The SWPPPs would describe BMPs to control runoff and prevent erosion for each project. Through compliance with this requirement, the potential for erosion impacts would be reduced. The Construction General Permit has been developed to address cumulative conditions arising from construction throughout the state, and is intended to maintain cumulative effects of projects subject to this requirement below levels that would be considered significant. For example, two adjacent construction sites would be required to implement BMPs to reduce and control the release of sediment and/or other pollutants in any runoff leaving their respective sites. The runoff water from both sites would be required to achieve the same action levels, measured as a maximum amount of sediment or pollutant allowed per unit volume of runoff water. Thus, even if the runoff waters were to combine after leaving the sites, the sediments and/or pollutants in the combined runoff would still be at concentrations (amount of sediment or pollutants per volume of runoff water) below action levels and would not be cumulatively considerable (**less than significant**).

Seismically induced groundshaking, liquefaction and lateral spreading, and expansive or corrosive soils could cause structural damage or pipeline leaks or ruptures. State and local building regulations and standards, described in the Regulatory Framework, have been established to address and reduce the potential for such impacts to occur. The proposed project and cumulative projects would be required to comply with applicable provisions of these laws and regulations. Through compliance with these requirements, the potential for impacts would be reduced. As explained in the Regulatory Framework, the purpose of the CBC and local ordinances is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction; by design, it is intended to reduce the cumulative risks from buildings and structures. Therefore, based on compliance with these requirements, the incremental impacts of the proposed project combined with impacts of other projects in the area would not cause a significant cumulative impact related to seismically induced groundshaking, liquefaction and lateral spreading, or expansive or

corrosive soils and the proposed project's contribution to cumulative effects would not be cumulatively considerable and this impact would be **less than significant**.

Cumulative Impacts during Project Operations

Seismically induced groundshaking, liquefaction and lateral spreading, and expansive or corrosive soils could cause structural damage or pipeline leaks or ruptures. State and local building regulations and standards, described in the Regulatory Framework, have been established to address and reduce the potential for such impacts to occur. The proposed project and cumulative projects would be required to comply with applicable provisions of these laws and regulations. Through compliance with these requirements, the potential for impacts would be reduced. As explained in the Regulatory Framework, the purpose of the CBC and local ordinances is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction; by design, it is intended to reduce the cumulative risks from buildings and structures. Therefore, based on compliance with these requirements, the incremental impacts of the proposed project combined with impacts of other projects in the area would not cause a significant cumulative impact related to seismically induced groundshaking, liquefaction and lateral spreading, or expansive or corrosive soils and the proposed project's contribution to cumulative effects would not be cumulatively considerable and this impact would be **less than significant**.

References – Geology, Soils, and Paleontological Resources

Association of Bay Area Governments (ABAG), 2016a. Adapted from *Modified Mercalli Intensity Scale (MMI),* Available online at: resilience.abag.ca.gov/shaking/mmi/. Accessed May 8, 2016.

Association of Bay Area Governments, 2016b. *See What Thrust Faults Can Do*, Available online at: resilience.abag.ca.gov/students/fieldtrip-mtdiablo/. Accessed November 11, 2016.

California Geological Survey (CGS), 2002a, *California Geomorphic Provinces,* CGS Note 36

California Geological Survey (CGS), 2002b., *How Earthquakes and Their Effects Are Measured*, Note 32.

California Geological Survey (CGS), 2007. *Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act with Index to Earthquake Fault Zones Maps, Special Publication 42, Interim Revision 2007*

California Geological Survey (CGS), 2008a. *PSHA Ground Motion Interpolator*, 2008.

California Geological Survey (CGS), 2008b. *Guidelines for Evaluating and Mitigating Seismic Hazards in California*, Special Publication 117A, October 7.

Central Valley Regional Water Quality Control Board (RWQCB), 2016a. *California Regional Water Quality Control Board, Central Valley Region, Order No. R5-2016-0040, NPDES No. CAS0085324, National Pollutant Discharge Elimination System Permit and waste*

discharge Requirements General Permit for Discharges from Municipal Separate Storm Sewer Systems. June 23, 2016.

City of Antioch, 2003, *Draft General Plan Update, Environmental Impact Report, City of Antioch, Contra Costa County, California*, July

Contra Costa County, 2011. *Contra Costa County Hazard Mitigation Plan Update, Volume 2: Planning Partner Annexes, USGS Hayward-EQ-Scenario and Landslide Hazard Areas*, May.

Geomatrix, 2005. *Final Report, Geologic/Geotechnical Study, Antioch Water Treatment Plant B Expansion Project, Antioch, California*, May 2005

Lawson, Andrew C., *The California Earthquake of April 18, 1906, Report of the State Earthquake Investigation Commission,* 1908.

National Resources Conservation Service (NCRS), 2017. *Web Soil Survey, Antioch Desal Project*, September 25.

University of California Museum of Paleontology (UCMP), 2018. Collections Database, available at: ucmpdb.berkeley.edu/loc.html, accessed January 10, 2018.

Virginia Polytechnic Institute and State University (Virginia Tech [VT]), 2013. *Liquefaction-Induced Lateral Spreading.*

Working Group on California Earthquake Probabilities (WGCEP), 2008a. *Forecasting California's earthquakes; what can we expect in the next 30 years?*: U.S. Geological Survey, Fact Sheet 2008-3027.

Working Group on California Earthquake Probabilities (WGCEP), 2008b. *The Uniform California Earthquake Rupture Forecast, Version 2 (UCERF 2)*: U.S. Geological Survey Open-File Report 2007-1437 and California Geological Survey Special Report 203.

Working Group on California Earthquake Probabilities, 2015a. *UCERF3: A new earthquake forecast for California's complex fault system*: U.S. Geological Survey Fact Sheet 2015–3009, March.

Working Group on California Earthquake Probabilities, 2015b. *The Third California Earthquake Rupture Forecast (UCERF3), Output from GoogleEarth file with fault probabilities.*

This page intentionally left blank

3.7 Energy Conservation

Sections	Tables
3.7.1 Environmental Setting 3.7.2 Regulatory Framework 3.7.3 Analysis, Impacts, and Mitigation	3.7-1 PG&E's 2016 Electric Power Mix Delivered to Customers 3.7-2 Summary of Impacts – Energy Conservation

This section evaluates the potential for construction and operation of the proposed project to result in adverse impacts associated with energy conservation. The environmental setting with respect to energy is described in Section 3.7.1, *Environmental Setting*, and the regulatory framework that governs energy conservation are discussed in Section 3.7.2, *Regulatory Setting*. Section 3.7.3, *Analysis, Impacts, and Mitigation*, defines significance criteria used for the impact assessment, and analyzes the potential impacts of the proposed project, including cumulative effects. The analysis is based on review of available reports prepared by agencies, such as the California Energy Commission (CEC), as well the local utility provider, Pacific Gas and Electric Company (PG&E), and project-specific construction and operational features provided by the City of Antioch. No comments related to GHG emissions were received during the scoping period.

CEQA Section 21100(b) requires evaluation of the potential energy impacts of a proposed project, and consideration of mitigation measures that would avoid or reduce the wasteful, inefficient, and unnecessary consumption of energy associated with the project. Appendix F of the CEQA *Guidelines* provides three goals for energy conservation:

- Decrease overall per capita energy consumption;
- Decrease reliance on natural gas and oil; and
- Increase reliance on renewable energy sources.

In addition, Appendix F of the CEQA *Guidelines* indicates that EIRs may include consideration of the following six energy conservation-related environmental impact types:

1. The project's energy requirements and its energy use efficiencies by amount and fuel type for each stage of the project including construction, operation, maintenance and/or removal. If appropriate, the energy intensiveness of materials may be discussed.
2. The effects of the project on local and regional energy supplies and on requirements for additional capacity.
3. The effects of the project on peak and base period demands for electricity and other forms of energy.
4. The degree to which the project complies with existing energy standards.
5. The effects of the project on energy resources.

6. The project's projected transportation energy use requirements and its overall use of efficient transportation alternatives.

This section does not address the potential air pollutant or greenhouse gas emissions associated with various forms of energy consumption. See Sections 3.2, *Air Quality*, and 3.8, *Greenhouse Gas Emissions*, for such discussions.

3.7.1 Environmental Setting

The study area for the analysis of energy conservation impacts is state-wide in terms of energy supplies, and site specific in terms of energy consumption.

California's Energy Supplies

With a relatively mild Mediterranean climate and strict energy efficiency and conservation requirements, California's per capita energy consumption ranked 49th in the nation (including the District of Columbia), indicating a low per capita use of energy; the state's low use of energy is due in part to its mild climate and its energy efficiency programs (USEIA, 2018a). Nevertheless, with a population of 38.7 million people, California is the second largest energy-consuming state in the U.S. (USEIA, 2018b).

Electricity

The production of electricity requires the consumption or conversion of energy resources such as water, wind, oil, gas, coal, solar, geothermal, and nuclear sources. Of the electricity generated in California in 2016, approximately 49.9 percent was generated by natural gas-fired power plants, 12.3 percent from hydroelectric, 0.2 percent of total net electricity generated came from coal-fired sources, 9.6 percent from nuclear, and 27.9 percent from renewable sources including solar and wind. The remaining balance came from oil and other unspecified sources of power (CEC, 2017a).

Gasoline and Diesel

Gasoline is by far the largest transportation fuel by volume used in California. Nearly all of the gasoline used in California is obtained through the retail market. In 2016, 13.8 billion gallons of gasoline were sold in California's retail market (CEC, 2018a). Diesel fuel is the second largest transportation fuel by volume used in California. In 2016, approximately 1.7 billion gallons of diesel were sold in California's retail market (CEC, 2018a).

Local Energy Systems

Electricity

Electricity is generated and distributed via a network of high voltage transmission lines commonly referred to as the power grid. PG&E provides electrical power to approximately 5.4 million customer accounts throughout a 70,000 square mile service area in Northern and Central California, including Contra Costa County (PG&E, 2018a). PG&E's service area extends from

Eureka to Bakersfield (north to south), and from the Sierra Nevada to the Pacific Ocean (east to west). PG&E produces and purchases energy from a mix of conventional and renewable generating sources. **Table 3.7-1** shows the electric power mix that PG&E delivered to its customers in California in 2016.

TABLE 3.7-1
PG&ES 2016 ELECTRIC POWER MIX DELIVERED TO CUSTOMERS

Power Source	Percentage of Total
Nuclear	24%
Large Hydroelectric	12%
Eligible Renewables	33%
Natural Gas	17%
Unspecified Power[a]	14%

NOTE:
[a] This electricity is not traceable to specific sources by any auditable contract trail.

SOURCE: PG&E, 2018b

Of the electricity delivered by PG&E to its customers in 2016, 24 percent was generated by nuclear power plants, 12 percent came from large hydroelectric dams, 33 percent came from renewable sources, 17 percent was from natural gas, and 14 percent from unspecified sources (PG&E, 2018b). Total electricity consumed in Contra Costa County in 2016 was 9,643,548 megawatt-hours (MWh) (CEC, 2018b).

Gasoline and Diesel Fuel

In 2016, all retail sales of gasoline and diesel in Contra Costa County were 431 million gallons, and 26 million gallons, respectively (CEC, 2018c).

3.7.2 Regulatory Framework

Federal

Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 was established in response to the oil crisis of 1973, which increased oil prices due to a shortage of reserves. The Act required that all vehicles sold in the U.S. meet certain fuel economy goals. Since 1990, the fuel economy standard for new passenger cars has been 27.5 miles per gallon. Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 miles per gallon. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not subject to fuel economy standards. The proposed project would be consistent with the Act because all passenger cars and light trucks that would be used directly or indirectly associated with the project would be required to comply with the applicable fuel economy standards.

Energy Policy Act of 2005

The Energy Policy Act of 2005 seeks to reduce reliance on non-renewable energy resources and provide incentives to reduce current demand on these resources. For example, under the Act, consumers and businesses can obtain federal tax credits for fuel-efficient appliances and products, including buying hybrid vehicles, building energy-efficient buildings, and improving the energy efficiency of commercial buildings. Additionally, tax credits are available for the installation of qualified fuel cells, stationary microturbine power plants, and solar power equipment. It is unknown whether or not the City would attempt to obtain any federal tax credits associated with the project under the Energy Policy Act of 2005.

State

State of California Integrated Energy Policy

In 2002, the Legislature passed Senate Bill 1389, which required the CEC to develop an integrated energy plan every two years for electricity, natural gas, and transportation fuels, for the California Energy Policy Report. The plan calls for the state to assist in the transformation of the transportation system to improve air quality, reduce congestion, and increase the efficient use of fuel supplies with the least environmental and energy costs. To further this policy, the plan identifies a number of strategies, including assistance to public agencies and fleet operators in implementing incentive programs for Zero Emission Vehicles and their infrastructure needs, and encouragement of urban designs that reduce vehicle miles traveled and accommodate pedestrian and bicycle access.

The CEC adopted the 2016 Integrated Energy Policy Report on February, 2017. The 2016 Integrated Energy Policy Report provides the results of the CEC's assessment of a variety of issues, and covers a broad range of topics including: initiatives to reduce greenhouse gas emissions; transformation of the electricity system towards renewable energy sources; the management of aging energy infrastructure; the environmental performance of the electricity generation system; landscape-scale planning the response to the leak at the Aliso Canyon natural gas storage facility, transportation fuel supply reliability issues; updates on Southern California electricity reliability; methane leakage; climate adaptation activities for the energy sector; climate and sea level rise scenarios; and the California Energy Demand Forecast (CEC, 2017b). Although the integrated energy plan is not directly applicable to the proposed project given that the project would not include utility-scale energy generation or transmission infrastructure, it is applicable to the operations of PG&E, which is the public utility that would provide the required electricity for the project. Given that PG&E is required to comply with the applicable provisions of the integrated energy plan, electricity obtained for the project would be generated in a manner consistent with the spirit of the integrated energy plan.

Title 24 Building Energy Efficiency Standards (California Energy Code)

The California Building Standards Commission first established Energy Efficiency Standards for California in 1978, in response to a legislative mandate to reduce California's energy consumption. The standards, which are contained in the California Code of Regulations, Title 24,

Part 6 (also known as the California Energy Code) are updated periodically by the CEC to allow consideration and possible incorporation of new energy efficiency technologies and methods. The standards regulate energy consumed in nonresidential buildings for heating, cooling, ventilation, water heating, and lighting. Title 24 is implemented through the local planning and permit process and therefore project components requiring building permits would be required to comply with Title 24. Title 24 is updated approximately every three years. The newest version became effective January 1, 2017, and continues to improve upon the standards for new construction of, and additions and alterations to, residential and nonresidential buildings. However, the proposed facilities evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, exempt from the Cities of Antioch and Pittsburg building ordinances pursuant to California Government Code Section 53091(d). Therefore, the proposed project is exempt from the Title 24 requirements.

California Green Building Standards Code (Cal Green)

On January 1, 2017, the California Building Standards Commission adopted the California Green Building Standards Code (Part 11 of the Title 24 Building Standards Code) for all new construction statewide. The code sets targets for energy efficiency, water consumption, dual plumbing systems for potable and recyclable water, diversion of construction waste from landfills, and use of environmentally sensitive materials in construction and design, including eco-friendly flooring, carpeting, paint, coatings, thermal insulation, and acoustical wall and ceiling panels. As described above, as a water production, treatment and transmission facility, the proposed project would be exempt from these requirements pursuant to California Government Code Section 53091(d).

Local

City of Antioch General Plan

The following energy conservation policies from the City of Antioch General Plan may be relevant to proposed project:

> ***Policy 10.8.2.d:*** Encourage the installation of energy-efficient lighting, reduced thermostat settings, and elimination of unnecessary lighting in public facilities.
>
> ***Policy 10.8.2.e:*** Facilitate the installation of environmentally acceptable forms of distributed generation[1], where such systems can be safely and economically provided.

[1] Distributed generation includes small-scale forms of electrical generation such as microturbins, fuel cells, photovoltaics, and co-generation.

3.7.3 Analysis, Impacts, and Mitigation

Significance Criteria

Based on Appendix F of the CEQA *Guidelines*, implementation of the proposed project would have a significant impact related to energy conservation if it would:

- Use large amounts of fuel or energy in an unnecessary, wasteful, or inefficient manner;
- Constrain local or regional energy supplies, require additional capacity, or affect peak and base periods of electrical demand;
- Require or result in the construction of new electrical generation and/or transmission facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects; or
- Conflict with existing energy standards, including standards for energy conservation.

Methodology and Assumptions

This analysis is based, in part, on basic assumptions regarding construction-related diesel and gasoline consumption for the proposed project, the City's proposed energy efficiency design elements for the proposed project, and the City's estimates of the operational electricity requirements of the proposed project. The analysis focuses on the anticipated energy demand and energy efficiency of the proposed project as a whole, including during construction, operation, and maintenance. This analysis assumes all electrical power needed for project operations would be provided by the local PG&E electrical power grid.

Fuel Consumption

Off-road equipment inventories and construction and maintenance activity assumptions were used to estimate fuel amounts that would be consumed by off-road equipment during construction and maintenance of the proposed project. Fuel consumption factors for off-road equipment were derived from equipment inventory data using CARB's off-road emissions inventory database. Fuel use that would be associated with commuting workers and truck hauling during construction and operation of the proposed project were also estimated using trip data projected for the project (see **Appendix B** for all fuel consumption factors and assumptions).

Energy Efficient Design Elements for the Proposed Project

As discussed in Chapter 2, *Background and Project Description*, the project would use variable speed pumps at the new river intake and reverse osmosis (RO) technology to remove salts and other minerals from water. During the RO process pretreated source water is forced at very high pressures through RO membranes. Generating the necessary high pressure can require a large amount of energy particularly for sea water desalination facilities. However, the proposed project uses desalination facilities for brackish water desalination, which requires much lower pressure and power usage and would incorporate various technological advancements to reduce the operational energy demand as much as possible. These advances include the use of the latest

generation of RO membranes that utilize the lowest operating pressure requirements (Pacific Institute, 2013).

Energy efficiency elements would also be incorporated into the process design associated with the proposed desalination facility and new intake pump station. Electrical and treatment equipment would include variable frequency drives to reduce the operating speed of pumps to match the pump discharge pressure requirements and reduce energy usage.

Areas of No Project Impact

Based on the nature of the proposed project, the following significance criterion is not addressed further in the EIR:

- ***Conflict with energy standards, including standards for energy conservation.*** The local government building permit application review process would ensure that the Project would be compliant with all applicable State and local energy conservation standards. In addition, the Project would not conflict with applicable plans, policies, or regulations related to energy use and conservation. Therefore, no impact related to compliance with applicable energy conservation standards would result, and this criterion is not discussed further in this section.

Impacts and Mitigation Measures

Impact Summary

Table 3.7-2 summarizes the project's energy use and conservation impacts and significance determinations.

TABLE 3.7-2
SUMMARY OF IMPACTS – ENERGY CONSERVATION

Impacts	Significance Determinations
Impact 3.7-1: The project would not use large amounts of fuel or energy in an unnecessary, wasteful, or inefficient manner.	LSM
Impact 3.7-2: The project would not constrain local or regional energy supplies, require additional capacity, affect peak and base periods of electrical demand, or otherwise require or result in the construction of new electrical generation and/or transmission facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects.	LS
Impact 3.7-C-1: Implementation of the project, in combination with past, present, and reasonably foreseeable future development, would not use large amounts of fuel or energy in an unnecessary, wasteful, or inefficient manner.	LSM
Impact 3.7-C-2: Implementation of the project, in combination with past, present, and reasonably foreseeable future development, would not constrain local or regional energy supplies, require additional capacity, affect peak and base periods of electrical demand, or otherwise require or result in the construction of new electrical generation and/or transmission facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects.	LS

NOTES:
LS = Less than Significant
LSM = Less than Significant with Mitigation

Impact 3.7-1: The project would not use large amounts of fuel or energy in an unnecessary, wasteful, or inefficient manner. (*Less than Significant with Mitigation*)

Construction

Construction of the proposed project would require the use of fuels (primarily gasoline and diesel) for operation of construction equipment (e.g., excavators and cranes), construction vehicles (e.g., dump and delivery trucks), and construction worker vehicles. Direct energy use may also include the limited use of electricity required to power construction equipment (e.g., electric power tools). In addition, construction of the proposed project would result in indirect energy use associated with the extraction, manufacturing, and transportation of raw materials to make construction materials. Indirect energy use typically represents about three-quarters of the total construction energy consumed, while direct energy use represents about one-quarter (Hannon et al., 1978).

Although the precise amount of construction-related direct energy consumption that would occur under the proposed project is unknown, fuel use amounts that would be required for construction of the following project components have been estimated: the new intake pump station (including demolition of the existing pump station); the desalination facility, the brine disposal pipeline, raw water pipeline connection to the WTP. It is estimated that off-road construction equipment would operate for a total of approximately 23,547 hours and would consume a total of approximately 90,163 gallons of diesel fuel at an average rate of 3.8 gallons per hour. With regard to vehicle use during construction, workers' personal vehicles would travel approximately 104,890 miles and consume approximately 5,267 gallons of gasoline (assuming an average fuel economy of 20.7 miles per gallon) and heavy haul trucks would travel 239,840 miles and consume approximately 37,417 gallons of diesel fuel (assuming an average consumption rate of 7.0 miles per gallon) (see **Appendix B** for all assumptions and fuel use factors). When considered over the project construction period, which would occur over a period of approximately 14 months, maximum annual fuel use for off-road construction equipment and haul trucks would be up to approximately 109,355 gallons of diesel fuel per year and construction workers' personal vehicles would consume up to approximately 4,515 gallons of gasoline per year.

These annual average fuel use amounts are equivalent to less than 0.01 percent and 0.42 percent of the total amounts of gasoline and diesel fuel, respectively, sold in Contra Costa County in 2016. With regard to decommissioning of the proposed project, amounts of direct energy consumption that would occur at the end of the useful life of the proposed project (in approximately 30 years) related to decommissioning is unknown; however, it is anticipated that the amounts would be similar to those required for construction, discussed above.

The amount of electricity and indirect energy consumption that would be associated with construction of the proposed project is unknown and cannot be estimated as it would be too speculative given existing data; however, the amounts would not be expected to be substantial.

Operations

With regard to long-term operations, employee personal vehicles would consume an estimated 1,625 gallons of gasoline per year, which would equate to substantially less than 0.01 percent of the total amount of gasoline sold in Contra Costa County in 2016. In addition to fuel use, implementation of the proposed project would increase the City's total electrical demand by approximately 1,447 MWh per year, which would represent substantially less than 0.01 percent of the total electricity used in in Contra Costa County in 2016 (CEC, 2018b).

Impact Determination

While the overall transportation energy use requirements would not be significant relative to the overall sales of transportation fuels in the county, construction and decommissioning activities could result in wasteful or inefficient use of energy if: construction and decommissioning equipment is not well maintained; if equipment is left to idle when not in use; or if haul trips are not planned efficiently. For all project components, the potential for construction and decommissioning to use large amounts of fuel or energy in a wasteful or inefficient manner is considered a significant impact. However, with implementation of **Mitigation Measures 3.7-1 (Construction Equipment Efficiency)** and **3.2-1 (BAAQMD Basic Construction Measures)**, which would ensure construction activities are conducted in a fuel-efficient manner and minimize idling times for construction equipment and vehicles, the impact would be reduced to a less-than-significant level. Regarding operations, the impact associated with the potential for the proposed project to use large amounts of fuel or energy in a wasteful or inefficient manner is considered to be less than significant.

Mitigation Measure:

Mitigation Measure 3.7-1: Construction Equipment Efficiency

The City shall retain a qualified professional (i.e., construction planner/energy efficiency expert) to identify the specific measures that the City (and its construction contractors) will implement as part of project construction and decommissioning to increase the efficient use of construction equipment to the maximum extent feasible. Such measures shall include, but not necessarily be limited to: procedures to ensure that all construction equipment is properly tuned and maintained at all times; a commitment to utilize existing electricity sources where feasible rather than portable diesel-powered generators; and identification of procedures (including the routing of haul trips) that will be followed to ensure that all materials and debris hauling is conducted in a fuel-efficient manner. The measures shall be incorporated into construction specifications and implemented throughout the construction and decommissioning periods.

Mitigation Measure 3.2-1: BAAQMD Basic Construction Measures

(See Impact 3.2-1 in Section 3.2, *Air Quality*, for description.)

Significance after Mitigation: Implementation of **Mitigation Measures 3.7-1** and **3.2-1** would reduce construction related fuel and energy use to a **less-than-significant** level.

Impact 3.7-2: The project would not constrain local or regional energy supplies, require additional capacity, affect peak and base periods of electrical demand, or otherwise require or result in the construction of new electrical generation and/or transmission facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects. *(Less than Significant)*

The project's impact on local and regional energy supplies depends on several factors; however, the primary energy source of concern associated with the operation of project is electrical power provided by PG&E. The proposed project's estimated electrical demand would be roughly 1,447 MWh per year, which would represent substantially less than 0.01 percent of the total electricity used in Contra Costa County in 2016 (CEC, 2018b). Therefore, it is reasonable to expect that the demands that would be associated with the proposed project could be accommodated within the capacity of existing available electrical generation and transmission facilities. New underground and/or aboveground power line connections would be required to connect the proposed facilities to the existing local PG&E power grid. However, for the reasons above, the project would be expected to be accommodated by the existing local and regional energy supplies and transmission infrastructure, and the impact would be less than significant.

Mitigation Measure:

None required.

Cumulative Impacts

Impact 3.7-C-1: Implementation of the project, in combination with past, present, and reasonably foreseeable future development, would not use large amounts of fuel or energy in an unnecessary, wasteful, or inefficient manner. (*Less than Significant with Mitigation*)

As described under Impact 3.7-1, the project would have no impact related to conflicting with energy standards. Therefore, it would not contribute to cumulative impacts related to these topics. Cumulative impacts associated with energy conservation are considered in the context of both local and regional energy supply and demand. As described under Impact 3.7-1, project construction could use large amounts of fuel or energy in a wasteful or inefficient manner, which in the context of local and regional energy supplies, in combination with the energy demands of the projects described in **Table 3-1**, could result in a significant cumulative impact. Implementation of **Mitigation Measures 3.7-1** and **3.2-1** identified in Impact 3.7-1 would help improve the fuel efficiency of and limit idling times for construction equipment. Energy used during construction would primarily be in the form of gasoline and diesel fuel. Even if project construction were to occur simultaneously with other cumulative projects, the cumulative use of energy resources during construction would be consistent with normal construction practices and would comply with efficiency- and conservation-related policies intended to address cumulative energy consumption statewide. Therefore, after mitigation, the proposed project construction would have a **less-than-significant** contribution to the overall cumulative impact related to the inefficient use of fuel sources.

Impact 3.7-C-2: Implementation of the project, in combination with past, present, and reasonably foreseeable future development, would not constrain local or regional energy supplies, require additional capacity, affect peak and base periods of electrical demand, or otherwise require or result in the construction of new electrical generation and/or transmission facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects. (*Less than Significant*)

As discussed under Impact 3.7-2, the anticipated increase in electricity consumption for the project would represent less than 0.01 percent of Contra Costa County's annual usage. It should be noted that PG&E purchases wholesale electric energy and capacity from generators and suppliers and periodically conducts solicitations / requests for offers (RFO) for additional supplies of conventional and renewable electricity. Therefore, in the event that many other cumulative projects listed in **Table 3-1** that would be high demand electricity users, request electrical service from PG&E, additional wholesale electric energy may need to be purchased by PG&E. In addition, some reinforcement or upgrades of the existing distribution system may also be required, but this would not substantially constrain local or regional energy supplies. Therefore, the project would have a **less-than-significant** contribution to the cumulative impact associated with constraining local or regional energy supplies, requiring additional capacity, affecting peak and base periods of electrical demand, or otherwise require or result in the construction of new electrical generation and/or transmission facilities, or the expansion of existing facilities.

References – Energy Conservation

California Energy Commission (CEC), 2017a. *Total System Electric Generation*. Data as of June 23, 2017. Available at: www.energy.ca.gov/almanac/electricity_data/total_system_power.html.

California Energy Commission (CEC), 2017b. 2016 Integrated Energy Policy Report Update. Publication Number CEC-100-2016-003-CMF. Docketed on February 28, 2017.

California Energy Commission (CEC). 2018a. California Retail Fuel Outlet Annual Reporting (CEC-A15) Results. Available at: www.energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html. Accessed January 22, 2018.

California Energy Commission (CEC). 2018b. California Electricity Consumption by County. Available at: www.ecdms.energy.ca.gov/elecbycounty.aspx. Accessed March 9, 2018.

California Energy Commission (CEC) 2018c. Energy Almanac, Retail Gasoline and Diesel Sales by County. Available at: energy.ca.gov/almanac/transportation_data/gasoline/piira_retail_survey.html. Accessed January 22, 2018.

Hannon et al., 1978. Energy and Labor in the Construction Sector. Article in Science Magazine. November 24, 1978.

Pacific Gas and Electric Company (PG&E), 2018a. Company Profile. Available at: www.pge.com/en_US/about-pge/company-information/profile/profile.page. Accessed January 22, 2018.

PG&E, 2018b. Delivering low-emission energy. Available at: www.pge.com/en_US/about-pge/environment/what-we-are-doing/clean-energy-solutions/clean-energy-solutions.page?WT.mc_id=Vanity_cleanenergy. Accessed January 22, 2018.

Pacific Institute, 2013. Key Issues for Seawater Desalination in California: Energy and Greenhouse Gas Emissions. Available at: pacinst.org/publication/energy-and-greenhouse-gas-emissions-of-seawater-desalination-in-california/ Accessed February 23, 2018.

U.S. Energy Information Administration (USEIA), 2018a. California State Profile and Quick Facts. Available at: www.eia.gov/state/?sid=CA#tabs-1. Accessed January 22, 2018.

USEIA, 2016b. California Profile Data. Available at: www.eia.gov/state/data.php?sid=CA. Accessed January 22, 2018.

3.8 Greenhouse Gas Emissions

This section evaluates the potential for construction and operation of the proposed project to result in adverse impacts associated with greenhouse gas (GHG) emissions. The environmental setting with respect to climate change, GHG emissions, and GHG sources is described in Section 3.8.1, *Environmental Setting*, and the regulatory framework that governs GHG emissions are discussed in Section 3.8.2, *Regulatory Setting*. Section 3.8.3, *Analysis, Impacts, and Mitigation*, defines significance criteria used for the impact assessment, and analyzes the potential impacts of the proposed project, including cumulative effects. The analysis is based on review of available reports, plans, and guidance prepared by agencies such as U.S. Environmental Protection Agency (USEPA), the California Air Resources Board (CARB), and the Bay Area Air Quality Management District (BAAQMD) as well as project-specific construction and operational features provided by the City of Antioch. No comments related to GHG emissions were received during the scoping period.

3.8.1 Environmental Setting

Climate Change

According to the USEPA, the term "climate change" refers to any significant change in measures of climate (such as temperature, precipitation, or wind) lasting for an extended period (over several decades or longer). There is scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. Gases that trap heat in the atmosphere are often called GHGs. Emissions of GHGs, if not sufficiently curtailed, are likely to contribute further to increases in global temperatures. The potential effects of climate change in California include sea level rise and reductions in snowpack, as well as an increased number of extreme-heat days per year, high ozone days, large forest fires, and drought years (CARB, 2014). Globally, climate change could affect numerous environmental resources through potential, though uncertain, changes in future air temperatures and precipitation patterns. According to the International Panel on Climate Change (IPCC), the observed and/or projected effects of climate change vary regionally, but include the following direct effects (IPCC, 2014):

- Changing precipitation and snow melt patterns;
- Negative effect on crop yield;
- Increased heat waves, drought, flood, wildfires, and storm events;
- Reduced renewable water resources in most dry subtropical regions; and
- Ocean acidification damage to marine ecosystems.

In addition, many secondary effects are projected to result from climate change, including a global rise in sea level, ocean acidification, impacts on agriculture, changes in disease vectors, and changes in habitat and biodiversity. The possible outcomes and feedback mechanisms involved are not fully understood, and much research remains to be done; however, over the long term, the potential exists for substantial environmental, social, and economic consequences.

Greenhouse Gas Emissions

GHG emissions that result from human activities primarily include carbon dioxide (CO_2), with much smaller amounts of nitrous oxide (N_2O), methane (CH_4, often from unburned natural gas), sulfur hexafluoride (SF_6) from high-voltage power equipment, and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. Because these GHGs have different warming potentials (i.e., the amount of heat trapped in the atmosphere by a certain mass of the gas), and CO_2 is the most common reference gas for climate change, GHG emissions are often quantified and reported as CO_2-equivalent (CO_2e) emissions. For example, while SF_6 represents a small fraction of the total annual GHGs emitted worldwide, this gas is very potent, with 23,900 times the global warming potential of CO_2. Therefore, an emission of 1 metric ton of SF_6 would be reported as 23,900 metric tons CO_2e. The global warming potential of CH_4 and N_2O are 25 times and 298 times that of CO_2, respectively (CARB, 2016a). The principal GHGs resulting from human activity that enter and accumulate in the atmosphere are described below.

Carbon Dioxide

CO_2 is a naturally occurring gas that enters the atmosphere through natural as well as anthropogenic (human) sources. Key anthropogenic sources include the burning of fossil fuels (e.g., oil, natural gas, and coal), solid waste, trees, wood products, and other biomass, as well as industrially relevant chemical reactions such as those associated with manufacturing cement. CO_2 is removed from the atmosphere when it is absorbed by plants as part of the biological carbon cycle.

Methane

Like CO_2, CH_4 is emitted from both natural and anthropogenic sources. Key anthropogenic sources of CH_4 include gaseous emissions from landfills, releases associated with mining and materials extraction industries (in particular coal mining), and fugitive releases associated with the extraction and transport of natural gas and crude oil. CH_4 emissions also result from livestock and agricultural practices. Small quantities of CH_4 are released during fossil fuel combustion.

Nitrous Oxide

N_2O is also emitted from both natural and anthropogenic sources. Important anthropogenic sources include industrial activities, agricultural activities (primarily the application of nitrogen fertilizer), the use of explosives, combustion of fossil fuels, and decay of solid waste.

Fluorinated Gases

HFCs, PFCs, and SF_6 are synthetic gases emitted from a variety of industrial processes, and they contribute substantially more to the greenhouse effect on a pound for pound basis than the GHGs described previously. Fluorinated gases are often used as substitutes for ozone-depleting substances (i.e., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). These gases are typically emitted in small quantities, but because of their potency they are sometimes referred to as "high global warming potential gases."

Greenhouse Gas Sources

Anthropogenic GHG emissions in the United States are derived mostly from the combustion of fossil fuels for transportation and power production. Energy-related CO_2 emissions resulting from fossil fuel exploration and use account for approximately three-quarters of the human-generated GHG emissions in the United States, primarily in the form of CO_2 emissions from burning fossil fuels. More than half of the energy-related emissions come from large stationary sources, such as power plants; over one-quarter derive from transportation; and a majority of the remaining sources include: industrial processes, agriculture, commercial, and residential (USEPA, 2017a).

Statewide emissions of GHG from relevant source categories for 2009 through 2015 are summarized in **Table 3.8-1**. Specific contributions from individual air basins, such as the San Francisco Bay Area Air Basin (Air Basin), which encompasses the project area, are included in the emissions inventory but are not itemized by air basin. In 2015, California produced 440 million gross metric tons of CO_2e emissions. Transportation was the source of 39 percent of the state's GHG emissions, followed by industrial at 23 percent, electricity generation at 19 percent, commercial and residential sources at 11 percent, and agriculture and forestry comprised the remaining 8 percent (CARB, 2017).

TABLE 3.8-1
CALIFORNIA GHG EMISSIONS (MILLION METRIC TONS CO_2E)

Emission Inventory Category	2009	2010	2011	2012	2013	2014	2015	
Electricity Generation (In State)	53.51	46.91	41.36	51.18	49.60	51.81	50.21	11.4%
Electricity Generation (Imports)	48.13	43.67	46.94	44.15	40.24	36.56	33.88	7.7%
Transportation	171.45	168.11	164.70	164.38	163.05	164.89	169.38	38.5%
Industrial	97.31	101.12	101.08	101.46	104.27	104.69	102.97	23.4%
Commercial	18.64	20.09	20.73	21.11	21.64	21.37	22.17	5.0%
Residential	30.21	31.26	32.03	30.04	31.19	26.26	26.93	6.1%
Agriculture and Forestry	33.83	34.64	35.28	36.42	34.93	36.03	34.65	7.9%
Not Specified (Solvents & Chemicals)	0.26	0.27	0.25	0.24	0.18	0.24	0.17	<0.1%
Total Gross Emissions	**453.34**	**446.06**	**442.38**	**448.97**	**445.08**	**441.85**	**440.36**	**100.00%**

SOURCE: CARB, 2017.

3.8.2 Regulatory Framework

Federal

Clean Air Act

On April 2, 2007, in *Massachusetts v. USEPA* (549 US 497), the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. The Court held that the USEPA must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making such decisions, the USEPA is required to follow the language of Section 202(a) of the Clean Air Act, which obligates it to prescribe (and from time to time revise) standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more than a dozen environmental, renewable energy and other organizations.

On April 17, 2009, the USEPA Administrator signed proposed "endangerment" and "cause or contribute" findings for GHGs under Section 202(a) of the Clean Air Act. The USEPA found that six GHGs, taken in combination, endanger both the public health and the public welfare of current and future generations. The USEPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse effect as air pollution that endangers public health and welfare under Clean Air Act Section 202(a). Pursuant to 40 CFR Part 52*, Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule*, USEPA has mandated that Prevention of Significant Deterioration (PSD) and Title V requirements apply to facilities whose stationary source CO_2e emissions exceed 100,000 tons per year (USEPA, 2017b). The proposed project would not trigger PSD or Title V permitting under this regulation because it would generate substantially less than 100,000 tons of CO_2e emissions per year.

U.S. Supreme Court Decision in Utility Air Regulatory Group v. USEPA

On June 23, 2014, the U.S. Supreme Court held that USEPA may not treat GHG emissions as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of Best Available Control Technology (BACT). In accordance with the Supreme Court decision, on April 10, 2015, the D.C. Circuit issued an amended judgment in *Coalition for Responsible Regulation, Inc. v. U.S. Environmental Protection Agency*, which vacated the PSD and Title V regulations under review in that case to the extent that they require a stationary source to obtain a PSD or Title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds. The D.C. Circuit also directed USEPA to consider whether any further revisions to its regulations are appropriate, and if so, to undertake to make such revisions. In response to the Supreme Court decision and the D.C. Circuit's amended

judgment, the USEPA intends to conduct future rulemaking action to make appropriate revisions to the PSD and operating permit rules (USEPA, 2017b).

State

A variety of statewide rules and regulations mandate the quantification and, if emissions exceed established thresholds, the reduction of GHGs. CEQA requires lead agencies to evaluate project-related GHG emissions and the potential for projects to contribute to climate change and to provide appropriate mitigation in cases where the lead agency determines that a project would result in a significant addition of GHGs to the atmosphere.

Executive Order S-3-05

Executive Order S-3-05 was established by Governor Arnold Schwarzenegger in June 2006, and establishes statewide emission reduction targets through the year 2050 as follows:

1. By 2010, reduce GHG emissions to 2000 levels;
2. By 2020, reduce GHG emissions to 1990 levels; and
3. By 2050, reduce GHG emissions to 80 percent below 1990 levels.

This executive order does not include any specific requirements that pertain to the proposed project; however, future actions taken by the State to implement these goals may affect the proposed project, depending on the specific implementation measures that are developed.

Assembly Bill 32

California Assembly Bill (AB) 32,[1] the Global Warming Solutions Act of 2006, is the cornerstone of state efforts to reduce GHG emissions. As described below, the law requires CARB to establish a statewide GHG emissions cap for 2020 based on 1990 emission levels, develop a mandatory reporting program of GHG emissions, adopt regulations for discrete early actions to reduce GHG emissions, prepare a scoping plan to identify how emissions reductions will be achieved, and adopt a regulation that establishes a market-based compliance mechanism (also referred to as "Cap and Trade").

Statewide GHG Emissions Cap

In 2007, CARB established the statewide GHG emissions limit that must be achieved by 2020, equivalent to the statewide GHG emissions levels in 1990, at 427 million metric tons of CO_2e. This figure is approximately 30 percent below projected "business-as-usual" emissions of 596 million metric tons of CO_2e for 2020, and about 10 percent below average annual GHG emissions during the period of 2002 through 2004 (CARB, 2009).

[1] AB 32 is codified in California Health and Safety Code Division 25.5, Sections 38500 et seq.

Climate Change Scoping Plan

In December 2008, CARB approved the AB 32 Scoping Plan outlining the state's strategy to achieve the 2020 GHG emissions limit (CARB, 2009). The Scoping Plan estimated a reduction of 174 million metric tons CO_2e from the transportation, energy, agriculture, forestry, and high climate-change-potential sectors, and proposed a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify California's energy sources, save energy, create new jobs, and enhance public health. The Scoping Plan must be updated every 5 years to evaluate the mix of AB 32 policies to ensure that California is on track to achieve the 2020 GHG reduction goal. CARB released the First Update to the Climate Change Scoping Plan in May 2014 (CARB, 2014). The Update builds upon the initial Scoping Plan with new strategies and recommendations. The Update identifies opportunities to leverage existing and new funds to further drive GHG emission reductions through strategic planning and targeted low carbon investments. The Update defines CARB's climate change priorities for the next 5 years and sets the groundwork to reach California's long-term climate goals set forth in Executive Orders S-3-05 and B-16-2012 (the latter of these ordered State agencies to facilitate the rapid commercialization of zero-emission vehicles (ZEVs), setting a target for the number of them on California roads and also set a goal for reduction of emissions from the transportation sector). The Update highlights California's progress toward meeting the near-term 2020 GHG emission reduction goals defined in the initial Scoping Plan. CARB is currently working on a second update to the Scoping Plan to reflect the 2030 target set by Executive Order B-30-15 (see below).

Senate Bill 97

In 2007, the California State Legislature passed Senate Bill (SB) 97, which required amendment of the CEQA *Guidelines* to incorporate analysis of, and mitigation for, GHG emissions from projects subject to CEQA. The amendments took effect March 18, 2010. The amendments add Section 15064.4 to the CEQA Guidelines, specifically addressing the potential significance of GHG emissions. Section 15064.4 neither requires nor recommends a specific analytical methodology or quantitative criteria for determining the significance of GHG emissions. Rather, the section calls for a "good faith effort" to "describe, calculate or estimate" GHG emissions and indicates that the analysis of the significance of any GHG impacts should include consideration of the extent to which the project would:

- Increase or reduce GHG emissions;
- Exceed a locally applicable threshold of significance; or
- Comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions."

Section 15064(h)(3) of the CEQA *Guidelines* also states that a project may be found to have a less-than-significant impact related to GHG emissions if it complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions.

Executive Order B-30-15

In April 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. Reaching this emission reduction target will make it possible for California to reach its ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, as identified in Executive Order S-3-05. In 2016, the Legislature passed SB 32, which codifies a 2030 GHG emissions reduction target of 40 percent below 1990 levels. Executive Order B-30-15 also specifically addresses the need for climate adaptation and directs state government to:

- Incorporate climate change impacts into the State's 5-Year Infrastructure Plan;
- Update the Safeguarding California Plan, the state climate adaption strategy to identify how climate change will affect California infrastructure and industry and what actions the state can take to reduce the risks posed by climate change;
- Factor climate change into state agencies' planning and investment decisions; and
- Implement measures under existing agency and departmental authority to reduce GHG emissions (Office of the Governor, 2015).

Executive Order B-30-15 requires CARB to update the AB 32 Climate Change Scoping Plan to incorporate the 2030 target. The 2030 Draft Scoping Plan will serve as the framework to define the State's climate change priorities for the next 15 years and beyond. In June 2016, CARB released the 2030 Target Scoping Plan Update Concept Paper to describe potential policy concepts to achieve the 2030 target that can be incorporated in the 2030 Draft Scoping Plan. The concept paper presents four potential high-level concepts for achieving the needed GHG reductions (CARB, 2016b). The proposed project would not conflict with Executive Order B-30-15's GHG emissions goal because it would generate direct and indirect emissions of GHG emissions that would have a less than significant impact on the environment. This issue is addressed in Section 3.8.3, *Analysis, Impacts, and Mitigation*.

Local

City of Antioch

2011 Municipal Climate Action Plan

The 2011 Municipal Climate Action Plan (MCAP) is a malleable non-binding resolution that details policies and programs that can be implemented to help reduce the City of Antioch's GHG emissions should funding or other opportunities become available. The City of Antioch's MCAP outlines the policies and measures in energy efficiency and renewable energy, transportation, water, and solid waste management sectors that the City may implement and/or is already implementing to achieve its ultimate target goal of an 80 percent GHG emissions reduction by 2050. Based on a survey and report of the City's water distribution system conducted by Pacific Gas and Electric Company (PG&E) that made recommendations on pumps that could be upgraded, the MCAP identifies a water and wastewater measure that includes upgrades designed to improve energy efficiency in water treatment and distribution. The proposed upgrades and

installation of low maintenance landscaping were estimated to result in a five percent reduction in water and wastewater energy consumption compared emissions generated in 2005, which would equate to an emissions reduction of 165 metric tons CO_2e per year (City of Antioch, 2011).

In September 2016, the City approved its 2010 GHG emissions inventory for 2015. The inventory suggests that the City has reduced its municipal GHG emissions related to water and wastewater operations by approximately 1,385 metric tons per year from 2005 to 2015 (City of Antioch, 2016), which far exceeds the reduction goal of the MCAP water and wastewater measure. Although the proposed project would result in a modest increase in GHG emissions compared to existing conditions (see the Impact 3.8-1 discussion in Section 3.8.3, *Analysis, Impacts, and Mitigation*), the City's MCAP water and wastewater goals would continue to be met while improving water supply reliability and water quality during droughts and due to future changes in Delta water management.

Construction and Demolition Recycling Ordinance

In 2004 the City of Antioch adopted a construction and demolition debris (C&D) recycling ordinance. This C&D recycling ordinance requires the redirection from the waste stream of at least 50 percent of the total construction and demolition debris generated by a project via reuse or recycling. This ordinance also requires a Waste Management Plan (WMP) to be completed and approved by the City of Antioch for the purposes of complying with this ordinance. A completed WMP contains actual weight or volume of the material disposed or recycled (City of Antioch, 2011). Construction of the proposed project would be conducted in accordance with the Construction and Demolition Recycling Ordinance.

City of Pittsburg

The City of Pittsburg currently does not have an approved climate action plan (City of Pittsburg, 2017).

3.8.3 Analysis, Impacts, and Mitigation

Significance Criteria

Based on CEQA *Guidelines* Section 15064.4 and Section 15064.7(c), as well as Appendix G, a project would have significant impacts associated with GHG emissions if it would:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment; or

b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

For land use projects with operations that are not stationary sources, the BAAQMD's 2017 CEQA Guidelines recommend use of an operational significance threshold of 1,100 metric tons CO_2e per year and for stationary source projects the recommended significance threshold is 10,000 metric tons CO_2e per year (BAAQMD, 2017). The proposed project would include no

new stationary sources of GHG emissions. Project operational emissions would primarily be indirect emissions generated by stationary sources at power plants due to the use of electricity from PG&E's electrical grid. These sources are regulated and permitted by local air districts throughout California; however, they are outside of the control and jurisdiction of the City of Antioch. Because the sources of the indirect emissions are already regulated and permitted by the local air districts where the power plants reside, no permit or other BAAQMD approval would be required for the project's demand for electricity. For this reason, the stationary source significance threshold of 10,000 metric tons CO_2e per year is not an appropriate threshold to gauge impact significance of the proposed project.

Therefore, even though the project is not a typical land use development project, this EIR nonetheless uses the significance threshold of 1,100 metric tons CO_2e per year to evaluate whether the project's GHG emissions could have a significant impact on the environment. Use of this threshold results in approximately 59 percent of all projects being above the significance threshold and having to implement feasible mitigation measures to meet their CEQA obligations. These projects account for approximately 92 percent of all GHG emissions anticipated to occur between now and 2020 from new land use development in the Bay Area (BAAQMD, 2017). If all land use-project emissions are mitigated to below this threshold, it would represent an overall reduction in new land use project-related emissions of up to 92 percent.

It is acknowledged that this significance threshold was developed to focus on emissions reductions by 2020, and that BAAQMD staff and CARB have not yet provided guidance or recommendations for significance thresholds to evaluate consistency with emissions reduction goals for years beyond 2020; however, since the Executive Order B-30-15 emissions reductions goal of lowering GHG emissions to 40 percent below 1990 levels by 2030 is roughly equivalent to reducing emissions by 42 percent below current levels and the Executive Order S-3-05 emissions reductions goal of lowering GHG emissions to 80 percent below 1990 levels by 2050 is roughly equivalent to reducing emissions by 81 percent below current levels, the 1,100 metric tons CO_2e per year threshold can be used as a rough gauge to determine if the project would be consistent with these post-2020 goals. For discussion relative to the potential for the project to result in emissions (including GHG emissions) that could conflict with the BAAQMD's 2017 Clean Air Plan, refer to Impact 3.2-3 in Section 3.2, *Air Quality*.

The BAAQMD has not adopted a significance threshold for construction-related GHG emissions; however, it requires that the lead agency disclose those emissions and make a determination of impacts in relation to meeting AB 32 reduction goals. For construction-related GHG emissions, other air districts (e.g., South Coast Air Quality Management District (SCAQMD)) have recommended that total emissions from construction be amortized over a period of 30 years (meant to represent the life of the project) and added to operational emissions and then compared to the operational significance threshold (SCAQMD, 2008). This approach to assessing short-term construction emissions is used in this EIR.

Methodology and Assumptions

The following discussions provide an overview of the approach to analysis for GHG emissions impacts. The assumptions used to estimate construction and operational GHG emissions are provided in **Appendix C**.

Construction Emissions

Off-road equipment and vehicle trip emissions were estimated using the California Emissions Estimator Model version 2016.3.2 (CalEEMod v2016.3.2) with assumptions for construction equipment inventories and use rates, haul truck and vehicle trips, and construction phasing developed by the City's engineering consultant for this EIR analysis.

Depending on the equipment type and activity, it is assumed that each piece of equipment associated with construction activities at each of the project component sites would operate for 1 to 8 hours per day. The equipment hours were multiplied by the required amount of workdays for each equipment type for the total hours of operation for each piece of equipment. The total hours operated for each equipment type were then divided by the total construction workdays for each project component for the average equipment hours of the project components that were used for CalEEMod input. The average daily trip rates for each project component vary from 12 to 16 one-way worker auto trips per day and up to 56 one-way haul truck trips per day depending on the project component type. CalEEMod default trip lengths of 10.8 miles and 20.0 miles for worker trips and haul truck trips, respectively, were used to estimate the on-road vehicle emissions.

Consistent with the SCAQMD's recommended approach for construction emissions, this analysis amortizes the project's construction emissions over a 30-year project lifetime, adds them to the Project's estimated annual operational emissions, and then compares the total combined emissions to the 1,100 metric tons CO_2e per year significance threshold.

Operational Emissions

Below are discussions of how the indirect and direct operational emissions that would be associated with the project have been estimated. See Appendix C for all emission factors and assumptions used to estimate GHG emissions that would be associated with operations of the proposed project.

Indirect Emissions

The indirect emissions that would be associated with the project's electricity use were estimated using PG&E's power grid emission factor for year 2020 [i.e., 290 pounds CO_2 per megawatt hour (MWh); PG&E, 2015], which is estimated to be the first year the project would be operational. The CalEEMod default N_2O and CH_4 electricity use emission factors were also used to estimate the indirect emissions associated with electricity use. Based on energy use data for the existing pump station and WTP for years 2014 through 2017, the pump station consumes an average of approximately 1,516 MWh per year and the WTP consumes an average of 3,450 MWh per year, for a total annual average energy use of 4,965 MWh per year. Operations of the new River Pump

Station and the Desalination Facility would increase the City's annual pump station and WTP energy use to approximately 6,413 MWh per year. The proposed project's net increase in annual electricity demand is estimated to be approximately 1,447 MWh per year.

CalEEMod also estimates indirect emissions that would be associated with water use and waste generation based on land use type and area of the site. GHG indirect emissions were estimated for CO_2, N_2O, and CH_4, and the total CO_2e associated with the project was calculated by multiplying the N_2O and CH_4 emissions by their respective global warming potential, and then those values were added to the CO_2 emissions.

Exhaust Emissions

GHG emissions would also be generated from project-related vehicle travel during operations and maintenance. GHG emissions from vehicles that would be used during project operations and maintenance were estimated using CalEEMod v2016.3.2. It is assumed that up to seven commuting workers would result in 14 one-way trips each day.

Impacts and Mitigation Measures

Table 3.8-2 summarizes the project's GHG-related impacts and significance determinations.

TABLE 3.8-2
SUMMARY OF IMPACTS – GHG EMISSIONS

Impacts	Significance Determinations
Impact 3.8-1: The project would not generate an amount of GHG emissions that would contribute substantially to climate change.	LS
Impact 3.8-2: The project would not conflict with the Executive Order B-30-15 Emissions Reduction Goal.	LS
Impact 3.8-C-1: Implementation of the project, in combination with past, present, and reasonably foreseeable future development, would not result in a cumulatively significant impact related to generating GHG emissions that would contribute substantially to climate change.	LS
Impact 3.8-C-2: The project, in combination with other cumulative development, would not conflict with the Executive Order B-30-15 Emissions Reduction Goal.	LS

NOTE:
LS = Less than Significant.

Impact 3.8-1: The project would not generate an amount of GHG emissions that would contribute substantially to climate change. *(Less than Significant)*

Implementation of the project would result in short-term construction and long-term operational emissions. Construction and operational emissions that would be associated with the project are discussed separately below; however, the impact conclusion is based on the sum of amortized construction emissions and the operational emissions (see *Methodology and Assumptions* discussion, above, for additional information regarding the methods used to estimate the project's short-term construction and long-term operation emissions).

Construction Emissions

As shown in **Table 3.8-3**, GHG emissions generated by construction of the Project would total approximately 1,127 metric tons CO_2e over an approximately 14-month construction period, which equates to a 30-year amortized annual average value of approximately 38 metric tons CO_2e (refer to the *Methodology and Assumptions - Construction Emissions* discussion for details on the approach this analysis uses relative to short-term construction emissions; and **Appendix B** for all assumptions associated with the GHG construction emissions.

TABLE 3.8-3
TOTAL GHG EMISSIONS FROM PROJECT CONSTRUCTION

Construction Emission Source	CO_2e (metric tons)
Demolition/Construction of River Pump Station	473.56
Raw Water Pipeline	44.78
Desal Facility Construction	441.67
WTP Pipeline Installation	18.82
Brine Discharge Pipeline	147.76
Total Emissions	1,126.58
30-Year Amortized Annual Average	37.55

SOURCE: ESA, 2018. See Appendix B.

Operational Emissions

The project would generate long-term GHG emissions associated with electrical power and water consumption, waste generation, and vehicle travel. As described in the *Methodology and Assumptions - Operational Emissions* discussion, indirect emissions would result from a total project-related net increase in electricity demand of approximately 1,447 MWh per year. Other emission sources that would occur during operations of the project would include up to 14 one-way vehicle trips per day associated with commuting workers. The estimated annual emissions that would be associated with these operational sources are presented in **Table 3.8-4**. As indicated in the table, total net CO_2e emissions associated with operation of the project would be approximately 220 metric tons per year.

TABLE 3.8-4
TOTAL GHG EMISSIONS FROM PROJECT OPERATIONS

Operation Emissions Source	CO_2e (metric tons)
Net Increase in Electricity Consumption	191.94
Vehicle Trips	17.08
Waste Generation and Water Consumption	10.60
Total	219.62

SOURCES: ESA, 2018. See Appendix B.

As listed in **Table 3.8-4**, the vast majority of GHG emissions associated with long-term operation of the project would be indirect emissions from the project's use of electricity, which would be provided by the local PG&E electrical power grid. Due to California's Renewables Portfolio Standard (RPS) program that requires investor-owned utilities to increase procurement from eligible renewable energy sources to 50 percent of total procurement by 2030, PG&E has steadily increased the amount of renewables in its energy production portfolio, which lowers the overall indirect emissions associated with use of its electricity. The mix of sources of electricity that PG&E delivered to its customers in 2016 is described in the *Local Electricity Systems* discussion in Section 3.7, *Energy Conservation*. In fact, indirect emissions associated with use of PG&E's electricity will continue to drop as more and more electricity from renewable power generators is brought onto the grid. PG&E estimates that its emissions rate for its current (i.e., year 2018) energy production portfolio is 328 pounds of CO_2 per MWh generated, and that its emissions rate estimate for year 2020 is 290 pounds of CO_2 per MWh generated (PG&E, 2015). This will equal a reduction in indirect GHG emissions associated with electricity use in the PG&E service area of approximately 12 percent over the next two years. PG&E's electricity emissions rate (and thus the carbon footprint of the project's electricity consumption) would continue to decrease throughout the life of the project.

Impact Conclusion

As shown in **Table 3.8-5**, the sum of the 40-year amortized construction GHG emissions and the total net operation emissions that would be associated with the project is approximately 257 metric tons CO_2e per year. These emissions would be less than the 1,100 metric tons per year significance threshold; therefore, a **less than significant impact** would occur, and the proposed project would not be considered to contribute substantially to the primary and secondary adverse effects of climate change, such as increases in global temperatures, global rise in sea level, ocean acidification, impacts on agriculture, changes in disease vectors, and changes in habitat and biodiversity.

TABLE 3.8-5
TOTAL AMORTIZED GHG EMISSIONS

Emissions Source	CO_2e (metric tons per year)
30-Year Amortized Construction Emissions	37.55
Total Net Operational Emissions	219.62
Total Project Emissions	257.17
Significance Threshold	1,100
Significant Impact?	No

SOURCE: ESA, 2018. See Appendix B.

Mitigation Measure:

None required.

Impact 3.8-2: The project would not conflict with the Executive Order B-30-15 Emissions Reduction Goal. (*Less than Significant*)

As noted in the *Significance Criteria* discussion above, the threshold of 1,100 metric tons CO_2e per year used to assess the significance of Impact 3.8-1 effectively requires mitigation for the top 92 percent of emissions generated by new land use projects, which would represent an overall reduction in new land use project-related emissions of up to 92 percent. Since the issuance of Executive Order B-30-15, the GHG emissions reductions goal of lowering GHG emissions to 40 percent below 1990 levels by 2030, is roughly equivalent to reducing emissions by 44 percent below current levels, this analysis uses the same significance threshold to determine if the project would generally be consistent with this goal. As discussed under Impact 3.8-1, the carbon footprint of the project and the impact associated with GHG emissions would be less than significant. Therefore, the project would not conflict with the Executive Order B-30-15 Emissions Reduction Goal, and the associated impact would be **less than significant**.

Mitigation Measure:

None required.

Cumulative Impacts

For the purposes of this analysis, the geographic context for cumulative impacts associated with GHG emissions is statewide.

Impact 3.8-C-1: Implementation of the project, in combination with past, present, and reasonably foreseeable future development, would not result in a cumulatively significant impact related to generating GHG emissions that would contribute substantially to climate change. (*Less than Significant*)

Because GHG emissions have global climate change implications, the evaluation of GHG emissions impacts is inherently a cumulative impact analysis. Through Executive Orders S-3-05 and B-30-15, the State has established goals and policies for reducing its contribution of GHG emissions. Accordingly, these policy documents provide goals against which the significance of individual projects' emissions can be measured. Consistent with the emissions reduction goal for 2030 identified in Executive Order B-30-15, the numeric significance criterion used to evaluate operational emissions plus construction emissions amortized over the project's estimated 30-year lifetime is 1,100 metric tons CO_2e per year. If project construction and operations would result in GHG emissions greater than 1,100 metric tons CO_2e per year, the project would not be considered consistent with the State's GHG reduction goals and the associated impact would be cumulatively significant. The timeframe during which the project could contribute to cumulative GHG emissions effects includes the 14-month construction phase, as well as the anticipated approximately 30-year operations phase.

As discussed under Impact 3.8-1, the amortized construction and operational emissions that would be associated with the project would be approximately 257 metric tons CO_2e per year (refer to **Appendix C** for all assumptions associated with the GHG emissions), which would result in a less than significant impact and a less than significant contribution to the overall significant cumulative impact associated with climate change. Therefore, the project would be consistent with the State's GHG reduction goals and the project's incremental contribution to the cumulative climate change impact related to GHG emissions would be **less than significant**.

Mitigation Measure:

None required.

Impact 3.8-C-2: The project, in combination with other cumulative development, would not conflict with the Executive Order B-30-15 Emissions Reduction Goal. (*Less than Significant*)

As noted above, the project would be consistent with the State's GHG reduction goals. Therefore, the project would not conflict with the Executive Order B-30-15 Emissions Reduction Goal, and the associated cumulative impact would be **less than significant**.

Mitigation Measure:

None required.

References – Greenhouse Gas Emissions

Bay Area Air Quality Management District (BAAQMD), 2017. *BAAQMD CEQA Air Quality Guidelines*, adopted June 2, 2010, updated May 2017.

California Air Resources Board (CARB), 2009. Climate Change Scoping Plan: A Framework for Change, December 2008, amended version included errata and Board requested modifications posted May 11, 2009, Available at: www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

CARB, 2014. First Update to the Climate Change Scoping Plan, Building on the Framework Pursuant to AB 32, the California Global Warming Solutions Act of 2006.

CARB, 2016a. Global Warming Potentials webpage, last reviewed June 17, 2016. Available online at: www.arb.ca.gov/cc/inventory/background/gwp.htm. Accessed December 5, 2016.

CARB, 2016b. 2030 Target Scoping Plan Update Concept Paper, June 17, 2016.

CARB, 2017. California Greenhouse Gas Inventory for 2000–2015 – by Sector and Activity, last updated June 6, 2017. Available online at: www.arb.ca.gov/cc/inventory/data/tables/ghg_inventory_sector_sum_2000-15.pdf. Accessed June 8, 2017.

City of Antioch, 2011. City of Antioch Municipal Climate Action Plan, Adopted per Resolution 2011/39.

City of Antioch, 2016. Staff Report to the City Council on Greenhouse Gas Emission Inventory for 2010 and 2015 and updated 2005 inventory, September 13, 2016.

City of Pittsburg, 2017. Climate Action Pages. Available at: www.ci.pittsburg.ca.us/index.aspx?page=301. Accessed November 3, 2017.

Environmental Science Associates (ESA), 2018. Criteria Pollutant and Greenhouse Gas Emissions Estimates, February 2018.

Intergovernmental Panel on Climate Change (IPCC), 2014. *Climate Change 2014, Impacts, Adaptation, and Vulnerability*. Summary for Policymakers, 2014.

Pacific Gas and Electric Company (PG&E), 2015. Greenhouse Gas Emission Factors: Guidance for PG&E Customers, November 2015. Available online at: www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf. Accessed June 28, 2016.

South Coast Air Quality Management District (SCAQMD), *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans*, December 5, 2008.

U.S. Environmental Protection Agency (USEPA), 2017a. Sources of Greenhouse Gas Emissions. Available online at: www.epa.gov/climatechange/ghgemissions/sources.html. Accessed September 18, 2017.

USEPA, 2017b. Clean Air Act Permitting for Greenhouse Gas Emissions webpage. Available online at: www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases. Accessed September 18, 2017.

3.9 Hazards and Hazardous Materials

This section evaluates the potential for implementation of the proposed project to result in adverse impacts associated with hazards and hazardous materials, including hazardous materials used for both construction and the operation of the proposed project. The analysis included in this section was developed based on project-specific construction and operational features, information provided by the City, and data from the Department of Toxic Substances Control (DTSC), State Water Resources Control Board (SWRCB), Regional Water Quality Control Board (RWQCB), the General Plans for the Cities of Antioch and Pittsburg, and regional disaster planning documents. Mitigation measures are identified to avoid or reduce significant adverse impacts, as appropriate.

Public comments were received during the scoping period that relate to hazards and hazardous materials. Some comments concerned the intersection of the proposed brine disposal pipeline with previously abandoned oil and fuel pipelines. This issue is discussed in the section below on Oil and Gas Pipelines and in Impact 3.9-3. Some comments concerned the storage and containment of chemicals that would be used in the water treatment process. This issue is discussed below in the relevant regulations in Section 3.9.2, *Regulatory Framework* and in Impact 3.9-1.

3.9.1 Environmental Setting

Definitions of Hazardous Materials

Definitions of terms used in the regulatory framework, characterization of baseline conditions, and impact analysis for hazards and hazardous materials are provided below.

Hazardous Material

The term “hazardous material” can have varying definitions depending on the regulatory programs. For the purposes of this EIR, the term refers to both hazardous materials and hazardous wastes. The California Health and Safety Code Section 25501(p) defines hazardous material as: Hazardous material means any material that because of its quantity, concentrations, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. Hazardous materials include, but are not limited to, hazardous substances, hazardous waste, and any material

which a handler or the administering agency has a reasonable basis for believing would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment.

Hazardous Waste

A "hazardous waste" is a waste that because of its quantity, concentration, or physical, chemical, or infectious characteristic, causes or significantly contributes to an increase in mortality or illness or poses substantial or potential threats to public health or the environment (42 U.S.C. 6903(5)). Hazardous wastes are further defined under the Resource Conservation and Recovery Act (RCRA) as substances exhibiting the characteristics of ignitability, reactivity, corrosivity, or toxicity. Chemical-specific concentrations used to define whether a material is a hazardous, designated, or nonhazardous waste include Total Threshold Limit Concentrations (TTLCs), Soluble Threshold Limit Concentrations (STLCs), and Toxic Characteristic Leaching Procedure (TCLPs), listed in CCR Title 22, Chapter 11, Article 3, Section 66261, and used as waste acceptance criteria for landfills. Waste materials with chemical concentrations above TTLCs, STLCs, and TCLPs must be sent to Class I disposal facilities, may be sent to Class II disposal facilities depending on the waste material, and may not be sent to Class III disposal facilities.

Screening Levels for Hazardous Materials in Soil, Soil Gas, or Groundwater

The USEPA Regional Screening Levels (RSLs) and San Francisco Bay Area RWQCB Environmental Screening Levels (ESLs) are guidelines used to evaluate the potential risk associated with chemicals found in soil or groundwater where a release of hazardous materials has occurred. Although developed and maintained by the San Francisco Bay Area RWQCB, ESLs are used by regulatory agencies throughout the state. Screening levels have been established for both residential and commercial/industrial land uses, and for construction workers. Residential screening levels are the most restrictive; soil with chemical concentrations below these levels generally would not require remediation and would be suitable for unrestricted uses if disposed of offsite.

Commercial/industrial screening levels are generally less restrictive than residential screening levels because they are based on potential worker exposure to hazardous materials in the soil (and these are generally less than residential exposures). Screening levels for construction workers are also less restrictive than for commercial/industrial workers because construction workers are only exposed to the chemical of concern during the duration of construction, while industrial workers are assumed to be exposed over a working lifetime. Chemical concentrations below these screening levels generally would not require remediation and would be suitable for unrestricted uses. In addition, there are other more specific but similar screening levels used more narrowly focused human health or ecological risk assessment considerations.

Existing Hazardous Materials in Components to be Replaced or Removed

The demolition of the existing Intake Pump Station would not involve the handling of hazardous materials. The existing wooden pile-supported pier would be used as is and not replaced. No

other existing structures or components that have hazardous materials would be replaced or removed and the proposed location for the desalination plant is on vacant land with a temporary storage shed.

Overlap with Oil and Natural Gas Pipelines

The proposed brine disposal pipeline would cross active and abandoned oil and natural gas pipes at the two locations shown on **Figure 3.9-1**. The location information was acquired from the Pipeline and Hazardous Materials Safety Administration map viewer (PHMSA, 2018). However, for homeland security reasons, the locations shown on map viewer are approximate. For more accurate locations, the pipeline owner or operator must be contacted. The available information on the identification numbers, status, and contacts are listed in **Table 3.9-1**.

TABLE 3.9-1
SUMMARY OF OIL AND GAS PIPELINES

Pipeline Identification Number	Owner	Status and Contents	Contact	Contact Information
G Street and Railroad Crossing				
485090CCFR	Kinder Morgan	Active; multiple products	Bayaneh Nikpour	714-560-4918 Bayaneh_nikpour@kindermorgan.com
31590	None listed	Abandoned; unknown if still present	NPMS Staff	703-317-6294 npms@dot.gov
CAL0002	Chevron	Active fuel	Garrett Parker	713-372-6847 ParkerG@chevron.com
Old Valley Pipeline & Tidewater Associated Oil Company Pipelines	Chevron	Abandoned; unknown if pipes still present	Mike Hurd Tan Hoang	510-466-7161 michael.t.hurd@leidos.com 916-979-3742 tan.t.hoang@leidos.com
West Tregallas Road Alignment				
19749.94 20206.44 20208.84 20213.64 20215.74 X6485_0 20539.2 20541.5 20217.94 20542.2	PG&E	Active Natural Gas	Customer Service	888-743-7431 PipelineRequests@pge.com

SOURCE: PHMSA, 2018, Chevron, 2017

During the scoping period, Chevron provided a comment letter with that noted that the alignment for the proposed disposal pipeline would cross over the alignment of previously abandoned Old Valley Pipeline (OVP) and the Tidewater Associated Oil Company (TOAC) Pipelines, included in the **Table 3.9-1** (Chevron, 2017). The portion of the proposed disposal pipeline alignments on G Street and L Street would cross the abandoned pipelines along the south side of the railroad tracks. Because the abandonment of the pipelines occurred many years ago, Chevron stated that the abandonment procedures and the condition of soil around the abandoned pipelines is uncertain. The pipelines were constructed in the early 1900's and carried crude oil from the San Joaquin Valley to the San Francisco Bay Area. The use of the pipelines ceased by the 1970's. The degree and method of decommissioning varied: in some instances, the pipelines were removed, while in others they remained in place. Because these pipelines have been decommissioned with the majority but not all of pipelines having been removed, they are not readily identified as underground utilities through the Underground Service Alert North System or utility surveys. The location of the pipelines is based on historical as-built drawings and the approximated positional accuracy of the alignments is generally no better than plus or minus 50 feet. The OVP and TAOC pipelines were installed at depths of up to 10 feet below ground surface. The steel pipelines were typically encased in a protective coating composed of coal tar and asbestos-containing materials (ACM). Chevron advised that construction at this location could encounter abandoned-in-place sections of pipeline, ACM insulation materials around the pipelines, and/or residual weather crude oil in soil.

Hazardous Materials in Soil and Groundwater

The DTSC's EnviroStor website and the SWRCB GeoTracker website were checked for known hazardous materials sites that may overlap the construction footprint of the proposed project. The existing Antioch WTP has no documented records of any hazardous materials releases. Other sites that may have hazardous materials issues that may overlap the footprint of the proposed project are discussed below.

Fulton Shipyard

The Fulton Shipyard, at 307 Fulton Shipyard Road, is located just north and east of the existing raw water pipeline and along the San Joaquin River, as shown on Figure 3-1a (DTSC, 2017; SGI, 2014). This site is an active cleanup site under the jurisdiction of the DTSC. From 1918 and 1999, the Fulton Shipyard fabricated and maintained tugboats, pleasure crafts, and manufactured crane equipment onsite. Soil sampling in the vicinity of an onsite marine railway in 1992 detected elevated concentrations of lead and zinc. Sediment samples collected and analyzed in 1994 suggested a potential release to the San Joaquin River of lead and mercury in the vicinity of the marine railway (see Figure 3-1a; the pier just east of the proposed project's intake station). Blast media was also observed in and around an onsite structure located in the northeast corner of the Fulton Shipyard during an onsite visit in 2002.

SOURCE: City of Antioch 2017; Carollo Engineers 2017; NAIP 2016, ESA 2018; OSM 2016

Brackish Water Desalination Facility Planning

Figure 3.9-1

Oil and Natural Gas Pipelines

ESA

This page intentionally left blank

The Remedial Investigation (SGI, 2014) concluded that Removal Action Workplan should be prepared to remediate specific areas with chemical concentrations that exceed screening levels. The DTSC EnviroStor website indicated that the Removal Action Workplan has not yet been submitted for their review (DTSC, 2017). The investigation of the nature and extent of contaminants in river sediments is not complete. Note that the direction of flow in the San Joaquin River is to the west from the Fulton Shipyards along the proposed intake pump station site and downstream. Sediment samples collected from San Joaquin River sediment contained contaminants and maximum concentrations, as summarized below.

- Aluminum (27,719 milligrams per kilogram [mg/kg])
- Antimony (16.2 mg/kg)
- Arsenic (12.8 mg/kg)
- Barium (312 mg/kg)
- Cadmium (2 mg/kg)
- Chromium (174 mg/kg)
- Copper (2,890 mg/kg)
- Iron (50,600 mg/kg)
- Lead (828 mg/kg)
- Manganese (1,226 mg/kg)
- Mercury (3.6 mg/kg)
- Nickel (96.1 mg/kg)
- Silver (2.5 mg/kg)
- Vanadium (93.4 mg/kg)
- Zinc (589 mg/kg)
- Low Molecular Weight PAHs (21.7 mg/kg)
- High Molecular Weight PAHs (23.2 mg/kg, including benzo(a)pyrene)
- Arochlors (0.352 mg/kg)
- PCB Congeners (0.442 mg/kg)
- Tributyltin (0.931 mg/kg)

The concentrations of lead in sediments may exceed STLC levels (see definition of hazardous waste above), which would define the sediments as hazardous waste, if removed for offsite disposal. None of the other chemicals exceed their respective hazardous waste levels.

Closed Leaking Underground Fuel Tank Sites

The following sites located along the portion of Contra Loma Boulevard and L Street where the brine disposal pipeline would be installed are closed (previously cleaned up) leaking underground fuel tank sites (SWRCB, 2018):

- Tosco, 2701 Contra Loma Boulevard
- Former Exxon, 2610 Contra Loma Boulevard
- Chevron, 2100 L Street

The following sites located along the portion of West 10th Street where the brine disposal pipeline would be installed are closed (previously cleaned up) leaking underground fuel tank sites (SWRCB, 2018):

- Contra Costa County Fairgrounds, 1201 West 10th Street
- Al Eames Ford, 1400 West 10th Street
- Delta Dodge, 1725 West 10th Street
- Former Mazzei Automobile Dealership, 1530 West 10th Street
- Petrol Express, 1800 West 10th Street

Although these sites have been cleaned up to the satisfaction of the regulatory agencies and closure or no further action letters have been issued, residual levels of petroleum hydrocarbons may be present at concentrations below screening levels in soil at and near these sites.

Schools

The following schools are within 0.25 mile of project components:

- Park Middle School, at 1 Spartan Way, is west of and adjacent to the proposed brine discharge pipeline.
- Sutter Elementary School, at 3410 Longview Road, is about 1,250 feet southwest of the proposed desalination plant and bulk chemical storage building.
- Antioch High School, at 700 West 18th Street, is north, east, and adjacent to the proposed brine discharge pipeline alignment.
- Antioch Middle School, at 1500 D Street, is about 800 feet northeast of the proposed brine discharge pipeline alignment.
- Fremont Elementary School, at 1413 F Street, is about 1,320 (0.25 mile) northeast of the proposed brine discharge pipeline alignment.
- Marsh Elementary School, at 2304 G Street, is west of and adjacent to the proposed brine discharge pipeline alignment.
- Antioch Charter Academy School, at 1201 West 10th Street, is west of and adjacent to the proposed brine discharge pipeline alignment.

Airports

There are no public airports or private airstrips within 2 miles of the proposed project. The nearest airport is Buchanan Field Airport located about 12 miles to the west.

Emergency Response Plans

The City of Antioch's Office of Emergency Services (OES) utilizes a Standard Emergency Notification System for emergency purposes, a Community Warning System for chemical releases at fixed facilities, an evacuation plan that is predicated on the type of emergency and location, and a Disaster-Preparedness Plan that is updated and practiced by city employees annually (City of Antioch, 2017a). The plan does not identify specific emergency response or evacuation routes. The OES states that in the event of a disaster, local schools would be used as designated emergency shelters. As noted above, seven schools are adjacent to or near components of the project.

Wildfire Hazards

Based upon fire hazard mapping by the California Department of Forestry and Fire Protection (CAL FIRE) Forest Resource Assessment Program, the proposed project is not within identified high fire hazard areas (CAL FIRE, 2007).

3.9.2 Regulatory Framework

Federal

The primary federal agencies with responsibility for hazardous materials management include the U.S. Environmental Protection Agency (USEPA), U.S. Department of Labor Occupational Safety and Health Administration (Fed/OSHA), and the U.S. Department of Transportation (USDOT). Federal laws, regulations, and responsible agencies are summarized in **Table 3.9-2**.

TABLE 3.9-2
FEDERAL LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible Federal Agency	Description
Hazardous Materials Management	Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA))	Imposes requirements to ensure that hazardous materials are properly handled, used, stored, and disposed of and to prevent or mitigate injury to human health or the environment in the event that such materials are accidentally released.
Hazardous Waste Handling	Resource Conservation and Recovery Act of 1976 (RCRA)	Under RCRA, the USEPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave."
	Hazardous and Solid Waste Act	Amended RCRA in 1984, affirming and extending the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.
Hazardous Materials Transportation	USDOT	USDOT has the regulatory responsibility for the safe transportation of hazardous materials. The USDOT regulations govern all means of transportation except packages shipped by mail (49 CFR).
	U.S. Postal Service (USPS)	USPS regulations govern the transportation of hazardous materials shipped by mail.
Occupational Safety	Occupational Safety and Health Act of 1970	Fed/OSHA sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries (29 CFR 1910).
Structural and Building Components (Lead-based paint, polychlorinated biphenyls, and asbestos)	Toxic Substances Control Act	Regulates the use and management of polychlorinated biphenyls in electrical equipment, and sets forth detailed safeguards to be followed during the disposal of such items.
	USEPA	The USEPA monitors and regulates hazardous materials used in structural and building components and their effects on human health.

State and local agencies often have either parallel or more stringent rules than federal agencies. In most cases, state law mirrors or overlaps federal law and enforcement of these laws is the responsibility of the state or of a local agency to which enforcement powers are delegated. For these reasons, the requirements of the law and its enforcement are discussed under either the State or local agency section.

State

The primary State agencies with responsibility for hazardous materials management in the region include the DTSC and the RWQCB within the California Environmental Protection Agency (Cal

EPA), California Occupational Safety and Health Administration (Cal/OSHA), California Department of Health Services (CDHS), California Highway Patrol (CHP), and the California Department of Transportation (Caltrans). State laws, regulations, and responsible agencies are summarized in **Table 3.9-3**.

TABLE 3.9-3
STATE LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible State Agency	Description
Hazardous Materials Management	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program); CUPA (Health and Safety Code Sections 25404 et seq)	In January 1996, Cal EPA adopted regulations, which implemented a Unified Program at the local level. The agency responsible for implementation of the Unified Program is called the Certified Unified Program Agency (CUPA), which for the City of Antioch, is the Contra Costa Health Services - Hazardous Materials Programs, discussed further below.
	State Hazardous Waste and Substances List ("Cortese List"); DTSC, RWQCB, SC EHD.	The Project site includes one hazardous materials site on the "Cortese List" compiled pursuant to Government Code section 65962.5 and referenced in Public Resources Code 21092.6. The oversight of hazardous materials sites often involves several different agencies that may have overlapping authority and jurisdiction. For the onsite hazardous materials cases and issues, the RWQCB is the lead agency. Other cases may be overseen by the DTSC, the RWQCB, the City of Antioch, or other agencies.
Hazardous Waste Handling	California Hazardous Materials Release Response Plan and Inventory Law of 1985; CUPA	The California Hazardous Materials Release Response Plan and Inventory Law of 1985 (Business Plan Act) requires that businesses that store hazardous materials onsite prepare a Hazardous Materials Business Plan (HMBP) and submit it to the local CUPA, which in this case is the Contra Costa Health Services - Hazardous Materials Programs.
	California Hazardous Waste Control Act; DTSC	Under the California Hazardous Waste Control Act, California Health and Safety Code, Division 20, Chapter 6.5, Article 2, Section 25100, et seq., DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste in California. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. DTSC is also the administering agency for the California Hazardous Substance Account Act. California Health and Safety Code, Division 20, Chapter 6.8, Sections 25300 et seq., also known as the State Superfund law, providing for the investigation and remediation of hazardous substances pursuant to State law.
	California Fire Code	The California Fire Code regulates the storage and handling of hazardous materials, including the requirement for secondary containment, separation of incompatible materials, and preparation of spill response procedures.
Hazardous Materials Transportation	Titles 13, 22, and 26 of the California Code of Regulations	Regulates the transportation of hazardous waste originating in and passing through the state, including requirements for shipping, containers, and labeling.
	CHP and Caltrans	These two state agencies are primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies.

TABLE 3.9-3 (CONTINUED)
STATE LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible State Agency	Description
	Cal/OSHA	Cal/OSHA has primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the Code of Federal Regulations (CFR). Cal/OSHA standards are generally more stringent than federal regulations.
	Cal/OSHA regulations (Title 8 CCR)	Concerning the use of hazardous materials in the workplace require employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.
	California Office of Statewide Health Planning and Development	The Office of Statewide Health Planning and Development serves as the regulatory building agency for all hospitals and nursing homes in California. Its primary goal in this regard is to ensure that patients in these facilities are safe in the event of an earthquake or other disaster, and to ensure that the facilities remain functional after such an event in order to meet the needs of the community affected by the disaster.
Construction Storm Water General Permit (Construction General Permit; Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ)	RWQCB	Dischargers whose project disturbs one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one of more acres, are required to obtain coverage under the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit; Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ). Construction activity subject to this permit includes clearing, grading, grubbing, and other disturbances to the ground such as excavation and stockpiling, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of a facility. The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific Best Management Practices (BMPs) designed to prevent sediment and pollutants from contacting stormwater from moving offsite into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area.
Municipal Separate Storm Sewer System (MS4) Permit NPDES No. CAS082597 and Order No. R5-2016-0040	RWQCB	The MS4 permit requires permittees (in this case, the City of Antioch) to reduce pollutants and runoff flows from new development and redevelopment using BMPs to the maximum extent practical. The MS4 permittee also has its own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification element. The MS4 permit requires specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.
Industrial Storm Water General Permit Order No. 2014-0057-DWQ	RWQCB	Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ (IGP). The IGP regulates discharges associated with certain defined categories of industrial activities including manufacturing facilities; hazardous waste treatment, storage, or disposal facilities; landfills, land application sites, and open dumps; cement manufacturing; fertilizer manufacturing; petroleum refining; phosphate manufacturing; recycling facilities; steam electric power generating facilities; transportation facilities; and

TABLE 3.9-3 (CONTINUED)
STATE LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible State Agency	Description
		sewage or wastewater treatment works. The IGP requires the implementation of best management practices, a site-specific Storm Water Pollution Prevention Plan (SWPPP), and monitoring plan. The IGP also includes criteria for demonstrating no exposure of industrial activities or materials to storm water, and no discharges to waters of the United States.
Underground Infrastructure	California Code of Regulations Section 4216-4216.9	Section 4216-4216.9 "Protection of Underground Infrastructure" requires an excavator to contact a regional notification center (e.g., Underground Services Alert or Dig Alert) at least two days prior to excavation of any subsurface installations. Any utility provider seeking to begin a project that could damage underground infrastructure can call Underground Service Alert, the regional notification center for southern California. Underground Service Alert will notify the utilities that may have buried lines within 1,000 feet of the project. Representatives of the utilities are then notified and are required to mark the specific location of their facilities within the work area prior to the start of project activities in the area.

Asbestos-Containing Materials

Section 19827.5 of the California Health and Safety Code, adopted in January 1991, requires that local agencies not issue demolition or alteration permits until an applicant has demonstrated compliance with notification requirements under applicable federal regulations (Part 61 of Title 40 of the Code of Federal Regulations) regarding hazardous air pollutants in the Bay Area, including asbestos. The BAAQMD is vested by the California legislature with authority to regulate airborne pollutants, including asbestos, through both inspection and law enforcement, and implements the California regulatory requirements through Regulation 11, Rule 2 (Asbestos Demolition, Renovation, and Manufacturing).

In accordance with Regulation 11, Rule 2, the BAAQMD must be notified 10 days in advance of any proposed demolition or abatement work that would involve removal of ACM. Notification includes the names and addresses of operations and persons responsible; description and location of the structure(s) to be demolished/altered including size, age, and prior use, and the approximate amount of ACM; scheduled starting and completion dates of demolition or abatement; nature of planned work and methods to be employed; procedures to be employed to meet BAAQMD requirements; and the name and location of the waste disposal site to be used.

Contractors who conduct ACM-related work activities must follow state regulations where the work would involve 100 square feet or more of ACM (California Code of Regulations [CCR] 8 Sections 1529 and 341.6-341.14). Specifically, under CCR Title 8 Section 341.6, the California Occupational Safety and Health Administration (Cal/OSHA) must be notified of asbestos-related work activities to be carried out. Contractors must be licensed as an Asbestos Qualified Contractor by the Contractors Licensing Board of the State of California and registered as such with Cal/OSHA. Section 1529 regulates asbestos exposure in construction work. In addition, a one-time report of the use of carcinogens must be made to Cal/OSHA under CCR Title 8

Chapter 4 Section 5203. The contractor and hauler of the material are required to file a Hazardous Waste Manifest that details the hauling of the material from the site and its disposal.

Local

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

The Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program), codified in Health and Safety Code Sections 25404 et seq., requires the administrative consolidation of six hazardous materials and waste programs under one agency, a Certified Unified Program Agency (CUPA). The following programs are consolidated under the unified program:

- Hazardous Materials Release Response Plans, and Inventory (also referred to as Hazardous Materials Business Plans)
- California Accidental Release Program
- Underground Storage Tanks
- Aboveground Petroleum Storage Spill Prevention Control and Countermeasures
- Hazardous Waste Generation and Onsite Treatment
- Uniform Fire Code Plans and Inventory Requirements

The State Secretary for Environmental Protection designated the Contra Costa Health Services - Hazardous Materials Program as the local CUPA. The CUPA is charged with the responsibility of conducting compliance inspections of over hazardous materials facilities in Contra Costa County, including the Cities of Antioch and Pittsburg. These facilities handle hazardous materials, generate or treat a hazardous waste, and/or operate underground storage tanks. The CUPA uses education and enforcement to minimize the risk of chemical exposure to human health and the environment. The CUPA forwards important facility information to local fire prevention agencies that enables them to take appropriate protective action in the event of an emergency at regulated facilities. In order to legally store and use hazardous materials above the trigger quantities, users must apply for permits and demonstrate satisfactory compliance with regulations. The quantities that trigger disclosure are based on the maximum quantity on site at any time:

- 55 gallons, 500 pounds, or 200 cubic feet for 30 days or more at any time in the course of a year
- Any amount of hazardous waste
- Category I or II pesticides
- Explosives
- Extremely hazardous substances above the threshold planning quantity

East Contra Costa County Municipal NPDES Permit, Waste Discharge Requirements Order R5-2010-0102 and NPDES Permit No. CAS083313 (MS4 Permit)

The Municipal Storm Water Program regulates storm water discharges from municipal separate storm sewer systems (MS4s) throughout California. U.S. EPA defines an MS4 as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) owned or operated by a State (40 CFR 122.26(b)(8)). For Contra Costa County, the *Contra Costa Clean Water Program Stormwater C.3. Guidebook, Stormwater Quality Requirements for Development Applications* describes the requirements of the site-specific Stormwater Control Plan mandated by the Municipal Regional Permit (MS4 Permit). The Guidebook describes BMPs and Low Impact Development (LID) features to enable compliance with permit requirements, including the following goals:

- minimize imperviousness and reduce runoff
- slow runoff rates and retain or detain stormwater
- incorporate required source controls
- treat stormwater prior to discharge from the site
- control runoff rates and durations if required
- provide for operation and maintenance of stormwater facilities

City of Antioch General Plan

Chapter 11.0 Environmental Hazards Element

Hazardous Materials Objective 11.7.2: Minimize the negative impacts associated with the storage, use, generation, transport, and disposal of hazardous materials.

***Policy 11.7.2.b*:** Implement the provisions of the Contra Costa County Hazardous Waste Management Plan, including, but not limited to, provisions for pretreatment and disposal, storage, handling, and emergency response.

***Policy 11.7.2.k*:** Require emergency response plans for all hazardous waste processors and large generators to be submitted as part of use permit applications, and require training of employees of all facilities in emergency procedures, and that they be acquainted with the properties and health effects of the hazardous materials involved in service facilities' operations.

***Policy 11.7.2.n*:** Require the provision of spill containment facilities and monitoring devices in all facilities, and ensure that pipelines and other hazardous waste channels are properly designed to minimize leakage and require above ground pipelines to be surrounded by spill containment basins.

Storm Drainage and Flood Control Objective 8.7.2: Conduct all storm water via adequately sized storm drains and channels.

***Policy 8.7.2.e*:** Require new developments to provide erosion and sedimentation control measures to maintain the capacity of area storm drains and protect water quality.

***Policy 8.7.2.f*:** Require implementation of Best Management Practices [BMPs] in the design of drainage systems to reduce discharge on non-point source pollutants originating in streets, parking lots, paved industrial work area, and open spaces involved with pesticide applications. New developments to provide erosion and sedimentation control measures to maintain the capacity of area storm drains and protect water quality.

City of Antioch Municipal Code

Section 6-9.05: Stormwater Control Plan Required. Every application for a development project, including but not limited to a rezoning, tentative map, parcel map, conditional use permit, variance, site development permit, design review, or building permit that is subject to the development runoff requirements in the city's NPDES permit shall be accompanied by a stormwater control plan that meets the criteria in the most recent version of the Contra Costa Clean Water Program Stormwater C.3. Guidebook. Implementation of an approved stormwater control plan and submittal of an approved stormwater control operation and maintenance plan by the applicant shall be a condition precedent to the issuance of a certificate of occupancy for a project subject to this section.

Section 6-9.09: Best Management Practices and Standards. (E) *Construction Activities.* All construction shall conform to the requirements of the California Stormwater Quality Association (CASQA) Stormwater Best Management Practices Handbooks for Construction Activities and New Development and Redevelopment, the Association of Bay Area Governments (ABAG) Manual of Standards for Erosion & Sediment Control Measures, the city's grading and erosion control ordinance and other generally accepted engineering practices for erosion control as required by the Director when undertaking construction activities. The Director may establish controls on the rate of stormwater runoff from new development and redevelopment as may be appropriate to minimize the discharge and transport of pollutants. (Note: CASQA BMPS are incorporated into SWPPPs).

Section 8-13.01: Storm water pollution control measures shall be implemented during all construction phases of development to prevent pollution from entering the waterways.

City of Pittsburg General Plan

Chapter 10 Health & Safety Element

Goal 10-G-9: Minimize the risk to life and property from the generation, storage, and transportation of hazardous materials and waste by complying with all applicable State regulations.

Policy 10-P-33: Prevent the spread of hazardous leaks and spills from industrial facilities to residential neighborhoods and community focal points, such as Downtown.

Policy 10-P-34: Identify appropriate regional and local routes for transport of hazardous materials and wastes. Ensure that fire, police, and other emergency personnel are easily accessible for response to spill incidences on such routes.

Goal 10-G-8: Flood Control: Ensure that new development mitigates impacts to the City's storm drainage capacity from storm water runoff in excess of runoff occurring from the property in its undeveloped state.

Policy 10-P-18: Evaluate storm drainage needs for each development project in the context of demand and capacity when the drainage area is fully developed. Ensure

drainage improvements or other mitigation of the project's impacts on the storm drainage system appropriate to the project's share of the cumulative effect.

Policy 10-P-19: Assure through the Master Drainage Plan and development ordinances that proposed new development adequately provides for on-site and downstream mitigation of potential flood hazards.

City of Pittsburg Municipal Code

Section 13.28.050: Stormwater Control Plan Required. Every application for a development project, including but not limited to a rezoning, tentative map, parcel map, conditional use permit, variance, site development permit, design review, or building permit that is subject to the development runoff requirements in the city's NPDES permit shall be accompanied by a stormwater control plan that meets the criteria in the most recent version of the Contra Costa Clean Water Program Stormwater C.3. Guidebook. Implementation of an approved stormwater control plan and submittal of an approved stormwater control operation and maintenance plan by the applicant shall be a condition precedent to the issuance of a certificate of occupancy for a project subject to this section.

Section 6-9.09: Best Management Practices and Standards. (E) *Construction Activities.* All construction shall conform to the requirements of the California Stormwater Quality Association (CASQA) Stormwater Best Management Practices Handbooks for Construction Activities and New Development and Redevelopment, the Association of Bay Area Governments (ABAG) Manual of Standards for Erosion & Sediment Control Measures, the city's grading and erosion control ordinance and other generally accepted engineering practices for erosion control as required by the Director when undertaking construction activities. The Director may establish controls on the rate of stormwater runoff from new development and redevelopment as may be appropriate to minimize the discharge and transport of pollutants. (Note: CASQA BMPs are incorporated into SWPPPs).

Section 8-13.01: Storm water pollution control measures shall be implemented during all construction phases of development to prevent pollution from entering the waterways.

3.9.3 Analysis, Impacts, and Mitigation

Significance Criteria

Based on Appendix G of the *CEQA Guidelines,* the project would have a significant impact related to hazards and hazardous materials if it would:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;

- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment;

- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the area;

- For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area;

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; and

- Expose people or structures to a significant risk of loss, injury or death involving wildland fires including where wildlands.

Methodology and Assumptions

General

Information for this assessment of impacts to workers, the public, or the environment relative to hazards and hazardous materials is based on a review of information from hazardous materials and pipeline databases, maps showing airports, schools, and fire hazard zones, and city and county plans.

The project would be regulated by the various laws, regulations, and policies summarized in Section 3.9.2, *Regulatory Framework*. Compliance by the project with applicable federal, state, and local laws and regulations is assumed in this analysis, and local and state agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the regulations is a condition of permit approval.

A significant impact would occur if, after considering the features described in the Chapter 2, *Project Description* and the required compliance with regulatory requirements, a significant impact would still occur. For those impacts considered to be significant, mitigation measures are proposed to reduce the identified impacts.

Issues not Discussed in Impacts

Due to the nature of the project, there would be no impact related to the following topics for the reasons described below:

- ***Public or private airports or airstrips.*** The project would not be located within two miles of an airport or airstrip. Therefore, there would be no impact related to airports or airstrips.

- ***Wildland fires.*** The project would not be located in areas susceptible to wildland fires. Therefore, there would be no impact related to wildland fires and this topic is not discussed further.

Impacts and Mitigation Measures

Table 3.9-4 summarizes the proposed project's impacts and significance determinations related to hazards and hazardous materials.

TABLE 3.9-4
SUMMARY OF IMPACTS – HAZARDS AND HAZARDOUS MATERIALS

Impacts	Significance Determinations
Impact 3.9-1: The proposed project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of hazardous materials.	LS
Impact 3.9-2: The proposed project could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LSM
Impact 3.9-3: The proposed project would be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, could create a significant hazard to the public or the environment.	LSM
Impact 3.9-4: The proposed project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LSM
Impact 3.9-C-1: Cumulative impacts related to hazards and hazardous materials	LS

NOTES:
LS = Less than Significant
LSM = Less than Significant Impact with Mitigation

Impact 3.9-1: The proposed project would not create a significant hazard to the public or the environment through the routine transport, use, disposal, or accidental release of hazardous materials. *(Less than Significant)*

Construction

During the construction phase, construction equipment and materials would include fuels, oils and lubricants, solvents and cleaners, cements and adhesives, paints and thinners, degreasers, cement and concrete, and asphalt mixtures, which are all commonly used in construction. The routine use or an accidental spill of hazardous materials could result in inadvertent releases, which could adversely affect construction workers, the public, and the environment. The potential impacts from encountering ACM on pipelines and/or contaminated soil are analyzed further below in Impact 3.9-3.

Construction activities would be required to comply with numerous hazardous materials regulations designed to ensure that hazardous materials are transported, used, stored, and disposed of in a safe manner to protect worker safety, and to reduce the potential for a release of construction-related fuels or other hazardous materials into the environment, including stormwater and downstream receiving water bodies. Contractors would be required to prepare and implement HMBPs that would require that hazardous materials used for construction would be used properly and stored in

appropriate containers with secondary containment to contain a potential release. The California Fire Code would also require measures for the safe storage and handling of hazardous materials.

As discussed in Section 3.7, *Geology, Soils, and Paleontological Resources*, construction contractors would be required to prepare a Stormwater Pollution Prevention Plan (SWPPP) for construction activities according to the National Pollutant Discharge Elimination System (NPDES) General Construction Permit requirements. The SWPPP would list the hazardous materials (including petroleum products) proposed for use during construction; describe spill prevention measures, equipment inspections, equipment and fuel storage; protocols for responding immediately to spills; and describe BMPs for controlling site runoff.

In addition, the transportation of hazardous materials would be regulated by the USDOT, Caltrans, and the CHP. Together, federal and state agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release.

Finally, in the event of a spill that releases hazardous materials at the project component sites, a coordinated response would occur at the federal, state, and local levels, including the City of Antioch. The Contra Costa County Fire Protection District is the local hazardous materials response team. In the event of a hazardous materials spill, the police and fire departments would be simultaneously notified and sent to the scene to respond and assess the situation.

The required compliance with the numerous laws and regulations discussed above that govern the transportation, use, handling, and disposal of hazardous materials would limit the potential for creation of hazardous conditions due to the use or accidental release of hazardous materials, and would render this impact less than significant.

Operations

The desalination facility would use and store chemicals that are not currently used at the Antioch WTP. The chemicals are described in Section 2.6.2.5, *Chemical Use and Storage* and would be used for post treatment of the desalination water and for cleaning the RO membranes. As listed in **Table 2-3**, the volume of chemicals exceeds the triggering volumes of 500 pounds for reporting the quantities to the Contra Costa County Health Services - Hazardous Materials Program, the local CUPA (see *Unified Hazardous Waste and Hazardous Materials Management Regulatory Program* in Section 3.9.2 *Regulatory Framework*). Some of the chemicals are considered hazardous materials (e.g., sulfuric acid, sodium hydroxide). The routine use or an accidental spill of hazardous materials could result in inadvertent releases, which could adversely affect construction workers, the public, and the environment. The disposal of brine into the San Joaquin River is analyzed in Section 3.11, *Water Quality*.

As required by the Hazardous Materials Management Program, the City, as the operator of the desalination facility would be required to prepare and submit a HMBP to the Contra Costa County Health Services - Hazardous Materials Program, the local CUPA for the desalination facility prior to the start of operations. The HMBP is required to include information on hazardous material

handling and storage, including site layout, storage in appropriate containers with secondary containment to contain a potential release, and emergency response and notification procedures in the event of a spill or release. In addition, the plan requires annual employee health and safety training. The plan must be approved by the CUPA prior to commencement of project construction and the proposed project would be subject to post-construction compliance inspections. The HMBP would also provide the local agencies with the information they need to plan appropriately for a chemical release, fire, or other incident, which would reduce the potential for an accidental release to cause harmful health effects to workers or the public or substantial degradation to soil or water quality. All hazardous materials are required to be stored and handled according to manufacturer's directions and local, state and federal regulations. The California Fire Code would also require measures for the safe storage and handling of hazardous materials.

Transportation and disposal of wastes, such as spent cleaning solutions, would also be subject to regulations for the safe handling, transportation, and disposal that would include appropriate containerization and labeling, transportation by licensed hazardous materials haulers, and disposal at licensed facilities permitted to accept the waste.

Finally, the desalination facility would be required to comply with the local MS4 permit development standards, which would reduce pollutants and runoff flows from new development and redevelopment using BMPs and Low Impact Development (LID)/post-construction standards.

The required compliance with the numerous laws and regulations discussed above that govern the transportation, use, handling, and disposal of hazardous materials would limit the potential for creation of hazardous conditions due to the use or accidental release of hazardous materials, and would render this impact less than significant.

Mitigation Measure:

None required.

Impact 3.9-2: The proposed project could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. *(Less than Significant with Mitigation)*

As discussed in Section 3.9.1, *Environmental Setting,* there are seven schools adjacent or within 0.25 miles of the proposed project components. The construction and operation of the project would include the handling of hazardous materials. The accidental release or spill of hazardous materials transported or used near schools could adversely affect schools by exposure of school children and workers to hazardous materials.

Construction

As discussed in Impact 3.9-1, there are numerous regulations covering the transportation, use, storage, and disposal of hazardous materials during construction activities. The required

compliance with these regulations would ensure that the nearby schools would not be exposed to hazardous materials. In addition, as discussed in Section 3.17, *Transportation and Circulation*, the proposed project would be required to prepare and implement Mitigation Measure 3.17-1b: Construction Traffic Control/Traffic Management Plan, which would manage the movement of vehicles, including those transporting hazardous materials on roads, including those adjacent to or near schools. With the implementation of **Mitigation Measure 3.17-1b (Construction Traffic Control/Traffic Management Plan)**, the impact relative to hazardous materials, substances, or waste in proximity to schools would be less than significant.

Operations

Once constructed, the use of hazardous materials would be confined to the desalination facility. As discussed in Impact 3.9-1, there are numerous regulations covering the transportation, use, storage, and disposal of hazardous materials during operations. The HMBP and fire code would require procedures for the safe handling, storage, secondary containment, and spill response. The required compliance with these regulations would ensure that the nearby schools would not be exposed to hazardous materials. The impact relative to proximity to schools would be less than significant.

Mitigation Measure:

> **Mitigation Measure 3.17-1b: Construction Traffic Control/Traffic Management Plan** (see Section 3.17, *Transportation and Circulation*).
>
> **Significance after Mitigation:** Implementation of Mitigation Measure 3.17-1b would reduce construction-related impacts relative to hazardous materials and proximity to schools to a **less-than-significant** level.

Impact 3.9-3: The proposed project would be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, could create a significant hazard to the public or the environment. *(Less than Significant with Mitigation)*

Construction

As discussed in Section 3.9.1, *Environmental Setting*, the components of the proposed project are not located on any active hazardous materials sites. However, several former hazardous materials sites are located along the brine disposal pipeline alignment and excavation may encounter soil with residual levels of petroleum hydrocarbons. In addition, although not listed on the Cortese List, the disposal pipeline would cross the alignment of several active and abandoned pipelines, including former petroleum product pipelines whose abandonment procedures and current status are unknown. Chevron has advised that the pipelines may have been abandoned in place, could still contain some residual product, could be coated with an asbestos insulation, and could have leaked product in place (Chevron, 2017). The excavation activities could encounter petroleum

hydrocarbons and/or ACM that could expose workers, the public, and the environment to hazardous materials.

The impact of encountering hazardous materials would be reduced to less than significant through the implementation of **Mitigation Measures 3.9-3a (Health and Safety Plan)**, **3.9-3b (Soil Management Plan),** and **3.9-3c (ACM Management Plan)**. These plans would ensure that workers are provided appropriate training in the recognition and response to encountering hazardous materials, and that plans are in place that provide procedures for the testing, handling, and disposal of hazardous materials. This planned removal action, along with implementing Mitigation Measures 3.9-3a, 3.9-3b, and 3.9-3c would remove the hazardous materials and reduce the impact associated with contaminated soil to less than significant.

Operations

Upon completion of the construction activities, the contaminated materials would have been removed, if encountered. There would be ongoing no impact during operations due to being located on a listed hazardous materials site.

Mitigation Measures:

Mitigation Measure 3.9-3a: Health and Safety Plan

The construction contractor(s) shall prepare and implement site-specific Health and Safety Plans (HASP) in accordance with 29 CFR 1910.120 to protect construction workers and the public during all excavation and grading activities. This HASP shall be submitted to the City of Antioch for review prior to commencement of demolition and construction activities and as a condition of the grading, construction, and/or demolition permit(s). The HASP shall include, but is not limited to, the following elements:

- Designation of a trained, experienced site safety and health supervisor who has the responsibility and authority to develop and implement the site HASP;
- A summary of all potential risks to demolition and construction workers and maximum exposure limits for all known and reasonably foreseeable site chemicals;
- Specified personal protective equipment and decontamination procedures, if needed;
- Emergency procedures, including route to the nearest hospital; and
- Procedures to be followed in the event that evidence of potential soil or groundwater contamination (such as soil staining, noxious odors, debris or buried storage containers) is encountered. These procedures shall be in accordance with hazardous waste operations regulations and specifically include, but are not limited to, the following: immediately stopping work in the vicinity of the unknown hazardous materials release, notifying Contra Costa Health Services - Hazardous Materials Programs, and retaining a qualified environmental firm to perform sampling and remediation.

Mitigation Measure 3.9-3b: Soil Management Plan

In support of the HASP described above in Mitigation Measure 3.9-3a, the contractor shall develop and implement a Soil Management Plan (SMP) that includes a materials

disposal plan specifying how the construction contractor(s) will remove, handle, transport, and dispose of all excavated materials in a safe, appropriate, and lawful manner. This SMP shall be submitted to the City of Antioch for review prior to commencement of demolition and construction activities and as a condition of the grading, construction, and/or demolition permit(s). The SMP must identify protocols for soil testing and disposal, identify the approved disposal site, and include written documentation that the disposal site can accept the waste. Contract specifications shall mandate full compliance with all applicable local, state, and federal regulations related to the identification, transportation, and disposal of hazardous materials, including those encountered in excavated soil. In addition, the City or its contractor shall contact the Fulton Shipyards to acquire the most current information regarding chemicals in sediments around the proposed intake pump station. The contact is Deltech, LLC, c/o Mr. Shannon Creson, 2200 Wymore Way, Antioch, California 94509, shannon@drilltechdrilling.com.

Mitigation Measure 3.9-3c: ACM Management Plan

Prior to commencement of demolition and construction activities and as a condition of the grading, construction, and/or demolition permit(s), the contractor that would be excavating at the location of the oil pipes that may be covered with ACM shall conduct a survey to determine if the oil pipes are present and if they are coated with ACM. In the event that the abandoned petroleum pipelines are coated with ACM and in support of the HASP described above in Mitigation Measure 3.9-3a, the contractor shall develop and implement an ACM Management Plan (ACMMP) that includes a materials disposal plan specifying how the construction contractor will remove, handle, transport, and dispose of all ACM-insulated pipe materials in a safe, appropriate, and lawful manner. The ACMMP must identify protocols for worker protection, ACM testing and disposal, identification of the approved disposal site, and include written documentation that the disposal site can accept the waste. The ACMMP shall be submitted to the BAAQMD for their review and approval. Contract specifications shall mandate full compliance with all applicable local, state, and federal regulations related to the identification, transportation, and disposal of ACM.

Significance after Mitigation: Implementation of **Mitigation Measures 3.9-3a, 3.9-3b**, and **3.9-3c** would reduce construction-related impacts related to encountering hazardous materials to a **less-than-significant** level.

Impact 3.9-4: The proposed project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. ***(Less than Significant with Mitigation)***

Construction

Although the Cities of Antioch and Pittsburg do not identify specific emergency response or evacuation routes, the construction activities for the raw water connection pipeline and brine disposal pipeline would occur within roadways and would require temporary road closures. These closures could interfere with emergency traffic on those roads. In addition, some of the road closures would occur adjacent to schools.

As discussed in Section 3.17, *Transportation and Circulation*, the proposed project would be required to prepare and implement **Mitigation Measure 3.17-1b (Construction Traffic Control/Traffic Management Plan)**, which would manage the movement of vehicles, including those transporting hazardous materials, on roads, including those roads adjacent to or near schools. With the implementation of Mitigation Measure 3.17-1b, the impact relative to proximity to schools would be less than significant.

Operations

Once operational, there would be no lane closure and no substantial additional traffic. Therefore, there would be no impact relative to interference with an emergency response plan or emergency evacuation plan.

Mitigation Measure:

> **Mitigation Measure 3.17-1b: Construction Traffic Control/Traffic Management Plan** (see Section 3.17, *Transportation and Circulation*).
>
> **Significance after Mitigation:** Less than Significant.

Cumulative Impacts

This section presents an analysis of the cumulative effects of the proposed project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts.

As previously discussed, the proposed project would have no impact with respect to being located within 2 miles of an airport or airstrip, or in an area susceptible to wildland fire hazards. Accordingly, the proposed project could not contribute to cumulative impacts related to these topics and are not discussed further.

The geographic area affected by the proposed project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative hazardous materials impacts encompasses and is limited to the project site and its immediately adjacent area. This is because impacts relative to hazardous materials are generally site-specific and depend on the nature and extent of the hazardous materials release, and existing and future soil and groundwater conditions. For example, hazardous materials incidents tend to be limited to a smaller more localized area surrounding the immediate spill location and extent of the release, and could only be cumulative if two or more hazardous materials releases spatially overlapped.

The timeframe during which proposed project could contribute to cumulative hazards and hazardous materials effects includes the construction and operations phases. For the proposed project, the operations phase is permanent. However, similar to the geographic limitations discussed above, it should be noted that impacts relative to hazardous materials are generally

time-specific. Hazardous materials events could only be cumulative if two or more hazardous materials releases occurred at the same time, as well as overlapping at the same location.

Impact 3.9-C-1: The proposed project, in combination with other cumulative development, would not result in a cumulatively significant impact related to hazards and hazardous materials. ***(Less than Significant)***

Cumulative Impacts during Project Construction

Significant cumulative impacts related to hazards and hazardous material could occur if the incremental impacts of the project combined with the incremental impacts of one or more of the cumulative projects identified in **Table 3-1** and **Figure 3-1** to substantially increase risk that people or the environment would be exposed to hazardous materials. Cumulative projects that would potentially be geographically adjacent or overlap components of the project include project numbers 1 (Almond Knolls), 2 (Water Treatment Plant Disinfection Improvements Project), 8 (West Antioch Creek Channel Improvements), and 15 (East County Bioenergy Project). All of these projects would be subject to the same regulatory requirements discussed for the proposed project, including the implementation of health and safety plans and soil management plans, as needed. That is, cumulative projects involving releases of or encountering hazardous materials also would be required to remediate their respective sites to established regulatory standards. This would be the case regardless of the number, frequency, or size of the release(s), or the residual amount of chemicals present in the soil from previous spills. While it is possible that the project and cumulative projects could result in releases of hazardous materials at the same location and time, the responsible party associated with each spill would be required to remediate site conditions to the same established regulatory standards. The residual less-than-significant effects of the project that would remain after mitigation would not combine with the potential residual effects of cumulative projects to cause a potential significant cumulative impact because residual impacts would be highly site-specific. Accordingly, no significant cumulative impact with respect to the use of hazardous materials would result. For the above reasons, the project would not cause or contribute to a cumulatively significant impact with respect to the use of hazardous materials, and impacts would be **less than significant**.

Cumulative Impacts during Project Operations

Significant cumulative impacts related to operational hazards could occur if the incremental impacts of the project combined with those of one or more of the above-listed projects to cause a substantial increase in risk that people or the environment would be exposed to hazardous materials used or encountered during the operations phase.

As discussed in Impact 3.9-1, the operation of the project facilities would require use of water treatment chemicals, introducing potential for inadvertent releases of hazardous materials. Compliance with the various regulations regarding the safe transport, use, storage, and disposal of hazardous materials would reduce the project-specific incremental impact to a less-than-significant level.

Of the overlapping or adjacent cumulative projects, only cumulative project number 15 (East County Bioenergy Project) would also would require the transport, use, and storage of hazardous chemicals. However, similar to the proposed project, the cumulative project components involving the handling, storage, and disposal of hazardous materials would also be required to prepare and implement an HMBP and comply with applicable regulations, including those governing containment, site layout, and emergency response and notification procedures in the event of a spill or release. Transportation and disposal of wastes, such as spent cleaning solutions, would also be subject to regulations for the safe handling, transportation, and disposal of chemicals and wastes. As noted previously, such regulations include standards to which parties responsible for hazardous materials releases must return spill sites, regardless of location, frequency, or size of release, or existing background contaminant concentrations to their original conditions. Therefore, compliance with existing regulations regarding hazardous materials transport would reduce the risk of environmental or human exposure to such materials. The combined effects of the project and cumulative projects would not result in a significant cumulative impact, and impacts would be **less than significant**.

References – Hazards and Hazardous Materials

Chevron, 2017, *Comments on the Notice of Preparation of an Environmental Impact Report for the City of Antioch Brackish Water Desalination Project, Chevron Environmental Management Company, Historical Pipeline Portfolio–Bakersfield to Richmond*, August 31.

Pipeline and Hazardous Materials Safety Administration (PHMSA), 2018, National Pipeline Mapping System (NPMS) Public Viewer, available at pvnpms.phmsa.dot.gov/PublicViewer/, accessed on January 19, 2018.

SGI Environmental, 2014, *Remedial Investigation Report, Former Fulton Shipyard Property, 307 Fulton Shipyard Road, Antioch, California*, January.

3.10 Local Hydrology and Water Quality

Sections	Figures	Tables
3.10.1 Environmental Setting 3.10.2 Regulatory Framework 3.10.3 Analysis, Impacts, and Mitigation	3.10-1 Flood Zones	3.10-1 Beneficial Uses of San Joaquin River 3.10-2 Summary of Impacts – Hydrology and Water Quality

This section discusses and evaluates the potential for implementation of the proposed project to result in adverse impacts associated with local hydrology, water quality, drainage, and flooding potential within the immediate vicinity of the project component sites. Regional water supply issues and the operations-related effects of the project on system-wide and Delta hydrology, hydrodynamics, water quality, and water elevations are discussed in in Section 3.11, *Delta Hydrology and Water Quality*.

Existing conditions are described for the project area and potential impacts associated with short-term construction and long-term operation activities are evaluated, including potential for erosion and sedimentation or discharge of pollutants to local surface waters and resulting water quality impacts. The analysis is based on review of available hydrology and water reports and maps, the General Plans for the Cities of Antioch and Pittsburg, and a 2005 geotechnical investigation conducted for the expansion of the Antioch WTP.

Public comments were received during the scoping period that relate to hydrology and water quality. The Central Valley Flood Protection Board and the Central Valley Regional Water Quality Control Board (RWQCB) noted various permits and regulations that may apply to the proposed project. The required permits are listed in Section 2.9, *Regulatory Requirements, Permits, and Approvals,* of Chapter 2, *Project Description*, and discussed in the Regulatory Framework section below, as well as the Regulatory Framework sections of each impact analysis section in Chapter 3.

3.10.1 Environmental Setting

Surface Water Hydrology

The project area lies south of the San Joaquin River and within the East Antioch, West Antioch, and Kirker Creek Watersheds, with the River Intake Pump Station extending into the river. All three watersheds generally drain from south to north into the San Joaquin River. The watersheds and the river are discussed below.

San Joaquin River

The San Joaquin River flows east to west, and drains into San Pablo Bay, then San Francisco Bay to the west. The existing intake pump station extends about 200 feet from the shore into the San Joaquin River with the pump intake about 8 feet above the river bed so as to minimize the intake of river bottom sediment. The existing Delta Diablo WWTP outfall pipeline also extends into the river at New York Slough.

East Antioch Creek Watershed

The proposed raw water pipeline connection, desalination facility, and the portion of the brine disposal pipeline north of East 18th Street would be located in the East Antioch Creek Watershed (CCC CDD, 2004). The drainage area of 11 square miles includes the City of Antioch and some unincorporated parts of Contra Costa County. East Antioch Creek and several unnamed tributaries drain the watershed from south to north into the San Joaquin River. None of the creeks are listed on the States 303(d) Impaired Water Bodies list. Rainfall averages about 13 inches per year. Impervious surfaces make up approximately 60 percent of the watershed. None of the proposed project components would cross East Antioch Creek. The portion of the raw water pipeline that crosses the creek is an existing section of pipeline.

West Antioch Creek Watershed

The portion of the proposed brine disposal pipeline from west of G Street to Auto Center Drive would be located in the West Antioch Creek Watershed (CCC CDD, 2004). The drainage area of 13 square miles includes the City of Antioch and some unincorporated parts of Contra Costa County. Markley Canyon Creek, West Antioch Creek, and several unnamed tributaries drain the watershed from south to north into the San Joaquin River. None of the creeks are listed on the States 303(d) Impaired Water Bodies list. Rainfall averages about 15 inches per year. Impervious surfaces make up approximately 35 percent of the watershed. The brine disposal pipeline would cross the constructed portion of the West Antioch Creek.

Kirker Creek Watershed

The portion of the brine disposal pipeline west of Auto Center Drive would be located in the Kirker Creek Watershed (CCC CDD, 2004). The drainage area of about 16 square miles includes the City of Pittsburg and some unincorporated parts of Contra Costa County. Kirker Creek and several unnamed tributaries drain the watershed from south to north into the San Joaquin River. None of the creeks are listed on the States 303(d) Impaired Water Bodies list. Rainfall averages about 16 inches per year. Impervious surfaces make up approximately 30 percent of the watershed. The section of the brine disposal pipeline on 10th Street would cross the Los Medanos Waterway.

Surface Water Quality

As discussed in Section 2.2.2, *Sources of Water Supply*, water quality in the San Joaquin River is affected by precipitation, regional water management activities, tides, and drought conditions. The ability to utilize the river water to meet water supply needs is currently limited by the river's water quality, which is affected by periodic high concentrations of total dissolved solids (TDS), chloride, and salinity. The existing WTP is unable to remove these water quality parameters. The City generally stops pumping water when the chloride concentration in the river exceed 75 mg/l. Generally, the City is able to pump river water from January to July and relies on other water sources for the remainder of the year.

Between 1995 and 2012, the 10th and 95th percentile of chloride concentrations in the river were 20 mg/l and 1,200 mg/L (RMC Water and Environment, 2015). The recommended Maximum Concentration Level (MCL; also referred to as the secondary drinking water standard) for chloride is 250 mg/L with an upper limit of 500 mg/L.

Flood Hazard Zones

The Federal Emergency Management Agency delineates regional flooding hazard areas in Contra Costa County as part of the National Flood Insurance Program. Areas that have a 1 percent chance of flooding in any given year are referred to as 100-year flood hazard zones. The 100-year flood hazard zones along the coast experience flooding coincident with high tide events typically combined with a wintertime storm surge. The proposed intake pump station and intake pipelines, and the brine disposal pipeline where it crosses the Los Medanos Waterway would both be sited within 100-year flood hazard zones, as shown on **Figure 3.10-1** (FEMA, 2015). None of the other proposed project facilities would be located within designated flood hazard areas.

Tsunami and Seiche Hazard Zones

A tsunami is a large wave or series of waves generated by an earthquake, volcanic eruption, or coastal landslide. Similar in cause to a tsunami, a seiche is a standing wave that occurs on rivers, reservoirs, ponds, and lakes when seismic waves from an earthquake pass through the area. Tsunami and seiche damage is typically confined to low-lying coastal areas. The Association of Bay Area Governments provides tsunami hazard mapping (ABAG, 2018). The project area is not located within a tsunami hazard zone. Given the similar seismic cause, the project area is also not located within a seiche zone.

Stormwater Drainage System

Stormwater collection is overseen by the Contra Costa County Flood Control and Water Conservation District (Flood Control District) through underground trunk lines that are independent from the wastewater collection system. The stormwater trunk lines discharge to channels and then to the San Joaquin River as permitted by a NPDES permit. CCCWP staff monitor the quality of the released water to comply with the specifications of the NPDES permit.

River Intake Pump Station Area

Brine Disposal Pipeline Area Crossing Los Medanos Waterway

Areas shaded in light blue are in 100-year flood zone

Antioch Brackish Water Desalination Project. 150433.02

SOURCE: FEMA, 2015

Figure 3.10-1
Flood Zones

Stormwater Drainage at Antioch WTP

The existing Antioch WTP is permitted under Domestic Water Supply Permit No. 02-04-02P0710009, dated May 30, 2008, and issued by the California Department of Public Health, as discussed in the Regulatory Framework below. Stormwater from the site is collected into storm drain grates throughout the WTP and directed into stormwater system overseen by the Flood Control District.

Groundwater

The proposed project would not extract groundwater and would not inject water into a subsurface aquifer. Therefore, given that there would be no impacts on groundwater, no description of groundwater conditions is provided.

3.10.2 Regulatory Framework

The following discussion summarizes the applicable federal, state, and local regulations relevant to this section. Note that regulations relevant to the disposal of brine into the San Joaquin River are discussed in Section 3.11, *Delta Hydrology and Water Quality*.

Federal

Clean Water Act

The federal Clean Water Act and subsequent amendments, under the enforcement authority of the U.S. Environmental Protection Agency (USEPA), was enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The Clean Water Act gave the USEPA the authority to implement pollution control programs such as setting wastewater standards for industry. In California, implementation and enforcement of the National Pollutant Discharge Elimination System (NPDES) program is conducted through the California State Water Resources Control Board (SWRCB) and the nine RWQCBs. The Clean Water Act also sets water quality standards for surface waters and established the NPDES program to protect water quality. Under Section 402 of the Act, discharge of pollutants is prohibited unless the discharge is in compliance with an NPDES permit. The NPDES program requires all facilities that discharge pollutants into waters of the United States to obtain a permit. The discharge permit provides limitations on pollutant concentrations to protect the water quality of the receiving waters. In 1972, the NPDES regulations initially focused on municipal and industrial wastewater discharges, followed by stormwater discharge regulations, which became effective in November 1990. NPDES permits for wastewater and industrial discharges specify discharge prohibitions and effluent limitations and also include other provisions (such as monitoring and reporting programs) deemed necessary to protect water quality.

Federal Emergency Management Agency

Under Executive Order 11988, FEMA is responsible for the management and mapping of areas subject to flooding during a 100-year flood event (i.e., one percent chance of occurring in a given year). FEMA requires that local governments covered by federal flood insurance pass and enforce

a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year flood plain, as depicted on FEMA maps.

State

Porter-Cologne Water Quality Act

The Porter-Cologne Water Quality Control Act (Division 7 of the California Water Code) is California's statutory authority for the protection of water quality. Under this act, the State must adopt water quality policies, plans, and objectives that protect the State's waters. The act sets forth the obligations of the SWRCB and RWQCBs pertaining to the adoption of Basin Plans and establishment of water quality objectives. Unlike the federal CWA, which regulates only surface water, the Porter-Cologne Act regulates both surface water and groundwater and this authority serves as the basis for Waste Discharge Requirements issued to municipal sewage treatment facilities by the RWQCBs. The Porter-Cologne Water Quality Act is promulgated in the California Code of Regulations Title 22. Title 22 includes treatment and reuse requirements for recycled water projects throughout California. The project area lies within the jurisdiction of the Central Valley RWQCB.

Anti-Degradation Policy

The SWRCB's Anti-Degradation Policy, otherwise known as Resolution No. 68-16, sets specific restrictions for surface and groundwater that have higher than the required quality in order to avoid degradation of those water bodies. Requirements of this policy must be included within all Basin Plans throughout California (discussed below). Under this policy, actions that would lower the water quality in designated water bodies would only be allowed if the action would provide a maximum benefit to the people of California, if it will not unreasonably affect beneficial uses, and if it will not lower water quality below applicable standards.

NPDES Construction General Permit

As discussed in Section 3.6 *Geology, Soils, and Paleontological Resources*, construction associated with the proposed project would disturb more than one acre of land surface potentially affecting the quality of stormwater discharges into waters of the U.S and is therefore subject to the NPDES Construction General Permit. The Construction General Permit regulates discharges of pollutants in stormwater associated with construction activity to waters of the U.S. from construction sites that disturb one or more acres of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface. The permit regulates stormwater discharges associated with construction or demolition activities, such as clearing and excavation; construction of buildings; and linear underground projects, including installation of water pipelines and other utility lines. Further details are provided in Section 3.6.2 Regulatory Framework in Section 3.6 *Geology, Soils, and Paleontological Resources*.

NPDES Municipal General Permits

In 1987, amendments to the Clean Water Act expanded the NPDES permit program to regulate discharges from storm drains owned and operated by municipalities. In November 1990, USEPA

published regulations that established application requirements for stormwater permits for municipal stormwater discharges. In California, the NPDES stormwater permit program is administered and enforced by the SWRCB through the nine RWQCBs by issuing Waste Discharge Requirements and NPDES permits. These permits are reissued approximately every five (5) years and also include applicable provisions of the state Porter-Cologne Act, which is the principal legislation for controlling stormwater pollutants in California. The regional municipal general permits are discussed below.

Regional and Local

Central Valley Water Quality Control Plan (Basin Plan)

The river intake pump station and most of the project components would be located within the area under the jurisdiction of the Central Valley RWQCB and its Basin Plan, discussed below. The brine disposal pipeline and the disposal of brine into the San Joaquin River would be located within the area under the jurisdiction of the San Francisco RWQCB, which is discussed in Section 3.11, *Delta Hydrology and Water Quality*.

The SWRCB and the Central Valley RWQCB share the responsibility, under the Porter-Cologne Act, to formulate and adopt water policies and plans and to adopt and implement measures to fulfill CWA requirements. The Central Coast Water Quality Control Plan (Basin Plan), last updated in July 2016b, identifies surface water and groundwater resources in the watershed and establishes beneficial uses and numeric water quality objectives for each resource. The beneficial uses for the San Joaquin River are listed below. The Basin Plan does not specifically identify the East and West Antioch Creeks, stating "that it is impractical to list every surface water body in the Region. The beneficial uses of any specifically identified water body generally apply to its tributary streams," with a few exceptions that do not include Antioch Creek. As previously noted, the disposal of brine that would be generated at the desalination plant is discussed in Section 3.11 *Delta Hydrology and Water Quality*. The beneficial uses for the San Joaquin River at this location within the Delta are listed below in **Table 3.10-1**.

TABLE 3.10-1
BENEFICIAL USES OF SAN JOAQUIN RIVER

Beneficial Use	Description
Municipal and Domestic Supply (MUN)	Waters are used for community, military, municipal or individual water supply systems. These uses may include, but are not limited to, drinking water supply.
Agricultural Supply (AGR)	Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.
Industrial Service Supply (IND)	Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.
Water Contact Recreation (REC 1)	Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white-water activities, fishing, or use of natural hot springs.

TABLE 3.10-1 (CONTINUED)
BENEFICIAL USES OF SAN JOAQUIN RIVER

Beneficial Use	Description
Non-Contact Water Recreation (REC 2)	Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
Wildlife Habitat (WILD)	Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.
Cold Freshwater Habitat (COLD)	Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Warm Freshwater Habitat (WARM)	Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.
Migration of Aquatic Organisms (MIGR)	Uses of water that support habitats necessary for migration or other temporary activities by aquatic organism, such as anadromous fish.
Spawning, Reproduction, and/or Early Development (SPWN)	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.
Navigation (NAV)	Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels.

SOURCE: RWQCB Basin Plan, 2016

The Sacramento-San Joaquin River Delta is the indirect receiving water body surface water drains into the Delta and river. The San Joaquin River is listed on the 2006 303(d) listing as part of the Delta Waterways (Western Portion) and is listed due to chloropyrifos, DDT (dichlorodiphenyl trichloroethane), diazinon, electrical conductivity, Group A pesticides, mercury, and invasive species (RWQCB, 2006). These contaminants are transported into the Delta water system through watersheds that drain into the Delta as a result of agricultural activities, urban runoff, and abandoned mine discharges.

Municipal NPDES Permits No. R5-2016-0040 (includes Antioch) and R2-2015-0049 (includes Pittsburg)

The boundary between the San Francisco RWQCB and the Central Valley RWQCB passes between the Cities of Pittsburg and of Antioch. However, the requirements of the previously discussed NPDES municipal general permits issued by the two RWQCBs are very similar; most of the project components would be under the jurisdiction of the Central Valley RWQCB and its municipal permit (RWQCB, 2016a). The permits establish regulations covering discharge prohibitions, receiving water limitations, municipal operations (such as the proposed project), new development, construction site controls (construction site runoff), and other regulations to regulate surface water quality.

The discharge prohibitions prohibit the discharge of non-stormwater (materials other than stormwater) into, storm drain systems and watercourses and includes a tiered categorization of non-stormwater discharges based on potential for pollutant content that may be discharged upon adequate assurance that the discharge contains no pollutants of concern at concentrations that will impact beneficial uses or cause exceedances of water quality standards. The receiving water limitations provide narrative and numeric water quality standards. The municipal operations regulations include a number of requirements to control and reduce non-stormwater discharges and polluted stormwater to storm drains and watercourses during operation, inspection, and routine repair and maintenance activities of municipal facilities and infrastructure, such as the proposed project. The requirements include source control, site design, and stormwater treatment requirements, such as minimizing disturbance of natural infiltration areas and the addition of impervious surfaces, controlling and directing runoff, and the use of infiltration and bioretention measures, among other measures.

To more efficiently address the requirements, the Contra Costa Clean Water Program (CCCWP) was established in 1991 in response to the federal stormwater regulations and covers Contra Costa County, its 19 cities/towns (including the Cities of Antioch and Pittsburg), and the Contra Costa County Flood Control and Water Conservation District (collectively referred to as Permittees). The CCCWP is discussed below and includes the requirements for municipalities and new developments.

Contra Costa Clean Water Program (CCCWP)

The Cities of Antioch and Pittsburg are members of the CCCWP, established in 1991 in response to the federal stormwater regulations and the NPDES municipal general permits. The CCCWP comprises Contra Costa County, its 19 cities and towns, and the Contra Costa County Flood Control and Water Conservation District (collectively referred to as Permittees). Through the CCCWP, Contra Costa municipalities have prepared a Stormwater C.3 Guidebook to assist applicants through the process of submittals and reviews (CCCWP, 2017).

Provision C.3 in the municipal general permit requires site designs to minimize the addition of impervious surfaces, controlling the rates and durations of site runoff, install pervious surfaces where feasible to facilitate onsite infiltration, treat remaining runoff from impervious areas using bioretention, and maintain stormwater treatment and flow-control facilities in perpetuity. The C.3 requirements are separate from, and in addition to, requirements for erosion and sediment control and for pollution prevention measures during construction.

Antioch Water Treatment Plant (WTP)

The existing Antioch WTP is permitted under Domestic Water Supply Permit No. 02-04-02P0710009, issued by the California Department of Public Health on March 22, 1996 (CDHS, 1996)), and amended on May 30, 2008 (CDPH, 2008). The WTP is required to only use approved water supply sources (which include the San Joaquin River), monitor plant performance to ensure the water quality is to drinking water standards, implement an equipment maintenance program,

and comply with CCR Title 17 CCR water treatment regulations. The permit includes the results of the engineering report providing further details on the operations.

Delta Diablo NPDES Permit No. CA0038547

The Delta Diablo WWTP is permitted under San Francisco RWQCB Waste Discharge Requirements (WDR) Order No. R2-2014-0030, NPDES No. CA0038547, adopted on August 13, 2014. The Delta Diablo WWTP provides domestic and industrial wastewater treatment and disposal for the Cities of Pittsburg and Antioch, and the unincorporated community of Bay Point. Residential, commercial, and industrial wastewater is conveyed to the Delta Diablo WWTP located at 2500 Pittsburg-Antioch Highway. The WWTP has an average dry weather design capacity of 19.5 million gallons per day (mgd) and peak wet weather design capacity of 31.1 mgd (SFRWQCB, 2014).

The WWTP treats all of its influent (approximately 13.1 mgd) to secondary treatment standards. About 6.3 mgd after secondary treatment is routed to tertiary treatment units. Most of the tertiary-treated water is recycled and used for cooling tower makeup water at the Delta and Los Medanos Energy Centers, with about 10 percent of the recycled water used for landscape irrigation at local parks and golf courses. The power plants return approximately 2 mgd of cooling tower blowdown to the WWTP, where it is combined with the secondary-treated water, chlorinated and dechlorinated, and the effluent is discharged through the deep-water diffuser approximately 500 feet offshore at a depth of 26 feet. The diffuser is permitted to convey 19.5 mgd of average dry weather flow, which is based on the plant's design treatment capacity.

The treated wastewater discharge is regulated by the RWQCB under the Waste Discharge Requirements for the San Francisco Bay Regional Water Quality Control Board (Order No. R2-2014-0030, NPDES Permit No. CA0038547). The minimum initial dilution (Dm) established in the NPDES permit at the point of discharge for operations by Delta Diablo is 61:1 for calculating the ammonia limit. The Dm is used by the RWQCB to determine compliance with the water quality effluent limitations established in the NPDES permit that are based on acute water quality objectives contained in the San Francisco Bay Area Basin Plan.

City of Antioch General Plan

The following objectives and policies from the Antioch General Plan are relevant to hydrology and water quality. The proposed project components would include the River Intake Pump Station, the Raw Water Pipeline, the Desalination Plant, and the portion of the brine disposal pipeline within the Antioch city limits.

Public Services and Facilities Element

8.4.1 Water Facilities Objective: Ensure a water system capable of providing high quality water to existing and future residences, businesses, institutions, recreational facilities, and other uses within the City of Antioch during peak use conditions, with sufficient water in storage reservoirs for emergency and fire protection needs.

***Policy 8.4.2.a*:** As part of the design of water systems, provide adequate pumping and storage capacity for both drought and emergency conditions, as well as the ability to provide fire flows required by the Contra Costa County Fire Protection District.

8.7.1 Storm Drainage and Flood Control Objective: Conduct all storm water via adequately sized storm drains and channels.

Policy 8.7.2.b: Require adequate infrastructure to be in place and operational prior to occupancy of new development, such that: new development will not negatively impact the performance of storm drain facilities serving existing developed areas and the performance standards set forth in the Growth Management Element will continue to be met.

Policy 8.7.2.e: Require new developments to provide erosion and sedimentation control measures to maintain the capacity of area storm drains and protect water quality.

Policy 8.7.2.f: Require implementation of Best Management Practices in the design of drainage systems to reduce discharge of non-point source pollutants originating in streets, parking lots, paved industrial work areas, and open spaces involved with pesticide applications.

Resource Management Element

10.7.1 Water Resources Objective: Ensure that an adequate supply of water is available to serve existing and future needs of the City.

Policy 10.7.2.a: As part of the implementing the City's residential growth management program and its development review process for non-residential development, ensure that adequate long-term water supplies are available to serve the development being granted new allocations, including consideration of peak drought and peak firefighting needs.

Policy 10.7.2.f: Participate in the Contra Costa Clean Water program to reduce storm water pollution and protect the water quality of the City's waterways.

Policy 10.7.2.g: Require public and private development projects to be in compliance with applicable National Pollution Discharge Elimination System (NPDES) permit requirements, and require the implementation of best management practices to minimize erosion and sedimentation resulting from new development.

Policy 10.7.2.i: Design drainage within urban areas to avoid runoff from landscaped areas and impervious surfaces from carrying pesticides, fertilizers, and urban and other contaminants into natural streams.

Environmental Hazards Element

11.4.1 Flood Protection Objective: Minimize the potential for loss of life, physical injury, property damage, and social disruption resulting from flooding.

> ***Policy 11.4.2.a:*** Prohibit all development within the 100-year floodplain, unless mitigation measures consistent with the National Flood Insurance Program are provided.
>
> ***Policy 11.4.2.c:*** Prohibit alteration of floodways and channelization of natural creeks if alternative methods of flood control are technically and financially feasible. The intent of this policy is to balance the need for protection devices with land use solutions, recreation needs, and habitat preservation.
>
> ***Policy 11.4.2.d:*** Require new development to prepare drainage studies to assess storm runoff impacts on the local and regional storm drain and flood control system, along with implementation of appropriate detention and drainage facilities to ensure that the community's storm drainage system capacity will be maintained and peak flow limitations will not be exceeded.

The proposed project would be consistent with the City of Antioch General Plan policies because:

- Construction contractors would be required to prepare and implement a SWPPP to control construction site runoff (see Impact 3.10-1).
- Construction contractors would be required to prepare and implement a HMBP to manage hazardous materials used during construction (see Impact 3.10-1).
- The project design would be required to evaluate the volume of runoff from the WTP and manage the volume of runoff such that the existing stormwater drainage system would be able to handle the volume (see Impacts 3.10-2 and 3.10-3).
- The project design would be required to evaluate the drainage of the WTP to prevent erosion or flooding due to drainage pattern changes (see Impact 3.10-2).
- The project design of the WTP would be required to prepare and implement a HMBP to manage hazardous materials used at the WTP (see Impact 3.10-1).

City of Antioch Municipal Code

The following City of Antioch municipal codes are relevant to hydrology and water quality. The proposed project components would include the River Intake Pump Station, the Raw Water Pipeline, the Desalination Plant, and the portion of the brine disposal pipeline within the Antioch city limits.

> **Chapter 9, Section 6-9.05**: Stormwater Control Plan Required. Every application for a development project, including but not limited to a rezoning, tentative map, parcel map, conditional use permit, variance, site development permit, design review, or building permit that is subject to the development runoff requirements in the city's NPDES permit shall be accompanied by a stormwater control plan that meets the criteria in the most

recent version of the Contra Costa Clean Water Program Stormwater C.3. Guidebook. Implementation of an approved stormwater control plan and submittal of an approved stormwater control operation and maintenance plan by the applicant shall be a condition precedent to the issuance of a certificate of occupancy for a project subject to this section.

Chapter 9, Section 6-9.09: Best Management Practices and Standards. (E) *Construction Activities.* All construction shall conform to the requirements of the CASQA Stormwater Best Management Practices Handbooks for Construction Activities and New Development and Redevelopment, the ABAG Manual of Standards for Erosion & Sediment Control Measures, the city's grading and erosion control ordinance and other generally accepted engineering practices for erosion control as required by the Director when undertaking construction activities. The Director may establish controls on the rate of stormwater runoff from new development and redevelopment as may be appropriate to minimize the discharge and transport of pollutants. (Note: CASQA BMPs are incorporated into SWPPPs).

Chapter 9, Section 8-13.01: Storm water pollution control measures shall be implemented during all construction phases of development to prevent pollution from entering the waterways.

City of Pittsburg General Plan

The following objectives and policies from the Pittsburg General Plan are relevant to hydrology and water quality. The proposed project components the portion of the brine disposal pipeline within the Pittsburg city limits.

Resource Conservation Element

Chapter 9.2 Drainage and Erosion

Goal 9-G-4: Minimize the runoff and erosion caused by earth movement by requiring development to use best construction management practices (BMPs).

Policy 9-P-15: As part of development plans, require evaluation and implementation of appropriate measures for creek bank stabilization, as well as necessary Best Management Practices (BMPs) to reduce erosion and sedimentation. Encourage preservation of natural creeks and riparian habitat as best as possible.

Goal 9-G-7: Water Quality - Comply with Regional Water Quality Control Board regulations and standards to maintain and improve the quality of both surface water and groundwater resources.

Policy 9-P-22: Continue working with the Regional Water Quality Control Board in the implementation of the National Pollutant Discharge Elimination System (NPDES), with specific requirements established in each NPDES permit.

> ***Policy 9-P-23:*** Require new urban development to use Best Management Practices to minimize creek bank instability, runoff of construction sediment, and flooding. The City's BMPs will ensure that new development projects consider the effects of construction debris and sediment on local water supplies.

Health and Safety Element

Chapter 10.2 Flood Control

Goal 10-G-7: Locate development outside of flood-prone areas unless mitigation of flood risk is assured.

> ***Policy 10-P-18:*** Evaluate storm drainage needs for each development project in the context of demand and capacity when the drainage area is fully developed. Ensure drainage improvements or other mitigation of the project's impacts on the storm drainage system appropriate to the project's share of the cumulative effect.

The proposed project would be consistent with the City of Pittsburg General Plan policies because construction contractors would be required to prepare and implement a SWPPP to control construction site runoff (see Impact 3.10-1), and construction contractors would be required to prepare and implement a HMBP to manage hazardous materials used during construction (see Impact 3.10-1).

City of Pittsburg Municipal Code

The following City of Pittsburg municipal codes are relevant to hydrology and water quality. The proposed project components the portion of the brine disposal pipeline within the Pittsburg city limits.

Chapter 15.88 Grading, Erosion, and Sediment Control: 15.88.030 Permit Required. B. All land-disturbing or land-filling activities or soil storage shall be undertaken in a manner designed to minimize surface runoff, erosion, and sedimentation.

Chapter 15.88.050 Data and documents to accompany application. The application shall be accompanied by not less than the following material:

A. General Plans and Data.

Erosion and sediment control plan;

a. Maximum surface runoff from the site shall be calculated using methods approved by the Contra Costa flood control district;
b. A delineation and brief description of the measures to be undertaken to retain sediment on the site, including, but not limited to, the designs and specifications for berms and sediment detention basins and a schedule for their maintenance and upkeep;

c. A delineation and brief description of the surface runoff and erosion control measures to be implemented, including, but not limited to, types and method of applying mulches, and designs and specifications for diverters, dikes and drains, and a schedule for their maintenance and upkeep;
d. A delineation and brief description of the vegetative measures to be taken, including, but not limited to, seeding methods, the type, location and extent of preexisting and undisturbed vegetation types, and a schedule for maintenance and upkeep;
e. The location of all the measures listed by the applicant under subsection (B)(2)(b) of this section shall be depicted on the site map and/or grading plan;
f. An estimate of the cost of implementing and maintaining all interim erosion and sediment control measures must be submitted in a form acceptable to the city engineer;
g. The applicant may propose the use of any erosion and sediment control techniques in the interim plan provided such techniques are proven to be as or more effective than the equivalent best management practices contained in the manual of standards.

3.10.3 Analysis, Impacts and Mitigation

Significance Criteria

Based on Appendix G of the CEQA *Guidelines*, the project would have a significant impact on hydrology and water quality if it would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality;
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede the sustainable groundwater management of the basin;
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would:
  - Result in substantial erosion or siltation onsite or offsite;
  - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
  - Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
  - Impede or redirect flood flows;
- Risk release of pollutants due to project inundation from being located in flood hazard, tsunami, or seiche zones;
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan

Methodology and Assumptions

General

Information for this assessment of impacts relative to hydrology is based on a review of reports, maps, and the General Plans and municipal codes for the Cities of Antioch and Pittsburg. This information was used to identify potential impacts to workers, the public, or the environment.

The project would be regulated by the various laws, regulations, and policies summarized in Section 3.10.2, *Regulatory Framework*. Compliance by the project with applicable federal, state, and local laws and regulations is assumed in this analysis, and local and state agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the regulations are conditions of permit approvals.

As described in more detail below, the analysis of hydrology impacts in this section takes into account that the City would incorporate into their facility designs the engineering recommendations provided by the geotechnical investigation that the CBC and local ordinances would require be conducted for the final design of the proposed project, which would include managing stormwater to prevent erosion, flooding, and adverse effects on the existing stormwater drainage system. The analysis also considers the various existing state and local regulations that apply to geotechnical design and construction, which include the CBC and local ordinances for buildings and grading. Through compliance with the existing CBC and local ordinances, the City would be required to demonstrate that the project design would be compatible with the local hydrology and water quality conditions; this must occur before building permits are issued. Additionally, it is assumed that the City would require its pipeline engineers and construction contractors to adhere to the American Water Works Association standards (AWWA; see discussion further below), or its equivalent for pipeline construction.

A significant impact would occur if, after considering the features described in Chapter 2, *Project Description* and the required compliance with regulatory requirements, a significant impact would still occur. For those impacts considered to be significant, mitigation measures are proposed to reduce the identified impacts.

American Water Works Association Standards for Proposed Pipelines

The AWWA is a worldwide nonprofit scientific and educational association that, among its many activities, establishes recommended standards for the construction and operation of public water supply systems, including standards for pipe and water treatment facility materials and sizing, installation, and facility operations. While the AWWA's recommended standards are not enforceable code requirements, they nevertheless can dictate how pipelines for water conveyance are designed and constructed. The City has committed to requiring its contractors to incorporate AWWA Standards into the construction of the proposed pipelines.

Issues Not Discussed in Impacts

Due to the nature of the proposed project, there would be no impacts related to the following evaluation criteria for the reasons described below:

- ***Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede the sustainable groundwater management of the basin.*** The proposed project does not include the extraction of groundwater nor the injection of water into a subsurface aquifer. Therefore, the evaluation criterion related to groundwater supplies or quality is not applicable to the proposed project and is not discussed further.

- ***Risk release of pollutants due to project inundation from being located in a tsunami or seiche hazard zone***. The proposed project would have no potential to release pollutants due to a tsunami or seiche because the proposed project would not be located in an area susceptible to a tsunami or a seiche. Therefore, the evaluation criterion related to a inundation by a tsunami or seiche is not applicable to the proposed project and is not discussed further.

- ***Conflict with or obstruct implementation of a sustainable groundwater management plan***. The proposed project does not include the extraction of groundwater nor the injection of water into a subsurface aquifer. Therefore, the evaluation criterion related to a groundwater management plan is not applicable to the proposed project and is not discussed further.

Impacts and Mitigation Measures

Table 3.10-2 summarizes the proposed project's impacts and significance determinations related to geology and soils.

TABLE 3.10-2
SUMMARY OF IMPACTS – HYDROLOGY AND WATER QUALITY

Impacts	Significance Determinations
Impact 3.10-1: The proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality.	LS
Impact 3.10-2: The proposed project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would: result in substantial erosion or siltation onsite or offsite; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; impede or redirect flood flows.	LS
Impact 3.10-3: The proposed project would not risk release of pollutants due to project inundation from being located in flood hazard zones.	LS
Impact 3.10-C-1: Cumulative impacts related to hydrology and water quality.	LS

NOTES:
LS = Less than Significant

Impact 3.10-1: The proposed project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality. *(Less than Significant)*

Construction

Construction of the project components would require the use of materials such as fuels, oils and lubricants, solvents and cleaners, cements and adhesives, paints and thinners, degreasers, cement

and concrete, and asphalt mixtures, which are all commonly used in construction. The routine use or an accidental spill of hazardous materials could result in inadvertent releases, which could adversely affect the water quality of stormwater and/or surface water bodies (e.g., San Joaquin River). In addition, construction of the proposed project would have the potential to result in soil erosion during excavation, grading, trenching, and soil stockpiling. Erosion could result in sediment and other pollutants entering surface water bodies and adversely affecting water quality.

As discussed in Impact 3.9-1 in Section 3.9 *Hazards and Hazardous Materials*, construction activities would be required to comply with numerous hazardous materials regulations designed to ensure that hazardous materials are transported, used, stored, and disposed of in a safe manner to protect worker safety, and to reduce the potential for a release of construction-related fuels or other hazardous materials into the environment, including stormwater and downstream receiving water bodies. Contractors would be required to prepare and implement HMBPs that would require that hazardous materials used for construction would be used properly and stored in appropriate containers, spill prevention measures be implemented, and that spill response procedures are in place to respond to accidental releases. The California Fire Code would also require measures for the safe storage and handling of hazardous materials.

As discussed in Impact 3.6-2 in Section 3.6 *Geology, Soils, and Paleontological Resources*, because the overall footprint of construction activities would exceed one acre, the proposed project would be required to comply with the Construction General Permit and the local stormwater ordinances. These state and local requirements were developed to ensure that stormwater is managed and erosion is controlled on construction sites. The Construction General Permit requires preparation and implementation of a SWPPP, which requires applications of BMPs to control runon and runoff from construction work sites. The BMPs would include, but would not be limited to, physical barriers to prevent erosion and sedimentation, construction of sedimentation basins, limitations on work periods during storm events, use of infiltration swales, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion and the potential for impacts to surface water quality from occurring during construction.

The required compliance with the regulations discussed above that govern the transportation, use, handling, and disposal of hazardous materials, and controlling runoff from construction activities would reduce the potential for adverse effects to water quality to **less than significant**.

Operation

River Intake Pump Station

Once the project components are constructed, there would be no further ground disturbance and no potential for erosion that could affect water quality. The intake for the new pump station would still be at 8 feet above the river bed and would not cause erosion that could affect water quality of the river. Therefore, relative to erosion causing water quality impacts during operations of the intake pump station, there would be **no impact**.

Desalination Facility

As described in Section 2.6.2.5, *Chemical Use and Storage* and listed in **Table 2-3**, the desalination plant would use chemicals that are not currently used at the Antioch WTP. The accidental release of these chemicals could adversely affect the water quality of surface water bodies (e.g., San Joaquin River), which could be transported offsite by stormwater.

As discussed in Impact 3.9-1 in Section 3.9 *Hazards and Hazardous Materials*, the volume of chemicals that would be used exceeds the triggering volumes of 500 pounds for reporting the quantities to the Contra Costa County Health Services - Hazardous Materials Program, the local CUPA. As required by the Hazardous Materials Management Program, the City, as the operator of the desalination facility, would be required to prepare and submit a HMBP to the CUPA for the desalination facility prior to the start of operations that would describe hazardous material handling and storage, storage in appropriate containers with secondary containment to contain a potential release, and emergency response and notification procedures in the event of a spill or release. Transportation and disposal of wastes, such as spent cleaning solutions, would also be subject to regulations for the safe handling, transportation, and disposal that would include appropriate containerization and labeling, transportation by licensed hazardous materials haulers, and disposal at licensed facilities permitted to accept the waste.

Development of the desalination facility would result in approximately 0.3-acre of additional impervious area at the WTP site. Stormwater runoff from the desalination facility area would be routed to the existing stormwater drainage system, as it is now. The project would be required to comply with the post-construction MS4 permit development standards (see CCCWP described in Section 3.10.2, *Regulatory Framework*). Compliance with the post-construction stormwater requirements under the MS4 permit would ensure that siting and operation of the above ground facilities would not substantially increase the existing amount or rate of runoff as compared to pre-construction conditions and that stormwater generated on site does contain substantially increased levels of pollutants, as compared to baseline conditions, that impair or degrade the beneficial uses of receiving water bodies. Therefore, mandatory compliance with the numerous laws and regulations discussed above that govern post-construction stormwater runoff would limit the potential for adverse impacts to water quality, and would render this impact **less than significant**.

Raw Water Connection and Brine Disposal Pipelines

Once the pipelines are constructed, there would be no further ground disturbance and no potential for erosion that could affect water quality. The brine disposal pipeline would be constructed using AWWA standards that would reduce the potential for leaks of the brine as it flows to the Delta Diablo WWTP, which would render this impact **less than significant**. The disposal of brine into the San Joaquin River is analyzed in Section 3.11 *Delta Hydrology and Water Quality*.

Mitigation Measure:

None required.

Impact 3.10-2: The proposed project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would: result in substantial erosion or siltation onsite or offsite; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite; create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; impede or redirect flood flows. *(Less Than Significant)*

Construction

As discussed above in Impact 3.10-1, during the construction phase, the proposed project would be required to comply with the Construction General Permit and local stormwater ordinances, which would require obtaining coverage under the Construction General Permit and the preparation and implementation of a SWPPP to control runon and runoff from construction work sites. The required compliance with the regulations discussed in Impact 3.10-1 that require controlling runoff from construction activities would reduce the potential for erosion, siltation, flooding, and exceeding stormwater drainage systems capacities to a **less than significant**.

Operation

River Intake Pump Station

The existing river intake pump station is located on a pier extending into the San Joaquin River, and as such is located with the FEMA mapped 100-year flood plain (**Figure 3.10-1**). Project implementation would relocate the pump station to the parking lot area inland from the current pier, and outside of the FEMA mapped 100-year floodplain. Design review would confirm pump station floor elevations relative to the mapped 100-year floodplain elevations. The new intake pump station and raw water pipeline connections are currently covered with impervious surfaces. Following construction, these areas would be restored to consist of impervious surfaces as it does currently, and drainage patterns would remain the same. The new intake pump station would also be required to incorporate post-construction stormwater management features at the site in accordance with the MS4 permit development standards, which would ensure that the siting and operation of the above ground pump station facility would not increase the existing amount or rate of runoff as compared to pre-construction conditions. Therefore, the new intake pump station would not substantially alter the existing drainage pattern, place new structures within the FEMA mapped 100-year floodplain, and impacts would be **less than significant**.

Desalination Plant

The desalination plant is located in an upland area and is not located on a drainage. In addition, as discussed above in Impact 3.10-1, the design of the desalination plant would ensure that the existing stormwater drainage system can accept the stormwater runoff and not cause erosion, siltation, or flooding. There would be no effect on the surrounding drainages and therefore there would **no impact**.

Brine Disposal Pipeline

The majority of the brine disposal pipeline would be constructed underground and within existing streets. The brine disposal pipeline would be constructed beneath the Los Medanos Waterway

using jack and bore drilling techniques. Therefore, the brine disposal pipeline would have no effect on surface drainage patterns and would not interfere with flow in the Los Medanos Waterway and therefore would have **no impact**.

Mitigation Measure:

None required.

Impact 3.10-3: The proposed project would not risk release of pollutants due to project inundation from being located in flood hazard zones. *(Less than Significant)*

As discussed above in Section 3.10.1, *Environmental Setting*, there are two locations where the project components would be located within the 100-year flood hazard zone: The intake pump station and intake pipelines, and the portion of the brine disposal pipeline that crosses the Los Medanos Waterway. No other components of the project would be located within the 100-year flood hazard zone.

Construction

The construction of the project components would be short-term and temporary activities unlikely to occur during a 100-year flood event. The impact would be **less than significant**.

Operation

River Intake Pump Station

The new intake pump station and intake pipelines would pump and convey river water to the WTP. In the event of damage from a 100-year flood event, only river water would be released; no pollutants would be released. Therefore, the impact would be **less than significant**.

Brine Disposal Pipeline

Once constructed, the brine disposal pipeline would be buried underground and would not be accessible to damage from a flooding event. Therefore, there would be **no impact**.

Mitigation Measure:

None required.

Cumulative Impacts

This section presents an analysis of the cumulative effects of the proposed project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts.

As previously discussed, the proposed project would have no impact with respect to groundwater supplies, groundwater recharge, sustainable groundwater management of the basin, or being

located in a tsunami or seiche hazard zone. Accordingly, the proposed project could not contribute to cumulative impacts related to these topics and are not discussed further. Disposal of the brine is discussed in Section 3.11, *Delta Hydrology and Water Quality*.

The geographic area affected by the proposed project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative hydrology and water quality impacts encompasses and is limited to the project site and its immediately adjacent area, with the exception of brine disposal, which is discussed in Section 3.11, *Delta Hydrology and Water Quality*. This is because impacts relative to hydrology and water quality are generally site-specific. For example, the effect of erosion resulting in the release of pollutants to surface water would tend to be limited to the localized area of a project and could only be cumulative if erosion occurred as the result of two or more adjacent projects that spatially overlapped.

The timeframe during which proposed project could contribute to cumulative hydrology and water quality impacts includes the construction and operations phases. For the proposed project, the operations phase is permanent. However, similar to the geographic limitations discussed above, it should be noted that impacts relative to hydrology and water quality are generally time-specific. Geologic hazards could only be cumulative if two or more hydrology and water quality impacts occurred at the same time, as well as overlapping at the same location.

Impact 3.10-C-1: Implementation of the proposed project, in combination with past, present, and reasonably foreseeable future development would not result in a cumulatively significant impact related to local hydrology and water quality. *(Less than Significant)*

Cumulative Impacts during Project Construction

Water Quality

Significant cumulative impacts related to hydrology and water quality could occur if the incremental impacts of the proposed project combined with the incremental impacts of one or more of the cumulative projects identified in **Table 3-1** to substantially increase risks of impacts to hydrology and water quality. The only cumulative project that could be geographically adjacent or overlap components of the proposed project would be cumulative project number 15 (East County Bioenergy Project) on **Figure 3-1**. This cumulative project would involve the construction of a new bio-refinery, co-located with the Delta Diablo water resource recovery facilities in Pittsburg. The East County Bioenergy Project would convert food waste and wastewater sludge via an anaerobic digestion process into a range of bio-products and biogas, which can be used to generate energy to provide renewable energy.

If the projects are constructed at the same time, the erosion effects with a potential for the release of sediment and/or other pollutants affecting water quality could be cumulatively considerable. However, the state Construction General Permit would require each project to prepare and implement a SWPPP, and local grading and erosion control codes would similarly require preventing erosion that could affect water quality. The SWPPPs and local codes would describe BMPs to control runoff and prevent erosion for each project. Through compliance with these

requirements, the potential for erosion impacts would be reduced and thus water quality would be protected. The Construction General Permit has been developed to address cumulative conditions arising from construction throughout the state, and is intended to maintain cumulative effects of projects subject to this requirement below levels that would be considered significant. For example, two adjacent construction sites would be required to implement BMPs to reduce and control the release of sediment and/or other pollutants in any runoff leaving their respective sites. The runoff water from both sites would be required to achieve the same action levels, measured as a maximum amount of sediment or pollutant allowed per unit volume of runoff water. Thus, even if the runoff waters were to combine after leaving the sites, the sediments and/or pollutants in the combined runoff would still be at concentrations (amount of sediment or pollutants per volume of runoff water) below action levels and would not be cumulatively considerable (**less than significant**).

Drainage Patterns

Similar to the Water Quality cumulative discussion above, the proposed project and all cumulative projects would be required to comply with the state Construction General Permit and local codes that would require the design of projects prevent changing drainage patterns that could result in erosion, siltation, and flooding. Therefore, the construction of multiple projects at the same time would not be cumulatively considerable and **less than significant.**

Flood Hazard Zone

Cumulative impacts relative to being located in flood hazard zones would require that projects spatially overlap. The only cumulative project that would be located near the proposed project would be the previously noted East County Bioenergy Project. However, the East County Bioenergy Project is not located within the 100-year flood hazard zone of the Los Medanos Waterway. Therefore, cumulative construction impacts in the event the two projects were constructed at the same time would not be cumulatively considerable and **less than significant**.

Water Quality Control Plan

The construction of projects would be short-term and temporary activities. Until operational, the proposed project and cumulative projects would have no impacts relative to the Basin Plan and would not be cumulatively considerable (**no impact).**

Cumulative Impacts during Project Operations

Water Quality

Once operational and as discussed in Impact 3.9-1 in Section 3.9 *Hazards and Hazardous Materials*, all projects that use hazardous materials that exceed triggering volumes would be required to prepare a HMBP and submit that HMBP to the CUPA for their review for compliance with regulations. Each HMBP would describe hazardous material handling and storage, storage in appropriate containers with secondary containment to contain a potential release, and emergency response and notification procedures in the event of a spill or release. Transportation and disposal of wastes, such as spent cleaning solutions, would also be subject to regulations for the safe handling, transportation, and disposal that would include appropriate containerization and labeling, transportation by licensed hazardous materials haulers, and disposal at licensed facilities

permitted to accept the waste. Finally, each facility that handles hazardous materials would be required to comply with the local MS4 permit development standards (see CCCWP in Section 3.10.2, *Regulatory Framework*), which would reduce pollutants and runoff flows using BMPs and LID/post-construction standards. Note that each facility would be required to comply with the same regulations that would include procedures to cleanup spills to the same cleanup standards. Thus, even if two adjacent facilities were to have simultaneous hazardous materials releases that might affect water quality, both facilities would be required to control and cleanup each of their releases to the same regulatory standards (the amount of sediment or pollutants per volume of runoff water) and would not be cumulatively considerable. Therefore, cumulative impacts would be **less than significant**.

Drainage Patterns

Similar to the Water Quality cumulative discussion above, the proposed project and all cumulative projects would be required to comply with the state Construction General Permit and local codes that would require the design of projects prevent changing drainage patterns and preventing erosion, siltation, and flooding. Therefore, the construction multiple projects at the same time would not be cumulatively considerable and **less than significant.**

Flood Hazard Zone

Cumulative impacts relative to being located in flood hazard zones would require that projects spatially overlap. The only cumulative project that would be located near the proposed project would be the previously noted East County Bioenergy Project. However, the East County Bioenergy Project is not located within the 100-year flood hazard zone of the Los Medanos Waterway. Therefore, cumulative construction impacts in the event the two projects were constructed at the same time would not be cumulatively considerable and **less than significant.**

References – Local Hydrology and Water Quality

Association of Bay Area Governments (ABAG), 2018. *Potential Tsunami Inundation Area.* Available online at: gis.abag.ca.gov/website/Hazards/?hlyr=femaZones, Accessed February 18, 2018.

California Department of Health Services, 1996. *City of Antioch, System 07110001, Revised Domestic Water Supply Permit #02-04-95P-0710001*. March 22, 1996.

California Department of Public Health, 2008, *Domestic Water Supply Permit Amendment, City of Antioch, System #02-04-95P-0710001*. May 30, 2008.

Central Valley Regional Water Quality Control Board (RWQCB), 2006. *Final California 2010 Integrated Report (303(d) List/305(b) Report) Supporting Information, Regional Board 5 - Central Valley Region, Delta Waterways (Western Portion).* July, 2006.

Central Valley Regional Water Quality Control Board (RWQCB), 2016a. *California Regional Water Quality Control Board, Central Valley Region, Order No. R5-2016-0040, NPDES No. CAS0085324, National Pollutant Discharge Elimination System Permit and waste*

discharge Requirements General Permit for Discharges from Municipal Separate Storm Sewer Systems. June 23, 2016.

Central Valley Regional Water Quality Control Board (RWQCB), 2016b. *The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region, Fourth Edition, Revised July 2016 (with Approved Amendments), the Sacramento River Basin and the San Joaquin River Basin.* July, 2016.

Contra Costa County Community Development Department (CCC CDD), 2004. *Contra Costa County Watershed Atlas.* May, 2004.

Contra Costa Cleanwater Program (CCC WP), 2017. *Stormwater C.3 Guidebook, Stormwater Quality Requirements for Development Applications.* May 17, 2017.

FEMA, 2015. FEMA Flood Map Service Center, Maps 06013C0139G and 06013C0138G. September 30, 2015.

RMC Water and Environment, 2015. *City of Antioch Brackish Water Desalination Evaluation Technical Memorandum, Prepared for the City of Antioch.* February, 2015.

San Francisco Regional Water Quality Control Board, 2014. Order No. R2-2014-0030 NPDES No. CA 0038547. Adopted on August 13, 2014.

This page intentionally left blank

3.11 Delta Hydrology and Water Quality

This section describes the surface water hydrology, relevant water management infrastructure, and water quality of the Sacramento–San Joaquin Delta (Delta), including key Delta hydrology concepts and issues, and Antioch's existing water use patterns. It also provides an overview of relevant hydrodynamics in the western Delta, existing relevant surface water intakes and outfalls, and various Delta water quality issues and concerns. This section reviews the applicable regulatory setting, including federal, state, and local regulations and requirements, and finally provides an analysis of potential hydrology and water quality impacts resulting from project implementation.

Several comments were received in response to the NOP addressing surface water hydrology and water quality. These included a summary of applicability of the Basin Plan and policies therein from the Central Valley Regional Water Quality Control Board (CVRWQCB); a request from the Delta Stewardship Council to review the impact analysis related to surface water withdrawals including effects on ecosystems and regional water supply reliability, and that the EIR should consider potential for conflict with the Delta Plan; a request from Contra Costa Water District to consider specific parameters and model assumptions when analyzing the effects of brine disposal

on Delta waterways; a request from the City of Pittsburg to consider the effects of brine disposal; and a request by Delta Diablo to consider specific issues relating to brine discharge impacts and Delta Diablo's existing wastewater National Pollutant Discharge Elimination System (NPDES) permit. See **Appendix A** for the full text of all NOP comment letters.

3.11.1 Environmental Setting

Delta Overview

The Sacramento-San Joaquin Delta (the Delta) is a network of leveed islands and channels that lies at the confluence of the Sacramento and San Joaquin Rivers. The Delta, together with Suisun Marsh and greater San Francisco Bay, make up the largest estuary on the west coast of North and South America. It is through the Delta that water from roughly two thirds of California's land area passes into the San Francisco Bay estuary and into the Pacific Ocean. Flows of surface water through the Delta provide and support critical ecosystem function, as well as drinking water supply for local purveyors and the state and federal water projects. The Delta also is the major collection and distribution point for water that serves more than 25 million people. Management actions and changes to those actions must consider these interlinked beneficial uses of water in the Delta, which range from habitat for fish and wildlife to agricultural, industrial, and municipal water supply.

Much of the flow that passes through the Delta is regulated by upstream reservoirs that are operated for flood management, water supply, water quality, power generation, wildlife and fisheries habitat, and recreation. Similarly, the system of river and bypass channels, levees, and water control structures in the Delta supports agricultural uses, serves as valued recreational and open space areas, supports management of surface water supplies as well as groundwater and water quality, and provides critical remnant riparian and wetland habitat for numerous fish and wildlife species.

Overview of Delta Hydrology

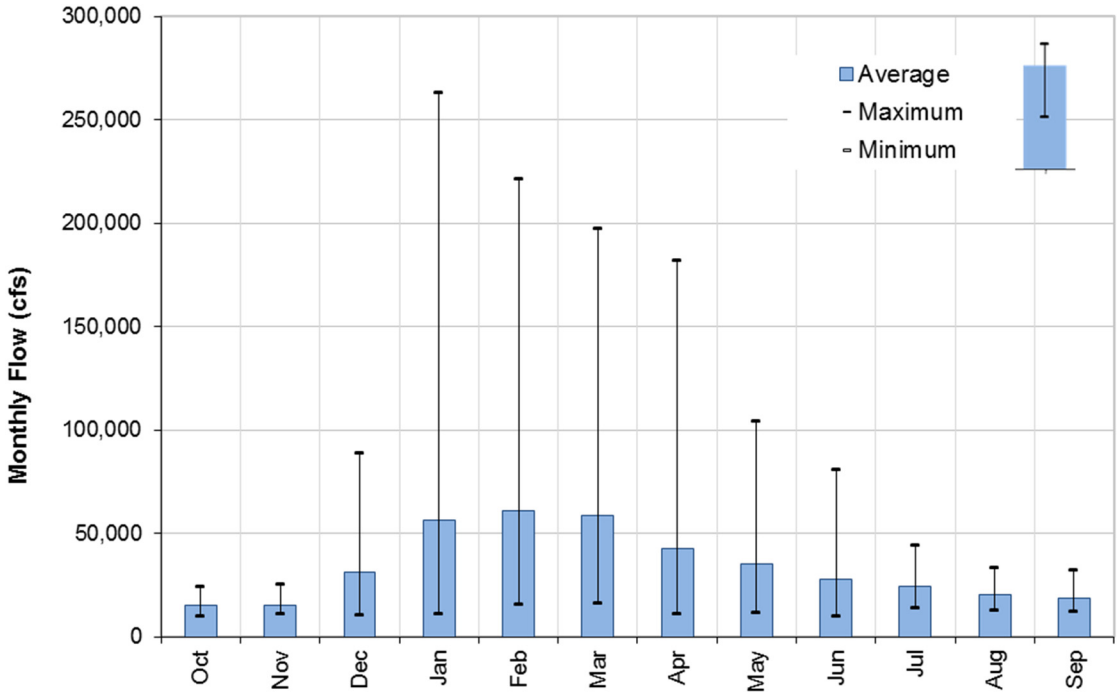
Several key factors affect Delta hydrology and water quality. These include the following:

Tidal Cycles

Except during major stormwater runoff events, flows of water along Delta channels are dominated by the 25-hour cycle of tidal flushing. The Delta, along with the San Francisco Bay, is subject to a mixed diurnal tide, which includes two tides of unequal magnitude each lunar day (24.9 hours). A higher-high and a lower-high tide occur each day. In almost all months, maximum tidal flows at Martinez—that is at the mouth of the Delta where the Delta transitions into San Francisco Bay--range from approximately 600,000 to 700,000 cubic feet per second (cfs). Tidal flows transport water into the Delta on the flood (landward) stage of the tide and withdraw water on the ebb (seaward) stage of the tide. Tidal currents routinely create reverse flows (i.e., landward flows) in select Delta waterways. However, the magnitude of reverse flows also depends on other factors such as Delta inflows, Central Valley Project/State Water Project (CVP/SWP) operational parameters, and local pumping.

Delta Inflow

Tides strongly influence the day-to-day movement of water through the Delta (except during very large storm events). Salinity within the Delta is determined by the balance between freshwater inflows to the Delta and salinity from the Bay, which enters the Delta from tidal dispersion. The vast majority of freshwater inflow to the Delta is derived from the Sacramento and San Joaquin Rivers. Sacramento River flows, when combined with flood flows routed through the Yolo Bypass and flows from Cache and Putah creeks, account for approximately 80 percent of total Delta inflow on an average annual basis. The San Joaquin River contributes about 15 percent of Delta inflow, while flows from the eastside tributaries (Mokelumne, Calaveras, and Cosumnes Rivers) account for most of the remainder, about 5 percent (DWR, 2018a). **Figure 3.11-1** presents monthly and average monthly Delta inflows from 1994 to 2013. The average annual Delta inflow for this period was approximately 24.5 million acre-feet (MAF). Inflows to the Delta are augmented slightly by local precipitation and runoff, drainage and seepage from Delta islands, and discharges from local wastewater treatment plants. Average annual precipitation over the Delta is approximately 0.9 MAF.



Source: DWR, 2018b

Figure 3.11-1
Average, Minimum, and Maximum Delta Inflow, 1994 to 2013

Delta Outflow

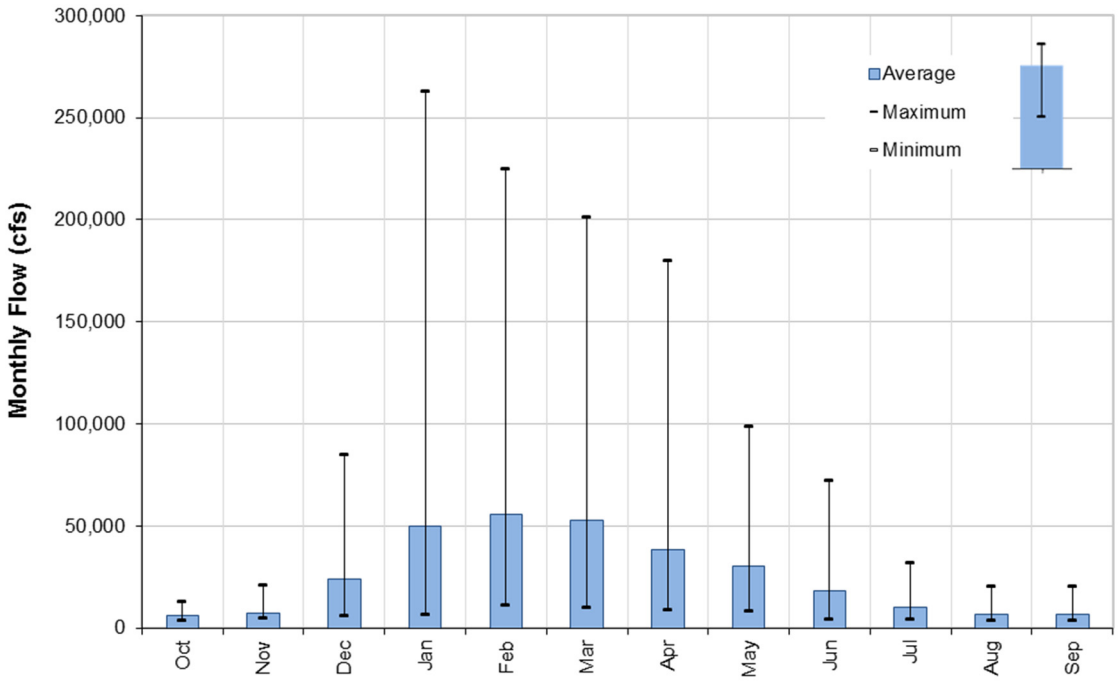
Freshwater that enters the Delta may be diverted for in-Delta agricultural or municipal use, exported by the CVP and SWP to meet contractor demands, or flow as Delta Outflow through Carquinez Strait into San Pablo Bay, San Francisco Bay, and the Pacific Ocean. Net Delta

Outflow is the net freshwater flow or tidally-averaged flow of water from the Delta into San Pablo Bay. Direct estimates of net Delta outflow are generated using U.S. Geological Survey (USGS) flow monitoring data from Rio Vista, Three Mile Slough, Jersey Point, and Dutch Slough, based on a methodology developed by Oltmann (1998).

As water flows out of the Delta, it pushes salty ocean water out of the Delta and downstream towards the San Francisco Bay and Pacific Ocean. The CVP and SWP ("the projects") manage reservoir releases and export pumping to attempt to achieve sufficient Delta outflow to repel salinity intrusion into the western Delta and comply with water rights requirements, including the agreement between the United States and the State for the coordinated operation of the CVP and SWP (otherwise commonly known as the "Coordinated Operations Agreement (COA)") and State Water Resources Control Board Water Rights Decision 1641 (D-1641). Various other regulatory requirements for Delta outflow, including the 2008 USFWS Biological Opinion (BiOp) and the 2009 NMFS BiOp and associated Reasonable and Prudent Alternatives (RPA), must also be met.

Because Delta outflow determines the extent to which salty water intrudes into the Delta (see discussion of X2 below), it also determines the ability of the CVP, SWP, and local purveyors (including the City) to divert and export water from the Delta. The Net Delta Outflow Index (NDOI) as defined in the State Water Resources Control Board D-1641 is a measure of the net Delta outflow. It is calculated using a volumetric balance of the Delta inflow less net Delta consumptive use, less inflows to Clifton Court Forebay, and less pumping at CVP's C.W. "Bill" Jones Pumping Plant (Jones Pumping Plant), SWP's Barker Slough intake, and Contra Costa Water District (CCWD) intakes. D-1641 specifies flow requirements for NDOI which varies by month and by water year type between 3,000 and 8,000 cfs. The highest flow requirement for NDOI (8,000 cfs) is in the month of July during Wet and Above Normal years (as defined in D-1641) and the lowest requirement (3,000 cfs) is in September of any given year and during August through December in critical years.

Figure 3.11-2 summarizes minimum, average, and maximum monthly Delta outflows for 1994 to 2013. On average, about 75 percent of Delta inflow contributes to Delta outflow to the San Francisco Bay with approximately 20 to 25 percent contributing to the flow to meet minimum outflow requirements for salinity control, and remaining 50 to 55 percent for additional requirements for fishery protection. The remaining 25 percent of the Delta inflow is used by local diversions and water exports (DWR, 2014).



Source: DWR, 2018b

Figure 3.11-2
Average, Minimum, and Maximum Monthly Delta Outflow, 1994-2013

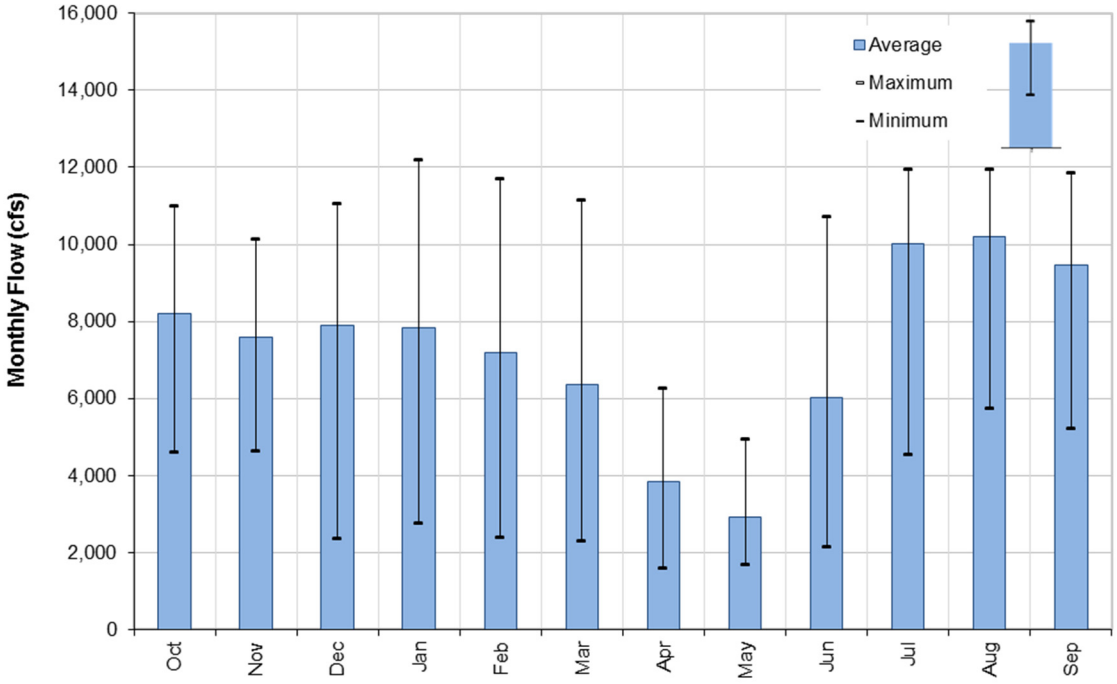
Delta Diversions and Exports

Delta diversions are distinguished from Delta exports by the place of use. For the purposes of this section, a diversion is defined as a withdrawal of water for use within or adjacent to the Delta; an export is defined as water that is withdrawn from the Delta and conveyed to areas distant from the Delta. Delta exports are regulated by D-1641 as a function of Delta inflow and are constrained by BiOp reasonable and prudent alternatives (RPAs).

Combined, the CVP and SWP are by far the largest users of Delta water. The projects export water from the South Delta through CVP's Jones Pumping Plant and SWP's Harvey O. Banks Pumping Plant (Banks Pumping Plant) for delivery to project contractors located in the San Francisco Bay Area, San Joaquin Valley, Central Coast, and Southern California. The SWP also diverts water into the North Bay Aqueduct, while local agencies, including the City, other municipalities, private entities, and agricultural users operate their own diversion infrastructure independent of the CVP and SWP. Examples include the City's diversion, approximately 1,800 agricultural diversions within the Delta, CCWD's Los Vaqueros Project, and the City of Stockton's Delta Water Supply Project.

Figure 3.11-3 presents minimum, average and maximum monthly Delta CVP and SWP diversions and exports from the south Delta only during 1994 to 2013. Annual exports range from 9 to 43 percent of Delta inflow, averaging 21 percent of inflow. In-Delta agricultural use accounts for about 7 percent of Delta inflow, CCWD diversions are less than 1 percent of Delta inflow,

diversions to the North Bay Aqueduct are less than 0.2 percent of Delta inflow, and City diversions are less than 0.1 percent of Delta inflow (DWR, 2014).



Source: DWR, 2018b

Figure 3.11-3
South Delta Exports, 1994 to 2013

Water management activities, especially export pumping, can affect the direction of flow in Delta channels. Under natural conditions, net flow of Delta waters is westward from the San Joaquin and Sacramento Rivers, across the Delta and toward San Francisco Bay. However, under certain tidal, river inflow, and south Delta export pumping conditions, net reverse flows may occur over a tidal cycle in the western Delta so that the net flow direction in those channels is eastward. The estimated net westward flow of the San Joaquin River at Jersey Point is used as a measure of net reverse flow conditions (exclusive of tides) within certain Delta channels, including the San Joaquin River at Blind Point, Three Mile Slough, and Dutch Slough.[1] CVP and SWP export pumping also may cause reverse flows (i.e., from north to south) in the Old and Middle Rivers (OMR) and other central and south Delta channels

[1] Flow at those three points is collectively referred to as "QWEST" under relevant Delta surface water modeling literature and reporting.

Delta Water Quality

According to the Water Quality Control Plan for the San Francisco Bay / Sacramento-San Joaquin Delta Estuary (the Basin Plan; see also regulatory discussion below), water quality in the Delta supports the following beneficial uses:

- Municipal and Domestic Supply (MUN)
- Industrial Service Supply (IND)
- Industrial Process Supply (PRO)
- Agricultural Supply (AGR)
- Ground Water Recharge (GWR)
- Navigation (NAV)
- Water Contact Recreation (REC-1)
- Non-Contact Water Recreation (REC-2)
- Shellfish Harvesting (SHELL)
- Commercial and Sport Fishing (COMM)
- Warm Freshwater Habitat (WARM)
- Cold Freshwater Habitat (COLD)
- Migration of Aquatic Organisms (MIGR)
- Spawning, Reproduction, and/or Early Development (SPWN)
- Estuarine Habitat (EST)
- Wildlife Habitat (WILD)
- Rare, Threatened, or Endangered Species (RARE)

Delta Drinking Water Constituents of Concern

Various drinking water constituents of concern are present in Delta waters. While Delta outflow controls the extent of seawater intrusion, constituents of concern are primarily released from urban and agricultural runoff as well as upstream point source discharges, and constitute a major factor affecting Delta water quality. Delta waterways in the vicinity of the project fall within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) and Central Valley RWQCB. Waterways that are considered water quality limited—that is, that have been identified as having existing water quality impairments—are summarized in the State Water Resources Control Board's 2014 and 2016 Clean Water Act Section 303(d) List. As shown in **Table 3.11-1**, waterways in the Western Delta in the vicinity of the project are considered impaired under the 303(d) list for the following constituents: pesticides including chlorpyrifos, DDT, diazinon, and group A pesticides; electrical conductivity; invasive species; mercury; and unknown toxicity.

Water quality in the Delta is highly variable temporally and spatially. Trends in Delta water quality reflect the effects of river inflows, tidal exchanges with San Francisco Bay, diversions, and discharges to Delta waters. The existing water quality problems of the Delta system may be characterized by the presence of toxic materials, salinity, presence of suspended sediments and turbidity, presence of bacteria, and eutrophication (the overgrowth of aquatic plants due to excess nutrients) and the associated fluctuations in dissolved oxygen. Generally, flow through the Delta is one of the major determining factors for water quality. Delta flows and water quality are controlled or influenced by the following factors:

- Inflow of freshwater from tributary rivers, as influenced by upstream reservoirs, diversions, and other infrastructure and management activities

- In-Delta diversions for export and local use, including NBA, CCWD, CVP, and SWP pumping
- Upstream and in-Delta wastewater treatment plant discharges
- Upstream and in-Delta agricultural return flows and local rainfall runoff with elevated concentrations of TOC, salts, nutrients, suspended solids, boron, and pesticides
- Tidal action that forces high-salinity seawater, including bromide associated with seawater, from Suisun and San Francisco bays into the lower Delta
- Upstream inflows carrying heavy metals, including cadmium, copper, mercury, and zinc, from abandoned mine sites, tailing deposits, urban runoff, and industrial and municipal wastewater

Water quality in the western Delta is strongly influenced by tidal exchange with San Francisco Bay; during low-flow periods, seawater intrusion causes increased salinity.

TABLE 3.11-1
CLEAN WATER ACT SECTION 303(D) LIST OF IMPAIRED WATER BODIES IN THE PROJECT VICINITY

Water Body Name	Affected Area/ Reach Length	Pollutant/Stressor	Pollutant Category	TMDL Status
Delta Waterways (western portion)	14,523 acres	Arsenic	Metals/metalloids	TMDL in place
		Chlordane	Pesticides	TMDL in place
		Chlorpyrifos	Pesticides	TMDL in place
		DDT	Pesticides	TMDL in place
		Diazinon	Pesticides	TMDL in place
		Dieldrin	Pesticides	TMDL in place
		Electrical Conductivity	Other	TMDL in place
		Group A Pesticides	Pesticides	TMDL in place
		Invasive Species	Miscellaneous	TMDL in place
		Mercury	Metals/metalloids	TMDL in place
		Polycyclic Aromatic Hydrocarbons	Toxics	TMDL in place
		Polychlorinated Biphenyls	Toxics	TMDL in place
		Total DDT	Pesticides	TMDL in place
		Toxicity	Toxics	TMDL in place

Key:
DDT = dichlorodiphenyltrichloroethane
PCB = polychlorinated biphenyl
TCDD = tetrachlorodibenzodioxin
TMDL = Total Maximum Daily Load
SOURCE: State Water Resources Control Board, 2017

Variability of Delta Salinity and Total Dissolved Solids Concentrations[2]

Salinity and related constituents, such as chloride and bromide, tend to occur toward the southern and western portions of the Delta (CALFED, 2000). Salinity is an important and regulated parameter in the Delta because water diverted and exported from the Delta is used for a variety of municipal, industrial, and agricultural uses, and elevated levels of salinity in these waters could could affect beneficial uses.

Salinity enters the Delta from various sources, including saline water intrusion from the San Francisco Bay, mineral-laden river inflows from tributaries, agricultural tailwater, and wastewater treatment plant outfalls within the watershed. Saline water intrusion from the San Francisco Bay is the primary determinant of salinity in the western Delta. Daily tidal cycles force saline water into and out of the Delta, with the extent of intrusion determined by tidal height, freshwater inflow from the Sacramento, San Joaquin, and eastside rivers, the rate of pumping at Delta water intakes, and the operation of various flow control structures (e.g., Delta Cross-Channel Gates and Suisun Marsh Salinity Control System) (DWR, 2001).

During winter and early spring, flows through the Delta are usually above the minimum levels required to control salinity. During the summer and autumn, salinity in the Delta typically increases because of decreased inflows or discharges from agricultural runoff. Decreased Delta outflow, combined with exports, may increase instances of net reverse flow drawing saltwater intrusion further into the Delta.

The X2 Objective

The 1995 Bay-Delta Basin Plan (predecessor to the current Basin Plan; see additional discussion below) established the estuarine habitat (X2) objectives for Suisun Bay and the western Delta. The X2 objective required specific daily or 14-day surface EC criteria, or 3-day averaged outflow requirements to be met for a certain number of days each month, from February through June. These requirements were designed to provide improved shallow water habitat for fish species in spring. Because of the relationship between seawater intrusion and interior Delta water quality, the X2 criteria also improved water quality at Delta drinking water intakes, including the City's intake. As a parameter, X2 is measured as the distance from the Golden Gate Bridge (in km) where salinity is equivalent to 2 parts per thousand (ppt). Due to the variable nature of Delta

2 Salinity is a measure of the amount of salts contained in water, including chloride and bromide, as well as many others. Chloride anion concentration and electrical conductivity (EC) are commonly used measurements of salinity. Like salinity, total dissolved solids (TDS) also describes the amount of salts in water. TDS also includes small amounts of other constituents, mainly organic carbon; however, the amount of organic carbon in Delta samples near the project is usually miniscule in comparison to the amount of salt in samples. Therefore, salinity, chloride anion concentration, EC, and TDS are all different ways of describing the amount of salts contained in a water sample. As much as possible, data are presented in this document in the form in which they were originally collected or modeled, to minimize the introduction of inaccuracies. As such, TDS and EC data are presented throughout the document, and EC and TDS are frequently used as indicators of salinity or chloride concentrations.

Typically, for Delta samples near the project site, salinity is described in terms of electrical conductivity (EC), with units of uS/cm. DSM2 simulations model EC but results can be converted to TDS or chloride concentrations. The conversion of salinity to TDS or chloride is different at different locations within the Delta due to the change in EC source (e.g. saltwater from the San Francisco Bay, or salts originating from agricultural drainage).

flows as well as tidal influence, the location of X2 can vary in its location from the western-central Delta during very dry periods, to the Golden Gate Bridge.

Local Setting

Local Hydrology

Antioch and Delta Diablo are located in a strongly tidally influenced area characterized by high tidal flows, and strong seasonal variability that is heavily influenced by upstream flows and management activities. Twice daily tidal cycles at Antioch cause water to ebb and flow at high rates, with peak flows ranging from 70,000 cfs to 200,000 cfs or more. At high and low tides, the waterway temporarily achieves slack water conditions, with limited movement, twice during each tidal cycle. Delta outflow past the City is measured as the net movement of water, discounting tidal flows, out of the Delta. Seasonally, hydrology in the vicinity of the City and the project components (i.e. the diffuser site and the existing intake pump station), reflects the patterns and seasonality trends discussed previously for the Delta.

Local Water Quality

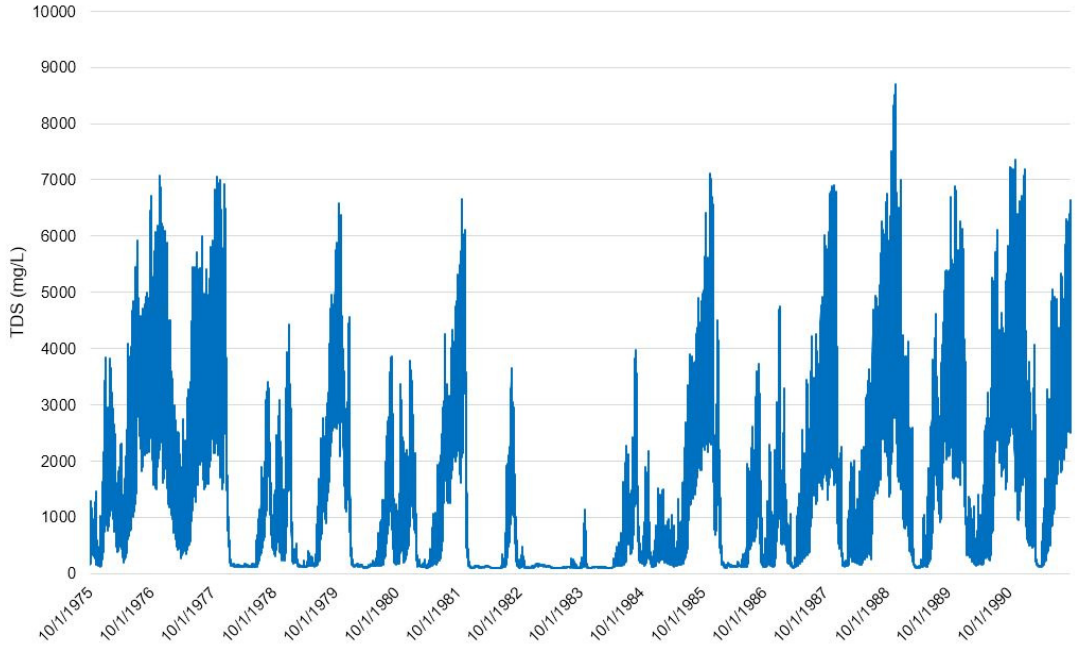
New York Slough is tidally influenced and the Basin Plan classifies it as estuarine. Salinity data collected at the Regional Monitoring Program (RMP) BG30 sampling station between 1993 and 2011 indicate that the salinity is greater than 1 ppt about 5 percent of the time, but never greater than 10 ppt. More specifically, salinity in New York Slough and the San Joaquin River near Antioch varies seasonally and based on the hydrologic year type. Seasonally, salinity is lowest during February through May, when large storms combine with snowmelt and other runoff to force saline Bay/ocean waters out west of the project area. Salinity typically begins to increase in June and continues to increase through the summer and autumn months. Salinity typically peaks during late autumn, before major runoff events start to freshen the system.

On an annual basis, drier years reduce Delta outflow and therefore reduce flushing of saline water out of the Delta. This results in increased saline water intrusion in the project vicinity, and salinity levels increase. During the driest of years, salinity can be elevated even during the February through May runoff season. During wet years, salinity can remain very low even during summer and late autumn months, when salinities typically rise.

Figure 3.11-4 summarizes historic concentrations of total dissolved solids (TDS) at Antioch near the Delta Diablo outfall diffuser site, as modeled by the California Department of Water Resources during a prior DSM2 analysis (Exponent, 2018). As shown, TDS concentrations vary seasonally and annually. TDS concentrations are highest during periods with lower freshwater input from upstream, and lowest when freshwater inflows to the Delta push tidal salts further out toward the Golden Gate.

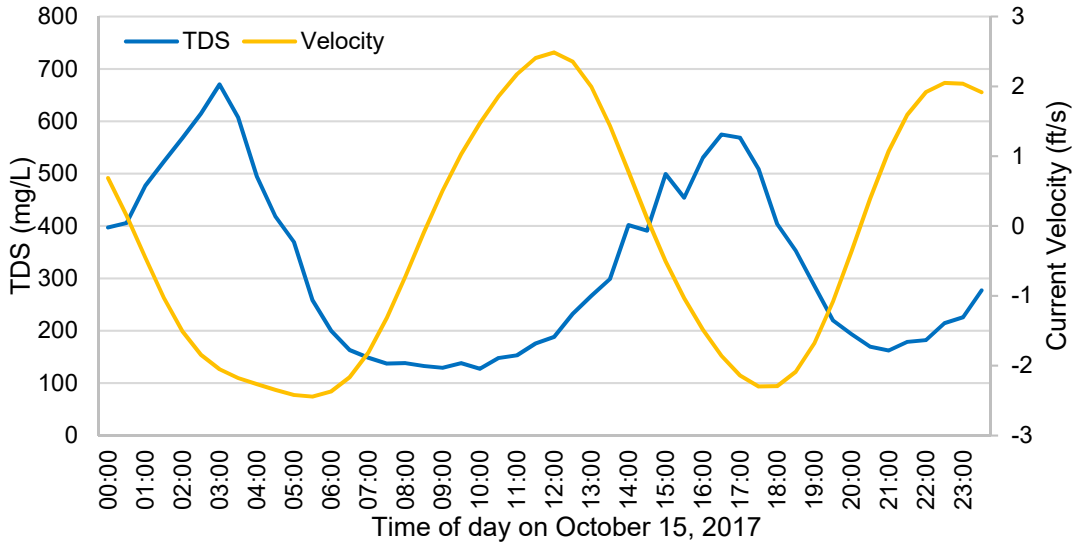
Salinity and TDS also vary considerably on a diurnal basis, along with the tidal cycle. **Figure 3.11-5** below provides a snapshot of ambient TDS concentrations at Antioch (i.e., in close proximity to the existing diffuser outfall) during a 24-hour period on October 15, 2017. As shown, TDS concentrations lag behind tidal velocity, with peak TDS concentrations occurring as saline tidal

flows pass upstream (negative current velocities) and minimum TDS concentrations occurring as fresh water flows from the central Delta pass downstream (positive current velocities).



Source: Exponent, 2018. Figure shows the TDS concentration in receiving waters at Antioch's drinking water intake as modeled by the Delta Simulation Model (DSM2) for the EBC2 existing conditions scenario. The EBC2 scenario includes the Fall X2 requirement and was generated by the Department of Water Resources (DWR) for the March 2013 Revised Administrative Bay Delta Conservation Plan to represent existing conditions.

Figure 3.11-4
Total Dissolved Solids of Receiving Water Near Delta Diablo Outfall Diffuser



Source: CDEC and Exponent, 2018.

Figure 3.11-5
Tidal Current Velocity and Receiving Water TDS Concentration, at New York Slough, October 15, 2017

3.11.2 Regulatory Framework

Federal

Clean Water Act

The federal Clean Water Act (CWA) seeks to "to restore and maintain the chemical, physical, and biological integrity of the nation's waters." The CWA is the major federal legislation that governs federal oversight of discharges into "jurisdictional waters" by federal, State, local, and private activities. Jurisdictional waters are waters of the United States, including wetlands, lakes, rivers, streams, and their tributaries. The CWA establishes the basic structure for regulating discharge of pollutants into the waters of the United States and gives the United States Environmental Protection Agency (USEPA) the authority to implement pollution control programs, such as setting effluent limitations for wastewater discharges by industries. In California, USEPA has given the State Water Resources Control Board (State Water Board) and its nine Regional Water Quality Control Boards (Regional Water Boards) the authority to identify beneficial uses and adopt applicable water quality objectives. Where multiple beneficial uses exist, water quality standards must protect the most sensitive use.

Section 303 of the CWA requires states to adopt water quality standards for all surface waters of the United States. Water quality standards include designation of beneficial uses, water quality criteria, and an antidegradation policy to prevent deterioration of existing levels of high water quality. Reductions in pollutant loading are achieved by implementing strategies authorized by the CWA through Sections 401, 402 and 404.

Note that site-specific CWA requirements and associated issues such as Section 401 and 404 compliance are addressed separately in the biological resources and local hydrology sections.

Federal Antidegradation

Section 303(c) of the CWA is designed to protect existing uses and water quality and national water resources. At a minimum, the policy and implementation methods must be consistent with the following:

- Existing instream water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
- Where the quality of the waters exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality shall be maintained and protected unless the State finds that allowing lower water quality is necessary to accommodate important economic or social development in the area. In allowing such degradation or lower water quality, the State shall assure water quality adequate to protect existing uses fully. Further, the State shall assure that there shall be achieved the highest statutory and regulatory requirements for all new and existing point sources and all cost-effective and reasonable best management practices (BMP) for nonpoint source control.
- Where high-quality waters constitute an outstanding national resource, such as waters of national and state parks and wildlife refuges and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

Although the quality of water in the Delta is relatively good, water quality problems do occur, including the presence of mercury, pesticides such as organochlorine pesticides, trace metals, turbidity, and toxicity from unknown origin (CALFED 2000).

Federal Safe Drinking Water Act

The Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the United States. The SDWA authorized USEPA to set national health-based standards for drinking water and requires many actions to protect drinking water and its sources, including rivers, lakes, reservoirs, springs, and groundwater wells. Furthermore, the SDWA requires owners or operators of public water systems to comply with primary (health-related) standards. USEPA has delegated the responsibility for administering California's drinking-water program to the State Water Board. The State Water Board is accountable to USEPA for program implementation and for adopting standards and regulations that are at least as stringent as those developed by USEPA. Contaminants of concern relevant to domestic water supply are defined as those that pose a public health threat or that alter the aesthetic acceptability of the water. These types of contaminants are regulated by USEPA primary and secondary maximum contaminant levels (MCLs) that are applicable to treated water supplies delivered to the distribution system. The MCLs and the process for setting these standards are reviewed triennially.

Surface Water Treatment Rule

The California Surface Water Treatment Rule is contained in Title 22, Article 7 of the California Code of Regulations. Under the rule, surface water supplies are assumed to contain pathogenic and microbial contaminants. As a result, inadequately treated surface water will cause waterborne disease. The rule therefore requires every public water system that relies on surface water for supply to conduct a comprehensive sanitary survey of its watersheds. The purpose of the surveys is to identify actual or potential sources of contamination, or any other watershed-related factor, which might adversely affect the quality of water used for domestic drinking water.

Disinfection Byproducts Rule

Reactions between naturally occurring organic carbon contained in natural waters and disinfectants such as chlorine and chloramines have been proven to result in the formation of disinfection byproducts such as trihalomethanes (THM) and haloacetic acids (HAA). Concentrations of THM and HAA in finished drinking water are regulated by the USEPA Disinfectants/Disinfection Byproducts Rule. Current regulations for disinfection byproducts (DBPs) at (80 ppb for THM and 60 ppb for HAA5) must be met by municipal/public water suppliers. DBP concentrations are determined based on running annual averages from quarterly measurements.

State

Porter-Cologne Water Quality Act

The Porter-Cologne Act is California's statutory authority for the protection of water quality. Under the act, the State must adopt water quality policies, plans, and objectives protecting the State's waters for the use and enjoyment of the people. The act also obligates the State and

Regional Water Boards to adopt and periodically update their basin plans A basin plan identifies the designated beneficial uses for specific surface water and groundwater resources, applicable water quality objectives necessary to support the beneficial uses, and implementation programs that are established to maintain and protect water quality from degradation for each of the Regional Water Boards. The act also requires waste dischargers to notify the regional Water Boards of their activities through the filing of reports of waste discharge and authorizes the State Water Board and Regional Water Boards to issue and enforce waste discharge requirements (WDR), NPDES permits, Section 401 water quality certifications, or other approvals. The Regional Water Boards also have authority to issue waivers to reports of waste discharge, WDRs for broad categories of "low threat" discharge activities that have minimal potential for adverse water quality effects when implemented according to prescribed terms and conditions.

Regional Water Quality Control Board and the Basin Plan

The Porter-Cologne Act provides for the development and periodic review of water quality control plans that designate beneficial uses of California's major rivers and groundwater basins and establish narrative and numerical water quality objectives for those waters. Beneficial uses defined in Water Code Section 13050(f) include domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and the preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. The State Water Board, the Central Valley Regional Water Board (Region 5) and San Francisco Bay Regional Water Board (Region 2), through their regulatory authorities, are also engaged in the development of water quality water objectives and other source water protection objectives for the Bay-Delta system. Beneficial uses represent the services and qualities of a water body (i.e., the reasons why the water body is considered valuable), while water quality objectives represent the standards necessary to protect and support those beneficial uses.

Bay-Delta Water Quality Control Plan

The 1995 Bay-Delta Water Quality Control Plan (Basin Plan) established water quality control measures that contribute to the protection of beneficial uses in the Delta (State Water Board 1995). The Bay-Delta Water Quality Control Plan (WQCP) identified (1) beneficial uses of the Delta to be protected, (2) water quality objectives for the reasonable protection of beneficial uses, and (3) a program of implementation for achieving the water quality objectives. Amendments made in 1995 as part of the December 15, 1994, Bay-Delta Accord, committed the CVP and SWP to new Delta habitat objectives. The new objectives were adopted in 1995 through Resolution No. 95-24.

One key feature of the 1995 Bay-Delta Basin Plan was the estuarine habitat (X2) objectives for Suisun Bay and the western Delta. The X2 objective required specific daily or 14-day surface EC criteria, or 3-day average outflow requirements to be met for a certain number of days each month, from February through June. These requirements were designed to provide improved shallow water habitat for fish species in spring. Because of the relationship between seawater intrusion and interior Delta water quality, the X2 criteria also improved water quality at Delta drinking water intakes. Other new elements of the 1995 Bay-Delta Basin Plan included export-to-inflow (E/I) ratios

intended to reduce entrainment of fish at the export pumps, Delta Cross Channel gate closures, and San Joaquin River EC and flow standards.

California Toxics Rule

The California Toxics Rule establishes numeric water quality criteria for approximately 130 priority pollutant trace metals and organic compounds. The State Water Board subsequently adopted its Policy for the Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries (State Implementation Policy, or SIP). The SIP outlines procedures for NPDES permitting for toxic-pollutant objectives that have been adopted in basin plans and in the California Toxics Rule.

State Antidegradation

The California Antidegradation Policy (Resolution No. 68-16) is a statement of policy with respect to maintaining high quality waters in California. As part of the state's policy for water quality control, it is incorporated into all regional water quality control plans. The antidegradation policy applies only to high quality waters and requires that that existing high quality be maintained to the maximum extent possible. The policy allows lowering only if that change is consistent with maximum benefit to the people of the state, will not unreasonably affect present and potential beneficial uses, will not result in water quality lower than applicable standards, and if waste discharge requirements for a proposed discharge would result in the best practicable treatment or control of the discharge. Such controls must be sufficient to ensure no pollution or nuisance, and the highest quality of water to afford maximum benefit to the people of the state. The state antidegradation policy applies to permits, waste discharge requirements, waivers for surface water discharges, basin planning and policies affecting surface water, clean water act Section 401 certifications, and surface water cleanups.

Water Right Decision 1641

The 1995 Bay-Delta Basin Plan was implemented through Water Right Decision 1641 (D-1641) in December 1999, Revised Water Right Decision 1641 (D-1641) in March 2000, and Order WR 2001-05. D-1641 incorporates water rights settlement agreements between DWR and Reclamation and certain water users in the Delta and upstream watersheds regarding contributions of flows to meet water quality objectives. However, DWR and/or Reclamation have the responsibility to ensure that WQCP objectives are met in the Delta.

As previously described, the COA between DWR and Reclamation describes how the CVP and SWP share their joint responsibility to meet Delta water quality standards and meet the water demands of senior water right holders. Many of the permit terms and conditions contained in the 1995 Bay-Delta Basin Plan for the Delta and Suisun Marsh and in water rights decisions implementing the Basin Plan have substantial influence on Delta operations, flows, water quality and ecosystem functions.

Delta Stewardship Council – Delta Plan

The Sacramento–San Joaquin Delta Reform Act (Reform Act), passed in 2009, created the Delta Stewardship Council (DSC) and empowered it to develop a comprehensive management plan (i.e., the Delta Plan), which was adopted in 2013 as a policy plan. The Reform Act also created the Sacramento–San Joaquin Delta Conservancy to support efforts that advance environmental protection and the economic well-being of Delta residents. The DSC and Delta Conservancy are independent agencies of the State. Under current requirements, state and local agencies proposing certain kinds of actions or projects in the Delta need to certify for the DSC that those efforts are consistent with the Delta Plan.

The DSC was created in legislation to achieve the state mandated coequal goals for the Delta. 'Coequal goals' means the two goals of providing more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place. (CA Water Code §85054)

The Delta Plan, adopted by the DSC in 2013, is a comprehensive, long-term management plan for the Delta. It creates new rules and recommendations to further the state's coequal goals for the Delta: Improve statewide water supply reliability, and protect and restore a vibrant and healthy Delta ecosystem, all in a manner that preserves, protects and enhances the unique agricultural, cultural, and recreational characteristics of the Delta.

The city of Antioch is within the Delta Secondary Zone, as shown in Appendix 6 of the Delta Plan; therefore, Delta Plan policies need to be evaluated to determine whether the proposed project would conflict with the Delta Plan.

The following policies from the Delta Plan are relevant to water quality:

> ***Policy WQ R1:*** Water quality in the Delta should be maintained at a level that supports, enhances, and protects beneficial uses identified in the applicable State Water Resources Control Board or regional water quality control board water quality control plans.
>
> ***Policy WQ R2:*** Covered actions should identify any significant impacts to water quality.

Local

City of Antioch General Plan

The City of Antioch's General Plan, Public Services and Facilities Element, contains the following water facilities objective and policies relevant to the project.

Water Facilities Objective. Ensure a water system capable of providing high quality water to existing and future residences, businesses, institutions, recreational facilities, and other users within the City of Antioch during peak use conditions, with sufficient water in storage reservoirs for emergency and fire protection needs.

Water Facilities Policies:

a. As part of the design of water systems, provide adequate pumping and storage capacity for both drought and emergency conditions, as well as the ability to provide fire flows required by the Contra Costa County Fire Protection District.

d. Maintain existing levels of water service by protecting and improving infrastructure, replacing water mains and pumping facilities as necessary, and improving the efficiency of water transmission facilities.

f. Periodically evaluate local water consumption patterns, the adequacy of existing facilities, and the need for new facilities, including this information in the comparison of proposed development projects to the performance standards of the Growth Management Element.

City of Pittsburg General Plan

The City of Pittsburg's General Plan, Public Facilities element, Water Supply and Distribution section contains the following water facilities goal and policies relevant to the project. The project would be consistent with the goal and policies identified below.

> ***Goal 11-G-1:*** Available water supply and distribution capacity should grow proportionally with development patterns and water usage trends. Update City's Water Master Plan to implement General Plan growth projections.
>
> ***Policy 11-P-3:*** Continue water district and user conservation efforts to help reduce demand in light of recent Contra Costa Water District raw water reductions.
>
> ***Policy 11-P-4:*** Work with Contra Costa Water District to develop a program ensuring adequate provision of raw water supplies during potential emergency water demands.

3.11.3 Permitting Framework

Delta Diablo NPDES Permit

Delta Diablo discharges wastewater from its municipal wastewater treatment plant under NPDES No. CA0038547 (Order No. R2-2014-0030). The order became effective on October 1, 2014, and will expire on September 30, 2019; it allows discharge of treated effluent into New York Slough. The permit allows for average dry weather effluent flows up to 19.5 million gallons per day (mgd), and specifies effluent limitations shown in **Table 3.11-2.**

In addition to these limitations, the order also requires the following:

- Percent Removal. The average monthly percent removal of BOD and TSS shall not be less than 85 percent.
- Enterococcus Bacteria. The geometric mean enterococcus bacteria concentration of all samples collected in a calendar month shall not exceed 35 most probable number per 100 mL (MPN/mL).
- Whole Effluent Acute Toxicity. Effluent shall comply with the following limitations, tested based on current USEPA bioassay protocols and species:
    - An 11-sample median value of not less than 90 percent survival
    - An 11-sample 90th percentile value of not less than 70 percent survival

TABLE 3.11-2
APPLICABLE EFFLUENT LIMITATIONS

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Biochemical Oxygen Demand, 5-day at 20 degrees C (BOD)	mg/L	30	45	—	—	—
Total Suspended Solids (TSS)	mg/L	30	45	—	—	—
Oil and Grease	mg/L	10	—	20	—	—
pH	Standard units	—	—	n/a	6.0	n/a
Total Residual Chlorine	mg/L	—	—	—	—	0.0
Copper, Total Recoverable	µg/L	35	—	53	—	—
Cyanide, Total	µg/L	18	—	39	—	—
Dioxin-TEQ	µg/L	1.4×10^{-8}	—	2.8×10^{-8}	—	—
Total Ammonia, as N	mg/L	170	—	220	—	—

Source: SFRWQCB, 2014.

- Whole Effluent Chronic Toxicity. Effluent shall not contain chronic toxicity at a level that would cause or contribute to toxicity in the receiving water, as determined by analysis of indicator organisms and toxicity tests

Finally, the order also incorporates the following receiving water limitations:

- The discharge shall not cause any of the following conditions to exist in receiving waters at any place:
    - Floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses;
    - Alteration of suspended sediment in such a manner as to cause nuisance or adversely affect beneficial uses, or detrimental increase in the concentrations of toxic pollutants in sediment or aquatic life;
    - Suspended material in concentrations that cause nuisance or adversely affect beneficial uses;
    - Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses;
    - Alteration of temperature beyond present natural background levels;
        - Changes in turbidity that cause nuisance or adversely affect beneficial uses, or increases from normal background light penetration or turbidity greater than 10

percent in areas where natural turbidity is greater than 50 Nephelometric Turbidity Unit (NTU)

- Coloration that causes nuisance or adversely affects beneficial uses;
- Visible floating, suspended, or deposited oil or other products of petroleum origin; or
- Toxic or other deleterious substances in concentrations or quantities that cause deleterious effects on wildlife, waterfowl, or other aquatic biota, or render any of these unfit for human consumption, either at levels created in the receiving waters or as a result of biological concentration.

- The discharge shall not cause the following limits to be exceeded in receiving waters at any place within one foot of the water surface:
  - Dissolved Oxygen: 7.0 mg/L

    The median dissolved oxygen concentration for any three consecutive months shall not be less than 80% of saturation. When natural factors cause concentrations less than that specified above, the discharge shall not cause further reduction in ambient dissolved oxygen concentrations.
  - Dissolved Sulfide: Natural background levels
  - pH: The pH shall not be depressed below 6.5 or raised above 8.5, and the discharge shall not cause changes greater than 0.5 pH units in normal ambient pH levels.
  - Nutrients: Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.
- The discharge shall not cause a violation of any applicable water quality standard for receiving waters.

3.1.4 Analysis, Impacts and Mitigation

Significance Criteria

According to Appendix G of the CEQA *Guidelines*, a project would result in a significant water quality impact if it would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality
- Result in substantial water quality changes that would adversely affect beneficial uses
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan

Methodology and Assumptions

Impacts in this section are analyzed based upon the significance criteria listed above and by assessing the change in the existing conditions resulting from the proposed project.

Modeling Approach

In order to evaluate potential impacts from project operations, three modeling tools were used to evaluate near-field effects from the brine disposal and far-field effects from the change in City diversions at the river intake and brine disposal. A discussion of each model, and its application to the impact analysis, is provided below.

Modeling Tools

DSM2

The Delta Simulation Model II (DSM2) is a Delta hydrodynamic and salinity model developed by DWR to simulate Delta hydrodynamics and water quality. Input to the model includes upstream river flows and salinities, downstream tidal stage and salinity, diversion rates and other relevant data as boundary conditions. The model can be used to simulate Delta channel flows, velocities, water surface elevations, and salinity. Existing model runs conducted by DWR for the WaterFix project were used as input in the analysis and as the basis for new runs conducted specifically for this project. DSM2 modeling files were developed by DWR for WaterFix for a 16-year period (water years 1976-1991).

Antioch Operations Model

The proposed project would change the timing and amount of water the City diverts from its river intake. In order to simulate City of Antioch water supply operations with and without the project, Carollo Engineers developed a spreadsheet operations model. The key inputs to the model are:

- City of Antioch water demands
- Source water quality at the City's River Intake
- River intake diversion capacity (16 mgd)
- Desalination Plant Capacity (6 mgd finished water)

City of Antioch water supply operations are based on factors including Delta conditions, real time City demands, and operator judgment. To simulate operations, simplified operating rules were developed for implementation in the spreadsheet model. For the without project simulations, which are generally representative of existing operations, the intake operating criteria were:

- River salinity below 100 mg/L: meet City demand using the river intake (up to 16 mgd pump station capacity and then purchase water from CCWD if needed)
- River salinity between 100mg/L and 250 mg/L: blend river and CCWD water to meet City demand (meet 50 percent of demand from river and remainder purchased from CCWD)
- River salinity greater than 250 mg/L: meet all demand using purchased CCWD water.

For the with project simulations, the operating criteria were modified in anticipation of future operating conditions:

- River salinity below 75 mg/L: meet City demand using the river intake (up to 16 mgd pump station capacity and then purchase additional water from CCWD if needed)

- River salinity greater than 75 mg/L: use desalination plant and meet any remaining demand with combination of river and CCWD water to achieve 75 mg/L delivered water quality goal.

The outputs of the model include the amount water diverted at the river intake and from the CCWD canal, the amount of "finished" water produced by the City's treatment plants. For the with project condition, model output also included the amount and quality of brine produced. Model outputs were used in combination with the other modeling tools to evaluate project effects.

Visual Plumes

The Visual Plumes UM3 model was used to calculate the near-field dilution[3] of the DDSD discharge. Visual Plumes is a widely used mixing-zone computer model developed in a joint effort led by USEPA and used to simulate single and multi-port submerged discharges using receiving water characteristics specified by the user. The Visual Plumes model was used to compute plume dilution, trajectory, and the dimensions of the plume at the edge of the zone of initial dilution (ZID). The ZID is defined as the area where mixing is driven primarily by the buoyancy and/or initial momentum of the discharge; beyond the ZID, mixing results mainly from ambient turbulence.

Brine Discharge Simulation: Near-Field Effects

Near-field effects of the brine discharge were evaluated using the Visual Plumes model. A number of modeling scenarios were identified to evaluate a range of future Delta Diablo effluent discharge volumes and seasonal and water year-type variations in receiving water conditions. Each model run was conducted over a full tidal cycle. The only difference between with and without project runs for each modeling scenario was the addition of 2 mgd of desalination brine.

The modeling analyses including a number of additive conservative assumptions. For example, the desalination brine was assumed to have a constant TDS concentration of 32,000 mg/L, corresponding to a river TDS of 8,000 mg/L (i.e., the brine is four times as concentrated as the source water); a river TDS concentration of 8,000 mg/L is near the peak salinity simulated to occur at the City's intake in the existing condition DSM2 simulations over the 16-year period (see **Figure 3-11.4**). Under actual operating conditions, the brine concentration will vary with the source water quality. The use of the peak brine concentration of 32,000 mg/L is a conservative assumption that will result in lower simulated dilution than using the brine TDS concentration calculated from the river (source) water for a given tidal cycle.

Analyses conducted by Exponent indicated that the lowest near-field dilution occurred during the fall season, indicating greatest potential for the project to alter conditions during this period *(Final Near-Field Modeling Study of Potential Future Discharge from the Delta Diablo*

[3] Dilution was calculated as the ratio of ambient water to diffuser effluent. For example, a 10:1 dilution means that 1 part of effluent is mixed with 10 parts of ambient water.

Sanitation District Outfall, 2018). Scenarios 1 and 3, which modeled receiving water conditions during fall months in dry-year and critically dry year types, represent the "worst case" scenario relative to receiving water quality. These scenarios were used to assess potential water quality impacts related to project implementation. A summary of all modeled scenarios is provided in **Table 3.11-3**, and the Exponent Modeling Study is included in **Appendix D.**

TABLE 3.11-3
MODELING SCENARIOS APPLIED FOR THE NEAR-FIELD ANALYSIS

Scenario[1]		Year Type	Season and Year	Flow (mgd)		
				Desal Brine	Blowdown and Dow Brine	Waste-water Effluent
1 Dry Year/ Max Recycled	a) Without-project (Min DDSD)	Dry	Fall 2013	a) 0	2013 Seasonal Avg.	0
	b) Project (Min DDSD)			b) 2		
2 Dry Year/ Min Recycled	a) Without-project (Typical DDSD)	Dry	Fall 2013	a) 0	2013 Seasonal Avg.	12
	b) Project (Typical DDSD)			b) 2		
3 Critical Dry Year/ Max Recycled	a) Without-project (Min DDSD)	Critical	Fall 2015	a) 0	2015 Seasonal Avg.	0
	b) Project (Min DDSD)			b) 2		
4 Critical Dry Year/ Min Recycled	a) Without-project (Typical DDSD)	Critical	Fall 2015	a) 0	2015 Seasonal Avg.	12
	b) Project (Typical DDSD)			b) 2		
5 Critical Dry Year Max Recycled-Spring	a) Without-project (Typical DDSD)	Critical	Spring 2015	a) 0	2015 Seasonal Avg.	12
	b) Project (Typical DDSD)			b) 2		
6 Dry Year ADWF Baseline	a) Without-project (16 mgd)	Dry	Winter 2013	a) 0	2013 Seasonal Avg.	16
	b) Project (16 mgd)			b) 2		
7 Dry Year Max Flow Winter	a) Without-project (32 mgd)	Dry	Winter 2013	a) 0	2013 Seasonal Avg.	32
	b) Project (32 mgd)			b) 2		

Source: Exponent, 2018 (Appendix D)

NOTES:
1. Scenarios 1 to 4 review receiving water conditions in fall months during Dry and Critically Dry Years. Scenario 5 evaluates the spring receiving water quality, relevant to fisheries. Scenarios 6 and 7 evaluated winter water receiving conditions.

The near-field effects analysis considers the extent to which the project could degrade water quality such that beneficial uses of receiving waters would be affected. Note that effects on fisheries as a beneficial use are discussed separately in Section 3.3, *Aquatic Biological Resources*.

Far-Field Effects

As explained in the project description, the amount of water delivered to City of Antioch customers would be the same with and without the proposed project. However, the proposed project would change the timing and amount of City diversions from its river intake and reduce the amount of Delta water purchased from CCWD. When the desalination project is operating,

the City would divert 8 mgd from the river intake for desalination to produce 6 mgd of finished water and return 2 mgd as brackish desalination brine at DD's diffuser.

The project would result in an incremental net increase in water diversions from the Delta, and the amount shifted from diversion at CCWD intakes to be diverted by City of Antioch is very small relative to western Delta flows, representing less than 0.05 percent of total river flow (calculated from information in Exponent, 2018).

As such, it was deemed unnecessary to use the Delta hydrologic/operations model CALSIM 2.0. Rather, the potential for Delta operational change resulting from the proposed project was analyzed using DSM2 to simulate potential water quality changes at key Delta regulatory compliance locations. The DSM2 analysis was also used to evaluate potential for degradation of beneficial uses and water quality at specific intake locations across the Delta, and for further comparison to future scenarios that include cumulative conditions.

For this analysis, two California WaterFix scenarios produced by the California Department of Water Resources (DWR) were used as basis for the existing and future condition analyses. DWR's EBC2 scenario was used to represent existing conditions, and the Boundary 1 scenario was used to represent future conditions. The Boundary 1 scenario has been described by DWR as the model scenario that may result in the highest salinity in the western Delta resulting from adaptive management of the WaterFix project. Discharge from the Delta Diablo diffuser and the diversion of water at the City's intake were simulated for the EBC2 and Boundary 1 scenarios for project and without-project scenarios.

DSM2 model output describing hourly water quality at Antioch's drinking water intake was used, together with the Antioch operations model, to generate City diversions and brine discharge flow rates and salinity. Intake and brine discharge flow rates from the operations model were then used in DSM2 simulations by Exponent to evaluate salinity at several locations in the western Delta, including Antioch's intake location, Contra Costa Canal at Pumping Plant #1, the CCWD intakes on Old River and Middle River, Emmaton, and Jersey Point. Exponent simulated both with and without project scenarios for the full 16-year DSM2 simulation period (1976-1991) for the EBC2 and Boundary 1 scenarios and computed hourly salinity at the six Delta locations.

3.11.4 Impacts and Mitigation Measures

TABLE 3.11-4
SUMMARY OF IMPACTS – DELTA HYDROLOGY AND WATER QUALITY

Impacts	Significance Determinations
Impact 3.11-1: Changes in the location and timing of water diversion from the Delta, when combined with proposed discharges, could alter threshold concentrations established by the Regional Water Quality Control Board, or otherwise violate waste discharge or water quality standards.	LS
Impact 3.11-2: The proposed project could exceed applicable NPDES permit discharge standards.	LS
Impact 3.11-C-1: Implementation of the proposed project, in combination with other cumulative development, could contribute to cumulative degradation of water quality in the Delta	LS

NOTES:
LS = Less than Significant

Impact 3.11-1: Changes in the location and timing of water diversion from the Delta, when combined with proposed discharges, could alter threshold concentrations established by the Regional Water Quality Control Board, or otherwise violate waste discharge or water quality standards. ***(Less than Significant)***

Delta Flows

The City has pre-1914 appropriative water rights to divert water from the San Joaquin River along with the tributary flow from the Sacramento River. Under existing conditions, the City's operations utilize river water as much as possible given water quality and the existing pump station's 16 MGD fixed speed capacity constraints. When salinity at the City's intakes becomes too high, the City ceases diversions and meets all demands with purchased water from CCWD. Consistent with current City operations and the City of Antioch's pre-1914 water right, project implementation would include City diversion of up to 8 mgd of water to produce 6 mgd of desalinated water. Modeled City diversions by month for typical wet year and dry year conditions are shown in **Figures 2-13a and 2-14a**, Chapter 2.0, *Project Description*, and modeling was conducted over a 16-year period, with the average increase in annual diversions by the City of about 6,000 afy. In comparison to San Joaquin River flows in the vicinity of the proposed intake, this diverted volume represents less than 0.05 percent of total river flow (calculated from Exponent, 2018). Potential water quality effects associated with the discharge of concentrate from the RO process via the DD diffuser were examined using the Visual Plumes model and are identified in the "near-field" analysis discussion. Potential water quality impacts outside of the near-field were evaluated using the DSM2 model to review potential water quality changes at specific locations, and are described in the "far-field" impacts discussion.

Project implementation would likely result in a reduction in City of Antioch water purchases from CCWD, depending upon hydrologic year. The City's operational modeling over the 16-year period indicates that the reduction in CCWD water purchased would range from 0 afy to 6,900

afy, with an average reduction of 4,200 afy compared to existing conditions. It is beyond the scope of this analysis to review potential CCWD operational changes, if any, that may result from reduced purchases by the City of Antioch. CCWD operations are governed by several biological documents and water rights, none of which would be affected by reduced purchase of stored water, or as demonstrated in the analysis below, by project implementation. Additionally, DSM2 modeling for the far-field analyses includes CCWD diversions (with existing City of Antioch demands), and City of Antioch proposed diversions, and would therefore be considered conservative relative to potential effects to Delta operations, water quality, and beneficial uses.

Near-Field Impacts

The reverse osmosis desalination process would generate approximately 2 mgd of brine waste. Brine from the reverse osmosis system would be conveyed through an approximately 4.3-mile long, 12-inch-diameter dedicated pipeline (see Section 2.6.3, Brine Disposal for details). The diffuser pipe is 400 feet long and 42 inches in diameter, with three-inch diameter ports spaced eight feet on center and offset side to side, for a total of 50 ports discharging brine waste.

Extensive modeling of hydrologic and water quality conditions was performed using mixing and dispersion models to provide a quantitative basis from which to assess potential operational effects of the project alternatives associated with brine waste discharge on fisheries resources and aquatic habitats (see **Appendix D**). Dilution of brine water discharge was evaluated using the Visual Plumes UM3 model. The model evaluated dilution achieved by the Delta Diablo Sanitation District (DDSD) diffuser at the edge of the ZID[4] for the base (without-project) scenario and for project scenarios that assumed continuous operation of the proposed desalination facility.

As noted above, the simulated brine concentration of 32,000 mg/L is a conservatively high estimate for the salinity of the brine water discharge. This estimate relies on peak potential brine concentration for all modeled scenarios, and therefore will result in model output that has lower simulated dilution than typical / average conditions.

Table 3.11-5 provides numerical results for the modeled output, for each of the seven scenarios considered. Modeling of brine water discharge across different operation scenarios showed relatively minor increases in salinities in the effluent plume under the proposed project versus existing conditions (see also **Appendix D**, Table 8 of the Near-Field modeling results). As shown, the greatest hourly increase in TDS concentration at the ZID under the project would occur under Scenario 1 (fall 2013, dry conditions, 0 mgd wastewater discharge), where the project would cause TDS concentrations at the ZID to increase from 246 mg/L (without project) to 948 mg/L (with project), equivalent to an increase of 702 mg/L (values shaded in gray in table). The highest modeled concentration observed would occur under Scenario 3 (fall 2015, critical water year conditions, 0 mgd wastewater discharge), when peak TDS concentrations at the ZID under

[4] The ZID is defined as the area where mixing is driven primarily by the buoyancy and/or initial momentum of the discharge, and defines area where the process of initial dilution is completed. Therefore, the cumulative ZID across the 50 ports was used to determine the potential area of influence of brine discharge on aquatic species.

the project are estimated to reach 1062 mg/L (project) compared to 532 mg/L (without-project) (values shaded in gray in table). Both of these scenarios, when TDS concentrations were the highest, occurred under the combined effects of dry or critical water year conditions plus zero wastewater discharge (where wastewater discharge would otherwise act to dilute the brine), as well as under low hourly ambient water current conditions.

Scenarios 2, 4, 5, 6, and 7, which included wastewater discharge, exhibited substantially lower with-project TDS concentrations at the edge of the ZID. Based on the minimum dilution results, Scenarios 1 and 3 have the greatest potential for increase in TDS concentrations and are reviewed in additional detail.

During periods of minimum dilution, when TDS concentrations at the edge of the ZID are highest, the size of the ZID (plume size) is relatively small. Reductions in plume size under the project scenarios in comparison to without-project scenarios reflect a denser plume due to elevated TDS concentrations in the effluent. This reduces the length of the ZID (the distance traveled by the plume perpendicular to the diffuser), as the discharged effluent sinks more quickly relative to comparable without-project scenarios. Further, as described above, where TDS concentrations at the edge of the ZID are highest when dilution is lowest. Scenarios 1 and 3, identified above as having the greatest effect on TDS concentrations during periods of low ambient current, have an estimated distance to the ZID of only 2 feet and 3 feet, respectively when effluent is discharged into an ambient current of 0.55 feet per second (ft/s) and -0.54 ft/s, respectively. Therefore, during the peak hourly TDS concentrations at the edge of the ZID, only a very small area is affected.

During periods of high ambient current, the length to the edge of the ZID is also substantially smaller under the project scenarios, again reflecting an effluent with increased density. The hourly maximum distance to the edge of the ZID for Scenarios 1 and 3 occurs during discharge into an ambient current of 2.45 ft/s, and result in ZID lengths of 28 feet (project) versus 85 feet (without project) for Scenario 1, and 35 feet (project) versus 98 feet (without project) for Scenario 3. Therefore, results of the modeled analysis indicate that plumes become more concentrated under the project, but are also smaller in size, and therefore, have the potential to affect a smaller parcel of water during initial mixing.

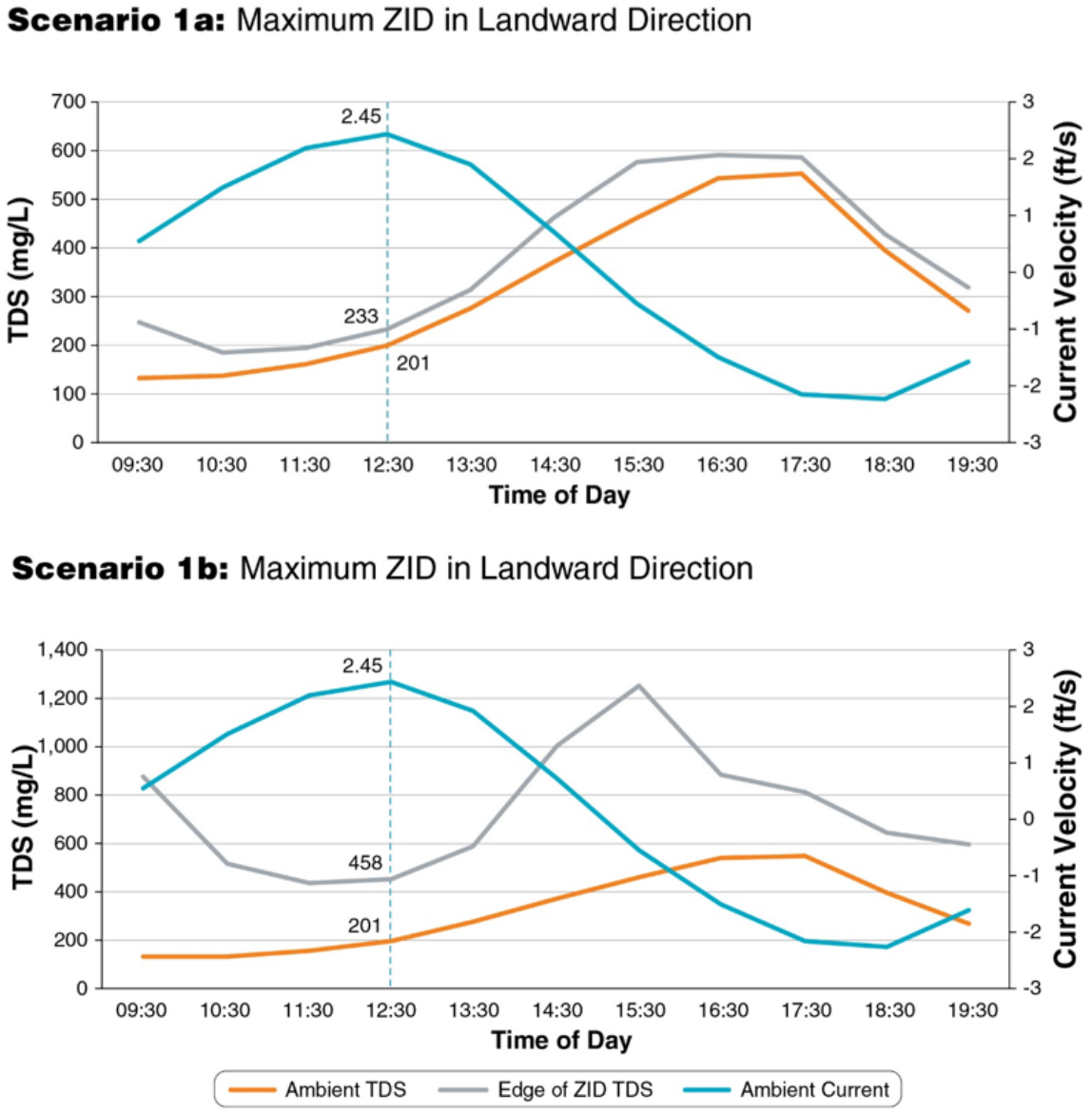
As noted above, Scenarios 1 and 3 show the greatest potential for salinity increase in the discharge plume; therefore, the following review of scenario-specific plume properties focuses on those two scenarios. **Figures 3.11-6** and **3.11-7** summarize results from the modeled analysis over an entire tidal cycle, for Scenario 1. The blue line in the figures represents current velocity, while ambient and discharge TDS are shown by the orange and grey lines, respectively. Comparing the without project and with project model results in **Figure 3.11-6**, which reveals generally higher TDS concentrations of the project in comparison to existing conditions. Nonetheless, ambient TDS is less than 8,500 mg/L at least 99.99 percent of the time based on the model scenario used for direct impacts (i.e., scenario EBC2, hourly data).

TABLE 3.11-5
NEAR-FIELD MODELED DILUTION RESULTS

Scenario		Total Flow (mgd)	Effluent TDS (mg/L)	Minimum Dilution and Plume Properties					Maximum ZID and Plume Properties				
				Minimum Dilution	Ambient TDS (mg/L)	TDS at ZID (mg/L)	Plume diameter (ft) [1]	Distance to edge of ZID (ft) [2]	Dilution	Ambient TDS (mg/L)	TDS at ZID (mg/L)	Plume diameter (ft)	Distance to edge of ZID (ft) [2]
1 Dry Year Max Recycled	a) Without-project (Min DDSD)	1.2	6346	55	135	**246**	**2**	**10**	191	201	233	2	85
	b) Project (Min DDSD)	3.2	22543	27	135	**948**	**3**	**3**	86	201	458	2	28
2 Dry Year Min Recycled	a) Without-project (Typical DDSD)	13.2	1285	55	464	479	17	21	599	201	203	24	1129
	b) Project (Typical DDSD)	15.2	5335	24	464	660	9	5	128	201	241	6	159
3 Critical Dry Year Max Recycled	a) Without-project (Min DDSD)	2.9	4835	63	464	**532**	**4**	**14**	167	201	228	3	98
	b) Project (Min DDSD)	4.9	15820	25	464	**1062**	**3**	**5**	99	201	357	3	35
4 Critical Dry Year Min Recycled	a) Without-project (Typical DDSD)	14.9	1611	34	135	177	12	10	337	201	205	16	559
	b) Project (Typical DDSD)	16.9	5198	24	135	341	9	5	133	201	238	7	170
5 Critical Dry Year Max Recycled-Spring	a) Without-project (Typical DDSD)	13.3	1257	45	464	481	14	16	325	201	204	13	663
	b) Project (Typical DDSD)	15.3	5288	23	464	662	8	5	119	201	243	6	126
6. Dry Year ADWF Baseline	a) Without-project (16 mgd)	18.2	1387	38	374	400	13	12	303	201	205	18	753
	b) Project (16 mgd)	20.2	4417	26	374	526	9	6	131	201	233	9	222
7 Dry Year PWWF Flow Winter	a) Without-project (32 mgd)	34.2	1127	33	374	396	16	10	223	201	205	26	348
	b) Project (32 mgd)	36.2	2832	34	374	444	16	12	218	201	213	27	512

NOTES:

1. For a plume diameter of 8 feet or less, plumes from individual ports do not merge. For plume diameters of more than 8 feet, individual plumes merge.
2. The distance from the diffuser to the edge of the ZID in one direction.
SOURCE: Exponent, 2018.



Note: The ambient current resulting in the maximum distance to the edge of the ZID is indicated by the vertical dashed line.
Source: Exponent, 2018.

Figure 3.11-6
Summary of TDS in ambient water and at the edge of ZID during a tidal cycle for Scenario 1 Without Project (TOP) and With Project (BOTTOM)

In general, the project results in a smaller plume and higher TDS concentrations at the edge of the ZID. The plume size and concentration varies over the tidal cycle, such that the effects of the project are greatest during slack tide and least when the ambient current is strongest. This situation is illustrated in **Figures 3.11-6**, which shows that the difference between ambient and edge of ZID TDS is largest following slack tide (zero ambient current). The difference between ambient and edge of ZID TDS narrows as soon as tidal flows begin to move again, and a similar cycle repeats during the next slack tide period. Model output illustrates similar results for the other scenarios. Therefore, while the project would increase TDS concentrations in effluent discharged through the diffuser, the increase in concentrations would be relatively small, the plumes would remain small relative to the width of the channel in New York Slough, and peak TDS concentrations would persist for a relatively short period of time. Additionally, modeled increases in TDS are well within the range of existing variability observed in the vicinity of the project (i.e., up to approximately 8,500 mg/L, as shown in **Figure 3.11-4**) up to at least 99.99% of the time. Therefore, project-related changes are not expected to noticeably alter or interfere with any beneficial use in the project area or its vicinity, and near-field impacts are considered **less than significant**.

Far-Field Impacts

For long-term or continuous discharges, concentrations of TDS from discharged effluent will reach a pseudo-steady state within the Delta over time, reflecting the balance between supply from the discharge location and the removal of discharged effluent from the Delta via advection and tidal flushing. The potential effects of the project on Delta water quality and beneficial uses at several locations in the western Delta beyond the edge of the ZID (i.e., in the far-field, away from the near-field zone at the point of discharge) were evaluated using DSM2. DSM2 model output describing water quality for the EBC2 and Boundary 1 scenarios (generated by DWR) were used as input to the Antioch operations model (described in Section 3.1.4) to compute City diversions and brine flow rates and salinity with and without the project over the 16-yr simulation period.[5] The discharge of brine by the City via the DDSD diffuser was included in DSM2 simulations for the existing condition (EBC2) and future with-project (Boundary 1) scenarios by Exponent to evaluate far-field salinity impacts at several locations in the western Delta, including Antioch's intake location, Contra Costa Canal at Pumping Plant #1, the CCWD intakes on Old River and Middle River, Emmaton, and Jersey Point. Hourly salinity over the 16-yr modeled period at the six Delta locations from the project DSM2 simulations was compared to salinity from the without-project DSM2 simulations to determine potential impacts (Exponent, 2018).

[5] In the near-field dilution evaluations, the salinity of the brine was assumed to be a constant 32,000 mg/L. In contrast, for the far-field model evaluations, the brine salinity was calculated for each hourly time step as a function of the ambient salinity (i.e., the salinity at the City's intake)."

Figures 3.11-7 to 3.11-10 summarize results from the far-field analysis for all modeled scenarios at the Delta compliance locations noted previously. These box-and-whisker plots show modeled median concentration (black bar), 75th percentile (top box), 25th percentile (bottom box), maximum (top whisker), and minimum (bottom whisker).[6] As shown, in all cases, changes in electrical conductivity[7] associated with the project would be nearly indistinguishable when summarized by water year type. Specifically, project related increases in electrical conductivity would be less than 17 micro-Siemens per centimeter (µS/cm) under the project during all water year types (see also **Tables 3.11-6** and **3.11-7**). These changes are equivalent to less than a 0.25 percent increase in comparison to baseline / without project conditions, including for median, 75th and 25th percentile, minimum, and maximum measured values. Additionally, as shown in **Figures 3.11-7 to 3.11-10**, these results hold for each of the modeled locations, including during all water years including those classified as critical, dry, normal, and wet years.

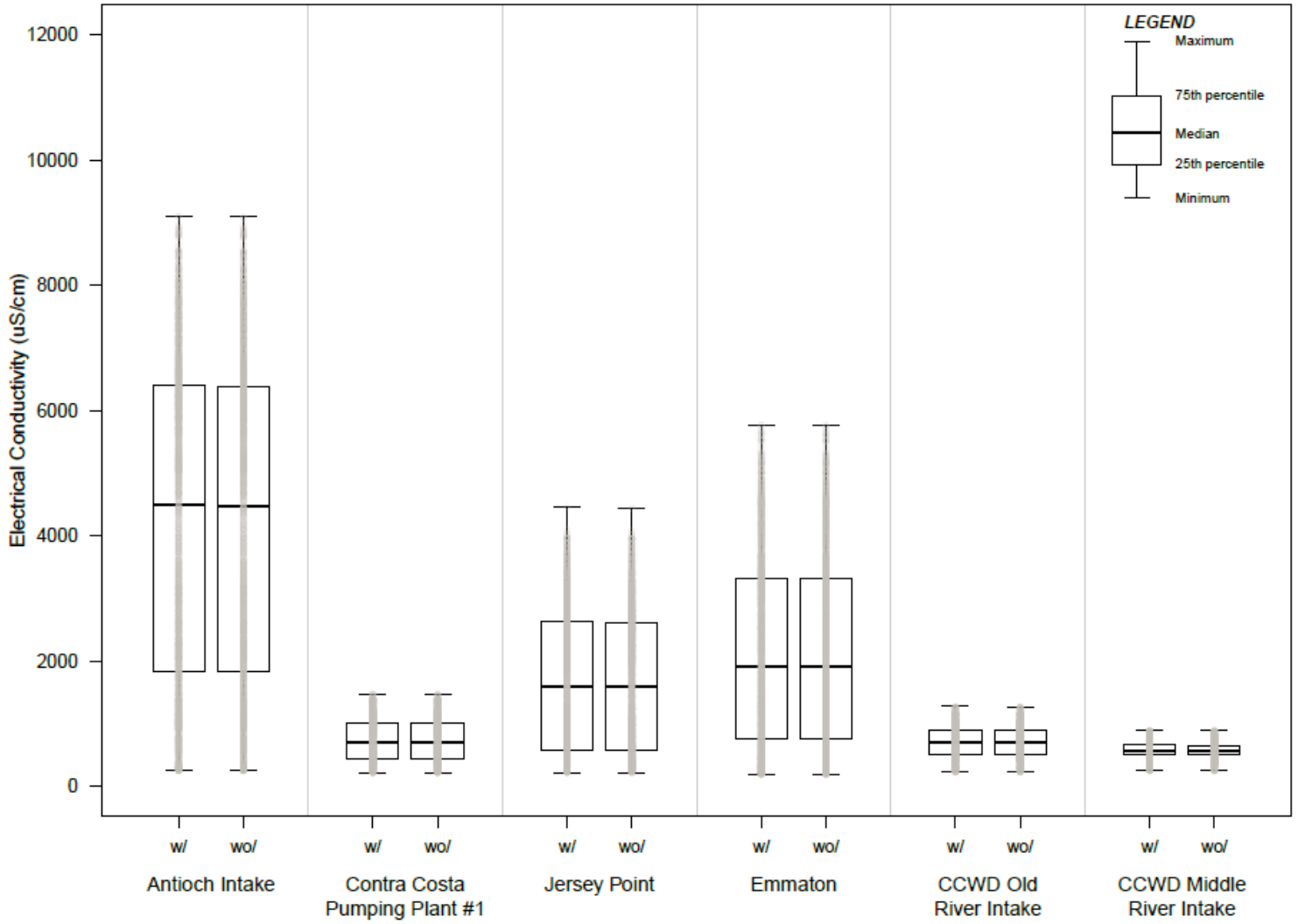
Table 3.11-6 summarizes modeled outcomes for without project and with project conditions, at each compliance location, and during each water year category, including median, 75th percentile, and maximum values for each. Net change associated with the project is shown in the *Difference* column. As shown, the greatest change in electrical conductivity was observed at the Antioch Intake site during normal water years, for the maximum value category, with an increase of 17 µS/cm (or 0.19%), when modeled conductivity increased from 9,011 under baseline conditions to 9,028 µS/cm with implementation of the project. Modeled results also showed a net increase of 16 µS/cm for the maximum value category during critical water years at the Antioch Intake, 14 µS/cm during dry years, and 15 µS/cm during wet years, all with background conductivities of at least 9,000 µS/cm and resulting in a change of 0.19% or less. Modeled results at all other compliance points indicated a difference of 10 µS/cm or less, including at CCWD's existing intakes and pumping plants. These changes are smaller than existing fluctuations in ambient water quality that occur over the course of a typical tidal cycle.

Table 3.11-7 provides additional detail of the far-field model analysis, including monthly average percent contribution of project discharges to electrical conductivity over the 16-year simulation period. As shown, the project contributed less than 0.15 percent of total conductivity, on average, during all months and water year types. During wet years, the project would contribute less than 0.1 percent of total conductivity during all months and at all identified locations. Project contributions range from 0.1 to 0.15 percent during September through January of Normal water years, during August through February in Dry water years, and during June through February of Critical water years. Outside of these months, project contributions to conductivity at CCWD's intakes would be less than 0.1 percent.

6 The percentiles, median, minimum, and maximum values were selected in order to provide a standardized and comparable summary of modeled results completed in support of the project. 25th and 75th percentiles collectively encompass the middle 50% of the data, and therefore summarizes the spread of electrical conductivity modeled results across the overall results distribution.

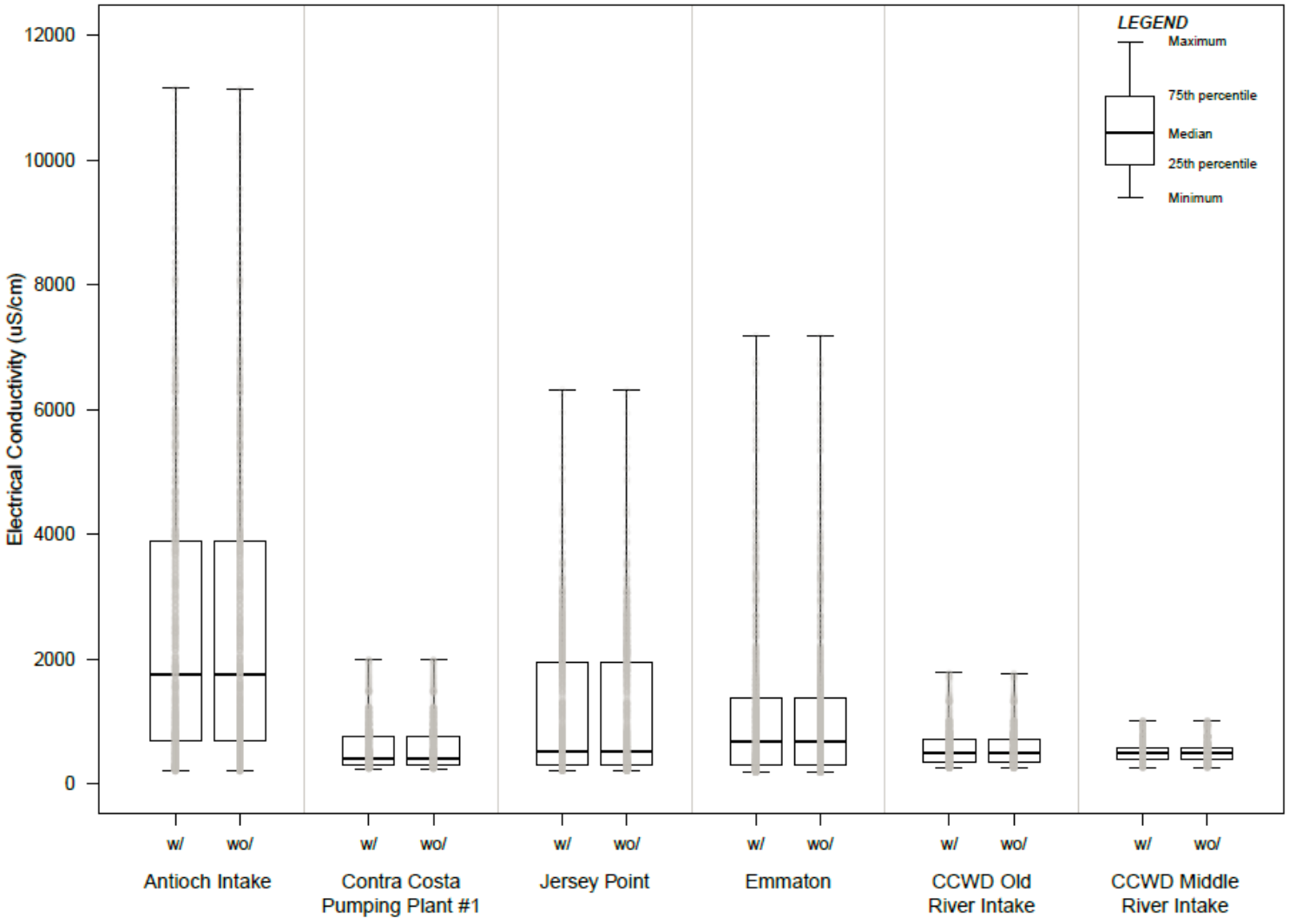
7 Results are reported as electrical conductivity rather than as TDS concentration because the conversion to TDS concentration varies spatially across the Delta; because DSM2 model output for salinity is provided as electrical conductivity, leaving far-field results as electrical conductivity facilitates intercomparison between compliance points.

These changes are identifiable within these modeled scenarios; however, under far-field conditions, these changes are smaller than existing fluctuations in ambient water quality that occur over the course of a typical tidal cycle, and would be difficult to measure. Additionally, none of the modeled scenarios would result in an increase in electrical conductivity that would prevent or impede withdrawal of Delta water by other users for municipal, agricultural, or industrial supply. Furthermore, these changes are not expected to be noticeable or interfere with other beneficial uses relevant to the Delta, and would likely be impossible to detect in most cases. Therefore, the potential changes in electrical conductivity (and therefore in TDS) associated with the project would be **less than significant**.



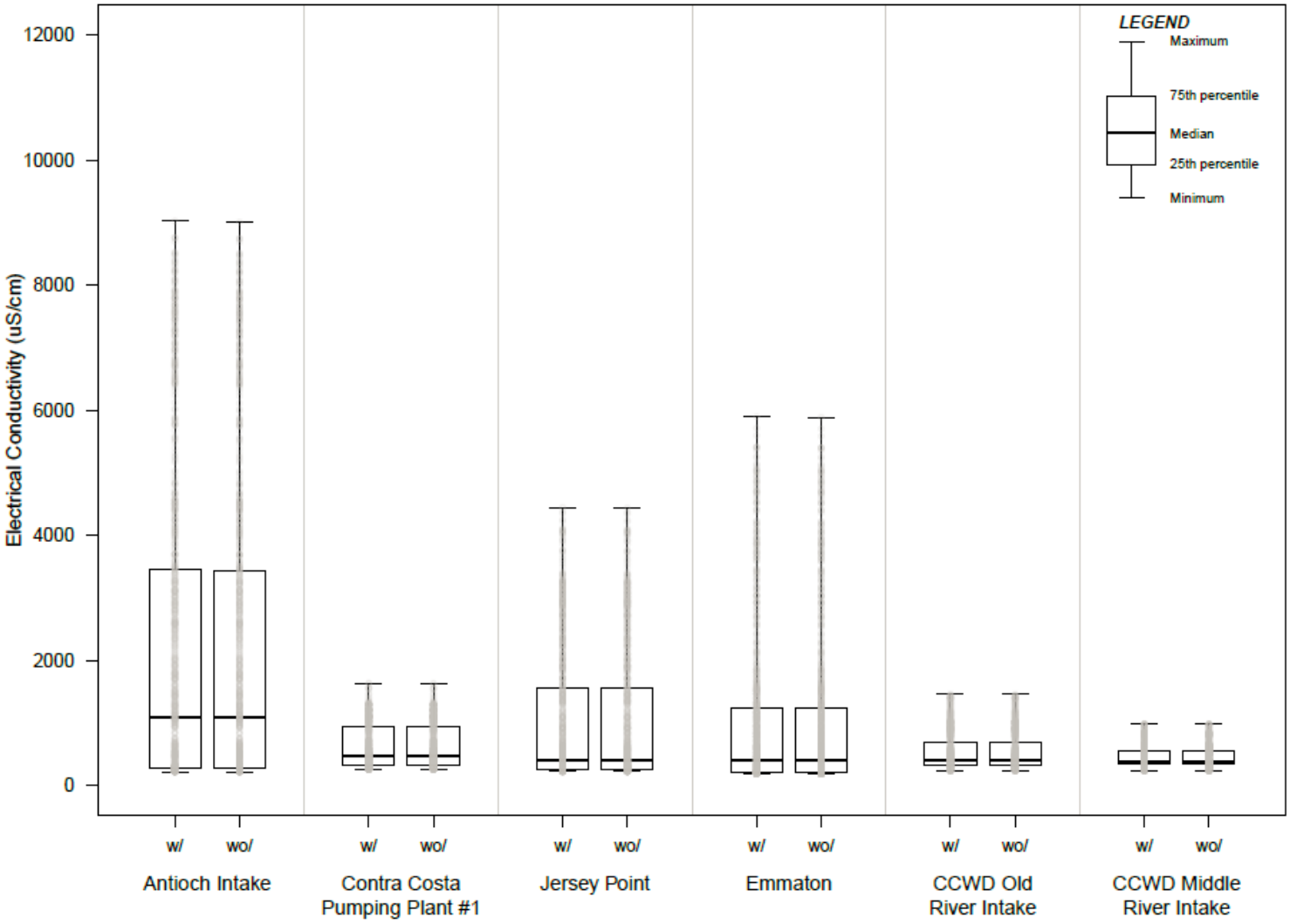
Source: Exponent, 2018

Figure 3.11-7
Project and Without Project Electrical Conductivity During Critical Water Years



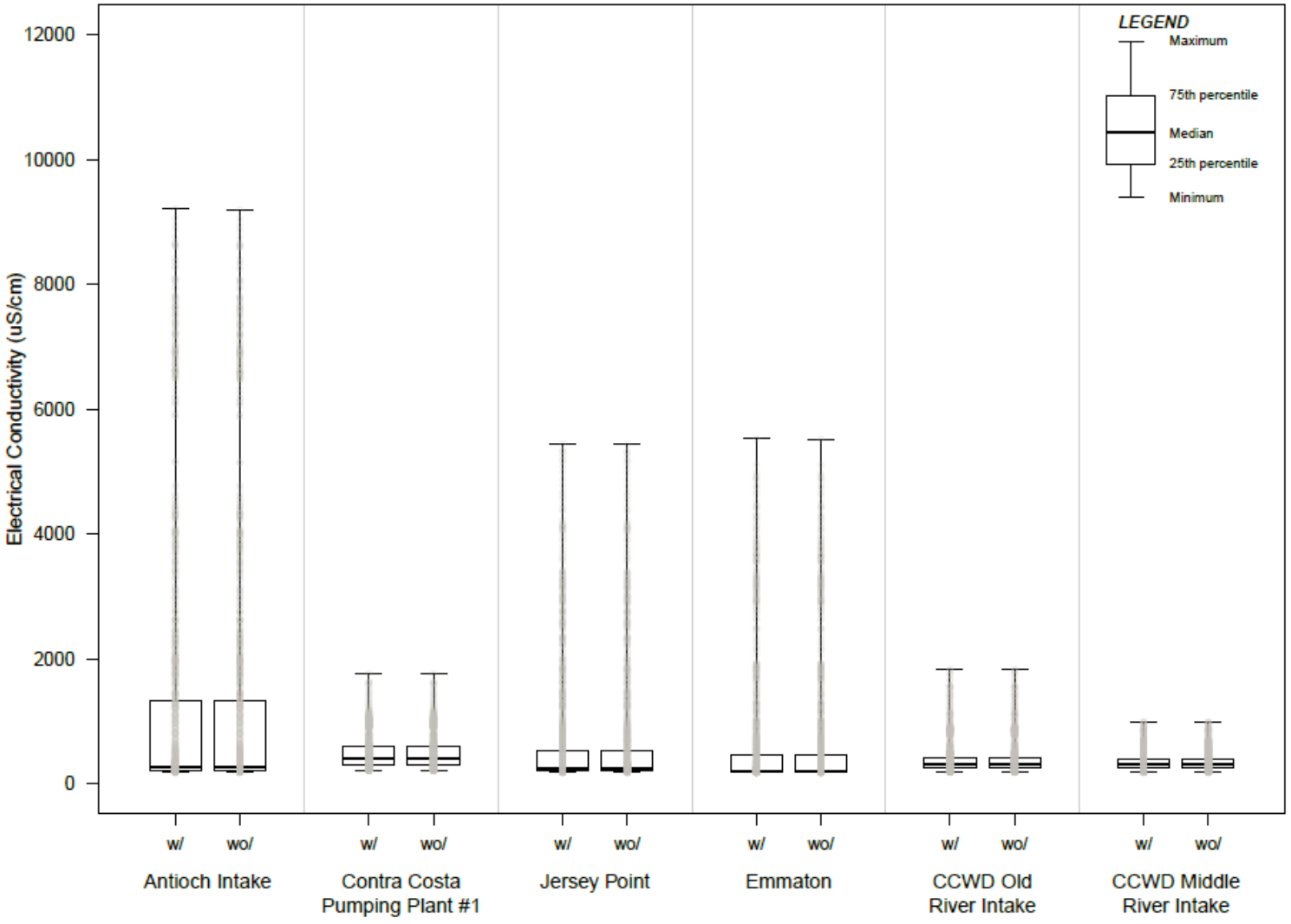
Source: Exponent, 2018

Figure 3.11-8
Project and Without Project Electrical Conductivity During Dry Water Years



Source: Exponent, 2018

Figure 3.11-9
Project and Without Project Electrical Conductivity During Normal Water Years



Source: Exponent, 2018

Figure 3.11-10
Project and Without Project Electrical Conductivity During Wet Water Years

TABLE 3.11-6
FAR-FIELD MODEL RESULTS SUMMARY, ELECTRICAL CONDUCTIVITY (µS/CM)

Location	Station	Median			75th Percentile			Maximum		
		Project	No Project	Difference	Project	No Project	Difference	Project	No Project	Difference
Normal Water Years										
Antioch Intake	RSAN007	1,094	1,092	1.3	3,442	3,434	7.9	9,028	9,011	17
Contra Costa Pumping Plant #1	CHCCC006	475	475	0.3	933	932	1.5	1,635	1,632	2.9
Jersey Point	RSAN018	390	389	0.52	1,551	1,548	2.9	4,446	4,436	9.4
Emmaton	RSAC092	395	395	0.095	1,228	1,226	2.4	5,897	5,887	10
CCWD Old River Intake	ROLD034	391	391	0.054	684	683	0.48	1,460	1,457	2.8
CCWD Middle River Intake	CHVCT000	385	385	0.064	555	555	0.48	984	983	1.4
Critical Water Years										
Antioch Intake	RSAN007	4,487	4,476	11	6,403	6,389	14	9,108	9,092	16
Contra Costa Pumping Plant #1	CHCCC006	702	702	0.99	1,014	1,013	1.7	1,471	1,468	2.7
Jersey Point	RSAN018	1,594	1,591	2.9	2,620	2,614	6.1	4,449	4,439	10
Emmaton	RSAC092	1,914	1,911	3.6	3,315	3,309	6.2	5,773	5,763	9.3
CCWD Old River Intake	ROLD034	706	706	0.51	897	895	1.4	1,270	1,268	2.3
CCWD Middle River Intake	CHVCT000	554	553	0.42	653	652	0.79	887	885	1.4
Dry Water Years										
Antioch Intake	RSAN007	1,757	1,754	3.8	3,898	3,889	8.1	11,155	11,141	14
Contra Costa Pumping Plant #1	CHCCC006	390	390	0.23	765	764	1.2	1,989	1,986	3.4
Jersey Point	RSAN018	512	511	0.81	1,944	1,940	4.2	6,318	6,307	11
Emmaton	RSAC092	677	676	1.2	1,369	1,367	2.3	7,183	7,172	11
CCWD Old River Intake	ROLD034	494	494	0.2	706	705	1.1	1,773	1,770	3
CCWD Middle River Intake	CHVCT000	489	489	0.43	574	574	0.0012	1,011	1,010	1.3
Wet Water Years										
Antioch Intake	RSAN007	265	265	-0.00012	1,323	1,321	2.2	9,217	9,202	15.4
Contra Costa Pumping Plant #1	CHCCC006	396	395	0.073	590	590	0.0011	1,765	1,761	3.4
Jersey Point	RSAN018	245	245	0.0014	531	531	0.71	5,445	5,434	11
Emmaton	RSAC092	193	193	0.000031	453	453	0.17	5,530	5,521	9.2
CCWD Old River Intake	ROLD034	300	300	0.000091	406	405	0.28	1,828	1,825	3.6
CCWD Middle River Intake	CHVCT000	306	306	0.092	400	399	0.33	990	989	1.5

TABLE 3.11-7
FAR-FIELD MODEL RESULTS, DETAIL BY WATER YEAR TYPE: AVERAGE PERCENT CONTRIBUTION OF THE PROJECT TO ELECTRICAL CONDUCTIVITY, BY SITE (PERCENT)

Water Year Type / Station	Location	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Critical													
RSAN007	Antioch Intake	0.130	0.130	0.128	0.136	0.107	0.094	0.073	0.083	0.106	0.123	0.143	0.147
CHCCC006	CCWD Pump Plant #1	0.095	0.087	0.084	0.091	0.072	0.044	0.023	0.014	0.026	0.067	0.106	0.106
RSAN018	Jersey Point	0.128	0.122	0.132	0.125	0.094	0.065	0.041	0.059	0.089	0.135	0.148	0.147
RSAC092	Emmaton	0.100	0.100	0.099	0.091	0.072	0.052	0.044	0.056	0.078	0.098	0.114	0.117
ROLD034	CCWD Old River	0.087	0.078	0.084	0.086	0.062	0.038	0.020	0.011	0.022	0.076	0.106	0.104
CHVCT000	CCWD Middle River	0.047	0.039	0.050	0.061	0.042	0.024	0.014	0.008	0.009	0.048	0.082	0.072
Dry													
RSAN007	Antioch Intake	0.079	0.096	0.082	0.117	0.093	0.046	0.017	0.047	0.073	0.096	0.117	0.130
CHCCC006	CCWD Pump Plant #1	0.044	0.036	0.037	0.045	0.053	0.024	0.005	0.001	0.005	0.050	0.091	0.101
RSAN018	Jersey Point	0.064	0.071	0.084	0.106	0.073	0.025	0.005	0.015	0.051	0.113	0.138	0.137
RSAC092	Emmaton	0.055	0.059	0.056	0.075	0.048	0.016	0.007	0.022	0.046	0.074	0.093	0.102
ROLD034	CCWD Old River	0.038	0.034	0.045	0.061	0.044	0.019	0.005	0.002	0.004	0.056	0.098	0.099
CHVCT000	CCWD Middle River	0.019	0.016	0.027	0.040	0.027	0.011	0.003	0.001	0.001	0.030	0.071	0.068
Normal													
RSAN007	Antioch Intake	0.129	0.136	0.120	0.095	0.020	0.000	0.000	0.000	0.016	0.068	0.097	0.129
CHCCC006	CCWD Pump Plant #1	0.077	0.079	0.086	0.077	0.044	0.014	0.001	0.000	0.000	0.008	0.044	0.066
RSAN018	Jersey Point	0.124	0.122	0.131	0.069	0.009	0.000	0.000	0.000	0.003	0.055	0.103	0.105
RSAC092	Emmaton	0.098	0.103	0.090	0.031	0.005	0.000	0.000	0.000	0.006	0.038	0.067	0.087
ROLD034	CCWD Old River	0.074	0.077	0.093	0.067	0.008	0.001	0.000	0.000	0.000	0.011	0.043	0.060
CHVCT000	CCWD Middle River	0.035	0.040	0.066	0.045	0.002	0.000	0.000	0.000	0.000	0.003	0.017	0.029
Wet													
RSAN007	Antioch Intake	0.074	0.078	0.051	0.033	0.003	0.000	0.000	0.000	0.015	0.049	0.070	0.094
CHCCC006	CCWD Pump Plant #1	0.056	0.053	0.047	0.027	0.005	0.003	0.001	0.000	0.000	0.008	0.029	0.044
RSAN018	Jersey Point	0.075	0.078	0.051	0.025	0.002	0.000	0.000	0.000	0.005	0.047	0.075	0.063
RSAC092	Emmaton	0.057	0.053	0.029	0.016	0.000	0.000	0.000	0.000	0.008	0.029	0.049	0.046
ROLD034	CCWD Old River	0.052	0.058	0.048	0.025	0.004	0.000	0.000	0.000	0.000	0.009	0.029	0.035
CHVCT000	CCWD Middle River	0.026	0.034	0.036	0.018	0.002	0.000	0.000	0.000	0.000	0.002	0.010	0.015

Source: Exponent, 2018.

Potential release of pollutants associated with construction of the proposed facilities is addressed in Section 3.10, *Local Hydrology and Water Quality*. The project would not result in other operational sources of water quality contamination or pollution. Specifically, the reverse osmosis system would not result in the dosing or addition of other water quality pollutants or other chemicals into the brine stream. Therefore, the project would not release or contribute to the release of new or increased loads of water quality pollutants that could degrade receiving water quality. Refer to Impact 3.11-2 for a discussion of relevant toxicity parameters.

Finally, as shown in **Table 3.11-8**, the project would be consistent with applicable policies included in the Delta Plan.

TABLE 3.11-8
APPLICABLE PLANS AND POLICIES

Policies	Consistency
Delta Plan	
WQ R1 Water quality in the Delta should be maintained at a level that supports, enhances, and protects beneficial uses identified in the applicable State Water Resources Control Board or regional water quality control board water quality control plans.	**No Conflict.** As discussed previously, the project would not result in the deterioration of water quality in the Delta, such that beneficial uses would be affected. Potential water quality degradation would be limited in extent, would be within the existing range of water quality levels, with peak levels limited to short periods of time during slack tide. As such, the project would not degrade or cause the degradation of water quality in the Delta such that beneficial uses would be affected, and the project is consistent with WQ R1 of the Delta Plan.
WQ R2 Covered actions should identify any significant impacts to water quality.	**No Conflict.** The present analysis contained in this section reviews potential for the project to cause or create significant impacts to water quality. No significant or potentially significant impacts were identified. The project is consistent with WQ R2 of the Delta Plan.

In summary, the project would generate effluent that would contain higher concentrations of dissolved solids (salts) in comparison to Delta Diablo's existing discharge. These changes would alter the density of the discharge plume, such that the plume would be smaller and more concentrated in comparison to existing conditions. Nonetheless, these changes would be limited temporally and spatially. Additionally, the near-field model analysis relied on highly conservative assumptions, including that the project would produce a brine with a constant concentration of 32,000 mg/L, equivalent to consistently drawing water with a TDS concentration of 8,000 mg/L (i.e., brine have a salinity four times that of the intake water). This is a considerable overestimate. Actual intake TDS concentrations would be below 7,000 mg/L at least 95 percent of the time, and below 3,000 mg/L at least 60 percent of the time (**Figure 3.11-4**). As such, brine concentrations would be comparatively lower than 32,000 mg/L (assumes fourfold concentration) in all but a handful of cases, as TDS is less than 8000 mg/L 99.99 percent of the time for EBC2 and 99.95 percent of the time for Boundary 1. As a result, discharges from the project are not expected to substantially affect beneficial uses.

Outside of the immediate dilution zone, DSM2 model analysis estimated changes in electrical conductivity (as a proxy for TDS) at six key locations across the Delta during critical, dry, normal, and wet water years. Changes in electrical conductivity were 17 µS/cm or less, equivalent to a change of 0.15 percent or less. Most modeled changes in electrical conductivity were even smaller, including at all CCWD facilities. These changes are not likely detectable using industry standard field measurement equipment. Finally, the project would not conflict with relevant stipulations of the Delta Plan, and would not introduce other sources of water quality pollutants during operation. Therefore, potential impacts related to Delta water quality, operations, or beneficial uses are considered **less than significant**.

Mitigation Measure:

None required.

Impact 3.11-2: The proposed project could exceed applicable NPDES permit discharge standards. ***(Less than Significant)***

As shown in **Table 3.11-2**, Delta Diablo's existing NPDES permit includes water quality effluent limitations for the following constituents: BOD, TSS, Oil and Grease, pH, Total Residual Chlorine, Copper (total recoverable), Cyanide (total), Dioxin-TEQ, and Total Ammonia (as N). The brine produced by the project would not add a new category of water quality pollutants to Delta Diablo's effluent stream. However, existing water quality pollutants in Delta waters would remain in the brine produced by the project. From a mass load perspective, the project would not alter the total mass of any such constituent in Delta waters: all constituents in the Delta source water taken into the proposed system would be released back into the Delta. However, the proposed RO system would concentrate these constituents by up to a factor of 4, which would be diluted both by other flows prior to discharge (e.g., treated wastewater, cooling water flows from generating stations) and by ambient flows in the Delta just beyond the point of discharge. To assess potential for conflict with Delta Diablo's NPDES permit, existing water quality impairments within the Western Delta, and the project's potential to contribute to water quality degradation for each of the constituents regulated under the permit was evaluated.

Biochemical Oxygen Demand (BOD). Levels of BOD in project effluent could be caused by very high concentrations of dissolved or particulate organic matter. Delta waters contain dissolved and particulate organic matter. However, the increase in BOD caused by the project would be small relative to background concentrations of BOD in the Delta, and therefore would not meaningfully contribute to BOD values in effluent, in comparison to baseline conditions.

Total Suspended Solids (TSS) concentrations in the Delta can vary widely, from as low as 1 to 2 mg/L to very high values that occasionally exceed 1,000 mg/L. However, suspended solids would be screened out of the proposed system during pre-treatment and disposed of separately, upstream of the reverse osmosis units, in order to prevent fouling of the membranes. This removal process would ensure that residual TSS, even when concentrated during the reverse osmosis process, would be minimal, and would not contribute to elevated TSS concentrations in project effluent.

Oil and Grease. Oil and grease are typically introduced through mechanical equipment or runoff from roadways or industrial facilities. Delta waters do not contain significant levels of oil and grease. Additionally, project equipment would not include mechanical equipment where oil or grease could come into contact with water. Therefore, the project would not contribute to elevated oil and grease concentrations in effluent.

pH. As shown in **Table 3.11-1**, the Western Delta does not have an existing impairment for pH, which is expected to be near neutral both at intake and in the brine following reverse osmosis. Therefore, the project would not meaningfully contribute to elevated or reduced pH levels in project effluent.

Total Residual Chlorine. Chlorine is a disinfectant used at the existing Delta Diablo facility to minimize bacteriological and viral constituents in discharged wastewater. Chlorine is not utilized in the reverse osmosis process. Therefore, the project would not contribute to elevated levels of chlorine in project effluent.

Copper, Total Recoverable. Copper can be a substantial concern in industrial facilities where very soft water (i.e., with low TDS) and/or water with low pH is in contact with copper plumbing and other copper fixtures. In contrast, water produced by the proposed reverse osmosis system would have high TDS concentrations and near neutral pH. The Western Delta is not identified as water quality limited for copper. As such, the project is not expected to contribute elevated copper levels to project effluent. Water quality data from the Regional Monitoring Program (RMP) for Sacramento/San Joaquin River indicate source water copper levels have an average concentration of 2.5 µg/L. Assuming the RO process results in a 4 times concentration of constituents, copper concentrations in brine generated by the RO process would average approximately 10 ug/L. Recent Delta Diablo effluent copper concentrations are approximately 5.5 ug/L,[8] and Delta Diablo's NPDES effluent limit for copper is 35 ug/L. Using the Delta Diablo effluent flow scenarios previously identified [0 mgd (maximum recycled water use) and 12 mgd (typical operations)], corresponding copper concentrations would be 10 ug/L (0 mgd) and 6.14 ug/L,(12 mgd), both of which would comply with the effluent limit established to be protective of aquatic life beneficial uses.

Dioxin. Dioxin is highly toxic and generated during the incomplete combustion of various substrates. The project would not operate any equipment or support any activities that would generate or release dioxin. Additionally, the Western Delta is not identified as water quality limited for dioxin. Therefore, the project is not expected to contribute elevated dioxin levels to project effluent.

Total Ammonia. Ammonia is a commonly regulated constituent from municipal wastewater treatment discharges. However, the proposed reverse osmosis system would not include any elements or components that could release ammonia. Additionally, the Western Delta is not listed as water quality limited for ammonia. As such, the project is not expected to contribute elevated ammonia levels to project effluent. Water quality data from the Regional Monitoring Program

[8] SWB CIWQS database. Available copper data from June 2011 – December 2017. Arithmetic average with two outlier values of 16 and 49 ug/L excluded.

(RMP) for Sacramento/San Joaquin River indicate source water ammonia (NH_3) levels have an average concentration of 0.07 mg/L.[9] Assuming the RO process results in a 4 times concentration of constituents, ammonia concentrations in brine generated by the process would average approximately 0.28 ug/L. Recent Delta Diablo effluent ammonia concentrations are approximately 45 mg/L. Delta Diablo's NPDES effluent limit for ammonia is 170 mg/L. Using the Delta Diablo effluent flow scenarios previously identified of 0 mgd (maximum recycled water use) and 12 mgd (typical operations), corresponding ammonia concentrations would be 0.28 ug/L (0 mgd) and 38.6 ug/L,(12 mgd), both of which would comply with the effluent limit established to be protective of aquatic life beneficial uses.

As discussed above, the project is not expected to generate or result in elevated levels of constituents identified in Delta Diablo's current NPDES Permit. Project implementation would include, through agreement between the City of Antioch and Delta Diablo, integration of brine disposal into Delta Diablo's NPDES permit reissuance as part of the regular NPDES permit review cycle, which is scheduled for 2019. The NPDES Permit incorporates the water quality objectives from the Basin Plan that are protective of beneficial uses of the receiving waters. Project implementation would be required to comply with Delta Diablo's NPDES permit requirements, and is not anticipated to result exceedance of effluent limitations. Therefore, potential impacts are considered less than significant.

Mitigation Measure:

None required.

Cumulative Impacts

Impact 3.11-C-1: Implementation of the proposed project, in combination with other cumulative development, could contribute to cumulative degradation of water quality in the Delta. ***(Less than Significant)***

This cumulative impacts analysis focuses on the far-field effects of the proposed project, which considers the effects of the proposed system across the Western and Western-Central Delta. The modeled cumulative far-field scenario includes implementation of WaterFix, as well as other relevant cumulative scenario projects listed in Chapter 2.0, Project Description. As discussed for direct impacts, for long-term or continuous discharges, the concentrations of TDS from discharged effluent would reach a long-term, pseudo-steady state within the Delta over time and represent the balance between supply from the discharge location and the removal of discharge discharged effluent from the Delta via flushing. Far-field changes therefore represent the potential for the project, in consideration of other cumulative scenario projects, to generate water quality impacts that could develop over time, and that could affect locations within the Delta.

Analogous to the direct impact analysis, **Figures 3.11-11 to 3.11-14** summarize results from the cumulative scenario far-field analysis, for all modeled scenarios, at the following Delta locations:

[9] SFEI RMP database. Average of BG20 (Sacramento River) and BG30 (San Joaquin River) stations. Available ammonia data from June 2011 – December 2017.

the Antioch Intake, Contra Costa Pumping Plant No. 1, Jersey Point, Emmaton, CCWD's Old River Intake, and CCWD's Middle River Intake. As shown, in all cases, changes in electrical conductivity associated with the project would be less than 17 µS/cm under the project during all water year types. Specifically, changes in maximum conductivity of 14 or 15 µS/cm were identified during normal and critical water years when electrical conductivity exceeded 11,000 µS/cm or 10,000 µS/cm under the cumulative without project scenario, and during normal, critical, and dry years for 75th percentile electrical conductivity, when values exceeded 6,200 µS/cm even without the project. Therefore, similar to direct impacts, these changes are equivalent to a 0.23-percent-or-less increase in comparison to baseline / without project conditions, including for median, 75th and 25th percentile, minimum, and maximum measured values. Additionally, these results hold for each of the modeled locations, including during all water years including those classified as critical, dry, normal, and wet years.

The largest changes in electrical conductivity are anticipated to occur at the Antioch Intake site. Modeled results at all other compliance points indicated a difference of 9.4 µS/cm or less, including at CCWD's existing intakes and pumping plants. These changes are computed by DSM2 for the modeled scenarios; however, under cumulative scenario far-field conditions, these changes would be difficult or impossible to detect based on the accuracy of industry standard instrumentation. Additionally, neither of the modeled cumulative scenarios would result in an increase in electrical conductivity that would prevent or impede withdrawal of Delta water by other users for municipal, agricultural, or industrial supply. Furthermore, these changes would not interfere with other beneficial uses in the Delta, and would be impossible to detect in most cases.

Other cumulative scenario projects are not expected to include discharge of brine from reverse osmosis. Instead, cumulative scenario projects focus primarily on changes to water supply management within the Delta. Although WaterFix has the potential to change EC within the Delta, as demonstrated above, the project's potential contribution to EC change is incidental. Therefore, the project's contribution to incremental increases in EC would not affect Delta beneficial uses, and would not be cumulatively considerable. Therefore, this impact is considered **less than significant**.

Finally, with respect to NPDES permit discharge standards at Delta Diablo's existing wastewater outfall, no other cumulative scenario projects would be expected to alter or worsen the quality of discharge from Delta Diablo's diffuser. Therefore, **no cumulative impact** would occur related to exceedance of applicable NPDES permitted discharges.

Mitigation Measure:

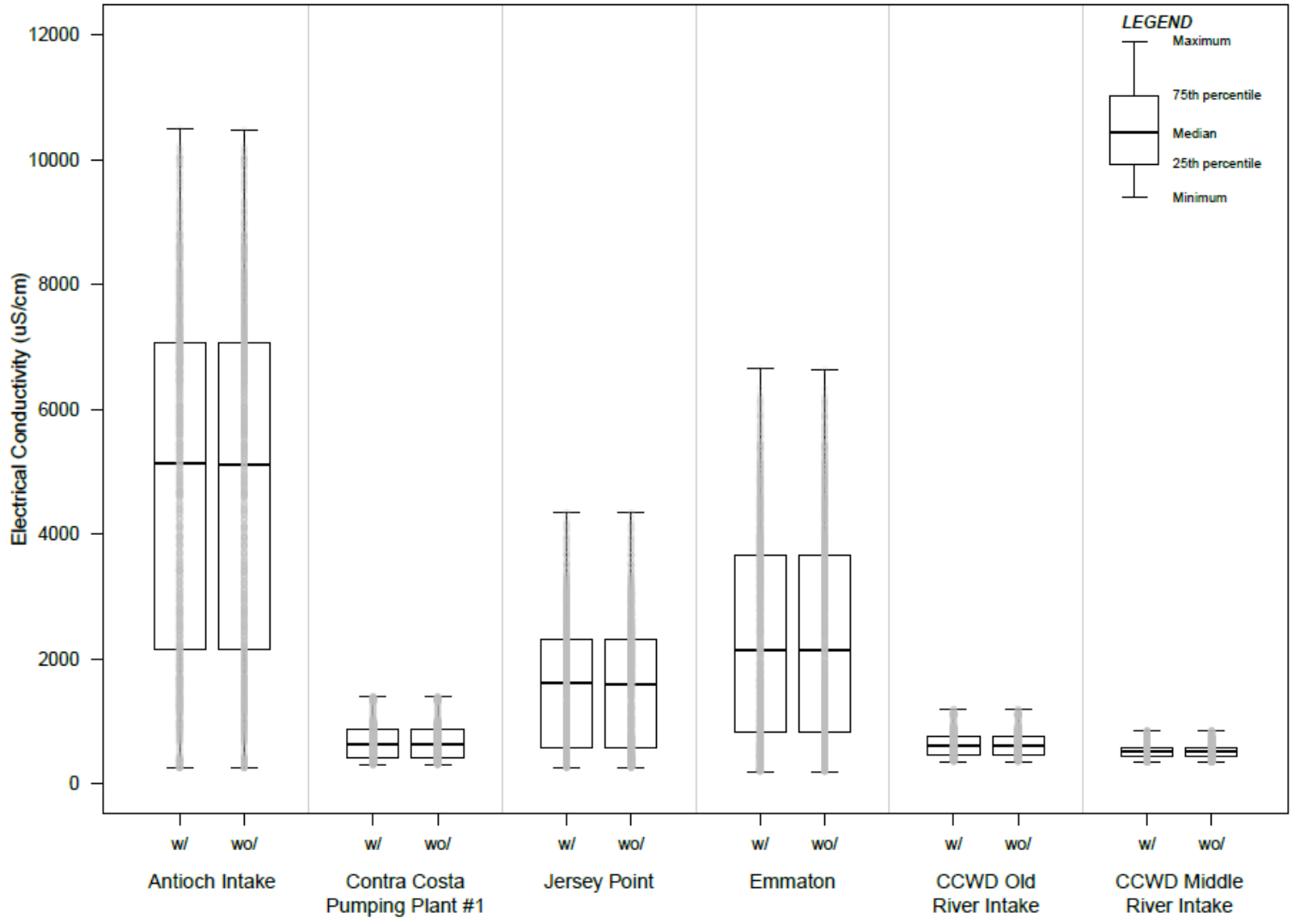
None required.

Impact 3.11-C-2: Implementation of the proposed project, in combination with other cumulative development, could potentially affect the timing of outfall capacity limitations associated with development identified under the Delta Diablo Master Plan. ***(Less than Significant)***

The Delta Diablo outfall capacity is expected to provide adequate capacity to accommodate growth within the Delta Diablo service area; however, outfall capacity constraints were identified in the Master Plan. Replacement or modification of the outfall is identified in the Delta Diablo Master Plan as a potential future improvement. Project implementation would contribute 2 mgd of brine downstream of treatment plant processes when the desalination plant is operating. Depending upon development rates within the Delta Diablo service area, the project's increment of brine, in combination with effluent generated within the service area, could alter the timeframe at which capacity of the outfall is reached. However, the project's contribution would be primarily during summer and fall months, when peak wet weather flows would not be anticipated, and recycling would be highest, thereby reducing the amount of effluent discharged via the outfall. As such, the project's increment would not be cumulatively considerable, and would only be considered a contribution when and if planned development in the Delta Diablo service area occurs such that outfall capacity is reached. Therefore, the City's contribution is considered **less than cumulatively considerable**.

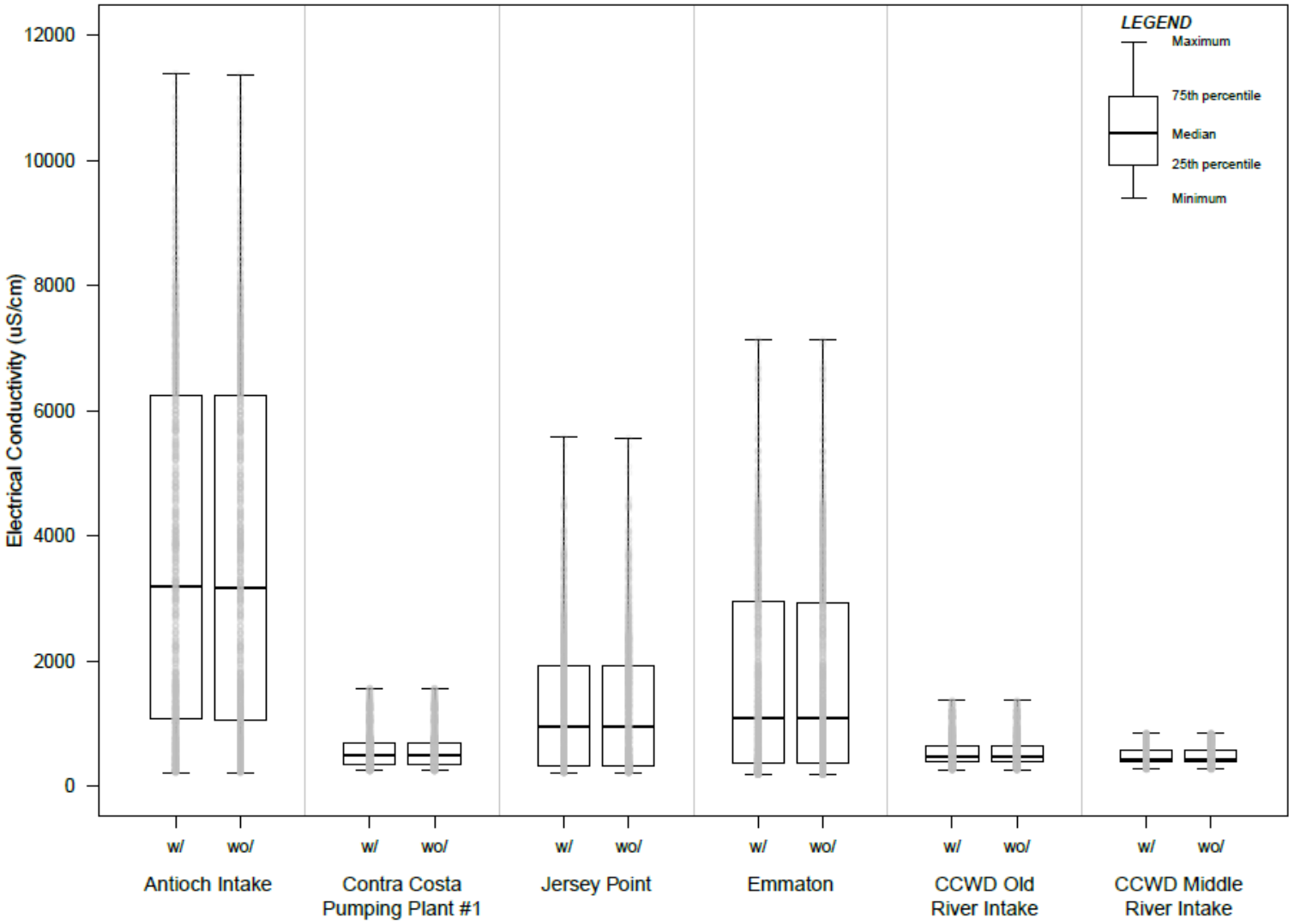
Mitigation Measure:

None required.



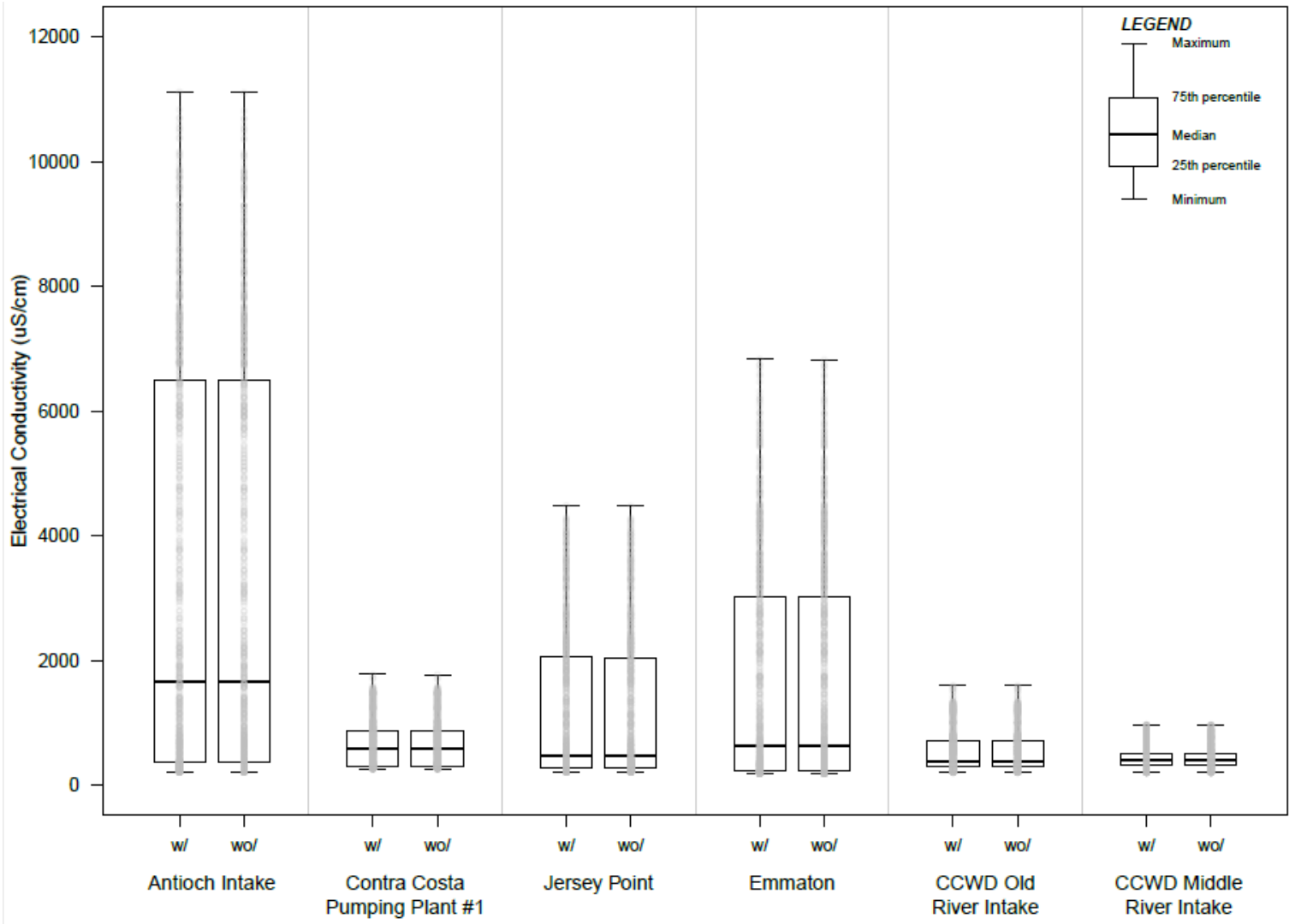
Source: Exponent, 2018

Figure 3.11-11
Cumulative Scenario With and Without Project: Electrical Conductivity During Critical Water Years



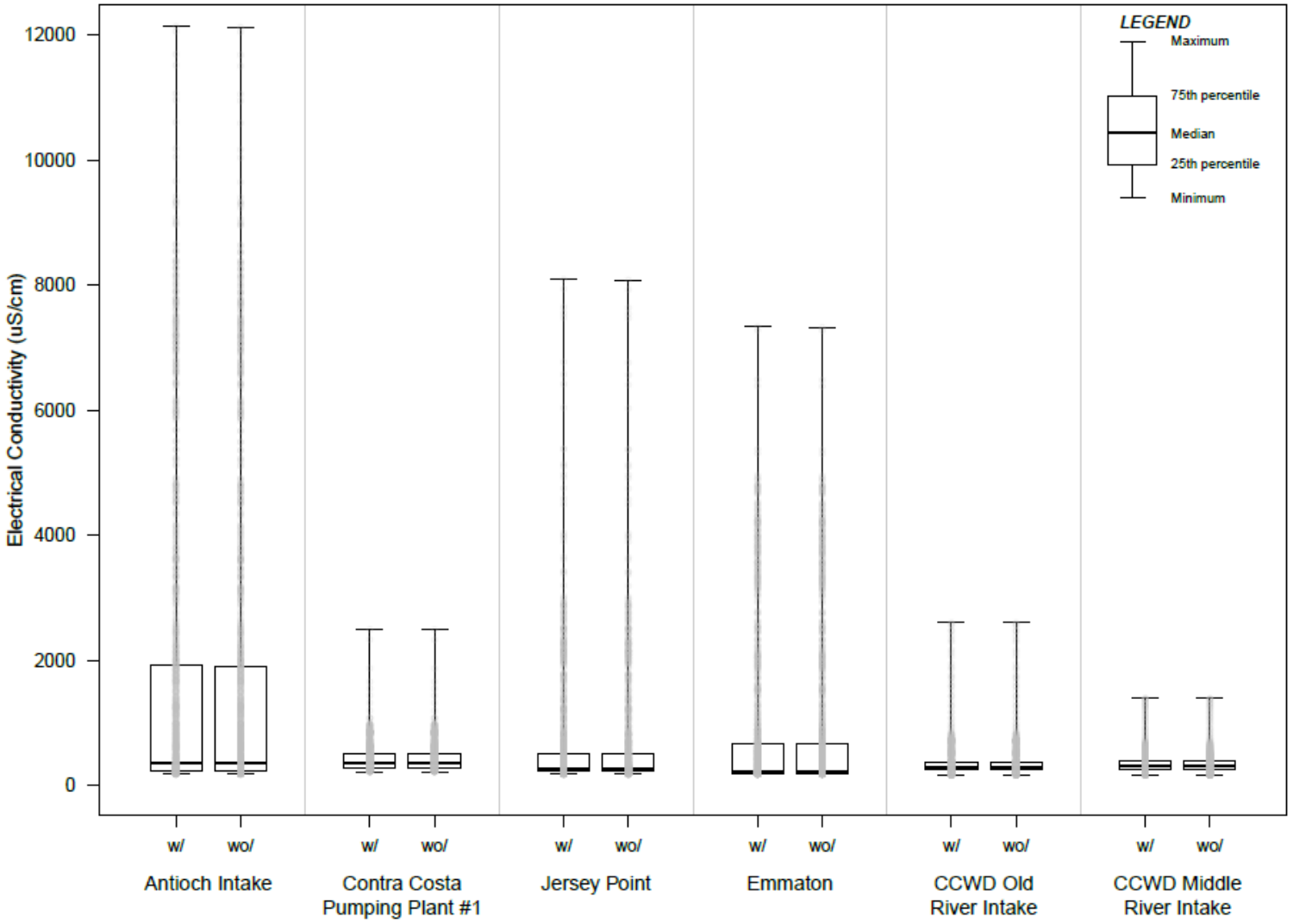
Source: Exponent, 2018

Figure 3.11-12
Project and Without Project Electrical Conductivity During Dry Water Years



Source: Exponent, 2018

Figure 3.11-13
Project and Without Project Electrical Conductivity During Normal Water Years



Source: Exponent, 2018

Figure 3.11-14
Project and Without Project Electrical Conductivity During Wet Water Years

References – Delta Hydrology and Water Quality

DWR, 2014. California Water Plan Update 2013.

DWR, 2018a. California Water Plan 2018. Preliminary Draft. Available at: https://www.water.ca.gov/Programs/California-Water-Plan Accessed June 4, 2018.

DWR, 2018b. Water Data Library. Available at: http://wdl.water.ca.gov/waterdatalibrary/ Accessed March 1, 2018.

Exponent, Antioch Brackish Desalination Plant Modeling: Methods and Results; Draft Technical Memorandum; May 30, 2018.

Oltmann, 1998. Measured flow and tracer-dye data showing the anthropogenic effects on the hydrodynamics of south Sacramento-San Joaquin Delta, California, spring 1996 and 1997. Available at: https://pubs.er.usgs.gov/publication/ofr98285 Accessed April 2, 2018.

San Francisco Regional Water Quality Control Board. 2014. Order No. R2-2014-0030, NPDES No. CA0038547.

SWRCB, 2017. Final 2014/2016 California Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report). Available at: https://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2014_2016.shtml Accessed May 20, 2018.

YSI, 2017. YSI Model 3100 Operations Manual. Available at: https://www.ysi.com/File%20Library/Documents/Manuals/031041-YSI-3100-Operations-Manual-RevB.pdf Accessed June 27, 2018.

3.12 Land Use and Planning

Sections	Tables
3.12.1 Environmental Setting 3.12.2 Regulatory Framework 3.12.3 Analysis, Impacts, and Mitigation	3.12-1 Summary of Impacts – Land Use and Planning 3.12-2 Applicable Plans and Policies

This section describes existing land uses in the vicinity of the project components which are located in the City of Antioch and a portion of the City of Pittsburg. This section analyzes the potential for the proposed project to affect established land uses, and evaluates project consistency with applicable plans, policies, and ordinances governing land use in the project area.

Comments received on the NOP related to Land Use and Planning concern consistency with the Delta Plan land use policies. The proposed project's consistency with these policies are discussed in Section 3.12.2, *Regulatory Framework*.

3.12.1 Environmental Setting

City of Antioch

Project components would primarily be located within the city of Antioch, while a small portion of a proposed pipeline would be located in the city of Pittsburg. The city of Antioch is located in eastern Contra Costa County at the western edge of the San Joaquin-Sacramento Delta. The city encompasses approximately 50 square miles and is bordered by the city of Pittsburg to the west, San Joaquin River to the north, cities of Oakley and Brentwood to the east, and unincorporated Contra Costa County to the south. Open space uses, including agriculture, open water, recreational lands, and vacant lands account for approximately half the land within the city (City of Antioch, 2003a). Within the developed portion of the city, single-family residential uses cover the largest area (approximately 23 percent). Industrial areas account for approximately 3 percent of the land and generally concentrated in the northern portion of the city. Commercial areas account for nearly 3 percent of land and are generally concentrated along major roadway corridors.

City of Pittsburg

The city of Pittsburg encompasses approximately 12 square miles and is bordered by Bay Point to the northeast, Contra Costa County to the south, and Antioch to the west. Residential development covers the largest area (approximately 32 percent). Industrial areas account for approximately 12 percent of the land area and are generally located along the waterfront. Commercial areas account for 5 percent of the land area and are generally located along the City's major transportation corridors (City of Pittsburg, 2001).

River Intake Pump Station Site Land Use and Vicinity

The existing river intake pump station is located approximately 200 feet offshore in a 1-acre parking lot site owned by the City. The parking lot site is at the terminus of Fulton Shipyard Road. The General Plan designates the site as Public/Institutional. The site is bordered by the San Joaquin River to the north, industrial/manufacturing uses to the east, a diner/restaurant and lot used for staging construction material, and a fenced grassy open space area to the west.

Water Treatment Plant Site Land Use and Vicinity

The proposed desalination facility would be located within the fenceline of the existing 25-acre WTP at 401 Putnam Street. Land uses surrounding the WTP site include a public school (Park Middle School) to the northwest and undeveloped open space areas to the northwest and east. The nearest private residences are directly west along View Drive, south along Terranova Drive, and northeast along Elizabeth Lane. The WTP site is closed to the public and includes several structures and facilities associated with water treatment. Land cover is predominantly paved surfaces and structures. There are no sensitive habitats in the vicinity of the WTP, and the site is not within any habitat or natural communities' conservation plans.

Land Uses in the Vicinity of the Pipelines

The new raw water pipeline would be located in the city of Antioch and would follow one of two routes. From the connection with the existing raw water pipeline, the proposed route would head west along Putnam Street, then south along D Street before entering the WTP site; the optional route would head south along Lone Tree Way, and then west across the WTP's southern property line. In the vicinity of the WTP, portions of the new brine disposal pipeline would be co-located with the new raw water pipeline. The proposed brine disposal pipeline route would head north across the WTP property and cross Putnam Street; the optional alignment would head east across the WTP's southern property line, north along Lone Tree Way, and then west along Putnam Street. Lands uses adjacent to the raw water pipeline and brine disposal pipeline routes are generally residential and commercial.

To reach the connection with the Delta Diablo WWTP in the city of Pittsburg, the majority of the new brine disposal pipeline would continue along rights-of-way through the city of Antioch, with a minor portion crossing into city of Pittsburg rights-of-way. Land uses adjacent to the pipeline would be residential, public/institutional, and commercial.

Delta Diablo WWTP Land Use

The Delta Diablo WWTP is located at 2500 Pittsburg-Antioch Highway and the site located within both the cities of Antioch and Pittsburg. This is an industrial facility that provides secondary treatment of wastewater, consisting of screening, grit removal, primary and secondary clarification, biological treatment by trickling towers and/or aeration basins, chlorination, and de-chlorination. The WWTP has an average dry weather design capacity to provide secondary level treatment for 19.5 mgd. Treated wastewater is discharged through a deep-water outfall to New York Slough.

3.12.2 Regulatory Framework

Federal

There are no applicable federal regulations related to land use.

State

California State Lands Commission

The California State Lands Commission (SLC) has jurisdiction and management authority over all ungranted tidelands, submerged lands, and the beds of navigable lakes and waterways. The State Lands Commission also has certain residual and review authority for tidelands and submerged lands legislatively granted in trust to local jurisdictions. All tidelands and submerged lands, granted and ungranted, as well and navigable lakes and waterways, are subject to the protections of the Common Law Public Trust. Generally, the SLC has jurisdiction over land below mean high tide. Public and private entities may apply to the SLC for land leases or permits on State lands for purposes, such as dredging and placement of new submarine infrastructure. California Government Code (CGC) Section 65940 specifies the requirements of a surface land lease application.

For this project, it is noted that the SLC granted the City of Antioch sovereign tide and submerged lands in trust in 1955. In 1989, the original grant and its amendments were repealed and replaced with a new granting statute and to convey certain tidelands and submerged lands to the City (California State Lands Commission, 1989).

California Government Code

California Government Code Section 53091(d) states that "building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency". Additionally, California Government Code Section 53091(e) establishes that "zoning ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water…." The proposed facilities evaluated in this EIR all relate exclusively to the production, generation, treatment, and transmission of water and are, therefore, legally exempt from Cities of Antioch and Pittsburg building and zoning ordinances, including their respective General Plans.

Delta Stewardship Council – Delta Plan

The Delta Stewardship Council is a State agency created through the Delta Reform Act of 2009 to develop and implement a legally enforceable long-term management plan for the Delta and Suisun Marsh. The Delta Plan applies a common sense approach based on the best available science to achieve the coequal goals of protecting and enhancing the Delta ecosystem and providing for a more reliable water supply for California, while protecting and enhancing the unique cultural, recreational, and agricultural values of the Delta as an evolving place.

The city of Antioch is within the Delta Secondary Zone, as shown in Appendix 6 of the Delta Plan; therefore, Delta Plan policies need to be evaluated to determine whether the proposed project would conflict with the Delta Plan.

The following policies from the Delta Plan are relevant to land use and planning:

DP P1 (a) New residential, commercial, and industrial development must be limited to the following areas, as shown in Appendix 6 and Appendix 7:

(1) Areas that city or county general plans as of May 16, 2013, designate for residential, commercial, and industrial development in cities or their spheres of influence;

DP P2 (a) Water management facilities, ecosystem restoration, and flood management infrastructure must be sited to avoid or reduce conflicts with existing uses or those uses described or depicted in city and county general plans for their jurisdictions or spheres of influence when feasible, considering comments from local agencies and the Delta Protection Commission. Plans for ecosystem restoration must consider sites on existing public lands, when feasible and consistent with a project's purpose, before privately owned sites are purchased. Measures to mitigate conflicts with adjacent uses may include, but are not limited to, buffers to prevent adverse effects on adjacent farmland.

(b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions that involve the siting of water management facilities, ecosystem restoration, and flood management infrastructure.

Local

City of Antioch General Plan

The Antioch General Plan (City of Antioch, 2003b) encompasses a comprehensive strategy for managing the community's future. The General Plan is the community's statement of what is in its interest, and is the City's most important statement regarding its ultimate physical, economic, and cultural development through 2028. The General Plan is a legally binding policy document to be used by City officials, the development community, citizens, and others to guide decisions regarding the future development and management of community resources, including land, the natural environment, and public services and facilities.

The Antioch General Plan designates the existing WTP site as Open Space, Neighborhood Commercial, and Medium Low Density Residential. Proposed pipelines would be constructed within road rights-of-way adjacent to areas designated as medium/low density residential, public/institutional, and business park. The river intake pump station site is designated Public/Institutional.

The following objectives and policies from the General Plan are relevant to land use and planning:

8.4.1 Water Facilities Objective: Ensure a water system capable of providing high quality water to existing and future residences, businesses, institutions, recreational facilities, and

other uses within the City of Antioch during peak use conditions, with sufficient water in storage reservoirs for emergency and fire protection needs.

***Policy 8.4.2.a*:** As part of the design of water systems, provide adequate pumping and storage capacity for both drought and emergency conditions, as well as the ability to provide fire flows required by the Contra Costa County Fire Protection District.

***Policy 8.4.2.d*:** Maintain existing levels of water service by protecting and improving infrastructure, replacing water mains and pumping facilities as necessary, and improving the efficiency of water transmission facilities.

City of Antioch Zoning Ordinance

The new River Intake Pump Station site is zone Urban Waterfront District (WF). Section 9-5.3803 of the City of Antioch Municipal Code states that utility substations are permitted in the WF district.

The WTP property is zoned Open/Space/Public Use District (OS) and Single-Family Low Density Residential District: 4-6 du/acre (R-6). Section 9-5.3803 of the City of Antioch Municipal Code states that utility substations are allowed with a Use Permit in R-6 and OS districts.

City of Pittsburg General Plan

The Pittsburg General Plan (City of Pittsburg, 2001) addresses issues related to physical development, growth, and conservation of resources in the City's Planning Area. The portion of the brine discharge pipeline that would be constructed within the road rights-of-way in Pittsburg is designated as Industrial in the General Plan.

City of Pittsburg Municipal Code

The Delta Diablo WWTP is located in an area zoned for General Industrial (IG). Chapter 18.54 of the City of Pittsburg Zoning Code specifies that IG districts are to provide sites for intense industrial uses on large parcels occupied by or directly adjacent to existing heavy industrial uses, as well as on small parcels in the vicinity of heavy industrial uses. Areas are established for heavy industrial uses in order to protect them, to the extent feasible, from disruption and competition for space from unrelated retail and commercial uses that are more appropriately located elsewhere in the city. Major utilities are permitted with a Use Permit from the Planning Commission on such lands.

3.12.3 Analysis, Impacts and Mitigation

Significance Criteria

Based on Appendix G of the CEQA *Guidelines*, the project would have a significant impact on land use and planning if it would:

- Physically divide an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local

coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or

- Conflict with any applicable habitat conservation plan or natural community conservation plan.

Methodology and Assumptions

Construction and Operational

The following section provides an impact analysis for the proposed project and discusses the thresholds listed above to determine the impact significance. The impacts analysis discusses the significance of the changes from the existing conditions as a result of the project. Impacts of the project would be considered significant if the project would divide an established community; conflict with any applicable land use plan, policy, or regulation; or conflict with any applicable habitat conservation plan or natural community conservation plan.

Issues Not Discussed in Impacts

Due to the nature of the project, there would be no impact related to the following topics for reasons described below:

- ***Physically divide an established community.*** The raw water connection pipeline and brine disposal pipelines would be located underground in roadway rights-of-way, and the overlying areas would be restored after construction. Although the project would add a desalination facility at the WTP and intensify uses at the site, it would be located inside the property line of the WTP. The new river intake pump station would be located within an existing City-owned parking lot, and would replace the function of an existing pump station. The aboveground structures would not divide an established community or established land uses. Therefore, the criterion related to the division of an established community is not applicable to the proposed project and is not discussed further.
- ***Conflict with any applicable HCP or NCCP.*** There are no habitat conservation plans or natural community conservation plans for the project area. The project would therefore have no impact on HCP or NCCP. This criterion is not discussed further.

Impacts and Mitigation Measures

Table 3.12-1 summarizes the proposed project's impacts and significance determinations related to land use.

TABLE 3.12-1
SUMMARY OF IMPACTS – LAND USE AND PLANNING

Impacts	Significance Determinations
Impact 3.12-1: The proposed project would not conflict with an applicable land use policy included in a general plan or zoning ordinance adopted for the purpose of avoiding or mitigating an environmental effect.	LS
Impact 3.12-C-1: Cumulative impacts related to land use.	LS

NOTES:
LS = Less than Significant

Impact 3.11-1: The proposed project would not conflict with an applicable land use policy included in a general plan or zoning ordinance adopted for the purpose of avoiding or mitigating an environmental effect. *(Less than Significant)*

Section 15125(d) of the CEQA *Guidelines* requires analysis of potential "conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect." There are numerous plans, policies, and regulations that either are implicated by relevant significance criteria or were adopted for environmental purposes and thus are evaluated under the appropriate topical sections of this EIR. As an example, Section 3.2, *Air Quality*, evaluates whether the project would conflict with or obstruct implementation of an applicable air quality plan. Accordingly, potential conflicts with air quality plans are discussed in Section 4.2.

This section evaluates the proposed project's potential to conflict with applicable plans, policies, and regulations pertaining to land use. The applicable plans, policies, and regulations related to these topics are presented in Section 3.12.2, *Regulatory Framework*, and discussed further in the following paragraphs.

Table 3.12-2 identifies applicable plans, policies, and objectives related to land use and applicable to the proposed project. The table includes an analysis of the project's potential to conflict with these provisions.

As noted in Section 3.12.2, *Regulatory Framework,* pursuant to California Government Code Section 53091(d) and (e), facilities for the production, generation, storage, treatment, and transmission of water supplies are exempt from local land use policies and zoning ordinances. Therefore, in accordance with Sections 53091(d) and 53091(e) of the California Government Code, the proposed desalination facility, intake pump station, and pipelines are exempt from the provisions of the City of Antioch and City of Pittsburg General Plan Land Use Plans and Zoning Ordinances.

For the reasons set forth in **Table 3.12-2,** the project would not conflict with plans, policies, and regulations pertaining to land use. The impact would be **less than significant**. The physical environmental effects of the proposed project's construction and operation are discussed in their respective sections in this EIR.

Mitigation Measure:

None required.

TABLE 3.12-2
APPLICABLE PLANS AND POLICIES

Policies	Consistency
Delta Plan	
DP P1 (a) New residential, commercial, and industrial development must be limited to the following areas, as shown in Appendix 6 and Appendix 7: (1) Areas that city or county general plans as of May 16, 2013, designate for residential, commercial, and industrial development in cities or their spheres of influence.	**No Conflict.** The new river intake pump station would be located in a parking lot designated as public/institutional. The proposed project is sponsored by the City, and would provide a public water source; therefore, the intake and pump station would be consistent with this designation. The lands surrounding the WTP site are designated as open space, commercial, and residential. Since the proposed desalination facilities would be located within the fenceline of the existing WTP, the proposed desalination facilities would not conflict with this policy. The pipelines would be installed in road rights-of-way and would not conflict with this policy.
DP P2 (a) Water management facilities, ecosystem restoration, and flood management infrastructure must be sited to avoid or reduce conflicts with existing uses or those uses described or depicted in city and county general plans for their jurisdictions or spheres of influence when feasible, considering comments from local agencies and the Delta Protection Commission. Plans for ecosystem restoration must consider sites on existing public lands, when feasible and consistent with a project's purpose, before privately owned sites are purchased. Measures to mitigate conflicts with adjacent uses may include, but are not limited to, buffers to prevent adverse effects on adjacent farmland. (b) For purposes of Water Code section 85057.5(a)(3) and section 5001(j)(1)(E) of this Chapter, this policy covers proposed actions that involve the siting of water management facilities, ecosystem restoration, and flood management infrastructure.	**No Conflict.** The proposed project could be characterized as a "water management facility", and would be sited to avoid conflicts with existing uses described in the City of Antioch General Plan. There are no plans for ecosystem restoration on public lands in the proposed project.
City of Antioch General Plan	
8.4.1 Water Facilities Objective: Ensure a water system capable of providing high quality water to existing and future residences, businesses, institutions, recreational facilities, and other uses within the City of Antioch during peak use conditions, with sufficient water in storage reservoirs for emergency and fire protection needs. 8.4.2.a: As part of the design of water systems, provide adequate pumping and storage capacity for both drought and emergency conditions, as well as the ability to provide fire flows required by the Contra Costa County Fire Protection District. 8.4.2.d: Maintain existing levels of water service by protecting and improving infrastructure, replacing water mains and pumping facilities as necessary, and improving the efficiency of water transmission facilities.	**No Conflict.** The purpose of the project is to diversify the City's water supply portfolio, provide operational flexibility, and reduce dependence on imported water supply. The project would not result in an increase in capacity of the water system. The project would provide a supplemental source of high quality water to the City of Antioch's service district during peak use conditions, and would ensure that sufficient water is stored in reservoirs for drought, emergency, and fire protection needs. The project would replace the existing intake pump station, provide adequate pumping capacity, and would improve the efficiency of water transmission facilities.

Cumulative Impacts

Impact 3.11-C-1: Implementation of the proposed project, in combination with past, present, and reasonably foreseeable future development would not result in a cumulatively significant impact related to land use. *(Less than Significant)*

As described in Section 3.12.3, the project would not divide an established community and would have no impact; therefore, it would not cause or contribute to any cumulative impact related to this issue. The proposed project is not within a HCP or NCCP area, and would have no impact; therefore, it would not cause or contribute to any cumulative impact related to this issue.

The geographic context for the cumulative land use impacts encompass the project components sites and immediate vicinities. A cumulative land use impact would occur if the proposed project in combination with the cumulative projects identified in **Table 3-1** would result in a change in land use that would divide an existing community or cause a conflict with applicable land use policies, plans, or regulations adopted for the purpose of avoiding or mitigating an environmental effect. As discussed in Impact 3.11-1, the proposed project is not expected to conflict with any land use plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect. The cumulative projects in the immediate vicinity of the project components sites include project numbers 1 (Almond Knolls), 2 (Water Treatment Plant Disinfection Improvements Project), 10 (Mt. Diablo Resource Recovery Park Service), 15 (East County Bioenergy Project), and 14 (Dow Modernization Project). The project in combination with past, present and reasonably foreseeable projects identified in Table 3.1-1 would intensify uses in the project vicinity. The cumulative projects would be required to be comply with the Cities' General Plans and applicable land use plans and regulations and would not substantially change the mix of land uses in the project vicinity. It is therefore expected that, the proposed project, in combination with cumulative projects would not result in significant cumulative impacts related to land use. On the basis of this discussion, cumulative land use impacts are considered **less than significant**.

References – Land Use and Planning

City of Antioch, 2003a. *Draft General Plan Update Environmental Impact Report, City of Antioch, Contra Costa County, California,* July 2003. Prepared by LSA.

City of Antioch, 2003b. *City of Antioch General Plan,* Updated November 23, 2003.

City of Pittsburg, 2001. *City of Pittsburg General Plan.* Adopted November 16, 2001.

City of Pittsburg, 2017. Pittsburg Municipal Code, Section 18.54. Available at www.codepublishing.com/CA/Pittsburg/html/Pittsburg18/Pittsburg1854.html#18.54. Accessed on December 28, 2017.

Delta Stewardship Council, 2014. Regulations. November 14, 2014. Amended November 22, 2016. Available at deltacouncil.ca.gov/delta-plan-regulations. Accessed December 27, 2017.

State of California, 1989. Chapter 1067, Statutes of 1989.

This page intentionally left blank

3.13 Noise and Vibration

This section evaluates the potential noise and vibration impacts associated with construction and operation of the proposed project and associated pipelines. This section describes the existing noise environment and identifies nearby sensitive receptors, presents relevant local noise ordinances and standards, and evaluates the potential for the proposed project to result in noise and vibration impacts. This section focuses on noise and vibration impacts on humans and structures; potential noise and vibration effects on marine and terrestrial wildlife are addressed in Sections 3.3, *Aquatic Biological Resources*, and 3.4, *Terrestrial Biological Resources*, respectively.

Public comments received during the scoping period that relate to noise and vibration generally concerned noise impacts to surrounding residents in general. These concerns are addressed in Section 3.13.3 below.

Data used to prepare this analysis were obtained from the General Plans for the Cities of Antioch and Pittsburg, the Municipal Codes for the Cities of Antioch and Pittsburg, a publication of Transit Noise and Vibration Impact Assessment developed by the Federal Transit Administration, Caltrans' Technical Noise Supplement to the Traffic Noise Analysis Protocol and by measuring and modeling existing and future noise levels at the Project site and the surrounding land uses. Information contained in Section 3.16, *Transportation and Circulation,* was used in the modeling of vehicle and truck traffic noise exposure.

3.13.1 Environmental Setting

General Background on Noise and Vibration Analysis

Overview

Sound is mechanical energy transmitted by pressure waves through a medium such as air. Noise is defined as unwanted sound. The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound pressure level is measured in

decibels (dB), with zero dB corresponding roughly to the threshold of human hearing, and 120 to 140 dB corresponding to the threshold of pain. Because sound pressure can vary greatly within the range of human hearing, a logarithmic loudness scale is used to keep sound intensity numbers at a convenient and manageable level.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude (sound power). When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. When assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA).[1] Frequency A-weighting is typically applied to community noise measurements. **Table 3.13-1** shows some representative noise sources and their corresponding noise levels in dBA.

TABLE 3.13-1
TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT

Examples of Common, Easily Recognized Sounds	Decibels (dBA) at 50 feet	Subjective Evaluations
Near Jet Engine	140	Deafening
Threshold of Pain (Discomfort)	130	
Threshold of Feeling – Hard Rock Band	120	
Accelerating Motorcycle (at a few feet away)	110	
Loud Horn (at 10 feet away)	100	Very Loud
Noisy Urban Street	90	
Noisy Factory	85	
School Cafeteria with Untreated Surfaces	80	Loud
Near Freeway Auto Traffic	60	Moderate
Average Office	50	
Soft Radio Music in Apartment	40	Faint
Average Residence Without Stereo Playing	30	
Average Whisper	20	Very Faint
Rustle of Leaves in Wind	10	
Human Breathing	5	
Threshold of Audibility	0	

NOTE: Continuous exposure above 85 dBA is likely to degrade the hearing of most people. Range of speech is 50 to 70 dBA.

SOURCE: United States Department of Housing and Urban Development, *The Noise Guidebook*, 1985.

[1] All noise levels reported herein reflect A-weighted decibels unless otherwise stated.

Noise Exposure and Community Noise

Noise exposure is a measure of the noise experienced by the individual over a period of time. A noise level is a measure of noise at a given instant in time. However, noise levels rarely persist consistently over a long period of time. Rather, community noise varies continuously with time with respect to the contributing sound sources in the environment. Community noise is primarily the product of many distinct noise sources that constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and changes in atmospheric conditions. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual. Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment.

These successive additions of sound to the community noise environment make the community noise level variable from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: The equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level, which would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max}: The instantaneous maximum noise level measured during the measurement period of interest.

L_x: The sound level that is equaled or exceeded x percent of a specified time period. The L_{50} represents the median sound level.

DNL: The day-night average noise level (DNL; also referred to as L_{dn}) or energy average of the A-weighted sound levels occurring during a 24-hour period, and which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night ("penalizing" nighttime noises). Noise between 10:00 PM and 7:00 AM is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noises.

CNEL: Similar to the DNL, the Community Noise Equivalent Level (CNEL) adds a 5-dBA "penalty" for the evening hours between 7:00 PM and 10:00 PM in addition to a 10-dBA penalty between the hours of 10:00 PM and 7:00 AM.

Effects of Noise on People

The effects of noise on people can be placed into three categories:

- Subjective effects of annoyance, nuisance, dissatisfaction;
- Interference with activities such as speech, sleep, learning; and
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants generally experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation exists in the individual thresholds of annoyance, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. With regard to increases in A-weighted noise level, the following relationships occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived;
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference;
- A change in level of at least 5 dBA is required before any noticeable change in human response would be expected; and
- A 10-dBA change is subjectively heard as approximately a doubling in loudness and can cause adverse response.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a non-linear fashion; hence the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but instead combine logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Health Effects of Environmental Noise

The World Health Organization (WHO) is an important source of current knowledge regarding the health effects of noise impacts because European nations have continued to study noise and its health effects. Potential health effects of daytime noise identified by WHO include decreased performance for complex cognitive tasks, such as reading, attention span, problem solving, and memorization; physiological effects such as hypertension and heart disease (after many years of constant exposure, often by workers, to high noise levels); and hearing impairment (again, generally after long-term occupational exposure, although shorter-term exposure to very high

noise levels, for example, exposure several times a year to concert noise at 100 dBA, can also damage hearing). Finally, noise can cause annoyance and can trigger emotional reactions like anger, depression, and anxiety. WHO reports that, during daytime hours, few people are seriously annoyed by activities with noise levels below 55 dBA or moderately annoyed with noise levels below 50 dBA.

Vehicle traffic and continuous sources of machinery and mechanical noise contribute to ambient noise levels. Short-term noise sources, such as truck backup beepers, the crashing of material being loaded or unloaded, car doors slamming, and engines revving outside a nightclub, contribute very little to 24-hour noise level metrics but are capable of causing sleep disturbance and annoyance.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate, or lessen, at a rate of 6 to 7.5 dBA per doubling of distance from the source, depending on the topography of the area and environmental conditions (i.e., atmospheric conditions and noise barriers, either vegetative or manufactured, etc.). Widely distributed noise, such as a large industrial facility spread over many acres or a street with moving vehicles, would typically attenuate at a lower rate, approximately 3 to 4.5 dBA per doubling of distance from the source.

Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Several different methods can be used to quantify vibration including the peak particle velocity (PPV), and the root mean square (RMS). The PPV is defined as the maximum instantaneous peak of the vibration signal and is discussed in terms of inches per second. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is the average of the squared amplitude of the signal. Typically, ground-borne vibration generated by man-made activities (e.g., pile driving, vibratory rollers, and drill rigs) attenuates rapidly with distance from the source of the vibration [Federal Transit Administration (FTA), 2006].

Existing Noise and Vibration in the Project Vicinity

Noise Environment

Transportation sources, such as automobiles, trucks, trains, and aircraft, are the principal sources of noise in most urban environments. Along major transportation corridors, noise levels can reach 80 DNL, while along arterial streets noise levels typically range from 65 to 70 DNL. The noise environment surrounding the proposed desalination facility is influenced primarily by existing operations of the existing WTP and traffic noise on View Drive and Terranova Drive. The proposed pipeline alignments are located in areas that are predominantly developed and urban, characterized by residential, commercial, and industrial development where roadway traffic noise is the predominant noise source.

Short-term (15-minute) noise monitoring was conducted in January 2018 at noise-sensitive land uses adjacent to the proposed RO facility and bulk chemical storage area. Additionally, a noise measurement was collected at the existing intake pumps station location. The locations of these noise measurements and associated results can be found in **Figure 3.13-1**. Noise monitoring data for these locations are presented in **Table 3.13-2**. These data indicate the typically suburban conditions around the project site which are generally between 47 and 50 dBA (hourly Leq) during daytime hours.

TABLE 3.13-2
MEASURED SHORT-TERM NOISE LEVELS ON THE PROJECT SITE

Site No.	Measurement Location	Noise Level in dBA[a]
ST-1	Property site boundary adjacent to proposed RO facility	47
ST-2	Property site boundary adjacent to bulk chemical storage area	50
ST-3	Intake Pump Station at end of pier	52

NOTES:
[a] dBA = A-weighted decibels.

Sensitive Noise Receptors

Some land uses are considered more sensitive to ambient noise levels than others because of the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved for those uses. Residences, schools, rest homes, hospitals, and churches are generally more sensitive to noise than commercial and industrial land uses. The proposed desalination facility would be located at the existing water treatment plant where the rear yards of single-family residential uses on Terranova and View Drive would be separated from the proposed RO facility and chemical storage area by a 25-foot setback. Sensitive receptors along the proposed brine disposal pipeline consist of Park Middle School, March Elementary School, Antioch High School and single-family residences along D Street, Tregallas Road, G Street, 18th Street, L Street, and 10th Street. Noise-sensitive land uses are located to the east within 500 feet the existing intake pump station and 125 feet of the proposed pump station location.

Vibration Environment

Sources of substantial vibration in the project vicinity are minimal, and are generally restricted to vibration and shaking caused by the occasional passing of heavy vehicles on major roadways with discontinuity in the pavement. There are no sources of substantial vibration on the project site itself. The brine disposal pipeline would cross the Union Pacific Railroad tracks which are subject to vibration from locomotive operations.

150433.02

SOURCE: ESA, 2018; Bases Google Earth, 2018

Brackish Water Desalination Facility

Figure 3.13-1
Noise Monitoring Locations

ESA

3.13.2 Regulatory Framework

Federal

There are no applicable federal standards that would apply to the project with respect to noise. For vibration, the Federal Transit Administration (FTA) has adopted vibration standards that are used to evaluate potential building damage impacts related to construction activities. While the FTA's criteria were primarily developed to assess construction vibration impacts from transit operations (e.g., bus, commuter rail, etc.), the criteria are broadly applicable to all types of construction activities that could generate vibration. The vibration damage criteria adopted by the FTA are shown in **Table 3.13-3**.

TABLE 3.13-3
CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	PPV (in/sec)
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

SOURCE: FTA, 2006.

In addition, the FTA has also adopted standards associated with human annoyance for ground-borne vibration impacts for the following three land-use categories: Vibration Category 1 – High Sensitivity, Vibration Category 2 – Residential, and Vibration Category 3 – Institutional. The FTA defines Category 1 as buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment but still have the potential for activity interference. The vibration thresholds associated with human annoyance for these three land-use categories are shown in **Table 3.13-4**. No thresholds have been identified or recommended specific to commercial and office uses, although Category 3 standards may be applied as they are defined as land uses with primarily daytime and evening use. Because the project-induced vibration would be from impact pile driving activities, as discussed later in this section, the impact thresholds for the proposed project would be based on the "Frequent Events" criteria shown in **Table 3.13-4**.

TABLE 3.13-4
GROUND-BORNE VIBRATION IMPACT CRITERIA FOR GENERAL ASSESSMENT

Land Use Category	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB[d]	65 VdB[d]	65 VdB[d]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

NOTES:
[a] Frequent Events" is defined as more than 70 vibration events of the same source per day.
[b] Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
[c] Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.
[d] This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

SOURCE: FTA, 2006.

State

The State of California does not have statewide standards for environmental noise, but the California Department of Health Services (DHS) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The purpose of these guidelines is to maintain acceptable noise levels in a community setting for different land use types. Noise compatibility by different land uses types is categorized into four general levels: "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." For instance, a noise environment ranging from 50 dBA CNEL to 65 dBA CNEL is considered to be "normally acceptable" for multi-family residential uses, while a noise environment of 75 dBA CNEL or above for multi-family residential uses is considered to be "clearly unacceptable." In addition, Section 65302(f) of the California Government Code requires each county and city in the state to prepare and adopt a comprehensive long-range General Plan for its physical development, with Section 65302(g) requiring a Noise Element to be included in the General Plan. The Noise Element must: (1) identify and appraise noise problems in the community; (2) recognize Office of Noise Control guidelines; and (3) analyze and quantify current and projected noise levels.

The California Noise Act of 1973 (Health and Safety Code Sections 46000–46002) sets forth a resource network to assist local agencies with legal and technical expertise regarding noise issues. The objective of the act is to encourage the establishment and enforcement of local noise ordinances.

The State has also established noise insulation standards for new multi-family residential units, hotels, and motels that would be subject to relatively high levels of transportation-related noise. These requirements are collectively known as the California Noise Insulation Standards (Title 24, California Code of Regulations). The noise insulation standards set forth an interior standard of DNL 45 dBA in any habitable room. They require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard where such units are proposed in

areas subject to noise levels greater than DNL 60 dBA. Title 24 standards are typically enforced by local jurisdictions through the building permit application process.

Local

City of Antioch General Plan

The Noise Objective for the City of Antioch General Plan (Section 11.6.1) calls for achieving and maintaining a 60 CNEL for single- and multi-family residential uses and 70 dBA[2] CNEL at the front setback for commercial/industrial uses. Other noise policies pertaining to the proposed project are as follows:

> ***Policy 11.6.2(e)*** requires the implementation of appropriate noise mitigation when the proposed project will cause new exceedances of General Plan noise objectives, or an audible (3.0 dBA) increase in noise in areas where General Plan noise objectives are already exceeded as the result of existing development.
>
> ***Policy 11.6.2(g)*** allows the use of noise barriers (walls, berms, or a combination thereof) to reduce significant noise impacts.
>
> ***Policy 11.6.2(j)*** requires proposed development adjacent to occupied noise sensitive land uses to implement a construction-related noise mitigation plan during construction.
>
> ***Policy 11.6.2(k)*** requires all construction equipment to utilize noise reduction features that are no less effective than those originally installed by the manufacturer.

City of Antioch Municipal Code

Sections 5-17.04 and 5-17.05 of the Antioch Municipal Code prohibits the use of heavy construction equipment used in grading and earth moving, (including diesel engine equipped machines over one ton); the starting, warming-up, and idling of heavy construction equipment engines or motors; and construction activity on weekdays prior to 7 a.m. and after 6 p.m.; on weekdays within 300 feet of an occupied dwelling space prior to 8 a.m. and after 5 p.m.; and on weekends and holidays prior to 9 a.m. and after 5 p.m. The City addresses noise from stationary noise sources through enforcement of its non-quantitative ordinance for Disturbing the Peace in Section 5-17.02 of the Antioch Municipal Code.

City of Pittsburg General Plan

These goals are to be implemented through policies of the General Plan Noise Element, the following of which may apply to elements of the proposed Project within the City of Pittsburg:

> ***Policy 12-P-1*****:** As part of development review, use Figure 12-3 to determine acceptable uses and installation requirements in noise-impacted areas. Figure 12-3 is based on land use and noise exposure compatibility levels in Appendix A of the State of California General Plan Guidelines. The table is consistent with the provision of State law that requires special noise

[2] The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. As a consequence, when assessing potential noise impacts, sound is measured using an electronic filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ears decreased sensitivity to low and extremely high frequencies instead of the frequency mid-range. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA).

insulation for new multi-family housing units within 60 dB Ldn noise exposure contours. The table's land use categories do not correspond to the land use classifications on the General Plan Land Use Diagram, but to actual uses in development projects.

***Policy 12-P-7*:** Require the control of noise at the source through site design, building design, landscaping, hours of operation, and other techniques, for new development deemed to be noise generators.

***Policy 12-P-8*:** Develop noise attenuation programs for mitigation of noise adjacent to existing residential areas, including such measures as wider setbacks, intense landscaping, double-pane windows, and building orientation muffling the noise source.

***Policy 12-P-9*:** Limit generation of loud noises on construction sites adjacent to existing development to normal business hours between 8:00 AM and 5:00 PM.

***Policy 12-P-10*:** Reduce the impact of truck traffic noise on residential areas by limiting such traffic to appropriate truck routes. Consider methods to restrict truck travel times in sensitive areas.

City of Pittsburg Municipal Code

Chapter 9-44 of the Pittsburg Municipal Code prohibits any person to make, continue or cause to be made or continued any noise which either unreasonably annoys, disturbs, injures or endangers the comfort, repose, health, peace or safety of others, within the limits of the city. The Code identifies horns and signaling devices, radios, television sets and mechanical devices, loudspeakers and amplifiers for advertising, yelling, shouting, steam whistles, engine exhaust, blowers or motor vehicle acceleration as examples of noise sources which may result in a violation of the Code.

The Code also prohibits the use of pile drivers, or other impact hammers between the hours of 10:00 p.m. and 7:00 a.m. except in case of emergencies. The Code further specifies that excessive noise on any street adjacent to any school, institution of learning, church or court while the same is in use, or adjacent to any hospital, which unreasonably interferes with the workings of such institution is prohibited. The Code does not establish any quantitative noise level standards.

- Protecting public health and welfare by eliminating or minimizing the effects of existing noise problems, and by preventing increased noise levels in the future;
- Encouraging criteria such as building design and orientation, wider setbacks, and intense landscaping in lieu of sound walls to mitigate traffic noise along all major corridors, except along State Route 4; and
- Continuing efforts to incorporate noise considerations into land use planning decisions, and guide the location and design of transportation facilities to minimize the effects of noise on adjacent land uses.

3.13.3 Analysis, Impacts, and Mitigation

Significance Criteria

Based on Appendix G of the CEQA *Guidelines*, the project would have a significant impact with respect to noise and/or ground-borne vibration if it would result in:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan, noise ordinance, or applicable standards of other agencies;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- Exposure of people residing or working in the area around the project site to excessive noise levels (for a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport);
- Exposure of people residing or working in the area around the project site to excessive noise levels (for a project within the vicinity of a private airstrip); or
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

Methodology and Assumptions

For the purpose of this analysis, the proposed project is considered to result in significant impacts on the environment if it would generate noise or vibration levels in excess of the following thresholds:

- **Construction Noise in Excess of Standards.** The project would result in a significant construction impact if construction activity would occur outside of the allowable daytime hours specified by the City of Antioch or (where applicable) City of Pittsburg noise ordinance. Additionally, the project would result in a significant construction impact if construction contractors would not implement a construction-related noise mitigation plan during construction adjacent to occupied noise-sensitive land uses in the City of Antioch or operate construction equipment that utilize noise reduction features no less effective than those originally installed by the manufacturer.
- **Construction Vibration.** Since the City does not have any regulations pertaining to vibration, the FTA criteria are applied to the project. The project would result in a significant vibration impact if buildings would be exposed to the FTA vibration threshold level of 0.2 PPV for building damage, or if sensitive individuals would be exposed to the FTA vibration threshold level of 72 VdB for human annoyance outside of the allowable daytime hours specified by the City noise ordinance.
- **Substantial Periodic or Temporary Increases in Noise over Existing Levels.** A "substantial" noise increase is defined as one that would interfere with human activities during the day and/or night (as opposed to an absolute, numerical increase over ambient noise levels). This evaluation uses speech interference as an indicator that construction noise could cause a substantial adverse impact on daytime and evening activities, and sleep interference

as an indicator that construction noise could cause a substantial adverse impact on nighttime activities. The speech and sleep interference criteria are based on objective research of speech and sleep interference (as opposed to subjective surveys of annoyance) and can be used to evaluate a project's noise impacts. The speech and sleep interference criteria used in this EIR are defined below.

- **Speech Interference.** A speech interference threshold, in the context of impact duration and time of day, is used to identify substantial increases in noise from temporary construction activities. This analysis assumes noise peaks generated by construction equipment could result in speech interference in adjacent buildings if the noise level in the interior of the buildings exceeds 45 dBA. A typical building can reduce noise levels by approximately 25 dBA with the windows closed (USEPA, 1974). This noise reduction could be maintained only on a temporary basis in some cases, since it assumes windows must remain closed at all times. Assuming a 25 dBA reduction with the windows closed, an exterior noise level of 70 dBA L_{eq} would maintain an acceptable interior noise environment of 45 dBA during the day and evening hours. Noise levels would vary depending on the phase of construction and the types of construction equipment being used.

  In addition to the decibel level of noise, the duration of exposure at any given noise-sensitive receptor is an important factor in determining an impact's significance. Generally, temporary construction noise that occurs during the day for a relatively short period of time would not be significant because most people of average sensitivity who live in suburban environments are accustomed to a certain amount of construction activity or heavy equipment noise from time to time. The loudest construction-related noise levels would be sporadic rather than continuous because different types of construction equipment would be used throughout the construction process. Therefore, an exterior noise level that exceeds 70 dBA Leq during the daytime is used as the threshold for substantial construction noise where the duration of construction noise exceeds two weeks.

- **Sleep Interference.** Based on available sleep data, an interior nighttime level of 35 dBA is considered acceptable for sleeping (USEPA, 1974). Assuming a 25 dBA reduction with the windows closed, an exterior noise level of 60 dBA would maintain an acceptable interior noise environment of 35 dBA at night. Therefore, a significant impact would occur if the proposed project were to generate exterior noise levels above the 60 dBA L_{eq} sleep interference threshold for one or more nights.

- **Operational Noise in Excess of Standards.** The project would result in a significant operational noise impact if project elements would exceed the Noise Objective for the City of Antioch General Plan (Section 11.6.1), which calls for achieving and maintaining a 60 CNEL for single- and multi-family residential uses and 70 dBA CNEL at the front setback for commercial/industrial uses. Consistent with Policy 11.6.2(e) of the General Plan Noise Element, if a receptor already experiences noise levels in excess of these standards, an increase of up to 3 dBA is allowed before noise control measures are required.

- **Substantial Permanent Increases in Ambient Noise over Existing Levels.** For the analysis of long-term operational impacts on the existing ambient noise environment, impacts are considered significant if operation of the project facilities would result in a substantial increase in noise levels in the project area. This evaluation uses a 5-dBA increase in noise exposure, which Caltrans identifies as a readily perceptible noise increase (Caltrans, 2013), to assess the significance of operational noise increases on ambient noise levels in the project vicinity for receptors where the existing noise environment is below the Noise Objective for the City of Antioch General Plan, discussed above.

Issues Not Discussed in Impacts

Due to the nature of the project, there would be no impact related to the following topics for the reasons described below:

- ***Be located within an airport land use plan area or within 2 miles of a public airport or public use airport and expose people to excessive noise levels.*** The closest public airport to the project area is Buchannan Field in Concord, which is approximately 13 miles west of the project site. No project components would be within 2 miles of a public airport. Additionally, none of the project facilities would result in direct increases in aircraft operations, nor would they constitute noise-sensitive land uses (i.e., the proposed project does not include the construction of new housing or other noise-sensitive receptors that would be subject to aviation noise). As a result, there would be no impacts related to this significance criterion and is not discussed further.

- ***Be located in the vicinity of a private airstrip and expose people to excessive noise levels.*** The closest private air strips to the project area are Funny Farm Airport which is approximately 9 miles east of the project area and Las Serpientes Airport, which is approximately 11 miles east of the project site. No project components would be within two miles of a private airstrip. Additionally, none of the project facilities would result in direct increases in aircraft operations, nor would they constitute noise-sensitive land uses (i.e., the proposed project does not include the construction of new housing or other noise-sensitive receptors that would be subject to aviation noise). As a result, there would be no impacts related to this significance criterion and is not discussed.

Impacts and Mitigation Measures

Table 3.13-5 summarizes the proposed project's impacts and significance determinations related to noise and vibration.

TABLE 3.13-5
SUMMARY OF IMPACTS – NOISE AND VIBRATION

Impacts	Significance Determinations
Impact 3.13-1: Construction of facilities under the proposed project could generate noise levels that exceed the applicable county or city noise standards or result in a substantial temporary increase in ambient noise levels at nearby sensitive receptors.	LSM
Impact 3.13-2: Construction of facilities under the proposed project would not expose persons to or generate excessive ground-borne vibration or ground-borne noise levels	LS
Impact 3.13-3: Operation of the project would generate traffic, stationary source, and area source noise similar to existing noise levels and would not exceed City noise requirements	LSM
Impact 3.13-C-1: Cumulative impacts related to noise and vibration	LSM

NOTES:
LS = Less than Significant
LSM = Less than Significant with Mitigation

Impact 3.13-1: Construction of facilities under the proposed project could generate noise levels that exceed the applicable county or city noise standards or result in a substantial temporary increase in ambient noise levels at nearby sensitive receptors. ***(Less than Significant with Mitigation)***

Construction noise levels at and near the construction areas would fluctuate depending on the particular type, number, and duration of use of various pieces of construction equipment. Construction-related material haul trips would raise ambient noise levels along haul routes, depending on the number of haul trips and types of vehicles used. In addition, certain types of construction equipment and construction activities generate impulsive noises (such as pile driving), which can be particularly annoying. **Table 3.13-6** shows typical noise levels produced by various types of construction equipment.

TABLE 3.13-6
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (dBA, Leq at 50 Feet)
Dump truck	80
Portable air compressor	78
Crane	81
Concrete mixer (truck)	79
Pile driver (impact or vibratory)	101
Excavator	81
Dozer	82
Generator	81
Backhoe	78
Graders	85
Rollers	80
Pavers	77

SOURCE: FHWA, 2006.

Noise from construction activities generally attenuates at a rate of 6 to 7.5 dBA per doubling of distance; therefore, other sensitive receptors in the study area would be exposed to construction noise at incrementally lower levels than the noise levels expected at the closest residences. Noise levels are analyzed below with an assumed attenuation rate of 7.5 dBA because construction activities would attenuate at a rate similar to a point source over an absorptive ground surface.

River Intake Pump Station

Construction activities for the proposed intake pump station would involve excavation, pouring concrete footing for foundations; assembling and installing piping, pumps, and electrical equipment; building concrete enclosures and roofs; and performing finish work such as paving, and fencing the perimeter of the pump station site on City property over a 12-month period.

Equipment used for construction of the pump station would include excavator, backhoe, air compressor, small crane, generator, paving equipment, rollers, and welders.

Additionally, a cofferdam may be temporarily installed in the river by the construction contractor to minimize turbulence and sediment disturbance during construction for the installation of pipelines and fish screens. The cofferdam would consist of interlocking sheet piles forming a watertight corridor approximately 50 feet wide that would extend into the River approximately 200 feet from the shore. Sheet piles are typically installed using vibratory pile driving methods. Sheet pile installation for the cofferdam is expected to take approximately two weeks.

The nearest sensitive land use to the intake pump station would be residential uses, approximately 125 feet to the east of the proposed pump station site and approximately 320 feet southeast of the proposed coffer dam where sheet pile driving would occur. At a distance of 320 feet pile driving noise would be attenuated to 85 dBA which would be above the speech interference threshold of 70 dBA for the approximately 2 weeks of coffer dam installation. Construction activity involving non-impact equipment such as excavators, cranes and generators would generate noise levels of 73 dBA at a distance of 125 feet which would also be above the speech interference threshold. However, with implementation of **Mitigation Measure 3.13-1 (General Noise Controls for Construction Equipment and Activities)**, temporary increases in noise levels resulting from project construction would be reduced to a less-than-significant level.

All construction activity would occur on weekdays between 7 a.m. and 6 p.m. and would be consistent with the restrictions of the City of Antioch Noise Ordinance. Therefore, construction noise impacts associated with the intake pump station would be **less than significant**.

Pipeline Installation

A total of approximately 4.8 miles of pipelines would be installed for the raw water pipeline connection to the WTP, the new filtered water and RO permeate pipelines at the WTP site, and the brine disposal pipeline. The raw water pipeline connection would be up to 3,000-feet-long and connect the River's pump station and the WTP either across Putnam Street, and south along D Street before entering the WTP site, or west across the southern property line.

The WTP pipelines would be approximately 1,200 feet in total length, and would run between the existing WTP and the proposed desalination plant. The brine disposal pipeline would be approximately 4.3 miles long. It would be constructed within roadway right-of-ways in the cities of Antioch and Pittsburg along Elizabeth Lane/D Street, Tregallas Road, G Street, 18th Street, L Street, and 10th Street and would connect to the Delta Diablo WWTP. As alternative alignments for crossing the highway/railroad and entering the WTP, G Street, East 18th Street, Putnam Street, Lone Tree Way, and private easement may be used. The majority of the pipelines would be installed in existing roadways using conventional cut and cover construction techniques and installing the pipe in open trenches.

The raw water pipeline connection and brine disposal pipeline construction may be completed simultaneously with other project components. Although construction of these pipelines would occur over a 10-month period, installation could occur at any time throughout the entire 14-month project construction period. The WTP pipelines would be installed during the desalination facility construction period, as described below. Raw water and brine disposal pipeline installation would be sequenced to minimize land use disturbance and traffic disruption to the extent possible.

Typical construction equipment for pipeline installation would include flatbed trucks, backhoes, excavators, pipe cutting and welding equipment, haul trucks for spoils transport and materials delivery, compaction equipment, arc welders, generators, air compressors, cranes, drill rigs, and skip loaders.

Sensitive receptors along the proposed brine disposal pipeline consist of Park Middle School, March Elementary School, Antioch High School and single-family residences along D Street, Tregallas Road, G Street, 18th Street, L Street, and 10th Street. The setback of some of these residential receptors would be as close as 50 feet from the proposed alignment and occasional noise levels exceeding 80 dBA could be expected to occur, as indicated in **Table 3.13-6**. Open-trench construction would generally proceed at a rate of about 200 feet per day. Consequently, any given receptor along a pipeline alignment would experience construction noise for approximately four days as construction approaches and then recedes. While pipeline construction activities could exceed the 70 dBA speech interference threshold at times, the brief duration of the noise exposure from pipeline installation would be relatively brief and would not be considered a significant noise impact. All construction activity would occur on weekdays between 7 a.m. and 6 p.m. and would hence be consistent with the restrictions of the City of Antioch Noise Ordinance. Therefore, construction noise impacts associated with pipeline installation activities would be **less than significant**.

Desalination Facility Construction

Construction activities for the desalination facility would include excavation, grading, pouring concrete footings for foundations, tanks, and other support equipment; building walls and roofs; assembling and installing major desalination process components; installing piping, pumps, storage tanks, and electrical equipment; testing and commissioning facilities; and finish work such as paving and landscaping of the site. Construction equipment would include excavators, backhoes, graders, pavers, rollers, bulldozers, concrete trucks, flatbed trucks, boom trucks, cranes, forklifts, welding equipment, dump trucks, air compressors, and generators. A total of approximately one quarter acre of the roughly 25 acre WTP site would be disturbed during construction. Construction activities at the desalination plant site are expected to occur over 14 months. All construction activity would occur on weekdays between 7 a.m. and 6 p.m. and would hence be consistent with the restrictions of the City of Antioch Noise Ordinance.

The proposed desalination facility would be located at the existing WTP where the rear yards of single-family residential uses on Terranova and View Drive would be separated from the proposed reverse osmosis facility and chemical storage areas by a 25-foot setback. Potential construction

noise levels at sensitive receptors nearest the desalination plant assuming the two noisiest pieces of equipment operating simultaneously,[3] were calculated using the Highway Noise Construction Model assuming a 25-foot property boundary offset as indicated in **Figure 3.13-1** and an additional 15 feet to the setback of the residential structure. Existing fences between the project site and these adjacent receptors have substantial gaps in places and the analysis conservatively assumed no attenuation due to their presence. Average Leq noise levels of 89 dBA at the property line and 85 dBA at the residential setback could be expected during peak activity. While construction activity closest to the property line would not occur over the entirety of the 14-month construction period, given the overall duration of construction activities within 100 feet of these adjacent residences and resultant noise levels exceeding the 70 dBA speech interference threshold, construction activity associated with the desalination plant would be considered to result in a **significant impact** with respect to temporary noise increases in ambient noise levels and mitigation is warranted.

Mitigation Measure:

Mitigation Measure 3.13-1: General Noise Controls for Construction Equipment and Activities

a) The construction contractor(s) shall assure that construction equipment with internal combustion engines have sound control devices at least as effective as those provided by the original equipment manufacturer. No equipment shall be permitted to have an unmuffled exhaust.

b) To reduce potential daytime construction noise impacts to residential uses immediately south of the desalination facility contractors shall employ temporary noise curtains or barriers along the southern and western property boundary of the WTP to shield daytime construction noise impacts to residential uses to the south and west. To reduce potential daytime construction noise impacts to residential uses immediately east of the proposed new pump station, contractors shall employ temporary noise curtains or barriers along the eastern property boundary of the pump station worksite to shield daytime construction noise impacts to residential uses to the east. Implementation of this measure will ensure that daytime construction activities do not exceed noise criteria for daytime construction at residential uses (70 dBA L_{eq}). These barriers shall be installed prior to the start of construction.

c) Impact tools (i.e., jack hammers, pavement breakers, and rock drills) used for project construction shall be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler shall be placed on the compressed air exhaust to lower noise levels by up to approximately 10 dBA. External jackets shall be used on impact tools, where feasible, in order to achieve a further reduction of 5 dBA. Quieter procedures shall be used, such as drills rather than impact equipment, whenever feasible.

Significance after Mitigation: Moveable sound barrier curtains can provide 15 dBA of sound attenuation (INC, 2014). Static sound barrier curtains can provide sound transmission loss of 16 to 40 dBA, depending on the frequency of the noise source (ENC,

[3] This is consistent with the *General Assessment* methodology of the Federal Transit Administration for assessing construction noise impacts (FTA, 2006).

2014). Given that the predicted noise levels would exceed daytime thresholds by 15 to 19 dBA, implementation of **Mitigation Measure 3.13-1** would reduce noise levels to a **less-than-significant** level.

Impact 3.13-2: Construction of facilities under the proposed project would not expose persons to or generate excessive ground-borne vibration or ground-borne noise levels. ***(Less than Significant)***

Some types of construction equipment can produce vibration levels that can cause architectural damage to structures and be annoying to nearby sensitive receptors. Vibration levels generated during construction of the proposed project would vary during the construction period, depending upon the construction activity and the types of construction equipment used. Typical vibration levels for the construction equipment types that would generally result in the highest vibration levels (e.g., drill rig, large bulldozers) are presented in **Table 3.13-7**.

TABLE 3.13-7
VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT

Equipment Activity	PPV at 25 Feet (inches/second)[a]	RMS at 25 Feet (VDB)[b]
Large Bulldozer	0.089	87
Bulldozers	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Pile driver (vibratory)	0.65	104
Vibratory Roller	0.21	94

NOTES:
[a] Buildings can be exposed to ground-borne vibration levels of 0.2 PPV without experiencing structural damage.
[b] The human annoyance response level is 80 RMS.

SOURCE: FTA, 2006, Caltrans, 2013.

River Intake Pump Station

Construction activities for the intake pump station would involve excavation, pouring concrete footing for foundations; assembling and installing piping, pumps, and electrical equipment; building concrete enclosures and roofs; and performing finish work such as paving, and fencing the perimeter of the pump station site on City property. Equipment prone to vibration generation that may be used for pump station installation would include rollers.

Additionally, a cofferdam may be temporarily installed in the River by the construction contractor to minimize turbulence and sediment disturbance during construction. The cofferdam would consist of interlocking sheet piles which are typically installed using vibratory pile driving methods.

Sheet pile installation for the coffer dam would be the activity with the greatest potential for vibration generation as indicated in **Table 3.13-7**. The cofferdam would be approximately 180 feet from the nearest structure. At this distance vibration levels would be attenuated to a vibration level of 0.074 PPV which would be below the 0.2 PPV threshold for building damage. Vibration levels from all other equipment would be substantially less than this and the impact of vibration from construction of the intake pump station with respect to building damage would be less than significant.

The cofferdam would be approximately 320 feet from the nearest residential structure. At this distance vibration levels would be attenuated to a vibration level of 71 VdB which would be below the 72 VdB criteria for frequent events at residences and buildings where people normally sleep. Additionally, sheet pile driving would be restricted to daytime hours and therefore would not be expected to result in sleep disturbance. Therefore, construction vibration impacts of the intake pump station would be **less than significant**.

Pipeline Installation

Typical construction equipment for pipeline installation would include flatbed trucks, backhoes, excavators, pipe cutting and welding equipment, haul trucks for spoils transport and materials delivery, compaction equipment, arc welders, generators, air compressors, cranes, drill rigs, and skip loaders.

Sensitive receptors along the proposed brine disposal pipeline consist of Park Middle School, March Elementary School, Antioch High School and single-family residences along D Street, Tregallas Road, G Street, 18th Street, L Street, and 10th Street. The setback of some of these residential receptors would be as close as 50 feet from the proposed alignment.

Vibration inducing equipment used in pipeline construction would be drill rigs and vibratory rollers. Drill rigs would generate approximately 0.089 PPV and 87 root mean square (RMS) amplitude at 25 feet. The nearest sensitive receptors to any of the proposed pipelines would be approximately 50 feet from heavy equipment activity and could experience vibration levels of 0.042 PPV and 78 RMS from drill rig operation. At 50 feet, vibration levels from vibratory roller operations would be attenuated to 0.10 in/sec PPV, which is below the building damage threshold, resulting in a less-than-significant impact.

Vibration levels at these receptors would not exceed the potential building damage threshold of 0.2 PPV or the annoyance threshold of 72 RMS during nighttime hours. Other sensitive receptors in the project vicinity would be exposed to vibration levels at incrementally lower levels than those calculated for the nearest receptors.

Desalination Facility Construction

Construction equipment for the desalination plant would include excavators, backhoes, graders, pavers, rollers, bulldozers, concrete trucks, flatbed trucks, boom trucks, cranes, forklifts, welding equipment, dump trucks, air compressors, and generators. Construction activities at the

desalination plant site are expected to occur over 14 months. All construction activity would occur on weekdays between 7 a.m. and 6 p.m.

The proposed desalination facility would be located at the existing water treatment plant where the setback of the residential structures on Terranova Drive and View Drive would be separated from the proposed reverse osmosis facility and chemical storage areas by a 25-foot property boundary offset and an additional 10 feet of building setback.

Vibration inducing equipment used in the desalination facility construction would be bulldozers and vibratory rollers. Bulldozers would generate approximately 0.089 PPV and 87 RMS amplitude at 25 feet. The nearest sensitive receptors to any of the proposed pipelines would be approximately 40 feet from heavy equipment activity and could experience vibration levels of 0.053 PPV and 81 RMS from bulldozer operation. Additionally, construction activity would be restricted to daytime hours and therefore would not be expected to result in sleep disturbance.

At 40 feet, vibration levels from vibratory roller operations would be attenuated to 0.13 in/sec PPV, which is below the building damage threshold, resulting in a less-than-significant impact.

Vibration levels at these receptors would not exceed the potential building damage threshold of 0.2 PPV or the annoyance threshold of 72 RMS during nighttime hours. Other sensitive receptors in the project vicinity would be exposed to vibration levels at incrementally lower levels than those calculated for the nearest receptors.

Mitigation Measure:

None required.

Impact 3.13.3: Operation of the project would generate traffic, stationary source, and area source noise similar to existing noise levels and would not exceed City noise requirements. ***(Less than Significant with Mitigation)***

Traffic Noise

Operation of the proposed desalination facility would add up to 7 new employees, whose trips would be distributed between two day shifts and one night shift. This would generate approximately 14 new one-way trips per day or about 4 trips per peak hour. While portions of the proposed pump stations and pipelines would be located near residences, periodic inspection and maintenance of these facilities would not generate significant noise as these inspections would be infrequent. No significant traffic-related noise impacts would occur.

Operational Equipment Noise

River Pump Station. Noise generated by the new intake pump station would result from pumping operations. The pump station building would be approximately 23-feet-tall and would house the mechanical and electrical equipment. Equipment would include three vertical variable

speed turbine pumps (8 mgd and 600 hp each). Two of the pumps would be active and one on standby.

Pump operations currently occur adjacent to this location where noise levels were monitored to be 52 dBA (see **Table 3.13-2)**. The ambient noise environment was dominated by marine engine activity from vessels in the San Joaquin River and using the pier, and by railroad operations to the south. The proposed relocated pumps would be enclosed within a structure and noise impacts from pump operations would be **less than significant**.

Desalination Plant. Noise generated by the new desalination plant would result from pump operations: four RO feed pumps (2 mgd and 250 hp each), four RO booster pumps (1 mgd and 100 hp each), chemical dosing pumps, and clean-in-place (CIP) recirculation pump (1000 gpm and 25 hp. All of these pumps would be housed in an approximately 18-foot-tall, 10,700 square-foot membrane process building which would serve to contain pump noise and reduce the impact to adjacent residential uses. At the current stage of project development noise generation specification of the proposed pumps are not available and quantitative estimate of noise generation of pump operation and the attenuation offered by the proposed RO building cannot be estimated. As a result, the impact is considered **significant**. However, implementation of **Mitigation Measure 3.13-3 (Stationary-Source Noise Controls)** would reduce impacts to a less-than-significant-level.

Mitigation Measure:

> **Mitigation Measure 3.13-3: Stationary-Source Noise Controls**
>
> The City shall retain an acoustical professional to design stationary-source noise controls and ensure the applicable noise standards are met. At a minimum, all stationary noise sources (e.g., RO pumps) shall be located within enclosed structures and with adequate noise screening, as needed, to maintain noise levels to no greater than 5 dBA above the existing monitored ambient values and 60 CNEL, at the property lines of nearby residences. Once the stationary noise sources have been installed, the contractor(s) shall monitor noise levels to ensure compliance with local noise standards.
>
> **Significance after Mitigation:** Implementation of **Mitigation Measure 3.13-3** would reduce stationary noise levels to a **less-than-significant** level.

Cumulative Impacts

This section presents an analysis of the cumulative effects of the proposed project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts. As discussed above, the proposed project would have no impact with respect to a being located in the vicinity of a public or private airport. Accordingly, the proposed project could not contribute to cumulative impacts related to these topics and are not discussed further.

Impact 3.13-C-1: Implementation of the proposed project, in combination with other cumulative development could result in a significant noise impact for which the proposed project would make a considerable contribution. ***(Less than Significant with Mitigation)***

Noise is a localized occurrence and attenuates with distance. Therefore, only other projects or activities in relatively close proximity (about 1,000 feet or less) to the intake pump station or the desalination facility sites would have the potential to add to anticipated project-generated noise and create cumulative noise effects. Pipeline installation would progress at a rate of 200 feet per day and would only occur in the presence of a given receptor for three to four days, thus avoiding cumulative noise impacts during construction.

For the intake pump station, the nearest cumulative project would be project number 6 (Rocketship Elementary School) on **Figure 3-1**, which would be over 4,000 feet to the south and would be sufficiently distant to preclude any localized cumulative noise impacts. For the desalination facility, the nearest off-site cumulative projects would be project number 1 (Almond Knolls) on **Figure 3-1** which would be over 1,500 feet away and be sufficiently distant to preclude any localized cumulative noise impacts.

Significant cumulative construction-related noise increases would occur if any nearby cumulative projects are constructed at the same time as the proposed project and affect the same sensitive receptors as the proposed project. Project number 2 (Water Treatment Plant Disinfection Improvements Project) on **Figure 3-1** is also located at the WTP. The Initial Study prepared for this cumulative project identified less than significant construction-related and operational noise impacts (CDM Smith, 2017). If construction of both the proposed project and the Water Treatment Plant Disinfection Improvements Project coincide, the combined effect could result in higher construction noise exposure to sensitive receptors. However, implementation of **Mitigation Measure 3.13-1 (General Noise Controls for Construction Equipment and Activities)** would require the incorporation of sufficient noise control measures. Therefore, with implementation of Mitigation Measure 3.13-1, the proposed project's contribution to cumulative impacts would not be considerable, and the impact would be **less than significant with mitigation**.

References – Noise and Vibration

California Department of Transportation (Caltrans), 2009. *Technical Noise Supplement*, November 2009.

California Department of Transportation (Caltrans), 2013. *Technical Noise Supplement*, November 2013.

Caltrans, 2013. *Transportation and Construction Vibration Guidance Manual*. September 2013.

Environmental Noise Control (ENC), 2014. Product Specification Sheet, ENC STC-32 Sound Control Panel System, 2014.

Federal Highway Administration (FHWA), 2006. *Roadway Construction Noise Model User Guide*, 2006.

Federal Transit Administration (FTA), 2006. *Transit Noise and Vibration Impact Assessment*, May 2006.

Industrial Noise Control (INC), 2014. Product Specification Sheet, INC Portable Noise Screen, 2014.

3.14 Population and Housing

Sections	Tables
3.14.1 Environmental Setting 3.14.2 Regulatory Framework 3.14.3 Analysis, Impacts, and Mitigation	3.14-1 Summary of Impacts – Population and Housing

This section describes existing population, housing, and employment characteristics and trends in the City of Antioch and the potential for implementation of the project to result in direct or indirect impacts on population and housing, or displace housing or residents in the project vicinity or citywide.

The analysis in this section is based on project-specific construction and operational features, and data provided in the Antioch General Plan, U.S. Census Bureau's American Fact Finder, the California Employment Development Department, and the California Department of Finance.

3.14.1 Environmental Setting

Regional and Local Setting

The City of Antioch is the primary area that would be affected directly by potential project-related population and housing effects, and by employment effects that could result in demand for additional housing. Because project construction could draw on the regional labor pool, this section also describes employment trends in Contra Costa County.

Population and Housing

In 2010, there were 102,372 people living in the City of Antioch, a 13 percent increase in the city's population compared to 2000 (U.S. Census Bureau, 2000, 2010). The California Department of Finance, which provides population estimates and tracks changes in housing and vacancy rates for years between the decennial census counts, estimates that the city's population in 2016 was 113,495, an 11 percent increase since 2010 (DOF, 2017).

The City of Antioch experienced housing growth between 2000 and 2010. About 4,733 housing units were added over this period, a 16 percent increase, for a total of 34,849 housing units in 2010; the estimated vacancy rate in 2010 was 7.5 percent (U.S. Census Bureau, 2010; 2000). The number of households (occupied housing units) increased over this period from 29,338 in 2000 to 32,252 in 2010, a 10 percent increase (U.S. Census Bureau, 2010; 2000). The California Department of Finance estimates that about 973 housing units were added in Antioch between 2010 and 2016 (a 3 percent increase during this time period) while about 2,578 households (occupied housing units) were added, (an 8 percent increase), and that the vacancy rate as of January 1, 2016 was 2.8 percent (DOF, 2017).

Employment

According to the California Employment Development Department data, approximately 364,200 people worked in Contra Costa County in 2016, an increase of 12,400 jobs since 2015[1] (CEDD, 2017). This estimate measures workers by place of work and includes full-time and part-time wage and salary employment; it does not include self-employed people, unpaid family workers, or private household employees. From 2010 to 2016, approximately 45,100 jobs were added in Contra Costa County (CEDD, 2017). The unemployment rate in Contra Costa County is estimated to be 3.1 percent (CEDD, 2018).

Employment in Contra Costa County, as in the Bay Area region as a whole, has fluctuated substantially since the mid-1990s. Both Contra Costa County and the Bay Area economies experienced strong job growth through 2000, fueled by the "dot-com" boom in the high technology and internet sectors; 47,000 jobs were added between 1994 and 2000 for a total of almost 339,000 workers in Contra Costa County in 2000 (CEDD, 2017). Following the dot-com crash, Contra Costa County gained only 2,000 jobs between 2000 and 2004. The county gained almost 3,600 jobs between 2004 and 2008 and lost about 26,500 jobs between 2008 and 2010 during the global recession (CEDD, 2017).

Construction employment in Contra Costa County has generally not recovered from the high point in 2005 (when there were 30,500 construction jobs) to 2016 (when there were 25,400 construction jobs). Construction jobs during that period reached the lowest point in 2011, when there were 17,800 construction jobs (CEDD, 2017). The employment data indicates that construction job growth has continued, and between 2011 and 2016, 7,600 jobs were added in Contra Costa County.

Antioch WTP and River Intake Pump Station

The existing WTP property contains no active uses other than water treatment facilities, which has about 11 employees. The existing river intake pump station is maintained by the existing WTP employees.

3.14.2 Regulatory Framework

Federal

There are no applicable federal regulations related to population, housing, or employment.

State

There are no applicable state regulations related to population, housing, or employment.

[1] These estimates of employment by place of work count part-time and full-time jobs equally. People who hold more than one job may be counted more than once.

Local

City of Antioch General Plan

The following goals and policies from the Antioch General Plan are relevant to population and housing.

> **Objective 3.8.1:** Achievement of a balance between housing and employment opportunities within Antioch, providing the opportunity for households of all income levels to both live and work in Antioch.
>
> ***Policy 3.8.2.a:*** Maintain an inventory of employment-generating lands, providing for a variety of office-based, industrial, and commercial (retail and service) employment opportunities.

City of Pittsburg General Plan

The following goal from the Pittsburg General Plan is relevant to population and housing.

> **Goal 3-G-1:** Manage the City's growth to balance development of housing options and job opportunities, protection of open space and habitat areas, construction of transportation improvements, and preservation of high quality public facilities.

3.14.3 Analysis, Impacts, and Mitigation

Significance Criteria

Based on Appendix G of the *CEQA Guidelines*, the project would have a significant impact on population and housing if it would:

- Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure);
- Displace substantial numbers of existing housing units or create demand for additional housing, necessitating the construction of replacement housing; or
- Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.

Methodology and Assumptions

Construction and Operational Impacts

The evaluation of the potential for project construction and operations to induce substantial population growth or creating demand for additional housing compares the number of project-related jobs to current and recent population, housing, and employment levels in the City of Antioch and Contra Costa County.

Issues Not Discussed in Impacts

Due to the nature of the project, there would be no impact related to the following topics for the reasons described below:

- ***Displace substantial numbers of existing housing units, necessitating construction of replacement housing.*** The project component sites contain no housing; consequently, there is no on-site population. The proposed project would not displace any housing that would necessitate construction of replacement housing. Therefore, the criterion related to housing displacement does not apply and is not addressed further in this section.

- ***Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere.*** The project component sites contain no housing; consequently, there is no on-site population. The project would not displace any people and therefore would not necessitate construction of any replacement housing elsewhere. Therefore, the criterion related to displacement of people does not apply and is not addressed further in this section.

Impacts and Mitigation Measures

Table 3.14-1 summarizes the proposed project's impacts and significance determinations related to population and housing.

TABLE 3.14-1
SUMMARY OF IMPACTS – POPULATION AND HOUSING

Impacts	Significance Determinations
Impact 3.14-1: The proposed project would not directly or indirectly induce substantial population growth in the area or create demand for additional housing.	LS
Impact 3.14-C-1: Cumulative impacts related to geology and soils.	LS

NOTES:
LS = Less than Significant

Impact 3.14-1: The proposed project would not directly or indirectly induce substantial population growth in the area or create demand for additional housing. *(Less than Significant)*

Construction

Project construction would take approximately 14 months, with an average of 6 to 8 construction workers for each component (refer to **Table 2-5** in Chapter 2, *Project Description).* During the construction period, a total of up to 38 construction workers would be employed. The 38 jobs provided during the construction period represents less than 1 percent of Contra Costa County construction jobs in 2016.

It is expected that construction workers would be drawn primarily from the regional construction employment pool, given that the project's construction jobs would represent a minor percentage of current regional construction employment levels. Project construction workers who do not live in Contra Costa County would likely commute from elsewhere in the Bay Area rather than relocate from more distant towns and cities. While it is possible that some workers might temporarily relocate from other areas, the small increase potentially attributable to project construction would not result in a substantial increase in the local population and not create an increase demand for services in the area. Consequently, construction of the project would not

induce population growth by attracting a substantial numbers of workers from outside the region to relocate to the area and would not create demand for additional housing or other facilities and services associated with growth; therefore, the growth-inducing impact of the construction of the proposed project would be **less than significant**.

Operational Impacts

Operation of the proposed project would result in the addition of 7 new permanent jobs at the WTP. Given that the city had a housing vacancy rate of 2.8 percent in 2016, meaning that 1,003 housing units were unoccupied (DOF, 2016), housing would be available to meet the need of any new workers. It is likely that new employees would be drawn from the existing local or regional labor pool; however, conservatively assuming that the regional labor force could not meet the operational workforce requirement, up to 7 new employees relocating to the area would represent a 0.001 percent increase in workers residing in Contra Costa County (i.e., 0.001 percent of the labor force) in 2016. This incremental increase would not constitute substantial population growth in the region. The proposed project would not involve construction of new homes that would directly induce population growth, or, with the exception of the WTP, new places of employment in the area.

Therefore, operation of the proposed project would not directly induce a substantial increase in the local population as it would not require a substantial increase in the local workforce to support project operations, and the direct growth-inducing impact of the proposed project would be **less than significant**.

Mitigation Measure:

None required.

Cumulative Impacts

As discussed in Section 3.14.3, the project would not displace any existing housing or people, or result in the need for replacement housing. Thus, there would be no cumulative impact associated with displacement of housing or people. The cumulative analysis focuses on the project's contribution to direct cumulative growth effects resulting from construction and operational labor force needs.

Impact 3.14-C-1: The proposed project, in combination with past, present, and reasonably foreseeable future projects in the vicinity, would not contribute to a cumulative impact on population and housing. ***(Less than Significant)***

The geographic scope for potential cumulative population and housing impacts encompasses Contra Costa County. The cumulative analysis takes a projections based approach, utilizing projections contained in the City's General Plan and regional estimates provided by the Association of Bay Area Governments (ABAG).

Development of the proposed project and cumulative projects would result in population, housing, and employment growth. "Substantial" growth is defined as unplanned growth, for which infrastructure, services, and housing have not been planned. So long as the cumulative project scenario generates cumulative population, housing, and employment conditions that are within the projections of the City and ABAG, there would be no significant adverse growth impact related to population, housing, or employment.

Construction

As discussed under Impact 3.14-1, project construction is expected to generate up to 38 daily construction jobs during the 14-month construction period. Because construction employment is temporary, it would not necessarily combine with past or future construction projects to contribute to a cumulative impact related to construction employment. However, project construction could be occurring concurrently with other construction activity within the Cities of Antioch and Pittsburg. Construction jobs are temporary, and construction workers in a region typically commute from their residences to temporary construction jobs elsewhere in the region, rather than relocating to the vicinity of the job site. Because of the limited duration of construction jobs and considering the size of the regional construction workforce and the substantial job losses in the region experienced by the construction industry until the last few years, the construction labor force in the county is expected to accommodate demand of the cumulative projects for construction labor. Even if cumulative construction projects were to lead to population and housing effects by attracting some workers to move to the area from outside the region, such moves, and associated effects, would likely be temporary. However, the contribution of the proposed project would not be cumulatively considerable because of the relatively small number of construction workers required and the short duration of the construction period. Therefore, the cumulative impact of project construction would not be cumulatively considerable and **less than significant**.

Operation

As discussed in Impact 3.14-1, the project would result in the addition of approximately 7 full time permanent jobs.

The City of Antioch routinely prepares growth projections to inform the planning and environmental review process; these projections are based on regional estimates provided by ABAG that reflect growth in the Bay Area as a whole. According to the City of Antioch's 2015-2023 Housing Element, ABAG forecasts a population of 120,300 for Antioch in 2035, which would be a 13 percent increase from 2014 (City of Antioch, 2015). The number of jobs in Antioch are projected to increase from 19,090 to 23,660 between 2010 and 2030, a 24 percent increase. Household growth is expected to rise from 32,252 households to 36,600, an increase of 13.5 percent (City of Antioch, 2015). These numbers show that the jobs-housing ratio in Antioch is projected to increase from 0.59 to 0.65; therefore, a significant portion of workers will continue to work outside City boundaries. For Contra Costa County as a whole, the jobs-housing ratio is projected to be approximately 1 for the next few decades (City of Antioch, 2015).

Given the size of the regional workforce, current unemployment rate in Contra Costa County, as discussed in Section 3.14.1, the labor demand associated with cumulative projects in **Table 3-1** is expected to be accommodated by workers in the region. To the extent that new workers would move to the area from outside the region in response to employment opportunities provided by non-residential development in the region, there is no evidence to suggest that any such in-migration would be inconsistent with job growth projected and planned to occur under the City of Antioch's general plan, and housing is also planned to accommodate such new workers. A key purpose of General Plan housing elements is to demonstrate that jurisdictions have the capacity to accommodate anticipated housing needs. The contribution of the proposed project would not be cumulatively considerable because of the relatively small number of operational workers required. Therefore, the cumulative impact of project operation would not be cumulatively considerable and **less than significant**.

References – Population and Housing

California Employment Development Department (CEDD), 2017. *LMI [Labor Market Information] for Contra Costa County, Industry Employment Data, Annual Average Estimates 1990-2016*, September 15, 2017.

California Employment Development Department (CEDD), 2018. *Local Area Unemployment Statistics (LAUS) – Contra Costa County*. Available at data.edd.ca.gov/Labor-Force-and-Unemployment-Rates/Local-Area-Unemployment-Statistics-LAUS-Contra-Cos/2fxf-y95y. Accessed on January 11, 2018.

Contra Costa Water District, 2016. *2016 Fast Facts*. Available at ccwater.com/796/2016-Fast-Facts. Accessed on December 6, 2017. 2017.

City of Antioch, 2003. *City of Antioch General Plan*, Updated November 23, 2003.

City of Antioch, 2015. *Housing Element, 2015-2023*. Adopted April 14, 2015.

State of California, Department of Finance (DOF), 2017. *E-5 Population and Housing Estimates for Cities, Counties, and the State, January 2011-2017, with 2010 Benchmark. 2017*.

U.S Census Bureau, American Fact Finder, 2000. *DP-1 Profile of General Demographic Characteristics: 2000, Census 2000 Summary File 1 (SF 1) 100-Percent Data, Antioch City, California*.

U.S Census Bureau, American Fact Finder, 2010. *DP-1 Profile of General Population and Housing Characteristics: 2010, 2010 Demographic Profile Data, Antioch City, California*.

This page intentionally left blank

3.15 Public Services and Utilities

Sections	Tables
3.15.1 Environmental Setting 3.15.2 Regulatory Framework 3.15.3 Analysis, Impacts, and Mitigation	3.15-1 Summary of Impacts - Public Services and Utilities

This section evaluates potential impacts on public services and utilities that could result from implementation of the proposed project. Public services in the project area include fire and police protection, emergency medical services, and schools. Utilities in the project area provide solid waste disposal, water, wastewater, and stormwater drainage. This section also presents mitigation measures to reduce or eliminate potential impacts, as appropriate. Potential impacts associated with hazards in the vicinity of schools in the project area are discussed in Section 3.9, *Hazards and Hazardous Materials*. In addition, the City of Antioch Recreation Department administers parks and recreation centers in the project area. Potential impacts associated with recreational facilities in the project area are discussed in Section 3.16, *Recreation*.

Public comments received during the scoping period that relate to utilities and public services generally concerned the potential for the proposed project to encounter existing pipelines and storm drains in the project area during construction, disclosure of brine discharge pipeline material and lifetime specifications, and potential impacts on the Delta Diablo Sanitation District's NPDES permit due to combined discharges with the proposed project's brine effluent.

As described in Chapter 2, *Project Description*, proposed raw water pipeline and brine disposal pipelines would be composed of ductile iron and HDPE/PVC, respectively. The remaining scoping comments are addressed in Section 3.15.3, *Analysis, Impacts, and Mitigation*, below.

The analysis included in this section was developed based on project-specific construction and operational features, applicable state and local regulations and policies, governmental and local utility websites detailing facility capacity, and technical utility documents.

3.15.1 Environmental Setting

The study area for evaluation of impacts on utilities and public service systems includes the service areas for the public services and utilities that serve the project area.

Public Services

Fire Protection and Emergency Medical Services

The Contra Costa County Fire Protection District and Emergency Medical Services Division serves the project area. The District currently operates 30 full-time Advanced Life Support engine companies (Contra Costa County Fire Protection District, 2018). Stations within the immediate project area include the following:

- Station No. 83: 315 W. 10th Street, Antioch, CA 94509
- Station No. 84: 196 Bluerock Drive, Antioch, CA 94509
- Station No. 85: 2717 Gentrytown Drive, Antioch, CA 94509

Police

The Antioch Police Department (APD) serves the project area, and the Antioch population of over 100,000. The police department is staffed with 103 sworn and 35 non-sworn employees. The department is comprised of two divisions: Support Services and Field Services. The Field Services Division includes the dispatch, patrol, community policing, and traffic bureaus. The Support Services Division consists of the administration, investigations, narcotics, records, and animal services Bureaus. The police station is located at 300 L Street (City of Antioch, 2017a).

Schools and Libraries

The Antioch Unified School District oversees the management of five high schools, four middle schools, and 13 elementary schools. Potential impacts to schools within 0.25 mile of project components is discussed in Section 3.9, *Hazards and Hazardous Materials*.

The Antioch Library at 501 West 18th Street is managed by the Contra Costa County Library system. The brine discharge pipeline would be installed within 0.25 mile of the Antioch Library.

Utilities

Solid Waste Services

Republic Services of Contra Costa County manages the City of Antioch's solid waste collection, disposal, and recycling system. All solid waste generated by construction and operation of the project that would not be recycled would be disposed of at the Keller Canyon Landfill. Keller Canyon is a 244-acre Class II facility, has a maximum permitted capacity of 75 million cubic yards and is permitted to accept 3,500 tons of solid waste per day. The landfill has a projected site life of 50 years from commencement of operations in October 1992 (CalRecycle, 2017).

Water Service

Water Supply

The City provides water to approximately 31,800 customers (connections) in the City of Antioch (City of Antioch, 2016). The City's primary sources of untreated surface water are from the San Joaquin River and the Contra Costa Canal, which can be stored in the Antioch Municipal Reservoir. The Canal water is purchased from the Contra Costa Water District (CCWD) and is pumped from the Delta and stored in the Los Vaqueros Reservoir (City of Antioch, 2016). Water is conveyed through pipelines from the Contra Costa Canal and pumped into the City's municipal reservoir or directly to the Antioch Water Treatment Plant (WTP). The WTP treats water from the Canal and municipal reservoir and distributes it through 320 miles of pipelines and water mains, and booster pumping stations to the City's residents and businesses. The City's current annual agreement with the Contra Costa Water District is for a peak demand of 36 mgd (13,140 MG per

year). In 2015, the City purchased 3,915 MG of raw surface water from CCWD. CCWD water purchases are projected to increase steadily from 4,099 MG in 2020 to 5,044 MG in 2040. The CCWD is prepared to sell to the City all of the City's projected water needs through 2028.

In 2015, the City pumped 409 MG of raw surface water from the San Joaquin River Intake. Water supplies from the river intake are projected to increase to 2,460 MG per year through 2040 (City of Antioch, 2016). The existing capacity of the river water intake is 16 mgd. Increased salinity in the San Joaquin River has limited the volume that the City can pump. The Department of Water Resources and the City have an agreement in which the City is able to pump water with a chloride content less than 250 mg/L, for at least 208 days per year (City of Antioch, 2016).

The City also receives treated, recycled wastewater from the Delta Diablo Sanitation District (District) to be used for irrigation in four City parks and in the Lone Tree Golf Course. In 2015, the District supplied the City with 79 MG of recycled water. Recycled water supplies are projected to increase to 326 MG in 2020 and up to 489 MG a year through 2040 (City of Antioch, 2016).

Overall, the City's actual total water supplies were 4,600 MG in 2015. Total water supply is projected to increase from 6,885 MG in 2020 to 7,993 MG in 2040, a 73 percent increase from 2015 (City of Antioch, 2016).

Water Demand

The City's total actual water demand was 4,521 MG in 2015. Water demand is projected to increase from 6,559 MG in 2020 to 7,504 MG in 2040, a 66 percent increase from 2015 usage (City of Antioch, 2016).

Wastewater Treatment

Delta Diablo provides wastewater resource recovery services for the Cities of Antioch and Pittsburg, and the unincorporated community of Bay Point, serving a population of approximately 208,000. The City of Antioch's sanitary sewer system includes approximately 292 miles of gravity sewer mains and the majority of the collection system is transported to the District's Wastewater Treatment Plant (WWTP). The WWTP is located at 2500 Pittsburg-Antioch Highway on the border of Pittsburg and Antioch and has an average dry weather design capacity for up to 19.5 mgd. The treated wastewater is discharged about 500 feet offshore through a deep water diffuser outfall to New York Slough (Delta Diablo, 2018.).

Sanitary Sewer System

The City of Antioch operates and maintains an estimated 310 miles of sanitary sewer system and 31,000 residential and commercial sewer lateral connections. The City's sanitary sewer lines feed into Delta Diablo's collection system (City of Antioch, 2017a).

Stormwater Drainage

The City maintains a stormwater collection system consisting of catch basins, storm drains, channels, detention basins, creeks, culverts, and concrete-lined "V" ditches in open space, which handle stormwater runoff throughout the City (City of Antioch, 2017a).

3.15.2 Regulatory Framework

Federal

There are no applicable federal regulations related to utilities and public services.

State

California Integrated Waste Management Act of 1989, Assembly Bill 341, and the California Green Building Standards

In 1989 the California legislature passed the Integrated Waste Management Act of 1989, known as AB 939. The bill mandates a reduction of waste being disposed: jurisdictions were required to meet diversion goals of 25 percent by 1995 and 50 percent by the year 2000 through source reduction and recycling programs. AB 939 also established an integrated framework for program implementation, solid waste planning, and solid waste facility and landfill compliance which requires each county to adopt development program for waste reduction.

Assembly Bill 341, which amends the Integrated Waste Management Act of 1989 and was adopted by the California legislature in October 2011, directs CalRecycle to adopt a state policy that actively seeks to achieve a goal of diverting 75 percent of solid waste from landfills by 2020. The new legislation focuses largely on commercial waste generators, as this sector was identified as the most in need of improved waste management. Assembly Bill 341 does not alter the diversion mandates included in AB 939; rather, it is a policy goal to guide CalRecycle's administration of the California Integrated Waste Management Act.

The 2016 California Green Building Standards Code (Part 11 of Title 24, California Code of Regulations), effective January 1, 2017, requires construction waste reduction of 65 percent.

Utility Notification Requirements

California law (Government Code Section 4216 et seq.) requires owners and operators of underground utilities to become members of, participate in, and share the costs of a regional notification center. Government Code Section 4216 requires that persons planning to conduct any excavation contact the regional notification center. Section 4216 includes several related requirements, including requirements for excavations near "high priority subsurface installation," or high-risk facilities, which include high-pressure natural gas pipelines and other pipelines that are potentially hazardous to workers or the public if damaged or ruptured. Underground Service Alert North (USA North) is the notification center for the project area. USA North receives planned excavation reports and transmits the information to all participating members that may

have underground facilities at the location of excavation. The USA North members will then mark or stake their facility, provide information about the location, or advise the excavator of clearance (USA North, 2018).

NPDES Waste Discharge Program

The National Pollution Discharge Elimination System (NPDES) waste discharge requirements and the NPDES Permit for the Delta Diablo WWTP are discussed in Sections 3.10, *Local Hydrology and Water Quality* and 3.11, *Delta Hydrology and Water Quality*.

Local

City of Antioch Municipal Code

Construction and Demolition Ordinance

Title 6, Chapter 3, Section 6-3.203 of the Antioch Municipal Code states that applicants for building, demolition, or site development permits involving any covered project shall complete and submit a waste management plan (WMP), on a WMP form approved by the city. No building, demolition, or site development permits shall be issued, nor shall any demolition, construction or renovation take place on any covered project, unless and until the WMP Compliance Official has approved the WMP.

City of Antioch General Plan

The following policies from the Antioch General Plan are relevant to utilities:

> ***Policy 8.4.2.a*:** As part of the design of water systems, provide adequate pumping and storage capacity for both drought and emergency conditions, as well as the ability to provide fire flows required by the Contra Costa County Fire Protection District.
>
> ***Policy 8.4.2.d*:** Maintain existing levels of water service by protecting and improving infrastructure, replacing water mains and pumping facilities as necessary, and improving the efficiency of water transmission facilities.
>
> ***Policy 8.6.2.h*:** The City of Antioch shall follow State regulations in implementing the goals, policies, and programs in order to achieve and maintain a 50 percent reduction in solid waste disposal through source reduction, reuse, recycling, and composting.
>
> ***Policy 8.6.2.j*:** The City shall require all development projects to coordinate with appropriate departments and/or agencies to ensure that there is adequate waste disposal capacity to meet the waste disposal requirements of the project, and the City shall recommend that all development projects incorporate measures to promote waste reduction, reuse, recycling, and composting.

The proposed project uses existing storage and pumping facilities and would continue to be able to provide adequate water supply, pressure, and capacity to meet emergency conditions; therefore, the proposed project would be consistent with Policy 8.4.2.a.

The proposed project is a water infrastructure project that would improve pumping facilities, construct new transmission pipelines, and create new desalination infrastructure; therefore, the proposed project would be consistent with Policy 8.4.2.d.

The proposed project would be required to submit a Waste Management Plan to the City of Antioch pursuant to Title 6, Chapter 3, Article II of the Antioch Municipal Code; therefore, the proposed project would be consistent with Policy 8.6.2.h.

The proposed project would be consistent with Policy 8.6.2.j. See the discussion in Impacts 3.15-2 and 3.15-3.

City of Pittsburg General Plan

The following policies from the City of Pittsburg General Plan Public Facilities element may be relevant to the proposed project (City of Pittsburg, 2001).

> ***Policy11-G-6:*** Continue reduction and recycling efforts within the City to divert increasingly larger portions of the waste stream from local landfills.
>
> ***Policy 11-G-7:*** Manage solid waste so that State diversion goals are met.

The proposed project would comply with policies in the Antioch Municipal Code and General Plan that require projects to incorporate measures to promote waste reduction, reuse, and recycling of materials to meet State regulations. Therefore, the proposed project would be consistent with Policies 11-G-6 and 11-G-7.

3.15.3 Analysis, Impacts, and Mitigation

Significance Criteria

Based on Appendix G of the CEQA *Guidelines*, the project would have a significant impact on public services and utilities if it would:

- Disrupt operations or require relocation of regional or local utilities;
- Result in the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any public services such as fire and police protection, schools, parks, or other public facilities;
- Require or result in the construction of new water treatment facilities or the expansion of existing facilities, the construction of which could cause significant environmental effects;
- Require or result in the construction of new stormwater drainage facilities or the expansion of existing facilities, the construction of which could cause significant environmental effects;
- Have insufficient water supply available to serve the project from existing entitlements and resources or require new or expanded water supply resources or entitlements;

- Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board;
- Result in a determination by the wastewater treatment provider that it has inadequate capacity, including treatment and/or outfall capacity, to accommodate the project's projected demand;
- Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs.

Methodology and Assumptions

The analysis included in this section was developed based on project-specific construction and operational features, applicable state and local regulations and policies, governmental and local utility websites detailing facility capacity, and technical utility documents.

Issues not Discussed in Impacts

Due to the nature of the proposed project, the following criteria are not addressed in the impact analysis sections for the reasons described below:

- ***Result in the need for new or physically altered governmental facilities.*** During the approximately 14-month construction period, an average of up to eight construction workers would be employed at the various construction sites, depending on the phase of construction and the construction activities taking place. It is expected that construction workers could come from the regional labor pool. While it is possible that some workers might temporarily relocate from other areas, the proposed project would not substantially increase the local population. During project construction, incidents requiring law enforcement, fire protection, or emergency services could occur; however, any temporary increase in incidents would not exceed the capacity of local and/or regional service providers to a degree that requires new or expanded facilities. Any temporary increase in the local population during project construction would be negligible and could be accommodated by existing service providers. Therefore, construction of the proposed project would not result in impacts related to the need for new or physically altered governmental facilities, including, including fire and police protection, libraries, schools, hospitals, or other services, in order to maintain existing levels of public services, and no impacts on public services would occur.

  Operation and maintenance activities would require approximately up to seven permanent employees and would not substantially increase the demand for public services, including fire and police protection, libraries, schools, hospitals, or other services. Therefore, no impacts related to public services would occur during project operations. Because there would be no construction or operational impacts, the criterion related to the need for new or modified governmental facilities is not applicable to the project and is not discussed further. The issues of population and housing are discussed in Section 3.13, *Population and Housing*. The potential impact related to impaired emergency access during construction is addressed in Section 3.17, *Transportation and Circulation*.

- ***Require or result in the construction of new water treatment facilities or the expansion of existing facilities, the construction of which could cause significant environmental effects.*** As described in Chapter 2, *Project Description*, the proposed project would develop a new water supply for the City to offset purchased water use. The construction of water-related facilities, including the desalination facility, is the subject of this EIR. Other sections in

Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures* discuss the potential impacts and identify mitigation measures associated with these proposed facilities.

- ***Require or result in the construction of new stormwater drainage facilities or the expansion of existing facilities, the construction of which could cause significant environmental effects.*** The potential for the proposed project to change drainage patterns and increase stormwater runoff is addressed in Section 3.10, *Hydrology and Water Quality*. That analysis indicates that, due to the negligible increase in impervious surfaces associated with the proposed aboveground facilities, the proposed project would have a less than significant impact associated with potential changes in drainage patterns and the rate and amount of surface runoff. As a result, the proposed project would not require or result in the need for new or expanded stormwater drainage facilities. No impact would result and this impact is not discussed further.
- ***Have insufficient water supply available to serve the project or require new or expanded water supply resources or entitlements.*** Project implementation would generate up to seven permanent jobs in the region. The proposed project would not construct new housing, nor would it substantially increase the number of permanent workers in the area. No substantial changes in water demand or water distribution would result. Furthermore, the purpose of the proposed project is to provide a new potable water supply source to serve the City of Antioch service area and the implementation of this new water supply is the subject of this EIR. Therefore, this criterion is not applicable to the project and is not discussed further in this section.

Impacts and Mitigation Measures

Table 3.15-1 summarizes the proposed project's impacts and significance determinations related to public services and utilities.

TABLE 3.15-1
SUMMARY OF IMPACTS – PUBLIC SERVICES AND UTILITIES

Impacts	Significance Determinations
Impact 3.15-1: The proposed project could disrupt operations or require relocation of regional or local utilities.	LSM
Impact 3.15-2: The proposed project would not exceed the wastewater treatment requirements of the applicable Regional Water Quality Control Board or result in a determination by the wastewater treatment provider that it has inadequate capacity, including treatment and/or outfall capacity, to accommodate the project's projected demand.	LS
Impact 3.15-3: The proposed project would not be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs.	LS
Impact 3.15-C-1: The proposed project, in combination with other cumulative development, could disrupt operations or require relocation of regional or local utilities.	LSM
Impact 3.15-C-2: The proposed project, in combination with other cumulative development, would not exceed the wastewater treatment requirements of the applicable Regional Water Quality Control Board or result in a determination by the wastewater treatment provider that it has inadequate capacity, including treatment and/or outfall capacity, to accommodate the project's projected demand.	LS
Impact 3.15-C-3: The proposed project, in combination with other cumulative development, would not be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs.	LS

NOTES:
LS = Less than Significant
LSM = Less than Significant with Mitigation

Impact 3.15-1: The proposed project could disrupt operations or require relocation of regional or local utilities. ***(Less than Significant with Mitigation)***

Construction

Disconnection or relocation of existing utility lines would not be required for construction of the desalination facility within the WTP property. As described in Section 2.7.3, *River Intake Pump Station,* the existing pump station would remain in operation while the new pump station is constructed. Once the new pump station is operational, the existing pump station would be taken offline and demolished. Therefore, the ability of the City of Antioch to pump raw water from the river would not be disrupted. This impact would be **less than significant**.

Construction activities that involve underground utilities throughout the City of Antioch and a small portion of the City of Pittsburg may require minor relocation or disruption of existing overhead and underground utility lines such as such as natural gas, electricity, sewage, telephone, fuel, and water lines. The impact is **potentially significant**.

Mitigation Measures:

Mitigation Measure 3.15-1a: Locate and Confirm Utility Lines.

Before excavation begins, the City of Antioch or its contractor(s) shall locate all overhead and underground utility lines (such as natural gas, electricity, sewage, telephone, fuel, and water lines) that are reasonably expected to be encountered during excavation. When a project excavation is within the approximate location of a subsurface utility, the City of Antioch or its contractor shall determine the exact location of the underground utility by safe and acceptable means, including the use of hand tools and modern techniques. Information regarding the size, color, and location of existing utilities shall be confirmed before construction activities begin. These utilities shall be highlighted on all construction drawings.

Mitigation Measure 3.15-1b: Coordinate Final Construction Plans with Affected Utilities.

The City of Antioch or its contractor(s) shall coordinate final construction plans, schedule, and specifications with affected utilities with utility providers and affected jurisdictions (e.g., the City of Pittsburg). Arrangements shall be made with these entities regarding the appropriate protection, relocation, or temporary disconnection of services. If any interruption of service is required, the City of Antioch or its contractor(s) shall notify residents and businesses in the project corridor of any planned utility service disruption at least 2 working days and up to 14 calendar days in advance.

Mitigation Measure 3.15-1c: Safeguard Employees from Potential Accidents Related to Underground Utilities.

When any excavation is open, the construction contractor(s) shall protect, support, or remove underground utilities as necessary to safeguard employees.

The contractor(s) shall be required to provide weekly updates to the City of Antioch and construction workers regarding the planned excavations for the upcoming week, and to specify when construction will occur near a high-priority utility (i.e., pipelines carrying petroleum products, oxygen, chlorine, or toxic or flammable gases; natural gas pipelines

greater than 6 inches in diameter or with normal operating pressures greater than 60 pounds per square inch gauge; and underground electric supply lines, conductors, or cables that have a potential to ground more than 300 volts that do not have effectively grounded sheaths). Construction managers shall hold regular tailgate meetings with construction staff on days when work near high-priority utilities will occur to review all safety measures regarding such excavations, including measures identified in the Mitigation Monitoring and Reporting Program and in construction specifications. The contractor shall designate a qualified Health and Safety Officer who shall specify a safe distance to work near high-priority utilities. Excavation near such utility lines shall not be authorized until the designated Health and Safety Officer confirms and documents in the construction records that: (1) the line was appropriately located in the field by the utility owner using as-built drawings and a pipeline-locating device; and (2) the location was verified by hand by the construction contractor.

Mitigation Measure 3.15-1d: Emergency Response Plan.

Before commencement of construction, the City of Antioch or its contractor(s) shall develop an emergency response plan that outlines procedures to follow in the event of a leak or explosion. The emergency response plan shall identify the names and phone numbers of staff at the potentially affected utilities that would be available 24 hours per day in the event that construction activities cause damage to or rupture of a high-risk utility. The plan shall also detail emergency response protocols, including notification, inspection, and evacuation procedures; any equipment and vendors necessary to respond to an emergency (such as an alarm system); and routine inspection guidelines.

Mitigation Measure 3.15-1e: Notify Local Fire Departments.

The City of Antioch or its contractor(s) shall notify local fire departments in advance of any time work that is to be performed in close proximity to a gas utility line, or any time damage to a gas utility line results in a leak or suspected leak, or whenever damage to any utility results in a threat to public safety.

Mitigation Measure 3.15-1f: Ensure Prompt Reconnection of Utilities.

The City of Antioch or its contractor(s) shall promptly contact utility providers to reconnect any disconnected utility lines as soon as it is safe to do so.

Significance after Mitigation: With the implementation of **Mitigation Measure 3.15-1a through f**, the impact would be reduced to a **less-than-significant** level because it requires the City of Antioch or its contractor(s) to locate and confirm utility lines, coordinate final construction plans with affected utilities, safeguard employees from potential accidents related to underground utilities, prepare an emergency response plan, notify local fire departments, and ensure prompt reconnection of utilities.

Operation

Operation of the proposed project would not disrupt operations or require relocation of regional or local utilities. There would be **no impact**.

Mitigation Measure:

None required.

Impact 3.15-2: The proposed project would not exceed the wastewater treatment requirements of the applicable Regional Water Quality Control Board or result in a determination by the wastewater treatment provider that it has inadequate capacity, including treatment and/or outfall capacity, to accommodate the project's projected demand. ***(Less than Significant)***

Construction

As described above in Section 3.15.1, *Environmental Setting*, the Delta Diablo provides wastewater resource recovery services for the Cities of Antioch and Pittsburg, and the unincorporated community of Bay Point. The City of Antioch's sanitary sewer system includes approximately 292 miles of gravity sewer mains and the majority of the collection system is transported to the WWTP at 2500 Pittsburg-Antioch Highway on the border of Pittsburg and Antioch. The treated wastewater is discharged about 500 feet offshore through a deep water diffuser outfall to New York Slough. The WWTP has an average dry weather design capacity for up to 19.5 mgd.

During the approximately 14-month construction period, an average of up to eight construction workers would be employed at each of the various construction sites, depending on the phase of construction and the construction activities taking place. While it is possible that some workers might temporarily relocate from other areas, it is expected that construction workers could come from the regional labor pool. Construction of the proposed project would not increase the local population to an extent that wastewater generated by project construction workers could exceed the wastewater treatment requirements or treatment capacity. The impact would be **less than significant**.

Mitigation Measure:

None required.

Operation

As described in Chapter 2, *Project Description*, brine from the RO system would be conveyed through an approximately 4.3-mile-long, 12-inch-diameter dedicated pipeline from the desalination facility to the existing Delta Diablo WWTP, which has primary, secondary, and partial tertiary treatment capabilities. The brine disposal pipeline would connect to the WWTP effluent channel at the north end of the plant. The brine would be mixed with treated wastewater from the WWTP prior to discharge through the existing WWTP outfall. As noted above, the WWTP has a permitted average dry weather effluent flow of 19.5 mgd.

As described in Chapter 2, *Project Description*, the desalination facility would operate at its full capacity with the RO process generating 2 mgd of brine. The desalination facility would operate at its full capacity anywhere between several days to every day of each month depending on the salinity of the river. Therefore, the total volume of brine discharged during the months the desalination facility is not operating every day would be lower than when the facility is operating every day. **Table 2-9** in Chapter 2, *Project Description* shows the average monthly wastewater

effluent flows from the WWTP and a conservative assumption of 2 mgd of brine through the outfall and diffuser during typical non-drought and drought year scenarios. As depicted in Table 2-9 combined existing and project effluent flows would not exceed the wastewater treatment requirements or treatment capacity, and the impact would be **less than significant**.

Mitigation Measure:

None required.

Impact 3.15-3: The proposed project would not be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs. *(Less than Significant)*

Construction

Excavation and construction activities would generate excess soil, rock, construction material, and debris. Although suitable topsoil and subsoils excavated during construction would be used to backfill excavations and restore work areas, project construction is projected to generate excess material that would require offsite disposal and the Keller Canyon Landfill.

If any soil contaminated with hazardous materials were encountered, it would be characterized, transported and disposed of at an appropriate landfill in compliance with applicable federal, state, and local regulations. Refer to Section 3.9, *Hazards and Hazardous Materials* for a more detailed discussion of the handling of hazardous materials generated by or encountered during project construction.

As shown **Table 2-5** in Chapter 2, *Project Description*, project construction would generate approximately 36,665 cubic yards of spoils and approximately 25,665 cubic yards of fill for a total volume of approximately 62,330 cubic yards of excess spoils and construction debris over an anticipated 14-month construction period.

The Keller Canyon Landfill is permitted to accept 3,500 tons (approximately 4,725 cubic yards of soil-type waste) per day and has a maximum permitted capacity of 75 million cubic yards. The projected site life is through 2042. If all construction spoils were disposed of at the Keller Canyon Landfill, the proposed project would not cause the landfill to exceed capacity. However, the proposed project would comply with policies in the Antioch Municipal Code and General Plan that require projects to incorporate measures to promote waste reduction, reuse, and recycling of materials to meet State regulations. Therefore, the proposed project would not exceed landfill capacity or be out of compliance with regulations related to solid waste during construction. The impact would be **less than significant**.

Mitigation Measure:

None required.

Operation

Operation of the desalination facility would produce minimal solid waste associated with the desalination process. The “cake” solids removed from the filtration backwash during the waste washwater treatment process would be comprised of naturally occurring organic and inorganic constituents of brackish river water very similar to the existing "cake" solids generated by the WTP.. The spent clean-in-place system chemicals would be neutralized and disposed through the WTP’s sanitary sewer system or be hauled to the Delta Diablo WWTP. Administrative activities associated with the desalination facility operation would not contribute significant amounts of solid waste and impacts would be negligible in this regard. Operation of the river intake pump station and pipelines would not generate excess soils or solid waste.

As noted above, the Keller Canyon Landfill is permitted to accept 3,500 tons (approximately 4,725 cubic yards of soil-type waste) per day and has a maximum permitted capacity of 75 million cubic yards. The projected site life is through 2042. Consequently, operational activities associated with the desalination facility would not exceed landfill capacity, and the impact would be **less than significant**.

Mitigation Measure:

None required.

Cumulative Impacts

The cumulative scenario and cumulative impacts methodology are described in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures*. **Table 3-1** lists potential cumulative projects.

Impact 3.15-C-1: The proposed project, in combination with other cumulative development, could disrupt operations or require relocation of regional or local utilities. *(Less than Significant with Mitigation)*

A cumulatively significant impact on utilities could result if the incremental impacts of the proposed project combined with those of one or more of the cumulative projects would cause utility damage, extended periods of utility service disruptions, or multiple disruptions within a short timeframe. As described in Impact 3.15-1, construction of the proposed project could require minor relocation or disruption of existing overhead and underground utility lines such as such as natural gas, electricity, sewage, telephone, fuel, and water lines.

As described in Impact 3.15-1, the proposed project’s potential utility impacts would be reduced to a less-than-significant level with implementation **Mitigation Measure 3.15-1a through f**, which requires the City of Antioch or its contractor(s) to locate and confirm utility lines, coordinate final construction plans with affected utilities, safeguard employees from potential

accidents related to underground utilities, prepare an emergency response plan, notify local fire departments, and ensure prompt reconnection of utilities.

Cumulative projects that could cause utility impacts similar to those described for the proposed include those identified in **Table 3-1** involving future construction. Due to the localized nature of utilities, most potential impacts would likely be limited to construction areas or utility distribution subareas, rather than affecting the entire project area or utility service area. The incremental contribution of the residual (post-mitigation) effects of the proposed project to a cumulative impact would not be substantial because most potential effects would be related to pipeline construction. Proposed project construction activities that have the potential to disrupt utility service would not occur in the vicinity of other cumulative projects for extended periods of time such that prolonged or frequent disruption of service would occur in the vicinity (or utility service subarea) of cumulative projects with potential to cause similar effects. Therefore, after implementation of mitigation measures described above, the proposed project's residual effects would be minimal and would not have a cumulatively considerable contribution to significant cumulative utility service impacts. Consequently, the cumulative impact would be **less than significant with mitigation**.

Impact 3.15-C-2: The proposed project, in combination with other cumulative development, would not exceed the wastewater treatment requirements of the applicable Regional Water Quality Control Board or result in a determination by the wastewater treatment provider that it has inadequate capacity, including treatment and/or outfall capacity, to accommodate the project's projected demand. ***(Less than Significant)***

A significant cumulative impact would occur if the effects of the proposed project combined with those of the cumulative projects would cause effluent flows to exceed the Delta Diablo WWTP capacity or exceed wastewater treatment requirements. As described in Impact 3.15-2, combined existing and project effluent flows would not exceed the wastewater treatment requirements or treatment capacity of the Delta Diablo Sanitation District WWTP.

Implementation of the proposed project, in combination with other cumulative development identified in **Table 3-1** would increase demand for wastewater treatment. The City's Wastewater Collection System Master Plan provides for a phased expansion of the WWTP as growth occurs in the City, ensuring that the WWTP has sufficient capacity to meet planned growth in the service area (City of Antioch, 2014). Any necessary changes to capacity would occur incrementally, as regional population growth demands greater treatment capacity. Because implementation of the Wastewater Collection System Master Plan is expected to ensure that capacity is available as growth occurs, the proposed project's contribution of 2 mgd to cumulative wastewater treatment demand would be less than considerable because it could be accommodated within the growth projections used in the City's Wastewater Collection System Master Plan. Therefore, the proposed project's contribution would not be considerable, and the resulting impact would be **less than significant**.

Mitigation Measure:

None required.

Impact 3.15-C-3: The proposed project, in combination with other cumulative development, would not be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs. ***(Less than Significant)***

As discussed in Impact 3.15-3, operation of the desalination facility and administrative activities associated with the desalination facility operation would not contribute significant amounts of solid waste and impacts would be negligible in this regard. Operation of the river intake pump station and pipelines would not generate excess soils or solid waste.

As noted above, the Keller Canyon Landfill is permitted to accept 3,500 tons (approximately 4,725 cubic yards of soil-type waste) per day and has a maximum permitted capacity of 75 million cubic yards. The projected site life is through 2042. Given the relatively small effect of the proposed waste disposal on daily and absolute landfill receiving capacity, and the comparatively large contribution anticipated by cumulative projects, the proposed project would not contribute considerably to a cumulatively significant landfill capacity impact. In addition, the proposed project would comply with policies in the Antioch Municipal Code and General Plan that require projects to incorporate measures to promote waste reduction, reuse, and recycling of materials to meet State regulations. Therefore, the proposed project's contribution would not be considerable, and the resulting impact would be **less than significant**.

References – Public Services and Utilities

CalRecycle, 2017. CalRecycle, Available online at: www.calrecycle.ca.gov. Accessed February 12, 2018.

City of Antioch, 2017a. Antioch, California. About APD. Available online at: www.ci.antioch.ca.us/CityGov/Police/about_apd.htm. Accessed on December 4, 2017.

City of Antioch, 2017b. Sewer Collections, NPDES. Available online at: www.ci.antioch.ca.us/CityGov/PublicWorks/WasteWaterDivision.htm. Accessed on August 21, 2017.

City of Antioch, 2016. *City of Antioch 2015 Urban Water Management Plan,* May 2016. Prepared by West Yost Associates.

City of Antioch, 2014. *City of Antioch Wastewater Collection System Master Plan,* October 2014. Prepared by RMC Water and Environment.

Contra Costa County Fire Protection District, 2018. District website. Available online at: www.cccfpd.org. Accessed February 12, 2018.

Delta Diablo, 2018. District website. Available online at: www.deltadiablo.org/about-us/about-us. Accessed February 12, 2018.

USA North, 2018. Underground Service Alert of Northern/Central California and Nevada. Available online at: http://usanorth811.org/. Accessed February 12, 2018.

3.16 Recreation

Sections	Tables
3.16.1 Environmental Setting 3.16.2 Regulatory Framework 3.16.3 Analysis, Impacts, and Mitigation	3.16-1 Summary of Impacts – Recreation

This section describes publicly accessible recreational resources in the vicinity of the proposed project components. The section also presents an impact analysis on the recreational resources that would result from the proposed project.

The analysis in this section was developed based on project-specific construction and operational features, and data provided by the City of Antioch's Recreation Department, the California Division of Boating and Waterways, and the U.S. Fish and Wildlife Service's National Wildlife Refuge System.

3.16.1 Environmental Setting

Parks

The City of Antioch Recreation Department manages over 35 parks, community centers, and open spaces throughout the city that are available for public recreation (City of Antioch, 2017). There are no designated parks within or immediately adjacent to the proposed project components. Local parks in the vicinity of the project components include the following (City of Antioch, 2003; City of Antioch, 2017):

- **Chichibu Park.** This 6.3-acre area is south of Longview Road, approximately 0.2-mile south of the WTP. This park's amenities include a group picnic area, sports fields, and a youth play area.

- **Mountaire Park.** This 5.1-acre area is east of Sunset Lane, approximately 0.4 mile east of the WTP. Amenities include a group picnic area, sports fields, and a youth play area.

- **Fairview Park.** This 3-acre area is east of Crestview Drive, approximately 0.1-mile south of the proposed brine discharge pipeline. This park's amenities include a group picnic area, sports fields, and a youth play area.

Local Recreational Facilities

Public recreational facilities in the project area include the following:

- **Antioch Boat Launch Ramp.** The City owns and manages the Antioch public boat launch ramp at the foot of Fulton Shipyard Road. This boat launch ramp has capacity to launch/receive one boat up to 12-feet-wide. The parking lot at the boat launch ramp includes 24 spaces for vehicles with boat trailers only, and approximately 25 spaces for vehicles. The boat ramp and parking lot are adjacent to the existing intake pump station. The walkway and access point to the pump station is located at the northwest corner of the parking lot.

The City has several special-use facilities, of which the following is located in the immediate vicinity of the project area:

- **Contra Costa County Fairgrounds.** This 75-acre area is located at L Street and W 10th Street, where the brine disposal pipeline would be installed. This site is accessed from O Street, W 10th Street, or at the L Street/W 18th Street intersection. The fairgrounds are used for the annual Contra Costa County Fair, and is in use continually as a site of preschool classes, a roller rink, flea market, auto races, cultural and music events, and community league ballfields (City of Antioch, 2003).

Other Recreational Facilities

- **Bicycle Facilities.** Class III bikeways exist on Tregallis Road for its entirety. Class II bikeways existing on: Lone Tree Way from SR 4 to James Donlon Boulevard; on Pittsburg-Antioch Highway from L Street to Antioch's western city limits; and on Contra Loma Boulevard between SR 4 and James Donlon Boulevard. The proposed raw water connection pipeline and brine disposal pipeline alignments would occur within portions of these roadways.

- **Antioch Dunes National Wildlife Refuge.** The U.S. Fish and Wildlife Service (USFWS) manages the Antioch Dunes National Wildlife Refuge, which is approximately 0.15 mile east of the proposed River Intake Pump Station. The 55-acre refuge is not open to unsupervised use by the public due to sensitivity of the dune habitat and the presence of endangered species; however, access is available via monthly guided tours and special events (USFWS, 2017).

- **Dow Wetlands Preserve.** Dow owns and manages this 472-acre undeveloped area located approximately 0.5-mile north of W 10th Street/Pittsburg-Antioch Highway where the brine disposal pipeline would be installed. This preserve serves as an environmental buffer zone for the existing Dow Chemical Plant to the west. The wetlands contain tideland marsh areas, upland grass areas, wildlife, and native vegetation. This area is open to the public from sunrise to sunset (Dow, No Date; Dow, 2017).

3.16.2 Regulatory Framework

Federal

There are no applicable federal regulations related to recreation.

State

Delta Stewardship Council – Delta Plan

The Delta Stewardship Council is a State agency created through the Delta Reform Act of 2009 to develop and implement a legally enforceable long-term management plan for the Delta and Suisun Marsh. The Delta Plan applies a common sense approach based on the best available science to achieve the coequal goals of protecting and enhancing the Delta ecosystem and providing for a more reliable water supply for California, while protecting and enhancing the unique cultural, recreational, and agricultural values of the Delta as an evolving place.

The city of Antioch is within the Delta Secondary Zone, as shown in Appendix 6 of the Delta Plan. The following policies from the Delta Plan are relevant to recreation:

> **DP R11** Water management and ecosystem restoration agencies should provide recreation opportunities, including visitor-serving business opportunities, at new facilities and habitat areas whenever feasible; and existing recreation facilities should be protected, using California State Parks' Recreation Proposal for the Sacramento-San Joaquin Delta and Suisun Marsh and Delta Protection Commission's Economic Sustainability Plan for the Sacramento-San Joaquin Delta as guides.

Local

City of Antioch General Plan

The following goals and policies of the Antioch General Plan (City of Antioch, 2003) are relevant to recreation.

> ***Objective 8.9.1:*** Maintain a system of parks, specialized recreation facilities, and natural open spaces of sufficient size and variety and in the appropriate locations to serve the needs of Antioch residents of all ages.
>
> *Policy 8.9.1.c:* Maintain a minimum size for neighborhood parks of five acres or more, unless there is a specific need for a smaller facility.
>
> *Policy 8.9.1.d:* Secure and develop a shoreline park along the San Joaquin River consisting of recreational trails, viewing areas, and natural habitat protection so as to ensure availability of the waterfront in the City for public enjoyment.

City of Pittsburg General Plan

There are no parks, open spaces, or trail systems managed by the City of Pittsburg that are in the vicinity of proposed project components.

3.16.3 Analysis, Impacts and Mitigation

Significance Criteria

Based on Appendix G of the CEQA *Guidelines*, the project would have a significant impact on recreation if it would:

- Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated; or
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.

Supplementing the above criteria, the proposed project would be considered to result in a significant impact on recreation if it would:

- Disrupt or preclude public access to existing recreational resources.

Methodology and Assumptions

The location, size, and type of recreational resources in the vicinity of the project components were identified using local planning documents and maps. Project impacts were analyzed by noting existing recreational resources and assessing potential changes in use of the resources that could result from the proposed project. The analysis addresses the potential for temporary impacts on recreation during construction. The level of the impact was determined using the significance criteria noted above.

Issues Not Discussed in Impacts

Due to the nature of the proposed project, the following criteria are not addressed in the impact analysis sections for the reasons described below:

- ***Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated.*** The desalination facility operating staff would include approximately 6 full-time equivalent workers. The project would not increase the number of residents in the project area such that it would result in the construction of new homes or businesses. Project construction would occur in the vicinity of recreational facilities, but would not cause permanent displacement of users from these facilities, such that other facilities experienced an increased level of use that resulted in physical impacts. Therefore, this significance criterion is not applicable to the proposed project and is not discussed further.

- ***Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.*** The proposed project is a water supply project and does not include recreational facilities or require the construction or expansion of recreational facilities. Thus, the significance criterion related to the construction or expansion of recreational facilities is not applicable to the proposed project and is not discussed further.

- ***Disrupt or preclude public access to recreational facilities during project operations.*** The proposed project does not involve any permanent aboveground facilities whose operations would affect public access to recreational facilities. The pipelines would be installed below ground and the desalination facility would be constructed within the WTP property outside of any public access areas. The new intake pump station would be a new aboveground structure in an existing City parking lot. Its operation would not disrupt or preclude public access to the boat ramp. Therefore, the significance criterion related to project operations impacts on public access to recreational facilities are not discussed further. Impact 3.16-1 below only discusses potential impacts during project construction activities.

Impacts and Mitigation Measures

Table 3.16-1 summarizes the proposed project's impacts and significance determinations related to recreation.

TABLE 3.16-1
SUMMARY OF IMPACTS – RECREATION

Impacts	Significance Determinations
Impact 3.16-1: Project construction activities could temporarily disrupt access to recreational resources in the vicinity of the project components.	LSM
Impact 3.16-C-1: Cumulative impacts related to recreation.	LS

NOTE:
LS = Less than Significant
LSM = Less than Significant with Mitigation

Impact 3.16-1: Project construction activities could temporarily disrupt access to recreational resources in the vicinity of the project components. *(Less than Significant with Mitigation)*

Construction activities associated with the new intake pump station and pipelines would overlap geographically or occur immediately adjacent to bicycle routes, the Antioch public boat launch ramp, and the Contra Costa County Fairgrounds. As described in Impact 3.17-3 in Section 3.17, *Transportation and Circulation,* project construction activities could temporarily disrupt routes in the project area, some of which include Class II and III bicycle facilities. Potential effects on bicycle routes are not analyzed here, but focused on the potential for project construction to disrupt access to recreational facilities in the vicinity of the project components. There are no recreational facilities at the Delta Diablo WWTP site; thus there are no potential effects on public access.

Construction staging associated with the new intake pump station would require approximately 3,000 square feet within the existing parking lot that serves the public boat launch ramp. Construction, staging, and demolition activities at this site would occur over a period of 12 months. As described in Chapter 2, *Project Description,* a cofferdam approximately 50 feet wide and extending 200 feet from shore may be temporarily installed in the river to facilitate installation of the pipelines and fish screens. If a cofferdam is not used, underwater construction techniques would be used. Both construction scenarios would occur in the area immediately adjacent to the boat launch ramp. Intake pipeline installation would also be required through the parking lot to connect the new pump station to the river. For safety purposes, the boat launch ramp may be temporarily closed during the construction of the new intake pump station. During the 12-month construction period, boats can access the river from the Antioch City Marina approximately 1 mile to the east. Following construction, the parking lot would be returned to its approximate pre-construction condition and public access to the boat launch ramp would continue to be provided.

The brine disposal pipeline construction activities would occur within the roadways adjacent to the Contra Costa County Fairgrounds and could impede access to the fairgrounds at O Street, W 10th Street, and L Street/W 18th Street intersection by temporary lane closures. Construction of the brine disposal pipeline would progress at a rate of approximately 200 feet per day in a linear

fashion and would typically be limited to a few days at each access point. Furthermore, due to the linear construction sequencing, one access point would be impacted at a time, while the other access points would remain open to the public. Following construction, the roadways adjacent to the fairgrounds would be returned to their approximate pre-construction condition and no permanent effects on access would result.

The impacts associated with access to these recreational facilities would be short term and temporary, but potentially significant. Implementation of **Mitigation Measure 3.17-1b** for all construction activities would require the preparation and implementation of a traffic control/traffic management plan. This measure would require the City to notify affected users of the construction activities in advance, and include measures to provide continued or alternate vehicular, pedestrian, and bicyclist access.

Mitigation Measure:

> **Mitigation Measure 3.17-1b: Construction Traffic Control/Traffic Management Plan** (see Section 3.17, *Transportation and Circulation*)
>
> **Significance after Mitigation**: Implementation of **Mitigation Measure 3.17-1b** would reduce construction related impacts on public access to recreational facilities to a **less-than-significant** level.

Cumulative Impacts

As described in Section 3.16.3, the proposed project would not increase the use of existing neighborhood parks or other recreational facilities, include or require the construction of recreational facilities, or disrupt or preclude public access to recreational facilities (operations phase); therefore, it could not cause or contribute to any cumulative impact related to these issues.

Impact 3.16-C-1: Implementation of the proposed project, in combination with other cumulative development would not result in a cumulatively significant impact related to recreational facilities. ***(Less than Significant)***

The geographic scope of potential cumulative impacts on recreation encompasses recreational facilities that would be affected by proposed project construction. The timeframe during which the proposed project could contribute to cumulative recreation effects includes the construction phase. A significant cumulative impact on recreation would result if the construction-phase effects of the project, combined with those of the cumulative projects, would impede public access to recreational facilities. As discussed in Impact 3.16-1, construction activities of the proposed project could temporarily disrupt of impede access to the public boat launch ramp and the fairground. Construction impacts from the proposed project would be less than significant with mitigation. There are no cumulative projects in **Table 3-1** whose effects could combine with those of the proposed project to further impact public access to these recreational facilities.

Therefore, no other projects could combine with the short-term construction-related effects of the project to result in a significant cumulative impact; this impact would be **less than significant**.

References - Recreation

City of Antioch, 2003. *Draft General Plan Update Environmental Impact Report, City of Antioch, Contra Costa County, California,* July 2003. Prepared by LSA.

City of Antioch, 2017. Antioch Recreation Guide. Fall 2017.

Dow, No Date. *Dow Wetlands Preserve*. History of the Wetlands. Available at: www.dow.com/en-us/about-dow/locations/pittsburg/wetlands. Accessed on January 4, 2018.

U.S. Fish and Wildlife Service, National Wildlife Refuge System, 2017. Antioch Dunes, National Wildlife Refuge, California. About the Refuge. Available at: www.fws.gov/refuge/Antioch_Dunes/about.html. Accessed on September 7, 2017.

This page intentionally left blank

3.17 Transportation and Circulation

This section describes the potential for the proposed project to affect transportation and circulation. The analysis is based on review of transportation studies and maps of the project area and vicinity, including site-specific investigations conducted for each of the three components (i.e., desalination facility, intake pump station replacement and raw water pipeline connection, and brine disposal pipeline) that comprise the proposed project, the relevant regulatory ordinances, and a discussion of the methodology and thresholds used to determine whether the proposed project would result in significant impacts. This section analyzes the potential for both project-level and cumulative environmental impacts.

Public comments received during the scoping period that relate to transportation and circulation concerned the requirement for an encroachment permit (issued by the California Department of Transportation [Caltrans]) for any construction work that would encroach onto the State right-of-way, the City's responsibility for any necessary improvements to State highways, and an encroachment permit from the City of Pittsburg for any work that would occur in the City of Pittsburg's right-of-way. These concerns are addressed in Sections 3.17.2 and 3.17.3 below.

The analysis included in this section was developed based on project-specific construction and operational features, data provided by the City, maps of the project area, and the City of Antioch General Plan. Due to the limited nature of the proposed project development and minimal additional operational traffic trips that would be added to the project area, a full traffic impact analysis (traffic study) was not required for the proposed project.

3.17.1 Environmental Setting

The proposed project would include the development of a desalination facility with associated equipment and appurtenances, replacement of an existing intake pump station, and pipelines for the conveyance of source water and brine concentrate. As shown in **Figure 2-1**, Project Vicinity, in Chapter 2.0, *Project Description*, the proposed desalination facility would be located within the fenceline of the City's existing water treatment plant (WTP) at 401 Putnam Street, and the pipeline routes would generally follow roadway ROW. The study area encompassing these three project components is generally bounded to the north by the San Joaquin River, to the south by the Contra Costa Canal, to the east by Lone Tree Way and Cavallo Road, and to the west by D Street, G Street, L Street, and Arcy Lane.

The section below describes the characteristics of the existing transportation system within the study area, including the regional and local roadways, bicycle facilities, pedestrian facilities, and public transit.

Regional and Local Roadways

Regional access to the project sites is provided by State Route (SR) 4, an east-west highway that connects the San Pablo Bay to the Sierra Nevada. SR 4 is identified as a Route of Regional Significance (RRS) by the Contra Costa Transportation Authority (CCTA), which is a major roadway or freeway corridor that serves regional traffic. RRS are identified in action plans adopted by the CCTA under the countywide Measure J program. Roadways in the study area are classified per the City of Antioch General Plan Circulation Element and the Contra Costa Congestion Management Program (CMP).

Intake Pump Station Replacement and Raw Water Pipeline Connection Sites

Fulton Shipyard Road/Cavallo Road is a two-lane roadway with no posted speed limit north of Wilbur Avenue. To the south of Wilbur Avenue, Fulton Shipyard Road becomes Cavallo Road with three lanes (includes a center left-turn lane) and a posted speed limit of 35 miles per hour (mph); and two lanes with a posted speed limit of 25 mph between E 18th Street and SR 4.

Tregallas Road is a two-lane roadway with a posted speed limit of 25 mph that runs east-west between G Street and Hillcrest Avenue parallel to SR 4. Class III bicycle facilities are located on Tregallis Road for its entirety.[1]

Sunset Lane is a two-lane roadway with a posted speed limit of 25 mph that runs north-south between Tregallas Road and Lone Tree Way.

Putnam Street/Worrell Road is a two-lane roadway with a posted speed limit of 25 mph that runs east-west between Gentrytown Drive and Garrow Drive. Putnam Street becomes Worrell Road east of Lone Tree Way.

A Street/Lone Tree Way is a four-lane roadway with a posted speed limit of 35 mph in the vicinity of the project site that runs north-south between downtown Antioch and SR 4 providing direct access to the Rivertown District. South of SR 4, A Street becomes Lone Tree Way, and continues southeast into Brentwood. It is identified by CCTA as a RRS and a Primary Arterial in the General Plan. Class II bicycle facilities are provided on Lone Tree Way from SR 4 to James Donlon Boulevard.[2]

[1] Class III facilities are defined in the General Plan as bicycle routes that provide signage to alert bicyclists and motorists that a bicycle route exists.

[2] Class II facilities are defined in the General Plan as designated bike lanes that provide space in the road for bicycle travel.

Desalination Facility

D Street is a two lane roadway with a posted speed limit of 25 mph in the vicinity of the project site that runs north-south between W 3rd Street and the project site, where it dead-ends at the driveway to the existing WTP site.

Elizabeth Court is a private one-way loop with no posted speed limit providing internal access to Plant A at the existing WTP site.

Brine Disposal Pipeline Alignment

Arcy Lane/Driveway is a private two lane roadway in the City of Pittsburg with no posted speed limit that runs north-south between W 10th Street/Pittsburg-Antioch Highway and the existing Delta Diablo Wastewater Treatment Plant (WWTP). This is the only roadway within the study area that is located outside of the City of Antioch.

W 10th Street/Pittsburg-Antioch Highway is a three-lane roadway (includes a center left-turn lane) with a posted speed limit of 35 mph in the vicinity of the project site that provides east-west access in downtown Antioch between Somersville Road and A Street. West of Somersville Road, W 10th Street becomes the Pittsburg-Antioch Highway, providing a regional roadway connection to the west of Antioch. It is identified by CCTA as a RRS and a Primary Arterial in the General Plan. Class II bicycle facilities are provided on Pittsburg-Antioch Highway from L Street to Antioch's western city limits.

L Street/Contra Loma Boulevard is a two-lane roadway with a posted speed limit of 35 mph in the vicinity of the project site that runs north-south in northern Antioch between SR 4 and W 10th Street. Contra Loma Boulevard runs north-south in southern Antioch between SR 4 and James Donlon Boulevard. It is identified as a Primary Arterial in the General Plan. Class II bicycle facilities are provided on Contra Loma Boulevard between SR 4 and James Donlon Boulevard.

18th Street is a two-lane roadway with a posted speed limit of 25 mph in the vicinity of the project site that is located north of SR 4 and runs parallel to SR 4. 18th Street acts as a major arterial between A Street and the SR 4/SR 160 junction. It is identified as a Primary Arterial in the General Plan. Class II bicycle facilities are provided on 18th Street between D Street and L Street.

G Street is a two-lane roadway with a posted speed limit of 25 mph in the vicinity of the project site that runs north-south between the San Joaquin River and James Donlon Boulevard.

Tregallas Road (refer to description above under *Intake Pump Station Replacement and Raw Water Pipeline Connection*)

D Street (refer to description above under *Desalination Facility*)

Existing Traffic Conditions

As stated previously, a traffic impact analysis was not required to assess specific traffic conditions on transportation facilities in the study area. However, the following background information is provided for a general understanding of current traffic conditions on regional and local roadways that serve the proposed project.

According to the latest traffic data available from Caltrans, SR 4 in the vicinity of the proposed project carried between 111,000 and 129,000 average daily traffic (ADT) (Caltrans, 2017). The most current ADT information available for the majority of the regional and local roadways described above, and their operational performance (level of service), are provided below in **Table 3.17-1**.

TABLE 3.17-1
EXISTING TRAFFIC CONDITIONS

Roadway	Classification	Level of Service (LOS)	Average Daily Traffic (ADT)
Regional Facilities			
SR 4 at A Street/Lone Tree Way	Divided Freeway	E	111,000
SR 4 at G Street	Divided Freeway	E	119,000
SR 4 at L Street/Contra Loma Boulevard	Divided Freeway	E	129,000
Local Facilities			
Cavallo Road north of 18th Street	Collector	C	5,750
Cavallo Road south of 18th Street	Collector	C	6,220
E Tregallas Road west of Garrow Drive	Local	C	5,160
Putnam Street east of G Street	Local	C	6,440
Worrell Road west of Garrow Drive	Collector	C	2,270
Lone Tree Way south of Worrell Road	Arterial	D	28,000
Pittsburg-Antioch Highway west of Somersville Road	Arterial	C	16,900
10th Street west of L Street	Arterial	C	17,300
L Street south of 10th Street	Arterial	C	6,960
18th Street east of L Street	Local	C	9,610
G Street south of 18th Street	Collector	C	6,380
W Tregallas Road east of G Street	Arterial	C	7,930

SOURCES: Caltrans, 2017; and City of Antioch, 2015 and 2003.

Level of service (LOS) is used to measure the perceptions of traffic conditions by motorists and passengers; it generally reflects driving conditions such as travel time and speed, freedom to maneuver, and traffic interruptions. The LOS rating is a qualitative letter grade that represents the operations of the roadway, from LOS A (minimal delay) to LOS F (excessive congestion). LOS E represents at-capacity operations. According to the General Plan, the City strives to maintain LOS D or better operations on all roadways.

Bicycle and Pedestrian Facilities

As noted above, Class II and Class III bicycle facilities are currently present on a number of study area roadways. In addition, there are a two nearby bicycle/pedestrian facilities that are not located on study area roadways. These are identified as Class I facilities in the General Plan, and are defined as bike paths that exclude motor vehicle access. Class I facilities located near the proposed project are as follows:

- Mokelumne Trail (East Bay Municipal Utility District ROW), from Buchanan Road to Hillcrest Avenue (approximately 1,200 feet south of the proposed Desalination Facility); and
- Delta De Anza Trail, from Antioch's western city limit to Hillcrest Avenue along the Contra Costa Canal (approximately 2,400 feet south of the proposed Desalination Facility).

Existing pedestrian facilities in the study area are extensive; all major roadways have sidewalks on both sides of the street. Sidewalks are *not* present on Fulton Shipyard Road, Arcy Lane, or Elizabeth Court.

Public Transit

Eastern Contra Costa Transit Authority (Tri Delta Transit) provides public transit service to the various components of the proposed project. Tri Delta Transit operates 13 local bus routes Monday through Friday, 4 local bus routes on weekends and holidays, door-to-door bus service for senior citizens and people with disabilities, and shuttle services for community events. The following Tri Delta Transit bus routes and their nearest bus stops to the three project components are as follows:

- **Route 380/392** – Service between Pittsburg/Bay Point BART Station and the Antioch Park & Ride on Hillcrest Avenue. The nearest bus stops are located approximately 0.5 miles south of the proposed Intake Pump Station Replacement facility at the corner of Wilbur Avenue and Cavallo Road, and approximately 0.5 miles east of the proposed Desalination Facility on Lone Tree Way.
- **Route 387** – Service between Pittsburg/Bay Point BART Station and the Tri Delta Transit headquarters on Wilbur Avenue. The nearest bus stop is located approximately 0.5 miles south of the proposed Intake Pump Station Replacement facility at the corner of Wilbur Avenue and Cavallo Road.
- **Route 388** – Service between Pittsburg/Bay Point BART Station and the Kaiser Medical Center on Deer Valley Road. The nearest bus stop is located approximately 0.5 miles south of the proposed Brine Storage and Disposal facility on Verne Roberts Circle.

3.17.2 Regulatory Framework

Federal

Federal Aviation Administration

All airports and navigable airspace not administered by the United States Department of Defense are under the jurisdiction of the Federal Aviation Administration (FAA). Federal Regulation Title

14 Section 77 establishes the standards and required notification for objects affecting navigable airspace. In general, projects involving features exceeding 200 feet in height above ground level or extending at a ratio greater than 50:1 (horizontal to vertical) from a public or military airport runway less than 3,200 feet long out to a horizontal distance of 20,000 feet are considered potential obstructions, and require notification to the FAA. In addition, the FAA requires a congested area plan (CAP) for operating a helicopter (with external load) near residential dwellings.

Transportation of Hazardous Materials

The U.S. Department of Transportation (USDOT) is the administering agency for the following regulations:

- Title 49 Code of Federal Regulations (CFR) Sections 171 through 177 (49 CFR 171–177), which govern the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of transportation vehicles.
- Title 49 CFR 350–399 and Appendices A through G, Federal Motor Carrier Safety Regulations, which address safety considerations for the transport of goods, materials, and substances over public highways.
- Title 49 CFR 397.9, the Hazardous Materials Transportation Act of 1974, which directs USDOT to establish criteria and regulations for the safe transportation of hazardous materials.

State

California Department of Transportation (Caltrans)

Caltrans is responsible for planning and maintaining state routes, highways, and freeways. Caltrans maintains jurisdictional authority of SR 4 in the study area. Caltrans has developed the *Guide for the Preparation of Traffic Impact Studies* (December 2002) for use when assessing state facilities.

Senate Bill 743

The legislature found that with the adoption of the SB 375, the State had signaled its commitment to encourage land use and transportation planning decisions and investments that reduce vehicle miles traveled (VMT) and thereby contribute to the reduction of greenhouse gas emissions (GHG), as required by the California Global Warming Solutions Act of 2006 (AB 32).

On September 27, 2013, SB 743 was signed into law. SB 743 started a process that could fundamentally change transportation impact analysis as part of CEQA compliance. These changes will include the elimination of auto delay, LOS, and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts in many parts of California (if not statewide). As part of the new *CEQA Guidelines*, the new criteria "shall promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses" (Public Resources Code [PRC] Section 21099(b)(1)). The Office of Planning and Research (OPR) is in the process of developing alternative metrics and thresholds

based on VMT. OPR has published the final draft of changes to the *CEQA Guidelines*, which will require certification and adoption by the California Secretary for Natural Resources before they go into effect. This may take several months depending on the input received during the review process. Once the guidelines are prepared and certified, "automobile delay, as described solely by LOS or similar measures of vehicular capacity or traffic congestion, shall not be considered a significant impact on the environment" (PRC Section 21099(b)(2)). Because OPR has not yet amended the *CEQA Guidelines* to implement this change, automobile delay is still considered a significant impact, and the City of Antioch will continue to use the established LOS criteria.

Local

City of Antioch General Plan

The City of Antioch General Plan Circulation Element promotes alternative modes of transportation, roadway improvements, and traffic improvements throughout the planning area (City of Antioch, 2003). As the General Plan focuses on the design and implementation of circulation system improvements, policies in this element do not directly relate to the proposed project.

City of Antioch Municipal Code

Title 7 (Public Works), Chapter 2 (Encroachments) of the City of Antioch Municipal Code details the City's regulations regarding the use of roads and the construction of utilities infrastructure, including encroachments. Numerous regulations are applicable to the proposed project, including regulations regarding the use of roadways, the type of vehicles and load sizes allowable on given roadways, encroachment on private property, and the construction of utilities infrastructure (City of Antioch, 2017). The municipal code applies to all roads within the City's jurisdiction, and project construction must adhere to all ministerial regulations presented in the Municipal Code.

City of Pittsburg General Plan

The City of Pittsburg General Plan Transportation Element promotes alternative modes of transportation, roadway improvements, and traffic improvements throughout the planning area (City of Pittsburg, 2001). As the General Plan focuses on the design and implementation of circulation system improvements, policies in this element do not directly relate to the proposed project.

City of Pittsburg Municipal Code

Title 15 (Buildings and Construction), Chapter 12.01 (Encroachments within Public ROWs) of the City of Pittsburg Municipal Code details the City's regulations regarding the use of roads and the construction of utilities infrastructure, including encroachments. Numerous regulations are applicable to the proposed project, including regulations regarding the use of roadways, the type of vehicles and load sizes allowable on given roadways, encroachment on private property, and the construction of utilities infrastructure (City of Pittsburg, 2017). The municipal code applies to all roads within the City's jurisdiction, and project construction must adhere to all ministerial regulations presented in the Municipal Code.

Contra Costa Countywide Bicycle and Pedestrian Plan

The Contra Costa Countywide Bicycle and Pedestrian Plan (CBPP) was prepared to help carry out the strategies identified in the Countywide Comprehensive Transportation Plan, which support pedestrian-friendly developments and encourages a connected, coordinated network of bicycle facilities (Contra Costa County, 2009). Bicycle facilities are defined in three different classifications as follows:

Class I Bikeway: A dedicated off-road bicycle and/or pedestrian path (typically multi-use path), which provides for bicycle travel on a paved right-of-way completely separated from any street or highway.

Class II Bikeway: A dedicated bike lane on a street and/or highway (not a sidewalk), with signing and pavement markings separating the bicycle lane from adjacent traffic flow.

Class III Bikeway: Dedicated bike routes that provide for shared use with pedestrian or motor vehicle traffic and are identified by signing.

Bicycle facilities in the project study area are identified above in Section 3.17.1, *Environmental Setting*.

3.17.3 Analysis, Impacts, and Mitigation

Significance Criteria

Based on Appendix G of the CEQA *Guidelines*, the project would have a significant impact on transportation and traffic if it would:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
- Conflict with an applicable congestion management program including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- Substantially increase hazards due to a design feature (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment);
- Result in inadequate emergency access; or
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Issues Not Discussed in Impacts

The proposed project would have no impact related to the following considerations identified in Appendix G of the CEQA Guidelines. Because the proposed project would not result in any direct or indirect impact related to these considerations, none could cause or contribute to any cumulative impact. Therefore, these considerations are not addressed further.

- ***Exceedance of LOS Standards Established by the County Congestion Management Agency.*** The LOS standards for roadways that are part of the Contra Costa County Congestion Management Program network are intended to regulate long-term traffic increases from operation of new development and do not apply to temporary construction projects. As noted above, the operation of proposed project facilities is anticipated to be similar to the existing traffic and circulation conditions within the project area, with the addition of a minimal increase in maintenance worker trips. Increases in traffic volumes generated by construction projects end when construction activities end. As such, the proposed project would not exceed LOS standards established by the Contra Costa County Congestion Management Agency (i.e., the Contra Costa Transportation Authority) for designated Congestion Management Program roadways. Therefore, this criterion is not discussed further.

- ***Changes in Air Traffic Patterns.*** The nearest airport, Buchanan Field Airport, is located approximately 13 miles west of the project area. The proposed project facilities would not affect air traffic patterns of nearby airports. New structures (i.e., intake pump station and desalination plant) or construction equipment would exceed height restrictions within this area. Therefore, the proposed project would not alter air traffic patterns nor result in substantial safety risks associated with airport operations. The significance criterion related to air traffic patterns are not discussed further.

- ***Increased Hazards Due to a Design Feature or Incompatible Uses.*** The proposed project would not include new design features (e.g., new facilities or obstructions within public roadways) or alterations of existing features (e.g., road realignment). In addition, traffic generated by the proposed project would be compatible with the mix of vehicle types (automobiles and trucks) currently using project area roads. Therefore, the proposed project would not result in hazards caused by a design feature or incompatible use, and this significance criterion is not discussed further.

- ***Conflicts with Adopted Policies, Plans, or Programs Supporting Alternative Transportation.*** The proposed project would not directly or indirectly eliminate alternative transportation corridors or facilities (e.g., bike paths, lanes, bus turnouts, etc.) both because of facility locations and because of the short-term nature of construction activities where potential effects could occur. In addition, the proposed project would not include changes in policies or programs that support alternative transportation. Therefore, the proposed project would not conflict with adopted policies, plans, or programs supporting alternative transportation, and this significance criterion is not discussed further.

Methodology and Assumptions

The evaluation of transportation and traffic impacts is based on the development assumptions for the proposed project, as described in Chapter 2, *Project Description*. The number of construction trips associated with the proposed project was quantified, taking into account the estimated

construction schedule and the number of truck trips and worker trips assumed to occur in each construction phase.

Based on the General Plan, the City has established a screening criterion of 50 or more net new peak-hour trips at which point projects that exceed that criterion are required to be assessed based on the City's guidelines (City of Antioch, 2003). Projects that generate less than that criterion are determined to have a less-than-significant impact. Operation of the proposed project would add up to 7 new employees, whose trips would be distributed between 2 day shifts and 1 night shift, and maintenance staff. This would generate approximately 14 new one-way trips.

Given that the net new operational trips would not trigger further analysis, the impact evaluation for operational activities is predominantly qualitative in nature.

Specific construction assumptions related to transportation and circulation are outlined below for the three components that comprise the proposed project. The proposed project facilities would be would be constructed between February 2019 through March 2020. The approximate duration of construction activities would vary by proposed project component as follows: intake pump station – 12 months; desalination plant – 14 months; pipelines – over the course of 10 months. Construction work would typically occur during normal working hours; weekdays between the hours of 8 a.m. and 5 p.m.

River Intake Pump Station

Only minor clearing or grubbing is expected for the intake pump station site as it would be constructed on pre-developed areas. Construction access would be provided via existing access roads and roadways.

Pipeline Installation

The installation of new pipelines would affect traffic flow by temporarily reducing the capacity of the affected roads because of lane closures and in some cases, road closures. The raw water pipeline connection would be up to 3,000-feet-long and would tee off of the existing pipeline in Lone Tree Way and provide a direct connection between the River's pump station and the WTP through one of two options: west across Robert Street, and south along D Street before entering the WTP site, or west across the southern property line. The WTP pipelines would be approximately 1,200 feet in total length, and would run between the existing WTP and the proposed desalination facility. The brine disposal pipeline would be approximately 4.3 miles long. It would be constructed within roadway ROWs along Elizabeth Lane/D Street, Tregallas Road, G Street, 18th Street, L Street, and 10th Street and would connect to the Delta Diablo WWTP.

Desalination Plant Construction

Construction workers would access the proposed desalination plant site via the WTP site entrance at D Street and existing internal access roads.

Impacts and Mitigation Measures

Table 3.17-2 summarizes the proposed project's impacts and significance determinations related to transportation and circulation.

TABLE 3.17-2
SUMMARY OF IMPACTS – TRANSPORTATION AND CIRCULATION

Impacts	Significance Determinations
Impact 3.17-1: Construction of the proposed project would have temporary and intermittent effects on traffic and transportation conditions in the project area.	LSM
Impact 3.17-2: Construction of the proposed project would temporarily disrupt circulation patterns near sensitive land uses (schools, hospitals, fire stations, police stations, and other emergency providers).	LSM
Impact 3.17-3: Construction of the proposed project would have temporary effects on alternative transportation or alternative transportation facilities in the project area.	LSM
Impact 3.17-4: Construction of the proposed project would temporarily increase the potential for accidents on project area roadways.	LSM
Impact 3.17-5: Construction of the proposed project would increase wear-and-tear on the designated haul routes used by construction vehicles to access the project area work sites.	LSM
Impact 3.17-C-1: Cumulative impacts related to transportation and circulation.	LSM

NOTES:
LSM = Less than Significant with Mitigation

Impact 3.17-1: Construction of the proposed project would have temporary and intermittent effects on traffic and transportation conditions in the project area. *(Less than Significant with Mitigation)*

The proposed project would not introduce any uses to the project study area that would generate noticeable long-term changes in traffic; operational traffic would be limited to infrequent trips by maintenance personnel and by vehicles delivering chemicals to the WTP facility once a month. Thus potential traffic and transportation effects would be confined to construction of the proposed facilities. Construction-generated traffic would be temporary and therefore would not result in any long-term degradation in operating conditions or level of service on any study area roadways. The primary impacts from the movement of construction trucks would include short-term and intermittent lessening of roadway capacities due to slower movements and larger turning radii of the trucks compared to passenger vehicles.

Construction activities conducted for the proposed project would result in increased traffic volumes on area roadways generated by the daily arrival and departure of constructions workers, and by trucks hauling equipment and materials to and from the construction sites. As a worst-case scenario, worker and construction trips for all project components were assumed to occur simultaneously. **Table 3.17-3** shows the total number of one-way, daily worker and truck trips that could potentially occur during the peak of construction activity. It is estimated that the proposed project would generate a maximum of 60 one-way worker trips per day, and a maximum of 82 one-way heavy truck trips per day.

TABLE 3.17-3
CONSTRUCTION WORKER AND TRUCK TRIPS

Project Component	Daily One-Way Trips	
	Workers	Trucks
Demolition/Construction of River Pump Station	12	4
Raw Water/Feed Water Connection Pipeline to WTP	16	70
Desalination Facility Construction	16	8
Brine Disposal Pipeline	16	0
Total	**60**	**82**

SOURCE: Carollo, 2017.

However, given the different locations of the distinct project components, increased traffic generated by construction activities associated with these overlapping (in time) construction phases generally would not use the same roadways. As such, the impact of increased traffic on traffic and transportation conditions for these project components generally would not be additive. An exception would be the potential concurrent use of SR 4, which would be used for regional access to all work sites.

Based on the existing ADT volumes shown in **Table 3.17-1** and the estimated number of construction-related project trips shown in **Table 3.17-3**, the concurrent construction activities would increase the average daily traffic volume on local and regional roadways by no more than 0.01 percent (i.e., too small of a change to be perceived by the average motorist). Traffic increases on local roads would be more noticeable, but the roadways would continue to accommodate traffic within the roadways' carrying capacity with no discernable affect to LOS. Proposed hours of construction are between 8:00 AM and 5:00 PM. Truck trips related to off hauling of excavated material from pipeline trenching and deliveries of equipment and materials would be dispersed over the course of the day, thus lessening the effect on traffic flow conditions. Construction truck traffic occurring weekdays during the hours of 7:00 to 9:00 AM and 4:00 to 6:00 PM would coincide with peak-period traffic, and therefore, would have the greatest potential to impede traffic flow. While the construction contractor for each project component would likely schedule truck trips to avoid peak traffic hours on area roadways, dispersion of the 142 construction vehicle trips (60 worker trips and 82 truck trips) over the course of the nine-hour workday would cause less than-significant impacts on traffic flow during any specific hour. Even if all 142 construction vehicle trips were to occur on a single roadway segment, that would still only amount to an average of an additional 16 hourly vehicle trips, which would not result in any discernable effect on roadway operations. The primary impacts from the movement of construction trucks would include short-term and intermittent lessening of roadway capacities due to slower movements and larger turning radii of the trucks compared to passenger vehicles. In addition, drivers could experience delays if they were traveling behind a construction truck.

Implementation of **Mitigation Measures 3.17-1a (Encroachment Permits)** and **3.17-1b (Construction Traffic Control/Traffic Management Plan)**, would require compliance with local road encroachment permit conditions, preparation of a Traffic Control Plan, identification of roadways that require special construction techniques, development of a circulation and detour plan, and consultation with local transit service providers.

Mitigation Measures:

Mitigation Measure 3.17-1a: Encroachment Permits

The construction contractor shall obtain any necessary road encroachment permits prior to constructing each project component and shall comply with the conditions of approval attached to all project permits and approval. In addition, the Construction Traffic Control/Traffic Management Plan (subject to local jurisdiction review and approval) required by Mitigation Measure 3.17-1b, would include safety measures for traffic flow and circulation during project construction.

Mitigation Measure 3.17-1b: Construction Traffic Control/Traffic Management Plan

The construction contractor shall prepare a Construction Traffic Control/Traffic Management Plan and submit it to the appropriate local jurisdiction prior to construction (i.e., City of Antioch, City of Pittsburg) for review and approval prior to construction. The plan shall include the following components:

- Identify hours of construction (between 8:00 AM and 5:00 PM; no construction shall be permitted between 10:00 PM and 7:00 AM);
- Schedule truck trips outside of peak morning and evening commute hours to minimize adverse impacts on traffic flow (i.e., if agencies with jurisdiction over the affected roads identify highly congested roadway segments during their review of the encroachment permit applications). Haul routes that minimize truck traffic on local roadways and residential streets shall be used.
- Develop circulation and detour plans to minimize impact to local street circulation. This may include the use of signing and flagging to guide vehicles, bicyclists, and pedestrians through and/or around the construction zone.
- Control and monitor construction vehicle movements by enforcing standard construction specifications through periodic onsite inspections;
- Install traffic control devices where traffic conditions warrant, as specified in the applicable jurisdiction's standards (e.g., the *California Manual of Uniform Traffic Controls for Construction and Maintenance Work Zones*);
- Perform construction that crosses on-street and off-street bikeways, sidewalks, and other walkways in a manner that allows for safe access for bicyclists and pedestrians. Alternatively, provide safe detours to reroute affected bicycle/pedestrian traffic.
- Consult with the Tri Delta Transit at least one month prior to construction to coordinate bus stop relocations (as necessary) and to reduce potential interruption of transit service;

- Comply with roadside safety protocols to reduce the risk of accidents. Provide "Road Work Ahead" warning signs and speed control (including signs informing drivers of state-legislated double fines for speed infractions in a construction zone) to achieve required speed reductions for safe traffic flow through the work zone.

- Identify all access and parking restrictions, pavement markings and signage requirements (e.g., speed limit, temporary loading zones);

- Store all equipment and materials in designated contractor staging areas;

- Encourage construction crews to park at staging areas to limit lane closures in the public ROW;

- Include a plan and implementation process for notifications and a process for communication with affected residents, businesses, and recreational users (public boat launch ramp and Contra Costa County Fairground) prior to the start of construction. Advance public notification shall include posting of notices and appropriate signage of construction activities at least one week in advance. The written notification shall include the construction schedule, the exact location and duration of activities within each street (i.e., which lanes and access point/driveways would be blocked on which days and for how long), and a toll-free telephone number for receiving questions or complaints;

- Include a plan and implementation process to coordinate all construction activities with emergency service providers in the area at least one month in advance. Emergency service providers shall be notified of the timing, location, and duration of construction activities. All roads shall remain passable to emergency service vehicles at all times;

- Include a plan and implementation process to coordinate all construction activities with the Antioch Unified School District at least two months in advance. The School District shall be notified of the timing, location, and duration of construction activities. The City shall coordinate with the School District to identify peak circulation periods at schools along the alignment(s) (i.e., the arrival and departure of students), and require their contractor to avoid construction and lane closures during those periods. The construction contractor for each project component shall be required to maintain vehicle, bicycle, pedestrian, and school bus service during construction through inclusion of such provisions in the construction contract. The assignment of temporary crossing guards at designated intersections may be needed to enhance pedestrian safety during project construction;

- Identify all roadway locations where special construction techniques (e.g., trenchless pipeline installation or night construction) will be used to minimize impacts to traffic flow. Include the requirement that all open trenches be covered with metal plates at the end of each workday to accommodate traffic and access; and

- Specify the street restoration requirements pursuant to agreements with the local jurisdictions (i.e., City of Antioch, City of Pittsburg).

Significance after Mitigation: With implementation of **Mitigation Measures 3.17-1a** and **3.17-1b**, the construction impact would be reduced to a **less-than-significant** level

because the temporary reduction in roadway capacity would be managed to minimize traffic disruptions to all roadway users.

Impact 3.17-2: Construction of the proposed project would temporarily disrupt circulation patterns near sensitive land uses (schools, hospitals, fire stations, police stations, and other emergency providers). ***(Less than Significant with Mitigation)***

The proposed project would result in temporary effects on traffic flow, particularly with pipeline construction within a road right-of-way. Pipeline construction within or across streets could result in delays for emergency vehicle access, and would also obstruct pedestrian, bicycle, and vehicle access to schools. Construction along the pipeline alignments could cause delays to school buses and limit access to school bus stops.

Construction of the desalination facility and the river intake pump station would not directly interfere with circulation patterns near sensitive land uses because no schools, hospitals, fire stations, police stations, or other emergency providers are located adjacent to these proposed facilities. However, construction could indirectly disrupt circulation patterns near sensitive land uses, as haul route could pass by sensitive land uses, and traffic may divert to roadways with sensitive land uses due to construction activity.

As stated previously in the discussion of Impact 3.17-1, implementation of **Mitigation Measure 3.17-1b (Construction Traffic Control/Traffic Management Plan)** would require the City to coordinate with the Antioch Unified School District prior to construction regarding construction schedule in the vicinity of schools and school access routes during construction. Furthermore, it would require the construction contractor to establish methods for maintaining traffic flow in and along the subject roadway corridor and minimizing disruption to emergency vehicle access to land uses along the alignment. Specific requirements that may be included in the traffic control/traffic management plan regarding emergency access and access to public schools are identified under **Mitigation Measure 3.17.1b**.

Mitigation Measure:

Mitigation Measure 3.17-1b: Construction Traffic Control/Traffic Management Plan

See Impact 3.17-1 above, for description.

Significance after Mitigation: Implementation of **Mitigation Measure 3.17-1b** would ensure that potential construction impacts associated with temporary effects on emergency access and access to public schools would be mitigated to a **less than-significant** level.

Impact 3.17-3: Construction of the proposed project would have temporary effects on alternative transportation or alternative transportation facilities in the project area. *(Less than Significant with Mitigation)*

The proposed project would not result in any long-term impact on demand for alternative transportation or on alternative transportation facilities (i.e., for transit and bicyclists). However, pipeline construction along project area roadways could disrupt bicycle facilities (i.e., Lone Tree Way, Tregallas Road, Pittsburg-Antioch Highway, and 18th Street) and access to bus stops and slow bus movements for bus routes provided by Tri Delta Transit; see *Public Transit* discussion in Section 3.17.1, *Environmental Setting*, above.

As stated previously in the discussion of Impact 3.17-1, implementation of **Mitigation Measure 3.17-1b (Construction Traffic Control/Traffic Management Plan)** would require the construction contractor to establish methods for minimizing construction effects on transit service. Specific requirements that may be included in the traffic control/traffic management plan are identified under **Mitigation Measure 3.17-1b**.

Mitigation Measure:

> **Mitigation Measure 3.17-1b: Construction Traffic Control/Traffic Management Plan**
>
> See Impact 3.17-1 above, for description.
>
> **Significance after Mitigation:** Implementation of **Mitigation Measure 3.17-1b** would reduce construction-related temporary disruptions to transit service to a **less-than-significant** level.

Impact 3.17-4: Construction of the proposed project would temporarily increase the potential for accidents on project area roadways. *(Less than Significant with Mitigation)*

The proposed project would not alter the permanent configuration (alignment) of area roadways, and would not introduce types of vehicles that are not already traveling on area roads. However, construction zones in the public ROW and heavy equipment operating adjacent to or within a road ROW would increase the potential for accidents. Construction-generated trucks on study area roadways would interact with other vehicles. Potential conflicts also could occur between construction traffic and alternative modes of transportation (e.g., bicyclists and buses).

As stated previously in the discussion of Impact 3.17-1, implementation of **Mitigation Measure 3.17-1b (Construction Traffic Control/Traffic Management Plan)** requires the contractor to prepare a traffic control/traffic management plan in accordance with professional engineering standards prior to construction, including compliance with roadside safety protocols, so as to reduce the risk of accidents. Specific requirements that may be included in the traffic management plan are identified under **Mitigation Measures 3.17-1b**. Thus, implementation of

Mitigation Measures 3.17-1b would ensure temporary increases in the potential for accidents would be mitigated to a **less-than-significant** level.

Mitigation Measure:

> **Mitigation Measure 3.17-1b: Construction Traffic Control/Traffic Management Plan**
>
> See Impact 3.17-1 above, for description.
>
> **Significance after Mitigation:** Implementation of **Mitigation Measure 3.17-1b** would reduce the potential for accidents to occur on project area roadways affected by construction activities to a **less-than-significant** level.

Impact 3.17-5: Construction of the proposed project would increase wear-and-tear on the designated haul routes used by construction vehicles to access the project area work sites. ***(Less than Significant with Mitigation)***

The use of large trucks to transport equipment and material to and from the project site(s) could affect road conditions on the designated haul routes by increasing the rate of road wear. The degree to which this impact would occur depends on the design (pavement type and thickness) and existing condition of the road. Major arterials and collectors such as SR 4, Pittsburg-Antioch Highway, and Lone Tree Way are designed to accommodate a mix of vehicle types, including heavy trucks. The project impacts are expected to be negligible on those roads. Residential streets are generally not built with a pavement thickness that would withstand substantial truck traffic volumes.

Implementation of **Mitigation Measure 3.17-5 (Roadway Repairs)**, which requires the applicant to enter into an agreement prior to construction that would detail pre- and post-construction conditions on project haul routes and pipeline segments and repair damaged roads, would reduce impacts to a **less-than-significant** level.

Mitigation Measure:

> **Mitigation Measure 3.17-5: Roadway Repairs**
>
> The City shall repair any roads damaged by project construction to a structural condition equal to that which existed prior to construction activity. Prior to project construction, City of Antioch Public Works Department shall document road conditions for all routes that would be used by project-related vehicles. The City shall also document road conditions after project construction is completed. Roads damaged by project construction shall be repaired to a structural condition equal to that which existed prior to construction activity.
>
> **Significance after Mitigation:** Implementation of **Mitigation Measure 3.17-5** would mitigate project construction wear-and-tear impacts on study area roadways to a **less-than-significant** level.

Cumulative Impacts

Section 3.1, *Approach to Cumulative Impact Analysis and Cumulative Projects*, describes the overall approach to the cumulative analysis for those topics using a list-based approach and summarizes reasonably foreseeable future projects in the vicinity of the project that could contribute to a cumulative impact; please refer to **Table 3-1** and **Figure 3-1** for a description and location of potential cumulative projects in the vicinity of the proposed project. The cumulative analysis for transportation and circulation uses a list-based approach to analyze the effects of the project in combination with other past, present, and probable future projects in the immediate vicinity.

The proposed project would result in no impact with respect to conflicts with an applicable congestion management plan, changes in air traffic patterns, permanent increases in traffic safety hazards due to a design feature or incompatible uses, or conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities. Therefore, it could not cause or contribute to any cumulative effects related to these traffic and transportation topics, and these topics are not discussed further.

Impact 3.17-C-1: Construction of the proposed project, in combination with other cumulative development, could result in cumulative effects relating to transportation and circulation conditions in the project study area. ***(Less than Significant with Mitigation)***

The geographic scope for the cumulative traffic impact analysis encompasses the local and regional roadways and highways that would be used for project-related construction. Cumulative projects that could overlap with the proposed project's construction schedule include numbers 1 (Almond Knolls), 10 (Mt. Diablo Resource Recovery Park Service), 14 (Dow Modernization Project), and 15 (East County Bioenergy Project). Cumulative projects with unknown construction timelines could be constructed within the anticipated construction period for the proposed project and have similar transportation and circulation effects. Accordingly, this analysis conservatively assumes that at least some of the cumulative projects whose construction schedules remain unknown would be constructed concurrent with the proposed project.

A significant cumulative effect on transportation and circulation could occur if the incremental impacts of the project combined with those of one or more of the projects listed in **Table 3-1** that would use the same transportation network as the project during construction to substantially and adversely affect the effectiveness of the circulation system. Concurrent construction of the proposed with other projects proposed in the vicinity (see Table 3.1-1) could result in potentially significant cumulative impacts due to increases in: construction-related vehicle trips, traffic delays, potential traffic safety hazards for vehicles, bicyclists and pedestrians on public roadways, and increased wear-and-tear on routes used by construction vehicles. As discussed in Impacts 3.17-1 through 3.17-5, the proposed project's construction activities would result in temporary, short-term impacts to transportation and circulation. However, the project's impacts would be reduced to less than cumulatively considerable with implementation of **Mitigation Measures 3.17-1a** and **3.17-1b**, and **3.17-5**, which would require the preparation and implementation of a Construction Traffic Control/Traffic Management Plan. With the

implementation of the mitigation measures, the proposed project's contribution to construction traffic impacts would not be cumulatively considerable. Therefore, cumulative transportation and circulation impacts are considered **less than significant with mitigation**.

References – Transportation and Circulation

California Department of Transportation, 2016. *2016 Traffic Volumes for all vehicles on CA State Highways*. Available online at: www.dot.ca.gov/trafficops/census/volumes2016/Route2-4.html. Accessed on December 7, 2017.

California Department of Transportation, 2002. *Guide for the Preparation of Traffic Impact Studies*, December 2002.

California Joint Utility Traffic Control Committee (CJUTCC), 2014. *California Joint Utility Traffic Control Manual, 6th Edition*, February 2014.

City of Antioch, *Code of Ordinances*, passed 1-10-17. Available online at: library.amlegal.com/nxt/gateway.dll/California/antioch/cityofantiochcaliforniacodeofordinances?f=templates$fn=default.htm$3.0$vid=amlegal:antioch_ca. Accessed on December 7, 2017.

City of Antioch, 2015. *Citywide Engineering and Traffic Survey*, February 6, 2015.

City of Antioch, 2003. *Antioch General Plan Update EIR*, July 2003.

City of Antioch, 2003. *General Plan – Circulation*, Updated November 24, 2003

City of Pittsburg, 2017. *Pittsburg Municipal Code*, passed August 7, 2017. Available online at: www.ci.pittsburg.ca.us/index.aspx?page=439. Accessed on December 7, 2017.

City of Pittsburg, 2001. *City of Pittsburg General Plan – Transportation Element*, Adopted November 16, 2001.

Contra Costa Transportation Authority, 2015. *2015 Update of the Contra Costa Congestion Management Program*, Adopted December 16, 2015.

Contra Costa Transportation Authority, 2014. *East County Action Plan for Routes of Regional Significance*, March 2014.

Contra Costa Transportation Authority, 2009. *2009 Contra Costa Countywide Bicycle and Pedestrian Plan*, Adopted October 2009.

Tri Delta Transit, *System Map* and *Schedules and Maps*. Available online at: trideltatransit.com/local_bus.aspx. Accessed on December 6, 2017.

This page intentionally left blank

3.18 Tribal Cultural Resources

Sections	Tables
3.18.1 Environmental Setting 3.18.2 Regulatory Framework 3.18.3 Analysis, Impacts, and Mitigation	3.18-1 Summary of Impacts – Tribal Cultural Resources

This section presents and discusses the tribal cultural resources associated with the project construction, implementation, and operation. Also discussed are the environmental setting, regulatory framework, the significance criteria used for determining environmental impacts, and potential impacts associated with construction and operation of the project.

During scoping for this EIR, tribal cultural resource-related concerns raised by the public and responsible agencies included the Native American Heritage Commission (NAHC). The NAHC submitted a letter that indicates Assembly Bill (AB) 52 applies to the proposed project and recommends consultation with applicable California Native American tribes in order to avoid potential tribal resources impacts. The NAHC also recommended actions to adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources.

The analysis included in this section was based on the cultural resources study completed for the proposed project: *Antioch Brackish Water Desalination Project Cities of Antioch and Pittsburg, Contra Costa County Cultural Resources Survey Report* (ESA, 2017) as well as consultation efforts with local Native American tribes.

3.18.1 Environmental Setting

Section 3.5.1 in Section 3.5, *Cultural Resources* provides the natural and cultural background for the cultural resources and tribal cultural resources analysis as well as a summary of the background research, survey effort, and an evaluation of potential tribal cultural resources. Section 3.5.1 also provides a summary of the Native American consultation effort for the proposed project.

3.18.2 Regulatory Framework

Federal

There are no applicable federal regulations that specifically address tribal cultural resources.

State

Public Resources Code (PRC) Section 21074

In September 2014, the California Legislature passed AB 52, which added provisions to the PRC regarding the evaluation of impacts on tribal cultural resources under CEQA, and consultation requirements with California Native American tribes. In particular, Assembly Bill 52 now

requires lead agencies to analyze project impacts on tribal cultural resources separately from archaeological resources (PRC Section 21074; 21083.09). The Bill defines tribal cultural resources in a new section of the PRC Section 21074. AB 52 also requires lead agencies to engage in additional consultation procedures with respect to California Native American tribes (PRC Section 21080.3.1, 21080.3.2, 21082.3).

Specifically, PRC Section 21084.3 states:

a) Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.

b) If the lead agency determines that a project may cause a substantial adverse change to a tribal cultural resource, and measures are not otherwise identified in the consultation process provided in Section 21080.3.2, the following are examples of mitigation measures that, if feasible, may be considered to avoid or minimize the significant adverse impacts:

    1) Avoidance and preservation of the resources in place, including, but not limited to, planning and construction to avoid the resources and protect the cultural and natural context, or planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.

    2) Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:

        A. Protecting the cultural character and integrity of the resource.

        B. Protecting the traditional use of the resource.

        C. Protecting the confidentiality of the resource.

    3) Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.

    4) Protecting the resource.

In addition, the Office of Planning and Research updated Appendix G of the CEQA *Guidelines* to provide sample questions regarding impacts on tribal cultural resources (PRC Section 21083.09).

Local

There are no applicable local regulations that specifically address tribal cultural resources.

3.18.3 Analysis, Impacts and Mitigation

Significance Criteria

Based on Appendix G of the CEQA *Guidelines*, the project would have a significant impact on tribal cultural resources if it would:

a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

a. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code Section 5020.1(k), or,

b. Determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Methodology and Assumptions

Tribal cultural resources are defined as a site feature, place, cultural landscape, sacred place or object, which is of cultural value to a tribe that is either on or eligible for the California Register or a local historic register, or the lead agency, at its discretion, chooses to treat the resource as a tribal cultural resource. Impacts on tribal cultural resources are assessed in consultation with the affiliated Native American tribe in accordance with PRC Section 21080.3. This analysis considers whether the Project would cause damaging effects to any tribal cultural resource, including archaeological resources and human remains.

Impacts and Mitigation Measures

Table 3.18-1 summarizes the proposed project's impacts and significance determinations related to tribal cultural resources.

TABLE 3.18-1
SUMMARY OF IMPACTS – TRIBAL CULTURAL RESOURCES

Impacts	Significance Determinations
Impact 3.18-1: The project could cause a substantial adverse change in the significance of a tribal cultural resource.	LSM
Impact 3.5-C-1: Cumulative impacts related to tribal cultural resources.	LSM

NOTE:
LSM = Less than Significant with Mitigation

Impact 3.18-1: The project could cause a substantial adverse change in the significance of a tribal cultural resource. (*Less than Significant with Mitigation*)

The City sent a letter to seven culturally-affiliated Native American tribes and individuals that may have interest in the proposed Project. The Ione Band of Miwok Indians responded that the tribe was requesting official consultation on the project. The City responded that they would provide the draft Cultural Resources Survey Report, which was sent to the tribe on January 17, 2018. No additional information has been received from the tribe. Based on the NWIC background research there are no tribal cultural resources in the Project area and the Project would have no impact on known tribal cultural resources. If archaeological resources or human remains are uncovered during construction activities, impacts to tribal cultural resources could be

potentially significant. **Mitigation Measure 3.5-2 (Inadvertent Discovery of Archaeological Resources)** and **Mitigation Measure 3.5-3 (Inadvertent Discovery of Human Remains)**, as described in Section 3.5, *Cultural Resources* would apply to archaeological resources and human remains that are considered tribal cultural resources and would reduce impacts to a less-than-significant level.

Mitigation Measures:

> **Mitigation Measure 3.5-2: Inadvertent Discovery of Archaeological Resources**
>
> **Mitigation Measure 3.5-3: Inadvertent Discovery of Human Remains**
>
> **Significance after Mitigation:** With the implementation of **Mitigation Measure 3.5-2** listed above, this impact would be reduced to a **less-than-significant** level because the resource would be either be avoided or a treatment plan would be developed by a qualified archaeologist, in consultation with the affiliated Native American tribe(s). In addition, if human remains are identified impacts to tribal cultural resources would be reduced to a **less-than-significant** level with the implementation of **Mitigation Measure 3.5-3** because the Native American Heritage Commission and the Most Likely Descendant would be contacted if the remains were found to be Native American and the provisions of PRC Section 5097.98 would be implemented.

Cumulative Impacts

Impacts related to tribal cultural resources are generally site-specific and depend on the specific localized resources and resource potential. As a result, they are not typically additive or cumulative in nature.

The geographic scope for the analysis of cumulative impacts on tribal cultural resources includes projects within or in the immediate vicinity of the project area. The project would contribute to a cumulative impact on unknown buried archaeological resources, or human remains, that are considered tribal cultural resources if the cumulative projects listed in **Table 3-1** were to adversely affect the same resources affected by the project or would affect other tribal cultural resources in the project vicinity.

Impact 3.18-C-1: Implementation of the proposed project, in combination with other cumulative development, could contribute to cumulative impacts to tribal cultural resources. *(Less than Significant with Mitigation)*

The geographic scope for cumulative effects to tribal cultural resources includes the immediate vicinity of locations where the project would cause ground disturbance. Similar to the proposed project as described under Impact 3.5-3, cumulative projects in the project vicinity listed in **Table 3-1** could have a significant impact on archaeological resources that are considered tribal cultural resources from construction-related ground disturbance. The potential impacts of the project when considered together with similar impacts from other cumulative projects in the

vicinity could result in a significant cumulative impact to tribal cultural resources. The proposed project's contribution to this impact could be cumulatively considerable. However, implementation of **Mitigation Measure 3.5-2** and **Mitigation Measure 3.5-3**, which would require avoidance of the resource or if avoidance is not feasible appropriate treatment and documentation of the resource as well as implementation of legally-required appropriate treatment of human remains. Therefore, with implementation of Mitigation Measure 3.5-2 and Mitigation Measure 3.5-3, the proposed project's contribution to cumulative impacts would not be considerable, and the impact would be **less than significant with mitigation**.

This page intentionally left blank

3.19 Environmental Topics Not Subjected to Detailed Analysis

Pursuant to CEQA *Guidelines* Section 15128, this subsection describes the reasons that various possible effects of a project were determined not to be significant, or to have no impact, and, therefore, were not discussed in detail in this EIR. These determinations were generally made because the identified environmental resources are not present within or around the project area or because implementation of the project would clearly have no effect with respect to the topic issue area. These issue areas are described in this section with an explanation of why they are not evaluated further in this EIR.

3.19.1 Agricultural and Forestry Resources

Appendix G of the CEQA *Guidelines* specifies that an impact to agricultural and forestry resources would occur if a project would: Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to non-agricultural use; conflict with existing zoning for agricultural use, or a Williamson Act contract; conflict with existing zoning, or cause rezoning of, forest land or timberland; result in loss of forest land or conversion of forest land to non-forest use, or; involve other changes that could result in conversion or farmland of forest land to non-agricultural use.

The entirety of the project area, is classified as "Urban and Built-up" by the California Farmland Mapping and Monitoring Program (California Department of Conservation, 2016), which is a classification used for lands that present constraints for agricultural use. No Prime Farmland, Unique Farmland, or Farmland of Statewide Importance is designated within any portion of the project area. The river intake pump station site and Antioch WTP sites are not zoned for agricultural uses, and there are no Williamson Act contracts that affect any portion of the project. No existing agricultural or timber-harvest uses are located on or in the vicinity of the project components. Based on these considerations, development of the proposed project would result in no impacts to agricultural resources.

3.19.2 Mineral Resources

For the purposes of this analysis, mineral resources are any non-fuel mineral resource that is obtained from the ground, including sand and gravel, cement, boron, crushed stone, gold, limestone, and other important excavated resources. Appendix G of the CEQA *Guidelines* specifies that an impact to mineral resources would occur if a project would: result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; or result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan.

There are no known mineral resources of mineral extraction operations occurring in the project area, nor have those operations been known to occur historically. No areas containing mineral resources have been identified within the City (City of Antioch, 2003). Development of the

proposed project therefore would not result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state; and would not result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan. Development of the proposed project would have no impact on mineral resources.

References – Environmental Topics Not Subjected to Detailed Analysis

California Department of Conservation, 2016. *Contra Costa County Important Farmland. 2014.*

City of Antioch, 2003. *Draft General Plan Update Environmental Impact Report, City of Antioch, Contra Costa County, California,* July 2003. Prepared by LSA.

CHAPTER 4
Other CEQA Considerations

Consistent with CEQA *Guidelines* Section 15126.2, this chapter discusses significant and unavoidable impacts, significant irreversible environmental changes, growth-inducing impacts, and impacts found to be less than significant. Cumulative impacts are separately discussed in Chapter 3, *Environmental Setting, Impacts, and Mitigation Measures* under each resource topic section.

4.1 Significant and Unavoidable Adverse Impacts

Potentially significant environmental impacts that would result from the proposed project are evaluated in Chapter 3.0, *Environmental Setting, Impacts, and Mitigation Measures*, of this EIR. With implementation of the project design features, standard conditions and requirements, and mitigation measures identified for each resource area significantly impacted, many of the potentially significant impacts resulting from the proposed project would be reduced to a less-than-significant level. The proposed project impacts listed below would remain significant and unavoidable even after mitigation.

4.2 Significant Irreversible Environmental Changes

Pursuant to Section 15126.2(c) of the CEQA Guidelines, an EIR must consider any significant irreversible environmental changes that would be caused by the proposed project should it be implemented. Section 15126.2(c) states:

> *"Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result*

from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified."

Construction and operation activities for the proposed project would require the commitment of renewable and non-renewable sources. Implementation of the project would necessitate the consumption of resources including, but not limited to: building materials, fuel and operational materials/resources, and transportation of persons and goods to and from the project site. Construction activities would specifically require the consumption of non-renewable resources and slowly renewable resources, including: lumber and other forest resources; aggregate materials used in concrete and asphalt; metals; and water. Project construction would also require the consumption of fossil fuels, including gasoline and oil, in order to provide power to construction vehicles and equipment. Also, during construction, petroleum products including, but not limited to, gasoline, diesel fuel, and lubricants may also be used to fuel, lubricate, and clean vehicles and equipment.

Refer to Section 3.6, *Energy Conservation*, for an expanded discussion of project energy consumption.

Resources that would be permanently and continually consumed by implementation of the proposed project include building materials, water, electricity, natural gas, and fossil fuels; however, the amount and rate of consumption of these resources would not result in significant environmental impacts or the unnecessary, inefficient, or wasteful use of resources. Construction activities related to the proposed project, though previously analyzed in Chapter 3.0 of this EIR, would result in the irretrievable commitment of nonrenewable energy resources, primarily in the form of fossil fuels, natural gas, and gasoline for automobiles and construction equipment. With respect to the operational activities of the proposed project, compliance with all applicable building codes, as well as EIR mitigation measures, would ensure that all natural resources are conserved to the maximum extent practicable. It is also possible that new technologies or systems would emerge, or would become more cost-effective or user-friendly, and would further reduce the project reliance upon nonrenewable energy resources.

The CEQA *Guidelines* also require a discussion of the potential for irreversible environmental damage caused by an accident associated with the proposed project. Completion of the proposed project would involve the routine use, transport, storage, or disposal of hazardous wastes other than small amounts of construction chemicals and non-acute hazardous materials by residents and other occupants of the site. As stated in Section 3.9, *Hazards and Hazardous Materials*, of this EIR, these materials are regulated through a series of federal, state, and local laws and regulations. Compliance with these existing requirements would ensure that the potential for the completed project to cause significant irreversible environmental damage from an accident or upset of hazardous materials would be less than significant.

4.3 Growth-Inducing Impacts

CEQA *Guidelines* Section 15126.2(d) requires that an EIR evaluate the growth-inducing impacts of a proposed project. Growth inducement is defined by the CEQA *Guidelines* as:

> *[T]he ways in which a proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

A project can have a direct effect on population growth if it involves construction of new housing. A project can have indirect growth inducement if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial or governmental enterprises) or if it would involve a substantial construction effort with substantial short-term employment opportunities and indirectly stimulate the need for additional housing and services to support the new employment demand. A project would also have an indirect growth inducement effect if it would remove an obstacle to additional growth and development, such as removing a constraint on a required public service.

Growth induced from a project may result in adverse impacts if the growth is not consistent with the land use plans and growth management plans and policies for the area affected. Local land use plans provide for land use development patterns and growth policies that allow for the orderly expansion of urban development supported by adequate urban public services, such as water supply, roadway infrastructure, sewer service and solid waste service. The urban development may have environmental impacts, as identified in CEQA documents prepared for adoption of local land use plans. A project that would induce "disorderly" growth that is in conflict with local land use plans could indirectly cause additional adverse environmental impacts and impacts to other public services.

4.3.1 Overview

This section addresses the indirect growth inducement potential of the proposed project. Refer to Section 3.14, *Population and Housing,* for an analysis of the project's potential direct effects on growth. Assessing the growth-inducement potential of the project involves answering the question: "Would implementation of the proposed project directly or indirectly support economic expansion, population growth, or residential construction?"

This section describes the water supply that the project would provide and characterizes the proposed project's potential to foster growth within the City's service area. The section also analyzes whether the reduction in purchased CCWD water frees up (i.e., increases the amount of) potable water that would be available for urban development, thus potentially removing an obstacle to growth. To make this determination, this section studies: the current and projected water demand in the City; planned use of desalinated water as a supply source; role of the proposed project; and the extent to which the project could remove water supply limitations and supply reliability as an obstacle to growth and therefore have an indirect growth-inducement potential.

4.3.2 Improving Water Supply Reliability

As described in Chapter 2, *Project Description,* the objectives of the proposed project include improving water supply reliability and water quality for customers; develop a reliable and drought-resistant water source to reduce dependency on purchased water supplies by maximizing the use of the City's water rights; maximize the use of existing infrastructure; and providing operational flexibility to allow the City to respond to changes in source water quality, emergencies, changes in climate and Delta conditions. The proposed project would allow the City to pump water from the river year-round and produce desalinated water to offset the use of purchased CCWD water.

The proposed project would reduce dependency on purchased water supplies with desalinated water through its provision of up to 6 mgd of desalinated water to the City's service area. The project is designed to replace water that would otherwise be purchased from CCWD and therefore would not augment the city's supplies. During the 2011 (wet year) and 2013 (dry year), purchased water from CCWD comprised approximately 40 percent (2,300 MG) and 75 percent (4,500 MG) of the City's potable water supply, respectively. The City's current operations are limited by water quality in the San Joaquin River and in recent years has needed to rely increasingly on purchased water from CCWD. CCWD obtains its water exclusively from the Sacramento-San Joaquin Delta (Delta) and operates the canal system, and intakes at Rock Slough, Victoria Canal, and Old River. The water withdrawn at these intakes are either diverted to the Los Vaqueros Reservoir or directly to the canal system. In the future, water quality and reliability in the Delta may further decline due to changes in Delta management activities, the cumulative impacts of other projects and development in the San Joaquin Valley, and climate change increasing the frequency and duration of droughts. Thus, the City's reliance on a single source of supply (aside from river pumping) could expose the City's water service area to decreased water supply reliability.

4.3.3 Water Supply and Population

There is a connection between land use planning and water supply. In California, cities and counties have primary authority over land use while water suppliers, through laws and agreements, are expected – and usually required – to provide water service if water supply is available. The City of Antioch is responsible for providing water in its service area and it is also has authority related to land use planning or approvals. The City's projection for future water needs are contained in its 2015 Urban Water Management Plan. The 2015 UWMP accounts for population projections and their relationship to water demands through data provided by the Association of Bay Area Governments (ABAG) and water use targets.[1] ABAG consists of local governments from Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, and Sonoma counties. ABAG develops and regularly updates regional growth forecasts that incorporate relevant zoning and land use information from jurisdictional general plans.

[1] The Water Conservation Act of 2009, also known as SB X7-7, requires agencies to establish water use targets for 2015 and 2020 that would result in statewide water savings of 20 percent by 2020.

As shown in **Table 4-1, t**he City's population is expected to increase by 15 percent from 2015 to 2035, which is approximately 0.66 percent per year. The water use projections for 2020 through 2035 assume that the City will achieve it's 2020 water use target of 165 gallons per capita per day. Brackish water desalination has been identified as a potentially viable additional source of water for several Bay Area water suppliers. A brackish water desalination facility with a capacity of up to 16 mgd was included as a potentially viable additional source of water for the City in the UWMP.

TABLE 4-1
POPULATION IN THE CITY OF ANTIOCH

	2015	2020	2025	2030	2035
Population Projected	105,600	108,900	112,400	116,200	120,300

SOURCE: ABAG, 2013

Table 4-2 summarizes water supply sources for the City and **Table 4-3** summarizes projected water demands. The City's water demand is only anticipated to increase minimally (approximately two percent annually) through 2035. Water demand is expected to be approximately 7,245 MG by 2035, and available water supplies are expected to be approximately 9,769 MG.

TABLE 4-2
WATER SUPPLIES IN THE CITY OF ANTIOCH FOR URBAN USE (MG)

Water Supply	Source	2015	2020	2025	2030	2035
Purchased or Imported Water	Contra Costa Water District	3,915	4,099	4,309	4,538	4,785
Surface Water	San Joaquin River Intake	409	2,460	2,460	2,460	2,460
Recycled Water	Delta Diablo	79	326	489	489	489
Supply from Storage	Storage from City Municipal Reservoir	197	0	0	0	0
	Total	**4,600**	**6,885**	**9,283**	**9,517**	**9,769**

NOTE: Supply from Storage (Municipal Reservoir) was collected from raw water supplies in previous years and used for consumption in 2015.

SOURCE: City of Antioch, 2016

TABLE 4-3
PROJECTED WATER USE (MG)

Use Type	2015	2020	2025	2030	2035
Single Family	2,768	4,051	4,181	4,323	4,477
Multi-Family	405	593	612	633	655
Commercial	300	440	454	469	486
Industrial	85	125	129	133	138
Institutional/Governmental	178	260	269	278	287
Landscape (treated)	465	681	703	727	753
Other (firelines and hydrant meters)	12	18	18	19	20
Other (unbilled meters)	57	0	0	0	0
Losses (potable water system losses)	222	362	374	387	400
Landscape (raw water)	29	29	29	29	29
Total	**4,521**	**6,559**	**6,769**	**6,998**	**7,245**

SOURCE: City of Antioch, 2016

Depending on the year type, the proposed project would produce roughly 2,600 AFY – 5,500 AFY (800 – 1,800 MG) of desalinated water (see **Tables 2-6** and **2-7** in Chapter 2, *Project Description)*. Purchased water from CCWD shown in **Table 4-2** would be offset by commensurate reductions – resulting in approximately 13 to 22 percent less purchased water depending on the year type.

While the project would provide a new water source within the City's service area, it would replace purchased water distribution through the service area and therefore would not induce future growth. Rather, as a project to support future supply reliability by creating a new local water source, the project would meet the demand previously met by purchased water. The project would therefore not be an impediment to already planned growth.

4.3.4 General Plan Policies

The City of Antioch General Plan lists the following policies to ensure an adequate water supply is available to serve existing and future needs of the City:

> ***Policy 8.4.1:*** Water Facilities Policies
>
> a. As part of the design of water systems, provide adequate pumping and storage capacity for both drought and emergency conditions, as well as the ability to provide fire flows required by the Contra Costa County Fire Protection District.
>
> b. Ensure that adequate infrastructure is in place and operational prior to occupancy or new development, such that (1) new development will not negatively impact the performance of water facilities serving existing developed areas, and (2) the performance standards set forth in the Growth Management Element will continue to be met.

c. Maintain an up-to-date master plan of water facilities.

d. Maintain existing levels of water service by protecting and improving infrastructure, replacing water mains and pumping facilities as necessary, and improving the efficiency of water transmission facilities.

e. Permit the construction of interim facilities only when it is found that construction of such facilities will not impair the financing or timely construction of master planned facilities.

f. Periodically evaluate local water consumption patterns, the adequacy of existing facilities, and the need for new facilities, including this information in the comparison of proposed development projects to the performance standards of the Growth Management Element.

g. Incorporate expected reductions in the need for water facilities resulting from water conservation programs only after several years of experience with the implementation of such programs.

h. Provide the Contra Costa Water District with timely information on development proposals and projected levels of future growth so that it can maintain appropriate long-term master plans and refine the delivery of service and facilities to maintain the performance standards set forth in the Growth Management Element.

Policy 10.7.2: Water Resources Policies

a. As part of the implementing the City's residential growth management program and its development review process for non-residential development, ensure that adequate long-term water supplies are available to serve the development being granted new allocations, including consideration of peak drought and peak firefighting needs.

b. Require new development to be equipped with drought tolerant landscaping and water conservation devices.

c. Work with Delta Diablo Sanitation District to make reclaimed wastewater available for irrigation use. Where reclaimed wastewater can be made available at a reasonable cost, require the installation of dual water systems in development projects and public facilities, using reclaimed wastewater for irrigation.

d. Protect, where possible, groundwater recharge areas, including protection of stream sides from urban encroachment.

e. Oppose proposals with the potential to increase the salinity of the Delta and/or endanger the City's rights to divert water from the San Joaquin River.

4.3.5 Secondary Effects of Growth

Implementation of the proposed project would allow the City to provide the level of pumping capacity, treatment and conveyance for production and distribution of desalinated water. As discussed previously, the proposed project would not result in a direct increase in population or employment. However, the project would develop a supplemental water supply to the City, and assist in providing water supply that is planned under the City of Antioch General Plan. As discussed above in Section 4.3.3, the project could provide for new use and development that is projected to occur and is consistent with the General Plan. Potentially adverse secondary effects

could result from development of planned land uses in the project area. Because the proposed project would not induce growth beyond that discussed in the General Plan and General Plan EIR, the secondary effects of growth would be consistent with those discussed in the General Plan and General Plan EIR.

As discussed above under Section 4.3.2, brackish water desalination as a component of the City's water supply portfolio has been evaluated in State-approved water planning documents including the City's UWMP. Because brackish water desalination is included within the water supply planning for the City, and the proposed project would be consistent with the amount of brackish water desalination identified, provision of brackish water desalination is not anticipated to affect the rate, timing, or distribution of urban growth within the City. While project implementation would not induce or alter growth trends in the City, it would, as part of the overall water supply picture, enable secondary effects associated with development under the approved General Plan to occur. Buildout under the General Plan requires several types of infrastructure, including an adequate water supply; the proposed project would contribute to the provision of adequate water supplies, within the City. The secondary impacts related to buildout under the approved General Plan are disclosed in the General Plan EIR for the City of Antioch. A summary of impacts from the General Plan EIR and mitigation measures that would reduce the impacts to less-than-significant levels are listed in the **Table 4-4** and the discussed below.

Local land use plans and specific development plans have been adopted and approved, with the City adopting a statement of overriding consideration for these significant unavoidable effects. The proposed project would not increase the nature, number or severity of significant effects associated with planned development.

TABLE 4-4
IMPACTS ASSOCIATED WITH CITY OF ANTIOCH GENERAL PLAN IMPLEMENTATION

City of Antioch
Significant But Mitigable Impacts
1) Light and glare resulting from new development associated with implementation of the proposed General Plan could adversely affect day or nighttime views of Antioch.
2) Development allowed by implementation of the proposed General Plan could cause the destruction of known archaeological resources, as defined in CEQA Guidelines, Section 15064.5.
3) Development as a result of implementation of the proposed General Plan could potentially destroy directly or indirectly a unique paleontological resource or site.
4) Future development permitted by the proposed General Plan may increase the potential for property loss, injury, or death resulting from this ground-shaking hazard.
5) Future proposed General Plan development within Antioch would increase the potential for the placement of structures and facilities in or near areas susceptible to liquefaction.
6) Implementation of the proposed General Plan could facilitate new development in areas that may become unstable and potentially result in landslides, lateral spreading, subsidence, liquefaction, or collapse.
7) Revitalization and development of Rodgers Point, including a proposed marina and a new access road, may substantially alter a portion of the San Joaquin River.
8) Build out of the City will result in a substantial increase in population and residential and non-residential structures, potentially increasing the use of and need for natural gas.
9) Build out of the City will result in a substantial increase in population and residential and non-residential structures, potentially increasing the use of and need for electricity.
10) Increases in population and employment with the proposed General Plan could result in the incremental increase of solid waste throughout Antioch. This could increase the need for solid waste disposal, requiring additional landfill capacity and related support facilities.

City of Antioch

Significant and Unavoidable Impacts

1) The proposed General Plan would generate NOx emissions, which would exceed the project level operations threshold established by the BAAQMD.
2) Consistency with Clean Air Plan population and VMT assumptions.
3) Future growth occurring as the result of implementing the proposed Antioch General Plan will increase area-wide traffic volumes with the potential to degrade roadway performance below applicable performance standards.

Less Than Significant Impacts

1) Would increase the development of urban uses, causing a loss of open space and change in aesthetic character. This could have a significant adverse impact on existing and future scenic vistas and scenic resources.
2) It is not anticipated that future ambient CO concentrations, with the proposed General Plan, would violate either the State or Federal CO standards.
3) The demolition, renovation or removal of asbestos-containing building materials is subject to the limitations of BAAQMD Regulation 11, Rule 2: Hazardous Materials; Asbestos Demolition, Renovation and Manufacturing. Compliance with this procedure would be considered to have a less than significant project impact.
4) The proposed General Plan would potentially result in increased stationary sources emissions from nonresidential development, new industries having the potential for emitting toxic air contaminants, and wood-burning stoves and fire places.
5) Implementation of the proposed General Plan may result in impacts to species identified as a candidate, sensitive, or special status species, as well as riparian, wetland or other sensitive natural communities.
6) Alteration or loss of habitat of listed proposed, or candidate species that inhibits or compromises recovery efforts that could otherwise lead or contribute to the delisting of the species.
7) Implementation of the proposed General Plan could interfere with the movement of wildlife species or with migratory wildlife corridors.
8) Future development adjacent to existing preserved land could impact habitat connectivity and the biological value of such preserved lands.
9) Development allowed by implementation of the proposed General Plan could cause the destruction of or loss of an historical resource, as defined in CEQA Guidelines, Section 15064.5.
10) Future proposed General Plan development within the City would increase the potential for the placement of structures and facilities in areas susceptible landslides or rockfalls.
11) Areas exposed during development activities would be prone to erosion and/or the loss of topsoil.
12) Future development within Antioch would increase the potential for the placement of structures and facilities in areas susceptible to damage resulting from expansive soils.
13) Build out of the proposed general plan may result in increased risk of upset associated with the routine use, generation, and transportation of hazardous materials, which may potentially pose a health or safety hazard.
14) Build out of the Proposed General Plan may impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
15) Implementation of the proposed General Plan may expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas.
16) Collapse of historic coal mine tunnels could result in subsidence of lands located above the mines, potentially causing damage to foundations or other improvements.
17) Implementation of the Proposed General Plan would not contribute to the depletion of groundwater supplies or reduce the amount of water available for public water supplies.
18) Impacts associated with new development can include erosion and sedimentation associated with groundbreaking and clearing activities. Additionally, stormwater runoff from urban areas contains a variety of pollutants that may reduce the quality of groundwater resources when introduced into groundwater aquifers.
19) Due to the City's geographic location, implementation of the proposed General Plan would not expose people or property to flooding associated with seiches or tsunamis. Additionally, the hillside topography surrounding the City to the south is generally stable and is not prone to mudflows.
20) Risk of Dam Failure. The City of Antioch is located below the Contra Loma Reservoir. The overall safety classification of the dam is registered as satisfactory.
21) Increases in runoff can amplify drainage volumes and velocities causing storm drainage facilities that are at or near capacity to fail during peak events, causing localized ponding and flooding.
22) Development has the potential to increase the risk of flooding, which leads to damage to structures and risk to the health and safety of people.
23) Because the proposed General Plan provides policies reflective of the unique combination of conditions within each area of the City, implementation of the proposed General Plan will not disrupt or divide the physical arrangement of any established neighborhood.
24) Relative to adjacent land uses, this intensification of development may contribute to or create significant land use

City of Antioch
impacts.
25) The General Plan proposes urban development within areas that are currently outside of the County's urban limit line. Such development might not be consistent with the provisions of the Contra Costa County 65/35 Land Preservation Plan.
26) The General Plan proposes employment-generating development in excess of that which is projected by ABAG.
27) Noise levels from grading and other construction activities would potentially result in significant noise impacts to offsite sensitive receptors adjacent to the individual construction site.
28) New development, particularly residential uses along and adjacent to major transit corridors, could be exposed to excessive traffic-related noise levels.
29) New development associated with implementation of the proposed General Plan could expose existing and/or new sensitive uses to stationary noise sources, such as industrial and/or commercial uses.
30) There could be new proposed sensitive land uses along and adjacent to the railroads that would be affected by high noise levels from railroad operations.
31) Build out of the City of Antioch due to implementation of the proposed Housing Element will result in a substantial increase in population and residential and nonresidential structures, and associated infrastructure.
32) Increases in population and employment anticipated with the proposed General Plan would increase the need for police protection and police services, requiring additional emergency responses and the need for additional police personnel and related support facilities.
33) Could result in significant impacts on existing fire protection services and require expansion of fire protection services.
34) Implementation of the proposed General Plan will result in increased development and associated student population throughout the City. School districts may be unable to meet future needs resulting from projected growth.
35) Build out within the City of Antioch will result in a substantial increase in population, potentially increasing the use of existing parks and recreation facilities.
36) The population increases projected for the City of Antioch with implementation of the proposed General Plan will increase the demand for water beyond that which currently exists.
37) Implementation of the proposed General Plan will result in reliance on a higher percentage of lower quality water from the San Joaquin River and may increase the level of pollutants that occur in water reserves.
38) Implementation of the proposed General Plan would generate increases in population and housing, in addition to increases of commercial, and industrial land uses. This growth would incrementally generate wastewater, which will necessitate increased wastewater treatment capacity.

SOURCE: City of Antioch, 2003a.

Mitigation Measures

Mitigation measures proposed in the City of Antioch General Plan Update EIR (1995) are described below:

Aesthetics: The City of Antioch shall require that sources of lighting within the General Plan area be limited to the minimum standard required to ensure safe circulation and visibility. Within rural areas the City of Antioch shall require street lighting to be limited to intersections and other locations that are needed to maintain safe access (e.g., sharp curves). The City of Antioch shall require exterior lighting for buildings to be of a low profile and intensity. The City of Antioch shall require that commercial and industrial development provide design features such as screened walls, landscaping, setbacks, and lighting restrictions between the boundaries of adjacent residential land use designations to reduce the impacts of light and glare.

Cultural: The City shall modify the proposed General Plan to incorporate a policy with the following provision: If avoidance and/or preservation in the location of any cultural resources is not possible, the following measures shall be initiated for each impacted site:

a. A participant-observer from the appropriate Indian Band or Tribe shall be used during archaeological testing or excavation in the project site.

b. Prior to the issuance of a grading permit for the project, the project proponent shall develop a test level research design detailing how the cultural resource investigation shall be executed and providing specific research questions that shall be addressed through the excavation program. In particular, the testing program shall characterize the site constituents, horizontal and vertical extent, and, if possible, period of use. The testing program shall also address the California Register and National Register eligibility of the cultural resource and make recommendations as to the suitability of the resource for listing on either Register. The research design shall be submitted to the City of Antioch for review and comment. For sites determined, through the Testing Program, to be ineligible for listing on either the California or National Register, execution of the Testing Program will suffice as mitigation of project impacts to this resource.

c. After approval of the research design and prior to the issuance of a grading permit, the project proponent shall complete the excavation program as specified in the research design. The results of this excavation program shall be presented in a technical report that follows the City's outline for Archaeological Testing. The Test Level Report shall be submitted to the City for review and comment. If cultural resources that would be affected by the project are found ineligible for listing on the California or National Register, test level investigations will have depleted the scientific value of the sites and the project can proceed.

d. If the resource is identified as being potentially eligible for either the California or National Register, and project designs cannot be altered to avoid impacting the site, a Treatment Program to mitigate project effects shall be initiated. A Treatment Plan detailing the objectives of the Treatment Program shall be developed. The Treatment Plan shall contain specific, testable hypotheses relative to the sites under study and shall attempt to address the potential of the sites to address these research questions. The Treatment Plan shall be submitted to the City for review and comment.

e. After approval of the Treatment Plan, the Treatment Program for affected, eligible sites shall be initiated. Typically, a Treatment Program involves excavation of a statistically representative sample of the site to preserve those resource values that qualify the site as being eligible for the California or National Register. At the conclusion of the excavation or research program, a Treatment Report shall be developed. This data recovery report shall be submitted to the City for review and comment.

When existing information indicates that a site proposed for development may contain paleontological resources, a paleontologist shall monitor site grading activities with the authority to halt grading to collect uncovered paleontological resources, curate any resources collected with an appropriate reposition, and file a report with the Community Development Department documenting any paleontological resources found during site grading.

Geologic and Seismic Hazards: The City shall modify the proposed General Plan to incorporate a policy with the following provision: as determined by the City of Antioch Building Division, a site specific assessment shall be prepared to ascertain potential ground shaking impacts resulting from development. The site-specific ground shaking assessment shall incorporate up-to-date data from government and non-government sources and may be included as part of any site-specific geotechnical investigation. The site-specific ground shaking assessment shall include specific measures to reduce the significance of potential ground shaking hazards. This site-specific ground shaking assessment shall be prepared by a

licensed geologist and shall be submitted to the City of Antioch Building Division for review and approval prior to the issuance of building permits. The policy shall apply to any structure or facility that undergoes expansion, remodeling, renovation, refurbishment or other modification.

Where development is proposed within an identified or potential liquefaction hazard area (as determined by the City), adequate and appropriate measures such as (but not limited to) design foundations in a manner that limits the effects of liquefaction, the placement of an engineered fill with low liquefaction potential, and the alternative siting of structures in areas with a lower liquefaction risk, shall be implemented to reduce potential liquefaction hazards. Any such measures shall be submitted to the City of Antioch Building Division for review prior to the approval of the building permits.

Hydrology and Water Quality: The City shall modify the proposed General Plan to incorporate a policy with the following provision: Prior to or concurrent with approvals of any development applications, a Master Plan for Rodgers Point and the Rivertown/Urban Waterfront Focus Area shall be prepared and approved by the City. The Master Plan shall provide detailed guidance for environmental review, project-related land use, provision and financing of required public services and facilities, open space preservation, community design, recreational amenities, and community improvements.

Discussion

The proposed project would create a new source of water to offset purchased supplies water distributed by CCWD. While desalination represents a new supply source, it would be offsetting use of purchased water within the City's service area. As a result, desalinated water for use in the City's service area would not create additional water for distribution that could result in a growth inducement potential. The supply would be more reliable and would not result in increasing the overall water portfolio water demand of the City, as documented in the UWMP. The UWMP accounts for this new supply source to offset purchased water, and as described above under Section 4.3.3, the City's water demand is only anticipated to increase minimally (approximately two percent annually) through 2035 so additional supplies are not required to support any increase in demand. As a project that supports future reliability by creating a new local water source, the proposed project would accommodate existing demand and annual increase in demand such that water infrastructure reliability would not be an impediment to already-planned growth. As a result, the proposed project neither supports nor encourages growth within the City's service area to a greater degree than presently estimated by the UWMP.

Although the City would purchase less water from CCWD in a given hydrologic year, it would not necessarily result in CCWD making commensurate reductions in its withdrawals from the Delta. Therefore, CCWD would have 6 mgd, or 2,600 AFY – 5,500 AFY of extra water that could be stored at the Los Vaquero Reservoir. CCWD's projections for future water needs are contained in its 2015 Urban UWMP. Based on projected supply and demand, CCWD does not anticipate supply deficits in normal years or single-dry years, but may have shortfalls up to approximately 30,000 AF during multiple-dry year (CCWD, 2016). As such, reductions in purchases by the City of Antioch, and subsequent storage in the reservoir, would have the potential to contribute to dry year and multi-dry year reliability for the region. CCWD is responsible for allocating water to jurisdictions within its boundary but does not have authority to make land use decisions or to approve growth. Once the water is allocated to the jurisdictions,

each city and Contra Costa County (for the unincorporated areas) would have the responsibility and discretion to approve or deny proposed development projects for which water was available, consistent with the jurisdiction's role as the primary land use authority and applicable land use plans, policies, regulations and laws.

The water that would not be purchased by the City would be stored at the Los Vaqueros Reservoir which provides off-stream storage to improve water quality and to provide emergency storage for customers of CCWD. A large portion of the reservoir is reserved for emergency purposes, providing up to 70,000 AF of emergency supply in wet years and up to 44,000 AF in dry years (CCWD, 2016). This water would not have a growth-inducing potential because it would not be used to meet the demands of or increase overall planned supply for any particular agency or area, but rather would be made available in the event of a natural disaster or other emergency based on needs and conditions specific to the emergency. The proposed project would not remove any obstacles to growth and would not indirectly have a significant impact on growth inducement. As a result, impacts to growth inducement would be less than significant.

References – Other CEQA Considerations

Association of Bay Area Governments (ABAG), 2013. *Projections 2013*.

City of Antioch, 2003a. *City of Antioch General Plan Update Environmental Impact Report*. July 2003. Prepared by LSA.

City of Antioch, 2003b. *City of Antioch General Plan*. November 24, 2003. Prepared by LSA.

City of Antioch, 2016. *City of Antioch 2015 Urban Water Management Plan*. May 2016. Prepared by West Yost Associates.

Contra Costa Water District, 2016. *2015 Urban Water Management Plan for the Contra Costa Water District.*

This page intentionally left blank

w

CHAPTER 5
Alternatives to the Proposed Project

5.1 Introduction and Overview

The following section evaluates the alternatives to the proposed Brackish Water Desalination Project. The project proposed by the City of Antioch includes a desalination facility with a finished water capacity of 6 million gallons per day (mgd) of potable drinking water. The alternatives in this chapter (excluding the "No Project" Alternative) are evaluated based on their ability to accomplish most of the Project Objectives while avoiding or minimizing one or more of the project's potentially significant impacts identified in Sections 3.1 through 3.18, as well as consideration of feasibility.

5.1.1 CEQA Requirements

CEQA requires that an EIR describe and evaluate a range of reasonable alternatives to the proposed project, and evaluate the comparative merits of the alternatives (CEQA *Guidelines* Section 15126.6(a), (d)). The "range of alternatives" is governed by the "rule of reason," which requires the EIR to set forth only those alternatives necessary to foster informed decision-making and public participation (Section 15126.6(a), (f)).

The range of alternatives shall include alternatives that would feasibly attain most of the basic objectives of the project and would avoid or substantially lessen any of the significant effects of the project (CEQA *Guidelines* Section 15126.6(a)-(c)). CEQA generally defines "feasible" to mean an alternative that is capable of being accomplished in a successful manner within a

reasonable period of time, taking into account economic, environmental, social, technological, and legal factors. In addition, the following may be taken into consideration when assessing the feasibility of alternatives: site suitability; economic viability; availability of infrastructure; general plan consistency; other plans or regulatory limitations; jurisdictional boundaries; and the ability of the proponent to attain site control (Section 15126.6(f)(1)). If the lead agency concludes that no feasible alternative locations exist, it must disclose the reasons for this conclusion, and should include the reasons in the EIR (Section 15126.6(f)(2)(B)).

The description or evaluation of alternatives does not need to be exhaustive, and an EIR need not consider alternatives for which the effects cannot be reasonably determined and for which implementation is remote or speculative. An EIR need not describe or evaluate the environmental effects of alternatives in the same level of detail as the proposed project, but must include enough information to allow meaningful evaluation, analysis, and comparison with the proposed project (CEQA *Guidelines* Section 15126.6(d)).

The "no project" alternative must be evaluated. This analysis shall discuss the existing conditions, as well as what could be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services (CEQA *Guidelines* Section 15126.6(e)(2)).

CEQA also requires that an environmentally superior alternative be selected from among the alternatives. The environmentally superior alternative is the alternative with the fewest or least severe adverse environmental impacts. When the "no project" alternative is the environmentally superior alternative, the EIR must also identify an environmentally superior alternative from among the other alternatives (CEQA *Guidelines* Section 15126.6(e)(2)).

5.2 Project Objectives and Significant Impacts

As noted in Section 5.1.1, the CEQA Guidelines call for evaluating alternatives that would attain most of the basic objectives of the project, but would avoid or substantially lessen any identified significant effects of the project. The analysis includes alternatives that would avoid or substantially lessen any of the significant environmental effects of the proposed project. Under CEQA, costs may be and are considered in the assessment of the reasonableness or feasibility of an alternative. However, the analysis in this chapter does not focus on relative economic factors of the alternatives carried through for detailed analysis. Nevertheless, the EIR indicates those considerations that may be relevant and important to decision-makers, including factors not related to environmental quality.

5.2.1 Project Objectives

As presented in Chapter 2, *Project Description*, the City's objectives for the Brackish Water Desalination Project are to:

- Improve water supply reliability and water quality for customers.

- Develop a reliable, and drought-resistant water source to reduce dependency on purchased water supplies by maximizing the use of the City's pre-1914 water rights.
- Maximize the use of existing infrastructure to maintain economic feasibility.
- Provide cost effective operational flexibility to allow the City to respond to changes in source water quality, emergencies, changes in climate and Delta conditions.
- Preserve the value of the City's pre-1914 water rights.

5.2.2 Significant Environmental Impacts

This section summarizes the impacts of the proposed project, as analyzed in Chapter 3 of this EIR, and that were considered during the alternatives identification process. CEQA *Guidelines* Section 15126.6 requires that alternatives are considered that can avoid or substantially lessen significant impacts of a project. All project impacts were determined to be less than significant with mitigation (LSM), meaning that all significant project impacts could be reduced to a less-than-significant level through the implementation of mitigation measures identified in this EIR.

Operational Impacts

Project operation would result in the following potentially significant and significant long-term impacts, all of which could be mitigated to a less-than-significant level with the implementation of mitigation measures identified in Chapter 3:

- **Noise.** The City's General Plan calls for achieving and maintaining a 60 CNEL for single- and multi-family residential uses and 70 dBA CNEL at the front setback for commercial/industrial uses. Noise generation specifications of the proposed desalination plant pumps are not available and quantitative estimate of noise generation of pump operation and the attenuation offered by the proposed RO building cannot be estimated. The noise threshold for residential uses could potentially be exceeded, and is therefore considered a potentially significant impact (Impact 3.13-3, LSM).

Construction Impacts

Project construction would result in the following significant short-term impacts, all of which could be mitigated to a less-than-significant level with the implementation of mitigation measures identified in Chapter 3:

- **Air Quality.** Project-related construction activities including trenching and earth disturbance would generate fugitive dust emissions (Impact 3.2-1, LSM). If fugitive dust emissions are not mitigated, the project could conflict with the 2017 Clean Air Plan (Impact 3.2-3, LSM).

  Project construction activities would result in the generation of toxic air contaminants, including diesel particulate matter (DPM) which could cause a cancer risk and PM2.5 emissions in excess of Bay Area Air Quality Management District (BAAQMD) thresholds. (Impact 3.2-4, LSM).
- **Aquatic Biology.** Construction work associated with the proposed intake facility could result in direct disturbance and mortality of fish from installation of cofferdams and dewatering, and short-term degradation of aquatic habitat caused by an increase in hydrostatic pressure,

underwater noise, and vibrations (Impact 3.3-3 and 3.3-4, LSM). In-water construction activities would result in a loss of shallow water habitat (Impact 3.3-5, LSM).

- **Terrestrial Biology.** Project-related construction activities could be disruptive to special-status birds, migratory birds, and roosting bats, through temporary noise disturbance or removal of trees (Impact 3.4-1, LSM).

  In-water construction work associated with the river pump station and associated pipelines and screened intakes, and removal of the existing pump station would constitute a discharge of fill into waters of the U.S. and could be considered a significant impact (Impact 3.4-3, LSM).

- **Cultural Resources.** Based on the results of the background research, surface survey, and subsurface survey, there are no known archaeological resources or human remains in the project area. The inadvertent discovery of archaeological resources or human remains during construction activities of the project could result in a potentially significant impact (Impact 3.5-2 and 3.5-3, LSM).

- **Energy.** Construction and decommissioning activities could result in wasteful or inefficient use of fuel or energy if: construction and decommissioning activities equipment is not well maintained; if equipment is left to idle when not in use; or if haul trips are not planned efficiently (Impact 3.7-1, LSM).

- **Hazards and Hazardous Materials.** Construction-related activities would require the use, handling, and transport of hazardous materials, of which the accidental release or spill could adversely affect schools within 0.25 mile of project components by exposure of school children and workers to hazardous materials (Impact 3.9-2, LSM).

  Excavation activities associated with the brine disposal pipeline could encounter petroleum hydrocarbons and/or asbestos-containing materials (ACM) that could expose workers, the public, and the environment to hazardous materials (Impact 3.9-3, LSM).

  Construction activities for the raw water connection pipeline and brine disposal pipeline would occur within roadways and could require temporary road closures, which could interfere with emergency traffic on those roads (Impact 3.9-4, LSM).

- **Noise.** Construction noise levels could result in substantial periodic or temporary increases in noise over existing levels and exceed noise thresholds for speech and sleep interference. An exterior noise level that exceeds 70 dBA Leq during the daytime is used as the speech interference threshold for substantial construction noise where the duration of construction noise exceeds two weeks. Construction activities associated with the river pump station and desalination plant would produce noise levels that would exceed the speech interfere threshold (Impact 3.13-1, LSM).

- **Utilities.** Construction activities associated with underground pipeline installation could disrupt operations or require relocation of regional or local utilities (Impact 3.15-1, LSM).

- **Recreation.** Construction activities associated with the river intake pump station and pipelines would overlap or occur adjacent to bicycle routes, the Antioch public boat launch ramp, and the Contra Costa County Fairgrounds, which could temporarily disrupt recreational resources in the project area (Impact 3.16-1, LSM).

- **Transportation.** Construction of the proposed project would have temporary and intermittent effects on traffic and transportation conditions, would temporarily disrupt circulation near sensitive land uses, would have temporary effects on alternative transportation or facilities, would temporarily increase the potential for accidents on project area roadways, and would

increase wear-and-tear on designated haul routes used by construction vehicles (Impacts 3.17-1 through 3.17-5, LSM).

- **Tribal Cultural Resources.** Based on the results of the background research, surface survey, and subsurface survey, there are no known archaeological resources or human remains in the project area. The inadvertent discovery of archaeological resources or human remains during construction activities of the project could result in a potentially significant impacts to tribal cultural resources (Impact 3.18-1, LSM).

5.3 Component Development and Screening Process

This alternatives analysis begins by describing and screening the key components of the desalination project. To maximize the range of components considered, this EIR separately considered the intake pump station, desalination plant and raw water pipeline connection, and brine discharge options. The screening process is guided in part, by the magnitude and severity of the impacts identified above.

All options in the screening process are sized for a desalination plant with finished water capacity of 6 mgd and a river intake pump station with a 16 mgd capacity.

In eliminating component options, this EIR considered whether the intake options could provide a sufficient and reliable source of brackish water, and methods of brine discharge. This EIR also considered site conditions, the availability of land at the City's WTP, and the use of existing infrastructure. The component options presented below came primarily from the following sources:

- Brown and Caldwell, 2018. *Revised Draft Technical Memorandum - Antioch River Pump Station Preliminary Design,* January 19, 2018.
- Carollo Engineers, 2016. *Technical Memorandum No. 1 Water Quality Basis of Design,* August 2016.
- Carollo Engineers, 2016. *Technical Memorandum No. 2 Brine Management Alternative Analysis,* October 2016.
- Carollo Engineers, 2017. *City of Antioch Brackish Water Desalination Project – Phase II, Technical Memorandum No. 3 Conceptual Design,* Draft February 2017

5.3.1 Intake Pump Station Screening Results

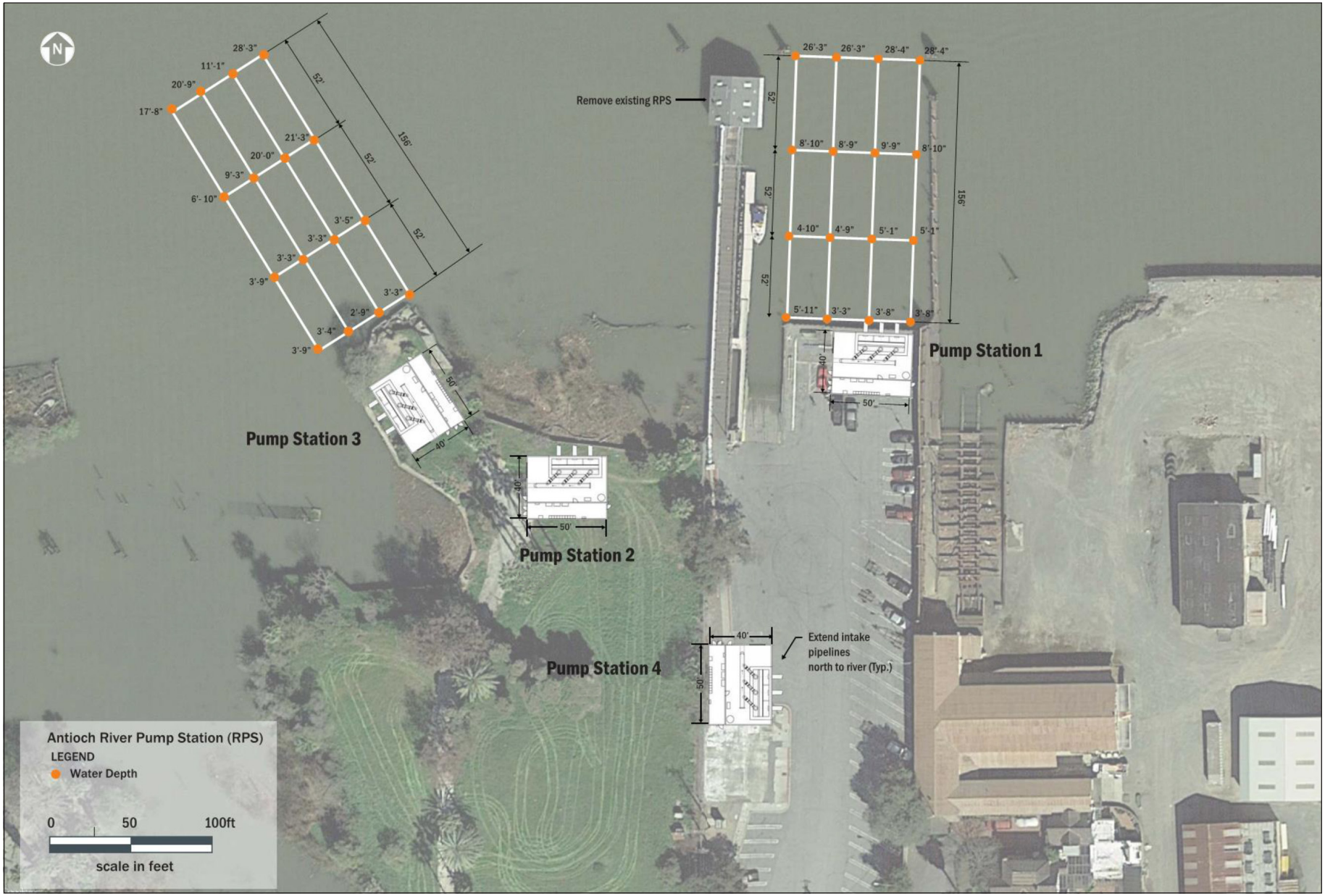
This analysis considers alternative locations or footprint configurations for the intake pump station. Four intake pump station options were identified and screened and are summarized in **Table 5-1** below and shown in **Figure 5-1**. Two of the four were not carried forward for further analysis. The primary screening criteria for the intake pump station options were:

- Proximity to the existing pump station to tie into the existing raw water pipeline at the site;
- Same intake capacity as the existing pump station (16 mgd);
- Located within City-owned property; and

- Enable the City to withdraw water from the river year-round.

TABLE 5-1
INTAKE PUMP STATION SCREENING RESULTS

Figure ID	Site	Description	Screening Results
Pump Station-1	Intake Pump Station Siting Option 1	• This option would be located east of existing pier and boat ramp at north end of parking lot. • Footprint area, three pumps (two active and one standby), and three new 36-inch diameter offshore intake pipelines would be the same as the proposed project.	*Retained for Further Analysis*
Pump Station-2	Intake Pump Station Siting Option 2	• This option would be located directly south of the area west of the existing pier. • Footprint area, three pumps (two active and one standby), and three new 36-inch diameter offshore intake pipelines would be the same as the proposed project. • This option would require the construction of a new access road.	*Not carried forward because its location offers no advantages to the pump station location under the proposed project. It would not reduce, avoid, or eliminate potential impacts of the proposed project and the location and required access roadway would be in direct conflict with plans the City may have in the future for a new park.*
Pump Station-3	Intake Pump Station Siting Option 3	• This option would be located west of the existing pier on the shore at Rogers Point. • Footprint area, three pumps (two active and one standby), and three new 36-inch diameter offshore intake pipelines would be the same as the proposed project. • This option would require the construction of a new access road.	*Not carried forward because its location offers no advantages to the pump station location under the proposed project. It would not reduce, avoid, or eliminate potential impacts of the proposed project and the location and required access roadway would be in direct conflict with plans the City may have in the future for a new park.*
Pump Station-4	Reduced Footprint Intake Pump Station	• Same location as proposed project • Two pumps (no standby) • Two new 36-inch diameter offshore intake pipelines • Footprint area would be less than the proposed project.	*Retained for Further Analysis*



SOURCE: Brown and Caldwell, 2018

Brackish Water Desalination Facility

Figure 5-1
Intake Pump Station Alternative Location Options

ESA

5.3.2 Brine Disposal Options Screening Results

This analysis considers an alternative disposal option for brine generated by the desalination plant and is summarized in **Table 5-2** below.

TABLE 5-2
BRINE DISPOSAL OPTIONS SCREENING RESULTS

Brine Disposal Option	Description	Screening Results
Surface water discharge	This option would discharge brine directly to a local or remote water body, and would require construction of an engineered solution (e.g., new outfall and diffuser).	*This option would discharge brine without dilution to local surface waters. Not carried forward because the California Ocean Plan Amendments[1] encourage co-location with a wastewater treatment plant outfall to dilute brine with wastewater effluent before it is discharged.*

Note:
1. The California Ocean Plan Amendments apply to coastal desalination plants using ocean water and are not directly applicable to the proposed desalination facility treating water from the San Joaquin River. However, these amendments are used as a guideline for this project.

The primary screening criteria for these options were:

- Technically feasible and capable of receiving the entire brine flow (2 mgd) from the brackish water desalination facility;
- Due to cost and viability for the City, the option should be a single, reliable brine management method;
- Must not require capital costs that would surpass additional revenue gained from implementation.

As described in Section 2.4, *Project Component Selection and Considerations,* a previous study for a Pilot Plant concluded that several opportunities for managing desalination concentrate would be available in the east Contra Costa region. Mixing the concentrate with wastewater effluent produced by Delta Diablo and/or the Central Contra Costa Sanitary District (CCCSD) were identified as opportunities for further consideration. Comingling with spent cooling water from the Mirant power plant, which is located east of the Mallard Slough Pump Station, or discharges into the power plant's intake itself, were also identified as potentially acceptable low cost options. The City subsequently evaluated brine disposal alternatives for their site-specific application using information from the study.

Land-based brine discharge options were not considered or evaluated in this analysis for several reasons, including: the impacts associated with the truck trips required to move 2 mgd of liquid brine to a processing facility or other disposal or treatment area; the infeasibility of developing a substantially large area that would be needed for the use of evaporation ponds; the lack of a market for the salt product in California (e.g. as a de-icing agent); the infeasibility of using the very saline brine as irrigation water or for dust control; and the infeasibility of deep well injection due to regulations requiring a 30 mile setback from known fault lines.

Based on this initial screening, no brine disposal alternative options were retained for valuation in the second step of the process.

5.3.3 Desalination Plant Site Option Screening Result

As previously discussed in Chapter 2, *Project Description*, existing facilities and assets in the vicinity of eastern Contra Costa County were reviewed for potential desalination plant site implementation by URS in 2010. The study considered plant sites at the Mallard Slough Intake Pump Station, Mirant Pittsburg Power Plant, and near Clyde or nearby locations, and included the City's WTP site. In addition, brackish water desalination has been evaluated at the planning level in the East Contra Costa County Integrated Regional Water Management Plan 2015 Update. The City has developed the proposed project in order to meet the objectives identified in Section 2.5.1, including the objective to maximize the use of existing infrastructure. Potential site options capable of meeting the project objectives is summarized in **Table 5-3** below and shown in **Figure 5-2**.

The primary screening criteria for the desalination plant were:

- Maximize use of existing infrastructure;
- Located outside of the 100-foot-wide PG&E easement that runs east-west through the WTP site; and,
- Within developable area of WTP not constrained by topography to minimize excavation.

TABLE 5-3
DESALINATION PLANT SITE OPTION SCREENING RESULT

Site	Description	Screening Results
Standalone Desalination Plant	• This option would construct a standalone desalination plant with a finished water capacity of 6 mgd at the southeast corner of the City's WTP site. • The footprint of the desalination plant would be approximately 19,000 square feet, plus approximately 3,900 square feet for chemical storage. • The desalination plant would require a 110,600-gallon Micro-Filtration filtrate tank, and an 80,000-gallon Reverse Osmosis permeate tank in the facility.	*Retained for Further Analysis*

This desalination plant option considered in this screening process would be located in the southeast corner of the City's WTP, similar to the proposed project. Unlike the proposed project, the standalone desalination plant would be capable of operating independently of Plants A and B. This facility would use microfiltration (MF) to provide pretreatment (i.e., solids removal) for the RO membranes as well as be used to address treatment requirements for pathogens and viruses. Plants A and B would not require any improvements to change their processes and would continue to operate as conventional treatment plants treating low-TDS water from the Reservoir and Canal. Filtered water produced by Plant A and/or B could be blended with RO permeate.

The footprint of a standalone desalination plant with a finished water capacity of 6 mgd would be approximately 19,000 square feet, and would require approximately 3,900 square feet for chemical storage. The standalone plant would also require a 110,600-gallon Micro-Filtration filtrate tank, and an 80,000-gallon Reverse Osmosis permeate tank in the facility.

5.3.4 Raw Water Pipeline Connection Option Screening Result

This analysis considers an alternative option for the raw water pipeline connection. This option is summarized in **Table 5-4** below and shown in **Figure 5-2**.

The primary screening criterion for the raw water pipeline connection was:

- Direct connection to the City's existing raw water pipeline to allow water to be conveyed directly from the river to the WTP.

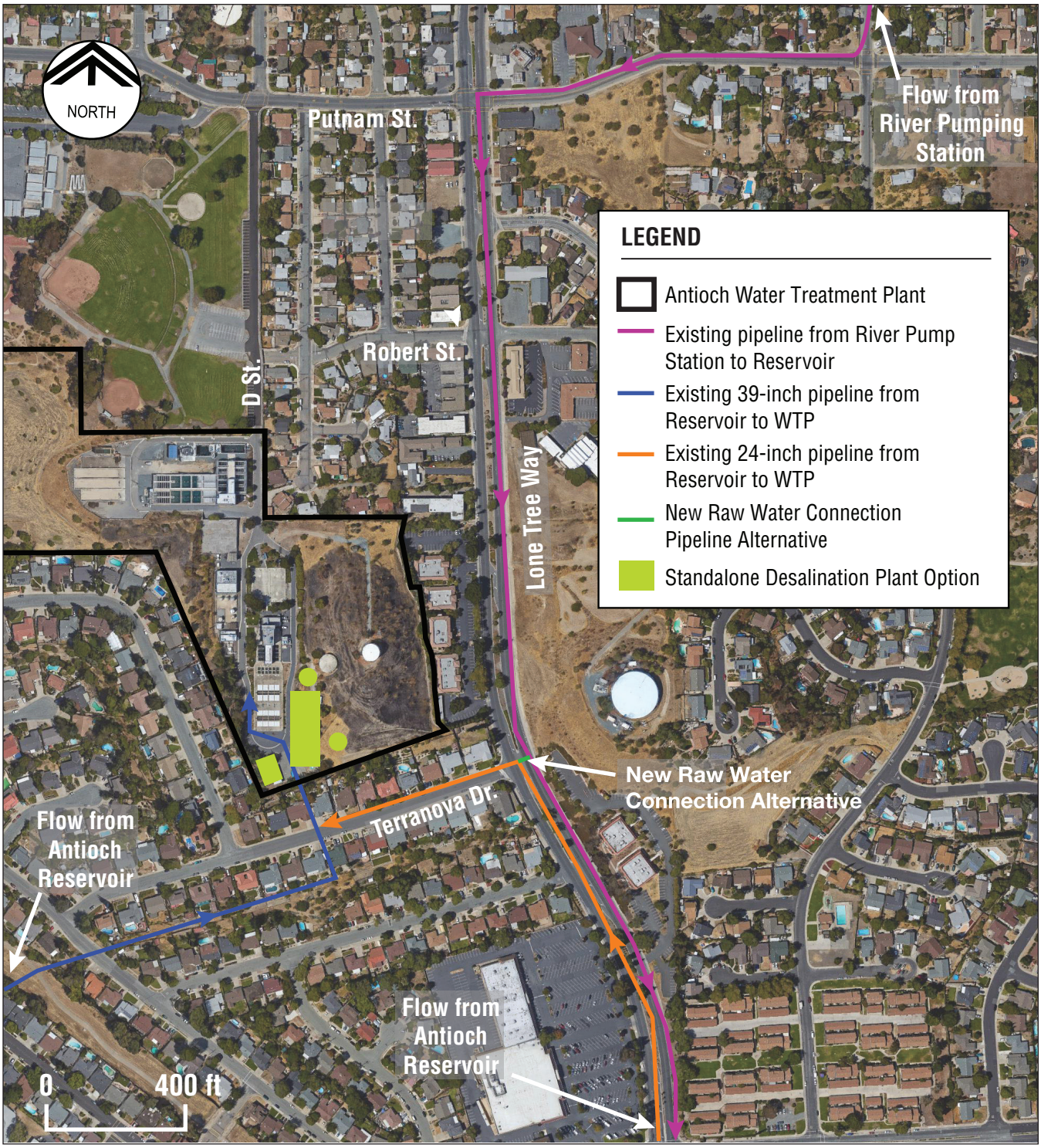
TABLE 5-4
RAW WATER PIPELINE CONNECTION OPTION

Site	Description	Screening Results
New Raw Water Pipeline Connection	• A new approximately 100-foot-long pipeline segment would tee off of the existing raw water pipeline on Lone Tree Way at Terranova Drive and connect to the existing pipeline that carries water to the WTP from the Reservoir. • Under this option, valves would be installed to allow water to flow either directly to the WTP or to the Reservoir. In-pipe blending of raw water and Reservoir water could occur, which would lower the TDS concentration of the RO feed water.	*Retained for Further Analysis*

This option would install a short section of new pipeline to connect the existing raw water pipeline from the river, to the existing 24-inch pipeline that supplies water from the Reservoir. Valves would be installed to direct the flow either to the Reservoir or the WTP.

Under this option, in-pipe blending of high-TDS river water and low-TDS Reservoir water could occur prior to the water entering the WTP. The City currently pumps river water with an elevated chloride concentration to the Reservoir whenever the Reservoir is capable of diluting the river water to an acceptable chloride concentration. Thus, the City currently has the ability to mix river and Reservoir water to control the concentration of chloride entering the WTP. This option would add another method of blending control.

This option could lower the TDS concentration of the RO feed water, which could reduce the need for RO treatment (thereby using less energy), and would lower the TDS concentration of the brine. However, under this option, because a portion of the Reservoir water used for blending would become brine, some of the Reservoir water would be wasted as the blended water undergoes RO.



SOURCE: Carollo Engineers, 2018

Brackish Water Desalination Facility

Figure 5-2
Desalination Plant Site and Raw Water Pipeline Options

ESA

5.4 Evaluation of Project Component Options

This section evaluates the relative environmental effects of the components carried forward from the prior screening step, and compared against the components of the proposed project. The components that are determined through the evaluation to avoid or reduce potential environmental impacts are used to compile whole alternatives in Section 5.4.4 that are evaluated against the proposed project in Section 5.5.

The following sub-sections present summary descriptions of the potential environmental impacts associated with the implementation of a particular component of the proposed project, as described in Chapter 3. The impacts of the component options are described comparatively using the following descriptors:

- **Similar** – impacts would be identical or would be of the same general magnitude as the proposed project component
- **Increased** – impacts would be notably greater than the proposed project component
- **Decreased** – impacts would be notably less than the proposed project component

5.4.1 Evaluation of Intake Pump Station Options

Two types of intake pump station options were compared against the proposed intake pump station.

Intake Pump Station Siting Option 1

Intake Pump Station Siting Option 1 would be constructed east of the existing pier and boat ramp at the north end of the parking lot. The footprint area, and number of pumps and pipelines would be the same as the proposed project. This option would have similar operational impacts related to Delta hydrology, impingement and entrainment when compared to the proposed project. Because this option would decrease some construction-related environmental effects, (while increasing others) compared with the proposed project, it is carried forward for development into the whole alternative (Alternative A).

Reduced Footprint Intake Pump Station

The Reduced Footprint Intake Pump Station would be in the same location as the proposed project, but would include only two pumps (no standby), and two 36-inch offshore intake pipelines with fish screens. Because this option would decrease construction-related environmental effects compared with the proposed project, it is carried forward for development into whole alternatives (Alternative B).

5.4.2 Evaluation of Standalone Desalination Plant Option

One alternative desalination plant option was compared to the proposed desalination plant at the WTP. Under the proposed project, the desalination facility would include a 10,700-square-foot

membrane process building and a 2,600-square-foot chemical storage building. The standalone desalination plant would result in a larger footprint for both the RO facility and chemical storage area, at approximately 19,000 square feet and 3,900 square feet, respectively. The proposed project would use the existing conventional treatment processes at Plant A for pre-treatment of raw water prior to RO treatment, thus requiring a smaller footprint for the desalination process. The standalone desalination plant would require a microfiltration component to provide pretreatment prior to RO treatment. The microfiltration system would require larger volumes of chemicals for the pretreatment process, and would require additional pumps that would require a greater amount of energy consumption. Compared to the proposed project this option would require a larger footprint, and greater chemical and energy consumption.

The standalone desalination facility option would result in increased construction and operational impacts compared to the proposed project, and would not avoid or minimize potential environmental impacts. For this reason, the standalone desalination plant option was not carried forward in the development of the whole alternatives.

5.4.3 Evaluation of Raw Water Pipeline Connection Option

The raw water pipeline connection option would construct a new pipeline segment to connect the existing raw water pipeline from the river, to the existing pipeline that carries water to the WTP from the Reservoir. Under the proposed project, the new raw water pipeline connection to the WTP would be up to 3,000 feet in length, whereas the raw water pipeline connection option would be approximately 100 feet. Therefore, this option would result in fewer impacts associated with excavation and construction, compared to construction of the proposed project.

Because the raw water pipeline connection option would allow blending with reservoir water before reaching the desalination facility, the lower TDS concentration of the RO feed water could reduce the need for RO treatment. Therefore, the raw water connection option would consume less energy, and thus generate less greenhouse gas emissions during operation, compared to operation of the proposed project.

5.4.4 Summary of Component Option Evaluation Conclusions

Both of the intake pump station options were carried forward into the development of whole alternatives.

Based on the conclusions of the component evaluations, the various options were combined into whole alternatives for detailed consideration. Alternative A would be similar to the proposed project except the intake pump station would be located at the north end of the parking lot (Intake Pump Station Siting Option 1). Alternative B represents a reduced footprint, consisting of a smaller intake pump station and a shorter raw water connection pipeline. Both alternatives would construct a desalination facility with a finished water capacity of 6 mgd, and a brine disposal pipeline to the Delta Diablo WWTP, as under the proposed project.

5.5 Description of Alternatives Selected for Analysis

The following alternatives are analyzed in this chapter:

- **No Project Alternative**
- **Alternative A: Intake Pump Station Siting Location 1**
- **Alternative B: Reduced Footprint Alternative**

These three alternatives were determined to adequately represent the range of feasible alternatives required under CEQA for the proposed project. The No Project Alternative is included, as required by CEQA *Guidelines* Section 15126.6(e), even though it would not meet the basic project objectives. Alternative A is a potentially feasible option that could meet all of the City's objectives. Alternative B is a potentially feasible option that could meet some of the City's objectives. **Table 5-5** summarizes and compares the characteristics of the proposed project with those of the No Project Alternative, and Alternatives A and B. Detailed descriptions of each alternative are presented, below, along with an evaluation of their environmental impacts. **Table 5-6** summarizes the ability of the two alternatives to meet the project objectives.

5.5.1 Alternative A: No Project Alternative

Discussion of the No Project Alternative must examine the existing conditions and reasonably foreseeable future conditions that would exist if the project were not approved (CEQA *Guidelines* Section 15126.6(e)). The No Project Alternative is defined as a continuation of existing conditions, as well as conditions that are reasonably expected to occur in the event that the proposed project is not implemented. Under the No Project Alternative and reasonably foreseeable future conditions, current operation of the City's existing water system would continue. The existing intake pump station would continue to divert water until the river's salinity exceeds potable water supply requirements, then supplemented by purchased water from CCWD. Under the No Project Alternative, the City would not implement the proposed project to provide desalinated water to offset purchased water use.

Comparative Impact Analysis

Under the No Project Alternative, significant impacts of the proposed project associated with the construction of the river intake pump station, raw water connection pipeline, desalination plant and associated facilities, and brine disposal pipeline would not occur including: short-term increases in criteria air emissions and noise levels; disturbance or destruction of cultural resources or tribal cultural resources; potential exposure to hazardous materials; short-term disruption of traffic patterns and emergency response; short-term disruption of recreational boat use at the pump station site; and disruption of regional or local utilities. Furthermore, because no new facilities would be constructed, there would be no impacts to special-status terrestrial and aquatic species when compared to the proposed project. There would also be no change to water quality or surface water flows in the Sacramento River and Delta because the existing intake would be operated as it is under current conditions. Because no new facilities would be constructed or

TABLE 5-5
COMPARISON OF PROPOSED PROJECT AND ALTERNATIVES

Characteristic	Proposed Project	No Project	Alternative A: Intake Pump Station Siting Option 1	Alternative B: Reduced Footprint
General				
Source of Water / Yield	Up to 6 million gallons per day (mgd) of desalinated product water to offset use of purchased water.	Current water demands would continue to be met through the use of water pumped from the San Joaquin River and water purchased through CCWD.	Same as proposed project	Same as proposed project
Facilities				
Intake Pump Station	• The new pump station would be constructed within the existing parking lot, approximately 200 feet inland from the shore. • Approximately 2,400 square feet in area with three 8 mgd vertical turbine pumps (two active and one standby) for a total intake firm capacity of 16 mgd. • Three new 36-inch-diameter offshore intake pipelines to replace the existing pipeline with fish screens meeting CDFW/NOAA requirements • Electrical and instrumentation equipment	No new facilities.	Same as the proposed project except the intake pump station would be located at the north end of the parking lot.	• Same location as the proposed project, except a smaller footprint. • Two 8 mgd pumps (two active, no standby) for a total intake firm capacity of 16 mgd. • Two new 36-inch-diameter offshore intake pipelines to replace the existing pipeline with fish screens meeting CDFW/NOAA requirements • Electrical and instrumentation equipment
Raw Water Pipeline Connection	New 3,000-foot-long raw water pipeline connection to the City's existing raw water pipeline to allow water to be conveyed directly from the River to the WTP		Same as proposed project	New approximately 100-foot-long raw water connection option to connect the existing raw water pipeline with the existing pipeline that runs from the reservoir to the WTP.

TABLE 5-5 (CONTINUED)
COMPARISON OF PROPOSED PROJECT AND ALTERNATIVES

Characteristic	Proposed Project	No Project	Alternative A: Intake Pump Station Siting Option 1	Alternative B: Reduced Footprint
Desalination Facilities	The existing WTP (Plant A) would provide pre-treatment of the raw water prior to RO treatment. A desalination plant with a finished water capacity of 6 mgd and related facilities, including reverse osmosis (RO); post-treatment systems; chemical feed and storage facilities; brine conveyance facilities; and other associated non-process facilities.		Same as proposed project	Same as proposed project
Brine Disposal	Approximately 4-mile-long brine disposal pipeline and connection to Delta Diablo's Wastewater Treatment Plant (WWTP) outfall		Same as proposed project	Same as proposed project
Construction				
Duration	The proposed project facilities would be built over approximately 14 months.	No construction required.	Same as proposed project	Same as proposed project, except the intake pump station and raw water pipeline connection construction would have a shorter duration.
Schedule	Monday through Friday, 8 a.m. to 5 p.m.	No construction required.	Same as proposed project	Same as proposed project
Operations				
Active Operation of Facilities	The new intake pump station could operate continuously for up to 24 hours a day.	No new operations.	Same as proposed project	Same as proposed project
Staff Requirements	Addition of 7 new permanent jobs at the WTP.	Same as existing.	Same as proposed project	Same as proposed project
Maintenance	Periodic servicing and maintenance of facilities.	No new maintenance.	Same as proposed project	Same as proposed project

TABLE 5-6
SUMMARY OF ABILITY OF ALTERNATIVES TO MEET PROJECT OBJECTIVES

Project Objective	No Project	Alternative A: Intake Pump Station Siting Option 1	Alternative B: Reduced Footprint
	Would the alternative meet this objective?		
Improve water supply reliability and water quality for customers.	No	Yes	Yes
Develop a reliable, and drought-resistant water source to reduce dependency on purchased water supplies by maximizing the use of the City's pre-1914 water rights.	No	Yes	Yes
Maximize the use of existing infrastructure to maintain economic feasibility.	No	Yes	Yes
Provide cost effective operational flexibility to allow the City to respond to changes in source water quality, emergencies, changes in climate and Delta conditions.	No	Yes	No
Preserve the value of the City's pre-1914 water rights.	No	Yes	Yes

operated, there would be no change in energy use, operational air emissions, or noise levels. Therefore, none of the impacts identified for the construction or operation of the proposed project would occur under the No Project Alternative.

Ability to Meet Project Objectives

Implementation of the No Project Alternative would not meet any of the stated project objectives and would not address water supply or operational constraints, nor would it reduce reliance on purchased water supplies during extended drought conditions. Under the No Project Alternative, water supply reliability would not be improved. Development of a reliable and drought-resistant water source would not occur under the No Project Alternative. Under the No Project Alternative operational flexibility would not be provided to the City, and the value of the City's pre-1914 water rights would not be preserved.

5.5.2 Alternative A: Intake Pump Station Siting Option 1

Under Alternative A, the intake pump station would be located east of the existing pier and boat ramp at the north end of the parking lot. As with the proposed project, the existing intake pump station would be demolished, and a new 2,400-square-foot pump station equipped with two active and one standby pumps, and three 36-in-diameter offshore intake pipelines with fish screens would be constructed. A cofferdam consisting of interlocking sheet piles approximately 50 feet wide that would extend into the river approximately 200 feet from the shore may be installed, as proposed under the project. Because the intake pump station under this alternative would be located at the shoreline, it would not require the installation of three pipelines in the parking lot to convey river water to the pump station (as depicted in **Figure 2-5a** for the proposed project). This alternative would require the installation of one pipeline through the parking lot to convey the pumped river water to the existing raw water pipeline. As a result, the amount of temporary disturbance associated with the pipeline installation in the parking lot would be slightly reduced compared to the project and construction-related impacts would be proportionately reduced.

All other project components, including the raw water connection pipeline, desalination plant and associated facilities, and brine disposal pipeline would be the same as the proposed project. Operation and maintenance of Alternative A would be similar to those for the proposed project. Alternative A would provide up to 6 mgd of desalinated product water to offset purchased water, and the intake pump station would be able to operate continuously for up to 24 hours per day. Like the proposed project, Alternative A would be constructed over an approximately 14-month period, and would require the addition of 7 new permanent jobs at the WTP. Facility maintenance would be the same as that for the proposed project.

Comparative Impact Analysis

Impacts That Would Not Occur

Although the intake pump station would be in a different location than in the proposed project, construction and operation of Alternative A would not eliminate any impacts, when compared to the proposed project.

Impacts Identified as Being the Same or Similar to the Proposed Project

Because the only difference between Alternative A and the proposed project would be the location of the intake pump station, which would be in an already disturbed area, Alternative A would have similar impacts associated with ground disturbance as the proposed project. The alternative location of the intake pump station would not have a geographically different setting, therefore Alternative A impacts to land use, local hydrology and water quality, land use and planning, and geology, soils, and paleontological resources would be less than significant, similar to the proposed project.

Like the proposed project, construction of the intake pump station and other components in Alternative A would require excavation and could encounter hazardous materials or result in the inadvertent discovery of cultural resources. Mitigation Measures 3.9-3a through 3.9-3c would ensure that workers are provided appropriate training in the recognition and response to encountering hazardous materials, and that plans are in place that provide procedures for the testing, handling, and disposal of hazardous materials. Mitigation Measures 3.5-1 and 3.5-2 would ensure that the proper steps are taken in the event cultural resources are encountered during construction. Like the proposed project, Alternative A would require construction in the intake pump station parking lot area and would temporarily disrupt use of the boat launch ramp during construction; therefore, recreational impacts would be the same as the proposed project and Mitigation Measure 3.17-1b would be implemented to notify affected users of the construction activities in advance.

Alternative A would require installation of a cofferdam similar to the proposed project. Installation of a sheetpile cofferdam could result in direct disturbance and mortality of fish and potential short-term degradation of aquatic habitat. Mitigation Measures 3.3-3a through 3.3-3d and Mitigation Measure 3.3-4 would reduce impacts by requiring worker awareness training programs, limiting in-water construction during periods when special-status fish species are not present or least sensitive, and consulting with resource agencies and implementing additional measures, where appropriate.

Similar to the proposed project, construction disturbance from trenching, pipeline installment, building demolition, and building construction under Alternative A could impact nesting birds and special-status bats in the vicinity. Mitigation Measures 3.4-1a and 3.4-1b would reduce impacts by determining presence or absence prior to construction activities. Alternative A would have a similar amount of construction activities in waters of the U.S. through in-water fill and other in-water work. Similar to the proposed project, implementation of Mitigation Measures 3.3-5 and 3.4-3 would protect aquatic habitat and water quality during construction.

Construction activities could result in short-term impacts related to the disruption of traffic and emergency response, and increases in noise levels. Mitigation Measures 3.17-1a and 3.17-1b would require obtaining any necessary road encroachment permits and develop and implement a traffic control plan. Mitigation Measure 3.13-1 would minimize construction noise impacts at

sensitive receptors. Similar to the proposed project, implementation of Mitigation Measure 3.13-3 would reduce stationary-source noise levels to a less-than-significant level.

Alternative A would require the same number of new employees as the proposed project and would have a less-than-significant impact related to population and housing.

Impacts Identified as Being Less Severe than the Proposed Project

Construction impacts associated with the Alternative A components would be similar to the proposed project for the brine disposal pipeline, raw water connection pipeline, and desalination facility. Construction impacts of the intake pump station would be slightly less severe when compared to the proposed project because less excavation in the parking lot would be required. Therefore, air quality, energy consumption and greenhouse gas emissions would be slightly reduced under Alternative A. Mitigation Measures 3.2-1 and 3.2-4 would minimize construction-related fugitive dust and DPM emissions. Mitigation Measure 3.7-1 would ensure construction activities are conducted in a fuel-efficient manner and minimize idling times for construction equipment and vehicles.

Impacts Identified as Being More Severe than the Proposed Project

The potentially higher groundwater level of the intake pump station site under Alternative A would require greater in-water work associated with dewatering and excavation, which could result in greater impacts to aquatic biology, when compared to the proposed project. The pump station location would add a 23-foot-tall structure at the shoreline. Unlike the proposed project, the alternative pump station location would be located on the shoreline of the San Joaquin River, and would be more prominent and would result in greater permanent aesthetic impacts.

Ability to Meet Project Objectives

Alternative A would meet all project objectives. The change in location in the intake pump station would not result in any significant changes to the project such that objectives could not be met.

5.5.3 Alternative B: Reduced Footprint Alternative

Under Alternative B, the intake pump station would be in the same location as for the proposed project, but would include two pumps (no standby) instead of three pumps, thereby reducing the footprint area of the pump station by approximately 30 percent. The 3,000-foot raw water pipeline connection from the existing raw water pipeline to the WTP would not be constructed, but instead an approximately 100-foot-long pipeline segment would tee off the existing raw water pipeline on Lone Tree Way at Terranova Drive and connect to the existing pipeline that carries water to the WTP from the Reservoir. As a result, the raw water connection pipeline would require about 95 percent less excavation and construction-related activities for this component. Valves would be installed to allow water to flow either directly to the WTP or to the Reservoir. In-pipe blending of raw water and Reservoir water could occur, which would lower the TDS concentration of the RO feedwater.

The other project components and construction-related activities for the desalination plant and associated facilities, and brine disposal pipeline would be the same as the proposed project. Operation and maintenance of Alternative B would be similar to those for the proposed project. Alternative B would provide up to 6 mgd of desalinated product water to offset purchased water, and the intake pump station would be able to operate continuously for up to 24 hours per day. However, because there would be no standby pump, in the event one of the pumps are out of service for maintenance, operations would be reduced to 8 mgd (versus 16 mgd under the project). Alternative B would be constructed over an approximately 14-month period, during which the various components could overlap; however, the construction duration for the intake pump station and raw water connection pipeline connection would be shorter than the proposed project. Like the proposed project, Alternative A would be constructed over an approximately 14-month period, and would require the addition of 7 new permanent jobs at the WTP. Facility maintenance would be the same as that for the proposed project.

Comparative Impact Analysis

Impacts That Would Not Occur

Although the intake pump station and raw water connection under Alternative B would have a smaller footprint, and the raw water connection would enable a lower the TDS concentration of the RO feedwater, construction and operation of Alternative B would not eliminate any impacts, when compared to the proposed project.

Impacts Identified as Being the Same or Similar to the Proposed Project

The reduced footprint area of the intake pump station and the alternative raw water connection would not have a geographically different setting, therefore Alternative B impacts to geology, soils, and paleontological resources and land use and planning would be less than significant similar to the proposed project. Alternative B would require the same number of new employees as the proposed project and would have a less-than-significant impact related to population and housing. Similar to the proposed project, implementation of Mitigation Measure 3.13-3 would reduce stationary-source noise levels to a less-than-significant level.

Like the proposed project, Alternative B would require construction in the intake pump station parking lot area and would temporarily disrupt use of the boat launch ramp during construction; therefore, recreational impacts would be the same as the proposed project and Mitigation Measure 3.17-1b would be implemented to notify affected users of the construction activities in advance.

Impacts Identified as Being Less Severe than the Proposed Project

Alternative B would require approximately 30 percent less excavation at the intake pump station location, and approximately 95 percent less excavation and trenching for the raw water connection pipeline. Because less area would be disturbed, construction-related impacts would be less than that anticipated with construction of the proposed project. Although impacts from construction disturbance would be less severe under Alternative B, there would still be short-term increases

in criteria air pollutant and fugitive dust emissions, GHG emissions, energy consumption, and noise levels.

Like the proposed project, construction of the intake pump station and other components in Alternative B would require excavation and ground disturbance activities. Construction-related activities for Alternative B could therefore encounter hazardous materials, result in the inadvertent discovery of cultural resources, potential degradation of water quality, potential disturbance to terrestrial resources, potential to disrupt utilities, and short-term disruption of traffic patterns and emergency response similar to the proposed project. Mitigation measures to minimize construction phase impacts would still be implemented under Alternative B. Mitigation Measures 3.2-1 and 3.2-4 would minimize construction-related fugitive dust and DPM emissions. Mitigation Measure 3.7-1 would ensure construction activities are conducted in a fuel-efficient manner and minimize idling times for construction equipment and vehicles.

Mitigation Measures 3.9-3a through 3.9-3c would ensure that workers are provided appropriate training in the recognition and response to encountering hazardous materials, and that plans are in place that provide procedures for the testing, handling, and disposal of hazardous materials. Mitigation Measures 3.5-1 and 3.5-2 would ensure that the proper steps are taken in the event cultural resources are encountered during construction. Mitigation Measures 3.4-1a and 3.4-1b would reduce impacts by determining presence or absence prior to construction activities. Mitigation Measures 3.17-1a and 3.17-1b would require obtaining any necessary road encroachment permits and develop and implement a traffic control plan. Mitigation Measure 3.13-1 would minimize construction noise impacts at sensitive receptors. Similar to the proposed project, implementation of Mitigation Measure 3.13-3 would reduce stationary-source noise levels to a less-than-significant level.

Construction-related activities including operation of construction equipment, worker trips, and hauling trips would be reduced, result in reduced criteria air pollutant and fugitive dust emissions as compared to the proposed project. Mitigation Measures 3.2-1 and 3.2-4 would minimize construction-related fugitive dust and DPM emissions. Alternative B would still require construction activities in waters of the U.S. through in-water fill and other in-water work. However, the overall impact would be less because the in-water area disturbed associated with two intake pipelines versus the 3 intake pipelines under the proposed project would have a smaller footprint. This would result in similar but less severe impacts to water of the U.S. Similar to the proposed project, implementation of Mitigation Measures 3.3-5 and 3.4-3 would protect aquatic habitat and water quality during construction. Mitigation Measures 3.3-3a through 3.3-3d and Mitigation Measure 3.3-4 would reduce impacts by requiring worker awareness training programs, limiting in-water construction during periods when special-status fish species are not present or least sensitive, and consulting with resource agencies and implementing additional measures, where appropriate.

Like the proposed project, the smaller footprint of the intake pump station would change (but not substantially degrade) the existing visual character of the site and its surroundings, but to a lesser degree than the proposed project.

The raw water pipeline connection would allow for lower TDS concentration of the RO feed water, which would reduce the need for RO treatment, and result in lower operational energy consumption and greenhouse gas emissions, when compared to the proposed project.

Impacts Identified as Being More Severe than the Proposed Project

Construction and operation of Alternative B would not result in more severe impacts when compared to the proposed project.

Ability to Meet Project Objectives

Not all of the project objectives would be achieved under Alternative B. Because Alternative B would have two pumps and no standby pump, it would not provide the operational flexibility if one pump were to become disabled. The reduced capacity would reduce the variable diversion rate volumes and would not maximize the City's use of its pre-1914 water rights. Alternative B would reduce the City's to respond to changes in source water quality, emergencies, changes in climate and Delta conditions compared to the proposed project.

5.6 Environmentally Superior Alternative

CEQA requires identification of an environmental superior alternative; that is, the alternative that has the least significant impacts on the environment. The CEQA *Guidelines* Section 15126.6 (e)(2) that: "If the environmentally superior alternative is the "no project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives."

Table 5-6 presents a comparison of impacts by issue area after mitigation for the proposed project, the No Project Alternative, Alternative A, and Alternative B. While the No Project Alternative would result in no impacts when compared to the proposed project, because no components would be constructed or operated, it would not achieve any of the proposed project objectives described above. As shown in Table 5-6 and as discussed in the alternative analysis above, Alternative B would be the environmentally superior alternative because it would result in similar or less severe impacts when compared to the proposed project. However, the proposed project objectives would not be met under Alternative B since, as discussed above, the lack of a standby pump would provide less operational flexibility to deal with changes in source water quality, emergencies, or changes in climate or Delta conditions if one pump were to become disabled or taken offline for maintenance compared to the proposed project.

TABLE 5-6
COMPARISON OF ENVIRONMENTAL IMPACTS OF THE ALTERNATIVES COMPARED TO THE PROPOSED PROJECT

Issue Area	Proposed Project[1]	No Project Alternative	Alternative A	Alternative B
Environmental Impacts				
3.1 Aesthetics	LS	NI	LS (More)	LS (Less)
3.2 Air Quality	LSM	NI	LSM (Less)	LSM (Less)
3.3 Aquatic Biology	LSM	NI	LSM	LSM
3.4 Terrestrial Biological Resources	LSM	NI	LSM	LSM (Less)
3.5 Cultural Resources	LSM	NI	LSM	LSM (Less)
3.6 Geology, Soils, and Paleontological Resources	LS	NI	LS	LS
3.7 Energy	LSM	NI	LSM (Less)	LSM (Less)
3.8 Greenhouse Gas Emissions	LS	NI	LS (Less)	LS (Less)
3.9 Hazardous and Hazardous Materials	LSM	NI	LSM	LSM (Less)
3.10 Local Hydrology and Water Quality	LS	NI	LS	LS (Less)
3.11 Delta Hydrology and Water Quality	LSM	NI	LSM	LSM
3.12 Land Use and Planning	LS	NI	LS	LS
3.13 Noise and Vibration	LSM	NI	LSM	LSM (Less)
3.14 Population and Housing	LS	NI	LS	LS
3.15 Public Services and Utilities	LSM	NI	LSM	LSM (Less)
3.16 Recreation	LSM	NI	LSM	LSM
3.17 Transportation and Circulation	LSM	NI	LSM	LSM (Less)
3.18 Tribal Cultural Resources	LSM	NI	LSM	LSM (Less)

1. This finding represents the most significant finding for the issue area after mitigation

NI – No Impact
LS – Less Than Significant
LSM – Less Than Significant With Mitigation
SU – Potentially Significant
Less – Less Severe
Greater – More Severe

5.7 Project Component Alternatives Considered but Rejected from Further Evaluation

Section 15126.6 of the CEQA *Guidelines* sets forth several requirements regarding the consideration of alternatives in an EIR. This section and related case law hold that alternatives that are not reasonable or are infeasible need not be discussed at length; alternatives that do not offer substantial environmental advantages over the project can be rejected from consideration; and alternatives that do not accomplish most of the basic objectives of the project can be excluded from detailed analysis.

Off-Site Desalination Facility

As described in Section 5.3.3, an alternative off-site location for the desalination plant has not been identified because the project is location specific. One of the primary objectives of the project is to maximize the use of the City's existing infrastructure to maintain economic feasibility and viability. The primary criteria for the desalination plant included co-locating the facility at the City's WTP to maximize use of existing infrastructure for pre-treatment of the raw water. Accordingly, no off-site alternative has been carried forward for detailed analysis.

This page intentionally left blank

CHAPTER 6
Report Preparers

6.1 Lead Agency

City of Antioch

Ron Bernal, City Manager
Scott Buenting, Project Manager

6.2 Consultants

Environmental Science Associates (ESA)

Project Director	Jim O'Toole
Project Manager	Susan Yogi
Deputy Project Manager	Hilary Finck
Document Coordinator	Jill Feyk-Miney
Aesthetics	Steve Smith
Air Quality	Matt Fagundes, Brian Schuster
Aquatic Biological Resources	Chris Fitzer, Paul Bergman
Terrestrial Biological Resources	Brian Pittman, Julie McNamara
Cultural Resources	Heidi Koenig, Kathy Anderson
Geology, Soils and Paleontological Resources	Michael Burns
Hazards and Hazardous Materials	Michael Burns
Local Hydrology	Michael Burns
Delta Hydrology and Water Quality	Jim O'Toole, Robert Eckard
Land Use and Planning	Hilary Finck, Susan Yogi
Noise and Vibration	Chris Sanchez
Population and Housing	Hilary Finck
Public Services and Recreation	Steve Smith
Recreation	Hilary Finck, Susan Yogi
Transportation and Circulation	Shadde Rosenblum
Tribal Cultural Resources	Heidi Koenig
Growth Inducement	Meryka Dirks
GIS	Jonathan Kemp, Eryn Pimentel
Graphics	Ron Teitel
Word Processing	Kristine Olsen, Lisa Bautista

Carollo Engineers

Scott Weddle, P.E., Associate Vice President/Project Manager
Kevin Fitzgerald, P.E., Senior Civil Engineer
Jill Shankel, P.E., Lead Engineer

Exponent

Susan Paulsen, Principal Scientist and Practice Director
Ryan Thacher, Managing Engineer

Woodard & Curran

Samantha Salvia, P.E. Senior Project Manager