INITIAL STUDY / PROPOSED MITIGATED NEGATIVE DECLARATION
CITY OF BRENTWOOD WASTEWATER TREATMENT PLANT
PHASE II EXPANSION PROJECT

Prepared for:

THE CITY OF BRENTWOOD
HERITAGE ▪ VISION ▪ OPPORTUNITY

CITY OF BRENTWOOD
PUBLIC WORKS-ENGINEERING

Prepared by:

ROBERTSON - BRYAN, INC.
Solutions for Progress

May 2016

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May 2016

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ACRONYMS AND ABBREVIATIONS

AFY	acre-feet per year
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
BMPs	Best Management Practices
CAA	federal Clean Air Act
CAAQS	California Ambient Air Quality Standards
CCAA	California Clean Air Act
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CEQA	California Environmental Quality Act
CCCFCWCD	Contra Costa County Flood Control and Water Conservation District
CFS	cubic feet per second
CH_4	methane
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DDW	Division of Drinking Water (State Water Resources Control Board)
DTSC	Department of Toxic Substances Control
ECCID	East Contra Costa Irrigation District
ECCCHCP	East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan
EC	electrical conductivity (or specific conductance)
ESA	federal Endangered Species Act
GHG	greenhouse gas emissions
hp	horsepower
MG	million gallons
MGD	million gallons per day
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NOAA Fisheries	National Oceanic and Atmospheric Administration
N_2O	nitrous oxide

ACRONYMS AND ABBREVIATIONS

NO_X	oxides of nitrogen
NO_3	nitrate
NPDES	National Pollution Discharge Elimination System
O_3	ozone
Pb	lead
$PM_{2.5}$	particulate matter 2.5 microns in diameter
PM_{10}	particulate matter 10 microns in diameter or smaller
ROG	reactive organic gases
SDWA	Safe Drinking Water Act
SFBAAB	San Francisco Bay Area Air Basin
SO_X	oxides of sulfur
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	toxic air contaminants
TDS	total dissolved solids
THM	trihalomethane precursor
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VMT	vehicle miles traveled

1 INTRODUCTION

1.1 REGULATORY GUIDANCE AND PURPOSE OF THIS DOCUMENT

This document has been prepared in accordance with the California Environmental Quality Act (CEQA), Public Resources Code §21000 et seq., and the State CEQA Guidelines, Title 14 California Code of Regulations (CCR) 15000 et seq. This Initial Study (IS) was prepared by the City of Brentwood (City) to determine if the proposed Wastewater Treatment Plant (WWTP) Phase II Expansion Project (Proposed Project) could have significant impacts on the environment. In accordance with CEQA Guidelines 15064(a), an Environmental Impact Report (EIR) must be prepared if there is substantial evidence that a project may have significant impacts on the environment. If the Lead Agency for the CEQA process determines that there is no substantial evidence for such impacts, or if the potential impacts can be reduced through revisions to the project or mitigation measures, a Negative Declaration (ND) or Mitigated Negative Declaration (MND) can be prepared (CEQA Guidelines 15070). The City, as the CEQA lead agency for the Proposed Project, has determined that an IS/MND is the appropriate document for compliance with CEQA and the CEQA Guidelines. The City is the Lead Agency for the Proposed Project.

The City intends to apply to the State Water Resources Control Board (SWRCB) for funding under the State Revolving Fund (SRF) loan program, which is partially funded by the U.S. Environmental Protection Agency (USEPA). Because federal funds would be used for the Proposed Project, compliance with the National Environmental Policy Act (NEPA) and other applicable federal environmental regulations is required. For compliance with the federal regulations, the USEPA established specific "CEQA-plus" requirements with the SWRCB for administering the SRF loan program that provide for the CEQA-plus process to serve as the functionally equivalent compliance process for NEPA, and compliance with the other applicable federal regulations. Accordingly, this CEQA document contains information regarding relevant and applicable federal regulations, and in particular supporting information for compliance with the Federal Endangered Species Act (ESA), National Historic Preservation Act (NHPA), and General Conformity Rule of the Clean Air Act (CAA).

1.2 PUBLIC REVIEW OF THE DOCUMENT

In accordance with Section 15073 of the CEQA Guidelines, this document will be circulated to local, state, and federal agencies and to interested organizations and individuals who may wish to review and comment on it. In reviewing this IS and proposed mitigation measures, affected public agencies and the interested public should focus on whether the document sufficiently identifies and analyzes the possible impacts on the environment.

A 30-day review and comment period for the IS/MND has been established in accordance with §15205(d) of the State CEQA Guidelines. This IS/MND is available for public review on the City's website (www.brentwoodca.gov/cd/planning/ceqa.asp) and during regular business hours at the City's Public Works – Engineering office (150 City Park Way, Brentwood, CA 94513). The 30-day public review period for the document is May 16, 2016 to June 15 2016 at 5:00 p.m.

Written comments on the IS/MND will be accepted during the comment period. Written comments (including via E-mail), must be submitted to the City by 5:00 p.m. on June 15, 2016. Postmarks after the close of the public review period will not be acceptable.

Written, E-mail or faxed comments should be addressed to:

Mr. Jagtar Dhaliwal. Assistant Director Public Works - Engineering
City of Brentwood Public Works-Engineering
150 City Park Way
Brentwood, California 94513-1164
Email: dept-pubwork@brentwoodca.gov
Fax: (925) 516-5128

Following the close of the public review period, the City Council will consider the IS/MND, and public comments received on the document, for potential adoption of the MND.

1.3 DOCUMENT ORGANIZATION

This document is organized in the following manner:

- Section 1, Introduction. This section provides an introduction and describes the purpose, scope, and organization of this document.

- Section 2, Project Description. This section describes the purpose and objectives of the Proposed Project, and a description of the construction methods and long-term operations of project facilities.

- Section 3, Environmental Checklist. This chapter provides an environmental setting for the Proposed Project and analyzes the potential environmental impacts of the Proposed Project. Resource topics appear in the order that they appear in Appendix G (Environmental Checklist) of the State CEQA Guidelines. Mitigation measures are incorporated and discussed, where appropriate, to reduce "potentially significant" impacts to a "less-than-significant" level. Mandatory Findings of Significance also are presented in this section.

- Section 4, List of Preparers. This section identifies a list of people that assisted in the preparation of this document

- Section 5, References. This section identifies the references used in the preparation of this document.

2 PROJECT DESCRIPTION

2.1 EXISTING WWTP FACILITIES AND OPERATIONS BACKGROUND

The Proposed Project is located within the City of Brentwood's current boundaries in Contra Costa County, as shown in **Figure 1**. The City's Wastewater Treatment Plant (WWTP) provides service to wastewater customers within the city boundaries. Wastewater consists of primarily domestic residential connections with limited commercial customers. No industrial uses occur within the service area. The current population is approximately 57,000 and is projected to be about 81,000 at buildout under the current General Plan (City of Brentwood 2014a and 2014b). The WWTP consists of a headworks (screening and grit removal), two anoxic basins, two extended aeration activated sludge basins, two denitrification basins, two secondary clarifiers, two banks of two single media filters (total of four filters), chlorine disinfection, dechlorination, and a cascade aeration system for discharge of treated effluent to Marsh Creek. The WWTP is permitted by the Central Valley Regional Water Quality Control Board ("Central Valley Water Board") under a National Pollution Discharge Elimination System (NPDES) permit (No. CA0085201, Order No. R5-2013-0106-01) issued in 2013 and amended in 2014 and 2015 which allows for effluent discharge at average dry weather flow (ADWF) of 5.0 million gallons per day (MGD). The WWTP has a design treatment capacity of 5.0 MGD at ADWF.

A large majority of the wastewater treated at the WWTP currently is discharged as dechlorinated effluent on a year-round basis to Marsh Creek in accordance with the NPDES permit requirements, with the remainder distributed as recycled water for landscape irrigation (described below). The lower reach of Marsh Creek is located within the jurisdictional area of the Sacramento-San Joaquin Delta (Delta). The average dry weather effluent discharge (i.e., average of June through August) was 3.6 MGD based on flows measured in 2013. The effluent discharge decreased in 2014 to 2.6 MGD as a result of drought-related water conservation and the increased use of recycled water.

The City also produces and distributes tertiary Title 22 recycled water for landscape irrigation customers and City properties. The City's recycled water operations have been authorized in the City's Master Reclamation Permit (MRP, Order No. R5-2004-0132), in coordination with approvals from the SWRCB, Division of Drinking Water (DDW). The City recently received authorization for recycled water distribution and use under the General Waste Discharge Requirements for Recycled Water Use SWRCB Order 2014-0090 (RW General Order) and the MRP R5-2004-0132 will be rescinded. Recycled water is distributed to irrigation customers primarily during the summer months through the City's non-potable water supply system, which conveys both recycled water and raw water supplied by the East Contra Costa Irrigation District (ECCID). The irrigation customer demands for recycled water reached a maximum monthly average rate of about 0.39 MGD during the summer irrigation season of 2013, with an annual recycled water use of about 196 acre-feet per year (AFY).

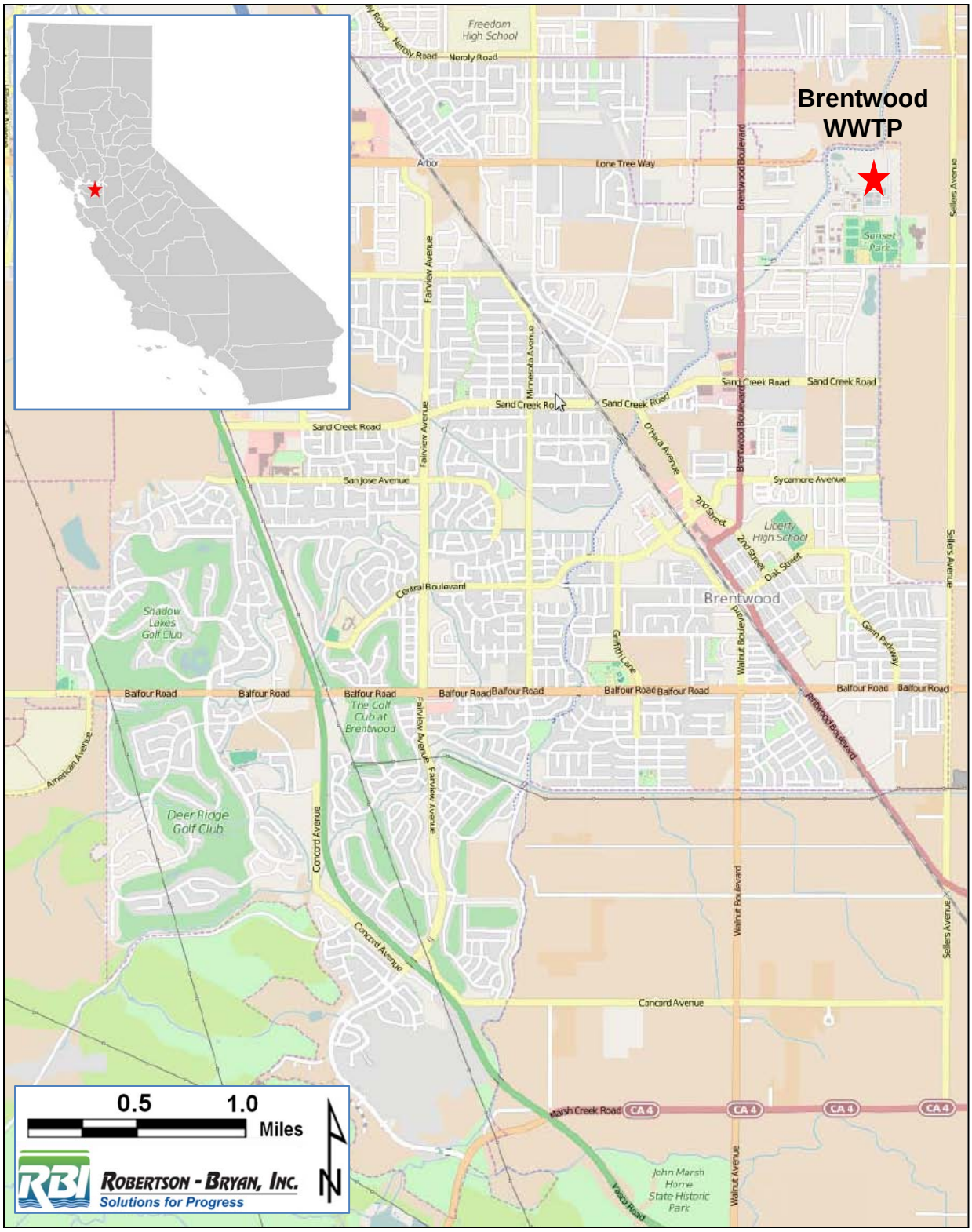

Figure 1. Location Map of City of Brentwood and Brentwood WWTP.

2.2 PURPOSE OF THE WWTP PHASE II EXPANSION PROJECT

The purpose of the Proposed Project is to increase the treatment capacity of the WWTP from the current 5.0 MGD to 7.5 MGD average dry weather flow (ADWF[1]), which the City identifies as the Phase II expansion, to accommodate future increased wastewater inflows associated with development and population growth identified in the City's General Plan.

Based on the projected future development under the General Plan, and the future wastewater flows identified in the City's Sewer Collection System Master Plan Update (City of Brentwood 2010), the City also has envisioned the ultimate need for a Phase III expansion to accommodate the City's wastewater flows that would occur with buildout of the City according to the General Plan. The Phase III expansion would undergo separate design and environmental review at a future date dependent on the rate of population growth, and is not considered further in this document. Accordingly, this Initial Study addresses the environmental effects of constructing and operating only the Phase II facilities.

A design WWTP capacity of 7.5 MGD also would support the continued production of tertiary Title 22 recycled water sufficient to meet additional landscape irrigation demands identified for the Recycled Water Project, and irrigation demands of future development areas identified in the City's General Plan. Planning for the City's Recycled Water Project was documented in two technical reports, *Recycled Water Feasibility Study for the City of Brentwood* (RBI 2013) and a supplemental memorandum (*Update to Recycled Water Feasibility Study*, RBI 2014), together referred herein as "Feasibility Study Update". The Feasibility Study Update evaluated existing landscape irrigation use areas, categorizing Phase A2 customers as those properties currently served with non-potable water, as shown in **Table 1**.

Table 1. Summary of Recycled Water Demands.

Parameter	Existing	RW Project (Phase A2 & Phase B1)	Future Potential Uses (Feasibility Study Update)			Total
			Phase B2 [a]	Phase B3 [a]	Golf Courses	
Annual Demand (AFY)	196	1750	223	262	1392	3823
Peak Day Demand (GPM)	273	2444	311	366	1944	5338
Peak Day Demand (MGD)	0.39	3.52	0.45	0.53	2.80	7.69
Peak Hour Demand (GPM)	729	5392	829	976	n/a [b]	7926
Peak Hour Demand (MGD)	1.05	7.76	1.19	1.41	n/a [b]	11.4
Number of Customers	17	86	15	28	3	150

[a] Only those customers whose average day demand contributed to the top 75% of the total irrigation demand were included in this assessment, since customers below this threshold would likely have very high cost/demand.
[b] Golf course irrigation rates are regulated evenly during off-peak times of day, and thus do not contribute measurably to increased peak hourly recycled water demand rates.

[1] All WWTP flow descriptions are based on a rating system of ADWF. The WWTP will be designed based on an ADWF of 7.5 MGD and will include appropriate peaking and loading factors for peak day, peak hour, and maximum month flows.

Potential recycled water customers in areas currently served only by potable water pipelines were identified as Phase B customers. Three categories of Phase B customers (B1, B2, and B3) were identified referring to general areas of the City where multiple potential customers exist, and where recycled water facilities could be cost-effectively extended. The Recycled Water Project is being designed and constructed to serve the Phase A2 and only the Phase B1 customers, which are considered the most cost-effective customers to receive recycled water service at this time. Recycled water demands identified in the Recycled Water Project total 1946 AFY as summarized in Table 1 (Existing plus Phase A2 and B1).

The Phase B2 and B3 customers represent a combined additional demand of 485 AFY that could be cost-effectively served with recycled water in the future. In addition to the Phase B2 and B3 customers, three golf courses exist within the City that were identified in the Feasibility Study Update that could be provided with recycled water in the future. These additional golf courses have a recycled water demand of 1392 AFY, resulting in additional future recycled water demands of 1877 AFY (Phase B2 and B3, and Golf Courses). The anticipated total recycled water demand identified in the Feasibility Study Update and considered in this Initial Study is 3823 AFY.

No additional recycled water storage and distribution facilities are considered for construction as a component of this Phase II WWTP expansion. The planning and design of additional recycled water facilities for the City (e.g., pipeline capacities and alignments, pumping stations, and storage tanks) can be developed more efficiently in the future as customer-specific information becomes known with greater certainty. With respect to the environmental review process (and applicable regulations), the planning, design, and development of facilities for the Phase II WWTP expansion has independent utility from the City's recycled water system operations, and therefore can proceed in advance of the planning and design of any future recycled water facilities. However, because the City intends to actively promote the use of recycled water in the future to facilitate water supply conservation, the increased use of recycled water is reasonably anticipated to occur along with the expansion of the WWTP capacity to 7.5 MGD. Therefore the use of up to 3823 AFY of recycled water to meet irrigation demands is considered in the environmental assessment of project operations, as described in further detail below.

2.3 PROJECT OBJECTIVES

The primary objectives of the Proposed Project, as defined by the City, are described as follows:

> **NPDES Permit Compliance:** The City's primary objective is to provide expanded wastewater treatment capacity, and support increased effluent discharge and/or recycled water uses, while maintaining existing levels of regulatory compliance for protection of water quality and public health. The City also seeks to provide for effective effluent disinfection while achieving compliance for existing effluent limitations for disinfection byproducts, and also potentially more restrictive future effluent limitations for ammonia.

Cost-Effective System: The City seeks to construct and operate the expanded treatment unit processes with the most cost-effective methods available that meet the City's overall system performance and regulatory compliance requirements.

2.4 DISCRETIONARY ACTIONS AND REGULATORY ACTIONS FOR THE PROPOSED PROJECT

The CEQA compliance process for the Proposed Project is intended to support several discretionary actions by the City, as follows:

- Requests for bids for construction of the proposed WWTP facilities, and subsequent contracts and agreements for the construction activities.
- Issuance of construction and/or grading permits to the construction contractors for the Proposed Project features.
- Direct all related construction and operations activities necessary to startup and test the expanded WWTP.

The CEQA process also is intended to support the regulatory actions that may be necessary for approval of the Proposed Project by other federal, State, and local agencies, and be used by other State responsible agencies that may have an interest in reviewing the project. The following list identifies the primary regulatory permits anticipated to rely on the CEQA document:

- Central Valley Water Board – in 2018, renewal of the City's NPDES permit at a permitted effluent discharge of 7.5 MGD ADWF.
- SWRCB/Division of Financial Assistance – State Revolving Fund (SRF) Loan Program application and CEQA-plus approval.
- Bay Area Air Quality Management District (BAAQMD) - permit to construct/operate.
- California Department of Fish and Wildlife (CDFW) – consultation under the California Endangered Species Act (as necessary).
- National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) – consultation under the federal Endangered Species Act (as necessary).
- U.S. Fish and Wildlife Service (USFWS) – consultation under the federal Endangered Species Act (as necessary).
- East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP) – review and participation fee agreement (as necessary).

2.5 PROPOSED PROJECT FACILITIES AND CONSTRUCTION ACTIVITIES

The existing WWTP was constructed and became operational in March 2002, and was designed intentionally for future modular expansions of the treatment unit processes as the City's wastewater inflows increased with the City's buildout and population growth. The City has conducted planning and engineering evaluation studies of the current WWTP facilities in preparing for the proposed expansion including a detailed WWTP expansion study performed in 2007 (Eco:Logic Engineering 2007), and four technical memorandums produced in 2015 to further identify processes to be considered as part of this design. Based on these studies, the City intends to construct new treatment unit processes consisting of an oxidation ditch or rectangular reactor, secondary clarifier, solids handling (i.e., belt filter presses or centrifuges), and media filters that would be constructed with the same basic physical layout, hydraulic, treatment design, and operational performance characteristics as the corresponding processes of the existing WWTP to ensure that the new facilities are appropriately integrated and compatible with the current system. Additionally, the City would consult with the WWTP engineering firm selected to design the new WWTP facilities to consider new, or modified, designs for solids drying and effluent disinfection compared to the existing facilities. Finally, several features of the existing WWTP facilities do not need expansion including the influent headworks and grit removal system, denitrification basins, chemical addition systems, cascade aeration and effluent outfall structure to Marsh Creek, recycled water pumping station, and the operations and laboratory buildings.

The City recently completed the CEQA environmental review process for the Recycled Water Project (City of Brentwood 2015), and the City Council approved the project and certified the CEQA document in June 9, 2015. The Recycled Water Project involves construction of a new recycled water pipeline, two recycled storage tanks, and increased pumping station capacity to facilitate a substantial increase in the amount of recycled water use. The Recycled Water Project will support an estimated total 1,946 AFY of recycled water demand for landscape irrigation uses in the City and at the Roddy Ranch Golf Course. Design and construction of one of the two recycled water storage tanks at the WWTP is currently in progress.

The following sections describe the new treatment unit processes needed to increase the wastewater treatment capacity from 5.0 MGD to 7.5 MGD, the construction activities, and long-term operations for the facilities. The CEQA environmental review process is being conducted in advance of the City's completion of the final planning and design of the WWTP expansion facilities. Therefore, the description of proposed construction and operations are approximate to reasonably reflect the anticipated activities and assumptions for those new and modified treatment unit processes described above that have yet to be designed, and may differ from the current WWTP system. If final designs for the facility options (e.g., solids dryer and disposal options, disinfection process) result in construction- or operations-related effects that differ materially or substantially from the assumptions of this Initial Study, the City would review the changes and consider the need for supplemental environmental review for CEQA compliance. Supplemental CEQA review may be necessary if substantial changes to the Proposed Project occur, for example if the project would result in new or substantially more severe significant environmental effects than evaluated herein.

2.5.1 Proposed Treatment Unit Processes

The following section describes the new treatment unit processes that would undergo modular expansion and be similar to the corresponding unit processes of the existing WWTP, as described above. The site plan of the existing treatment unit processes, layout of other facilities located on the site near the WWTP, and the Marsh Creek corridor and effluent outfall location are shown in **Figure 2**. The new treatment unit processes to be constructed for the Phase II capacity expansion are shown in **Figure 3**. Also shown is the approximate location of the 3.0 million gallon (MG) recycled water storage tank that is currently being designed for that site and which is part of the Recycled Water Project. Construction of this 3.0 MG storage tank is anticipated to occur prior to the beginning of or concurrent with construction for the Proposed Project. The footprint of the new Phase II facilities is anticipated to occupy approximately 4 acres (including landscaping) within existing cleared earthen areas that were reserved for the future facilities expansion when the existing facilities were constructed.

Oxidation Ditch or Rectangular Reactor System. A new oxidation ditch/rectangular activated sludge reactor would be constructed north of and adjacent to the two existing parallel oxidation ditches. The process involves aeration and anoxic zones for biological nutrient removal. The existing oxidation ditches are aerated and mixed using two 150 horsepower (HP) mixers/aerators. The City intends to have the WWTP design engineer determine whether it is cost-effective to continue using the mechanical aerators, or switch to a more energy efficient method of submerged diffused aeration. The rectangular reactor will have submerged diffused aeration and additional anoxic zones.

Secondary Clarifier. A new circular secondary clarifier including waste sludge and scum pumps would be constructed adjacent to the existing clarifiers, and is anticipated to be similar in design and operating characteristics as the two existing clarifiers.

Media Filters. The WWTP uses deep bed sand filters for filtration of wastewater. A new media filter unit would be constructed and integrated with the existing media filters, which is anticipated to have similar design and operating characteristics as the existing filter units.

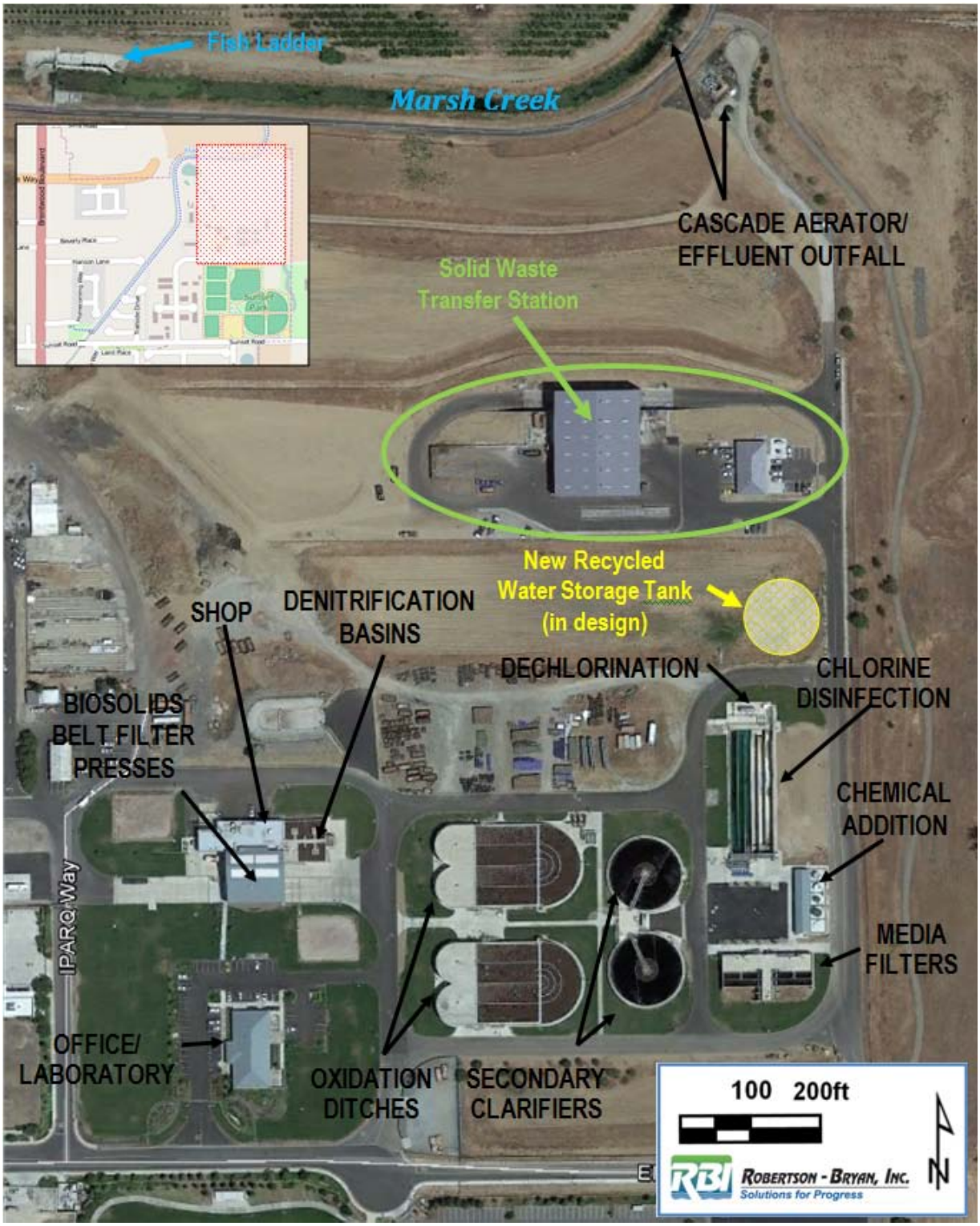

Figure 2. Existing Brentwood WWTP Facilities.

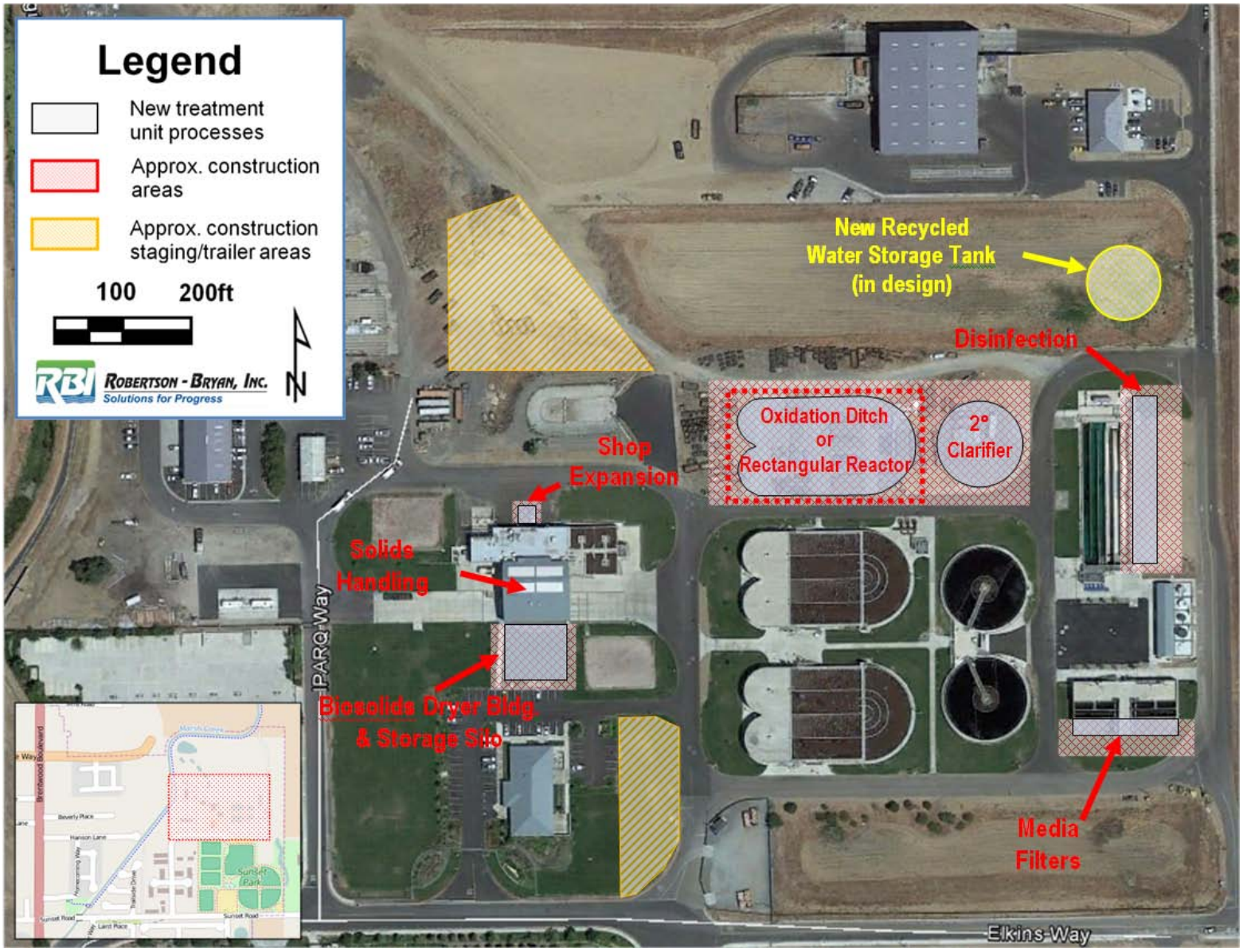

Figure 3. Proposed New Treatment Unit Processes for the Brentwood WWTP Phase II Capacity Expansion.

Wastewater Disinfection – Expansion and Process Option. The WWTP currently uses chlorine contact basins for effluent disinfection, followed by dechlorination of the effluent discharged to Marsh Creek. The chlorination process is causing challenges to meeting the NPDES permit effluent limitations for dibromochloromethane (DBCM) (a specific trihalomethane compound [THM]). For the Proposed Project, the capacity of the disinfection system would be increased to accommodate the increased wastewater flows.

- Process Option - The City intends to have the WWTP design engineer evaluate modification options for the disinfection process to reduce or eliminate the THM production. The existing chlorine system operations may be modified or an air stripping system may be added, or conversion to a different disinfection processes would be evaluated consisting of ultra violet (UV) light, ozone, free chlorine, or chloramination. The City has conducted initial evaluations of chloramination; however, a final determination has not yet been made.

Solids Handling. A new solids belt filter press would be installed, which is anticipated to have similar design and operating characteristics as the two existing belt presses. Alternatively, the existing belt filter presses would be replaced in-kind with centrifuges and a new centrifuge would be installed. The centrifuges would facilitate improved liquid removal before sending solids to the dryer.

Solids Dryer Option. The City currently produces dewatered biosolids that are hauled to a landfill for disposal. During design, the City intends to evaluate the feasibility of installing a new solids dryer system as a means of producing Class A biosolids, and thus facilitate additional uses or disposal methods for the biosolids. The location of a new biosolids dryer building (approximately 8,500 square feet) that would be constructed is shown on Figure 3. A storage silo will be constructed as part of the biosolids dryer building. Natural gas would be used for the solids dryer unit. New uses or disposal options for the Class A biosolids is expected to be land application on nearby farming operations for soil amendment.

Shop Addition. A small room addition to add shop facilities (approximately 900 square feet), also may added to the north side of the existing headworks/shop building.

2.5.2 Construction Methods

Construction for the Proposed Project is anticipated to begin no earlier than 2017, pending approval of funds from the SRF Loan Program. The specific construction methods and activity occurring over the course of the project, including number of construction personnel, vehicle round trips per day and effects on local roadways, and the specific onsite equipment operations required to construct the facilities would vary. Construction activities would include site preparation (e.g., excavation, grading, and clearing), installation of underground features (e.g., trenching/backfilling), concrete work for foundations/structures, equipment installation, paving and landscaping, and miscellaneous activities and cleanup. The sections below identify the City's assumptions and construction details that are relevant for conducting the review and assessment of environmental effects of construction and operations for the Proposed Project.

Traffic Control

Construction is not anticipated to require temporary street closures and/or traffic detours. However, if necessary, traffic control would be provided in accordance with the latest edition of *Caltrans' Manual of Uniform Traffic Control Devices*.

Construction Schedule and Phasing

The Proposed Project schedule anticipates construction occurring no earlier than 2017, and requiring approximately 24 months to complete.

Construction Equipment and Use

Table 2 lists the types of equipment that may be used during construction on an as-needed basis. An anticipated peak day of construction activity for the Proposed Project would likely occur in association with a day where heavy earthmoving occurs in combination with equipment-intensive activities such as concrete placement, and would involve use of 3 to 4 pieces of equipment and 10 to 15 delivery trips of concrete over a 10-hour day. The anticipated peak daily construction workforce for the Proposed Project is approximately 30 workers and the average number of workers for the duration of construction would be approximately 15 workers. Construction would generally be performed between 7 a.m. and 6 p.m., Monday through Friday.

Table 2. Typical Construction Equipment and Associated Construction Activity.

Construction Equipment	Construction Activity
Air compressor	All construction activities
Asphalt delivery dump truck	Paving
Asphalt roller machine	Paving
Asphalt spreading machine	Paving
Compressor/generator	All construction activities
Concrete truck	Facility construction
Crane truck	Facility construction
Delivery and dump trucks	All construction activities
Dozer	Initial site development
Excavator (rubber-tired or track-propelled)	Initial site development
Forklift	All construction activities
Fuel/oil service truck	All construction activities
Generator	All construction activities
Pickup truck	All construction activities
Power hand tools	All construction activities
Rubber tired backhoe/backhoe	All construction activities
Sheepsfoot roller	All construction activities
Small compactor	All construction activities

Construction Equipment	Construction Activity
Water truck	All construction activities
Welder, trailer or truck mounted	All construction activities

2.6 PROPOSED PROJECT OPERATIONS

The treatment unit processes constructed to expand the WWTP capacity would be operated in an essentially similar manner to the existing facilities. The City anticipates operations of the new facilities to begin by about 2019/20. Currently, the facility is operated by thirteen full-time employees. The City estimates that three additional full-time employees would be needed to operate the expanded WWTP facilities.

With the increased treatment capacity to 7.5 MGD, the amount of solids collected and processed would increase. If the City continues production of dewatered biosolids (either with belt filter presses or centrifuges), the current offsite hauling of dewatered biosolids to the Vasco Road Landfill of approximately 370 trips per year would increase to approximately 550 truck trips per year (i.e., additional 180 trips per year). If the City decides to construct and operate the optional solids dryer, the resulting production of Class A biosolids would reduce the weight, bulk, and number of offsite hauling trips required to approximately 110 trips per year (i.e., 260 fewer trips than existing conditions and 440 fewer trips than for continued dewatered biosolids production). Hauling of Class A biosolids for soil amendment at farms that are licensed for Class A biosolids land application would result in a similar number of hauling trips as described for disposal at the Vasco Road Landfill given that the hauling distance to several of the licensed land applicators in Solano County is similar (i.e., approximately 20 miles).

The WWTP would continue to discharge effluent to Marsh Creek, and distribute recycled water to meet seasonal landscape irrigation demands. While construction of additional recycled water facilities are not included as part of the Phase II expansion at this time, the City assumes that the future recycled water demands of the Phase B2 and B3 customers along with three future potential golf courses (i.e., additional 1847 AFY) identified in the Feasibility Study Update will occur. Accordingly, for the purposes of evaluating effects of WWTP operations, this IS/MND assumes that the Recycled Water Project is fully implemented to meet the Phase A2 and B1 demands, and considers distribution of recycled water to meet the additional 1877 AFY of demand. As identified in the Recycled Water Project, recycled water operations would be conducted according to the City's Master Reclamation Permit (or Notice of Applicability under the RW General Order), California Water Code (CWC) provisions (§§13500-13530), policies and procedures of the Regional Water Quality Control Plan (Basin Plan), and Title 22 of the California Code of Regulations (CCR), Division 4, Chapter 3 (§60301 et seq.) for the protection of human health and receiving water beneficial uses. The Title 22 tertiary recycled water produced at the WWTP is suitable for "full unrestricted" reuse activities (e.g., irrigation of food and fodder crops, landscape irrigation, fire hydrants, street sweeping, dust control, carwash facilities, fountains, evaporative cooling or power plant cooling facilities, etc.).

Figure 4 depicts the monthly average effluent discharge flows and recycled water demands for two timeframes, as follows:

- **Existing Conditions:** Reflects monthly average effluent discharge in 2014 (Note: timeframe is prior to construction of the Recycled Water Project, thus existing recycled water deliveries are minimal).

- **Projected 2017 Planning Timeframe:** Reflects effluent discharge and recycled water demands evaluated for the Recycled Water Project (i.e., with Phase A2 and B1 customer irrigation demands) at the timeframe when construction of the recycled water system will be completed and operational. Irrigation demands exceed, or nearly exceed, the recycled water available in the months of May through August resulting in reduced effluent discharge to Marsh Creek compared to existing conditions. A substantial surplus of recycled water/effluent exists in the other months of the year with less irrigation demands.

Figure 5 depicts the monthly average effluent discharge and total recycled water demands for the assumed future timeframe conditions with the Phase II WWTP expansion to 7.5 MGD ADWF. The future timeframe for buildout where City wastewater inflows would reach the for the Phase II WWTP treatment capacity of 7.5 MGD is uncertain.

For the purposes of this Initial Study, the City assumes seasonal effluent discharge and recycled water demands would reflect the existing customers, the Phase A2 and Phase B1 customers associated with the Recycled Water Project, and the future potential Phase B2/B3 and golf course customers identified in the Feasibility Study Update. Recycled water availability would generally meet or exceed recycled water demands in all months except July, resulting in a corresponding increase in effluent discharge to Marsh Creek compared to the future anticipated conditions with implementation of the Recycled Water Project. Additionally, during the non-irrigation fall and winter months, the effluent discharge to Marsh Creek would increase compared to the existing conditions and future Recycled Water Project timeframe conditions.

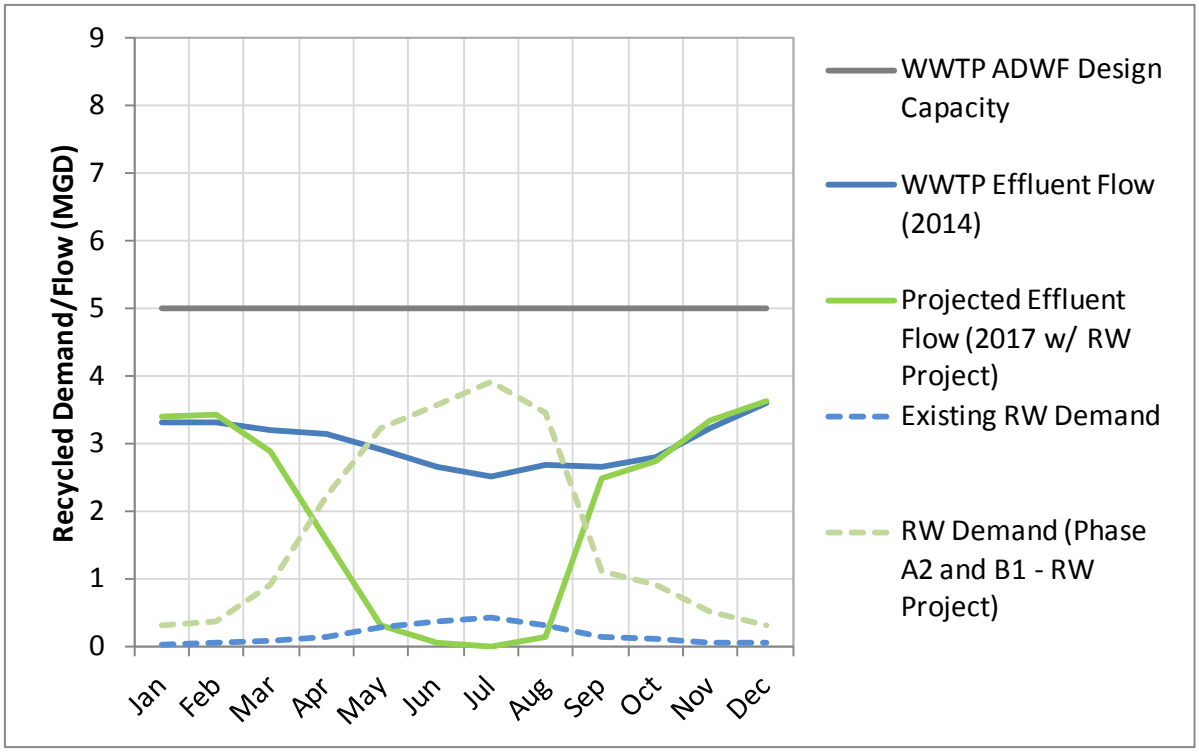

Figure 4. Effluent Flow and Recycled Water Demands – Existing Conditions and Recycled Water Project.

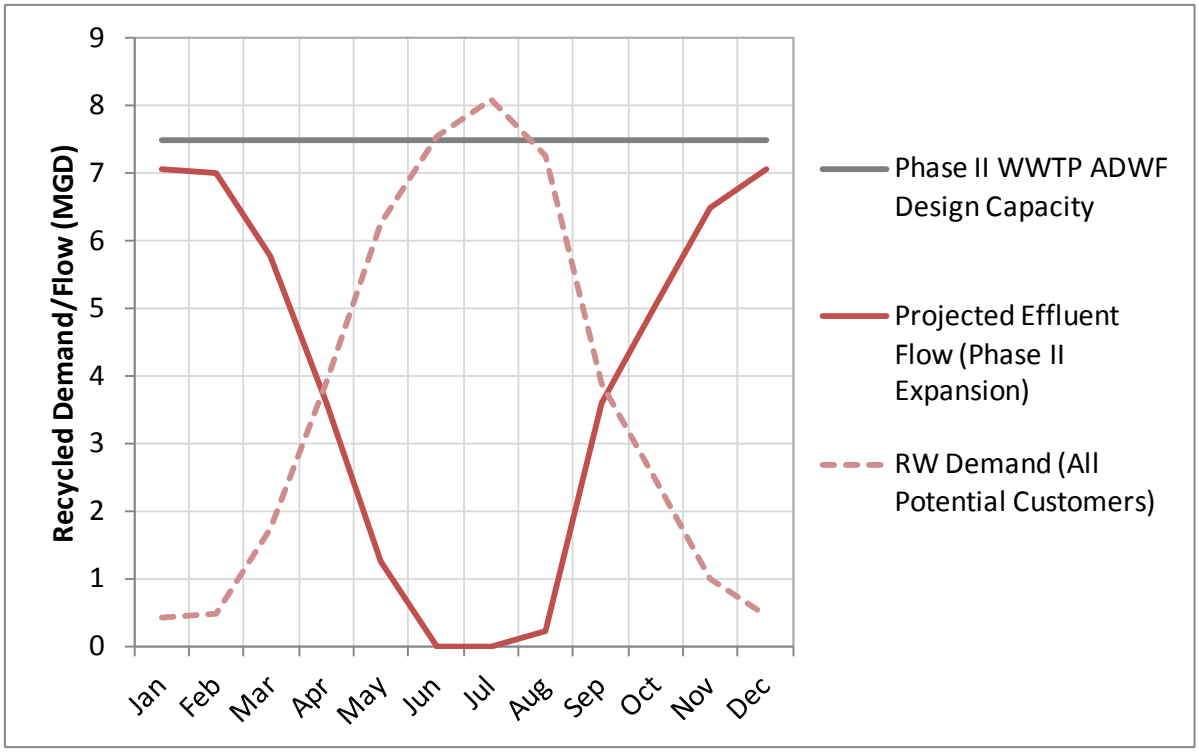

Figure 5. Effluent Flow and Recycled Water Demands – Proposed Project.

Figure 6 shows the existing background monthly average streamflow in Marsh Creek measured upstream of the WWTP (i.e., RSW-001 monitoring location), existing streamflow downstream of the WWTP (i.e., RSW-002 monitoring location), and projected future streamflow at the future planning timeframes of 2017 with implementation of the Recycled Water Project, and finally with the future Phase II expanded treatment capacity and additional future potential recycled water demands. During the irrigation period, the seasonal Marsh Creek streamflow conditions under the Proposed Project will generally be similar to the anticipated conditions that will occur with the Recycled Water Project, which is a reduction in streamflow downstream of the WWTP compared to existing conditions during the months of May through August. During the months of low irrigation water demands, the Proposed Project would result in increased average Marsh Creek streamflow downstream of the WWTP during the period of October through March (with similar streamflow in April and September), compared to existing conditions.

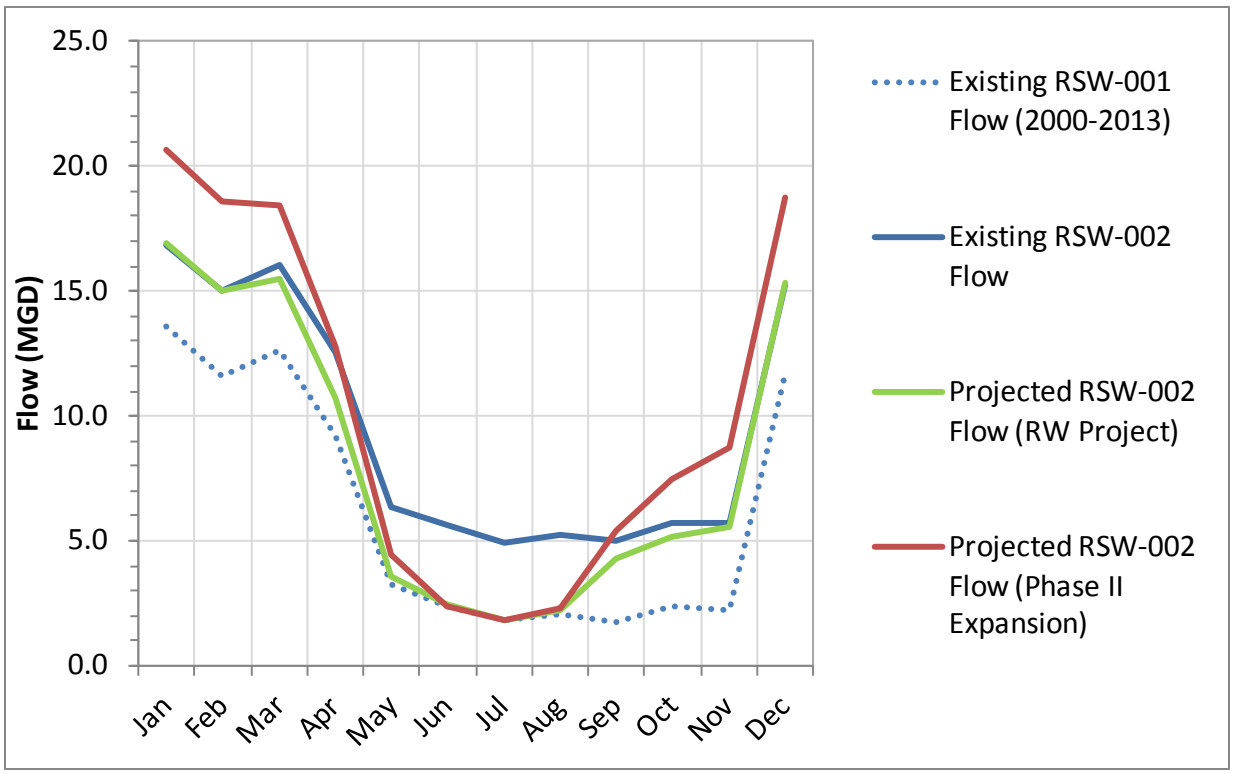

Figure 6. Monthly Average Marsh Creek Streamflow.

3 ENVIRONMENTAL CHECKLIST

PROJECT INFORMATION		
1.	Project Title:	City of Brentwood WWTP Phase II Expansion Project
2.	Lead Agency Name and Address:	City of Brentwood (Contra Costa County)
3.	Contact Person and Phone Number:	Mr. Jagtar Dhaliwal
4.	Project Location:	City of Brentwood
5.	Project Sponsor's Name and Address:	n/a
6.	General Plan Designation:	Variable (residential, public facility)
7.	Zoning:	Variable planned development zones, public facility
8.	Description of Project: (Describe the whole action involved, including but not limited to later phases of the project, and any secondary, support, or off-site features necessary for its implementation. Attach additional sheets if necessary.)	
	See Chapter 2, Project Description	
9.	Surrounding Land Uses and Setting: (Briefly describe the project's surroundings)	See Chapter 2, Project Description
10:	Other public agencies whose approval is required: (e.g., permits, financing approval, or participation agreement)	None

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forest Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural Resources	☒ Geology / Soils
☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials	☒ Hydrology / Water Quality
☐ Land Use / Planning	☐ Mineral Resources	☐ Noise
☐ Population / Housing	☐ Public Services	☐ Recreation
☐ Transportation / Traffic	☐ Utilities / Service Systems	☒ Mandatory Findings of Significance

3.1 AESTHETICS

	Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☑
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☑
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☑	☐
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☑	☐

3.1.1 Setting

The City's General Plan identifies State Route 4, Camino Diablo Rd. (Rd.), Marsh Creek Rd., Walnut Rd. (Blvd.), Deer Valley Rd., Lone Tree Way, and the SR4 Bypass as scenic routes; however, there are no officially designated State Scenic Highways in the City (City of Brentwood 2014a). Mount Diablo and the Diablo Range are visually prominent scenic vistas in the view westward from the Brentwood area.

The Conservation and Open Space (COS) element of the General Plan addresses the protection of visual resources in Goal COS 7, as follows: *Protect hillsides and ridgelines from visual impacts and erosion.* Policy COS 7-3 addresses protection of "prominent community views of scenic resources, including Mount Diablo, local hills and ridgelines, and open space areas surrounding Brentwood".

3.1.2 Discussion

a) The Proposed Project involves the construction of new municipal wastewater treatment unit processes within the boundaries of the existing WWTP that would have similar dimensions and layout as the existing facilities. The proposed facilities would be visible from the Marsh Creek trail, but would not be visible from any designated scenic routes, and would not adversely affect any community views of Mount Diablo or the ridgelines from scenic routes or public spaces. Therefore, there would be **no impact**.

b) There are no designated scenic highways in the Brentwood area, and no rock outcroppings or historic buildings or structures would be affected by the Proposed Project. Therefore, there would be **no impact**.

c) Both natural and artificial landscape features contribute to perceived visual images and the scenic attractiveness of a landscape. Scenic attractiveness is influenced by vegetation pattern, water characteristics, landforms, recreational features, and rural and urban features. Individuals respond differently to changes in the physical environment based on their

experiences of the environment prior to changes, the extent and nature of those changes, and the proximity and duration of their views. The aesthetic value of an area is therefore a subjective measure of the visual character and scenic quality.

Construction activities would involve temporary visual disturbances at the WWTP that would be visible from the Marsh Creek trail. There is only limited visibility of the proposed construction sites from nearby public roads (i.e., Elkins Way, Sellers Ave.) adjacent to the WWTP. Final engineering and design of the Proposed Project has not occurred; however, the modular expansion of the treatment facilities would have similar form, dimensions, and layout as the existing facilities. The new facilities would affect a small area of the WWTP site (i.e., about 4 acres) and no trees would be removed for construction of new facilities. Consequently, the Proposed Project would not appreciably change the visual character of the project area because the design of new facilities would be similar to the existing facilities, and facilities would not substantially change or block any views in the area from public spaces. Therefore, the impact would be **less than significant.**

d) The proposed treatment unit processes may include a minimal amount of additional security lighting. However, the new facilities would not be expected to appreciably change any existing glare or lighting conditions because the visibility of the site from residential areas and public spaces and roadways is limited. Therefore, the impact would be **less than significant**.

3.2 AGRICULTURE AND FOREST RESOURCES

	Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a)	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☑
b)	Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☑
c)	Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)) or timberland (as defined in Public Resources Code section 4526)?	☐	☐	☐	☑
d)	Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☑
e)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use??	☐	☐	☐	☑

3.2.1 Setting

The construction areas for the Proposed Project facilities within the boundaries of the WWTP site are characterized as existing disturbed areas with either turf or paved surfaces. No agricultural lands or forests are located at the WWTP where the Proposed Project would be constructed.

3.2.2 Discussion

a-e) No aspect of construction or operations of the Proposed Project would adversely affect, or directly or indirectly cause or contribute to conversion of agricultural or forestry resources to other land uses. Therefore, there would be **no impact**.

3.3 AIR QUALITY

	Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☑	☐
b)	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☑	☐
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☑	☐
d)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☑	☐
e)	Create objectionable odors affecting a substantial number of people?	☐	☐	☑	☐

3.3.1 Setting

The project site is located in Contra Costa County, California, which is within the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB also includes all of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara Counties; the western portion of Solano County and the southern portion of Sonoma County. The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by the sources of air pollutants and the atmosphere's ability to transport and dilute such emissions. Natural factors that affect transport and dilution include terrain, wind, atmospheric stability, and sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources.

The city of Brentwood is located in the eastern portion of Contra Costa County. The area is generally well ventilated by winds flowing through the Carquinez Straits and Delta. Terrain does not restrict ventilation, but temperatures are quite warm which promotes the formation of ozone (County of Contra Costa 2005: 8-51).

Of the many pollutants, ozone and particulate matter (i.e., respirable [PM_{10}] and fine [$PM_{2.5}$]) are of primary concern within the County, as well as for much of the rest of the State. Contra Costa County is considered by the State, under the terms of the California Clean Air Act (CCAA), to be "non-attainment" for ozone and both PM_{10} and $PM_{2.5}$, and to be either "attainment" or unclassified for other pollutants (California Air Resources Board [ARB] 2014). Additionally, under the terms of the National Ambient Air Quality Standards (NAAQS), the County is categorized as "marginal non-attainment" for the 8-hour ozone standard, "other non-attainment" for the 1-hour ozone standard, "moderate non-attainment" for the $PM_{2.5}$ standard, and "attainment" for the PM10 standard (U.S. Environmental Protection Agency [USEPA] 2015). **Table 3** summarizes the air quality data for the three most recent calendar years for which data is available.

Table 3. Summary of Annual Data on Ambient Air Quality (2012-2014)[1].

Air Contaminant	2012	2013	2014
Ozone			
Maximum concentration (1-hr/8-hr avg, ppm)	0.098/ 0.088	0.082/ 0.076	0.092/ 0.071
Number of days state standard exceeded (1-hr/8-hr)	1/4	0/1	0/1
Number of days national standard exceeded (1-hr/8-hr)	0/2	0/0	0/0
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration (24-hour µg/m^3)	32.2	36.2	30.6
Number of days national standard exceeded (24-hour measured[2])	0	1	0
Respirable Particulate Matter (PM_{10})			
Maximum concentration (24-hour µg/m^3)	52.3	50.7	61.3
Number of days state standard exceeded (measured/calculated[2])	1/6.1	1/*	1/*
Number of days national standard exceeded (measured/calculated[2])	0/0.0	0/*	0/*

Notes:

1 Measurements from the Bethel Island Rd. Monitoring Station for ozone and respirable particulate matter (PM_{10}). Measurements of fine particulate matter ($PM_{2.5}$) obtained from the Concord-2975 Treat Blvd air monitoring station.

2 Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every six days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

µg/m3 = micrograms per cubic meter
ppm = parts per million
* = There was insufficient data to determine the value.
Source: ARB 2016

Criteria air pollutant concentrations are measured at several monitoring stations in the Bay Area Air Quality Management District (BAAQMD). The Bethel Island Rd. station is the closest station to the project site, located approximately three miles northeast of the city limits, and reports air quality data for ozone and PM_{10}. The next nearest station that reports $PM_{2.5}$ data is the Concord-2975 Treat Blvd station, located about 16 miles west of the city. In general, the ambient air quality measurements from these stations are representative of the air quality near the project site.

Although naturally occurring asbestos occurs throughout the State, occurrences within Contra Costa County are located in central and western areas of the County and are not located within Brentwood city limits. Thus, naturally occurring asbestos is unlikely to be found within the project area (Van Gosen and Clinkenbeard 2011).

There are several sensitive receptors within 2,000 feet of the WWTP with the closest sensitive receptor located as close as 120 feet from the proposed construction staging area at the southern end of the WWTP. Just south of the WWTP across Elkins Way is the 38-acre Sunset Park Athletic Complex. The Black Diamond Kid Center, an existing day-care facility, is located approximately 1,625 feet southwest of the southern staging area. Additionally, concentrations of single family homes and other residences are located west of the WWTP, as close as 950 feet from project fence line to residential fence line.

Regulatory Framework

Air quality within the project area is regulated by such agencies as USEPA and ARB at the federal and state levels, respectively, and locally by the BAAQMD. BAAQMD attains and maintains air quality conditions in the SFBAAB through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. BAAQMD's clean air strategy includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. BAAQMD also inspects stationary sources of air pollution and responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the federal Clean Air Act (CAA), the federal Clean Air Act Amendments of 1990 (CAAA), and the CCAA.

Federal

At the federal level, USEPA implements the national air quality programs. USEPA's air quality mandates are drawn primarily from the CAA, enacted in 1970. The most recent major amendments were made by Congress in 1990. The CAA requires USEPA to establish National Ambient Air Quality Standards (NAAQS). USEPA has established primary and secondary NAAQS for criteria air pollutants consisting of ozone, carbon monoxide (CO), oxides of nitrogen (NO_X), oxides of sulfur (SO_X), PM_{10}, $PM_{2.5}$, and lead (ARB 2015a). The primary standards protect public health and the secondary standards protect public welfare. The CAA also requires each state to prepare an air quality control plan referred to as a State

Implementation Plan (SIP). The federal CAAA added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is modified periodically to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. USEPA reviews all state SIPs to determine whether they conform to the mandates of the CAA and its amendments and whether implementing them will achieve air quality goals. If USEPA determines a SIP to be inadequate, a Federal Implementation Plan that imposes additional control measures may be prepared for the nonattainment area. If the state fails to submit an approvable SIP or to implement the plan within the mandated time frame, sanctions may be applied to transportation funding and stationary air pollution sources in the air basins.

Federal General Conformity

Some project-related construction activity would occur in the SFBAAB Federal Ozone and $PM_{2.5}$ Nonattainment Areas, which includes Contra Costa County under the jurisdiction of the BAAQMD. As mentioned above, the SFBAAB is classified as "marginal non-attainment" for the 8-hour ozone standard, "other non-attainment" for the 1-hour ozone standard, "moderate non-attainment" for the $PM_{2.5}$ standard under the NAAQS (USEPA 2015). Section 176(c)(4) of the Clean Air Act prohibits federal entities from taking actions in nonattainment or maintenance areas if those actions do not conform to the applicable SIP for the attainment and maintenance of NAAQS. The project area is in attainment or unclassified with respect to the NAAQS for all other CAPs.

General conformity is the federal regulatory process for preventing major federal actions or projects from interfering with air quality planning goals. Conformity provisions ensure that federal funding and approval are given only to those activities and projects that are consistent with air quality SIPs. Conformity with the SIP means that major federal actions will not cause new air quality violations, worsen existing violations, or delay timely attainment of the NAAQS.

The process for making this determination for non-transportation projects is referred to as a general conformity rule, or general conformity analysis, and is subject to USEPA's General Conformity Regulations (40 CFR 93, Subpart B). The general conformity regulations incorporate a stepwise process, beginning with an applicability analysis. Before any approval is given for a federal action to go forward, the regulating federal agency must apply the applicability requirements found at 40 CFR Section 93.153(b) to the federal action to evaluate whether, on a pollutant-by-pollutant basis, a determination of general conformity is required. The applicability analysis examines whether the net increase in direct and indirect emissions resulting from a federal action would equal or exceed certain de minimis emission levels.

Because ozone is a secondary pollutant, the applicability analysis is based on primary emission of its precursors, reactive organic gases (ROG) and NO_X. If the net emissions levels for either ROG or NO_X exceed the de minimis levels for ozone, then the federal action is subject to a general conformity evaluation for ozone. De minimis emissions levels depend on the severity of non-attainment and type of pollutant. De minimis levels applicable to the SFBAAB non-

attainment ratings for ozone precursors and $PM_{2.5}$ are presented in the list of significance thresholds below.

State

For state air quality planning purposes, the SFBAAB, including Contra Costa County, is classified as a marginal non-attainment area for the 8-hour ozone standard. Under the CCAA, areas not in compliance with the state standards must submit plans to reduce emissions and achieve attainment. The Bay Area Clean Air Plan (CAP), updated approximately every three years, reflects the progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data. The latest CAP is the Bay Area 2010 Clean Air Plan. BAAQMD is currently working on updates to the 2016 Clean Air Plan/Regional Climate Protection Strategy (BAAQMD 2016). BAAQMD's plan is prepared with the cooperation of the Metropolitan Transportation Commission (MTC), and the Association of Bay Area Governments (ABAG). The CAP serves to:

- update past strategies in accordance with the requirements of the CCAA to implement "all feasible measures" to reduce ozone;
- consider the impacts of ozone control measures on particulate matter, toxic air contaminants (TACs), and greenhouse gases (GHGs) in a single, integrated plan;
- review progress in improving air quality in recent years; and
- establish emission control measures to be adopted or implemented in the near future timeframe.

Bay Area Air Quality Management District

All projects are subject to BAAQMD's rules and regulations in effect at the time of construction. Specific rules applicable to the construction activities under the alternatives being considered may include, but are not limited to:

- Regulation 2, Rule 1, General Permit Requirements. Includes criteria for issuance or denial of permits, exemptions, appeals against decisions of the Air Pollution Control Officer (APCO) and BAAQMD actions on applications.
- Regulation 2, Rule 2, New Source Review. Applies to new or modified sources. Rule 2 contains requirements for Best Available Control Technology and emission offsets. Rule 2 implements federal New Source Review and Prevention of Significant Deterioration requirements.
- Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants. Applies preconstruction permit review to new and modified sources of toxic air contaminants; contains project health risk limits and requirements for Toxics Best Available Control Technology.

- Regulation 2, Rule 6, Major Facility Review. Establishes procedures for large facilities to obtain Title V permits. This includes stationary facilities that burn fossil fuels such as natural gas for usable heat.
- Regulation 6, Rule 1, General Requirements. Limits the quantity of particulate matter in the atmosphere by controlling emission rates, concentration, visible emissions and opacity.
- Regulation 7, Odorous Substances. Establishes general limitation on odorous substances and specific emission limitation on certain odorous compounds.
- Regulation 8, Rule 3, Architectural Coatings. Limits the quantity of volatile organic compounds in architectural coatings supplied, sold, offered for sale, applied, solicited for application, or manufactured for use within BAAQMD.
- Regulation 10, Standards of Performance for New Stationary Sources. Establishes emission and/or performance standards for new plants and other sources. The rules are incorporated by reference to the provisions of Part 60, Chapter 1, Title 40, of the Code of Federal Regulations.

Brentwood General Plan

The Conservation and Open Space (COS) element of the City of Brentwood's General Plan (General Plan) (adopted in July 2014) contains goals, policies, and actions that pertain to CAP emissions, TACs, and odors include (City of Brentwood 2014a). Key policies and actions that are applicable to the project include the following:

- Goal COS 8: Reduce air pollutants and greenhouse gas (GHG) emissions.
    - Policy COS 8-2: Minimize exposure of sensitive receptors to concentrations of air pollutant emissions and toxic air contaminants.
    - Policy COS 8-5: Continue to require all construction projects and ground disturbing activities to implement BAAQMD dust control and abatement measures.
    - Action COS 8a: Review all new industrial and commercial development projects for potential air quality impacts to residences and other sensitive receptors. The City shall ensure that mitigation measures and best management practices are implemented to reduce significant emissions of criteria pollutants.
    - Action COS 8b: Review development, infrastructure, and planning projects for consistency with BAAQMD requirements during the CEQA review process. Require project applicants to prepare air quality analyses to address BAAQMD and General Plan requirements, which include analysis and identification of:
        1. Air pollutant emissions associated with the project during construction, project operation, and cumulative conditions;
        2. Potential exposure of sensitive receptors to toxic air contaminants;

3. Significant air quality impacts associated with the project for construction, project operation, and cumulative conditions; and

4. Mitigation measures to reduce significant impacts to less than significant or the maximum extent feasible where impacts cannot be mitigated to less than significant.

- Action COS 8d: Work with Contra Costa County and the Bay Area Air Quality Management District to implement programs aimed at improving regional air quality.
- Action COS 8e: Adequate buffers between new industrial uses and sensitive receptors shall be required to avoid potential air quality and nuisance impacts.

Methods

The Proposed Project would result in the construction and operation of a modular expansion of the wastewater treatment components including a new oxidation ditch/rectangular reactor, secondary clarifier, solids handling (belt filter presses or centrifuges), and filter, and include the optional installation of a solids dryer and conversion of the chlorine disinfection system to UV light disinfection (or other disinfection improvements such as free chlorine). Construction and operational emissions were calculated using a combination of model and off-model methods along with the assumptions dictated in the project description. Emissions from wastewater treatment plant expansion construction were estimated with the CalEEMod (Version 2013.2.2) computer program, recommended by BAAQMD (BAAQMD 2011).

In accordance with BAAQMD-recommended methodologies, emissions generated by the project are modeled and presented on a pound-per-day and a tons-per-year basis with respect to the metrics in the selected thresholds of significance. Assumptions and data used for the model inputs were based on information Section 2 ("Project Description") and details described in **Appendix A**.

Short-Term Construction

Construction-related emissions are described as "short term" or temporary in duration but have the potential to represent a significant impact with respect to air quality. Construction-related activities would result in emissions of criteria air pollutants (e.g., PM_{10} and $PM_{2.5}$) and precursors (e.g., ROG and NO_X). Emissions of NO_X would be primarily associated with off-road (e.g., gas and diesel) construction equipment exhaust; secondary sources would include on-road trucks for import and export of materials and worker vehicles for commuting. Worker commute trips in gasoline-fueled vehicles, off-gassing from asphalt application, and application of architectural coatings would be the principal sources of ROG, with additional ROG coming from off- and on-road construction equipment.

Emissions of fugitive PM or dust (PM_{10} and $PM_{2.5}$) are associated primarily with ground-disturbance activities during site preparation, trenching, and grading, and may vary as a function of such parameters as soil silt content, soil moisture, wind speed, acreage of disturbance area, and VMT onsite and offsite. Exhaust emissions from diesel equipment and worker commute

trips also contribute to short-term increases in PM_{10} and $PM_{2.5}$ emissions, but to a much lesser extent.

Construction activities would consist of grading, excavation, pipeline installation, building construction, paving, and architectural coating. For a conservative estimate, it was assumed that individual off-road equipment piece would operate three hours per day, unless the CalEEMod default for the particular equipment type indicated a default operating time of less than three hours assuming default load factors. Construction is also assumed to occur five days per week. As shown stated in the project description, construction would occur over 24 months starting in June 2017. Specific construction equipment assumptions were provided by Robertson-Bryan, Inc. (pers. comm.); and additional details regarding the model inputs and assumptions can be found in Appendix A.

Long-Term Operations

Operations-related emissions were evaluated for the following project scenarios to estimate the range of minimum to maximum effects that may occur from the optional facilities and operations that may be implemented, as described in the Project Description (Section 2.5.1):

> **"Proposed with Same Processes":** Modular expansion of the current treatment unit processes with the same or similar processes to provide 7.5 MGD wastewater treatment capacity. Disinfection with free chlorine or chloramination, solids handling using centrifuges and rectangular reactor are considered similar processes.
>
> **"Proposed with Solids Dryer":** Modular expansion of the current treatment unit processes to provide 7.5 MGD wastewater treatment capacity plus the additional solids dryer that uses natural gas as the fuel source.
>
> **"Proposed with Dryer and Ultraviolet (UV) Disinfection":** Modular expansion of the current treatment unit processes to provide 7.5 MGD wastewater treatment capacity plus the additional solids dryer and conversion of the existing chlorine disinfection process to ultraviolent (UV) light disinfection.

Criteria pollutant emissions would result from process VOC emissions of aerobic wastewater treatment, vehicle exhaust emissions (i.e., employee commute, deliveries, and hauling of biosolids), and combustion of natural gas in the optional solids drying process. The expansion also would result in additional hauling trips to transport biosolids to a nearby landfill, or to land application sites. Estimated additional annual natural gas usage, hauling and delivery trips, and number of employees for the existing conditions and Proposed Project conditions were provided by Robertson-Bryan, Inc. (pers. comm.); and additional details regarding the model inputs and assumptions can be found in Appendix A.

Criteria pollutants from wastewater treatment processes were calculated from ARB's stationary source facility emissions database for the current wastewater treatment plant (ARB 2015b). Modeled process emissions from the WWTP under the existing conditions were scaled upward linearly according to the current dry weather inflow of 3.7 MGD to estimate future emissions at

the current WWTP capacity of 5 MGD and for the Proposed Project capacity of 7.5 MGD. Vehicle exhaust emissions were calculated using mileage-based emission factors from ARB's EMFAC 2014 database for the 2019 calendar year, the first year of operation, for Contra Costa County, using EMFAC 2011 vehicle categories. Employee trips were assumed to be a weighted-average of light-duty auto (LDA) and light duty truck (LDT1 and LDT2) vehicle types in the County; deliveries were assumed to be made by medium heavy duty trucks (MHDT); and biosolids hauling trips were assumed to be made by heavy-heavy duty trucks (HHDT). Trip lengths were assumed to be 12, 15, and 21 miles for employee, delivery, and biosolids hauling trips, respectively. The driving distance between the Brentwood WWTP and the Vasco Road Landfill, where the WWTP currently sends biosolids, is approximately 21 miles. The proposed option to transport Class A biosolids to the nearest permitted biosolids land application facilities in Contra Costa County is assumed to result in similar hauling distances.

CEQA Thresholds of Significance

BAAQMD adopted thresholds of significance for the purposes of CEQA assessments in June 2010 that are currently undergoing legal review, as summarized below. The thresholds were designed to establish the level at which BAAQMD determined air pollution emissions, including GHGs, would cause significant environmental impacts under CEQA and were included in BAAQMD's May 2010 Draft CEQA Guidelines.

On March 5, 2012, the Alameda County Superior Court issued a judgment finding that BAAQMD had failed to comply with CEQA when it adopted the thresholds. However, on August 13, 2013, the Court of Appeals reversed the trial court's decision. The Court of Appeal's decision was appealed to the California Supreme Court, which granted limited review with respect to whether or not CEQA requires analysis of the impact of the environment on the project. On December 17, 2015, the California Supreme Court held that "agencies subject to CEQA generally are not required to analyze the impact of existing environmental conditions on a project's future users or residents. But when a proposed project risks exacerbating those environmental hazards or conditions that already exist, an agency must analyze the potential impact of such hazards on future residents or users." The Supreme Court remanded the case to the Court of Appeal for reconsideration in light of its holding. As such, the previous Court of Appeals ruling that the BAAQMD did not need to conduct CEQA review for the adoption of significance thresholds still stands.

As recommended in BAAQMD's Draft CEQA Guidelines dated May 2010, the following thresholds of significance will be used to determine if an impact on air quality would be significant. The project would result in a significant air quality impact if it would:

- cause daily short-term construction-generated criteria air pollutant or precursor emissions to exceed average emissions of 54 pound per day (lb/day)for ROG, 54 lb/day for NO_X, 82 lb/day of PM_{10} exhaust, or 54 lb/day of $PM_{2.5}$ exhaust, or substantially contribute to emissions concentrations (e.g., PM_{10}) that exceed the NAAQS or CAAQS;

- cause daily long-term regional (i.e., operational) criteria air pollutant or precursor emissions to exceed average emissions of 54 lb/day for ROG and 54 lb/day for NO_X, 82 lb/day of PM_{10} exhaust, or 54 lb/day of $PM_{2.5}$ exhaust, or substantially contribute to emissions concentrations (e.g., PM_{10}) that exceed the NAAQS or CAAQS;

- not comply with BAAQMD's Best Management Practices for dust emissions (e.g., PM_{10} and $PM_{2.5}$);

- result in long-term operational local mobile-source CO emissions that would violate or contribute substantially to concentrations that exceed the California 1-hour ambient air-quality standard of 20 ppm or the 8-hour standard of 9 ppm;

- generate TAC emissions that would expose sensitive receptors to an incremental increase in cancer risk that exceeds 10 in one million and/or a hazard index of 1 for receptors within 1,000 feet;

- locate sensitive receptors where they would be exposed to a combined level of cancer risk from nearby sources of TACs that exceeds 100 in one million and/or a combined hazard index of 10;

- create objectionable odors affecting a substantial number of people (e.g., five confirmed complaints per year averaged over three years); or

- result in cumulative annual emissions that would exceed the federal de minimis levels of 50 tons of ROG per year, 100 tons of NO_X per year, or 100 tons of PM2.5 per year (USEPA 2016).

- For informational purposes only, the Proposed Project is compared against the "Permitted Future" scenario which represents the existing WWTP capacity of 5 MGD and existing treatment unit processes. Consistent with the state CEQA Guidelines, the significance of operational air quality impacts was determined by comparing the changes in emissions between the Proposed Project and existing conditions with respect to the applicable significance thresholds.

3.3.2 Discussion

a) The emission inventories used to develop a region's air quality attainment plans are based primarily on projected population growth and vehicle miles traveled (VMT) for the region, which are based, in part, on the planned growth identified in regional and community plans. Therefore, projects that would result in increases in population or employment growth beyond that projected in regional or community plans could result in increases in VMT above that planned in the attainment plan, further resulting in mobile source emissions that could conflict with a region's air quality planning efforts. Increases in VMT beyond that projected in area plans generally would be considered to have a significant adverse incremental effect on the region's ability to attain or maintain state and federal ambient air quality standards.

The proposed project would not result in increases in population or employment beyond those projected in the buildout of the General Plan. Instead, the project is part of the utility needs identified in the General Plan to accommodate planned growth in the city (City of Brentwood 2014a). The WWTP Phase II expansion would increase the WWTP capacity to 7.5 MGD (from the current 5 MGD). The project would not result in any regional population growth beyond what is planned in the General Plan. Thus, implementation of the Proposed Project would not conflict with or obstruct implementation of any air quality planning efforts. As a result, this impact would be **less-than-significant**.

b) The Proposed Project would result in emissions of criteria air pollutants and precursors, including ROG, NO_X, PM_{10}, and $PM_{2.5}$ associated with construction (short-term), and under operation (long term). A description of the methods and assumptions used in estimating emissions are described under "Methods". Input parameters were based on project-specific information, default model settings, and reasonably conservative assumptions. Emissions from short-term construction and long-term operations are described separately below.

Short-Term Construction-Related Regional Criteria Air Pollutant and Precursor Emissions

Table 4 summarizes the modeled construction-related emissions of criteria air pollutants and ozone precursors for the Proposed Project. The significance of construction-related air quality impacts was determined by comparing these modeling results with applicable significance thresholds. It is assumed that the construction activity modeled is reasonably representative of the maximum activity to construct all of the proposed and optional treatment unit processes comprising the Proposed Project. Refer to Appendix A for detailed modeling input parameters and results.

Based on the modeling conducted, construction of the proposed project would result in maximum daily emissions of approximately 4.7 lb/day of ROG, 46.2 lb/day of NOX, 2.2 lb/day of PM10 and 2.0 lb/day of PM2.5 starting in 2017. The estimated emissions levels would not exceed the thresholds of significance or the federal de minimis levels in regards to General Conformity Rule applicability (e.g., project would not conflict with implementation of the CAA). The Proposed Project also would apply all feasible dust control measures recommended by BAAQMD to reduce fugitive dust generated during construction. Consequently, the project would not result in short-term construction-related emissions that violate any air quality standard or contribute substantially to an existing or projected air quality violation. Therefore, this impact is considered **less than significant**.

Table 4. Summary of Modeled Maximum Daily Emissions of Criteria Air Pollutants and Precursors Associated with Project Construction Activities for a 24-Month Construction Period[1].

Construction Year	ROG (lb/day)	NO_X (lb/day)	PM_{10} (exhaust) (lb/day)	$PM_{2.5}$ (exhaust) (lb/day)
2017[2]	4.7	46.2	2.2	2.0
2018	4.6	43.6	2.1	2.0
2019	2.0	17.7	0.8	0.8
BAAQMD Thresholds of Significance	54	54	82	54
Exceeds Thresholds?	No	No	No	No

Notes:
1 Modeled using CalEEMod 2013.2.2.
2 Construction is assumed to begin in June 2017.

BAAQMD = Bay Area Air Quality Management District
lb/day = pounds per day
NO_X = oxides of nitrogen
PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less
$PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less
ROG = reactive organic gases

Modeled values represent average daily emissions that would occur over the duration of the construction period.
See Appendix A for detail on model inputs, assumptions, and project specific modeling parameters.
Source: BAAQMD 2010, Modeling conducted by Ascent Environmental in 2016

Long-Term Operational-Related Regional Criteria Air Pollutant and Precursor Emissions

Operation of the Proposed Project would result in emissions from additional use of gasoline- and diesel-fueled vehicles, additional electrical energy use, off-gassing from the modular expansion of wastewater treatment unit processes, and emissions from optional facilities and operations (e.g., natural gas use for optional solids dryer). **Table 5** summarizes the modeled emissions of criteria air pollutants and ozone precursors that would occur during operations under the following three scenarios of optional facilities that were evaluated to estimate the range of minimum to maximum emissions that may occur from the optional facilities and operations that may be implemented, as described in the "Methods" section above.

Based on the modeling conducted, operation of the Proposed Project would result in maximum daily emissions of approximately 1.1 lb/day of ROG, 6.6 lb/day of NO_X, 0.6 lb/day of PM_{10} and 0.6 lb/day of $PM_{2.5}$ starting in 2020 when the new facilities become operational. These maximum emissions would occur with either scenario of the optional installation of the solids dryer process, or installation of the solids dryer and conversion to UV light disinfection. The maximum emissions estimates anticipated under long-term operation of any combination of facilities that may be implemented for the Proposed Project would result in no exceedance of selected thresholds or the federal de minimis levels in regards to General Conformity Rule applicability (e.g., project would not conflict with implementation of the CAA). The Proposed Project would not result in long-term

operational emissions that violate any air quality standard or contribute substantially to an existing or projected air quality violation. Therefore, this impact is considered **less than significant**.

Table 5. Summary of Modeled Average Daily Emissions of Criteria Air Pollutants and Precursors Associated with Project Operation by Alternative1.

WWTP Expansion Option	ROG (lb/day)	NO_X (lb/day)	PM_{10} (exhaust) (lb/day)	$PM_{2.5}$ (exhaust) (lb/day)
Permitted Future[2]	0.1	0.2	0.0	0.0
Proposed Project with Same Processes	0.4	0.6	0.1	0.1
Proposed with Solids Dryer	1.1	6.6	0.6	0.6
Proposed with Solids Dryer and UV Disinfection	1.1	6.6	0.6	0.6
BAAQMD Thresholds of Significance	54	54	82	54
Exceeds Thresholds?	No	No	No	No

Notes:
1 Full capacity operation is assumed to begin in 2020.
2 Shown for comparison purposes only.

BAAQMD = Bay Area Air Quality Management District
lb/day = pounds per day
NO_X = oxides of nitrogen
PM_{10} = respirable particulate matter with an aerodynamic diameter of 10 micrometers or less
$PM_{2.5}$ = respirable particulate matter with an aerodynamic diameter of 2.5 micrometers or less
ROG = reactive organic gases
UV = ultraviolet
WWTP = wastewater treatment plant

Modeled values represent average daily emissions that would occur over the duration of the construction period.
See Appendix A for detail on model inputs, assumptions, and project specific modeling parameters.
Source: BAAQMD 2010, Modeling conducted by Ascent Environmental in 2016

c) The Contra Costa County portion of the SFBAAB is currently designated as a nonattainment area for the federal and State ambient air quality standards for ozone and $PM_{2.5}$ and for the State standards for PM_{10}. Past, present, and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts.

In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions.

As discussed in the analysis under item b) above, project-generated emissions would not exceed applicable BAAQMD thresholds or the federal de minimis levels and; therefore, would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under the CAAQS or NAAQS. As a result, project-generated emissions of criteria air pollutants and precursors would not be cumulatively considerable. Therefore, this impact would be **less than significant**.

Note that the construction of the city's previously approved Recycled Water Project may not be completed by the time construction of the WWTP Phase II Expansion begins pending acquisition of financing or other circumstances. The overlap in construction schedules may result in an overlap in daily emissions. However this overlap would not be cumulatively significant because each project's estimated maximum daily construction emissions were determined to be below thresholds. BAAQMD developed the project-level criteria pollutant thresholds in consideration of their cumulative impacts such that an exceedance of a project-level threshold would be considered cumulatively significant. Similarly, meeting project-level thresholds, regardless of overlaps, would not be considered cumulatively significant.

d) The nearest sensitive receptors to the WWTP include an outdoor athletic facility located approximately 120 feet south of the WWTP and a child day-care center approximately 1,625 feet southwest of the facility. Residences are located west of the WWTP, but are no closer than 950 feet to the WWTP and over 1,000 feet from the closest staging or construction area. Construction and operation of the Proposed Project would result in short-term and long-term emissions that could affect nearby sensitive receptors. These potential impacts are discussed below.

Short-Term Construction

Construction-related activities would result in temporary, short-term project-generated emissions of diesel PM from the exhaust of off-road, heavy-duty diesel equipment for site preparation (e.g., excavating); underground work; equipment installation; and other miscellaneous activities. Particulate exhaust emissions from diesel-fueled engines (i.e., diesel PM) was identified as a TAC by the ARB in 1998. The potential cancer risk from the inhalation of diesel PM, as discussed below, outweighs the potential for all other health impacts (ARB 2003), so diesel PM is the focus of this discussion. Based on the emission modeling conducted and presented in Appendix A, maximum daily emissions of PM2.5, considered a surrogate for diesel PM, would not exceed 2.2 lb /day at either the storage tank or pipeline construction locations and; therefore, would be less than BAAQMD's threshold of 54 lb/day.

Additionally, the dose to which receptors are exposed is the primary factor used to determine health risk (i.e., potential exposure to TAC emission levels that exceed applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for any exposed receptor. Thus, the risks estimated for an exposed individual are higher if a

fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA), health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 30-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the proposed project (OEHHA 2012:11-3). Consequently, it is important to consider that the use of off-road heavy-duty diesel equipment would be limited to the construction period, which would be at most 24 months. Also, studies show that diesel PM is highly dispersive (e.g., decrease of 70% at 500 feet from the source) (Zhu et al. 2002).

Although nearby residences and day-care facilities are located over 1,000 feet from on-site construction activities, receptors located at the Sunset Park Athletic Complex would be within 200 feet of construction activity at the WWTP. However; considering the highly dispersive properties of diesel PM, the relatively low mass of diesel PM emissions that would be generated during project construction, and the relatively short duration of construction activities; construction-related TAC emissions would not expose sensitive receptors to an incremental increase in cancer risk that exceeds 10 in one million or a hazard index greater than 1.0.

As a result, the Proposed Project would not exceed BAAQMD thresholds for risks and hazards to receptors associated with new emissions sources. Additionally, the Proposed Project would not exceed applicable thresholds with respect to short term construction emissions, as discussed under b). Thus, the Proposed Project would not expose sensitive receptors to substantial pollutant concentrations during construction. Therefore, the Proposed Project would not expose sensitive receptors to substantial pollutant concentrations during construction. This impact would be **less than significant**.

Long-Term Operations

The WWTP is a permitted stationary source under BAAQMD's jurisdiction. Under existing conditions, the current WWTP facility operations generate approximately 167 lb per year of TACs, 91 percent of which consist of gaseous ammonia (NH_3) (ARB 2015b). BAAQMD's estimates that, as of 2012, TAC emissions from the Brentwood WWTP is associated with a cancer risk of 6.409 in a million and a non-cancer hazard index of 0.015 in a million at the fence line of the WWTP (Kirk, pers. comm., 2015). Assuming that increased plant emissions are proportional to the increased wastewater treated, the Proposed Project would increase cancer risks by 6.93 in a million and hazard index by 0.016 in a million at the fenceline. Therefore, the long-term operations of the Proposed Project facilities would not expose sensitive receptors to an incremental increase in cancer risk that exceeds 10 in one million or a hazard index greater than 1.0.

As a result, the Proposed Project would not exceed applicable thresholds for risks and hazards to receptors associated with new emissions sources. Thus, the Proposed Project would not expose sensitive receptors to substantial pollutant concentrations during operation. This impact would be **less than significant**.

e) The occurrence and severity of odor impacts depend on numerous factors, including the nature, frequency, and intensity of the source; wind speed and direction; and the presence of sensitive receptors. Although offensive odors rarely cause physical harm, they may still be very unpleasant, leading to considerable distress and often generating citizen complaints to local governments and regulatory agencies.

Temporary construction activities for the Proposed Project would result in odors from exhaust emissions from onsite diesel equipment, asphalt paving, and painting. Such emissions would be intermittent in nature and would dissipate rapidly with increasing distance from the source.

Due to the existing WWTP operations, construction and operation of the Proposed Project facilities would not place receptors substantially closer to existing sources of odors nor introduce new types of odors, but would add new permanent odor-generating facilities. The current WWTP has not received any odor complaints within the past three years. The proposed facility could generate odors during solids drying, but these odors would be managed through existing biofilters, with a chemical odor removal system that accompanies the solids drying, or a combination of both. Thus, the level of odors currently being perceived in the vicinity of the WWTP would likely remain the same as existing conditions. Therefore, implementation of the Proposed Project would not expose the nearby existing receptors to objectionable odors.

Implementation of the Proposed Project would not involve the construction or operation of any major odor sources. Thus, the proposed project would not be anticipated to result in the exposure of sensitive receptors to objectionable odors. As a result, this impact would be **less than significant.**

3.4 BIOLOGICAL RESOURCES

Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☑	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☑	☐

c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☑	☐
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☑	☐
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☑
f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☑

3.4.1 Setting

The project area that may be affected by either construction or operations of the Proposed Project includes the WWTP site, areas of additional recycled water customers, and the Marsh Creek corridor extending to Big Break in the Sacramento River-San Joaquin River Delta (Delta). The project area is in eastern Contra Costa County with diverse land uses including urban city areas, undeveloped lands, unincorporated agricultural lands along the Marsh Creek corridor north of the city, and sparsely populated foothill areas of the Diablo Mountain Range west of the city. Land elevations range from approximately 0 to 100 feet above mean sea level.

Methods

Special-status plant species are defined as any species that is granted status by a federal, state, or local agency. Federally listed species are defined as those species granted status by the U.S. Fish and Wildlife Service (USFWS) under the federal Endangered Species Act (ESA) and include threatened (FT), endangered (FE), proposed threatened or endangered (FPT, FPE), candidate (FC), or listed species proposed for delisting (FPD). California listed plant species are granted status by the California Department of Fish and Wildlife (CDFW) under the California Endangered Species Act (CESA), and include rare (SR), threatened (ST) or endangered (SE) species. Under CEQA, special-status plants also include rare, threatened, or endangered species identified by the California Native Plant Society (CNPS 2014 - Lists 1B and 2).

A special-status fish or wildlife species is any species granted status by the USFWS, National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service (NOAA Fisheries), or CDFW. Federally listed species are those granted status as FT, FE, FPT, FPE, FC, or FPD. Also included are USFWS-designated Birds of Conservation Concern (BCC) which include "species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under ESA of 1973" (USFWS 2008). California listed fish and wildlife species include those granted status as ST, SE, California Fully Protected species (CFP), and California Species of Special Concern (CSC).

Existing Conditions for Terrestrial Vegetation and Wildlife

A literature review and database searches were completed to determine the potential for presence of special-status plant and wildlife species or their habitat in the project area. Sensitive natural communities, as defined by CDFW, include areas of high ecological importance due to being considered rare within the region, likely to support sensitive plants or animals, or provide connectivity between other sensitive habitats, and include wetlands and riparian areas within the project area. Existing documents pertinent to biological resources in the vicinity of the Proposed Project were reviewed and analyzed, as applicable, including the following sources:

- CDFW's California Natural Diversity Database (CNDDB) (CDFW 2014);
- USFWS Species List (USFWS 2014);
- CNPS Electronic Inventory of Rare and Endangered Plants of California (CNPS 2014);
- United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (NRCS 2014); and
- East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECCCHCP) (Jones and Stokes 2006).

Reconnaissance surveys of undisturbed portions of the WWTP site were conducted on November 5, 2014, April 2, 2015, and July 9, 2015 for presence of habitat and occurrence of species in the vicinity of areas to be affected by construction activities. Vegetation communities were assessed in the field based on observed plant species composition. Vegetation communities were classified based on *A Manual of California Vegetation* (Sawyer et al. 2011) and cross-referenced with wildlife habitat types as classified in California Statewide Wildlife Habitat Relationships System (Mayer and Laudenslayer 1988). Wetland delineation field surveys were not conducted based on the lack of mapped wetland resources, and lack of any indicators of seasonal wetland features at the areas where construction activities would occur. **Figure 7** shows a map of the locations of known special-status plant populations and wildlife occurrences in the project area based on the database records.

The results of the reconnaissance surveys and literature review also are summarized in **Appendix C**, as follows:

- Table C-1 (Project Site Descriptions)
- Table C-2 (Vegetation Communities/Wildlife Habitats)
- Table C-3 (Special-Status Plants)
- Table C-4 (Special-Status Wildlife).

The assessment of potential effects of the Proposed Project is conducted for those species identified in Appendix C as having the potential to occur in the project area and be affected by one or more aspects of the project construction activities or operations.

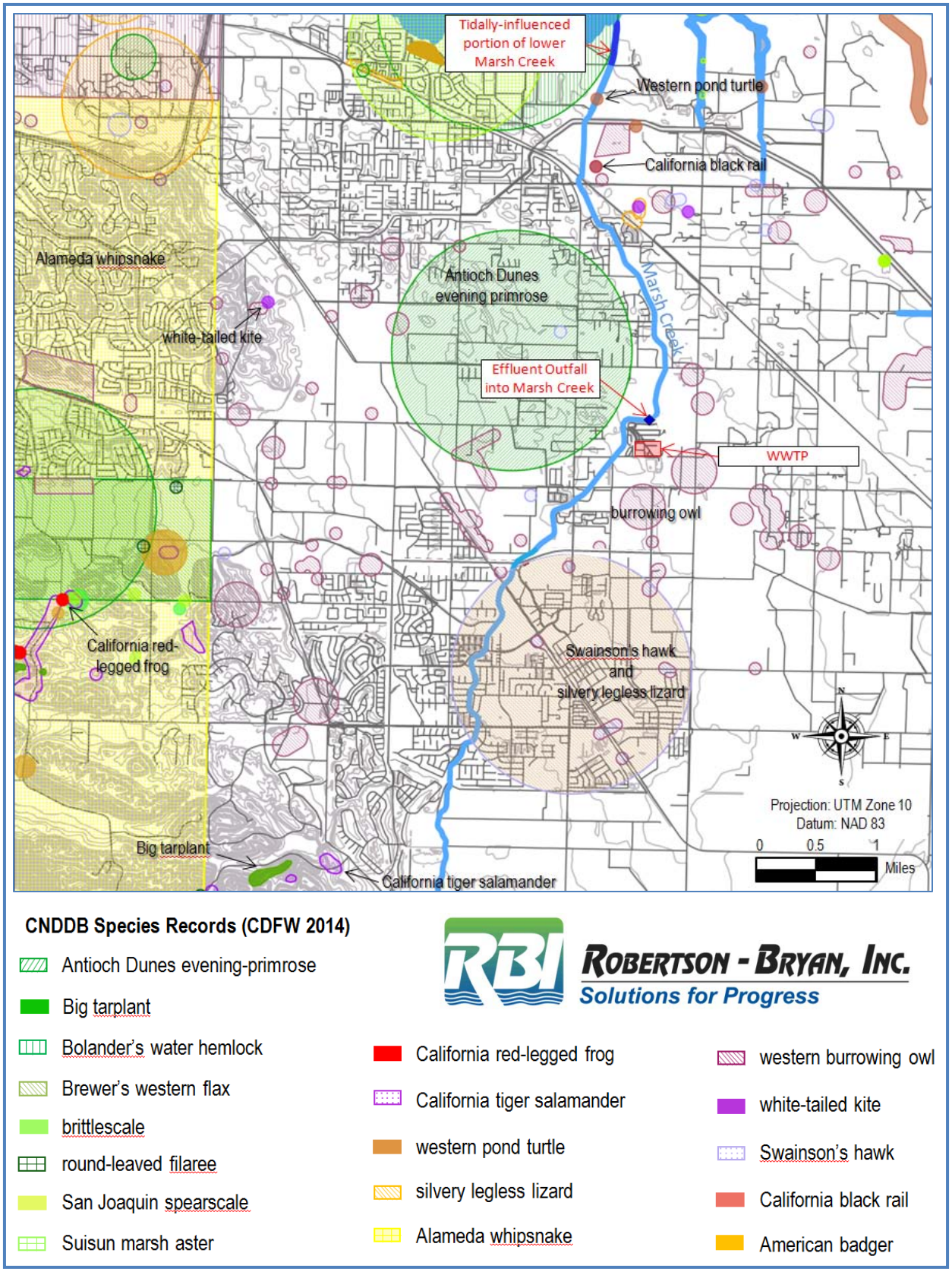

Figure 7. Special-Status Plant and Wildlife Records in the Project Area.

Existing Conditions for Fisheries Resources

Affected Area

Cain et al. (2003) described Marsh Creek as having three distinct zones, based on elevation: (1) the upper zone from the headwaters at approximately 2,000 ft above mean sea level (msl) to approximately 1,000 ft msl, (2) the intermediate zone from 1,000 ft msl to Marsh Creek Reservoir which is an impoundment created by Marsh Creek Dam at river mile (RM) 10; and (3) the lower zone, which includes the 10-mile reach extending from Marsh Creek Dam downstream to Marsh Creek's terminus at Big Break in the Delta. The WWTP discharges treated effluent to the lower zone of Marsh Creek at approximately RM 3.5 (i.e., 3.5 miles upstream of Big Break). As such, changes in effluent discharge rates under the Proposed Project would directly affect flows and aquatic habitat within the lower zone of Marsh Creek downstream of the Brentwood WWTP outfall. Based on the de minimis contribution of Marsh Creek flows to Big Break, the relatively small seasonal decrease in effluent discharges under the Proposed Project would not have any measurable effects on aquatic habitat in Big Break or the Delta; therefore biological resources of these water bodies are not discussed in detail.

Because the Proposed Project would have seasonal effects on flows in the lower 3.5 miles of Marsh Creek, it could indirectly affect fish access to the eight-mile reach of the lower zone that lies upstream of the WWTP outfall (i.e., between the outfall and Marsh Creek Dam). Marsh Creek Dam, which was constructed in 1963 and forms a complete barrier to fish migration, prevents fish from accessing the intermediate and upper zones upstream of the dam. Consequently, the Proposed Project would have no effect on aquatic life or aquatic habitats in the intermediate or upper zones of Marsh Creek. In summary, the Proposed Project could have direct seasonal effects on aquatic habitat in the 3.5-mile reach between the WWTP outfall and Big Break, and could indirectly affect the ability of migratory fish to access aquatic habitats upstream of the WWTP outfall.

The lower zone of Marsh Creek is characterized as a heavily altered corridor that is generally channelized and straightened within the city limits, and contained by levees downstream of the city, for flood control purposes. Levine and Stewart (2004) examined substrate composition, water depth and velocity, channel morphology, and overhead cover in the lower zone and concluded that a 1.2-mile reach immediately downstream of Marsh Creek Dam provided "satisfactory habitat" for spawning and rearing of fall-run Chinook salmon (*Oncorhynchus tshawytscha*). Access to this habitat by anadromous salmonids was historically prevented, except under flood conditions, by a 6-foot-high grade control (drop) structure that was built in the 1960s approximately 1,000 ft upstream of the WWTP outfall. In 2010, the Natural Heritage Institute, American Rivers, Friends of the Marsh Creek Watershed, Contra Costa County Flood Control and Water Conservation District (CCCFCWCD), and a consortium of local and State agencies constructed a fish ladder (see Figure 2) at the drop structure to facilitate passage of fish to habitats upstream of the grade control structure under wet-weather flow conditions.

Instream channel habitat in the approximate 2.5-mile reach extending from the fish ladder to Cypress Rd. (RM 1) contains engineered rock weirs approximately every 200 ft with pool or

glide habitats between each rock weir. Instream channel in the lowest one-mile reach downstream of Cypress Rd. consists primarily of shallow runs with infrequent shallow pools. Aquatic habitat quantity (i.e., depth and width) in the vicinity of Big Break is influenced by tidal cycles, particularly in the 2,000-ft reach extending from the footbridge over Marsh Creek to the terminus at Big Break. The stream channel throughout the lower 3.5-mile reach of Marsh Creek (as well as upstream to about RM 6.5) is largely devoid of overhead and instream cover as most large vegetation has been removed to facilitate water conveyance (Jones & Stokes 2006). Streambed substrate is comprised primarily of fine sediments (i.e., sand, clay, and silt) with localized accumulations of riprap. Streambanks are dominated by grasses and localized areas that are reinforced by riprap (e.g., road crossings, return drains). Bulrushes (*Scirpus spp*.), marsh primrose (*Ludwigia spp.*), and the invasive Brazilian waterweed (*Egeria densa*) are the most common type of emergent vegetation. Under base flow conditions, water depths in the reach downstream of the WWTP outfall range from approximately 1 to 4 feet.

Fish Community

Lower Marsh Creek supports a number of California native and introduced fish species downstream of Marsh Creek Dam shown in **Table 6** (Cain et al. 2003; Leidy 2007). Resident fish species occurring year-round in lower Marsh Creek include native and introduced warmwater fish species, including minnows in the Family Cyprinidae (California roach, common carp, hitch, and Sacramento pikeminnow), introduced Centrarchidae (bluegill, green sunfish, and largemouth bass), native threespine stickleback, introduced western mosquitofish, and native Sacramento suckers.

Special-status Fish

Adult and juvenile Central Valley Evolutionarily Significant Unit (ESU) fall-run Chinook salmon (*Oncorhynchus tshawytscha*), a federal Species of Concern and California Species of Special Concern, have been observed regularly in lower Marsh Creek downstream of the grade control structure near the Brentwood WWTP during the fall and winter months in recent years. Adult fall-run Chinook salmon have also been observed during the fall spawning period in the lower zone of Marsh Creek upstream of the grade control structure since construction of the fish ladder in 2010. Juvenile Chinook salmon have been collected in lower Marsh Creek (i.e., downstream of the grade control structure) on at least two separate occasions prior to construction of the fish ladder. In 1995, five juvenile Chinook salmon measuring between 60 and 80 millimeters (mm) were collected by Dr. Darrell Slotton of University of California, Davis, during fish collection efforts implemented under the Marsh Creek Watershed Mercury Assessment Project (Cain et al. 2003).

Table 6. Fish Species Occurring in Marsh Creek Downstream of the Marsh Creek Dam.

Common Name	Scientific Name	Native / Introduced [1]	Endangered Species Act Status [2]	
			Federal	State
Central Valley Fall-run Chinook salmon	*Oncorhynchus tshawytscha*	Native	SC	SSC
California roach	*Hesperoleucus symmetricus*	Native	--	--
Common carp	*Cyprinus carpio*	Introduced	--	--
Hitch	*Lavinia exilicauda*	Native	--	--
Sacramento pikeminnow	*Ptychocheilus grandis*	Native	--	--
Bluegill	*Lepomis macrochirus*	Introduced	--	--
Green sunfish	*Lepomis cyanellus*	Introduced	--	--
Largemouth bass	*Micropterus salmoides*	Introduced	--	--
Threespine stickleback	*Gasterosteus aculeatus*	Native	--	--
Western mosquitofish	*Gambusia affinis*	Introduced	--	--
Sacramento sucker	*Catostomus occidentalis*	Native	--	--

[1] Indicates whether the species is native or introduced into California water bodies.
[2] SC: Species of Concern (federal); SSC: Species of Special Concern (State); "--": no special-status designation.

In March 2002, 13 juvenile Chinook salmon measuring between 40 and 60 mm were collected in lower Marsh Creek during seining efforts conducted by CDFW biologists (Jones & Stokes 2003). Based on their life history, adult fall-run Chinook salmon have the potential to occur in lower Marsh Creek from October through December. Should adult spawning successfully occur in suitable habitats upstream of the fish ladder, post-emergent fry may be carried downstream to Big Break under high winter (i.e., December-March) flow events and smolts may move downstream to Big Break beginning in January until late March or April when Marsh Creek temperatures begin to approach their thermal tolerance.

Although there are no documented observations of Sacramento splittail (*Pogonichthys macrolepidotus*) or delta smelt (*Hypomesus transpacificus*) in Marsh Creek, these fish species may occur seasonally in the tidal waters of the Delta at Big Break. Consequently, there is a potential for these special-status fish species to make seasonal opportunistic use of the lower, tidally influenced reach (i.e., the lower one-mile) of Marsh Creek in some years (RBI 2010).

Sacramento splittail, a California Species of Special Concern, is a small minnow that was previously listed as threatened under the federal ESA, but was removed from the list of endangered and threatened species by the USFWS on September 22, 2003. On October 7, 2010, the USFWS published a 12-month finding (50 CFR Part 17), which concluded that the best available information indicated that there is no evidence of decline in abundance of Sacramento splittail and that there were no threats to Sacramento splittail sufficient for warranting listing under the ESA. The range of this species includes open water of the Delta, Suisun Bay, Suisun Marsh, lower Napa River, lower Petaluma River, and other areas of the San Francisco Estuary (Moyle 2002), except during their spawning period. Sacramento splittail spawn in the spring

months, primarily in March and April, on floodplain habitats (USFWS 2010). Although Sacramento splittail may occur seasonally in Big Break, there are no records of this species occurring in Marsh Creek. Because there are no floodplain spawning habitats in lower Marsh Creek, Sacramento splittail are not expected to spawn in Marsh Creek. However, they may make opportunistic use (e.g., for feeding, thermal refugia) of the tidally influenced reach of Marsh Creek within one mile of Big Break.

Delta smelt are listed as threatened under the ESA and endangered under the CESA. Like Sacramento splittail, this species occurs throughout waters of the Delta and Suisun Bay and may occur seasonally in Big Break and thus may make opportunistic use of the tidally influenced reach of Marsh Creek within one mile of Big Break. However, there are no documented occurrences of delta smelt in Marsh Creek, which lacks suitable habitat for delta smelt spawning or rearing of early life stages. Delta smelt spawn in shallow channels and sloughs of the Delta primarily in March and April, but may occur as late as June where conditions (e.g., water temperature, salinity) are suitable.

Central Valley steelhead (*Oncorhynchus mykiss*), the anadromous form of rainbow trout and a threatened species under the federal ESA, occur seasonally in the lower San Joaquin River during their seasonal immigration and emigration period, but have not been documented in Marsh Creek (Leidy et al. 2005; RBI 2010). In an assessment of the historical and current distribution of steelhead in Contra Costa County, Leidy et al. (2005) concluded that the Marsh Creek Dam blocked passage of steelhead to potentially suitable spawning and over-summer rearing habitats in the headwaters of Marsh Creek. Furthermore, these authors concluded that there was no evidence indicating the historical presence of steelhead in the upper reaches of Marsh Creek. Lower Marsh Creek lacks the perennial coldwater pool habitats required by rearing juvenile steelhead (DWR 2003; Cain et al. 2003; RBI 2010). Consequently, the Proposed Project would not have any adverse effects on Central Valley steelhead.

Finally, based on the compiled USFWS species list and review of other available information, other special-status species may occur in the Sacramento River-San Joaquin River Delta (Delta) but are not addressed further in this Initial Study based on the following rationale. Federal special-status species that occur in the Delta include green sturgeon (*Acipenser medirostris*, threatened), tidewater goby (*Eucyclogobius newberryi*, endangered), Central Valley spring-run Chinook salmon (*O. tshawytscha*, threatened), and winter-run Chinook salmon (*O. tshawytscha*, endangered). However, as described below, while the Marsh Creek channel flows into the Delta at Big Break, none of these species are expected to be affected by the Proposed Project based on the available biological survey information for Marsh Creek, and the known habitat requirements for the species. Additionally, the Central California Coastal ESU coho salmon (*O. kisutch*, endangered) was identified on the USFWS species list for presence in Contra Costa County. However, coho salmon habitat only extends upstream of the coastal areas to tributaries of San Francisco Bay (e.g., Alameda Creek, Napa River) and is not present in the Delta system and tributaries such as Marsh Creek. Therefore, coho salmon do not occur within the project area.

3.4.2 Discussion

The potential for project-related construction activities to affect vegetation or wildlife is assessed below in responses to the IS checklist questions. The assessment of construction-related effects primarily considers the likely presence of biological resources and their habitats in the project area, the magnitude and duration of potential disturbances, and the availability of feasible mitigation measures to avoid or minimize the effects.

Regarding the potential operations-related effects to biological resources, it should be noted that the city's Recycled Water Project will be completed and operational by the time the Proposed Project is completed and operational. The Recycled Water Project, as shown in Figure 4 (see section 2.6 above), will result in increased seasonal recycled water use to meet landscape irrigation demands (i.e., primarily during the months of April through September). Concurrently, the reduced effluent discharge to Marsh Creek during these months will be reduced (and minimal in the peak irrigation months of June through August), resulting in reduced Marsh Creek streamflow downstream of the WWTP. The city's CEQA Initial Study prepared for the Recycled Water Project (City of Brentwood 2015) evaluated the operations-related effects of the seasonal reduction in Marsh Creek flow to biological resources.

Under the Proposed Project with the increased WWTP capacity of 7.5 MGD, as shown in Figure 5 and 6 above, seasonal recycled water use would increase. Consequently, the seasonal effluent discharge to Marsh Creek would be low during the irrigation period similar to the conditions resulting from implementation of the Recycled Water Project. Consequently, this assessment refers to and incorporates information presented in the Recycled Water Project Initial Study regarding the effects during the irrigation season. During the seasonal low irrigation months (i.e., generally October through March), the Proposed Project would result in increased effluent discharge to Marsh Creek compared to both existing conditions and the Recycled Water Project conditions. Accordingly, the assessment of the Proposed Project also is focused on the environmental effects to Marsh Creek during the low irrigation period. Pursuant to the CEQA Guidelines requirements, the environmental impacts of the Proposed Project are evaluated primarily based on the changes that would occur compared to the baseline existing conditions. However, the potential effects also are considered with respect to the conditions that would exist under the Recycled Water Project, as necessary to describe changes that could be more severe than effects compared to the existing conditions.

a) Checklist question "a" addresses the potential for adverse effects to special-status plants and wildlife to occur from construction- and operations-related activities of the Proposed Project.

Construction-Related Effects to Special-Status Plants

There are no records for special-status plants being present at the WWTP site. However there are several records for special-status plant populations in the vicinity of the city. Appendix C, Table C-2 shows the potentially occurring special-status plant species. Additionally, no special-status plants were found within the WWTP site adjacent to areas

where construction and equipment staging activities would occur for the Proposed Project during surveys conducted in the spring and fall of 2015 (i.e., during the potential blooming period for special status plants). Although unlikely due to the extensive land disturbance that occurs in the WWTP site, the small ruderal grassland areas within the WWTP site may represent potential habitat for special-status plant species including, but not limited to large flowered fiddleneck (*Amsinckia grandiflora*), big tarplant (*Blepharizonia plumosa*), and diamond-petaled poppy (*Eschscholzia rhombipetala*). Construction-related activities including ground disturbance (e.g., grading and excavation), material staging and vehicular traffic, and general facility construction activities could potentially damage or destroy special-status plants, if present. Construction activities could result in the potential for permanent grassland habitat loss in areas of new treatment unit processes and staging areas, which likely would be limited to about 0.5 acre of the 4 acres of total construction area. Direct effects resulting from the Proposed Project including loss or disturbance of special-status plants, or indirect effects including loss or disturbance of habitat, would be considered a potentially significant impact. Implementation of Mitigation Measures BIO-1, BIO-2, and BIO-3 would reduce the impacts to a **less-than-significant** level.

MITIGATION MEASURE BIO-1. GENERAL CONSTRUCTION MEASURES.

All contractors and equipment operators will be made aware of the ecological values of the site, and will be given instructions to comply with all mitigation measures.

Construction activities will be limited to a designated work area (including the work corridor and staging areas). The work area will be clearly identified and will be staked and flagged where necessary prior to initiation of construction activities. This will include flagging of riparian and wetland habitats in the vicinity of work areas to ensure their avoidance and protection.

All construction activities, including site preparation and development, will be restricted to daytime hours between 7 a.m. and 5 p.m. on weekdays and non-holidays unless weekend work is unavoidable.

MITIGATION MEASURE BIO-2. PARTICIPATION IN THE ECCCHCP.

The City will participate in the ECCCHCP for the Proposed Project, if applicable to the work sites, to mitigate any potential impacts to special-status species covered under the ECCCHCP. This coverage will allow the City to minimize and compensate for potential effects resulting from construction- and operation-related activities associated with the Proposed Project through implementation of all applicable conservation measures and compensation mechanisms of the ECCCHCP.

The City will conduct Planning Surveys, as necessary, according to the species-specific protocols contained in Section 6.3.1 of the ECCCHCP and will complete

an Application Form and Planning Survey Report.

To compensate for unavoidable project-related effects the City will pay either the applicable fee or dedication of land in lieu of the fee as described in Chapter 9, Funding, and in Brentwood Ordinance number 850

MITIGATION MEASURE BIO-3. SPECIAL-STATUS PLANTS.

On suitable land cover types under the ECCCHCP, the City will conduct special-status plant surveys using approved CDFW/USFWS methods during the appropriate season for identification of covered and no-take plant species, as well as any additional special-status plant species not covered under the ECCCHCP.

If ECCCHCP-covered special-status plant species are found in the construction areas, the City would implement all applicable conditions on covered activities under the ECCCHCP including Conservation Measure 1.11 "Avoid Direct Impacts on Extremely Rare Plants" and Conservation Measure 3.10 "Plant Salvage when Impacts are Unavoidable."

If special-status plant species that are not covered by the ECCCHCP are discovered, mitigation measures to reduce impacts to less-than-significant levels would be developed in consultation with appropriate resource agencies.

Operations-Related Effects to Special-Status Plants

Under the Proposed Project, the seasonal reduction in effluent discharge during the irrigation period, and resulting reduction in Marsh Creek streamflow downstream of the WWTP (i.e., generally May through August), is not anticipated to result in substantial changes in vegetation growth along the channel or adjacent stream bank compared to existing conditions because existing streamflow is low during these months. Special-status plant species are not expected to be present along Marsh Creek downstream of the WWTP due to active vegetation management activities routinely conducted along the stream bank by the CCCFCWCD as part of the flood control maintenance activities. During the low irrigation months of October through March, the effluent discharge would increase resulting in average Marsh Creek streamflow downstream of the WWTP increasing from 12.4 MGD (existing conditions) to 15.4 MGD under the Proposed Project. The increased streamflow would result in slightly deeper and wider flow in the channel on average, which may result in shifts of emergent aquatic vegetation growth compared to existing conditions. However, the low irrigation period coincides with reduced and dormant plant growth, and therefore average changes in streamflow would not be anticipated to adversely affect the types, quantity, or growth rates of vegetation along the streambanks.

The tidally-influenced portion of lower Marsh Creek is less disturbed and has discontinuous riparian shrub and tree cover. While this area may represent potential habitat for some special-status plant species, such as Delta tule pea (*Lathyrus jepsonii spp. Jepsonii*), Mason's lilaeopsis (*Lilaeopsis masonii*), and Suisun marsh aster (*Symphyotrichum lentum*), changes in the flow regime in Marsh Creek are not expected to affect special-status plant

species, even if populations are present, for the following reasons. Average Marsh Creek streamflow is relatively low during the period of May through September under existing conditions, and thus the lower portion of Marsh Creek is tidally dominated to some distance upstream of Big Break. The seasonal reduction in flows in Marsh Creek downstream of the WWTP is not expected to substantially alter water quality or flow conditions in the existing tidal portion of Marsh Creek, nor is the change in flows expected to substantially alter the distance upstream that is influenced by the tides. The minor increased streamflow that would occur during the low-irrigation period, when plants are typically in senescent or dormant phases of growth, also would not be expected to have any substantially adverse effects on plants in the tidal reach. Thus, habitat and vegetation in the tidally-influenced portion of Marsh Creek would not be expected to be affected by the seasonal changes in streamflow. Consequently, any operations-related effects to special-status plants as a result of the Proposed Project, if at all, would be **less than significant**.

Construction-Related Effects to Special-Status Amphibian or Reptiles

Annual grassland habitat at proposed work sites within the WWTP site, while limited to several small currently undeveloped areas, represents potential terrestrial habitat for special-status amphibian and reptile species such as California tiger salamander, silvery legless lizard, California horned lizard, giant garter snake (GGS), and San Joaquin whipsnake. Construction-related activities including ground disturbance, material staging and vehicular traffic, and general facility construction activities in these habitats could potentially disturb or harm these individuals or nests, if present. The potential construction-related disturbances are considered a potentially significant impact. Implementation of Mitigation Measures BIO-1 and BIO-2 (described above) and Mitigation Measure BIO-4 would reduce the impact to **less-than-significant** level.

MITIGATION MEASURE BIO-4. SPECIAL-STATUS AMPHIBIANS AND REPTILES.

The City will implement pre-construction surveys, as necessary per the ECCCHCP, for California tiger salamander, silvery legless lizard, western pond turtle, California horned lizard, giant garter snake, and San Joaquin whipsnake in annual grassland habitat for the construction areas at the WWTP.

Surveys will be implemented in accordance with methods described in Section 6.4.3 of the ECCCHCP.

If any ECCCHCP -covered species are found (California tiger salamander, silvery legless lizard, western pond turtle, and giant garter snake), all applicable avoidance and minimization measures, construction monitoring, conservation measures, and/or mitigation fees of the ECCCHCP will be implemented.

If any special-status species not covered by the ECCCHCP (California horned lizard and San Joaquin whipsnake) are discovered, measures to reduce impacts to less-than-significant levels would be developed in consultation with CDFW.

Construction-Related Effects to Terrestrial Habitat for Amphibians or Reptiles

Annual grassland habitats represent potential foraging and breeding habitat for the special-status amphibian and reptile species. Construction-related effects to these habitats would mostly be temporary. However, construction activities could result in the potential for permanent habitat loss in areas of new treatment unit processes and staging areas, which likely would be limited to small areas where ruderal grassland exists within the 4 acres of total construction area. Because of the temporary nature of the disturbance and the limited extent of permanent impacts to annual grassland habitat, this impact is considered **less-than-significant** and no mitigation is necessary.

Construction-Related Effects to Aquatic Foraging Habitat for Amphibians or Reptiles

Temporary construction-related soil disturbances and potential runoff of sediment and contaminants has the potential to adversely affect aquatic foraging habitat for the special-status amphibians and reptiles. However, the potential area of disturbances within the WWTP is limited and any disturbances would be unlikely to result in substantial changes to habitat or foraging behavior. Additionally, implementation of Mitigation Measure HWQ-1 (see Section 2.15, "Hydrology and Water Quality") would require the City, or general contractor, to implement Best Management Practices for stormwater runoff, erosion control, and prevention of offsite sedimentation and contaminant spills. Therefore potential construction-related effects to aquatic foraging habitat for amphibians or reptiles would be **less-than-significant**.

Operations-Related Effects to Amphibian or Reptiles

Marsh Creek downstream of the WWTP effluent discharge location represents aquatic habitat for the western pond turtle (WPT) and GGS. The WPT is associated with permanent ponds, lakes, streams, irrigation ditches, or permanent pools along intermittent streams. The seasonal reduction in effluent discharge to Marsh Creek under the Proposed Project during the summer months (i.e., May through August), and cessation of average effluent discharges in July and August, would lead to reduced streamflow, water levels, and potential water quality changes in Marsh Creek compared to existing conditions. However, while low, there would continue to be background streamflow in Marsh Creek from the upper reaches that would provide average levels of streamflow in the channel downstream of the WWTP under the Proposed Project.

Existing vegetation management activities for the Marsh Creek channel for flood control purposes by the CCCFCWCD reduces the quality of WPT habitat by causing disturbance to WPT potentially using this area. The tidally-influenced portion of Marsh Creek would not be affected and would remain available as superior habitat for this species. Additionally, WPT appears to be fairly tolerant of low water quality, although there has been little research on the subject. The absence of literature on documented adverse water quality effects and the presence of apparently healthy western pond turtles in wastewater treatment

ponds in the Central Valley (Germano and Bury, 2001), suggest that water quality may not be a key limiting factor for WPT survival.

The GGS inhabits low gradient streams and adjacent uplands in areas with essential habitat components consisting of (1) adequate water during the snake's active period, (early spring through mid-fall) to provide a prey base and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat; (3) upland habitat for basking, cover, and retreat sites; and (4) higher elevation uplands for cover and refuge from flood waters. Portions of lower Marsh Creek below the effluent outfall were modeled as core habitat and movement and foraging habitat in the ECCCHCP. However, there are no recorded observations of GGS presence in the results of the database search for the project area. The seasonally reduced streamflow in Marsh Creek under the Proposed Project may result in encroachment and additional growth of vascular emergent vegetation in the creek channel, and thus provide additional habitat and prey for GGS compared to existing conditions. Based on the available information, the operations-related effects of the Proposed Project to aquatic habitat for the WPT and GGS is considered a **less-than-significant impact** and no mitigation is necessary.

Construction-Related Effects to Nesting or Foraging Birds

Annual grassland habitats in the project area represent potential nesting, burrowing, and foraging habitat for the burrowing owl, as well as foraging habitat for the Swainson's hawk and golden eagle. These species are covered under the ECCCHCP. Additional special-status bird species not covered by the ECCCHCP are known to or could potentially forage or nest in annual grassland, coastal scrub, and wetland habitats in the vicinity of the WWTP and along the Marsh Creek riparian corridor. The potential construction-related disturbances are considered a potentially significant impact. Implementation of Mitigation Measures BIO-1 and BIO-2 (described above) and Mitigation Measures BIO-5 and BIO-6 would reduce the impact to **less-than-significant** level.

MITIGATION MEASURE BIO-5. BURROWING OWLS.

The City will implement pre-construction surveys for burrowing owls or burrows at proposed construction sites with potential habitat in accordance with methods described in Section 6.4.3 of the ECCCHCP.

If the burrowing owls nests or burrows are discovered in the work areas, all applicable avoidance and minimization measures, construction monitoring, conservation measures, and/or mitigation fees for this species in the ECCCHCP will be implemented.

MITIGATION MEASURE BIO-6. OTHER SPECIAL-STATUS BIRDS.

If construction activities are scheduled to occur between February 15 and September 15, preconstruction surveys will be conducted at proposed construction sites within 30 days prior to any such activities to determine whether any nests of special-status birds are present. A qualified biologist will search within 1000 feet of

sites for raptor nests, and within 250 feet of sites for passerine nests. Biologists will conduct a visual and aural search of the survey area on foot, using binoculars to scan tree tops for the presence of raptor nests.

If any nests are identified, measures to reduce impacts to less-than-significant levels, such as species-specific buffers, would be developed in consultation with appropriate resource agencies (CDFW and/or USFWS).

Construction-Related Effects to Foraging or Breeding Habitat (Birds)

There would be no tree removal associated with the Proposed Project. Annual grassland habitats represent potential foraging and breeding habitat for several special-status bird species. Construction-related effects to these habitats would mostly be temporary. However, construction activities could result in the potential for permanent habitat loss in areas of new treatment unit processes and staging areas, which likely would be limited to about 0.5 acre of remnant grassland within the 4 acres of total construction area. Because of the temporary nature of the disturbance and the limited extent of permanent effects to annual grassland habitat, this impact is considered **less-than-significant** and no mitigation is necessary.

Construction-Related Effects to Aquatic Foraging Habitat (Birds)

Construction-related activities including ground disturbance (e.g., grading and excavation), material staging and vehicular traffic could potentially result in erosion and sedimentation, thereby altering aquatic foraging habitat for special-status birds. However, the potential area of disturbances within the WWTP is limited and any disturbances would be unlikely to result in substantial changes to habitat or foraging behavior. Additionally, implementation of Mitigation Measure HWQ-1 (see Section 2.15, "Hydrology and Water Quality") would require the City, or general contractor, to implement Best Management Practices for stormwater runoff, erosion control, and prevention of offsite sedimentation and contaminant spills. Therefore potential construction-related effects to aquatic foraging habitat for birds would be **less-than-significant**.

Operations-Related Effects to Special-Status Birds

Marsh Creek downstream of the current effluent discharge location contains aquatic and wetland habitat potentially used by special-status birds such as the California black rail, California clapper rail, and yellow-billed cuckoo. The seasonal reduction in effluent discharge to Marsh Creek under the Proposed Project during the summer months (i.e., May through August), and cessation of average effluent discharges in July and August, would lead to reduced streamflow, water levels, and potential water quality changes in Marsh Creek compared to existing conditions. The seasonally reduced streamflow in Marsh Creek under the Proposed Project may result in encroachment and additional growth of vascular emergent vegetation in the creek channel. However, while low, there would continue to be background streamflow in Marsh Creek from the upper reaches that would provide average levels of streamflow in the channel downstream of the WWTP under the Proposed Project.

Additionally, habitat along the stream bank downstream of the WWTP currently is disturbed routinely by vegetation management activities of the CCCFCWCD as part of the flood control maintenance activities. The tidally-influenced portion of Marsh Creek would not be affected and would remain available as superior habitat for these species. Therefore, the operations-related effects of minor seasonal reductions in streamflow under the Proposed Project to special-status birds are considered **less-than-significant** and no mitigation is necessary.

Construction-Related Effects to Special-Status Mammals

While unlikely to occur in the WWTP due to the developed nature of the facilities and daily disturbances at the site (e.g., employee activities, vehicle traffic, and noise), areas of annual grassland habitat may be potential habitat for the American badger. The potential construction-related disturbances are considered a potentially significant impact. Implementation of Mitigation Measures BIO-1 and BIO-2 (described above) and Mitigation Measure BIO-7 would reduce the impact to **less-than-significant** level.

Additionally, open areas over project sites may provide foraging habitats for special-status bats. Therefore, construction activities could potentially result in temporary disturbance to foraging bats. The potential construction-related disturbances are considered a potentially significant impact. Mitigation Measure BIO-1 restricts all project activities to the defined work area and limits construction to daylight hours. Implementation of this measure would avoid any disturbance to bats, which tend to forage at dusk or dark. Implementation of Mitigation Measure BIO-1 would reduce the construction-related impact to special-status bats to a **less-than-significant** level.

MITIGATION MEASURE BIO-7. AMERICAN BADGER.

The City will implement pre-construction surveys for American badgers or burrows at proposed construction areas with potential habitat in conjunction with burrowing owl surveys.

If any American badgers or burrows are found, measures to reduce impacts to less-than-significant levels would be developed in consultation with CDFW, and/or mitigation fees for this species in the ECCCHCP will be implemented.

Construction-Related Effects to Foraging or Breeding Habitat (Mammals)

Annual grassland habitats represent potential habitat for the American badger and potential foraging habitat for special-status bats. Construction-related effects to these habitats would mostly be temporary. However, construction activities could result in the potential for permanent habitat loss in areas of new treatment unit processes and staging areas, which likely would be limited to smaller areas of undeveloped and remnant ruderal grassland within the 4 acres of total construction area. Because of the temporary nature of the

disturbance and the limited extent of permanent impacts to annual grassland habitat, this impact is considered **less-than-significant** and no mitigation is necessary.

Construction-Related Effects to Aquatic Foraging Habitat (Mammals)

Construction-related activities including ground disturbance (e.g., grading and excavation), material staging and vehicular traffic, and general facility construction activities could potentially result in erosion and sedimentation, thereby altering aquatic foraging habitat for special-status mammals. Implementation of Mitigation Measure HWQ-1 (see Section 2.15, "Hydrology and Water Quality") would require the City, or general contractor, to implement Best Management Practices for stormwater runoff, erosion control, and prevention of offsite sedimentation and contaminant spills. Therefore, implementation of Mitigation Measure HWQ-1 would reduce the potential construction-related impact to aquatic habitat to a **less-than-significant** level.

Operations-Related Effects to Mammals

The tidally-influenced portion of Marsh Creek downstream of the current effluent discharge location represents potential habitat for special-status mammals such as the saltmarsh harvest mouse and ringtail. Because the hydrology of this area is largely tidally-driven, changes in the flow regime in Marsh Creek are not expected to affect special-status mammals or their habitat in this area. Therefore, the Proposed Project would not result in operational-related effects to the saltmarsh harvest mouse and ringtail.

Marsh Creek downstream of the WWTP effluent discharge location represents potential foraging habitat for special-status bats such as the Townsend's western big-eared bat. The seasonal reduction in effluent discharge under the Proposed Project would lead to reduced water levels in Marsh Creek during the irrigation season compared to existing conditions (i.e., primarily May through August), thus potentially affecting foraging habitat for bats. Structures such as bridges and overpasses in the Marsh Creek area represent potential roosting habitat for bat species known to roost in human-made structures, such as Townsend's western big-eared bat. Roosting sites are the most important limiting resource to this species (Zeiner et al 1990). The Proposed Project would have no impact on potential roosting habitat for Townsend's western big-eared bat or other bat species. Furthermore, surrounding open areas, including grasslands, shrublands, and agricultural areas, as well as the tidally-influenced portion of lower Marsh Creek would remain available as foraging habitat. Therefore, operations-related effects of the Proposed Project to special-status bats are considered **less-than-significant** and no mitigation is necessary.

Construction-Related Effects to Special Status Fish

No construction-related disturbances of in-channel or riparian vegetation would occur under the Proposed Project. The construction activities within the WWTP would be conducted throughout the year over the course of approximately two years, and thus disturbed sites may be exposed to rainfall-related erosion and stormwater runoff. However, construction

sites are relatively level and not located directly adjacent to any drainage channels, thus the potential for stormwater runoff to cause adverse effects to Marsh Creek is minimal. As such, the Proposed Project would not likely adversely affect or modify riparian or aquatic habitats, including habitats used by special-status or migratory fishes. However, because construction would occur during the months when storm events can occur, the potential for exposure construction sites to stormwater runoff and adverse effects to fish or their habitat would exist, which would be considered a potential significant impact. Moreover, implementation of Mitigation Measure HWQ-1 (see Section 2.15, "Hydrology and Water Quality") would require the City, or general contractor, to implement Best Management Practices for stormwater runoff, erosion control, and prevention of offsite sedimentation and contaminant spills. Therefore, potential construction-related effects to special-status fish and their aquatic habitat would be **less-than-significant** with implementation of Mitigation Measure HWQ-1.

Operations-Related Fisheries Habitat Modification

The seasonal reduction in effluent discharges under the Proposed Project during the irrigation period would result in reduced average streamflow depth and velocity in the lower three-mile reach of Marsh Creek downstream of the WWTP outfall (i.e., primarily May through August) compared to existing conditions (see Figure 6 above in Section 2.6). Reduced streamflow may reduce the potential availability of aquatic habitat compared to existing conditions when the lower portion of Marsh Creek is effluent-dominated. Seasonal effluent discharges to Marsh Creek under the Proposed Project would be similar to or greater than existing conditions during the low irrigation period, resulting in similar or higher average Marsh Creek streamflow downstream of the WWTP (i.e., during September through April). Because Marsh Creek would have substantial flow during the low irrigation period, the Proposed Project would result in little or no measurable effect on aquatic habitat availability in lower Marsh Creek during this period.

Consequently, the period of potential concern for aquatic habitat availability and Marsh Creek's warmwater resident fish community is May through August, while the period of potential concern for fall-run Chinook salmon is their fall adult migration period, rearing, and spring emigration. An analysis was conducted to determine the effect of the decreased effluent discharges under the Proposed Project on velocities, maximum depths, and wetted perimeter in Marsh Creek downstream of the WWTP outfall, with results of the analysis shown in **Table 7**. The two-mile reach immediately downstream of the WWTP outfall has grade control rock weirs constructed approximately every 200 ft interspersed by relatively deep pools (e.g., 3-6 ft under summer base flow conditions), with a very low gradient. The lowest one-mile reach has a nearly level (i.e., 0.00%) slope and lacks the grade control rock weirs.

Under the Proposed Project, the average and minimum flow area, top width, maximum depth, and wetted perimeter would be minimally affected in the two-mile reach immediately downstream of the WWTP outfall during the low irrigation period when effluent discharge would be reduced (see Table 7). The rock weirs maintain relatively constant depths, widths,

and wetted perimeters in the pools upstream of each weir over the entire range of summer flow conditions and thus would not have a substantial adverse effect on the quantity of habitat in this two-mile reach downstream of the outfall. However, flow velocity in the two-mile reach downstream of the outfall would be substantially decreased. The lowest velocity on a monthly average basis at the RSW-002 monitoring station (i.e., at one of the grade control rock weirs) in July would be decreased from 0.19 to 0.07 fps, while the lowest monthly flow would be decreased from 0.14 to 0.02 fps under the Proposed Project.

Table 7. Lower Marsh Creek Section Typical Channel Characteristics-Downstream of WWTP.

Scenario	Flow (CFS)	Velocity (ft/s)	Flow Area (sq. ft)	Top Width (ft)	Maximum Depth (ft)	Wetted Perimeter (ft)
Existing July Average RSW-002 Flow	7.6	0.19	40.88	33.40	1.40	33.85
Projected July Average RSW-002 Flow	2.79	0.07	37.82	32.85	1.31	33.27
Existing July Lowest RSW-002 Flow	5.58	0.14	39.66	33.18	1.36	33.62
Projected July Lowest RSW-002 Flow	0.78	0.02	35.70	32.46	1.24	32.86

Under existing conditions, velocities in lower Marsh Creek downstream of the Brentwood WWTP are low and dry weather flows are relatively low. The resident warmwater fish species in Marsh Creek are adapted to living in low-gradient and low-velocity habitats (e.g., pools, ponds, lakes) and thus would not be adversely affected by reductions in flow velocities in the two-mile reach of Marsh Creek downstream of the Brentwood WWTP outfall. The streamflow conditions in Marsh Creek are too low to attract fall-run Chinook salmon during their early fall migration, or provide adequate conditions for passage through the lower two miles of Marsh Creek. Fall-run Chinook typically hold in the tidal and subtidal areas of Big Break until late-fall or winter storms increase flows in Marsh Creek. The attraction flows from storms induce immigration into the creek and increased flows must occur to facilitate upstream passage in lower Marsh Creek and adequate water depths at low-flow barriers (e.g., rock weirs, the fish ladder just upstream of the Brentwood WWTP outfall). Consequently, the reduction in stream velocities and small reductions in width, depth, and wetted perimeter in Marsh Creek during May through August would not create barriers or otherwise interfere substantially with the movement of migratory fish in the two-mile reach of Marsh Creek downstream of the WWTP outfall. Additionally, during the low irrigation period, effluent discharge under the Proposed Project would be similar or higher compared to existing conditions during September through April, and thus would not result in barriers or adversely affect the movement of migratory fish.

In the lowest one-mile reach of Marsh Creek, which is tidally influenced and lacks the grade control rock weirs, velocity and wetted perimeter would not be appreciably affected by the reduced effluent discharges under the Proposed Project due to the relatively flat channel bottom. However, depths in this lower one-mile reach could be reduced under the Proposed Project during the months of May through August compared to existing conditions. The average maximum depth under average July flows could be reduced from 0.81 to 0.45 ft,

while the average maximum depth under lowest July flows could be reduced from 0.67 to 0.21 ft.

Table 8. Lower Marsh Creek Section Typical Channel Characteristics-Tidally Influenced Reach.

Scenario	Flow (CFS)	Velocity (ft/s)	Flow Area (sq. ft)	Top Width (ft)	Maximum Depth (ft)	Wetted Perimeter (ft)
Existing July Average RSW-002 Flow	7.6	0.34	22.16	29.85	0.81	30.11
Projected July Average RSW-002 Flow	2.79	0.24	11.78	27.68	0.45	27.83
Existing July Lowest RSW-002 Flow	5.58	0.31	18.20	29.04	0.67	29.26
Projected July Lowest RSW-002 Flow	0.78	0.15	5.34	26.25	0.21	26.32

The analysis used to determine these decreases in average maximum depths assumed that the channel bottom is flat. However, the channel has many relatively deep pools throughout this reach. Furthermore, this reach is characterized as being fully tidally influenced up to the East Bay Regional Park District footbridge, and tidally dampened upstream to the Contra Costa Canal crossing (i.e., the outgoing creek flows are backed up under high tide). Depths and flows in this tidally influenced one-mile reach would be relatively unchanged during high tide conditions. Under low tide conditions, resident fish would hold in the deeper pools, as they do under existing conditions. As discussed above, the resident fish assemblage in Marsh Creek is composed of species that are adapted to the existing low-gradient flow and pool habitats; thus, their movements would not be limited or precluded by shallow water barriers under the Proposed Project where such conditions did not already occur under existing conditions.

Based on the above assessment, the Proposed Project would seasonally reduce flows in the lower 3.5 miles of Marsh Creek during the months of May through August. However, background flows and pools in lower Marsh Creek would remain to support the resident fish community during these periods. Although delta smelt and Sacramento splittail have the potential to occur in the lower tidally influenced portion of Marsh Creek, these special-status species have never been observed in the creek and the Proposed Project would not adversely affect their potential to make opportunistic use of the tidally influenced portion of the creek. Consequently, the Proposed Project would not have a substantial adverse effect on any candidate, sensitive, or special-status fish species or habitat for special-status fish species and thus is considered a **less-than-significant** impact.

Operations-Related Water Temperature Effects to Fish

The City recently conducted a temperature study in support of a compliance requirement of the WWTP NPDES permit (RBI 2015). The study evaluated hourly temperature data from February 2013 through June 2014 at seven locations in Marsh Creek extending from the RSW-001 location downstream to Big Break to assess the potential thermal effects of the WWTP effluent discharge. The temperature monitoring data is shown in **Table 9** and

indicate that the discharge of effluent from the WWTP can affect water temperatures in Marsh Creek, with the effects attenuated over the lower three miles downstream of the WWTP to the tidally influenced reach. During the winter months, the effluent is typically warmer than the background Marsh Creek temperatures at the RSW-001 receiving water monitoring station (i.e., upstream of the WWTP). Consequently, average and maximum monthly temperatures are often higher at RSW-002 (i.e., 300 feet downstream of the WWTP outfall) than temperatures at RSW-001 during the October-May period. During the June-September period, the effluent exerts a small influence on monthly average temperatures at RSW-002 and, based on its relatively narrow daily variability, attenuates the maximum summer streamflow temperatures.

Table 9. Monthly Average and Maximum Temperatures (°F) in the Effluent, and Marsh Creek Upstream (RSW-001) and Downstream (RSW-002) of the WWTP Outfall from February 2013 through June 2014.

Month	Monthly Average			Monthly Maximum		
	Effluent	RSW-001	RSW-002	Effluent	RSW-001	RSW-002
Feb 2013	66.1	53.0	61.9	68.1	61.7	67.1
Mar 2013	68.8	62.6	66.7	71.7	72.3	71.1
Apr 2013	70.8	67.6	68.8	75.4	80.8	74.9
May 2013	73.8	71.3	71.4	77.2	81.5	76.2
Jun 2013	76.7	75.1	74.4	81.6	87.5	80.9
Jul 2013	79.0	77.6	76.2	82.1	87.9	80.6
Aug 2013	79.1	75.8	76.3	82.1	83.9	80.6
Sep 2013	78.2	72.2	74.8	81.2	81.1	79.6
Oct 2013	74.8	63.8	71.6	77.6	72.2	75.8
Nov 2013	71.7	56.4	67.9	74.0	61.8	72.7
Dec 2013	67.6	49.2	64.9	71.5	63.6	69.4
Jan 2014	67.4	43.1	65.7	69.2	64.8	68.7
Feb 2014	67.7	57.0	63.9	70.0	66.2	69.6
Mar 2014	69.3	62.3	66.7	71.7	71.4	71.6
Apr 2014	71.5	66.9	68.7	74.9	78.2	74.2
May 2014	74.2	70.7	72.0	78.0	81.2	77.5
Jun 2014	77.1	73.9	74.4	80.1	81.1	78.8

Under the Proposed Project, the seasonal changes in effluent discharge compared to existing conditions would affect the fully mixed temperatures downstream of the WWTP outfall. During the October-December period, when the effluent discharge causes an increase in fully mixed temperatures downstream of the outfall and adult fall-run Chinook salmon may migrate for spawning (when present), the increased effluent discharge could increase average temperatures slightly (i.e., average increase of approximately 2°F from 66°F to 68°F in November). The average temperature increases would be similar in October (approximately 1°F from 70°F to 71°F) and December (approximately 3°F from 53°F to 56°F). The potential increased temperatures would not be expected to impede, reduce, or adversely affect migration of fall-run Chinook salmon based on the thermal tolerance of

adult fish. Dunham (1968 as cited in Boles 1988) reported that water temperatures approaching 76°F in the lower Klamath River had no observable effect on the upstream migration of adult Chinook salmon. Marine (1992) reported that adult Chinook salmon can tolerate short-term and transient temperature exposures to temperatures of 77–80.6°F during spawning migrations. Consequently, a thermal barrier to adult Chinook salmon spawning migration in Marsh Creek would not be expected to unless water temperatures were to approach or exceed approximately 80°F. Because the increased effluent discharge under the Proposed Project would result in Marsh Creek temperatures well within the thermal tolerance range of adult fall-run Chinook salmon downstream of the WWTP outfall, the project-related effects would not adversely affect immigrating adult Chinook salmon.

During the remainder of the low irrigation period when effluent discharge would increase compared to existing conditions (i.e., January through March), which also coincides with the primary period of emigration for juvenile fall-run Chinook salmon, the hourly temperature data (Table 9) indicate that monthly average and maximum temperatures in both the effluent and Marsh Creek downstream of the WWTP outfall are less than 68°F and 72°F, respectively. Under the Proposed Project, as a result of the increased effluent discharge, the average and maximum Marsh Creek temperatures downstream of the WWTP would be expected to be similar or slightly higher compared to existing conditions (i.e., average increase of no greater than approximately 1.5°F [based on the average temperatures and project-related change in flows in February]). However, the increases in fully mixed Marsh Creek temperatures would not exceed thermal tolerances of juvenile fall-run Chinook salmon based on available physiological information for the species. Brett (1952) reported that juvenile Chinook salmon acclimated to a temperature of 59°F had an upper lethal temperature tolerance exceeding 77°F (for a one-week exposure). Gray et al. (1977) reported that juvenile Chinook salmon avoided heated thermal plumes when temperatures were 16°F to 19°F above the background water temperature. Therefore, the small incremental changes in Marsh Creek temperatures that may occur under the Proposed Project during the January-March period would not adversely affect emigrating juvenile fall-run Chinook salmon.

While never observed in Marsh Creek, the months of December through June is the period when delta smelt or Sacramento splittail could make opportunistic use of the tidal reach of Marsh Creek, if conditions are favorable. Based on field and laboratory studies, the USFWS considers delta smelt spawning success to be sharply reduced in the Delta at temperatures above 68°F, and larval delta smelt haven't been captured in surveys when temperatures exceed 68°F (Bennett 2005). As discussed above, the available background Marsh Creek data (Table 9) indicate that by April, average temperatures are typically exceeding 68°F which restricts the period of suitable water temperature for delta smelt rearing to December through March, with suitable conditions unlikely to occur in May and June. Moreover, the effluent discharge in April, and the resulting effects on Marsh Creek temperatures, would be similar under the Proposed Project compared to existing conditions. Thus, the potential effects of the Proposed Project to conditions affecting delta smelt and splittail would be limited to the months of December through March when effluent discharge would increase compared to existing conditions. However, as indicated above,

the average effluent and Marsh Creek temperatures during the December through March period are anticipated to generally be less than 68°F and thus suitable for delta smelt. Also, as noted above, the increased effluent discharge under the Proposed Project would not substantially increase average temperatures in Marsh Creek compared to the existing conditions (i.e., less than approximately 0.5°F under March conditions). The maximum monthly temperatures in the effluent and Marsh Creek under March conditions may exceed 68°F; however, the maximum effluent temperature is generally similar or less than background streamflow during this period and thus would not adversely affect delta smelt during such temporary elevated warm water conditions.

The City's 2013-2014 temperature study also indicates that during the December-March period, the slight increase in average Marsh Creek temperatures that can occur at the WWTP outfall as a result of the effluent discharge dissipates and stream temperatures cool as flow travels downstream. Consequently, average and maximum temperatures in the tidally influenced reach of Marsh Creek are generally cooler or not substantially different than background streamflow temperatures (i.e., at RSW-001). Consequently, any minor changes in the Marsh Creek temperature regime near the WWTP outfall under the Proposed Project would not be expected to extend far enough downstream during the December-March period to adversely affect the potential opportunistic use of lower Marsh Creek by delta smelt or Sacramento splittail.

Finally, the resident fish community of lower Marsh Creek to the tidal reach consists of the same fish species upstream and downstream of the WWTP outfall, which are adapted to living in Central Valley streams with the range of cool winter to warm summer conditions where temperatures typically reach and exceed 86°F. As discussed above, the increased effluent discharge during the low irrigation period would not substantially change the thermal regime of Marsh Creek downstream of the WWTP outfall compared to existing conditions. During the irrigation period, and in particular May through August, the reduced or minimal effluent discharge under the Proposed Project compared to existing conditions would result in slightly increased average and maximum temperatures downstream of the outfall. Consequently, temperatures downstream of the outfall would more closely resemble the temperatures measured at RSW-001 upstream of the outfall, which are less than 78°F on an average monthly basis and 88°F or less as a monthly maximum. Consequently, the reduction in effluent discharges during the low irrigation period and resulting average temperature increases to more closely resemble temperatures upstream of the outfall would not adversely affect the resident warmwater fish community downstream of the outfall. Therefore, changes in temperature associated with the reduction in effluent discharges under the Proposed Project would not have substantial adverse effects on the resident fish population. Therefore, the Proposed Project would not result in any substantial adverse temperature effects on any candidate, sensitive, or special-status fish species and the potential operations-related impact is considered **less than significant**.

b) There is no riparian habitat or other sensitive natural communities in the construction area. Therefore, implementation of the Proposed Project would not result in construction-related disturbances of riparian habitats.

The operations-related changes increase in effluent discharge to Marsh Creek during the low irrigation period (October through March) and reduction in effluent discharge in the irrigation season (May through August) would not be expected to result in adverse effects to riparian habitat. The channel downstream of the WWTP outfall is actively managed as a flood control channel by the CCCFCWCD, and thus riparian vegetation is limited. Additionally, the operations-related changes in Marsh Creek streamflow are relatively small relative to the range of existing seasonal flows in the channel. The tidally-influenced portion of lower Marsh Creek has discontinuous riparian shrub and tree cover. However, tidal exchange primarily influences hydrology in the tidal reach and minor changes in seasonal Marsh Creek streamflow would not substantially alter water quality or tidal exchange, nor affect the distance upstream that is influenced by the tides. Thus, habitat and vegetation in the tidally-influence portion of the creek is not expected to be affected by project-related seasonal streamflow changes. Therefore, the potential operations-related effects of the Proposed Project to riparian habitat or other sensitive natural communities is **less than significant.**

c) No construction activities for the Proposed Project would occur directly in any jurisdictional wetlands. Moreover, no other potentially jurisdictional waters of the U.S. or isolated waters are located within areas to be disturbed by construction activities. Construction activities for the Proposed Project would be conducted with conventional work practices and erosion control measures to prevent any discharge of sediment or runoff to the Marsh Creek channel, which is the nearest water body to the construction areas within the WWTP site.

The seasonal reduction in Marsh Creek streamflow downstream of the WWTP under the Proposed Project during the irrigation period would not be expected to substantially alter streamflow conditions in non-tidal or the tidally-influenced reaches of the channel. Thus, hydrology and vegetation characteristics in the tidally-influenced portion of the creek are not expected to be substantially affected by the seasonal reduction in flows. Therefore, the potential construction- and operations-related effects of the Proposed Project to wetland resources are considered **less than significant**.

d) There are no known migratory wildlife corridors or native wildlife nursery sites in the project area. Construction activities could temporarily affect the movement of native resident or migratory wildlife that may be present in the project area. However, implementation of Mitigation Measure BIO-1 would minimize the potential effects by restricting all project-related activities to the defined work area and limiting construction to daylight hours. Due to the temporary and limited nature of potential disturbance to wildlife movement, this impact is considered **less-than-significant**.

Operations-Related Effects on Fish Migration

Adult fall-run Chinook salmon migrate into Marsh Creek when attraction flows are sufficient in October through December. Post-emergent fry and smolts emigrate from Marsh Creek to the Delta from December through early April under high-flow conditions (e.g., spring freshets). Because spawning and rearing of early life stages occur upstream of

the WWTP outfall, the lower three-mile reach of Marsh Creek serves as a migration corridor for immigrating adults and emigrating post-emergent fry and smolts. During the October-March period, effluent discharges would increase slightly under the Proposed Project relative to the existing conditions (refer to **Error! Reference source not found.**6). Therefore, the operations-related changes in Marsh Creek streamflow would not measurably affect the magnitude of fall-winter storm events, or flows during the spring emigration period, and thus would have no effect on the ability for adult or early life stages of fall-run Chinook salmon to move upstream or downstream through the lower three miles of Marsh Creek downstream of the WWTP outfall. Consequently, the Proposed Project would not substantially interfere with the movements of any native resident or migratory fish species. Therefore, this impact is considered **less than significant**.

e) Contra Costa County has a Tree Preservation Ordinance that provides for the preservation of certain protected trees in unincorporated areas of the county. However, the City does not have a Tree Preservation ordinance. However, no trees would be removed for the Proposed Project and there are no other local policies or ordinances protecting tree resources. Therefore, there would be **no impact**.

f) The City would participate in the ECCCHCP for the Proposed Project. This coverage would allow the City to minimize and compensate for potential effects resulting from construction- and operation-related activities associated with the Proposed Project. Therefore the Proposed Project would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan and there would be **no impact**.

3.5 CULTURAL RESOURCES

Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?	☐	☐	☐	☑
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	☐	☑	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☑	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☑	☐	☐

3.5.1 Setting

The following section summarizes information presented in **Appendix B**, which contains a comprehensive discussion of the cultural resources setting of the region and city areas, and information regarding known and potential historical, archaeological, and paleontological

resources in the project area, and regulatory framework. The report was prepared by Ric Windmiller, Consulting Archaeologist dated February 2016.

Efforts to identify cultural resources in the project area consisted of database searches, literature review, and an archaeological field inspection. On October 6, 2014, the Northwest Information Center completed a cultural resources records search that was conducted for the city's Recycled Water Project, which encompassed the areas of the WWTP to be affected by the Proposed Project and a one-quarter mile radius around the plant (NWIC File No. 14-0315). On September 3, 2014, the Native American Heritage Commission completed a search of its sacred lands file for areas encompassing the WWTP site for the city's Recycled Water Project, and updated the search for the Proposed Project on February 4, 2016. In the commission's letter reports, staff indicated that the file search failed to indicate the presence of Native American cultural resources in the immediate project vicinity. Additionally, the Native American contact persons recommended by the commission were sent letters and emails providing information and maps regarding the Proposed Project, and telephone calls were made to attempt to contact each person. However, no written responses to the inquiry with the Native American contacts were received; and two discussions by telephone with contacts indicated no concerns with the project as long as the ground disturbance was located away from Marsh Creek. On September 22, 2014, Kenneth L. Finger, Ph.D., conducted a search of the University of California, Museum of Paleontology's database.

On January 14, 2016, a field inspection was conducted of the areas within the WWTP site to be affected by staging and construction activity for the Proposed Project. The survey was conducted for a defined Area of Potential Effect (APE) where ground disturbance may occur, and was walked along zig-zagging transects set approximately 5 to 15 meters apart. Ground visibility in the proposed construction areas was variable; being obscured by the presence of managed turf grass, asphalt paving, and obstacles (e.g., dumpsters, vehicles, and materials/equipment storage) in some areas. However, the wastewater treatment facility also was the subject of a previous cultural resources survey in 1976 by Arthur D. Little, Department of Anthropology, University of California, Berkeley in which no cultural resources were identified within the surveyed area.

3.5.2 Discussion

a) No historical resources, traditional cultural properties, or Native American cultural resources were identified within were identified within the project area (i.e., the defined APE) through either the database records searches or the field survey. Consequently, there would be **no impact**.

b) Temporary construction activities for the Proposed Project would involve ground disturbing activities including grading, and could involve excavations to an estimated maximum depth of about six feet below ground surface for underground utility installations (e.g., pipes) and facility foundations. No prehistoric or historic archaeological resources, traditional cultural properties, or Native American cultural resources were identified within were identified within the project area (i.e., defined APE) through the database record searches or the field

survey. However, construction activities have the potential to encounter buried archaeological resources as the lack of surface indications does not always ensure that there are no buried sites, features or objects of significance. Buried archaeological resources may include but are not limited to deposits of stone, bone and shell artifacts, dark gray "midden" sediments, historic trash deposits, and stone or adobe foundations. Therefore, the impact is considered potentially significant. Implementation of Mitigation Measure CULT-1 would reduce this impact to a **less-than-significant** level.

MITIGATION MEASURE CULT-1. ACCIDENTAL DISCOVERY OF ARCHAEOLOGICAL RESOURCES.

If any prehistoric or historic artifacts, or other indications of archaeological resources such as unusual deposits of stone, bone or shell, stone artifacts, or historic trash deposits or foundations are discovered once ground-disturbing activities are underway, the find(s) shall be immediately evaluated by a qualified archaeologist. If the find is determined to be a historical or unique archaeological resource, contingency funding and a time allotment to allow for implementation of avoidance measures or appropriate mitigation shall be made available, as provided in §15064.5 of the CEQA Guidelines. Work may continue on other parts of the project site while historical or unique archaeological resource mitigation takes place on-site.

c) No paleontological resources were identified during the field inspection, nor were any previous finds reported for the WWTP site in the database search records. However, the database search did conclude that potentially important vertebrate fossils may occur in a two older alluvial deposits that occur in the project area consisting of Holocene and Pleistocene dune sands that occur within the WWTP site. The Holocene deposits are too young to yield fossils, however, deep excavation in older Pleistocene units at the WWTP has the potential to encounter vertebrate fossils. The impact is potentially significant. Implementation of Mitigation Measure CULT-2 would reduce this impact to a **less-than-significant** level.

MITIGATION MEASURE CULT-2. ACCIDENTAL DISCOVERY OF PALEONTOLOGICAL RESOURCES.

A qualified professional paleontologist shall periodically monitor excavations to check for fossils that may be unearthed. If vertebrate fossils (e.g., teeth, bones) are unearthed by the construction crew anywhere on the project, the finds should be set aside and all excavation activity cease at the specific place of discovery until the paleontologist has assessed the find and, if deemed significant, salvaged the find in a timely manner. The decision to conduct paleontological salvage operations will be determined by the paleontologist in consultation with city staff. Work may proceed on other parts of the project while assessment and/or salvage by the paleontologist is underway. Finds determined significant by the paleontologist shall be conserved and deposited with a recognized repository such as the University of California Museum of Paleontology.

d) Human remains were not discovered during the field investigation of the project area for the Proposed Project. While it is unlikely, there is a possibility that buried human remains may be encountered during construction. The impact is potentially significant. Implementation of Mitigation Measure CULT-3 would reduce this impact to a **less-than-significant** level.

MITIGATION MEASURE CULT-3. ACCIDENTAL DISCOVERY OF HUMAN REMAINS.

In the event of the accidental discovery or recognition of any human remains, there shall be no further excavation or disturbance of the find or any nearby area reasonably suspected to overlie adjacent human remains, until compliance with the provisions of §15064.5(e)(1) and (2) of the CEQA Guidelines has occurred. The Guidelines specify that in the event of the discovery of human remains other than in a dedicated cemetery, the Contra Costa County Coroner must be notified to determine if an investigation into the cause of death is required. If the coroner determines that the remains are Native American, then, within 24 hours, the coroner must notify the Native American Heritage Commission, which in turn will notify the most likely descendant who may recommend treatment of the remains and any grave goods. If the Native American Heritage Commission is unable to identify a most likely descendant or the most likely descendant fails to make a recommendation within 24 hours after notification by the Native American Heritage Commission, or the landowner or his authorized agent rejects the recommendation by the most likely descendant and mediation by the Native American Heritage Commission fails to provide a measure acceptable to the landowner, then the landowner or his authorized representative shall rebury the human remains and grave goods with appropriate dignity at a location on the property not subject to further disturbances.

3.6 GEOLOGY, SOILS, AND SEISMICITY

Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☑	☐	☐
ii) Strong seismic ground shaking?	☐	☑	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☑	☐	☐
iv) Landslides?	☐	☐	☐	☑
b) Result in substantial soil erosion or the loss of topsoil?	☐	☑	☐	☐

c)	Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☑	☐	☐
d)	Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☑	☐	☐
e)	Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☑

3.6.1 Setting

The city of Brentwood is located within a seismically active region east of San Francisco. The project area is not located in an Alquist-Priolo Earthquake Fault Zone (City of Brentwood 2014b). The Greenville Fault is the nearest active fault located approximately 7 miles southwest of the city. Potential seismic hazards include ground rupture, or surface faulting, and ground shaking or lurching. Fault ground ruptures are generally confined to a narrow linear zone adjacent to faults. Fault ground ruptures are unlikely to occur in the project area because there are no active faults mapped in the project area by the California Geological Survey. However, the project area is potentially subject to strong ground shaking from regional seismic activity.

The land forms within the project area where construction activities would occur are generally level and therefore not prone to landslides. However, the potential for soil to be susceptible to liquefaction hazard, or to be expansive (i.e., shrink-swell potential) varies substantially throughout the city (City of Brentwood 2014b).

3.6.2 Discussion

a, c, d) Fault ground ruptures are unlikely in the project area as there are no active faults mapped across the site by the California Geological Survey and the sites are not located in any Alquist-Priolo Earthquake Fault Zone. However, fault rupture from buried thrust faults and inferred faults represent a potential but uncertain hazard in the project area. The project area is subject to potentially strong ground-shaking during seismic events that could occur from active faults in the region. Geotechnical studies have not yet been conducted for the Proposed Project. However, there is the potential for facilities to be constructed in areas that contain expansive soils, have elevated risk of liquefaction, or exhibit corrosive soil properties. These properties have potential to compromise the structural integrity of the proposed wastewater treatment unit process structures.

Structural failure of the proposed facilities would potentially pose a risk to life, property, and environmental resources. Therefore, the potential exposure of facilities to seismic hazards and surface soil hazards is considered a potentially significant impact. With implementation of Mitigation Measure GEO-1, this impact would be **less than significant**.

MITIGATION MEASURE GEO-1. CONDUCT GEOTECHNICAL INVESTIGATION AND IMPLEMENT RECOMMENDED MEASURES.

The City will conduct a geotechnical investigation for the Proposed Project that evaluates site-specific conditions related to the potential for ground rupture, risk to features due to ground shaking, risk of soil liquefaction, and risk of expansive soils. Based on subsurface conditions, the proposed facilities will be designed to withstand the effects of strong ground shaking and the effects of soil liquefaction.

Based on the results of the geotechnical investigation, the City and its contractor(s) will be responsible for implementing the design specification and performance criteria according to Uniform Building Code (UBC) the City's Seismic Hazards policies for pipeline construction, trenching, backfill materials, and other recommendations.

b) The temporary construction-related activities have the potential to result in localized and temporary soil erosion, in particular when exposed to rainfall and stormwater runoff events on a seasonal basis during the winter rainfall period. However, the Proposed Project would not involve any operations-related activities that would cause or contribute to any long-term soil erosion. The potential for temporary construction-related erosion is considered a potentially significant impact. Mitigation Measure HWQ-1 is identified in Section 3.9 ("Hydrology and Water Quality") and would require the City and general contractor(s) for the Proposed Project to implement construction-related erosion and stormwater management measures. With implementation of Mitigation Measure HWQ-1, this impact would be **less than significant**.

e) The Proposed Project would not contribute to use of septic tanks or alternative wastewater disposal systems. Therefore, there would be **no impact**.

3.7 GREENHOUSE GASES AND CLIMATE CHANGE

Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☑	☐
b) Conflict with any applicable plan, policy, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☑	☐

3.7.1 Setting

Certain gases in the earth's atmosphere, classified as Greenhouse Gases (GHGs), play a critical role in determining the earth's surface temperature. GHGs are responsible for "trapping" solar radiation in the earth's atmosphere, a phenomenon known as the greenhouse effect. Prominent

GHGs contributing to the greenhouse effect are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Non-CO_2 GHGs can have global warming potentials (GWPs) from a few hundred to several thousand times that of CO_2.

Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the greenhouse effect and have led to a trend of unnatural warming of the earth's climate, known as global climate change or global warming. It is extremely unlikely that global climate change of the past 50 years can be explained without the contribution from human activities (Intergovernmental Panel on Climate Change (IPCC) 2007:86). By adoption of Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006, and Senate Bill (SB) 97, the State of California has acknowledged that the effects of GHG emissions cause adverse environmental impacts. AB 32 mandates that emissions of GHGs must be capped at 1990 levels by the year 2020 (Health and Safety Code section 38530).

Emissions of GHGs have the potential to adversely affect the environment because such emissions contribute, on a cumulative basis, to global climate change. Although the emissions of one single project, such as this, would not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change.

Regulatory Framework

Legislation and executive orders on the subject of climate change in California have established a statewide context and a process for developing an enforceable statewide cap on GHG emissions. Given the nature of environmental consequences from GHGs and global climate change, CEQA requires that lead agencies consider evaluating the cumulative impacts of GHGs, even relatively small (on a global basis) additions. Small contributions to this cumulative impact (from which significant effects are occurring and are expected to worsen over time) may be potentially considerable and therefore, significant.

Therefore, the global climate change analysis presented in this section estimates and analyzes the GHG emissions associated with construction- and operations-related activities that would occur under the Proposed Project.

<u>Brentwood General Plan</u>

- Goal COS 8 - Reduce air pollutants and GHG emissions.
    - Policy COS 8-6: Support the development and implementation of a GHG reduction plan, or Climate Action Plan, that addresses and reduces GHG emissions associated with community operations, including but not limited to, mobile sources (vehicle traffic), energy consumption, and solid waste.

- Policy COS 8-7: Coordinate with Contra Costa County and nearby cities to implement regional GHG reduction plans and consolidate efforts to reduce GHGs throughout the county.

- Policy COS 8-8: Encourage local businesses and industries to engage in voluntary efforts to reduce GHG emissions and energy consumption.

- Policy COS 8-9: Preserve, protect, and enhance, as appropriate, the city's carbon sequestration resources, also referred to as "carbon sinks," to improve air quality and reduce net carbon emissions.

- Policy COS 8-10: Encourage public transit, ridesharing and van pooling, shortened and combined motor vehicle trips to work and services, use of bicycles, and walking. Minimize single passenger motor vehicle use.

- Policy COS 8-11: Encourage new construction to incorporate passive solar features.

- Action COS 8c: Prepare and adopt a Climate Action Plan. The Climate Action Plan should include the following components:

    1. A baseline greenhouse gas (GHG) emissions inventory;

    2. An adopted GHG emissions reduction target of at least 15% below the business-as-usual projections by 2020;

    3. GHG reductions measures that apply to community wide operations;

    4. City operations, and future development projects; and,

    5. An implementation and monitoring program.

- Goal COS 9 - Promote conservation of energy and other natural resources.

    - Policy COS 9-1: Require all new public and privately constructed buildings to meet and comply with the most current "green" development standards in the California Code of Regulations (CCR), Title 24.

    - Policy COS 9-2: Support innovative and green building best management practices including, but not limited to, LEED certification for all new development, and encourage project applicants to exceed the most current "green" development standards in the California Code of Regulations (CCR), Title 24, if feasible.

    - Policy COS 9-3: Promote the use of alternative energy sources in new development.

- Policy COS 9-4: Incorporate innovative green building techniques and best management practices in the site design, construction, and renovation of all public projects.
- Policy COS 9-5: Promote water conservation among water users.
- Policy COS 9-6: Continue to require new development to incorporate water efficient fixtures into design and construction.
- Policy COS 9-7: Promote the use of reclaimed water and other non-potable water sources.
- Action COS 9c: Explore amending the Brentwood Municipal Code to incentivize the use of small-scale renewable energy facilities and, where appropriate, to remove impediments to such uses.

- Goal IF 3 - Provide adequate wastewater collection and treatment capacity.
  - Policy IF 3-1: Ensure adequate sewage conveyance and treatment infrastructure to meet existing and future development.
  - Policy IF 3-2: Maintain the existing wastewater system on a regular basis to increase the lifespan of the system and ensure public safety.

Methods

The Proposed Project would result in the construction and operation of a modular expansion of the wastewater treatment components including a new oxidation ditch/rectangular reactor, secondary clarifier, solids handling, and filter, and include the optional installation of a solids dryer and conversion of the chlorine disinfection system to UV light disinfection. The volume of solids processing would increase with the increased treatment capacity under the Proposed Project, which would result in additional dewatered biosolids hauling trips to the landfill if the City uses the belt filter press or centrifuges. If the City installs the solids dryer process option, the expansion would result in fewer hauling trips to transport biosolids to a nearby landfill or to land application sites, relative to the number of existing hauling trips. Criteria pollutant emissions would result from combustion of natural gas in the optional installation of the solids dryer process, VOC emissions from aerobic wastewater treatment processes, and vehicle exhaust emissions from employee commuting, deliveries, and offsite hauling of biosolids. Estimated additional annual natural gas usage, hauling and delivery trips, and number of employees for the existing conditions and Proposed Project conditions were provided by Robertson-Bryan, Inc. (pers. comm.); and additional details regarding the model inputs and assumptions can be found in **Appendix A**.

Construction and operational emissions were calculated using a combination of model and off-model methods along with the assumptions dictated in the project description. Emissions from wastewater treatment plant expansion construction were estimated with CalEEMod, as

recommended by BAAQMD (BAAQMD 2011). Greenhouse gas emissions generated by the project are presented in metric tons of CO_2 equivalents per year ($MTCO_2e$/year). This analysis uses 100-year GWP factors from IPCC's Fifth Assessment Report (IPCC 2013: Table 8.A).

Construction

Construction-related GHG emissions are described as "short term" or temporary in duration but have the potential to stay in the atmosphere for long durations. Construction-related activities would result in emissions of GHGs associated primarily with off-road (e.g., gas and diesel) construction equipment exhaust and secondary sources such as on-road hauling trucks and worker commute.

The methodology and assumptions used to calculate GHG emissions associated with construction activities of the project are consistent with those described in the discussion of Air Quality impacts above (Section 3.3).

Operations

During project operation, GHG emissions would result from vehicle activity, combustion of natural gas, on-site electricity usage, and certain process emissions. Operations-related emissions were evaluated for the following three project scenarios to estimate the range of minimum to maximum effects that may occur from the optional facilities and operations that may be implemented, as described in the Project Description (Section 2.5.1):

> **"Proposed with Same Processes":** Modular expansion of the current treatment unit processes with the same or similar processes to provide 7.5 MGD wastewater treatment capacity. Disinfection with free chlorine or chloramination, solids handling using centrifuges and rectangular reactor are considered similar processes.
>
> **"Proposed with Dryer":** Modular expansion of the current treatment unit processes to provide 7.5 MGD wastewater treatment capacity plus the additional solids dryer that uses natural gas as the fuel source.
>
> **"Proposed with Dryer and Ultraviolet (UV) Disinfection":** Modular expansion of the current treatment unit processes to provide 7.5 MGD wastewater treatment capacity plus the additional solids dryer and conversion of the existing chlorine disinfection process to ultraviolent (UV) light disinfection.

Electricity would be required to power pumps, and other equipment. Additional waste going through nitrification-denitrification and effluent discharge would generate N_2O emissions. Little to no CH_4 emissions are anticipated from the wastewater treatment system due to its aerobic design. Estimated electricity usage for each alternative was provided by RBI. A CO_2 emission factor of 290 lb CO_2/MWh was available from PG&E and reflects the estimated conditions in 2020 at the start of project operation (PG&E 2015). CH_4 and N_2O emissions were calculated

using default emission factors from CalEEMod 2013.2.2. N_2O from nitrification-denitrification and effluent discharge processes was calculated using Equation 10.7 and 10.9 from the International Council for Local Environmental Initiatives (ICLEI) Community Protocol (ICLEI 2012).

The proposed expanded treatment capacity of the WWTP is designed to support population growth anticipated in the Brentwood General Plan. However, full buildout of the city under the General Plan is not anticipated to occur until 2035.

Thresholds of Significance

The BAAQMD does not have a threshold for construction-related GHG emissions. For further context, refer to the discussion on Thresholds of Significance in the Air Quality section above.

With respect to stationary sources, the BAAQMD recommends a 10,000 $MTCO_2e$ per year threshold. The BAAQMD's CEQA Thresholds Options and Justification Report outlines substantial evidence supporting a variety of thresholds of significance, noting that limiting stationary source emissions to 10,000 $MTCO_2e$ per year per project would capture 95 percent of all GHG emissions from new permit applications in the SFBAAB (BAAQMD 2009:28). Therefore, because the proposed project is primarily a stationary source and is located within the BAAQMD's jurisdiction for which these thresholds were determined to be applicable, the City considers the threshold of 10,000 $MTCO_2e$ per year to be an acceptable threshold for CEQA significance with regards to GHG emissions from stationary sources, such as wastewater treatment plant operations. Note that the Proposed Project also would result in non-stationary GHG emissions from mobile and indirect sources (i.e., electricity use), in addition to on-site stationary sources (i.e., off-gassing from wastewater processes, and optional natural gas use for the solids dryer). However, the City considers these emissions as part of the stationary source operations.

Thus, based on Appendix G of the CEQA Guidelines, impacts are considered significant if implementation of the proposed project would do any of the following:

- generate GHGs, either directly or indirectly, that may have a significant impact on the environment (i.e., result in emissions that exceed 10,000 $MTCO_2e$ per year for operation of a stationary source); or,

- conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

For informational purposes only, the Proposed Project is compared against the "Permitted Future" scenario which represents the existing WWTP capacity of 5 MGD and existing treatment unit processes. Consistent with the state CEQA Guidelines, the significance of operational air quality impacts was determined by comparing the changes in emissions between the Proposed Project and existing conditions with respect to the applicable significance thresholds.

Note: Regarding California Supreme Court Decision in the Center for Biological Diversity V. California Department of Fish and Wildlife/Newhall Ranch (CBD vs. CDFW) Case

In the case of Center for Biological Diversity v. California Department of Fish and Wildlife (Newhall Ranch), the California Supreme Court found that the California Department of Fish and Wildlife's (CDFW) record lacked substantial evidence to support the conclusion that GHG impacts would be less than significant. In assessing the significance of GHGs in this case, the Environmental Impact Report (EIR) inquired whether project-generated emissions (i.e., 269,053 MT CO_2e]) "…would impede the State of California's compliance with the statutory emissions reduction mandate established by AB32 (the Global Warming Solution Act of 2006)". The analysis in the EIR compared project-generated emissions against those that would occur under a "business as usual (BAU)" scenario (i.e., 390,046 MT CO_2e).

Because the Newhall Ranch project would reduce GHG emissions 31 percent below the BAU scenario by 2020, which was better than the 29 percent average reduction required for the State as a whole, the EIR concluded the project would not impede achievement of state goals and the GHG emissions impact would be less than significant. The Court concluded that "the Scoping Plan nowhere related the statewide level of reduction effort to the percentage of reduction that would or should be required from individual project" and that "nothing … in CDFW's … record indicates that required percentage reduction from BAU is the same for an individual project as for the entire state population and economy". In addition, the Court stated that "at bottom, the EIR's deficiency stems from taking a quantitative comparison method developed by the Scoping Plan as a measure of the GHG emissions reduction effort required by the state as a whole, and attempting to use that method, without consideration of any changes or adjustments, for a purpose very different from its original design: To measure the efficiency and conservation measures incorporated in a specific land use development proposed for a specific location". In summary, the Newhall Ranch decision reveals the challenges of using a BAU threshold comparison that is based on achieving the average statewide level of GHG reduction from the Scoping Plan in the context of an individual land use development project.

As mentioned, the proposed project is under jurisdiction of the BAAQMD, which has developed thresholds to determine significance of GHG emissions at the project level. The BAAQMD-developed thresholds are based on absolute numerical thresholds and do not rely on comparisons to a project's BAU scenario as it relates to the Scoping Plan. Although the district thresholds are still under litigation, Contra Costa County has determined that BAAQMD thresholds are acceptable for CEQA significance with regard to GHG emissions. Thus, the decision from CBD v. CDFW may not apply to the proposed project.

3.7.2 Discussion

a) GHG emissions generated by the proposed project would predominantly be in the form of CO_2 from the exhaust associated with worker commute trips, haul truck trips, equipment used on-site (e.g., natural gas burners, construction equipment), and off-site electricity generation. CH_4 and N_2O are also important with respect to global climate change. Fuel combustion in vehicles and the proposed optional implementation of a solids dryer fueled by

natural gas would result in nominal CH_4 and N_2O emissions. However, wastewater processes, such as the nitrification-denitrification of wastewater can result in considerable N_2O emissions which have a high GWP factor of 265.

Based on the thresholds discussion above, implementation of the Proposed Project would generate GHG emissions that may have a significant impact on the environment if operational emissions exceed 10,000 $MTCO_2e$ per year. The analysis of the potential construction- and operations-related emissions of the Proposed Project are presented below.

Construction

Construction of the project would generate GHG emissions from off-road heavy-duty equipment, trucks hauling construction supplies, and worker commute trips. As mentioned in the project description (Section 2.5.2), construction would start in mid-2017 and last up to 24 months through 2019. Annual GHG emissions associated with construction of the project are shown in **Table 10**.

Table 10. Summary of Modeled Emissions of GHG Associated with Project Construction Activities [1].

Year	$MTCO_2e$/year
2017	323
2018	515
2019	75
Project total emissions	913
Amortized Construction Emissions[2]	23

Notes:
1 Modeled using CalEEMod 2013.2.2.
2 Assumes a 40-year lifetime for the wastewater treatment expansion.

CO_2e = carbon dioxide equivalents
MT = Metric Tons

See Appendix A for detail on model inputs, assumptions, and project specific modeling parameters.
Source: Modeling conducted by Ascent Environmental, Inc. in 2016.

The maximum annual GHG emissions (515 $MTCO_2e$) from construction would occur in 2018. To determine whether emissions from construction activities exceed thresholds, construction emissions were amortized assuming a 40-year lifetime for the expanded wastewater facilities. Due to the cumulative effects of GHGs in the atmosphere, amortized construction emissions are included with annual operation emissions estimates which are compared to BAAQMD thresholds.

Operations

During operations, implementation of the Proposed Project is anticipated to increase net emissions through the combined changes in employee trips, hauling trips, electricity use,

natural gas use, and wastewater treatment processes. The project could operate under the three potential options described in Air Quality (Section 3.3 above), checklist question (b). Emissions results under each option are presented below.

At full operational capacity (7.5 MGD), the Proposed Project would result in a net increase in GHG emissions compared to the existing conditions for the WWTP. As shown in **Table 11**, the proposed WWTP expansion would increase employee trips and energy use under all options, but the optional implementation of a solids dryer would result in lower hauling trips than existing conditions. This is because the drying process results in a considerable reduction in the weight of biosolids to be hauled, and thus facilitates use of larger capacity trucks.

Table 11. Comparison of Proposed Project Variables for GHG Emissions Calculation [1].

Parameter	Existing Conditions [2]	Permitted Future [2]	Proposed - Same Processes	Proposed with Solids Dryer	Proposed with Dryer and UV
WWTP Capacity (MGD)	3.7	5	7.5	7.5	7.5
Employee Trips (round trips/day)	13	13	15	15	15
Hauling Trips - Biosolids (round trips/yr)	370	430	550	110	110
Hauling Trips - Chemicals (round trips/yr)	44	60	90	90	45
Electrical Energy Use (Annual MWh)	5,434	8,200	13,000	13,300	14,300
Natural Gas Use (therms)	0	0	0	242,000	242,000
Nitrogen in Effluent Discharge (kg N/day)[3]	119	110	138	138	138

Notes: Analysis assumes 12 miles per trip for employee trips, 24 miles per trip for biosolids hauling trips, and 15 miles per trip for chemical hauling trips.

1 Full capacity operation is assumed to begin in 2020.
2 Shown for comparison only
3 Used to determine nitrous oxide emissions.

kg N/day = kilograms of nitrogen per day
MGD = million gallons per day
MWh = megawatt-hours
UV = ultraviolet
WWTP = wastewater treatment plant
yr = year

Source: Data provided by Robertson-Bryan, Inc. (pers. comm.)

Based on the changes in operational parameters shown in Table 11, the modeled net change in annual emissions compared to existing conditions are summarized in **Table 12** and described below. Based on the modeling conducted, the project-related activities would result in a maximum increase in emissions of 2,523 $MTCO_2e$/year compared to the existing

conditions. This estimate includes amortized construction emissions. These emissions levels would be less than the selected threshold of significance of 10,000 $MTCO_2e$/year. Thus, the project-generated operational emissions would not result in a cumulatively considerable net increase of GHGs. Therefore, this impact is considered to be **less-than-significant**.

Table 12. Summary of Net GHG Emissions for Proposed Project Operations ($MTCO_2e$/year) [1].

Scenario	Change in Emissions Compared to Existing Conditions			
	Permitted Future	Proposed - Same Processes	Proposed with Solids Dryer	Proposed with Solids Dryer and UV Disinfection
Employee Trips	-	5	5	5
Hauling Trips	5	16	-19	-19
Electricity Use	367	1,003	1,043	1,176
Natural Gas Use	-	-	1,298	1,298
Process Emissions	2	40	40	40
Amortized Construction Emissions	0	23	23	23
Total Emissions	375	1,088	2,390	2,523
Thresholds of Significance for Operational Emissions		10,000		
Exceed Thresholds?		No	No	No

Notes:

1 Full capacity operation is assumed to begin in 2020.

- = zero emissions
CO_2e = carbon dioxide equivalents
GHG = greenhouse gas
MT = Metric Tons
UV = ultraviolet

See Appendix A for detail on model inputs, assumptions, and project specific modeling parameters.

b) Although the project would result in a net increase in GHG emissions, as discussed in b), the maximum annual GHG emissions associated with this project would be less than the operational threshold of 10,000 MTCO2e/year. The project is also consistent with the General Plan, which has goals and policies that aim to reduce GHG emissions in the city in coordination with efforts of the County and nearby cities and requires sufficient wastewater treatment to meet the growth projected under the General Plan (Goal COS 8, Goal IF 3). The General Plan generally promotes energy and water conservation, the use of renewable energy, and building efficiency standards in an effort to reduce GHG emissions, but relies on the development of a future Climate Action Plan (CAP) to specify the exact reduction measures the City would apply.

While the City has not yet prepared a CAP, BAAQMD developed the 10,000 MTCO2e/year threshold for stationary sources to show consistency with AB 32 and the Scoping Plan. Therefore, while the project results in a contribution to GHG emissions among the various GHG sources in the city, the incremental and minor increase in GHG emissions would not conflict with or obstruct implementation of ARB's Scoping Plan for achieving GHG reductions consistent with AB 32 and BAAQMD's guidance, and would not impede the city's ability to achieve overall GHG reductions within the city. Therefore, this impact would be **less than significant**.

3.8 HAZARDS & HAZARDOUS MATERIALS

	Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a)	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☑
b)	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?	☐	☐	☐	☑
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☑
d)	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?	☐	☐	☐	☑
e)	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 project area?	☐	☐	☐	☑
f)	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?	☐	☐	☐	☑
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☑
h)	Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☑

3.8.1 Setting

A hazardous waste is a substance, or mixture, with properties that make it potentially dangerous or harmful to human health or the environment. Specifically, hazardous wastes include waste listed on one of the four Resource Conservation and Recovery Act (RCRA) hazardous wastes lists—the F-list (non-specific source wastes), K-list (source-specific wastes), P-list and U-list (both lists consist of discarded commercial waste products), or that exhibits one of the four characteristics of a hazardous waste—ignitability, corrosivity, reactivity, or toxicity.

The Proposed Project facilities are not located within two miles of any airport or airstrip, and no hazardous waste sites are anticipated to be encountered in the project area (City of Brentwood 2014b). The site also is not located in a wildland fire hazard area or a designated California Department of Forestry and Fire Protection area.

3.8.2 Discussion

a-h) The Proposed Project does not involve any construction or change in operations that would change the use of any hazardous materials or affect or generate hazardous wastes. Therefore, no effects on hazards and hazardous materials are anticipated as a result of implementing the Proposed Project. Therefore, there would be **no impact**.

3.9 HYDROLOGY AND WATER QUALITY

	Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a)	Violate any water quality standards or waste discharge requirements?	☐	☑	☐	☐
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☑	☐
c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☑	☐
d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☑	☐
e)	Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☑	☐
f)	Otherwise substantially degrade water quality?	☐	☑	☐	☐

g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☑
h)	Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☑
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☑
j)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☑

3.9.1 Setting

Regional Overview

The city of Brentwood is located in eastern Contra Costa County within the Marsh Creek watershed, which originates on the eastern flanks of Mount Diablo in the Diablo Range of the coastal mountains. Brentwood has a Mediterranean climate with dry, warm summers and cool, wet winters. Annual rainfall averages about 12.5 inches, which occurs primarily from November through March. Topography within the city and project area includes low hills of the Diablo Range up to an elevation of about 425 feet above mean sea level (msl), and a generally level alluvial plane surrounding the Sacramento River-San Joaquin Delta (Delta) that slopes east and north down to an elevation of about 25 feet msl.

Surface Water Resources

Marsh Creek is the dominant stream in the project area. From the slopes of Mount Diablo, Marsh Creek passes through Brentwood and traverses north to its confluence with the San Joaquin River and the large embayment area known as Big Break within the Delta. A dam forms Marsh Creek Reservoir at the base of the foothills, about ten river miles upstream from Big Break, where Marsh Creek enters the city limits, and provides detention of high flows for flood control and storage of winter runoff. Downstream from the reservoir, Marsh Creek is a generally meandering channel and transitions to a large constructed trapezoidal channel with flood protection levees downstream of the confluence with Sand Creek. Dry Creek, Deer Creek, and Sand Creek are small streams that flow eastward from the slopes of the Diablo Range to join the lower Marsh Creek channel. Rainfall runoff generated in the city is conveyed via the stream channels and constructed stormwater drainage systems that discharge to the ditches, streams, and Marsh Creek areas within the city. All of these streams within the city have generally been straightened with constructed flood control levees, which are under the control of the Contra Costa County Flood Control and Water Conservation District (CCCFCWCD). The lower Marsh Creek channel within the city limits has a designated 100-year floodplain by the Federal Emergency Management Agency (FEMA) that is generally confined within the flood control levees in the project area, and the WWTP is not located within the 100-year floodplain (City of Brentwood 2014b).

The United States Geological Survey (USGS) installed a streamflow gauge in Marsh Creek approximately 800 feet upstream of the WWTP effluent discharge outfall. Data from this gauge represents the runoff in the upper watershed as attenuated by Marsh Creek Reservoir, plus additional inflows downstream of the dam. The City contracted with the USGS to operate the gauge until October 2013, at which time the gauge monitoring was discontinued. A summary of descriptive statistical streamflow parameters based on monthly average streamflow data from the USGS gauge are shown in **Table 13**, which indicate that the lowest average streamflow occurs during July through September. Daily data from the USGS gauge indicates nearly continuous flow throughout the year; however, periods of no flow occurred in several periods in May 2012 and July 2012 lasting up to several days at a time. Continuous flow was observed in the critical water years of 2007, 2008, and 2013. A review of historical aerial photos of Marsh Creek taken during low-streamflow conditions indicates that the year-round flow occurs in the approximately four miles of lower Marsh Creek channel from the Dry Creek confluence to the WWTP outfall. The aerial photos indicate that the reach upstream of the Marsh Creek Reservoir is ephemeral (i.e., exhibiting seasonal streamflow conditions in the winter months and dry conditions in the summer months). The generally continuous streamflow pattern downstream of the reservoir within the city urban area is likely associated with the additional flow contributed from Dry Creek, Sand Creek, and Deer Creek, urban drainage, and incidental runoff from landscape irrigation and golf courses. The Brentwood WWTP contributes additional year-round flow to the lower reach of Marsh Creek that is relatively constant throughout the year (i.e., daily average discharge of 5.1 CFS or 3.3 MGD in 2013). The WWTP discharge comprises a majority of the total streamflow in the lower reach of Marsh Creek during the summer months. Tidal action provides daily water exchange in the lower one mile of the Marsh Creek channel. There is no streamflow gauge in Marsh Creek downstream of the WWTP.

Table 13. Descriptive Statistical Streamflow Variables (CFS) for Marsh Creek at the USGS Gauge (#11337600) for the 2001-2013 Water Years.

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Count	403	367	403	390	403	390	403	409	420	403	390	403
Average	21.0	18.1	19.6	14.2	5.0	3.5	2.7	2.9	2.7	3.6	3.4	18.1
Std Dev	65.1	38.1	42.5	38.6	6.1	2.9	1.7	2.2	2.5	18.3	14.8	60.1
Minimum	1.1	1.1	0.9	1.7	0.5	0.8	0.6	0.5	0.5	0.9	0.5	0.3
Maximum	83.8	48.9	75.4	105.7	18.6	6.4	5.4	5.6	5.2	13.7	13.5	70.1

Groundwater Resources

As defined by the Department of Water Resources (DWR) in Bulletin 118 (DWR 2006), Brentwood is located towards the northern end of the Tracy Subbasin of the San Joaquin Valley Groundwater Basin. Freshwater resources within the subbasin occur in the upper continental deposits created from erosion associated with variable lake, stream, and sea level changes in the Central Valley over the past 5 million years. The continental deposits are characterized by four major stratigraphic layers—Tulare Formation, Older Alluvium, Flood Basin Deposits, and Younger Alluvium—that begin at the western edge of the uplifted Diablo Range foothills, and

increase in depth to about 3,000 feet along the eastern margin of the subbasin. The city has seven municipal water supply wells in service that are constructed at depths of 200 to 660 feet below ground surface (BGS) in the Tulare Formation. The Tulare Formation consists of semi-consolidated, poorly sorted, and discontinuous layers of gravel, sand, silt, and clay. Most domestic wells in the region are shallower and constructed in overlying alluvium that is up to about 150 feet thick.

Groundwater conditions in the Brentwood region (e.g., water table levels, groundwater storage) are a function of geologic characteristics of the aquifers, sources of groundwater recharge (i.e., rainfall, runoff in stream channels, and agricultural irrigation drainage), groundwater pumping for agricultural and municipal use, and lateral groundwater inflow and outflow from the area. A comprehensive review of groundwater information for the City conducted in the late 1990's identified that groundwater levels under the Brentwood region are slightly sloped downward from west to east in the southern part of the city, and southwest to northeast in the northern area (Lawrence Livermore National Laboratory 1995). At the time of the study, the largest source of groundwater recharge was agricultural irrigation and drainage associated with the approximately 37,500 AFY of water delivered to farms in the Brentwood area by the East Contra Costa Irrigation District (ECCID), followed by rainfall and groundwater inflow to the basin. The city and ECCID's uses of groundwater represented the largest sources of groundwater extraction, and groundwater was the city's only source of water until the late 1990's, with combined city/ECCID pumping levels up to about 7,000 AFY. The water table ranged from about 25 feet BGS in the north and east sections to about 100 feet BGS near the base of the Diablo Range foothills, and as evidenced by relatively stable levels over the previous 50 years, indicated that groundwater storage was generally static throughout the region with no substantial losses or gains.

As growth in the city occurred, the City developed a municipal water service system and began purchasing surface water from the Contra Costa Water District (CCWD), and completed construction of the Brentwood Water Treatment Plant (WTP) in 2008 to facilitate additional use of surface water from the Delta. The city's water supply is now comprised of an average of about 70 percent surface water (i.e., averaging 7,000 AFY) and 30 percent groundwater. Groundwater use in 2009-2013 (since the Brentwood WTP came online) has ranged from 2,700 AFY to 4,900 AFY.

Surface and Groundwater Quality

Available information characterizing existing water quality conditions in Marsh Creek is limited to routine weekly monitoring data collected by WWTP staff for the NPDES permit for several general parameters (i.e., temperature, dissolved oxygen [DO], electrical conductivity [EC], pH, and turbidity) at a site upstream and site downstream of the effluent discharge (RSW-001 and RSW-002, respectively). In general, water quality in Marsh Creek upstream of city limits is anticipated to be relatively low in contaminants of concern because the upper watershed is undeveloped and there are no major natural or industrial contaminant sources. However, within the city limits, urban stormwater runoff can contain suspended sediment, trash, organic matter, nutrients (e.g., nitrogen and phosphorus), pathogens (i.e., bacteria and viruses from fecal wastes of domesticated animals and pets), vehicle wastes from pavement including petroleum products

and trace metals (e.g., copper), and commonly used residential and commercial landscape pesticides. The Marsh Creek channel downstream of Marsh Creek Reservoir is designated impaired by diazinon, mercury, E. coli bacteria, sediment toxicity, and unknown toxicity in the SWRCB 2010 Clean Water Act (CWA) Section 303(d) list of impaired water bodies.

The city's existing wells obtain groundwater from deeper layers of the aquifers considered suitable for all uses and compliant with human health standards. The City routinely monitors untreated groundwater supplies for constituents regulated by human health standards including nitrate, fluoride, metals (i.e., arsenic, chromium, and selenium), and disinfection byproducts as well as constituents for consumer acceptance including salinity parameters (EC, chloride, sulfate, and total dissolved solids [TDS]), pH, and hardness (City of Brentwood 2014c). The groundwater exhibits a near-neutral range of pH (i.e., 6.5 to 7.5) and thus, is neither excessively acidic or alkaline.

Groundwater in the Brentwood region has relatively elevated salinity and total hardness levels, and is generally characterized as having calcium and sodium as the dominant cations and bicarbonate and chloride as the dominant anions (Lawrence Livermore National Laboratory 1995). Consequently, use of residential water softeners is prevalent in the city for hardness control. Through the increased use of Delta source waters for the municipal supply relative to groundwater use, the average hardness of delivered municipal water has decreased steadily in the past several years (City of Brentwood 2014c). The City is conducting outreach with information included in the annual Consumer Confidence Reports (i.e., reports prepared annually that summarize potable water quality performance) to inform customers of the improved hardness conditions and reduced levels of water softening needed, and additionally is developing an incentive program for residents to remove softeners. Salinity in the Brentwood region, measured as EC, is usually between 1,000 and 2,000 µS/cm. Conductivity is generally lower in easterly-located wells and higher in westerly- and centrally-located areas. Additionally, shallower groundwater wells in the region have been affected by overlying land use and agricultural activities over many years. Nitrate is elevated in some areas, and the City has discontinued using some wells due to excessive nitrate. Shallow groundwater also exhibits generally elevated salinity levels compared to deeper groundwater.

Regulatory Framework

Regulations, plans or policies relevant to the management of hydrology and water quality in the project area and considered in this evaluation include federal and state water quality regulations, and the City's General Plan policies.

Federal Water Quality Regulations

The Clean Water Act (CWA) establishes the policies and procedures for protection of the nation's surface water resources and regulation of waste discharge activities. The law authorizes the USEPA to set standards (technology and water quality) and permitting procedures for point-source industrial and municipal wastewater discharge activities and municipal stormwater. The USEPA has delegated many of the permitting, administrative, and enforcement aspects of the

CWA to the SWRCB and the nine Regional Water Quality Control Boards (Regional Water Boards). In 2000, the USEPA promulgated the California Toxics Rule (CTR), which includes criteria for toxic pollutants that are applicable to California's surface waters. USEPA also sets National Recommended Water Quality Criteria which are advisory surface water criteria.

The USEPA, under the Safe Drinking Water Act (SDWA), sets national drinking water standards, or maximum contaminant levels (MCLs), applicable to treated drinking water to protect against health risks considering available technology and costs. The owners and operators of public water systems are required to comply with primary (health-related) MCLs and encouraged to comply with secondary MCLs (i.e., for nuisance or aesthetic effects). The SWRCB DDW oversees the SDWA regulations.

Section 303(d) of the CWA requires states to identify water bodies that will not attain water quality standards after implementation of minimum required levels of treatment by point-source dischargers. Section 303(d) requires states to develop a total maximum daily load (TMDL) and implementation program for listed pollutants and water bodies. A TMDL is the amount of loading that the water body can receive and still meet water quality standards.

State Water Quality Regulations

Porter-Cologne Water Quality Control Act. Under the Porter-Cologne Water Quality Control Act, the SWRCB (and nine Regional Water Boards) must adopt water quality policies, plans, and objectives that ensure beneficial uses of surface and groundwater are reasonably protected. The SWRCB administers water rights, water pollution control, and water quality functions, while the Water Boards conduct planning, permitting, and enforcement activities. The Regional Water Boards issue Waste Discharge Requirements (WDRs) for the discharge of wastes that may affect surface waters or groundwater.

Water Quality Control Plan. The Central Valley Water Board's Water Quality Control Plan for the Sacramento River and San Joaquin River Basins (Basin Plan) (CVRWQCB 2015) defines beneficial uses of water resources, water quality objectives, and implementation programs applicable to Marsh Creek, a portion of which is within the legal boundary of the Delta. The Basin Plan contains specific numeric water quality objectives for surface waters for bacteria, DO, pH, pesticides, EC, TDS, temperature, turbidity, and some priority toxic pollutants (i.e., some trace metal and organic compounds), as well as narrative water quality objectives for several constituents. In addition, the Basin Plan contains objectives for groundwater, including MCLs applicable to groundwater designated with the municipal and domestic supply beneficial use.

Antidegradation Policy. The State's antidegradation policy (SWRCB Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California) is to maintain high-quality waters where they exist in the state. The antidegradation policy requires protection of all existing beneficial uses that existed at the time of the policy adoption, and specifies that degradation of high quality water is only when demonstrated that beneficial uses

would not be unreasonably affected, and the highest quality water consistent with the maximum benefit to the state would be achieved.

Recycled Water Regulations. Recycled water quality and reuse activities are regulated by the SWRCB's DDW. Statewide uniform recycled water quality criteria are established by DDW and specified in Title 22, Division 4, Chapter 3, section 60301 et. seq. of the CCR. The Title 22 regulations set treatment process, treatment reliability, and recycled water reuse requirements for the protection of public health from pathogens. The uses of recycled water regulated under Title 22 include landscape irrigation, recreational impoundments, industrial and commercial cooling, and other uses with limited public exposure (e.g., construction uses, fire fighting). The treatment requirements are based on the expected degree of human contact with recycled wastewater under each type of use and are most stringent for the uses that involve potential public contact. Irrigation of food crops, parks, playgrounds, school yards, residential areas, cemeteries, and golf courses require recycled water at all times to be adequately oxidized, coagulated, clarified, filtered, and disinfected.

The SWRCB (and Regional Water Boards) are responsible for issuing water recycling requirements in accordance with the CWC, section 13523. The SWRCB adopted a Recycled Water Policy in 2009 and amended in January 2013 intended to facilitate and guide the increased use of recycled water from municipal wastewater sources, and thereby contribute to water conservation in California. In adopting the policy, the SWRCB declared, "…recycled water is safe for approved uses, and strongly supports recycled water as a safe alternative to potable water for such approved uses….." when used in compliance with Title 22 requirements. The SWRCB additionally adopted General WDRs for Recycle Water Use (Order WQ 2014-0090-DWQ) in June 2014 to facilitate additional streamlining in the permitting process for recycled water projects. Among many standard terms and conditions in Order WQ 2014-0090-DWQ to ensure compliance with Title 22 regulations, the WDRs additionally require recycled water uses to be consistent with any Salt and Nutrient Management Plan adopted by a Regional Water Board for the area.

State Water Resources Control Board NPDES General Construction Storm Water Permit. The SWRCB adopted a general NPDES permit for storm water discharges associated with construction activity (Construction General Permit) in Order No. 2009-0009-DWQ (as amended by revised orders 2010-0014-DWQ and 2012-006-DWQ). The Construction General Permit applies to projects that involve soil disturbance of more than one acre, and includes specific requirements based on the "risk level" of the site. Three different risk levels are dependent on two factors: 1) project sediment runoff risk; and 2) receiving water risk. Obtaining coverage under the Construction General Permit requires filing of a Notice of Intent and preparing and implementing a storm water pollution prevention plan (SWPPP), which specifies best management practices (BMPs) to reduce or eliminate sediment and other pollutants in storm water as well as non-storm water discharges.

<u>City of Brentwood General Plan</u>

The Conservation and Open Space (COS) element of the General Plan addresses the protection of water resources in goal COS-4, as follows: *Protect and enhance water resources in local creeks, riparian habitat, wetlands, the Marsh Creek Watershed, and aquatic habitat*.

3.9.2 Discussion

a) This section addresses the potential for construction- and operations-related effects of the Proposed Project to adversely affect surface and groundwater quality via the exceedance of a water quality standard or a waste discharge requirement. A water quality standard has three components: 1) the designated beneficial use, 2) the water quality objectives/criteria adopted to protect the designated beneficial uses, and 3) an antidegradation policy. It should be noted that an exceedance of a water quality objective/criterion is but one of many considerations that go into determining whether a change in water quality would result in a significant environmental impact (i.e., adverse effect on the designated beneficial uses of a water body). For the purposes of this assessment, the frequency, magnitude, and geographic extent of any objective/criterion exceedance caused by the Proposed Project is evaluated to determine whether adverse effects to beneficial uses of the water would occur. If the Proposed Project would result in consistent compliance with applicable water quality objectives/criteria and beneficial uses would not be adversely affected by the Proposed Project, then it was determined that a significant water quality impact would not occur.

Construction-Related Water Quality Effects

Construction activities for the Proposed Project would involve storage, handling, and use of construction materials (e.g., fuels, concrete, paints, cleaners and solvents) that may contain contaminants potentially harmful to water quality. Construction activities also would involve site grading, excavation, and facility construction activities that would occur over the course of approximately 24 months. Therefore, the construction areas could be exposed to rainfall and runoff events, and exposure of disturbed soil could be subject to erosion and suspended sediment and other construction-related contaminants could be discharged offsite in runoff. If shallow groundwater is present in the project area, excavations also may require temporary site dewatering and disposal to accommodate construction activities. Consequently, construction activities could result in the discharge of constituents of concern to receiving waters in the project area (e.g., Marsh Creek and other small streams and drainage channels). Aquatic life beneficial uses of surface waters would be the most sensitive beneficial uses of water to contaminants discharged from construction site runoff, which may include suspended sediment and turbidity, toxic organic compounds in petroleum products, and trace metals (e.g., copper, zinc). Therefore, the temporary construction-related water quality impacts of the Proposed Project would be potentially significant. With implementation of Mitigation Measure HWQ-1, this impact would be **less than significant**.

MITIGATION MEASURE HWQ-1. IMPLEMENT CONSTRUCTION BMPS FOR WATER QUALITY PROTECTION.

The City, or its designated general contractor, shall obtain authorization of project construction activities under the SWRCB's NPDES Construction General Permit (Order No. 2009-0009-DWQ/NPDES Permit No. CAS000002, and any applicable amendments), for any activities not subject to exemption from the permit. The Stormwater Pollution and Prevention Plan (SWPPP) prepared for permit will describe the BMPs that will be used to avoid and minimize potential construction-related contaminant discharges at construction sites. Compliance with this mitigation shall be included as a condition of the construction contract(s) between the City and applicable construction contractor(s), and as appropriate, shall additionally be included in final project designs and specifications that are prepared for the Proposed Project. The City will be responsible for ensuring that the construction is implemented in accordance with the Construction General Permit.

Operations-Related Water Quality Effects

At the time the Proposed Project is constructed, the city's Recycled Water Project will be completed and operational. The Recycled Water Project, as shown in Figure 4 (see section 2.6 above), will result in the distribution and use of most of the treated wastewater that is produced during the months of April through September as Title 22 recycled water to meet landscape irrigation demands. Concurrently, the effluent discharge to Marsh Creek during these months will be substantially reduced (and minimal in the peak irrigation months of June through August), and Marsh Creek streamflow downstream of the WWTP will be reduced. The city's CEQA Initial Study prepared for the Recycled Water Project (City of Brentwood 2015) evaluated the operations-related hydrology and water quality effects of increased recycled water use at the projected level of wastewater inflow in 2017 when the new recycled water pipelines, storage tanks, and pumping facilities will become operational.

Under the Proposed Project with the increased WWTP capacity of 7.5 MGD, as shown in Figure 5 and 6 above, recycled water use would increase to meet the irrigation demands of Phase B2/B3 customers and golf courses and there would be less surface water and groundwater used for landscape irrigation. The monthly average effluent and Marsh Creek streamflow rates (upstream and downstream of the WWTP) are shown in **Table 14** for the existing conditions, future conditions with implementation of the Recycled Water Project (projected for 2017 wastewater inflow conditions), and the Proposed Project with full use of the treatment capacity (7.5 MGD) and additional recycled water demands. During the irrigation season, the effluent discharge to Marsh Creek would be reduced (and groundwater use would be reduced) resulting in reduced Marsh Creek streamflow primarily in May through August compared to existing conditions (i.e., similar to conditions with the Recycled Water Project). Consequently, this assessment refers to and incorporates information presented in the Recycled Water Project Initial Study regarding the effects during the irrigation season.

During months with reduced demands of recycled water for landscape irrigation (i.e., generally October through March), the Proposed Project would result in increased effluent discharge to Marsh Creek compared to both existing conditions and the Recycled Water Project conditions as a result of the increased wastewater inflows and WWTP treatment capacity to 7.5 MGD. Accordingly, the assessment of the Proposed Project also is focused on the environmental effects to Marsh Creek during the low irrigation period when effluent discharge would increase relative to baseline conditions.

Table 14. Average Monthly Effluent Discharge (MGD) and Marsh Creek Streamflow (MGD) Under Existing Conditions and the Proposed Project Conditions.

Scenario	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Effluent Discharge (i.e., flow rate)												
Existing (2013)	3.3	3.4	3.4	3.4	3.1	3.2	3.1	3.2	3.2	3.3	3.5	3.5
Projected (2017) - Recycled Water Project	3.4	3.4	2.9	1.6	0.3	0.0	0.0	0.2	2.5	2.7	3.3	3.6
Proposed Project (Phase II Expansion)	7.1	7.0	5.8	3.6	1.2	0.0	0.0	0.2	3.6	5.0	6.5	7.0
Marsh Creek Monthly Average Streamflow – RWS-001 (i.e., upstream of WWTP)												
Average (2000-2013)	13.5	11.6	12.6	9.2	3.2	2.4	1.8	2.0	1.8	2.4	2.2	11.7
Minimum (2000-2013)	0.7	0.7	0.6	1.1	0.4	0.5	0.5	0.4	0.5	0.6	0.3	0.2
Marsh Creek Monthly Average Streamflow – RWS-002 (i.e., downstream of WWTP)												
Minimum – Projected 2017 (i.e., with Recycled Water Project)	4.2	4.1	3.5	2.6	0.7	0.6	0.5	0.6	3.0	3.4	3.7	3.8
Average – Projected 2017 (i.e., with Recycled Water Project)	17.0	15.0	15.5	10.7	3.5	2.5	1.8	2.2	4.3	5.2	5.6	15.3
Minimum - Phase II Expansion	7.8	7.7	6.4	4.7	1.7	0.5	0.5	0.7	4.1	5.7	6.8	7.3
Average - Phase II Expansion	20.6	18.6	18.4	12.8	4.5	2.4	1.8	2.3	5.4	7.5	8.7	18.7

Pursuant to the CEQA Guidelines requirements, the environmental impacts of the Proposed Project are evaluated primarily based on the changes that would occur compared to the baseline existing conditions. However, the potential effects also are considered with respect to the conditions that would exist when the Recycled Water Project is completed and becomes operational in 2017, as necessary to describe changes that could be more severe than effects compared to the existing conditions. The analysis of environmental effects to Marsh Creek is limited to the stream reach from the WWTP effluent discharge outfall extending downstream to the tidal zone at Big Break. Effects of Marsh Creek flows in Big Break and beyond in the Delta are considered minimal because the Marsh Creek flows are nearly immeasurable relative to the much larger average and daily tidal flows that occur in the western Delta. Additionally, the water quality assessment considers the effects to groundwater that may occur as a result of the additional use of recycled water for the city's irrigation water supply and less use of potable/non-potable water.

Existing water quality data available for constituents of concern in Marsh Creek and the WWTP effluent were evaluated to identify the constituents that may be affected by the

Proposed Project. A mass balance analysis was conducted to estimate the changes in constituent concentrations in Marsh Creek downstream of the WWTP effluent outfall due to the changes in WWTP discharge rate. The changes in effluent quality that would occur with implementation of the optional conversion of the existing chlorine disinfection system to a UV light disinfection process (or other disinfection improvements) are considered qualitatively.

The beneficial uses designated for Marsh Creek in the Basin Plan are contact and non-contact water recreation, commercial and recreational fish and shellfish harvesting, warm freshwater aquatic life, preservation of rare, threatened or endangered species. Accordingly, the assessment was focused on water quality changes that may be of sufficient magnitude, duration, and frequency to result in potential adverse effects to these existing beneficial uses. Marsh Creek is not designated for municipal drinking water use, agriculture, or cold freshwater aquatic life beneficial uses. Therefore, no assessment of the effects to these uses was conducted with the exception that potential to affect water quality conditions of importance to fall-run Chinook salmon, a coldwater species, were considered because the species makes opportunistic use of Marsh Creek (i.e., when hydrology and water quality conditions are suitable for such use).

Constituents of concern detected in Marsh Creek and WWTP effluent samples were evaluated in relation to applicable water quality objectives including CTR criteria and Basin Plan objectives. Applicable USEPA-recommended criteria also were considered where adopted state water quality objectives/criteria do not exist (e.g., ammonia) and where USEPA-recommended criteria are more specific and have a stronger scientific basis for use in assessing effects to beneficial uses compared to general Basin Plan objectives (e.g., dissolved oxygen). Constituents in the effluent and Marsh Creek were evaluated for potential effects to beneficial uses if detected at least once above an applicable objective, based on past monitoring data. Potential changes in receiving water concentrations were assessed with respect to appropriate averaging periods upon which the objectives are based (i.e., the tolerance of aquatic life to concentration changes depend on the time period considered). Acute criteria are applicable to changes over a short time period (e.g., 1-hour) and chronic criteria are applicable to longer time periods (e.g., 4-day or 30-day average). Effects of the Proposed Project on water temperature are addressed entirely in Section 3.4 ("Biological Resources") because fisheries and other aquatic biological resources are the primary and most sensitive resource to temperature. Constituents not detected in the effluent and Marsh Creek from past monitoring efforts (using appropriate analytical methods) were not assessed further because adverse effects would not be expected to occur when constituents are at such low levels (or not present).

Constituents detected in the effluent and Marsh Creek, regardless of the concentrations, also were evaluated for the potential to reduce water quality downstream of the WWTP effluent discharge over the long-term (i.e., cause degradation of existing conditions). If the Proposed Project would not cause increases in constituent concentrations in surface water bodies by frequency, magnitude, and geographic extent that would adversely impact the water body's beneficial uses, and the project would not cause substantial, long-term

degradation of water quality, then it was determined that the Proposed Project would not result in a significant water quality impact. Specific discussion for the potential of the Proposed Project to degrade water quality is provided in checklist question "f" below.

Table 15 provides a summary of average and maximum concentrations for constituents detected in the effluent, average concentrations in background Marsh Creek samples collected upstream of the WWTP effluent discharge location (i.e., identified in the NPDES permit as location RSW-001), and the applicable water quality objectives that were used for the assessment. Table 15 also shows the results of the mass balance analysis conducted to estimate constituent concentrations in Marsh Creek downstream of the effluent discharge. The water quality objectives for protection of aquatic life are the lowest objectives for Marsh Creek for the majority of constituents assessed. Based on the available data, there is no indication that the effluent discharge has potential to result in constituent concentrations in Marsh Creek exceeding any acute water quality objective (a single effluent sample value exceeding the acute ammonia criteria is discussed further below). Therefore, the mass balance was based on monthly average flows (i.e., effluent and RSW-001) and average constituent concentrations to evaluate potential changes relative to chronic objectives for the protection of aquatic organisms. The mass balance analysis for constituents of concern for long-term effects such as human health associated with consumption of aquatic organisms, and potential bioaccumulation in the food chain of wildlife, was based on average constituent concentrations and annual average flows. The mass balance analysis was evaluated for the existing conditions, 2017 baseline conditions following implementation of the Recycled Water Project, and Proposed Project. Additionally, mass balance analysis was conducted with data for July to reflect low-flow conditions during the primary months of irrigation water demands when the Proposed Project would result in reduced effluent discharge. For the low irrigation period of October through March, the mass balance analysis was conducted based on November data that reflects the lowest average monthly Marsh Creek streamflow (i.e., 2.2 MGD or 3.4 CFS).

Effects to Marsh Creek – Irrigation Period with Reduced Effluent Discharge

The available monitoring data indicate that constituents are not present in either the effluent or Marsh Creek at levels that would exceed the CTR aquatic life criteria for toxic constituents (i.e., trace metals) and therefore, implementation of the Proposed Project does not have the potential to result in receiving water concentrations exceeding any applicable criteria. Because the Proposed Project would reduce (or eliminate) effluent discharge during months of the irrigation season compared to existing conditions, the mass balance analysis demonstrates that the concentrations in Marsh Creek would be reduced for many constituents where background streamflow concentrations are lower than effluent concentrations. Chloride, an inorganic ion that contributes to salinity is the only constituent where the average effluent concentration exceeds the applicable chronic criterion. However, because chloride concentrations in background Marsh Creek flow are lower, the Proposed Project would result in reduced chloride concentrations in Marsh Creek downstream of the WWTP outfall.

Table 15. Mass Balance Constituent Analysis for Marsh Creek – Existing Conditions and Future Conditions with Recycled Water Project and Phase II Expansion.

Constituent	Units	Water Quality Objective [1]	Effluent Concentration		RSW-001 Marsh Ck. Conc.	Mass Balance Assessment for Marsh Creek Downstream of the WWTP [3]										
						Recycled Water Irrigation Period (July) [4]				Low Recycled Water Use Period (November) [5]						
			Avg [2]	Max	Avg [2]	Exist.	Ph. II Proposed Project	Change (Ph.II - Existing)		Exist.	RW Project (2017)	Ph. II Proposed Project	Change (Ph.II - Existing)		Change (Ph.II – RW Project)	
								Conc.	Assim. Capacity				Conc.	Assim. Capacity	Conc.	Assim. Capacity
Arsenic	µg/L	150	2 [j]	3.0	3.0	2.4	3.0	0.7	(0.4%)	2.4	2.4	2.3	(0.1)	0.1%	(0.2)	0.1%
Chromium	µg/L	349	1 [j]	3	1.4	1.2	1.4	0.4	(0.1%)	1.2	1.2	1.1	(0.1)	0.0%	(0.1)	0.0%
Copper	µg/L	10.4/ 25.5 [a]	6.0	11.2	5.6	5.8	5.6	(0.2)	5.0%	5.8	5.8	5.9	0.0	(1.1%)	0.1	(1.2%)
Lead	µg/L	6.1	0.2 [i]	0.70	0.51	0.3	0.51	0.2	(3.4%)	0.3	0.3	0.3	(0.0)	0.7%	(0.0)	0.8%
Nickel	µg/L	89	1 [j]	2	7.2	3.3	7.2	3.9	(4.6%)	3.4	3.5	2.6	(0.8)	1.0%	(0.9)	1.1%
Selenium	µg/L	5	1.4	2.4	3.1	2.0	3.1	1.1	(36%)	2.0	2.1	1.8	(0.2)	7.6%	(0.3)	8.5%
Zinc	µg/L	205	55 [j]	60	16	41	16	(25)	15%	40	40	45	5.2	(3.1%)	5.7	(3.5%)
Aluminum	µg/L	750 [b]	16	60	496	192	496	303	(54%)	201	208	138	(64)	12%	(70)	13%
Ammonia (as N)	mg/L	0.62 / 1.7 [c]	0.15	2.0	0.36	0.23	0.36	0.13	(36%)	0.23	0.23	0.20	(0.03)	7.7%	(0.03)	8.6%
Chloride	mg/L	356 / 577 [d]	378	442	182	306	182	(124)	_ _ [l]	303	300	329	26	(55%)	29	(58%)
Dissolved Oxygen	mg/L	5 [e]	7.7	n/a	2.1	7.1 [m]	2.1 [m]	(5.0) [m]	(<100%) [m]	6.5	6.5	6.9	0.4	19%	0.3	28%
Nitrate (as N)	mg/L	- - [f]	9.2	12.9	1.3	6.3	1.3	(5.0)	n/a	6.1	6.0	7.2	1.1	n/a	1.2	n/a
pH	Std.	>6.5 to <8.5 [g]	7.6	8.0	7.7	7.6	7.7	0.1	n/a	7.6	7.6	7.6	(0.0)	n/a	0.0	n/a
Phosphorus Total (P)	mg/L	- - [f]	1.8	3.3	0.6	1.3	0.6	(0.8)	n/a	1.3	1.3	1.5	0.2	n/a	0.2	n/a
Turbidity	NTU	<50/<20% change [h]	0.2	1.9	12	4.6	12	7.7	n/a	4.9	5.0	3.3	(1.6)	n/a	(1.8)	n/a
Constituents of Concern Relative to CTR Human Health Criteria for Consumption of Organisms [i]																
DEHP	µg/L	5.9	1.1	7	<2 [k]	1.0	1.0	0.0	(0.1%)							
Mercury	µg/L	51	0.0006	0.0011	0.0056	0.0037	0.0037	(0.0001)	0.0%							
DBCM	µg/L	34	18.9	59	<0.5 [k]	7.2	7.5	0.2	(0.9%)							
DCBM	µg/L	46	18.4	57	<0.5 [l]	7.0	7.3	0.2	(0.6%)							

Notes:

mg/L = milligrams per liter; µg/L = micrograms per liter; Std. = standard pH units; NTU = nephelometric turbidity units; "n/a" = not applicable; "Avg." = average; "Max" = maximum; "Exist." = existing conditions; "Assim." = assimilative; DEHP = bis(2-ethylhexyl)phthalate; DBCM = dibromochloromethane; DCBM = dichlorobromomethane

1 CTR aquatic life water quality criterion unless otherwise noted, as reported in the city's NPDES Permit (Order R5-2013-0106); shown as the CTR chronic criterion or "chronic / acute" criteria where the effluent concentration exceeds the chronic criterion. Hardness-dependent metal CTR criteria based on effluent hardness of 189 mg/L as $CaCO_3$ (and Marsh Creek hardness of 157 mg/L, as necessary).

2 Average constituent concentrations (i.e., 2011-2013)reported unless otherwise noted.

3 Mass balance estimate of average constituent concentrations downstream of the WWTP for three time periods: (a) existing conditions (2013 effluent discharge data); (b) with the city's Recycled Water (RW) Project implemented and 2017 conditions; and, (c) for the Proposed Project (Phase II Expansion) conditions. Analysis is based on representative effluent data for the period of Nov. 2011 through Dec. 2015 and USGS stream gauge records (2001-2013). Marsh Creek water quality monitoring data is from city studies in 2002/2003 and 2011 and routine monthly monitoring during Nov. 2011- Dec. 2015. Values in parentheses represent reduction in the variable compared to the baseline. Increases that result in exceeding the criteria completely eliminate the available assimilative capacity are shown as (<100%).

4 Mass balance analysis for July represents the period of the largest decrease in existing Marsh Creek flow downstream of the WWTP based on the monthly average effluent discharge rates and recycled water use during the primary months of landscape irrigation (April through September).

5 Analysis for November represents largest increase in Marsh Creek flow based on average effluent discharge and Marsh Creek streamflow in the low irrigation period (October through March).

a Applicable copper criteria are shown as Basin Plan objective / CTR acute criterion.

b Aquatic life criteria for aluminum have not been adopted in California. Hardness-dependent chronic total aluminum criterion is shown and based on the tabulated values for water hardness of 150 mg/L as $CaCO_3$ as shown in the Arid West Water Quality Research Project, Evaluation of the USEPA Recalculation Procedure in the Arid West, Technical Report (Parametrix et al. 2006).

c Ammonia criteria based on USEPA criteria published in 2013 and identified as "chronic/acute" for assumption that unionid mussels may be present in Marsh Creek. Lowest 30-day chronic criterion calculated from 30-day moving average of paired receiving water pH and temperature. Lowest acute criterion calculated from daily maximum Marsh Creek pH and temperature.

d Chloride chronic criteria as reported in the city's NPDES Permit (Order R5-2013-0106); based on USEPA criteria equation with effluent hardness (189 mg/L as $CaCO_3$) and sulfate concentration (172 mg/l as SO_4).

e The Basin Plan specifies the objective for DO as 5 mg/L for waters within the legal boundary of the Delta… "except for those bodies of water which are constructed for special purposes and from which fish have been excluded or where the fishery is not important as a beneficial use." USEPA national recommended dissolved oxygen criteria are variable based on aquatic life stages to be protected and exposure period.

f Constituents nitrate and phosphorus subject to evaluation under the Basin Plan narrative objective for biostimulatory substances. Numerical aquatic life criteria for nitrate and phosphorus do not exist.

g Basin Plan objective for pH prescribes an acceptable range for minimum and maximum concentration; therefore, analysis of change in assimilative capacity not evaluated.

h Basin Plan turbidity objective for the Delta is 50 NTUs; Basin Plan objective for waters with background between 5 and 50 NTU is specified as an allowable change of up to 20%.

i Mass balance analysis for constituents regulated by CTR human health criterion for consumption of organisms. Receiving water concentrations based on average annual effluent and Marsh Creek flows.

j Insufficient data to calculate mean concentration; value reported as median concentration.

k Constituent not detected in any sample. Method reporting limit (RL) shown; one-half of RL used for mass balance.

l Percentage change in assimilative capacity not calculated because none exists under the baseline condition; implementation of the Proposed Project would improve available assimilative capacity.

m The mass balance analysis for DO in July was based on minimum monthly average DO levels in effluent and RSW-001 monitoring in 2011 through 2013 (June through August), and minimum monthly average Marsh Creek streamflow of 0.4 MGD (equivalent to 0.6 CFS) measured in the 2001-2013 USGS gauge data (April through September).

The effects of the Proposed Project to nutrient concentrations (i.e., nitrogen and phosphorus), dissolved oxygen (DO), and turbidity are assessed below in greater detail because concentrations may result in increased concentrations in Marsh Creek downstreamof the WWTP outfall as a result of the higher background Marsh Creek concentrations relative to the effluent discharge concentrations. Finally, implementation of the Proposed Project would not substantially change receiving water quality conditions during the irrigation season compared to the Recycled Water Project conditions, in particular during the months of June through August when the effluent discharge would be minimal under future project conditions. Therefore, the focus of the assessment is on potential operations-related effects of the Proposed Project compared to existing conditions.

Nutrients (Nitrogen Compounds and Total Phosphorus): The Basin Plan contains a narrative objective that states, "Water shall not contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses." Numerical water quality objectives for biostimulatory substances have not been adopted. Plant nutrients that primarily contribute to biostimulation of primary producers in aquatic environments (i.e., aquatic algae, aquatic vascular plants) include nitrogen compounds (e.g., ammonia, nitrate) and phosphorus. The City's available monitoring data indicate that nitrogen and phosphorus are present in both the background Marsh Creek streamflow and in the effluent. The average nitrate and total phosphorus concentrations in the effluent are higher, and ammonia is slightly lower, than the Marsh Creek levels. However, excessive levels of algae and plant growth are not present downstream of the WWTP outfall. With implementation of the Proposed Project, the seasonally reduced effluent discharge would result in lower average inorganic nitrogen content (i.e., sum of ammonia and nitrate) and phosphorus concentrations in Marsh Creek downstream of the WWTP outfall. Consequently, the Proposed Project would not increase the potential to stimulate nuisance plant and algae growth downstream of the WWTP, compared to the existing conditions.

Turbidity: The monitoring data tabulated in Table 15 indicate that the average turbidity concentration in Marsh Creek upstream of the WWTP is higher than the effluent. The treatment processes of the WWTP include settling, clarification, and filtration of suspended solids, thus producing effluent with consistently low turbidity levels compared to the variable turbidity conditions of Marsh Creek. Consequently, under existing conditions, the effluent discharge generally results in lower turbidity levels downstream of the WWTP compared to Marsh Creek upstream of the WWTP. Accordingly, with implementation of the Proposed Project, the average reduction in effluent discharge during the irrigation period would result in higher turbidity levels downstream of the WWTP relative to the existing conditions, and there would be no appreciable change in turbidity levels relative to the 2017 baseline conditions with the Recycled Water Project implemented. The Basin Plan objective limits the allowable turbidity increase to less than 20% above background levels, and allows for the objective to be met over an appropriate averaging period provided it does not adversely affect beneficial uses.

Marsh Creek supports only warmwater species during the irrigation period when the lowest

effluent discharge rates and largest potential turbidity increases would occur under the Proposed Project. As described in detail in Section 3.5 (Biological Resources), native and introduced warmwater fish species occur year-round in lower Marsh Creek upstream and downstream of the WWTP outfall, including native minnows (California roach, common carp, hitch, and Sacramento pikeminnow), introduced Centrarchids (bluegill, green sunfish, and largemouth bass), native threespine stickleback, native Sacramento sucker, and introduced western mosquitofish. A technical review of turbidity and total suspended solids (TSS) objectives for an amendment to the Basin Plan cited work by the European Inland Fisheries Advisory Committee (EIFAC) in 1965, and reaffirmed by the National Academy of Sciences (NAS) in 1972, that concluded waters with TSS concentrations less than 25 mg/L provide a high level of protection for fish, and water with TSS levels less than 80 mg/L provide a moderate level of protection (CVRWQCB 2007). The relationship of TSS to turbidity is variable and site-specific, however is generally in the range or 2:1 to 1:1. Assuming a conservative ratio of 2:1, the EIFAC/NAS findings indicate that turbidity between 12-40 NTUs are protective of fish. As indicated in the mass balance analysis, turbidity would increase by an average of 11 NTU in lower Marsh Creek downstream of the WWTP with the Proposed Project. Consequently, the small increase in average turbidity levels downstream of the WWTP would not be of sufficient magnitude to result in adverse effects to the warmwater fish community. Therefore, the potential long-term operations-related impact of the Proposed Project on lower Marsh Creek turbidity would be **less than significant**.

Dissolved Oxygen (DO): As shown in Table 15, average DO concentrations in Marsh Creek upstream of the WWTP are below the Basin Plan objective of 5 mg/L, and the low levels are generally observed during the warmer weather months of June through October. Average effluent DO concentrations are consistently above 7.5 mg/L. Consequently, the effluent discharge contributes to DO levels in Marsh Creek downstream of the WWTP effluent outfall. The mass balance analysis indicates that under the Proposed Project the reduced effluent discharge during the irrigation period would result in lower DO concentrations downstream of the WWTP, relative to the existing conditions.

With regard to the warmwater fish community of Marsh Creek, the USEPA recommended warmwater criteria for DO (USEPA 1986) shown in **Error! Reference source not found.** are more scientifically refined and representative of potential effects to fish than the Basin Plan objective. Based on the USEPA criteria, DO levels in Marsh Creek upstream and projected DO levels under the Proposed Project downstream of the WWTP may be low compared to the desirable levels for some life stages and averaging periods for warmwater fish species. There is considerable uncertainty in the potential for adverse effects to actually occur to the resident fish community as a result of reduced Marsh Creek DO levels downstream of the WWTP. Although the mass balance analysis works well for many conserved parameters, it likely may not accurately predict DO levels downstream of the WWTP outfall because DO is not a conservative parameter, and is being produced and consumed in every reach of the creek. Moreover, water temperature, channel gradient, creek depth, and turbulence all affect reach-specific re-aeration of creek water. In addition, because DO fluctuates on a diurnal basis, with higher levels in the daylight when algae and

plants are producing oxygen, and lower levels at night when plants are respiring, the weekly grab samples may not represent the range of actual average DO concentrations available to fish. Moreover, field surveys in Marsh Creek conducted in recent years for compliance studies required under the city's NPDES permit indicate that the diversity and abundance of the fish community is robust upstream of the WWTP. The resident fish community in Marsh Creek upstream and downstream of the WWTP consists of the same species that are adapted to living in the warmwater conditions. Consequently, the seasonal and temporary reduction in effluent discharge and resulting reduction in average DO concentrations during the warmer months downstream of the outfall would not necessarily result in adverse effects to the fish community.

Table 16. USEPA-Recommended Ambient Water Quality Criteria for Dissolved Oxygen.

Parameter	Warmwater DO Criteria (mg/L)	
	Early Life Stages[1]	Other Life Stages
30-Day Mean	NA	5.5
7-Day Mean	6.0	NA
7-Day Mean Minimum	NA	4.0
1-Day Minimum [2,3]	5.0	3.0

NA = not applicable

[1] Includes all embryonic and larval stages and all juvenile forms to 30 days following hatching.

[2] For highly manipulable discharges, further restrictions apply (see pg. 37 of USEPA 1986).

[3] All minima should be considered as instantaneous concentrations to be achieved at all times.

Based on the available data, implementation of the Proposed Project has the potential to result in seasonally lower DO concentrations downstream of the WWTP during the irrigation period relative to existing conditions. The potential for reduced DO levels to adversely affect resident fish is considered a **potentially significant impact**. Because the effluent discharge pattern under the Proposed Project and the Recycled Water Project would be similar in the irrigation period, the Proposed Project would not result in more severe effects than were described in the Recycled Water Project Initial Study. The City adopted the following Mitigation Measure HWQ-2 for the Recycled Water Project, and therefore would implement the measure, as needed, for the Proposed Project as well. Mitigation Measure HWQ-2 is anticipated to minimize the potential effects to DO and reduce the impact to a less-than-significant level.

MITIGATION MEASURE HWQ-2. DISSOLVED OXYGEN EVALUATION AND CONTROL MEASURES.

Upon initiation of increased recycled water deliveries for the Proposed Project, the City shall evaluate Marsh Creek for adverse DO-related effects to the fish community, and implement control measures, if necessary. During periods when recycled water is being distributed from the WWTP during the mid-summer months (i.e., July and August), and background Marsh Creek streamflow levels are low, the City will monitor receiving water DO to determine whether DO falls to levels that may result in adverse effects to fish and invertebrates within lower Marsh Creek. If potentially adverse DO levels are observed from monitoring, the City will implement fish and invertebrate surveys upstream and downstream of the WWTP discharge to determine whether actual adverse effects (e.g., reduced species diversity, change in expected community structure, loss of sensitive organisms) are occurring. Should adverse effect be identified through field surveys that are determined to be attributable to the reduced effluent discharge, the City shall implement corrective measures to substantially reduce or eliminate the adverse effects. Such corrective measures include, but may not be limited to, reducing the amount of water used for recycled water irrigation.

Effects to Marsh Creek – Low Irrigation Period with Increased Effluent Discharge

As noted above, during the low irrigation period of November through March, implementation of the Proposed Project would be anticipated to increase the effluent discharge to Marsh Creek, and thereby increase Marsh Creek streamflow downstream of the WWTP relative to existing conditions. The results of the mass balance analysis indicate that concentrations for many constituents (including turbidity) would be lower in Marsh Creek compared to existing conditions due to the lower effluent concentrations, and Marsh Creek DO levels would be higher and not exceed the USEPA criteria. The mass balance analysis indicates that zinc and chloride concentrations would increase slightly compared to existing conditions. However, with the dilution provided by average Marsh Creek flows, the resulting receiving water zinc and chloride concentrations would remain well below the applicable chronic and acute criteria and therefore not adversely affect aquatic organisms.

Ammonia was detected in the effluent once in the past five years of weekly effluent grab samples (i.e., 2011 through 2015) at a concentration that may have exceeded the USEPA acute aquatic life criterion. However, with the available dilution in Marsh Creek, the receiving water concentrations are unlikely to exceed the acute criterion. Therefore, the increased effluent discharge under the Proposed Project is unlikely to result in exceedances of ammonia criteria at a frequency or magnitude that would adversely affect aquatic organisms. The increased effluent discharge under the Proposed Project would result in slightly higher concentrations of nutrients (i.e., combined nitrate/ammonia and phosphorus) in Marsh Creek compared to existing conditions. However, the period of increased effluent discharge coincides with seasonal conditions that result in lower aquatic primary production of algae and plants, or dormancy in plants. Therefore, increased nutrient concentrations would not cause or contribute to any changes in biostimulation relative to the existing

conditions. Therefore, the potential long-term operations-related impact of the Proposed Project on constituents that may increase in lower Marsh Creek during the low irrigation period would **be less than significant.**

Effects to Marsh Creek – Long-term Effects of Increased Effluent Discharge

Implementation of the Proposed Project would result in an annual effluent discharge of 3.9 MGD, which is an incremental increase (i.e., 18% increase) compared to the existing 3.3 MGD discharge. The results of the mass balance analysis for mercury, which is based on long-term average flow and concentration values, indicate that the Proposed Project would result in lower average concentrations in Marsh Creek downstream of the WWTP relative to existing conditions due to the lower effluent concentration compared to the higher background Marsh Creek concentrations. Mercury is present in the Marsh Creek watershed as a result of historic mining activity for mercury in the upper watershed, and therefore is present in the stream at higher concentrations than in the effluent. The potential concern for mercury is bioaccumulation through the lower trophic levels of the aquatic food chain, and transfer of mercury to higher trophic levels of fish, birds, terrestrial wildlife and humans, where it may increase potential for adverse toxicological effects in wildlife or risk of human health effects in people that consume organisms with accumulated mercury. Therefore, reduced average Marsh Creek mercury concentrations under the Proposed Project may contribute beneficially to a lower potential for bioaccumulation of mercury.

With the increased effluent discharge under the Proposed Project, the discharge of several organic compounds that have been detected in the effluent may result in slightly increased concentrations in Marsh Creek downstream of the WWTP compared to existing conditions. The potential concern for these compounds is exceedance of CTR criteria for the protection of human health from long-term exposure of organisms and consumption of organisms. The City has been monitoring bis(2-ethylhexyl)phthalate (also called diethylhexyl phthalate or DEHP) in the effluent on a quarterly basis since November 2013 as a result of its detection in one sample during 2011 at a concentration above the CTR criterion. However, bis(2-ethylhexyl)phthalate appears to be infrequently present in the effluent resulting in an average effluent concentration that is considerably lower than the CTR criterion, and it has not been detected in Marsh Creek. Based on the mass balance analysis, the bis(2-ethylhexyl)phthalate concentration in Marsh Creek would remain below the CTR criterion and not measurably increase under the Proposed Project.

Several trihalomethane (THM) compounds formed as disinfection byproducts of the existing chlorine disinfection process (i.e., bromoform, chloroform, dibromochloromethane [DBCM], and dichlorobromomethane [DCBM]) are present in the effluent. There is no CTR criterion for chloroform; thus, no assessment is necessary. The maximum effluent bromoform concentration from 2011 monitoring data (i.e., 6.4 µg/L) was much lower than the CTR criterion of 380 µg/L and it has not been detected in Marsh Creek. Effluent is monitored monthly for DBCM and DCBM, and maximum concentrations above the applicable CTR criteria have been periodically measured. However, average DBCM/DCBM concentrations are less than the CTR criteria and, while not measured

routinely, are not anticipated to be present in background Marsh Creek flows. Consequently, the mass balance analysis indicates that with the available dilution in Marsh Creek, the DBCM/DCBM concentrations downstream of the WWTP are currently below the CTR criteria, and the Proposed Project would result in minor increases in concentrations and remain below the criteria. Therefore, slightly increased levels of bromoform, DBCM, and DCBM in Marsh Creek as a result of the Proposed Project would be unlikely to cause or contribute to any adverse change in risk to human health. Furthermore, if the City replaces the existing chlorine disinfection system with a UV light disinfection system, as noted in the Project Description above (section 2.5.1), the THMs would no longer be formed thereby eliminating any potential risk to human health from consumption of organisms residing in Marsh Creek. The optional disinfection modification for chloramination also would not be anticipated to result in any increased formation of these compounds. Therefore, the potential long-term operations-related impact of the Proposed Project on levels of mercury, bis(2-ethylhexyl)phthalate, bromoform, DBCM, and DCBM would **be less than significant.**

Operations-Related Groundwater Effects of Recycled Water Irrigation

Under the Proposed Project, the increased delivery and use of recycled water would replace a corresponding amount of the potable and non-potable water sources that would otherwise be used by city customers for landscape irrigation. The Proposed Project would not involve any direct effects to groundwater such as changes in recharge, well uses, or construction of new wells. Therefore, the Proposed Project would not result in changes to groundwater hydrology conditions (e.g., aquifer storage, yield, or flow conditions) compared to existing conditions. Additionally, the city's WWTP produces recycled water that meets the Title 22 tertiary treatment and disinfection requirements, and thus is compliant with the stringent water quality regulations for unrestricted reuse activities with a potential for indirect contact by the general public. The irrigation customers that receive recycled water, would be required to comply with the city and SWRCB DDW requirements for use of the recycled water such as control of runoff, overspray and wind drift, and cross connection and backflow controls to prevent inadvertent mixing of recycled water into the potable supplies that may be used for activities with potential for ingestion (e.g., drinking water, swimming pools). Consequently, it is assumed for the purposes of this assessment that the increased recycled water irrigation use under the Proposed Project would be conducted in accordance with regulatory requirements and there would not be any potential for substantial adverse human health effects from direct exposure to recycled water.

The following assessment describes the potential operations-related groundwater quality effects from the changes in concentrations of constituents of concern in the water supplies used for landscape irrigation in the city as a result of the Proposed Project, and associated water infiltration into soils at irrigation sites to the underlying groundwater aquifer. The beneficial uses of groundwater designated in the Basin Plan are municipal, industrial, and agricultural water supply. Therefore, the state drinking water MCLs, which are Basin Plan objectives for waters designated for municipal and domestic supply uses, were used in the assessment for evaluating potential adverse effects and human health risk of any project-related changes in groundwater quality.

Water quality monitoring data reported in the city's annual Consumer Confidence Reports were used for a mass balance analysis of estimated changes in water quality of applied irrigation water. Data is reported for the city's municipal groundwater wells, Brentwood WTP, and purchased water from the Randall-Bold (RB) WTP which is owned by the Contra Costa Water District. The monitoring data indicate that no constituents of concern are detected at average concentrations that exceed applicable MCLs. However, as described above, salinity and total hardness levels in groundwater in the project area are known to generally be elevated. Available monitoring data for salinity parameters, as reported in the city's most recent report for 2013, are tabulated in **Table 17** (City of Brentwood 2014c), along with corresponding values in the recycled water.

Salinity reflects the total mineral content in water and is primarily composed of inorganic cations and anions (i.e., calcium, magnesium, potassium, sodium, bicarbonate, chloride and sulfate), and dissolved organic matter generally contributes very little salinity in water. Salinity is not a human health concern, but elevated salinity can cause water to taste salty and be detrimental for irrigation of salt-sensitive plants. Many of the inorganic ions comprising salinity are soluble and chemically conservative (i.e., not likely to be assimilated by plants or adsorbed to soil) and, as a result of evapotranspiration, they either accumulate in the soil layer or pass beyond the root zone at higher concentrations than in the applied water. The data indicate that average constituent concentrations in the potable water (i.e., produced from surface water diversions in the Delta) and city groundwater wells are lower than applicable drinking water MCLs. The recycled water has elevated levels of TDS and EC present at slightly higher concentrations than the MCLs.

Table 17. Salinity Constituents in Existing Water Supplies and Mass Balance Analysis of Salinity Changes in Applied Irrigation Water.

Constituent	Units	Lowest Drinking Water Criterion [1]	2013 Average Concentration [2]				Flow-Weighted Concentrations in Applied Irrigation Water [3]		
			City Wells	City WTP	RB WTP	RW	Existing	Proposed Project	% Change
Chloride	mg/L	500	168	110	65	378	93	130	40.6%
EC	µS/cm	1600	1293	605	464	1925	572	745	30.2%
Sulfate	mg/L	500	201	56	51	208	60	78	30.0%
TDS	mg/L	1000	823	314	248	1072	306	402	31.4%

Notes:
RW = recycled water; µS/cm = micro Siemens per centimeter
1 Secondary MCLs.
2 Average concentrations reported in City of Brentwood 2013 Consumer Confidence Report.
3 Flow weighted concentration of applied irrigation water assuming City's irrigation supply is 27% of total surface and groundwater deliveries, consisting of 70% treated surface water and 30% groundwater. Analysis includes ECCID's surface water deliveries in the Brentwood region.

The potential groundwater quality effects of landscape irrigation operations were assessed with a mass balance analysis to estimate the existing average salinity of the irrigation water supply used by the city. The mass balance estimate of the flow-weighted average salinity in irrigation water used under the Proposed Project was then compared to the existing conditions as a direct indicator of the potential change that could occur to groundwater

quality. The current total irrigation water use in the city for landscape irrigation is estimated to be approximately 27% of the annual potable and non-potable deliveries (City of Brentwood 2011), or about 3,240 AFY based on approximately 12,000 AFY total water use in 2013. The city also currently uses about 196 AFY of recycled water, and ECCID delivers about 23,500 AFY of raw water to the region. The mass balance analysis for the Proposed Project included the additional use of recycled water in place of surface/groundwater use (i.e., increase of 3,267 AFY, Table 1 consisting of the future 1,750 AFY to be supplied via the city's Recycled Water Project facilities currently under development, and 1,877 AFY of future recycled water to be delivered to Phase B2/B3 and golf course customers). The mass balance also considers the projected population growth in the city identified in the General Plan (i.e., increase to 81,000 population) and its associated incremental increase in seasonal irrigation demand for surface water and groundwater (i.e., increase of 1,519 AFY excluding the additional recycled water use), along with an equivalent reduction in ECCID raw water use for lands converted to urban development. Other factors that could affect groundwater quality were assumed to not change appreciably (i.e., rainfall, groundwater hydrology, constituent concentrations, etc.) since groundwater use which comprises a small amount of overall water use (i.e., <10%) would not substantially change.

The flow-weighted average concentrations for the salinity parameters in the blend of city water supplies are shown in Table 17 for the existing conditions, and for the Proposed Project scenario with increased recycled water use. The analysis shows that the flow-weighted average concentrations are lower than the MCLs under existing conditions. The increased recycled water use under the Proposed Project would increase the average constituent concentrations in the irrigation supply by up to about 30-40% relative to the existing conditions, and supply water concentrations would remain below the applicable MCLs. Therefore, the Proposed Project could result in increased salinity levels in the groundwater relative to existing conditions. However, operations-related changes would not be expected to increase groundwater salinity levels such that MCLs would be exceeded at a magnitude, frequency, or geographic extent, nor would beneficial uses be adversely affected, to a substantially greater extent than would otherwise potentially occur without the use of additional recycled water for irrigation. Moreover, the city is currently developing and implementing actions to reduce chloride inflow to the WWTP that occurs as a result of the use of self-regenerating water softeners in the city and discharge of softener brine to the sewer system. Reduction of water softener-related brine discharges and the chloride contribution to wastewater inflows would reduce effluent and recycled water chloride levels, which will minimize the potential effects of salinity in groundwater associated with increased irrigation. Finally, if the City replaces the existing chlorine disinfection system with a UV light disinfection system, the chemical additions of chlorine and bisulfite used in the existing process would be eliminated, which would be expected to further reduce salinity concentrations in recycled water. Therefore, the long-term operations-related impact of the Proposed Project on groundwater quality is considered to be **less than significant**.

b) Groundwater recharge is dependent on the permeability of soils and amount of recharge that occurs. The Proposed Project involves construction activity on approximately 4 acres of existing earthen areas to erect the new treatment unit processes at the WWTP, which would

result in an inconsequential amount of additional impermeable surfaces in the project area. New impermeable surfaces may reduce the potential for groundwater recharge at a site. However, the construction area is small relative to the Brentwood area and available region-wide groundwater recharge areas. Therefore, the minor potential reduction in groundwater recharge as a result of the Proposed Project would not measurably affect groundwater hydrology. Therefore, this impact would be **less than significant**.

(c-e) Neither the construction or operations of the Proposed Project would substantially alter the existing drainage patterns and there would be no changes made to any constructed stormwater drainage systems or natural stream channels. Therefore, the Proposed Project would not affect flows in any drainage or stream channel. The additional impervious surfaces constructed would be approximately 4 acres, and additional stormwater drainage and runoff from these surfaces would be incorporated into the final landscaping designs for the sites to ensure that site drainage is appropriately conveyed to a drainage system. Potential erosion associated with drainage areas also would be considered through the final project design phases, and thus minor amounts additional runoff would not substantially contribute to or change erosion and siltation rates compared to existing conditions. Therefore, this impact would be **less than significant**.

f) The assessment of the potential for the Proposed Project (including future increased recycled water use) to cause or contribute to degradation of surface water or groundwater quality was conducted with consideration of the antidegradation policy and the SWRCB's findings in the adoption of the General WDRs for Recycled Water Use (WQ 2014-0090-DWQ) adopted in June 2014. The mass balance analysis of potential operations-related water quality changes summarized in Table 15 indicates the potential changes in constituent concentrations in Marsh Creek downstream of WWTP, which represents the potential reduction in assimilative capacity relative to the applicable regulatory water quality criteria. The mass balance analysis shows that increased Marsh Creek constituent concentrations compared to the existing conditions would occur in either the irrigation period as a result of reduced effluent discharge and elevated concentrations in the background streamflow, or in the low irrigation period as a result of increased effluent discharge of constituents. Additionally, long-term average concentrations of THMs (i.e., bromoform, DBCM, and DCBM) also would increase if the city expands and continues to use the existing chlorine disinfection process. However, the average Marsh Creek concentrations downstream of the WWTP for all constituents except DO would remain well below the respective water quality criteria. Therefore, the Proposed Project would not substantially increase the risk of water quality criteria being exceeded or beneficial uses to otherwise be adversely affected for the majority of constituents, and Marsh Creek would retain a large amount of the available assimilative capacity for any other future constituent loading from unforeseen sources. However, the mass balance analysis indicates that seasonally reduced effluent discharge during the irrigation period may result in reduced DO concentrations below USEPA recommended criteria for warmwater fish species downstream of the WWTP relative to existing conditions, and thus eliminate existing capacity that currently exists.

With respects to potential degradation of groundwater quality, the mass balance analysis summarized in Table 17 indicates that average salinity constituent concentrations in the irrigation water supply would increase by up to about 30-40% with the implementation of the Proposed Project (depending on the constituent). Therefore, the increased recycled water use may result in incremental reduction of assimilative capacity in the underlying groundwater aquifer for salinity constituents relative to drinking water secondary MCLs. However, groundwater quality depends on many factors beyond the effect of added constituent loading from the Proposed Project. It is generally recognized that the predominantly irrigated agricultural land uses that existed in the Brentwood area prior to the extensive urbanization beginning in the 1990's was a substantial contributor of constituents to groundwater, and urbanization is expected to substantially reduce constituent loading (Lawrence Livermore Laboratory 1995). Consequently, the current balance of salinity loading and attenuation in the groundwater, while uncertain given the lack of comprehensive data, is expected to generally be lower than in the past. Consequently, the Proposed Project would not be expected to substantially increase groundwater salinity levels or the risk of exceeding objectives or adversely affect beneficial uses.

Additionally, recycled water used for irrigation may contain constituents not present in the native groundwater, or at generally higher concentrations, such as pathogens, nitrate, phosphorus, trace metals, organic carbon, residual chlorine, and THM disinfection byproducts. Some of these compounds are potential drinking water constituents of concern and regulated under MCLs, and thus increased use of recycled water may result in reduced assimilative capacity in groundwater relative to existing conditions. However, concentrations of these constituents in the recycled water do not exceed applicable MCLs. The majority of these compounds also are not chemically conservative; therefore, natural processes such as biological uptake by plants and soil microbes, photo-degradation, evaporation and volatization, adsorption to surface soils and organic matter, and physical filtration in the topsoil and deeper soil layers would reduce concentrations in any water that infiltrates to groundwater. Additionally, recycled water requirements of the Central Valley Water Board and state recycled water policies require irrigation to be conducted at agronomic rates to match the plant water demands, and thus minimize excessive irrigation and infiltration of water into the soil past the root zone. Consequently, the potential for the Proposed Project to result in groundwater degradation from discharge of these constituents, if at all, is considered minimal.

With the city's construction of the Brentwood WTP in 2008, the relative amount of surface water has increased and groundwater use has decreased. Consequently, the total hardness of delivered water has decreased and the city is promoting the reduced use of salt-based self regenerating water softeners by customers to reduce the salt brine discharges to the sewer system. The City also is developing a water softener buy-back program to further reduce brine discharges. With the continued increased use of low-salinity surface water with city population growth, and reduced water softener brine discharges, the salinity levels in the recycled water and potable water supplies should decrease over time. Therefore, the potential for salinity degradation under the Proposed Project, if at all, would not be of sufficient magnitude such that exceedances of MCLs would increase or be more severe, or

result in substantially increased risk for adverse effects to the municipal beneficial uses. Moreover, the city's WWTP produces recycled water that fully complies with the Title 22 tertiary treatment and disinfection requirements for reuse, which is consistent with the state antidegradation policy to provide best practical treatment and control (BPTC). Furthermore, if the City replaces the existing chlorine disinfection system with a UV light disinfection system, additional reductions in recycled water salinity concentrations would contribute to minimizing increases in groundwater salinity levels.

Finally, the effluent also may contain constituents of emerging concern (CECs) such as pharmaceutical products (e.g., antibiotics, natural and synthetic hormones), alkylphenols and alkylphenol ethoxylates, polybrominated diphenyl ether (PBDE) flame-retardant chemicals, phthalates, and nitrosamines. No applicable federal or state water quality criteria or objectives have been adopted or recommended for most of the CECs, and it may be many years before regulatory objectives are developed or the Central Valley Water Board establishes effluent limitations for wastewater. No effluent or Marsh Creek monitoring data exists for these constituents, and the Central Valley Water Board does not require monitoring for most CECs. Consequently, this assessment is provided for informational purposes and at this time, there is not sufficiently developed scientific evidence available to assess the specific environmental effects of the city's effluent discharges on beneficial uses in Marsh Creek or effects of these compounds resulting from irrigation with recycled water. As organic compounds, many CECs are not anticipated to be chemically conservative and processes such as photo-degradation, evaporation and volatization, adsorption to surface soils and organic matter, physical filtration in the topsoil and deeper soil layers, and microbial decay would likely reduce concentrations in any recycled water that infiltrates to groundwater. Because the effects of CECs in effluent on surface water beneficial uses are not well understood and subject to ongoing research, a significance conclusion on the environmental impacts of CEC discharges under the proposed project cannot be made. Section 15145 of the State CEQA Guidelines provides that if, after a thorough investigation, a lead agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impacts. This is the case for CECs that may be present in the effluent and no impact conclusion can be made about potential water quality effects of the discharge on beneficial uses in the receiving water bodies.

The minor degradation of certain water quality parameters that would occur as a result of the Proposed Project is consistent with the state and federal antidegradation policies and would not cause long-term degradation of water quality that would result in substantial risk of adverse effects on beneficial uses. However, the potential for degradation of Marsh Creek with respect to seasonal DO levels downstream of the WWTP as a result of reduced effluent discharge during the irrigation period is considered a potential significant impact. Implementation of Mitigation Measure HWQ-2 specified above would reduce this impact to a **less-than-significant** level.

(g-i) The Proposed Project would not involve the placement of structures within a 100-year flood hazard area. Therefore, the Proposed Project is not anticipated to adversely affect

flooding, flood exposure, or impede or redirect flood flows. Therefore, there would be **no impact.**

j) The project area is not subject to exposure to seiche or tsunami. Therefore, there would be **no impact.**

3.10 LAND USE AND PLANNING

	Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a)	Physically divide an established community?	☐	☐	☐	☑
b)	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?	☐	☐	☐	☑
c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☑

3.10.1 Setting

The WWTP site where construction of new wastewater treatment facilities would be constructed for the Proposed Project is designated in the General Plan as public facilities. The city and all areas potentially affected by implementation of the Proposed Project are located within the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECCCHCP) area, which is discussed in detail in Section 3.4 ("Biological Resources").

3.10.2 Discussion

a, b) The Proposed Project involves temporary construction activities within the WWTP site which is zoned for public facilities. Thus, the Proposed Project would not involve any land use changes and no communities would be physically divided. Therefore, no conflict with the existing land use designations would occur. Therefore, there would be **no impact**.

c) As described in Section 3.5, "Biological Resources," the City would coordinate with the Habitat Conservancy office and participate in the ECCCHCP accordingly. Therefore, the Proposed Project would not conflict with the ECCCHCP requirements. Therefore, there would be **no impact**.

3.11 MINERAL RESOURCES

	Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact

a)	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?	☐	☐	☐	☑
b)	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?	☐	☐	☐	☑

3.11.1 Setting

The City of Brentwood General Plan identifies coal, oil and gas, and sand as significant mineral resources within the area (City of Brentwood 2014a). The proposed areas where construction activities would occur are not sites used for mineral resource extraction.

3.11.2 Discussion

a,b) The Proposed Project would not involve temporary construction-related activities or any permanent facilities in an area used for mineral extraction. Neither the temporary construction activities or long-term increased use of recycled water in the city would result in the loss of any mineral resources. Therefore, there would be **no impact.**

3.12 NOISE

	Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a)	Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☑	☐	☐
b)	Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☑	☐
c)	A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☑	☐
d)	A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☑	☐	☐
e)	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 expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑
f)	For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☑

3.12.1 Setting

Sound is mechanical energy transmitted in the form of a pressure wave from a disturbance or vibration. Noise, is generally defined as sound that is loud, unpleasant, unexpected, or disagreeable. The human ear is sensitive to a wide range of sound pressure fluctuations. Sound pressure levels are expressed in logarithmic units called decibels. Because the human ear is not equally sensitive to all sound frequencies, a "dBA" frequency-dependent rating scale is used to reflect the range of sensitivity for the average human ear from the faintest sound audible to the maximum sensitivity. Based on the dBA scale, a10 dBA increase is perceived by the average human ear as a doubling of the loudness, thus a 70dBA sound is twice as loud as a 60 dBA sound. Negative effects of noise exposure include nuisance effects (e.g., annoyance, sleep disturbance) to physical damage to the human auditory system. Physical damage to the auditory system may lead to gradual or traumatic hearing loss.

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. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal and is a measure typically used to describe potential vibration effects to buildings. The root mean square amplitude is most frequently used to describe the affect of vibration on the human body. The effects of ground vibration can vary from no perceptible effects at the lowest levels, low rumbling sounds and detectable vibrations at moderate levels, up to causing building damage at the highest levels. Damage to structures from vibration is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely result in structural damage. Ground vibration generated by construction equipment spreads through the ground and diminishes in strength with distance.

The dBA scale is used for purposes of environmental noise assessment and regulation. The Noise Element of the city's General Plan specifies noise criteria for evaluating the compatibility of individual land uses with respect to long-term ambient noise exposure (City of Brentwood 2014b). Normal construction activities are exempt from the ambient noise criteria if performed according to the City's restrictions on hours/days for construction activity and implement best practice guidelines. The Municipal Code limits construction-generated noise levels for outside heavy equipment activities on Monday through Friday to the hours between 8:00 a.m. and 5:00 p.m., on Saturday between 9:00 a.m. and 4:00 p.m., and no construction on Sundays and city holidays. The City Municipal Code restricts outside carpentry construction on Monday through Friday to the hours between 7:00 a.m. and 7:00 p.m., on Saturday to the hours between 9:00 a.m. and 5:00 p.m. and no construction on Sundays and city holidays.

There are no federal, state, or local regulatory standards for vibration. However, Caltrans has developed vibration criteria based on human perception and structural damage risks (Caltrans 2002). For most structures, Caltrans considers a PPV threshold of 0.2 inches per second (in/sec) to be the level at which architectural damage (i.e., minor cracking of plaster walls and ceilings) to normal structures may occur. Below 0.10 in/sec there is "virtually no risk of 'architectural' damage to normal buildings. Levels above 0.4 in/sec may possibly cause structural damage. Continuous vibrations in excess of 0.1 in/sec ppv are identified by Caltrans as the minimum level

perceptible level for ground vibration. Short periods of ground vibration in excess of 0.2 in/sec can be expected to result in increased levels of annoyance to people within buildings.

Sensitive receptors to noise and ground vibration in the project area primarily consist of the commercial areas located south of the WWTP along Elkins Way. The nearest potentially sensitive residential areas are located approximately 950 feet west of the WWTP, and a day-care facility is located about 1,625 feet southwest of the WWTP site. There are no schools or hospitals located near the zones of proposed construction activities.

3.12.2 Discussion

a, d) The Proposed Project would involve temporary construction activities for the proposed wastewater treatment unit processes involving grading, excavation, material hauling trips, paving, and other heavy equipment use. Periods of concentrated construction-related noise would be intermittent, such as periods of initial excavation and grading for facility site preparation; and overall construction would occur over a period of up to about 24 months. A majority of the facilities, and thus construction activities to occur, are located behind existing large treatment facilities and buildings at the WWTP site with respect to the line of sight to potential sensitive receptors such as businesses south of the WWTP or residences to the west of the WWTP. Consequently, in addition to the construction areas being located considerable distances from these receptors, construction noise also would be partially screened and impeded by existing structures at the WWTP. Therefore construction would not be anticipated to result in any substantial adverse noise effects adjacent to the WWTP.

Without noise control measures, the maximum noise levels from construction equipment typically range from approximately 75 to 90 dBA at 50 feet (USFHWA 2006). With noise control, individual equipment noise levels would be reduced by approximately 10 dBA. Noise intensity dissipates (i.e., reduced) depending on the ground surface and the number or type of objects between the noise source and the receiver. Hard and flat surfaces, such as concrete or asphalt, have an attenuation rate of about 3.0 dBA per doubling of distance. Soft surfaces, such as uneven or vegetated terrain, have an attenuation rate of about 4.5 dBA per doubling of distance. Noise generated by stationary sources typically attenuates at a rate between 6.0 and about 7.5 dBA per doubling of distance. For the Proposed Project, the residential areas are considered the nearest sensitive receptors to the proposed construction activities. However, for the nearest residential land uses, with noise attenuation assumed to occur at a rate of 4.5 dBA per doubling of distance, the maximum noise levels from the proposed construction activities would be expected to decrease to levels of about 62 dBA or less. While not anticipated to occur, the potential construction-related noise levels may adversely affect sensitive receptors if not controlled, which would be considered a potentially significant impact. With implementation of Mitigation Measure NZ-1, this impact would be **less than significant**.

MITIGATION MEASURE NZ-1. MINIMIZE CONSTRUCTION-RELATED NOISE.

To reduce noise-related impacts to occupants of nearby residential land uses, the following BMPs will be incorporated into the plans and design of the Proposed Project:

Noise-generating construction activities will be limited to the weekday and weekend restrictions specified by the City's Municipal Code. All construction equipment will be required to have sound-control devices no less effective than those provided on the original equipment. No equipment will have an unmuffled exhaust system.

Additional noise-reduction measures will be implemented as appropriate and practical, including but not limited to: (a) locating staging areas and stationary construction equipment as far away from sensitive receptors as feasible and direct noise emissions away from receptors; (b) limiting equipment idling time; and, (c) notifying nearby residents 48 hours in advance of starting construction in an area not previously affected by recent construction activities.

Require construction contractor to have a designated "noise disturbance coordinator" who will be responsible for responding to noise complaints, determining the causes of the noise, and instituting reasonable measures (as warranted) to correct the problem.

b) The Proposed Project would not involve the long-term use of any equipment or processes that would result in potentially substantial levels of ground vibration. Temporary construction-related activities for the Proposed Project may result in intermittent ground vibration. Ground-borne vibration levels associated with the conventional and typical construction activities for the proposed additional wastewater treatment facilities and structures would be expected to result in maximum vibration levels no greater than 0.089 in/sec PPV at 25 feet. As a result, predicted ground vibration levels at nearby structures would not be anticipated to exceed the minimum perceptible threshold 0.1 in/sec PPV for human annoyance, nor would ground vibration levels be anticipated to exceed the minimum threshold of 0.2 in/sec PPV for structural damage. Therefore, this impact would be **less than significant**.

c) Long-term operations-related noise associated with the Proposed Project would be limited to additional stationary equipment to be installed at the WWTP (i.e., various motors and pumps) associated with the additional treatment unit processes at the WWTP. However, existing noise levels from the wastewater treatment facilities are low and the proposed expansion of facilities would result in only minor changes to the existing noise levels. Two additional WWTP employees would be hired to operate the expanded facilities for the Proposed Project (i.e., from the existing 13 employees to 15), thus increasing minimally the daily noise associated with additional vehicle use at the WWTP site. Therefore, the additional operations-related noise sources reflect a minor change to the existing WWTP

operations and would not be expected to contribute substantially to noise levels, or result in any exceedance of ambient noise thresholds of the City's Municipal Code. Therefore, this impact would be **less than significant**.

e, f) The construction areas for the Proposed Project are not located in the vicinity of an airport. Therefore, there would be **no impact**.

3.13 POPULATION AND HOUSING

Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a) 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)?	☐	☐	☐	☑
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☑

3.13.1 Setting

The City of Brentwood General Plan identifies the 2021 buildout population for the city as approximately 81,000 and the current population is about 53,000. The city has experienced a high rate of population growth since the 1990's.

3.13.2 Discussion

a-c) The purpose of the Proposed Project is to accommodate future increased wastewater flows associated with development and population growth identified in the City's current General Plan. Consequently, the expansion of the WWTP treatment capacity from the current capacity of 5 MGD to 7.5 MGD would not directly accommodate or remove a barrier to additional unplanned population growth in the city.

Additionally, the Proposed Project would provide an increased supply of recycled water to existing customers that use potable and non-potable water for irrigation. Consequently, the potable and non-potable water would be available for other uses or future use. However, the community water supply of potable, non-potable, and recycled water sources is only one factor that facilitates planned growth in the city. Water supply is not a barrier to the city's planned growth; therefore, the potable and raw water saved under the Proposed Project would not induce additional population growth, displace housing, or displace residents. Therefore, there would be **no impact**.

3.14 PUBLIC SERVICES

Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, 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 of the public services:				
i) Fire protection?	☐	☐	☐	☑
ii) Police protection?	☐	☐	☐	☑
iii) Schools?	☐	☐	☐	☑
iv) Parks?	☐	☐	☐	☑
v) Other public facilities?	☐	☐	☐	☑

3.14.1 Setting

The provision of public services in the project area is the responsibility of the City of Brentwood (i.e., police, parks) and other local special districts (e.g., school districts, East Contra Costa Fire Protection District).

3.14.2 Discussion

a) The Proposed Project would involve temporary construction-related activities, and long-term operations of additional wastewater facilities. The Proposed Project would not involve or require any changes in public services. Therefore, the Proposed Project would not cause any changes to the level of fire and police protection services, schools, or other public services. Therefore, there would be **no impact**.

3.15 RECREATION

Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a) Would the project 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?	☐	☐	☐	☑
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☑

3.15.1 Setting

The city's 38-acre Sunset Park Athletic Complex is located immediately south of the WWTP and is accessed via Elkins Way beyond the entrance to the WWTP.

3.15.2 Discussion

a-b) The temporary construction activities would result in additional traffic on Elkins Way during the approximately 24-month long construction period in association with material hauling trucks and construction employees. Construction traffic would not result in any road closures of Elkins Way, and would not be expected to result in a frequency of trips that would adversely affect or impede access to the Sunset Park facilities. The Proposed Project would involve additional use of recycled water for landscape irrigation of recreational fields. However, recycled water irrigation would occur in evening hours when fields are generally not being used, and all irrigation application would be conducted according to Title 22 regulations. Additionally, there would be no adverse effects to any recreational facilities as a result of the Proposed Project. Therefore, there would be **no impact.**

3.16 TRANSPORTATION/TRAFFIC

	Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a)	Exceed the capacity of the existing circulation system, based on an applicable measure of effectiveness (as designated in a general plan policy, ordinance, etc.), taking into account all relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☑	☐
b)	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?	☐	☐	☑	☐
c)	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?	☐	☐	☐	☑
d)	Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☑
e)	Result in inadequate emergency access?	☐	☐	☐	☑
f)	Conflict with applicable adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☑

3.16.1 Setting

The Proposed Project would involve temporary construction activities and operations-related changes at the city's WWTP (e.g., employees, operations and maintenance) site which is located in the northeast quadrant of the city, approximately one mile north and east of downtown Brentwood.

3.16.2 Discussion

a-b) Temporary construction activities would result in additional traffic during the approximately 24-month long construction period for the Proposed Project in association with periodic material hauling truck trips and daily construction employee trips. The construction activities would result in temporary increases in traffic volume on major roadways in the city including, but not limited to SR4/SR4 Bypass, and the primary arterial roadways that provide access to the WWTP (i.e., primarily Brentwood Blvd., Sunset Rd., and Elkins Way). The frequency of construction-related trips would vary with the phases of construction, with the most frequent activity occurring with the site preparation and concrete phases and involving up to 25 daily construction workers traveling to the site, and an estimated maximum of five to seven material truck trips per day. All of the construction activity would occur within the boundaries of the existing WWTP site, and there would be no alteration of roads or access points to the WWTP. Construction also would not be expected to result in the need for any traffic control measures or road closures; and the City would require the general contractors for the Proposed Project to prepare Traffic Control Plans for review and approval by the Engineering Department, if necessary. Consequently, the temporary construction-related trips for the Proposed Project would not be expected to substantially affect the capacity or congestion patterns on affected roads.

The long-term operations of the Proposed Project would add two employees to the existing 13 full-time WWTP staff, and thus would result in a minor increase in daily employee passenger vehicle trips. However, the frequency of biosolids hauling truck trips to transport material to a landfill or land application site would be reduced if the optional solids dryer process is constructed, from the current level of about one to two trips per day to about two trips per week under the Proposed Project. If the city does not install the solids dryer process and continues to haul dewatered biosolids to a landfill, the frequency of biosolids hauling trips at the WWTP would increase by about one to two trips per day. Consequently, the maximum potential increase in operations-related vehicle trips at the WWTP site of up to four additional trips per day under the Proposed Project would not substantially change long-term circulation system capacity or congestion patterns of affected roads. Therefore, the potential temporary construction- and operations-related impacts to the capacity of traffic circulation systems, and to local congestion management, is considered to be **less-than-significant**.

c-f) As noted above, all of the proposed facilities to be constructed for the Proposed Project would be located within the existing WWTP site and there would not be any changes made to the city's roads or access points to the WWTP. Therefore, the Proposed Project would

not result in any hazards or incompatible uses associated with traffic circulation systems, affect emergency access, or conflict with any policies, plans, or programs supporting alternative transportation. The project also would have no affect on air travel patterns. Therefore, there would be **no impact**.

3.17 UTILITIES AND SERVICE SYSTEMS

	Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☑
b)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☑
d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☑
e)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the providers existing commitments?	☐	☐	☐	☑
f)	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☑
g)	Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☑

3.17.1 Setting

The proponent for the Proposed Project is the City of Brentwood that has responsibility for providing water and wastewater services for the community. The Proposed Project would not involve any construction or changes to stormwater drainage or solid waste management.

3.17.2 Discussion

a) The Proposed Project would consist of the modular expansion of wastewater treatment capacity at the WWTP from the current capacity of 5 MGD to 7.5 MGD, and thus would exceed the authorized capacity of the current NPDES permit adopted by the Central Valley Water Board in July 2013 (Order R5-2013-0106). The NPDES permit is scheduled for renewal in July 2018, at which time it would be expected that this Initial Study would

support the Central Valley Water Board's decision in authorizing the proposed increase in treatment capacity. The Proposed Project consists of expanding the current treatment unit processes at the WWTP and thus would not result in any changes to compliance with the NPDES permit-related terms and conditions relating to treatment performance, safety, and effluent and receiving water quality protection. Moreover, the City may replace the current chlorine disinfection system with UV light disinfection which may result in improved effluent quality for some constituents which would facilitate improved compliance with NDPES permit provisions. Additionally, the Proposed Project would facilitate the increased distribution and use of recycled water to meet landscape irrigation water demands in the city. The City is permitted through the Central Valley Water Board for a Master Reclamation Permit, which is the current regulatory authorization to operate recycled water facilities according to Title 22 regulations. The City also may pursue authorization under the SWRCB General Waste Discharge Requirements for Recycled Water Use (Order WQ 2014-0090-DWQ) to administer recycled water users associated with the Proposed Project. The Proposed Project would not result in exceedance of any regulatory requirements applicable to the operations of the WWTP. Therefore, there would be **no impact**.

b-c) Construction of the proposed additional modular wastewater treatment facilities at the WWTP site would be expected to include features onsite to accommodate a minor increase in the amount of stormwater drainage generated from additional impervious surfaces (e.g., building roof runoff, pavement drainage). The Proposed Project is not anticipated to require modifications to any offsite stormwater drainage systems. The Proposed Project would increase recycled water uses in the project area and this Initial Study fully addresses the potential environmental effects of the Proposed Project. The Proposed Project does not involve any changes to the city's existing water supply system, other than the long-term operations-related reduction in potable supply uses relative to existing conditions that would occur as a result of increasing recycled water use. Therefore, there would be **no impact**.

d-e) These resource topics are not relevant to the Proposed Project; thus there would be **no impact**.

f-g) The Proposed Project may result in increased production of dewatered biosolids that would continue to be hauled to a landfill (currently the Vasco Road landfill). If the optional solids dryer is constructed, the production of biosolids and hauling trips would decrease. Biosolids are used by landfills for use as "alternative daily cover" which is the term for the material used each day to cover the exposed waste pile. Consequently, increased biosolids production would not affect landfill capacity or conflict with solid waste regulations; thus, there would be **no impact**.

3.18 MANDATORY FINDINGS OF SIGNIFICANCE

Would the project…	Potentially Significant Impact	Less than Significant with Mitigation	Less than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☑	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☑	☐
c) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☑

3.18.1 Discussion

a) With respect to terrestrial wildlife resources, as discussed in Section 3.5 ("Biological Resources"), implementation of the Proposed Project has the potential primarily to result in temporary construction-related disturbance to potential habitats in the project area, and several wildlife species, if present during the time of construction. However, feasible project-specific mitigation measures are identified to minimize and avoid the potential adverse effects. The City also would participate in the ECCCHCP program, which is designed to protect core habitat areas and populations of special status species in the region, and promote recovery of species and habitats. The primary long-term operations-related effect of the Proposed Project is the seasonal change in WWTP effluent discharge to Marsh Creek, resulting in lower streamflow conditions downstream of the WWTP during months in the summer irrigation period and increased streamflow in the low irrigation period. The changes in streamflow would not result in any substantial adverse effects to fisheries resources or other aquatic resources, or terrestrial wildlife in the Marsh Creek corridor. A small amount of background streamflow would still exist in the Marsh Creek channel during these periods and there are constructed pools in the lower Marsh Creek streambed that would provide refuge for resident fish. The summer period when streamflow would be reduced is not a period of concern for the opportunistic uses of Marsh Creek by any special-status fish species. The incremental increase in streamflow during the months of October through March also would not substantially affect water quality or temperature conditions and thus would not adversely affect any special-status fish or wildlife in Marsh Creek. Consequently, the Proposed Project would not be anticipated to measurably affect special status species populations, range, habitat, migration corridors, or HCP-related species

recovery activities. Therefore, with the mitigation measures identified herein, the impact is considered to be **less than significant**.

b) As documented in the impact assessments presented in this IS, the Proposed Project would either not affect, or result in minimal and localized effects with respect to most environmental resources. Implementation of the Proposed Project would result in temporary construction-related disturbances that may affect short-term air quality, biological resources, cultural resources, water quality, traffic, and noise. Feasible mitigation measures have been identified that when implemented would avoid and minimize the potentially significant effects that may occur to these resources. Furthermore, with implementation of the mitigation measures, the temporary construction-related effects would not cause or contribute to any adverse long-term cumulative effects to these resources.

With respect to potential long-term cumulative environmental impacts, the City's implementation of the Proposed Project and its operations-related increase in wastewater treatment and disposal of effluent and recycled water reuse could contribute to air quality and greenhouse gas emissions, terrestrial biological resources, aquatic biological resources and water quality in Marsh Creek, and traffic effects. The Proposed Project incrementally may contribute to cumulative impacts associated with past, present, and reasonably foreseeable effects to these resources. The potential contribution of operations-related effects of the Proposed Action to cumulative impacts for these resources follows:

Traffic: No information exists to suggest that the future traffic conditions in Brentwood, including the employee- and biosolids hauling-related trips that would increase slightly under the Proposed Project, would be significantly adverse. It is assumed that City and regional transportation planning and construction of transportation systems will be implemented to accommodate the increased community development and population growth. Therefore, potential cumulative traffic impacts are not assessed further.

Air Quality and Greenhouse Gas Emissions: As noted above in the air quality and greenhouse gas sections of this IS (Section 3.3 and 3.7, respectively), the potential adverse effects of greenhouse gas emissions and the primary concern of air quality pollutants occur over local, regional, and global areas as a result of the cumulative emissions of sources. No single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards, or measurably influence global greenhouse gases. Accordingly, the thresholds for project-related emissions of regulated air pollutants and greenhouse gases established by BAAQMD consider the regional emissions necessary for maintaining compliance with the air quality standards and long-term greenhouse gas emission reduction objectives. Because the estimated air pollutant and greenhouse gas emissions that would occur under the Proposed Action are well below the BAAQMD thresholds, the Proposed Action would not result in a cumulatively considerable contribution to any significant cumulative air quality or greenhouse gas emission impacts.

Biological Resources. The future cumulative biological resource conditions for terrestrial special-status species in the project area are anticipated to improve relative to existing

conditions given that the purpose of the ECCCHCP is the protection and recovery of species in the region. The City would contribute to the fair share implementation of the ECCCHCP for the potential project-related permanent habitat disturbances, and thus not contribute considerably to any adverse cumulative terrestrial biological resource impacts.

With respect to special-status fisheries resources (and other aquatic biological resources) in Marsh Creek, there is no information available to suggest that the future cumulative resource conditions would be substantially different than the existing conditions. Aquatic biological resources in the lower Marsh Creek channel downstream of the WWTP outfall would be primarily influenced by the seasonal changes in WWTP effluent discharge rates resulting from implementation of the Proposed Project. Under the Proposed Project, the increased recycled water use would result in seasonally reduced effluent discharge to Marsh Creek and streamflow downstream of the WWTP during the irrigation period, and effluent discharge and streamflow would increase during the low irrigation period as a result of increased wastewater treatment inflow. As identified in the Biological Resources section of this IS (Section 3.4), the operations-related effects of seasonally reduced effluent discharge during the irrigation period, and increased effluent discharge in the low irrigation period, would not be expected to result in any significant adverse effects to special-status fish species (or other aquatic resources). Therefore, the Proposed Project would not contribute considerably to any potential significant future cumulative aquatic biological resource impacts.

Water Quality. Future cumulative water quality conditions in Marsh Creek downstream of the WWTP outfall would be affected by background Marsh Creek conditions and the WWTP effluent that has a substantial influence on stream conditions, as well as other influences such as watershed and urban stormwater runoff. There is no information available to suggest that the future cumulative resource conditions would be substantially different than the existing conditions or more severe. As described in Section 3.9 of the IS ("Hydrology and Water Quality"), the seasonal reduction in effluent discharge and Marsh Creek streamflow downstream of the WWTP during the irrigation period would result in reduced dissolved oxygen (DO) concentrations resulting from the seasonally lower DO in background Marsh Creek flow. The existing DO conditions in Marsh Creek upstream of the WWTP is considered a significant cumulative water quality condition given that ambient DO concentrations can be low with respect to the USEPA-recommended criteria for warmwater fish species. However, as described in Section 3.9, it is uncertain whether the existing limited seasonal period of low average DO conditions in Marsh Creek represent a significant effect to fisheries and other aquatic resources given that an abundant and diverse warmwater fish community exists upstream of the WWTP with the seasonally low DO conditions present. Furthermore, the City's implementation of mitigation measure HWQ-2 would minimize the City's contribution to the effects of low DO concentrations in lower Marsh Creek downstream of the WWTP outfall.

Mercury loading to Marsh Creek in the upper watershed where historic mercury mining activities and mercury-containing waste disposal occurred is considered a significant cumulative water quality condition given that Marsh Creek is identified on the state's

Section 303(d) list of impaired water bodies for mercury. However, the Proposed Project does not contribute to mercury mass loading, and the annual average mercury concentrations downstream of the WWTP outfall would be reduced slightly as a result of the long-term average increase in effluent discharge with the increased wastewater inflows and treatment associated with population growth. Consequently, the seasonal changes in mercury concentrations in Marsh Creek associated with the Proposed Project would be unlikely to substantially change, if at all, the mercury uptake and bioaccumulation in the food chain. Therefore, the Proposed Project would not contribute substantially to the cumulative mercury and low DO effects, and the contributions would be considered less than considerable and therefore a **less-than-significant impact.**

c) The Proposed Project would facilitate the increased distribution and use of recycled water for the identified Phase B2/B3 and golf course customers that currently use potable water or raw water supplies for landscape irrigation. Consequently, the Proposed Project would support the long-term goals of the Conservation and Open Space element of the General Plan to conserve water resources and increase recycled water uses. Final project planning and engineering designs, and project implementation, would be conducted in a manner to minimize the potential temporary construction-related disturbances, and mitigation measures would be implemented for such disturbances. Consequently, the Proposed Project would not cause adverse direct or indirect impacts to people. Therefore, there would be **no impact**.

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APPENDIX A

Air Quality and Greenhouse Gas Emissions Data (Ascent Environmental, Inc.)

AIR QUALITY AND GREENHOUSE GAS

Overall Methodology

Construction and operational emissions were calculated using a combination of model and off-model methods along with the assumptions dictated in the project description. Annual and daily emissions were estimated for both the existing facility and the facility with proposed expansions. The difference between the two scenarios was used to determine the net change in emissions due to implementation of the Proposed Project.

The proposed wastewater treatment plant (WWTP) expansion would involve construction of new facilities as well as additional operation associated with the expansion, including new vehicle trips. Operation of the expanded facility would result in emissions from energy use as well as wastewater processes. The CalEEMod (Version 2013.2.2) computer program was used to quantify emissions from facility construction and building energy use, which is the model recommended by the Bay Area Air Quality Management District (BAAQMD 2013). California Air Resources Board's (ARB) EMFAC2014 emission factors were used to estimate emissions from additional employee and truck trips. Equations from the International Council for Local Environmental Initiatives' (ICLEI) Community Protocol were used to estimate nitrous oxide (N2O) emissions from wastewater processes.

The methods and assumptions used for calculation of the facility construction, operations, vehicle trips, and process emissions are discussed separately below.

Construction

The proposed project would involve the use of motorized equipment during construction (e.g., forklifts, excavators, generators) which would last approximately 24 months through seven unique phases. A maximum of 23 pieces of off-road equipment would be operated in any given construction day, owing to the anticipated overlap of no more than two phases at a time. Each phase is described separately below. Construction activity is approximate.

Site Preparation (June through September 2017 – 4 months)

Site preparation involves clearing of any vegetation, ground leveling, and other activity to prepare the site for construction. A maximum of 15 workers per day and a phase average of 7 workers per day would be on site during construction. Approximately nine off-road equipment pieces would be used on-site, including a dozer, an excavator, a loader, and a roller. Specific site preparation include earthwork, watering for dust control, and hauling of bulk materials such as gravel and sand.

Underground Features (August through November 2017 – 4 months)

The project would result in the construction of underground features such as pipeline and utilities. A maximum of 15 workers per day and a phase average of 10 workers per day would be on site during construction. Approximately seven off-road equipment pieces would be used

on-site, including a dozer, an excavator, a loader, and a roller. Construction of underground features would involve excavation, other earthwork, and hauling of bulk materials (e.g. sand and gravel) and underground infrastructure component (e.g. pipeline).

Concrete Work (October 2017 through October 2018 – 13 months)

Concrete work involves construction of the foundation and structures supporting the proposed WWTP expansion equipment and is the longest of all phases in terms of duration. A maximum of 25 workers per day and a phase average of 20 workers per day would be on site during construction. Approximately 12 off-road equipment pieces would be used on-site, including an excavator, a loader, cranes, a forklift, a generator, and air compressors. Concrete work would include on-site material transport, some earthwork, crane operations, and hauling of concrete and rebar material. Concrete hauling trips would occur up to five times per day or two times per day on average. Rebar hauling trips would occur no more than two times per week. Other material deliveries would occur up to two times per day.

Equipment Installations (July 2018 through January 2019 – 7 months)

During equipment installation, much of the construction activity would involve on-site movement and placement of equipment and materials as well as the actual installation of the equipment. A maximum of 20 workers per day and a phase average of 15 workers per day would be on site during construction. Approximately 11 off-road equipment pieces would be used on-site, including an excavator, a loader, cranes, a generator, and air compressors. Equipment deliveries would occur at a maximum of three times per week. Deliveries of other material would occur up to four times per week.

Startup and Testing (November 2018 through February 2019 – 4 months)

During startup and testing, most of the physical portion of the proposed project would have been completed. On-site use of up to five pick-up trucks would occur during this phase, along with some material deliveries occurring up to three times per week. A maximum of 10 workers per day and a phase average of seven workers per day would be on site during this phase.

Paving and Landscaping (February through March 2019 – 2 months)

During this phase, auxiliary paving and landscaping would be constructed around the propose WWTP expansion. A maximum of 15 workers per day and a phase average of seven workers per day would be on site during this phase. Approximately eight off-road equipment pieces would be used on-site including an asphalt spreading machine, roller, excavator, dump truck, loader, forklift, generator, and air compressor. No deliveries would occur during this phase. Asphalt deliveries would occur at a maximum of two times per day for a one-week period. Other deliveries would occur up to five times per week.

Clean Up (March through May 2019 – 3 months)

Clean up would involve the removal of on-site construction equipment and support materials. A maximum of seven workers per day and a phase average of five workers per day would be on site during this phase. Approximately three off-road equipment pieces would be used on-site, including a loader, forklift, and excavator. No deliveries would occur during this phase.

Additional detail regarding the CalEEMod model assumptions, inputs and outputs are included in Attachment A, which is included in the administrative record for the Proposed Project available for review at the City of Brentwood, Public Works-Engineering office.

Operations

Assumptions regarding the operations-related changes that would occur under the Proposed Project with respect to wastewater production and chemical use, on-road hauling activities and other trips, and energy resources were provided by Robertson-Bryan, Inc. (pers. comm.).

Building Emissions

Annual electricity and natural gas consumption rates that would occur under the Proposed Project were based on the assumptions and/or calculated in CalEEMod. Where electricity and natural gas use are known, the CalEEMod model only accepts adjustments in annual kWh per sq ft for electricity and kBTU per sqft for natural gas. Table A-1 shows the assumed energy and natural gas use estimates, assuming a total building area of 175,000 sq ft. The scenarios evaluated included "Existing Conditions" which represent current average dry weather wastewater inflows of about 3.7 mgd; the "Permitted Future" represents projected conditions for the existing WWTP treatment capacity of 5 mgd, and the "Proposed" scenarios reflect estimates for the proposed expanded WWTP capacity of 7.5 mgd.

To simplify modeling effort, only the "Proposed with Solids Dryer" option was run in CalEEMod. Energy-related emissions estimates for other project options were scaled from the "Proposed with Solids Dryer" emissions results by their respective differences in energy use.

Table A-1. WWTP Expansion Operations: Building Energy Use and Model Inputs.

Parameter	Existing Conditions	Permitted Future	Proposed – with Same Processes	Proposed with Solids Dryer	Proposed with Dryer and UV
Electrical Energy Use (Annual MWh)	5,434	8,200	13,000	13,300	14,300
Natural Gas Use (Therms)	0	0	0	242,000	242,000
Energy use per square foot	For CalEEMod Inputs				
Electrical Energy Use (Annual kWh/sqft)	31.05	46.86	74.29	76.00	81.71
Natural Gas Use (KBTU/sqft)	0.00	0.00	0.00	138.29	138.29

Source: Robertson-Bryan, Inc. (pers. comm.) - assumptions for operations-related energy sources and use rates.

Vehicle Trips

As mentioned in the Air Quality and Greenhouse Gas sections and above, mobile emissions were based on emission factors from EMFAC2014. The estimates of employee trips and hauling trips and assumptions relating to trip lengths are shown in **Table A-2** (Robertson-Bryan, Inc. [pers. comm.]), along with the vehicle trip parameters, including vehicle types, for each scenario. Vehicle emission factors from EMFAC2014 run for the 2020 calendar year, Contra Costa County, and the specific vehicle types also are identified in Table A-2.

Table A-2. WWTP Expansion Operations: Vehicle Trip Parameters.

Parameter	Vehicle Type	Miles per Trip	Existing Conditions	Permitted Future	Proposed - Same Processes	Proposed with Dryer	Proposed with Dryer and UV
Employee Trips (round trips/day)	LDA/ LDT1/ LDT2	12	13	13	15	15	15
Hauling Trips - Biosolids (round trips/yr)	HHDT	23.8	370	430	550	110	110
Hauling Trips - Chemicals (round trips/yr)	MHDT	15	44	60	90	90	45
Source: Robertson-Bryan, Inc. (pers. comm.) - biosolids hauling trip miles based on driving distance from WWTP to Vasco Road Landfill.							

Process Emissions

GHG emissions from wastewater treatment processes are shown in **Table A-3**, which were based on Equations 10.7 and 10.9 from ICLEI's Community Protocol. Additional detail regarding model assumptions, inputs and outputs are included in Attachment B, which is included in the administrative record for the Proposed Project available for review at the City of Brentwood, Public Works-Engineering office.

Table A-3. EMFAC2014 Emission Factors for the Brentwood WWTP Phase II Expansion.

Parameter	Vehicle Type	ROG	NOx	PM_{10}	$PM_{2.5}$	CO	CH
Employee Trips	LDA/ LDT1/ LDT2	0.01	0.07	0.00	0.00	299.03	0.01
Hauling Trips - Biosolids	HHDT	0.14	4.44	0.02	0.02	1,653.65	0.05
Hauling Trips - Chemicals	MHDT	0.13	2.33	0.05	0.05	1,212.12	0.02
Source: EMFAC 2014							

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Written References

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Personal Communications

Robertson-Bryan, Inc. Jeff Lafer (Project Scientist). November 13, 2015 – email providing responses to data requests regarding construction- and operations-related activity assumptions.

Data

Parameter	Existing Conditions	Future Scenarios			
		1	2	3	4
		Permitted Future	Proposed – Same System	Proposed (w/ dryer)	Proposed (w/ UV)
MGD	**3.7**	**5**	**7.5**	**7.5**	**7.5**
Describe any anaerobic processes, if any (e.g. anaerobic lagoons). Are methane emissions captured or flared?	The WWTP does not have anaerobic digesters, so no major methane sources onsite – and no change with Proposed Project. There are two denitrification basins in front of the oxidation ditches, which are anoxic but do not produce methane. The denitrification does produce a small amount of nitrogen gas. These two de-N basins will remain with the Proposed Project and are sufficient for the increased flow - there will be no change with the Proposed Project (i.e., no additional basin is being added).				
Existing/Future Population served *(use same assumptions as for the energy estimates)*	57000	62000	71000	71000	71000
Is industrial and commercial wastewater accepted?	No appreciable existing ind/commercial sources; and no change expected with City growth (i.e., Proposed Project); substantially less than typical city				
N2O Emissions Calculations (1)					
kg N/day in water discharged to March Creek	119	110	138	138	138
F_ind-com	1	1	1	1	1
N2O emissions from Nitrification/Denitrification (MT/year) (Equation 10.7 from LGOP)	0.399	0.434	0.497	0.497	0.497
N2O emissions from Effluent Discharge to Rivers and Estuaries (MT/year) (Equation 10.9 from LGOP)	0.342	0.316	0.396	0.396	0.396
MT CO2/year (from Toxics)	0.006	0.009	0.013	0.013	0.013
MT CH4/year (from Toxics)	0.000	0.000	0.000	0.000	0.000
MT N2O/year	0.741	0.750	0.893	0.893	0.893
MT CO2e/year	196.241	198.674	236.667	236.667	236.667
Process Criteria Pollutant Emissions (2)					
lb TOG/day	0.6680	0.903	1.354	1.354	1.354
lb ROG/day	0.3841	0.519	0.778	0.778	0.778
lb CO/day	0.0710	0.096	0.144	0.144	0.144
lb NOX/day	0.3250	0.439	0.659	0.659	0.659
lb PM10/day	0.1060	0.143	0.215	0.215	0.215
lb PM2.5/day	0.1030	0.139	0.209	0.209	0.209
Toxics Emissions (2) (lbs/year)					
Ammonia - NH3	152.11	205.55	308.32	308.32	308.32
CO2	14.03	18.95	28.43	28.43	28.43
Benzene	0.92	1.25	1.87	1.87	1.87
Formaldehyde	0.08	0.10	0.15	0.15	0.15
Nickel	0.03	0.04	0.07	0.07	0.07
Manganese	0.00	0.00	0.01	0.01	0.01
Cadmium	0.00	0.00	0.00	0.00	0.00
Lead	0.00	0.00	0.00	0.00	0.00
CH4	0.00	0.00	0.00	0.00	0.00
Arsenic	0.00	0.00	0.00	0.00	0.00
Mercury	0.00	0.00	0.00	0.00	0.00
Beryllium	0.00	0.00	0.00	0.00	0.00
Cr(VI)	0.00	0.00	0.00	0.00	0.00

Source: (1) ICLEI Community Protocol, (2) ARB 2013 Facility Emissions Data
(http://www.arb.ca.gov/app/emsinv/facinfo/facdet.php?co_=7&ab_=SF&facid_=15789&dis_=BA&dbyr=2013&dd=)

WWTP Process Emissions Equations from ICLEI's Community Protocol

10.3.2.1 Process Emissions from WWTP with Nitrification/Denitrification

Equation 10.7	Process N_2O Emissions from WWTP with Nitrification/Denitrification
Annual N_2O emissions (metric tons CO_2e) =	
$((P_{total} \times F_{ind\text{-}com}) \times EF\ nit/denit \times 10^{-6}) \times GWP$	

Where:

Term		Description	Value
P_{total}	=	total population that is served by the centralized WWTP adjusted for industrial discharge, if applicable [person]	user input
$F_{ind\text{-}com}$	=	factor for industrial and commercial co-discharge waste into the sewer system	1.25
EF nit/denit	=	emission factor for a WWTP with nitrification/denitrification [g N_2O/person/year]	7
10^{-6}	=	conversion from g to metric ton [metric ton/g]	10^{-6}
GWP	=	N_2O Global Warming Potential	310

Source: EPA *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007*, Chapter 8, 8-13 (2009).

Equation 10.9	Process N_2O Emissions from Effluent Discharge (site-specific N load data)
Annual N_2O emissions (metric tons CO_2e) =	
(N Load x EF effluent x 365.25 x 10^{-3} x 44/28) x GWP	

Where:

Term		Description	Value
N Load	=	measured average total nitrogen discharged [kg N/day]	user input
EF effluent	=	emission factor [kg N_2O-N/kg sewage-N produced]	0.005
365.25	=	conversion factor [day/year]	365.25
10^{-3}	=	conversion from kg to metric ton [metric ton/kg]	10^{-3}
44/28	=	molecular weight ratio of N_2O to N_2	1.57
GWP	=	Global Warming Potential	310

Source: EPA *Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007*, Chapter 8, 8-13 (2009).

APPENDIX B

Cultural Resources Technical Report

BRENTWOOD RECYCLED WATER PROJECT PHASE 2

Cultural and Paleontological Resources Inventory
Brentwood, Contra Costa County, California

Section 6, T.1N, R.3E MDM
Brentwood, Calif. 7.5' USGS Quadrangle
Approximately 4 Acres

Prepared By

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February, 2016

MANAGEMENT SUMMARY

The City of Brentwood, Contra Costa County, California, plans to expand its capability to recycle water on the existing wastewater treatment plant grounds. The project consists of a, shop expansion, oxidation ditch, secondary clarifier, disinfection and media filters expansion and new treatment unit processes. Equipment and materials will be staged at two locations on the facility.

Efforts to identify historical resources, historic properties and paleontological resources included a search of the University of California Museum of Paleontology database, a records search by the Northwest Information Center, California Historical Resources Information System, two sacred lands file searches by the Native American Heritage Commission, contacts with Native Americans listed by the commission, literature review and an archaeological field inspection.

The records search by the Northwest Information Center did not identify any cultural resources located within the project area / Areas of Potential Effect (APEs) on the wastewater treatment plant grounds. A search of the University of California Museum of Paleontology's database did not identify any fossil localities within the existing wastewater treatment facility. However, the wastewater treatment plant is located in an area of Pleistocene/Holocene dune sands and may yield Pleistocene vertebrate fossils such as bones or teeth.

The Native American Heritage Commission's sacred lands file search and contacts with Native Americans failed to identify any Native American tribal cultural resources or Native American traditional cultural properties in the project vicinity. The field inspection by the archaeological field team also did not identify any archaeological resources within the project area /APEs.

The areas of proposed ground disturbance (APEs) lie on previously disturbed ground consisting of previously graded, cut and filled terrain. While additional ground disturbing activities have the potential to disturb or destroy buried prehistoric and historic archaeological resources including human remains, the probability for encountering buried archaeological resources is very low due to previous intense construction.

As no archaeological resources, traditional cultural properties, or Native American cultural resources were identified within the APEs, it is our opinion that the proposed project will have no effect on historic properties or historical resources, but could have an effect on unique paleontological resources and that effect could be adverse.

INTRODUCTION

The City of Brentwood, Contra Costa County, California, plans to expand its capability to recycle water on the existing wastewater treatment facility (Figures 1 and 2). The purpose of the Phase 2 expansion is to increase the treatment capacity of the plant from the current 5.0 million gallons per day (MGD) to 7.5 MGD average dry weather flow, which the City of Brentwood identifies as the Phase 2 expansion. The expansion will accommodate future increased wastewater inflows associated with development and population growth identified in the City's General Plan.

The project consists of a new oxidation ditch, secondary clarifier, solids belt filter press, biosolids dryer, media filters, wastewater disinfection and shop addition. Equipment and materials will be staged at two locations on the facility (see Figure 3).

CEQA Regulatory Background

The California Environmental Quality Act (CEQA) statutes [Public Resources Code §21001(b) *et seq.*] require planning agencies to carefully consider the potential effect of a project on historical resources. Under CEQA guidelines in §15064.5, a historical resource includes: a resource listed in or eligible for the California Register of Historical Resources; or listed in a local register of historical resources; or identified in a historical resource survey and meeting requirements in §5024.1(g) of the Public Resources Code; or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines historically significant, provided the determination is supported by substantial evidence in light of the whole record; or a resource so determined by a lead agency under Public Resources Code §5020.1(j) or §5024.1.

Under CEQA Guidelines, "A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment" [Public Resources Code §15064.5(b)]. "Substantial adverse change" is ". . . physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired [Public Resources Code §15064.5(b)(2)].

While alteration of the setting of an archaeological site that is eligible only for its information potential may not affect the site's significant characteristics, alteration of a site's location (*viz.*, removing or damaging all or part of the site) may have a significant adverse effect. CEQA's Guidelines §15126.4(b)(3) state, "Public agencies should, whenever feasible, seek to avoid damaging effects on any historical resource of an archaeological nature." The guidelines further state that preservation in place is the preferred manner of mitigating impacts, and that preservation ". . may be accomplished by, but is not limited to, the following":

1. Planning construction to avoid archaeological sites;

2. Incorporation of sites within parks, greenspace, or other open space;

3. Covering the archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site.

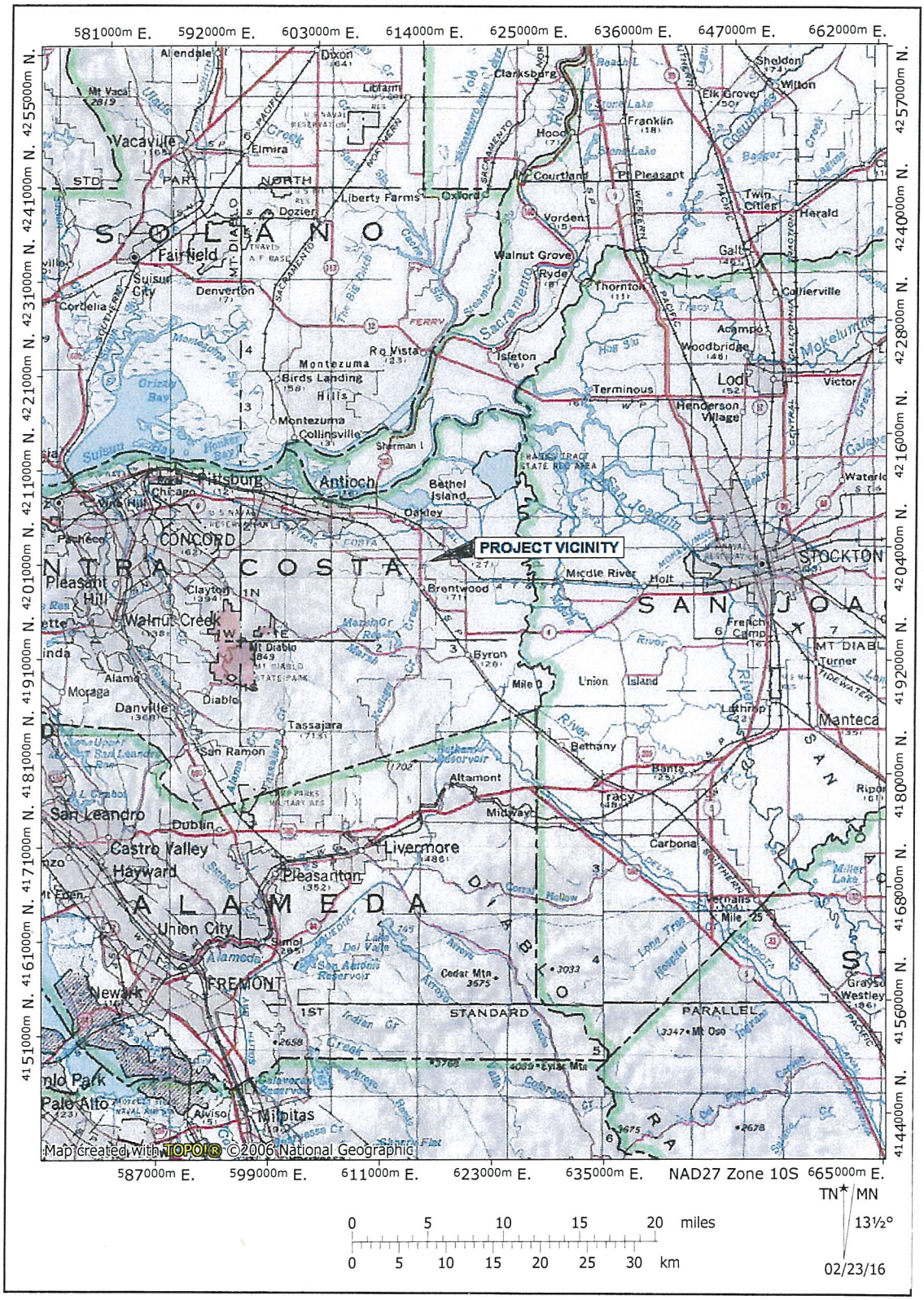

Figure 1. Project vicinity.

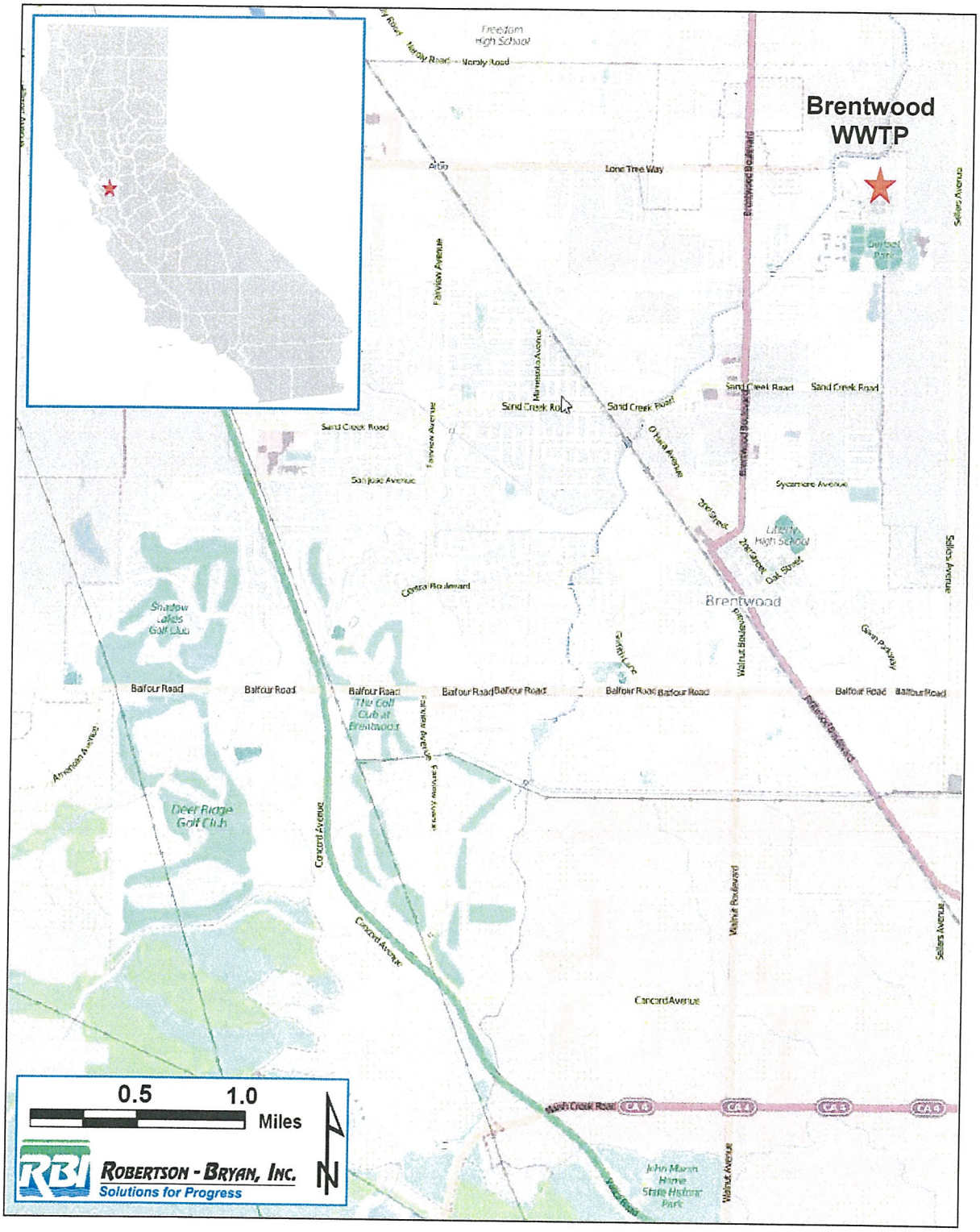

Figure 2. Project location.

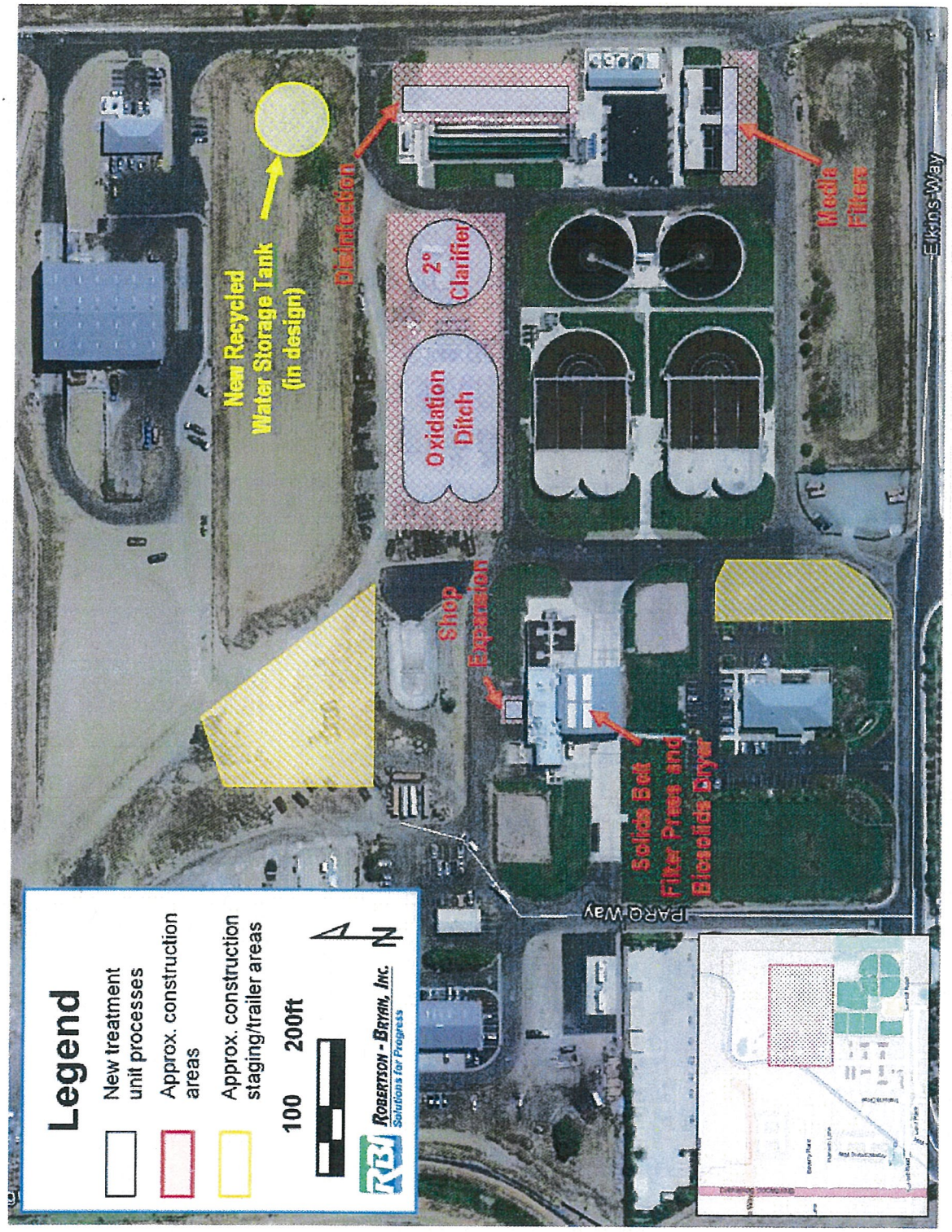

Figure 3. Areas of anticipated ground disturbance excluding new water storage tank, which is part of a separate project.

4. Deeding the site into a permanent conservation easement.

CEQA Guidelines state, "when data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provision for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken" [CEQA Guidelines §15126.4(b)(3)(C)]. However, "data recovery shall not be required for a historical resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource . . ." [CEQA Guidelines §15126.4(b)(3)(D)].

California law protects Native American burials, skeletal remains and associated grave goods regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains (Health and Safety Code §7050.5, Public Resources Code §5097.94 *et seq.*).

Like archaeological resources, paleontological resources are non-renewable and once destroyed, they are lost forever. Appendix G (Part V), CEQA Guidelines states that a project may have a significant impact on the environment if it will destroy a unique paleontological resource or site of unique geological feature(s). The guidelines require the assessment and mitigation of impacts to paleontological resources on all discretionary projects. Public Resources Code §5097.5 regulates the unauthorized removal of paleontological remains. Penal Code §622.5 sets penalties for damage to or removal of archaeological (paleontological) resources.

Federal Regulatory Background

The National Historic Preservation Act (NHPA) as amended is the primary federal law governing the preservation of cultural resources in the United States. Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on any district, building, structure, site or object listed on or determined eligible for the National Register of Historic Places.

The National Environmental Quality Act (NEPA) as amended, mandates a policy of environmental considerations during federal planning and decision-making and defines the environmental review process.

The State Water Resources Control Board California Department of Health is acting as the lead federal agency for the proposed recycled water project. The purpose of the present study is to assist the SWRCB in meeting its responsibilities under the NHPA, Section 106. A Section 106 consultation is a federal review, separate from any environmental or planning reviews required by state and local laws and ordinances. The purpose of Section 106 is to avoid unnecessary harm to historic properties listed in or eligible for the National Register (National Park Service 1991: Appendix IV-2). Under federal regulations at 36 CFR Part 800, effective January 11, 2001 and amended since then, the basic steps in a Section 106 review include:

- **Initiating the Section 106 process** (This step was added in 1999 to encourage early consideration of the potential effects of the federal permitting or other action, to coordinate with other reviews, to identify consulting parties such as the State Historic Preservation Officer and federally recognized Indian tribes, and to make plans for other public involvement);

- **Identifying historic properties** (The federal agency is responsible for defining the Area or Areas of Potential Effects; also included in this step is the identification of cultural resources, evaluating

the eligibility of those resources for the National Register, including sites to which Indian tribes attach religious and cultural significance, determining the eligibility of those resources for the National Register and determining whether or not historic properties will be affected);

- **Assessing Adverse Effects** (The federal agency must consider both direct and indirect effects, reasonably foreseeable effects that are cumulative, later in time or at a distance, and with respect to all qualifying characteristics of a historic property--*e.g.*, if an archaeological site is important for its scientific information potential and for its cultural or religious importance to an Indian tribe, then the adverse effects on both must be considered).

- **Resolving Adverse Effects** [The process of negotiating a Memorandum of Agreement (MOA) between the consulting parties is now streamlined and may involve only the federal agency and the State Historic Preservation Officer as signatories. However, the Advisory Council recommends that the federal agency should invite federally-recognized Indian tribes that attach religious and cultural significance to properties off tribal lands to concur with the findings in the MOA].

Under federal regulations, where there is a federal undertaking on non-federal land (*e.g.*, federal permitting, licensing or funding), a consultant may gather information necessary for the federal agency to meet its responsibilities under Section 106, but the agency official remains legally responsible for all required findings and determinations [36 CFR Part 800.2(a)(3)].

In accordance with 36 CFR Part 800.2(c)(ii)(A), (B) and (C), it is also the agency official who has the responsibility to make a reasonable and good faith effort to identify Indian tribes that shall be consulted in the Section 106 process.

California law protects Native American burials, skeletal remains and associated grave goods regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains (Health and Safety Code §7050.5, Public Resources Code §5097.94 *et seq.*).

PROJECT DESCRIPTION

The City of Brentwood, Contra Costa County, California, plans to expand its recycled water facility. The proposed new treatment processes would undergo modular expansion and be similar to the corresponding unit processes of the existing wastewater treatment plant. These new treatment unit processes to be constructed for the Phase 2 capacity expansion are shown in Figure 3 with the exception of the new recycled water storage tank, which is part of a separate project (see also Attachment A: Photographs).

The footprint of the proposed new Phase 2 facilities will occupy approximately four acres including landscaping. The new facilities lie within existing cleared earthen areas reserved for such expansion when the original facilities were built.

- **Oxidation Ditch System.** A new oxidation ditch will be constructed next to the two existing parallel oxidation ditches. The oxidation ditch process involves extended aeration and anoxic zones for biological nutrient removal.

- **Secondary Clarifier.** A new circular secondary clarifier including waste sludge and scum pumps

will be constructed next to the existing clarifiers. It will likely be similar in design and operating characteristics as the two existing clarifiers.

- **Solids Belt Filter Press.** A new solids belt filter press and liquids return pump will be installed. The belt press will likely be similar in design and operating characteristics as the two existing belt presses.

- **Biosolids Dryer.** The City plans to evaluate the feasibility of installing a new biosolids dryer system to produce Class A biosolids, which will allow new uses or disposal options beyond those in current use. Currently, the City produces dewatered biosolids that are hauled to a landfill for disposal. On the other hand, Class A biosolids may be used as a soil amendment on nearby farming operations.

- **Media Filters.** The wastewater treatment plant uses deep bed sand filters for filtration of wastewater. A new media filter unit will be constructed and integrated with the existing media filters. Design and operating characteristics will be similar to those of the existing filter units.

- **Wastewater Disinfection.** The current effluent disinfection is a chlorine/dechlorination process for effluent discharge to Marsh Creek. The proposed project will expand the plant's capability and possibly convert the existing system to an alternative disinfection process.

- **Shop Addition.** A small, approximately 900 square feet room addition to the shop building may be attached to the north side of the existing headworks/shop building.

Specific construction methods and activity occurring over the course of he project will vary. Depths of excavation as related to site preparation (clearing, grading and excavation) and installation of underground features, paving filling, landscaping and cleanup will be determined as specific plans for new facilities are finalized.

PROJECT AREA / AREA OF POTENTIAL EFFECT

The project area / Area of Potential Effect (area of anticipated ground disturbance) consists of non-contiguous localities within the existing wastewater treatment plant. Specifically, the non-contiguous localities are two staging areas, the location for the new oxidation ditch, secondary clarifier, disinfection facility expansion, media filters expansion, shop expansion and solids belt filter press and biosolids dryer.

One of the two staging areas is an existing lawn on the east side of the recycled water facility's office building. The second staging area lies between two on-site roads immediately north of a small reservoir. The oxidation ditch and secondary clarifier will be constructed in an area that currently serves as a staging area. Expansion for disinfection and media filters are existing lawns. The shop expansion area is currently paved with asphalt. The solids belt filter press and biosolids dryer are new treatment processes in existing facilities. The vertical APE or maximum depth of anticipated excavation is unknown. Access will be along existing roads.

HISTORIC CONTEXT

Identification, evaluation and treatment of historical resources and historic properties are most reliable when there is an understanding of the relationship between those properties and other similar cultural

resources. Standard I of the Secretary of the Interior's Standards and Guidelines defines the concept of "historic context" as information on aspects of history, architecture, archaeology, engineering and culture that are collected and organized to define those relationships (National Park Service 1983:44717).

Historic contexts are based on cultural themes, their geographic extent and time period. Any particular historic context describes the "significant broad patterns of development in an area that may be represented by historic properties." Prehistory, *Julpun* Miwok ethnohistory, agriculture and the settlement and growth of Brentwood provide the historic context for the present study.

Geology/Land Forms

The Brentwood area is located on flat terrain consisting mostly of young sedimentary deposits, ranging from Pliocene to Holocene in age (Graymer *et al* 1944; Helley and Graymer 1997; Dibblee 2006). One geologic unit is mapped in the area: dune sands (Qds). The undifferentiated Holocene/ Pleistocene dune sands unit includes the wastewater treatment plant location.

Prehistory

The greater San Francisco Bay area was inhabited by diverse peoples for more than 10,000 years. When the bay and delta formed, the region emerged ". . . as a distinctive cultural center with influences extending to and from the Central Valley and Coast Ranges" (Moratto 1984:218).

Until 1970, most of the archaeological sites investigated were middens, deposits of refuse at village and camp sites, dating back 3000-4000 years. Radiocarbon-dated finds between San Francisco and Monterey bays indicated that human beings were in the region as early as 8000 B.C. In addition, a dozen or more archaeological sites in the Bay Area have been dated to the period, 5000-2000 B.C. The earliest component of archaeological site, CA-CCO-548/H, which is located about five miles southwest of the recycled water treatment facility yielded radiocarbon dates dating to the beginning of the Middle Archaic. Archaeological evidence suggested foothill contexts with artifact assemblages dominated by implements fashioned from cobbles. Central Valley counterparts are few, while the frequency of such sites in the foothills is relatively high (Corey 2011).

Occupation of CA-CCO-548/H in the latter part of the middle Archaic is associated with the Windmiller Pattern of the Central Valley, according to the archaeological site's National Register nomination form. The site was identified from deposits eroding from both sides of a seasonal creek. Encompassing 44 acres, the site lies on an extensive flood plain and alluvial terraces. Pleistocene or Holocene alluvium lies on the surface in and around the archaeological site. Cretaceous to Tertiary sedimentary bedrock underlies the flood plain (Corey 2011). The site occupies an entirely different geographic and geologic setting than Brentwood's Wastewater Treatment Plant.

Another Contra Costa County site (CA-CCO-308) situated near Walnut Creek was dated to the Middle Archaic, as well. The location of these early settlements, whether in hill country, bay or ocean shores, are marked by earth or sand deposits with relatively sparse shell. Artifacts from this early period include large projectile points and milling stones.

A new and distinctive culture of bayshore and marsh-adapted people appeared after 2000 B.C. By the beginning of the Christian era, numerous villages were established throughout the San Francisco Bay region. The late archaeologist David Fredrickson identified these settlements collectively as the

"Berkeley Pattern," a variant of his "Windmiller Pattern" of the interior valley and distinct from the late "Borax Lake Pattern" of the north coast ranges (Fredrickson 1973:116-133).

In his 1984 synthesis of California archaeology, Moratto contended that the Early Bay Culture was a relict Hokan population in contact with early Costanoans (Moratto 1984:279). The Berkeley Pattern, represented Utian (Miwok-Costanoan) speaking people who were settling older Hokan territories in the Bay Area and along California's central coast. It appeared to Moratto that people belonging to Utian language groups first occupied eastern Contra Costa County around 2500-2000 B.C., coincidental with the rise in sea level and birth of the delta region. The Utians expanded westward to San Francisco Bay by *circa* 1900 B.C. By 1500 B.C., ancestral Costanoans had settled at the southern end of San Francisco Bay and by 500 B.C., their territory had expanded to include the Santa Clara Valley (Moratto 1984:279).

Concurrently, ancestral Miwok-speaking groups moved into the North Bay. Yukian and possibly Hokan language groups on the Marin coast were displaced by ancestral Miwokans between 1000 and 500 B.C. However, the way in which older populations were displaced by new ones is still poorly understood.

The subsequent Augustine Pattern, which began *circa* A.D. 300-500, did not appear to mark a replacement of Utian populations in the bay region, according to Moratto. However, artifacts characteristic of the Augustine Pattern denoted, in the northeast Bay Area, the southward expansion of Wintuan (ancestral Patwin) peoples into Bay Miwok territory (Moratto 1984:283). Another component of CA-CCO-548/H dates to this latter Emergent period (Corey 2011).

In 1987, James Bennyhoff provided an updated overview of Middle and Late period West Delta and Bay Area prehistory (Bennyhoff 1994:81-89). Bennyhoff contended that the earliest phase of the Berkeley Pattern was not simply a variant of the Windmiller Pattern suggested by Moratto (*cf.* Bennyhoff 1994:83 and Moratto 1984:207ff). Based on an analysis of human remains, it appeared to Bennyhoff that two separate populations were represented. The Windmiller Pattern included early period sites in the Sacramento, Cosumnes, Stockton districts and well into the West Delta. Lower Berkeley Pattern sites were located around San Francisco, San Pablo and Suisun bays (Bennyhoff 1994:Figure 8.1).

Bennyhoff further contended that the Meganos Culture, which he identified in 1968, was the result of a "hybrid" Windmiller population intermarrying with people of the Berkeley Pattern. "Meganos" meant "sand mound," referring to the non-midden cemeteries found in the sand mounds on West Delta islands. Bennyhoff asserted that the Meganos Culture rose between 500 and 200 B.C., that it was always centered in the San Joaquin Valley, but expanded into parts of the Bay Area by the late Middle period circa A.D. 300-700.

The Middle-Late transition, A.D. 700-900, was a period of disruption across Central California, suggested Bennyhoff. With the southward expansion of Wintuan peoples, probably the bearers of the Augustine Pattern, the Meganosans appear to have retreated to the Sacramento Delta. The intruding Patwin, a Wintuan-speaking people, moved deep into the Solano District and apparently forced the resident ancestral Bay Miwok across the West Delta to the south side of Suisun Bay. Ancestral Karkin Costanoans, who lived on the north side of San Pablo and Suisun bays, also moved to the south across Carquinez Strait to join other Costanoans from whom they had been physically separated for 300 years. It was during this time, A.D. 700-900, that the Meganos cemeteries in the Alameda and Diablo districts were abandoned.

During the earliest phase of the Late period, A.D. 900-1100, Bennyhoff indicated that the Bay Miwok expanded eastward into the West Delta, occupying the Hotchkiss Mound (CA-CCO-138) located near the present-day community of Bethel Island. Concomitantly, the nearby Meganos cemeteries at CA-

CCO-20 and CA-CCO-139 were abandoned. The study of a late period Meganos cemetery in Stockton (CA-SJO-154) showed that the Meganos survivors integrated with Valley Yokuts people. By the period A.D. 1100-1300, a new settlement pattern was evident for the Stockton District (Bennyhoff 1994:83).

A recent updated synthesis has taken the generally recognized cultural periods and updated the time span of each period based on new radiocarbon determinations adjusted with modern calibration curves (Rosenthal *et al.* 2007:150):

Paleo-Indian (11,550-8550 cal B.C.)
Lower Archaic (8550-5550 cal B.C.)
Middle Archaic (5550-550 cal B.C.)
Upper Archaic (550 cal B.C.-cal A.D. 1100)
Emergent (cal A.D. 1100-Historic)

Ethnography/Ethnohistory

History records that Dr. John Marsh, who acquired *Rancho Los Meganos* in 1842, made mention of the *Pulpines* (*Pulpunes*) on the southeastern flanks of Mount Diablo and on islands in the delta (Collier 1983:15). Bennyhoff in his definitive work on the *Ethnogeography of the Plains Miwok* stated that the territory of the West Delta *Julpun* tribelet of Miwok-speaking people probably extended to lower Marsh Creek. John Marsh found a few returned 'Pulpunes' neophytes in 1838. This would place the Brentwood Wastewater Treatment facility within pre-mission period *Julpun* (Bay Miwok) territory.

> Excavations in CCO-138 (the Hotchkiss Mound about three miles northeast of the Brentwood Wastewater Treatment Plant and the largest site yet known in the Diablo district until the discovery of CA-CC)-548/H at the Marsh house site) revealed a long history of occupation that was terminated at or just prior to the historic period. This site may well have been the aboriginal *Julpun* tribelet center (Bennyhoff 1977:144).

Bennyhoff continued his speculative reconstruction of *Julpun* history by suggesting that the *Julpun* may have moved its tribelet center to an unidentified island on the north bank of the San Joaquin River shortly after intensive mission contact began in 1810 (Bennyhoff 1977:144).

Miwok-speaking people organized themselves into tribelets. Several more or less permanent settlements and a larger number of seasonal campsites combined to make an independent, land-holding group within a well-defined territory (Levy 1978:398).

Miwok people living along the waterways of the West Delta were fishermen, hunters and gatherers. Some villages may have specialized in fishing, while others relied on seasonal rounds of hunting, fishing and seed gathering. Their houses were domed-shaped, covered with tule mats or tule thatch. Semi-subterranean lodges were also constructed. In the central valley, large semi-subterranean structures were used as assembly houses and were found mainly in the principal village (or center) of each tribelet. Other structures in a village included a sweathouse built over a pit 2-3 feet deep, a menstrual hut, acorn granaries and shelters over mortars where acorns were pulverized for meal.

By 1797, the Mission Delores was founded. Settlement at the mission led to a renewed interest in the East Bay region. Explorers and missionaries penetrated the San Joaquin-Sacramento Delta in search of neophytes. Much of the territory of Bay Miwok tribelets was cleared of its entire native population by 1824, if not earlier. Many were sent to Mission San Jose. By 1832, as a consequence of missionization,

the population of the Bay Miwok in general had declined by 80 percent (Levy 1978:400).

The 1824 Kotzebue map and several diaries written during the period between 1796 and 1817 indicate that the *Julpun* ". . . controlled the islands and adjacent west bank of the San Joaquin River where the three branches reunite" (Bennyhoff 1977:144).

Bennyhoff indicated that baptismal dates for *Julpun* end in 1827. He suggested that *Julpun* territory southeast of the mouth of the San Joaquin River was abandoned by that time. Yet, it was apparent to Bennyhoff that the few *Julpunes* who survived secularization of the missions and left the Indian settlements around the missions, returned to their native territory. As a consequence, Marsh was able to find and use local Native American labor when he settled on *Rancho los Meganos*, which he named, "Farm of the Pulpunes" (a variation of *Julpun*) (Bennyhoff 1977:62).

History

The *Rancho Los Meganos* ("sand hills") land grant was made to Jose Noriega, who came to California on the ship "Natalie" in 1834. It was during the following year, 1835, that Noriega became treasurer at the pueblo of San Jose and was ceded the land, *Rancho Los Meganos*. In the following years between 1834 and 1841, Noriega also became co-owner of *Rancho Las Positas* with Robert Livermore and shared another land grant, *Rancho Quito* with Jose Zenon Fernandez (Collier 1983:89).

Noriega and his wife occupied *Rancho Los Meganos* until the spring of 1842, when he officially sold the place to Dr. John Marsh. An early survey resulted in a figure of 52,083 acres describing the land grant. With the assistance of local native labor, Marsh built an adobe house with four rooms, an attic and a thatched roof. He later constructed a stone house (Collier 1983:89-90).

Brentwood was named after the Brentwood in Essex, England, home of John Marsh's family. In the 1860s and early 1870s, two schools, a few businesses and a saloon were established. In 1867, the Brentwood Coal Mine was opened.

Coal (lignite) was discovered at a site about halfway between Mount Diablo and Antioch in 1858. Most notable among the mines later developed were the Black Diamond Coal Mine, the Cumberland Mine, Pittsburg Mine, Central Coal Mine, Union Mine, Independence Mine and the Brentwood Coal Mine, which was located on the old Marsh *rancho* (Munro-Fraser 1882:131-132).

Construction of the San Pablo and Tulare Railroad prompted the owners of the old Marsh land grant to donate a tract of land to lay out the town. Fish & Blum of Martinez constructed a warehouse to accompany the new train depot (Munro-Fraser 1882:496-497).

Although coal was responsible for a brief fluorescence of the region, agriculture became its mainstay. John Marsh is reported to have made the first attempt at cultivating cereal crops in Contra Costa County (Munro-Fraser 1882:55-56).

Like other agricultural areas throughout the delta and San Joaquin Valley regions, the Brentwood area was on the forefront of California's wheat boom of the 1880s and 1890s. By1890, Brentwood was the largest shipping point for grains between New Orleans and San Francisco. It was during this same period that coal declined and California oil became the fuel of industry.

The beginning of the twentieth century brought many changes in both ownership and agricultural

production in the area. In 1910, Balfour, Guthrie and Company purchased the Marsh Ranch. Three years later, the company subdivided 12,616 acres bringing more small farmers and ranchers to the area. During the 1920s, local farmers planted the first orchards.

By an overwhelming vote, the residents of Brentwood established the first Contra Costa water district to serve the town with a domestic water supply. This was the first district in Contra Costa County under the County Water District Act. In addition, the East Contra Costa Irrigation District was established. The new district consolidated Lone Tree, Knightsen, and Brentwood Irrigation companies.

The change to orchards in the early 1920s attracted more large-scale farming operations. H.P. Garin, for example, leased 600 acres in Brentwood in 1926. By 1935, Garin controlled over 30,000 acres throughout California.

The City of Brentwood was incorporated in 1948. While the city remained a predominantly rural agricultural community, the post war population boom in the Bay Area changed the economic focus of the entire region. People could live in Brentwood and commute to factory jobs in Pittsburgh and Martinez. The trend away from a rural agricultural community towards a suburban city began slowly. The 1978 USGS Brentwood quadrangle shows that the area around the wastewater treatment plant was not yet developed beyond agriculture and scattered rural residences.

UCMP DATABASE SEARCH RESULTS

On September 22, 2014, Kenneth L. Finger, Ph.D., conducted a search of the University of California, Museum of Paleontology's database. The database records search revealed 63 Pleistocene and 12 Pliocene vertebrate fossil localities from Contra Costa County represented by 9,924 and 1,267 specimens, respectively. One of the localities (V92081) yielded remains of the American mastodon, *Mammut americanus* located in the Brentwood region, though not within the APE of the Phase 2 project (see Attachment B: UCMP Database Search Results).

NWIC RECORDS SEARCH RESULTS

On October 6, 2014, the Northwest Information Center, California Historical Resources Information System completed a cultural resources records search, which included the Brentwood Wastewater Treatment Plant and a one-quarter mile radius around the plant (NWIC File No. 14-0315).

As a result of the records search, no cultural resources were identified on the wastewater treatment plant grounds. Information center staff found no listings in the Archaeological Determinations of Eligibility, California Inventory of Historic Resources or local inventories. There were no apparent relevant listings in Brentwood on the Office of Historic Preservation's Directory of Properties in the Historic Property Data File for Contra Costa County provided with the records search and dated April 5, 2012. There were no relevant listings in the August 2013 Caltrans Structure Maintenance and Investigations Historical Significance-Local Agency Bridges.

The records search included copied segments of historic maps. The General Land Office plat dated September 1862 showed roads roughly paralleling Marsh Creek northwest and southeast of the wastewater treatment plant. The much smaller scale and undated Map of Contra Costa County illustrated the boundaries of *Los Meganos* in the project area. The 1862 Plat of the *Rancho Los Meganos* Finally Confirmed to Alice Marsh illustrates a half dozen roads and few other man-made features in the general

area.

The 1914 USGS Byron 7.5' quadrangle illustrates the diminutive town of Brentwood situated largely on the east side of the Southern Pacific Railroad tracks. The town is also centered on a cross-roads of north-south and east-west vehicle roads. The 1916 USGS Byron 15' quadrangle illustrates much the same distribution of man-made features. The 1940 USGS Byron 15' quadrangle illustrates a small Brentwood on the railroad (Southern Pacific) and houses scattered along north-south and east-west roads around the town.

The 1954 USGS Brentwood 7.5' quadrangle illustrates a larger Brentwood surrounded mainly by orchards. A small sewage disposal plant surrounded by orchards is illustrated at the location of the modern wastewater treatment plant (see Attachment C: NWIC Records Search Results for a copy of the records search report).

NATIVE AMERICAN COORDINATION

On September 3, 2014, the Native American Heritage Commission completed a search of its sacred lands file for the Brentwood Recycled Water project, which encompassed the Phase 2 project area. In the commission's letter report, staff indicated that the file search failed to indicate the presence of Native American cultural resources in the immediate project vicinity. Staff enclosed a short list of Native American individuals and organization that may have knowledge of Native American cultural resources in the area.

- Ms. Katherine Erolinda Perez;
- Mr. Andrew Galvan, The Ohlone Indian Tribe;
- Ms. Ramona Garibay, Representative, Trina Marine Ruano Family

The above individuals were contacted by US mail in a letter dated September 15, 2014. The letter indicated that the Native American Heritage Commission recommended contacting each individual for information he or she may have regarding specific knowledge of cultural resources. The letter included a brief description of the proposed project and included a location map. There was no response from the letter. On December 20, 2015, we contacted each by email with updated maps of the project. However, no responses were received.

We subsequently requested a new Sacred Lands File search from the Commission specifically for the expansion project. On January 25, 2016, we sent a new letter to each of the three individuals describing Phase 2 of the expansion project and included a location map. On February 4, 2016, we attempted to contact each of the three individuals by telephone. There was one response. Ms. Ramona Garibay, representing the Trina Marine Ruano family indicated that she had no concerns as long as the ground disturbance was located away from Marsh Creek.

The Commission issued a response to our January 23, 2016 request, which was dated February 4, 2016 and received by us on February 10, 2016. Commission staff listed five individuals, one of which (Andrew Galvan) was contacted in the initial mailing. The new list provided by the Commission follows:

- Mr. Andrew Galvan, The Ohlone Indian Tribe;
- Ms. Irenne Zwierlein, Chairperson, Amah Mutsun Tribal Band of Mission San Juan Bautista;
- Ms. Ann Marie Sayers, Chairperson, Indian Canyon Mutsun Band of Costanoan;
- Ms. Rosemary Cambra, Chairperson, Muwekma Oholine Indian Tribe of the SF Bay Area;

- Mr. Raymond Hitchcock, Chairperson, Wilton Rancheria.

We mailed a letter to each contact on February 10, 2016 asking for information on any known or suspected sites of Native American importance that may be located on the treatment plant grounds. There was no response to the mailing. On February 23, 2016, we followed up with a telephone call to each contact. After questioning the senior author, Ms. Ann Marie Sayers expressed comfort in our findings of no surface evidence of Native American sites (see Attachment D: Native American Coordination).

FIELD METHODS

On January 14, 2015, we conducted a pedestrian field inspection of the construction locations and the staging areas (see Attachment A: Photographs). The areas of potential ground disturbance were walked along zig-zagging transects 5-15 meters apart.

The field team was lead by Ric Windmiller, M.A., Registered Professional Archaeologist. Windmiller has more than 40 years experience conducting and directing archaeological field surveys and excavations, and meets the Secretary of the Interior's Professional Qualifications Standards in prehistoric and historical archaeology. Windmiller was assisted by Steve Laumann with eight seasons experience in archaeological field surveys.

The first staging area located immediately east of the wastewater treatment plant's office building was planted in dense lawn grasses. Exposed soil at the edges of the lawn was inspected in addition to the lawn itself in a further effort to find some soil exposures. The second staging area located north of the office building, shop and reservoir was almost entirely exposed ground, which was examined along transects approximately five meters apart..

The area of potential ground disturbance around the disinfection facility is planted in dense lawn grasses. Although the lawns were walked along transects approximately five meters apart, ground visibility was only possible at the edges of lawn and in adjacent areas, which were also walked.

The same tack was taken with inspecting the lawn, which may be disturbed on the south side of the media filters facility. At the north central portion of the lawn against the south side of the facility there is bare ground, which was inspected along transects less than five meters apart. The lawn was bordered on three sides by paved roads.

The entire location of the oxidation ditch and secondary clarifier is currently a staging area. Here, the ground is largely exposed except for areas of parked equipment and plastic dumpsters. Even so, coverage was along irregular transects averaging about five meters apart.

The shop expansion area was entirely on existing asphalt pavement surrounded by more asphalt pavement. Therefore, inspection of the ground surface was focused on the exposed slope to the north, which faces the shop expansion location. Here, coverage was along transects less than five meters apart.

The wastewater treatment plant lies on largely disturbed ground in what could be described as the sand hills. The wastewater treatment facility was the subject of a cultural resources survey back in 1976 by

Arthur D. Little, Department of Anthropology, University of California, Berkeley. According to Northwest Information Center staff, no cultural resources were identified within the surveyed area (see Attachment C: NWIC Records Search Results).

FINDINGS

No archaeological resources or paleontological resources were identified within the project area / Areas of Potential Effect.

ASSESSMENT OF EFFECT

For purposes of the Section 106 consultation, "effect" is defined as "alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register" [36 CFR Part 800.16(I)]. Under CEQA Guidelines, "A project with an effect that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment" [Public Resources Code §15064.5(b)]. "Substantial adverse change" is ". . . physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired [Public Resources Code §15064.5(b)(2)].

No archaeological resources were identified within the APEs for the proposed recycled water project. Ground-disturbing activities (*e.g.*, grubbing/grading at tank location) to construct or install new facilities have the potential to disturb or destroy buried prehistoric and historic archaeological resources including human remains. However, the probability for encountering buried archaeological resources is very low due to previous major disturbances to the earth during previous construction of the wastewater treatment plant. All of the proposed facilities (non-contiguous portions of the APE lie on previously disturbed ground.

Located in an area of Pleistocene/Holocene dune sands (Qds), the Phase 2 expansion has the potential to yield significant paleontological resources. Holocene remains are too young to be considered fossils. However, Pleistocene remains such as bones and teeth of fossil vertebrates could be encountered during excavations.

As no archaeological resources, traditional cultural properties, or Native American cultural resources were identified within the APEs, it is our opinion that the proposed project will have no effect on historic properties or historical resources, but could have an effect on unique paleontological resources and that effect could be adverse.

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ATTACHMENT A: PHOTOGRAPHS

Figure 4. Site for temporary staging area (lawn) looking north.

Figure 5. Temporary staging area between two on-site roads looking south.

Figure 6. Site of disinfection process expansion looking north.

Figure 7. Site (lawn) for media filters expansion looking east.

Figure 8. Site for secondary clarifier and oxidation ditch expansion looking northwest.

Figure 9. Site of shop expansion looking southwest.

ATTACHMENT B: UCMP DATABASE SEARCH RESULTS

Paleontological Records Search for the Brentwood Recycled Water Pipeline Project, Contra Costa County

Kenneth L. Finger, Consulting Paleontologist
September 22, 2014

Local Geology

According to the geologic maps of Graymer, Jones, and Brabb (1994), Helley and Graymer (1997), and Dibblee (2006), the Brentwood area is located on flat terrain consisting mostly of young sedimentary deposits, ranging from Pliocene to Holocene in age (see Figure 1). Animal or plant remains in Holocene deposits are too young to be considered fossils. Two units mapped in the area, dune sands (Qds) and gravel (Qtu), however, have the potential to yield significant paleontological resources. The undifferentiated Holocene/Pleistocene dune sands unit is mapped in the northeast part of map and includes the Brentwood WWTO Pump Station. The undifferentiated Pleistocene/Pliocene gravel unit occurs in the southwestern part of the map and includes the Reddy Ranch Pump Station.

UCMP Records Search

The UCMP database records search revealed 63 Pleistocene and 12 Pliocene vertebrate fossil localities from Contra Costa County listed in the UCMP database, which are represented by 9924 and 1267 specimens, respectively. One of these localities (V92081) is within the area of the map shown for the project and it yielded remains of the American mastodon, *Mammut americanus.*

Summary and Recommendations

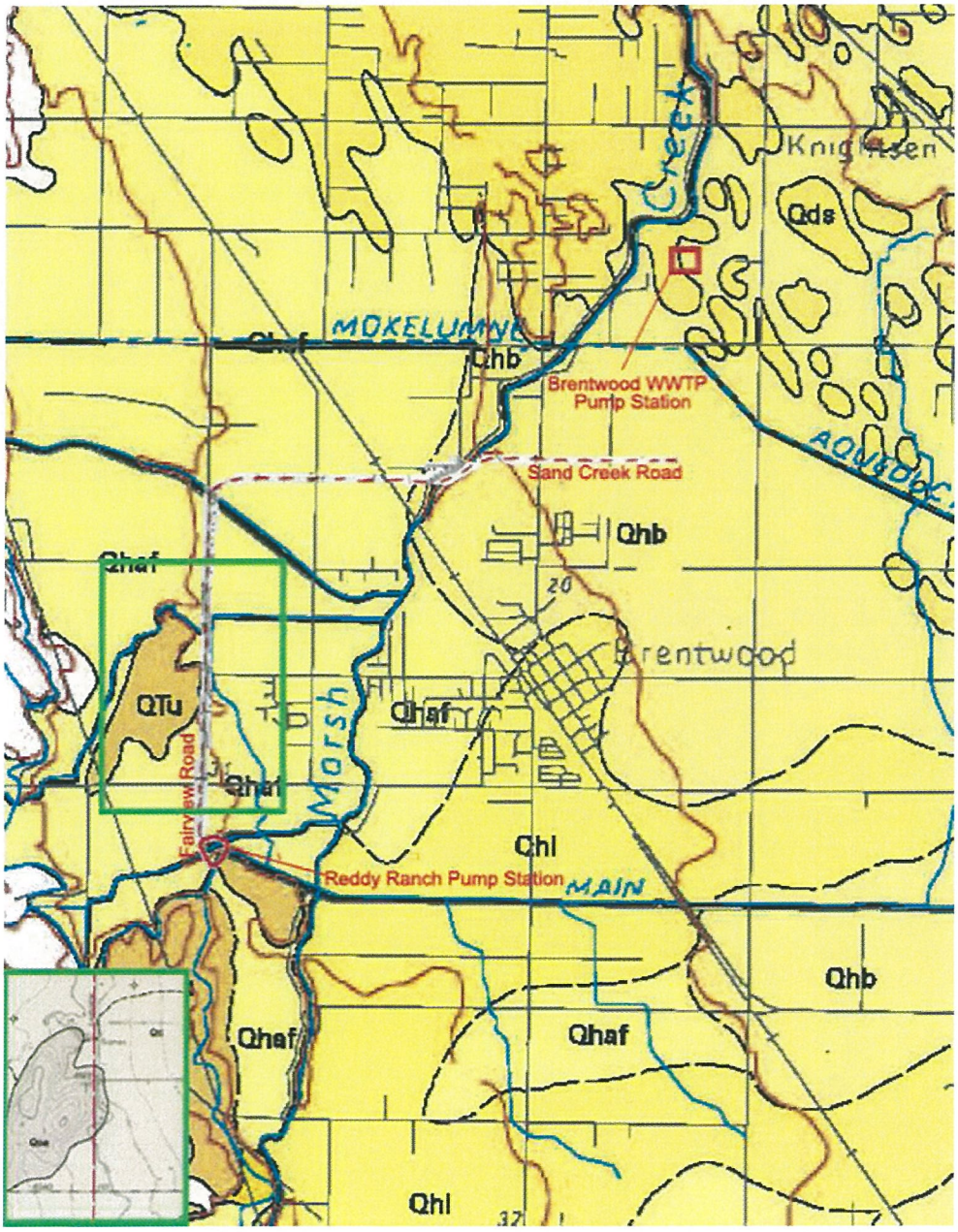
A preconstruction paleontological site walkover is not suggested due to widespread disturbance of the flat terrain. If the two pump stations are extant and will not be subject to modifications involving major excavations of previously undisturbed deposits, those particular sites are of no concern. However, a half-mile segment of the proposed pipeline trench will impact the Qtu gravel unit along Fairview Road. Elsewhere it appears that only Holocene sediments will be disturbed by project-related excavations.

Because of the nearby fossil locality and the great number of Pliocene and Pleistocene vertebrate localities in the County, it would be prudent to have a cultural resouces monitor present during the half-mile excavation noted above. At a minimum, a professional paleontologist should be given access to the site to regularly periodically inspect this excavation as it progresses. Should any vertebrate fossils (i.e., teeth, bones) be unearthed by the construction crew, they should divert all activities away from the point of discovery until the paleontologist has assessed the find and, if deemed significant, salvaged it in a timely manner. Recovered fossils should be donated to an appropriate repository, such as UCMP, where proper curation will ensure that they are available for study by scientists and students.

Figure 1. The proposed project location plotted on part of the geologic map of Helley and Graymer (1997). The green rectangle in the lower left corner is from Dibblee (2006) and corresponds to the green rectangled area above, but more clearly shows that his older alluvium (Qoa), equivalent to Qtu, is mapped across Fairview Road and the proposed trench.

Key to geologic units

Qds	Holocene and Pleistocene dune sands
Qhaf	Holocene alluvial fan deposits
Qhb	Holocene basin deposits
Qhl	Holocene natural levee deposits
Qtu	Undifferentiated Pleistocene and/or Pliocene gravel



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APPENDIX C

Biological Resources Data

Table C-1. Brentwood Project Site Descriptions.

Project Site	Site Description	Soils (NRCS 2014)	Sensitive Habitats (waters/wetlands or riparian habitat)
WWTP Treatment Unit Process Areas	The sites where proposed staging and construction activities would occur are disturbed with only about 25% remaining as bare ground. Land cover is dominated by active use equipment storage areas for the City corporation yard, managed turf, and or gravel/paved surfaces. Small bare areas consist of ruderal annual grassland cover.	Soils are classified as Rincon clay loam, which are well-drained alluvial soils.	There are no sensitive habitats in the Project area at this site. There is a small grove of Fremont cottonwoods located just to the east of this site, outside of the Project area.
Lower Marsh Creek Below Current Effluent Discharge Site	Treated WWTP effluent is discharged year-round into Marsh Creek, a perennial stream that flows approximately 3.5 miles from the current discharge location at the WWTP to its confluence with the Sacramento-San Joaquin River Delta at Big Break. Areas surrounding the creek corridor are typically agricultural, barren ground, and residential. Free-flowing reach downstream of effluent discharge outfall: The first approximately 3 miles north of the effluent discharge location is channelized by levees on both banks and vegetated with mostly non-native herbaceous vegetation, and no shrub or tree cover. The creek banks, including streamside vegetation, are actively managed by the Contra Costa County Flood Control and Water Conservation District for flood control maintenance. Tidally-influenced reach of lower Marsh Creek: The final approximate 0.3 mile of Marsh Creek is tidally-influenced. This tidally-influenced reach has an established but discontinuous riparian tree and shrub cover characterized by willows (*Salix* sp.), Fremont cottonwood (*Populus fremontii*), and Hind's walnut (*Juglans Hindsii*).	Soils along the creek are mostly alluvial and include Piper loamy sand, Ryde silt loam, Sacramento clay, and Sycamore silty clay loam.	This portion of the Project area consists of the bed and bank of Marsh Creek.

Table C-2. Vegetation Communities and Wildlife Habitats.

CNPS Vegetation Community/Alliance	CWHR Wildlife Habitat	Characteristic Species	Locations Affected by Proposed Project		
			WWTP Construction Sites 2	Lower Marsh Creek Downstream of Effluent Discharge	Tidally-Influenced Portion of Lower Marsh Creek Downstream of Effluent Discharge
Tree-Dominated Communities					
Hinds's walnut and related stands *(Juglans hindsii* and Hybrids Semi-Natural Woodland	Valley Foothill Riparian	Hind's walnut (*Juglans hindsii*), willow (*Salix* sp.), Fremont cottonwood (*Populus fremontii*), giant reed (*Arundo donax*),			X

Stands)		Himalayan blackberry (*Rubus armeniacus*)			
Herb-Dominated Communities					
Various Semi-Natural Herbaceous Alliances	Annual Grassland	Yellow starthistle (*Centaurea solstitialis*), wild oats (*Avena* sp.), bermuda grass (*Cynodon dactylon*), bindweed (*Convolvulus arvensis*), tarweed (*Holocarpha heermannii*),	X	x	x
Bulrush/Cattail Marsh (*Schoenoplectus* sp. /*Typha* sp. Alliances)	Fresh Emergent Wetland	Bulrush (*Schoenoplectus* sp.), cattail (*Typha* sp.), Himalayan blackberry, rush (*Juncus* sp.), cheeseweed (*Malva parviflora*), spearmint (*Menta spicata*)		X	
Bulrush Marsh (*Schoenoplectus* sp. Alliance)	Saline Emergent Wetland	Bulrush, cattail, willow, water hyacinth (*Eichhornia crassipes)*			X
Non-vegetated areas					
N/A	Barren/Ruderal	N/A	x	X	x
N/A	Urban	N/A	x	x	x
Aquatic					
N/A	Riverine	N/A		X	
N/A	Estuarine	N/A			X

CNPS Vegetation Community/Alliance	CWHR Wildlife Habitat	Characteristic Species	Locations Affected by Proposed Project		
			WWTP Construction Sites 2	Lower Marsh Creek Downstream of Effluent Discharge	Tidally-Influenced Portion of Lower Marsh Creek Downstream of Effluent Discharge
Tree-Dominated Communities					
Hinds's walnut and related stands *(Juglans hindsii* and Hybrids Semi-Natural Woodland Stands)	Valley Foothill Riparian	Hind's walnut (*Juglans hindsii*), willow (*Salix* sp.), Fremont cottonwood (*Populus fremontii*), giant reed (*Arundo donax*), Himalayan blackberry (*Rubus armeniacus*)			x
Herb-Dominated Communities					
Various Semi-Natural Herbaceous Alliances	Annual Grassland	Yellow starthistle (*Centaurea solstitialis*), wild oats (*Avena* sp.), bermuda grass (*Cynodon dactylon*), bindweed (*Convolvulus arvensis*), tarweed (*Holocarpha heermannii*),	X	x	x
Bulrush/Cattail Marsh (*Schoenoplectus* sp.	Fresh Emergent Wetland	Bulrush (*Schoenoplectus* sp.), cattail (*Typha* sp.), Himalayan		X	

/*Typha* sp. Alliances)		blackberry, rush (*Juncus* sp.), cheeseweed (*Malva parviflora*), spearmint (*Menta spicata*)			
Bulrush Marsh (*Schoenoplectus* sp. Alliance)	Saline Emergent Wetland	Bulrush, cattail, willow, water hyacinth (*Eichhornia crassipes)*			X
Non-vegetated areas					
N/A	Barren/Ruderal	N/A	x	X	x
N/A	Urban	N/A	x	x	x
Aquatic					
N/A	Riverine	N/A		X	
N/A	Estuarine	N/A			X

Table C-3. Potentially Occurring Special-Status Plant and Wildlife Species.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
Plants				
Large-flowered fiddleneck *Amsinckia grandiflora*	FE	Grassy slopes below 1,000 feet in the San Joaquin Valley.	Potential for occurrence in annual grasslands within the Project area.	NA: Not found during reconnaissance surveys conducted in appropriate period of blooming.
Alkali milkvetch *Astragalus tener* ssp. *tener*	N	Alkaline flats and vernally moist meadows below 200 feet.	Potential for occurrence in areas with spring moisture within annual grassland habitats in the Project area.	NA: Not found during reconnaissance surveys conducted in appropriate period of blooming.
Big tarplant *Blepharizonia plumosa*	N	Dry slopes in grassland below 1,600 feet.	Potential for occurrence in annual grasslands within the Project area.	NA: Not found during reconnaissance surveys conducted in appropriate period of blooming.
Round-leaved filaree *California (Erodium) macrophylla*	C	Clay soils in cismontane woodland and valley/foothill grassland <4,000 feet.	Potential for occurrence in annual grasslands within the Project area.	NA: Not found during reconnaissance surveys conducted in appropriate period of blooming.
Mount Diablo fairy lantern *Calochortus pulchellus*	C	Wooded slopes, generally northern aspect; 600-2,700 feet.	Unlikely to occur. Project is outside of species elevational range and no appropriate habitat is present.	NA: Unlikely to occur.
Soft bird's-beak *Chloropyron molle molle (Cordylanthus mollis mollis)*	FE	Coastal salt marshes; below 30 feet elevation.	Potential for occurrence in the tidally-influenced portion of Marsh Creek near its confluence with San Joaquin River.	NA: Construction activity would not occur in or near the habitat for this species, and operations-related changes would not affect habitats offsite from areas of construction.
Mount Diablo buckwheat *Eriogonum truncatum*	N	Sand; 600–1300 feet	Unlikely to occur. Project area is outside of this species elevational range.	NA: Unlikely to occur.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
Diamond-petaled poppy *Eschscholzia rhombipetala*	N	Open areas and grasslands below 1,000 feet.	Potential for occurrence in annual grasslands within the Project area.	NA: Not found during reconnaissance surveys conducted in appropriate period of blooming.
Brewer's dwarf flax *Hesperolinon breweri*	N	Serpentine soils in woodland, grassland, and chaparral habitats.	Unlikely to occur as no appropriate habitat is present. Project area does not contain modeled suitable habitat.	NA: Unlikely to occur.
Contra Costa goldfields *Lasthenia conjugens*	FE	Vernal pools and wet meadows in valley grasslands.	Unlikely to occur as no appropriate habitat is present.	NA: Unlikely to occur.
Showy madia *Madia radiata*	C	Grassy or open slopes, generally clayey soils or shale.	Potential for occurrence in annual grasslands within the Project area.	NA: Not found during reconnaissance surveys conducted in appropriate period of blooming.
Colusa grass *Neostapfia colusana*	FT	Vernal pools.	Unlikely to occur as no appropriate habitat is present.	NA: Unlikely to occur.
Antioch Dunes evening primrose *Oenothera deltoides ssp. howellii*	FE	Sandy bluffs, dunes below 100 meters in the Deltaic Great Central Valley (Antioch and Contra Costa Counties).	Potential for occurrence on sandy soils at WWTP.	NA: Not found during reconnaissance surveys conducted in appropriate period of blooming.
Keck's checkerbloom Sidalcea keckii	FE	Grassy slopes above 250 feet elevation.	Unlikely to occur Project area is below this species' elevational range.	NA: Unlikely to occur.
Invertebrates				
Conservancy fairy shrimp *Branchinecta conservatio*	FE	Vernal pools.	Unlikely to occur. No appropriate habitat (vernal pools) is present in the Project area.	NA: Unlikely to occur.
Longhorn fairy shrimp *Branchinecta longiantenna*	FE	Vernal pools.	Unlikely to occur. No appropriate habitat (vernal pools) is present in the Project area.	NA: Unlikely to occur.
Vernal pool fairy shrimp *Branchinecta lynchi*	FT	Vernal pools.	Unlikely to occur. No appropriate habitat (vernal pools) is present in the Project area.	NA: Unlikely to occur.
Vernal pool tadpole shrimp *Lepidurus packardi*	FE	Vernal pools.	Unlikely to occur. No appropriate habitat (vernal pools) is present in the Project area.	NA: Unlikely to occur.
California freshwater shrimp *Syncaris pacifica*	FE	Select streams in Sonoma, Napa and Marin Counties	Unlikely to occur. Project is outside of species' geographic range.	NA: Unlikely to occur.
Delta green ground beetle *Elaphrus viridis*	FT	Vernal pools in Solano County.	Unlikely to occur. No appropriate habitat (vernal pools) is present in the Project area. Project is outside of species' geographic range.	NA: Unlikely to occur.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	FT	Occurs only in the Central Valley of California, in association with blue elderberry (*Sambucus nigra* ssp. *Caerulea*). Prefers to lay eggs in elderberries 2-8 inches in diameter; some preference shown for "stressed" elderberries.	Unlikely to occur as there are no elderberry shrubs in the Project area. Closest known occurrence is approximately 19 miles east of the Project	NA: Unlikely to occur.
Lange's metalmark butterfly *Apodemia mormo langei*	FE	Endemic to the stabilized Antioch Dunes along the San Joaquin River in Contra Costa County. Primary host plant is *Eriogonum nudum* var *auriculatum*.	Unlikely to occur. No appropriate habitat (Antioch Dunes/*Eriogonum nudum* var. *auriculatum*) is present in the Project area. Nearest record consists of a 2008 record in the Antioch Dunes National Wildlife Refuge approximately 3 miles northwest of the Project area.	NA: Unlikely to occur.
Callippe silverspot butterfly *Speyeria callippe callippe*	FE	Found in native grassland and adjacent habitats with their larval food plant, Johnny-jump- up (*Viola pedunculata*). Known only from seven threatened sites in the San Francisco Bay area.	Unlikely to occur. Outside of species remaining, limited range. Closest known occurrence 2009 CNDDB record 22 miles northwest of the Project area near Vallejo.	NA: Unlikely to occur.
Amphibians				
California tiger salamander *Ambystoma californiense*	FT	Occurs primarily in annual grassland habitat, but is also found in the grassy understory of valley-foothill hardwood habitats, and uncommonly along stream courses in valley-foothill riparian habitats below 3,200 feet. Require vernal pools or ponds for breeding. Can disperse up to one mile from their breeding ponds.	Potential for occurrence. According to the East Contra Costa Habitat Conservation Plan (HCP), no modeled habitat is present in the Project Area (Jones and Stokes 2006). However, there are CNDDB occurrences in the Project area vicinity and CTS could potentially be present in grassy areas where appropriate habitat is present.	NLAA: Construction activities would occur in areas that may provide foraging habitat for California tiger salamander; however, no breeding habitat is present onsite. Pre-construction surveys and conservation measures (if needed), would minimize potential adverse effects. There would be no operations effects to the species.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
California red-legged frog *Rana aurora draytonii*	FT	Breeds in aquatic areas with dense, shrubby, or emergent riparian vegetation and a permanent source of deep (greater than 2 1/3 feet deep) still or slow-moving water below 4,000 feet elevation. Upland dispersal within 1 mile of aquatic breeding habitat with no impassable dispersal barriers (suburban areas, suburban developments, wide or fast flowing rivers or streams, lakes greater than 50 acres, and heavily traveled roads without underpasses or culverts).	Unlikely to occur. No appropriate habitat is present. No modeled habitat is present in the Project Area under the HCP (Jones and Stokes 2006).	NA: Unlikely to occur.
Reptiles				
Alameda whipsnake *Masticophis lateralis euryxanthus*	FT	Typically found in chaparral, such as northern coastal sage scrub and coastal sage. Mating and egg-laying occur in grassland habitats adjacent to chaparral habitats in the spring.	Unlikely to occur. Project area does not contain suitable habitat and is not within the modeled habitat distribution for the species (Jones and Stokes 2006).	NA: Unlikely to occur.
Giant garter snake *Thamnophis gigas*	FT	Uses a wide variety of habitats including forests, mixed woodlands, grasslands, chaparral, and agricultural lands. Often occurs near aquatic habitat including ponds, marshes, and streams where it freely enters and retreats to when alarmed.	Potential for occurrence in the Project area in and around lower Marsh Creek. Portions of the Project area in and around Marsh Creek were modeled as Core Habitat and Movement and Foraging Habitat (Jones and Stokes 2006).	NLAA: Construction activities would occur in areas that may provide foraging habitat. Pre-construction surveys and conservation measures (if needed), would minimize potential adverse effects. There would be no operations effects to the species
Birds				
Black-footed Albatross (nb) *Phoebastria nigripes*	BCC	Off-shore waters of the Pacific.	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
Pink-footed Shearwater (nb) *Puffinus creatopus*	BCC	Off-shore waters of the Pacific.	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.
Black-vented Shearwater (nb) *Puffinus opisthomelas*	BCC	Off-shore waters of the Pacific.	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.
Ashy Storm-Petrel *Oceanodroma homochroa*	BCC	Off-shore waters of the Pacific.	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.
Golden eagle (nesting and wintering) *Aquila chrysaetos*	BGPA	Grasslands and early successional stages of forest and shrub habitats for foraging at elevations up to 11,500 feet. Secluded cliffs with overhanging ledges or large trees in open areas with unobstructed view for nesting.	Potential for foraging in Project area in annual grassland habitats and surrounding lower Marsh Creek.	NLAA: Construction activities would occur in areas that may provide foraging habitat. Pre-construction surveys and conservation measures (if needed), would minimize potential adverse effects. There would be no operations effects to the species
Bald eagle (nesting and wintering) *Haliaeetus leucocephalus*	FPD/ BGPA/ BCC	Year-round resident in ice-free regions of California. Foraging areas include regulated and unregulated rivers, reservoirs, lakes, estuaries, and coastal marine ecosystems. Majority of bald eagles in California breed near reservoirs and nests are usually located within 1 mile of foraging habitat.	Potential winter migrant in and around Project area where appropriate habitat is present.	NA: Areas affected by project construction unlikely to provide foraging habitat. There would be no measurable operations effects to the species.
American peregrine falcon (nesting) *Falco peregrinus*	FD, BCC	Breeds in woodlands, forests, coastal habitats, and riparian areas near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, or mounds. Migrants occur along the coast and the western Sierra Nevada in spring and fall.	Potential forager or migrant in Project area. Unlikely to nest in the Project area as no appropriate habitat is present.	NA: Areas affected by project construction unlikely to provide foraging habitat. There would be no measurable operations effects to the species.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
California black rail *Laterallus jamaicensis coturniculus*	BCC	Inhabits freshwater marshes, wet meadows & shallow margins of saltwater marshes bordering larger bays. Needs water depths of about 1 inch that does not fluctuate during the year & dense vegetation for nesting habitat.	Potential for occurrence in tidally-influenced portion of lower Marsh Creek.	NA: Construction activity would not occur in or near the habitat for this species, and operations-related changes would not affect habitats offsite from areas of construction.
Yellow Rail (nb) *Coturnicops noveboracensis*	BCC	Occurs year round in California, breeding in the northeastern interior and as a winter visitor in the Suisun marsh region.	Potential winter migrant or forager in tidally-influenced portion of lower Marsh Creek.	NA: Construction activity would not occur in or near the habitat for this species, and operations-related changes would not affect habitats offsite from areas of construction.
California clapper rail *Rallus longirostris obsoletus*	FE	Forages in saline emergent wetlands and along tidal creeks. Nests in saline emergent wetlands near tidal sloughs. Veg	Potential for foraging or nesting in tidally-influenced portion of lower Marsh Creek.	NA: Construction activity would not occur in or near the habitat for this species, and operations-related changes would not affect habitats offsite from areas of construction.
Least Bell's vireo *Vireo bellii pusillus* [1]	FE	Summer migrant to southwestern California and northwestern Baja California, Mexico. Habitat generally consists of low shrubs up to riparian/woodland and coastal areas, often near water courses in arid areas.	Unlikely to occur as the Project area is outside of this species' current range.	NA: Unlikely to occur.
Mountain plover (wintering) *Charadrius montanus*	BCC	Winter resident from September through March in short grasslands and plowed fields in the Central Valley. Does not breed in California.	Potential winter migrant or forager in annual grassland habitats in the Project area.	NA: Areas affected by project construction unlikely to provide foraging habitat. There would be no measurable operations effects to the species.
Snowy Plover *Charadrius nivosus*	BCC	Common on sandy marine and estuarine shores in fall and winter.	Potential winter migrant or forager in tidally-influenced portion of lower Marsh Creek.	NA: Construction activity would not occur in or near the habitat for this species, and operations-related changes would not affect habitats offsite from areas of construction.
Black Oystercatcher *Haematopus bachmani*	BCC	Forages and nests in rocky coastal habitats.	Unlikely to occur in the Project area as no appropriate habitat is present.	NA: Unlikely to occur.
Short-billed Dowitcher (nb) *Limnodromus griseus*	BCC	Spring and fall migrant along coast in intertidal mudflats, including portions of western Contra Costa County.	Unlikely to occur in the Project area as no appropriate habitat is present.	NA: Unlikely to occur.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
Long-billed curlew *Numenius americanus*	BCC	Breeds from April to September in wet meadow habitat in northeastern California. Potential winter visitant from early July to early April in grasslands and croplands in the Central Valley. Additionally, non-breeders may remain in the Central Valley through the summer.	Potential winter migrant in and around Project area where appropriate habitat is present.	NA: Areas affected by project construction unlikely to provide foraging habitat. There would be no measurable operations effects to the species.
Whimbrel (nb) *Numenius phaeopus*	BCC	Nests in the arctic. Forages in California on rocky intertidal and sandy beach marine habitats, on the intertidal mudflats of estuarine habitats, and on wet meadow and pasture habitats adjacent to the immediate coast. Occasionally forages on lawns or golf courses. Inland, prefers flooded fields, wet meadows, croplands and the margins of riverine and lacustrine habitat.	Potential spring or fall migrant or wintertime forager in the Project area vicinity.	NA: Areas affected by project construction unlikely to provide foraging habitat. There would be no measurable operations effects to the species.
Marbled Godwit (nb) *Limosa fedoa*	BCC	Spring and fall migrant along coast in intertidal mudflats, including portions of western Contra Costa County.	Unlikely to occur in the Project area as no appropriate habitat is present.	NA: Unlikely to occur.
Red Knot (*roselaari* ssp.) (nb) *Calidris canutus*	BCC	Breeds in northern Alaska and Canada. Occasional migrant or winter resident in estuarine habitats in the San Francisco Bay area.	Potential winter forager in tidally-influenced portion of lower Marsh Creek.	NA: Construction activity would not occur in or near the habitat for this species, and operations-related changes would not affect habitats offsite from areas of construction.
Black Skimmer *Rynchops niger*	BCC	Forages and nests at the Salton Sea and occasionally other California coastal estuaries, including the southern tip of the San Francisco Bay.	Unlikely to occur as the Project area is outside of this species' range.	NA: Unlikely to occur.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
California least tern (nesting colony) *Sternula antillarum browni*	FE	Breeding areas include abandoned salt ponds and estuarine shores along the southern San Francisco Bay. Feeds primarily in shallow estuaries or lagoons	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.
Gull-billed Tern *Gelochelidon nilotica*	BCC	Breeds in low sandy islets in the Salton Sea and near the Mexican border.	Unlikely to occur. Project area is north of this species' geographic range.	NA: Unlikely to occur.
Cassin's Auklet *Ptychoramphus aleuticus*	BCC	Marine pelagic waters off California.	Unlikely to occur as the Project area is outside of this species' range.	NA: Unlikely to occur.
Xantus's Murrelet (a) *Synthliboramphus scrippsi*	BCC	Channel Islands and islands off Baja.	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.
Yellow-billed Cuckoo *Coccyzus americanus*	BCC FC	Breeds and forages in riparian areas with low woody vegetation in lowland California, especially willow-cottonwood habitat.	Potential for nesting or foraging in tidally-influenced portion of lower Marsh Creek.	NA: Construction activity would not occur in or near the habitat for this species, and operations-related changes would not affect habitats offsite from areas of construction.
Western burrowing owl *Athene cunicularia*	BCC	Open, dry annual or perennial grasslands, deserts & scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Potential for foraging and nesting in the Project area. Several CNDDB records in the direct vicinity of the WWTP and lower Marsh Creek.	NLAA: Construction activities would occur in areas that may provide foraging habitat. Pre-construction surveys and conservation measures (if needed), would minimize potential adverse effects. There would be no operations effects to the species
Flammulated Owl *Psiloscops flammeolus*	BCC	Summer resident in coniferous habitats from ponderosa pine to red fir forests from 6,000 to 10,000 feet in elevation; prefers low to intermediate canopy closure. Breeds in the North Coast and Klamath Ranges, Sierra Nevada, and in suitable habitats in mountains in southern California.	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
Spotted Owl *Strix occidentalis occidentalis* ssp.) (c)	BCC	Dense, old growth, multi-layered mixed conifer, redwood, Douglas fir, and oak woodland habitats, from sea level to elevations of approximately 7,600 feet.	Unlikely to occur as no appropriate habitat is present.	NA: Unlikely to occur.
Black swift *Cypseloides niger*	BCC	Nests in moist crevices or caves on sea cliffs. Forages over a variety of habitats.	Potential for foraging over the Project area.	NLAA: Construction activities would occur in areas that may provide foraging habitat. Pre-construction surveys and conservation measures (if needed), would minimize potential adverse effects. There would be no operations effects to the species
Allen's hummingbird *Selasphorus sasin*	BCC	Summer resident and migrant along the California Coast.	Unlikely to occur as the Project area is inland of this species' range.	NA: Unlikely to occur.
Costa's hummingbird *Calypte costae*	BCC	Desert, chaparral, and riparian areas, largely in southern California.	Unlikely to occur. Project area is north of this species' geographic range.	NA: Unlikely to occur.
Lewis' woodpecker *Melanerpes lewis*	BCC	Breeds east of the Sierra Nevada crest in cavity excavated in sycamore, cottonwood, oak, or conifer trees. Winter resident in open oak savannas, broken deciduous and coniferous habitats with sufficient supply of acorns and insects.	Unlikely to occur in the Project area as no appropriate habitat is present.	NA: Unlikely to occur.
White-headed Woodpecker *Picoides albolarvatus*	BCC	Forages and nests in mature montane coniferous forests, including occasionally in the Coast Range.	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.
Nuttall's Woodpecker *Picoides nuttallii*	BCC	Low elevation riparian deciduous and oak habitats.	Unlikely to occur as no appropriate habitat is present.	NA: Unlikely to occur.
Loggerhead shrike *Lanius ludovicianus*	BCC	Open habitats with scattered trees or other perches in the Central Valley.	Potential winter migrant in and around Project area where appropriate habitat is present.	NA: Areas affected by project construction unlikely to provide foraging habitat. There would be no measurable operations effects to the species.
Island Scrub-Jay *Aphelocoma insularis*	BCC	Oak woodlands on Santa Cruz Island.	Unlikely to occur as Project is outside of species' geographic range.	NA: Unlikely to occur.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
Yellow-billed Magpie *Pica nuttalli*	BCC	Nests in trees; forages in valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, orchard, vineyard, cropland, pasture, and urban habitats.	Potential for foraging in annual grassland habitats in the Project area.	NLAA: Construction activities would occur in areas that may provide foraging habitat. Pre-construction surveys and conservation measures (if needed), would minimize potential adverse effects. There would be no operations effects to the species
Oak Titmouse *Baeolophus inornatus*	BCC	Primarily associated with oak woodlands.	Unlikely to occur in Project area as no appropriate habitat is present.	NA: Unlikely to occur.
Cactus Wren *Campylorhynchus brunneicapillus*	BCC	Desert areas of southern California.	Unlikely to occur. Project area is north of this species' geographic range.	NA: Unlikely to occur.
Leconte's Thrasher *Toxostoma lecontei*	BCC	Desert habitats in southern California.	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.
Saltmarsh common yellowthroat *Geothlypis trichas sinuosa*	BCC	Requires extensive wetlands with adjacent riparian thickets. Breeding range includes portions of western Contra Costa County along the coast of the San Pablo Bay.	Unlikely to occur. Project area is outside of this species' geographic range and no appropriate habitat is present.	NA: Unlikely to occur.
Yellow Warbler *Setophaga petechia* (*brewsteri*ssp.)	BCC	Breeds in riparian woodlands from coastal and desert lowlands at elevations below 8,000 feet. Also breeds in montane chaparral, open ponderosa pine, and mixed conifer habitats with substantial amounts of brush.	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.
Spotted Towhee *Pipilo maculates* (*clementae* ssp.)	BCC	Channel Islands.	Unlikely to occur as the Project area is outside of this species' range.	NA: Unlikely to occur.
Suisun song sparrow *Melospiza melodia maxillaris*	BCC	Year round range is confined to tidal salt and brackish marshes fringing the Carquinez Strait and Suisun Bay east to Antioch.	Potential for occurrence in tidally-influenced portion of lower Marsh Creek.	NA: Construction activity would not occur in or near the habitat for this species, and operations-related changes would not affect habitats offsite from areas of construction.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
Alameda song sparrow *Melospiza melodia pusillula*	BCC	Year round range is confined to tidal salt and brackish marshes fringing the San Francisco Bay.	Unlikely to occur as the Project area is outside of this species' range.	NA: Unlikely to occur.
San Pablo song sparrow *Melospoza melodia samuelis*	BCC	Year round range is confined to tidal salt and brackish marshes fringing the San Pablo Bay.	Unlikely to occur as the Project area is outside of this species' range.	NA: Unlikely to occur.
Black-chinned Sparrow *Spizella atrogularis*	BCC	Breeds and forages in the foothills bordering the Central Valley in brushy, dense chaparral.	Unlikely to occur as the Project area is outside of this species' range and no appropriate habitat is present.	NA: Unlikely to occur.
Tricolored blackbird (nesting colony) *Agelaius tricolor*	BCC	Highly colonial species, most numerous in the Central Valley & vicinity. Largely endemic to California. Requires open water, protected nesting substrate, and a foraging area with insect prey within a few miles of the colony. Nests in emergent wetlands with dense vegetation. Forages on ground in grassland or cropland habitats.	Potential for foraging in the Project area at the WWTP where appropriate habitat is present, and in the vicinity of lower Marsh Creek. Project area contains modeled suitable foraging habitat (Jones and Stokes 2006). Potential for nesting in tidally influenced portion of lower Marsh Creek.	NLAA: Construction activities would occur in areas that may provide foraging habitat. Pre-construction surveys and conservation measures (if needed), would minimize potential adverse effects. There would be no operations effects to the species
Lawrence's goldfinch *Carduelis lawrencei*	BCC	Nests in trees and shrubs in valley foothill woodlands, near water. Forages in herbaceous habitats.	Potential for foraging at annual grassland habitats in the Project area.	NLAA: Construction activities would occur in areas that may provide foraging habitat. Pre-construction surveys and conservation measures (if needed), would minimize potential adverse effects. There would be no operations effects to the species
Mammals				
Riparian brush rabbit Sylvilagus bachmani riparius	FE	Yearlong resident of dense, brushy areas, and of early successional stages of oak and conifer habitats. The *riparius* subspecies is found only at Caswell Memorial State Park on the Stanislaus River in San Joaquin County.	Unlikely to occur. Project area is outside of this species geographic range.	NA: Unlikely to occur.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
Riparian woodrat *Neotoma fuscipes riparia*	FE	Yearlong resident of riparian woodlands with abundant dead branches and downed woody material. The *riparia* subspecies is found only at Caswell Memorial State Park on the Stanislaus River in San Joaquin County.	Unlikely to occur. Project area is outside of this species geographic range.	NA: Unlikely to occur.
Saltmarsh harvest mouse *Reithrodontomys raviventris*	FE	Found only in saline emergent wetlands of San Francisco Bay and its tributaries.	Potential for occurrence in the tidally-influenced portion of lower Marsh Creek. Closest known occurrence is a 1985 CNDDB record approximately 7 miles northwest of the Project area.	NA: Construction activity would not occur in or near the habitat for this species, and operations-related changes would not affect habitats offsite from areas of construction.
San Joaquin kit fox *Vulpes macrotus mutica*	FE	Grasslands and shrubland areas in the San Joaquin Valley with friable soils for building underground dens. Denning begins around September, mating occurs from December to March, and pups are born February through April.	Unlikely to occur. Project area does not contain suitable habitat and is not within the modeled habitat distribution for the species (Jones and Stokes 2006).	NA: Unlikely to occur.

Scientific and Common Name	Federal Status	Habitat	Potential for Occurrence in Project Area	Potential for Project to Affect
Federal Status FT = Federal Threatened FE = Federal Endangered FC = Federal Candidate BCC = USFWS Birds of Conservation Concern BGPA = Bald and Golden Eagle Protection Act N = No Take {species addressed in the East Contra Costa County HCP} C = Covered {species addressed in the East Contra Costa County HCP} *NLAA: not likely to adversely affect* *NA: no affect* *n/a: not applicable* *[1] The Least Bell's vireo was identified on the USFWS species list for presence in San Joaquin County. However, least Bell's vireo was not identified in either the USFWS or CNDDB database searches as having potential to occur in the project area. The project area also is not within the designated critical habitat area adopted in 1994 (Federal Register 59 FR 4845–4867) that consists of 10 areas in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego Counties in southern California covering about 38,000 acres. Least Bell's vireo historically occurred in the Central Valley, but with the exception of some recent observations of breeding pairs in Stanislaus County (i.e., approximately 50 miles east of Brentwood), presence of these birds has not been observed since the late 1950's (Howell et al. 2010).*				