4.3 Surface Water Hydrology and Water Quality

Sections

Figures

Tables

This section analyzes the potential for the Monterey Peninsula Water Supply Project (MPWSP or proposed project) which includes 10 slant wells at CEMEX, to adversely affect surface water hydrology and water quality in inland freshwater bodies and in Monterey Bay National Marine Sanctuary (MBNMS) ocean waters[1] in the southern portion of Monterey Bay. Impacts on groundwater resources are evaluated in Section 4.4, Groundwater Resources. The secondary effects of potential project-related changes in ocean water quality on marine biological resources are evaluated in Section 4.5, Marine Biological Resources. Impacts related to coastal erosion are evaluated in Section 4.2, Geology, Soils, and Seismicity.

Comments received on the April 2015 Draft EIR expressed concerns over the potential for hypoxia[2] to occur near the seabed as a result of proposed MPWSP operational discharges. Specifically, there was concern that high salinity discharges from the MRWPCA outfall would restrict oxygen supply near the seabed and result in stress or mortality to benthic organisms and other marine resources. Additionally, comments raised concerns regarding the adequacy of model analyses related to salinity and water quality; the travel path of the operational discharge plume; salinity levels within and beyond the area of initial dilution following discharge; and the potential for a dense operational discharge plume to travel along the sea floor and result in impacts on marine resources as a result of elevated salinity and associated toxic effects to habitat and wildlife. These issues are addressed in Section 4.3.5.2 under Impact 4.3-4 and Impact 4.3-5. Comments related to impacts on marine biological resources resulting from operational discharges are addressed in Section 4.5, Marine Biological Resources and are based, in part, on the water quality analyses presented in Impacts 4.3-4 and 4.3-5. Additional sampling and modeling were conducted to address many of these concerns and are addressed in Section 4.3.5.2.

As a result of comments received on the January 2017 Draft EIR/EIS, revisions have been made to this EIR/EIS section. Those changes include:

- *Clarifications and revisions to Setting/Affected Environment and Regulatory Setting sections.*
- *Additional dilution model analysis to assess dilution and water quality impacts for a wider range of potential operational discharge scenarios.*
- *Incorporation of additional water quality data into the assessment of potential water quality impacts from operational discharges.*
- *Revisions relating to compliance with Ocean Plan water quality objectives for two constituents for certain operational discharge scenarios based on revised model analysis and additional water quality data.*
- *Removal of biologically active filtration from Mitigation Measure 4.3-5.*
- *Addition of end gate modification for the existing diffuser outfall structure in Mitigation Measure 4.3-5.*

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1 "Ocean water" is defined as water located above the seafloor.

2 Hypoxia, or oxygen depletion, is an environmental phenomenon where the concentration of dissolved oxygen in the water column decreases to a level that can no longer support living aquatic organisms. The impacts of hypoxia are often described as creating a so-called "dead zone" in the marine environment.

- *Addition of an assessment of the efficacy of end gate modification to increase dilution for operational discharges.*
- *Addition of an assessment of secondary impacts from implementing end gate modification under Mitigation Measure 4.3-5.*
- *Additional model assessment to determine the feasibility of retrofitting the existing outfall diffuser with incline jets to achieve compliance with all Ocean Plan water quality objectives.*
- *Revision of Mitigation Measure 4.3-5 such that retrofit of the diffuser is elevated to the primary mitigation strategy for mitigating water quality impacts based on model assessment.*

4.3.1 Setting/Affected Environment

The study area for evaluation of surface water hydrology and water quality impacts is the Salinas River watershed, Carmel River watershed, and the southern portion of Monterey Bay south of Elkhorn Slough within MBNMS.

4.3.1.1 Climate and Topography

The climate in the study area is moderate throughout the year with warm, dry summers and cool, moist winters. The average temperature is approximately 60 degrees Fahrenheit (°F) (Monterey County, 2008). Rainfall occurs primarily between November and April. Average annual rainfall in the county is approximately 18 inches.

The study area lies within the southern portion of the Coast Ranges province. The topography in the study area is dominated by a rugged coastline and the Diablo, Gabilan, and Santa Lucia mountain ranges with peaks of up to 5,844 feet above mean sea level (msl). Elevations in the project area range from approximately 10 feet above msl in the CEMEX active mining area to roughly 300 feet above msl along General Jim Moore Boulevard in Seaside. The topography of the project area results in part from the gently to moderately rolling sand dunes that are present along the coastal areas in the north to the city of Monterey in the south. Active, wind-blown dunes generally extend less than a 0.5-mile inland, and older, more stabilized dunes extend up to 4 miles inland.

4.3.1.2 Regional Surface Water Hydrology

The project area is located in the Salinas River and Carmel River watersheds (see **Figure 4.3-1**), which are discussed below. The headwaters of the Salinas and Carmel Rivers, the primary watercourses in the region, originate in the Santa Lucia and Gabilan Mountains (Monterey County, 2008). In general, the overall drainage pattern in the county is from southeast to northwest. The Salinas River drains into Monterey Bay and the Carmel River drains into Carmel Bay both of which are within MBNMS. A third major watershed in the region, the Pajaro River watershed, lies north of the project area and includes the Elkhorn Slough subwatershed. The Pajaro River enters Monterey Bay at the northern tip of Monterey County. The Pajaro River Watershed lies north of and outside of the project area and is not discussed further.

Salinas River Watershed

With the exception of the Main System-Hidden Hills Interconnection Improvements and the Carmel Valley Pump Station, all of the proposed project facilities would be located in the Salinas River watershed. The Salinas River drains approximately 3,950 square miles and has the largest drainage area in Monterey County. The Salinas River watershed is bounded by the Santa Lucia Mountains to the west and the Gabilan Mountains to the east (Monterey County, 2008). Historically, the Salinas River joined with Elkhorn Slough in Moss Landing prior to discharging into Monterey Bay; this river segment is now referred to as the Old Salinas River. Today, the Salinas River drains directly into Monterey Bay approximately 4 miles south of Moss Landing (CCoWS, 2006). In the project area, within the Salinas River watershed, the Canyon del Rey subwatershed extends east of Monterey and Seaside (see **Figure 4.3-1**). The Canyon del Rey subwatershed covers approximately 13.8 square miles and is located along the Seaside/Del Rey Oaks/Highway 68 corridor (Monterey County, 2010b). Canyon Del Rey Creek discharges seasonally to Monterey Bay via Laguna del Rey.

Average annual flows to the ocean from the Salinas River are around 282,000 acre-feet per year, most of which occurs from November through March. This period corresponds to the months of peak seasonal rainfall and coincides with a seasonal drop in irrigation in the valley (Monterey County, 2008). The Salinas River hydrology during the dry season is largely determined by water releases from the Nacimiento and San Antonio reservoirs. During spring and summer, operation of the two reservoirs regulates flow to minimize ocean outflow and maximize groundwater recharge through the Salinas River bed (Kozlowski et al., 2004). Water from the reservoirs[3] is used for groundwater recharge and managed so that the flows reach the lower Salinas River and percolate without being lost to the ocean (Kozlowski et al., 2004).

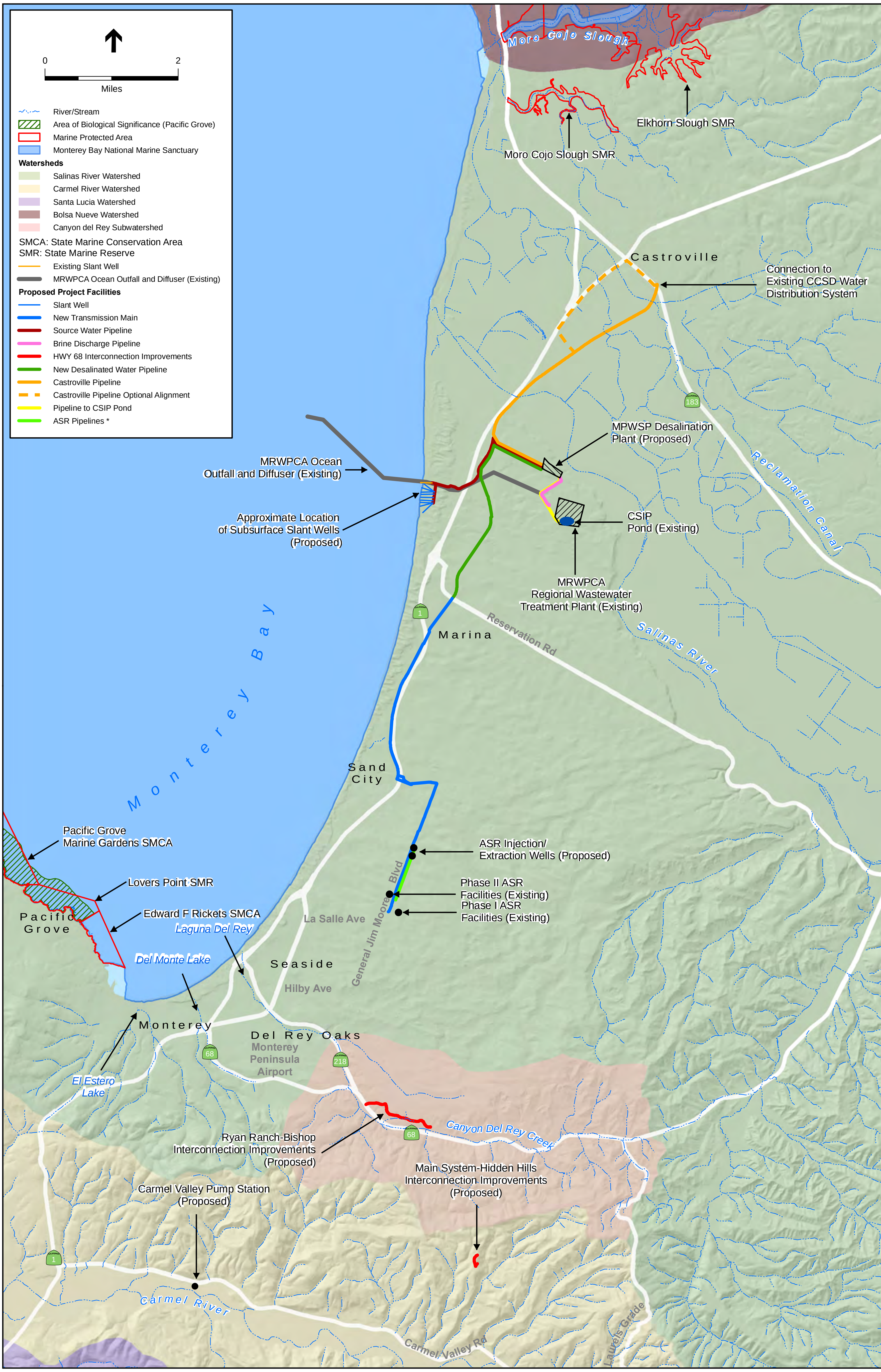
Carmel River Watershed

The Carmel River watershed covers an area of 255 square miles. From its headwaters in the Santa Lucia Mountains, the Carmel River flows for 36 miles, draining into Carmel Bay just south of the city of Carmel-by-the-Sea (Monterey County, 2010b). The larger tributaries of the Carmel River include Garzas Creek, San Clemente Creek, Tularcitos Creek, Pine Creek, Danish Creek, Cachagua Creek, and Miller Fork. The Main System-Hidden Hills Interconnection Improvements and the Carmel Valley Pump Station would lie within the Carmel River watershed.

Monterey Bay

Monterey Bay is a bay of the Pacific Ocean on California's Central Coast within MBNMS. The bay extends between the city of Santa Cruz and the Monterey Peninsula. MBNMS was designated in 1992 as a federally protected marine area off of California's Central Coast. It stretches from Marin to Cambria, encompasses a shoreline length of 276 miles and 4,601 square nautical miles of ocean, and extends an average distance of 30 miles from shore. The shoreline of Monterey Bay is composed primarily of less resistant sand dune and sedimentary deposits that form the ancient sand dune terraces and provide the opportunity for farmland around the communities of Watsonville,

[3] This does not include the modifications to the Nacimiento Dam spillway and operation of the rubber dam associated with the Salinas Valley Water Project.



SOURCE: DWR, 2004; SWRCB, 2005; NOAA, 2012

NOTE:
*The ASR Pipelines are the ASR Conveyance Pipeline, the ASR Pump-to-Waste Pipeline, and the ASR Recirculation Pipeline. See Figure 3-9a for the individual pipeline alignments.

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Figure 4.3-1

Surface Water Resources in the Project Area

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Castroville, Marina, Sand City, and Seaside. The primary freshwater inputs to Monterey Bay are through the San Lorenzo, Pajaro, Salinas and Carmel Rivers but other water bodies such as the Moro Cojo Slough feed into the Monterey Bay (see **Figure 4.3-1**). Beneath Monterey Bay is the Monterey Submarine Canyon, one of the deepest submarine canyons on the west coast of the United States (MBARI, 2016). The canyon head lies just offshore of Moss Landing. From there, the main channel meanders 470 kilometers (292 miles) seaward and is approximately 12 kilometers at its widest point, with a maximum rim to floor relief of 1,700 meters (5,577 feet) (MBNMS, 2016a). The Monterey Canyon system includes two additional canyon heads, Soquel Canyon and Carmel Canyon, which flank Monterey Canyon to the north and south, respectively.

The oceanographic features primarily affecting waters of Monterey Bay are seasonal upwelling and the California Current System, which consists of the California Current, the California Undercurrent, and the Davidson Current. The California Current is a large scale upper ocean current that transports cold, subarctic water with lower salinity from the North Pacific south along the North American coast where it mixes with warm, saltier equatorial water (ESA, 2015). Beneath this near-surface current and relatively close inshore (within 100 kilometers or 62 miles), is the California Undercurrent that transports warm subtropical water northward. During winter months the California Undercurrent becomes the inshore countercurrent or Davidson current (Flow Science Inc., 2014). Seasonal upwelling and the California Current System and its influence on Monterey Bay water quality is discussed further in Section 4.3.1.3 (below).

4.3.1.3 Surface Water Quality

The quality of surface water is primarily a function of land uses in the project area. Pollutants and sediments are transported in watersheds by stormwater runoff that reaches streams, rivers, storm drains, and reservoirs. Local land uses influence the quality of the surface water through point source discharges (i.e., discrete discharge from a wastewater treatment plant) and nonpoint source discharges (e.g., storm runoff). Some of the most prominent water quality problems in the project area are erosion and sedimentation, pollutants in urban runoff, nitrate contamination, and inorganic constituents (Monterey County, 2010b). Surface water quality for the two primary watersheds in the project area and Monterey Bay is described below.

Salinas River and Carmel River Watersheds

Urban runoff has the potential to directly affect water quality in the Salinas River and in Monterey Bay (Monterey County, 2008). As further discussed in Section 4.3.2.1, below, the lower Salinas River water quality is impaired by pesticides and nutrients. Relatively less urbanization has occurred in the Carmel River watershed as compared to the Salinas River watershed. However, because most of the urban uses are close to the Carmel River, they present the potential for direct impacts on surface water quality. According to a Carmel River Watershed Conservancy[4] monitoring report (2004), excess sediment in the Carmel River occurs due to various land uses and road designs.

[4] The Carmel River Watershed Conservancy monitors the health of the Carmel River watershed resources including creeks, streams, and wildlife habitat.

Monterey Bay

This section characterizes baseline water quality conditions in Monterey Bay/MBNMS with a focus on salinity and temperature (which can affect ocean water density and receiving water mixing dynamics) as well as water quality constituents that are regulated by the State Water Resources Control Board (SWRCB) and the Central Coast Regional Water Quality Control Board (RWQCB) (see Section 4.3.2, Regulatory Framework, below, for additional information regarding water quality regulations). Ocean climate, a physical driver that affects water quality in Monterey Bay, is also described here. When turbulence associated with ocean currents or surface waves exceed the threshold required for initiating motion of seabed materials, the resuspension of bottom sediments, which occurs naturally, can affect water quality by producing short-term and localized increases in suspended sediment concentrations and turbidity levels in near bottom waters. Suspended sediments also occur in surface waters following storm events that result in discharges from coastal rivers. Ocean currents may transport these river-derived sediments substantial distances alongshore or offshore from the origin. For additional details related to sediment dynamics and physical processes in Monterey Bay, see Section 4.5, Marine Biological Resources.

Salinity and Temperature

The seawater in Monterey Bay is a mixture of water masses from different parts of the Pacific Ocean with warmer, saltier water from the equatorial zone and colder, fresher water from the arctic regions. Near-shore surface temperatures vary from 46.4°F (8°C) during winter and early spring to 62.6°F (17°C) during fall. Near-shore surface salinities vary from 33.2 practical salinity units (psu) to 34.0 psu[5] when upwelling[6] is strong. Streams and rivers can locally affect salinity, but even during flood conditions, when freshwater inputs to Monterey Bay peak, the salinity of Monterey Bay surface waters does not fall below 31 psu (MBNMS, 2013b). Salinity tolerances of organisms present in Monterey Bay are discussed in detail in Section 4.5, Marine Biological Resources. In general, as discussed in detail in Section 4.5.5.2, the species present in the study area are tolerant of differing ranges of salinities depending on the organism and the life-stage in question. As an example, most cephalopods (e.g. squid) have an ideal range of salinity of 32 to 38 ppt, and are tolerant of salinities at levels outside this range. For general context, marine organisms in the study area have been demonstrated to tolerate salinities up to 36 ppt with no adverse effects on survival, growth, and behavior (see Table 4.5-9).

Bograd and Lynn (2003) compared nearshore salinity and temperatures in Monterey Bay during two periods: 1950-1976 and 1977-1999 and found very little variation. The difference in nearshore salinities between the periods was approximately 0.2 parts per thousand (ppt) or psu[7] and the difference in nearshore temperatures was approximately 1.4 °F. As such, the reported seasonal salinity and temperature is provided here as representative of baseline conditions. Additional temperature and salinity data is presented below as part of the characterization of

[5] Unit used to measure salinity in terms of the concentration of dissolved salts in water. Equivalent to parts per thousand (ppt).

[6] Upwelling is the process by which the warmer water at the ocean surface is pushed away by wind and replaced by colder, denser water that rises up from the subsurface.

[7] The unit ppt is equivalent to psu.

ocean climate, seasonal ocean water density and physical processes (such as waves and currents) that influence water quality.

Dissolved Oxygen

Dissolved Oxygen (DO) is typically used as a general index for the health of receiving waters (such as in the *Water Quality Control Plan for Ocean Waters of California* or Ocean Plan, discussed below in Section 4.3.2.2). Adequate DO is vital for aquatic life and higher concentrations are generally considered to be desirable. Dissolved oxygen content in water is, in part, a function of water temperature and salinity (discussed above). The ability of oxygen to dissolve in water decreases as the temperature and salinity of water increases. As the temperature and/or salinity of water increases, water loses the ability to hold dissolved oxygen and the concentration goes down. Salinity also has properties that can facilitate the creation of hypoxic[8] zones. Because salt water is more dense than fresh water, under certain conditions (typically observed in estuaries and coastal lagoons), a less dense layer of fresh or low salinity water can form on top of a denser layer of high salinity water on the bottom. Such a scenario can prevent adequate mixing of the water column and prevent oxygenated water from getting to the lower depths, resulting in the heavier, saltier layer at the bottom to become oxygen-depleted. However, DO varies according to many other factors, including photosynthesis and biological and chemical oxygen demand associated with decomposition of organic material. Monterey Bay is a dynamic environment that includes variable concentrations of DO. Ambient DO levels in Monterey Bay at a depth of approximately 100 feet have ranged from 4.25 milligrams per liter (mg/L) to 8.00 mg/L (KLI, 1998; KLI, 1999); typically, DO in the range of 5 to 8 mg/L is considered protective of fish and marine biota depending on the species and life-stage.

Other Constituents

The water quality of Monterey Bay is a function, in part, of different constituents present in the water, as well as the seasonal ocean climate (discussed below) in the Bay that affects the concentration of the constituents present. The waters of Monterey Bay contain numerous legacy pesticides[9] such as organochlorine pesticides, Dieldrin and dichloro-diphenyl-trichloroethane (DDT), as well as chemical products in current use such as organophosphate pesticides, polynuclear aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs).[10] The largest source of contaminants is agricultural runoff into the Pajaro and Salinas Rivers. Seasonal data collected by the Central Coast Long-term Environmental Assessment Network11 (CCLEAN) between 2001 and 2013 indicate numerous instances where water quality objectives and human health alert levels in Monterey Bay were exceeded due to the presence of contaminants (CCLEAN, 2011 and

[8] Hypoxia occurs when the amount of dissolved oxygen in water becomes too low to support most aquatic life (typically below 2 mg/l).

[9] Legacy pesticides are persistent pesticides that have been banned from use but are still commonly found in the environment.

[10] PCBs are also legacy contaminants.

[11] CCLEAN is a long-term water quality monitoring program designed to help municipal agencies and resource managers protect the quality of the nearshore marine waters in the Monterey Bay. CCLEAN is a collaborative program between the cities of Watsonville and Santa Cruz, MRWPCA, Carmel Area Wastewater District, Dynegy Moss Landing Power Plant, and Central Coast Regional Water Quality Control Board (CCLEAN, 2013).

2014). Nearshore waters of Monterey Bay have failed to meet the Ocean Plan water quality objective for the protection of human health (i.e., concentrations are higher than numeric water quality objectives) for PCBs, Dieldrin, chlordanes, and DDTs. PCBs in the northern portion of Monterey Bay have increased significantly since 2006 and annual average concentrations across all samples have increased exponentially (CCLEAN, 2014). Annual data reported indicate that waters of Monterey Bay exceeded the Ocean Plan 30-day average PCB water quality objective of 1.9×10^{-5} micrograms per liter (µg/L)[12] for most of the years between 2004 and 2013. Additional details related to water quality objectives and Monterey Bay water quality is provided in Section 4.3.2.2, below, under the subsection California Ocean Plan Water Quality Objectives.

Monterey Bay also receives point source discharges from pipelines and other structures. These permitted discharges are subject to prohibitions and water quality requirements established by the Central Coast RWQCB such as effluent limitations, periodic monitoring, annual reporting, and other requirements designed to protect the overall water quality of Monterey Bay. (see Section 4.3.2, Regulatory Framework, below, for additional information regarding water quality regulations pertaining to MBNMS). In the project area, some of these permitted discharges include stormwater discharges from the cities of Sand City, Seaside, Monterey, Del Rey Oaks, and Pacific Grove, and unincorporated portions of Monterey County, and treated wastewater from the Monterey Regional Water Pollution Control Agency (MRWPCA) Regional Wastewater Treatment Plant located on Charles Benson Road in Marina. Another permitted point discharge in Monterey Bay is located 7 miles north of the project area in Moss Landing associated with a natural gas power plant operated by Dynegy, whose cooling water is discharged.[13]

Monterey Bay Ocean Climate

Ocean climate refers to oceanographic conditions, including temperature, salinity, current, and wave patterns prevailing over a period of time. An understanding of the ocean climate in Monterey Bay is important because the climatic conditions within the Bay influences the seasonal density of Bay receiving waters. The seasonal density of receiving waters is an important consideration related to the proposed operational discharges of the MPWSP and the mixing and dilution mechanics associated with such discharges that can influence receiving water quality. There are three known ocean climate seasons in Monterey Bay (Roberts, 2016):

- Upwelling Period: a wind-induced upwelling period that is characterized by strong currents, high salinities and cooler surface waters. Typically occurs March to September when steady northwesterly/westerly winds cause offshore transport of surface waters, resulting in deep, colder, nutrient-rich water to rise to the surface (upwelling).
- Oceanic or California Current Period: characterized by average currents, low salinity and warmer water. Typically occurs September to November when winds relax and upwelling ceases, allowing previously upwelled water to sink and be replaced by warm oceanic waters from offshore.

[12] This objective for protection of human health is listed in the Ocean Plan and is discussed further in Section 4.3.2.2, State Regulatory Framework, below.
[13] Based on *Waste Discharge Requirements Order No. 00-041 NPDES No. CA0006254* issued to Duke Energy North America Moss Landing Power Plant (RWQCB, 2000).

- Davidson Current Period (also called the "low thermal gradient phase"): characterized by slow currents and freshwater inputs (lower salinity). Typically occurs November to March when winter storm conditions prevail, causing downwelling in Monterey Bay and lower currents in the nearshore area.

These three individual seasons overlap extensively and do not recur with exact consistency. For more information on ocean climate seasons as they relate to water quality in Monterey Bay, see **Appendix D1** (Roberts, 2017) **and D2** (Flow Science Inc., 2014). Besides the ocean climate seasons, the physical mixing of the ocean water is influenced by the ocean water density, physical processes such as waves and currents, and physical features on the ocean floor. Baseline conditions characterizing each of these factors are described below.

As described above, the salinity and temperature of the ambient receiving ocean water determines its density, which in turn affects the mixing and dilution dynamics of discharges or surface waters (such as rivers, streams and stormwater) flowing into the ocean. Monthly measurements of conductivity-temperature-depth (CTD) were collected at four locations proximate to the MRWPCA outfall (see Figure 1 in **Appendix D1**) between February 2014 and December 2015 to document baseline ocean conditions. The profiles were averaged by ocean climate season (described above) to obtain representative water column densities, as well as salinity and temperature conditions near the seabed where the existing MRWPCA diffuser is located (**Table 4.3-1**).

TABLE 4.3-1
SEASONAL AVERAGE TEMPERATURE, SALINITY, AND DENSITY PROPERTIES AT MRWPCA OUTFALL DIFFUSER

Ocean Season	Temperature (°C)	Salinity (ppt)	Density (kg/m3)
Davidson	14.46	33.34	1024.8
Upwelling	11.48	33.89	1025.8
Oceanic	13.68	33.57	1025.1

SOURCE: Roberts, 2016.

The processes influencing the physical mixing of Bay receiving waters with inputs from other sources is enhanced by turbulence induced by currents and waves. Current velocities can be different throughout the water column. Tidally-driven currents can cause large pulses of water movement along the Monterey Submarine Canyon. Wave action, particularly during stormy periods, can vertically stir the water. The ocean water density and the physical processes (waves and currents) vary as a result of seasonal weather cycles and can also be severely modified by global ocean climate events, such as the Pacific Decadal Oscillation (SWRCB, 2012a).

Physical features on the ocean floor, such as regional bathymetry[14] and structures such as pipelines (which can influence localized mixing and dilution) also influence mixing and dilution

[14] National Oceanic and Atmospheric Administration (2014) refers to bathymetry as the ocean's depth relative to sea level, although it has come to mean "submarine topography," or the depths and shapes of underwater terrain.

dynamics. The bathymetry in the vicinity of the MRWPCA outfall structure is relatively flat with an average slope of 1 percent to the west of the diffuser for 5 miles. The rim of Monterey Submarine Canyon is less than 4 miles to the northwest of the project area.

4.3.1.4 Flooding

Flooding can occur when excessive precipitation generates stormwater runoff that exceeds the carrying capacity of the drainage system. Flooding can also occur due to dam or levee failure, tsunamis, especially high tides, coastal storms, and/or sea level rise.

Flood Hazard Zones

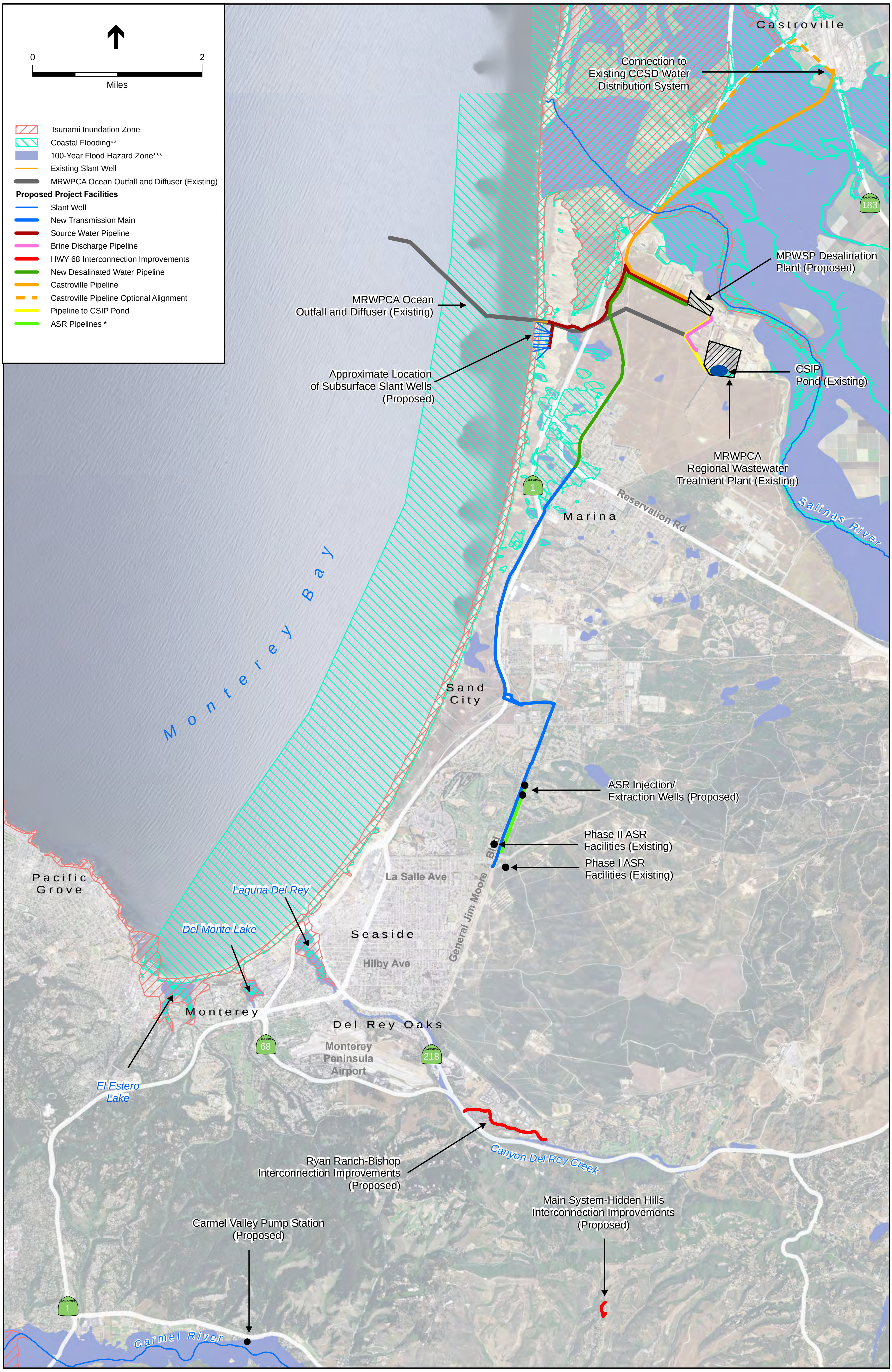
The Federal Emergency Management Agency (FEMA) delineates regional flooding hazard areas in Monterey County as part of the National Flood Insurance Program. Official Flood Insurance Rate Maps (FIRMs) for the project area indicate areas that have a 1 percent chance of flooding in any given year (100-year flood hazard zone). The 100-year flood hazard zones along the coast experience flooding coincident with high tide events typically combined with a wintertime storm surge. Significant flood events occurred in Monterey County in January 1995, March 1995, and February 1998 (MCWRA, 2013). During these events, major water bodies, including the Salinas River and Carmel River, experienced flooding and Monterey County was declared a federal disaster area.

The FEMA 100-year flood hazard zone in the project vicinity is shown in **Figure 4.3-2**. Portions of the proposed Source Water Pipeline and new Transmission Main in Marina; most of the Castroville Pipeline and Castroville Pipeline Optional Alignment 1 located north of the Salinas River, and the Carmel Valley Pump Station in unincorporated Monterey County are sited within a FEMA 100-year flood hazard zone. None of the other proposed facilities would be located within designated flood hazard areas.

Dam or Levee Failures

Dams located within the project vicinity include Los Padres Dam on the Carmel River; and Nacimiento and San Antonio Dams on the Salinas River. Historically, CalAm diverted surface water supplies from the Carmel River at Los Padres and San Clemente Dams to serve CalAm's Monterey District service area (Monterey District). However, the storage capacity of both dams was reduced substantially by the gradual accumulation of sediment over the years of operation (CCoWS, 2009; DWR, 2012). Los Padres Dam, built in response to an increase in sediment accumulation behind the downstream San Clemente Dam, has been reduced to 60 percent of original capacity. Removal of San Clemente Dam was completed in summer of 2015 (CalAm, 2016). Nacimiento and San Antonio Dams are owned and operated by the Monterey County Water Resources Agency (MCWRA).

The three remaining dams—Los Padres, Nacimiento, and San Antonio Dams—are regulated by the design and operational requirements established by the California Division of Safety of Dams (DSOD) and are administered by Monterey County. California Water Code Section 6000, et seq.



SOURCE: DWR, 2004; SWRCB, 2005; NOAA, 2012

NOTE:
*The ASR Pipelines are the ASR Conveyance Pipeline, the ASR Pump-to-Waste Pipeline, and the ASR Recirculation Pipeline. See Figure 3-9a for the individual pipeline alignments.

**Represents the extent of a 100-year coastal flood under current projections (year 2010) from Monterey Bay SLR study (ESA PWA 2014).

***Represents the 100-year FEMA floodplain.

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Figure 4.3-2
Flood Hazards in the Project Area

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and 23 California Code of Regulations (CCR) 301, et seq. establish the authority and responsibility of the DSOD, including periodic safety inspections of dams, completion of studies that predict the flood zones created by sudden dam failure, and development of emergency response plans in the advent of pending dam failure, including a program for emergency warning and evacuation prepared by the Monterey County Office of Emergency Services (Monterey County, 2007). The DSOD requires the determination of a dam inundation area, which is an area downstream of a dam that would be inundated or otherwise affected by the failure of the dam and accompanying large flood flows (California Office of Emergency Services, 2011). Based on the County-wide dam inundation map, the Castroville Pipeline and Castroville Pipeline Optional Alignment 1 would be located within the dam inundation zone for Nacimiento and San Antonio Dams (Monterey County, 2010b).

In Monterey County, levees along portions of the Salinas and Carmel Rivers were constructed as part of U.S. Army Corps of Engineers or U.S. Department of Agriculture flood control projects, or by local flood control programs administered by the MCWRA and other stakeholders. All of these levees and floodwalls are required to undergo periodic inspections for safety and performance as part of routine maintenance plans (Monterey County, 2007).

Tsunami Hazards

A tsunami is a large wave or series of waves generated by an earthquake, volcanic eruption, or coastal landslide. Tsunami damage is typically confined to low-lying coastal areas. The United States Geologic Survey (USGS) evaluated the potential community exposure to tsunami hazards along the California coastline, including Monterey Bay (Wood et. al., 2013). The report estimated the maximum onshore wave run-up[15] from a tsunami would reach an elevation of 18.37 feet[16] in the city of Monterey. This degree of run-up would inundate a large portion of the city. Seaside and the unincorporated areas near the mouth of the Salinas River could also be subject to large areas of inundation (see **Figure 4.3-2**). Following the tsunami in Japan in 2011, the maximum wave height at Monterey Harbor was recorded at 2.4 feet (Monterey County, 2014).

The Monterey County Office of Emergency Services (OES) is responsible for developing and maintaining a state of readiness in preparation of any emergency, including tsunamis that could adversely affect any part of Monterey County (OES, 2010). According to the *Tsunami Incident Response Plan* prepared by the Monterey County OES and incorporated cities in the county, a locally generated tsunami may occur if a large enough earthquake occurs in or near Monterey Bay (OES, 2007). Such an earthquake could produce a tsunami that reaches shore in a matter of minutes. The plan states that within Monterey County, there is a low likelihood of experiencing a tsunami. The most likely tsunami, though still relatively unlikely compared to other hazards, is from a distant event, where there would be more than one hour to respond to a tsunami warning. The Tsunami Incident Response Plan lists individual response areas along the Monterey County

15 *Wave run-up* refers to the maximum vertical extent of a wave up rush on a beach or a structure.
16 The maximum onshore run-up elevation presented in the 2013 USGS report (Wood et. al., 2013) is based on modeled scenarios (for distant sources) and past events (for local sources).

and outlines the response agencies, evacuation routes, routes to avoid, safe areas, and special considerations for neighboring areas.

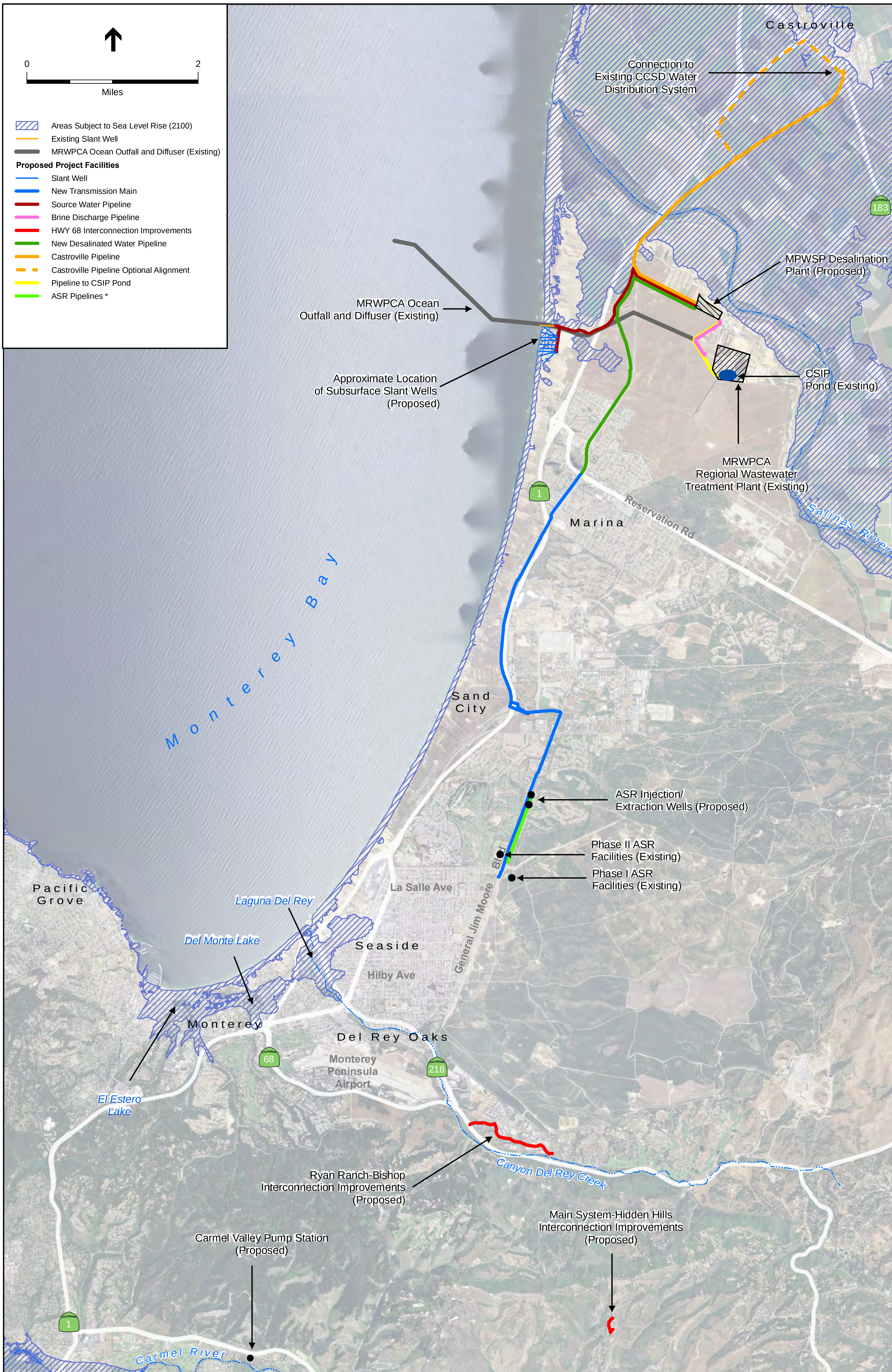
Coastal Flooding and Sea Level Rise

Coastal flooding can occur when there is a short- or long-duration increase in sea level during a period of extreme precipitation and runoff. Wave run-up along the coastal areas of Monterey County also contributes to coastal flooding. Wave run-up may cause coastal erosion by directly impacting coastal bluffs, dislodging material, and redistributing it to the foreshore and nearshore. Storms in the Pacific Ocean in the months of November through February, in conjunction with high tides and strong winds, can cause significant wave run-up.

Coastal flooding can be exacerbated by the physical characteristics of the continental shelf and shoreline. As part of the California Coastal Analysis and Mapping Project, FEMA is performing the Open Pacific Coast Study, a detailed coastal engineering analysis and mapping of the Pacific Coast of California. The results of the study will be used to remap the coastal flood risk and wave hazards for the California coastline, including Monterey County (FEMA, 2016).

Sea level rise at a global level is a phenomenon generally attributed to global climate change. Climate change is expected to result in more extreme weather events, both heavier precipitation events that can lead to flooding as well as more extended drought periods. According to a report by the Intergovernmental Panel on Climate Change (IPCC), the global average sea level rose at an average rate of 1.8 millimeters (0.07 inch) per year from 1961 to 2003 and at an average rate of about 3.1 millimeters (0.12 inch) per year from 1993 to 2003 (IPCC, 2007). The more recent Assessment Report predicts mean sea level could, depending on future emissions, rise by up to 7 meters (23 feet) over a millennium or more, assuming near-complete loss of the Greenland ice sheet (IPCC, 2014, p. 12).

The National Research Council estimates sea level in California to rise by 4.6 to 24 inches by 2050 and 17 to 66 inches by 2100 (NRC, 2012). The Pacific Institute report (2009) predicts that sea level rise along the California coast could increase by 55 inches by 2100. This projection may be an underestimation because the climate models used did not account for ice-melt from Antarctica and Greenland (Pacific Institute, 2009). Based on monthly mean sea level data from 1973 to 2006, the mean sea level in Monterey Bay is increasing by approximately 1.35 millimeters (0.053 inches) per year (NOAA, 2013a). Sea level rise will likely increase the rate of coastal erosion and related coastal hazards (see Section 4.2, Geology, Soils, and Seismicity for more information regarding coastal erosion and coastal hazards). As shown in **Figure 4.3-3**, within the project area, portions of the subsurface slant wells and Source Water Pipeline in Marina and the Castroville Pipeline in unincorporated Monterey County would lie in areas that would be subject to coastal flooding and sea level rise.



SOURCE: Pacific Institute, 2009

NOTE:
*The ASR Pipelines are the ASR Conveyance Pipeline, the ASR Pump-to-Waste Pipeline, and the ASR Recirculation Pipeline. See Figure 3-9a for the individual pipeline alignments.

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Figure 4.3-3
Areas Subject to Sea Level Rise in the Project Area

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4.3.2 Regulatory Framework

This section provides an overview of federal, state, and local environmental laws, policies, plans, regulations, and/or guidelines (hereafter referred to generally as "regulatory requirements") relevant to surface water hydrology and water quality. A brief summary of each is provided, along with a finding regarding the project's consistency with those regulatory requirements. The consistency analysis is based on the project as proposed, without mitigation. Where the project, as proposed, would be consistent with the applicable regulatory requirement, no further discussion of project consistency with that regulatory requirement is provided. Where the project, as proposed, would be potentially inconsistent with the applicable regulatory requirement, the reader is referred to the specific impact discussion in Section 4.3.5, Direct and Indirect Effects of the Proposed Project, below, where the potential inconsistency is addressed in more detail. Where applicable, the discussion in Section 4.3.5 identifies feasible mitigation that would resolve or minimize the potential inconsistency.

4.3.2.1 Federal Regulations

Clean Water Act

Under the Clean Water Act (CWA) of 1977, the United States Environmental Protection Agency (USEPA) seeks to restore and maintain the chemical, physical, and biological integrity of the nation's waters by implementing water quality regulations. The National Pollutant Discharge Elimination System (NPDES) permit program under section 402 of the CWA controls water pollution by regulating sources that discharge pollutants into waters of the United States. The USEPA has delegated authority of issuing NPDES permits in California to the California State Water Resources Control Board (SWRCB), which has nine regional boards. The Central Coast RWQCB regulates water quality in the project area (further discussion of the NPDES program and permits in California relevant to the proposed project is provided in Section 4.3.2.2, below). Additionally, determinations of consistency of the proposed MPWSP with specific applicable SWRCB regulations, plans and policies are provided in Section 4.3.2.2, below.

Section 303(d) List of Impaired Water Bodies and Total Maximum Daily Loads

Section 303(d) of the CWA requires that each State identify water bodies or segments of water bodies that are "impaired" (i.e., do not meet one or more of the water quality standards established by the state, even after point sources of pollution have been equipped with the minimum required levels of pollution control technology). Inclusion of a water body on the Section 303(d) List of Impaired Water Bodies triggers development of a Total Maximum Daily Load (TMDL) for that water body and a plan to control the associated pollutant/stressor on the list. The TMDL is the maximum amount of a pollutant/stressor that a waterbody can assimilate and still meet the water quality standards. Typically, a TMDL is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources.

Table 4.3-2 lists the impaired water bodies in the project area, including the pollutants that cause the impairments, and the potential sources of the pollutants.

TABLE 4.3-2
303(D) LIST OF IMPAIRED WATER BODIES IN THE PROJECT VICINITY

Water Body	Impairments/Pollutants
Salinas River	
Old Salinas River Estuary	Pesticides, Nutrients
Salinas Reclamation Canal	Ammonia (unionized), Chlorpyrifos, Copper, Diazinon, E. coli, Fecal Coliform, Low Dissolved Oxygen, Nitrate, Pesticides, pH, Priority Organics, Sediment Toxicity, Turbidity, Unknown Toxicity
Salinas River (Lower estuary to Gonzales Road crossing)	Chlordane, Chloride, Chlorpyrifos, DDD (Dichlorodiphenyldichloroethane), Diazinon, Dieldrin, Electrical Conductivity, E. coli, Fecal Coliform, Nitrate, PCBs, Pesticides, pH, Sodium, Total Dissolved Solids, Toxaphene, Turbidity, Unknown Toxicity
Salinas River Lagoon (North)	Nutrients, Pesticides
Tembladero Slough	Chlorophyll-a, Chlorpyrifos, Diazinon, Enterococcus, E. coli, Fecal Coliform, Nitrate, Nutrients, Pesticides, pH, Sediment Toxicity, Total Coliform, Turbidity, Unknown Toxicity
Carmel River	None
Lake El Estero	None
Del Monte Lake	None
Laguna del Rey	None
Monterey Bay	
Monterey Bay South (Coastline)	None
Monterey Harbor	None

SOURCE: RWQCB, 2015.

National Marine Sanctuaries Act, MBNMS Regulations and Desalination Guidelines

Pursuant to the National Marine Sanctuaries Act (NMSA or Act), originally referred to as the Marine Protection, Research, and Sanctuaries Act of 1972, the primary purpose of the NMSA is to identify, designate and manage areas of the marine environment of special national significance due to their conservation, recreational, ecological, historical, research, educational, or aesthetic qualities. Under the NMSA, it is unlawful for any person to destroy, cause the loss of, or injure any sanctuary resource managed under law or regulations for that sanctuary. NMSA general regulations define sanctuary resource as any living or nonliving resource that contributes to the conservation, recreational, ecological, historical, research, educational or aesthetic value of the sanctuary, including any algae and other marine plants, marine invertebrates, brine-seep biota, phytoplankton, zooplankton, fish, seabirds, sea turtles, and marine mammals.

MBNMS was designated in 1992 in recognition that the area provides a highly productive ecosystem and a wide variety of marine habitat, including outstanding concentrations of pinnipeds, whales, otters, and seabirds, abundant fish stocks, a variety of crustaceans, and invertebrates.

In addition to the statute, each sanctuary has unique regulatory prohibitions codified within a separate subpart of 15 CFR Part 922. Subpart M contains the regulations specific to MBNMS. The importance of sanctuary resources relevant to water quality is emphasized among the MBNMS statutory, regulatory, and management priorities. The importance of water quality to sanctuary resources is further emphasized in the 2008 MBNMS *Final Management Plan*, which includes a desalination action plan (MBNMS 2008). The desalination action plan details numerous strategies for the protection of MBNMS resources, including one to develop specific guidelines for desalination projects to be sited in MBNMS (discussed below).

MBNMS regulations that are relevant to the construction and operation of desalination plants include a prohibition on discharging material or other matter into the sanctuary and a prohibition on activities that alter the submerged lands (aka seabed) as a result of the installation of desalination facility structures on or beneath the ocean floor (e.g. an intake or outfall pipeline). In particular, MPWSP activities that would be subject to MBNMS approval include the seawater intake from aquifers below the ocean floor, and the discharge of brine into sanctuary ocean waters from an existing ocean outfall, approximately two miles off shore and 90-110 feet below sea level. Any actions that have the potential to alter the seabed would require an MBNMS Authorization of a Coastal Development Permit issued by the CCC. Operational discharges into sanctuary waters would require MBNMS authorization of an NPDES permit issued by the RWQCB (see Section 1.3.2 for additional information). NOAA may also issue Special Use Permits to establish conditions of access to, and use of, any sanctuary resource or to promote public use and understanding of a sanctuary resource. Special Use Permits may only be authorized if that activity is compatible with the purposes for which the sanctuary is designated and with protection of sanctuary resources; and that activities carried out under the permit be conducted in a manner that does not destroy, cause the loss of, or injure sanctuary resources. (See Section 1.3.2 for additional information.)

Guidelines for Desalination Plants in MBNMS

In 2010, MBNMS in collaboration with the California Coastal Commission, California Central Coast Regional Water Quality Control Board, and NOAA Fisheries, published a report titled *Guidelines for Desalination Plants in Monterey Bay National Marine Sanctuary* (MBNMS 2010), which implements the desalination action plan included in the MBNMS *Final Management Plan* (described above). These include non-regulatory guidelines that were developed to help ensure that any future desalination plants in the sanctuary would be sited, designed, and operated in a manner that results in minimal impacts on the marine environment. The Guidelines address numerous issues associated with desalination including site selection, construction and operational impacts, monitoring and reporting, plant discharges, and intake systems.

The following guidelines are pertinent to the analysis of impacts presented in Section 4.3.5:

- All desalination plants should be designed to minimize impacts from the discharge. Desalination project proponents should investigate the feasibility of diluting brine effluent by blending it with other existing discharges. The proponent should evaluate the use of measures to minimize the impacts from desalination plant discharges including discharging to an area with greater circulation or at a greater depth, increasing in the number of diffusers, increasing the velocity while minimizing the volume at each outlet, diluting the brine with seawater or another discharge, or use of a subsurface discharge structure. The project proponent should provide a detailed evaluation of the projected short-term and long-term impacts of the brine plume on marine organisms based on a variety of operational scenarios and oceanographic conditions. Modeling should address different types of seasonal ocean circulation patterns, including consideration of "worst case scenarios."

- Results of accepted plume models should be included, to illustrate how the plume will behave during variable oceanographic conditions. The plume model should estimate salinity concentrations at the discharge point, as well as where and when it would reach ambient ocean concentrations. The extent, location, and duration of the plume where the salinity is 10 percent above ambient salinity should also be provided.
- The project proponent should provide information on the physical and chemical parameters of the brine plume including salinity, temperature, metal concentrations, pH, and oxygen levels. These water quality characteristics of the discharge should conform to California Ocean Plan requirements and should be as close to ambient conditions of the receiving water as feasible.
- A continuous monitoring program should be implemented to verify the actual extent of the brine plume, when deemed necessary (see Monitoring on page 4.3-13) and to determine if the plume is impacting Essential Fish Habitat (EFH), critical habitat, or sanctuary resources. If it is, then mitigation for the EFH impact will be required.

The issues discussed in the Guidelines relating to siting, constructing, and operating a desalination facility within MBNMS and the recommendations for reducing, avoiding, and minimizing impacts on sanctuary resources are reflected in the requirements of the California Ocean Plan (described in detail under State Regulations in Section 4.3.2.2, below). The Ocean Plan was recently amended (effective January, 2016) to specifically control potential adverse impacts on marine life associated with desalination facility intakes using seawater as source water and brine discharges. Further, the Ocean Plan includes specific enforceable numeric water quality objectives and other requirements pertaining to siting, constructing, and operating a desalination facility that are consistent with the Guidelines. The requirements set forth in the Ocean Plan were informed by the SWRCB collaborating with the Southern California Coastal Water Research Project to evaluate methods of brine disposal and monitoring strategies. Additionally, the amendments to the Ocean Plan were assessed in a SWRCB staff report analyzing desalination facility intakes and brine discharges which provides the rationale for how implementing such measures reduce potential environmental impacts from desalination facilities (SWRCB, 2015). To reflect this evolution of regulatory requirements supported by evidence based research, the Ocean Plan requirements are used, in part, as key thresholds of significance in the evaluation criteria for assessing impacts. The Ocean Plan requirements are generally more stringent and have more specificity regarding assessment and monitoring requirements than the Guidelines. As such, the Ocean Plan requirements are substantially consistent with the Guidelines. Section 6.4 includes a comprehensive list of Guideline recommendations and summarizes the proposed project's consistency with those guidelines.

As proposed, the MPWSP would involve water quality and marine biological resource impacts that could indirectly affect Sanctuary managed resources in a manner that would be potentially inconsistent with the provisions of the National Marine Sanctuaries Act as well as the guidelines (MBNMS, 2010) that relate to water quality and associated MBNMS managed resources for desalination plants in MBNMS. Impacts on sanctuary resources from brine discharges, and mitigation measures to avoid the impacts, are discussed in detail in Impact 4.3-4 and Impact 4.3-5 as well as in Section 4.5, Marine Biological Resources.

NOAA (MBNMS) Memorandum of Agreement with State and Federal Agencies

NOAA (MBNMS) entered into a Memorandum of Agreement (MBNMS, 2016e) with the State of California, USEPA, and the Association of Monterey Bay Area Governments, which addresses the process for implementing the following water quality regulations applicable to State waters within MBNMS (MBNMS, 2013a):

- NPDES permits issued by the State of California under Section 13377 of the California Water Code; and
- Waste Discharge Requirements issued by the State of California under Section 13263 of the California Water Code.

The Memorandum of Agreement specifies how the review process for applications for leases, licenses, permits, approvals, or other authorizations will be administered within State waters in MBNMS in coordination between the State and the Sanctuary's permit programs. The MBNMS Superintendent develops and follows a management plan that ensures protection of these resources, provides for research and education, and facilitates recreational and commercial uses that are compatible with the primary goal of resource protection. MBNMS also implements the Water Quality Protection Program to enhance and protect the chemical, physical, and biological integrity of the sanctuary. The program is a partnership of many local, state, and federal government agencies and calls for education, funding, monitoring, and development of treatment facilities and assessment programs to protect water quality (MBNMS, 2016c). The MPWSP would be consistent with the requirements outlined above because, prior to issuance of any permits or licenses, a review and authorization process by MBNMS is required to ensure such permits and licenses are protective of MBNMS resources and are consistent with relevant plans, policies, and guidelines.

Coastal Zone Management Act

The Coastal Zone Management Act (CZMA) of 1972 provides for management of the nation's coastal resources, including the Great Lakes, and balances economic development with environmental conservation. In 1990, Congress passed the Coastal Zone Act Reauthorization Amendments (CZARA) to address nonpoint source pollution problems in coastal waters. The California Coastal Commission has jurisdiction for CZMA implementation throughout the state.[17]

[17] Except within the San Francisco Bay-Delta where the Bay Conservation and Development Commission has authority for implementation of CZMA within its jurisdictional area.

Section 6217 of CZARA and Section 319 of the CWA require California and 28 other states to develop coastal nonpoint source pollution control programs that incorporate required management measures to reduce or prevent polluted runoff to coastal waters from specific sources. Management measures are defined in Section 6217 of the CZARA as economically achievable measures to control the addition of pollutants to coastal waters, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives. These management measures are incorporated by states into their coastal nonpoint source pollution programs (USEPA, 1993) and coastal management programs. (See Section 4.3.2.2, below, for additional discussion of how the CZMA is regulated at the state level.)

The California Coastal Act contains numerous enforceable policies that are directed at protecting and, where feasible, restoring coastal water quality. The California Coastal Commission applies the Coastal Act's water quality policies when reviewing applications for coastal development permits in California state waters. The Coastal Commission also applies the water quality policies when reviewing federally licensed and permitted activities to ensure they are consistent with the State's coastal management program in accordance with the CZMA federal consistency provision.

The Coastal Commission considers an application for a coastal development permit to cover the requirement for an applicant submitting a consistency certification to the Coastal Commission if the activity is located in state waters. Typically, the Coastal Commission will provide its response (concurrence, conditional concurrence, or objection) in its staff report for the coastal development permit.

Executive Order 11988 and National Flood Insurance Program

Under Executive Order 11988, Floodplain Management of May 24, 1977, FEMA is responsible for management of floodplain areas defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a one percent or greater chance of flooding in any given year. Also, FEMA administers the National Flood Insurance Program, which requires that local governments covered by federal flood insurance enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year flood zone (one percent chance of occurring in a given year). FEMA prepares Flood Insurance Rate Maps (FIRMs) that that indicate areas prone to flooding. MCWRA is responsible for issuing permits within designated flood zones in the project area and would ensure consistency with requirements for development within a floodplain. Local municipalities are responsible for permitting development on floodplains within their jurisdictions.

4.3.2.2 State Regulations

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act (Division 7 of the California Water Code) provides the basis for water quality regulation within California and defines water quality objectives as the limits or levels of water constituents that are established for reasonable protection of beneficial uses. The Porter-

Cologne Act allows the California SWRCB to adopt statewide water quality control plans (such as "Basin Plans" as well as the California Ocean Plan) which serve as the legal, technical, and programmatic basis of water quality regulation for a region or along the coast. The Act also authorizes the NPDES program under the CWA, which establishes effluent limitations and water quality requirements for discharges to waters of the state. The California Ocean Plan, Basin Plan for the Central Coast and the NPDES permits relevant to the proposed MPWSP are discussed further below, as well as determinations of consistency of the MPWSP with these regulatory requirements.

California Toxics Rule

Under the California Toxics Rule (CTR), the USEPA has proposed water quality criteria for priority toxic pollutants for inland surface waters, enclosed bays, and estuaries. These federally promulgated criteria create water quality standards for California waters. The CTR satisfies CWA requirements and protects public health and the environment. The USEPA and the SWRCB have the authority to enforce these standards, which are incorporated into the NPDES permits (discussed below) that regulate existing discharges in the project area. The MPWSP would be consistent with the CTR requirements because such requirements would be incorporated into NPDES permits applicable to construction and operation of the MPWSP and CalAm would be required to comply with the permit requirements.

California Coastal Act

The California Coastal Act (Public Resources Code Section 30000 et seq.) provides for the long-term management of lands within California's coastal zone boundary. The Coastal Act includes specific policies for management of natural resources and public access within the coastal zone. Of primary relevance to surface water hydrology and water quality are Coastal Act policies concerning protection of the biological productivity and quality of coastal waters. For example, Article 4 of the Act details policies related to the marine environment, such as biological productivity and water quality. Specifically, and relevant to surface water hydrology and water quality, the Act requires the quality of coastal waters, streams, wetlands, estuaries appropriate to maintain optimum populations of marine organisms and for the protection of human health, to be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges, controlling runoff, and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams (Cal. Pub. Res. Code §§ 30231).

A preliminary assessment of project consistency with these priorities is provided here. Final determinations regarding project consistency are reserved for the Coastal Commission. Operational discharges of the MPWSP under certain scenarios may exceed Ocean Plan water quality objective thresholds. Exceedances of these thresholds would be potentially inconsistent with Coastal Act policies. This issue is discussed further in Impact 4.3-5.

State Marine Protected Areas

Within Monterey Bay, there are three conservation areas relevant to the study area (shown in **Figure 4.3-1**): Pacific Grove State Marine Conservation Area, Edward F. Ricketts State Marine Conservation Area, and Lovers Point State Marine Reserve, designated as such under the Marine Life Protection Act and administered by the California Department of Fish and Wildlife. These designated areas are further discussed in Section 4.5, Marine Biological Resources.

California Ocean Plan

The *Water Quality Control Plan for Ocean Waters of California* (or Ocean Plan; SWRCB, 2016), adopted by the SWRCB in May 2015 and effective January 2016, establishes water quality objectives and beneficial uses for waters of the Pacific Ocean adjacent to the California Coast outside of estuaries, coastal lagoons, and enclosed bays. The Ocean Plan establishes effluent quality requirements and management principles for specific waste discharges. The Ocean Plan was recently amended to establish a receiving water limitation for brine discharges from desalination facilities (discussed in detail under Salinity, below), and to ensure the protection of beneficial uses by establishing a consistent statewide analytic framework for new desalination facilities for the best available site, design, technology, and mitigation measures feasible in order to minimize intake and mortality of all forms of marine life. The water quality requirements and objectives of the Ocean Plan are incorporated into NPDES permits for ocean discharges, such as the *Waste Discharge Requirements for the Monterey Regional Water Pollution Control Agency Treatment Plant* (Order No. R3-2014-0013, NPDES Permit No. CA0048551) for discharges of treated wastewater from the MPWPCA Regional Wastewater Treatment Plant to Monterey Bay (MRWPCA's NPDES permit is discussed in more detail below).

The 2016 Ocean Plan includes the following provisions that are applicable to the proposed project:

- Waste management systems that discharge into the ocean must be designed and operated in a manner that will maintain the indigenous marine life and a healthy and diverse marine community.
- Waste discharged to the ocean must be essentially free of substances that will accumulate to toxic levels in marine waters, sediments or biota.
- Waste effluents must be discharged in a manner which provides sufficient initial dilution to minimize the concentrations of substances not removed in treatment.

The Ocean Plan prohibits discharges into Areas of Special Biological Significance (ASBS), except with an approved exception. ASBS are designated by the SWRCB (**Figure 4.3-1**) and require protection of species or biological communities to the extent that alteration of natural water quality is undesirable. In the Monterey region, Old Salinas River Estuary, Pacific Grove, Carmel Bay, and Point Lobos are designated as ASBS and are located near Monterey Bay within the boundaries of MBNMS (SWRCB, 2013a). **Table 4.3-3** below lists the water bodies in the project area described above along with beneficial uses identified by the Central Coast RWQCB.

TABLE 4.3-3
DESIGNATED BENEFICIAL USES OF SURFACE WATER BODIES IN THE PROJECT VICINITY

	Beneficial Uses																			
Water Bodies	**MUN**	**AGR**	**GWR**	**IND**	**COMM**	**SHELL**	**COLD**	**EST**	**MIGR**	**RARE**	**SPWN**	**BIOL**	**WARM**	**WILD**	**REC-1**	**REC-2**	**NAV**	**MAR**	**FRSH**	**ASBS**
Salinas Reclamation Canal					X								X	X	X	X				
Tembladero Slough					X	X		X		X	X		X	X	X	X				
Old Salinas River Estuary					X	X	X	X	X	X	X	X	X	X	X	X				
Salinas River Lagoon (North)					X	X	X	X	X	X	X	X	X	X	X	X				
Pacific Ocean (Monterey Bay)				X	X	X			X	X	X			X	X	X	X	X		X
Carmel River	X	X	X	X	X		X		X	X	X	X	X	X	X	X			X	
Carmel River Estuary			X		X	X	X	X	X	X	X	X		X	X	X				
Carmel Bay				X	X	X				X					X	X		X		X

ACRONYMS:

MUN – Municipal and Domestic Supply
IND – Industrial Service Supply
COLD – Cold Freshwater Habitat
REC-2 – Non-Contact Water Recreation
FRSH – Freshwater Replenishment
REC-1 – Water Contact Recreation
SPWN – Spawning, Reproduction, and/or Early Development
BIOL – Preservation of biological Habitats of Special Significance
AGR – Agricultural Supply
COMM – Ocean, Commercial, and Sport Fishing
MIGR – Migration of Aquatic Organisms,
RARE – Preservation of Rare and Endangered Species
ASBS – Areas of Special Biological Significance
WARM – Warm Freshwater Habitat
GWR – Groundwater Recharge
SHELL – Shellfish Harvesting
EST – Estuarine Habitat
WILD – Wildlife Habitat
NAV – Navigation

SOURCE: RWQCB, 2011b; 2014.

The recently amended Ocean Plan also contains the following four primary components intended to control potential adverse impacts on marine life associated with desalination facility intakes using seawater as source water and brine discharges (SWRCB, 2015; 2016):

1. Clarify SWRCB's authority over desalination facility intakes and discharges;
2. Provide guidance to the regional water boards regarding the determination required by Water Code section 13142.5 (b) for the evaluations of the best available site, design, technology, and mitigation measures to minimize the intake and mortality of marine life at new or expanded desalination facilities.
3. A narrative receiving water limitation for salinity applicable to all desalination facilities to ensure that brine discharges to marine waters meet the biological characteristics' narrative water quality objective[18] and do not cause adverse effects to aquatic life beneficial uses.
4. Monitoring and reporting requirements that include effluent monitoring, as well as monitoring of the water column bottom sediments and benthic community health to ensure that the effluent plume is not harming aquatic life beyond the brine mixing zone (BMZ).

[18] The 2016 Ocean Plan Section II. E (biological characteristics water quality objective) requires that, "marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded."

To inform the recent amendments to the Ocean Plan, the SWRCB contracted with the Southern California Coastal Water Research Project to evaluate methods of brine disposal and monitoring strategies, which resulted in a technical report on *Management of Brine Discharges to Coastal Waters* (SWRCB, 2012a). Additionally, the amendments to the Ocean Plan were assessed in a SWRCB staff report analyzing desalination facility intakes and brine discharges (SWRCB, 2015). The SWRCB (2015) staff report assessed the proposed Ocean Plan amendments and provides the rationale for how implementing such measures reduce potential environmental impacts from desalination facilities. As discussed in Section 4.3.2.1, above, the Ocean Plan requirements pertaining to desalination facilities are substantially consistent with the recommendations described in the *Guidelines for Desalination Plants in Monterey Bay National Marine Sanctuary* (MBNMS 2010) for siting and operating a desalination facility within MBNMS to reduce, avoid, and minimize impacts on sanctuary resources.

The SWRCB (2015) states, "subsurface intakes extract marine water from beneath the ground, filtering the seawater through the geological features of the sea floor. Because the water is naturally filtered as it moves through sediments, it generally contains lower levels of contaminants such as suspended solids, silts, organic contaminants, oil, and grease. Similarly, subsurface intakes provide a natural barrier to suspended sediments … dissolved or suspended organic compounds …debris, or oil or chemical spills…. This gives subsurface intakes a significant environmental advantage over surface water intakes because mitigation for surface intake entrainment has to occur throughout the operational lifetime of the facility." Such findings are also relevant to the water quality or the constituent concentrations found in Monterey Bay where the seawater extracted from the bay through the subsurface intakes would be used as source water for the MPWSP Desalination Plant. The SWRCB acknowledges that slant wells also minimize aboveground shoreline structures and can provide substantially greater length of well screen in the target aquifer, an important advantage when there is limited aquifer thickness (SWRCB, 2015). The SWRCB recommends the option of using subsurface intakes as its preferred technology and allowing surface water intakes where subsurface intakes are found infeasible (SWRCB, 2015). These recommendations are reflected in the current requirements of the 2016 Ocean Plan for new desalination facilities along the California coast (discussed below).

Concerning brine discharge from a desalination plant, the Ocean Plan requires an owner or operator to first evaluate the availability and feasibility of diluting brine by commingling it with wastewater. If wastewater is unavailable, then multiport diffusers are the next preferred method of brine disposal (SWRCB, 2016). Consistent with such measures, the brine discharge from the MPWSP Desalination Plant is proposed to be discharged through a multiport diffuser of an existing outfall and commingled with the MRWPCA wastewater that is currently discharged through the outfall whenever the wastewater is available (see the water quality impact related to the brine discharge in Section 4.3.5 Direct and Indirect Effects of the Proposed Project).

Ocean Plan Water Quality Objectives

To protect the beneficial uses of the surface water bodies shown in **Table 4.3-3**, the Ocean Plan establishes water quality objectives for bacterial, physical, chemical, biological, and radioactive constituents (**Table 4.3-4**). The Ocean Plan water quality objectives are to be met after the initial dilution of a discharge into the ocean. The Ocean Plan defines initial dilution as the process which results in the rapid and irreversible turbulent mixing of wastewater with ocean water around the point of discharge. Initial dilution occurs in an area known as the zone of initial dilution (ZID), within which the density of the discharge is substantially different from that of the receiving water. Typically, constituent concentrations are permitted to exceed water quality objectives within the ZID, which is limited in size. Thus, in the case of MPWSP, the Ocean Plan water quality objectives would apply to the edge of the ZID (Flow Science, Inc., 2014 in **Appendix D2**). Dilution occurring within the ZID from an operational discharge is conservatively calculated as the minimum probable initial dilution (Dm). The water quality objectives established in the Ocean Plan are considered in the context of the calculated Dm to derive the NPDES effluent limits for a wastewater discharge in-pipe (i.e., prior to ocean dilution).

For typical wastewater discharges, the ZID is the zone adjacent to the discharge point where momentum and buoyancy-driven mixing produces rapid dilution of the discharged effluent (Flow Science, Inc., 2014; SWRCB, 2012a). Municipal wastewater effluent, being effectively freshwater, is less dense than seawater and thus rises (due to buoyancy) while it mixes with ocean water, whereas desalination brine, when discharged directly, is more dense than seawater and thus sinks while it mixes with ocean water. The mixing and dilution are also affected by the density of the effluent being discharged. **Figure 4.3-4** illustrates the likely trajectories of positively and negatively buoyant effluent plumes from a horizontal discharge (such as that proposed as part of the MPWSP) for illustrative purposes. As effluent travels away from the discharge port, it entrains ambient seawater, which increases the diameter of the plume and decreases the plume concentration. Thus, the edge of the ZID depends, in part, on the discharge plume density. If the effluent density is lower than the ambient salinity, it rises and becomes a buoyant plume (see **Figure 4.3-4a**). Here, the edge of the ZID is located at the point where the effluent plume reaches the water surface or attains a depth level where the density of the diluted effluent plume becomes the same as the density of ambient water (i.e., the “trap” level). The effluent plume spreads within and beyond the trap level and forms a rising plume. If the effluent density is greater than the ambient salinity, it produces a negatively buoyant plume that sinks toward the seabed (see **Figure 4.3-4b**). In this case, the edge of the ZID is located at the point where the discharge plume contacts the sea floor.

In addition to establishing water quality objectives, the Ocean Plan lays out the implementation provisions with an equation to derive constituent concentrations that are compared with the water quality objectives. The constituent concentrations are calculated using the background concentrations of the constituents as one of the factors.[19] The background concentrations are provided for only five constituents: arsenic, copper, mercury, silver, and zinc; and for other constituents it is assumed to be zero (SWRCB, 2016).

[19] The calculation also uses the constituent concentrations and dilution factor estimated for the discharge that is studied.

TABLE 4.3-4
WATER QUALITY OBJECTIVES IN THE 2016 OCEAN PLAN

Water Quality Objectives for Protection of Marine Life

	Units of Measurement	Limiting Concentrations		
		6-month Median	Daily Maximum	Instantaneous Maximum
Arsenic	µg/L	8	32	80
Cadmium	µg/L	1	4	10
Chromium (Hexavalent)	µg/L	2	8	20
Copper	µg/L	3	12	30
Lead	µg/L	2	8	20
Mercury	µg/L	0.04	0.16	0.4
Nickel	µg/L	5	20	50
Selenium	µg/L	15	60	150.
Silver	µg/L	0.7	2.8	7
Zinc	µg/L	20	80	200
Cyanide	µg/L	1	4	10
Total Chlorine Residual	µg/L	2	8.0	60
Ammonia (expressed as Nitrogen)	µg/L	600	2400	6000
Acute Toxicity	TUa	N/A	0.3	N/A
Chronic Toxicity	TUc	N/A	1	N/A
Phenolic Compounds (non-chlorinated)	µg/L	30	120	300
Chlorinated Phenolics	µg/L	1	4	10
Endosulfan	µg/L	0.009	0.018	0.027
Endrin	µg/L	0.002	0.004	0.006
HCH	µg/L	0.004	0.008	0.012
Radioactivity	Not to exceed limits specified in Tile 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30253 of the California Code of Regulations.			

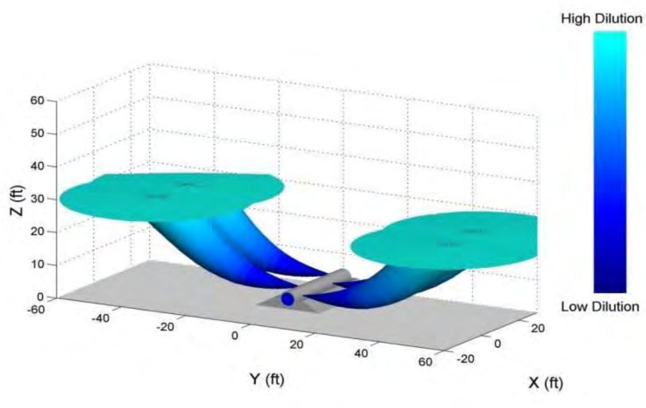
Water Quality Objectives for Protection of Human Health-Noncarcinogens

Chemical	30-day Average (micrograms per liter or µg/L)	
	Decimal Notation	Scientific Notation
acrolein	220	2.2×10^{2}
antimony	1,200	1.2×10^{3}
bis(2-chloroethoxy) methane	4.4	4.4×10^{0}
bis(2-chloroisopropyl) ether	1,200	1.2×10^{3}
chlorobenzene	570	5.7×10^{2}
chromium (III)	190,000	1.9×10^{5}
di-n-butyl phthalate	3,500	3.5×10^{3}
dichlorobenzenes	5,100	5.1×10^{3}
diethyl phthalate	33,000	3.3×10^{4}
dimethyl phthalate	820,000	8.2×10^{5}
4,6-dinitro-2-methylphenol	220	2.2×10^{2}
2,4-dinitrophenol	4.0	4.0×10^{0}
ethylbenzene	4,100	4.1×10^{3}
fluoranthene	15	1.5×10^{1}
hexachlorocyclopentadiene	58	5.8×10^{1}
nitrobenzene	4.9	4.9×10^{0}
thallium	2	$2. \times 10^{0}$
toluene	85,000	8.5×10^{4}
tributyltin	0.0014	1.4×10^{-3}
1,1,1-trichloroethane	540,000	5.4×10^{5}

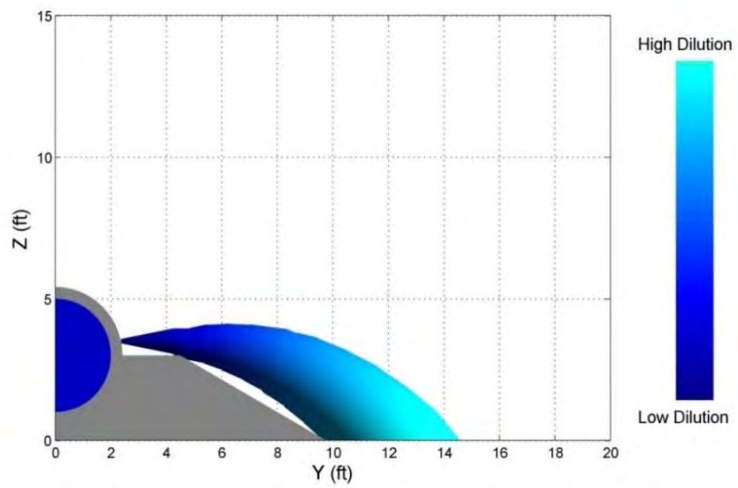
TABLE 4.3-4 (Continued)
WATER QUALITY OBJECTIVES IN THE 2016 OCEAN PLAN

Water Quality Objectives for Protection of Human Health-Carcinogens		
Chemical	30-day Average (micrograms per liter or µg/L)	
	Decimal Notation	Scientific Notation
acrylonitrile	0.10	1.0×10^{-1}
aldrin	0.000022	2.2×10^{-5}
benzene	5.9	5.9×10^{0}
benzidine	0.000069	6.9×10^{-5}
beryllium	0.033	3.3×10^{-2}
bis(2-chloroethyl) ether	0.045	4.5×10^{-2}
bis(2-ethylhexyl) phthalate	3.5	3.5×10^{0}
carbon tetrachloride	0.90	9.0×10^{-1}
chlordane	0.000023	2.3×10^{-5}
chlorodibromomethane	8.6	8.6×10^{0}
chloroform	130	1.3×10^{2}
DDT	0.00017	1.7×10^{-4}
1,4-dichlorobenzene	18	1.8×10^{1}
3.3'-dichlorobenzidine	0.0081	8.1×10^{-3}
1,2-dichloroethane	28	2.8×10^{1}
1,1-dichlorethylene	0.9	9×10^{-1}
dichlorobromomethane	6.2	6.2×10^{0}
dichloromethane	450	4.5×10^{2}
1,3-dichloropropene	8.9	8.9×10^{0}
dieldrin	0.00004	4.0×10^{-5}
2,4-dinitrotoluene	2.6	2.6×10^{0}
1,2-diphenylhydrazine	0.16	1.6×10^{-1}
halomethanes	130	1.3×10^{2}
heptachlor	0.00005	5×10^{-5}
heptachlor epoxide	0.00002	2×10^{-5}
hexachlorobenzene	0.00021	2.1×10^{-4}
hexachlorobutadiene	14	1.4×10^{1}
hexachloroethane	2.5	2.5×10^{0}
isophorone	730	7.3×10^{2}
N-nitrosodimethylamine	7.3	7.3×10^{0}
N-nitrosodi-N-propylamine	0.38	3.8×10^{-1}
N-nitrosodiphenylamine	2.5	2.5×10^{0}
Polyaromatic hydrocarbons (PAHs)	0.0088	8.8×10^{-3}
Polychlorinated biphenyls (PCBs)	0.000019	1.9×10^{-5}
TCDD equivalents	0.0000000039	3.9×10^{-9}
1,1,2,2-tetrachloroethane	2.3	2.3×10^{0}
tetrachloroethylene	2.0	2.0×10^{0}
toxaphene	0.00021	2.1×10^{-4}
trichloroethylene	27	2.7×10^{1}
1,1,2-trichloroethane	9.4	9.4×10^{0}
2,4,6-trichlorophenol	0.29	2.9×10^{-1}
vinyl chloride	36	3.6×10^{1}

SOURCE: SWRCB, 2016.



(a) Illustration of a Rising Plume



(b) Illustration of a Sinking Plume

SOURCE: Flow Science, Inc., 2014 (see Appendix D2)

Figure 4.3-4
Illustrations of the Trajectory and Behavior of a Brine Discharge Plume

As discussed under Other Constituents in Section 4.3.1.3, Surface Water Quality, above, near-shore water quality in Monterey Bay is monitored by the Central Coast Long-term Environmental Assessment Network (CCLEAN). The CCLEAN program design includes some, but not all constituents that are regulated by the Ocean Plan (listed in **Table 4.3-4**). A review of the most recent monitoring data reported under CCLEAN for the past 8 years (2008-2015) indicates exceedances of maximum concentrations of several constituents over the water quality objectives listed in **Table 4.3-4**. **Table 4.3-5** below summarizes exceedances (denoted in bold) of Ocean Plan water quality objectives listed in **Table 4.3-4** documented under baseline conditions under CCLEAN. Aldrin was not detected.

TABLE 4.3-5
WATER QUALITY IN MONTEREY BAY
(CONSTITUENT CONCENTRATIONS REPORTED UNDER CCLEAN 2008-2015)

Constituent	Reported Average Concentration (µg/L)*	Reported Maximum Concentration (µg/L)*	Ocean Plan Water Quality Objectives (µg/L)
Endosulfan	0.0000039	0.0000390	0.009 (6-month median)
Endrin	0.0000006	0.0000160***	0.002 (6-month median)
HCH	0.0001679	0.0003930	0.004 (6-month median)
Fluoranthene	0.0003068	0.0010800	15 (6-month median)
Aldrin**	0.0000000	0.0000000**	0.000022 (30-day average)
Chlordane	0.0000155	**0.0001140**	0.000023 (30-day average)
DDT	0.0000548	**0.0003190**	0.00017 (30-day average)
Dieldrin	0.0000168	**0.0000510**	0.00004 (30-day average)
Heptachlor	0.0000003	0.0000050	0.00005 (30-day average)
Polyaromatic hydrocarbons (PAHs)	0.0000007	0.0000050	0.0088 (30-day average)
Polychlorinated biphenyls (PCBs)	**0.0023236**	**0.0069071**	0.000019 (30-day average)
Toxaphene**	0.0001414	**0.0012139*****	0.00021 (30-day average)

NOTES:
* Concentrations higher than the Ocean Plan water quality objectives in Table 4.3-4, above, **are shown in bold**.
** Aldrin was not detected.
*** Endrin and Toxaphene were detected in 1 and 2 samples, respectively.

SOURCE: CCLEAN, 2016.

As shown in **Table 4.3-5**, maximum concentrations detected in Monterey Bay for chlordane, dieldrin, DDT, and both average and maximum concentrations of PCBs currently exceed the Ocean Plan water quality objectives. In the case of endrin, aldrin, and toxaphene, the actual average and maximum concentrations are shown. In the case of toxaphene, the average value of the range of reporting limits used also exceeded the water quality objectives. In summary, the background concentrations or ambient levels of constituents in Monterey Bay vary with time. The exceedances in **Table 4.3-5** are used as a conservative estimate using representative data and are considered as baseline or existing water quality conditions in the bay in the impact analysis discussed in Section 4.3.5 Direct and Indirect Effects of the Proposed Project, below. Operational discharges of the MPWSP under certain scenarios would be potentially inconsistent with the provisions of the Ocean Plan water quality objectives because, in the absence of mitigation measures, the brine may exceed water quality objective thresholds at the edge of the ZID. This issue is discussed further in Impact 4.3-5.

Ocean Plan Salinity Requirements

The current Ocean Plan includes new requirements to address brine discharges from desalination facilities along the California coast. The most relevant of these to the proposed MPWSP is contained in Section III.M.3, "Receiving Water Limitation for Salinity". The receiving water limitation for salinity requires that discharges not exceed a daily maximum of two (2) parts per thousand (ppt) above natural background salinity measured no further than 100 meters (328 ft) horizontally from each discharge point, representing the Brine Mixing Zone (BMZ)[20] the actual shape of which is determined by the diffuser. The value of 2 ppt represents the maximum incremental increase above natural background salinity allowed at the edge of the BMZ. There is no vertical limit to this zone and to determine the effluent limit necessary to meet the receiving water limitation, the Ocean Plan includes a required methodology for brine discharges. In addition, the owner or operator of a desalination facility must meet the dilution standard at the edge of the BMZ or minimum initial dilution (Dm; discussed above), whichever is smaller. Dilution must be determined using applicable water quality models that have been approved by the regional water boards in consultation with State Water Board staff. Operational discharges of the MPWSP would be consistent with the provisions of the Ocean Plan salinity requirements because all operational discharge scenarios would be below the specified maximum incremental increase of 2 ppt above natural background salinity allowed at the edge of the BMZ (see **Impact 4.3-4** for details).

Ocean Plan Monitoring Requirements

Included in the recent amendments to the Ocean Plan is the requirement for a monitoring and reporting program (Section III.M.4, "Monitoring and Reporting Program"; SWRCB, 2016). The monitoring requirements for operation of a new desalination facility are such that the owner or operator of a desalination facility must submit a Monitoring and Reporting Program to the regional water board for approval. The Monitoring and Reporting Program must include provisions for monitoring of effluent and receiving water characteristics and impacts on all forms of marine life. The Monitoring and Reporting Program must, at a minimum, include monitoring for benthic community health, aquatic life toxicity, hypoxia, and receiving water characteristics. Further, the Monitoring and Reporting Program must be consistent with the standard monitoring procedures detailed in Appendix III of the Ocean Plan, which specifies monitoring plan framework, scope, and methodological design and additional details for determining compliance with the receiving water limitation in chapter III.M.3. Additionally, receiving water monitoring for salinity must be conducted at times when the monitoring locations detailed in the Monitoring and Reporting Program are most likely affected by the discharge.

Monitoring requirements in the Ocean Plan that are relevant to the operation of the MPWSP also require an owner or operator to perform facility-specific monitoring to demonstrate compliance with the receiving water limitation for salinity (described above), and to evaluate the potential effects of the discharge within the water column, bottom sediments, and the benthic communities. Baseline biological conditions must be established at the discharge location as well as at a reference location outside the influence of the discharge prior to commencement of construction. To achieve this requirement, the owner or operator is required to conduct biological surveys (e.g.,

[20] At the time of publication of the April 2015 Draft EIR the Ocean Plan did not include a water quality objective for elevated salinity levels from operation of a desalination facility. As such, the analysis of salinity related water quality impacts was based on determining salinity increases at the edge of the ZID, as is done for other water quality constituents. Subsequent to the publication of the April 2015 Draft EIR, the Ocean Plan was amended to include a salinity standard, compliance with which is determined at the edge of the BMZ.

Before-After Control-Impact studies) that evaluate the differences between biological communities at a reference site and at the discharge location before and after the discharge commences. The pertinent regional water board uses the data and results from the surveys and any other applicable data for evaluating and renewing the requirements set forth in a facility's NPDES permit (in the case of the proposed project, the MRWPCA's outfall). Such monitoring is required to continue until the RWQCB and MBNMS determines that a regional monitoring program is adequate to ensure compliance with the receiving water limitation. The Monitoring and Reporting Plan would require review and approval by the RWQCB and MBNMS prior to implementation of the MPWSP, and would be revised if necessary, as part of the NPDES permit process. The MPWSP would be consistent with the Monitoring and Reporting Plan requirements of the Ocean Plan because such requirements form a part of the NPDES permit process and, further, CalAm would submit and, once approved by the RWQCB and MBNMS, execute a facility-specific Monitoring and Reporting Plan.

Thermal Plan

The *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California* (or Thermal Plan) adopted by the SWRCB in 1995 establishes temperature requirements for existing and new discharges in California coastal waters, interstate waters, enclosed bays, and estuaries. Water quality objectives for existing discharges into coastal waters require that wastes with elevated temperature comply with limitations necessary to assure protection of the beneficial uses and ASBSs (see also the discussion of the Waste Discharge Requirements for the Monterey Regional Water Pollution Control Agency Treatment Plant [Order No. R3-2014-0013, NPDES Permit No. CA0048551], below, for discharges of treated wastewater from the Regional Wastewater Treatment Plant to Monterey Bay). The Thermal Plan defines new discharges as "discharges that are not presently taking place" and elevated-temperature wastes as "liquid, solid, or gaseous material including thermal waste[21] discharged at a temperature higher than the natural temperature of receiving water". The Thermal Plan establishes the following standards for all new discharges (SWRCB, 1995):

- The maximum temperature of thermal waste discharges shall not exceed the natural temperature of receiving waters by more than 20°F.
- The discharge of elevated temperature wastes shall not result in increases in the natural water temperature exceeding 4°F at the shoreline, the surface of any ocean substrate, or the ocean surface beyond 1,000 feet from the discharge system. The surface temperature limitation shall be maintained at least 50 percent of the duration of any complete tidal cycle.

During the non-irrigation season, the brine from the MPWSP Desalination Plant could be blended with treated wastewater from the MRWPCA's Regional Wastewater Treatment Plant, if available, prior to discharge via the MRWPCA outfall into Monterey Bay. The temperature requirements above are included in the MRWPCA's NPDES Permit (R3-2014-0013), discussed below, and would apply to brine-only discharges from the MPWSP Desalination Plant (during

[21] Cooling water and industrial process water used for the purpose of transporting waste heat.

periods when there is no wastewater available for blending), as well as combined discharges (when the brine would be blended with the treated wastewater). Operational discharges of the MPWSP would be consistent with the provisions of the thermal plan because MPWSP operational discharges would not operate in combination with a power plant or other operation requiring use of ocean waters for cooling for thermal control. As such, there would be no heating mechanism or any process that would increase the temperature of the source water as it passes through the treatment units.

Anti-Degradation Policy

The SWRCB Anti-Degradation Policy, formally known as the Statement of Policy with Respect to Maintaining High Quality Water in California (SWRCB Resolution No. 68-16), restricts degradation of surface and ground waters. Specifically, this policy protects water bodies where existing quality is higher than necessary for the protection of beneficial uses and requires that existing high quality be maintained to the maximum extent possible.

Under the Anti-Degradation Policy, any actions that can adversely affect water quality in all surface and ground waters must: (1) be consistent with maximum benefit to the people of California; (2) not unreasonably affect present and anticipated beneficial use of the water; and (3) not result in water quality less than that prescribed in water quality plans and policies. Furthermore, any actions that can adversely affect surface waters are also subject to the federal Anti-Degradation Policy (40 CFR Section 131.12) developed under the CWA. Operational discharges of the MPWSP would be consistent with the provisions of the SWRCB Anti-Degradation Policy because discharges from the proposed project that could affect surface water quality would be required to comply with the Anti-Degradation Policy, which is included as part of the NPDES permit requirements for point discharges (discussed below).

Nonpoint Source Pollution Control Program

In accordance with Section 319 of the Clean Water Act and Section 6217 of the CZARA of 1990, SWRCB and the California Coastal Commission jointly submitted the Plan for California's Nonpoint Source (NPS) Pollution Control Program to the USEPA and NOAA on February 4, 2000. The NPS Pollution Control Program provides a single unified, coordinated statewide approach to address nonpoint source pollution (USEPA, 2012). A total of 28 state agencies are working collaboratively through the Interagency Coordinating Committee to implement the NPS Pollution Control Program. California's Critical Coastal Areas (CCA) Program is a non-regulatory planning tool to foster collaboration among local stakeholders and government agencies, to better coordinate resources and focus efforts on coastal-zone watershed areas in critical need of protection from polluted runoff. A coastal area is designated as a CCA if it: has a 1998 303(d)-listed impaired coastal water body that flows into a Marine Managed Areas; flows into a Wildlife Refuge or Waterfront Park/Beach; flows into an Area of Special Biological Significance;[22] or was on the original 1995 CCA list, which is comprised of watersheds that flow into an 1994 303(d)-listed

[22] There are 34 ASBS ocean areas along the California coast monitored and maintained for water quality under the regulatory authority of the SWRCB.

impaired bay or estuary. The CCAs in the project area and vicinity include the Old Salinas River Estuary, Salinas River, Carmel Bay, Point Lobos, and Pacific Grove (CCC, 2012).

Central Coast Water Quality Control Plan (Basin Plan)

The *Water Quality Control Plan for the Central Coast* (or Basin Plan) prepared by the Central Coast RWQCB (2011b) identifies the designated beneficial uses of surface waters in the Central Coast region (see **Table 4.3-3**). The Basin Plan establishes quantitative and qualitative water quality objectives for protection of the beneficial uses, and establishes policies to guide the implementation of these water quality objectives. In addition to the water quality objectives in the Ocean Plan (see **Table 4.3-4**, above), the following objectives of the Basin Plan apply to all ocean waters, including Monterey Bay and Carmel Bay:

- **Dissolved Oxygen:** The mean annual dissolved oxygen concentration shall not be less than 7.0 mg/L, nor shall the minimum dissolved oxygen concentration be reduced below 5.0 mg/L at any time.
- **pH:** The pH value shall not be depressed below 7.0, nor raised above 8.5.
- **Radioactivity:** Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life; or result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life.

The water quality objectives are incorporated in the individual NPDES permits. For example, the MRWPCA’s NPDES Permit No. CA0048551 (Order No. R3-2014-0013) for discharges of treated wastewater from the Regional Wastewater Treatment Plant to Monterey Bay would be amended to include the brine discharge resulting from the proposed project.

NPDES Waste Discharge Program

In California, administration of the NPDES program has been delegated by the US EPA to the State Board. Through the RWQCBs, point source dischargers are required to obtain NPDES permits (or, in California under authority of Porter-Cologne, Waste Discharge Requirements). Point sources include municipal and industrial wastewater facilities and stormwater discharges. There are two types of NPDES permits: individual permits tailored to an individual facility and general permits that cover multiple facilities within a specific category. Effluent limitations serve as the primary mechanism in NPDES permits for controlling discharges of pollutants to receiving waters. When developing effluent limitations for an NPDES permit, a permit applicant must consider limits based on both the technology available to control the pollutants (i.e., technology-based effluent limits) and limits that are protective of the water quality standards of the receiving water (i.e., water quality-based effluent limits if technology-based limits are not sufficient to protect the water body). For inland surface waters and enclosed bays and estuaries, the water-quality-based effluent limitations are based on criteria in the National Toxics Rule and the California Toxics Rule, and objectives and beneficial uses in the Basin Plan. For ocean discharges, the Ocean Plan contains beneficial uses, water quality objectives, and effluent limitations (described in detail above). NPDES permits for discharges into Monterey Bay must be authorized by MBNMS.

NPDES Construction General Permit

The State of California adopted a revised Construction General Permit on September 2, 2009 (Order No. 2009-0009-DWQ as amended by 2010-0014-DWQ and 2012-0006-DWQ) (General Construction NPDES Permit). The General Construction NPDES Permit regulates construction site storm water management. Dischargers whose projects disturb one or more acres of soil, or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the general permit for discharges of stormwater associated with construction activity. The proposed project would be required to comply with the permit requirements to control stormwater discharges from the construction sites. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation, as well as construction of buildings and linear underground projects (LUP), including installation of water pipelines and other utility lines. Portions of the proposed project would fall under the Type 1 LUP category if the following conditions are met:

a) Construction occurs on unpaved improved roads, including their shoulders or land adjacent to them;

b) The areas disturbed during a single construction day are returned to their preconstruction condition, or to an equivalent condition (i.e., disturbed soils such as those from trench excavation are hauled away, backfilled into the trench, and/or placed in spoils piles and covered with plastic), at the end of that same day;

c) Vegetated areas disturbed by construction activities are stabilized and revegetated at the end of the construction period; and

d) When required, adequate temporary soil stabilization best management practices (BMPs) are installed and maintained until vegetation has reestablished to meet the permit's minimum cover requirements for final stabilization.

In the project area, the Construction General Permit is implemented and enforced by the Central Coast RWQCB, which administers the stormwater permitting program. To obtain coverage under this permit, project operators must electronically file Permit Registration Documents, which include a Notice of Intent, a Stormwater Pollution Prevention Plan (SWPPP), and other compliance-related documents. An appropriate permit fee must also be mailed to SWRCB. The SWPPP identifies BMPs that must be implemented to reduce construction effects on receiving water quality based on potential pollutants. The BMPs identified are directed at implementing both sediment and erosion control measures and other measures to control potential chemical contaminants. In addition, the SWPPP is required to contain a visual monitoring program and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Examples of typical construction BMPs include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing and fueling. The SWPPP also includes descriptions of the BMPs to reduce pollutants in stormwater discharges after all construction phases have been completed at the site (post-construction BMPs). Dischargers are responsible for notifying the RWQCB of violations or incidents of non-compliance, as well as for submitting annual reports identifying deficiencies of the BMPs and how the deficiencies were corrected.

The Construction General permit includes several new requirements (as compared to the previous Construction General Permit, 99-08-DWQ), including risk-level assessment for construction sites, an active storm water effluent monitoring and reporting program during construction (for Risk Level II and III sites), rain event action plans for certain higher risk sites, and numeric effluent limitations (NELs) for pH and turbidity as well as requirements for qualified professionals that prepare and implement the plan. The risk assessment and SWPPP must be prepared by a state-qualified SWPPP Developer and implementation of the SWPPP must be overseen by a state-qualified SWPPP Practitioner.

RWQCB Dewatering Requirements

NPDES General Permit for Discharges with Low Threat to Water Quality

Construction of the proposed facilities would require excavation and trenching activities. Such activities in areas with shallow groundwater or that are located adjacent to surface water bodies could require dewatering to create a dry area. Discharges of dewatering effluent to the local stormwater drainage system or to vegetated upland areas are conditionally exempt provided they meet the water quality criteria in the General Waste Discharge Requirements (General WDRs). The RWQCB requires that the dewatering effluent be tested for possible pollutants; the analytical constituents for these tests are generally determined based on the source of the water, the land use history of the construction site, and the potential for the effluent to impact the quality of the receiving water body.

The *General WDRs NPDES General Permit for Discharges with Low Threat to Water Quality* (Order No. R3-2011-0223, NPDES No. CAG993001) (RWQCB, 2011a) applies to low-threat discharges, which are defined as discharges containing minimal amounts of pollutants and posing little or no threat to water quality and the environment. Discharges that meet the following criteria are covered under this permit:

a) Pollutant concentrations in the discharge do not: (1) cause, (2) have a reasonable potential to cause, or (3) contribute to an excursion above any applicable water quality objectives, including prohibitions of discharge;

b) The discharge does not include water added for the purpose of diluting pollutant concentrations;

c) Pollutant concentrations in the discharge will not cause or contribute to degradation of water quality or impair beneficial uses of receiving waters;

d) Pollutant concentrations in the discharge do not exceed the limits in the permit unless the Executive Officer determines that the applicable water quality control plan (i.e., Ocean Plan and/or State Implementation Policy) does not require effluent limits;

e) The discharge does not cause acute or chronic toxicity in receiving waters; and

f) The discharger demonstrates the ability to comply with the requirements of this General Permit.

The project-related discharges that could fall under the General WDRs include: discharges of dewatering effluent; water produced from one-time draining of existing pipelines to construct new connections; and disinfection water from these same existing pipelines and newly constructed pipelines before being put into service, all of which could be discharged to vegetated upland areas or to the local stormwater drainage system. These discharges may be treated and discharged on a continuous or a batch basis. For discharges from construction sites smaller than one acre that are part of a larger common plan of development or that may cause significant water quality impacts, the discharge may require coverage under the construction stormwater permit or an individual NPDES permit.

Waiver of Waste Discharge Requirements

California Water Code Section 13269 authorizes the Central Coast RWQCB to waive WDRs for specific discharges or specific types of discharges where such a waiver is consistent with any applicable state or regional water quality control plan and is in the public interest. The *General Waiver of WDRs for Specific Types of Discharges* (Resolution R3-2014-0041) (General Waiver) (RWQCB, 2014) contains specific conditions for the specific discharges and is consistent with the Central Coast Basin Plan. Waivers may be granted for discharges to land and may not be granted for discharges to surface waters or conveyances there to that are subject to the federal CWA requirements for NPDES permits.

Under the MPWSP, drilling fluids, such as water, bentonite mud, or environmentally inert biodegradable additives, would be used for well construction. The threat to water quality of such materials depends primarily on the additives used. If the drilling fluids are free of appreciable additives (additive quantities in conformance with industry standards), the used slurry may be spread on pastures or fields, provided that contact with surface water is avoided and runoff is prevented (RWQCB, 2014). The muds and clay slurry generated during the drilling and development of the subsurface slant wells and the proposed ASR-5 and ASR-6 Wells in the Fitch Park military housing area would fall under the category of "Water Supply Well Drilling Muds" in the General Waiver.

The water extracted during well development falls under the category of "water supply discharges" in the General Waiver (RWQCB, 2014). Water supply discharges that would occur under the proposed project include all water produced during drilling and development of the subsurface slant wells and ASR-5 and ASR-6 Wells. Under the General Waiver, these discharges would be waived from WDRs and from the requirement of submitting a waste discharge report; however, they would be subject to the following conditions (RWQCB, 2014).

Water Supply Well Drilling Muds:

a) The discharge shall be spread off-site on Army property over an undisturbed, vegetated area capable of absorbing the top-hole water and filtering solids in the discharge, and spread in a manner that prevents a direct discharge to surface waters.

b) The pH of the discharge shall be between 6.5 and 8.3.

c) The discharge shall not contain oil or grease[23].

d) The discharge area shall not be within 100 feet of a stream, body of water, or wetland, nor within streamside riparian corridors.

Water Supply Discharges:

a) The discharger shall implement appropriate management practices to dissipate energy and prevent erosion.

b) The discharger shall implement appropriate management practices to preclude discharge to surface waters and surface water drainage courses. The discharger shall immediately notify the Central Coast RWQCB staff of any discharge to surface waters or surface water drainage courses.

c) The discharge shall not have chlorine or bromine concentrations that could impact groundwater quality.

d) The discharge area shall not be located within 100 feet of a stream, body of water, or wetland, nor within streamside riparian corridors.

However, the MPWSP would not be inconsistent with such requirements as all drilling fluids would be recirculated into and out of the borings using a mud tank located next to the drill rig. Drill cuttings would be removed from the drilling mud using a shaker table and then the drilling mud would be re-used. Once the drill bit reaches groundwater, the construction contractor would pump out all of the drilling fluid slurry and put it in a storage container for offsite hauling and disposal.

NPDES Municipal Stormwater Permit

The NPDES General Permit for (WDRs for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4s) (Order No. 2013-0001-DWQ, NPDES No. CAS000004) regulates stormwater discharges from small Municipal Separate Storm Sewer Systems (MS4) into waters of the U.S. (SWRCB, 2013b). An "MS4" is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains): (i) designed or used for collecting or conveying stormwater; (ii) which is not a combined sewer; and (iii) which is not part of a Publicly Owned Treatment Works as defined at Title 40 of the Code of Federal Regulations (CFR) Section 122.2 (MRSWMP, 2011).

The Phase II Municipal General Permit requires regulated small MS4s to develop and implement BMPs, measurable goals, and timetables for implementation, designed to reduce the discharge of pollutants to the maximum extent practicable and to protect water quality.[24] The permittees under

23 Oil and grease includes hydraulic fluids.
24 Phase I stormwater permits provide permit coverage for medium (serving between 100,000 and 250,000 people) and large (serving 250,000 people) municipalities.

the small MS4 (Phase II) General Permit[25] in the project area include Monterey County and cities therein. Additionally, the Presidio of Monterey is a Phase II non-traditional MS4 permittee with requirements applicable within the Ord Military Community in Seaside. Each permittee is required to prepare and implement a stormwater management plan (SWMP) and regulate stormwater runoff from development and redevelopment projects through post-construction stormwater management requirements (RWQCB, 2013).

Several of the proposed facilities such as the subsurface slant wells at CEMEX, the MPWSP Desalination Plant in unincorporated Monterey County, and the ASR-5 and ASR-6 Wells and ASR Conveyance Pipelines in the Presidio of Monterey – Ord Military Community in Seaside would be subject to the stormwater control requirements in the respective local jurisdictions.

A Memorandum of Agreement for the Monterey Regional Stormwater Pollution Prevention Program was prepared and executed by MRWPCA and by the entities in the southern Monterey Bay area (Monterey County and cities of Carmel-by-the-Sea, Del Rey Oaks, Monterey, Pacific Grove, Sand City, and Seaside) to form the Monterey Regional Stormwater Management Program (MRSWMP). MRWPCA acts as the administrative agent for the MRSWMP. The purpose of the MRSWMP is to implement and enforce a series of BMPs to reduce the discharge of pollutants from the MS4s to the "maximum extent practicable," to protect water quality, and to satisfy the appropriate water quality requirements of the CWA (City of Monterey, 2011). The Phase II Program contains six Minimum Control Measures (MRSWMP, 2011):

- Public Education and Outreach;
- Public Participation/Involvement;
- Illicit Discharge Detection and Elimination;
- Construction Site Runoff Control;
- Post-Construction Runoff Control; and
- Pollution Prevention/Good Housekeeping.

The MRSWMP lists BMPs and associated Measurable Goals for the six Minimum Control Measures. The Measurable Goals must include, as appropriate, the months and years for scheduled actions, including interim milestones and frequency of the action. It is through the implementation and evaluation of these BMPs and Measurable Goals that the permittees ensure that the objectives of the Phase II NPDES Program are met (MRSWMP, 2011).

In July 2013, the Central Coast RWQCB adopted Resolution No. R3-2013-0032, which prescribes new Post-Construction Requirements for projects that create or replace 2,500 square feet or more of impervious area and receive their first discretionary approval for design elements after March 6, 2014. **Table 4.3-6** summarizes the new post-construction requirements for different categories of projects, which would include the MPWSP.

[25] Phase II stormwater permits provide permit coverage for smaller municipalities (populations less than 100,000), including non-traditional Small MS4s, which are facilities such as military bases, public campuses, prisons, and hospital complexes.

TABLE 4.3-6
OVERVIEW OF POST-CONSTRUCTION REQUIREMENTS FOR STORMWATER MANAGEMENT

Project Categories	Performance Requirements
Tier 1 Projects Projects that create or replace 2,500 square feet or more of impervious surface.	**Implement One or More Low Impact Design (LID) Measures:** Limit disturbance of natural drainage features. Limit clearing, grading, and soil compaction. Minimize impervious surfaces. Minimize runoff by dispersing runoff to landscape or using permeable pavements.
Tier 2 Projects Projects that create or replace 5,000 square feet or more net impervious surface.	**Tier 1 requirements, plus treat site runoff:** Treat runoff generated by the 85th percentile 24-hour storm event with an approved and appropriately sized LID treatment system prior to discharge from the site.
Tier 3 Projects Projects that create or replace 15,000 square feet or more of impervious surface.	**Tier 2 requirements, plus:** Prevent offsite discharge from events up to the 95th percentile rainfall event using Stormwater Control Measures.
Tier 4 Projects Projects that create or replace 22,500 square feet of impervious surface.	**Tier 3 requirements, plus:** Control peak flows to not exceed pre-project flows for the 2-year through 10-year events.

SOURCE: MRSWMP, 2014.

NPDES Permit for MRWPCA Regional Wastewater Treatment Plant

MRWPCA provides wastewater treatment, disposal, and reclamation services for the cities of Monterey, Pacific Grove, Del Rey Oaks, Sand City, Marina, and Salinas; the Seaside Sanitation District; Castroville, Moss Landing, and Boronda Community Service Districts; and the former Fort Ord military base. Residential, commercial, and industrial wastewater is conveyed to the MRWPCA Regional Wastewater Treatment Plant in Monterey County located 2 miles north of Marina. The MRWPCA Regional Wastewater Treatment Plant has an average dry weather design treatment capacity of 29.6 million gallons per day (mgd) and peak wet weather design capacity of 75.6 mgd (RWQCB, 2014).

In winter months, secondary treated wastewater from the MRWPCA Regional Wastewater Treatment Plant is discharged to Monterey Bay through a diffuser positioned 11,260 feet offshore at a depth of approximately 100 feet. The diffuser is designed to convey ultimate wet weather flows of 81.2 mgd, which is the permitted rate of discharge through the outfall. The treated wastewater discharge is regulated by the RWQCB (2014) under the *Waste Discharge Requirements for the Monterey Regional Water Pollution Control Agency Treatment Plant* (Order No. R3-2014-0013, NPDES Permit No. CA0048551). The minimum initial dilution (Dm) established in the NPDES permit at the point of discharge for operations by the MRWPCA is 1:145 (parts effluent to seawater). The Dm is used by the RWQCB to determine compliance with the water quality effluent limitations established in the NPDES permit for in-pipe water quality (i.e., prior to discharge) that are based on water quality objectives contained in the Ocean Plan.

The effluent limitations in the permit are based on and are consistent with the water quality objectives contained in the Ocean Plan.

In the summer months, up to 29.6 mgd of the secondary treated wastewater from the Regional Wastewater Treatment Plant is conveyed to the Salinas Valley Reclamation Project (SVRP) recycled water plant, where it is tertiary treated[26] and subsequently used for irrigation of 12,000 acres of farmland in the northern Salinas Valley. This reclaimed water is distributed to farmland via the Castroville Seawater Intrusion Project (CSIP) distribution system. The SVRP and CSIP reduce the region's dependence on local groundwater, thereby controlling saltwater intrusion.

The NDPES permit incorporates the Ocean Plan water quality objectives established by the SWRCB in order to ensure the protection of the beneficial uses of Monterey Bay. An amendment to the MRWPCA NPDES Permit to include discharges of brine would be required prior to the implementation of the MPWSP and operation of the MPWSP Desalination Plant. The amendment process for the NPDES Permit would require an extensive water quality assessment, which would involve MRWPCA (as the discharger defined in the current NPDES Permit) and/or CalAm (as a contributor of a new discharge) to perform testing and monitoring of the water quality of the discharges, including the testing of the source water drawn from the subsurface water intake wells and piped to the MPWSP Desalination Plant and assessing the resulting water quality of the discharges from the MPWSP Desalination Plant. Any discharge from the operation of the MPWSP Desalination Plant to Monterey Bay through the MRWPCA outfall would be subject to the Amended NPDES Permit.

As per Section 2c of the NPDES Permit, "prior to increasing the volume of brine waste discharged through the ocean outfall beyond 375,000 gallons average daily flow, the Discharger [i.e., MRWPCA] shall submit a brine waste disposal study to the Executive Officer for approval. The study shall include, at a minimum, the following elements: (1) a projection of the brine volume and characteristics, (2) an assessment of the impact of the increased brine volume on permit compliance, (3) an assessment of the impact of the increased brine volume on the minimum probable initial dilution at the point of discharge, (4) a detailed description of the brine waste disposal facilities which are proposed to accommodate the increased brine volume and facilitate blended secondary effluent and brine wastes flow metering and sampling, and (5) a schedule for the design and construction of the new brine disposal facilities."

Section VII B.1 of the NPDES Permit includes the "Reopener Provisions" which state that the [NPDES Permit] Order may be modified in accordance with the requirements set forth at 40 C.F.R. parts 122 and 124, to include appropriate conditions or limits based on newly available information, or to implement any, new State water quality objectives that are approved by the USEPA. As effluent is further characterized through additional monitoring, and if a need for

[26] Tertiary treatment is an advanced level of treatment provided to secondary treated wastewater prior to use for irrigation under Title 22 regulations.

additional effluent limitations becomes apparent after additional effluent characterization, the Order will be reopened to incorporate such limitations."

Further, the NPDES Permit accounts for a potential exceedance of any constituent over the effluent limitation. "An existing effluent limitation for the pollutant shall remain in the permit, otherwise the permit shall include a reopener clause to allow for subsequent modification of the permit to include an effluent limitation if the monitoring establishes that the discharge causes, has the reasonable potential to cause, or contribute to an excursion above a Table 1 water quality objective" (RWQCB, 2014).

4.3.2.3 Applicable Regional and Local Land Use Plans and Policies

Table 4.3-7 presents the regional and local land use plans, policies, and regulations pertaining to surface water hydrology and water quality that are relevant to the MPWSP and that were adopted for the purpose of avoiding or mitigating an environmental effect. Project consistency with such plans, policies, and regulations is also indicated in the table. Where the analysis concludes the proposed project would be consistent with the applicable plan, policy, or regulation, the finding is noted and no further discussion is provided. Where the analysis concludes the proposed project would be potentially inconsistent with the applicable plan, policy, or regulation, the reader is referred to Section 4.3.5 Direct and Indirect Effects of the Proposed Project, for additional discussion. In that subsection, the significance of the potential conflict is evaluated. Where the effect of the potential conflict would be significant, feasible mitigation is identified to resolve or minimize that conflict.

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TABLE 4.3-7
APPLICABLE REGIONAL AND LOCAL LAND USE PLANS, POLICIES, AND REGULATIONS PERTAINING TO SURFACE WATER HYDROLOGY AND WATER QUALITY

Project Planning Region	Applicable Plan	Plan Element/ Section	Project Component(s)	Specific Plan, Policy, or Ordinance	Relationship to Avoiding or Mitigating a Significant Environmental Impact	Project Consistency with Plan, Policy, or Ordinance
City of Marina (coastal zone and inland areas)	City of Marina General Plan	Community Design and Development	Subsurface slant wells, Source Water Pipeline, new Desalinated Water Pipeline, and new Transmission Main	***Policy 4.125:*** Approval of all future uses and construction within the Marina Planning Area shall be contingent upon compliance with the following policies and conditions intended to protect the quality of the area's water resources, avoid unnecessary consumption of water, and ensure that adequate water resources are available for new development.	This policy is intended to protect water quality, minimize unnecessary consumption, and provide for future resource needs.	Consistent: The project would be constructed in conformance with the State Construction General Permit and WDRs, which require specific construction-related BMPs to prevent concentrated stormwater run-on/runoff, soil erosion, and release of construction site contaminants. The project would be operated in conformance with State WDRs under the NPDES Phase II Permit (Order No. 2013-0001-DWQ, NPDES No. CAS000004), which regulates stormwater discharge into storm sewer systems. Mandatory compliance with these permits would protect water quality during construction and operation. The project would not increase water consumption and would develop supplemental water supplies for the Monterey Peninsula.
City of Marina (coastal zone and inland areas)	City of Marina General Plan	Storm Drainage	Subsurface slant wells, Source Water Pipeline, new Desalinated Water Pipeline, and new Transmission Main	***Policy 3.57 (1):*** All storm water runoff shall continue to be retained onsite and accommodated by localized retention basins. Retention basins associated with a particular project shall be landscaped with appropriate plant materials and shall be designed wherever possible as integral parts of a development project's common open space or parks, or to create new or enhance existing habitat. All onsite drainage facilities shall be designed to convey runoff from a 10-year frequency storm at minimum. In areas of the City where recycled water will not be readily available, the City encourages the provision of storm water reuse facilities of sufficient size to provide for landscape irrigation of development in proximity to retention basins. The adequacy of onsite and offsite drainage facilities shall be determined through the preparation of storm drainage reports and plans, approved by the City Public Works Director; such reports and plans shall be required for all new subdivisions and new commercial/industrial development proposed in Marina.	This policy is intended to minimize adverse effects of uncontrolled stormwater runoff.	Consistent: The project would conform to the State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ, NPDES No. CAS000004) which require specific BMPs and measures to manage stormwater. The project would be subject to MRSWMP, which requires stormwater control requirements under the MS4 permit and implementation of erosion and stormwater control measures. The State requirements are incorporated in the municipal stormwater permit.
City of Marina (coastal zone and inland areas)	City of Marina General Plan	Storm Drainage	Subsurface slant wells, Source Water Pipeline, new Desalinated Water Pipeline, and new Transmission Main	***Policy 3.57 (2):*** Pretreatment of stormwater runoff from roads, large parking areas, and other extensive paved areas used by vehicles shall be provided using appropriate means such as primary settlement structures, routing through settlement ponds, or routing through adequately long natural swales or slopes. In addition, all development plans shall conform to the requirements of the City's National Pollution Discharge Elimination System permit and City ordinances, and all subdivisions and new commercial/industrial development shall identify Best City of Marina General Plan 74 Management Practices (BMP's) appropriate or applicable to uses conducted onsite to effectively prevent the discharge of pollutants in stormwater runoff. 3. Stormwater systems shall be constructed in a manner which prevents soil erosion. Appropriate measures to avoid such impacts include the dispersal of runoff, installation of energy dissipaters where dispersal is not practical and concentration of runoff water is necessary, and retention of vegetation or revegetation of affected surfaces.	This policy is intended to minimize adverse effects of uncontrolled stormwater runoff.	Consistent: The project would conform to the State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ, NPDES No. CAS000004) which require specific BMPs and measures to manage stormwater. The State requirements are incorporated in the municipal stormwater permit. The project would be subject to the MRSWMP requirements under the MS4 permit and would be required to implement erosion and stormwater control measures.

TABLE 4.3-7 (Continued)
APPLICABLE REGIONAL AND LOCAL LAND USE PLANS, POLICIES, AND REGULATIONS PERTAINING TO SURFACE WATER HYDROLOGY AND WATER QUALITY

Project Planning Region	Applicable Plan	Plan Element/ Section	Project Component(s)	Specific Plan, Policy, or Ordinance	Relationship to Avoiding or Mitigating a Significant Environmental Impact	Project Consistency with Plan, Policy, or Ordinance
City of Marina (coastal zone and inland areas)	Marina Municipal Code	Chapter 15.48 – Flood Damage Prevention	Subsurface slant wells, Source Water Pipeline, new Desalinated Water Pipeline, and new Transmission Main	***Chapter 15.48 - Flood Damage Prevention*** states provisions for flood prevention and reduction of flood hazards. A special flood hazard area is an area that is subject to one percent or greater change of flooding in a given year, which is the FEMA 100-year floodplain. The code also sets requirements for new storm drainage facilities.	This section is intended to prevent and reduce damage from floods.	Consistent: Within the city of Marina, portions of the Source Water Pipeline and new Transmission Main would be constructed in a 100-year flood hazard area. However, these underground pipelines would not impede or redirect flood flows. None of the aboveground facilities in the city of Marina would be located in the 100-year floodplain.
City of Marina (coastal zone and inland areas)	Marina Municipal Code	Chapter 16.08 – Design Requirement by Type of Subdivision	Subsurface slant wells, Source Water Pipeline, new Desalinated Water Pipeline, and new Transmission Main Pipeline	***Section 16.08.080 (F) Erosion Control.*** [Implement] silt basins, structures, planting or other forms of erosion control when necessary in the opinion of the Planning Commission.	This section is intended to control erosion.	Consistent: The project conforms to the State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ, NPDES No. CAS000004) which require specific BMPs and measures to manage stormwater and control erosion. The State requirements are incorporated in the municipal stormwater permit. The project would be subject to the MRSWMP, which requires stormwater control requirements under the MS4 permit and implementation of erosion control measures.
City of Marina (coastal zone & inland area)	Marina Municipal Code	Title 8 - Health and Safety	Subsurface slant wells, Source Water Pipeline, new Desalinated Water Pipeline, and new Transmission Main	***Section 8.46.130 Requirement to prevent, control, and reduce storm water pollutants (b) Responsibility to Implement Best Management Practices.*** Notwithstanding the presence or absence of BMP requirements promulgated pursuant to subparagraphs (a), (b), (c), and (d) of this section, each person engaged in activities or operations, or owning facilities or property which will or may result in pollutants entering storm water, the storm drain system, or waters of the U.S. shall implement best management practices to the extent they are technologically achievable to prevent and reduce such pollutants. The owner or operator of each commercial or industrial establishment shall provide reasonable protection from accidental discharge of prohibited materials or other wastes into the city storm drain system and/or watercourses. Facilities to prevent accidental discharge of prohibited materials or other wastes shall be provided and maintained at expense of the owner or operator.	This section is intended to protect water quality by preventing, controlling, and reducing pollutants (including sediment) from entering stormwater, the storm drain system, and waters of the U.S.	Consistent: The project would conform to the State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ, NPDES No. CAS000004) that require specific BMPs and measures to manage stormwater. The State requirements are incorporated in the municipal stormwater permit. The project would be subject to the MRSWMP, which requires stormwater control requirements under the MS4 permit and implementation of erosion and stormwater control measures to protect water quality.
City of Marina (coastal zone & inland area)	Marina Municipal Code	Title 8 - Health and Safety	Subsurface slant wells, Source Water Pipeline, new Desalinated Water Pipeline, and new Transmission Main	***Section 8.46.130 Requirement to prevent, control, and reduce storm water pollutants (c) Construction Sites.*** The city's BMP Guidance Series will include appropriate best management practices to reduce pollutants in any storm water runoff from construction activities. The city shall incorporate such requirements in any land use entitlement and construction or building-related permit to be issued relative to such development or redevelopment. The owner and developer shall comply with the terms, provisions, and conditions of such land use entitlements and building permits as required in this chapter and the city storm water utility ordinance. Construction activities subject to BMP requirements shall continuously employ measures to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts on water quality, contamination, or unauthorized discharge of pollutants.	This section is intended to protect water quality by preventing, controlling, and reducing pollutants (including sediment) from entering stormwater, the storm drain system, and waters of the U.S.	Consistent: The project would conform to the State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ, NPDES No. CAS000004) that require specific BMPs and measures to manage stormwater. The proposed project would be subject to the MRSWMP, which requires stormwater control requirements under the MS4 permit and implementation of erosion and water quality control measures.
City of Marina (coastal zone)	Marina Local Coastal Program Land Use Plan	Policy	Subsurface slant wells, Source Water Pipeline, new Desalinated Water Pipeline, and new Transmission Main	**Policy 17.** To insure protection and restoration of ocean's water quality and biological productivity.	This policy is intended to protect ocean water quality and biological productivity.	Consistent: The project would conform to the State Construction General Permit and WDRs (the NPDES Phase II Permit, Order No. 2013-0001-DWQ, NPDES No. CAS000004), which require i specific construction-related BMPs to prevent concentrated stormwater run-on/runoff, soil erosion, and release of construction site contaminants to protect water quality.

TABLE 4.3-7 (Continued)
APPLICABLE REGIONAL AND LOCAL LAND USE PLANS, POLICIES, AND REGULATIONS PERTAINING TO SURFACE WATER HYDROLOGY AND WATER QUALITY

Project Planning Region	Applicable Plan	Plan Element/ Section	Project Component(s)	Specific Plan, Policy, or Ordinance	Relationship to Avoiding or Mitigating a Significant Environmental Impact	Project Consistency with Plan, Policy, or Ordinance
City of Monterey (inland area)	Monterey City Code	Chapter 31.5 - Storm Water Management	Ryan Ranch–Bishop Interconnection Improvements	***Section 31.5-12. Prohibitions of Illegal Discharges.*** No person or entity shall discharge or cause to be discharged into the municipal Storm Drain System or waters of the state, any materials, including but not limited to Pollutants or waters containing any Pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water.	This section is intended to prevent discharges into the municipal Storm Drain System or waters of the state that could affect water quality.	<u>Consistent:</u> The project would conform to the State Construction General Permit and the Chapter 31.5 of the City Code, which require specific construction-related BMPs to prevent erosion and the release of contaminants to protect water quality.
City of Monterey (inland area)	Monterey City Code	Chapter 31.5 - Storm Water Management	Ryan Ranch–Bishop Interconnection Improvements	***Section 31.5-12. Requirement to Prevent, Control, and Reduce Storm Water Pollutants***. (c) Construction Sites. BMPs to reduce pollutants in any storm water runoff activities shall be incorporated in any land use entitlement and/or construction or building-related permit. The owner and developer shall comply with the terms, provisions, and conditions of such land use entitlements and/or building permits as required by the City and as required by the NPDES General Permit and as amended thereto.	This section is intended to prevent pollutants (including sediment) from entering stormwater runoff.	<u>Consistent:</u> The project would conform to the State Construction General Permit and the Chapter 31.5 of the City Code, which require specific construction-related BMPs to prevent erosion and the release of contaminants.
City of Monterey (inland areas)	Monterey City Code	Chapter 31.5 – Storm Water Management	Ryan Ranch-Bishop Interconnection Improvements	***Section 31.5-15 - Requirement to Prevent, Control, and Reduce Storm Water Pollutants. (b) New Development and Redevelopment.*** The City may require any owner or person developing real property to identify appropriate BMPs to control the volume, rate, and potential pollutant load of stormwater runoff from new development and redevelopment projects as may be appropriate to minimize the generation, transport and discharge of pollutants. The City shall incorporate such requirements in any land use entitlement and construction or building-related permit to be issued relative to such development or redevelopment. The owner and developer shall comply with the terms, provisions, and conditions of such land use entitlements and building permits as required in this Article and the City Stormwater Utility Ordinance, Chapter 31.5, Article 1. The requirements may also include a combination of structural and non-structural BMPs along with their long-term operation and maintenance.	This section is intended to protect stormwater quality from pollutants associated with new development.	<u>Consistent:</u> Within the city of Monterey, the project would conform to the State Construction General Permit and WDRs, which require BMPs and measures to prevent water pollution and control any pollutant discharge so as to protect water quality.
City of Monterey (inland areas)	Monterey City Code	Chapter 9 – Building Regulations	Ryan Ranch-Bishop Interconnection Improvements	***Section 9-70.1- Establishment of Development Permit.*** A Development Permit shall be obtained before construction or development begins within any area of special flood hazards established in Section 9-69. Application for a Development Permit shall be made on forms furnished by the Floodplain Administrator and may include, but not be limited to plans prepared by a registered civil engineer in duplicate drawn to scale showing the nature, location, dimensions, and elevation of the area in question; existing or proposed structures, fill, storage of materials, drainage facilities; along with their locations.	This section is intended to protect people and property from flood hazards.	<u>Consistent:</u> No new habitable development or redevelopment is proposed under the MPWSP within the city of Monterey.
City of Seaside (coastal zone and inland areas)	Seaside General Plan	Conservation/ Open Space	New Transmission Main, ASR Conveyance Pipeline, ASR Pump to Waste Pipeline, and ASR Recirculation Pipeline	***Policy COS.3-2:*** Work with all local, regional, State, and federal agencies to implement mandated water quality programs and regulations to improve surface water quality. *Implementation Plan COS-3.2.1: NPDES Requirements:* To reduce pollutants in urban runoff, require new development projects and substantial rehabilitation projects to incorporate Best Management Practices (BMPs) pursuant to the National Pollutant Discharge Elimination System (NPDES) permit to ensure that the City complies with applicable state and federal regulations.	This policy is intended to protect surface water quality from pollutants (including sediment) in urban runoff.	<u>Consistent:</u> The pipelines would be constructed below grade and would not increase the amount of impervious surfaces, or release pollutants. In addition, the project would conform to the State Construction General Permit and the Seaside Municipal Code, which require specific construction-related BMPs to prevent stormwater pollutants from leaving the construction sites. Once installed, the proposed pipelines would have no effect on stormwater quality or runoff.

TABLE 4.3-7 (Continued)
APPLICABLE REGIONAL AND LOCAL LAND USE PLANS, POLICIES, AND REGULATIONS PERTAINING TO SURFACE WATER HYDROLOGY AND WATER QUALITY

Project Planning Region	Applicable Plan	Plan Element/ Section	Project Component(s)	Specific Plan, Policy, or Ordinance	Relationship to Avoiding or Mitigating a Significant Environmental Impact	Project Consistency with Plan, Policy, or Ordinance
City of Seaside (coastal zone and inland areas)	Seaside General Plan	Conservation/ Open Space	New Transmission Main, ASR Conveyance Pipeline, ASR Pump to Waste Pipeline, and ASR Recirculation Pipeline	***Policy COS-4.2*:** Protect and enhance the creeks, lakes, and adjacent wetlands for their value in providing visual amenity, habitat for wildlife, and recreational opportunities.	This policy is intended to protect beneficial uses of creeks, lakes, and adjacent wetlands.	Consistent: The project would conform to State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ), which require BMPs and measures to control and minimize any stormwater runoff and prevent water pollution so as to protect water quality. The project would conform with State WDRs under the NPDES Phase II Permit (Order No. 2013-0001-DWQ, NPDES No. CAS000004), which regulates stormwater discharge into storm sewer systems. For impacts related to wetlands, please refer to Section 4.6, Terrestrial Biological Resources. As discussed for wetlands in Section 4.6, Terrestrial Biological Resources, for wetlands, the project would have a less than a significant impact with mitigation.
City of Seaside (coastal zone and inland areas)	Seaside General Plan	Safety	New Transmission Main, ASR Conveyance Pipeline, ASR Pump to Waste Pipeline, and ASR Recirculation Pipeline	***Policy S-1.2*:** Protect the community from flooding hazards. *Implementation Plan S-1.2.1*: Project Flood Control. Require developers to provide flood control systems in new development areas that mitigate potential onsite flooding hazards and also avoid increasing flood hazards elsewhere.	This policy is intended to protect people and property from flood hazards.	Consistent: None of the MPWSP components proposed for Seaside would be located in a flood hazard area. All MPWSP facilities in Seaside would be buried below ground surface and would not present a risk of flood hazard.
City of Seaside (coastal zone and inland areas)	Seaside General Plan	Land Use	New Transmission Main, ASR Conveyance Pipeline, ASR Recirculation Pipeline, and ASR Pump-to-Waste Pipeline	***Policy LU-8.2:*** Ensure that developers provide stormwater retention/detention facilities and institute Best Management Practices that regulate runoff and siltation that meets local, State, and federal standards.	This policy is intended to ensure that developers provide stormwater retention/detention facilities.	Consistent: None of the MPWSP components proposed for Seaside would be located in a flood hazard area. All MPWSP facilities in Seaside would be buried below ground surface and would not present a risk of flood hazard.
City of Seaside (coastal zone and inland areas)	Seaside Municipal Code	Chapter 8.46 – Urban Storm Water Quality Manage Surface management and Discharge Control	New Transmission Main, ASR Conveyance Pipeline, ASR Pump to Waste Pipeline, and ASR Recirculation Pipeline	***Chapter 8.46 Urban Storm Water Quality Manage Surface Management and Discharge Control.*** Urban Stormwater Quality Management and Discharge Control would apply to all water entering the storm drain system generated on any developed and undeveloped lands lying within the city. The chapter lists requirements to prevent, control, and reduce stormwater pollutants, protection of water courses, and notification to emergency response officials in the event of a chemical release.	This guideline is intended to manage stormwater quality and control stormwater discharges.	Consistent: The proposed project would be constructed and operated in conformance with State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ, NPDES No. CAS000004 and Order No. R3-2014-0013), which require implementation of BMPs and measures to control and minimize stormwater discharges into nearby water bodies. The State requirements are incorporated in the local municipal code and the municipal stormwater permit.
City of Seaside (coastal zone and inland areas)	Seaside Municipal Code	Chapter 8.46 - Health and Safety	New Transmission Main ASR Conveyance Pipeline, ASR Pump to Waste Pipeline, and ASR Recirculation Pipeline	***Section 8.46.130 Requirement to prevent, control, and reduce storm water pollutants (B) Responsibility to Implement Best Management Practices***. Notwithstanding the presence or absence of BMP requirements promulgated pursuant to subparagraphs A, B, C, and D of this section, each person engaged in activities or operations, or owning facilities or property which will or may result in pollutants entering storm water, the storm drain system, or waters of the U.S. shall implement best management practices to the extent they are technologically achievable to prevent and reduce such pollutants. The owner or operator of each commercial or industrial establishment shall provide reasonable protection from accidental discharge of prohibited materials or other wastes into the city storm drain system and/or watercourses. Facilities to prevent accidental discharge of prohibited materials or other wastes shall be provided and maintained at expense of the owner or operator.	This section is intended to protect surface water quality from pollutants (including sediment) associated with development.	Consistent: The pipelines would be constructed below grade and would not increase the amount of impervious surfaces, or releasing pollutants. In addition, the proposed project would be subject to the State Construction General Permit, and the Seaside Municipal Code, which require the implementation of specific construction-related BMPs to prevent stormwater pollutants from leaving the construction sites.

TABLE 4.3-7 (Continued)
APPLICABLE REGIONAL AND LOCAL LAND USE PLANS, POLICIES, AND REGULATIONS PERTAINING TO SURFACE WATER HYDROLOGY AND WATER QUALITY

Project Planning Region	Applicable Plan	Plan Element/ Section	Project Component(s)	Specific Plan, Policy, or Ordinance	Relationship to Avoiding or Mitigating a Significant Environmental Impact	Project Consistency with Plan, Policy, or Ordinance
City of Seaside (coastal zone and inland areas)	Seaside Municipal Code	Chapter 8.46 - Health and Safety	New Transmission Main, ASR Conveyance Pipeline, ASR Pump to Waste Pipeline, and ASR Recirculation Pipeline	***Section 8.46.130 Requirement to prevent, control, and reduce storm water pollutants (C) Construction Sites***. The city's BMP Guidance Series includes appropriate best management practices to reduce pollutants in any storm water runoff from construction activities. The city shall incorporate such requirements in any land use entitlement and construction or building-related permit to be issued relative to such development or redevelopment. The owner and developer shall comply with the terms, provisions, and conditions of such land use entitlements and building permits as required in this chapter and the city storm water utility ordinance. Construction activities subject to BMP requirements shall continuously employ measures to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts on water quality, contamination, or unauthorized discharge of pollutants.	This section is intended to protect surface water quality from pollutants (including sediment) associated with development.	<u>Consistent:</u> The pipelines would be constructed below grade and would not increase the amount of impervious surfaces, or release pollutants. In addition, the proposed project would be subject to the State Construction General Permit and Seaside Municipal Code, which require the implementation of specific construction-related BMPs to prevent stormwater pollutants from leaving the construction sites.
County of Monterey (inland areas)	Carmel Valley Master Plan	Natural Resources	Carmel Valley Pump Station and Main System-Hidden Hills Interconnection Improvements	***Policy CV-1.20:*** Design ("D") and site control ("S") overlay district designations shall be applied to the Carmel Valley area. Design review for all new development throughout the Valley, including proposals for existing lots of record, utilities, heavy commercial, and visitor accommodations, but excluding minor additions to existing development where those changes are not conspicuous from outside of the property, shall consider the following guidelines: f. Minimize erosion and/or modification of landforms.	This policy is intended to minimize erosion.	<u>Consistent:</u> The proposed project would be constructed and operated in conformance with State Construction General Permit, which requires implementation of BMPs and measures to control and minimize erosion.
County of Monterey (inland areas)	Carmel Valley Master Plan	Natural Resources	Carmel Valley Pump Station and Main System-Hidden Hills Interconnection Improvements	***Policy CV-4.1:*** In order to reduce potential erosion or rapid runoff: a. The amount of land cleared at any one time shall be limited to the area that can be developed during one construction season. b. Motorized vehicles shall be prohibited on the banks or in the bed of the Carmel River, except by permit from the Water Management District or Monterey County. c. Native vegetative cover must be maintained on areas that have the following combination of soils and slope: 1. Santa Lucia shaly clay loam, 30-50% slope (SfF) 2. Santa Lucia-Reliz Association, 30-75% slope (Sg) 3. Cieneba fine gravelly sandy loam, 30-70% slope (CcG) 4. San Andreas fine sandy loam, 30-75% slope (ScG) 5. Sheridan coarse sandy loam, 30-75% slope (SoG) 6. Junipero-Sur complex, 50-85% slope (Jc)	This policy is intended to reduce potential erosion or rapid runoff.	<u>Consistent:</u> The proposed project would be constructed and operated in conformance with State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ), which require implementation of BMPs and measures to control and reduce erosion and stormwater runoff. The State requirements are incorporated in the municipal stormwater permit.
County of Monterey (coastal zone and inland areas)	Monterey County Code	Chapter 16.08 –Grading	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills Interconnection Improvements, and Ryan Ranch-Bishop Interconnection Improvements	***Chapter 16.08 -*** The Monterey County Grading Ordinance generally regulates grading activities that involve more than 100 cubic yards of excavation and fill. Minor fills and excavations ("cuts") of less than 100 cubic yards that are not intended to provide foundations for structures, or that are very shallow and nearly flat, are typically exempt from the ordinance, as are shallow footings for small structures. Submittal requirements for a County grading permit include site plans, existing contours and proposed contour changes, an estimate of the volume of earth to be moved, and geotechnical (soils) reports. Grading activities that involve over 5,000 cubic yards of soil must include detailed plans signed by a state-licensed civil engineer. Grading is not allowed to obstruct storm drainage or cause siltation of a waterway. All grading requires implementation of	This ordinance is intended to minimize soil erosion, and loss of topsoil, and associated environmental effects.	<u>Consistent:</u> As noted in Chapter 3, Description of the Project (Proposed Project), CalAm would be required to obtain a grading permit prior to project construction. As part of the grading permit review process, CalAm would have to demonstrate conformity with the requirements of the Monterey County Grading Ordinance, including specific provisions designed to minimize soil erosion, loss of topsoil, and associated environmental effects. In addition, the proposed project would be subject to the State Construction General Permit and the Monterey County Erosion Control Ordinance, which also require the implementation of specific construction-related BMPs to minimize erosion and soil loss, and prevent stormwater pollutants from leaving the construction sites.

TABLE 4.3-7 (Continued)
APPLICABLE REGIONAL AND LOCAL LAND USE PLANS, POLICIES, AND REGULATIONS PERTAINING TO SURFACE WATER HYDROLOGY AND WATER QUALITY

Project Planning Region	Applicable Plan	Plan Element/ Section	Project Component(s)	Specific Plan, Policy, or Ordinance	Relationship to Avoiding or Mitigating a Significant Environmental Impact	Project Consistency with Plan, Policy, or Ordinance
County of Monterey (coastal zone and inland areas) (cont.)				temporary and permanent erosion-control measures. Grading within 50 feet of a watercourse, or within 200 feet of a river, is regulated in the Monterey County Zoning Ordinance floodplain regulations. The Monterey County Grading Ordinance requires a soil engineering and engineering geology report (Section 16.08.110: Permit – Soil Engineering and Engineering Geology Reports [Ordinance 4029, 1999; Ordinance 2534, Section 110, 1979], unless waived by the Building Official because information of record is available showing such data is not needed. The soil engineering and engineering geology report must include the following: a. Data regarding the properties, distribution and strength of existing soils b. Recommendations for grading and corrective measures for project design, as appropriate c. An adequate description of the geology of the site and potential hazards. The recommendations from the soil engineering and engineering geology report must be incorporated in the grading plans and construction specifications.		
County of Monterey (coastal zone and inland areas)	Monterey County Code	Chapter 16.12 -Erosion Control	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Chapter 16.12 - Erosion Control.*** Requires that specific design considerations be incorporated into projects to reduce the potential of erosion and that an erosion control plan be approved by the County prior to initiation of grading activities.	This ordinance is intended to minimize erosion and soil loss, and associated water quality impacts, among other environmental effects.	<u>Consistent:</u> As noted in Chapter 3, Description of the Project (Proposed Project), CalAm would be required to obtain a grading permit prior to project construction. As part of the grading permit review process, CalAm would have to demonstrate conformity with the requirements of the Monterey County Erosion Control Ordinance, including through preparation of an erosion control plan indicating proposed methods for the control of runoff, erosion, and sediment movement. In addition, the proposed project would be subject to the State Construction General Permit, which also requires the implementation of specific construction-related BMPs to minimize erosion and soil loss, and prevent stormwater pollutants from leaving the construction sites.
County of Monterey (coastal zone and inland areas)	Monterey County Code	Chapter 16.16 - Development of Floodplains	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Chapter 16.16 - Development of Floodplains.*** Establishes methods of reducing flood losses such as controlling the alteration of natural floodplains and requiring new construction in the floodplain to incorporate flood-proofing measures (Floodplain regulations in the county extend to areas within 200 feet of rivers or within 50 feet of watercourses).	This ordinance is intended to protect people, property, and the environment from the effects of development in flood hazard areas.	<u>Consistent:</u> The Carmel Valley Pump Station and Castroville Pipeline would be located in a floodplain. Once constructed, the Castroville Pipeline would be underground and would have no effect on flooding. The Carmel Valley Pump Station would be constructed in accordance with Chapter 16.16 of the Monterey County Code. None of the other proposed aboveground facilities would be constructed in a floodplain.
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Conservation and Open Space	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy OS-3.3:*** Criteria for studies to evaluate and address, through appropriate designs and BMPs, geologic and hydrologic constraints and hazards conditions, such as slope and soil instability, moderate and high erosion hazards, and drainage, water quality, and stream stability problems created by increased stormwater runoff, shall be established for new development and changes in land use designations.	This policy is intended to protect people, property, and the environment from the effects of development in geologic and hydrologic hazard areas.	<u>Consistent:</u> The proposed project would be constructed and operated in conformance with State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ and NPDES General Permit for Discharges with Low Threat to Water Quality and the General Waiver of WDRs for Specific Types of Discharges [Resolution R3-2014-0014]), which require implementation of BMPs and measures to control and reduce erosion and pollutant discharge, thus both stormwater runoff and quality. The State requirements are incorporated in the County's Municipal Code and the municipal stormwater permit.

TABLE 4.3-7 (Continued)
APPLICABLE REGIONAL AND LOCAL LAND USE PLANS, POLICIES, AND REGULATIONS PERTAINING TO SURFACE WATER HYDROLOGY AND WATER QUALITY

Project Planning Region	Applicable Plan	Plan Element/ Section	Project Component(s)	Specific Plan, Policy, or Ordinance	Relationship to Avoiding or Mitigating a Significant Environmental Impact	Project Consistency with Plan, Policy, or Ordinance
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Conservation and Open Space	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy OS-4.2:*** Direct and indirect discharges of harmful substances into marine waters, rivers or streams shall not exceed state or federal standards.	This policy is intended to protect the quality of marine waters, rivers, and streams.	<u>Inconsistent:</u> The project would conform with State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ and NPDES General Permit for Discharges with Low Threat to Water Quality and the General Waiver of WDRs for Specific Types of Discharges [Resolution R3-2014-0041], NPDES No. CAS000004 and Order No. R3-2014-0013, NPDES Permit No. CA0048551 for the Monterey Regional Water Pollution Control Agency Treatment Plant), which require BMPs and measures to control and reduce pollutants in the point and nonpoint discharges (e.g., stormwater runoff and brine discharge) from project facilities. The State requirements are incorporated in the County's Municipal Code and the municipal stormwater permit, and would be incorporated into any new permits obtained prior to project operation such as the amendment to the NPDES permit for discharging brine from the MPWSP Desalination Plant into Bay through the existing MRWPCA outfall. Operational discharges of the MPWSP under certain scenarios may exceed Ocean Plan water quality objective thresholds. This issue is discussed in Impact 4.3-5.
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Conservation and Open Space	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy OS-4.3:*** Estuaries, salt and fresh water marshes, tide pools, wetlands, sloughs, river and stream mouth areas, plus all waterways that drain and have impact on State Monterey County General Plan designated Areas of Special Biological Significance (ASBS) shall be protected, maintained, and preserved in accordance with state and federal water quality regulations.	This policy is intended to protect and maintain the quality of coastal waterways and designated ASBSs.	<u>Inconsistent:</u> The project would conform with State Construction General Permit and WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ and NPDES General Permit for Discharges with Low Threat to Water Quality and the General Waiver of WDRs for Specific Types of Discharges [Resolution R3-2014-0041], NPDES No. CAS000004 and Order No. R3-2014-0013, NPDES Permit No. CA0048551 for the Monterey Regional Water Pollution Control Agency Treatment Plant), which require BMPs and measures to control and reduce pollutants in the discharges from project facilities, which eventually drain into the designated ASBSs. The State requirements are incorporated in the County's Municipal Code and the municipal stormwater permit, and would be incorporated into any new permits obtained prior to project operation such as the amendment to the NPDES permit for discharging brine from the MPWSP Desalination Plant into Bay through the existing MRWPCA outfall. Operational discharges of the MPWSP under certain scenarios may exceed Ocean Plan water quality objective thresholds. This issue is discussed in Impact 4.3-5.
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Safety	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy S-2.3:*** All new development, including filling, grading, and construction, within designated 100-year floodplain areas shall conform to the guidelines of FEMA and the National Flood Insurance Program and ordinances established by the County Board of Supervisors. With the exception of the construction of structures, Routine and Ongoing Agricultural Activities shall be exempt from this policy.	This policy is intended to protect people and property from flood hazards.	<u>Consistent:</u> The Carmel Valley Pump Station and Castroville Pipeline would be located in a floodplain. Once constructed, the Castroville Pipeline would be underground and would have no effect on flooding. The Carmel Valley Pump Station would be constructed in accordance with Chapter 16.16 of the Monterey County Code and FEMA requirements for construction in the flood plain. None of the other proposed aboveground facilities would be constructed in a floodplain.

TABLE 4.3-7 (Continued)
APPLICABLE REGIONAL AND LOCAL LAND USE PLANS, POLICIES, AND REGULATIONS PERTAINING TO SURFACE WATER HYDROLOGY AND WATER QUALITY

Project Planning Region	Applicable Plan	Plan Element/ Section	Project Component(s)	Specific Plan, Policy, or Ordinance	Relationship to Avoiding or Mitigating a Significant Environmental Impact	Project Consistency with Plan, Policy, or Ordinance
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Safety	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy S-2.6:*** Drainage and flood control improvements needed to mitigate flood hazard impacts associated with potential development in the 100-year floodplain shall be determined prior to approval of new development and shall be constructed concurrently with the development.	This policy is intended to protect people and property from flood hazards.	<u>Consistent:</u> The Carmel Valley Pump Station and Castroville Pipeline would be located in a floodplain. Once constructed, the Castroville Pipeline would be underground and would have no effect on flooding. The Carmel Valley Pump Station would be constructed in accordance with Chapter 16.16 of the Monterey County Code and FEMA requirements for construction in the flood plain. None of the other proposed aboveground facilities would be constructed in a floodplain.
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Safety	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy S-2.8:*** Alternative project designs and densities to minimize development in the floodplain shall be considered and evaluated.	This policy is intended to protect people and property from flood hazards.	<u>Consistent:</u> The Carmel Valley Pump Station and Castroville Pipeline would be located in a floodplain. Once constructed, the Castroville Pipeline would be underground and would have no effect on flooding. The Carmel Valley Pump Station would be constructed in accordance with Chapter 16.16 of the Monterey County Code and FEMA requirements for construction in the flood plain. None of the other proposed aboveground facilities would be constructed in a floodplain.
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Safety	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy S-3.1:*** Post-development, offsite peak flow drainage from the area being developed shall not be greater than pre-development peak flow drainage. Onsite improvements or other methods for storm water detention shall be required to maintain post-development, offsite, peak flows at no greater than predevelopment levels, where appropriate, as determined by the Monterey County Water Resources Agency.	This policy is intended avoid potential adverse effects of increased surface runoff from new development.	<u>Consistent:</u> Within the county of Monterey, the proposed project would be subject to State WDRs (NPDES Phase II Permit, Order No. 2013-0001-DWQ and NPDES General Permit for Discharges with Low Threat to Water Quality and the General Waiver of WDRs for Specific Types of Discharges [Resolution R3-2014-0041], NPDES No. CAS000004 and Order No. R3-2014-0013) which are set forth in the local municipal stormwater permit and which require implementation of site design and stormwater control measures such that post-project flow drainage from the site must match pre-project flows.
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Safety	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy S-3.2:*** Best Management Practices to protect groundwater and surface water quality shall be incorporated into all development.	This policy is intended to protect groundwater and surface water quality from pollutants associated with development.	<u>Consistent:</u> The proposed project would be constructed and operated in conformance with State Construction General Permit and WDRs, which require implementation of BMPs and measures to control and reduce pollutants in the discharges from project facilities that could affect water quality. The State requirements are incorporated in the County's Municipal Code and the municipal stormwater permit, and would be incorporated into any new permits obtained prior to project operation. The issue of groundwater quality is addressed further in Section 4.7, Hazards and Hazardous Materials. As discussed in Section 4.7, groundwater quality issues would be addressed through implementation of mitigation measures, thereby resolving potential conflicts with applicable groundwater quality protection policies.
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Safety	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy S-3.3:*** Drainage facilities to mitigate the post-development peak flow impact of new development shall be installed concurrent with new development	This policy is intended avoid potential adverse effects of increased surface runoff from new development.	<u>Consistent:</u> Within the county of Monterey, the proposed project would be subject to State WDRs set forth in the local municipal stormwater permit, which require implementation of site design and stormwater control measures such that post-project flow drainage from the site must match pre-project flows.

TABLE 4.3-7 (Continued)
APPLICABLE REGIONAL AND LOCAL LAND USE PLANS, POLICIES, AND REGULATIONS PERTAINING TO SURFACE WATER HYDROLOGY AND WATER QUALITY

Project Planning Region	Applicable Plan	Plan Element/ Section	Project Component(s)	Specific Plan, Policy, or Ordinance	Relationship to Avoiding or Mitigating a Significant Environmental Impact	Project Consistency with Plan, Policy, or Ordinance
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Safety	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy S-3.5:*** Runoff Performance Standards that result in an array of site planning and design techniques to reduce storm flows plus capture and recharge runoff shall be developed and implemented, where appropriate, as determined by the Monterey County Water Resources Agency.	This policy is intended to protect groundwater and surface water quality from pollutants associated with development.	Consistent: Within the county of Monterey, the proposed project would be subject to State WDRs set forth in the local municipal stormwater permit, which require implementation of site design and stormwater control measures such that post-project flow drainage from the site must match pre-project flows.
County of Monterey (coastal zone and inland areas)	Monterey County General Plan	Safety	Source Water Pipeline, MPWSP Desalination Plant, new Desalinated Water Pipeline, Brine Discharge Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Carmel Valley Pump Station, Main System-Hidden Hills and Ryan Ranch-Bishop Interconnection Improvements	***Policy S-3.9:*** In order to minimize urban runoff affecting water quality, the County shall require all future development within urban and suburban areas to implement Best Management Practices (BMPs) as approved in the Monterey Regional Storm Water Management Program which are designed to incorporate Low Impact Development techniques. BMPs may include, but are not limited to, grassy swales, rain gardens, bioretention cells, and tree box filters. BMPs should preserve as much native vegetation as feasible possible on the project site.	This policy is intended to protect surface water quality from pollutants that may be present in stormwater runoff.	Consistent: The proposed project would be subject to State WDRs set forth in the local municipal stormwater permit, which require implementation of site design and stormwater control and treatment measures (including LID measures where necessary) to control any pollutant discharges through the runoff and to minimize site runoff such that the post-project flow drainage from the site must match pre-project flows.
County of Monterey (coastal zone)	North County Land Use Plan	Land Use and Development	Source Water Pipeline and new Desalinated Water Pipeline	***Key Policy 4.3.4:*** All future development within the North County coastal segment must be clearly consistent with the protection of the area's significant human and cultural resources, agriculture, natural resources, and water quality.	This policy is intended to provide long-term management and protection of the County's coastal resources.	Consistent: The proposed project would be implemented in conformance of State Construction General Permit and WDRs set forth in the local municipal code and stormwater permit. The WDR requirements would be incorporated into any new permits obtained prior to project operation, such as minimizing erosion and sediment control and runoff. The project's implications for cultural, agricultural, and terrestrial biological resources are discussed in EIR Sections 4.15, Cultural Resources, 4.16, Agriculture and Forestry Resources, and 4.6, Terrestrial Biological Resources, respectively, which present additional discussion of the project's conformity with applicable North County Land Use Plan policies governing these resource areas, respectively.
County of Monterey (inland areas)	North County Area Plan	Seismic, Geologic, Flood, and Fire Hazards	Castroville Pipeline	***16.2.1.1 (NC):*** Site plans for new development shall indicate all perennial or intermittent streams, creeks, and other natural drainages. Development shall not be allowed within these drainage courses, nor shall development be allowed to disturb the natural banks and vegetation along these drainage courses, unless such disturbances are with approved flood or erosion control or water conservation measures.	This policy is intended to protect streams, creeks, and natural drainages from development disturbances.	Consistent: Within the county of Monterey, the proposed project would be subject to State WDRs set forth in the local municipal stormwater permit, which require implementation of site design and stormwater control measures such that post-project flow drainage from the site must match pre-project flows. The requirements are also aimed at minimizing soil erosion and protecting water quality.
County of Monterey (inland areas)	North County Area Plan	Seismic, Geologic, Flood, and Fire Hazards	Castroville Pipeline	***16.2.11 (NC):*** New development in North County shall be required to limit peak storm runoff to pre-project or pre-soil disturbance levels, unless otherwise dictated by the Monterey County Flood control and Water Conservation District (MCFCWCD). Runoff shall be limited by construction of detention ponds or other approved measures. In areas where the potential for erosion also exists, detention ponds shall be constructed for the dual process of storm water detention and sediment control.	This policy is intended to limit peak storm runoff to pre-project or pre-soil disturbance levels for new development.	Consistent: Within the county of Monterey, the proposed project would be subject to State WDRs set forth in the local municipal stormwater permit, which require implementation of site design and stormwater control measures such that post-project flow drainage from the site must match pre-project flows. The requirements are also aimed at minimizing soil erosion and protecting water quality.
Fort Ord Reuse Authority (Seaside)	Fort Ord Reuse Plan	Conservation	New Transmission Main, ASR Conveyance Pipeline, ASR Pump-to-Waste Pipeline, and ASR Recirculation Pipeline	***Hydrology and Water Quality Policy A-1:*** At the project approval stage, the City shall require new development to demonstrate that all measures will be taken to ensure that runoff is minimized and infiltration maximized in groundwater recharge areas.	This policy is intended to control runoff from new development.	Consistent: Within the county of Monterey, the proposed project would be subject to State WDRs set forth in the local municipal stormwater permit, which require implementation of site design and stormwater control measures such that post-project flow drainage from the site must match pre-project flows. The requirements are also aimed at minimizing soil erosion and protecting water quality.

TABLE 4.3-7 (Continued)
APPLICABLE REGIONAL AND LOCAL LAND USE PLANS, POLICIES, AND REGULATIONS PERTAINING TO SURFACE WATER HYDROLOGY AND WATER QUALITY

Project Planning Region	Applicable Plan	Plan Element/ Section	Project Component(s)	Specific Plan, Policy, or Ordinance	Relationship to Avoiding or Mitigating a Significant Environmental Impact	Project Consistency with Plan, Policy, or Ordinance
Fort Ord Reuse Authority (Seaside)	Fort Ord Reuse Plan	Conservation	New Transmission Main, ASR Conveyance Pipeline, ASR Pump-to-Waste Pipeline, and ASR Recirculation Pipeline	***Hydrology and Water Quality Policy C-2:*** At the project approval stage, the City shall require new development to demonstrate that all measures will be taken to ensure that onsite drainage systems are designed to capture and filter out urban pollution.	This policy is intended to control runoff from new development.	Consistent: Within the county of Monterey, the proposed project would be subject to State WDRs set forth in the local municipal stormwater permit, which require implementation of site design and stormwater control measures such that post-project flow drainage from the site must match pre-project flows. The requirements are also aimed at minimizing soil erosion and protecting water quality.
Fort Ord Reuse Authority (Monterey County)	Fort Ord Reuse Plan	Conservation	Ryan Ranch–Bishop Interconnection Improvements	***Hydrology and Water Quality Policy A-1:*** At the project approval stage, the County shall require new development to demonstrate that all measures will be taken to ensure that runoff is minimized and infiltration maximized in groundwater recharge areas.	The intent of this policy is for new development to demonstrate implementation of measures to minimize and allow infiltration of the runoff.	Consistent: There would be no aboveground improvements that would constitute new development and increase in runoff. The proposed pipelines as part of the interconnections would be located underground and the surface along the pipeline alignments would be restored to pre-construction conditions.
Fort Ord Reuse Authority (County of Monterey)	Fort Ord Reuse Plan	Conservation	Ryan Ranch–Bishop Interconnection Improvements	***Hydrology and Water Quality Policy C-2*:** At the project approval stage, the County shall require new development to demonstrate that all measures will be taken to ensure that onsite drainage systems are designed to capture and filter out urban pollution.	The intent of this policy is for new development to demonstrate that onsite drainage systems are implemented such that they capture and filter out urban runoff.	Consistent: There would be no aboveground improvements that would constitute new development and increase in runoff. The proposed pipelines as part of the interconnections would be located underground and the surface along the pipeline alignments would be restored to pre-construction conditions.

SOURCE: City of Marina, 2000, 1982; City of Seaside, 2004b; FORA, 1997; Monterey County 1982, 1985, 1999, 2010a, 2010b 2013.

4.3.3 Evaluation Criteria

Implementation of the proposed project (MPWSP), which would include 10 slant wells at CEMEX, would have a significant impact related to surface water hydrology and water quality if it would:

- Violate any water quality standards or waste discharge requirements;
- 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 that would result in substantial erosion or siltation on- or offsite;
- 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 increasing the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- Otherwise substantially degrade water quality;
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other authoritative flood hazard delineation map;
- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;
- 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;
- Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche,[27] tsunami, or mudflow;
- Exceed the numeric water quality objectives established in the Ocean Plan, including those for salinity that require discharges not to exceed 2 ppt over ambient salinity levels at the edge of the regulatory Brine Mixing Zone (BMZ) associated with operation of new desalination facilities or cause dissolved oxygen concentration to be depressed more than 10 percent from that which occurs naturally as the result of the discharge of oxygen demanding waste materials; or,
- Expose people or structures to a significant risk of loss, injury, or death involving coastal flooding from sea level rise.

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

- ***Place Housing within a 100-Year Flood Hazard Zone.*** The proposed project would not involve construction of new housing or structures for human occupancy within a 100-year flood hazard zone. Therefore, the evaluation criterion related to the placement of housing

[27] A seiche is a rhythmic motion of water in a partially or completely landlocked water body caused by earthquakes, landslides, tsunamis, or local changes in atmospheric pressure.

within a 100-year flood hazard zone is not applicable to the proposed project and is not discussed further.

- ***Expose People or Structures to Inundation by Seiche or Mudflow.*** The proposed project would have no effect on the frequency or probability of seiches (i.e., earthquake-induced oscillating waves in an enclosed water body such as the Del Monte Lake, Laguna del Rey, or El Estero Lake in the project area) because the proposed project would not create new enclosed water bodies or affect the frequency of earthquakes (see Section 4.2.5.2). Further, as the proposed project would not include construction of habitable structures, there would be no impacts related to property loss, injury, or death from a seiche. Due to the relatively flat topography of the project area, project implementation would not expose people or property to increased mudflow hazards. Therefore, no impact related to inundation by seiche or mudflow would result from the proposed project, and this topic is not discussed further.

- ***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.*** There are no dams or levees adjacent to the project area. Dams that are located in the region include Los Padres Dam on the Carmel River and Nacimiento and San Antonio Dams on the Salinas River. The Castroville Pipeline and Castroville Pipeline Optional Alignment 1 would be located within the dam inundation zone for Nacimiento and San Antonio Dams, but would be located below ground and, as such, are unlikely to become damaged during such an event and would not redirect flood flows in a manner that causes increased flood hazard offsite. None of the other proposed facilities would lie within a predicted dam inundation zone. Implementation of the proposed project would not affect reservoir operations. Therefore, the proposed project would not expose people or structures to flooding damages due to failure of a dam or levee. There would be no impact associated with potential flooding from levee or dam failure. Relevant flooding-related issues are addressed under Impacts 4.3-8 through 4.3-10 in Section 4.3.5.2, below.

- ***Violate any water quality standards or waste discharge requirements, or substantially degrade water quality, as a result of increased temperatures from operational discharges.*** Based on published literature on desalination plant discharges, temperature is a commonly studied parameter due to the commingling of the brine streams from desalination plants with power plant discharges of cooling water that have high temperatures (Roberts et al., 2010; Dawoud and Al Mulla, 2012). Such commingling of brine and power plant thermal discharges increase the temperature of operational discharges as a result of processes inherent to power plant cooling operations that involve high temperatures (Dawoud and Al Mulla, 2012). However, the proposed MPWSP Desalination Plant would not operate in combination with a power plant or other facility that uses ocean waters for cooling purposes. There would be no heating mechanism or any process that would increase the temperature of the source water as it passes through the treatment units. Therefore, the desalination process under the MPWSP would not substantially increase the temperature of the discharged effluent, and thermal impacts on receiving waters are not discussed further.

4.3.4 Approach to Analysis

This analysis evaluates the potential effects of the MPWSP (proposed project/10 slant wells at CEMEX) on surface water hydrology and water quality during project construction and operations. The reported ambient water quality parameters and constituent levels described in

Section 4.3.1.3, above, are considered to be representative of baseline concentrations; these are used, in part, to assess the proposed project's impacts on water quality. Construction-related effects on surface water hydrology and water quality relate to direct and indirect impacts that could occur during construction activities, including site preparation and clearing, excavation, dewatering, and demobilization and site restoration. Operational impacts involve long-term effects related to facility siting, operational discharges, and maintenance activities. The impact analysis is organized by construction impacts and operational impacts.

The discussion of construction impacts presented in Section 4.3.5.1, below, is based on conservative assumptions regarding project construction activities, existing site conditions, and the applicable water quality objectives established by the Construction General Permit and the local ordinances.

The discussion of operational impacts presented in Section 4.3.5.2 is based on conservative assumptions regarding operational discharges and any potential post-construction or long-term effects from building the new facilities (such as increases in storm runoff from addition of impervious surfaces). Additionally, the assessment of long-term operational discharges of desalination brine is based on analyzing adverse impacts on water quality and the environment, including consideration of the risk of hypoxia, or so-called "dead zones," occurring in the marine environment as a result of increased salinity and/or decreased dissolved oxygen. To assess these risks, model analyses were conducted to characterize projected salinity increases in the immediate vicinity of the discharge point (diffuser port upon discharge) or near-field, as well as farther away from the discharge at the regulatory compliance point represented by the edge of the BMZ, which is 100 meters (348 feet) from the discharge point (far-field). Modeling analyses were conducted for a number of likely discharge scenarios, including brine-only discharges and combined discharges where the brine effluent may be mingled with secondary treated wastewater with different seasonal characteristics during a typical operational year. Additionally, model analyses were conducted to determine whether discharges would be in compliance with numeric Ocean Plan water quality objectives. Specifically, the in-pipe concentration of a broad suite of water quality constituents was calculated. Following such calculation, a dilution model was applied to determine each water quality constituent's concentration at the regulatory point of compliance to determine Ocean Plan compliance and identify potential impacts related to water quality.

The impact analysis describes if, and to what degree, the MPWSP would change the existing hydrology, water quality, and flooding conditions described in Section 4.3.1 and how the MPWSP would comply with or exceed any regulatory requirements described in Section 4.3.2 (for certain regulations, compliance determinations are discussed in Section 4.3.2 only). The severity of an impact is determined using the evaluation criteria identified in Section 4.3.4. Impacts on water quality associated with the brine discharge are evaluated in the context of and against the requirements specified in the recently amended Ocean Plan water quality objectives (SWRCB, 2016). In response to public comments, specific analyses were conducted to address risks related to the occurrence of hypoxia, or so-called "dead zones," in the proximity of the discharge point.

4.3.5 Direct and Indirect Effects of the Proposed Project

Table 4.3-8 summarizes the significance determinations related to surface water hydrology and water quality impacts of the proposed project (10 slant wells at CEMEX).

TABLE 4.3-8
SUMMARY OF IMPACTS –
SURFACE WATER HYDROLOGY AND WATER QUALITY

Impacts	Significance Determinations
Impact 4.3-1: Degradation of water quality associated with increased soil erosion and inadvertent releases of hazardous chemicals during general construction activities.	LS
Impact 4.3-2: Degradation of water quality from construction-related discharges of dewatering effluent from open excavations and water produced during well drilling and development.	LSM
Impact 4.3-3: Degradation of water quality from discharges of treated water and disinfectant from existing and newly installed pipelines during construction.	LS
Impact 4.3-4: Violate water quality standards or waste discharge requirements or degrade water quality from increased salinity as a result of brine discharge from the operation of the MPWSP Desalination Plant.	LSM
Impact 4.3-5: Violate water quality standards or waste discharge requirements or degrade water quality as a result of brine discharge from the operation of the MPWSP Desalination Plant.	LSM
Impact 4.3-6: Degradation of water quality due to discharges associated with maintenance of the subsurface slant wells and the ASR-5 and ASR-6 Wells.	LS
Impact 4.3-7: Alteration of drainage patterns such that there is a resultant increase in erosion, siltation, or the rate or amount of surface runoff.	LS
Impact 4.3-8: Alteration of drainage patterns such that there is an increase in flooding on- or offsite or the capacity of the stormwater drainage system is exceeded.	LS
Impact 4.3-9: Impedance or redirection of flood flows following construction due to the siting of project facilities in a 100-year flood hazard area.	LS
Impact 4.3-10: Exposure of people or structures to a significant risk of loss, injury, or death from flooding due to a tsunami.	LS
Impact 4.3-11: Exposure of people or structures to a significant risk of loss, injury, or death from flooding due to sea level rise.	LS
Impact 4.3-C: Cumulative impacts related to surface water hydrology and water quality.	LSM

NOTES:
LS = Less than Significant impact, no mitigation proposed
LSM = Less than Significant impact with Mitigation

4.3.5.1 Construction Impacts

Impact 4.3-1: Degradation of water quality associated with increased soil erosion and inadvertent releases of hazardous chemicals during general construction activities. (*Less than Significant*)

General Construction Activities (Applies to All Project Components)

Project construction activities would involve site clearing and earthmoving activities, excavation and soil stockpiling, and temporary storage and use of chemicals such as fuel. Earthmoving activities associated with project construction would include vegetation removal, grading, excavation, soil stockpiling, and backfilling. Prior to construction mobilization, the contractor(s) would prepare construction work areas and staging areas by removing vegetation and debris, and grading these areas to provide a relatively level surface for the movement of construction equipment.

Soil disturbing activities could result in soil erosion and the migration of soil and sediment in stormwater runoff to downgradient water bodies and storm drains. Sediment from project-related construction activities could degrade the water quality of receiving water bodies such as the Salinas River and Monterey Bay.

As part of project construction, workers would install approximately 21 miles of pipelines. Most pipeline segments would be installed using conventional open-trench construction methods. Open excavations would also be required for construction of buildings and aboveground structures, including the MPWSP Desalination Plant, ASR-5 and ASR-6 Wells, and Carmel Valley Pump Station. Grading and earthwork would be required for foundations, parking areas, and access road improvements. The combination of all project construction activities would generate an estimated 25,110 cubic yards of excess spoils and construction debris. If not properly managed, stockpiled spoils could migrate offsite during precipitation events and could result in increased sedimentation in downstream receiving waters bodies.

Construction activities could also result in the accidental release of hazardous construction chemicals such as adhesives, solvents, fuels, and petroleum lubricants that, if not managed appropriately, could adhere to soil particles, become mobilized by rain or runoff, and degrade water quality.

Project construction activities would disturb more than one acre of soil, and therefore would be subject to the NPDES Construction General Permit requirements. As required under the Construction General Permit, a Storm Water Pollution Prevention Plan (SWPPP) would be prepared by a Qualified SWPPP Developer and a Qualified SWPPP Practitioner would oversee its implementation. The SWPPP, which would include specific measures and conditions to reduce or eliminate stormwater flow carrying any pollutants or sediment from the drilling and related construction activities, would be implemented throughout the duration of construction activities. As discussed in Section 4.3.2, Regulatory Framework, above, the SWPPP is required to include specific elements such as erosion and stormwater control measures that would be implemented onsite. At a minimum, the SWPPP must include the following:

- A description of construction materials, practices, and equipment storage maintenance;
- A list of pollutants likely to contact stormwater and site specific erosion and sedimentation control practices;
- A list of provisions to eliminate or reduce discharge of materials to stormwater;
- BMPs for fuel and equipment storage;
- Non-stormwater management measures to manage pollutants generated by activities such as paving operations and vehicle and equipment washing and fueling;

- The requirement that the appropriate equipment, materials, and workers be available to respond rapidly to spills and/or emergencies. All corrective maintenance or BMPs must be performed as soon as possible, depending upon worker safety; and
- Onsite post-construction controls.

Examples of typical construction Best Management Practices (BMPs) include scheduling or limiting certain activities to dry periods of the year, installing sediment barriers such as silt fencing and fiber rolls, maintaining equipment and vehicles used for construction, and tracking controls such as stabilization of construction access points. The development and implementation of BMPs such as overflow structures designed to capture and contain any materials that are inadvertently released from the storage containers on the construction site is also required. In accordance with the Construction General Permit, a Rain Event Action Plan would be required to ensure that active construction sites have adequate erosion and sediment controls in place prior to the onset of a storm event, even if construction is planned only during the dry season.

The construction contractor(s) would also be required to develop and implement a monitoring program as required under the NPDES Construction General Permit. The contractor would be required to conduct inspections of the construction site(s) prior to anticipated storm events and after the actual storm events. During extended storm events, the inspections would be conducted after every 24-hour period. The inspections would be conducted to: identify areas contributing to stormwater discharge; evaluate whether measures to reduce pollutant loadings identified in the SWPPP are adequate, were properly installed, and are functioning in accordance with the Construction General Permit; and determine whether additional control practices or corrective measures are needed. Mandatory compliance with the NPDES Construction General Permit requirements would prevent significant construction-related impacts on water quality during general construction activities.

In addition to the NPDES Construction General Permit requirements, construction contractor(s) would be required to comply with the local City municipal codes and the County code, depending on the construction activities and the pertinent jurisdictions. For example, construction of the subsurface slant wells in the CEMEX active mining area and approximately 0.25 mile (1,320 feet) of the Source Water Pipeline would be subject to the City of Marina Municipal Code, which requires the installation of erosion control measures such as sediment fencing and adequate set back from the shoreline to withstand erosion to the extent that the reasonable economic life of the use would be guaranteed without need for shoreline protection structures. (Refer to Section 4.2, Geology, Soils, and Seismicity, for a discussion of effects associated with coastal erosion.) Mandatory compliance with the water quality protection requirements of the Construction General Permit and the accompanying regulatory process would ensure that the necessary controls to minimize soil erosion, manage runoff, and protect water quality are in place during general construction activities. Therefore, the water quality impact associated with general construction activities would be less than significant.

Impact Conclusion

For all project facilities, mandatory compliance with NPDES Construction General Permit requirements would involve implementation of erosion and stormwater control measures, which would prevent substantial adverse effects on water quality during construction. The impact on water quality associated with increased soil erosion and sedimentation, and inadvertent releases of hazardous chemicals during general construction activities, would be less than significant for all project components. No mitigation is necessary.

Mitigation Measures

None proposed.

Impact 4.3-2: Degradation of water quality from construction-related discharges of dewatering effluent from open excavations and water produced during well drilling and development. (*Less than Significant with Mitigation*)

Discharges of Water Produced during Well Drilling and Development (Subsurface Slant Wells and ASR-5 and ASR-6 Wells)

Construction activities associated with the subsurface slant wells and ASR-5 and ASR-6 Wells would involve: drilling the borehole (well drilling); constructing the well inside the borehole by installing the well casing and well screens and filling the annulus around the casing with a gravel (filter) pack and cement seal (well construction); and then surging water in and out of the well screen openings to clean the borehole and properly settle the gravel pack (well development).

Subsurface Slant Wells

Drilling of the subsurface slant wells would involve the use of water, bentonite mud, and/or the use of environmentally-inert biodegradable additives to push the drill rig through the uppermost layer of dry dune sands (the uppermost 100 feet so, when drilling at an angle). Once the drill bit reaches groundwater, the mud slurry from the upper 100 feet of drilling would be pumped out and put it in a storage container for offsite hauling and disposal. Beyond this point only the water already present in the sand and potable water would be used to circulate the drill cuttings. Once the borehole and the casing and gravel pack have been installed, potable water would be circulated through the well casing to develop the well. The effluent produced during well development, which may contain soil cuttings and formation water (water present at depth in geologic materials), would be pumped to baker tanks to allow sediment to settle out. The clarified effluent would then either be conveyed to the existing discharge pipeline for the test slant well and discharged to the ocean waters of MBNMS via the MRWPCA ocean pipeline and outfall in accordance with the MRWPCA's NPDES permit, or percolated into the ground at the CEMEX active mining area. The muds generated during drilling in the wet dune sands (beyond the first 100 feet) and development of the subsurface slant wells would fall under the category of "Water Supply Well Drilling Muds" in the General Waiver. The water produced during slant well drilling and development would be considered a "water supply discharge" under the General Waiver of

WDRs for Specific Types of Discharges (General Waiver) (RWQCB Resolution R3-2014-0041), discussed above in Section 4.3.2, Regulatory Framework. CalAm would not be required to submit a waste discharge report. However, the following conditions of the General Waiver would apply:

- The discharge shall be spread over an undisturbed, vegetated area capable of absorbing the top-hole water and filtering solids in the discharge, and spread in a manner that prevents a direct discharge to surface waters;
- The pH of the discharge shall be between 6.5 and 8.3;
- The discharge shall not contain oil or grease;
- The discharge area shall not be within 100 feet of a stream, water body, wetland, or streamside riparian corridor;
- The discharger shall implement appropriate management practices to dissipate energy and prevent erosion;
- The discharger shall implement appropriate management practices to preclude discharge to surface waters and surface water drainage courses; and
- The discharger shall immediately notify the Central Coast RWQCB staff of any discharge to surface waters or surface water drainages. The discharge shall not have chlorine or bromine concentrations that could impact groundwater quality.

Because the disposal of water produced during well drilling and development activities would comply with the conditions of the MRWPCA's NPDES permit and General Waiver, which are set to prevent impacts on water quality, there would be no injury to sanctuary resources, so the impact would be less than significant and no mitigation is proposed.

ASR Injection/Extraction Wells (ASR-5 and ASR-6 Wells)

As described in Section 3.5.7 of Chapter 3, Description of the Proposed Project, the ASR injection/extraction wells would be drilled without the use of drilling muds containing bentonite clays. However, when necessary and depending on the formation material encountered, certain commercially available additives could be combined with the drilling water to increase fluid viscosity and stabilize the walls of the boring to prevent reactive shale and clay from swelling and caving into the hole. Other products used to enhance the drilling performance help reduce the buildup of solids, decrease friction, and aid in reducing solids suspension. Drilling mud additives are commonly used by the well drilling industry for the drilling and installation of groundwater wells. Because the additives are combined with the water and are circulated through the borehole annulus during drilling, they react locally within the borehole and do not migrate into the surrounding groundwater formation. The additives are noncorrosive, biodegradable and do not contain chemicals that would contaminate the groundwater supply.

The muds and clay slurry generated during the drilling and development of the proposed ASR-5 and ASR-6 Wells in the Fitch Park military housing area would fall under the category of "Water Supply Well Drilling Muds" in the General Waiver. Water extracted during drilling and development of the ASR-5 and ASR-6 Wells would be placed in portable holding tanks to settle out solids, conveyed to a 1.4-acre natural depression located east of the intersection between San Pablo Avenue and General Jim Moore Boulevard, and subsequently percolated into the ground. Similar to the subsurface slant wells, it is anticipated that discharges of water produced during the drilling and development of the ASR-5 and ASR-6 Wells would be conducted in accordance with the General Waiver. Thus, the same conditions of the General Waiver described above for the slant wells would also apply to the ASR-5 and ASR-6 Wells.

Adherence to the conditions of the General Waiver would prevent significant adverse effects on water quality from discharges of water produced during drilling and development of the ASR-5 and ASR-6 Wells. The impact would be less than significant.

Dewatering Discharges (All Other Project Facilities)

Dewatering could be required during construction to create a dry work area if surface water or groundwater is encountered in excavations. Project construction activities, particularly open-cut trenching, jack-and-bore, and microtunneling for the installation of pipelines, could intercept shallow or perched groundwater and require temporary localized dewatering to facilitate construction.

Most of the dewatering effluent produced during construction and excavation is considered a low threat and could be discharged to land or the stormwater drainage system provided it complies with the *General WDRs for Discharges with a Low Threat to Water Quality* (Order No. R3-2011-0223, NPDES Permit No. CAG993001) (RWQCB, 2011a). The construction contractor(s) would be required to control, test, and treat the extracted water as needed to minimize or avoid water quality degradation, erosion, and sedimentation in the receiving waters. To receive coverage under the General WDRs, CalAm would submit a NOI along with the following materials to the Central Coast RWQCB (2011a):

- A list of all chemicals (including Material Safety Data Sheets) added to the water and the concentrations of such additives in the discharged effluent;
- Certified analytical results of the effluent for all priority toxic pollutants listed in Attachment D of the General WDRs. These analyses would fulfill the requirements set forth in the California Toxics Rule to evaluate the potential for water quality degradation and establish effluent limits, unless the discharge meets all requirements for a conditional exception;
- Certified analytical results of representative samples of the receiving surface water collected 50 feet upstream and 50 feet downstream from the point of discharge, respectively. Alternately, if access is limited, the samples can be collected at the first point upstream and downstream of the discharge, respectively, that is accessible for the following constituents: pH, temperature, color, turbidity, and dissolved oxygen;
- For low-threat discharges from proposed facilities, CalAm would provide analytical data for discharges from similar existing facilities, or information regarding the anticipated discharge characteristics of the proposed facility based on the specific facility design. As part of facility startup, CalAm would submit all analytical results required in Section A of the General WDRs; and

- If the concentration of any constituent in the effluent sampled under the second bullet above exceeds the applicable criterion listed in Attachment D of the General WDRs, CalAm may submit a Reasonable Potential Analysis[28] consistent with Section 1.3 of the State Implementation Policy or Appendix VI of the Ocean Plan, as applicable.

As discussed in Section 4.3.2, Regulatory Framework, and in the bulleted list above, CalAm would be required to test the dewatering effluent for possible pollutants. The analytical constituents for such tests are generally based on the source of the water, the land use history of the construction site, and potential impacts on the quality of the receiving water. If the dewatering effluent meets the water quality requirements of the General WDRs, CalAm's construction contractor(s) would discharge the dewatering effluent to vegetated upland areas or the local storm drain system in accordance with the General WDRs. It is assumed most dewatering effluent would be disposed of in accordance with the General WDRs.

As described in detail under **Impact 4.7-2**, sites with known soil and/or groundwater contamination are located close to or extend into the proposed construction alignments for pipelines. The contaminants with the potential to be encountered during project construction activities include petroleum hydrocarbons, VOCs, PAHs, and metals from gasoline service stations, and dry cleaners. The dewatering of contaminated groundwater during construction excavation activities would be considered a significant impact if the contaminated groundwater (i.e., dewatering effluent) were not handled properly and released into the environment. The impact would be reduced to a less-than-significant level with implementation of **Mitigation Measure 4.7-2b (Soil and Groundwater Management Plan)**, which requires CalAm or its contractor to develop a groundwater dewatering control and disposal plan that identifies locations where groundwater dewatering is likely to be required, the method to analyze groundwater for hazardous materials, and appropriate treatment and/or disposal methods. If the dewatering effluent contains contaminants that exceed the requirements of the *General WDRs for Discharges with a Low Threat to Water Quality* (Order No. R3-2011-0223, NPDES Permit No. CAG993001), the construction contractor shall contain the dewatering effluent in a portable holding tank for appropriate offsite disposal or discharge.

Impact Conclusion

The water extracted during drilling and development of the subsurface slant wells and ASR-5 and ASR-6 Wells would be disposed of in accordance with the MRWPCA's NPDES permit (for discharges via the ocean outfall) and General Waiver (RWQCB Resolution R3-2014-0041) for clarified effluent that is percolated into the ground. All discharges of water produced during well drilling and development would occur in compliance with regulatory requirements that are protective of the receiving waters. Therefore, the impact associated with discharges of water produced during drilling and development of the subsurface slant wells and ASR-5 and ASR-6 Wells would be less than significant.

With respect to general construction dewatering, it is anticipated that most dewatering effluent would be disposed of in accordance with the General WDRs (Central Coast RWQCB Order R3-

[28] A Reasonable Potential Analysis is the process for determining whether any of the constituents in a discharge causes, has reasonable potential to cause, or contributes to an exceedance of a water quality standard.

2011-0223). However, discharges of dewatering effluent exceeding the water quality limitations in the General WDRs would result in a significant impact. This impact would be reduced to a less-than-significant level with implementation of the **Mitigation Measure 4.7-2b**. Thus, for all project facilities except the subsurface slant wells and ASR-5 and ASR-6 Wells, the impact associated with discharges of dewatering effluent would be less than significant with implementation of mitigation.

Mitigation Measures

Mitigation Measure 4.7-2b applies to all project components except the subsurface slant wells and the ASR-5 and ASR-6 Wells.

Mitigation Measure 4.7-2b: Soil and Groundwater Management Plan.

(See Section 4.7, Hazards and Hazardous Materials, for the description.)

Impact 4.3-3: Degradation of water quality from discharges of treated water and disinfectant from existing and newly installed pipelines during construction. (*Less than Significant)*

Prior to constructing the connections between existing and new pipelines, segments of existing pipelines would need to be drained and disinfected before being returned to service. Newly installed pipelines (i.e., the Source Water Pipeline, new Desalinated Water Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Brine Discharge Pipeline, new Transmission Main, ASR pipelines [ASR Conveyance Pipeline, ASR Pump-to-Waste Pipeline, ASR Recirculation Pipeline], and the pipelines associated with the Ryan Ranch-Bishop Interconnection Improvements and Main System-Hidden Hills Interconnection Improvements) would also be disinfected before being put into service. It is anticipated that chlorine would be used for disinfection. The treated water generated from the draining of existing pipelines and the effluent generated from disinfection of newly installed pipelines would be discharged to the local storm drainage system or discharged in compliance with stormwater control requirements in the respective local jurisdictions (e.g., to percolation ponds as may be directed by U.S. Army approvals on Army-owned property). Without proper controls, these discharges could adversely affect water quality in downstream receiving water bodies by increasing turbidity (if discharged directly without appropriate treatment) or due to high chlorine (the primary disinfectant used for drinking water) concentrations. However, the discharges would be subject to the *General WDRs for Discharges with Low Threat to Water Quality* (Order No. R3-2011-0223, NPDES Permit No. CAG993001). The General WDRs require that CalAm neutralize the residual chlorine remaining in disinfection effluent such that detectable chlorine levels are less than 0.02 mg/L, and require that the total dissolved solids be within surface water and groundwater quality objectives (RWQCB, 2011a). Compliance with the General WDRs and the conditions therein would protect water quality in receiving water bodies. Therefore, the impact would be less than significant.

All Other Proposed Facilities

None of the other proposed facilities (i.e. the Slant Wells, Desalination Plant, and Carmel Valley Pump Station) are anticipated to require flushing and generate disinfection effluent prior to being brought online. Thus, no impact would result.

Impact Conclusion

Adherence to the General WDRs (Order No. R3-2011-0223, NPDES Permit No. CAG993001) would ensure this impact is less than significant for the Source Water Pipeline, Pipeline to CSIP Pond, Castroville Pipeline, Brine Discharge Pipeline, new Desalinated Water Pipeline, new Transmission Main, ASR pipelines, Ryan Ranch-Bishop Interconnection Improvements, and Main System-Hidden Hills Interconnection Improvements. Construction of all other proposed project facilities would have no impact on water quality associated with discharges of treated water or disinfection effluent.

Mitigation Measures

None proposed.

4.3.5.2 Operational and Facility Siting Impacts

Impact 4.3-4: Violate water quality standards or waste discharge requirements for salinity, or degrade water quality from increased salinity as a result of brine discharge from the operation of the MPWSP Desalination Plant. (*Less than Significant with Mitigation*)

Operational discharges from the MPWSP would locally increase salinity levels and thus could violate water quality standards or waste discharge requirements or otherwise degrade the water quality of receiving waters in Monterey Bay, within MBNMS. As described in Section 4.3.2.2, the Ocean Plan establishes receiving water salinity limitations for brine discharges from desalination facilities to protect the quality of ocean waters for beneficial uses (such as aquatic habitat). This impact analysis uses the Ocean Plan's receiving water salinity limitations as significance thresholds, incorporates the Ocean Plan's requirements relating to water quality, and is consistent with the methods prescribed in the Ocean Plan for assessing increased salinity from the operation of desalination plants. In response to public comments, additional analysis is provided to address risks of increased salinity causing hypoxia, or so-called "dead zones" in the marine environment.

The Ocean Plan limits the increase of salinity of receiving water from desalination plant discharges to a daily maximum of 2 parts per thousand (ppt) above natural background salinity as measured no further than 100 meters (328 ft) horizontally from each discharge point (known as the brine mixing zone [BMZ]). For the MPWSP, the BMZ represents an area of approximately 27 acres based on the existing outfall diffuser structure (see Figure 4.3-7). While salinity increment limitations of 2 ppt must be met at the boundary of the BMZ, the Ocean Plan also requires that dischargers estimate salinity levels within the BMZ, where salinity may exceed 2.0 ppt above natural background salinity, to determine the potential frequency and intensity of impacts on marine biological resources and beneficial uses. As described in Section 4.3.3, a significant impact related to water quality, water quality standards or waste discharge requirements would occur if operational discharges from the MPWSP resulted in salinity greater than 2 ppt over ambient salinity levels at the edge of the BMZ. Consistent with Ocean Plan and MBNMS requirements, this impact analysis also evaluates the salinity and dilution dynamics of operational discharges within the BMZ by determining the Zone of Initial Dilution (ZID) for each discharge scenario and describes areas where salinity would exceed 2 ppt. The determination of the dilution dynamics, extent of the ZID, and determination of areas where salinity exceeds 2 ppt supports water quality analyses for other constituents (i.e., in addition to salinity) listed in the Ocean Plan (see Impact 4.3-5) and analysis of impacts on marine habitat and wildlife presented in Section 4.5, Marine Biological Resources. Additionally, the analysis addresses comments received during the public comment period for the April 2015 DEIR, on the fate and travel path of the discharge plume beyond the BMZ and the potential for hypoxia[29] to occur near the seabed. The Ocean Plan limits dissolved oxygen decreases as a result of operational discharges to no more than 10 percent from that which occurs naturally. Exceeding this standard for dissolved oxygen would result in a significant impact related to water quality, water quality standards or waste discharge requirements.

Introduction to the Impact Analysis for Salinity

To comprehensively assess and describe the water quality effects associated with operational discharges and increased salinity of the proposed project (10 Slant Wells at CEMEX), Impact 4.3-4 is structured as follows:

- **Operational Discharge Scenarios**: The impact analysis first describes the range of operational discharges that could occur with implementation of the MPWSP to provide context for the modeling completed in support of the project analyses.
- **Approach to Analysis**: This subsection describes the various studies and model analyses related to plume dynamics, dilution, and salinity that were completed in support of the analysis of impacts related to the Project.
- **Dense Operational Discharges - Salinity Impact Analysis**: The analysis presents an assessment of effects on receiving water salinity levels for operational discharges that are denser than the ambient receiving sea water. Sinking plumes have substantially lower initial dilution from turbulent mixing than positively buoyant, or rising, plumes (i.e., discharges with densities less than the receiving seawater). As such, the evaluation of potential salinity impacts from MPWSP operational discharges focuses on negatively buoyant discharges.
- **Dense Operational Discharges - Areas Exceeding 2 ppt Salinity**: Consistent with Ocean Plan requirements, this analysis evaluates the plume dynamics of dense, negatively buoyant operational discharges to quantify areas where salinity would exceed 2 ppt above natural background salinity around the outfall diffuser. Areas determined to exceed 2 ppt above natural background salinity are considered further in Section 4.5, Marine Biological

[29] Hypoxia, or oxygen depletion, is an environmental phenomenon where the concentration of dissolved oxygen in the water column decreases to a level that can no longer support living aquatic organisms (so-called “dead zones”)

Resources, in the context of assessing and quantifying potential for mortality of aquatic wildlife and loss of habitat from operational discharges.

- **Dense Operational Discharges – Additional Considerations**: This subsection addresses concerns raised during the public comment period for the April 2015 DEIR. The comments received involved the brine discharge and its travel path beyond the BMZ, concerns relating to the propagation of a dense saline plume along the sea floor, and the potential for hypoxia to occur near the seabed as a result of extremely elevated salinity levels adjacent to the outfall diffuser.
- **Buoyant Operational Discharges – Analysis and Discussion**: The analysis evaluates positively buoyant operational discharges (i.e., that have densities less than the receiving seawater) using model analyses to determine salinity, dilutions, and plume behavior.
- **Impact Summary and Conclusion**: The above-described analyses are followed by a summary analysis that characterizes the entire range of results for the project. This section provides an impact statement and conclusion in the context of the relevant significance criteria.

Operational Discharge Scenarios

Described here is the range of operational discharge scenarios that could occur with implementation of the MPWSP to provide context for the modeling completed in support of the project impact analyses. The scenarios include brine-only discharges and combined discharges, which occur during certain times of the year when the brine would be blended with secondary treated wastewater (when available) from the MRWPCA Regional Wastewater Treatment Plant.

The Desalination Plant of the proposed project would treat the source water drawn from the slant wells at a 42 percent recovery rate, and approximately 14 mgd of brine would be generated, consisting of concentrates from the pretreatment and reverse osmosis (RO) processes as well as waste effluent produced during routine backwashing and operation and maintenance of the pretreatment filters (see Section 3.2.2 for details). The brine generated in the desalination process would be discharged into MBNMS through the MRWPCA's existing ocean outfall (see **Figure 3-2**). The MRWPCA outfall consists of a 2.1-mile-long pipeline that terminates at a 1,100-foot-long diffuser resting above the ocean floor at approximately 90 to 110 feet below sea level. The outfall pipe consists of a 60-inch internal diameter (ID) reinforced concrete pipe (RCP), and the diffuser consists of 480 feet of 60-inch RCP with a single taper to 840 feet of 48-inch ID. The diffuser has 172 2-inch diameter ports: 65 in the 60-inch section, 106 in the 48-inch section and an opening at the end of the diffuser pipe (Figure A-4, Appendix D; the "end gate"). The ports discharge horizontally, alternating on both sides of the diffuser, at a spacing of 16 ft on each side except for one port in the taper section that discharges vertically for air release. The 42 ports closest to shore are presently closed, so there are 129 open ports distributed over a length of approximately 1,024 ft (312 m). The 129 open ports are fitted with 4-inch Tideflex "duckbill" check valves (the "4-inch" refers to the flange size, not the valve opening). Because the valves open as the flow through them increases, the cross-sectional area is variable. The opening at the bottom of the end gate (from which flows exit the diffuser for flushing purposes) is about two inches high. **Appendix D1** discusses the effect of the valves on the flow distribution in the diffuser as well as the procedure used for analyzing the internal hydraulics of the outfall and diffuser for the dilution modeling completed as part of the salinity impact assessment**.** The diffuser, representing the brine discharge point, would disperse the brine stream, thereby minimizing differences in salinity and other water quality parameters between the discharged brine and the surrounding seawater (see Section 3.2.2.5 for additional information).

During certain times of the year, the brine would blend with secondary treated wastewater (when available) from the MRWPCA Regional Wastewater Treatment Plant, forming a combined discharge (discussed in Section 3.2.2). **Table 4.3-9** shows the monthly projected brine flows from the MPWSP Desalination Plant and the 1998-2012 average monthly wastewater flows from the MRWPCA as well as the estimates for 2017 maximum and minimum that were developed in early 2017.

TABLE 4.3-9
MONTHLY AVERAGE FLOWS OF SECONDARY-TREATED WASTEWATER FROM THE MRWPCA REGIONAL WASTEWATER TREATMENT PLANT (1998–2012 AND PROJECTED 2017) AND THE ESTIMATED BRINE STREAM UNDER THE MPWSP
(MGD)

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
MPWSP Brine	13.98	13.98	13.98	13.98	13.98	13.98	13.98	13.98	13.98	13.98	13.98	13.98
1998–2012 Average Treated Wastewater from MRWPCA[1]	19.78	18.41	14.68	7.02	2.40	1.89	0.90	1.03	2.79	9.89	17.98	19.27
2017 Max. Treated Wastewater[2]	18.8	13.7	16.2	8.68	1.12	0.83	0.91	0.88	2.38	12.29	18.5	19.5
2017 Min. Treated Wastewater[2]	2.8	5.0	0.5	0	0	0	0	0	0	1.49	5.5	16.5

SOURCES: [1]MRWPCA, 2013; [2]Brown and Caldwell, 2017.

As shown in **Table 4.3-9**, the treated wastewater flow varies throughout the year, with the highest flows observed during the non-irrigation season (November through March) and the lowest flows observed during the irrigation season (April through October), when the treated wastewater is processed through the SVRP for tertiary treatment and distributed to irrigators through the CSIP. Based on the monthly projected brine flows from the MPWSP Desalination Plant and the average monthly wastewater flows from the MRWPCA, the following discharge scenarios were assessed (summarized in **Table 4.3-10**):

- **Scenario 1:** Baseline condition – current operational discharges of secondary treated MRWPCA wastewater without desalination brine.
- **Scenario 2:** Desalination brine only – proposed discharge of project brine without wastewater into Monterey Bay/MBNMS through the outfall. This scenario would occur during the irrigation season as a result of the MRWPCA wastewater flows being provided to irrigators. To conservatively assess the potential impacts from operational discharges, it is assumed for this analysis that the discharge of brine occurs without dilution by wastewater during the entire irrigation season (April - October).

TABLE 4.3-10
PROPOSED PROJECT DISCHARGE SCENARIOS MODELED

Scenario No.	Discharge Scenario	Constituent Flows[a] (mgd)	
		Secondary Effluent	Desal Brine
Typical Discharge Scenarios			
1	Secondary Effluent (SE) Only	19.78	0
2	Brine only	0	13.98
3	Brine + Low (1) SE	1	13.98
4	Brine + Low (2) SE	2	13.98
5	Brine + Low (3) SE	3	13.98
6	Brine + Low (4) SE	4	13.98
7	Brine + Moderate (5) SE	5	13.98
8	Brine + Moderate (6) SE	6	13.98
9	Brine + Moderate (7) SE	7	13.98
10	Brine + Moderate (8) SE	8	13.98
11	Brine + Moderate (9) SE	9	13.98
12	Brine + High (10) SE	10	13.98
13	Brine + High (15) SE	15	13.98
14	Brine + High (19.78) SE	19.78	13.98
High Brine Discharge Scenarios (post-shutdown operations)			
15	High Brine only	0	16.31
16	High Brine + Low (1) SE	1	16.31
17	High Brine + Low (2) SE	2	16.31
18	High Brine + Low (3) SE	3	16.31
19	High Brine + Low (4) SE	4	16.31
20	High Brine + Moderate (5) SE	5	16.31
21	High Brine + Moderate (6) SE	6	16.31
22	High Brine + Moderate (7) SE	7	16.31
23	High Brine + Moderate (8) SE	8	16.31
24	High Brine + Moderate (9) SE	9	16.31
25	High Brine + High (10) SE	10	16.31
26	High Brine + High (12) SE	12	16.31
27	High Brine + High (14) SE	14	16.31
28	High Brine + High (16) SE	16	16.31

NOTES:

[a] MRWPCA also accepts 0.01mgd of trucked brine waste for ocean disposal (“hauled waste”), which is stored in a pond and mixed with secondary effluent prior to being discharged. This “hauled brine” is included in all model analyses for dilution predictions.

SE= Secondary Effluent (MRWPCA wastewater).

SOURCE: Roberts 2017 (Appendix D1).

- **Scenarios 3 through 14**: Desalination brine with wastewater – proposed discharge of project brine with varying amounts of wastewater. These scenarios would occur during the non-irrigation season (November - March). For the combined discharge scenario, the analysis accounted for different wastewater flows ranging from 15 mgd to 19.78 mgd that result in a positively buoyant plume to a range of lower documented wastewater flow rates of 1 mgd to 10 mgd that result in a negatively buoyant plume.

- **Scenario 15**: Increased volumes of desalination brine only – as described in Section 3.4.1, following a shutdown of the desalination facility for repair or routine maintenance, CalAm may temporarily (up to 11 days) operate the desalination facility with one additional reverse osmosis module in service to catch up on production; however, the total annual production would not be increased. As with Scenario 2, brine would be discharged without wastewater into Monterey Bay/MBNMS through the outfall during the irrigation season as a result of the MRWPCA wastewater flows being provided to irrigators.

- **Scenarios 16 through 28**: High desalination brine volumes with wastewater – as with Scenarios 3 through 14, the analysis accounted for different wastewater flows being combined with the higher volume brine discharges.

The combined discharge during the non-irrigation season would be consistent with the recommendations in the SWRCB's technical report on discharges of brine from desalination plants[30] and with the amendments to the Ocean Plan (SWRCB, 2015; 2016) by "co-discharging it with municipal wastewater" and discharging it "through a multiple-port diffuser system" (SWRCB, 2016). The proposed brine-only discharge during the irrigation season would adhere to the panel's recommendation for discharge through a multiple-port diffuser system.

Approach to Analysis

Described here are the various studies and model analyses related to plume dynamics, dilution, and salinity that were completed in support of the analysis of impacts related to the proposed project.

Based on the amended Ocean Plan (SWRCB, 2016) described in Section 4.3.2, Regulatory Framework, the MPWSP Desalination Plant would result in a significant water quality impact if operational discharges would exceed a daily maximum of 2 ppt above natural background salinity as measured at the BMZ (328 ft horizontally from the discharge point). Discharges that are denser than the receiving seawater would result in a sinking plume that impacts the sea floor at some distance from the diffuser nozzle (**Figure 4.3-5**). Because of its high exit velocity, the jet of effluent discharged from the diffuser port entrains seawater that mixes with and dilutes the effluent. Because sinking plumes have substantially lower initial dilutions than positively buoyant or rising plumes, the evaluation of potential salinity impacts from operational discharges focuses on sinking plumes (i.e., those plumes comprised mainly of brine). However, the analysis also addresses the dilution dynamics and salinity of rising plumes.

[30] The recommendations were made as part of the Southern California Coastal Water Research Project, discussed in Section 4.3.2, Regulatory Framework.

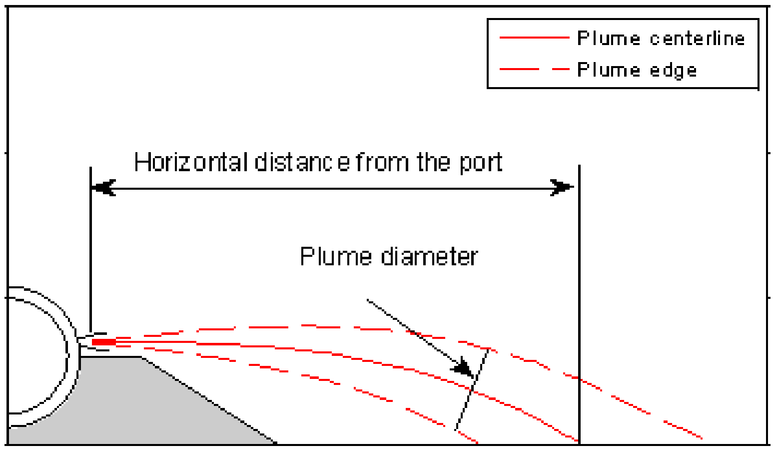

Figure 4.3-5
Illustrations of the Trajectory
of a Dense Brine Discharge Plume

Flow Science, Inc. (2014; see **Appendix D2**) conducted near-field (within the BMZ) modeling of the proposed MPWSP discharge through the existing MRWPCA outfall in Monterey Bay. Input to the model included temperature and salinity levels derived from within the ambient water column at Monterey Bay Aquarium Research Institute Monitoring Station C1 (see Figure 3 in **Appendix D2**) during the period from 2002 to 2012. This monitoring station is located approximately 5 miles northwest of the MRWPCA outfall at the head of the Monterey Submarine Canyon in an area considered representative of ambient conditions for the proposed discharge. The salinity and temperature of ocean water determine its density (discussed in detail in Section 4.3.1.3), which in turn affects the movement, dilution, and mixing of the brine plume upon discharge. Based on data (2010–2012) from Monterey Bay, a temperature, salinity, and density profile was developed for the upper 98 feet of the water column (the outfall diffuser is located at a depth of approximately 100 feet) for the three oceanic conditions (upwelling, oceanic, and Davidson, described in detail in Section 4.3.1.3, above). However, as described below, the temperature, salinity, density profile was subsequently updated to include more recent and site specific data from recent monitoring efforts. As discussed in Section 4.3.1, Setting / Affected Environment, salinity in Monterey Bay in the project vicinity, as monitored by the Monterey Bay Aquarium Research Institute, ranges between 33.1 and 34.2 ppt, with a natural variability of 3.3 percent or approximately 1.1 ppt and a temperature range from 47.5°F to 59.4°F. More recently, monthly measurements of salinity and temperature were collected between February 2014 and December 2015 by Applied Marine Sciences (Appendix D1) around the MRWPCA outfall at varying depths and locations. The purpose of this monitoring effort was to gather data over a nearly two-year period that reflected ocean conditions in the immediate vicinity of the outfall structure and to support model analyses. Seasonal average temperatures ranged between 52.7°F and 58.1°F and seasonal salinity levels ranged from 33.3 to 33.9 ppt at the depth of the diffuser.

An ocean current velocity of zero was used for the near-field modeling. This represents a worst-case (conservative) assessment scenario for dilution and mixing as it assumes no additional mixing or dilution from wave or tidal currents occurs in addition to that resulting from the momentum of the discharged plume (Flow Science, Inc., 2014; SWRCB, 2012a). A wastewater-only discharge scenario (Scenario 1) was modeled for the Davidson oceanic condition to understand the dynamics of the baseline non-irrigation-season condition. The brine-only discharge scenario (Scenario 2) was modeled for all three oceanic climate conditions,[31] and combined discharge scenarios (Scenarios 3 through 6) with varying amounts of wastewater were modeled for the non-irrigation season. For the combined discharge scenarios, the analysis incorporated data on salinity, temperature, and total dissolved solids (representative of salinity) measured in the treated wastewater from the MRWPCA Regional Wastewater Treatment Plant.[32]

Consistent with the recommendations in the SWRCB's technical report on discharges from desalination plants (SWRCB, 2012a), the near-field modeling analysis (Flow Science, Inc., 2014) studied the plume behavior in terms of the density (a function of temperature and salinity) and flow rate of the discharge. The differences between the salinity levels in the discharge stream and in the ambient (or receiving) water were calculated by determining the size of the brine plume, its trajectory in the ocean and the dilution of the brine with the ambient seawater within the ZID (which occurs within the BMZ for all discharge scenarios assessed, as described below). As in Section 4.3.2, Regulatory Framework, under the Ocean Plan, the ZID (or the regulatory mixing zone) is defined as the zone adjacent to a discharge where momentum and buoyancy-driven mixing produces rapid dilution of the discharge (Flow Science, Inc., 2014). The size of the plume and the extent of dilution depends in part on whether the plume is positively buoyant (rising) or negatively buoyant (dense or sinking) (**Figure 4.3-4**). In the near-field analysis for a sinking plume, the edge of the ZID would be located at the point where the plume contacts the sea floor. The edge of the ZID for a buoyant plume would be located at the point where the plume reaches the water surface or attains a depth level at which the density of the diluted effluent plume becomes the same as the density of ambient water (i.e., the "trap" level).

Flow Science, Inc. (2014) used two analytical methods — the Semi-Empirical Analysis (SEA) and the mathematical model UM3 in the US EPA model suite Visual Plumes (VP) — to characterize and understand the range of dilution that might be expected to occur for the operational discharges from the MRWPCA outfall diffuser; both methods are consistent with the regulatory approach recommended by the SWRCB for analyzing the brine discharge (Flow Science, Inc., 2014; SWRCB, 2012b). The model represents a constant discharge for each of the defined scenarios, and the discharge continues to move away from the port. The VP method is widely used in diffuser discharge analyses; however, data from the SEA method is presented to provide redundancy in the analysis and confirmation of the results (Flow Science, Inc., 2014; Roberts, 2016).

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[31] The brine-only discharge during the non-irrigation season (January) is a less likely operating scenario because at least some wastewater would flow through the outfall, along with the brine, throughout the year. Nonetheless, this scenario was evaluated during the Davidson condition (January), as was the MRWPCA wastewater-only discharge, to understand how the brine would influence existing conditions.

[32] Wastewater monitoring data from the MRWPCA Regional Wastewater Treatment Plant for salinity and total dissolved solids (1998–2012) and for temperature (2006–2012).

In response to public comments on the 2015 Draft EIR and at the request of MBNMS, the modeling analysis completed by Flow Science, Inc. (2014; **Appendix D2**) was peer reviewed and updated by Roberts[33] (2016; **Appendix D1**), as described below (and discussed in detail in **Appendix D1**) to:

- Update the assessed operational discharge scenarios to ensure consistency with proposed operations (summarized in **Table 4.3-10**).
- Update in the model the number of open diffuser ports (129 versus 120) and the height of the ports off the ocean floor (4 feet versus 3.5 feet) to reflect current baseline conditions regarding the status of the outfall diffuser.
- Update data on density stratification at the MRWPCA diffuser to reflect more recently collected site-specific data (discussed in Section 4.3.1.3 and summarized in **Table 4.3-1**).
- Include detailed computations of the internal flow hydraulics of the diffuser to address the variation in flow along the diffuser outfall pipe and the subsequent effect on dilution.
- Update the Semi-Empirical Analysis (SEA) to use the Cederwall formula and provide validation of the applicability of Visual Plumes (VP) modeling methodologies for dense negatively buoyant discharge plumes (discussed in detail in Section 4 of **Appendix D1**).
- Update the analysis of plume dynamics and dilution for positively buoyant discharge plumes using two mathematical models within the US EPA model suite Visual Plumes: UM3 (described above) and NRFIELD. NRFIELD is specifically designed for conditions typical of very buoyant discharges of domestic effluent from multiport diffusers into stratified oceanic waters (discussed in detail in Section 5 of **Appendix D1**).
- Compute salinity within the BMZ (328 feet from point of discharge, as required by the Ocean Plan) and at its boundary for dense negatively buoyant discharges.
- Compute minimum dilution and plume behavior for positively buoyant discharges utilizing the site specific oceanic density stratification data.
- Estimate regions within the BMZ where salinity would exceed 2 ppt above background salinity.

To revise the near-field brine discharge model analysis completed by Flow Science, Inc. (2014, see Appendix D2), Roberts (2017, see Appendix D1) combined the updated and site-specific environmental baseline conditions from **Table 4.3-1**, the updated discharge flows from the scenarios summarized in **Table 4.3-10**, and the effluent water quality characteristics of the brine and the MRWPCA wastewater and hauled brine (**Table 4.3-11**) to calculate flow, salinity, and density for all possible flow scenarios (**Table 4.3-12**, discussed in detail below). The values calculated for flow, salinity, and density for all possible discharge scenarios were then utilized for the near-field brine discharge model analysis to compute minimum dilution ratios (Dm) at the edge of the ZID, estimate the gradient of salinity between the diffuser ports and the edge of the ZID, and calculate the salinity beyond the ZID but within the regulatory mixing zone (BMZ). These results are presented below.

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[33] Dr. Philip J. Roberts has extensive international experience in marine wastewater disposal including the design of ocean outfalls and numerical modeling. Dr. Roberts' mathematical models and methods have been adopted by the USEPA and are widely used around the world.

TABLE 4.3-11
EFFLUENT WATER QUALITY CHARACTERISTICS ASSUMED FOR ALL MODELED SCENARIOS

Constituent	Temperature (°C)	Salinity (ppt)	Density (kg/m^3)
Secondary effluent	20.0	0.80	998.8
Brine	9.9	58.23	1045.2
Hauled brine	20.0	40.00	1028.6

Dense Operational Discharges - Salinity Impact Analysis

Presented here is an assessment of effects on receiving water salinity levels for operational discharges that are denser than the ambient receiving sea water. Sinking plumes have substantially lower initial dilution from turbulent mixing than positively buoyant, or rising, plumes (i.e., discharges with densities less than the receiving seawater). As such, the evaluation of potential salinity impacts from MPWSP operational discharges focuses in this section on negatively buoyant discharges.

As discussed in Section 4.3.4, Approach to Analysis, the potential water quality impact resulting from the brine-only and combined discharges was analyzed for the near field (the immediate vicinity of the diffuser port upon discharge) and beyond (the edge of the BMZ as the plume travels away from the diffuser port). The near-field analysis for salinity was based on modeling conducted within the mixing zone (i.e., the ZID). Of the assessed discharge scenarios (**Table 4.3-10**), discharges of brine only, Scenario 2, or low volumes of wastewater, Scenarios 3 through 12 (typical operations) and 15 through 26 (temporary post-shutdown operations) were determined to be dense (i.e., with salinity levels in excess of ambient conditions and thus negatively buoyant). When the MPWSP brine is combined with high volumes of wastewater (Scenarios 13, 14, 27, and 28), the plume is positively buoyant because the salinity of the effluent is substantially lower than that of ambient conditions (**Table 4.3-11** and **Table 4.3-12**). Dilution values and plume dynamics for the positively buoyant plumes (operational discharges during the non-irrigation months) are further discussed below under Buoyant Discharge Model Results and Discussion.

A typical jet trajectory output from Visual Plumes (for the pure brine case, Scenario 2, **Table 4.3-10**) is shown in **Figure 4.3-6**. In the case of Scenario 2, the centerline of the plume discharged from each of the 129 diffuser jets makes contact with the seabed approximately 10 ft from the nozzle (with a plume diameter of approximately 5 ft). Similar simulations were run for all discharge scenarios for which the operational discharge plume was dense and negatively buoyant. Additionally, simulations were run using the SEA method for redundancy and validation. The results of salinity predictions and minimum dilution values for each discharge scenario are summarized in **Table 4.3-13**. The distance from each diffuser port at which the dense discharge plume makes contact with the seabed (from the VP model) is also shown in **Table 4.3-13** for all dense discharge scenarios. The distance between the diffuser port and the point where the plume contacts the seabed can be interpreted as the ZID, with the point of contact with the seabed representing the edge of the ZID.

**TABLE 4.3-12
OPERATIONAL DISCHARGE FLOW, SALINITY, AND DENSITY**

Scenario No.	Discharge Scenario	Combined effluent		
		Flow (mgd)	Salinity (ppt)[1]	Density (kg/m3)
Typical Discharge Scenarios				
1	SE Only	19.88	1.00	999.0
2	Brine only	14.08	58.10	1045.1
3	Brine + Low (1) SE	15.08	54.30	1042.0
4	Brine + Low (2) SE	16.08	50.97	1039.4
5	Brine + Low (3) SE	17.08	48.04	1037.0
6	Brine + Low (4) SE	18.08	45.42	1034.9
7	Brine + Moderate (5) SE	19.08	43.08	1033.0
8	Brine + Moderate (6) SE	20.08	40.98	1031.3
9	Brine + Moderate (7) SE	21.08	39.07	1029.7
10	Brine + Moderate (8) SE	22.08	37.34	1028.3
11	Brine + Moderate (9) SE	23.08	35.76	1027.1
12	Brine + High (10) SE	24.08	34.30	1025.9
13	Brine + High (15) SE	29.08	28.54	1021.2
14	Brine + High (19.78) SE	33.86	24.63	1018.1
High Brine Discharge Scenarios (post-shutdown operations)				
15	High Brine only	16.41	58.12	1045.1
16	High Brine + Low (1) SE	17.41	54.83	1042.5
17	High Brine + Low (2) SE	18.41	51.89	1040.1
18	High Brine + Low (3) SE	19.41	49.26	1038.0
19	High Brine + Low (4) SE	20.41	46.89	1036.1
20	High Brine + Moderate (5) SE	21.41	44.73	1034.3
21	High Brine + Moderate (6) SE	22.31	42.78	1032.7
22	High Brine + Moderate (7) SE	23.31	40.98	1031.3
23	High Brine + Moderate (8) SE	24.31	39.33	1030.0
24	High Brine + Moderate (9) SE	25.31	37.81	1028.7
25	High Brine + High (10) SE	26.31	36.40	1027.6
26	High Brine + High (12) SE	28.31	33.89	1025.6
27	High Brine + High (14) SE	30.31	31.70	1023.8
28	High Brine + High (16) SE	32.31	29.79	1022.2

NOTES: SE = Secondary Effluent (MRWPCA wastewater)

[1] Unit used to measure salinity in terms of the concentration of dissolved salts in water. Equivalent to practical salinity units (PSU).

SOURCE: Roberts, 2017 (Appendix D1).

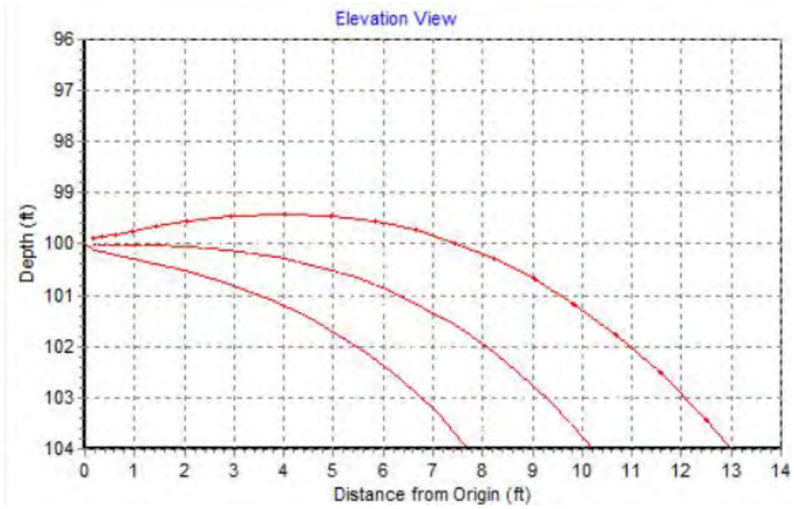


Figure 4.3-6
Typical Graphics Output of Jet Trajectory
from VP Method: Brine Only Discharge (Scenario 2)

The dilution predictions from the VP and SEA model analysis methods presented in **Table 4.3-13** are consistent, providing validation for the model results. The worst case for typical operations, as expected, is the pure brine discharge scenario during the irrigation season (Scenario 2). For Scenario 2, the minimum dilution at the plume centerline is 1:15.4 (effluent : seawater) and the salinity increment above ambient at the edge of the ZID, located approximately 10 feet from the diffuser port, is 1.61 ppt. In all cases, the Ocean Plan salinity limit of 2 ppt is met at the edge of the ZID, the length of which ranges from approximately 10 to 39 feet for the dense discharge scenarios (**Figure 4.3-7**), well within the Ocean Plan receiving water limitation for salinity of 2 ppt at a distance of 328 feet from the diffuser (the BMZ). Therefore, for all discharge scenarios, the Ocean Plan water quality standard for salinity is met. Further, the standard is demonstrated to be met at a maximum distance from the diffuser (33 feet for typical operations, 39 feet for post-shutdown operations) which is much smaller than that allowed under the Ocean Plan (328 feet).

The subsequent increase in dilution from the edge of the ZID to the edge of the BMZ cannot be predicted using model analysis as no experimental data are available for these horizontal dense jet flows. Roberts (2016, 2017) conservatively calculates the increase in dilution of the dense discharges up to the edge of the BMZ using guidance obtained from experiments on buoyant jets and inclined dense jets which estimate dilution increases of between 60 percent and 22 percent, respectively, for non-merging and merging plumes. Because the diameters of individual discharge jets from the diffuser ports are generally much smaller than the port spacing of 16 ft, the plumes are not expected to merge before impacting the sea floor (**Figure 4.3-8**), thus allowing for maximum dilution at each diffuser port (Roberts, 2016; Geosyntec, 2015). As the dense discharge plumes from the diffuser jets contact the seabed, they would continue to dilute and ultimately merge beyond the edge of the ZID. For this analysis, it was conservatively assumed that the dense discharge plumes from the diffuser jets will merge within the BMZ and that the increase in dilution from the edge of the ZID to the BMZ would be 20 percent (see Appendix D1 for details). This increase was

TABLE 4.3-13
DILUTION MODEL RESULTS FOR DENSE DISCHARGE SCENARIOS

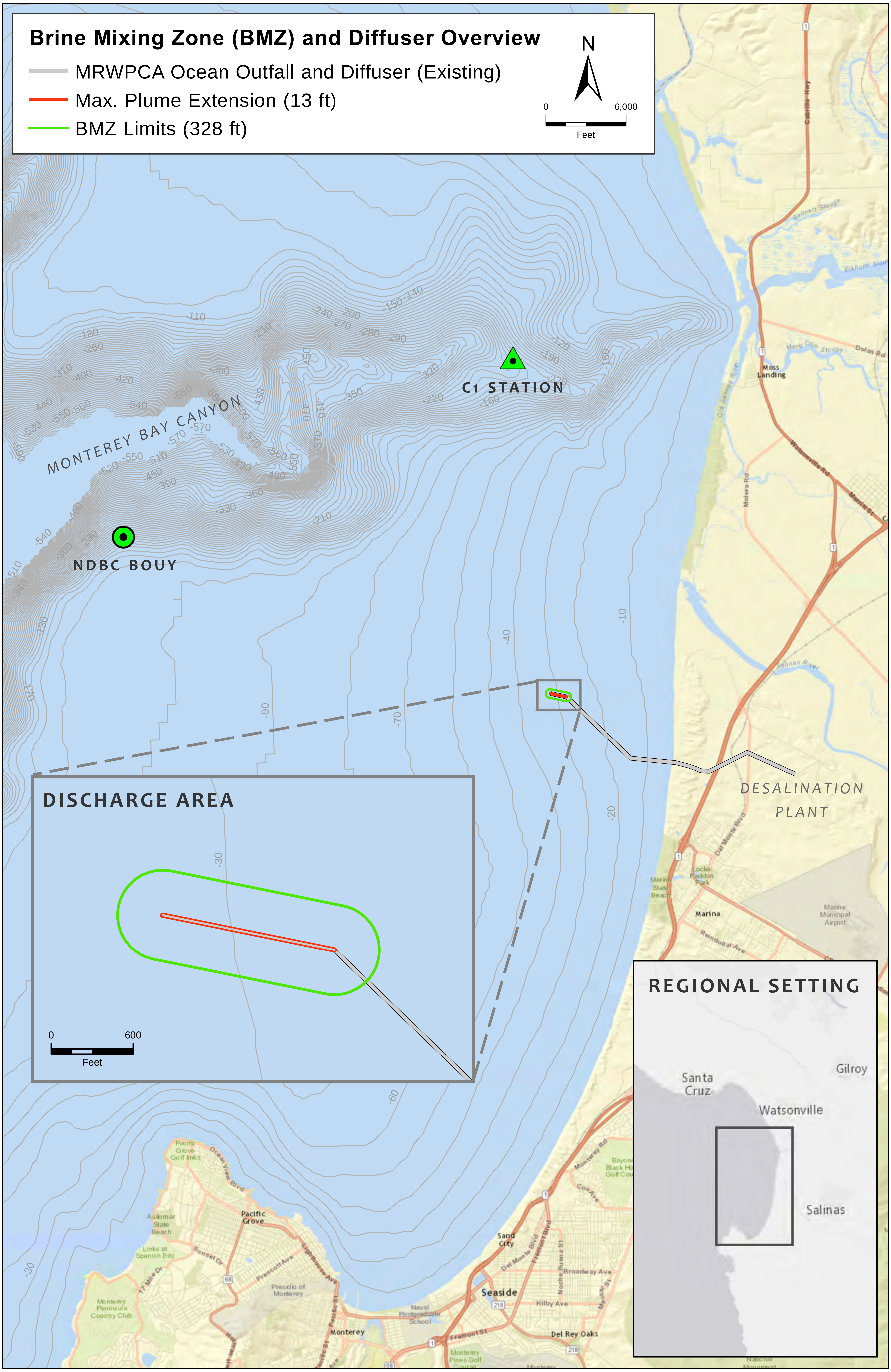
Scenario No.	Scenario	Predictions			At impact (ZID)		At BMZ	
		SEA	VP					
		Dilution	Dilution	Distance (ft)	Dilution[a]	Salinity increment (ppt)	Dilution	Salinity increment (ppt)
Typical Discharge Scenarios								
1	SE Only	-	-	-	-	-	-	-
2	Brine only	15.4	16.2	10.2	15.4	1.61	18.5	1.34
3	Brine + Low (1) SE	16.0	16.1	10.4	16.0	1.31	19.2	1.09
4	Brine + Low (2) SE	16.8	17.6	11.6	16.8	1.05	20.1	0.88
5	Brine + Low (3) SE	17.7	18.5	12.7	17.7	0.83	21.2	0.69
6	Brine + Low (4) SE	18.8	19.5	13.8	18.8	0.64	22.5	0.54
7	Brine + Mod (5) SE	20.1	20.9	15.3	20.1	0.48	24.2	0.40
8	Brine + Mod (6) SE	21.9	22.2	16.8	21.9	0.35	26.3	0.29
9	Brine + Mod (7) SE	24.8	24.9	19.2	24.8	0.23	29.7	0.19
10	Brine + Mod (8) SE	28.2	27.5	21.9	27.5	0.15	33.0	0.12
11	Brine + Mod (9) SE	34.2	27.7	22.3	27.7	0.09	33.2	0.07
12	Brine + High (10) SE	46.7	39.2	33.0	39.2	0.02	47.0	0.02
13	Brine + High (15) SE	-	-	-	-	-	-	-
14	Brine + High (19.78) SE	-	-	-	-	-	-	-
High Brine Discharge Scenarios (post-shutdown operations)								
15	High Brine only	15.5	16.3	10.5	15.5	1.60	18.6	1.33
16	High Brine + Low (1) SE	16.1	16.9	11.3	16.1	1.34	19.3	1.11
17	High Brine + Low (2) SE	16.7	17.5	12.1	16.7	1.11	20.1	0.92
18	High Brine + Low (3) SE	17.5	18.4	13.1	17.5	0.91	21.0	0.76
19	High Brine + Low (4) SE	18.6	19.3	14.2	18.6	0.73	22.3	0.61
20	High Brine + Mod (5) SE	19.6	20.4	15.4	19.6	0.58	23.6	0.48
21	High Brine + Mod (6) SE	22.1	21.4	16.6	21.4	0.42	25.7	0.35
22	High Brine + Mod (7) SE	22.8	22.8	18.1	22.8	0.34	27.4	0.28
23	High Brine + Mod (8) SE	25.0	24.5	19.8	24.5	0.24	29.4	0.20
24	High Brine + Mod (9) SE	28.2	27.2	22.3	27.2	0.16	32.6	0.14
25	High Brine + High (10) SE	32.5	30.2	25.3	30.2	0.10	36.2	0.08
26	High Brine + High (12) SE	58.6	44.9	39.0	44.9	0.01	53.9	0.01
27	High Brine + High (14) SE	-	-	-	-	-	-	-
28	High Brine + High (16) SE	-	-	-	-	-	-	-

NOTES:

[a] The lowest dilution value was selected from the two model (SEA and VP) analysis results to calculate incremental salinity increases at the edge of the ZID and BMZ to provide the most conservative assessment of potential salinity increases.

SE = Secondary Effluent (MRWPCA wastewater)

SOURCE: Roberts, 2017 (Appendix D1).



Basemap Sources: ESRI, USGS

Monterey Peninsula Water Supply Project . 205335.01

Figure 4.3-7

Brine Mixing Zone (BMZ) and Diffuser Overview

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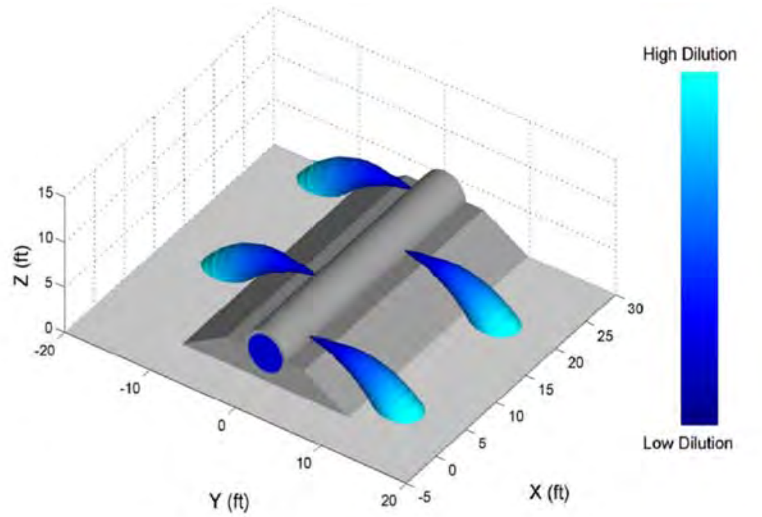
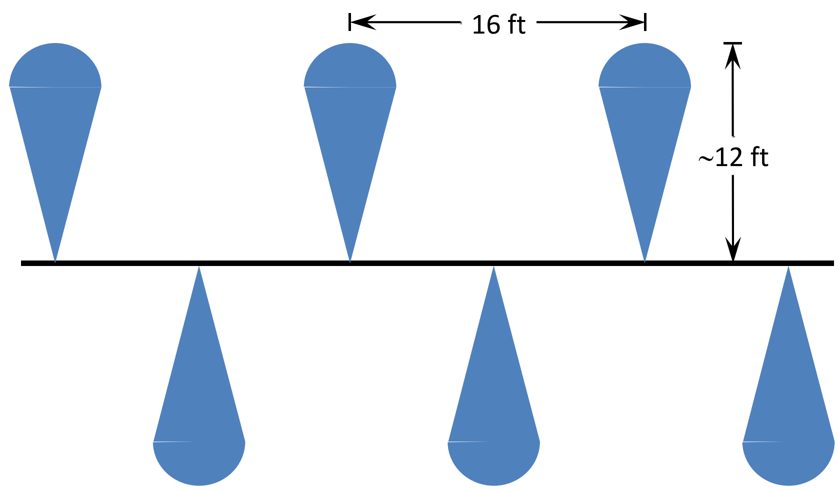


(a) Illustration of non-merging discharge plumes from VP (3D view, only 4 of the 129 open ports are shown).



(b) Illustration of non-merging discharge plumes (2D plan view)

Figure 4.3-8
Non-merging Dense Discharge Plumes from Diffuser Ports (near field)

used to predict the BMZ dilutions and incremental salinity above baseline conditions for each dense discharge scenario, as shown in **Table 4.3-13**. It is expected that dilution would actually be much greater than the assumed 20 percent (Roberts, 2016). As discussed above, the worst case for typical operations is Scenario 2, the pure brine discharge scenario during irrigation months. For Scenario 2, the incremental increase in salinity above background conditions at the edge of the BMZ was conservatively calculated to be 1.34 ppt, which is below the Ocean Plan salinity limit of 2 ppt. Scenarios 3, 4, and 5 have incremental salinities at the edge of the BMZ of 1.09, 0.88, and 0.69 respectively, demonstrating incremental salinity reductions as increasing wastewater flows are combined with the brine.

When brine discharges are increased following a shutdown, the minimum dilution ratios of brine to seawater and associated incremental salinity increases would not be substantially altered as compared to typical operations (**Table 4.3-13**). For example, when the densest discharges of brine only (most conservative scenarios with lowest minimum dilution values) are compared for typical operations (13.98 mgd of brine) and for post-shutdown operations (16.31 mgd of brine), the minimum dilution achieved at the edge of the ZID and BMZ are not measurably different in regards to incremental salinity. For typical operations, minimum dilution at the edge of the ZID and BMZ would be 15.4 and 18.5, respectively, with associated incremental salinity increases of 1.61 ppt and 1.34 ppt. When the same values are compared for post-shutdown operations, the minimum dilution at the edge of the ZID and BMZ would be 15.5 and 18.6, respectively, with associated incremental salinity increases of 1.60 ppt and 1.33 ppt above ambient. Overall, the minimum dilution results and increases above ambient salinity are very similar for all discharge scenarios for both typical and post-shutdown operations. This is due, in part, to the diffuser ports being fitted with duckbill valves that change in diameter as flows increase or decrease.

The model results are conservative. The dilution calculations presented above assume that discharges are made from round nozzles whose area is the same as the effective opening of the check valves (described under Operational Discharge Scenarios Modeled and Assessed, above). No existing models predict the dilution from elliptically-shaped check valves, but experiments show that the centerline dilutions from elliptical nozzles are greater than from equivalent round nozzles due to the larger surface area available for entrainment (see **Appendix D1** for details). Furthermore, the computed salinities presented in **Table 4.3-13** occur only along the seabed. Salinities decrease with height in the water column and would be above ambient only near to the seabed. For most of the water column, incremental salinities would be much less than the conservative values shown in **Table 4.3-13**. Finally, the model conservatively assumed no additional mixing of the discharge would occur as a result of tidal or wave related currents.

Operational discharges from the MPWSP would not violate water quality standards or waste discharge requirements or otherwise substantially degrade the water quality of receiving waters in Monterey Bay by increasing salinity levels. Therefore, this impact would be less than significant.

Dense Operational Discharges - Areas Exceeding 2 ppt Salinity

Consistent with Ocean Plan requirements, the analysis presented in this section evaluates the plume dynamics of dense, negatively buoyant operational discharges to quantify areas where salinity would exceed 2 ppt above natural background salinity around the outfall diffuser. Areas determined to exceed 2 ppt above natural background salinity are considered further in Section 4.5, Marine Biological Resources, in the context of assessing and quantifying the potential for mortality of aquatic wildlife and loss of habitat from operational discharges as well as the potential for operational discharges to injure sanctuary resources. While no significance threshold or regulatory standard exists for the exceedance of 2 ppt salinity within the BMZ related to water quality, the following assessment is presented to further support the assessment of impacts on marine biological resources within the BMZ from operational discharges (see Section 4.5, Marine Biological Resources). Additionally, the assessment and disclosure of areas exceeding 2 ppt salinity is required by the Ocean Plan and MBNMS guidelines for desalination facilities (MBNMS, 2010). For dense discharges around the outfall diffuser, exceedances of the 2-ppt salinity threshold would be restricted to small areas adjacent to the diffuser ports. To estimate the area around the diffuser ports where salinities could exceed 2 ppt, Roberts (2016) presents three-dimensional, laser-induced fluorescence (3DLIF) images of a horizontal, negatively buoyant jet representative of those assessed in this impact analysis (**Figure 4.3-9**; see **Appendix D1** for additional details). The images were obtained by scanning a laser sheet horizontally through the dense discharge flow, to which a small amount of fluorescent dye was added. The fluoresced light was captured and converted to tracer concentrations and dilution and imaged by computer graphics techniques. The image in **Figure 4.3-9** shows the outer surface of a dense discharge plume as semi-transparent, with concentrations depicted in various colors through the jet centerline. High salinity concentrations (i.e., exceeding 2 ppt) would be confined to a relatively small area (by water volume) adjacent to the diffuser port and would attenuate rapidly with distance from the nozzle. Using **Figure 4.3-9** to represent a negatively buoyant plume similar to those assessed in this analysis and scaling up to be consistent with the proposed project, the region of a salinity exceeding 2 ppt threshold would be represented by the area contained within the first three color contours (red, orange, and yellow contours). **Figure 4.3-10** presents a graphical output from Visual Plumes UM3 model (described above) for Scenario 2 (brine only discharge, the worst case scenario for salinity increases). Visual Plumes computes a constant salinity contour (blue line) representing a salinity increment of 2 ppt; within this contour, the salinity increment is greater than 2 ppt, and outside this line it is less than 2 ppt. The area where salinity exceeds the 2 ppt threshold under the worst case scenario (brine only) around each of the 129 outfall diffuser jets is a conical area with a volume on the order of 8.5 cubic feet (approximately 8 feet long by 2 feet in diameter), located approximately 2 feet above the sea floor (**Figure 4.3-10**). As discussed above, the brine plumes do not merge prior to contacting the sea floor, and so there would not be a contiguous area around the diffuser where salinity exceeds the 2 ppt salinity threshold. When the brine plume for Scenario 2 contacts the sea floor, the salinity would be 1.56 ppt above ambient (Table 4.3-13) and would pose no risk for the occurrence of hypoxia. For all discharge scenarios, the discharge plume contacts the sea floor and is less than 2 ppt above ambient at a distance ranging from 10 feet to 33 feet from the outfall diffuser for typical operations, representing an area of the sea floor of 0.6 to 1.8 acres respectively (for context the total area within the BMZ represents a sea floor area of 27 acres). For additional discussion of the areas exceeding 2 ppt salinity levels in the context of potential impacts on marine organisms and sanctuary resources, see Section 4.5, Marine Biological Resources.

Dense Operational Discharges - Additional Considerations

This impact analysis addresses concerns raised during the public review of the April 2015 DEIR. The comments received involved the brine discharge and its travel path beyond the BMZ, concerns relating to the propagation of a dense saline plume along the sea floor, and the potential for hypoxia to occur near the seabed as a result of extremely elevated salinity levels adjacent to the outfall diffuser. Each of these concerns is addressed briefly below.

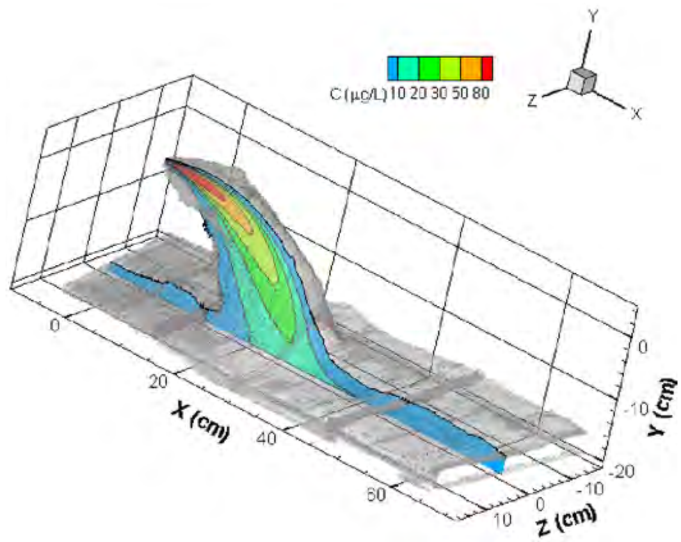
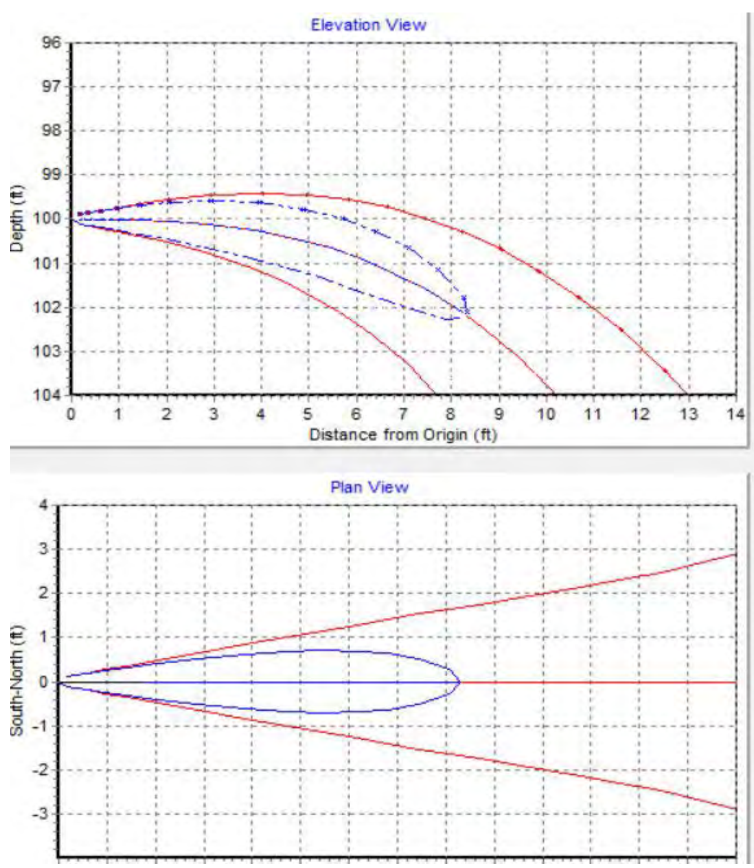


Figure 4.3-9
3DLIF Image of a Laboratory-generated Generic Horizontal Dense Jet



NOTES: Red line is the outer boundary of the jet. Blue line is contour of 2 ppt salinity increment.
SOURCE: Roberts, 2016

Figure 4.3-10
UM3 Graphical Output for Scenario 2 (pure brine at 13.98 mgd)

While there are no significance thresholds for salinity limitations beyond the BMZ boundary (328 ft), as discussed above, operational discharges would be less than 2 ppt above ambient salinity levels at the edge of the ZID, which ranges between 10 and 33 feet from the diffuser depending on discharge scenario (and up to 39 feet for temporary post-shutdown operations). Further, the model analysis presented in **Appendix D1** demonstrates that, as the brine plume travels away from the point of discharge, salinity levels associated with the discharge would progressively decrease with time and distance from the point of discharge, approaching background salinity levels beyond the BMZ through dispersion and dilution with the ocean currents.

Mixing and dilution of horizontal dense plumes from the diffuser jets could be affected by proximity to a local boundary, such as the sea floor (Roberts, 2016). As a fluid moves across a surface a certain amount of friction occurs between the fluid and the surface, which tends to slow the moving fluid. This resistance to the flow of the fluid pulls the fluid towards the surface. Thus, a fluid emerging from a nozzle (such as a dense plume from a diffuser) could potentially follow a nearby curved surface (such as the sea floor) if the curvature of the surface, or the angle the surface makes with the fluid stream, is not too sharp (i.e., acute). This effect (known as Coanda attachment), could result in substantially reduced dilution, or as public commenters suggested, result in creating a dense saline plume that forms a connection to and travels along the sea floor. In response to this concern, Roberts (2016) modeled the anticipated discharge to see if this effect was likely to occur. He determined that conditions of the discharge, namely, the expected negatively buoyant, density characteristics, were not likely to result in a Coanda effect of plume attachment to the sea floor (for details regarding methods and results see **Appendix D1**). Based on published research in the scientific literature on plume experiments relevant to desalination outfall facilities, a Coanda attachment to the sea floor will not occur for a negatively buoyant dense discharge when the parameter "z_o/dF" is greater than 0.12[34] (**Table 7** of **Appendix D**). The parameter "z_o/dF" represents a function of the internal hydraulics of the outfall and diffuser ports and was modeled as part of the dilution analyses described in **Appendix D**. Roberts (2016) concluded that, because "z_o/dF" is substantially greater than 0.12 for all discharge scenarios involving a dense negatively buoyant plume, a Coanda attachment would not occur, and that there would be no significant impairment to the dynamics or mixing of the discharges with receiving waters.

Comments received on the April 2015 DEIR expressed concerns over the potential for areas of hypoxia to form beneath dense discharges. Adequate DO is vital for aquatic life and higher concentrations are generally considered to be desirable. Dissolved oxygen content in water is, in part, a function of water temperature and salinity, which affect the point at which water becomes saturated with DO. As described in Section 4.3.1.3, the ability of oxygen to dissolve in water decreases as the temperature and salinity of water increases. As the temperature and/or salinity of water increases, water loses the ability to hold dissolved oxygen and the concentration goes down. Salinity also has properties that can facilitate the creation of hypoxic[35] zones. Because salt water is more dense than fresh water, under certain conditions, a less dense layer of fresh or low

34 Table 7 of Appendix D1 (Roberts, 2017) includes the model results for calculation of the internal hydraulics of the outfall and diffuser ports under "Port Conditions" used as part of the dilution analyses.

35 Hypoxia occurs when the amount of dissolved oxygen in water becomes too low to support most aquatic life (typically below 2 mg/l).

salinity water can form on top of a denser layer of high salinity water. Such a scenario can prevent adequate mixing of the water column and prevent oxygenated water to get to the lower depths resulting in the heavier, saltier layer at the bottom to become oxygen-depleted.

However, DO varies per many other factors, including photosynthesis and biological and chemical oxygen demand associated with decomposition of organic material. Monterey Bay is a dynamic environment that includes variable concentrations of DO. Ambient DO levels in Monterey Bay at a depth of approximately 100 feet have ranged from 4.25 milligrams per liter (mg/L) to 8.00 mg/L (KLI, 1998; KLI, 1999); typically, DO in the range of 5 to 8 mg/L is considered protective of fish and marine biota depending on the species and life-stage. Under the Ocean Plan, a discharge may not increase DO more than 10 percent of ambient levels at the edge of the BMZ.

Comments specifically expressed concern that, due to sediment oxygen demand and potential limited mixing due to dense discharges forming Coanda attachments, limited dilution and mixing could restrict oxygen supply. As described above, Coanda attachments would not occur, and modeled salinity levels are less than 2 ppt above ambient salinity at the edge of the ZID. Further, to evaluate the potential for hypoxia, Geosyntec (2015) performed a mass-balance analysis (a mass-balance analysis accounts for a given material entering and leaving a system) based on dilution and dispersion analyses for operational discharges completed by ESA (ESA, 2015). The analysis applied a mass-balance approach to a conservative areal extent of a brine-only plume (i.e., the most dense of the proposed operational discharges) to derive estimates of oxygen demand in local sediments (70 to 180 kilograms/day) and estimates of oxygen supplied (less than 5,600 kilograms/day) by the operational discharges (including entrained seawater). Based on the results of the mass-balance analysis, the amount of oxygen supplied to the discharged plume by ambient seawater entrained during turbulent mixing and dilution is more than 30 times greater than that consumed by the sediments. As such the concentration of dissolved oxygen in receiving ocean waters would not become depressed by more than 10 percent from that which occurs naturally, hypoxia is unlikely to occur as a result of proposed operational discharges and impacts would be less than significant.

Buoyant Operational Discharges - Analysis and Discussion

The analysis presented in this section evaluates positively buoyant operational discharges (i.e., that have densities less than the receiving seawater) using model analyses to determine salinity, dilutions, and plume behavior.

Positively buoyant discharge plumes (i.e., those with densities less than the receiving water) require different analytical procedures than are used for negatively buoyant plumes. Only five discharge scenarios involve a positively buoyant discharge: Scenario 1, the baseline consisting only of MRWPCA wastewater and Scenarios 13, 14, 27, and 28, MPWSP brine combined with high flows of wastewater during the non-irrigation season (**Table 4.3-10** and **Table 4.3-13**). The plume dynamics for these scenarios were simulated with two models in Visual Plumes: UM3 and NRFIELD (**Appendix D1**). UM3 is an entrainment model that was previously described above. NRFIELD is based on experiments on multiport diffusers discharging from two sides (Roberts, 2016). NRFIELD is specifically designed for conditions typical of very buoyant discharges of domestic effluent from multiport diffusers into stratified oceanic waters, and as such, is considered applicable to this analysis. The primary outputs from NRFIELD are the minimum (centerline) dilution, the plume rise height, and thickness at the end of the near field.

The following procedure was used for the buoyant plume dilution simulations. The internal hydraulics of the outfall diffuser were computed for each of the discharge scenarios (described in detail in **Appendix D1**) and the average port diameter and flows were obtained for each diffuser port. The UM3 and NRFIELD model suites in Visual Plumes were then run for each oceanic season: Upwelling, Davidson, and Oceanic. The seasonal average density stratifications (**Table 4.3-1**) were used, and zero current speed was conservatively assumed.

The results are summarized in **Table 4.3-14**. For UM3, the average dilutions at the terminal rise height are given along with the centerline rise heights of the plume; for NRFIELD, the near field (minimum) dilution is given along with the height of the near field (centerline) dilution and the height to the top of the spreading plume. The average dilution predicted by UM3 is very close to the minimum (centerline) dilution predicted by NRFIELD. The reason for this is that the increase in mixing and dilution in the transition from vertical to horizontal flow and merging of the plumes from both sides, neither of which are incorporated into UM3, are accounted for in the ratio of average to the minimum dilutions (Roberts, 2017). Therefore, while the average dilution predicted by UM3 is presented as a model output, it is interpreted here as the minimum centerline dilution (see **Appendix D1** for details). The near field dilution is synonymous with the minimum initial dilution in the ZID, as defined in the California Ocean Plan.

However, the results for UM3 and NRFIELD diverge as the effluent becomes only slightly buoyant (i.e. the effluent density approaches the ambient density), with UM3 dilutions being considerably higher. NRFIELD is based on experiments conducted for parameters typical of domestic wastewater discharges into coastal waters and estuaries. For this situation, dilution and mixing are mainly dependent on the source buoyancy flux with momentum flux playing a minor role. NRFIELD is the preferred model for this case. As the effluent density approaches the background density, buoyancy becomes less important and the mixing becomes dominated by momentum. UM3 is the preferred model for this case. In that situation, NRFIELD continues to give predictions but issues a warning that “The results are extrapolated” when the parameters are outside the range of the original experiments. Therefore, the NRFIELD results were utilized in the impact assessment when the results are within the experimental range, and UM3 when extrapolated.

The model output showed that the dilutions of project-related discharges would be high for all of the buoyant plume scenarios evaluated. The lowest is a minimum initial dilution of 88 for Scenario 7. The highest dilution was 349 for Scenario 1 (pure secondary effluent) during the Davidson season. As demonstrated by model analysis, when the MPWSP brine is combined with high volumes of wastewater, the plume is positively buoyant because the salinity of the effluent is substantially lower than that of ambient conditions (**Table 4.3-12**). Operational discharges that are buoyant would not exceed the significance threshold of 2 ppt at the BMZ; the salinity of the buoyant discharges is already lower than that of the receiving waters, and impacts would be less than significant.

TABLE 4.3-14
DILUTION RESULTS FOR BUOYANT DISCHARGE SCENARIOS

Scenario No.	Scenario	Season	Effluent conditions			UM3 simulations		NRFIELD simulations		
			Flow (mgd)	Salinity (ppt)	Density (kg/m^3)	Average dilution	Rise height (centerline) (ft)	Minimum dilution	Rise height (centerline) (ft)	Rise height (top) (ft)
1	SE Only	Upwelling	19.88	1.00	999.0	-	-	179	41	57
		Davidson				-	-	349	100	100
		Oceanic				-	-	238	50	72
13	Brine + High SE (15 mgd)	Upwelling	29.08	28.54	1021.2	93	28	-	-	-
		Davidson				127	57	-	-	-
		Oceanic				94	27	-	-	-
14	Brine + High SE (19.78 mgd)	Upwelling	33.86	24.63	1018.1	99	36	-	-	-
		Davidson				147	76	-	-	-
		Oceanic				104	41	-	-	-
27	High Brine + High SE (14 mgd)	Upwelling	30.31	31.70	1023.8	88	19	-	-	-
		Davidson				120	45	-	-	-
		Oceanic				90	17	-	-	-
28	High Brine + High SE (16 mgd)	Upwelling	32.31	29.79	1022.2	90	26	-	-	-
		Davidson				118	53	-	-	-
		Oceanic				88	23	-	-	-

NOTES:
SE = Secondary Effluent (MRWPCA wastewater)

SOURCE: Roberts, 2017 (Appendix D1).

Impact Summary and Conclusion

The analysis of salinity levels indicates that for all scenarios, and assuming a continuous discharge stream, the MPWSP brine only discharges and discharges of brine combined with varying amounts of waste water will meet Ocean Plan salinity and dissolved oxygen standards and will not result in hypoxia on the ocean floor. Specifically, the discharges would result in salinity levels that would not exceed 2 ppt above ambient salinity at the edge of the ZID (the edge of which is 10 feet to 39 feet from the diffuser depending on discharge scenario), which means that salinity levels would not exceed 2 ppt above ambient salinity at the edge of the BMZ (328 ft from the diffuser) since the edge of the ZID is well within the BMZ under all scenarios. The proposed action would therefore not exceed or violate the Ocean Plan salinity standards or degrade water quality in terms of salinity.

As the plumes discharged from each of the 129 outfall diffuser jets travel away from the ZID, they continue to dilute (further reducing salinity levels) and ultimately merge within the BMZ boundary. Salinity levels would exceed 2 ppt in a relatively small area, approximately 8.5 cubic feet, adjacent to each of the 129 diffuser ports in an area 2 feet above the sea floor, after which the discharge plumes would attenuate rapidly with distance from each port. The combined area of exceedances of 2 ppt is not likely to adversely impact the marine environment because it is a relatively small volume in the water column when considered in the context of the total volumes of Monterey Bay. Also, the salinity increases presented in the analysis represent conservative values and would occur only along the seabed. Modeling demonstrates that salinity plumes are not likely to travel, or become trapped, along the sea floor due to the Coanda effect. Hypoxia from salinity near the sea floor was determined to be unlikely based on a mass-balance analysis, which demonstrated that the amount of oxygen supplied to the discharged plume by ambient seawater entrained during turbulent mixing and dilution is more than 30 times greater than that consumed by the sediments. As such, the concentration of dissolved oxygen in receiving ocean waters would not become depressed by more than 10 percent from that which occurs naturally under baseline conditions. For the majority of the water column, incremental salinities would be much lower than the reported values. Additionally, the analysis assumed zero ocean current; however, under actual ocean conditions, waves, tidal forces, and seasonal currents would increase mixing and dilution, thus reducing these assessed salinity levels. Therefore, operational discharges from the MPWSP would not increase salinity levels or impact DO in a manner that violates water quality standards or waste discharge requirements or otherwise degrades the water quality of receiving waters in Monterey Bay and MBNMS. Environmental impacts and impacts on MBNMS resources would be less than significant.

The current NPDES permit (Order No. R3-2014-0013, NPDES Permit No. CA0048551), which regulates the wastewater discharge from the outfall, would be amended before the MPWSP Desalination Plant begins operation to incorporate the brine-only and combined discharges. Under the amended NPDES permit, the discharges would be subject to the Ocean Plan water quality objectives, which would be incorporated into the permit in the form of specific effluent limitations as water quality requirements. Further, the amended NPDES permit would require approval by MBNMS to ensure discharges would not impair or degrade the resources of the Sanctuary.

As described in Section 4.3.2.2, the Ocean Plan includes monitoring and reporting requirements for the operation of new desalination facilities (Section III.M.4, "Monitoring and Reporting Program"; SWRCB, 2016). The monitoring requirements for the operation of a new desalination facility are such that the owner or operator of a desalination facility must submit a Monitoring and Reporting Plan to the RWQCB for approval. The Monitoring and Reporting Plan must include provisions for monitoring of effluent and receiving water characteristics and impacts on all forms of marine life. The Monitoring and Reporting Plan must, at a minimum, include monitoring for benthic community health, aquatic life toxicity, hypoxia, and receiving water characteristics. Additionally, receiving water monitoring for salinity must be conducted at times when the monitoring locations detailed in the Monitoring and Reporting Plan are most likely affected by the discharge. Additionally, as described in Section 4.3.2.2, MBNMS has established non-regulatory guidelines (MBNMS, 2010) for the construction and operation of desalination facilities to ensure that desalination plants in the sanctuary would be sited, designed, and operated in a manner that results in minimal impacts on the marine environment. The proposed project is substantially consistent with the guidelines relating to operational discharges regarding water quality and salinity. However, the guidelines also specify that a monitoring program should be developed to evaluate the extent of impacts from the plant's discharge operations on marine resources. The guidelines for developing a monitoring program are largely consistent with those described for the Ocean Plan with the addition that any proposed mitigation should be monitored for unavoidable impacts to ensure the mitigation is performing as intended.

A monitoring and reporting plan, consistent with the Ocean Plan requirements and MBNMS Guidelines for operation of a new desalination facility, has not been defined and proposed as part of the project. Several of the parties to the CPUC proceeding have agreed upon terms of the brine discharge that establishes, in part, a detailed monitoring and reporting program that includes the collection of relevant, long-term water quality data. The intent of the monitoring program is to determine compliance with defined water quality standards and to implement specific corrective actions when non-compliance is determined to occur. While the monitoring plan defined by the settling parties is consistent with portions of the Ocean Plan (SWRCB 2016) requirements and the MBNMS Desalination Guidelines (MBNMS 2010), it does not include biological monitoring to determine impacts on marine life. Further, while the Ocean Plan requires implementation of a monitoring plan for operation of a desalination facility, the requirement is new and, as such, is not well tested. Additionally, the monitoring requirements defined in the Ocean Plan are broadly described and do not include specific thresholds, performance standards, or corrective actions.

While impacts related to water quality from increased salinity have been determined to be less than significant based on model analyses, and although it is likely that monitoring would occur based on the Settlement Agreement and the Ocean Plan requirements, implementation of **Mitigation Measure 4.3-4 (Operational Discharge Monitoring, Analysis, Reporting, and Compliance)** would ensure compliance with the Ocean Plan monitoring requirements and consistency with MBNMS guidelines for operation of desalination facilities that are protective of the beneficial uses (including aquatic wildlife and habitat) of Monterey Bay. Further, Mitigation Measure 4.3-4 would ensure that monitoring data considers impacts on marine resources and that all collected data is assessed against defined performance standards and that corrective actions are implemented in the case that performance standards are not met. For these reasons, the following mitigation measure is proposed.

Mitigation Measure 4.3-4 requires CalAm to implement a comprehensive Monitoring and Reporting Plan (Plan), following review and approval by the RWQCB and MBNMS that is consistent with the requirements and monitoring guidelines of the Ocean Plan and the MBNMS Guidelines for desalination plants. The monitoring program set forth in the Plan would ensure that adequate water quality and marine resource data are gathered to determine baseline conditions and compliance with Ocean Plan water quality limitations related to salinity. The Plan shall include, at a minimum, the water quality performance standard that operational discharges must comply with the 2 ppt salinity limitation at the BMZ compliance point. The Plan shall also include the performance standard that no statistically significant changes in benthic community composition occur within the maximum extent of the ZID, as compared to reference and baseline conditions that are directly and statistically associated with changes in salinity resulting from operational discharges (with consideration given to natural and seasonal variations and long-regional trends). The Plan shall also include corrective actions that would be required to be implemented if the acquired data indicated deleterious effects to receiving water quality or marine biological resources in the context of the performance standards resulting from operational discharges.

Mitigation Measures

Mitigation Measure 4.3-4 applies only to the operational discharges associated with the MPWSP Desalination Plant through the existing MRWPCA outfall.

Mitigation Measure 4.3-4: Operational Discharge Monitoring, Analysis, Reporting, and Compliance.

To ensure that the operational discharges from the MPWSP are in compliance with the 2 ppt receiving water salinity limitation at the BMZ compliance point required by the California Ocean Plan, the discharger(s) shall implement a Monitoring and Reporting Plan (Plan). The Plan shall, at a minimum, include protocols for monitoring of effluent and receiving water salinity characteristics as well as protocols for determining statistically significant changes in benthic community composition within the maximum extent of the ZID as compared to baseline conditions (established a minimum of one year prior to operations) that is directly associated with changes in salinity resulting from operational discharges (with consideration given to natural and seasonal variations and long-regional trends). Such protocols shall include, but not be limited to, monitoring for benthic community health, aquatic life toxicity, and hypoxia, within the ZID. The Plan shall be consistent with the standard monitoring procedures detailed in Appendix III of the Ocean Plan. Such monitoring protocols specify monitoring plan framework, scope, and methodological design for determining compliance with the Ocean Plan defined receiving water limitations relating to salinity. Prior to implementation, the Plan shall be approved by the RWQCB and MBNMS. Following implementation, the Plan shall be reviewed by the RWQCB, and revised if necessary, as part of the NPDES permit renewal process.

As part of the Plan, receiving water monitoring for salinity shall be conducted at times when the monitoring locations are most likely to be potentially adversely affected by the discharge. The Plan shall establish protocols to establish baseline biological conditions at the discharge location as well as at a reference location outside the influence of the discharge for at least one year prior to commencement of project construction. To determine impacts on marine biological resources against baseline biological conditions, the discharger(s) shall conduct biological surveys (e.g., Before-After Control-Impact studies), that evaluate and quantify the differences between biological communities at a reference site and at the discharge location before and after the discharge(s) commence. All monitoring data, results, and analyses shall be compiled and submitted to the RWQCB and MBNMS for review. Such monitoring shall continue until the RWQCB and MBNMS determines that a regional monitoring program is adequate to ensure compliance with the receiving water limitation.

Water Quality Monitoring. At a minimum, the Plan shall include the following water quality monitoring protocols and monitoring frequencies to assess baseline conditions and to track the compliance of the Project with the performance standard of ensuring operational discharges do not exceed ambient salinity by more than 2 ppt at the edge of the BMZ, as well as to assess the efficacy of any operational or design features implemented:

A. At least one year prior to implementing operational discharges, the discharger(s) shall install continuously recording automated water quality monitoring equipment, such as automatically recording water quality data sondes (water quality monitoring instrument), to monitor salinity and dissolved oxygen levels at one hour intervals in the receiving waters of Monterey Bay. The discharger(s) shall install water quality monitoring equipment at a minimum of four locations within 3 meters of the ocean floor as follows:

   a. 1 monitoring station at the edge of the Zone of Initial Dilution, but not more than 10 meters from the outfall diffuser.

   b. 1 monitoring station at the edge of the Brine Mixing Zone, representing the point of compliance with the Ocean Plan salinity standard (not more than 100 meters from the outfall diffuser).

   c. A representative reference location at least 1000 meters from the outfall diffuser, situated on the same elevation contour as that of the outfall diffuser, in an area outside the influence of operational discharges or other inputs to Monterey Bay, such as operational discharges from other facilities or fresh water inputs in the form of major surface water inputs.

B. Monitoring will be conducted for one year prior to the commencement of operational discharges to confirm baseline conditions.

C. Once operational discharges commence, the discharger(s) shall continue monitoring (for a minimum of five years, as described below) to confirm compliance of operational discharges with the Ocean Plan receiving water salinity limitation, which specifies discharges shall not exceed a daily maximum of 2 parts per thousand (ppt) above natural background salinity, as measured no further than 100 meters (328 ft) horizontally from the discharge point.

The discharger(s) shall retrieve all data from deployed water quality monitoring instrumentation at least four times a year at quarterly annual intervals during both the one year period of baseline monitoring and during the salinity standard compliance monitoring associated with operations. Following data collection, data shall be analyzed for compliance with the receiving water salinity standard defined in the Ocean Plan. Additionally, the salinity and dissolved oxygen data retrieved shall be used, in conjunction with biological survey data, to assess changes to benthic community composition within the ZID. The analyses and monitoring data shall be summarized and submitted to the RWQCB and MBNMS as annual reports as well as made publicly available via the project website. Reports shall include summary graphs of all quality assured/quality controlled data as well as statistical analyses of the data relative to historic baselines. Reports shall assess water quality data within the context of relevant water quality standards. The reports shall describe any measured adverse water quality related changes, such as high salinity or low dissolved oxygen levels that potentially impact marine habitat quality or benthic communities. The reports shall include assessment of the extent to which any measured changes were attributable to controllable factors, such as the variation of combined flows as part of operational discharges.

The analysis and reporting conducted as part of the Plan shall determine the need for corrective actions to be implemented in the form of the design features and operational measures prescribed in **Mitigation Measure 4.3-5** to reduce identified impacts to less-than-significant levels. As part of such a determination for implementation of corrective actions, a schedule for implementation shall be provided, as well as rationale for how such design features and/or operational measures were selected and the expected results following implementation. All analysis and reporting, including determinations for the need for corrective actions to be implemented, the schedule for implementation, and the rationale for selected corrective actions shall be approved by the RWQCB and MBNMS. If at the end of five complete years of monitoring operational discharges, the 24-hour average salinity measured at the edge of the BMZ is less than 75% of the salinity performance standard for 45 days without interruption under all discharge scenarios representative of typical operations (i.e. irrigation season and non-irrigation season operations), and with approval by the RWQCB and MBNMS, the discharger(s) may terminate the monitoring and reporting specified as part of this mitigation measure (but not terminate monitoring and reporting required as part of compliance with NPDES permit conditions or Ocean Plan monitoring and reporting requirements for discharges into California ocean waters).

Impact 4.3-5: Violate water quality standards or waste discharge requirements, or degrade water quality as a result of brine discharge from the operation of the MPWSP Desalination Plant. (*Less than Significant with Mitigation*)

Operational discharges may contain a variety of water quality constituents that, in high enough concentrations, could degrade water quality and adversely affect the beneficial uses of the receiving waters in Monterey Bay and MBNMS resources. The concentrations of water quality constituents present in the operational discharges are determined and impacts on water quality are assessed based on compliance with the Ocean Plan water quality objectives. Depending upon the time of the year and the quantity of wastewater flows released, the operation of the MPWSP Desalination Plant would result in a brine-only discharge or a combined discharge (brine blended with varying flows of treated wastewater). Operational discharges from the MPWSP could violate water quality standards or waste discharge requirements or otherwise degrade the water quality of receiving waters in Monterey Bay.

Treated wastewater from the existing MRWPCA Regional Wastewater Treatment Plant is currently discharged through the MRWPCA outfall and is subject to the provisions and effluent limitations of an NPDES permit (Order No. R3-2014-0013, NPDES Permit No. CA0048551). Under the proposed MPWSP, the current NPDES permit would need to be amended to incorporate the brine-only and combined discharges before the MPWSP Desalination Plant commences operation. Under the amended NPDES permit, the discharges would be subject to the Ocean Plan water quality objectives, which would be incorporated into the permit as specific effluent limitations.

Compliance with water quality objectives other than salinity (see Impact 4.3-4 for assessment of salinity-related impacts) is assessed here. Noncompliance with the Ocean Plan water quality objectives could degrade water quality and adversely affect the beneficial uses of the receiving waters in Monterey Bay. When treated wastewater is discharged, it enters ocean waters into an area known as the zone of initial dilution (ZID). As prescribed in the Ocean Plan, the discharge must meet the water quality objectives at the outer boundary of the ZID, after the wastewater has undergone a period of initial dilution (i.e., mixing of the discharge with the receiving water). Discharge limitations for the NPDES permit (i.e., the permitted in-pipe concentration of water quality constituents) are obtained by quantifying the degree of dilution that occurs within the ZID, referred to as the minimum probable initial dilution (Dm). The water quality objectives established in the Ocean Plan are adjusted by the project-specific Dm to derive the NPDES permit limits on in-pipe constituent concentrations for a wastewater discharge prior to ocean dilution. Determination of a significant impact related to water quality, water quality standards, and waste discharge requirements is based on compliance with the Ocean Plan water quality objectives (see Section 4.3.3).

Introduction to the Impact Analysis of Other Ocean Plan Constituents

Impact 4.3-5 is structured as follows:

- **Operational Discharge Scenarios**: To provide context for the water quality analysis, this section describes the operational discharge scenarios that could occur as a result of implementing the MPWSP.
- **Approach to Analysis**: This section describes the methodologies used in the impact analysis to determine compliance with Ocean Plan water quality objectives.
- **Results and Impact Discussion:** In this section, concentrations of constituents regulated under the Ocean Plan are discussed for each evaluated discharge scenario. First, the concentrations at the edge of the ZID are presented in the context of the minimum dilution values assessed for each discharge scenario. The resulting concentrations are then compared to the Ocean Plan objectives to assess operational water quality impacts and regulatory compliance.

- **Consistency with Regulatory Requirements**: This section assesses the proposed project's consistency with applicable regulatory requirements adopted for the purpose of avoiding or mitigating environmental effects; these requirements are described above in Section 4.3.2, Regulatory Framework. Where the proposed project conflicts with applicable plans or policies, a significant impact would result.
- **Impact Summary and Conclusion**: This section summarizes the results of the comprehensive analysis of water quality impacts in the context of the evaluated operational discharge scenarios. An impact conclusion is provided that considers the results of the analysis in the context of proposed operations, the relevant described significance criteria, and applicable regulations.

Operational Discharge Scenarios

Table 4.3-10 summarizes the operational discharge scenarios evaluated for the MPWSP (described in detail under Impact 4.3-4). Predictive models were used to determine the potential water quality impacts under each discharge scenario.

Approach to Analysis

Potential water quality impacts were identified by determining whether operational discharges would exceed the water quality objectives established in the Ocean Plan. As discussed in detail in Section 4.3.2, Regulatory Framework, the Ocean Plan establishes objectives for a wide range of constituents and also forms the basis of NPDES permit effluent quality requirements for waste discharges to ocean waters. **Table 4.3-4** provides the suite of constituents and their Ocean Plan water quality objectives.

Initial Dilution of Discharges and the "Zone of Initial Dilution"

For typical wastewater discharges, when released from an outfall, the wastewater and ocean water undergo rapid mixing. The mixing of the discharge with receiving ocean waters is affected by the buoyancy and momentum of the discharge plume, a process referred to as initial dilution. Compliance with the Ocean Plan water quality objectives summarized in **Table 4.3-4** is required after the initial dilution of the discharge into the ocean is completed. The initial dilution occurs in an area known as the zone of initial dilution (ZID). The ZID is defined as the zone where buoyancy- and momentum-driven mixing produces rapid dilution of the discharge. Compliance was determined by comparing water quality parameters measured at the edge of the ZID with Ocean Plan objectives, an approach to identifying impacts that is consistent with the requirements outlined in the Ocean Plan.

Data Sources

The impact analysis relies on a compilation of the most recent and best available water quality data from several sources. The MRWPCA wastewater constituent concentrations were determined using historical NPDES compliance data collected by the MRWPCA, results from secondary effluent water quality monitoring conducted between July 2013 and June 2014, and water quality data collected by CCLEAN. The constituent concentrations in the brine were determined using available data from CalAm's temporary test subsurface slant well[36] on the CEMEX property in Marina, California, as well as consideration of the 42 percent efficacy of the treatment process at the MPWSP Desalination Plant. A summary of the estimated water quality for the MPWSP brine and the MRWPCA wastewater is presented in **Appendix D3** (Table 4).

Ocean Plan Discharge Compliance

Trussell Tech conducted the evaluation to determine compliance of the operational discharges with Ocean Plan objectives. This section provides a summary of the data sources and specific methodologies for each step of the model analysis (see **Appendix D3** for details). **Figure 4.3-11** illustrates the approach to analysis.

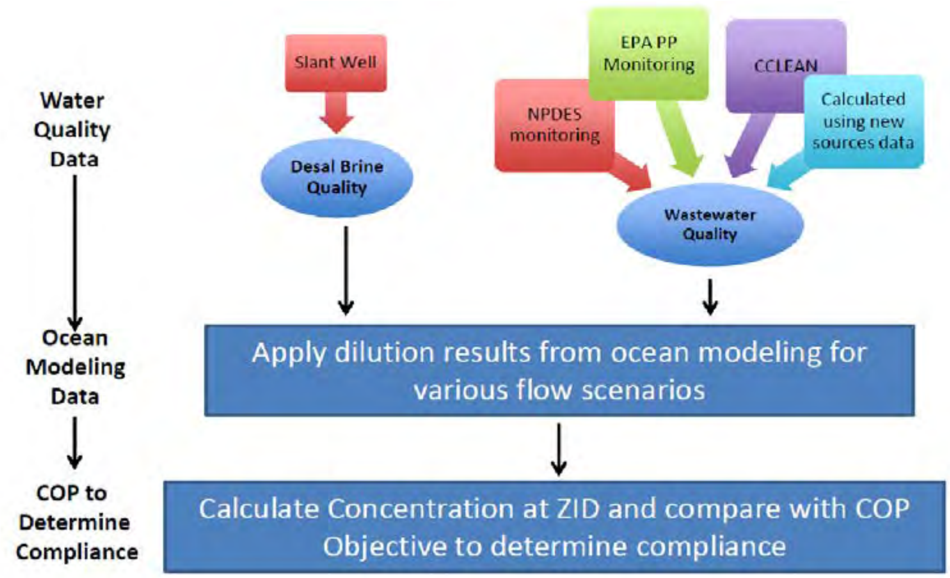


Figure 4.3-11
Summary of Approach to Analysis
for Determining Ocean Plan Compliance

After compiling water quality data for the desalination brine and MRWPCA wastewater (described above), Trussell Tech (2017; **Appendix D3**) combined the data for the evaluated discharge scenarios. Specifically, Trussell Tech calculated the combined in-pipe concentration of water quality constituents prior to discharge. This in-pipe concentration of constituents was calculated using a flow-weighted average of each discharge component for each of the flow scenarios described in **Table 4.3-10**.

The minimum dilution ratios (Dm) developed by Roberts (2017; **Appendix D1**) and summarized in **Tables 4.3-13** and **4.3-14** were then applied to the average flow-weighted in-pipe concentrations to determine the constituent concentrations at the edge of the ZID. The Dm value

36 Long-term pumping and water quality sampling from this well on the CEMEX property in Marina, California began in April 2015.

calculated for each discharge scenario was applied to the in-pipe concentration of the constituents to calculate each constituent's concentration at the edge of the ZID (described in detail in **Appendix D3**). This calculation also considered the existing background concentration of the constituents present in the ocean receiving water. This approach is consistent with the Implementation Provisions set forth in the Ocean Plan (SWRCB, 2016).

Finally, to determine Ocean Plan compliance, the calculated concentrations at the edge of the ZID were compared to the Ocean Plan water quality objective for that constituent (summarized in **Table 4.3-4**). **Appendix D3** documents the data sources and provides further detail on the methodology used to perform the ocean water quality modeling analysis.

Ocean Plan Water Quality Objectives

The Ocean Plan contains three categories of objectives: (1) Objectives for Protection of Marine Aquatic Life, (2) Objectives for Protection of Human Health – Non-Carcinogens, and (3) Objectives for Protection of Human Health – Carcinogens. There are three numeric thresholds (water quality objectives) defined for each constituent in the first category: six-month median concentration, daily maximum concentration, and instantaneous maximum concentration. For the other two categories, there is one numeric threshold: 30-day average concentration. When a constituent had three numeric thresholds, the lowest—the six-month median—was used to estimate compliance. This approach was used to account for the fact that most of the operational discharge scenarios would be sustained on a seasonal basis for up to 6 months (i.e., during the irrigation and non-irrigation seasons), and therefore the 6-month median objective would need to be met. However, the scenarios in which brine is discharged with low flows of wastewater (see **Table 4.3-10**) are unlikely to be implemented in a sustained manner seasonally, but rather represent the time periods when seasonal operations change and wastewater flows are ramped up or down depending on inputs of wastewater to the Salinas Valley Reclamation Project (SVRP) via the Castroville Seawater Intrusion Project (CSIP). Therefore, these transitional scenarios provide a conservative, worst-case assessment of potential water quality impacts.

Basis for Impact Conclusion: The Zone of Initial Dilution

A conservative threshold of 80 percent or greater (≥80%) of the Ocean Plan objective was established for determining potential impacts for constituent concentrations at the edge of the ZID. For each discharge scenario, if the concentration of a constituent at the edge of the ZID was below the 80 percent Ocean Plan water quality objective threshold, then it was assumed that the discharge would comply with the Ocean Plan. However, if the concentration of a constituent at the edge of the ZID exceeded the Ocean Plan objective, then it was concluded that the discharge scenario could violate the Ocean Plan objective and result in a significant impact. If the concentration of a constituent at the edge of the ZID exceeded the conservative threshold of 80 percent or greater of the Ocean Plan objective, it was concluded that the discharge scenario could result in a significant impact unless additional analysis could provide context, such as data outliers or water quality data not representative of proposed operations, to conclude otherwise. Note that this approach could not be applied for some water quality objectives defined in the

Ocean Plan, such as acute toxicity, chronic toxicity, and radioactivity.[37] Also, reliable water quality data were not available for several Ocean Plan constituents, in which case a concentration at the edge of the ZID could not be calculated. This lack of information regarding certain constituents is conservatively addressed in the analysis and impact conclusion presented below.

Results and Impact Discussion

The first step in the Ocean Plan compliance analysis was to estimate the worst-case concentrations of water quality constituents present in the source water for the desalination brine and in the MRWPCA secondary effluent wastewater. The estimated water quality constituent concentrations for each discharge component are presented in **Appendix D3** (Table 4). The flow-weighted in-pipe concentration for each constituent was calculated for each modeled discharge scenario using the water quality results presented in **Appendix D3** (Table 4) and the discharge flows presented in **Table 4.3-10**. The in-pipe concentration was then used to calculate the concentration at the edge of the ZID using the Dm values presented in **Table 4.3-13** (for negatively buoyant discharge plumes) and **Table 4.3-14** (for positively buoyant discharge plumes) for each discharge scenario.

The estimated concentrations for the full suite of Ocean Plan constituents are presented as concentrations at the edge of the ZID and as a percentage of the Ocean Plan numeric water quality objective in **Table A1** and **Table A2** in **Appendix D3** for the fourteen[38] operational discharge scenarios assessed for the MPWSP. As summarized in **Tables A1** and **A2** (**Appendix D3**), out of 80 constituents assessed for compliance with Ocean Plan numeric water quality objectives, the proposed project would comply with 65 objectives under all assessed operational discharge scenarios that could potentially occur. These 65 objectives are not discussed further. The remaining 15 constituents are characterized further regarding potential exceedances of the Ocean Plan objectives.

Two constituents, cyanide and ammonia, were identified as having the potential to exceed the Ocean Plan objectives under certain operational scenarios. Potential issues for cyanide and ammonia compliance were identified to occur when there would only be low volumes of secondary effluent flow mixed with desalination brine. These two constituents may exceed the Ocean Plan objective, or come close to exceeding the objective, and are shown at their estimated concentration at the edge of the ZID and as a percentage of the Ocean Plan numeric water quality objective at the edge of the ZID, in **Tables 4.3-15** and **4.3-16**, respectively. Ten constituents[39]

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[37] Calculating flow-weighted averages for toxicity (acute and chronic) and radioactivity (gross beta and gross alpha) is not appropriate based on the nature of the constituents. These constituents were measured individually for the secondary effluent, and these individual concentrations would comply with the Ocean Plan objectives. Current discharges of the secondary effluent and hauled waste are monitored semiannually for acute toxicity, chronic toxicity, and radioactivity per the existing NPDES permit and would continue to be monitored as part of future NPDES permit requirements. (See Appendix D3, Section 4.4 for details).

[38] The Draft EIR/EIS considered five operational discharge scenarios. This model analysis determined that MPWSP operational discharges would not exceed Ocean Plan water quality objectives for the constituents listed in Table 4.3-4 for which a compliance determination could be made. (See Draft EIR/EIS at page 4.3-100).

[39] Chlorinated phenolics, 2,4-dinitrophenol, tributyltin, aldrin, benzidine, bis(2-chloroethyl)ether, 3,3-dichlorobenzidine, 1,2-diphenylhydrazine, heptachlor, 2,4,6-trichlorophenol.

TABLE 4.3-15
MPWSP OPERATIONAL DISCHARGE SCENARIOS: ESTIMATED CONCENTRATIONS AT THE EDGE OF THE ZID FOR OCEAN PLAN CONSTITUENTS OF CONCERN

Constituent	Units	Ocean Plan Objective	Estimated Concentration at Edge of ZID by Flow Scenario Number[a,b]													
			MPWSP Typical Operations							MPWSP Post Shut-Down Operations						
			2	4	6	8	11	12	14	15	17	22	23	25	26	28
Objectives for protection of marine aquatic life - 6-month median limit																
Cyanide	µg/L	1	0.6	1.1	1.3	1.4	1.3	1.0	0.5	0.6	1.0	1.3	1.3	1.2	0.9	0.4
Ammonia (as N) - 6-mo median	µg/L	600	29	341	523	600	614	461	255	26	301	575	585	546	409	243

NOTES:
[a] Flow scenarios correspond to those scenario numbers provided in Table 4.3-10
[b] Shading indicates constituent is expected to be greater than 80 percent (orange shading) or exceed (red shading) the ocean plan objective for that discharge scenario.

SOURCE: Appendix D3.

TABLE 4.3-16
MPWSP OPERATIONAL DISCHARGE SCENARIOS: ESTIMATED CONCENTRATIONS AT THE EDGE OF THE ZID EXPRESSED AS PERCENTAGE OF OCEAN PLAN OBJECTIVE FOR OCEAN PLAN CONSTITUENTS OF CONCERN

Constituent	Units	Ocean Plan Objective[40]	Percentage of Ocean Plan Objective at Edge of ZID by Scenario[a,b]													
			MPWSP Typical Operations							MPWSP Post Shut-Down Operations						
			2	4	6	8	11	12	14	15	17	22	23	25	26	28
Cyanide	µg/L	1	59%	108%	133%	140%	134%	99%	52%	58%	101%	134%	133%	120%	88%	51%
Ammonia (as N) - 6-mo median	µg/L	600	5%	57%	87%	100%	102%	77%	43%	4%	50%	96%	97%	91%	68%	40%

NOTE: footnotes [a] and [b] provided under Table 4.3-15

SOURCE: Trussell Technologies, 2017 (Appendix D3).

40 Objectives for protection of marine aquatic life - 6-month median limit

were not detected in any of the source waters (desalination brine or wastewater) and results for these ten constituents are summarized in **Tables A1** and **A2** (**Appendix D3**). However, for these ten constituents, the analytical Method Reporting Limit[41] (MRL) achieved by the testing laboratory was higher than the Ocean Plan numeric objective.[42] This is a typical occurrence for ocean discharges as, under certain circumstances due to the limitations of available analytic techniques, an MRL can be higher than the Ocean Plan objective for certain constituents. Three additional constituents—acrylonitrile, beryllium, and TCDD equivalents—were initially identified as having the potential to exceed water quality objectives because they were detected in either the desalination brine or wastewater, but not in both. However, there is not enough information to assess the concentrations for these three constituents in the combined discharge of wastewater and brine due to differences in MRLs applied in the brine source waters as compared to the MRWPCA wastewater.

Based on the conservative 80 percent threshold described above for assessing operational discharges for compliance with Ocean Plan objectives, implementation of the MPWSP could potentially cause exceedances of Ocean Plan water quality objectives for the measurable constituents ammonia and cyanide (see **Tables 4.3-15** and **4.3-16**) under certain operational conditions when wastewater volumes co-mingled with the brine are low. For an additional thirteen constituents, there is not enough information to assess concentrations at the edge of the ZID due to differences in MRLs used to assess the source waters or due to MRLs being higher than Ocean Plan objectives. Therefore, it is conservatively concluded that Ocean Plan water quality objectives could potentially be exceeded during operations for some operational discharge scenarios, resulting in a significant impact. **Mitigation Measure 4.3-5 (Implement Protocols to Avoid Exceeding Water Quality Objectives)** would require CalAm to perform an extensive water quality assessment using protocols defined in Appendix II "Minimum Levels" of the 2015 California Ocean Plan prior to implementation of the MPWSP. Operational discharges that cannot be demonstrated to conform to the Ocean Plan water quality objectives, incorporated as performance standards, may only be discharged following implementation of additional design features, engineering solutions, and/or operational measures as defined in Mitigation Measure 4.3-5 that ensure compliance with objectives. Should analytical technologies be unable to achieve MRLs at or below Ocean Plan limits, it will be presumed those constituents exceed Ocean Plan water quality objectives at concentrations consistent with MRLs, and appropriate design features, engineering solutions and/or operational measures designed to mitigate the exceedance of these constituents will be implemented. With implementation of the proposed mitigation, the impact would be less than significant.

Additionally, future water quality testing and analysis, required under the NPDES permit process, would ensure that operational discharges under the MPWSP would fully comply with Ocean Plan water quality objectives and NPDES effluent limitations, including for toxicity and radioactivity.

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[41] The lowest amount of an analyte in a sample that can be quantitatively determined with acceptable precision and accuracy under stated analytical conditions (i.e., the lower limit of quantitation).

[42] The exceptions to this statement are:2,4-dinitrophenol was not detected in the MPWSP secondary effluent, and this MRL is lower than the Ocean Plan objective (i.e., MRL = 0.5 µg/L versus 4 µg/L = objective); heptachlor was not detected above the MRL in the slant well, and this MRL is lower than the Ocean Plan objective (i.e., MRL = 0.00000069 µg/L versus 0.00005 µg/L).

Consistency with Regulatory Requirements

In addition to the impacts described above, operational discharges of the MPWSP could conflict with other applicable regulatory requirements and guidelines, as noted in Section 4.3.2, Regulatory Framework. Operational discharges resulting from implementation of the proposed MPWSP may be potentially inconsistent with provisions of the National Marine Sanctuaries Act, the California Ocean Plan, MBNMS Guidelines for operation of desalination facilities, and the City of Marina LCP (Section 30231: Biological Productivity; Water Quality). Specifically, operational discharges could conflict with requirements and guidelines which were established to avoid or mitigate impacts on water quality, aquatic wildlife, and other beneficial uses of marine waters. **Mitigation Measure 4.3-5 (Implement Protocols to Avoid Exceeding Water Quality Objectives)** would require CalAm to perform an extensive water quality assessment using protocols defined in Appendix II “Minimum Levels” of the 2015 California Ocean Plan prior to implementation of the MPWSP; in addition, operational discharges that cannot be demonstrated to conform to the prescribed performance standards may only be discharged following implementation of additional design features, engineering solutions, and/or operational measures as defined in Mitigation Measure 4.3-5. With implementation of the proposed mitigation, the proposed project would be consistent with regulatory requirements and MBNMS guidelines.

Impact Summary and Conclusion – Ocean Plan Water Quality Constituents

The model-based analyses concluded constituent concentrations would become elevated for the assessed discharge scenarios to levels greater than 80 percent of the Ocean Plan objective for ammonia and cyanide. Therefore, it was concluded that the MPWSP would result in exceedances of Ocean Plan objectives, resulting in a significant impact related to water quality standards, waste discharge requirements and water quality of receiving waters in Monterey Bay. Water quality testing and analysis required under the NPDES permit process would determine whether operational discharges under the MPWSP would fully comply with Ocean Plan water quality objectives. Significant impacts would be reduced to a less-than-significant level by implementing **Mitigation Measure 4.3-5 (Implement Protocols to Avoid Exceeding Water Quality Objectives)**, which requires corrective actions be incorporated into the Project to ensure operational discharges meet all Ocean Plan water quality objectives.

Mitigation Measure 4.3-5 (Implement Protocols to Avoid Exceeding Water Quality Objectives) (presented below) requires that, prior to implementing operational discharges via the existing outfall, CalAm must perform an extensive water quality assessment as part of a waste disposal study to demonstrate compliance with Ocean Plan water quality objectives and minimum initial dilution requirements. Specifically, CalAm (and other dischargers, if applicable) would be required to analyze MPWSP operational discharges for the full range of regulated water quality constituents specified in the Ocean Plan and NPDES water quality requirements, in accordance with protocols approved by the RWQCB. Discharges would not be allowed if they do not conform to the Ocean Plan objectives for water quality. If the water quality assessment shows that releases via the existing outfall would exceed Ocean Plan objectives, then additional design features, engineering solutions, and/or operational measures must be implemented to reduce the concentration of water quality constituents in the operational discharges such that they conform with these objectives.

Mitigation Measure 4.3-4 (Operational Discharge Monitoring, Analysis, Reporting, and Compliance), described under Impact 4.3-4, above, would further reduce and minimize potential impacts by requiring CalAm to implement a comprehensive Monitoring and Mitigation Plan (Plan), following approval by the RWQCB and MBNMS, to obtain field monitoring and marine resource data in the area affected by a project. The Plan would set forth appropriate response thresholds and corrective actions that would be required if the acquired data indicated deleterious effects on receiving water quality or marine biological resources from MPWSP operational discharges.

Additionally, as stated above, it is required by law that operational discharges from the MPWSP be incorporated into an amended NPDES Permit. Under the amended NPDES permit, MPWSP operational discharges would be subject to the permit requirements prescribed by the RWQCB as part of the permit amendment process. Such requirements would be designed to ensure that operation of the MPWSP Desalination Plant would not violate waste discharge requirements defined in the amended NPDES permit, which incorporate the Ocean Plan objectives, upon discharge of the brine.

Mitigation Measures

Mitigation Measure 4.3-5 applies only to the operational discharges associated with the MPWSP Desalination Plant through the existing MRWPCA outfall.

Mitigation Measure 4.3-5: Implement Protocols to Avoid Exceeding Water Quality Objectives.

Compliance with Water Quality Objectives. Prior to MPWSP operations, and as part of the MRWPCA NPDES Permit amendment process (Order No. R3-2014-0013, NPDES Permit No. CA0048551), the permitee shall complete a water quality assessment. As part of the water quality assessment, the permitee shall:

- Quantify the projected final design discharge volume(s) by month based on project design and historic and projected monthly wastewater discharge volumes.
- Collect samples of the source waters and operational discharges and analyze them in a certified laboratory for the constituents listed in Table 1 of the California Ocean Plan (Ocean Plan Water Quality Objectives). Sampling must be completed in accordance with protocols approved by the US EPA and RWQCB.
- Demonstrate compliance for the full range of regulated water quality constituents specified in the Ocean Plan and NPDES water quality requirements in the context of minimum initial dilution values at the edge of the Zone of Initial Dilution (ZID) for the point of discharge.

If the results of the water quality assessment and waste disposal study find that operational discharges will not meet the NPDES water quality requirements, including the Ocean Plan receiving water limitation for salinity, at the edge of the zone of initial dilution (ZID) and the Brine Mixing Zone (BMZ), respectively (incorporated here as performance standards), then the MPWSP operational discharges shall not be released as proposed. Such operational discharges shall be subject to additional design features, engineering solutions, and/or operational measures to reduce the concentration of water quality constituents to be in conformance with the Ocean Plan water quality objectives and amended NPDES permit requirements at the edge of the ZID or BMZ, as applicable. Such necessary design features and operational measures shall either be implemented individually or in combination to achieve compliance (unless the RWQCB determines that different but equally effective measures be employed).

Such possible additional design features and operational measures include:

(1) *Retrofitting the existing outfall to increase dilution:* If this operational measure is implemented, the dischargers shall retrofit the outfall diffuser to include inclined diffuser jets positioned at the optimum angle to achieve maximum dilution.

(2) *Additional pre-treatment of source water to the Desalination Plant:* Feasible methods to remove polychlorinated biphenyls (PCBs) and other organic compounds from the source water include additional filtration or use of granular activated carbon (GAC) - a U.S. Environmental Protection Agency-approved method.

(3) *Treatment of discharge:* The dischargers must consider one or more of the alternative feasible methods that remove residual compounds from the discharge to meet water quality objectives at the edge of the ZID. These methods include the following:

    (a) Use of GAC (similar to that under the additional pre-treatment of source water described above, but here such treatment would be applied to the effluent following processing at the desalination facility instead of to the source water from the slant wells); or

    (b) Advanced oxidation with ultraviolet light with concurrent addition of hydrogen peroxide.

(4) *Flow Augmentation:* If this operational measure is implemented, the dischargers shall decrease the density difference of the discharge and the receiving water through the addition of up to 5 mgd of flows with densities close to freshwater to increase the minimum dilution of dense discharges.

(5) *End gate modification:* If this operational measure is implemented, the dischargers shall retrofit the outfall diffuser end gate to replace the existing opening with a minimum of one 6-inch Tideflex (or similar) check valve (Hydraulic Code 355) installed at an inclined (upward) angle greater than 20°, with an optimum angle of 60° to maximize dilution.

Determination of Efficacy of Mitigation Measures

The design features, engineering solutions, and/or operational measures required to be implemented, as necessary, either individually or as a combination, through Mitigation Measure 4.3-5 and/or Mitigation Measure 4.3-4, include a number of strategies, described below. The most effective strategy for ensuring compliance with Ocean Plan objectives, and the one most likely to be implemented, is retrofit of the existing diffuser with inclined jets. Such an option would substantially increase dilution at the edge of the ZID, ensuring compliance with all Ocean Plan water quality objectives, and would also result in the least secondary impacts (assessed under "Secondary Impacts of Mitigation Measures", below). Additional strategies that may be employed to address water quality impacts associated with operational discharges include pre-treatment of source water, post processing treatment of discharge flows, and/or flow augmentation. While less likely to be implemented, these strategies are included here as feasible measures that may be employed to achieve the performance standards required under Mitigation Measure 4.3-5. Information is provided below regarding the feasibility for these measures to reduce constituent concentrations and/or increase minimum dilution at the edge of the ZID from operational discharges in a manner that would ensure compliance with Ocean Plan objectives:

- **Retrofitting the existing outfall to increase dilution**: Diffusers for discharging dense effluents typically consist of nozzles that are inclined upwards to increase dilution and mixing. Such methods for dilution have been extensively studied (Roberts, 2016). These studies have demonstrated that retrofitting the existing outfall to include inclined diffuser jets (jets are currently oriented horizontally) increases dilution substantially. The optimum angle to the horizontal for the discharge of dense plumes for increasing initial dilution is 60° as this maximizes the path length and dilution of the dense discharge at the point of contact on the seafloor. Inclined jets can be achieved by retrofitting the existing check valves with upwardly inclined nozzles. From model analysis, all diffuser ports would require retrofit to achieve substantially increased dilution (i.e., not a subset).

  Roberts (2017; Appendix D1) assessed a representative number of discharge scenarios to compare the minimum dilution achieved if the diffuser ports were retrofitted to be inclined at 60°. **Table 4.3-17** summarizes the results for the assessed discharge scenarios, providing dilution results for both horizontal and inclined jets for comparison. Additionally, to demonstrate the feasibility for inclined jets to successfully mitigate potential water quality impacts, Table 4.3-17 includes the minimum dilution required for the assessed discharge scenarios to achieve compliance with Ocean Plan WQOs for all water quality constituents (for additional details related to Ocean Plan compliance modeling, see Appendix D3).

TABLE 4.3-17
EFFECT OF NOZZLE ANGLE ON DILUTION FOR SELECT OPERATIONAL DISCHARGE SCENARIOS

Scenario No.	Discharge Scenario	Constituent Flows[a] (mgd)		Minimum Modeled Dm		Minimum Required Dm
		Secondary Effluent	Desal Brine	Horizontal Diffusers	Inclined Diffusers (60˚)	
Typical Discharge Scenarios						
1	SE Only	19.78	0	187	180	80
2	Brine only	0	13.98	14.4	49.7	8
5	Brine + Low (3) SE	3	13.98	16.7	67.9	21
10	Brine + Mod (8) SE	8	13.98	26.5	142.7	34
13	Brine + High (15) SE	15	13.98	92	73	45
High Brine Discharge Scenarios (post-shutdown operations)						
20	High Brine + Mod (5) SE	5	16.31	18.6	84.7	25
26	High Brine + High (12) SE	12	16.31	43.9	344.6	38

SOURCE: Roberts, 2017 (Appendix D1); Trussell Tech, 2017b (Appendix D3).

- **Use of granular activated carbon (GAC):** GAC is a U.S. Environmental Protection Agency approved method. Applied as part of pretreatment of source water of post processing treatment of effluent, GAC acts as a very strong sorbent and can effectively remove PCBs and other organic compounds from the source water (Luthy, 2015). See Section 4.3.5.4 for additional information on GAC.

- **Advanced oxidation:** Advanced oxidation with ultraviolet light with concurrent addition of hydrogen peroxide is successfully used for the destruction of a variety of environmental contaminants such as synthetic organic compounds, volatile organic compounds, pesticides, pharmaceuticals and personal care products, and disinfection byproducts. This process is energy intensive, but oxidizes compounds that are difficult to adsorb with activated carbon, and requires a relatively small footprint.

- **Flow Augmentation to increase dilution**: The minimum dilution of dense discharges may be increased through the addition of flows with densities close to freshwater (such as the MRWPCA waste water), when available. The addition of such flows would decrease the density difference of the operational discharge and the receiving water. As modeled by Roberts (2016; Appendix D1), it was demonstrated that when flows with densities similar to that of freshwater were added to the dense brine discharges, the resulting discharge plumes exiting the diffuser ports had a flatter and longer trajectory due to smaller density differences of the discharge as compared to the receiving waters. The decrease in density differences resulted in increased dilution. For low added volumes (e.g. 1 mgd), the effect on dilution was determined to be minor. As the added flows are increased to where the density of the combined effluent approaches that of the background, i.e., the flow becomes neutrally buoyant, the dilution increases exponentially. Roberts (2016) demonstrated that adding 2.3 to 4.8 mgd of freshwater flows, depending on the discharge scenario, can substantially increase minimum dilution at the edge of the ZID to a degree similar to that achieved by retrofitting the diffuser ports with nozzles that are inclined upwards 60° (described above).

- **Retrofitting the end gate to increase dilution**: The minimum dilution of discharges exiting the outfall diffuser end gate would be substantially increased by modifying the existing 2-inch opening with a Tideflex check valve installed at an upward angle to maximize dilution of dense discharges, as described above for retrofitting the existing outfall to increase dilution. As modeled by Roberts (2017; Appendix D1, Supplemental Report), it was demonstrated that modifying the end gate with an inclined check valve would slightly reduce flow volume and increase exit velocity, resulting in an increased minimum dilution at the end gate, as compared to existing conditions. As described in detail in Section 3.1 of Roberts (2017), any upward angle greater than about 20° would result in dilutions that meet the BMZ salinity requirements, with an optimum angle to maximize dilution calculated as being 60° (see Figures 2 and 3, Roberts 2017, Appendix D1).

4.3.5.3 Secondary Impacts of Mitigation Measure 4.3-5

Potential secondary impacts associated with implementation of **Mitigation Measure 4.3-5 (Implement Protocols to Avoid Exceeding Water Quality Objectives)** are discussed below. Secondary impacts would be associated with the treatment methods and any components that may be installed as part of **Mitigation Measure 4.3-5**.

Retrofitting the Existing Outfall to Include Inclined Diffuser Jets and/or Modified End Gate to Increase Dilution

Retrofitting the existing MRWPCA outfall diffuser would be achieved by installing inclined nozzles on the existing diffuser check valves and/or replacing the existing end gate opening with a minimum of one 6-inch Tideflex (or similar) check valve. The impacts associated with the physical construction of such a retrofit would likely be minor and temporary, consisting primarily of minor construction-related sea-bed disturbance and water quality degradation in the form of increased turbidity and disturbance of benthic organisms on and adjacent to the outfall diffuser. Such temporary disturbances to the seafloor and increases in associated turbidity would be minor, primarily occurring over several hours to a day or two, through the process of divers staging and installing equipment to complete the retrofit of the diffuser. Additionally, the use of support craft at the water surface could be used for staging equipment and construction supplies or to facilitate the removal of built up sediment from the terminus of the diffuser pipe. Water quality would rapidly return to ambient conditions following completion of the retrofit as sediments re-settle on the seabed. Similarly, any disturbance to benthic communities would consist of a minor disturbance over a small area, consisting of the outfall diffuser and seabed immediately surrounding the diffuser. Prior to implementation of the retrofit, MBNMS would review and approve design specifications and construction plans to ensure that disturbances to benthic communities are minimized or avoided. The disturbance would be short in duration and of low intensity and benthic communities would likely recover to baseline conditions. Secondary impacts from construction related to retrofitting the existing outfall to increase dilution would be less than significant.

Operation of the outfall diffuser following modification of the end gate described above was assessed by Roberts (2017; Appendix D1) to determine whether such a modification would reduce overall dilution from the outfall diffuser ports, as described under Impact 4.3-4 and in detail in Appendix D1. As demonstrated by the model analyses presented in Appendix D1, modification of the end gate would have minimal effect on the flow distribution between the diffuser ports and minimal effect on head loss. Typical flow variations with and without the end gate valve are assessed in Roberts (2017) and shown in Figure 3 of Appendix D1 (Supplemental Report). For example, discharge scenarios involving only secondary effluent (total flow of 19.88 mgd, density 999.0 kg/m3) and only brine (flow of 14.08 mgd, density 1,045.1 kg/m3) are assessed. Flow distributions with and without the Tideflex valve are virtually indistinguishable. The flow exiting from the end gate is reduced slightly from 4 percent to 3 percent of the total for the secondary effluent only scenario and from 5 percent to 4 percent for the brine only scenario. The velocity from the end gate is increased by the check valve, from 6.7 to 10.7 ft/s for the secondary effluent only scenario and from 6.1 to 9.7 ft/s for the brine only scenario. The additional total head loss through the outfall diffuser overall due to the check valve is negligible, about 0.01 ft. Therefore, modification of the end gate would have only a negligible effect on overall dilution from the outfall diffuser ports for all assessed discharge scenarios. Secondary operational impacts related to modifying the end gate to increase dilution would be less than significant.

Operation of the outfall diffuser following installation of inclined nozzles on the existing diffuser check valves was assessed by Roberts (2017) and Trussell Tech (2017) to determine whether retrofitting the diffuser would reduce overall dilution from the outfall diffuser ports for certain operational discharge scenarios (see Appendix D1 and Appendix D3 for details). Roberts (2017) determined that orienting the nozzles upwards from horizontal would increase the dilution of brine mixtures that are denser than the receiving water (Table 4.3-17). However, for buoyant effluents, such as when brine is absent or when high volumes of MRWPCA secondary effluent are discharged with brine, dilution will become decreased. Decreasing dilution at the outfall for buoyant effluents could prevent MRWPCA from meeting NPDES discharge requirements, especially should the desalination facility be offline. To determine whether retrofitting the outfall diffuser with inclined jets could cause secondary impacts on water quality through reducing minimum dilution for buoyant discharges, the effect on dilution of varying nozzle orientations for dense and buoyant effluents was modeled (Appendix D1). As summarized in Table 4.3-17, and discussed in detail by Roberts (2017; Appendix D1), retrofitting the diffuser with inclined jets would not reduce minimum dilution to the extent that buoyant plumes would fail to conform to NPDES or Ocean Plan requirements. Secondary operational impacts related to retrofitting the existing outfall to increase dilution would be less than significant.

GAC Facility to Treat the Source Water and/or Brine:

- The GAC facility would consist of GAC adsorption equipment likely consisting of a series of pressure vessels, a building and a backwash system similar to the proposed pressure filtration pretreatment system. Based on the preliminary MPWSP Desalination Plant design, the GAC units could be accommodated within the currently proposed building footprint. The installation of the GAC facility would be a part of the construction activities associated with the MPWSP Desalination Plant site within the existing footprint and would not create new or additional impacts beyond those discussed for the construction at the site in this EIR/EIS. The impact would be less than significant.

- Treatment of the source water (as opposed to the brine) could potentially be provided by GAC filter-adsorbers that would be similar to the proposed pressure filtration pretreatment system. If GAC adsorption of the source water were to replace or supplement the proposed conventional filtration process, water quality of the drinking water delivered to the distribution system would likely improve as measured by lower concentrations of organic compounds, total organic carbon, disinfection byproducts; fewer tastes and odors; and more stable chlorine residuals. Other benefits might include reduced fouling potential at the RO membranes.

  Operation of the GAC adsorption process would generate spent GAC, which would be considered hazardous waste. Handling and disposal of the waste generated would be subject to federal and state hazardous waste regulations (discussed in Section 4.7, Hazards and Hazardous Materials). For example, the federal Toxic Substances Control Act of 1976 and the Resource Conservation and Recovery Act of 1976 authorized the USEPA to regulate the generation, transportation, treatment, storage, and disposal of hazardous waste. The Resource Conservation and Recovery Act was amended in 1984 by the Hazardous and Solid Waste Act, which affirmed and extended the "cradle to grave" system of regulating hazardous wastes. Further, the California Occupational Safety and Health Act (OSHA) of 1973 would apply to handling of spent GAC material onsite. The California OSHA addresses California employee working conditions, enables the enforcement of workplace standards, and provides for advancements in the field of occupational health and safety. Thus, handling, transportation, and disposal of the spent GAC material generated at the MPWSP Desalination Plant site would be subject to, and would adhere to, the regulations intended to protect environmental and public health and ensure safety. Therefore, the impact would be less than significant.

- Operating the GAC adsorption system would result in an increase in energy use, in particular if there is additional pumping necessary. The system could operate using the pressure of the brine stream, or it may require an intermediate pumping station. It is anticipated that operation of the GAC adsorption system would thus increase the energy use at the proposed MPWSP Desalination Plant. The impacts resulting from energy use from the proposed project are discussed in Section 4.11, Greenhouse Gas Emissions and Section 4.18, Energy Conservation, and the secondary impacts from the operation of the GAC adsorption system are discussed below.
  - Section 4.11, Greenhouse Gas Emissions, identifies the increase in greenhouse gas emissions due to increased energy use from the proposed project as a significant yet mitigable impact. Any increase in the energy usage resulting from operating the GAC adsorption system would increase the severity of the impact but would still be mitigable. Therefore, operating the GAC adsorption system would not contribute to a significant and unavoidable impact.
  - CalAm's operational electrical power demand for water production under the proposed project (including water produced from the MPWSP Desalination Plant, Seaside Groundwater Basin production wells, ASR system, and the Carmel River) and the net increase in annual electrical power demand for water production is described in Section 4.18, Energy Conservation. The analysis in Section 4.18 determined that the proposed project would not consume energy wastefully or inefficiently. The GAC adsorption system for removing organic compounds from the source water and/or the brine would be employed to ensure that the brine discharged to the bay would comply with the water quality standards or regulatory requirements, which are protective of the beneficial uses of the bay. Therefore, electricity consumed as a result of project operations, including that from operating the GAC system, would not be wasteful or inefficient. The increase in the energy use for any GAC adsorption system would be less than significant.

    As discussed in Section 4.18, Energy Conservation, Pacific Gas and Electric (PG&E), the power provider in the project area, would have adequate capacity and infrastructure to support the proposed project. Electric power for implementation of the proposed project could be accommodated by the existing local and regional energy supplies and the impact would be less than significant. An incremental increase in the energy use from the operation of the GAC adsorption system would be accommodated within the existing capacity. Therefore, the secondary impact would be less than significant.

- Maintenance of the GAC system would involve removing and replacing the GAC, which would be accommodated within the proposed operations and maintenance of the MPWSP Desalination Plant. The impact from routine transport, use, or disposal of hazardous materials during project operations is discussed under Impact 4.7-6 in Section 4.7, Hazards and Hazardous Materials. As discussed in the section, CalAm, as required by law, would submit a Hazardous Materials Business Plan (HMBP) for the project facilities to the Monterey County Environmental Health Division prior to the start of project operations; therefore, no additional environmental impact would result from maintenance.

Advanced Oxidation System and Facility to Treat the Brine:

- The advanced oxidation system would likely include a building with a liquid hydrogen peroxide chemical storage and feed system. The building would be installed as part of the construction activities associated with the MPWSP Desalination Plant site and would not create new or additional impacts beyond those discussed for the construction at the site.
- The advanced oxidation process would generate minimal byproducts and no residuals compounds or liquid or solid waste. The quality of the brine discharged to Monterey Bay would improve as a result of the removing organic compounds. The impact related to solid or liquid waste and disposal would therefore be less than significant.
- Implementing the advanced oxidation system would result in an increase in energy use. It is anticipated that operation of the advanced oxidation system would thus increase the energy use at the proposed Desalination Plant. The impacts resulting from energy use from the proposed project are discussed in Section 4.11, Greenhouse Gas Emissions, and Section 4.18, Energy Conservation, and the secondary impacts from the operation of the advanced oxidation are discussed below:
  - Section 4.11, Greenhouse Gas Emissions, identifies the increase in greenhouse gas emissions due to increased energy use from the proposed project as less than significant with mitigation. Any additional increase in energy use resulting from operating the advanced oxidation system would increase the severity of the impact but would remain mitigable. Therefore, in this issue area, operating the advanced oxidation system would not contribute to a significant and unavoidable impact.
  - CalAm's operational electrical power demand for water production under the proposed project (including water produced from the MPWSP Desalination Plant, Seaside Groundwater Basin production wells, ASR system, and the Carmel River) is estimated in Section 4.18, Energy Conservation. The analysis in Section 4.18 determined that the proposed project would not consume energy wastefully or inefficiently. The advanced oxidation system for removing organic compounds from the source water and/or the brine would be employed to ensure that the brine discharged to the bay would comply with the water quality standards or regulatory requirements, which are protective of the beneficial uses of the bay. Therefore, electricity consumed as a result of project operations, including that from operating of the advanced oxidation system, would not be wasteful or inefficient. The increase in the energy use for any advanced oxidation system would be less than significant.

    Further, PG&E, the power provider in the project area, would have adequate capacity and infrastructure to support the proposed project. Electric power for implementation of the proposed project could be accommodated by the existing local and regional energy supplies and the impact would be less than significant. An incremental increase in energy use from the operation of the advanced oxidation system would be accommodated within the existing capacity of PG&E. Within the MPWSP Desalination Plant site, this could require increasing the capacity of the power distribution system to accommodate the additional electrical load; however, this would not entail additional construction or installation activities. The secondary impact is considered less than significant.
- The advanced oxidation system would require a liquid hydrogen peroxide chemical storage and feed system onsite. Under the proposed project, the MPWSP Desalination Plant

operations would involve the use and storage of chemicals to remove performance-reducing deposits from the pretreatment filtration system and RO membranes, as well as chemicals to adjust product water quality. The impact from routine transport, use, or disposal of hazardous materials during project operations is discussed under Impact 4.7-6 in Section 4.7, Hazards and Hazardous Materials. As discussed in the section, CalAm, as required by law, would submit a Hazardous Materials Business Plan (HMBP) for the project facilities to the Monterey County Environmental Health Division prior to the start of project operations. The HMBP is required to include information on hazardous material handling and storage, including containment, site layout, and emergency response and notification procedures in the event of a spill or release. In addition, the plan requires annual employee health and safety training. The plan must be approved by the County prior to commencement of project construction and the project facilities would be subject to post-construction compliance inspections. The HMBP would also provide the local agencies with the information they need to plan appropriately for a chemical release, fire, or other incident, which would reduce the potential for an accidental release to cause harmful health effects to workers or the public or substantial degradation to soil or water quality. Compliance with these various regulations would ensure this impact is less than significant. The hydrogen peroxide storage and feed system for the advanced oxidation system would be included as part of the HBMP and be subject to the regulatory requirements described for other chemicals proposed to be stored, used, and handled onsite and would not result in a new or significant impact. The secondary impact therefore would be less than significant.

Flow Augmentation

Flow augmentation would be achieved by the addition of flows to operational discharges with densities close to freshwater (such as the MRWPCA waste water), when available. The impacts associated with such flow augmentation would be minor, consisting of negligible increased velocities of the operational discharges. Extreme discharge velocities have the capacity to entrain aquatic wildlife, such as larval stage or planktonic stage organisms, and subject such organisms to shear stress, resulting in increased rates of mortality. As demonstrated by Roberts (2016), because the existing diffuser ports are equipped with Tideflex duckbill diffuser nozzles, the diffuser ports increase in opening diameter as flow increases. Therefore, velocity increases as a result of flow augmentation would be negligible due to the increased port opening diameter offsetting the increased jet velocity as compared to increased velocities that would occur for a fixed orifice port. Impacts relating to entrainment and shear stress are discussed in detail in Section 4.5, Marine Biological Resources. The secondary impact from flow augmentation to increase dilution would be less than significant.

Impact 4.3-6: Degradation of water quality due to discharges associated with maintenance of the subsurface intake wells and ASR-5 and ASR-6 Wells. *(Less than Significant)*

This impact focuses on discharges of effluent generated during maintenance of the subsurface intake wells and ASR-5 and ASR-6 Wells. This impact does not apply to any of the other proposed facilities.

Subsurface Slant Wells

As described in Section 3.6.1 of Chapter 3, Description of the Proposed Project, the subsurface slant wells would require periodic maintenance every 5 years. Slant well maintenance activities would disturb roughly 6 acres at the CEMEX active mining area for 9 to 18 weeks during well cleaning operations. Beach sand disturbed during maintenance activities would be susceptible to erosion and could migrate outside of the work area. However, because sand migration is a natural ongoing process along the shoreline, the migration of sand within and to areas adjacent to the CEMEX active mining area would not adversely affect water quality. However, toxic chemicals used to maintain heavy maintenance equipment, such as fuels and petroleum lubricants, if not managed appropriately, could be accidentally released to sensitive beach areas and adversely affect shallow groundwater and/or water quality in Monterey Bay.

As described in Chapter 3, Description of the Proposed Project, mechanical brushes would be lowered into the slant wells to mechanically clean the well screens. If chemical cleaning products are needed for maintenance, only environmentally inert products would be used. However, the effluent produced during slant well cleaning could carry sediment or other contaminants that, if discharged directly to the beach area, could adversely affect water quality in Monterey Bay.

Slant well maintenance activities would be considered a “land disturbance activity” and would be subject to the water quality control requirements of the *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009, NPDES No. CAS000002)* (Construction General Permit) (SWRCB, 2009). Similar to slant well construction activities, the contractor conducting the maintenance would be required to prepare a SWPPP that includes specific measures to manage pollutants generated during maintenance activities. These measures would address the potential adverse effects to water quality associated with equipment fueling and storage, inadvertent releases of toxic chemicals, and discharges of cleaning effluent. The cleaning effluent would be conveyed to portable holding tanks to allow chemical residuals and sediment to settle out, and the decanted water would be subsequently percolated into the ground in the CEMEX active mining area. (See Section 4.3.2.2 and Impact 4.3-1, above, for additional information regarding the Construction General Permit requirements.) Adherence to these requirements would prevent significant water quality impacts during slant well maintenance activities. The impact would be less than significant. No mitigation is necessary.

ASR-5 and ASR-6 Wells

As part of routine maintenance of the ASR-5 and ASR-6 Wells, and similar to the routine maintenance of the four existing ASR wells, CalAm facility operators would regularly backflush accumulated sediment and turbid water from the two wells. The duration of the backflushing would range from a few minutes to 2 hours. Water produced during routine backflushing would be conveyed via the new ASR Pump-to-Waste Pipeline to the existing Phase I ASR Pump-to-Waste System located at the intersection of General Jim Moore Boulevard and Coe Avenue. These discharges would be considered “water supply discharges” and would be conducted under the *General Waiver of WDRs for Specific Types of Discharges* (Resolution R3-2014-0041)

(General Waiver) (RWQCB, 2014). As such, discharges of backflush effluent would be subject to the conditions of the General Waiver, including the requirements that all discharges occur at distances greater than 100 feet from streams, wetlands, and other water bodies, and that appropriate management practices be implemented to preclude discharging to surface waters and surface water drainage courses. In addition, backflush effluent discharges would be subject to the condition that it would not have chlorine or bromine concentrations that could impact groundwater quality. Compliance with the conditions of the General Waiver would prevent the degradation of water quality during routine maintenance of the ASR-5 and ASR-6 Wells. The impact would be less than significant, and no mitigation is necessary.

Impact Conclusion

Discharges related to periodic maintenance of the subsurface slant wells and routine maintenance of the ASR-5 and ASR-6 Wells would be conducted in accordance with regulatory requirements designed to protect water quality. As a result, the impact would be less than significant for both facility components.

Mitigation Measures

None proposed.

Impact 4.3-7: Alteration of drainage patterns such that there is a resultant increase in erosion, siltation, or the rate or amount of surface runoff. (*Less than Significant*)

During construction of the various proposed MPWSP components, soil disturbance associated with grading and earthmoving operations could expose soils to stormwater runoff, which could result in onsite erosion and sediments being transported in stormwater runoff, subsequently resulting in downstream siltation. Following construction (operation phase), stormwater runoff volumes and rates generated from undeveloped, unpaved areas can increase considerably when drainage patterns are substantially altered, a site is paved, the impervious surface area is increased, and the ability of surface water to infiltrate the ground surface is reduced or eliminated. The addition of impervious surfaces or the alteration of drainage patterns (such as through grading) can increase peak stormwater flows, causing erosion or siltation onsite or downstream. The majority of the proposed facilities would be constructed below ground and would not increase impervious surfaces or alter long-term drainage patterns during operations in a manner that increases onsite or offsite erosion or siltation. As discussed in detail above (Impact 4.3-1), construction of the proposed project would be subject to the Construction General Permit requirements, which include preparation of a SWPPP as well as additional local requirements governing management of construction stormwater and the use of established BMPs for the management of erosion during construction activities. As described in Impact 4.3-1, preparation and approval of the SWPPP associated with the Construction General Permit would include site-specific erosion and sedimentation control practices. Incorporation of these permit requirements would ensure the implementation of BMPs and specific measures for the protection of water quality effective in minimizing the potential for erosion or siltation as a result of altered drainage patterns. The SWPPP also includes descriptions of the BMPs required to reduce pollutants, including sediment, in stormwater discharges after all construction phases have been completed at the site (post-construction BMPs). Since the proposed project would create new impervious surfaces at the aboveground facilities located throughout the project area, impacts related to altered drainage patterns, erosion, and siltation are assessed in detail for specific project components below.

Subsurface Slant Wells

The subsurface slant wells would be constructed in a previously disturbed portion of the CEMEX active mining area in the city of Marina. The 10 slant wells would be located at six sites along the back of the dunes: four sites (the test slant well site No. 1, and three new sites) would each have one slant well and two sites would have three slant wells at each (see **Figure 3-3**). Sites 1 through 6 would include the following aboveground facilities: one wellhead vault per slant well, mechanical piping (meters, valves, gauges), electrical control cabinet, and a pump-to-waste vault. The new permanent slant wells and associated aboveground infrastructure at Sites 2 through 6 would be constructed on a 5,250- to 6,025-square-foot graded pad located above the maximum high tide elevation.

Implementation of the subsurface slant wells at the CEMEX active mining area would result in a minor increase in impervious surface area. As indicated in **Table 4.3-6**, above, the subsurface slant wells would qualify as a Tier 4 project and CalAm would be required to ensure flows for the 2-year through 10-year storm events match pre-project flows. With mandatory compliance with the post-construction stormwater requirements, alterations in drainage patterns at the CEMEX active mining area would not result in substantial increases in erosion, siltation, or the rate or amount of surface runoff. The impact would be less than significant.

MPWSP Desalination Plant

The proposed MPWSP Desalination Plant site would disturb approximately 25 acres of a 46-acre undeveloped parcel located on Charles Benson Road, northwest of the MRWPCA Regional Wastewater Treatment Plant. The proposed improvements at the MPWSP Desalination Plant site would include laboratory and administration buildings, various treatment and storage facilities, as well as paved parking, driveways, and maintenance areas. The site would add approximately 15 acres of impervious surfaces, which would reduce stormwater infiltration onsite and could increase stormwater runoff from the site. If not managed, an increase in stormwater runoff could increase erosion and/or siltation downstream.

CalAm would be required to comply with the most recent post-construction stormwater control requirements (Central Coast RWQCB Resolution No. R3-2013-0032), which are enforced by the local jurisdictions in accordance with the MRSWMP and the NPDES Municipal Stormwater Permit for MS4s (described in Section 4.3.2, Regulatory Framework, above). As indicated in **Table 4.3-6**, above, the MPWSP Desalination Plant would qualify as a Tier 4 project and CalAm would be required to: incorporate Low Impact Development (LID) measures into site design, treat stormwater runoff, retain a portion of stormwater runoff from the site, and manage flows for the 2- through

10-year storm events such that they match pre-project flows. Post construction stormwater BMPs could include, but would not be limited to, the use of pervious concrete or pavement, bioswales, vegetated swales, buffer strips, and vegetated retention ponds. CalAm would be required to prepare and implement a post-construction SWMP that details the maintenance schedule for post-construction BMPs. With mandatory compliance with the post-construction stormwater requirements, alterations in drainage patterns at the MPWSP Desalination Plant site would not result in substantial increases in erosion, siltation, or the rate or amount of surface runoff. The impact would be less than significant.

All Pipelines

Once constructed, all of the proposed pipelines would be located entirely underground and the surface along the pipeline alignments would be restored to pre-construction conditions. No substantial long-term changes in drainage patterns would result from implementation of the proposed pipelines. Therefore, no impact would result.

ASR-5 and ASR-6 Wells

The proposed ASR-5 and ASR-6 Wells at the Fitch Park military housing area would add a total of approximately 2,000 to 2,500 square feet of impervious surface due to the addition of the concrete pump houses, electrical transformer, and access driveway for maintenance vehicles. It is assumed that the ASR-5 and ASR-6 Wells would qualify as a Tier 1 project under the post-construction stormwater management requirements (see **Table 4.3-6**, above) and CalAm would be required to implement LID elements into the site design. With adherence to the post-construction stormwater management requirements, this negligible increase in impervious surfaces would not significantly impede infiltration, alter drainage patterns, or increase erosion and siltation. Therefore, the impact would be less than significant.

Carmel Valley Pump Station

The Carmel Valley Pump Station would be enclosed in a 500-square-foot single-story building along with a 100-square-foot electrical control building outside of the pump station building. These structures would add approximately 600 feet of impervious surfaces. These negligible increases in impervious surfaces would not result in a substantial change in drainage patterns, erosion, or siltation. Therefore, the impact would be less than significant.

Impact Conclusion

The subsurface slant wells, MPWSP Desalination Plant, and ASR-5 and ASR-6 Wells would be subject to the post-construction stormwater management requirements of the municipal stormwater permit and CalAm would be required to implement post-construction stormwater BMPs into the final site designs. With adherence to the post-construction requirements, the existence and operation of these facilities would result in a less than significant impact related to changes in drainage patterns, increased soil erosion, and siltation. Implementation of the Carmel Valley Pump Station would result in a less than significant impact. No impact would result from implementation of the proposed pipelines.

Mitigation Measures

None proposed.

Impact 4.3-8: Alteration of drainage patterns such that there is an increase in flooding on- or offsite or the capacity of the stormwater drainage system is exceeded. (*Less than Significant*)

During construction of the various components of the proposed project, grading and earthmoving operations could alter local drainage patterns and redirect or concentrate stormflows, which could result in increased risks related to onsite and/or downstream (offsite) flooding, especially if stormwater conveyance capacity is exceeded in existing or planned stormwater systems. Following construction (operation phase) stormwater runoff volumes and rates can increase significantly when drainage patterns are substantially altered or when the impervious surface area is increased.

As discussed in detail under Impact 4.3-7, implementation of the proposed facilities would not result in substantially altered drainage patterns or increased stormwater runoff as a result of increased impervious surfaces. The subsurface slant wells, and the MPWSP Desalination Plant would qualify as a Tier 4 project and CalAm would be required to ensure flows for the 2-year through 10-year storm events match pre-project flows (**Table 4.3-6**). Other project components (ASR-5 and ASR-6 Wells) would qualify as a Tier 1 project and CalAm would be required to implement LID elements into the final site design (**Table 4.3-6**), ensuring stormwater runoff is not increased such that flood risks on- or offsite are increased or stormwater conveyance structure capacity is exceeded. Further, the existing ASR settling basin at the intersection of General Jim Moore Boulevard and Coe Avenue would be used for settling of backflush effluent from the wells and would not result in flooding or affect the capacity of the stormwater drainage system. Pipelines would be located entirely underground and the surface along the pipeline alignments would be restored to pre-construction conditions. No changes in drainage patterns would result from implementation of the proposed pipelines. Implementation of the Carmel Valley Pump Station would add approximately 600 square feet of impervious surfaces and land uses in the vicinity of the pump station site include low density residential development and open space. This negligible increase in impervious surfaces would not result in substantial impacts related to changes in drainage patterns, flooding, or flows in excess of the stormwater drainage system.

With mandatory compliance with the post-construction stormwater management requirements, alterations in drainage patterns resulting from implementation of the proposed facilities would not result in substantial alterations in drainage patterns such that flooding on or offsite were increased, nor the capacity of stormwater drainage systems exceeded. The impact would be less than significant.

Mitigation Measures

None proposed.

Impact 4.3-9: Impedance or redirection of flood flows due to the siting of project facilities within a 100-year flood hazard area. (*Less than Significant*)

The subsurface slant wells and portions of the Source Water Pipeline, Castroville Pipeline, and new Transmission Main would be constructed in a 100-year flood hazard area.

Subsurface Slant Wells

As shown in **Figure 4.3-2**, the subsurface slant wells and associated structures would be located within or adjacent to the 100-year coastal flood hazard area. The subsurface slant wells would be constructed near the western terminus of the CEMEX access road and just south of the CEMEX settling ponds. The electrical control cabinet at each well site (Figure 3-3a) would be a single-story structure 16 feet long by 7 feet wide. Any flood flows associated with 100-year coastal flooding diverted by the electrical control cabinet would be diverted to the sandy areas immediately surrounding the cabinet, within the CEMEX active mining area, and would be temporary in nature, highly localized in extent, and would not affect other properties or structures or otherwise interfere with CEMEX operations. The wellheads and supporting structures would extend at a maximum height of 2 feet above the ground surface and would not impede or redirect flood flows in the area. Therefore, the impact would be less than significant.

Source Water Pipeline, Castroville Pipeline, and New Transmission Main

Portions of the Source Water Pipeline and new Transmission Main in Marina, and the Castroville Pipeline in unincorporated Monterey County would be located within 100-year coastal flood hazard areas (see **Figure 4.3-3**). However, once constructed, these pipelines would be located underground and would not impede or redirect surface flood flows in the area. The impact would be less than significant.

All Other Project Components

None of the other project components are located within a 100-year flood hazard area. Therefore, no impact related to the impedance or redirection of flood flows in a 100-year flood hazard area would result.

Impact Conclusion

Portions of the Source Water Pipeline, new Transmission Main, and Castroville Pipeline would be constructed in a 100-year flood hazard area. However, these facilities would be placed underground would not impede or redirect flood flows. The impact would be less than significant for the subsurface slant wells, and Source Water Pipeline. No impact would result from implementation of all other proposed facilities because none of the other project components are located within a 100-year flood hazard area.

Mitigation Measures

None proposed.

Impact 4.3-10: Exposure of people or structures to a significant risk of loss, injury, or death from flooding due to a tsunami. (*Less than Significant*)

Tsunami damage is typically confined to low-lying coastal areas. As shown in **Figure 4.3-2**, the near-shore margins of Monterey County, including coastal portions of Marina, Seaside, and Monterey, are subject to flooding in the event of a tsunami. The subsurface slant wells in Marina, and the Castroville Pipeline in unincorporated Monterey County would be located in areas subject to flooding from a tsunami.

Subsurface Slant Wells

All facilities in the CEMEX active mining area would be designed to withstand inundation. As a result, the slant wells would not be subject to a significant risk of damage from flooding in the event of a tsunami. The slant wells would be operated remotely using a SCADA system, with routine site visits by facility operators to monitor operations. Because the presence of onsite personnel would be minimal, operation of the subsurface slant wells would not expose facility operators to significant tsunami hazards. The impact would be less than significant for the subsurface slant wells.

Castroville Pipeline

Because the Castroville Pipeline would be located underground and designed to withstand inundation, the pipeline would not be subject to a significant risk of damage from flooding in the event of a tsunami.

Site visits from facility operators associated with pipeline operations and maintenance would be limited to annual inspections of the cathodic protection system, testing and servicing of valves, vegetation maintenance, and repairs of minor leaks in buried pipeline joints or segments. Pipeline operations and maintenance would not expose personnel or structures to significant risks from flooding in the event of a tsunami. The impact would be less than significant.

All Other Project Components

None of the other project components are located within a tsunami inundation zone. Therefore, no impact would result.

Impact Conclusion

The MPWSP would not expose people or structures to a significant risk of loss, injury, or death from flooding due to a tsunami. The impact would be less than significant for the subsurface slant wells, and Castroville Pipeline. For all other facilities, no impact would result.

Mitigation Measures

None proposed.

Impact 4.3-11: Exposure of people or structures to a significant risk of loss, injury, or death from flooding due to sea level rise. (*Less than Significant*)

Coastal flooding impacts would be short-term (from storm tides) and long-term (from sea level rise). Short-term impacts from coastal flooding could occur during 100-year storm events and include coastal erosion, which is discussed under Impact 4.2-10 in Section 4.2, Geology, Seismicity, and Soils, and impedance or redirection of flood flows, which is discussed under Impact 4.3-9, above. This impact focuses only on the long-term impacts related to exposure of people or structures to a significant risk of loss, injury, or death from flooding due to sea level rise. Detailed analyses of coastal surface water elevations and erosion associated with sea level rise are presented in Appendix C.

The proposed project could expose project facilities to long-term flooding from sea level rise. The subsurface slant wells, the northernmost portion of the MPWSP Desalination Plant site, and portions of the Source Water Pipeline would be located in areas that could be subject to sea level rise. However, because the subsurface slant wells and the two pipelines would be constructed underground and designed to withstand inundation, these facilities would not be subject to a significant risk of damage from flooding due to sea level rise. The proposed aboveground facilities at the 40-acre MPWSP Desalination Plant site would be constructed on the upper terrace of the site and at elevations higher than the predicted elevations associated with the 2100 sea level rise of 55 inches (Figure 4.3-3). The desalination facilities would be designed so as to minimize the risk from flooding due to sea level rise. The impact would be less than significant.

Subsurface Slant Wells

The subsurface slant wells in Marina would be located in the CEMEX active mining area. This area is subject to sea level rise as shown in **Figure 4.3-3**. All facilities in the CEMEX active mining area would be designed to withstand inundation. Therefore, the slant wells would not be subject to a significant risk of damage from flooding due to sea level rise. The impact would be less than significant.

MPWSP Desalination Plant

According to reports related to climate change and sea level rise (see the discussion of Coastal Flooding and Sea Level Rise under Section 4.3.1.4, above, for further details), during the lifetime of the desalination facilities (approximately 50 years), the sea level in the project vicinity is projected to rise by a total of 27.5 inches (2.3 feet). Further, the mean sea level rise trend in Monterey Bay is estimated to be increasing by 0.053 inches per year (NOAA, 2013b).

The MPWSP Desalination Plant site is located in close vicinity of the areas subject to flooding from sea level rise (see **Figure 4.3-3**). The MPWSP Desalination Plant would be located at elevations between 85 and 110 feet above msl, which is greater than the sea level rise of approximately 2.3 feet estimated to occur during the lifetime of the proposed project (the next 50 years). Thus, the MPWSP Desalination Plant site facilities would not be subject to flooding and would not expose people or structures to risk from flooding due to sea level rise during the lifetime of the proposed project. Therefore, the impact on proposed project facilities would be less than significant.

Source Water Pipeline and Castroville Pipeline

Portions of the proposed Source Water Pipeline in Marina and the Castroville Pipeline in unincorporated Monterey County (see **Figure 4.3-3**) would be located in areas that would be subject to flooding from sea level rise. However, once constructed, the pipelines would be located underground and would not impede or redirect flood flows, nor be subject to a significant risk of flood damage from sea level rise. The impact would be less than significant.

All Other Proposed Facilities

None of the other proposed facilities would be located in areas that would be subject to flooding from sea level rise. No impact would result.

Impact Conclusion

The MPWSP would not expose people or structures to a significant risk of loss, injury, or death from flooding due to sea level rise. The impact would be less than significant for the subsurface slant wells, MPWSP Desalination Plant, and Source Water Pipeline, and Castroville Pipeline. All other proposed facilities would have no impact.

Mitigation Measures

None proposed.

4.3.6 Cumulative Effects of the Proposed Project

The cumulative scenario and cumulative impacts methodology are described in Section 4.1.7. Table 4.1-2 lists potential cumulative projects.

Impact 4.3-C: Cumulative impacts related to surface water hydrology and water quality (*Less than Significant with Mitigation)*

The geographic scope for potential cumulative surface hydrology and water quality impacts consists of the project area and surrounding Salinas River and Carmel River watershed lands as well as marine waters in Monterey Bay. The analysis of potential cumulative impacts on hydrology and water quality considers those cumulative projects listed in **Table 4.1-2** and shown in **Figure 4-1**. The analysis focuses on cumulative adverse effects on water quality associated with construction and operations. The timeframe during which the MPWSP could contribute to cumulative surface water hydrology and water quality effects includes the 24-month construction period, as well as the estimated 40-year operations phase.

Of not, on Saturday, January 20, 2018, MBNMS was notified of a sewage spill into MBNMS from the Monterey Regional Water Pollution Control Agency (MRWPCA), the local wastewater treatment facility. The original estimate indicated a discharge from one million gallons to 4.4 million gallons. Monterey County Department of Environmental Health closed the beaches from the Salinas River mouth to Carmel Bay due to the southerly currents and very large ocean swell at the time. Eleven samples for fecal indicator bacteria and ammonia were collected offshore at the outfall pipe and at more than seven local beaches on January 20th. All sample results were within acceptable regulatory (USEPA Ambient Water Quality Criteria) limits except for one unrelated to the discharge at Del Monte beach in the City of Monterey. MBNMS staff requested that MRWPCA submit samples for additional analysis of raw sewage for all California Ocean Plan Table 1 constituents to determine potential impacts on marine resources. MRWPCA reported that the spill resulted from the failure of an analog input card which caused alarms and bar screen rakes to fail, thus releasing sewage to overflow a 300,000-gallon sump, thereby bypassing any treatment and discharging directly into Monterey Bay for 9.25 hours. Engineering analysis later determined that approximately 2.8 million gallons of untreated sewage entered Monterey Bay. Subsequently, MRWPCA undertook multiple actions aimed at preventing future spills of this nature, including but not limited to: installing cameras, level sensors, updated software, and additional staff conducting rounds after hours. Sampling and information collection regarding the extent and potential impacts of the spill is ongoing. As noted in Section 4.3.1.3, the processes influencing the physical mixing of Bay receiving waters with inputs from other sources is enhanced by turbulence induced by currents and waves. While current velocities can be different throughout the water column, tidally-driven currents can cause large pulses of water movement. Wave action, particularly during stormy periods, can vertically stir the water. The ocean water density and the physical processes (waves and currents) vary as a result of seasonal weather cycles and can also be severely modified by global ocean climate events. As noted by MBNMS, (2018) residence times in Monterey Bay varied between 2 and 12 days, with a mean of around 6 days (which is approximately the time required for a water parcel to travel 50km at an average speed of 10cm/sec). Therefore, the incident is not anticipated to have any long-term residual impact on the water quality of Monterey Bay in the year 2021 that would affect or change the EIR/EIS conclusion of impacts on water quality resulting from implementation of the proposed project and the spill was not assessed in the cumulative scenarios.

Impacts on Surface Hydrology and Surface Water Quality during Construction

Construction activities associated with the MPWSP could result in the degradation of water quality from increased soil erosion and associated sedimentation of water bodies due to stormwater runoff, as well as accidental releases of hazardous materials (see Impact 4.3-1). In addition, discharges of dewatering effluent from excavated areas and treated water and disinfectant from pipelines could adversely affect water quality (see Impacts 4.3-2 and 4.3-3).

Nearly all the cumulative projects identified in **Table 4.1-2** involve excavation and use of heavy equipment during construction. Therefore, the cumulative projects in **Table 4.1-2** have the potential to degrade surface water quality as a result of construction-related soil erosion or accidental discharges of hazardous construction chemicals. A number of the cumulative projects could also require construction dewatering. Cumulative projects that include the installation of new pipelines, such as the Salinas Valley Water Project Phase II, Granite Ridge Water Supply Project, DeepWater Desal, RUWAP, Pacific Grove Local Water Project, Pacific Grove Recycled Water project, Monterey-Pacific Grove ASBS Stormwater Management Project, and Peoples'

Moss Landing Desal Project (Nos. 1, 33, 34, 31, 22, 23, 45, and 57), would likely involve discharges of treated water produced during pipeline draining and disinfection. In addition, the CEMEX Removal Plan (No. 63), which requires the removal of all machinery and structures associated with sand mining operations, must include a description of all temporary run-off and erosion control measures to be used during removal activities. The relevant cumulative projects would have control measures (described below) such that there would be no combined cumulative impact related to the degradation of water quality.

As described in Impact 4.3-1, projects that would disturb more than one acre of soil (including nearly every project in **Table 4.1-2**) would be subject to the National Pollutant Discharge Elimination System (NPDES) Construction General Permit requirements. The NPDES Construction General Permit requirements are themselves measures based, in part, on the consideration of cumulative effects on receiving waters. Such requirements include the preparation and implementation of project-specific Stormwater Pollution Prevention Plans (SWPPPs). The SWPPPs would include specific erosion and stormwater control measures to prevent substantial adverse effects on water quality during construction and would be implemented throughout the duration of construction activities. Nearly every project in the cumulative scenario would be required to implement a SWPPP. As a result, the effects of the MPWSP would not be expected to combine with those of cumulative projects to cause a cumulatively significant water quality impact from increased soil erosion and sedimentation, or inadvertent releases of toxic chemicals during general construction activities. Therefore, no overall cumulatively significant effect would occur and the project's contribution to the cumulative impact would be less than significant.

As with the MPWSP, the cumulative projects in **Table 4.1-2** could also require dewatering during construction to create a dry work area if groundwater is encountered in open excavations. In addition, for cumulative water supply projects, segments of existing pipelines would need to be drained and disinfected prior to being returned to service and newly installed pipelines would need to be disinfected before being put into service. The dewatering effluent from open excavations, treated water from the draining of existing pipelines, and the effluent generated from disinfection of pipelines could be discharged to the storm drainage system or to vegetated upland areas. As discussed in Impacts 4.3-2 and 4.3-3, these discharges would be regulated by the Regional Water Quality Control Board (RWQCB) and would be subject to *General Waste Discharge Requirements for Discharges with a Low Threat to Water Quality* (General WDRs). The General WDRs include measures to bring such effluent into conformance with State standards prior to discharge (e.g., neutralizing residual chlorine and reducing total dissolved solids). For the discharges of treated water and disinfection effluent, compliance with the General WDRs and the conditions therein would protect water quality in receiving water bodies. Since all other water supply projects that involve pipelines would also need to comply with the General WDRs, the effects of MPWSP treated water and disinfection effluent discharges when combined with those of cumulative projects would not cause a cumulatively significant effect on water quality. Thus, the proposed project's contribution to the cumulative impact would be less than significant.

However, if the MPWSP's dewatering effluent from open excavations were to contain materials from previous spills or leaks, discharges of contaminated dewatering effluent to vegetated upland areas or the local storm drain system would result in a significant impact, which also could result in a significant contribution to a significant cumulative surface water quality impact. To reduce the potential for residual contaminants in the MPWSP dewatering effluent to adversely affect water quality, Impact 4.3-2 calls for implementation of **Mitigation Measure 4.7-2b (Soil and Groundwater Management Plan)**, which would require construction contractors to comply with all relevant environmental regulations and plan for the safe and lawful disposal of contaminated groundwater, when encountered. With implementation of **Mitigation Measure 4.7-2b**, the residual effects of MPWSP discharges of dewatering effluent would not be expected to combine with that of projects in the cumulative scenario to cause a significant cumulative impact. Therefore, with implementation of mitigation, the proposed project's contribution to any cumulative impact would be less than significant.

The water extracted during drilling and development of the subsurface slant wells and ASR-5 and ASR-6 Wells would be disposed in accordance with the RWQCB's *General Waiver of WDRs for Specific Types of Discharges* (General Waiver). The General Waiver would allow the extracted water to be discharged to upland areas after allowing suspended solids to settle out (e.g., routing to temporary holding tank). The conditions of the General Waiver would minimize the potential for water quality degradation by regulating the types and concentrations of pollutants in the discharges, and restricting the location and method of disposal. However, dewatering of contaminated groundwater could result in a significant impact if released into the environment, which also could result in a cumulatively significant contribution to a significant cumulative surface water quality impact. With implementation of **Mitigation Measure 4.7-2b (Soil and Groundwater Management Plan)** and mandatory compliance with the NPDES Construction General Permit, General Waiver, and General WDRs, residual effects of MPWSP discharges of water extracted during well drilling and development would not be expected to combine with those of projects in the cumulative scenario to cause a significant cumulative impact. Therefore, with implementation of mitigation, the proposed project's contribution to any cumulative impact would be less than significant.

Impacts on Surface Hydrology and Surface Water Quality during Operation and Maintenance

Operation and maintenance of MPWSP facilities could degrade surface and marine water quality during the anticipated approximately 40-year operations phase as a result of altered drainage patterns, operational discharges, flooding and flood hazards.

Discharge from the Operation of the MPWSP Desalination Plant

The geographic area associated with the assessment of cumulative water quality impacts from operation of the MPWSP is Monterey Bay. For water quality impacts related to the discharge of brine from the operation of the MPWSP Desalination Plant, the cumulative projects whose water quality impacts could overlap with those of the MPWSP include the Sand City Coastal Desalination Plant (No. 6), RUWAP Desalination Element (No. 31), RUWAP Recycled Water

Project (No. 35), Monterey Bay Regional Water (DeepWater Desal) Project (No. 34), and The People's Moss Landing Water Desal Project (People's Project; No. 48). The Sand City Coastal Desalination Plant was completed in 2010. As such, the Sand City Coastal Desalination Plant represents a "past/present" project for purposes of cumulative analysis and water quality impacts relating to MPWSP operations associated with the Sand City Coastal Desalination Plant are reflected in the baseline used for the project-level and the cumulative analysis. As proposed by their respective applicants, both the DeepWater Desal Project and the People's Project would develop supplemental water supplies to serve the same customers in the Monterey Peninsula (in CalAm's Monterey District service area). The People's Project is proposed as an alternative to the MPWSP such that both the People's Project and the proposed project would not both be implemented since their purposes and customers would be largely the same. Therefore, this EIR/EIS assumes that the People's Project is not a reasonably foreseeable project in the cumulative scenario relevant to the proposed project. Further, for purposes of the analysis presented here, consideration of the DeepWater Desal project represents the more conservative worst-case cumulative scenario since this project is larger than the People's Project. However, in the case of DeepWater Desal, water could be provided to other off-takers in Santa Cruz County or the City of Salinas, and the project could be approved in addition to the proposed project. Therefore, the cumulative impacts of the DeepWater Desal Project are considered as they relate to the provision of water to Santa Cruz County and the City of Salinas.

The significance thresholds identified for the analysis of cumulative water quality impacts from the brine discharge are listed below. A cumulative impact would occur if the combined impact from the cumulative projects considered here would result in an exceedance of the following significance standards:

- Exceed the receiving water limitation for salinity of 2 ppt at the edge of the Brine Mixing Zone (BMZ) established in the Ocean Plan.
- Exceed water quality objectives established in the Ocean Plan at the edge of the zone of initial dilution (ZID).

Implementation of the MPWSP would require the MRWPCA NPDES permit to be amended to incorporate the brine discharge from the MPWSP Desalination Plant, where the brine and its combination with the wastewater would be subject to the water quality requirements in the amended NPDES Permit, which would incorporate the Ocean Plan water quality objectives and the receiving water limitation for salinity from operation of a new desalination plant. Further, operation of the MPWSP would be required to adhere to all monitoring and reporting requirements prescribed in the Ocean Plan relating to operational discharges and receiving water characteristics as well as assessments relating to impacts on all forms of marine life.

As discussed under Impact 4.3-4, modeling of the MPWSP brine discharge from the MRWPCA outfall indicates that the brine effluent would be below the 2 ppt salinity significance threshold under the worst case scenario. Additional modeling (ESA, 2015) further indicates that the brine plume would generally reach ambient salinity levels at a distance of approximately 0.26 miles from the outfall diffuser under worst case conditions. All existing and proposed outfalls associated with the cumulative projects (listed above) are greater than 0.26 mile from the MRWPCA outfall. Therefore, the likelihood of discharge plumes from different outfalls or their ZIDs intersecting or merging and resulting in exceedances of Ocean Plan defined water quality objectives or receiving water salinity limitations and adversely affecting beneficial uses of receiving waters (Monterey Bay) is very low.

At the project level, it is conservatively determined that under the assessed discharge scenarios, operational discharges from implementation of the MPWSP could exceed Ocean Plan water quality objectives for certain constituents. This would result in a significant impact, and because the Ocean Plan water quality objectives are based on the effects of cumulative impacts on ocean water quality, an exceedance of water quality objectives also would represent a cumulatively significant contribution to a potential significant cumulative impact. The proposed project's contribution would be minimized to a less-than-significant level by implementation of **Mitigation Measure 4.3-4 (Operational Discharge Monitoring, Analysis, Reporting, and Compliance)** and **Mitigation Measure 4.3-5 (Implement Protocols to Avoid Exceeding Water Quality Objectives)**.

As discussed under Impact 4.3-5, future water quality testing and analysis, required as part of the NPDES permit process, would determine whether operational discharges under the MPWSP Project comply with Ocean Plan water quality objectives. The water quality testing and analysis would be conducted as per protocol approved by the RWQCB. **Mitigation Measure 4.3-4 (Operational Discharge Monitoring, Analysis, Reporting, and Compliance)** requires CalAm to implement a comprehensive Monitoring and Mitigation Plan consistent with the requirements of the Ocean Plan (described in detail in Section 4.3.2.2) that would set forth appropriate response thresholds and corrective actions that would be required if the acquired data indicated deleterious effects to receiving water quality or marine biological resources from the proposed MPWSP operational discharges. **Mitigation Measure 4.3-5 (Implement Protocols to Avoid Exceeding Water Quality Objectives)** would require data gathering to determine baseline conditions and compliance with Ocean Plan water quality objectives and would involve employing design features and/or operational measures to achieve the required minimum dilution of the discharge at the edge of the ZID to ensure compliance with Ocean Plan water quality objectives. With implementation of **Mitigation Measure 4.3-4** and **Mitigation Measure 4.3-5**, the MPWSP would comply with NPDES permit requirements as well as all water quality objectives detailed in the Ocean Plan. The requirements of NPDES permits, which incorporate the Ocean Plan water quality objectives in the case of operational discharges from the MRWPCA outfall, are designed and intended to protect beneficial uses of receiving waters (i.e., Monterey Bay) from the effects of numerous potential sources of pollution, and are therefore protective against significant adverse cumulative impacts.

The brine discharge from the operation of the proposed MPWSP Desalination Plant would be subject to water quality requirements in the amended NPDES Permit for the discharge through the MRWPCA outfall. Any new or modified waste discharges to the bay, such as those proposed as part of the DeepWater Desal Project, are subject to the water quality requirements of the NPDES permit system, administered by the Central Coast RWQCB. Thus, operation of the cumulative projects that would result in waste discharge (listed above), including and similar to the proposed project would be subject to, and would be required to comply with, the regulatory requirements for the protection of the beneficial uses of Monterey Bay. The SWRCB establishes the regulatory limitations and guidance on compliance and continues to develop and administer regulations through the RWQCBs (the Central Coast RWQCB in the project area) to regulate the water quality of the waters of the U.S. The most recent amendment to the Ocean Plan (SWRCB, 2016) reflects the SWRCB's process of adapting to the need to regulate discharges from desalination projects. As also discussed above, the Ocean Plan objectives are incorporated into the NPDES permits issued to the dischargers by RWQCBs in the form of specific water quality requirements.

With mandatory compliance with the regulatory requirements and the NPDES effluent limitations, and implementation of mitigation measures, the cumulative impact from the discharges resulting from MPWSP and the projects in **Table 4.1-2** is therefore considered less than significant. Additionally, with implementation of mitigation measures, the proposed project's contribution to any cumulative water quality impact in Monterey Bay would be reduced to a level that is less than significant.

Discharges Related to Maintenance of Subsurface Intake Wells and ASR Wells

As discussed in Impact 4.3-6, the proposed project would require site disturbance for the slant well maintenance and routine cleaning of the ASR wells, which could result in discharges that would affect water quality. Site disturbance as part of the proposed project would occur once in five years and would be subject to the water quality control requirements of the Construction General Permit. Nearly all the cumulative projects identified in **Table 4.1-2** would involve site disturbance activities as part of construction and, as discussed above, would be subject to the Construction General Permit requirements, including implementation of a SWPPP to prevent substantial adverse effects on water quality during construction. As a result, the effects of the MPWSP would not be expected to combine with those of cumulative projects to cause a significant cumulative water quality impact from increased soil erosion and sedimentation, or inadvertent releases of toxic chemicals during general construction activities as part of the slant well maintenance. The proposed project would result in a less than significant contribution to this cumulative impact.

As discussed in Impact 4.3-6, as part of the ASR well maintenance, the proposed project would require backflushing of the accumulated sediment and turbid water in the two ASR wells. The duration of backflushing would range from a few minutes to 2 hours. The discharge of the backflushed effluent would be subject to specific requirements under the General Waiver of WDRs for Specific Types of Discharges (Resolution R3-2014-0041) to protect surface water quality. The projects in **Table 4.1-2** that would include maintenance-related discharges from water supply wells would be subject to and be required to comply with the water quality control requirements under the General Waiver. As a result, the effects of the proposed project would not be expected to combine with those of cumulative projects to cause a significant cumulative water quality impact from ASR well maintenance-related discharges. The proposed project would result in a less than significant contribution to this cumulative impact.

Alteration of Drainage Patterns and Non-point Source (Stormwater) Pollution

As discussed in Impacts 4.3-7 and 4.3-8, the MPWSP would require site disturbance in a manner that could alter drainage patterns and a net increase in impervious surface area at several project sites. Most of the projects identified in **Table 4.1-2** would also involve new impervious surfaces, which may alter site drainage. Alterations to site drainage could cause increased peak flows in creeks, exacerbate erosion and sedimentation, and result in greater non-point source pollution in downstream water bodies. Increased areas of impervious surfaces could also increase flooding of downstream waterways and cause runoff volumes to exceed stormwater conveyance system capacities.

However, operation of the proposed project would not represent a substantial land use change within the geographic scope when combined with the projects identified in **Table 4.1-2** as compared to current conditions at the site and in the surrounding area. The majority of the projects identified in **Table 4.1-2** are located within the urbanized portion of the Salinas River and Carmel River watershed lands (the geographic scope), and along the margin of Monterey Bay. The urbanized portions of these watershed lands no longer reflect natural historic conditions in terms of stormwater quality, volume, and drainage. The majority of the surfaces associated with the identified projects in the cumulative scenario, including most locations affected by the project, are covered with impervious surfaces and as a result stormwater runoff is generally rapid and surface infiltration rates are very low. Stormwater flows in the lower portions of the affected watershed lands adjacent to the proposed project are generated as runoff from paved surfaces and drain down gradient into stormwater conveyance systems and can contain pollutants typical of urbanized watersheds. While the proposed project and many of the projects identified in **Table 4.1-2** would result in some increase in impervious area, storm runoff volumes and rates as well as water quality generated during the operations phase would be similar to the existing runoff typical of urbanized watersheds.

Additionally, as discussed in Impacts 4.3-7 and 4.3-8, such developments would be required to comply with the Central Coast RWQCB Resolution No. R3-2013-0032, as implemented through the Monterey Regional Stormwater Management Program and NPDES Municipal Stormwater Permit. Adherence to these requirements would ensure potential effects of the MPWSP on site drainage would be less than significant. Projects constructed after March 6, 2014 that create or replace 2,500 square feet of impervious surface area are also subject to these requirements.

As the previously noted stormwater requirements are part of a regional program designed to address the potential cumulative effects of past, present, and foreseeable projects within the region, adherence to these requirements would ensure hydrology and water quality effects related to the alteration of drainage patterns would not cause a significant cumulative impact. The proposed project therefore would result in a less than significant contribution to any cumulative impact.

Risk of Loss, Injury, or Death due to Flooding

As discussed in Impacts 4.3-9, 4.3-10, and 4.3-11, the MPWSP would involve the siting of facilities in locations within or near areas subject to inundation due to 100-year flood, tsunami, and sea level rise. Specifically, the subsurface slant wells, and portions of the new Transmission Main, Castroville Pipeline, and Source Water Pipeline would be located in areas subject to inundation from 100-year flood and sea level rise. The subsurface slant wells would also be subject to inundation from tsunami. However, these facilities would be operated remotely and would not be regularly manned. Further, they would be designed to withstand periods of inundation. The MPWSP Desalination Plant would be constructed at elevations between 85 and 110 feet above mean sea level, well above areas of anticipated inundation due to flood, tsunami, and sea level rise. Some of the cumulative projects identified in **Table 4.1-2** and shown on **Figure 4-1** could have significant adverse effects related to flooding, tsunami, and sea level rise inundation. However, because the MPWSP components within such areas would be below grade, and with construction areas returned to their approximate pre-construction topography, they would have a less than significant contribution to any significant cumulative impacts associated with flooding, tsunami, and sea level rise.

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