APPENDIX I2

Component Screening Results – Component Options Not Carried Forward

Intake Option #1 – Subsurface Slant Wells at North CEMEX

This intake option was described in CalAm's Application for a Certificate for Public Convenience and Necessity (CPCN) for the MPWSP, as amended in CalAm's Supplemental Testimony dated January 2013.[1] This intake option would locate up to ten subsurface slant wells in the northern portion of the 376-acre CEMEX property, approximately 0.5 mile north of the CEMEX active mining area, and between 1.25 and 1.75 miles south of the Salinas River (see **Figure 7-1**). This site is referred to as the "north CEMEX site."

The slant wells would be designed as gravity wells that would passively receive seawater. A 0.2- to 0.3-mile-long pipeline would collect the combined source water from the slant wells and convey it to a 0.5-mile-long intake tunnel. The intake tunnel would convey the source water beneath the dunes to an intake pump station located on the inland side of the dunes. The pump inlet lines would be below sea level. The elevation difference between the ocean surface and the pump inlet lines would create the differential pressure (i.e., hydraulic head) needed to convey seawater via gravity through the collector pipeline and intake tunnel to the pump station. The intake pump station would then pump seawater through a source water pipeline to the 9.6-mgd MPWSP Desalination Plant. Because the slant wells would rely on differential pressure to collect seawater (i.e., they would be gravity-fed), the wellheads would not be equipped with pumps.

Construction activities associated with the slant wells would occur within the swash zone (the zone of wave run-up between normal and high tides). A temporary precast-concrete barrier system and sheet piling would be installed to protect equipment and personnel from wave action during construction. For each well cluster, approximately 120 linear feet of temporary barrier would be placed parallel to the shoreline at 1 to 3 feet below mean sea level (msl). A temporary enclosure made of sheet piling would be constructed on the inland side of the barrier.

To install the slant wells, construction personnel would excavate a hole and place the wellhead vault structures (precast) into the ground; drill and develop the slant wells; spread drill cuttings or haul them offsite; and remove the precast-concrete barrier system and sheet piles. The slant wells would be constructed using large drilling machinery modified for angle (slant) wells. The collector pipeline and intake tunnel would likely be constructed using jack-and-bore and/or drill-and-burst methods. It is assumed that the following construction equipment would be used to install the slant wells: a dual-wall, reverse-circulation "Barber"–type drilling rig; sheet-pile drivers; pipe trailers; portable drilling fluid tanks; portable holding tanks; haul trucks; flatbed trucks; pumps; and air compressors. Construction activities would temporarily disturb approximately 10 acres of critical habitat for sensitive biological resources (California western snowy plover and Smith's blue butterfly, coast buckwheat, Yadon's wallflower, Monterey spineflower, and sand gilia)[2] in the active beach area and 0.25 acre of prime farmland on the inland side of the dunes. In addition, the

[1] In June 2013, in response to input from resource agencies, the location of the proposed MPWSP seawater intake system was moved approximately 0.5 mile south to the CEMEX active mining area.

[2] See Section 4.6, Terrestrial Biological Resources, for information regarding these species.

footprint of the intake pump station would permanently disturb approximately 3,000 square feet of prime farmland.

Access to this intake site is limited due to the presence of critical habitat as well as property ownership of the adjacent parcels to the east (on the inland side of the dunes). To minimize disturbance in the active beach area, construction vehicles would access the coastal dune area via Del Monte Boulevard and existing access roads in the CEMEX active mining area. From the western terminus of the CEMEX access road, construction trucks would travel north along the beach area below the mean high tide elevation to access the slant well construction areas. In an effort to further reduce disturbance in sensitive areas/areas of critical habitat, some construction equipment and most construction materials would be delivered directly to the slant well site via barge.

Slant well construction (as well as construction of the collector pipeline and intake tunnel) at the north CEMEX site would occur between October and February over 2 years (10 months total) to avoid the nesting season for western snowy plover. Multiple slant wells would be constructed simultaneously. Construction activities would occur 24 hours a day, 7 days a week. Each well would be pumped continuously for 6-week periods during slant well completion and initial well testing, and the extracted water would be returned to the ocean via a temporary pipeline.

The north CEMEX slant well site is currently undeveloped and sufficient space is available to accommodate slant wells in this location. In the active beach area (between the toe of the dunes and the open ocean), CEMEX owns the coastal land above mean high tide; the California State Lands Commission owns the land below mean high tide. The City of Marina has jurisdiction over this land, which is subject to the *City of Marina General Plan* and *Local Coastal Land Use Plan*. This land is designated for Habitat Preserve and Other Open Space l*a*nd uses and zoned Coastal Conservation and Development (City of Marina, 2000; City of Marina, 1982). Construction of the slant wells within the swash zone would also be subject to California State Lands Commission jurisdiction. The north CEMEX intake pump station site is located in unincorporated Monterey County and therefore subject to provisions of the *North County Land Use Plan* of the *Monterey County General Plan*. The site is designated as prime farmland.

Access to the north Cemex location could impact environmentally sensitive and/or critical habitat along the beach. Construction activities on the beach would require the installation of sheet pile enclosures to work in the dry. Extreme wave runup at the temporary coffer dam could have a mean total water level (TWL) of 14.6 feet NAVD (11.6 MSL), but a maximum or 100-year TWL of approximately 32 feet NAVD (29 MSL), suggesting the sheet piles as sized in the swash zone would likely be overtopped by wave action, and the overtopping during an extreme winter storm would be substantial. Scour at the sheetpile enclosure could also be substantial, and could require the sheetpile enclosure to be inserted deeper into the sand than anticipated. Based on ongoing discussions and coordination with regulatory agencies regarding site conditions and construction techniques, this option was determined to be fatally flawed and was eliminated from future analysis due to permitting issues regarding impacts on biological resources.

Screening Results: Eliminated from further consideration.

Intake Option #5 – Ranney Wells at Moss Landing Harbor (Modify Existing Intake System at National Refractories site)

This intake option was proposed for the People's Moss Landing Water Desal Project by the Moss Landing Business Park, LLC[3] and would involve the conversion of an existing intake system into a Ranney well subsurface intake system. The existing open-water intake system of the former National Refractories and Minerals Corporation (National Refractories) site is located in Moss Landing Harbor in the area where the Moro Cojo Slough and the Old Salinas River converge, immediately west of the National Refractories site and Dolan Road (see **Figure 7-2**) (MLBP LLC, 2013; Mickley, 2012). The existing intake system was constructed in the 1940s to provide seawater for industrial processes at the Kaiser Refractories Moss Landing Magnesia Plant[4] and, subsequently, for the National Refractories plant and the Moss Landing Cement Company. The existing intake system consists of a screened open water intake and 60-mgd intake pump station in Moss Landing Harbor, and two 36-inch-diameter pipelines extending from the intake pump station under Highway 1 (through two 72-inch-diameter corrugated-steel conduits) to the National Refractories site. One of the intake pipelines is steel over its entire length; the other is steel where it's buried (west of Highway 1) and redwood staved piping east of Highway 1. The intake pump station is currently equipped with five vertical turbine pumps with individual capacities of 15 mgd (MLBP LLC, 2013). The existing intake system is not currently used. Welded repairs have reportedly been made at several locations along the existing intake pipelines. A 2012 structural evaluation indicates both pipelines are structurally adequate to serve as intake pipelines (Miller, 2012).

This intake option would involve replacing the existing open water intake system with a subsurface system consisting of one or more Ranney wells at the Moss Landing Harbor location. Each Ranney well caisson would be 50 to 100 feet deep, and would be equipped with screened laterals projecting below the harbor bottom at various depths. The total number of Ranney wells would depend on the characteristics of subsurface deposits. Existing structures would be modified as needed to connect the new subsurface intake with the existing steel intake pipeline; only the full-length steel pipeline would be used to convey source water to the desalination plant (MLBP LLC, 2013). In addition, the existing intake pumps would be replaced. The intake pump system design, including the number of pumps, would be defined as part of the intake site studies (MLBP LLC, 2013a).

This intake option would require construction in the Moss Landing Harbor and could require access via barge for both construction and maintenance. A general description of Ranney well construction and maintenance is provided in Section 7.6.1.2. The *Monterey County General Plan* designates the National Refractories site as a Heavy Industrial Coast Dependent use. Construction of the Ranney wells and associated intake system modifications within Moss Landing Harbor

[3] The sponsor of the People's Moss Landing Water Desal Project and current owner of the former National Refractories site is alternatively identified in some documents as the Moss Landing Commercial Park, LLC, and some documents use both names.

[4] The seawater was used for calcium and magnesium removal during magnesia production.

would also be subject to California State Lands Commission jurisdiction. This intake option would require coordination with the site owner, Moss Landing Business Park, LLC, to avoid conflicts with existing and future operations.

Between September 2013 and January 2014, approximately six boreholes were drilled in the Moss Landing area for the purposes of collecting hydrogeologic information to support groundwater modeling efforts and evaluating the feasibility of various conceptual intake options for the MPWSP. The borehole data indicate that the individual sand and sand and gravel lenses in the Moss Landing area are not vertically or laterally extensive and that the permeable deposits were not thick enough for a subsurface intake system in this area to be capable of providing a reliable source of seawater for the MPWSP Desalination Plant (Geoscience, 2014). As a result, this intake option is considered fatally flawed and was eliminated from further consideration.[5]

Screening Results: Eliminated from further consideration.

Intake Option #7 – Disengaging Basin at Moss Landing Power Plant (Water from Spent Cooling System)

This intake option is presented as Intake Contingency Option #5 in the MPWSP Contingency Plan. This option would divert spent cooling water from the disengaging basin at the Moss Landing Power Plant (MLPP) for use as source water at the MPWSP Desalination Plant. The disengaging basin receives spent cooling water from MLPP's power generating Units 1 and 2; the water used to cool Units 1 and 2 is drawn from Moss Landing Harbor via the power plant's northern intake[6] and circulated through Units 1 and 2 before entering the disengaging basin. From the disengaging basin the spent cooling water currently is directed to the existing MLPP outfall and discharged to Monterey Bay. This option would modify the disengaging basin to divert the spent cooling water, with the use of new vacuum-actuated siphons, to the desalination plant. Physical space is available at the power plant for this modification. Access to the new facilities would be via Dolan Road through the MLPP complex (with appropriate easement).

The MLPP is owned by Dynegy Moss Landing, LLC, and located in the unincorporated community of Moss Landing. The *Moss Landing Community Plan* (MCRMA, 2012), a chapter of the *Monterey County General Plan North County Land Use Plan*, designates land use in this area as Coastal Heavy Industrial.

The California Energy Commission permitted an upgrade of the power plant's existing northern intake in October 2000, when new Units 1 and 2 were also approved (replacing five older units). Impingement and entrainment controls at the existing northern intake include inclined vertical traveling screens, initial bar racks, a relocated intake structure, and operation practices to minimize the operation time of the intake pumps (Dynegy, 2011). The northern intake has a

[5] Later in 2014 the Peoples Moss Landing Water Desal Project indicated it was considering an open water intake in Monterey Bay.

[6] The power plant's southern intake, also located in Moss Landing Harbor, serves the plant's other two power generating units, Units 6 and 7.

maximum intake flow capacity of 360 mgd; together the plant's two intakes have a maximum intake capacity of 1.2 billion gallons per day. Assuming that the power plant would circulate at least 23 mgd or more of seawater each day to the disengaging basin, even if Units 1 and 2 were not generating power, this alternative would not increase the amount of cooling water currently drawn into the northern intake by the Moss Landing Power Plant.

This intake option relies on the continuation of MLPP's once-through-cooling (OTC) system, about which there is current uncertainty due to federal and state requirements for cooling water structures at power plants.[7] The federal Clean Water Act Section 316(b) requires the location, design, construction, and capacity of cooling water intake structures to reflect the best technology available for minimizing adverse environmental impact. In 2010 the SWRCB adopted a statewide "Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling" (SWRCB policy) (SWRCB, 2010) establishing technology-based standards to implement Clean Water Act Section 316(b) and reduce the harmful effects associated with cooling water intake structures on marine and estuarine life. The SWRCB policy, which applies to 19 existing power plants that use OTC systems, including MLPP, requires that power plant owners or operators bring their facilities into compliance by either (1) reducing intake flow rates by at least 93 percent ("Track 1") or (2) reducing impingement mortality and entrainment of marine life for the facility to a comparable level that would be achieved under Track 1, using operational or structural controls or both ("Track 2"). (Track 1 must be infeasible for the Track 2 option to be taken.) The SWRCB policy, which establishes a compliance schedule for each power plant, requires that the plant owner or operator prepare an implementation plan indicting the specific measures that will be undertaken to achieve compliance. To prevent disruption of the state's electrical power supply, the SWRCB convened a Statewide Advisory Committee on Cooling Water Intake Structures (SACCWIS), to review implementation plans and schedules and provide recommendations to the SWRCB at least annually. The SWRCB policy calls for the MLPP to comply by December 31, 2017.

In its April 2011 implementation plan for MLPP, Dynegy proposed a compliance date of 2032 for Units 1 and 2 and to implement Track 2 retrofit measures for Units 6 and 7. In a November 2013 letter to SWRCB about the implementation plan, however, Dynegy stated its intention to implement Track 2 retrofit measures for Units 1 and 2 as well as Units 6 and 7 (SACCWIS, 2014). The 2014 SACCWIS report to SWRCB stated that the California Independent System Operator (ISO)[8] intended to model Units 1 and 2 as offline after 2017 and would provide the results of those studies to SACCWIS. At the time of its 2014 report SACCWIS did not recommend changing the compliance dates for the units at MLPP (SACCWIS, 2014).

Through a settlement agreement executed on October 9, 2014 between the SWRCB and Dynegy, the MLPP must reduce its intake of cooling water to meet an 83.7 percent or greater reduction in mortality from entrainment and impingement impacts beginning with reductions on December 31, 2016 and achieving full compliance by December 31, 2020 to meet the 83.7 percent reduction in mortality. Dynegy has indicated its intention to retrofit the power plant's four generating units to

[7] The federal requirements also apply to other industrial facilities that use large amounts of cooling water.
[8] The California ISO is responsible for maintaining the reliability of the state's power grid, and is also represented on SACCWIS.

reduce entrainment and impingement impacts in compliance with the OTC policy. Compliance with the OTC policy would dramatically reduce the amount of cooling water discharged through the MLPP outfall, and the cooling water that was discharged is expected to have much higher concentrations of minerals (because the minerals in the original seawater would be concentrated due to evaporation during the retrofitted cooling process), compared to current discharges from the power plant.

To reduce intake volume, it is assumed that the power plant's cooling system would be retrofitted to allow recirculation of the cooling water thorough cooling towers (or similar equipment) and the power units multiple times before the water is discharged to the disengaging basin. After multiple passes, not only would the volume of water discharged to the disengaging basin be substantially reduced compared to the amount drawn from the harbor but, also due to evaporation, the minerals that were in the source water (such as calcium, magnesium, and chloride) would be concentrated in the spent cooling water (U.S. Department of Energy, 2014). This would make the spent cooling water from a retrofitted cooling system less suitable (or unsuitable) for use as desalination source water. Therefore, once the power plant is in compliance with the OTC policy, the plant's cooling water system would provide less volume and lower quality source water for use by the MPWSP for desalination.

The Track 2 approach Dynegy proposes to pursue to comply with the SWRCB policy is not expected to result in an actual 93 percent reduction in intake flow (which is the Track 1 requirement). However, absent information about Dynegy's retrofit plans and the amount or quality of cooling water that would be available at the disengaging basin after such a retrofit, and given the uncertainty associated with Dynegy's actions to meet the settlement agreement, intake flows could be substantially reduced or interrupted for long periods of time needed for necessary operations and critical system construction and maintenance required to meet the reduced pumping rates. Therefore, due to uncertainties regarding the reliability, quality, and quantity of this potential source water supply, this alternative is eliminated from further consideration.

Screening Results: Eliminated from further consideration.

Intake Option #10 – Open Deepwater Intake in PG&E Fuel Oil Pipeline at Moss Landing

Intake Option 10 would use the existing carbon-steel pipeline previously used by PG&E for offloading fuel oil for the Moss Landing Power Plant. The pipeline consists of a 24-inch segment that extends under Moss Landing Harbor to Moss Landing Beach and an 18-inch submarine section that extends from the beach approximately 3,000 feet into Monterey Bay. While most of the 24-inch segment is underground, a section of it is exposed at Moss Landing Beach. Information provided by Dynegy in conjunction with an inspection of the exposed portion of pipeline (Longitude 123 Inc., 2011) suggests that the pipeline may not have been pigged or flushed out before being capped when the offshore terminal to which it connected was decommissioned, and therefore may contain large quantities of fuel (light oil or diesel fuel) (Longitude 123 Inc., 2011).

This intake option is fatally flawed for several reasons: (1) the existing fuel line likely contains a substantial amount of fuel residue, which could present a public health issue; (2) the 18-inch-diameter of the offshore section of the pipeline would be too small to support a 9.6-mgd facility, especially if it were sliplined with a smaller pipeline to address the public health issued noted in (1) above; and (3) no impingement and entrainment studies have yet to be performed for this option. (Use of this pipeline is also being considered for an outfall, discussed in Section 7.6.3.7.)

Screening Results: Eliminated from further consideration.

Intake Option #11 – Ranney Wells in Seaside/Sand City

Intake Option 11 emerged from earlier investigations conducted by the MPWMD and would involve the installation of three Ranney wells at two sites in the former Fort Ord coastal area in Seaside and Sand City. This intake option is also included in response to public comments received during the MPWSP EIR scoping process requesting that the CPUC consider subsurface intakes located outside of the Salinas Valley Groundwater Basin; a constraints analysis was attached to the comment. The earlier investigations provided by the commenter, and conducted by the MPWMD are summarized below, followed by the preliminary screening results.

The *Monterey Peninsula Water Management District 95-10 Project Constraints Analysis* (referred to herein as the 2008 Constraints Analysis) (ICF et al., 2008) investigated the feasibility of utilizing the shallow Dune Sand Aquifer as a source of feedwater for a 8,400-afy desalination plant for the Monterey Peninsula. The 2008 Constraints Analysis identified 25 individual well locations for using HDD (e.g., slant wells), radial wells (e.g., Ranney collector wells), or conventional wells. Each well location and type was ranked considering drilling and siting complexity, policy and regulatory restrictions, and feedwater system costs. The 2008 Constraints Analysis then proposed combinations of wells, locations, and technologies that would result in a production capacity of 8.7 mgd (or 6,042 gallons per minute [gpm]) of desalinated product water, the volume considered necessary at that time. The 2008 Constraints Analysis identified alternatives at three sites that could be paired up to provide the desired production capacity:

- **Fort Ord Bunker Site** (Seaside Groundwater Basin) – Two radial or eight vertical wells in the Dune Sands/Aromas Aquifer with a 6,000- or 4,000-gpm production capacity, respectively.
- **Former Fort Ord Waste Water Treatment Site (Salinas Valley Groundwater Basin)** – Two conventional vertical wells in the 180-Foot Aquifer with a 4,000-gpm production capacity.
- **Former Stillwell Hall Site (Salinas Valley Groundwater Basin)** – One 3,000-gpm radial well in the Dune Sands/Aromas Aquifer or four conventional wells with a production capacity of 2,000 gpm in the Dune Sands/Aromas Aquifer or two conventional wells in the 180-Foot Aquifer with a 4,000-gpm combined production capacity.

The “preferred” wells identified in the 2008 Constraints Analysis are located within the Salinas Valley Groundwater Basin, since they are north of the northernmost extent of the divide between

the Seaside and Salinas Valley Groundwater Basins. Additionally, it is estimated that these wells could only supply feedwater for up to 8.7 mgd (6,042 gpm) of product water, not the 9.6 mgd (or 6,667 gpm) of product water identified for the proposed project.

As such, for this analysis, the options presented in the 2008 Constraints Analysis have been reevaluated to identify a potential combination of well options that could better meet the project objectives as well as the intent of the comments received during public scoping. The 2008 Constraints Analysis identified two combinations of well alternatives that could meet the project objectives:

- **Alternatives 5 and 14** – One Ranney well on private property in Sand City and two radial wells at the SNG Development Corporation site, each pumping at 3,000 gpm for a combined capacity of 9,000 gpm. All of the wells would be located in the Seaside Groundwater Basin and would draw from the shallow Dune Sands/Aromas Aquifer, thus avoiding any pumping from the policy-restricted 180-Foot Aquifer. The pipeline required to connect the three wells together would be about 3,000 feet long. However, this option is not considered further because it would require the purchase of private property.

- **Alternatives 17 and 19** – Two Ranney wells at the former Fort Ord bunker site and one radial well at the former Fort Ord MW-1 site, each pumping at 3,000 gpm for a combined capacity of 9,000 gpm. All of the wells would be located in the Seaside Groundwater Basin and would draw from the Dune Sands/Aromas Aquifer, thus avoiding any pumping from the policy-restricted 180-Foot Aquifer. The pipeline required to connect the three wells together would be about 4,000 feet long.

  The wells would be spaced a minimum of 100 feet apart (ICF et al., 2008). The footprint of each well would be approximately 1 acre; wellheads would be buried below grade.

The Fort Ord Bunker Site, formerly used to store ammunition supplies, is located immediately west of Gigling Road at the approximate northern extent of Seaside Groundwater Basin. The Fort Ord MW-1 site is located west of Highway 1, and south of the bunker site. There are existing dirt access roads to each of the sites. In a 2004 study, Camp Dresser & McKee developed geologic boring data for the MW-1 site (ICF et al., 2008).

Under this option, wells would be located within unincorporated Monterey County on former Fort Ord lands, now part of Fort Ord Dunes State Park. California State Parks manages all former Fort Ord lands west of Highway 1. The lands are still under U.S. Army ownership, but are set to be transferred in the future (ICF et al., 2008). Currently, any proposed third-party actions within the park would require Army review and approval.

Drawing water from these wells (Alternatives 17 and 19) could provide the required production capacity and would conform with the export policy that groundwater should not be pumped from the 180-Foot Aquifer in the Salinas Valley Groundwater Basin. However, the two wells are about 5.5 miles south of the proposed MPWSP desalination plant and would therefore require the additional expense of constructing a source-water pipeline.

Implementation of wells in this location could also require a Permit for Injection and Extraction from the Seaside Groundwater Basin Watermaster, and the potential drawdown relative to the amount allowed under the current adjudication would need to be reviewed. The Dune Sands Aquifer is in direct hydraulic connection with the ocean and is only saturated along the coastal margin; consequently, there is unlikely to be a defined flow boundary between the Salinas Valley and Seaside Groundwater Basins. However, because this extraction would occur within the legally recognized Salinas Valley Groundwater Basin, approval from the Monterey County Water Resources Agency to export groundwater from the Dune Sands Aquifer could be required. Additional work would be necessary to define boundary between the Salinas Valley and Seaside Groundwater Basins for the Dune Sands Aquifer.

It should be noted that the extraction of brackish water from this unit could assist in mitigating saltwater intrusion into the aquifer through the development of a groundwater depression; however, technical, legal, and political challenges to using this water source necessitated early collaboration with the Monterey County Water Resources Agency. Discussions with Monterey County Water Resources Agency representatives (ICF et al., 2008) indicated that extracting groundwater from the 180-Foot Aquifer in the Salinas Valley Groundwater Basin for export outside of the Salinas Valley Groundwater Basin for municipal use would be precedent-setting and would therefore have significant institutional and policy ramifications for Salinas Valley Groundwater Basin users. Although extraction from the 180-Foot Aquifer would be more politically sensitive, extraction from the Dune Sands Aquifer could also be controversial, and CalAm would need to demonstrate that the proposed project would extract seawater only and would not affect brackish groundwater.

California State Parks raised a policy concern regarding the installation of permanent infrastructure within parkland, specifically third-party infrastructure that could be abandoned in the future. California State Parks also discourages the placement of facilities outside of defined development zones; however, the proposed well locations are in conformance with approved development zones (ICF et al., 2008).

The construction methodology for this option is generally discussed in Section 7.6.1.2. The Ranney well construction would include installation of a caisson to a depth of approximately 50 feet below sea level, and horizontal drilling or jacking wells in a radial formation.

Specific information on facility maintenance (type, frequency, access) has not been developed; however, maintenance is expected to be similar to that described in Section 7.6.1.2.

The operation of a subsurface seawater intake system that produces groundwater from the shallow dune sand aquifer would, by intent and design, induce seawater intrusion into the shallow aquifer system. Thus, the presence of low-permeability materials between the shallow aquifer system and the underlying aquifers would protect the underlying aquifers from infiltration of seawater from the shallow aquifer system.

Because both the former Fort Ord Wastewater Treatment Plant site and former Stillwell Hall site are in the Salinas Valley Groundwater Basin, the Phase II hydrogeologic investigation focused on

the Bunker site, which is located in the Seaside Groundwater Basin and believed to be less politically challenging than the other two sites. Subsurface investigation of the Bunker site revealed the presence of clay layers in some of the borings and not in others. Low-permeability strata encountered were really discontinuous and occurred at differing elevations. The Phase II investigation concluded that even if there were evidence of an extensive low-permeability layer between the shallow aquifer system and the underlying aquifers, the siting constraints of both the CCC and the CA State Parks, combined with the relatively low-permeability sands at this site limit the potential amount of feedwater that could be developed from a subsurface intake at the Bunker site to about 2,000 afy (Feeney, 2009).

Screening Results: Eliminated from further consideration.

Intake Option #12 – Subsurface Slant Wells at Reservation Road

This intake option would locate at least nine subsurface slant wells at the western terminus of Reservation Road on the inland side of the Marina State Beach parking lot. Slant well construction activities and periodic maintenance would involve earthwork and other ground disturbance in the paved beach parking lot, but there would be no disturbance in the active beach or dune areas. All other aspects of construction, operation, and maintenance are assumed to be consistent with those of the proposed project, as described in Chapter 3.

The parking lot is part of Marina State Beach, which is owned and operated by California State Parks. This land lies within the City of Marina and is subject to the *City of Marina General Plan* and *Local Coastal Land Use Plan*. This area is designated for Parks and Recreation uses and is zoned Coastal Open Space (City of Marina, 2000; City of Marina, 1982). Physical space is available to accommodate the subsurface slant wells. Site access is available via Reservation Road and the paved state beach parking lot. Well construction would require full closure of the parking lot for the duration of the construction period. Adequate physical space is available; however, easements with California State Parks would be required.

General construction methods and considerations, as well as operation and maintenance assumptions, are assumed to be consistent with the proposed MPWSP methodology for slant well implementation.

A potential constraint to the implementation of slant wells at this location is Marina Coast Water District's existing 300 acre-foot/year desalination (currently non-operational) and associated intake well, as well as MCWD's plans for developing a future 1.5-mgd (or larger) desalination facility that would include development of a subsurface seawater intake system on nearby/adjacent property. Implementation of subsurface slant wells for the MPWSP at this same location could result in well interference. In addition, the geometry of the beach profile is not favorable for slant well installation since the target aquifer is shallow, and the limit on a slant well angle would not allow the well screen to be completed in the Dune Sands aquifer.

Screening Results: Eliminated from further consideration.

Desalination Plant Site Option 1 – North Marina Armstrong Ranch Property

Under this site option, the MPWSP Desalination Plant would be located on approximately 10 acres of the 320-acre Armstrong Ranch parcel, which is situated south of and adjacent to the MRWPCA Regional Wastewater Treatment Plant and the Monterey Regional Environmental Park. The Marina Coast Water District currently owns this site, which was evaluated in the Coastal Water Project EIR as the location for the desalination plant for the North Marina and Regional Project alternatives.

This undeveloped site is used for grazing land. It lies within the City of Marina Sphere of Influence (which is governed by the *City of Marina General Plan*) and in unincorporated Monterey County (which is subject to the *Greater Monterey Peninsula Area Plan*). The land is designated for public facility uses and permanent grazing under the respective land use plans. The site is accessible via existing unpaved access roads in the Monterey Regional Environmental Park. Dirt access roads at the proposed site would require improvement from existing access points for the construction and operation of a desalination plant.

Given that Marina Coast Water District currently owns the property, and that CalAm already owns the 46-acre Charles Benson Road site which is located approximately 0.75 mile to the north, and since Site Option 1 does not provide any advantage over the Charles Benson Road site, it was not carried forward.

Screening Results: Eliminated from further consideration.

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