8.2 Master Responses

8.2.1 Master Response 1: EIR/EIS Authorship

COMMENTS ADDRESSED IN MASTER RESPONSE 1

Ag Land Trust	Kathy Biala
California Unions for Reliable Energy (CURE)	Margaret-Anne Coppernoll
Citizens for Just Water	Juli Hofmann
Ford Ord Rec Users	

Several comments received on the Draft EIR/EIS appear to refer to CalAm as the author of the EIR/EIS, or represent that CalAm provided the analysis contained therein. For example, commenters assert that "CalAm erroneously represents," or that "CalAm states," or that "CalAm concludes" when referencing the EIR/EIS. This Master Response has been prepared to clarify that this EIR/EIS was prepared by the California Public Utilities Commission (CPUC) as the CEQA Lead Agency, by NOAA's Monterey Bay National Marine Sanctuary (MBNMS) as the NEPA Lead Agency, and by independent consultants under contract with these agencies, and not by CalAm, the project applicant.

CEQA Guidelines Section 15051(b) explains that if the proposed project is to be carried out by a non-governmental person or entity (like CalAm), the lead agency shall be the public agency with the greatest responsibility for supervising or approving the project as a whole. Under NEPA, the role of a federal lead agency is similar to the lead agency role under CEQA. See 40 CFR 1501.5. As explained in EIR/EIS Executive Summary Section ES.1, this EIR/EIS was prepared in accordance with CEQA (Cal. Pub. Res. Code §21000 et seq.), the CEQA Guidelines (Cal. Code Regs., Tit. 20, Div. 6, Ch. 3, §15000 et seq.), NEPA (42 U.S.C. §4321 et seq.,) and the NEPA implementing regulations (40 CFR Parts 1500-1508).

The analyses and conclusions in the EIR/EIS were prepared by the consultants on behalf of the Lead Agencies and were independently evaluated, reviewed, and revised by Lead Agency staff. See EIR/EIS Section 7.2 for a list that identifies consulting firms and individuals and their specific roles in the preparation of the EIR/EIS. Use of contractors is expressly approved under the NEPA regulations (40 CFR 1506.5). The analyses and conclusions in the EIR/EIS reflect the independent judgment of the Lead Agencies, and therefore, the CPUC and MBNMS are responsible for the scope, content, adequacy, and objectivity of the EIR/EIS.

8.2.2 Master Response 2: Source Water Components and Definitions

COMMENTERS ADDRESSED IN MASTER RESPONSE 2

City of Marina	David Beech
Marina Coast Water District	Kathy Biala
Monterey Peninsula Regional Water Authority	Margaret-Anne Coppernoll
Ag Land Trust	Myrleen Fisher
Citizens for Just Water	Juli Hofmann
Fort Ord Rec Users	Form Letter 2
Public Water Now	Public Meeting Verbal Comments
Water Ratepayers Association of the Monterey Peninsula	

Commenters have questioned the specifics of how the EIR/EIS uses key terms associated with and comprising the source water for the proposed desalination plant. This Master Response clarifies those definitions. The definitions also have been consolidated in Section 3.1, the introduction to the project description, to assist the reader.

To begin with, groundwater and ocean water can be described in simple geographic, locational terms as follows:

> **Groundwater:** water located beneath the earth's surface
>
> **Ocean water:** water located above the seafloor

In the context of the proposed MPWSP and for purposes of this EIR/EIS, of most importance is the chemical composition of any affected water. The reason for this is that the water chemistry indicates where the water came from (i.e., whether it started as groundwater or ocean water) and how usable it is for domestic and other purposes. The source water components are defined and used in the EIR/EIS as follows:

> **Fresh water:** water that originated in a groundwater basin through precipitation or rivers and streams; in the context of the MPWSP, fresh water is water that originated within the Salinas Valley Groundwater Basin, identified as containing total dissolved solids (TDS) concentrations of less than 500 milligrams per liter (mg/L), consistent with the secondary drinking water standards established by the SWRCB in Title 22 California Code of Regulations, section 64449, as recommended levels of TDS.[1] TDS is the quantity of dissolved materials in a water sample and is used to quantify the amount of salts in a sample (it is a test for salinity).
>
> **Seawater:** water that originated in the ocean, identified as containing 33,500 mg/L of TDS, which represents current salinity levels in Monterey Bay.

1 "Constituent concentrations lower than the Recommended contaminant level are desirable for a higher degree of consumer acceptance." 22 Cal.Code Regs. 64449(d)(1).

Brackish water: water that is a combination of seawater and fresh water, and thus contains TDS levels between 500 mg/L and 33,500 mg/L.

Source water (also referred to as feed water): water that would be drawn into the proposed project slant wells and conveyed to the desalination facility. This water would be a combination of brackish groundwater representing the ambient conditions in the water-bearing sediments of the Dune Sand and 180-FTE Aquifers at the coast, and the seawater that is drawn in through the aquifer sediments to recharge the capture zone. The capture zone is the localized region that would contribute source water to the slant wells. (See Master Response 8, Source Water and Seawater Intrusion.)

The categories of fresh water, seawater, brackish water, and source water are consistent with the SWRCB's *Final Review of California American Water Company's Monterey Peninsula Water Supply Project*, included as EIR/EIS Appendix B2, which states on page 35 that "CalAm's proposed MPWSP would pump seawater, brackish water, and possibly a fresh water component."

8.2.3 Master Response 3: Water Rights

COMMENTS ADDRESSED IN MASTER RESPONSE 3

City of Marina	Kathy Biala
Marina Coast Water District	David Brown
Ag Land Trust	Bob Coble
California American Water Company	Margaret-Anne Coppernoll
CEMEX	Myrleen Fisher
Citizens for Just Water	David Gorman
Fort Ord Rec Users	Jane Haines
Just Water	Juli Hofmann
Land Watch Monterey County	Thomas Moore
Public Trust Alliance	Hebard Olsen
Public Water Now	Nancy Selfridge
Salinas Valley Water Coalition and Monterey County Farm Bureau	Form Letters 1 & 2
Water Ratepayers Association of the Monterey Peninsula	Public Meeting Verbal Comments
Michael Baer	

This Master Response addresses comments concerning the likelihood that CalAm would possess water rights to support the proposed project. While the topic of water rights is a legal issue, a fact-based analysis is key to the ultimate legal conclusion of whether, under the developed water doctrine, CalAm could have appropriative rights to the portion of project source water that would be drawn into the slant wells from the Salinas Valley Groundwater Basin (SVGB or Basin). The EIR/EIS explored in detail the law and the pertinent facts as they have been amassed to date in Section 2.6, Water Rights, concluding that the Lead Agencies could determine that there is a sufficient likelihood of CalAm having rights to water for the project for the purpose of determining project feasibility. Many comments on the EIR/EIS addressed such subjects as the water rights legal framework, the facts to support the conclusions reached in EIR/EIS Section 2.6, and the conclusions as to whether the project would cause harm or injury to Basin water users. Given the wide variety of comments on water rights, the comments are summarized throughout this Master Response as to particular topics for ease of organization and clarity. In addition to this Master Response, also see Final EIR/EIS Section 2.6, Water Rights, which has been updated and refined in further response to comments on the topic. For a full understanding, this Master Response should also be read in conjunction with Final EIR/EIS Section 4.4, Groundwater Resources, and Master Responses 2, Source Water Components and Definitions; 4, The Agency Act and Return Water; 7, The Deeper Aquifers of the Salinas Valley Groundwater Basin; and 8, Project Source Water and Seawater Intrusion.

8.2.3.1 Purpose of EIR/EIS Water Rights Section

The water rights analysis in the EIR/EIS provides the Lead Agencies and members of the public with data upon which to assess the likelihood that CalAm will possess water rights because, if it appeared more likely that CalAm would not have such rights, then the project may be deemed infeasible. The function of the EIR/EIS analysis of water rights is not to definitively decide whether there are water rights to support the project, nor would a decision to approve the project function as a binding decision on CalAm's water rights. As stated in the Draft EIR/EIS on page 2-30:

> If the proposed project is approved and any dispute arises as to whether or not CalAm possesses legal water rights, such dispute likely would be resolved through court action. Naturally, however, if CalAm does not have the right to the supply water for the proposed project, the proposed project could not proceed and would thus prove infeasible. This section examines whether, based upon the evidence currently available, the CPUC could conclude that there is a sufficient degree of likelihood that CalAm will possess rights to the water that would supply the desalination plant such that the proposed project can be deemed to be feasible.

Numerous commenters state that CalAm would be unable to meet its burden of proof to establish water rights for the project in a court of law, and several commenters (opining both that CalAm does and does not have sufficient water rights) have included lengthy legal analyses on the water rights topic. In developing this Master Response and other responses to comments, as well as in refining EIR/EIS Section 2.6, the Lead Agencies have reviewed and considered all authorities cited. At the same time, the level of detail and certainty for a feasibility analysis within an EIR/EIS is not the same as the more exacting level of detail, proof and legal arguments that would pertain in a court challenge on water rights. In an EIR/EIS, there is room for disagreement among experts, with the Final EIR/EIS still concluding that the project can be deemed feasible for current purposes on a water rights basis due to substantial evidence that CalAm will possess rights to the water that would supply the desalination plant.

Some commenters urge that CalAm should have a burden of proof now to establish by a preponderance of the evidence that it will possess water rights sufficient to make the project feasible. Other commenters ask what standard applies to the question within the EIR/EIS as to whether CalAm will possess water rights for the project, and seek identification of the criteria that the Lead Agencies will use to determine whether the project is feasible as to water rights. The criteria for the feasibility analysis are set forth within EIR/EIS Section 2.6. The standard of review that the decision-making bodies would apply to the conclusion of the Final EIR/EIS on this project feasibility matter is whether substantial evidence in the record supports the water rights findings. This standard of review may be different than a standard of review in any judicial challenge to the water rights of CalAm to support the project.

8.2.3.2 Sequence of Approvals Vis-à-vis Water Rights

Numerous commenters express concern that the MPWSP project review and consideration process is proceeding without CalAm having secured water rights for the project, urging that water rights should first be established before the Lead Agencies consider approval of the project.

This position may reflect a misunderstanding of the nature of an appropriative right to “developed water” under water rights law. As explained in Draft EIR/EIS Section 2.6, on page 2-29, “no government agency will formally grant water rights to CalAm for the project.” There is no state or local agency with authority to approve CalAm’s water rights for the MPWSP. As stated on page 35 of the State Water Resources Control Board (SWRCB) report on water rights for the MPWSP (EIR/EIS Appendix B2, referred to as the “Report”), “No permit is required by the State Water Board to acquire or utilize appropriative groundwater rights.” The rights to pump and use groundwater in California in a non-adjudicated basin (such as the SVGB) are established by actual diversion, pumping and use, and are governed by a long line of court cases. In the event that one or more parties believe that the extraction and use of groundwater by another party is inconsistent with the law, the concerned parties may initiate a civil action against the extracting party to contest the right of that party to take and use groundwater. As applied here, someone could bring a legal action against CalAm challenging the right of CalAm to use SVGB groundwater incidentally withdrawn by the slant wells for the desalination project. The substance of CalAm’s legal claim to water rights is addressed in EIR/EIS Section 2.6, and in this Master Response in Section 8.2.3.4, below. Since under the legal construct, an appropriative right to developed water is a right that exists based upon the facts at hand, and need not be formally established in advance, there is no possibility for the Lead Agencies to insist that CalAm obtain or perfect water rights prior to project approval.

Commenters point out that the uncertainty concerning project water rights could inhibit MPWSP construction or operation, and possibly even make the project infeasible in the end. It is true that a water rights judicial challenge, if one were to ensue, could indeed impair the ability of the project to move forward and timely meet the project objectives. It would at this juncture be speculative for the Lead Agencies to forecast whether such a judicial challenge would be filed, when it would occur, whether an injunction would be issued to halt project progress, how long resolution of it would take and what the outcome may be of such an action. Any development project, and certainly any complex project such as the MPWSP, is subject to myriad legal hurdles on the permitting and judicial fronts. It is precisely because the Lead Agencies understand that water rights is a topic of considerable interest for the MPWSP that the EIR/EIS includes a robust discussion of water rights in an effort to ascertain whether it appears likely based on the evidence in the record that CalAm will have water rights such that the project can be deemed feasible. The fact that someone could challenge CalAm’s water rights (and the possible effects of such a challenge) does not in and of itself make the project infeasible; however, it is a factor that can be considered by the decision-makers in determining whether the project is viable, cost effective, and can be timely implemented.

Commenters have asked what would happen if a court were later to determine that CalAm did not have legal rights to the Basin water withdrawn by the project slant wells, and whether CalAm or the Lead Agencies would bear liability if it turns out the SVGB is harmed. If it were later determined that CalAm did not possess legal rights to some portion of the water for the MPWSP, the MPWSP would have to be somehow redesigned or relocated to accommodate the specific ruling. As made clear above, the Lead Agencies are not formally deciding in the EIR/EIS or through their approval processes, nor do they have jurisdiction to do so, that CalAm possesses water rights for the project. Thus, if a court were to determine that CalAm did not enjoy such rights, the Lead Agencies would not be involved in such proceeding and would not bear any liability for the outcome. It is not the place of the EIR/EIS to opine as to any liability that CalAm may or may not bear in such a circumstance. Note, however, that CalAm has proposed a mitigation measure (Mitigation Measure 4.4-3, set forth in Draft EIR/EIS Section 4.4.5.2 at page 4.4-74, and also discussed in EIR/EIS Section 2.6) whereby CalAm would take steps to avoid harm (possibly including improving well efficiency, providing a replacement water supply and/or compensating the well owner for increased costs) if the MPWSP is demonstrated to adversely affect existing neighboring active wells.

8.2.3.3 Authority and Expertise of SWRCB to Opine on Water Rights

As explained in EIR/EIS Section 2.6 and in Section 8.2.3.2 of this Master Response, in response to a written request from the CPUC for expert assistance in gauging CalAm's rights to water for the project supply, the SWRCB prepared a report concerning the legal framework applicable to and the factual basis needed for CalAm to possess water rights for the project. Some commenters have questioned the authority and expertise of the SWRCB to prepare the Report. The Report on page 58-59 (EIR/EIS Appendix B2) addresses this critique, in response to a similar comment on the draft Report, as follows:

> The State Water Board is the state agency with primary responsibility for the regulatory and adjudicatory functions of the state in the field of water resources. (Wat. Code, § 174.) The water right permitting and licensing system administered by the State Water Board is limited to diversions from surface water channels and subterranean streams flowing through known and definite channels. (See *id.*, § 1200.) But the State Water Board has other authority that applies to all waters of the state, surface or underground. This includes the State Water Board's water quality planning authority, which extends to any activity or factor affecting water quality, including water diversions. (*Id.* §§ 13050 subds. (e) & (i).), 13140 et seq., 13240 et seq.; see 44 Ops. Cal. Atty. Gen. 126, 128 (1964).)
>
> The State Water Board has broad powers to exchange information with other state agencies concerning water rights and water quality, and more specific authority to evaluate the need for water-quality-related investigations. (Wat. Code, §§ 187, 13163, subd. (b).) The State Water Board also has authority to conduct or participate in proceedings to promote the full beneficial use of waters of the state and prevent the waste or unreasonable use of water. (*Id.*, § 275.) This authority includes participation in proceedings before other executive, legislative, or judicial agencies, including the [California Public Utilities] Commission. (*Ibid.*) And the State Water Board's authority to promote the full beneficial use of water and prevent waste or unreasonable use applies [to] all waters the state, including percolating groundwater. (See, e.g., SWRCG Decision 1474 (1977.)
>
> The Water Code includes procedures for court references to the State Water Board, under which the State Water Board prepares a report on water right issues before the court. (Wat. Code, §§ 2000 et seq., 2075 et seq.; see *National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419, 451 [these procedures are designed to enable courts . . . "to make use of the experience and expert knowledge of the board."]; *San Diego Gas & Electric Co. v. Superior Court* (1996) 13 Cal.4th 893, 914-15 [the Commission has broad authority including judicial powers].)

> Thus, it is well within the State Water Board's authority and consistent with the execution of its statutory responsibilities to report to the [California Public Utilities] Commission on matters related to rights to diversion and use of water, including diversions of percolating groundwater. The conclusions and recommendations in this Report are not binding on the [California Public Utilities] Commission, but provide a means for the [California Public Utilities] Commission to make use of the knowledge and expertise of the State Water Board.

8.2.3.4 Description of Supply Water

Numerous commenters questioned the following statement in the Draft EIR/EIS at 2-30:

> The proposed project (MPWSP) and Alternative 5a are designed to take supply water from the ocean via underground slant wells that draw water from the earth underneath the ocean.

Commenters pointed out that some of the screens through which project supply water would be pulled into the slant wells lie under coastal land along the ocean, rather than being located under the ocean itself. In recognition of this fact, the pertinent language has been altered as follows:

> The proposed project (MPWSP) and Alternative 5a are designed to take supply water via underground slant wells that <u>would</u> draw water from <u>aquifers that extend</u> underneath <u>Monterey Bay, and at this location, would eventually be recharged primarily by seawater</u>.

8.2.3.5 Water Rights Analysis and Conclusions

Legal Framework

As a threshold matter, consistent with CEQA and NEPA directives and norms, the EIR/EIS (including Section 2.6) presumes that CalAm would implement the project in full conformance with laws, regulations, contracts and other legal constraints. As explained in EIR/EIS Section 2.6, and based on the SWRCB Report, CalAm would not need to secure any particular right to the seawater that would enter the slant wells for the project. As to the portion of the source water that would originate from the Basin, CalAm would need an appropriative groundwater right to retrieve and use that water. The Report outlines the factual circumstances that would need to exist in order for CalAm to possess such water right: so long as no legal user of water is harmed as a result, CalAm could withdraw for the project water that would otherwise be unused. CalAm would have rights to that water because it would be classified as "developed water" (sometimes also referred to as "salvaged water"), meaning that the new potable water would not have existed absent CalAm's efforts and actions. EIR/EIS Section 2.6 delves into the application of available facts to these criteria, concluding it is likely that CalAm would have water rights for any portion of the supply water that originated from the Basin because: (a) the water that originated from the Basin that would enter the desalination system is not currently being put to beneficial use, and; (b) the project would not injure existing legal water users per the factors outlined in the Report.

It is important to note that an appropriative groundwater right cannot and does not exist unless and until water is actually pumped and used. "To constitute a valid appropriation, three elements must always exist: (1) the intent to appropriate water and apply it to a beneficial use; (2) the actual diversion . . . from a groundwater basin; and (3) the application of water to a beneficial use within a reasonable time." Turlock Irr. Dist. v. Zanker,140 Cal.App. 4th 1047, 1054 (2006). This means that CalAm will not actually possess water rights to the incidental water that originated in the Basin until the project is underway, and also means that those who may desire to use that water in the future through appropriation do not currently possess rights to use water in any greater amount or different manner other than their current actions.

The subsections of this Master Response below further address comments received on the water rights analysis and conclusions.

Quality of Basin Water

Some commenters question or seek proof that any water withdrawn from the Basin by the slant wells is in fact unusable to legal water users. As explained in Master Response 2, Source Water Components and Definitions, four basic types of water are pertinent to the project. The first, seawater originating from the ocean, is not at issue for water rights purposes. The second type, fresh water, is water that originated in the SVGB and has a total dissolved solids (TDS) concentration under 500 milligrams per Liter (mg/L). The third type of water is brackish water, a mix of seawater and fresh water resulting from decades of inland seawater intrusion. The fourth is source water, which is water that is drawn into the slant wells and is a combination of ambient highly brackish groundwater in the Dunes Sand and 180-Foot Equivalent Aquifers and the seawater that would recharge the slant well capture zone. The proposed slant wells at CEMEX would extract source water. As explained in EIR/EIS Section 4.4.1, the Dune Sand and 180-FTE Aquifers along the coast are hydraulically connected to the Pacific Ocean and seawater within the 180-Foot Aquifer has intruded to a maximum of approximately 8 miles inland as inferred from chloride concentrations greater than 500 mg/L as reported by the Monterey County Water Resources Agency (MCWRA). The source water that could be drawn into the supply wells is thus of very little use for irrigation or for drinking. It is thus reasonable to conclude that the water that would be drawn into the wells, including the brackish water originating in the Dune Sand and 180-Foot Equivalent Aquifers, is unusable water in its current form. Because the source water is unusable at present, it is not foreseeable that such water has potential reasonable beneficial uses. The only way for such water to become usable in any meaningful quality and quantity would be for such water to be desalinated in the same or a similar manner to the proposed project (see Section 8.2.3.7, below, for discussion of that possibility). Furthermore, as discussed in EIR/EIS Section 2.6, and further below, evidence indicates that any existing legal users of the brackish water would not be injured by the project.

The physical effects of the slant wells withdrawing the source water were projected using a calibrated groundwater model, as explained in EIR/EIS Section 4.4.4.2. See also Master Response 12, North Marina Groundwater Model (v.2016). Slant wells would initially extract the water that exists in the surrounding sediments (ambient brackish groundwater). As pumping continues, the wells would extract increasing proportions of infiltrating recharge from the ocean. The steady ocean recharge would gradually replace the ambient groundwater within the capture zone, and move within the capture zone toward the wells, but would not advance beyond the capture zone. For more information on these technical aspects of the project, see Master

Responses 8, Project Source Water and Seawater Intrusion. Given the inland groundwater gradient and the localized extent of the capture zone, the geographic extent within which water quality would be affected, would be a limited area confined to the coast and slightly inland (see Figures 8.2.8-5 and 8.2.6-4).

Commenters have questioned the conclusions of the water rights analysis in light of the sentence in Draft EIR/EIS Section 2.6 on page 2-34, that states that the groundwater modeling "cannot project the amount of Basin water that is expected to be drawn into the wells." It is true that the North Marina Groundwater Model cannot predict water quality, and is designed to show changes in water levels. The precise amount of fresh water (as a component of brackish water) that would be withdrawn by the slant wells is not a deciding factor as to whether CalAm would possess rights to the Basin water withdrawn. The SWRCB Report itself, at page 36, acknowledges that "the State Water Board is unable to estimate what percentage or proportion of water extracted from the Basin landward of the proposed well location could be attributed to fresh water sources." Yet the Report concludes at page 38, even with such uncertainty, that CalAm could possess rights to use Basin water for the project so long as "no other legal user of water is injured in the process." Thus, the question at hand is one of injury to existing legal water users. The modeled assessment of the drawdown effects of the project on aquifer levels appear sufficient for assessing injury without knowing how much of the withdrawn brackish water would consist of ocean water and how much would comprise fresh water. In any event, however, the Hydrogeologic Working Group has completed a work product that does help answer this query (EIR/EIS Appendix E3) and it is addressed in detail in Master Response 4, The Agency Act and Return Water.

Surplus Water

Commenters state that the brackish water drawn into the project slant wells would not automatically or necessarily be classified as surplus water in the water rights rubric. One argument is that such degraded water can still be used for "minor irrigation and dust control" and could be used by another possible desalination plant in the future. To the contrary, it does appear that such water can be properly characterized as surplus water. As the SWRCB Report states on page 35, "[B]ecause groundwater in the Basin is in a condition of overdraft, the only way to show there is surplus water available for export to non-overlying parcels is for a user to develop a new water source." The analysis and conclusion of EIR/EIS Section 2.6 are centered on exploring whether CalAm would have a right to Basin water on the basis of developing the water supply. As also stated in the Report (in footnote 65 on page 47), "Water that is currently unusable, both due to its location in the Basin and corresponding quality, could be rendered useable if desalinated and would thus be surplus to current water supplies in the Basin." Any water that is currently used for minor irrigation and dust control could continue to be so used and would not constitute surplus water. Section 4.4, Groundwater Resources, together with Section 2.6, Water Rights, indicate that the project would not harm such existing legal water users. Any possible future desalination plant does not currently possess appropriative groundwater rights because such plant has not already created a new water supply out of unusable surplus water, so it need not be considered in the pertinent water rights equation (but see the Effects on Marina Coast Water District subsection of this Master Response below).

Commenters criticize the water rights analysis for considering the usability of the brackish water that would make up a portion of the source water; they maintain that the Agency Act and County Ordinance 3709 do not differentiate between groundwater (no matter its quality) and "usable groundwater." However, the water rights evaluation is based upon the SWRCB Report, which does focus upon the quality (or usability, as discussed above) of the water withdrawn. The consistency of the project with the Agency Act and County Ordinance 3709 is a separate topic addressed in Master Response 4, The Agency Act and Return Water. Some commenters opine that the term "incidentally extracted useable groundwater" as used on page 40 of the Report in the Agency Act consistency discussion is different than the term "fresh water" (that may be contained within project source water) used in the EIR/EIS. However, the Report does repeatedly use the term "fresh water" in discussing the water that would be returned to the Basin as part of the project. It seems clear that the Report intended those terms to be interchangeable.

Commenters note that overlying Basin water users have been complying with Ordinance 3709 precluding pumping from the 180-Foot Aquifer and that the lack of use of such water should not classify it as "abandoned" water available for the project. However, EIR/EIS Section 2.6 does not depend on the unusable groundwater being "abandoned" to establish CalAm's rights to the source water. Some commenters further state that overlying users have voluntarily refrained from using groundwater when, in fact, they were precluded by Ordinance 3709 from doing so, and could not have used the water for domestic purposes due to its quality. In any event, the water rights analysis is based on the actual use and quality of any non-seawater withdrawn by the supply wells rather than the intent of overlying users.

Harm or Injury

A critical element of inquiry explored within EIR/EIS Section 2.6, and discussed throughout this Master Response, is harm or injury. As noted, CalAm may possess legal rights (on a developed water basis) to pump and use water that originated from the Basin so long as existing legal water users are protected from harm. Certain commenters claim that there is no substantiation for the conclusion in the water rights analysis that the project will not cause harm. However, as detailed in EIR/EIS Section 2.6, the findings related to harm or injury to groundwater users are based primarily upon the scientific analysis set forth in EIR/EIS Section 4.4, and the validated groundwater modeling that has been conducted for the project (as well as pertinent master responses). Section 2.6 does not merely apply the groundwater resources significance thresholds, but considers and applies each of the elements of possible injury to water rights as specified in the SWRCB Report. That Report was plainly based upon and grounded in legal precedent defining harm or injury.

Commenters stress the need for the water rights analysis to consider the effect of the diminution of water quality in the vicinity of the CEMEX property. EIR/EIS Section 4.4, together with Master Response 8, Project Source Water and Seawater Intrusion, explain that the diminution in water quality in the very local area of the CEMEX property would be of limited extent such as to not affect existing groundwater wells.

Some commenters state that the water rights analysis focuses on individual well owners, but fails to consider potential impacts on the region and its aquifers, alleging that "harm" and injury" are too narrowly defined and that any compensatory actions or mitigation measures should also include other stakeholders, such as MCWD, the City of Marina and the Fort Ord community. As stated in EIR/EIS Section 2.6:

> The [SWRCB] Report specifies three categories of foreseeable injuries that conceivably could be experienced by overlying water users within the area of influence of the MPWSP supply wells: "(1) a reduction in the overall availability of fresh water due to possible incidental extraction by the MWPSP; (2) a reduction in water quality in those wells in a localized area within the capture zone; and, (3) a reduction in groundwater elevations requiring users to expend additional pumping energy to extract water from the Basin." Report at 45.

It is not clear that MCWD or the City of Marina (as entities) have overlying water rights, so the harm inquiry directed by the Report above may not even apply. In any event, EIR/EIS Section 2.6 finds it reasonable to conclude that harm would not accrue to current groundwater users within the area where water levels could decline by 1 to 5 feet as a result of the project. Logically then, water users located more distant from the project slant wells, where water levels would decline by less than 1 foot (if at all), should be protected from harm or injury. Furthermore, EIR/EIS Section 4.4, fully examined more regional issues such as seawater intrusion, depletion of aquifer volume and reduction of groundwater quality, concluding in each respect that the project would not generate a significant environmental effect. While the CEQA/NEPA and water rights inquiries are not identical, the thresholds of significance employed in EIR/EIS Section 4.4 are such that application of them to the change effected by the project would encompass any resulting harm or injury.

In a similar vein, commenters state that taxpayers have invested in the improvement of the SVGB and efforts to ensure a long term, sustainable water supply, and that the proposed project would be adverse to such investments. With a similar response, the EIR/EIS demonstrates that no harm will accrue to the legal users of groundwater within the SVGB.

Waste of Water

At least one commenter linked the analysis of water demand in EIR/EIS Sections 2.1 – 2.5 with the topic of water rights, maintaining that any project supply of water in excess of the water supply needs of current water users would be a prohibited "waste" of groundwater. It is not expected that the project would produce more desalinated water than would be supplied to CalAm current and future customers. Thus, it is expected that no water would be wasted. To the extent that project water may be employed by new users or to support new land uses (such as legal lots of record or growth that has been envisioned by pertinent local general plans), it seems logical to assume that such water use would be a "reasonable and beneficial use" under the California Constitution aimed at preventing waste or unreasonable use of water.

8.2.3.6 Return Water

CalAm proposes as part of the project to return to the Basin the amount of fresh water that is contained within the brackish water withdrawn by the slant wells, by providing desalinated product water to CCSD and CSIP, in-lieu of CCSD and agricultural users pumping an equal amount of groundwater; see EIR/EIS Section 2.5.1. One purpose of the return water is to allay concerns over project compliance with a state law that precludes SVGB water from being removed from the SVGB. See Master Response 4, Agency Act and Return Water. Some commenters maintain that this return water component of the proposed MPWSP is a prerequisite to a conclusion that the project would enjoy water rights. Other commenters opine that water rights would exist without the return water component because the project generates no harm to existing legal water users that needs to be addressed through return water. The purpose of the return water element of the project is not to alleviate or address any environmental effects, and it is true that as to water rights, no harm has been shown to exist that the return must ameliorate. The return water is proposed to be returned to the same groundwater basin from which the fresh water component of the withdrawn brackish water would be derived; as such, the Basin would enjoy the benefits of such fresh water so as to stay in balance from a fresh water perspective. In any event, however, the question of whether the return water element is required to establish water rights is academic since the proposed project does include the return water elements and the project as a whole (rather than its individual parts) is the topic of the EIR/EIS and the water rights conclusions.

Certain commenters maintain that the return water component of the project is needed in order to establish water rights because of the water quality harm they state that the project would generate. The assertion is based on analysis in EIR/EIS Section 4.4 concerning changes in groundwater quality that could occur in the immediate vicinity of the slant wells and within the capture zone. There are no active wells constructed in the Dune Sands and 180-FTE Aquifers within the projected capture zone such that no existing legal water users would suffer harm. Furthermore, as noted above, the project considered as a whole does include the return water component such that the project would appear to be feasible from a water rights standpoint even if the return water element were critical to such conclusion.

8.2.3.7 Effect on Marina Coast Water District

Commenters express concern that the project will impair MCWD's ability to supply water on a long term, economic basis to the City of Marina and to Fort Ord, including through a possible future MCWD desalination plant. Some commenters state that the slant wells fall under the jurisdiction of MCWD, which is a public water agency. Many commenters appear to believe that MCWD owns, controls, or otherwise possesses legal rights to all groundwater within its service territory. This is not the case. To the extent that MCWD is currently appropriating water for its customers' beneficial use, MCWD certainly does possess the appropriative rights to such pumped water. As explained above in this Master Response, appropriative groundwater rights are based upon active use. They cannot be reserved in advance. The SWRCB Report at page 35 refers to "existing uses" and to "[p]otential overlying uses" as being implicated in a water rights analysis to demonstrate surplus water, but not to potential appropriative uses. Therefore, the fact that

MCWD may desire at some point in the future to use groundwater within the same aquifer or general location as does the proposed project, is not a factor that weighs into the current water rights inquiry for the project. Nonetheless, EIR/EIS Section 4.4.6 does contain a cumulative analysis of the combined effects of the MPWSP with a possible MCWD desalination plant. The analysis (which is necessarily of a fairly general, preliminary nature since no such MCWD plant is yet proposed) concludes that operation of both desalination projects would not adversely impact groundwater resources.

Commenters raise concerns that, in light of the dearth of water available to MCWD and its customers, and the needs of such current and future customers for a long term, sustainable water supply, it is illogical or unfair for the project to take any amount of water from the SVGB for the purpose of supplying water to CalAm's customers on the Monterey Peninsula. Such comments do not raise a water rights issue, but do engender a policy consideration that can be factored in and addressed by agencies considering approval of the project. Note that based on EIR/EIS Sections 4.4 and 2.6, and this Master Response, the proposed project would not cause significant impacts on groundwater quantity or quality in the Basin and it appears that the project would not harm current legal groundwater users. As to physical effects on MCWD's water source, please see Master Response 7, The Deeper Aquifers of the Salinas Valley Groundwater Basin, and Master Response 8, Project Source Water and Seawater Intrusion.

8.2.3.8 Implications of Annexation Agreement

In 1996, the MCWRA, the MCWD, the City of Marina, the owners of Armstrong Ranch, and then owners of the CEMEX property (RMC Lonestar) entered into an Annexation Agreement and Groundwater Mitigation Framework for Marina Area Lands ("Annexation Agreement"; MCWRA et al., 1996). The agreement established a framework for management of groundwater from the Basin and included terms and conditions for the annexation of lands (including the CEMEX properties) to MCWRA's benefit assessment zones as a financing mechanism to fund groundwater resource protection and reduction of seawater intrusion and to MCWD for water service.

Several commenters have raised the issue that Paragraph 7.2 of the Annexation Agreement limits CEMEX's (the successor owner of the Lonestar property and party to the Annexation Agreement) withdrawal and use of groundwater from the Basin to Lonestar's historical use of 500 acre-feet per year (afy). According to the comments, this same limitation should also apply to CalAm's right to pump groundwater from the CEMEX property. Many of the comments center on the argument that the Annexation Agreement was effective upon execution of the agreement by all parties in 1996, and therefore the limitations and restrictions apply to the proposed project. (Annexation Agreement, paragraph 7.2.)

The commenters are correct that the Annexation Agreement became effective on the date it was executed. It is not clear whether the parties to the Annexation Agreement are currently abiding by the agreement in that certain key objectives behind the agreement have not materialized (such as annexation of territory into MCWD). It does appear, though, that the more supportable position based upon the terms of the Annexation Agreement alone is that the 500 afy limitation on

CEMEX pumping groundwater from its property did also become effective on the effective date of the Annexation Agreement. EIR/EIS Section 2.6.4 has been revised to reflect this information.

Notwithstanding that conclusion, the commenters erroneously focus on the Annexation Agreement as a basis to argue that CalAm is restricted from withdrawing and using more than 500 afy of groundwater for the project. The parties to the Annexation Agreement whose water rights were implicated were all property owners, and the agreement relates to each of their overlying rights and uses of pumped groundwater on their properties. The MCWD 2010 Urban Water Management Plan (section 3.2.1, page 14) confirms that Lonestar's historical water use of 500 afy was an overlying water right and use.

In contrast, CalAm is not an overlying property owner subject to the Annexation Agreement and its right to withdraw and use brackish water from the Basin for the proposed project would be an appropriative right, as discussed extensively above and in EIR/EIS Section 2.6. The law distinguishes between the right to use water under an appropriative right and an overlying right. For instance, "[t]he overlying right . . . is associated with the ownership of land. Overlying rights are special rights to use groundwater under the owner's property. Appropriative rights, on the other hand, are not derived from land ownership but depend upon the actual taking of water." City of Santa Maria v. Adam, 211 Cal.App.4th 266, 278 (2006). A water rights legal treatise emphasizes this point as follows: "Unlike…overlying rights, [an] appropriative right is not dependent upon the ownership of real property. The right to use water under an appropriative right is distinct from the property through which the water flows or the land where the water is ultimately placed to beneficial use." 1 Slater, California Water Law and Policy (2017) § 2.16, at p. 2-102. Under these key distinctions, a non-property owner's right to water that is developed through pumping is an appropriative right. While it is true that the MPWSP would pump some water from the Basin through wells on CEMEX's property, CalAm is not the property owner and therefore does not have an overlying right to the groundwater. Accordingly, the limitations and restrictions in the Annexation Agreement apply only to CEMEX's use of the groundwater and would not apply to the proposed project.

Draft EIR/EIS Section 2.6.4 on page 2-41 stated that CalAm could conceivably employ an injection well on the CEMEX land to offset water pumped from the land so as to meet the requirements of the Annexation Agreement. Commenters have pointed out that such a strategy may not offset the amount of Basin groundwater withdrawn from the CEMEX land, and that such a concept was not studied in the Draft EIR/EIS. The critique is well taken and the language in Final EIR/EIS Section 2.6.4 has been amended to delete the suggestion.

8.2.3.9 Recirculation of Draft EIR/EIS

Certain commenters state that EIR/EIS Section 2.6 should be altered in various respects and then the Draft EIR/EIS should be recirculated for an additional round of public review and comment. In response to comments, some changes have been made to EIR/EIS Section 2.6. However, neither the methodologies employed nor the conclusions reached have changed in any way that implicates a significant environmental impact not identified in the Draft EIR/EIS, a substantially more severe significant environmental effect than indicated, or a new feasible alternative or mitigation measure. Thus, there is no legal requirement based upon the water rights analysis to recirculate the Draft EIR/EIS.

8.2.3.10 References

MCWRA, MCWD, City of Marina, J.G. Armstrong Family Members, and RMC Lonestar, 1996. Annexation Agreement and Groundwater Mitigation Framework for Marina Area Lands. Available at http://www.water.ca.gov/urbanwatermanagement/2010uwmps/Marina%20Coast%20Water%20District/MCWD-MCWRA%202-2A%20annexation%201996.pdf.

8.2.4 Master Response 4: The Agency Act and Return Water

COMMENTERS ADDRESSED IN MASTER RESPONSE 4

City of Marina	Water Ratepayers of the Monterey Peninsula
Marina Coast Water District	Kathy Biala
Monterey Peninsula Regional Water Authority	Margaret-Anne Coppernoll
Monterey Peninsula Water Management District	Juli Hofmann
Citizens for Just Water	Hebard Olsen
Coalition of Peninsula Businesses	Larry Parrish
Fort Ord Rec Users	Form Letter 2
Land Watch Monterey County	Public Meeting Verbal Comments
Public Water Now	

This Master Response addresses comments concerning the proposed project's compliance with the Monterey County Water Resources Agency Act (Agency Act) and aspects of the proposed return water component of the MPWSP, including the allocation of the proposed return water to the Castroville Community Services District (CCSD) and to the Castroville Seawater Intrusion Project (CSIP). This Master Response also addresses comments on the amount of water required to be so allocated (or returned) in order to satisfy the Agency Act and to address project impacts, and discusses the likely percentage of water drawn through the proposed supply wells that would comprise the fresh water component of the source water. See Master Response 2, Source Water Components and Definitions, for definitions of all components of source water.

8.2.4.1 Agency Act Compliance and Location of Return Water

As explained in Draft EIR/EIS Section 2.6.3 on page 2-39, a state law known as the Agency Act created the Monterey County Water Resources Agency (MCWRA or Agency). Section 21 of the Agency Act is titled "Legislative findings; Salinas River groundwater basin extraction and recharge." Section 21 provides in pertinent part:

> The Legislature finds and determines that the Agency is developing a project which will establish a substantial balance between extraction and recharge within the Salinas River Groundwater Basin. For the purpose of preserving that balance, no groundwater from that basin may be exported for any use outside the basin . . .

In order to satisfy the Agency Act, CalAm has proposed that it will calculate annually (based on the total dissolved solids (TDS) concentration of the water being drawn through the slant wells) the percentage of supply water that originated in the Salinas Valley Groundwater Basin (SVGB, which is the same as the Salinas River Groundwater Basin) as fresh water, i.e., the fresh water component of the brackish water drawn by the slant wells. CalAm would then "return" to the SVGB that same amount of water by providing desalinated product water to CCSD and CSIP. As a result, the amount of fresh water that was drawn into the slant wells would be devoted to domestic and agricultural uses in lieu of CCSD and agricultural users pumping and using an equal amount of groundwater within the SVGB. Draft EIR/EIS Section 2.6.3 evaluates the likelihood that the project would comply with the Agency Act, concluding on page 2-40 that "it appears at least preliminary reasonable to conclude that the project would be consistent with the Agency Act and the Ordinance [prohibiting groundwater extractions at a particular depth] such that those laws would not impair project feasibility."

Commenters expressed concern over the fact that the water returned to the Basin through provision of it to CCSD and to CSIP would be in a different location than the place from which the water was withdrawn. Specifically, commenters question how returning water to Castroville would benefit the water source for MCWD and state that the project would not return pumped groundwater directly to the Basin. Section 21 of the Agency Act pertains quite plainly to the "Salinas River Groundwater Basin" and states that "no water **from that basin** may be exported for any use outside the basin . . ." (emphasis added). The molecules of fresh water that would be drawn by the slant wells would have come from the SVGB. Likewise, CCSD currently pumps groundwater from the SVGB and that would be replaced by desalinated water supplied to CCSD, and agricultural users currently pump groundwater from the SVGB that would be replaced by desalinated water supplied to CSIP. The return water would be used in lieu of pumping groundwater directly from the SVGB. Thus, even though the withdrawal and the return may occur in different areas of the SVGB (roughly 4.5 miles apart), both would be within the same basin that is the subject of Agency Act Section 21. Concerning MCWD specifically, its water source is the SVGB. The relationship of the "Marina Subarea" defined by MCWD to the hydrogeographic unit of the SVGB is discussed in Master Response 6, The Sustainable Groundwater Management Act. The Agency Act concerns itself only with the SVGB as a whole, and does not regulate use of SVGB water based upon any geographic locale or administrative jurisdiction within the overall SVGB.

Furthermore, as discussed in EIR/EIS Section 2.6.3 and included as EIR/EIS Appendix B2, the SWRCB opined on page 40 of its *Final Review of California American Water Company's Monterey Peninsula Water Supply Project* ("Report") that because "the Project as proposed would return any incidentally extracted usable groundwater to the Basin … , it does not appear that the Agency Act or the Ordinance [3709] operate to prohibit the Project." Pages 39 to 40 of the SWRCB Report noted that while the word "export" is not defined in the Agency Act, "limitations on export ordinarily are not interpreted to apply to situations where the conveyance of water to areas outside a watershed or stream system is accompanied by an augmentation of the waters in that area, so there is no net export." The Report specifically stated on page 39 that the return may be through the CSIP (the return to CCSD had not been identified when the Report was drafted), supporting the notion that the return locale need not be within a particular radius of the slant wells so long as it occurs within the SVGB.

Several commenters noted that the SWRCB Report assumed that the screens for the slant wells would be located solely under the ocean, with none being located inland of the mean high tide line. Regardless, the SWRCB's evaluation of Agency Act compliance assumes that the project would withdraw some usable groundwater (i.e., fresh water) from the SVGB. In addition, the EIR/EIS both acknowledges and assumes that some of the water withdrawn by the slant wells would indeed be brackish water containing fresh water molecules subject to the return component of the project because they originated in the SVGB. The conclusions of the EIR/EIS Section 2.6.3 analysis concerning whether the Agency Act would impair project feasibility need not be altered.

Some commenters asked whether the MCWRA has agreed that the Agency Act does not preclude project viability. It is noteworthy that MCWRA (a party to the CPUC proceeding on the project) agreed to and executed the June 14, 2016, MPWSP Desalination Return Water Settlement Agreement. That Settlement Agreement, the terms of which are incorporated into CalAm's MPWSP proposal, sets forth the return water construct as to how the return water amount would be calculated and the provision of the return water to CCSD and CSIP. The Settlement Agreement does state that CalAm shall comply with the Agency Act and that the agreement does not alter or affect MCWRA's authority under the Agency Act. Nonetheless, the fact that MCWRA is a party to the Return Water Settlement Agreement indicates some level of endorsement by MCWRA of CalAm's plan for Agency Act compliance through the proposed return, as well MCWRA's acknowledgement that Ordinance 3709 would not impair the project.

8.2.4.2 Required Amount of Return Water

Certain commenters maintain that new test well and groundwater monitoring data indicate that the proposed one-to-one return water ratio is insufficient to offset impacts on the Marina Subarea of the SVGB. For a discussion of the Marina Subarea, see Master Response 6, The Sustainable Groundwater Management Act. See Master Response 11, CalAm Test Slant Well, for information on test slant well data, and Master Response 8, Project Source Water and Seawater Intrusion, together with Section 4.4, Groundwater Resources, concerning impacts to groundwater resources. The project envisions returning to the Basin precisely the same amount of desalinated water as the amount of fresh water that is withdrawn (as a component of brackish water) by the slant wells. None of the commenters articulate precisely why a ratio different than one-to-one should be employed, nor do they indicate what ratio would be more appropriate. It is noteworthy that while the fresh water component of the source water (the amount subject to the return proposal) would be mingled with ocean water within the withdrawn brackish water (and could be separated only through the use of a desalination technology), the water returned to the SVGB in lieu of an equal amount of groundwater pumping would be desalinated, and fully potable water.

8.2.4.3 Anticipated versus Actual Amount of Return Water

Certain commenters requested further discussion of the anticipated annual volume of water that would be returned to the SVGB. While a range of annual volume of water to be returned to the SVGB was assumed in order to analyze the anticipated impact of the proposed intake system, the actual volume of return water would be calculated annually using actual water quality data from the production wells, as specified in the 2016 Return Water Settlement Agreement. Both the Settlement Agreement calculation method and the modeling estimation procedures are discussed below.

2016 Settlement Agreement Return Water Calculation Method

The method of calculating the specific volume of annual return water is set forth in Section H of the Settlement Agreement, which states the following:

> The Project's slant intake wells are designed to produce source water for treatment by the selected desalination plant ("Project Source Water Production"). To meet applicable requirements of the Agency Act, CalAm has proposed as part of the Project to make available for delivery to groundwater users overlying the SVGB a volume of water ("Return Water") equal to the percentage of SVGB groundwater in the total Project Source Water Production, as calculated on a water year basis and determined by the Agency.

The formula for calculating the annual volume of return water is described in the Settlement Agreement, Appendix D Base Return Water Obligation Methodology. The equation is as follows:

> (seawater salinity) x (percentage of seawater) + (inland water salinity) x (percentage of Salinas Basin water) = (brackish water salinity)

The formula is aimed at establishing the percentage of the project source water that represents the fresh water component (i.e., inland water per the formula) of the brackish water withdrawn by the slant wells.

The Settlement Agreement establishes as constant values that the measured seawater salinity in Monterey Bay (analyzed as TDS) is 33,500 milligrams per liter (mg/L) and the fresh (i.e., inland) water salinity is 500 mg/L. The brackish water salinity would be measured annually in the source water from the slant wells. Inserting the agreed-upon salinity concentrations:

> 33,500 x percentage of seawater + 500 x percentage of inland water = source water salinity

Since the sum of both percentages must be 100 percent, or 1, the percentage of inland water would be 1 minus the percentage of seawater. Inserting this value:

> 33,500 x percentage of seawater + 500 x (1- percentage of seawater) = source water salinity

Rearranging the equation provides:

> [33,500 x percentage of seawater] + 500 - [500 x percentage of seawater] = source water salinity
>
> or
>
> 33,000 x percentage of seawater = source water salinity - 500

Simplifying the equation provides:

> Percentage of seawater = [source water salinity - 500] / 33,000

The percentage of return water would be 1 minus the percentage of seawater, yielding:

> Percentage of return water = 1 - [(source water salinity - 500) / 33,000]

For example, if the salinity of the source water were measured at 31,076 mg/L, then:

> Percentage of return water = 1 - (31,076 - 500 / 33,000) = 0.074 or 7.4 percent return water

Hydrogeologic Working Group Evaluation of Return Water Estimates

As discussed in Master Response 5, The Role of the Hydrogeologic Working Group and its Relationship to the EIR/EIS, referred to as the Technical Group in the 2013 Large Settlement Agreement, was tasked with reaching "…agreement among the Technical Group about the studies, well tests, field work, modeling, monitoring, and other data analyses most appropriate to assess and characterize whether and to what extent the proposed operation of the MPWSP may adversely affect the SRGB [Salinas River Groundwater Basin] and the water supply available to legal water users thereof ("Hydrogeologic Study")."

Included in the tasks performed by the Hydrogeologic Working Group (HWG) was the evaluation of the methods and procedures used for developing the North Marina Groundwater Model (NMGWM). As described in Section 4.4.4.2, Groundwater Modeling, and Appendix E2, within the area to be modeled (model domain), the input parameters for the model included quantifying the volumes of water entering into the model domain from all sources (e.g., precipitation, seawater intrusion, agricultural return water, and infiltration from streams) and quantifying the volumes of water leaving the model domain (e.g., groundwater flow out of the model domain and agricultural pumping). The volume of return water is also an input parameter to the NMGWM because, although the return water would be extracted from and returned to the same basin, the location of the extraction (the slant wells) would not be the same as the location where the return water would be returned to the basin (CCSD distribution system or CSIP).

As previously discussed, the actual volume of return water would be calculated annually based on the salinity of the source water extracted by the slant wells, and would be expected to vary with time and season. Although the exact volume of return water would not be known prior to initiating the seawater extraction system, the return water volume was expected to be more than 0 percent but less than 12 percent, based on preliminary groundwater model runs and calculations. To account for the variable return water volumes, the 2016 version of the NMGWM ($NMGWM^{2016}$) was run with pumping scenarios that included representative return water volumes of 0, 3, 6, and 12 percent of the total source water volume. The HWG, as part of its Hydrogeologic Investigations, has since evaluated several approaches to return water estimates and has confirmed that the actual return water volume is expected to fall between 0 to 12 percent, as discussed below.

Return Water Estimates

As required by the 2013 Large Settlement Agreement and defined in the Hydrogeologic Workplan, the HWG was tasked with evaluating the test well study data, and ultimately preparing a report of its findings. The Technical Report prepared by the HWG (HWG, 2017; included in Final EIR/EIS as Appendix E3) includes two return water estimation methods. The first approach involves development of an analytical equation to describe mixing of water within the capture zone;[1] the second approach involves numerical modeling using the existing CEMEX Model. These methodologies are described further below. The Lead Agencies have independently reviewed the two methodologies and agree that the approaches and the input assumptions appear reasonable. The two methods – the Analytical Method and the CEMEX Model – confirm that the

[1] The capture zone is the localized region that would contribute source water to the slant wells. (See Master Response 8, Project Source Water and Seawater Intrusion).

range of 0 to 12 percent return water used in the EIR/EIS and the NMGWM^{2016} was reasonable. The HWG Technical Report (EIR/EIS Appendix E3) presents the calculated percentage of ocean water within the source water, referred to as the Ocean Water Percentage (OWP), in Section 2.2.3 and Appendix G of the report for each of the two methods. Since the OWP includes both the seawater in the source water as well as the seawater within the brackish water withdrawn by the supply wells, and in accordance with the formula in the Settlement Agreement, the return water percentage would be equal to 100 percent (or 1) minus the percentage of ocean water.

Calculation of OWP Using Analytical Method

This approach uses an analytical equation to calculate the percentage of ocean water based on the water and salinity budgets within the capture zone of the proposed slant wells. The water budget represents the steady-state inflows and outflows after equilibrium is reached from project pumping. The results show that equilibrium would be reached several months to a few years after the project pumping begins. The steady-state water inflows to the capture volume are seawater inflow from Monterey Bay and recharge from precipitation on the land surface overlying the capture zone. The steady-state water outflow from the capture zone is the pumping from the project wells.

The analytical method was generally calibrated by using the first 1.6 years (April 2015 through October 2016) of data collected from the test slant well and assumed groundwater gradients that were consistent with those used in the EIR/EIS and specifically within the NMGWM^{2016}. The major conclusions of the analytical method of calculating OWP, for the 6.4 mgd and the 9.6 mgd desalination facility options, are listed below:

- The long-term equilibrium OWP is estimated to range from 96 to 99 percent.
- Based on the range of assumptions considered, the continuous pumping time to reach 90 percent ocean water is estimated to range from about 4 months to 1.7 years.
- Based on the range of assumptions considered, the continuous pumping time to reach 95 percent ocean water is estimated to range from about 6 months to 3.1 years.

Thus, based upon the HWG calculations, the return water percentage is likely to be no more than 10 percent within the first 2 years of project slant well pumping, decreasing to no more than 5 percent within 6 months to roughly 3 years. Longer term, it appears that the return water percentage would be between 1 percent and 4 percent, well within the 0 to 12 percent range studied in the EIR/EIS.

Calculation of OWP Using CEMEX and North Marina

As discussed in Section 2.2.3.2 of the HWG Technical Report, the analytical method discussed above cannot accurately predict salinity in the early months of project pumping (prior to equilibration) because the capture zone is transient (i.e., it starts with a smaller area and increases with time until equilibrium is reached). Therefore, the CEMEX Model (see description in EIR/EIS Section 4.4.4.2, Groundwater Modeling) and NMGWM^{2016} were used to provide data to compare with the results of the analytical method. Use of the models allows for additional detail in the early months of the pumping scenarios since the CEMEX Model can provide transient water quality data. The results for these early months of project pumping indicate a higher percentage of ocean water in the project source water than that predicted by the analytical method. As pumping continues, however, the results from the CEMEX Model and NMGWM^{2016} are consistent with the long-term pumping results from the analytical method. The analysis predicts that the percentage of ocean water will rise to 90 percent within 90 days of the initiation of full-scale pumping and the percentage of ocean water will reach 95 percent within 5 years.

Based upon calculation of the OWP using the groundwater models, it appears that the return water percentage would be no more than 10 percent within the first year of project pumping and would drop to no more than 5 percent within 5 years of project pumping.

Conclusion

In conclusion, both the analytical method and CEMEX modeling approaches to estimating the percent of return water confirm that the anticipated actual annual volume of return water could be 10 percent in the first few months of project pumping and would be no more than 5 percent within 5 years of project pumping. The 0 to 12 percent range used in the EIR/EIS and the NMGWM^{2016} is consistent with these conclusions, appears conservative, and no edits to the analysis relevant to return water presented in the Draft EIR/EIS are necessary.

8.2.5 Master Response 5: The Role of the Hydrogeologic Working Group and its Relationship to the EIR/EIS

COMMENTERS ADDRESSED IN MASTER RESPONSE 5

Marina Coast Water District	Charles Cech
Ag Land Trust	Bruce Delgado
Public Water Now	Margaret-Anne Coppernoll
Michael Baer	Jan Shriner
David Beech	Public Meeting Verbal Comments
Kathy Biala	

This Master Response discusses the background that led to the formation of the Hydrogeologic Working Group (HWG), identifies the members and the stakeholders each member represents, describes the roles and activities conducted by the HWG, describes the relationship of HWG work products to the CEQA/NEPA analysis, and discusses alleged conflicts of interest.

8.2.5.1 2013 Settlement Agreement

A Settlement Agreement was reached in 2013 wherein several parties to CPUC Proceeding A.12-04-019 affirmed their belief that, consistent with the Public Utilities Code Section 1002(a), the MPWSP would serve the public convenience and necessity. The 2013 Settlement Agreement was reached between California American Water Company (CalAm) and 10 parties, later expanded to 16 parties.[1] Parties to the 2013 Settlement Agreement represent diverse interests including: ratepayers, environmental groups, business groups, local government governments and government agencies, as well as other key stakeholders on the Monterey Peninsula. The Marina Coast Water District is a party to the proceeding, but is not a party to the 2013 Settlement Agreement. The City of Marina was not a party when the 2013 Settlement Agreement was executed and therefore, did not sign the 2013 Settlement Agreement; the City was granted party status in March 2017. Note that the 2013 Settlement Agreement is actually dated July 31, 2013, although it was submitted into the proceeding on August 6, 2013.

8.2.5.2 Establishment and Role of HWG

The HWG, referred to as the Technical Group in the 2013 Settlement Agreement, was established by the parties to the 2013 Settlement Agreement, and not by the CPUC. Within the Agreement, the parties with diverse interests agreed that CalAm's hydrogeologist and technical team would work with the Salinas Valley Water Coalition's (SVWC) and Monterey County Farm Bureau's

[1] CalAm, City of Pacific Grove, Coalition of Peninsula Businesses, County of Monterey, CPUC Division of Ratepayer Advocates (DRA), LandWatch Monterey County, Monterey County Farm Bureau (MCFB), Monterey County Water Resources Agency (MCWRA), Monterey Peninsula Regional Water Authority (MPRWA), Monterey Peninsula Water Management District (MPWMD), Monterey Regional Water Pollution Control Agency (MRWPCA), Planning and Conservation League Foundation, Salinas Valley Water Coalition (SVWC), Sierra Club, and Surfrider Foundation (collectively, the Parties)

(MCFB) assigned hydrogeologists, and other technical experts designated by CalAm. As stated in Section 5 of the 2013 Settlement Agreement, the purpose of the HWG is:

> …to reach agreement among the Technical Group about the studies, well tests, field work, modeling, monitoring, and other data analyses most appropriate to assess and characterize whether and to what extent the proposed operation of the MPWSP may adversely affect the SRGB [Salinas River Groundwater Basin] and the water supply available to legal water users thereof ("Hydrogeologic Study"). The 10 Parties agree that the purpose of this Section 5 is intended to avoid litigation regarding the scope of and methodology used to develop the Hydrogeologic Study and the Technical Report.

The Hydrogeologic Study's Work Plan and Technical Report are described further below in Section 8.2.5.4, HWG Activities and are included in EIR/EIS Appendix E3.

8.2.5.3 HWG Members

The HWG is a collaborative body and does not have an executive director, a manager, a chief hydrogeologist, or any other leader; all work is shared and openly peer reviewed by all HWG members. As previously noted, CalAm and the SVWC designated experts to represent their interests. The HWG members and the entities they represent are:

- The SVWC and the MCFB are jointly represented by Tim Durbin and Martin Feeney, as independent consultants.
- CalAm is represented by Peter Leffler (Ludorff and Scalmanini) and Dr. Dennis Williams, assisted by his staff at Geoscience Support Services (Geoscience).

HWG members are paid by the entities they represent.

Additional Participants at HWG Meetings

Other participants attended some or all of the HWG meetings, but not as formal members of the HWG. Independent consultant Barry Keller participated in some meetings on behalf of CEMEX, the property owner of the proposed source water intake site. Rich Svindland and Ian Crooks participated in some HWG meetings as additional representatives for CalAm. These participants were also paid by the entities they represent. MCWD did not have a representative on the HWG because it was not a signatory to the 2013 Settlement Agreement that established it. The City of Marina did not become a party to the proceeding until March 2017. The Monterey County Water Resources Agency (MCWRA) and the Monterey Peninsula Water Management District (MPWMD) were both settling parties and agreed to accept the SVWC and MCFB representation. Representatives from the MCWRA participated in one or two of the HWG meetings that were attended by members of the CEQA/NEPA team. In addition, the CEQA/NEPA team participated in the HWG, as described below.

8.2.5.4 HWG Activities

As previously noted, the parties to the 2013 Settlement Agreement agreed that the CalAm and SVWC/MCFB hydrogeologists and technical teams would develop a joint Work Plan to conduct the Hydrogeologic Study described in Section 5 of the 2013 Settlement Agreement, for the proposed source water intake site consistent with the study recommendations presented in the State Water Resources Control Board's (SWRCB) July 31, 2013, Final Review of California American Company's Monterey Peninsula Water Supply Project (included as Appendix B2 in the EIR/EIS). The HWG did not consider administrative or political boundaries (e.g., city, county, or agency areas of jurisdiction), water rights issues, legal issues, or financial considerations.

The Work Plan is titled *Monterey Peninsula Water Supply Project, Hydrogeologic Investigation Work Plan* and dated August 2, 2013. The Work Plan was referenced in the Draft EIR/EIS in Section 4.4 Groundwater Resources. Section 5.2 of the 2013 Settlement Agreement also states that, "The Technical Group will review and evaluate the data and results of the Hydrogeologic Study, and will prepare a Technical Report presenting the findings and conclusions of the Technical Group." The HWG prepared the *Draft Monterey Peninsula Water Supply Project Hydrogeologic Investigation, HWG Hydrogeologic Investigation Technical Report*, dated July 27, 2017, which is referenced in and employed in the analysis of EIR/EIS Section 4.4, Groundwater Resources. The 2013 Work Plan as well as the 2017 Technical Report are included in the Final EIR/EIS in Appendix E3.

Although the Work Plan and the Technical Report are published by Geoscience since the Settlement Agreement states (at Section 5.1, pages 9 and 10) that CalAm will implement and carry out the Hydrogeologic Study, the work products (Work Plan and Technical Report) represent the collaborative work of the entire HWG, not merely Geoscience or CalAm.

The HWG developed the Work Plan as a collaborative plan of investigation to assess the hydrogeologic conditions in the project area. The Work Plan provided a phased approach to progressively investigate the hydrogeology and the potential effects of the project on aquifers from the use of subsurface slant wells for obtaining feedwater supply. The Work Plan described the Hydrogeologic Study approach and methodologies, including the purpose, locations, and methodologies for installing exploratory borings and monitoring wells; the purpose and methods for collecting and analyzing soil and groundwater samples; the aquifer testing methodology using the test slant well; the development of the conceptual model of site conditions; and the development of the groundwater models. The Work Plan was updated several times as new information became available. The final Work Plan, cited above, incorporated comments and recommendations by members of the HWG, and covered the investigative steps the HWG agreed were needed to consider the anticipated effects of the project. The final Work Plan became the hydrogeology investigation roadmap and resulted in the implementation of the fieldwork and modeling efforts conducted for the MPWSP.

8.2.5.5 Relationship to CEQA/NEPA Analysis

As described above, the HWG resulted from the 2013 Settlement Agreement with a purpose independent of the EIR/EIS. However, the topics addressed by the HWG overlap with some of the environmental topics and inquiries considered by the EIR/EIS, and the Lead Agencies were able to gain valuable data from the work of the HWG. The CEQA/NEPA team engaged with the HWG to observe the implementation of the Work Plan, to understand the test slant well data, and to take advantage of the individual and collective knowledge of the HWG members to inform the CEQA/NEPA analysis of groundwater resources. The CEQA/NEPA team members that participated in HWG meetings were Eric Zigas and Michael Burns (Environmental Science Associates), Peter Hudson (Sutro Science), and John Fio and Steve Deveral (HydroFocus). The CEQA/NEPA team members attended 10 monthly meetings with the HWG between December 10, 2015, and January 27, 2017 in order to understand the results of the Hydrogeologic Study.

As the Hydrogeologic Study progressed, at each meeting attended by the CEQA/NEPA team, the HWG discussed the status and preliminary results for various tasks of the Hydrogeologic Study, enabling the CEQA/NEPA team to understand the preliminary and final results, and provided the opportunity to ask questions to clarify understandings and assumptions. Concurrently, the CEQA/NEPA team provided feedback to assist the HWG and the groundwater modelers in understanding the significance criteria to be employed in the EIR/EIS. The CEQA/NEPA team obtained feedback from the HWG as to the groundwater aquifer characterization and the groundwater modeling assumptions (this is noted in Footnote 34 on Draft EIR/EIS page 2-35). The HWG also reviewed and commented on the portion of the August 19, 2016, Draft North Marina Groundwater Model Technical Memo that was prepared by HydroFocus for the Lead Agencies and presented at the September 1, 2016, public Groundwater Modeling Workshop that was hosted by the CPUC in Carmel.

The primary topics discussed during the meetings attended by the CEQA/NEPA team included the ongoing test slant well monitoring results, characterization of the hydrogeologic baseline, the Monthly Reports prepared pursuant to the Coastal Development Permit Special Condition 11, the CEMEX Modeling being performed by Geoscience for CalAm, and the 2016 version of the North Marina Groundwater Model ($NMGWM^{2016}$) being utilized by HydroFocus for the Lead Agencies. Other topics discussed included: the December 2015 site visit to the Castroville Community Services District, and the Ag Land Trust wells; the approach to modeling sea level rise; scaling issues between the regional Salinas Valley Integrated Ground and Surface Water Model (SVIGSM), the $NMGWM^{2016}$ and the focused CEMEX model; model boundaries and boundary conditions; recharge and infiltration rates; the Seaside Basin divide; and Salinas Valley Return Water estimation methods.

The Lead Agencies prepared the EIR/EIS independent from the HWG, using independent judgment in evaluating the information provided by the HWG to help inform the EIR/EIS. The Lead Agencies considered and incorporated information and data generated by the HWG, as appropriate, into the EIR/EIS after subjecting it to peer review. The EIR/EIS impact analysis conclusions and mitigation measures were not shared or discussed with the HWG prior to January 2017 publication of the Draft EIR/EIS.

8.2.5.6 Potential Conflicts of Interest and Independent Judgment

Several commenters expressed concern that one or more conflicts of interest among the Lead Agencies and their consultants, the Applicant and its consultants, and the HWG may compromise the integrity of the CEQA/NEPA analysis and decision-making process. Three characterizations of potential conflicts of interest have been raised in comments:

1) that Dr. Dennis Williams, the President of Geoscience, holds one or more patents related to slant well technology that CalAm could or might use in the construction of the MPWSP;

2) that Geoscience, while under contract to the CPUC, also had a contractual relationship with CalAm, which raised concerns over the credibility and accuracy of the groundwater modeling, and concerns that the use of the NMGWM^{2016} does not reflect the independent judgment of the Lead Agencies; and

3) that the role of Geoscience, and of Dr. Williams in particular, on the HWG presented a potential or perceived conflict of interest with respect to the HWG work products and HWG input on information sources relied on in the EIR/EIS, and/or that HWG and Geoscience work products were relied on in a way that does not reflect the independent judgment of the Lead Agencies.

Although only the third item is directly related to the HWG itself, this section of Master Response 5 addresses these issues as well as the actions taken by the CPUC in response to these concerns. The second and third items are addressed together, as commenters have raised similar concerns about both Geoscience and the HWG, although they are not the same organization.

Financial Conflict of Interest Related to Patents

Dr. Williams, the President of Geoscience, is a member of the HWG and holds certain patents on slant well technology, specifically, the methodology for constructing the slant well subsurface feedwater supply system. Certain entities contacted the CPUC during the comment period for the 2015 MPWSP Draft EIR, and opined that having Geoscience conduct the project modeling and developing the design of the subsurface intake system using technology for which Dr. Williams holds the patents might constitute a conflict of interest. The opinions were that Dr. Williams would have a vested interest in the MPWSP using his technology and would gain financially by its use. Upon being apprised of the potential for a conflict of interest, a CPUC Administrative Law Judge (ALJ) issued a July 14, 2015, ruling in Proceeding A.12-04-019, requesting data from Geoscience and CalAm about patents held by Geoscience relating to the MPWSP.

Geoscience and CalAm both responded to the ruling in a document dated July 28, 2015 and titled *Response of Geoscience Support Services, Inc. to Administrative Law Judge's Ruling Requesting Data on Ratemaking and Geoscience Patents*. As explained in their responses, both parties maintained that Dr. Williams never intended to seek royalties or payments regarding his patent for slant wells in connection with the prior Coastal Water Project or the MPWSP, and no royalties were paid to Dr. Williams. Nevertheless, to provide the CPUC and CalAm customers with certainty on this issue, CalAm entered into a *Patent License and Non-Assertion Agreement* with Dr. Williams in his personal capacity and as president and owner of Geoscience. The agreement makes clear, as described in the Geoscience Response to Request No. 1f, "that Cal-Am, along with its contractors, the overseeing public entity, and end-users, are fully licensed to use, in connection with the MPWSP and for no additional charge, the technology that Geoscience has provided and is providing to CalAm . . . [P]er the terms and conditions of the Agreement, Geoscience and Dr. Williams have granted a royalty-free, fully paid-up license to make and use the slant well systems and methods . . . [A]lso per the terms and conditions of the Agreement, Geoscience and Dr. Williams have covenanted not to assert . . . any claim of patent infringement respecting the slant well systems and methods being made and used as part of the MPWSP."

Geoscience Groundwater Model and Independent Review of Geoscience and HWG Work Products and Input

As noted in EIR/EIS Section 1.4.3, to address questions about the accuracy and credibility of the groundwater modeling performed by Geoscience (referred to as $NMGWM^{2015}$), the CPUC extended the public comment period on the April 2015 Draft EIR, made the groundwater data files available for public review, and employed the Lawrence Berkeley National Laboratory (LBNL) to conduct an independent evaluation of that data. In addition, the CPUC engaged with Monterey Bay National Marine Sanctuary (MBNMS, or Sanctuary) as co-lead agency and prepared an updated EIR/EIS that used an independent groundwater modeling consultant, HydroFocus, that had no prior connection to the MPWSP, as discussed below.

The results of LBNL's independent evaluation are provided in EIR/EIS Appendix E1, Section 2. As described therein, LBNL found that its simulation results matched Geoscience's results, which were presented in Appendix E2 of the April 2015 Draft EIR. LBNL's evaluation reproduced some of the groundwater modeling outputs exactly, while others showed small differences that can be attributed to computer round-off and cancellation errors. LBNL found that there were shortcomings in the Geosciences hydrostratigraphic model and simulation inputs that could potentially change the impact assessments. Chief among these was the absence of the Fort Ord-Salinas Valley Aquitard (FO-SVA), which hydraulically separates the Dune Sand and 180-Foot Equivalent (180-FTE) aquifers from greater than about 2 km east of the proposed extraction site.

Although the LBNL review indicated that the $NMGWM^{2015}$ was correctly run and could be improved with the addition of input on the FO-SVA, in July 2015, the CPUC elected to terminate its relationship with Geoscience and proceed with the understanding that Geoscience's role was limited to being a consultant to CalAm, the Applicant. CalAm submitted the Geosciences model ($NMWMG^{2015}$) as applicant-provided information to the CPUC. The CPUC subsequently contracted with HydroFocus, a groundwater modeling consultant, to independently review, revise, and continue to develop and use the model for purposes of the revised Draft EIR/EIS. HydroFocus was selected because of its experience; because it had no existing or recent relationship with CalAm, Salinas Valley stakeholders, or any party to the CPUC proceeding; and because it would have no involvement with the design, construction, or operation of the MPWSP. As noted by HydroFocus in Section 1 of EIR/EIS Appendix E2, HydroFocus was charged with reviewing the $NMGWM^{2015}$ to:

- Confirm reported hydraulic properties (horizontal and vertical hydraulic conductivity and specific storage), specified stresses (recharge and pumping), boundary conditions, and model-calculated groundwater levels and fluxes.
- Update the $NMGWM^{2015}$ using new information from borehole, monitoring well, and slant well pumping test data (the update is referred to as the $NMGWM^{2016}$).
- Evaluate the $NMGWM^{2016}$ by assessing history matching results (October 1979 through September 2011) and slant well pumping test results (April 2015 through January 2016).

- Employ the NMGWM^{2016} to calculate drawdown from proposed slant well pumping.
- Characterize sensitivity of the NMGWM^{2016} results to model assumptions and parameter values.

Revisions made to the NMGWM^{2015} by HydroFocus are described in EIR/EIS Appendix E2 at Section 3.0, specifically in Table 3.1, and were made independent from, but are consistent with, the LBNL recommendations. Thus, the credibility of the original model was confirmed by LBNL's independent review, and subsequently the accuracy of the groundwater modeling was improved as a result of the revisions made by HydroFocus.

The CPUC has properly exercised independent judgment under Public Resources Code section 21082.1(c)(3). A lead agency has the discretion to adopt materials that it chooses, such as those drafted by the applicant or its consultants, so long as the lead agency independently reviews, evaluates, and exercises judgment over that documentation and issues it raises and addresses. (*Friends of La Vina v. County of Los Angeles* (1991) 232 Cal.App.3d 1446; Pub. Resources Code, §21082.1, subd. (c); Cal. Code Regs., tit. 14, §15084, subd. (e).) The lead agency also has the discretion to resolve factual issues and to make policy decisions. As an example, "[i]f the determination of a baseline condition requires choosing between conflicting expert opinions or differing methodologies, it is the function of the agency to make those choices based on all of the evidence." (*Save Our Peninsula Committee v. Monterey County Board* (2001) 87 Cal.App.4th 99, 120; citing *Barthelemy v. Chino Basin Municipal Water District* (1995) 38 Cal.App.4th 1609, 1617.) Even if an entire EIR is initially prepared by the project applicant or a third party (such as the NMGWM^{2015} prepared by Geoscience as CalAm's consultant) and subsequently adopted by the lead agency, that does not mean that the lead agency failed to exercise its independent judgment. (*City of Poway v. City of San Diego* (1984) 155 Cal.App.3d 1037, 1042.)

Under NEPA regulations, materials may also be prepared by the applicant or a third-party contractor as long as the agency independently evaluates the information submitted and the agency is responsible for its accuracy (40 CFR § 1506.5).

Here, the Lead Agencies and their CEQA/NEPA experts relied on HydroFocus' superposition modeling report (Appendix E2); the Lead Agencies independently reviewed the report, and made an independent conclusion in the EIR/EIS about the proposed project's potential impacts on groundwater resources. It is irrelevant that Geoscience prepared the NMGWM^{2015}, or that the HWG reviewed and commented on the August 19, 2016, Draft NMGWM Technical Memo, because the analyses and the conclusions in the EIR/EIS reflect the independent judgment of the Lead Agencies.

8.2.6 Master Response 6: The Sustainable Groundwater Management Act

COMMENTERS ADDRESSED IN MASTER RESPONSE 6

City of Marina	Public Water Now
Marina Coast Water District	Margaret-Anne Coppernoll
Monterey County Water Resources Agency	Just Water

This Master Response addresses comments regarding the Sustainable Groundwater Management Act (SGMA) and about whether the proposed MPWSP would be consistent with the requirements of SGMA. Specifically, commenters requested information on how the MPWSP would avoid causing the undesirable results cited in SGMA, and discussed below. Commenters asked whether SGMA may place restrictions on pumping that would prevent implementation of the MPWSP. Commenters also requested the recent updated groundwater basin designation information in response to SGMA and requested information on which entity would serve as the Groundwater Sustainability Agency (GSA) for which subbasin.

This Master Response, therefore, provides supplemental information that expands on the discussion of groundwater basins and SGMA as presented in the Draft EIR/EIS. However, the information presented in this Master Response does not change the representation of SGMA in EIR/EIS Section 4.4.2.2, nor does it change the impact significance determinations, as explained in Section 8.2.6.3 of this Master Response.

8.2.6.1 Sustainable Groundwater Management Act

As summarized in EIR/EIS Section 4.4.2.2, SGMA became effective January 1, 2015, gives local agencies the authority and obligation to manage groundwater in a sustainable manner, and allows for limited State intervention when necessary to protect groundwater resources. SGMA establishes a definition of sustainable groundwater management, establishes a framework for local agencies to develop plans and implement strategies to sustainably manage groundwater resources, prioritizes basins (ranked as high- and medium-priority) with the greatest problems (i.e., the undesirable results as discussed below), and sets a 20-year timeline for implementation.

SGMA requires the creation of a GSA for medium- and high-priority groundwater basins in accordance with Water Code §10723 et seq. Each GSA is responsible to develop and implement a Groundwater Sustainability Plan (GSP) in accordance with Water Code §10727 et seq. Each GSP is expected to describe how users of groundwater within the basin would manage and use groundwater in a manner that can be sustainably maintained during the planning and implementation horizon without causing undesirable results. SGMA defines undesirable results as follows:

- Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply

- Significant and unreasonable reduction of groundwater storage
- Significant and unreasonable seawater intrusion
- Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies
- Significant and unreasonable land subsidence that substantially interferes with surface land uses
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

Section 8.2.6.3 of this Master Response refers to revisions that have been made in Final EIR/EIS Section 4.4.5.2 (Impacts 4.4-3 and 4.4-4), to document how and why the proposed MPWSP would not conflict with the SGMA-defined undesirable results.

8.2.6.2 Basins and Subbasins

Commenters requested the recent updated groundwater basin designation information in response to SGMA; this discussion is provided in response to those comments.

General Discussion

As discussed in EIR/EIS Section 4.4.1.2, the Salinas River Valley extends from the headwaters around the La Panza Range and Lake Nacimiento northwestward to the Pacific Ocean. The western coastline extent of the Valley extends from Moss Landing and Elkhorn Slough in the north to the City of Monterey in the south; the Valley is underlain by the Salinas Valley Groundwater Basin (SVGB). EIR/EIS Section 4.4.1.1 provides a discussion of groundwater terminology and concepts including basins, basin boundaries, and groundwater divides. The designation and delineation of groundwater basins is the responsibility of the California Department of Water Resources (DWR). The DWR has delineated several basins and subbasins within the Valley.

The designation of groundwater basins has evolved over time as new information has become available. As shown on EIR/EIS Figure 4.4-1, the basin boundaries designated by the DWR in 2012 (colored polygons) differ from the basin boundaries designated by DWR in 1946 (black outlines). Note that the names of the subbasins have also evolved over time. Local agencies such as the Monterey County Water Resources Agency (MCWRA) have used some different basin names and delineations based on their locally available information and understanding of basin boundaries. The proposed source water intake system, for example, would be located in the 180/400 Foot Aquifer Subbasin, the boundaries of which generally coincide with those of the SVGB Pressure Area (or Subbasin) traditionally recognized by MCWRA and DWR. The basin borders are described in EIR/EIS Section 4.4.1.2.

With the implementation of SGMA, DWR reviewed all of the basins statewide and assigned priorities for establishing GSAs and implementing GSPs. Entities desiring to become a GSA must submit an application to the DWR that justifies why they would qualify as a GSA, defines the basin or subbasin over which they propose to develop and implement a GSP, and proposes any basin boundary changes based on technical data that justifies boundary changes. The DWR then reviews the submittal and either accepts the proposed GSA or rejects the submittal, informing the stakeholders as to the reasons and directing them to resolve the issues. In some cases, multiple entities have submitted proposals to the DWR to become GSAs for the same area or for areas that overlap. The DWR may accept one GSA submittal and reject the other(s), or reject all submittals and direct the stakeholders to resolve their differences. In cases where no entity proposes to become the GSA, the DWR would assign an entity, typically the county, as the GSA. Information on the current status of the formation of GSAs and the boundaries of basins and subbasins is provided by the DWR on its SGMA website at http://water.ca.gov/groundwater/sgm/index.cfm. The website is continually updated as new information becomes available.

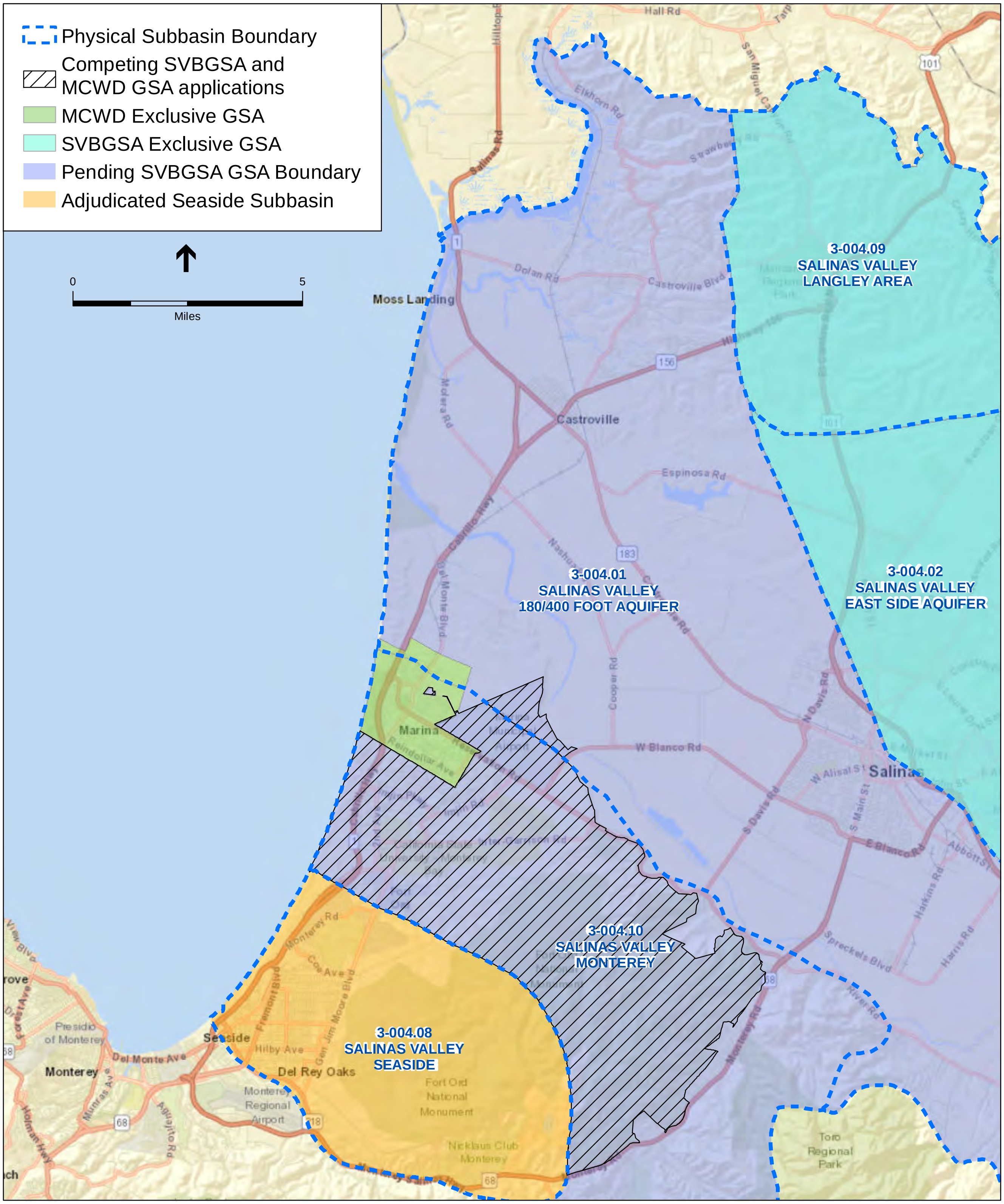
The subbasin assignments may be based on physical conditions (e.g., a groundwater divide within the overall basin), or administrative or jurisdictional boundaries (e.g., the service area of a water district whose boundaries may have no correlation to physical boundaries). It is important to note that the DWR, as authorized under SGMA, will require that each entire basin achieve sustainable groundwater conditions, regardless of how many GSAs or subbasins may exist within a given basin. Consequently, for basins that have multiple GSAs and/or subbasins, the GSAs will need to cooperate with each other to achieve sustainability on a basin-wide basis. As an ongoing process subsequent to the publication of the Draft EIR/EIS, the DWR has revised basin and subbasin boundaries and names, and will continue to do so as GSAs are formed, boundary disputes are resolved, and GSAs are accepted by the DWR.

Salinas Valley Groundwater Basin and Subbasins

Under SGMA, the DWR has identified the entire SVGB (Basin 3-004) as consisting of medium to high priority subbasins. In addition, the Salinas Valley 180/400 Foot Aquifer (Basin 3-004.01), a subbasin within the SVGB where the proposed seawater intake system would be located, is listed as a high priority, critically overdrafted subbasin. The subbasin boundaries and names, and the status of the formation of GSAs within the SVGB as of July 18, 2017, are shown on **Figure 8.2.6-1** and described below. Note that the DWR uses “basin” in its formal names of the subbasins even though these are specifically considered subbasins. Also note in the discussion below, the physical footprints of the basins, the jurisdictional footprint of water provider service areas, and the footprints in the applications for GSAs do not always precisely align; some GSA applications have overlap. Consequently, some of the GSA applications are still pending because the DWR will not approve overlapping GSAs.

Salinas Valley 180/400 Foot Aquifer Basin 3-004.01

The Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) is a joint powers authority consisting of a variety of local public agencies with water supply, water management, and land use responsibilities. The agencies include Monterey County; MCWRA; the cities of Salinas, Soledad, Gonzales, and King; the Castroville Community Services District (CCSD), and the Monterey Regional Water Pollution Control Agency (MRWPCA). The SVBGSA submitted GSA formation applications for all of the subbasins within the SVGB that are within Monterey County, including the Salinas Valley 180/400 Foot Aquifer Basin 3-004.01, where the source water intake system for the MPWSP would be located. However, the GSA formation decision by



Notes: SVBGSA = Salinas Valley Basin Groundwater Sustainability Agency MCWD = Marina Coast Water District

SOURCE: DWR, 2017

http://sgma.water.ca.gov/webgis/index.jsp?appid=gasmaster&rz=true

205335.01 Monterey Peninsula Water Supply Project

Figure 8.2.6-1
DWR SGMA Basin Map

the DWR for the Salinas Valley 180/400 Foot Aquifer Basin 3-004.01 is still pending because the Marina Coast Water District (MCWD) submitted an application for Salinas Valley Monterey Basin 3-004.10, discussed below, with a footprint that overlaps a southern portion of the Salinas Valley 180/400 Foot Aquifer Basin 3-004.01 that the SVBGSA also applied to manage. MCWD may have done this because the MCWD is the water service provider in the overlapping area.

Salinas Valley Monterey Basin 3-004.10

The Salinas Valley Monterey Basin lies in between the Salinas Valley 180/400 Foot Aquifer Basin 3-004.01 to the north (discussed above) and the Seaside Basin 3-004.08 to the south (discussed below). The formation of a GSA for this basin is pending because the SVBGSA and the MCWD each submitted overlapping and conflicting GSA formation requests for most of this basin.

The MCWD is a water agency that provides water supply for: the Central Marina service area, which consists of most of the City of Marina, and; the Ord Community service area, which includes some western portions of the former Ford Ord military base. The DWR has accepted the MCWD as the exclusive GSA within the Central Marina service area, most of which is in the northwestern portion of Salinas Valley Monterey Basin 3-004.10 but extends into a small portion of the Salinas Valley Monterey Basin 3-004.10 to the north, shown as the green area on Figure 8.2.6-1.

The SVBGSA has submitted a GSA formation request to the DWR for all of the Salinas Valley Monterey Basin 3-004.10, except for the above-described MCWD Central Marina service area. However, the MCWD has also submitted a proposal to the DWR to have the MCWD be the GSA for a larger portion of the Salinas Valley Monterey Basin 3-004.10 than merely the area within the MCWD Central Marina service area. The MCWD request includes its Ord Community service area, but also extends further east into areas not served by the MCWD. The DWR GSA formation decision on the diagonal shaded area on Figure 8.2.6-1 is pending.

Seaside Basin 3-004.08

The Seaside Basin 3-004.08, where the proposed ASR wells would be installed and operated, was adjudicated in 2006 in response to overdraft of the subbasin and conflict between groundwater users (*California American Water v. City of Seaside, et al*. (Case No. M66343, California Superior Court, Monterey County). The adjudication defined the safe yield of the subbasin and allocated specific volumes of groundwater pumpage to each of the parties to the adjudication that limits the total volume of groundwater extraction to the safe yield. The implementation of the adjudication results in managing the subbasin's groundwater resources in a sustainable manner similar to the requirements of SGMA. Consequently, the Seaside Basin 3-004.08 will not have a GSA formed and will not be required to prepare and implement a GSP under SGMA.

MCWD Proposed Designation of "Marina Subarea"

MCWD, in its comment letter on the Draft EIR/EIS (see Section 8.5.2), refers to a "Marina Subarea" that includes its service area and the combined area of the Salinas Valley 180/400 Foot Aquifer Basin 3-004.01 south of the Salinas River and the northwest portion of the Salinas Valley

Monterey Basin 3-004.10. MCWD states this area would include the area affected by the proposed slant well pumping on the CEMEX property. MCWD acknowledges that this is not a DWR-recognized designation; MCWD has not formally requested such a designation from the DWR but claims, without providing documentation or published references to support the claim, that the hydrogeological conditions justify such a designation for “discussion purposes.” However, the hydrogeological conditions as described in Section 4.4, Groundwater Resources, do not justify this designation because there are no known boundary conditions that would justify further subdividing the subbasin. Note that the analysis of impacts of the project are not dependent on which entity manages any particular area nor what the basins are named.

Anticipated Radius of Influence Relative to Subbasins

Based on the modeled maximum radius of influence of groundwater drawdown that could be caused by the operation of the source water intake system, as shown on EIR/EIS Figure 4.4-15 and discussed in Section 8.2.6.3 below, the majority of the affected area would be within the Salinas Valley 180/400 Foot Aquifer Basin 3-004.01. The southern boundary of this basin is a groundwater divide with the Salinas Valley Monterey Basin 3-004.10. As explained in EIR/EIS Section 4.4.1.2, the precise location of a groundwater divide changes over time in response to changes in climate, seasonal rainfall, and pumping of nearby extraction wells. Consequently, the location of the groundwater divide at any given time may not precisely align with the basin boundary as delineated by the DWR. Depending on the actual extent of the radius of influence of the proposed project pumping, the affected area may extend a short distance into the northern portion of the Salinas Valley Monterey Basin 3-004.10 and may extend into the MCWD GSA area. However, regardless of the precise extent of the radius of influence, the impact analyses concluded that there would be no adverse effects on users of groundwater in the subbasins, including in the area of MCWD’s GSA, as discussed in Impacts 4.4-3 and 4.4-4 in the EIR/EIS.

8.2.6.3 Project Consistency with SGMA

As noted above, SGMA states that groundwater basins must be managed without resulting in the listed undesirable results. A summary of these analyses to address each undesirable result identified in SGMA has been added to Final EIR/EIS Section 4.4 in Impacts 4.4-3 (groundwater supplies and recharge) and 4.4-4 (groundwater quality) under the subheadings “Consistency with Regulatory Requirements.” Based on those discussions, the project would not result in any of the six undesirable results cited in SGMA; therefore, MPWSP would be consistent with SGMA, and SGMA would not restrict the MPWSP’s ability to pump groundwater as proposed.

Because adjudicated basins are exempt from SGMA requirements, as noted in Water Code §10720.8, impacts on groundwater resources in the Seaside Basin from operation of the proposed ASR wells are not discussed.

8.2.7 Master Response 7: The Deeper Aquifers of the Salinas Valley Groundwater Basin

COMMENTERS ADDRESSED IN MASTER RESPONSE 7

City of Marina	Just Water
Marina Coast Water District	Hebard Olsen
Monterey Regional Water Pollution Control Agency	Form Letter 2
Ag Land Trust	Public Meeting Verbal Comments
Fort Ord Rec Users	

Several comments on the Draft EIR/EIS suggested that Section 4.4, Groundwater Resources, did not adequately describe or address potential impacts on the "900-Foot (Deep)" Aquifer (see discussion of aquifer name below) and that the lack of analysis represented a flaw in the environmental evaluation of groundwater impacts. In addition, commenters asserted that the computer modeling used to evaluate the groundwater response to the proposed project did not analyze the effects on this aquifer.

Draft EIR/EIS Section 4.4.1.2 described the local and regional hydrogeology; the 400-Foot and 900-Foot Aquifers were presented on Draft EIR/EIS page 4.4-11. This Master Response addresses the inclusion of supplemental information in the Final EIR/EIS that clarifies the deeper aquifer system of the Salinas Valley Groundwater Basin (SVGB).

8.2.7.1 The Deeper Aquifers – Terms, Characteristics, and Production

In response to comments that suggested Draft EIR/EIS Section 4.4 did not adequately describe the "900-Foot (Deep)" Aquifer, this section summarizes the supplemental discussion that has been added to the Final EIR/EIS, which describes the hydrogeology of the deep aquifer zone in the SVGB, the terms used to describe it, and the current use of the aquifer for groundwater production.

Draft EIR/EIS Section 4.4.1.2 described the Pressure Area, a subbasin of the SVGB that has traditionally been recognized by the Monterey County Water Resources Agency (MCWRA) and the California Department of Water Resources (DWR). The Pressure Area is composed of aquifers and aquitards within distinct geologic formations and the characteristics of the aquifers and aquitards were described in the Draft EIR/EIS on pages 4.4-4 through 4.4-12. The Draft EIR/EIS included a discussion of the 900-Foot Aquifer in the subsection titled "400-Foot and 900-Foot Aquifers." EIR/EIS Figure 4.4-2 provides a conceptual model of the coastal aquifers, including the 900-Foot Aquifer. Because the groundwater modeling did not detect a drawdown in the 900-Foot Aquifer (as described in Section 8.2.7.2, below), the description of the 900-Foot Aquifer was minimized in the Draft EIR/EIS consistent with CEQA Guidelines Section 15125, which states, "The description of the environmental setting shall be no longer than is necessary to an understanding of the significant effects of the proposed project and its alternatives."

Increasing seawater intrusion over the past 30 years forced groundwater users in the Marina/Castroville area to drill and develop wells below the 400-Foot Aquifer. Starting in 1976, groundwater users, including the Marina Coast Water District (MCWD), had to drill into the deeper aquifers to find a fresh groundwater supply. However, after implementation of the Castroville Seawater Intrusion Project (CSIP) in 1998, many of the groundwater users in the Castroville area who began receiving recycled water ceased using their deeper aquifer wells.

The terms "900-Foot Aquifer," "1,500-Foot Aquifer," and "Deep Zone" have been used to refer to the deeper aquifer units in the SVGB. However, these are vague definitions because the water-bearing sediments are not necessarily at these arbitrary depths. For the purposes of this EIR/EIS, and to be consistent with current findings regarding the distribution of water-bearing zones below the 400-Foot Aquifer, the term "deeper aquifers" is used to describe these units.

For informational purposes, supplemental text describing the deeper aquifers is presented in Final EIR/EIS Section 4.4.1.2 and, for the reasons just explained, the following EIR/EIS subsections have been renamed and reorganized as follows:

> 400-Foot ~~900-Foot~~ Aquifer; and,
>
> Deeper Aquifers.

8.2.7.2 Computer Model Response in the Deeper Aquifer

In response to comments that suggested the Draft EIR/EIS did not adequately address potential impacts on the deeper aquifers and that the computer modeling used to evaluate the groundwater response to the proposed project did not analyze the effects on such aquifers, this section describes how the North Marina Groundwater Model, v. 2016 (NMGWM^{2016}) interpreted the effects of the proposed project on the deep aquifers and introduces supplemental text included in the Final EIR/EIS that presents its results.

The NMGWM^{2016} is a detailed hydrologic computer model covering approximately 149 square miles and was a primary analytical tool used to evaluate impacts of the proposed project and alternatives on groundwater resources. See EIR/EIS Appendix E2. EIR/EIS Section 4.4.4.2 and Appendix E2 describe the components, model layers, and applications of the NMGWM^{2016} and EIR/EIS Table 4.4-8 presents the correlation of the geologic units, aquifers, and model layers. As shown in Table 4.4-8, and discussed in detail in Appendix E2, the deeper aquifers were represented in the NMGWM^{2016} as Model Layer 8.

As discussed in the EIR/EIS, the NMGWM^{2016} did not indicate drawdown in Model Layer 8 from the proposed MPWSP pumping at CEMEX for either of the CEMEX site options (the proposed project and Alternative 5a with 24.1 mgd and 15.5 mgd pumping, respectively) or either of the Potrero Road options (Alternative 1 and 5b with 24.1 mgd and 15.5 mgd pumping, respectively); see Appendix E2, Figures 5.3a-b, 5.4a-b, 5.9a-b and 5.10a-b. The lack of detected response by the NMGWM^{2016} in the deeper aquifers represented by Model Layer 8 prompted analysts to de-emphasize the deeper aquifers in the groundwater impacts analysis presented in the Draft EIR/EIS. Nonetheless, for informational purposes, supplemental text has been added to Final EIR/EIS Section 4.4.5.2, Impact 4.4-3, under the heading "Results of Impact Analysis – Proposed Project on Nearby Production Wells," to discuss aquifer response to the project in the deeper aquifers. Such additional clarifying text does not change the conclusions in the EIR/EIS.

8.2.8 Master Response 8: Project Source Water and Seawater Intrusion

COMMENTERS ADDRESSED IN MASTER RESPONSE 8

Fort Ord Base Realignment and Closure Field Office	Charles Cech
City of Marina	Bob Coble
Marina Coast Water District	David Gorman
Monterey County Water Resources Agency	Juli Hofmann
Monterey Peninsula Regional Water Authority	Thomas Moore
Citizens for Just Water	Hebard Olsen
Fort Ord Rec Users	Larry Parrish
Just Water	Nancy Selfridge
Salinas Valley Water Coalition and Monterey County Farm Bureau	Jan Shriner
Water Ratepayers Association of the Monterey Peninsula	Form Letter 1
David Beech	Form Letter 2
Kathy Biala	Public Meeting Verbal Comments
David Brown	

This Master Response addresses comments received on the Draft EIR/EIS regarding the origin of the slant well source water and the current seawater intrusion conditions in the Salinas Valley Groundwater Basin (SVGB), underlying the MPWSP area, including portions of the City of Marina. Several commenters maintain that the proposed project would draw fresh groundwater that could otherwise be used for potable groundwater supply from inland portions of the SVGB. Other commenters disagreed with the determination in the EIR/EIS that the groundwater underlying the project area in the Dune Sands and 180-Foot Equivalent (180-FTE) Aquifer is degraded by legacy and ongoing seawater intrusion and thus is not available for potable uses. This Master Response presents hydrogeologic and groundwater chemistry information to supplement and clarify the analyses of the groundwater resources impacts presented in EIR/EIS Section 4.4, Groundwater Resources, but does not change the impact conclusions. Where noted, EIR/EIS Section 4.4, Groundwater Resources, has been updated and refined based on information presented in this Master Response. Regarding the deeper aquifers of the SVGB (i.e., the 900-Foot Aquifer referred to in the Draft EIR/EIS and in comments), see Master Response 7.

8.2.8.1 Cone of Depression and Capture Zone

This subsection provides a brief summary of the difference between drawdown, the cone of depression, and the capture zone; this is a fundamental concept necessary to understand the response and movement of groundwater drawn to the proposed slant wells. These concepts are discussed in EIR/EIS Section 4.4.4, Approach to Analyses, and summarized and clarified in the sections below in response to comments about these concepts.

Drawdown and the Cone of Depression

Drawdown is the observed change in the aquifer water level caused by the extraction of groundwater and is calculated by subtracting the water level measured under pumping conditions from the water level measured without pumping, also referred to as the static water level. The static water level represents baseline conditions. The cone of depression, as described and shown graphically in EIR/EIS Section 4.4.4.2, Groundwater Modeling, is the zone where the drawdown caused by groundwater pumping is observed. Section 4.4.4.2 describes groundwater model terminology. The definition of the cone of depression (see Draft EIR/EIS page 4.4-44) has been revised as follows:

> As water is extracted from a well, it is pulled into the screened section of the slant wells and removed from the subsurface water-bearing unit. Groundwater elevations would decrease around the slant wells in a ~~radial~~distorted ovate fashion ~~resulting in a~~due to the ocean recharge boundary such that the cone of ~~drawdown~~ depression would not be centered at the slant wells. This cone would be the steepest and deepest closest to the well screen and rapidly become flatter and shallower away from the slant wells.

Draft EIR/EIS Figure 4.4-13 depicted this modelled cone of depression, represented by contour lines of equal drawdown, in the 180-Foot Aquifer. This figure has been renumbered 4.4-13a in the Final EIR/EIS, and Figure 4.4-13b has been added to Final EIR/EIS Section 4.4 to show the modelled cone of depression in the Dune Sand Aquifer.

The 2016 version of the North Marina Groundwater Model (NMGWM^{2016}) projects that this drawdown would occur as a result of a slant well extraction rate of 24.1 million gallons per day (mgd). This is considered “worst-case” because it represents the cone of depression in the Dune Sand Aquifer under 2012 sea level conditions and 0 percent return water. Final EIR/EIS Figure 4.4-13a shows the cone of depression for the 180-FTE Aquifer as projected by the NMGWM^{2016}. This is also considered the worst-case drawdown condition under the proposed 24.1 mgd pumping scenario. The cones of depression for both the Dune Sand Aquifer and 180-FTE Aquifer are similar: steep contours just offshore along the western extent and flatter to the east, forming a cone of depression that extends inland with drawdown amounts ranging between 1 to 5 feet. As discussed in EIR/EIS Section 4.4.4.2, Groundwater Modeling, the area or radius of pumping influence demarks the extent that water levels would decrease (or be drawn down) by the extraction of groundwater at the slant wells. For purposes of the impact analysis in the EIR/EIS, the extent of the radius of influence was marked by the one-foot drawdown contour of the cone of depression.

Capture Zone

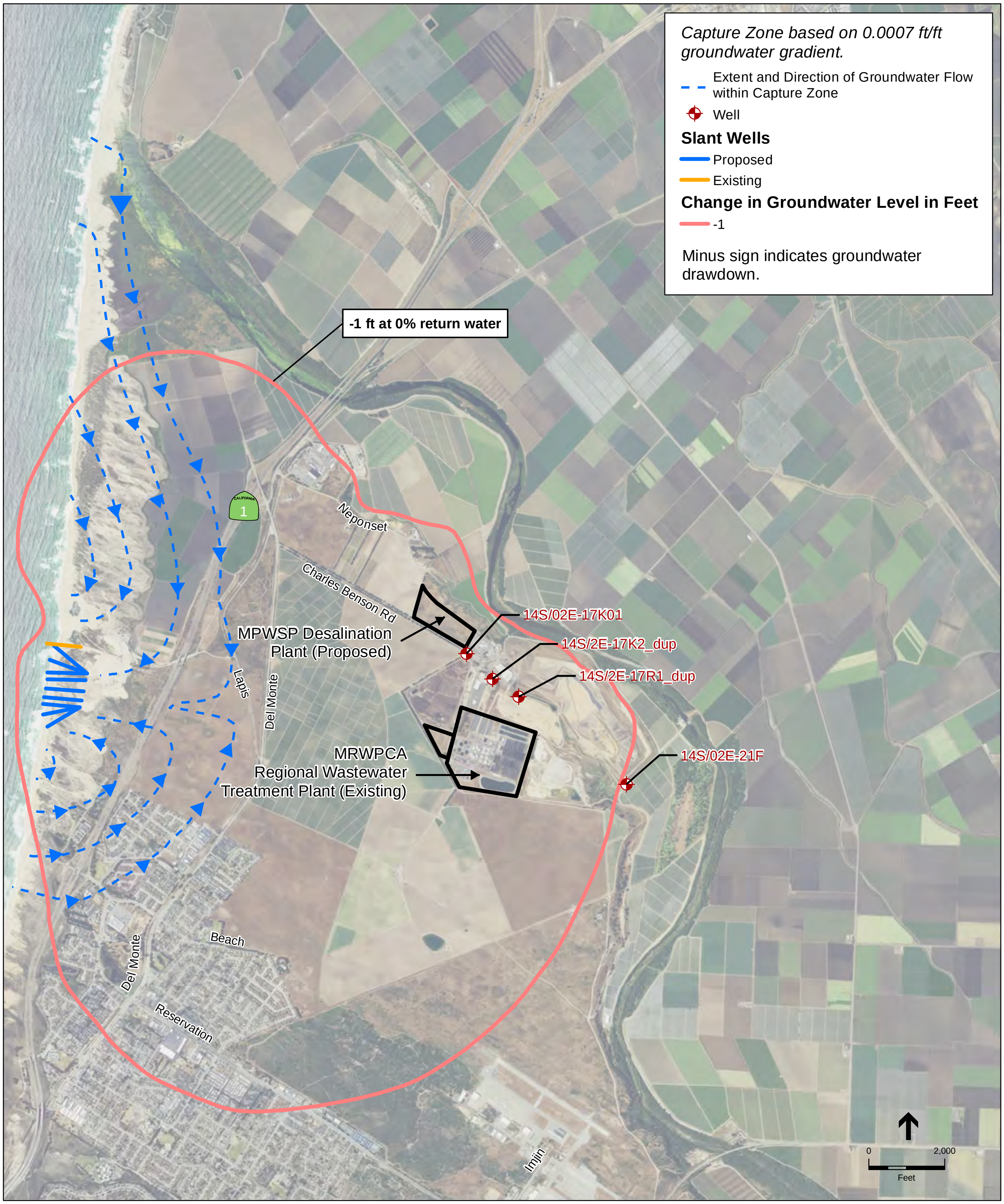
A capture zone refers to the three-dimensional volume of aquifer that contributes the water extracted by the wells. It is a function of drawdown caused by the pumping rate and the gradient (direction and slope) of the groundwater flow. When the pumps in the slant wells are turned on, the wells would initially extract the water that is held in the surrounding sediments (ambient groundwater). As pumping continues, the modeling indicates that the wells would extract increasing proportions of infiltrating recharge from the ocean. The ocean recharge would gradually replace the ambient groundwater within the capture zone, and move within the capture zone toward the well, but would not advance beyond the capture zone, as shown in **Figure 8.2.8-1** (Dune Sand) and **Figure 8.2.8-2** (180/180-FTE Aquifer). In the map view provided in these figures, the capture zone is a 2-dimensional surface that delineates the underlying aquifer volume where ocean water replaces ambient groundwater and ultimately becomes the primary source water to the slant wells. Figures 8.2.8-1 and Figure 8.2.8-2 show the map view of the capture zones for the proposed 24.1 mgd pumping scenario at CEMEX under a regional gradient estimated from groundwater measurements, which were developed as discussed below. The term "capture zone" has been clarified in Final EIR/EIS Section 4.4.4.2. To summarize the key differences in terms, the cone of depression is the area in which drawdown of groundwater would occur. However, the water drawn into the project supply wells would not originate from the entirety of the cone of depression, and would be drawn from the capture zone only.

Particle Tracking to Simulate Capture Zones

As described in EIR/EIS Section 4.4.4.2 and Appendix E2, groundwater capture zone boundaries were delineated using NMGWM^{2016} steady-state flow condition[1] results and particle tracking using the MODFLOW computer code post-processer MODPATH. The MODFLOW computer code post-processer MODPATH was employed to simulate groundwater flow paths. MODPATH uses the output from MODFLOW to simulate paths for "particles" of water moving through the modeled groundwater system. In addition to delineating particle paths, MODPATH computes the time-of-travel for the simulated particles to reach their ending locations. Backward tracking shows the movement of groundwater to former points of recharge (for example, the movement of ocean water recharge to a pumping well), and forward tracking shows the movement of groundwater to future points of discharge (for example, the continued inland movement of the interface between intruded saltwater and native groundwater).

NMGWM^{2016} delineated slant well ocean water capture zones under steady-state flow conditions assuming full time operation 24 hours a day, 7 days a week. Forward tracking particles placed in every cell along the coast in model layers representing the Dune Sand Aquifer and the 180-Foot/180 FTE Aquifer displayed path lines that delineate groundwater flow paths to the extraction wells. Backward tracking particles placed evenly within pumping cells provided path lines that delineate recharge that either originates at the ocean bottom or as groundwater beneath the bay bottom. In both scenarios, MODPATH demonstrated that groundwater extracted by the wells would be recharged by ocean water. EIR/EIS Appendix E2 provides additional details on the particle tracking and simulation of capture zone.

[1] Steady state refers to the condition where the magnitude and direction of groundwater flow in a groundwater model domain remains constant; the same amount of water flows into the system as flows out.

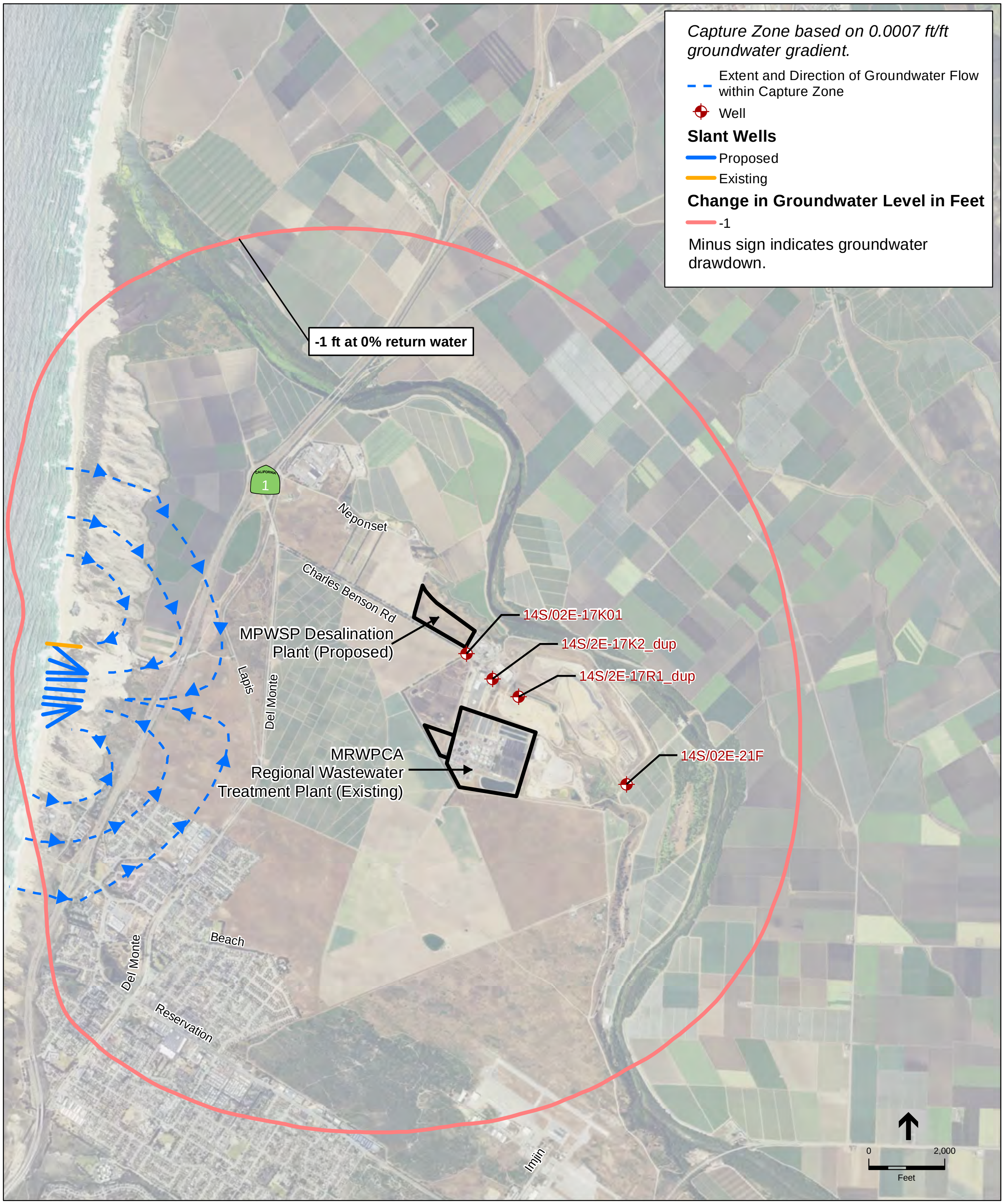


SOURCE:HydroFocus, 2016

205335.01 Monterey Peninsula Water Supply Project

Figure 8.2.8-1

Extent of Capture Zone and -1-Foot Contour of Cone of Depression
Dune Sand Aquifer After 63 years
0% Return Water



SOURCE:HydroFocus, 2016

205335.01 Monterey Peninsula Water Supply Project

Figure 8.2.8-2

Extent of Capture Zone and -1-Foot Contour of Cone of Depression
180-Foot Aquifer After 63 Years
0% Return Water

Consideration of Groundwater (Hydraulic) Gradients and Capture Zones

As explained in EIR/EIS Section 4.4.4.1, Subsurface Investigations, groundwater under unconfined conditions flows from areas of high groundwater elevation to areas of low groundwater elevation, and groundwater under confined conditions flows from areas of a higher head[2] to areas of lower head. The change in the head over distance is called the hydraulic gradient, and the groundwater flow direction is that which yields a maximum rate of decrease in head (Fetter, 1994). Hydraulic gradients, referred to hereafter as groundwater gradients, are typically shown using contour lines on 2-dimensional groundwater maps.[3] Figures 4.4-6, 4.4-7, and 4.4-8 in EIR/EIS Section 4.4.1.3 show regional groundwater gradients in the SVGB and the MPWSP area. As discussed in EIR/EIS Section 4.4.1.3, the groundwater in both the Dune Sand Aquifer and 180/180-FTE Aquifer flows inland beneath the project area (i.e., from the Monterey Bay east, toward the Salinas Valley) with measured gradients ranging from a minimum of 0.0007 to an average local gradient of 0.0011 (HWG, 2017). The inland gradient is a direct response to the extensive overpumping of the groundwater basin that has resulted in a groundwater depression located on the northeast side of the City of Salinas; see EIR/EIS Section 4.4.1.3.

As discussed in EIR/EIS Section 4.4.4.2 and in Appendix E2, the $NMGWM^{2016}$ was converted to superposition and, as such, initial water levels are considered zero throughout the model area. Consequently, the model does not account for regional background groundwater gradients. However, these regional groundwater gradients significantly influence groundwater-flow paths from the ocean to the proposed project slant wells, and therefore are important to consider when calculating capture zone boundaries. Therefore, to incorporate the regional groundwater gradient across the CEMEX site, the gradient was calculated using the fall 2015 measured background gradient and then the approximate gradient was reproduced in the $NMGWM^{2016}$. The $NMGWM^{2016}$ simulated the capture zones using the average groundwater gradients of 0.0004, 0.0007, and 0.0011, which are based on averages of measured gradients throughout the entire model domain.[4] However, the hydraulic gradients used in the modeling underestimate the local hydraulic gradients in the project area, since the steepest gradient used in the analysis (0.0011) is more representative of the average local gradient and the 0.0007 gradient better represents the minimum gradient (HWG, 2017). As shown in EIR/EIS Appendix E2, Figure 5.6, the extent of the capture zone is influenced by the groundwater gradient: the steeper the gradient, the smaller the capture zone. So, the smaller of the three capture zones (based on the gradient of 0.0011) projected by the $NMGWM^{2016}$ would likely be more representative of actual project pumping conditions. Capture zones projected for the 15.5 mgd slant well pumping scenario would be smaller than those estimated for the 24.1 mgd scenario because less source water would be drawn to the slant wells. A graphic comparing the extent of capture zones under the 15.5 mgd and 24.1 mgd scenarios is shown in Appendix E2,

2 Head is the fluid potential for flow through an aquifer and is observed by the height of water in a groundwater well.
3 Groundwater gradients are expressed as the ratio of vertical change in head to lateral distance. For example, if groundwater levels decrease 5 feet over a horizontal distance of 10,000 feet, the gradient is expressed as 0.0005 feet per foot or ft/ft. Because it is a ratio, the units are often not included.
4 While the groundwater gradient of 0.0004 was considered for the $NMGWM^{2016}$ in determining the extent of the capture zones, it was determined that 0.0007 was more representative of the minimum gradient based on local conditions.

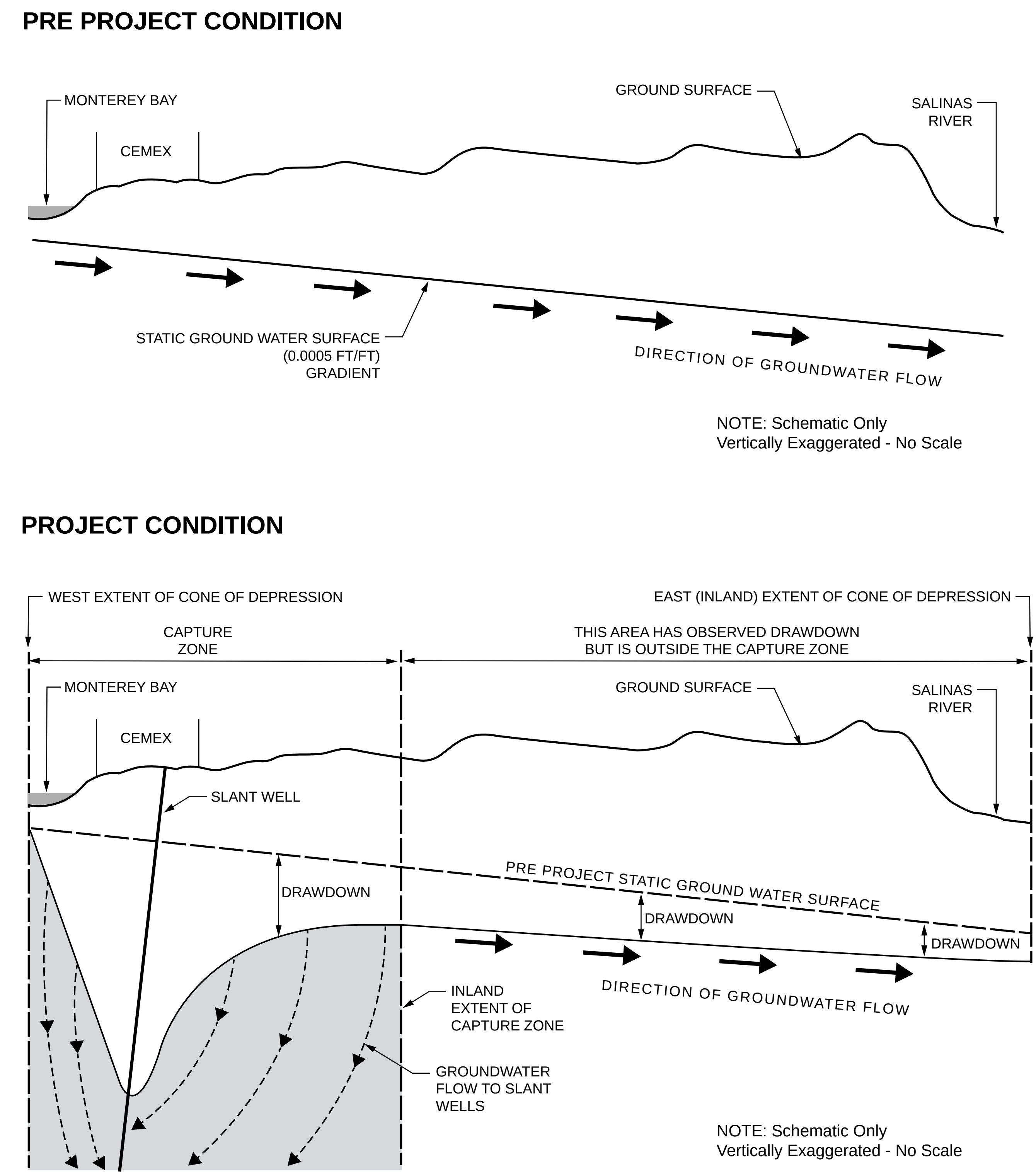
Figure 5.6. EIR/EIS Appendix E2 and Appendix E3 provide additional details on particle tracking, the development of the capture zones, and the process of simulating groundwater gradients.

Relationship between Cone of Depression and Capture Zone

The cone of depression that forms from groundwater pumping and the capture zone that provides source water to the slant wells are not the same. **Figure 8.2.8-3** is a cross-sectional schematic that illustrates the relationship between the cone of depression (shown in map view on Figure 4.4-13a) and capture zone (shown in map view on Figure 8.2.8-2) under a "Pre-Project" and "Project" condition. Under the Pre-Project Condition (shown at the top of Figure 8.2.8-3), the groundwater is flowing inland from the coast at a gradient of 0.0005.[5] The Pre-Project Condition represents the groundwater condition without accounting for current well pumping or groundwater recharge. The "Project Condition" represents how the groundwater would respond to project slant well pumping in the 180/180-FTE Aquifer, assuming 2012 sea level and no return water (both conservative assumptions), and is correlative to the map view of the cone of depression shown on EIR/EIS Figure 4.4-13a. It should be noted that the vertical scale is considerably exaggerated in the "Project Condition" to clearly illustrate the relationship between the cone of depression and the capture zone; for reference, the NMGWM[2016] projected that the maximum drawdown amount under this pumping scenario was about 29 feet at the slant wells. As illustrated in Figure 8.2.8-2, when the slant wells are pumping, water within the capture zone would be drawn into the wells from the surrounding sediments. The groundwater responds by creating a cone of depression, which would be most pronounced near the slant wells. Notice that the drawdown caused by slant well pumping decreases as the cone of depression extends eastward. The inland extent of the capture zone is shown by a vertical dashed line. This point could be described as a groundwater gradient divide: groundwater west of the divide is drawn into the capture zone by the slant wells and thus flows west, while the groundwater to the east of the boundary continues to flow inland unimpeded due to the regional gradient. The fundamental difference between the capture zone, which is supplying the water to the slant wells, and the cone of depression, which forms in response to pumping, is that the groundwater entering the slant wells originates only from within the capture zone, while the regional gradient controls the groundwater flow beyond the capture zone.

While the wells are expected to be operated 24 hours/per day every day as described in EIR/EIS Section 3.2.1.1, EIR/EIS Appendix E2 Section 5.4 examined the effects of ceasing pumping on groundwater basin recovery, in order to consider what would happen when the wells are turned off permanently. Temporary, short-term shut down for maintenance are not considered because at least some wells would be operating during servicing and repair. The effects on groundwater levels and water quality during a temporary shut-down would occur gradually and not be immediately obvious. Figure 5.5 in Appendix E2 shows the model-calculated post project recovery from drawdown due solely to 63 years of proposed project slant well pumping. Hydrographs at various locations show that drawdown would decrease and water levels would return to pre-pumped

5 The gradient of 0.0005 was measured using groundwater contours generated from groundwater measurements in the 180/180-FTE aquifer collected in fall 2015 (Geoscience, 2017) and is used in Figure 8.2.8-3 as a representative gradient for the purposes of demonstration.



SOURCE: ESA

Monterey Peninsula Water Supply Project . 205335.01

Figure 8.2.8-3
Schematic Showing Relationship Between Cone of Depression and Capture Zone

conditions within several years for all but two wells. The modeled water level recovery for monitoring wells MW-5S and MW-7S would be completed within about 20 years due to the depth and location of the wells. Considering that the recovery for surrounding wells is on the order of a few years, the longer recovery for just these two wells is the effect of the relatively low hydraulic conductivity associated with the geologic conditions of Model Layer 2 (Dune Sand Aquifer) in those areas of the model.

8.2.8.2 Groundwater Quality within the Capture Zone

This subsection clarifies the quality of the existing groundwater within the capture zone, defined above, in response to comments expressing disagreement with the finding in the EIR/EIS that the groundwater underlying the project area in the Dune Sands and 180-FTE Aquifer is degraded by legacy and ongoing seawater intrusion, and claiming that water in this location is fresher than described in the EIR/EIS. As discussed in EIR/EIS Section 4.4.1.4 and Impact 4.4-3, the proposed MPWSP pumping would draw source water from a capture zone in the Dune Sand and 180-FTE Aquifers. The groundwater in this area is degraded by seawater and therefore, unusable for potable or irrigation water supply due to its elevated total dissolved solids (TDS) and chloride concentrations. The chemistry of groundwater in this area has been analyzed by the ongoing monitoring program implemented by CalAm and peer-reviewed by the Hydrogeologic Working Group (HWG), as discussed in EIR/EIS Section 4.4.4.1, and separately by the hydrologists and hydrogeologist on the EIR/EIS team. In conjunction with the installation and pumping of the test slant well (see EIR/EIS Section 4.4.4.1 and Master Response 11, CalAm Test Slant Well), CalAm installed nine clustered monitoring wells between December 2014 and August 2015 to monitor groundwater levels and collect representative groundwater quality data from the Dune Sand Aquifer, the 180-FTE Aquifer and the 400-Foot Aquifer. Each monitoring well cluster consists of three individual, separately constructed monitoring wells completed at different depth intervals identified as S (shallow), M (middle), D (deep), where shallow wells are primarily screened in the Dune Sand Aquifer, the middle wells are screened in the 180-FTE Aquifer or 180-Foot Aquifer, and the deep wells are primarily screened in the 400-Foot Aquifer (HWG, 2017). CalAm has conducted regular water level and water quality monitoring and has, since February 2015, produced and posted on its website weekly and monthly test slant well pumping reports. As shown on Figures 4.4-13a and 4.4-13b, MW-1 and MW-3 are located within or proximate to the capture zone and best represent the conditions and quality of slant well source water.

The analysis presented in EIR/EIS Impact 4.4-3 concluded that groundwater extracted by the slant wells would be brackish and originate in the capture zone, which occupies a localized area just inland from the coast underlying the CEMEX property (illustrated by Figures 8.2.8-1 and 8.2.8-2, included in this master response to clarify the extent and direction of groundwater flow within the capture zone). There is no active groundwater pumping by other users from the Dune Sand and/or 180-FTE Aquifers within the capture zone, primarily because of the degraded water quality. **Table 8.2.8-1** summarizes the TDS and chloride concentrations in the CalAm monitoring wells collected by pumping after development of the monitoring wells and prior to the first phase of test slant well pumping (thus representing baseline conditions) and references the California Secondary Maximum Contaminant Level (MCL) (Cal. Code Regs., tit. 22, § 64449) for TDS and chloride, which is 500 mg/L and the 250 mg/L, respectively. The groundwater quality data provided in Table 8.2.8-1 below supports the conclusion that the water in the Dune Sand Aquifer and 180-FTE aquifer that is available to the slant wells is brackish to near seawater and does not meet California drinking water standards. In addition to the groundwater sample data provided in Table 8.2.8-1, Figures 3-1 and 3-2 in the Baseline Water and Total Dissolved Solids Levels Technical Memorandum illustrates that data logger-collected TDS concentrations in MW-1 and MW-3 consistently recorded between 22,000 mg/L and 33,000 mg/L for the entire groundwater quality baseline monitoring period of 34 days (Geoscience, 2015, see Appendix E3). Long term monitoring of the slant well water quality and the MPWSP monitoring wells near CEMEX site show that the TDS in the groundwater has remained elevated since monitoring began in 2015 (Geoscience, 2018). Brackish water is defined as having a TDS concentration greater than freshwater, but not as much as seawater, which is typically about 33,500 mg/L (see Master Response 2, Source Water Components and Definitions). Therefore, for the purposes of the groundwater resources analysis in the EIR/EIS, brackish water is considered to have a TDS concentration ranging between 500 mg/L to 33,500 mg/L. Concentrations of TDS in surface and groundwater that exceed 3,000 mg/L are considered by the SWRCB (Resolution No. 88-63, Adoption of Policy Entitled “Sources of Drinking Water”) as an exception to its resolution that, “[a]ll surface and groundwaters of the state are considered to be suitable, or potentially suitable, for municipal or domestic water supply and should be so designated by the Regional Boards.” The groundwater in the capture zone of the MPWSP slant wells exceeds 3,000 mg/L TDS.

TABLE 8.2.8-1
TOTAL DISSOLVED SOLIDS CONCENTRATIONS IN MPWSP MONITORING WELLS LOCATED WITHIN THE SLANT WELL CAPTURE ZONE

Well Number	Sample Date	Aquifer	Total Dissolved Solids (TDS) (mg/L)	Chloride (mg/L)
			California Drinking Water Standard: 500 mg/L[a]	California Drinking Water Standard: 250 mg/L[a]
MW-1S	2/13/15	Dune Sand	26,600	14,504
MW-1M	2/14/15	180-FTE	30,900	16,037
MW-3S	2/25/15	Dune Sand	23,400	11,680
MW-3M	2/24/15	180-FTE	28,500	14,686
MW-4S	3/7/15	Dune Sand	11,900	5,497
MW-4M	3/6/15	180 FTE	17,900	9,751

NOTES:
[a] California Secondary Maximum Contaminant Level (Cal. Code Regs., tit. 22, § 64449)

SOURCE: Geoscience, 2015

Table 8.2.8-1 shows that chloride concentrations in the wells within the capture zone exceed the MCL for drinking water standard of 250 mg/L, indicating that this groundwater would be intolerable as a drinking water source unless it was desalinated. These chloride levels are also unsuitable for agricultural irrigation. With chloride concentrations over 355 mg/L, the groundwater does not meet the RWQCB Central Coast Basin Plan water quality guidelines for irrigation water. The irrigation water guidelines indicate that chloride concentrations exceeding 355 mg/L chloride could potentially result in severe effects for crops and soils (SWRCB, 2017).

8.2.8.3 Ocean Water Percentage

This subsection describes the estimated percentage of seawater in the slant well source water. The change in ocean water percentage (OWP) describes the projected water quality over time in the MPWSP slant well feedwater. An estimate of the OWP that would contribute to the slant well source water was calculated using an analytical methodology and numerical modeling (HWG, 2017) and the approach was peer reviewed by the EIR/EIS team. The OWP as it relates to return water is addressed in Master Response 4, The Agency Act and Return Water, and the methodology of the OWP calculation is provided in Appendix E3. The analytical methodology used an equation to calculate OWP based on water and salinity budgets for the capture zone volume of the proposed slant wells and the numerical modeling method utilized the CEMEX and $NMGWM^{2016}$ groundwater models. The CEMEX and $NMGWM^{2016}$ models provided better resolution than the analytical method in evaluating the early time interval after slant well pumping begins. Numerical modeling predicted a higher source water OWP during the early time period than the analytical method, but the long-term pumping results are consistent between the analytical and numerical predictions. Results of the analytical/numerical methods indicate that the OWP would range from 88 to 92 percent the first year, increase to 93-97 percent after two years, and exceed 94 percent over the long term. This is consistent with two years of field data from the test slant well that indicated OWP ranging from 92 to 95 percent in the first year and 90 to 92 percent in year 2.[6] These methodologies and results are discussed in Master Response 4 and are described in detail in Appendix E3.

8.2.8.4 Summary of Impact Conclusions

A clear understanding of the difference between the cone of depression and capture zone is paramount to understanding project impacts on groundwater resources presented in EIR/EIS Section 4.4.5. This section reviews the impact conclusions in the EIR/EIS, in response to comments disagreeing with the conclusions presented in Section 4.4.5, and provides further clarification based on the information discussed in the sections above.

Groundwater Supply

EIR/EIS Impact 4.4-3 concludes that the proposed project would not deplete groundwater supplies that would otherwise be available to users in the SVGB. This conclusion was reached because the proposed project would extract groundwater from a localized coastal-adjacent capture zone, which has been verified by water quality testing to contain groundwater with elevated concentration of TDS and chloride from decades of legacy seawater intrusion. The slant wells would initially extract the ambient brackish groundwater and, over time, the source water supplied by capture zone would be replaced by seawater. Given the proposed location of the slant wells, the projected configuration of the capture zone, and the inland regional gradient, groundwater originating from inland regions of the basin would not be drawn into the slant wells. This is because, to reiterate, groundwater would be drawn into the slant wells within the boundaries of a localized capture zone, which would be within the larger cone of depression.

6 The decrease in salinity in Year 2 can be explained by the infiltration of fresh rainwater during an above normal rainfall year and percolation of fresh water during sand washing operations at CEMEX.

While the cone of depression is an expression of the drawdown effects of slant well pumping, it does not demark the area that would contribute to the slant well source water supply.

Groundwater Levels in Neighboring Wells

EIR/EIS Impact 4.4-3 concludes that the project would not negatively impact groundwater levels in nearby production wells. This conclusion is based on the fact that there are no active production wells extracting groundwater from the Dune Sand or 180-FTE Aquifer within the boundaries of the capture zone or cone of depression that would be created by the MPWSP slant well pumping. While the groundwater levels within the capture zone at the CEMEX site could be drawn down by as much as 29 feet at the peak 24.1 mgd scenario, the projected groundwater drawdown elsewhere in the cone of depression would range from 1 to 5 feet, as shown in EIR/EIS Figures 4.4-14, 4.4-15, and 4.4-16. This projected amount of drawdown is not sufficient to lower groundwater in neighboring production wells in the 180-Foot and 400-Foot aquifer below the top of the screen or to expose the well pump. Currently, there are no active production wells drawing supply from the Dune Sand Aquifer. **Table 8.2.8-2** expands on information provided in EIR/EIS Table 4.4-10 to compare the screen interval and the approximate depth to water in select neighboring production wells in the 180-FTE and 400-Foot Aquifers[7]. As is evident from these data, the well screens are considerably deeper than the static water level in the well and, consistent with the conclusion in the EIR/EIS, would accommodate the 1- to 5-foot drawdown that the MPWSP slant well pumping could create without damaging the well and/or exposing well screens or pumps. This is discussed in further detail below.

TABLE 8.2.8-2
REPRESENTATIVE SCREEN INTERVALS AND WATER DEPTHS FOR PRODUCTION WELLS WITHIN VICINITY OF THE PROPOSED MPWSP SLANT WELLS

Well Owner	Well Number/ID	Aquifer	Screen Interval(s) (depth in feet from top of well)	Approximate Depth to Water (feet below ground surface) Fall 2016[a]	Approximate Distance from Groundwater Surface to Top of Well Screen (feet)
Monterey Peninsula Landfill	14S/02E-17K01	180	210 - 250	95.0	115
	14S/02E-21F	180	200 - 261	43.0	157
Bill Baillee/Unknown	14S/02E-17L01	400	244 – 303 328 - 338	111.0	133

NOTES:
[a] Depth to water based on estimates from contours.
MRWPCA = Monterey Regional Water Pollution Control Agency
180 = 180-FTE Aquifer or 180-Foot Aquifer
400 = 400-Foot Aquifer
900 = 900-Foot Aquifer

SOURCE: Geoscience, 2015c; MRWMD, 2003.

[7] These representative wells were selected because adequate well construction details were available to assess screen depth.

The MCWRA compiles annual regional groundwater level data on a quarterly basis for the SVGB including the Pressure 180-Foot Aquifer and Pressure 400-Foot Aquifer[8] and compares the data to a representative dry water year and the 30-year average (MCWRA, 2018). According to MCWRA water level data, the 30-year average (1987 to 2017) groundwater levels in the Pressure 180-Foot Aquifer fluctuate seasonally about 17 feet: from about 22 feet above mean sea level (amsl) in the winter months to 5 feet amsl in the summer. The lowest seasonal average water levels are recorded during drought years where, seasonally, the maximum seasonal fluctuation can be similar to the 30-year average (about 17 feet) but the groundwater levels drop about 7 feet overall, as was the case during the peak of the last drought in 2015 when the groundwater levels reached an annual low of about 6 feet below mean sea level. The groundwater level trends are similar in the pressure 400-Foot Aquifer where the annual seasonal fluctuation is about 20 feet between: 7 feet amsl in the winter months to 17 feet below sea level in the summer. The drought year groundwater level fluctuation was similar to the 30-year average (about 22 feet) but the groundwater levels dropped about 7 feet in the dry water year of 2015.

The MCWRA groundwater level trend data characterizes the average and drought year seasonal fluctuation of groundwater in the Pressure 180- and 400-Foot Aquifer and thus provides a benchmark for analyzing the effect of the MPWSP on the local production wells (see EIR/EIS Table 4.4-10) within the MPWSP area of pumping influence. As shown on Table 8.2.8.2, above, there is over 100 vertical feet of groundwater column between the top of the well screens and the water level in the wells. This provides ample vertical distance to accommodate the seasonal and drought condition groundwater level fluctuation considering that the 30-year average fluctuation is 17 feet in the 180-Foot Aquifer and 20 feet in the 400-Foot Aquifer and dry year groundwater levels decline about 7 feet. Modeling projects that the proposed MPWSP pumping could add between 1 and 5 feet of additional drawdown to the seasonal fluctuation resulting in a maximum effect of about 12 feet of total drawdown during a dry year. While there could be an additional 1 to 5 feet of drawdown from MPWSP pumping, that increment of change would not negatively affect well yield or expose the screens leading to damage to the production well.

However, as discussed in the EIR/EIS Impact 4.4-3, CalAm recognizes the long-term nature of the proposed project and the need to provide continued verification that the project would not adversely affect groundwater levels in nearby wells within the SVGB. Under Applicant Proposed Measure 4.4-3, CalAm proposes to fund the expansion of the existing regional groundwater monitoring program to include the area where groundwater elevations are anticipated to decrease by one foot or more in the Dune Sand Aquifer, the 180-FTE Aquifer, and the 400-Foot Aquifer. The applicant-proposed measure would monitor changes in the groundwater surface elevations caused by the proposed pumping at the slant wells through a voluntary program and use of new groundwater monitoring wells. If it is determined that the project is causing groundwater levels to decline such that neighboring groundwater production wells are damaged or otherwise negatively affected by the proposed pumping, CalAm would arrange for an interim water supply and begin developing a

8 As discussed in EIR/EIS Chapter 4.4, SVGB Pressure Area (or Subbasin) is traditionally recognized by the MCWRA. The Pressure Area consists of a series of aquifers include the 180-Foot Aquifer and the 400-Foot Aquifer, which underlie the CEMEX site and the area of influence of the proposed MPWSP pumping.

mutually agreed upon course of action to repair or deepen the well, restore groundwater yields by improving well efficiency, provide a long term supply or construct a new well.

Violation of Water Quality Standards

EIR/EIS Impact 4.4-4 concluded that the localized change in groundwater quality in the Dune Sand and 180-FTE Aquifers due to slant well pumping is not expected to violate water quality standards or interrupt or eliminate the potable or irrigation supply available to other basin users. This conclusion is reasonable because, as discussed above, the capture zone that supplies water to the slant wells contains groundwater that was previously degraded by decades of seawater intrusion, and the TDS concentrations of this water -- ranging between brackish and saline -- makes it non-potable or suitable for irrigation supply. The proposed project would not violate water quality standards because slant well pumping would, over time, only replace the existing, highly brackish and saline ambient groundwater within the capture zone with seawater from the Monterey Bay; the project would not degrade an otherwise potable groundwater supply. Furthermore, the proposed project would not interrupt or eliminate a potable groundwater supply because the exchange of ambient brackish water with saline water would only occur within the confines of the coastal-adjacent capture zone and would not extend inland or encroach on areas of the SVGB that rely on fresher groundwater for potable or irrigation supply.

8.2.8.5 References Cited

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8.2.9 Master Response 9: Electrical Resistivity Tomography (ERT) and Airborne Electromagnetics (AEM)

COMMENTERS ADDRESSED IN MASTER RESPONSE 9

City of Marina	David Gorman
Marina Coast Water District	Jane Haines
Citizens for Just Water	Juli Hofmann
Fort Ord Rec Users	Carol Reeb
Public Water Now	Jan Shriner
Michael Baer	Form Letter 1
Kathy Biala	Form Letter 2
David Brown	Public Meeting Verbal Comments
Margaret-Anne Coppernoll	

Several comments received on the Draft EIR/EIS addressed Electrical Resistivity Tomography (ERT) and Airborne Electromagnetics (AEM). Commenters stated that ERT and AEM data should be used to supplement the groundwater modeling and monitoring data that was used in the Draft EIR/EIS to analyze the impacts of the MPWSP on groundwater resources and some comments suggested that ERT should be used instead of the groundwater monitoring to analyze local water quality and seawater intrusion. In addition, certain commenters took issue with how Draft EIR/EIS Section 4.4.1.4 presented, on page 4.4-28, the ERT survey results and the work by Dr. Rosemary Knight.

This master response provides supplemental information and further clarification on ERT and its use as a method to help characterize water quality and seawater intrusion along the coast of Monterey Bay. This master response also provides information and preliminary results from the SkyTEM airborne geophysical survey, also referred to as AEM, which was conducted in May 2017 near the city of Marina for Marina Coast Water District (MCWD) by the Stanford University School of Earth Energy and Environmental Sciences. Section 8.2.9.1 of this master response describes ERT technology and other previous geophysical studies conducted along the Monterey Coast and the Salinas Valley, and the application of the technology as a geophysical exploratory tool. Section 8.2.9.2 describes the limitations of ERT surveys as a method to monitor and assess seawater intrusion along the Monterey Coast and inland. Section 8.2.9.3 discusses the use of ERT data in the Draft EIR/EIS analysis of groundwater impacts and in the North Marina Groundwater Model, as well as a discussion of the preliminary results from the May 2017 AEM survey and how such results compare to the data, analysis and conclusions of the EIR/EIS. Section 8.2.9.3 concludes by explaining that CEQA and NEPA do not require a lead agency to conduct every recommended test and perform all recommended research to evaluate the impacts of a proposed project.

8.2.9.1 ERT Technology, Application, and Recent Studies

ERT is a geophysical survey method that measures electrical resistance through a material to create images of subsurface geologic and geochemical features and conditions. As discussed in

EIR/EIS Section 4.4.1.4, electrical resistivity imaging uses a series of sensors (referred to as electrodes) placed along a transect line on the ground surface. A direct electrical current is applied to the sensors and the resulting electrical field is measured along the ground using a second pair of electrodes, referred to as dipoles. The decrease in electrical current detected by the receiving dipoles is recorded and the resistivity is calculated based on the measured voltage, the distance between the electrodes, and the current flowing between electrodes. By varying the unit length, or depth of the dipoles as well as the distance between them, the horizontal and vertical distribution of the subsurface material's electrical properties can be recorded. Using computer processing, the distribution differences can represent a two-dimensional cross-sectional image of the subsurface. The high and low resistivity zones in the subsurface are displayed as a series of colors in a cross section that represent variations in electrical resistivity. In this application, variations in electrical resistivity can be interpreted as variations in the content of seawater, fresh water, or varying intermediate concentrations of brackish water (i.e., water with salinity in between seawater and fresh water). Salty water has low resistance due to the higher concentration of total dissolved solids (TDS) or salinity; fresh water has a higher resistance because of the relatively low concentration of TDS.

ERT is not a new technology and its application as a preliminary geophysical exploration method has been in use for decades. Electrical resistivity survey methods have assisted in groundwater and engineering studies to identify ground failure surfaces, bedrock quality, groundwater quality, saltwater boundaries, and areas of seawater intrusion. In addition to Stanford Professor Dr. Rosemary Knight's recent ERT work along the Monterey Bay coast, at least two other hydrogeologic studies using electrical resistivity geophysics have been conducted in the Salinas Valley. The first resistivity geophysics survey was completed in this area in 1990, and the second study was conducted in 1993 for the Monterey County Water Resources Agency (MCWRA) as part of its Salinas Valley Groundwater Basin Seawater Intrusion Delineation/Monitoring Well Construction Program using Controlled Source Audio-frequency Magnetotellurics (CSAMT), a nonintrusive, ground geophysical survey method for obtaining information about subsurface resistivity.

As mentioned in EIR/EIS Section 4.4.1.4, Dr. Knight, along with Stanford University graduate and post-graduate students and staff, completed two ERT surveys along the beaches of Monterey Bay. The two ERT surveys were conducted along a single transect and generated two-dimensional cross sections of conditions directly beneath the beach; as these surveys were a single transect on the beach, they did not capture subsurface conditions under the ocean, under CEMEX or any further inland. The first study was conducted in 2011-12 and included one 4-mile-long line along the beach from Seaside to Marina (Pidlisecky et al., 2016), ending south of the location of the proposed slant wells. This was a pilot study to: 1) demonstrate the viability of using large-offset ERT to image the distribution of subsurface freshwater and saltwater over a large spatial extent; and 2) gain insight in the distribution and geologic controls of seawater intrusion in the Monterey Bay region.

A second, more extensive ERT survey was conducted along a 25-mile transect along the coast of Monterey Bay in 2014 and 2015 (Goebel et al., 2017), extending from the Santa Cruz Mid-County Basin in the north, through a portion of the Pajaro Valley Groundwater Basin as well as a portion of the Salinas Valley Groundwater Basin, to the Seaside Basin in the south. However, several coast line stretches, including the beach area fronting the CEMEX sand mining facility, were not surveyed due to access restrictions. The purpose of the 2014-2015 resistivity survey was to map the salinity of groundwater and further delineate the location and extent of seawater intrusion along the coastline. The resistivity sections were further interpreted by comparing the results with well logs, seismic reflection data, geologic reports, hydrologic reports, and land use maps from the region. The study determined that the electrical resistivity readings positively correlated with measured TDS concentrations to a depth of about 500 feet in the Seaside Basin Water Master (SBWM) Monitoring Wells SBWM-1 thru SBWM-4, and supported the understanding that the deeper aquifers in the Seaside Basin have not yet been affected by seawater intrusion. Although access limitations prevented placing ERT electrodes on the beach directly in front of the proposed slant well location at CEMEX, the nearby ERT survey results identified the seawater intrusion that is occurring in the 180-Foot Aquifer and 400-Foot Aquifer in the Salinas Valley Groundwater Basin.

In May 2017, Dr. Knight and graduate students conducted a third geophysical study consisting of an airborne geophysics survey of the coastal area of the Salinas Valley Groundwater Basin near Marina, extending inland from the Monterey Bay to Highway 183 and the Armstrong Ranch. A portion of the survey was also conducted off the Monterey Bay coast to capture and correlate resistivity data from the hydrogeology and water quality within the geologic units underlying the Bay. The survey employed a method known as Time Domain Electromagnetics (TEM); SkyTEM, a Denmark-based company, collected the survey data. SkyTEM introduced airborne geophysical surveys for groundwater studies around 2011 and has applied this technology in various applications throughout the world. The SkyTEM antenna, which is suspended from a helicopter at a height of about 150 feet above the ground, generates a primary magnetic field that is directed downward. This creates a secondary magnetic signal that is returned and detected by the receiver. The received signal is then converted to resistivity data and that data is inverted to produce output like that obtained from ERT. The SkyTEM survey, hereafter referred to as Airborne Electromagnetics (AEM), was conducted for MCWD and was designed to provide resistivity data that can be linked to the extent of seawater intrusion at the coast and further inland. Dr. Knight and graduate researcher Ian Gottschalk prepared a report in June 2017 (Gottschalk and Knight, 2017) with the preliminary interpretation of the AEM data acquisition and the initial results of the AEM survey were publicly presented to the Marina City Council on August 8, 2017 and provided to the Lead Agencies by MCWD in November 2017; see Section 8.5.2. The analysis of the AEM survey data relied on subsurface information provided by geophysical borehole logs from CalAm's nine monitoring well clusters installed in 2015 as part of the MPWSP Hydrogeologic Investigations Workplan. Preliminary results of the AEM study are discussed below in Section 8.2.9.2.

8.2.9.2 ERT/AEM Requires Ground-Truthing: Correlation with Actual Subsurface Data

ERT/AEM is a commonly used geophysical method; it can be used as a preliminary exploratory tool to provide data about the subsurface and is useful to identify data gaps and supplemental data needs. It is also useful for identifying preferred locations of monitoring and groundwater production wells. Dr. Knight's 2011 and 2014 ERT surveys demonstrated that there is generally a positive correlation between the ERT outputs and known subsurface geology and water chemistry. However, as a general understanding, it should be noted that while the salinity of the groundwater in the aquifer materials can change subsurface resistivity measurements in seawater intruded areas, differences in the character of the subsurface geologic materials can also alter the measured resistivity (Goebel et al., 2017). Moreover, ERT/AEM requires correlation and ground-truthing with known data points that describe the geologic, groundwater, and water chemistry. In the case of the 2011 and 2014 ERT surveys, data from the four SBWM monitoring wells, seismic data, induction logging, and lithologic logs were critical to interpretation of ERT data. For the 2014 effort, use of downhole geophysical logs (E- logs) and drillers' reports led Goebel and others to "interpret the lowest resistivities in the inverted resistivity section as corresponding to the presence of saltwater, and the highest resistivities as corresponding to freshwater. Between these two end members, variation in lithology introduces uncertainty in the determination of fluid [groundwater] salinity" (Goebel et al., 2017)

ERT/AEM technology has the potential to augment subsurface data on seawater intrusion and subsurface groundwater conditions, but it cannot be considered a replacement for intrusive methods to evaluate the subsurface and groundwater aquifers (exploratory boreholes, groundwater monitoring wells, down-hole geophysics and modeling) because ERT/AEM has certain limitations. First, any obtained data would require verification and correlation through ground-truthing using groundwater monitoring wells and other subsurface data as control points. Without adequate ground-truthing or control points with actual subsurface lithology and water chemistry data, the ERT data could not be calibrated to actual site conditions.

Second, for each study area, there is a need for complementary data to transform the measured electrical resistivity measurements into relative salinity or TDS concentrations. As electrical resistivity depends on knowing both subsurface lithologic conditions and measured salinity or TDS concentrations of the groundwater, there is no universal salinity/TDS correlation with the specific color schemes displayed as ERT data (Knight, 2017). That correlation would have to be obtained from water testing from wells in the particular location to generate that correlation at that location. In Dr. Knight's 2011 and 2014 single-transect ERT surveys along the Monterey Coast, a review of down-hole E-log data allowed researchers to define a threshold above which resistivity corresponds to entirely freshwater-saturated materials (depicted as very blue in Dr. Knight's ERT studies), and another threshold below which resistivity corresponds to salt-water saturated materials (depicted as very red in Dr. Knight's ERT studies). As discussed in more detail below, the preliminary findings of the 2017 AEM survey show the bulk resistivity of the aquifer sediments combined with the resistivity of the water in those sediments but does not convert those resistivities to represent the actual groundwater quality. The final AEM report, which may provide that correlation, is expected in spring 2018.

Third, the ability of an ERT or AEM survey to identify the varying lithology and water chemistry in the distinct groundwater zones beneath the Salinas Valley area would depend on how the survey is designed and the desired image depth. ERT/AEM resolution decreases with depth and is less able to distinguish subtle changes in subsurface conditions as the depth increases. Therefore, if an ERT/AEM survey is not tailored for a specific shallower depth, it cannot necessarily be relied upon to accurately distinguish smaller zones of saline water from other zones producing water with lower salinity. This would be a concern for ERT/AEM surveys in the area near the city of Marina, for example, where areal and vertical variations in lithology and, therefore, electrical properties, are numerous and widespread. However, Goebel et al. (2017) was able to show the value of using a combination of ERT data and traditional subsurface data (i.e. data from well bore logs, groundwater levels) to better understand the distribution of seawater intruded groundwater and fresher groundwater on a groundwater basin scale.

The AEM geophysical survey that was conducted in May 2017 will generate some usable data on the extent of groundwater aquifers and provide information as to the relative salinity/TDS concentrations of the water in those aquifers inland of the coast. This AEM technology makes it possible to complete numerous parallel transects efficiently and cost-effectively. It is likely, due to the recent advancements in the AEM technology, that the data will be more representative of the actual conditions than the geophysical studies conducted in the 1990s. However, as with the ERT results, the AEM data must be ground-truthed and correlated with the actual subsurface geology and water chemistry information using well logs, induction logs, and groundwater sampling results as control points. This is especially true for AEM assessments of seawater intrusion and identification of the seawater intrusion front. ERT/AEM data collected in the Monterey Bay area can be interpreted using well data. What can be extracted from the data (i.e., the extent to which lithology versus salinity/TDS can be resolved) depends on the quality of the complementary data. Locally, the verification of the recent AEM survey will include information from the monitoring wells installed by CalAm in the Marina area. The challenges with using AEM survey results to identify seawater intrusion and the seawater intrusion front could include difficulty resolving subtle changes in subsurface resistivity, identifying decreases in resistivity that do not necessarily indicate a decrease in salinity/TDS concentration, and capturing lateral resistivity changes that correlate with geologic conditions rather than water quality.

8.2.9.3 Use of ERT/AEM Results in the Analysis of Groundwater Impacts in the EIR/EIS

The Draft EIR/EIS mentioned Dr. Knight's ERT work along the Monterey Coast (EIR/EIS Section 4.4.1.4) as informational background for the Environmental Setting, and to recognize the current, notable efforts to apply geophysical methodology to the further assessment of seawater intrusion. Some comments assert that the analysis of groundwater in the EIR/EIS is incomplete or flawed because it did not incorporate findings from Dr. Knight's ERT surveys along the Monterey Coast. As explained below, the approach in the Draft EIR/EIS was appropriate, and minor clarifications and updates have been made in Final EIR/EIS Section 4.4.1.4, regarding the use of ERT/AEM data that do not change the conclusions reached in the EIR/EIS related to groundwater impacts.

Use of 2011 and 2014 ERT Survey Results in Draft EIR/EIS

The groundwater analysis did not incorporate findings from Dr. Knight's studies for three key reasons. First, the ERT survey results did not add new significant information that was not already known regarding the extent of seawater intrusion along the Monterey Coast or the hydrogeological conditions in the project area. Dr. Knight's 2011 and 2014 ERT surveys along the Monterey Coast captured only static images of subsurface conditions and water quality directly under the beach at that time; they did not extend inland and they did not include the CEMEX property where project slant wells are proposed to be located. While they were interesting data from a scientific perspective, especially considering the resolution at depth, they did not provide additional useful information for the analysis of impacts for the MPWSP, primarily because the extent of seawater intrusion conditions at the coast have been confirmed for years through groundwater monitoring. Information regarding subsurface geology, groundwater flow and occurrence, and groundwater chemistry used in the EIR/EIS and for the 2016 version of the North Marina Groundwater Model (NMGWM^{2016}) development and validation were obtained from known scientific sources and included some of the same sources that Dr. Knight's team used to verify the ERT survey findings. Furthermore, the ERT results are reported as a cross-section of the groundwater system, and cannot be reliably extrapolated into the NMGWM^{2016} areas that extend substantial distances west and east of the ERT section.

Use of 2011 and 2014 ERT Survey Data for NMGWM^{2016}

The data from the 2011 and 2014 ERT surveys did not provide useful supplemental data for input or calibration of the updated NMGWM^{2016}. As described in EIR/EIS Section 4.4.4.2, groundwater modeling using the NMGWM^{2016} was the primary tool used to evaluate the response from pumping at the slant wells and to analyze the project impacts on groundwater resources in accordance with CEQA thresholds. The NMGWM^{2016} was employed to calculate the water level decline in response to proposed MPWSP pumping, specifically, to estimate the cone of depression. MPWSP slant well pumping effects on the inland movement of the seawater intrusion front and the characteristics of the capture zone were evaluated using the NMGWM^{2016} and particle tracking with the MODPATH code. The NMGWM^{2016} is a detailed model, the construction of which is thoroughly documented in EIR/EIS Appendix E2. The input data for the models consists of lithologic conditions observed in drilling cores, and other field data. Given the development history, regional focus, calibration, and measured data, the NMGWM^{2016} is the industry standard and best available technology to simulate the groundwater response from the proposed MPWSP pumping and to analyze the environmental impacts under CEQA and NEPA. Groundwater modeling, informed by a reasonable understanding of the local hydrogeologic conditions, which is agreed upon by experts in hydrogeology, provided sufficient information to assess impacts on groundwater in the project area. Master Response 12, The North Marina Groundwater Model (v. 2016), addresses comments about the model.

The NMGWM^{2016} was not constructed or employed to calculate changes in water quality and water density due to the mixing of ocean water and groundwater. The ERT studies produced a 2-dimensional cross-sectional resistivity map of single transects along the coast that showed estimates of bulk resistivity of geologic materials and pore water at an instant in time. The estimated bulk resistivities did not represent actual groundwater quality and even if they had, the NMGWM^{2016} would not benefit nor would it be improved by ERT groundwater resistivity data because the model did not project changes in groundwater quality. The resistivity estimates provided by the 2011 and 2014 surveys, therefore, would not add relevant information to the calibration or operation of the NMGWM^{2016}.

Use of 2017 Preliminary AEM Results in the EIR/EIS

A preliminary interpretation of the May 2017 AEM survey that was conducted for MCWD was prepared in June 2017, publicly presented at a Marina City Council meeting in August 2017, and provided to the Lead Agencies in November 2017; see Section 8.5.2. According to the preliminary report, subsurface areas of low resistivity indicate the presence of saltwater and areas of high resistivity indicate areas that contain fresh groundwater. Based on this, the preliminary interpretation concluded that there is a "sizable isolated lens of freshwater" in the Dune Sand and 180-FTE Aquifer and the presumption of saltwater intrusion in this area appears incorrect. For the purposes of the AEM study, Dr. Knight's team defined an isolated freshwater lens as a water-bearing unit with anomalously low concentrations of TDS in an area otherwise known to be intruded by saltwater (Gottschalk and Knight, 2017).

As discussed above in Section 8.2.9.2, AEM data must be validated using physical data so it provides a consistent interpretation of subsurface conditions. Like ERT, AEM is unable to distinguish between fresh water filled fine-grained sediments and saline water filled sand sediments without the presence of a control point such as a boring or monitoring well (HWG, 2017; see EIR/EIS Appendix E3). Dr. Knight's team requested, received from CalAm, and used geophysical logs of MPWSP monitoring well clusters MW-1, MW-4, and MW-7 as control points in developing its resistivity profiling.[1] These geophysical logs were created when the wells were drilled in the latter part of 2014 and spring 2015. The resistivity shown on the geophysical logs, which Dr. Knight's team relied upon and the AEM survey output represent, is the bulk resistivity of the aquifer sediments (clay, silts clays) combined with the resistivity of the water within the aquifer; this combined resistivity is not the same as the resistivity (or conductivity by inverse) of the groundwater within the aquifer.

As discussed in detail in EIR/EIS Appendix E3, the Hydrogeologic Working Group (HWG) acquired the cross-sectional profile that was developed and presented as preliminary AEM study in August 2017 and overlaid the known hydrostratigraphy on it to show the perched and regional water tables. The overlay shows dark blue areas in the Marina uplands representing the unsaturated zone above the perched water table and a seawater wedge in the 180-Foot Aquifer with lower salinity in the shallow portion and higher salinity water in the lower portion. The 400-Foot Aquifer is shown to be seawater intruded throughout this profile. The observations and interpretations associated with the AEM data profile and HWG's hydrostratigraphic overlay are consistent with the hydrogeologic conceptual model developed by the HWG, confirmed by the Lead Agencies and used in the NMGWM^{2016}.

As noted above, the resistivity values shown on the geophysical logs of the monitoring wells, which were used to correlate the preliminary AEM survey data, represent bulk resistivity of the aquifer sediments and groundwater and do not represent the resistivity of just the groundwater. For example, when Dr. Knight's preliminary AEM study results show areas of dark blue (high resistivity, low conductivity, indicative of a fresher water source), it represents the combined resistivity of the sediments and the groundwater but does not necessarily mean that there is potable,

1 Other than these three control points, most of the profiles developed by Dr. Knight's team to illustrate preliminary AEM findings do not show control points such as well logs or water quality sampling points.

freshwater in a particular zone. The only way to use the preliminary AEM survey data to represent the actual quality of the groundwater is to correlate it relative to actual groundwater quality data obtained from the monitoring wells. That is what the HWG did and the results are provided in EIR/EIS Appendix E3. The HWG used the actual groundwater conductivity measurements from a data set that has been compiled from the MPWSP monitoring well network for over 2 years to modify the presentation of Dr. Knight's the preliminary AEM survey findings. The HWG chose to use conductivity measurements taken in May 2017 so they would closely correlate to the time that the Stanford team conducted the AEM survey. In Appendix E3, the HWG presents an example to illustrate the difference between correlating groundwater quality with over two-year-old down-hole geophysical logs, as Dr. Knight's team did in its preliminary AEM findings, versus using actual, current groundwater data obtained from the well to correlate the AEM data, as was done by the HWG. The example considers geophysical log of MW-7. According to the MW-7 geophysical log (see Figure 3-9 in Appendix E-3), the resistivity in monitoring well cluster MW-7 at an elevation of -20 meters (correlative to MW-7S), is 100 ohm-meters (ohm-m), which is equivalent to a conductivity of 100 microsiemens per centimeter (µs/cm) or a TDS of about 68 mg/L. This could be considered fresher water considering the recommended California Secondary Maximum Contaminant Level (MCL) (Cal. Code Regs., tit. 22, § 64449) for TDS in drinking water is only 500 mg/L. However, compared to the actual measured TDS in the monitoring well in May 2017, this estimated TDS concentration is very low and inconsistent with actual groundwater data in and around monitoring well MW-7. Water chemistry monitoring over the past two years at MW-7S has shown that the conductivity of the groundwater near MW-7 is on average 2,160 µs/cm, representing a TDS of about 1,470 mg/L, which far exceeds California's MCL for drinking water. A TDS reading of that magnitude is greater than what was predicted using geophysical log data and shows that the groundwater is far from "fresh", as reported by Dr. Knight's team. This example illustrates how the preliminary AEM results, which have been presented to the public by the MCWD and Dr. Knight's team, do not accurately depict and may exceedingly underestimate the actual TDS concentrations in the groundwater. This finding underscores the need to use caution when relying on the preliminary AEM results to determine the presence or absence of isolated lenses of freshwater in the Dune Sand or 180-Foot aquifer.

As described above, the HWG modified the preliminary AEM resistivity profile to more correctly illustrate the distribution of water quality in the aquifers using the same control points but using known groundwater conductivity measured in the monitoring wells during May 2017 rather than geophysical logs from 2015. The results of the HWG modification of the AEM resistivity profile shows a distribution of groundwater chemistry that is consistent with the findings of the HWG hydrogeologic investigation and generally consistent with the annual salinity mapping for the 180-Foot and 400-Foot Aquifers published by the Monterey County Water Resources Agency. The red and dark red colors on the profile modified by the HWG (HWG, 2017) clearly indicate a two-dimensional view of a seawater intrusion front that is present in the Marina area. The AEM survey provides data to help interpolate between control points provided by the MPWSP monitoring network and confirms the work completed for the hydrogeologic investigation regarding the distribution of water quality in the MPWSP study area (HWG, 2017).

As described in Master Response 8, Project Source Water and Seawater Intrusion, the MPWSP would capture ambient groundwater from a coastal area that is heavily intruded with seawater and, as pumping continues in that capture zone, seawater would eventually replace the ambient, intruded groundwater. Both the preliminary AEM survey results released by Dr. Knight's team and the modification of those results by the HWG to depict actual groundwater quality, clearly show the band of highly brackish to saline groundwater along the coast where the MPSWP slant wells would be extracting water. If there are pockets or lenses of fresher groundwater inland and outside of the MPWSP capture zone, it is of minor consequence because while the water located inland from the coast may be less intruded and have lower TDS, it would not be drawn into and would not become source water for the MPWSP slant wells.

CEQA and NEPA Perspective on Use of ERT/AEM in EIR/EIS

Several comments assert the EIR/EIS is deficient since it did not incorporate the ERT survey data or the May 2017 AEM survey data, that the ERT and AEM survey data should be incorporated and the Draft EIR/EIS should be recirculated. The Lead Agencies reviewed the ERT/AEM data and, as noted above, the HWG modification of the AEM resistivity profile shows a distribution of groundwater chemistry that is consistent with the findings of the HWG hydrogeologic investigation and generally consistent with the annual salinity mapping for the 180-Foot and 400-Foot Aquifers published by the Monterey County Water Resources Agency; no changes are required to the Draft EIR/EIS. The Lead Agencies considered this additional technology and while they are required to utilize best available science to make conclusions on the potential environmental harm of a project, the use of every possible technology available to evaluate the impacts of the project is not required. As explained previously, the Lead Agencies used the $NMGWM^{2016}$ for the analysis. This master response demonstrates that the ERT/AEM data (once ground-truthed) and the underlying parameters of the $NMGWM^{2016}$ are consistent; thus, the $NMGWM^{2016}$ is sufficiently credible to be used in evaluating project impacts.[2]

____

[2] "CEQA does not require a lead agency to conduct every recommended test and perform all recommended research to evaluate the impacts of a proposed project. The fact that additional studies might be helpful does not mean that they are required." (*Clover Valley Foundation v. City of Rocklin* (2011)197 Cal.App.4th 200, 245, quoting *Association of Irritated Residents v. County of Madera* (2003) 107 Cal.App.4th 1383, 1396.) "CEQA does not require a lead agency to conduct every test or perform all research, study, and experimentation recommended or demanded by commenters." (CEQA Guidelines§ 15204, subd. (a).)

The studies on which an EIR/EIS is based need not be irrefutable, nor are analyses deemed inadequate because they could have been better or because there is another study or analysis that may provide more information. (See, *State Water Resources Control Bd. Cases* (2006) 136 Cal.App.4th 674, 795; *Barthelemy v. Chino Basin Mun. Water Dist.* (1995) 38 Cal.App.4th 1609, 1620; *Laurel Heights Improvement Assn v. Regents of University of California* (1988) 47 Cal. 3d 376; *Berkeley Keep Jets Over the Bay Committee v. Board of Port Com'rs* (2001) 91 Cal.App.4th 1344, 1355 - 1356.) The only relevant issue is whether the discussion of environmental impacts relied on in the EIR/EIS reasonably sets forth sufficient information to foster informed public participation and to enable the decision makers to consider the environmental factors necessary to make a reasoned decision, regardless of whether a new methodology is available.

In *Laurel Heights Improvement Assn v. Regents of University of California, supra,* 47 Cal. 3d at 409, the final EIR described two environmental sampling studies conducted at the UC San Francisco Parnassus campus in 1984 and 1986, which established that research activities had not resulted in statistically significant increases in the deposition of organic chemicals or radioactive materials in the vicinity of the campus. The Court of Appeal and the project opponent found the studies lacking and concluded the EIR should not have relied on them, but the Supreme Court disagreed. It was irrelevant that the studies might be lacking in certain particulars or that the studies may not have conclusively demonstrated a lack of environmental effect; rather, the relevant issue was whether the studies were sufficiently credible to be considered as part of the total evidence to support the conclusions in the EIR.

8.2.9.4 References

Goebel, Meredith, Adam Pidlisecky, and Rosemary Knight, 2017. *Resistivity Imaging Reveals Complex Pattern of Saltwater Intrusion along Monterey Coast*, Journal of Hydrology, accepted manuscript February 22.

Gottschalk, Ian and Rosemary Knight, 2017. *Preliminary Interpretation of SkyTEM Data Acquired in the Marina Coast Water District*, June 16.

Hydrogeologic Working Group (HWG), 2017. *HWG Hydrogeologic Investigation Technical Report. Monterey Peninsula Water Supply Project*, October 2.

Knight, Rosemary, 2017. Personal Communication, May 15.

Pidlisecky, Adam, Tara Moran, Brad Hansen, and Rosemary Knight, 2016. Electrical Resistivity Imaging of Seawater Intrusion into the Monterey Bay Aquifer System. Groundwater, March-April, Vol. 54, No. 2, pages 255-261.

8.2.10 Master Response 10: Environmental Baseline under CEQA and NEPA

COMMENTERS ADDRESSED IN MASTER RESPONSE 10

City of Marina	Ecological Rights Foundation, the Center for Biological Diversity, and Our Children's Earth Foundation
Marina Coast Water District	Point Blue Conservation Science
California Unions for Reliable Energy	Public Water Now
Citizens for Just Water	

This Master Response has been prepared in response to comments asking why the EIR/EIS did not include a separate baseline report and why the baseline of 2012 was selected by the Lead Agencies, as well as claims that the selection and/or characterization of the baseline conditions against which environmental impacts were measured did not comply with CEQA. As is common with most EIRs and EISs, the CEQA and NEPA baseline has been integrated into the EIR/EIS and there was no specific baseline report prepared. As CEQA Guidelines Section 15125 explains, "An EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, from both a local and regional perspective. This environmental setting will normally constitute the baseline physical conditions by which a lead agency determines whether an impact is significant." NEPA (40 CFR 1502.15) requires that an "environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration. The descriptions shall be no longer than is necessary to understand the effects of the alternatives."

Every resource section in EIR/EIS Chapter 4 (and in Section 5.5, Alternatives Impact Analysis) includes a setting/affected environment section and information on field studies conducted to develop the baseline. EIR/EIS Section 4.1.3, Baseline Conditions, explains the baseline:

> The baseline for this EIR/EIS is the existing condition on or about October 5, 2012, updated with new data as appropriate, which is when the CPUC issued a Notice of Preparation (NOP) for the proposed project to local, state, and federal agencies, Native American tribal organizations, and other interested parties. Although the Notice of Intent for the NEPA review contained within this document was issued in 2015, use of the 2012 baseline is appropriate and reasonable because (i) 2012 is a very recent point in time; (ii) the CPUC invested considerable resources amassing 2012 background/baseline data for the April 2015 Draft EIR; and (iii) environmental conditions in the study area have been relatively static such that 2012 conditions remain representative of meaningful baseline conditions. The environmental baseline reflects the pre-project environmental conditions to which the potential impacts of the proposed project and all alternatives are compared.
>
> Since the CPUC issued its NOP in 2012, the Lead Agencies have developed or received new data on some of the resource areas, so they have updated the baseline data as appropriate. This document notes those updates in its discussions of the Setting/Affected Environment for the various resource areas and applies them in the pertinent analyses. For instance, in

Section 4.6, Terrestrial Biological Resources, updates to survey information for biological resources are described in Section 4.6.1.2, Information Sources and Survey Methodology.

As noted by the Department of Commerce, NOAA Office of National Marine Sanctuaries in its Notice of Intent to Prepare an EIS (80 FR 51787 dated Wednesday, August 26, 2015), "MBNMS has requested CPUC to re-issue the Project EIR as part of a joint draft CEQA/NEPA document." Therefore, the baseline used in this EIR/EIS represents existing conditions at the time the CEQA NOP was issued, updated as appropriate to reflect conditions since the analysis was re-initiated by the introduction of the NEPA Lead Agency.

8.2.11 Master Response 11: CalAm Test Slant Well

COMMENTERS ADDRESSED IN MASTER RESPONSE 11

City of Marina	Bob Coble
Marina Coast Water District	Margaret-Anne Coppernoll
Ag Land Trust	Myrleen Fisher
California Unions for Reliable Energy (CURE)	Jane Haines
Citizens for Just Water	Juli Hofmann
Fort Ord Rec Users	Thomas Moore
Public Water Now	Hebard Olsen
Water Ratepayers Association of the Monterey Peninsula	Nancy Selfridge
Michael Baer	Jan Shriner
David Beech	Form Letters 1 & 2
Kathy Biala	Public Meeting Verbal Comments
Charles Cech	

This Master Response addresses comments and questions about the existing CalAm test slant well, including: clarification of its background and purpose; its permitting and CEQA/NEPA review process; the monitoring wells and pump tests and how these data have been used in this EIR/EIS; and the conversion of the test slant well to a production well. This Master Response also summarizes data concerning other locations within California where slant well technology for desalination plants has been explored, but such technology has not been pursued, and explains why such evolving technology was deemed infeasible in those circumstances, in those locations, and how those conclusions don't necessarily apply to the MPWSP. Supplemental information provided in this Master Response is for clarification and does not change any of the conclusions made in the EIR/EIS.

8.2.11.1 Background

In 2013, CalAm proposed to install and operate a test slant well on the CEMEX site to gather technical data related to the feasibility of a subsurface intake system and to facilitate design and intake siting for the proposed Monterey Peninsula Water Supply Project (MPWSP), as well as to gather information about the potential effects of the proposed project on the groundwater aquifers. As described in Draft EIR/EIS Section 2.6 on page 2-30, the topic of water rights is relevant to the MPWSP in the context of project feasibility. EIR/EIS Section 2.6.1 notes that since the SWRCB is the state agency authorized to exercise adjudicatory and regulatory functions in the areas of water rights, the CPUC asked that the SWRCB issue an opinion as to whether CalAm has a credible legal claim to the supply water for the MPWSP. In response, the SWRCB prepared its *Final Review of California American Water Company's Monterey Peninsula Water Supply Project*. That July 2013 report is attached to the EIR/EIS as Appendix B2, and as described therein, the SWRCB recommended a series of test boring/wells to assess the hydrogeologic conditions at the CEMEX site, and aquifer testing to determine the pumping effects on both the Dune Sand Aquifer and the underlying 180-Foot Aquifer. As specified in EIR/EIS Appendix B2 Section 8, "Pre-project conditions should be identified prior to aquifer testing. Aquifer tests should mimic proposed pumping rates." The installation and operation of the test slant well was in response to the SWRCB recommendation to collect the required information, and to inform CalAm's final design of the production wells.

8.2.11.2 Coastal Development Permit and CEQA Review for Test Slant Well

Several comments question the adequacy of the CEQA/NEPA review process conducted for the test slant well, challenge the EIR/EIS representation of the CEQA/NEPA review process for the test slant well, and question whether, or opine that, CEQA/NEPA was avoided completely. A test slant well, even as a temporary exploratory project, requires a Coastal Development Permit (CDP). As noted in the revised footnotes in EIR/EIS Sections 1.4.4 and 3.1, CalAm applied to the City of Marina for a CDP in July 2013, and the City oversaw the preparation of a CEQA Initial Study (IS) and Mitigated Negative Declaration (MND) for the project in 2014 (SWCA, 2014a). The IS/MND indicated that the proposed test slant well project had the potential to result in significant adverse effects on the environment, but that any such effects could be avoided or reduced to a less-than-significant level through project design modifications and development and implementation of feasible mitigation.

On July 10, 2014, the City of Marina Planning Commission declined to adopt the City-prepared IS/MND, and declined to approve or disapprove a CDP for the proposed CalAm test slant well project. CalAm appealed the Planning Commission's decisions to the Marina City Council; on September 4, 2014, the City Council also declined to adopt the IS/MND and denied CalAm's application for development of the test slant well in the coastal zone. CalAm filed a timely appeal with the California Coastal Commission (CCC), pursuant to Coastal Act Section 30603(a)(5), which allows appeals of any development that constitutes a major public works facility.

The CCC considered CalAm's application for a CDP on appeal at its November 2014 meeting, and issued Coastal Development Permit #A-3-MRA-14-0050, dated December 8, 2014, to CalAm for the test slant well.

As noted in the October 31, 2014 Staff Report (CCC, 2014), the CCC approvals of CDP applications are to be consistent with any applicable requirements of CEQA. CEQA Guidelines Section 21080.5(d)(2)(A) prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment. The CCC identified and adopted 17 special conditions necessary to avoid, minimize, or mitigate the potential for the proposed test slant well to result in significant adverse environmental impacts and found that, within the meaning of CEQA, the proposed project, as conditioned, was adequately mitigated and consistent with CEQA.

8.2.11.3 MBNMS Authorizations and NEPA Review for Test Slant Well

On June 25, 2013, CalAm submitted a Request for Authorization to MBNMS for the issuance of two separate authorizations for the test slant well project: (1) authorization of the CDP issued by the CCC to allow CalAm's proposed drilling into the submerged lands of MBNMS; and (2) authorization of a National Pollutant Discharge Elimination System (NPDES) permit issued by the Central Coast Regional Water Quality Control Board to allow CalAm's proposed discharge of water into MBNMS. See EIR/EIS Sections 1.4.4 and 3.1. MBNMS oversaw the preparation of an Environmental Assessment (EA) for the test slant well project, in compliance with NEPA, and a Final EA was published in September 2014 (SWCA, 2014b). MBNMS authorized the CDP on December 9, 2014 and the NPDES permit on January 6, 2015.

8.2.11.4 Monitoring Wells

One of the special conditions of the CDP, Special Condition 11 ("Protection of Nearby Wells"), required CalAm to install monitoring devices in a minimum of four wells on the CEMEX site within 2,000 feet of the test well, and one or more offsite wells, to record water and salinity levels within the wells. Between December 2014 and April 2015, CalAm constructed the test slant well and five monitoring well clusters (MW-1, MW-3, MW-4, MW-5, and MW-6) with each cluster consisting of three, 4-inch diameter monitoring wells completed at different depth intervals corresponding to the Dune Sands, 180-Foot, and 400-Foot Aquifers (Shallow – MW-4S, Medium – MW-4M, and Deep – MW-4D, respectively), meeting this Special Condition 11 requirement for monitoring wells.

Special Condition 11 also required that prior to commencement of pumping of the test slant well, the Hydrogeologic Working Group (HWG; see also Master Response 5, The Role of the Hydrogeologic Working Group and its Relationship to the EIR/EIS, Section 8.2.5) establish baseline water levels and Total Dissolved Solids (TDS) levels in those monitoring wells and provide these levels to the Executive Director of the CCC. Data monitoring began on February 19, 2015, and five monitoring reports were prepared prior to starting the pump test. An April 15, 2015 report titled *Baseline Water and Total Dissolved Solids Levels* was prepared in compliance with this provision of Special Condition 11, and included the results of Monitoring Report Nos. 1 through 5. That Baseline Report is referenced in EIR/EIS Section 4.4, Groundwater Resources, as Geoscience, 2015b. As confirmed in that report, groundwater level measurements and groundwater quality samples were collected from the test slant well and all monitoring wells, (Monitoring Reports Nos. 1 through 4) prior to the initiation of test well pumping.

8.2.11.5 The Long-Term Pump Test

Test slant well pumping was performed in two phases: a step-drawdown and 5-day constant rate pump test[1] immediately following construction and development of the test slant well, followed by the long-term pump test. The long-term[2] pump test commenced on April 22, 2015. Special Condition 11 required CalAm to stop pumping the test slant well if water levels were to drop more than 1.5 feet, or if TDS were to levels increase more than 2,000 parts per million from pre-pump test conditions. After 44 days of pumping (June 5, 2015), the test slant well was shut

1 In a step-drawdown test, the discharge rate in the pumping well is increased from an initially low constant rate to a progressively higher constant rate, whereas a 5-day constant rate test would use the same rate for 5 days.

2 The HWG Work Plan (Geoscience, 2013) makes reference to long-term as being 18 months (540 days) with the purpose of determining if there are seasonal or annual variations in source water quality due to potential changes in precipitation or upstream groundwater production.

off in compliance with Special Condition 11 because water levels were approaching the maximum allowable water level decrease. In a June 2015 memo to the CCC (HWG, 2015), the HWG provided the CCC with two analyses of groundwater elevations and TDS trends in the compliance monitoring wells, and demonstrated the influence of regional pumping.

In July 2015, the Executive Director of the CCC (Dr. Charles F. Lester) informed CalAm that the water level decrease appeared to be caused in part by the pump test and acknowledged that based on the data, several influences other than pumping of the test slant well were also responsible for the decrease in water levels (CCC, 2015). CalAm was required to submit an application for an amendment to the CDP, and the CCC recommended to CalAm that the HWG develop a proposed amendment to Special Condition 11 that better incorporated the local and regional trends in water levels and salinity.

Collection of data from the monitoring wells continued during the approximate 144-day test slant well shutdown period, and weekly reports of changes in groundwater levels and salinity during the test slant well outage continued to be prepared and posted online[3]; water levels continued to decrease in some of the monitoring wells while the test well was not pumping.

Revisions were made to Special Condition 11 of the CDP. Specifically, these revisions (CDP Amendment A-3-MRA-14-0050-A1 dated October 13, 2015) state:

- The HWG shall review weekly monitoring data and prepare a monthly report that shall be submitted to the Executive Director [of the CCC] documenting the regional/background groundwater elevation trends and TDS level trends.
- If data collected during the pump test from MW-4S or MW-4M exhibit a decrease in groundwater levels that exceed 1.5 feet ***from regional groundwater elevation trends***, or if TDS levels increase more than two thousand parts per million ***from regional TDS level trends***, the Permittee shall immediately stop the pump test and inform the Executive Director [of the CCC]. [emphasis added]

Test Well Outages

Following approval of these revisions to Special Condition 11, the long-term pumping of the test slant well resumed on October 27, 2015, and results, including a table of outages, have been made publicly available online[2]. The test slant well experienced numerous short term outages in addition to the 144-day shutdown. Comments on the Draft EIR/EIS questioned the reasons for the outages and requested the disclosure of their frequency. Over the course of the two-year test slant well operations (730 days from April 2015 to April 2017), the test slant well operated for approximately 500 days, and was idle for about 230 days. The largest blocks of idle time occurred during the voluntary shutdown between June 5 and October 27, 2015 (144 days), during the winter storm events in March/April 2016 (60 days) and in December 2016/January 2017 (18 days). All other outages (19 days total) were the result of power interruptions.

[3] https://www.watersupplyproject.org/test-well

The following table summarizes the details of the pumping interruptions encountered during the test slant well long-term pump test, through April 2017[4]:

Pump Test Off		Pump Test On		Hours Off	Notes
Date	Time	Date	Time		
		4/22/2015	3:20 PM		Start of long-term pump test
6/5/2015	12:00 PM	10/27/2015	3:03 PM	3,459	Voluntary shutdown: revisions to CDP Special Condition 11
1/19/2016	11:10 AM	1/20/2016	8:51 AM	22	PG&E power interruptions
1/22/2016	11:53 PM	1/24/2016	11:01 AM	35	
1/30/2016	2:50 AM	1/30/2016	11:08 AM	8	
1/31/2016	3:29 PM	2/1/2016	11:20 AM	20	
2/12/2016	2:43 AM	2/12/2016	10:51 AM	8	
3/1/2016	8:30 AM	3/2/2016	1:40 PM	29	Discharge line repairs from winter storm event
3/4/2016	10:10 AM	5/2/2016	1:22 PM	1,419	
5/17/2016	11:59 PM	5/18/2016	2:35 PM	15	PG&E power interruptions
5/25/2016	1:28 PM	5/25/2016	5:21 PM	4	
6/3/2016	7:45 AM	6/3/2016	9:08 AM	1	
7/8/2016	6:12 AM	7/8/2016	7:17 AM	1	
7/14/2016	10:21 AM	7/14/2016	11:36 AM	1	
8/13/2016	11:32 AM	8/16/2016	7:29 PM	80	
10/3/2016	7:55 PM	10/5/2016	6:23 PM	46	
12/24/2016	9:18 AM	1/11/2017	9:23 AM	432	PG&E power interruption & discharge line repair
1/20/2017	7:42 PM	1/25/2017	2:43 PM	115	PG&E power interruptions
2/17/2017	5:43 AM	2/23/2017	9:47 AM	148	
2/23/2017	9:57 AM	2/23/2017	12:13 PM	2	
3/13/2017	2:48 PM	3/13/2017	4:14 PM	1	
3/22/2017	4:54 AM	3/22/2017	9:09 AM	4	
4/10/2017	4:04 PM	4/10/2017	10:32 AM	6	

SOURCE: HWG, Monthly Monitoring Report No. 25, December 2017.

Results of the Long-Term Pump Test

The *MPWSP Test Slant Well Long Term Pumping Monthly Monitoring Report No. 25* (November 1 through November 30, 2017) was published by the HWG on December 13, 2017. Rainfall events recorded from the local Marina, CA station are overlaid on the water level plots for MW-4 (see **Figure 8.2.11-1**), the compliance point for Special Condition 11. The larger precipitation events that took place between mid-October 2016 and late March 2017 likely contributed (through precipitation recharge and/or impacts of precipitation events on basin pumping) to the upward trend of groundwater levels from approximately mid-October 2016 in MW-4S through early March 2017. Overall, the seasonal trend of groundwater elevations at MW-4 from April 2015 through October 2017 are consistent regardless of the test slant well pump being on or off (see Figure 8.2.11-1).

[4] The test slant well continued to operate through November 2017 (an additional operating time of 6 months, or 180-days, or 4,320 hours) and experienced approximately 500 hours of additional outages.

Groundwater elevation and TDS changes in the compliance well (MW-4) showed no measurable impact that can be attributed to test slant well pumping throughout the monitoring record shown in Figure 8.2.11-1. The shallow aquifer (MW-4S) showed distinct seasonal trends from the start of test slant well pumping on April 22, 2015. A downward trend occurred through the summer of 2015 (even though the test slant well was not pumping), a flat trend occurred during the fall of 2015, followed by an upward trend through the winter of 2015/2016 (even though the test slant well was pumping). A downward trend began again in mid-April 2016 just prior to the May 2, 2016 re-start of the test slant well, and continued about halfway through October 2016, albeit with a slightly decreasing slope from late July through October 2016. A seasonal increase in water levels, likely due to onset of rainfall and/or a decline in regional groundwater pumping, began in mid-October 2016 and continued through the early part of March 2017.

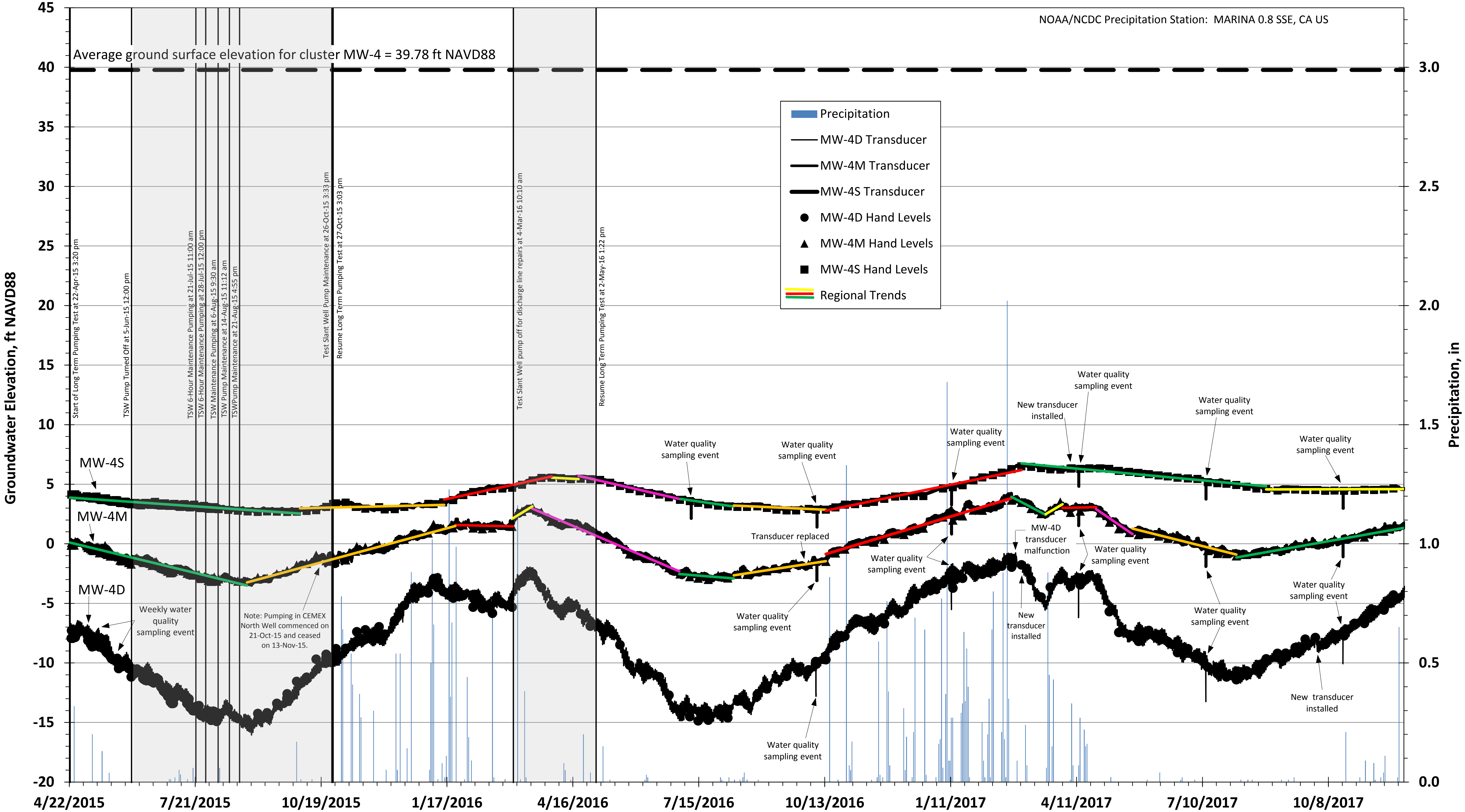
Similar to the shallow aquifer, MW-4M (at medium depth corresponding to the 180-Foot Aquifer) groundwater levels showed a distinct seasonal trend, with decreasing water levels in the spring and summer months and increasing water levels during fall and winter. There was a downward trend from mid-March through early July 2016, corresponding to a period of decreased precipitation and increased regional pumping (the start of irrigation season). The slope of the water level surface appears to have flattened in July 2016, with a slight upward slope beginning in August 2016, and a continued increasing slope through the early part of March 2017, likely as a result of decreased regional pumping (the end of the irrigation season) and the onset of the rainy season.

In summary, groundwater elevations in the Dune Sands Aquifer (MW-4S) and the 180-FTE Aquifer (MW-4M) reflected the effects of increased regional pumping in the summer months during irrigation season, and reduced irrigation pumping in the winter months, especially following rain events.

Based on data collected before and after the 144-day shutdown of test well pumping and subsequent power-related short-term test slant well outages, the HWG concluded and reported to the CCC in Monthly Monitoring Report No. 25 (HWG, 2017) that between April 2015 and November 2017:

- Groundwater levels in MW-4S and MW-4M continued to display regional trends. Therefore, groundwater levels in MW-4S and MW-4M continued to show no influences that can be attributed to test slant well pumping or non-pumping during the period (see Figure 8.2.11-1.) The groundwater elevations in MW-4S and MW-4M continued to decline when the test slant well pump was turned off between June and October 2015, and the groundwater elevations rose and then fell when the test slant well pump was turned off during March and April 2016. See Figure 8.2.11-1.
- TDS concentrations in MW-4S and MW-4M continued to display regional and/or seasonal trends, with water produced by the test slant well ranging from 25,400 mg/l[5] of TDS at start-up in April 2015 (76 percent ocean water salinity) to 31,800 mg/l in November 2016 (95 percent ocean water salinity). See HWG 2017, Table 3.

[5] Seawater generally has a TDS of 33,500 mg/l.



SOURCE: Geoscience, 2017

205335.01 Monterey Peninsula Water Supply Project

Figure 8.2.11-1

Groundwater Elevation in MPWSP MW-4

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Groundwater level changes and TDS changes in the compliance well (MW-4S and MW-4M) continued to indicate no impact from test slant well pumping or non-pumping, and groundwater and TDS levels continued to remain within compliance with CCC permit requirements for the test slant well long-term pump test program.

8.2.11.6 Use of the Test Well Data in the EIR/EIS

The available test slant well pumping and monitoring data was used to assess the reliability of the North Marina Groundwater Model that was used in the EIR/EIS for simulating drawdown from slant well pumping (referred to as $NMGWM^{2016}$). The measured/observed drawdown was calculated from measured water levels in the monitoring wells during and after cessation of test slant well pumping, and was plotted against the corresponding model-calculated drawdown and recovery. There is generally good agreement between the model-calculated and measured timing of drawdown and recovery. See EIR/EIS Appendix E2, Section 4.2, and Figure 4.6.

The test slant well was also used to collect water quality data, which is shown in Table 3 in each of the Monthly Monitoring Reports, and was used in the EIR/EIS evaluation of the proposed project's conformance with Ocean Plan water quality objectives (see Draft EIR/EIS Section 4.3 on page 4.3-93, and Appendix D3). The salinity in the test slant well was also monitored and varied over time, ranging from 76 percent ocean water salinity at slant well start-up, to 95 percent ocean water salinity in November 2016, as discussed above in Section 8.2.11.5.

8.2.11.7 Conversion of Test Slant Well to Permanent Well

Some commenters on the Draft EIR/EIS question the appropriateness of converting the test slant well into a permanent well without complying with CEQA or NEPA, and because it was proposed and permitted as a "temporary" facility. The conversion of the test slant well to a permanent well is part of the proposed project and is evaluated in the EIR/EIS, as is made clear throughout the document. As stated in EIR/EIS Section 3.2.1.1, upon completion of the aquifer pump testing, CalAm proposes to convert the test slant well into a permanent well and operate it as part of the MPWSP source water intake system. Both the construction of the additional conveyance and treatment facilities needed to convert the test slant well into a permanent well and the long-term operation and maintenance of the converted test slant well are part of the proposed project, and thus evaluated in this EIR/EIS. Further, EIR/EIS Section 3.2 explains that if the MPWSP with subsurface slant wells at CEMEX is not approved and implemented, the test well would be decommissioned. However, if the proposed subsurface slant wells at CEMEX are ultimately approved as part of the proposed project, CalAm would convert the test slant well into a permanent well and operate it as part of the source water intake system. The conversion and long-term operation of the well has not been covered under previous approvals and is evaluated in this EIR/EIS as part of the proposed project.

CalAm has always proposed to convert the test slant well into a permanent well if testing at CEMEX was successful and the MPWSP is approved, and has communicated this intention in publicly available documents such as its March 2013 application for test slant well permits to the City of Marina, MBNMS, and the CCC. In those applications, CalAm pointed out that the temporary test slant well could not be used for the MPWSP without substantial additional infrastructure and associated CEQA, NEPA, and regulatory permitting compliance, which would be addressed as part of a separate CEQA, NEPA, and permitting process for the potential future MPWSP, if and when undertaken (CalAm, 2013). Accordingly, the conversion of the test slant well to a permanent well is part of the proposed project described and analyzed in the EIR/EIS, in compliance with CEQA and NEPA requirements. If the MPWSP is not approved in any form at the CEMEX site, then the test well would be decommissioned consistent with the prior CEQA/NEPA review for, and approval of, the test slant well. The test slant well is currently permitted to operate until February 2019, per a December 2017 Coastal Development Permit amendment.

8.2.11.8 New Technology

Although the test slant well at CEMEX is not the first of its kind, to the best of the Lead Agencies' knowledge, slant well technology has not yet been used for a full-scale desalination project. Several commenters question the feasibility of relying on this new, evolving technology for the MPWSP by citing issues with the Dana Point test slant well, and by citing out of context statements made as part of the Huntington Beach and Santa Barbara subsurface intake feasibility investigations. The discussions below provide background information concerning the other potential desalination projects addressed by commenters, and places the circumstances of those endeavors into their proper context.

Dana Point Test Slant Well

The Municipal Water District of Orange County (MWDOC), in partnership with five participating agencies, investigated the feasibility of slant wells to extract ocean water and a test slant well was constructed at Doheny State Park in Dana Point, CA in 2006. A step drawdown test was performed on March 29, 2006, and a five-day constant rate test was performed from March 31 to April 5, 2006. The well was redeveloped in 2010, and equipped with a submersible pump; a long-term pump test was performed between June 2010 and February 2012. The rate of drawdown measured in the well showed an increase over time, and well efficiency dropped from 95 percent to 52 percent.

Performance issues associated with the Dana Point Test Slant Well are summarized in a technical memo that is referenced in the EIR/EIS as Geoscience 2012, and titled *Aquifer Pumping Test Analysis and Evaluation of Specific Capacity and Well Efficiency Relationships SL-1 Test Slant Well Doheny Beach, Dana Point, CA.* The loss of well efficiency was expected due to the inability to fully develop[6] the well during construction. Specifically, the Doheny test slant well was completed with a uniform 12-inch diameter casing and well screen, without a larger diameter pump house chamber due to limited funding. As described in Geoscience, 2012, the general rule of thumb for final well development is that the well must be fully developed to pump at a rate of 1.5 times the design rate. In the case of the Doheny test slant well, the well should have been developed up to a rate of approximately 3,000 gallons per minute (gpm); however, during final

6 "Developing a well" describes the act of cleaning out the clay and silt introduced during the drilling process as well as the finer part of the aquifer directly around the well screen prior to putting the well into service.

well development by pumping and surging in 2006, the well was pumped only to a maximum discharge rate of approximately 1,800 gpm because at that time, limitations of the test well pump did not allow pumping at a higher rate. As determined by Geoscience (2012), the consequence of this was that fine-grained formation material that was not properly removed from the near well zone during well development likely migrated toward the well during the long-term pump test, clogging the well screen and near well zone

Since the Doheny test slant well was the first test slant well designed for seawater intake, valuable lessons were learned regarding submersible well pump design, installation, and operation for use as a seawater intake that were applied to CalAm test slant well. For example, because of the pump house casing limitation experienced at the Doheny test slant well and the inability to fully develop the well, the CalAm test slant well at CEMEX was designed to include an 18-inch pump house casing, which can accommodate the placement of large development pumps with capacities over 3,000 gpm, and a 5-inch artificial filter pack was installed around the screens to minimize clogging. To date, the test slant well at CEMEX has not experienced the same issues as the Dana Point slant well.

Huntington Beach Independent Scientific Technical Advisory Panel

After conducting public hearings in late 2013 to determine whether to issue a CDP for the offshore portions of the Poseidon Resources LLC-proposed Huntington Beach Desalination Project (including an open water intake), the CCC and Poseidon agreed in January 2014 to collectively develop independent verification of whether any of several subsurface intake designs would be feasible for the Huntington Beach project, and convened the Huntington Beach Independent Scientific Technical Advisory Panel (HB ISTAP, or Panel). Several commenters on the MPWSP EIR/EIS suggest that since subsurface intake wells were determined to be technically infeasible at the Huntington Beach site, the technology should also be considered infeasible at the Marina site.

However, the HB ISTAP interpreted its Phase 1 charge to be the evaluation of the technical feasibility of subsurface intake technology to deliver source water for a 100 to 127 mgd desalinated water project (compared to 9.6 mgd for the proposed MPWSP), given the hydrogeologic and oceanographic site conditions at the Huntington Beach site. The HB ISTAP's Phase 1 Final Report (2014) was included as a reference to the Draft EIR/EIS on page 5.3-57. The HB ISTAP Phase 1 Final Report discussed the nine subsurface intake options considered by the Panel and noted in its discussion of well intake systems (HB ISTAP Section 3.3.6) that based on the experience at Dana Point, "the long-term performance of the [slant well] technology has yet to be confirmed." In its evaluation of subsurface intakes for Huntington Beach, the Panel acknowledged (HB ISTAP Section 5.2.5) that "slant wells completed in the Talbert aquifer would draw large volumes of water from the Orange County Groundwater Basin, which in itself is considered a fatal flaw." The Panel concluded in its Chapter 6 (Summary, Conclusions and Recommendations for Phase 2) that "slant wells tapping into the Talbert aquifer would interfere with the management of the salinity barrier and the management of the freshwater basin, and further, would likely have geochemical issues with the water produced from the aquifer."

The HB ISTAP concluded that slant wells would not be technically feasible to supply source water to support a project that would produce 100 to 127 mgd of product water at the Huntington Beach site, given the hydrogeologic and oceanographic conditions at that location. That conclusion is not directly transferable to the Marina location due to different hydrogeologic and oceanographic conditions and since the MPWSP is approximately 1/10th the size of the proposed Huntington Beach project. See also EIR/EIS Appendix E3.

Santa Barbara Subsurface Intake Feasibility Study

Some commenters on the MPWSP Draft EIR/EIS suggest that since the City of Santa Barbara found subsurface intakes to be infeasible for its project, subsurface intakes should be determined to be infeasible in Marina. On September 23, 2014, the City of Santa Barbara City Council directed staff to report back on a plan to evaluate the feasibility of using subsurface intakes as part of recommissioning that city's 10 mgd Charles E. Meyer Desalination Plant which was "mothballed" following the drought in the late 1990s. In January 2015, the Central Coast RWQCB adopted an amendment to the City's WWTP Waste Discharge Requirements that included a condition that the City should report back to the RWQCB with a work plan that would result in a completed subsurface intake feasibility study. Santa Barbara City staff accordingly explored the technical feasibility of six subsurface alternatives through an initial screening process to determine if the existing, permitted, screened open ocean intake at the existing Charles E. Meyer Desalination Plant could be replaced by a subsurface intake system.

The February 2017 Subsurface Desalination Intake Feasibility Study (Carollo, 2017) noted at page 3-19 that "slant wells have been tested for over six years at the Dana Point test site . . . [t]he overall experience with Dana Point was positive . . ." Carollo 2017 states on page 3-21 that "[o]peration of slant wells at the Dana Point and Monterey test sites in California demonstrated that this intake technology was capable of delivering 2,000 to 2,200 gpm of water." Carollo 2017 concludes on page 3-65 that "none of the subsurface intake alternatives considered in this study were determined to be potentially feasible based upon the study objectives" established by the City of Santa Barbara, and concludes specifically about slant wells on page 3-71 that "[t]o achieve the capacity required to meet this study's objectives [with slant wells], 3.5 to 6 miles of beachfront are required . . . only 1.7 miles of beach front is available . . ."

As a result, Santa Barbara chose to retain the existing open water intake, and not employ subsurface intakes because of the lack of any feasible subsurface intake alternative that could produce the full quantity of feed water required for the existing and already-permitted desalination plant within the limited City-owned beach front locations studied, and not because of the technology. Although the Santa Barbara project and the MPWSP are comparable in terms of production capacity, the conclusion that subsurface intakes are infeasible in Santa Barbara is not transferable to the MPWSP because the stratigraphy is different at CEMEX than in Santa Barbara, there is greater depth of sediment in Monterey and a larger beach within which to locate enough wells to meet the project objectives.

8.2.11.9 Slant Well Angle

Commenters have asked why the production wells are proposed to be drilled at a 14 degree angle from horizontal, when the test slant well was drilled at 19 degress from horizontal. The test slant well was planned to be drilled to 1,000 feet long at 19 degrees from horizontal, but due to snowy plover season and the USFWS requirement for construction equipment to be off the beach by the end of February 2015, the driller stopped before reaching the full length. In addition, the test slant well intentionally stopped short of penetrating the Salinas Valley Aquitard (SVA), which is the clay layer separating the 180-FTE Aquifer from the 400-Foot Aquifer. Since CalAm has committed to pumping from the shallower aquifers, the production wells are proposed to be drilled a little “flatter,” at 14 degrees from horizonal, in order to gain some additional screen length in the targeted aquifers while staying above the SVA. The EIR/EIS evaluated the slant wells at 14 degrees, described in Draft EIR/EIS Section 3.2.1.1 at page 3-15, and the NMGWM^{2016} appropriately allocated slant well pumping between the Dune Sands Aquifer and the 180-FTE Aquifer, accounting for the proposed 14-degree angle of the production wells.

Regarding maintenance and cleaning of the slant wells (described in EIR/EIS Section 3.4.1), the test slant well has been cleaned using standard well cleaning procedures with no issues. The well cleaning procedures are also described in the Hydrogeologic Investigation Work Plan (Geoscience, 2013) and include swabbing and airlifting the screened interval to dislodge and remove materials collected on the well screen, and aggressively pumping and surging the well until fluids removed are effectively free of sand, sediment, and other material, and have very low turbidity values. Given the similar shallow angles, no maintenance and cleaning issues are expected for the proposed slant wells at 14 degrees. Wells constructed with well screens at 0 degrees (entirely horizontal) have been commonly used for both water supply (e.g., horizontal wells drilled into spring locations to increase the water flow) and groundwater cleanup (e.g., horizontal wells installed under structures to access and remove contaminated groundwater).

8.2.11.10 References

California American Water (CalAm), 2013. Application Package for the Temporary Slant Test Well Project, Marina, CA.

California Coastal Commission (CCC), 2014. Staff Report: Recommendation on Appeal, Substantial Issue & De Novo Hearing and Coastal Development Permit. October 31.

California Coastal Commission (CCC), 2015. Condition Compliance – Special Condition #11 of Coastal Development Permits (“CDPs”) A-3-MRA-14-0050 and 9-14-1735 for California American Water’s (“Cal-Am’s) slant test well project in Marina, Monterey County. July 3, 2015.

Carollo, 2017. City of Santa Barbara. Subsurface Desalination Intake Feasibility Study. Final. February 2017. Available online at http://www.nwri-usa.org/pdfs/SSI-Feasibility-Study_COMPRESSED_022017.pdf. Accessed November 15, 2017.

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Hydrogeologic Working Group (HWG), 2015. Monterey Peninsula Water Supply Project – Test Slant Well Long Term Pumping Test and Coastal Development Permit #A-3-MRA-14-0050. June 10, 2015.

Hydrogeologic Working Group (HWG), 2017. Test Slant Well Long Term Pumping Monthly Monitoring Report No. 25. December 13. [https://www.watersupplyproject.org/test-well]

SWCA, 2014a. Draft Initial Study/Mitigated Negative Declaration for the California American Water Slant Test Well Project. Prepared for the City of Marina. May.

SWCA, 2014b. Final Environmental Assessment for the California American Water Slant Test Well Project. Prepared for National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Monterey Bay National Marine Sanctuary. September.

8.2.12 Master Response 12: The North Marina Groundwater Model (v. 2016)

COMMENTERS ADDRESSED IN MASTER RESPONSE 12

City of Marina	David Brown
Marina Coast Water District	Charles Cech
Ag Land Trust	Juli Hofmann
Coalition of Peninsula Businesses	Hebard Olsen
Fort Ord Rec Users	Nancy Selfridge
Water Ratepayers Association of the Monterey Peninsula	Form Letter 2
Kathy Biala	Public Meeting Verbal Comments

Numerous comments expressed concerns about the purpose of the 2016 version of the North Marina Groundwater Model (referred to herein as $NMGWM^{2016}$) and its construction, calibration, and reliability. Further, comments questioned the model application using the method of superposition and the relationships between model sensitivity and model reliability. These topics are clarified below in response to these comments. For further reference, see EIR/EIS Section 4.4.4.2, Groundwater Modeling, and Appendix E2, which provide a robust discussion of the NMGWM. Note that Appendix E2 is a complex, scientific technical report appropriately appended to the EIR/EIS while EIR/EIS Section 4.4, Groundwater Resources, explains the processes and assumptions and summarizes the results of the groundwater modeling effort in relatively approachable and understandable terms. Some comments concerning the modeling for the Draft EIR/EIS were submitted by members of the general public, but numerous comments were also submitted by technical consultants and, as such, are detailed and delve into the technical aspects of the groundwater modeling. Because this Master Response addresses topics raised by all such comments, some aspects of this Master Response are necessarily technical and focused on the details of the model parameters, assumptions, processes and results.

8.2.12.1 $NMGWM^{2016}$ Purpose and Approach

Some reviewers commented on the scope of the modeling analysis, the model's results and construction, and the modeling assumptions used. Several comments cited results for individual model layers interchangeably with hydrogeologic nomenclature of Salinas Valley aquifers and aquitards, which obscures interpretation of the relationships between model performance and comparisons to observed data. Other comments questioned the validity of the selected model boundary locations, referring to them as arbitrary and not representing physical conditions, or claiming that the model boundaries were located too close to the pumping wells analyzed with the $NMGWM^{2016}$. These comments did not acknowledge the telescopic modeling approach, the relationships between the $NMGWM^{2016}$ and regional Salinas Valley Integrated Groundwater Surface Water Model (SVIGSM), and the testing of boundary conditions reported as part of $NMGWM^{2016}$ assessment. In contrast, other comments recognized the relationship between the SVIGSM and $NMGWM^{2016}$ but concluded that discrepancies in model input and results between both models were indicative of $NMGWM^{2016}$ limitations. Finally, there were comments about

NMGWM^{2016} limitations for modeling the influence of spatial variations in groundwater salinity and density. These comments included requests to model groundwater density variations explicitly, and questioned the deployment of "equivalent freshwater head" to approximate the density contrast between "fresh water" and "sea water" in a constant density model. These topics are addressed in detail below.

HydroFocus's Assignment/Scope

HydroFocus, as a subconsultant to the consultant contracted by the Lead Agencies to prepare the EIR/EIS, was assigned to review, update, and if appropriate, re-calibrate the NMGWM for the purpose of estimating water level changes in response to proposed slant well pumping. The result of that effort is referred to as the NMGWM^{2016}. HydroFocus's scope of work was not related to the Lawrence Berkeley National Laboratory (LBNL) model evaluation, nor did HydroFocus receive direction from LBNL or have access to the LBNL model evaluation report prior to conducting its review and implementing its update. The LBNL recommendations (see EIR/EIS Appendix E1) and the NMGWM^{2016} are the result of two independent evaluations, and their agreement provides credible evidence for the validity of the updates implemented in the NMGWM^{2016}.

The NMGWM^{2016} was employed to calculate the water level decline in response to proposed project pumping (see "Introduction" of Appendix E2) -- specifically, to estimate the cone of depression, defined as the area where the difference between pumping and non-pumping water levels (the drawdown) are greater than or equal to 1 foot. The model also provided insight into the change in groundwater flow directions in response to pumping. The NMGWM^{2016} was not constructed or employed to calculate changes in water quality and water density due to any mixing of ocean water and groundwater, and therefore model-calculated drawdown is an approximation. However, as discussed below, the influence of variable density on model-calculated drawdown is small, and aquifer property values and the modeled pumping stress have a much greater influence on the drawdown.

Model Grid and Layering

Table 2.1 of Appendix E2 describes what each model layer represents. For example, Model Layer 2 represents the shallow water-bearing sediments referred to as the Dune Sand Aquifer, A-Aquifer, Perched Aquifer, Perched 'A' Aquifer, 35-Foot Aquifer, and -2-Foot Aquifer. Similarly, Model Layer 4 represents the 180-Foot Aquifer, 180-Foot Equivalent Aquifer (180-FTE), Upper and Lower 180-Foot Aquifer, and Pressure 180-Foot Aquifer. The geographic and hydrogeologic characteristics of these water bearing units are not equivalent, and they are represented in the NMGWM^{2016} by different zones, and each zone is assigned a unique value for its water transmitting and storage property values. It would therefore be erroneous to use model results for an entire model layer to make global conclusions regarding one of the property zones. For example, model-calculated water levels at all monitoring wells located in Model Layer 2 cannot effectively evaluate model reliability for the single zone that represents the Dune Sand Aquifer (the Dune Sand Aquifer is represented by one of the 16 parameter zones in Model Layer 2).

Telescopic modeling approach and boundary effects

The NMGWM^{2016} is based on the telescopic mesh refinement approach, where a relatively coarse model grid is utilized to represent the regional groundwater system defined by the physical limits of the aquifer, and a second smaller model having a relatively fine grid is utilized to represent a subregion of the aquifer (Ward, et al., 1987). Continuity between the two models is maintained using either specified water levels or specified fluxes. For example, in the NMGWM^{2016}, the simulated water levels from the SVIGSM are extrapolated and specified at the NMGWM^{2016} head-dependent flux boundaries. Using this approach, the NMGWM^{2016} boundaries have hydraulic continuity with the physical boundaries of the basin through the SVIGSM, and while there was flexibility in the locations selected for the NMGWM^{2016}, the hydraulic conditions at those boundaries are quantitatively determined by the SVIGSM and therefore are not arbitrary.

The NMGWM^{2016} was employed to calculate the cone of depression for slant well pumping at the CEMEX and Potrero Road sites. Multiple model tests confirmed that the NMGWM^{2016} results are not substantially influenced by the head-dependent flux boundaries. In one test, the cone of depression calculated with the NMGWM^{2016} (24.1 mgd) was shown to be the same as the cone of depression calculated by an extended version of the NMGWM^{2016} (see **Figure 8.2.12-1**). The "Extended Model" is described in Attachment 2 of Appendix E2 "Simple Expanded Test Model," and its northern head-dependent flux boundary is located approximately 5.5 miles north of the NMGWM^{2016} boundary. Hence, two models having different boundary configurations produced the same cone of depression, confirming that the NMGWM^{2016} boundary locations do not reduce model-calculated drawdown. As another test, HydroFocus increased the pumping rate from 24.1 mgd to 27.7 mgd (an increase of 15 percent), and results showed the expected expansion of the cone of depression within the model domain (see **Figure 8.2.12-2**). These results confirm that the NMGWM^{2016} boundaries did not reduce the extent of the cone of depression from pumping at the CEMEX site. The same comparisons for the Potrero Road Site indicated that the cone of depression is modestly influenced by the northern boundary location, but the effect is fairly insignificant for making drawdown comparisons between the CEMEX and Potrero Road Sites (see Attachment 2 of Appendix E2).

Hydrostratigraphic comparison between SVIGSM and NMGWM

The NMGWM^{2016} includes the A-Aquifer and Fort Ord Salinas Valley Aquitard (FO-SVA) in model layers 2 and 3, respectively. These units are not considered in the 2015 version of the NMGWM (referred to herein as NMGWM^{2015}) and in SVIGSM, both of which supported the analysis in the April 2015 MPWSP Draft EIR. Their inclusion in the NMGWM^{2016} is consistent with recommendations made by the LBNL based on its review of the NMGWM^{2015}, but their inclusion was also identified and was implemented independently by HydroFocus. Drawdown due solely to pumping is dependent primarily on the pumping rate and the water transmitting and storage properties of the aquifer (Driscoll, 1986; Bear, 1979). Hence, because the NMGWM^{2016} is a more accurate representation of the hydrostratigraphic framework in the Fort Ord area (because it includes the A-Aquifer and FO-SVA), it provides more reliable drawdown results than the NMGWM^{2015} and SVIGSM.

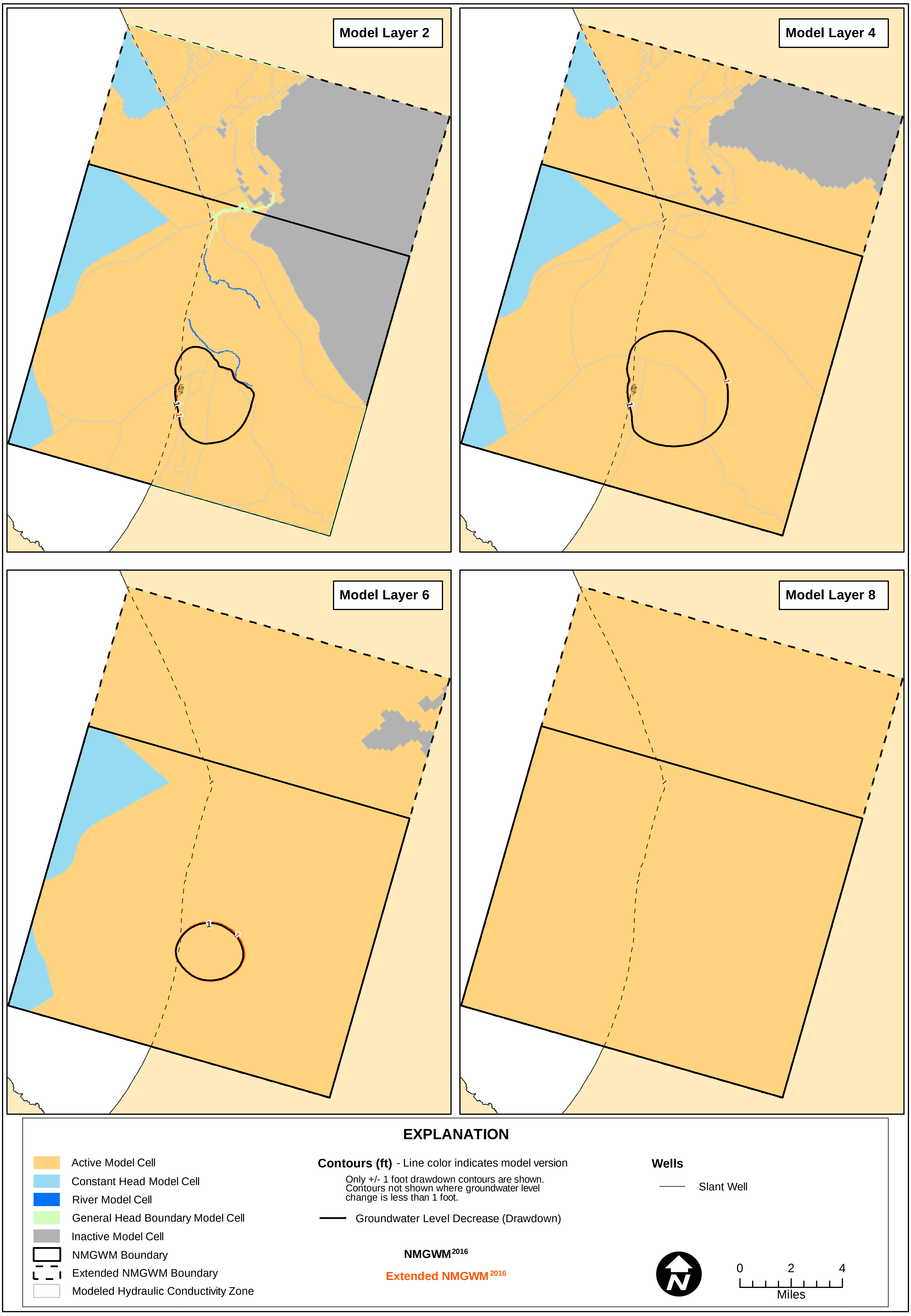
Groundwater Flow in Coastal Aquifers

In coastal aquifers, an interface can exist between groundwater with relatively low total dissolved solids ("fresh") and the saline groundwater influenced by seawater. The concentrations of dissolved constituents influence fluid density, and the resulting spatial variations in concentrations and fluid density within the transition zone can affect groundwater flow paths, the volumetric water balance, and location of the saltwater-freshwater interface. For example, the computer program SEAWAT is a modified version of MODFLOW (the computer program used for the $NMGWM^{2016}$), and simulates three-dimensional, variable-density, transient ground-water flow using the concept of equivalent freshwater head to solve the variable density flow equation. However, there are no guidelines to determine when it is necessary to employ a program like SEAWAT (Post et al., 2007). Therefore, HydroFocus's approach used the same concept of equivalent freshwater head to represent the density contrast between free-standing ocean water and groundwater, and then assumed that the density variations in the transition zone and resulting uncertainty in model-calculated drawdown was within the range of uncertainty quantified as part of the sensitivity assessment (see Section 8.2.12.4).

Equivalent Freshwater Head

"Equivalent freshwater head" is a common approach used to mimic the water density contrast near ocean boundaries (Senger and Fogg, 1990; Hanson et al., 2014; Payne et al., 2005). The approach increases the water level to account for the greater density of seawater within a constant density model domain. Motz (2004) examined the differences in calculated heads between SEAWAT (variable density flow model) and MODFLOW (constant density flow model) and found that the SEAWAT-calculated water levels were best matched to the MODFLOW-calculated water levels whose initial conditions had the ocean water level specified as equivalent freshwater heads over the full thickness of the aquifer. More recent work by Lu et al. (2015) suggests that submarine groundwater discharge in both confined and unconfined aquifers can be accurately simulated using constant-density flow and a coastal head correction factor. Modeling studies cited by Marina Coast Water District (MCWD) in its letter provided in Section 8.5.2 (Hydrometrics, 2008) similarly increased fresh water levels to account for the density contrast at the coast, and utilized the approach to calculate drawdown and groundwater flow paths from the ocean to coastal pumping wells.

Both the $NMGWM^{2015}$ and $NMGWM^{2016}$ employed equivalent freshwater heads to represent the water density contrast between ocean water and groundwater (Geoscience, 2016). The equivalent heads were assigned to the portions of Model Layer 1 that represent ocean water; the portions of Model Layer 1 that represent the inland basin areas are inactive and have no influence on model calculations. Hence, no horizontal groundwater movement occurs between Model Layer 1 cells representing the ocean and the adjacent Model Layer 1 cells that overlie the inland basin. In the $NMGWM^{2015}$, Model Layer 1 is 1-foot thick everywhere, whereas in the $NMGWM^{2016}$ the thickness of Model Layer 1 is variable and equal to the thickness of the water column between the ocean surface and the bottom of Monterey Bay. While the Layer 1 thicknesses representing ocean water are different in the two models, the equivalent head values were determined by the assumed TDS concentration of ocean water and the real-world height of the water column above the seafloor. Hence, although the thicknesses of Model Layer 1 are different in the two models, the specified values of the equivalent freshwater heads for corresponding model cells are essentially the same.



SOURCE: HydroFocus, 2017

Monterey Peninsula Water Supply Project . 205335.01

Figure 8.2.12-1
Extended NMGWM2016

SOURCE: HydroFocus, 2017

Monterey Peninsula Water Supply Project . 205335.01

Figure 8.2.12-2

Extended NMGWM2016 at 27.7 MGD (15% increase)

The use of equivalent freshwater heads had negligible effect on the history matching results and model calibration, and their use, therefore, does not artificially increase the modeled potential for seawater intrusion. HydroFocus confirmed this fact by running the history matching assessment with the NMGWM^{2016} after changing the equivalent freshwater head values everywhere to be equal to mean sea level ("0"), making them equal to the initial constant density water level values in the aquifer. The comparisons between model-calculated and measured water levels for the "with" and "without" equivalent freshwater head model simulations are essentially the same, confirming that there is negligible influence from equivalent freshwater heads on model-calculated inland aquifer water levels (see **Table 8.2.12-1**). Furthermore, the projected drawdown due to proposed slant well pumping was calculated using the method of superposition, and as stated in Section 5.3 of Appendix E2 under the subsection "Initial Heads, Boundary Conditions and Stresses," superposition is implemented by setting the hydraulic gradients along all boundaries to zero. This means "the boundaries representing the ocean and the head-dependent boundaries along the edges of the model domain were set to zero." While the concept of equivalent freshwater heads was utilized during the history matching run, they were not used in any of the runs used to project drawdown and therefore had no influence on model-calculated inland movement of saltwater.

TABLE 8.2.12-1
SUMMARY STATISTICS FOR THE COMPARISON BETWEEN MEASURED AND NMGWM^{2016} CALCULATED WATER LEVELS WHEN CONSTANT HEAD VALUES ARE SET EQUAL TO MEAN SEA LEVEL OR EQUIVALENT FRESHWATER HEADS

Calibration Statistics	Mean Sea Level ("0") (feet)	Equivalent Freshwater Head (feet)
RMSE[a]	10.2	10.3
Mean Model Error[b]	1.5	0.0
Min Model Error[b]	-39.9	-40.2
Max Model Error[b]	55.0	54.9

NOTES:
a Root Mean Square Error, which is the standard deviation of the residuals.
b Model Error is the model-calculated water level minus the measured water level.

Constant Density Assumption

The NMGWM^{2016} employed equivalent freshwater heads to simulate the density contrast between seawater at the Pacific Ocean boundary of the model and the underlying fresh groundwater in the aquifer. Dissolved constituent concentrations in groundwater can change from the movement of seawater in response to slant well pumping, but the effects of these changes on drawdown were assumed negligible and not simulated by the model. The extent of the cone of depression was, therefore, approximated by assuming that the constituent concentrations and groundwater density remain constant. Because measured dissolved constituent concentrations in groundwater decrease with increasing distance inland from the coast, with or without slant well pumping, the uncertainty introduced by the constant density approximation becomes less significant with increasing distance further inland and ultimately becomes negligible. The constant density assumption was assumed reasonable for reasons summarized below.

For the conditions analyzed in Appendix E2, the pumping stress and water transmitting and storage properties of the aquifer (the "aquifer parameter" values) have a much larger effect on the model-calculated drawdown than variations in constituent concentrations and water density. In other words, the uncertainty in model-calculated drawdown attributed to the constant density assumption is negligible relative to the uncertainty in aquifer parameter values. Appendix E2 at page 26 notes that comparisons between the MODFLOW-calculated water levels (constant density) and calculations using SEAWAT (variable density) differ at most by less than 2 feet. These differences exist nearest the coast where model-calculated drawdown and associated density effects are greatest. Further inland at the extent of the model-calculated drawdown, the constituent concentrations decrease and the differences between MODFLOW- and SEAWAT-calculated water levels diminish and become insignificant. The specified pumping rates, return water volumes, projected sea level, aquifer parameter values, and the relative contributions of multiple aquifers to total slant well production all have a greater influence on the extent of model-calculated drawdown than a contrast in dissolved constituent concentrations and groundwater density. The effects of these factors on the uncertainty in the model-calculated cone of depression was rigorously tested and conservatively quantified for the $NMGWM^{2016}$ (see Section 6.0, "Uncertainty," in Appendix E2).

8.2.12.2 Calibration Assessment

Commenters cited the lack of historical monitoring well data in the CEMEX area as limiting $NMGWM^{2016}$ reliability to calculate drawdown in the Dune Sand Aquifer; however, such comments do not acknowledge the other CEMEX area data and associated analyses with the $NMGWM^{2016}$ used to evaluate model performance, including data from the slant well pumping test. Additionally, commenters cited model discrepancies in the Fort Ord Area of the $NMGWM^{2016}$ as an indication of the unreliability of the $NMGWM^{2016}$ to calculate drawdown in the CEMEX area; however, the comparison is inappropriate because of the very different hydrogeologic conditions that exist in the two areas. For example, monitoring well data indicate perched water table conditions in the Fort Ord Area, whereas perched water table conditions do not exist in the CEMEX area. Further, part of the reported model error[1] is contributed by discrepancies with the initial water levels, and these are removed from the drawdown analysis using the method of superposition. There were also comments concerning model calibration and reliability based on reported model error, comparisons between $NMGWM^{2015}$ and $NMGWM^{2016}$ model output, and reported model bias. For example, some comments made conclusions on model reliability based on comparisons between $NMGWM^{2015}$ and $NMGWM^{2016}$ calibration statistics, even though the statistics were determined from two different data sets. One commenter concluded that their analysis and review showed that data falsification occurred ("data tampering"). These comments are all based on methods and interpretations that generally deviate from accepted modeling practice, and the additional discussion below is provided to clarify these issues.

1 "Model error" refers to the difference between model-calculated results and the corresponding measured values (for example, the difference between model-calculated and measured water levels in monitoring wells). All models approximate real-world conditions and therefore all models include model error. Model calibration and assessment evaluate the significance of the error relative to the intended use of the model.

Absence of Historical Dune Sand Data

The Dune Sand Aquifer is present in the CEMEX area. Water level data for the Dune Sand Aquifer are absent from the October 1979 through September 2011 historical calibration because no historical monitoring well data exists within the model domain for the Dune Sand Aquifer. However, Dune Sand Aquifer monitoring well data collected during test slant well pumping was available and used to adjust aquifer parameter zones and parameter values in Model Layer 2 and Model Layer 4 (see Appendix E2, Section 3.3 "Aquifer Parameter Zones"). Figure 4.6 in Appendix E2 shows generally good agreement between the model-calculated and measured timing of water level drawdown and recovery in Dune Sand Aquifer monitoring wells, and demonstrates that the model can be employed to reliably project water level drawdown in the CEMEX area in response to proposed slant well pumping.

Monitoring well data from six cluster sites located in the "Fort Ord Area" were added to the historical model run to assess model-calculated water levels by the NMGWM^{2016} for areas south of the Salinas River. The shallowest of these monitoring wells are constructed in the A-Aquifer (not the Dune Sand Aquifer). As explained in Section 2.1 of Appendix E2, "The names and characteristics of this upper water-bearing zone are variable throughout the NMGWM. For example, *the Dune Sand Aquifer is present beneath the CEMEX* site and consists of younger and older dune sand geologic units. *The A-Aquifer located beneath the former Fort Ord Area* contains older dune sand deposits and overlies the Fort Ord-Salinas Valley Aquitard (FO-SVA) …These and other shallow aquifers are collectively represented by Model Layer 2" (emphasis added). The additional monitoring well data, therefore, represent conditions in the A-Aquifer beneath the Fort Ord Area – not the Dune Sand Aquifer at the CEMEX site. This distinction is important because the hydrogeologic conditions of the A-Aquifer and Dune Sand Aquifer are different.

The poor agreement between model-calculated and measured water levels reported in Appendix E2 for some Model Layer 2 wells located in the Fort Ord Area is due to deficiencies in prescribed initial water levels – the starting point for the historical model run – and the likelihood of "perched" groundwater conditions (in Appendix E2, see Figure 4.1 and the section "Seasonal Water-Levels and Long-Term Variations"). The discrepancy in the initial water levels is attributed solely to the input from the SVIGSM, and the method of superposition was employed to eliminate any effect these deficient initial water levels would contribute to model calculated drawdown.

Perched Conditions

As explained in Appendix E2, Section 4.1, vertical gradients between Fort Ord Area monitoring wells located in Model Layers 2 and 4 are greater than 1.0 at two sites (MW-BW-01-A and MW-OU2-29-A). Vertical gradients greater than 1.0 indicate the likely presence of an unsaturated interval between water-bearing deposits. Groundwater separated from a deeper water table by an unsaturated interval is considered "perched." The groundwater flow model assumes fully saturated conditions in all model layers, and therefore this unsaturated interval and its influence on vertical groundwater movement are not reproduced by the model. Data indicate that the perched groundwater conditions and corresponding area of poor model performance appears to be limited to the southernmost portions of the Fort Ord Area, beyond the influence of the proposed pumping capture zone, and model performance is notably more acceptable in other parts of the

Fort Ord Area where the observed vertical gradients are less steep. Relatively poor model performance in this localized area, however, does not affect model reliability in the area of interest and the calculated extent of drawdown from proposed project pumping.

Horizontal and vertical hydraulic conductivity specified for the A-Aquifer and FO-SVA in the Fort Ord Area were obtained from previous aquifer test and modeling studies (see Figure 3.3d of Appendix E2). The values selected minimized the difference between measured and model-calculated water levels, and are within the referenced range from previous studies (see Appendix E2, Figure 3.3a and 3.3b). This confirms that the water transmitting properties specified in the model are reasonable, and therefore the model errors in Model Layer 2 are attributed to other factors. Specifically, the model errors in Model Layer 2 are attributed to the large differences between measured and model-calculated water levels in the perched Model Layer 2 wells and the discrepancies in the initial water level conditions inherited from the SVIGSM. The "Model Error" discussion below explains how removing the perched well data substantially reduces the model error statistics, and Section 8.2.12.4 explains how errors due to specified initial water levels are removed from model-calculated drawdown.

Model Error Assessment

All groundwater models solve universally accepted mathematical equations to simulate subsurface water movement in porous media. The solutions are approximations because a model cannot quantify exactly the spatially variable properties that exist in the real world. A reliable groundwater-flow model is one that can produce field-measured water levels and groundwater flow within an acceptable range of error. Error exists because information on the real world system is always incomplete, and the field information that is available has associated errors (for example, measurement error or the assignment of monitoring wells to incorrect aquifers). The most likely sources of error in the NMGWM^{2016} could arise from neglecting potential processes (for example, density effects on groundwater flow) and uncertainty associated with modeled boundary conditions, specified hydraulic conductivity values. Model error is therefore, evaluated to quantify model uncertainty, and the evaluation of NMGWM^{2016} uncertainty is described in Section 4.1 of Appendix E2 "History Matching Assessment." That evaluation clearly states that model error was assessed using six tests widely used and accepted within the groundwater modeling community: "Ultimately the decision of model acceptability is based on the weight of one or more of the test results and their relevance to meeting modeling objectives (in this situation, concluding that the model acceptably projects the magnitude and distribution of the water level change due to coastal slant well pumping)." Several comments suggested that using only one of the six tests could delineate a "good/successful" model from a "bad/failed" model; this is not recommended groundwater modeling practice.

The use of multiple tests provides the means to identify key sources of model uncertainty that are not likely revealed relying solely on any one test. Furthermore, the acceptance or rejection of a model depends not only on the evaluation of model error but also on the intended application for which the model was created (Freyberg, 1988). For example, the model error may be high in the history matching run because recharge and pumping are poorly estimated. However, when the purpose of the model is to calculate water level changes due to a new stress, the reliability of the model-calculated drawdown will depend primarily on the specified water transmitting and storage properties of the aquifer and not on the background recharge and pumping.

In EIR/EIS Appendix E2, multiple test results are reported that identified model deficiencies associated primarily with the prescribed initial conditions, boundary conditions, and historical recharge and pumping, all of which originated from the SVIGSM. The reliability of the specified aquifer parameters, however, was determined by comparisons between NMGWM^{2016} values and the measured or estimated values for similar materials. These comparisons indicated general agreement with values from previous hydrogeological and model studies (see Section 3.3, "Aquifer Parameter Zones," in Appendix E2). For the EIR/EIS, the "method of superposition" was employed to eliminate the deficiencies introduced by the prescribed initial conditions, boundary conditions, and recharge and pumping, whereas sensitivity tests were employed to quantify the potential uncertainty in the aquifer parameter values, boundary conditions, future project operations (see Appendix E2 Section 5.2 and EIR/EIS Section 4.4.4.2). By running the model and incorporating uncertainty related to 1) sea level rise, 2) return water volumes, 3) slant-well pumping rates, 4) model parameter values (hydraulic conductivity and storage properties), and 5) the relative volumes of groundwater flowing to the slant wells from different aquifers, HydroFocus estimated the potential range in the areal drawdown due to slant well pumping (see the discussion of uncertainty in Appendix E2, Section 6.0).

Comparison of NMGWM^{2016} and NMGWM^{2015}

NMGWM^{2016} has less model error than NMGWM^{2015}. A valid error comparison between two models must use the same wells and water level data, and when the same wells and water level data are used (see **Table 8.2.12-2**), the summary of error statistics confirm that the NMGWM^{2016} performance is superior to the NMGWM^{2015}. For example, Model Layer 2 monitoring wells located south of the Salinas River were added to the NMGWM^{2016}, and when these same wells and their corresponding water level data are added to the NMGWM^{2015} data set, the Model Layer 2 Root Mean Square Error (RMSE, which is the standard deviation of the residuals) is 40.2 feet, which is substantially higher than the RMSE calculated for the NMGWM^{2016} (10.1 feet). The comparisons between the deeper model layers have RMSE values that generally agree and are all within +/- 0.1 feet, indicating both models perform similarly in representing the deeper aquifers.

Model Bias

Bias in groundwater flow models results when model errors (the difference between model-calculated and measured water levels) do not conform to the assumptions of regression analysis (the assumptions that the model errors are independent, have zero mean, have a constant variance and follow a normal distribution) (Ward, et al., 1987). The evaluation of model error for Model Layer 4 (the 180-Foot Aquifer) provided in Appendix E2 showed that the model errors are not independent (the model errors vary with model-calculated values), the mean model error is not zero (the mean model error is equal to 1.4 feet), and visual inspection of the histogram suggests that model errors are not approximated by the normal distribution. These results indicate model bias in Model Layer 4. Further analysis of model errors was conducted by HydroFocus and revealed the cause of this bias, and the modeling approach employed to assess the proposed project was developed to eliminate the effect of this bias on the model results. The results of the model error analyses are discussed below.

TABLE 8.2.12-2
SUMMARY OF ERROR STATISTICS
BETWEEN NMGWM[2015] AND NMGWM[2016] USING IDENTICAL WATER LEVEL DATA

	NMGWM[2015]* (feet) (using NMGWM[2016] calibration data)					NMGWM[2016]* (feet)				
	Layer 2	Layer 4	Layer 6	Layer 8	Entire Model	Layer 2	Layer 4	Layer 6	Layer 8	Entire Model
RMSE[a]	40.2	7.3	10.7	11.4	12.8	10.1	7.2	10.7	11.3	10.2
Minimum Error	-63.2	-16.4	-40.2	-38.6	-63.2	-35.2	-15.8	-39.9	-35.4	-39.9
Mean Error	-30.1	1.2	1.7	-1.9	-0.3	-4.9	1.4	2.1	0.4	1.5
Maximum Error	-1.2	32.7	54.9	39.2	54.9	9.2	32.2	55.0	41.2	55.0
Relative Error	62.8%	14.7%	10.2%	14.5%	7.9%	15.7%	14.4%	10.3%	14.4%	6.3%

NOTES:
* Statistics exclude two perched wells MW-BW-01-A and MW-OU2-29-A.
Root Mean Square Error (expressed in feet)

In Appendix E2, Figure 4.3d "Relationships between measured water levels, model-calculated water levels, and water level residuals, Well 02J01, Model Layer 4" shows two graphs. The upper graph shows model-calculated and measured water levels during the time period October 1979 through September 1991 for Well 02J01, which is screened in Model Layer 4 (180-Foot Aquifer). The upper graph also shows the residual (model error) for the same time period. The values and distances (scale) for both vertical axes (y-axes) are the same. Measured water levels are reported relative to mean sea level, which by convention is assigned a value of zero. The model error is also plotted relative to zero, and positive errors indicate model-calculated water levels are greater than measured, and negative errors indicate that model-calculated water levels are lower than measured. The lower graph shows the relationship between model error and model-calculated water level. Close inspection of these two graphs shows the following:

1. The upper graph shows that measured and model-calculated water levels decrease and become more negative over time. The shift from positive to negative water levels indicates that the water levels have decreased from above mean sea level to below mean sea level.
2. The lower graph shows that the model errors are generally large in magnitude and positive when model-calculated water levels are relatively high and above mean sea level. Conversely, the model errors are generally smaller in magnitude and more negative when model-calculated water levels are relatively low and below mean sea levels.

The water level and error plots indicate that model error is not random (the model results for Model Layer 4 are biased). The bias is consistent with the positive correlations shown for Model Layer 4 in Appendix E2 Figure 4.3b and Figure 4.3d (calculated correlation of 0.2). The positive correlation is consistent with the observation that the greatest water levels (the water levels that are the highest above mean sea level) have the greatest model errors and the errors tend to be positive, whereas the lowest water levels (the water levels that tend to be below mean sea level) have relatively smaller model errors that tend to be negative. In other words, the model error is positive (increases) when the water levels are positive, and the error is negative when the water levels are negative. Hence, the slope of the line in the lower graph of Appendix E2 Figure 4.3d is positive, and shows an increasing relationship between model error and model-calculated water levels.

The model-calculated and measured water levels in Appendix E2 Figure 4.3d rise and fall each year as a result of seasonal changes in recharge and pumping. The seasonal trends in Figure 4.3d are superimposed on the longer, multi-year trends that show water levels generally decline from above sea level to below sea level. Comparisons between the model-calculated and measured water levels reveal that in the early years of the plotted data set, the seasonal model-calculated water level decline begins sooner than the measured seasonal water level decline, and this shift in timing causes relatively large differences between model-calculated and measured water levels (relatively large model error). In the later years of the plotted data set, there is better agreement between the timing of the seasonal water level decline, and as a result the model error is relatively smaller. The net effect of these time-shifts is the cause of the model bias described above.

Appendix E2 Figure 4.3c shows that the same relationship between seasonal model-calculated and measured water levels shown in Figure 4.3c exists in the SVIGSM – the greatest water levels have model errors that tend to be positive, and the lowest water levels have model errors that tend to be negative. The magnitude and timing of groundwater recharge and pumping utilized by the $NMGWM^{2016}$ was obtained from the SVIGSM, and therefore the model bias in the $NMGWM^{2016}$ produced by the seasonal changes in recharge and pumping is inherited from the SVIGSM.

Data Tampering

The documented correlation between model-calibrated water levels and model error described above under “Model Bias” has been erroneously cited in some comments as evidence of data tampering. However, the facts indicate that data tampering has not occurred, and this can be clarified with a discussion about what a groundwater-flow model is, how a groundwater model is constructed, and how a groundwater model is ultimately used.

As described in EIR/EIS Section 4.4.4.2, groundwater models are computer simulations that represent water flow in the environment using mathematical equations. The “model” is a mathematical model, meaning that groundwater flow is simulated by solving a governing mathematical equation that represents the physical processes that occur in a groundwater system. That governing equation is commonly referred to as the three-dimensional partial differential equation of groundwater flow.

MODFLOW is one of many computer codes that numerically solve the governing groundwater flow equation. As noted in EIR/EIS Section 4.4.4.2, since MODFLOW's release, the USGS has released numerous updated versions, and MODFLOW is now the de facto standard code for aquifer simulation. The MODFLOW computer source code is written in FORTRAN programming language, which is compiled to create an executable, which is the engine that actually performs the numerical calculations. The $NMGWM^{2016}$ is an application of MODFLOW, where the MODFLOW executable performs the calculations on the input data sets constructed specifically for the North Marina Area. The output from the MODFLOW executable is model-calculated water levels and groundwater fluxes for the North Marina Area.

Input data to MODFLOW includes the three-dimensional distribution of water storage and transmitting properties of the site-specific aquifers and aquitards in the North Marina Area. The input data also includes site-specific values for groundwater recharge and extractions by pumping wells. Lastly, input data includes specified conditions at the boundaries of the model domain (for example, boundary conditions specified to represent the Pacific Ocean). The water levels measured in wells (observations) are not input data, but rather are utilized to compare against their corresponding model output (model-calculated water levels) for the same time and spatial location. Similar to a "ruler" utilized to quantify the error in the estimated length of an object, measured water levels are compared to model-calculated water levels to quantify model error (the difference between model-calculated and measured water levels). Hence, model input (water storage properties, water transmitting properties, recharge, pumping, and boundary conditions) can be altered to change model output, but changes to measured water levels (observations) have no effect on model output. With this in mind, three facts indicate that data tampering – in this case, modification of the measured or model-calculated water levels employed to calculate model error – has not occurred. They are as follows:

1. The measured data were not altered before running the model. Measured water levels were provided by Monterey County Water Resources Agency (MCWRA), and Section 2.3 of Appendix E2, "Assessment of Model Inputs and Outputs," reports that measured water levels used by the model and reported by MCWRA are the same. Measurement dates used in the model for one well were off and another well was assigned to a different aquifer. Specifically, the water level measurement dates reported by MCWRA for well 14S/3E-6R1 were 11 days off in the $NMGWM^{2015}$ input data set, and well 14S/2E-14L01 was designated as representing Model Layer 6 but identified by MCWRA as representing the 180-Foot Aquifer (Model Layer 4). Neither of these exceptions had any effect on the measured water level values reported.

2. Three independent runs using different MODFLOW executables produced the same output (model-calculated water levels) and confirm that the model-calculated water levels were not modified during the model run. As noted in Table 3.1 of Appendix E2, Geoscience and HydroFocus utilized two different MODFLOW executables. Geoscience employed MODFLOW using the proprietary software "Groundwater Vistas," whereas HydroFocus employed the MODFLOW executable "freely available from the USGS." Section 2 of Appendix E2, "Assessment of Model Inputs and Outputs," states, "We ran the model ($NMGWM^{2015}$) and confirmed the model results [model-calculated water levels] were the same as reported." Furthermore, Appendix E-1, "Lawrence Berkeley National Laboratories Peer Review," describes similar testing and reported "computer simulations carried out by the modeling team can be replicated using the input and executable codes provided to us." This confirms that the FORTRAN computer code for the numerical groundwater-flow model (MODFLOW) was not altered prior to running the executable as a means to "tamper" with the data.

3. Model-calculated water levels were not altered after running MODFLOW. There is no processing of model output after running MODFLOW other than plotting the results using Excel software. The model-calculated water levels in the Excel files match the output from MODFLOW obtained from three independent runs using three different MODFLOW executables.

8.2.12.3 Superposition

The analysis using the NMGWM^{2016} employed the method of superposition. Some commenters interpreted this to mean a new model was developed rather than an application of the model. Other commenters utilized results from their own application of the NMGWM^{2016} and superposition method, and their results were different from those reported in Appendix E2. However, the analysis undertaken by the commenters was flawed, and conclusions based on those results were both unreliable and appeared to demonstrate misunderstanding about the method of superposition. The additional discussion below is provided to clarify the issues.

The NMGWM^{2016} was employed to calculate drawdown in response to pumping. Drawdown due solely to proposed project pumping is dependent primarily on the pumping rate, the water transmitting and storage properties of the aquifer (Driscoll, 1986; Bear, 1979), and any change in groundwater recharge or discharge that would occur solely as a result of that drawdown. For example, if pumping were to cause coastal water levels to decline below sea level, ocean water would percolate into the underlying aquifer and move inland to replace the extracted water. This increase in ocean-water recharge induced by the new pumping would reduce the drawdown relative to that which would have occurred in the absence of the ocean-water recharge.

For the EIR/EIS, the method of superposition was employed to remove the discrepancies introduced by the SVIGSM (initial water levels, boundary conditions, and bias attributed to specified recharge and pumping). Superposition is routinely employed for solving complex problems. It is a modeling approach that is useful in saving time and effort and eliminating uncertainty. The principal advantages and constraints of using superposition are described by Reilly et al. (1987) and summarized below:

1. The effects of a specified stress on the groundwater system can be evaluated even if other stresses in the basin are unknown.
2. The effects of a change in stress on the system can be evaluated even if the original conditions or subsequent period of equilibrium conditions are unknown.
3. The effect of one stress on the system can be isolated from the effects of all other stresses.

The superposition approach does not employ a “new” model; rather, the initial water levels and background recharge and pumping are all set to zero. These inputs are not “predictive variables” in the model, and they have no influence on the projected future drawdown calculated by the model. The approach therefore effectively removes the deficiencies introduced by the SVIGSM (see Section 5.2 of Appendix E2).

In the application of the NMGWM^{2016}, the complex problem is quantifying groundwater level changes and fluxes due to geographically and temporally varying recharge and discharge processes occurring within the Salinas Valley Groundwater Basin. The question asked is “what change in these groundwater levels and fluxes are expected as a result of a new stress – groundwater extraction by the proposed slant wells?” Rather than employ a model to simulate the complex problem (i.e., to quantify the effects of all recharge and discharge processes occurring within the basin), superposition is employed to determine the incremental drawdown due solely to the proposed groundwater extraction by the slant wells. In other words, superposition is employed to isolate the expected change in groundwater levels and fluxes due solely to the project. These changes would be additive to future changes that occur as the net result of all other factors such as climate, background pumping, background recharge, and land use changes, which cannot be predicted with certainty. Accordingly, validating the future drawdown calculated by the superposition modeling approach, which corresponds to validating the change in future water levels due solely to proposed project pumping, is in practical terms less difficult than validating model projections that include the additional complexity of assumed climate, water use, and land use changes, none of which are known with certainty. See Appendix E2, Section 4.2, "Test Slant Well Pumping," for an example where real-world monitoring data is used to compare measured drawdown with the drawdown calculated with the superposition model.

Water Levels

The drawdown from proposed slant well pumping can be isolated using one of two approaches: (1) subtracting the results from two model runs, one run with the new stress and a second run without the stress, or (2) directly using superposition. For example, in its report attached to the MCWD comments, GeoHydros employed the superposition method to isolate the model-calculated drawdown due to slant well pumping from the proposed project (GeoHydros, 2017). To do this, GeoHydros added the proposed slant well pumping to the recharge, pumping, constant head, and head-dependent flow boundary input data from the "History Matching Assessment" described in Appendix E2. The approach is identical to the one described in Attachment 1 to Appendix E2 ("Example Superposition Model"). In Attachment 1, a model of a hypothetical groundwater basin is used to show that drawdown from a new pumping well calculated directly by superposition is identical to the drawdown calculated indirectly by subtracting the results from two model runs (one model run with the new well pumping stress and the second model run without the new well pumping stress). Both approaches employ the theory of superposition, but GeoHydros chose to use the latter approach of subtracting two model runs to isolate the drawdown rather than calculate it directly. If correctly implemented, the results from the two approaches must be identical, as was shown by the example problem in Attachment 1 to Appendix E2. However, the GeoHydros analysis was not conducted correctly, and the flawed GeoHydros results are therefore different from the results reported in Appendix E2. As explained below, the GeoHydros analysis was flawed because it did not consider changes in the hydraulic interaction between groundwater, the Salinas River, and Tembladero Slough, and the GeoHydros report and results have therefore not been incorporated into the EIR/EIS analysis.

The recharge and pumping model input files from the History Matching Assessment include the historical river losses and gains due to the hydraulic interactions between groundwater, the Salinas River, and Tembladero Slough. GeoHydros used the same recharge and pumping input files for both of its simulations: one simulation that was identical to the History Matching Assessment and an identical simulation but with the addition of proposed slant well pumping. The GeoHydros approach failed to account for the changes in Salinas River and Tembladero Slough gains and losses that occur in response to the new pumping stress introduced by the slant wells, and the drawdown calculated by the GeoHydros approach is therefore greater than reported in Appendix E2. In order to account for the changes in river gains and losses, the $NMGWM^{2016}$

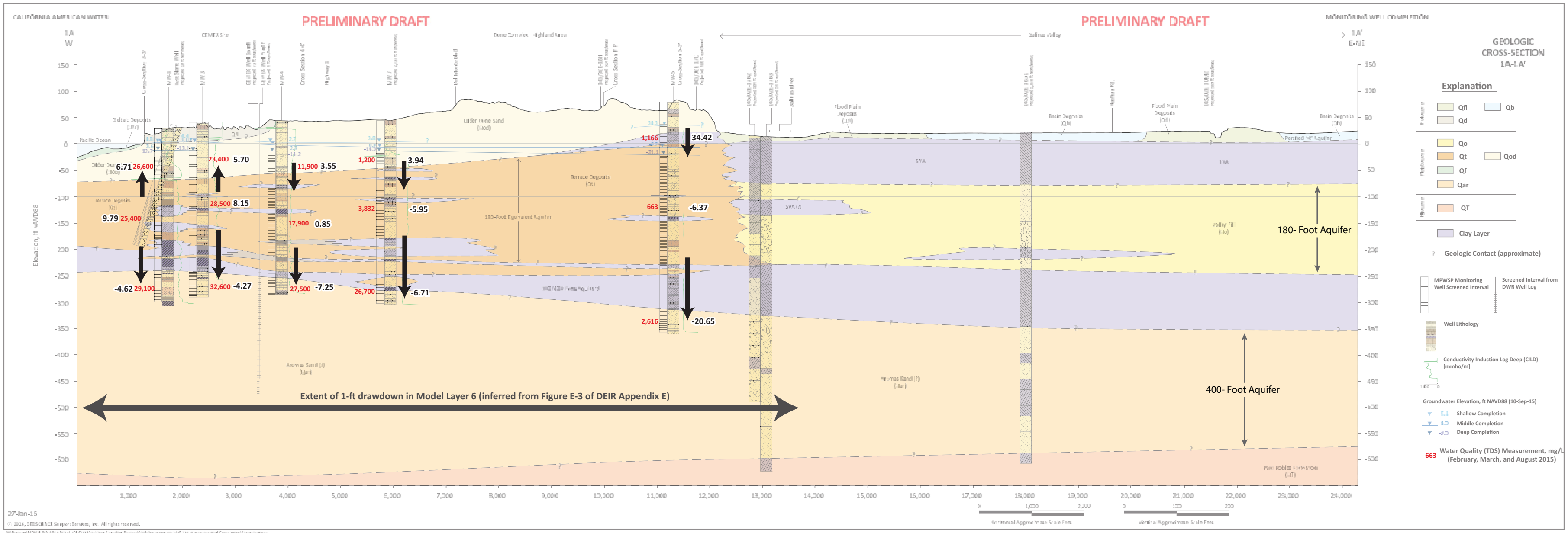
was modified as explained in Section 5.3 of Appendix E2 ("Modifications to the $NMGWM^{2016}$"). Hence, the GeoHydros results are not credible for assessing the adequacy of the $NMGWM^{2016}$ and the superposition approach.

Water Budget

The method of superposition, whether employed directly using a superposition model as described in Appendix E2, or indirectly by subtracting two model runs as employed by GeoHydros, also provides the change in the volumetric groundwater budget. GeoHydros calculated the change in fluxes between model layers by subtracting the water budgets from the two model runs. Based on the GeoHydros calculations using flawed model results, GeoHydros reported that 756 afy of the water removed by the slant wells would come from "upward flow into the overlying 180-Foot and Dune Sand Aquifers" from the 400-Foot and deeper aquifers. They concluded that the model-calculated gain in the 180-Foot Aquifer represents harm to the deeper aquifers. However, this conclusion comes from an inappropriate interpretation of superposition results that ignore the real-world groundwater conditions beneath the CEMEX site. Further, the conclusion does not consider the poor water quality conditions measured in the 180-Foot Aquifer and existing groundwater overdraft of the deeper aquifers caused by inland pumping.

Superposition calculates the change in the volumetric water budget relative to the real-world groundwater system. A positive water budget change indicates "gain," whereas a negative water budget change indicates "loss." However, a gain is not necessarily indicative of greater "inflow" but can also indicate reduced outflow. Similarly, a loss is not necessarily indicative of greater "outflow" but can also indicate reduced inflow. The volumetric budget changes calculated by superposition and reported by GeoHydros must therefore be applied to real-world groundwater conditions to determine slant well pumping effects on groundwater-flow.

The real-world groundwater conditions beneath the CEMEX site as reported by Geoscience (2016) is illustrated in **Figure 8.2.12-3**, which is a modified cross-section that includes groundwater elevations determined from measured water levels in monitoring wells (corrected to equivalent freshwater heads based on measured TDS concentrations). Groundwater flow directions are inferred from the equivalent freshwater heads, whereby groundwater moves from areas of high equivalent freshwater head to areas of relatively low equivalent freshwater head. The inferred vertical flow directions in Figure 8.2.12-3 indicate that groundwater moves downward from the 180-Foot Aquifer to the 400-Foot Aquifer. Hence, the model-calculated gain in the "180-Foot Aquifer" is actually a reduction of the existing downward flow from the 180-Foot Aquifer to the 400-Foot Aquifer. The water quality data posted on the cross-sections indicate that near the coast and where project pumping induced drawdowns would be the greatest, the measured TDS concentrations in the 180-Foot Aquifer can exceed 28,000 mg/L. Hence, the 756 afy reported by GeoHydros as being removed from the deeper aquifers would actually be a reduction in downward flow of high-TDS groundwater. Reducing the inflow of high-TDS groundwater into the deeper aquifers would provide a water quality benefit. Because the GeoHydros analysis is conceptually consistent with that found in the EIR/EIS, but flawed and therefore quantitatively different from the EIR/EIS analysis as described above under "Water Levels," no revision to the EIR/EIS analysis is warranted in response to the GeoHydros analysis.



Modified from: GEOSCIENCE, 2016. Monterey Peninsula Water Supply Project - Hydrogeologic Investigation, Technical Memorandum (TM2) Monitoring Well Completion Report and CEMEX Model Update Draft. Prepared for California American Water dated July 15, 2016. Figure 3.

9.79 Equivalent freshwater head calculated from measured TDS concentrations

↓ Inferred vertical groundwater flow component

SOURCE: HydroFocus, 2017

Monterey Peninsula Water Supply Project . 205335.01

Figure 8.2.12-3
Cross-section Showing Calculated Equivalent Freshwater Heads

8.2.12.4 Sensitivity Analysis

Some comments interpreted model sensitivity as a model limitation, and require clarification about the difference between model calibration and model prediction, as each relate to model sensitivity. In model calibration, the parameter sensitivity analysis identified the hydraulic conductivity and storativity[2] values that most influence the comparison between model-calculated and measured results in the history-matching assessment (parameter calibration sensitivity). The most sensitive calibrated values are usually the most reliable when it can be shown they are comparable to reported values from previous studies. When employing a model to predict future conditions, the parameter sensitivity analysis identifies the hydraulic conductivity and storativity values that have the most influence on the predicted water level changes (parameter prediction sensitivity). Because the proposed pumping is an entirely new stress, the most sensitive prediction parameters are not necessarily the same as the most sensitive calibration parameters (often they are not). The prediction parameter sensitivity results provide little to no information about the reliability of the calibrated parameter values.

Appendix E2 Section 6.0, "Uncertainty," explains that both the predictive sensitivity to assumed project operations and the predictive sensitivity to modeled aquifer parameters were considered. In the case of modeled aquifer parameters, the sensitivity assessment used "…extreme values relative to the calibrated values and values reported by other sources, and therefore using these values essentially bracket the range in possible drawdowns." Extreme values were employed to provide a conservative answer to the question "would the model predictions change so as to change the conclusions regarding proposed slant well operation." Extreme values were employed to rigorously test and conservatively quantify the drawdown calculated by the NMGWM^{2016} as part of a planning assessment, and the results have limited application for assessing the adequacy of the model calibration conducted in the history-matching assessment.

8.2.12.5 References

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[2] Specific storativity is the amount of water taken out or put back into a unit volume of an aquifer when the water level changes.

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8.2.13 Master Response 13: Demand (Project Need) and Growth

COMMENTERS ADDRESSED IN MASTER RESPONSE 13

City of Marina	Public Trust Alliance
Monterey Peninsula Water Management District	Public Water Now
California Unions for Reliable Energy	Surfrider Foundation
Carmel River Steelhead Association	Margaret-Anne Coppernoll
Coalition of Peninsula Businesses	Juli Hofmann
Ecological Rights Foundation, the Center for Biological Diversity, and Our Children's Earth Foundation	Carol Reeb
Land Watch Monterey County	Roy Thomas
Pebble Beach Company	

This Master Response addresses comments concerning customer water demand, available water supplies, and growth that could be induced by the proposed MPWSP water supply. Given the wide variety of comments related to water supply and demand, and for clarity: Section 8.2.13.2 addresses comments on demand, Section 8.2.13.3 addresses comments on supplies, and Section 8.2.13.4 addresses comments on growth that would be induced by project water supply and the impacts of that growth. Appendix L: Alternative Supply - Demand Scenarios was prepared in conjunction with this master response to test the possibility of whether the project could be smaller if one considered different supply and demand numbers as suggested in some comments; Section 8.2.13.5 summarizes the results of that inquiry.

EIR/EIS Sections 2.3 through 2.5 provide information on estimated water customer demand, supplies, the basis for those estimates, and supplemental information about water supply and demand and factors affecting them in the area that would be served by the MPWSP. Use of these supply and demand assumptions in the EIR/EIS does not mean that these assumptions will for certain prove true. Forecasting future demand and supply is not an exact science. As stated in EIR/EIS Section 2.5.4, "estimating future water demand necessarily entails the use of assumptions about demand factors that cannot be predicted with absolute certainty." The demand and supply estimates presented in EIR/EIS Sections 2.3 through 2.5 are planning and environmental evaluation tools that are based upon the evidence available from multiple (sometimes conflicting) sources and reasonable assumptions stemming from that evidence. Future supply and/or demand could, in reality, turn out to be higher or lower than estimated. Commenters have expressed that more or less supply is needed and more or less demand should be assumed, and any one of those commenters could end up being correct. The lead agencies do not control demand of service area residents and businesses, which is affected by such things as the economy, trends in use habits, drought, water cost, and more; nor do they control supplies, which are dramatically affected by weather and climate. While the estimates assumed in the EIR/EIS are reasonable based on available data, they are inherently uncertain and cannot be guaranteed. Section 8.2.13.1, below, provides additional discussion of supply and demand in the context of the proposed project and the EIR/EIS analysis.

Note also that evidence concerning supply and demand is being gathered by the CPUC in a process that is separate from, but parallel to, the CEQA and NEPA process. Such evidence will be considered, along with all of the data within the EIR/EIS, to inform and shape the decision on the size of project and the possibility of phasing in the project or alternatives. The Lead Agencies have endeavored to consider and reflect in the EIR/EIS evidence that has been presented in the general CPUC proceeding. It will be up to the decisionmakers to weigh all of the evidence in the record, determine which, if any, option best suits the project purpose and need/satisfies the project objectives, and take appropriate actions based upon findings. This means that the CPUC could decide (for example only) that it is most likely that there will be no further hospitality industry economic recovery such that water need not be supplied for that purpose. So long as substantial evidence supports that ultimate decision, the state permitting agencies may judge the evidence as they see fit.

8.2.13.1 Purpose of the EIR/EIS Demand and Supply Information

NEPA and CEQA analyses typically address potable water demand and supply in the context of evaluating a project's impact on available supply (typically in the utilities section of the impact analysis). In this case, the MPWSP has been proposed to *provide* water supply to the CalAm service area. Given that the MPWSP project objectives and purpose and need are primarily related to supplying water to meet existing and some future water customer needs, supply and demand are fundamentally tied to the ability of the project to satisfy the project need and objectives. Supply and demand are therefore, important to fashioning the requisite range of feasible and reasonable project alternatives. In addition, to the degree that evidence indicates that the project may provide water in an amount that exceeds current demand, the project would be growth-inducing. EIR/EIS Sections 2.3 through 2.5, and Appendix L, provide the Lead Agencies and members of the public with data on water demand and supply in the CalAm service area with which to assess the likelihood that the MPWSP will provide adequate water supply to replace existing Carmel River and Seaside Groundwater Basin (SGB) supplies that were reduced by State Water Board orders and the SGB adjudication. This will allow the provision of an appropriate, acceptable level of supply for the identified additional future customer needs that CalAm proposes to serve.

8.2.13.2 Demand Assumptions

Existing Annual Service Area Demand

Many comments objected to CalAm's estimate of existing annual demand, which is based on service area demand in 2010, stating that the estimate overstates existing demand and ignores the trend of decreasing demand since 2010. The use of 2010 service area demand data to represent existing annual demand is consistent with the California Department of Public Health's California Waterworks Standards,[1] discussed in EIR/EIS Section 2.3.2, Peak Demands. As described in Section 2.3.2, this regulation – and CPUC General Order 103-4 – requires that the water sources of public water systems of the size of CalAm's Monterey District service area have the capacity

1 California Code of Regulations Title 22, Division 4, Chapter 16, Section 64554.

to meet peak demands. Specifically, the regulations require that systems have the capacity to meet maximum (max) day demand and peak hour demand, and specifies that max day demand and peak hour demand are to be determined *based on the most recent ten years of operation* (emphasis added). Peak month demand represents the Monterey District's most critical challenge in meeting peak demand, as elevated demand in the peak month is more sustained, over multiple days, and needs to be considered as a factor in plant sizing (Svindland, 2013b). The trend that shows declining water use is considered. The 2010 service area demand data was used because it provides a higher, more conservative estimate of the local water use to better plan for potential future peak demands and for consistency with California Waterworks Standards and CPUC General Order 103-A. CalAm selected year 2010 to represent peak month demand of existing customers with the explicit expectation that demand would continue to decline, as stated in Draft EIR/EIS Section 2.3.2, and that by 2020, when the desalination plant was expected to be on line, 2010 demand would represent the maximum demand year for this 10-year period, and July 2010 would represent max month demand (Svindland, 2016, as cited in Section 2.3.2).

Comments Urge Lower Demand Number

Some commenters stated that service area demand in 2015 or 2016 was lower than in 2010 and various commenters recommend that demand in one of these years be used to represent service area demand for MPWSP planning; some pointed to the downward trend in water demand shown in EIR/EIS Table 2-2 as evidence that a downward trend in demand would continue. While a generally downward trend in water demand is expected to continue as permanent conservation measures continue to be implemented, demand in recent years has been influenced by two uncommon events: the deepest recession since the Great Depression, recovery from which has been unusually protracted (Federal Reserve Bank of Dallas, 2013); and a severe five-year drought. These events complicate the task of estimating service area demands under more "typical" conditions when the influence of these events is expected to subside.

As described in EIR/EIS Section 2.3, the economic recession that began in late 2007-early 2008 affected the Monterey Peninsula hospitality industry, reducing occupancy levels and visitation rates, and, consequently, reducing water demand at local visitor-serving businesses. The recession was global in scope and commonly recognized as the deepest since the Great Depression, with an unusually weak and prolonged recovery period (Federal Reserve Bank of Dallas, 2013; Fischer, 2014; Russell Sage Foundation et al., 2017). High unemployment and low consumer confidence lingered for years after it was officially declared to be over in mid-2009, with different geographic areas experiencing different rates and degrees of recovery. If lingering effects of the recession continued to depress water demand to some extent in recent years, demand in a fully recovered, robust economy could rebound above 2015 or 2016 demand. The drought was in progress during the last four years shown in Table 2-2 and the governor's declared statewide drought emergency was in effect in the last two years shown. Permanent measures to reduce water use, such as plumbing retrofits and landscaping changes, were implemented during this period. However, it is also likely that many people on the Monterey Peninsula, as throughout the state, made voluntary behavioral changes to reduce their water use during the drought – changes that a water manager cannot count on to be sustained at the same level of commitment in normal rainfall years or when restrictions imposed by the CDO are lifted. Under normal rainfall conditions and without the CDO restrictions, year-to-year declines cannot be expected to be as dramatic as were achieved during the drought, and service area demand could increase to some degree compared to the later years of the drought. For example, urban water production statewide in May 2017[2] (following a wet winter after five years of severe drought) was somewhat higher than in May 2016 and residential per capita water use in May 2017 was somewhat higher in all hydrologic regions than in May 2016 (SWRCB, 2017). For this reason, it may be unwise to assume that the final years of a severe drought, such as 2015 or 2016, provide a reliable estimate of customer demand in non-drought years. In addition, as discussed above, use of 2010 to estimate peak month demand of existing customers ensures capacity to meet the peak need consistent with state waterworks regulations. The general downward trend in demand is expected to continue for some time and this expectation underlies the assumption that using 2010 demand would be consistent with state waterworks regulations regarding capacity to meet peak demands discussed above. That said, the incremental water use reductions achieved each year by conservation measures and programs cannot be expected to continue at the same rate indefinitely as programs and measures reach market saturation in a given service area, barring currently unforeseen technological breakthroughs. The rate of continuing reductions in water use can, therefore, be expected to slow over time and eventually level off.

Comments Urge Higher Demand Number

Some comments state that the demand estimates in the Draft EIR/EIS were too low, that demand estimates reflect current constraints on water use, and that the project should be sized to allow more “relaxed” conservation. Related comments stated that demand estimates need to reflect non-revenue water use and the need for Salinas Valley Groundwater Basin (SVGB) return water; that it was short-sighted not to size the plant to meet general plan buildout; and that minor changes to the EIR/EIS could address a plant sized to meet general plan buildout demand. While some relaxation in the behavioral changes people made during the drought can be expected, as noted in the discussion of 2015 and 2016 demand above, such changes are not expected to warrant a larger-capacity project. The experience of drought, changing weather patterns, and concern about effects of climate change have increased the recognition of the need for ongoing conservation efforts. For example, Governor Brown’s April 2017 Executive Order B-40-17 terminating the January 2014 Drought State of Emergency also calls for “Making Conservation a Way of Life” and retains prohibitions on wasteful water use. MPWMD and CalAm are not expected to abandon or weaken water conservation programs that have been put in place since 1995 or the MPWMD’s prohibition on water waste if the MPWSP were implemented. Demand described in the EIR/EIS is system demand (not water customer consumption) and, therefore, accounts for non-revenue water loss. Regarding SVGB return water, see the discussion under “Supply available for other use” below in Section 8.2.13.3 and Master Response 4. Regarding one commenter’s opinion that the project should be sized to address general plan buildout, EIR/EIS Chapter 2, Section 2.3, describes the demand the project is proposed to meet, which would include some development under adopted general plans: development of legal lots of record represents development that would be anticipated in general plans. EIR/EIS Table 2.5 (Section 2.5) shows the amount of water

2 The most recent month reported as of July 2017.

needed to meet future water demand associated with general plan buildout and in Table 6.3-8 (Section 6.3), the EIR/EIS growth inducement analysis compares the amount of project water that could be available for growth with the amount needed for general plan buildout. The amount of water that would be available to serve growth depends on the project's SVGB return water obligation. Note also that CalAm, the Monterey Peninsula Regional Water Authority representing Monterey Peninsula jurisdictions, the Coalition of Peninsula Businesses, and others agreed to the size of the MPWSP desalination plant in a proposed settlement agreement on plant sizing in 2013 (CalAm, et al. 2013).

Other Demands

Pebble Beach Entitlements

Several comments stated that the Draft EIR/EIS failed to adequately scrutinize the amount of water CalAm assumed for the Pebble Beach water entitlements and that existing customer demand does not include water to serve the Pebble Beach water entitlements. Other comments stated that the recycled water project that was the basis for these entitlements enabled the conservation of far more potable water than the amount represented by the entitlements, that CalAm has an obligation to serve the entitlements from whatever sources are currently available, and that the full entitlement amount represents an existing "irrevocable, divisible, binding entitlement to potable water, as a vested property right and interest" for use on and by the benefitted properties and should, therefore, be classified as existing demand. Related comments stated that because the Pebble Beach entitlements must be honored from existing supplies whether or not a new water project is built, water for the entitlements would not be growth inducing. Comments noted that this obligation has been recognized by the State Water Board and in written agreement between CalAm, the Pebble Beach Company and MPWMD, and that the proposed MPWSP would not change the effect of the Pebble Beach entitlements.

Draft EIR/EIS Section 2.3.3.1 explained that the MPWMD granted the Pebble Beach water entitlements to the Pebble Beach Company and two other fiscal sponsors for underwriting the development of a wastewater reclamation project that MPWMD estimates saves approximately 1,000 acre-feet per year (afy) of potable water. The Pebble Beach Company was granted a 380 afy entitlement. Draft EIR/EIS Section 2.3.3.1 also discussed how much of the original 380 afy entitlement had been used and the basis for concluding that 325 afy was a reasonable estimate of the remaining entitlements not reflected in recent system demand. The State Water Board recognizes that the wastewater project reduced demand on the Carmel River by more than the amount of the water entitlements, as some comments noted, and has stated that the 380 afy represented by the water entitlements is available to serve the Del Monte Forest properties when they are developed. The State Water Board also recognizes that during the CDO extension period (extended by Order 2016-0016 to December 31, 2021), increased diversions from the Carmel River by CalAm to satisfy the Pebble Beach entitlements would not be counted as part of CalAm's diversion limit but instead added to the adjusted base against which CalAm's compliance was measured. The properties developed using these entitlements also are not subject to the prohibition on new service connections contained in the State Water Board CDOs (Anton, 1998; SWRCB, 2009; SWRCB 2016). The commenters who questioned the inclusion of the

Pebble Beach entitlements as part of CalAm's service area demand provided no evidence or reason for excluding this legal obligation to serve water. The water entitlements constitute an existing commitment by MPWMD and obligation to serve by CalAm when the properties are developed, and therefore, are considered part of CalAm's existing demand. Therefore, EIR/EIS Section 2.3.1, Existing Service Area Demand, includes a new section, 2.3.1.3, Pebble Beach Entitlements. Compared to the Draft EIR/EIS, the Pebble Beach entitlements have been moved in the Final EIR/EIS from being part of the project water to a baseline condition because these entitlements represent demand that CalAm is obligated to serve whether or not the project is implemented. As such, the project would not remove an obstacle to growth of the properties served by this water entitlement and the project would not be considered to induce the growth of those lands.

Economic Recovery

Some comments asserted that the Draft EIR/EIS failed to adequately scrutinize the amount of water assumed within the proposed project to serve tourism rebound, that this CalAm estimate was inflated and unsupported, and that tourism has rebounded although water demand remains low, while another comment cited previous MPWMD testimony that CalAm's 500 afy estimate was reasonable. CalAm estimated that water demand at local hospitality-related businesses, which had been depressed due to the lingering effects of the recession that began in late 2007-early 2008, could increase by about 500 afy under a more robust, recovered economy. This estimate was included as part of future service area demand that the MPWSP (with other service area supplies) would need to serve. The Draft EIR/EIS growth inducement analysis (Section 6.3) conducted additional review of available commercial sector water consumption data and concluded that some degree of economic recovery had likely occurred and that additional demand at existing businesses under a fully recovered economy may be less than CalAm had estimated – closer to 250 afy than 500 afy. The Draft EIR/EIS described the 2016 economic study of travel impacts mentioned in some comments, which showed that transient occupancy tax receipts in Monterey County declined for several years following 2008, but by 2012 were greater than before the recession. While this study provides evidence that the hospitality industry in the county has recovered to some extent, the study does not support a direct comparison of tax receipts in different years because the tax receipt data were not adjusted for inflation; therefore, increased tax receipts in recent years likely reflect, to some extent, increases in lodging prices that have occurred since 2008, in addition to increased occupancy rates due to a recovering economy. Thus, that single study does not establish that the county's economy has fully recovered.

In response to a comment stating that economic rebound would affect demand in all commercial, industrial, and institutional sectors – not just restaurants and lodging – CalAm water consumption data for the industrial and public authority sectors were reviewed in addition to the commercial sector consumption data discussed in Draft EIR/EIS Section 6.3.5.1 and shown in Table 6.3-2. The data show that demand for the three sectors combined in years after the recession commenced is lower than pre-recession demand by a greater margin than a comparison of the commercial sector alone for the same time periods. For example, a comparison of demand in the four years before the recession started (2004 through 2007) with the four years after (2008 through 2011) shows that average annual commercial sector demand was 230 acre-feet (af) lower than average annual demand in the four years before the recession started, whereas average annual demand for the three sectors combined was 600 af lower. Non-residential demand since 2012 has continued to decrease, thereby increasing the difference in demand compared to 2007 or other years before 2008, even though the economic study discussed above suggests that the economy had begun to recover, to some extent, by 2012. The lower demand in recent years is assumed to reflect responses to the drought at least as much – likely more – than lingering effects of the recession. Some post-drought rebound in demand is expected to occur, as discussed above under "Comments Urge Lower Demand Numbers," and available evidence has not established that the economy in CalAm's service area has fully recovered. However, non-residential demand in a fully recovered economy is not expected to return to pre-recession demand levels given permanent reductions in water consumption achieved by ongoing conservation programs since 2007. If somewhat more supply were needed for economic recovery than was assumed in the Draft EIR/EIS growth inducement analysis, taking into account economic rebound in the industrial and public authority sectors in addition to the commercial sector, this would not change the Draft EIR/EIS conclusions regarding the project's growth-inducing impact but could reduce somewhat the amount of water assumed to be available for growth.

Legal Lots of Record

Comments stated that the Draft EIR/EIS failed to adequately scrutinize the amount of water that CalAm has assumed is needed as part of the project to serve legal lots that do not now use water; that development has occurred since MPMWD's preliminary reports were prepared in the early 2000s estimating the water needed for these lots; and that some vacant lots on improved parcels that were included in MPWMD's vacant lot study may never be split from the main property and developed. Draft EIR/EIS Section 6.3.5.1 described the basis for CalAm's estimate of demand associated with vacant legal lots of record and summarized available information about this estimate. This included information on the preliminary studies that had been prepared for MPWMD and MPWMD's testimony during MPWSP proceedings that, based on MPWMD's assessment of available data, CalAm may have underestimated demand associated with lots of record. As the EIR/EIS states, one objection MPWMD had with one of the vacant lot studies (which it had commissioned but did not adopt) was that the demand estimate did not include demand associated with vacant lots on improved parcels in unincorporated areas. EIR/EIS Section 6.3.5.1 has been revised to include updated information from MPWMD (in Draft EIR/EIS comments, summarized above) that some lots have been developed and some vacant lots on improved parcels may never be developed. Due in part to the limited data on this component of project demand, Draft EIR/EIS Section 6.3.5.3 and Table 6.3-8 compared the water supply that would be provided by the project to serve legal lots of record and other new development with the estimate of water supply needed to serve development under adopted general plans in CalAm's service territory, and concluded that the amount of water supply provided by the project was consistent with (and less than) the estimate of water supply that would be needed to support general plan buildout.

Other Approaches to Estimating Future Water Demands

Some comments stated that the Draft EIR/EIS failed to conduct a per capita demand analysis or similar analysis based on water use per dwelling unit to determine the level of growth that would be supported by the proposed project. Estimating demand based on per capita water use is one of several methods to estimate future water demand. The EIR/EIS compared the water that would be provided for additional development with the estimate of future water needs prepared by MPWMD, as described in Section 6.3.5.3 and shown in Table 6.3-8. The approach MPWMD took in 2006 to estimate future demand involved close consultation with service area jurisdictions and was based on anticipated land use development in the jurisdictions consistent with the respective adopted general plans. The analysis factored in water use based on different types of non-residential land uses, and recognized differences in water use in unincorporated county residences compared to city residences due to larger lot sizes, among other factors. One could reason this approach is no less valid than one based on estimated per capita or per dwelling unit water use, and arguably provides a more nuanced assessment of future water needs accounting for different land use types. The updates to the MPWMD estimates discussed in EIR/EIS Section 2.5.3.4 and shown in detail in EIR/EIS Table 2-5 were provided after the moratorium on new water connections was established in 2009. Therefore, little if any of this projected future demand will have been realized (became actual water use that would be reflected in existing demand) and the MPWMD estimates as revised are assumed to continue to reasonably reflect future water supply needs in CalAm's service area. The estimate of future water demand used in the EIR/EIS is appropriate and adequate because it is based on existing demand (for the substantial portion of the MPWSP that would replace water supplies no longer available to CalAm due to legal decisions discussed in EIR/EIS Section 2.2) and was evaluated with reference to the analysis of future water needs that was prepared by MPWMD.

Summary of Demand Assumption Revisions

For the reasons discussed above, the overall demand of 14,275 afy shown in Draft EIR/EIS Tables 2-3, 6.3-1, and 6.3-3 has not changed. However, the breakdown of identified existing and anticipated future demands shown in Table 6.3-3 has been revised: existing demand has been revised to include the 325 afy associated with existing Pebble Beach water entitlements, thereby increasing the estimate of existing demand from the 12,520 afy shown in the Draft EIR/EIS to 12,845 afy in the Final EIR/EIS. Correspondingly, because demand associated with anticipated future development shown in Table 6.3-3 no longer includes the Pebble Beach entitlements, it has been reduced by 325 afy, from 1,755 afy in the Draft EIR/EIS to 1,430 afy in the Final EIR/EIS.

8.2.13.3 Supply Assumptions

This section responds to comments concerning Draft EIR/EIS assumptions regarding available water supply. As discussed in the EIR/EIS and below, data concerning supply (as with data regarding demand) were derived primarily from estimates provided by CalAm and MPWMD.

ASR System

Several comments stated that the amount of water supply provided by the Aquifer Storage and Recovery (ASR) project assumed in the EIR/EIS was too low – that MPWMD assumed a higher yield from the ASR project and that a yield of 1,920 afy should be assumed rather than 1,300 afy assumed in the EIR/EIS. MPWMD commented that it has recently revised its estimate of the average annual yield from the ASR project. Draft EIR/EIS Section 2.4.3 explained that although the EIR prepared for the Phase I and Phase II ASR projects estimated the combined yield of the two phases would be 1,920 afy, diversions to the ASR system are contingent on maintaining minimum daily instream flows in the Carmel River. Precipitation and streamflow can vary substantially from year to year; due to these uncertainties and constraints on potential diversions, the estimated long-term average annual ASR system yield of 1,300 afy assumed for the purpose of MPWSP water supply planning was considered reasonable to account for these fluctuations. MPWMD's updated estimate of the ASR project yield indicated that the weighted average yield (accounting for the statistical frequency of different water year types) of the Phase 1 and 2 ASR projects with the recently approved Monterey Pipeline is about 1,600 afy (see response to comment MPWMD-14). While CalAm's 1,300 afy estimate of long term average yield of the ASR project is more conservative than MPWMD's 1,600 afy estimate, CalAm's estimate is not unreasonable given the low yields during drier years – which many expect to be more frequent in the future due to climate change. Draft EIR/EIS Section 2.4.3 reported the substantial variation of Carmel River water available for ASR storage in recent years: "In water year 2011, which was wetter than average, 1,117 af of Carmel River water was injected into the groundwater basin. In water year 2012, 132 af was injected; in 2013, 295 af was injected, in 2014, no Carmel River water was injected, and in 2015, 215 af was injected."

Table 13 Water Rights

One commenter stated that the EIR/EIS should include water supply available under CalAm's Table 13 water rights, that Table 13 water supply should not be excluded on the basis that it is only available in wet years, and that it is not limited to wet years because it can be stored through the ASR system. As discussed in Draft EIR/EIS Section 2.4.6.1, CalAm's Table 13 water rights are subject to river flow criteria and other conditions, and Table 13 water must be used in the Carmel River watershed. That is, water available under this right cannot be diverted to storage in the ASR system, which is outside the Carmel River watershed. While Table 13 water is a useful supplement to CalAm supplies when it is available, it is less reliable than supply available via CalAm's other Carmel River rights because Table 13 water would not be available in dry years. Due to the variability of this supply, it is not appropriate to include it as a reliable element in CalAm's yearly supply portfolio. For example, as stated in Draft EIR/EIS Section 2.4.6.1, CalAm's combined diversions of Carmel River water under CalAm's Table 13 and ASR water rights were less than 300 afy in water year 2015. Regarding the effect of Table 13 water on desalination plant operations, in the proposed sizing settlement agreement signed by CalAm, the Monterey Peninsula Regional Water Authority, MPWMD, and others in 2013, CalAm agreed that if Table 13 water is available, "CalAm shall be able to lower the operating level of the desalination plant or use the Table 13 rights first in the year to allow other existing rights to be used later in the year for emergencies" (CalAm et al., 2013).

Sand City Desalination Plant

One commenter stated that more water is available to CalAm from the Sand City desalination plant than the 94 afy assumed for the project and noted that the description of the No Project Alternative in Draft EIR/EIS Section 5.4.2.3 assumed that 230 afy would be available from the Sand City plant. As discussed in EIR/EIS Section 2.4.4, CalAm's long term supply from the Sand City desalination plant water is 94 afy, and is the amount assumed in EIR/EIS Chapter 2 and Section 6.3. More is available in the near term – until Sand City needs the full 206 afy balance of the plant's 300 afy production for development in Sand City. The timing and amount of availability of water for CalAm in excess of 94 afy is not under the control of CalAm, but is solely a function of growth in Sand City. To characterize CalAm's supply portfolio under the No Project Alternative when CalAm's unlawful Carmel River diversions end, pursuant to the 2016 CDO, 230 afy was assumed to be available from the Sand City plant. This is a near-term estimate of supply based on the amount assumed in the State Water Board's 2009 CDO for year 2016-2017, the last year for which the 2009 CDO provided a quantified estimate of supply available to CalAm from the Sand City plant.[3] The Final EIR/EIS Section 5.4.3.2 discussion under "Supply Shortages" has been revised to clarify that supply available to CalAm from the Sand City desalination plant under the No Project Alternative would eventually be reduced to 94 afy, as assumed for the MPWSP. Alternative supply and scenarios presented in Appendix L and summarized below in Section 8.2.13.5 include scenarios that assume 230 afy would be provided by the Sand City desalination plant.

GWR Supply

One commenter stated that the Draft EIR/EIS analysis underestimated the supply that would be available to CalAm from the GWR project and that 3,700 afy would be available to CalAm rather than the 3,500 afy assumed in the EIR/EIS. The amount of GWR supply that the EIR/EIS assumes would be available to CalAm is based on GWR project information. MRWPCA staff confirmed in September 2017 that an average of 3,500 afy of GWR water would be provided to CalAm. The GWR project also includes a drought component, which entails banking 200 afy in the groundwater basin for agricultural use during drought periods. That is, of a total of 3,700 acre-feet that would be injected into the groundwater basin each year, on average, 200 afy would be banked and withdrawn when needed during drought periods to provide additional supply to Salinas Valley growers (Imamura, 2017).

At the request of the CPUC, MRWPCA submitted three hypothetical scenarios to expand the GWR Project and produce more than 3,500 acre feet of purified recycled water annually for (CalAm's) Monterey District service area. In its testimony, MRWPCA emphasized that these scenarios are speculative; at this time, MRWPCA has no plans or proposals to expand the PWM Project beyond the current plans for expansion to 5 mgd (million gallons per day). As such, these scenarios are not assessed in this Final EIR/EIS. See Testimony at ohttp://docs.cpuc.ca.gov/PublishedDocs/SupDoc/A1204019/990/197582477.pdf.

Supply for Peak Demands

One commenter suggested that, similar to electric utilities, CalAm's Monterey District would require a "reserve margin," which the commenter defined as "a measure of the amount of electricity imports and in-state generation capacity available over average peak demand conditions" and asserted that the MPWSP project objective "to develop a reliable water supply for the CalAm Monterey District service area, accounting for peak month demand of existing

[3] The 2016 CDO does not quantify an estimate of near term supply available to CalAm from the Sand City plant. The 2016 CDO states that the Sand City desalination plant provides CalAm a minimum of 94 afy and the balance of the plant's capacity not needed for expanded use in Sand City.

customers" is a type of "planning or month-ahead reserve margin requirement" to meet demand of existing customers. Related comments suggested that a reserve margin of 10 percent applied to 2016 annual demand would be adequate to meet system capacity needs. Like any water supplier, CalAm needs adequate capacity to meet peak demands, as a practical matter and as required by state Waterworks Standards discussed above in Section 8.2.13.2 and EIR/EIS Section 2.3.2. Thus, the size of the MPWSP is logically tied to these peak demands. As noted above under "Existing Annual Service Area Demand," peak month demand is the peak demand that challenges system capacity in CalAm's Monterey District, and state Waterworks Standards require the system to have the capacity to meet peak demands considering the most recent ten years of operation. While a commenter suggested that a 10 percent margin should be adequate to meet CalAm's capacity requirements, monthly demand varies by much more than 10 percent. **Table 8.2.13-1** shows the variation in average monthly production demand anticipated for the project in a typical year. "System production demand" includes CalAm service area demand assumed for the proposed project and SVGB return water. The production demand shown is based on a 9.6 mgd desalination plant with an assumed 6 percent SVGB return water obligation. As shown, demand in the peak month, July, is roughly 35 percent greater than average monthly demand for the year overall, and demand in December is roughly 30 percent lower than the average monthly demand for the year. The comments raising the topic of a reserve margin defined it as being an amount "over average peak demand" but did not indicate what the "average peak demand" was assumed to be for the CalAm system. Comments subsequently implied that the reserve margin was an amount above average demand, and failed to demonstrate how the assumed 10 percent reserve margin could meet CalAm's peak demand capacity requirements. Regarding the assumption that 2016 demand accurately represents existing average annual demand, see the discussion of "Comments Urge Lower Demand Numbers" above in Section 8.2.13.2.

"Supply available for other use"

Several comments stated that water supply shown in Draft EIR/EIS Table 2-4 as "available for other uses" is surplus, should be subtracted from the asserted demand for this project, and shows that a smaller desalination plant would be feasible. The water shown in EIR/EIS Table 2-4 as "supply available for other use" is the volume of water available for other uses after service area demand is subtracted from anticipated supplies. Much of this water would be used to meet CalAm's SVGB return water obligation. SVGB return water is discussed in Section 2.5.1 and Section 2.6. See also Table 6.3-4 in Chapter 6, which shows supplies, demands, and two estimates of SVGB return water. Thus, supply shown as available for other use after service area demand is met is not necessarily surplus that would allow for a reduction in the size of the proposed project. Refer to Master Response 4, The Agency Act and Return Water. As discussed under "Conclusion: MPWSP Water Service Capacity" in EIR/EIS Section 6.3.5.1, there could be surplus supply after meeting the return water obligation – or a deficit – depending on the actual amount of the return water obligation. As that discussion states, supply not needed for other uses would be available to support new development. In addition, as indicated in the notes in Draft EIR/EIS Table 2-4, the estimates of annual water supply provided by desalination plant production show a direct unit conversion of the rated capacity of a 9.6 mgd and a 6.4 mgd plant, and thus reflect operation at 100 percent capacity. This is greater than industrial facilities are typically recommended to operate. If operating the plant at or near full production capacity

TABLE 8.2.13-1
TYPICAL MONTHLY SYSTEM PRODUCTION DEMAND - PROPOSED MPWSP

	January	February	March	April	May	June	July	August	September	October	November	December	Monthly Average
MPWSP System Production Demand (mgd)[a]	10.0	10.2	10.9	11.6	16.4	18.6	19.1	18.8	18.6	14.7	11.7	9.6	14.2
Percent of Average Monthly Demand[b]	70%	72%	77%	82%	116%	131%	134%	132%	131%	103%	83%	68%	100%

NOTES:
mgd = million gallons per day

[a] System production demand includes existing annual service area demand and additional demands the project is proposed to meet (Pebble Beach water entitlements, demand associated with hospitality industry economic recovery, and legal lots of record, shown in Draft EIR/EIS Chapter 2 Table 2-3), and Salinas Valley Groundwater Basin return water assuming a 6 percent return water obligation for a 9.6 mgd desalination plant.

[b] This row compares the typical demand for the month with annual average monthly demand to show the month-to-month variation in system production demand over the course of a year. For example, in July, demand is about 35 percent higher than the annual average (134%-100%), and in December, demand is about 30 percent lower than the annual average (100%-68%).

SOURCE: CalAm, 2016; ESA, 2017.

provided more water than needed to meet service area demand and the return water obligation, the plant could be operated at a lower capacity. As discussed above, the plant is sized to provide the flexibility needed to meet peak month demands.

Supply Provided by the Desalination Plant

One commenter asserted that the Draft EIR/EIS provided insufficient information on how CalAm's multiple water supply sources will be operated together to ensure supplies were optimized and another commenter expressed concern about high operating capacity assumed for the plant. As shown in EIR/EIS Table 3-7, the proposed desalination plant is expected to operate at a relatively constant rate throughout the year. As described in EIR/EIS Section 3.4.2, during wet periods, CalAm would store desalinated water supply in the SGB via the ASR system, and the stored desalinated product water as well as stored Carmel River supplies would typically be extracted during summer months and periods of peak demand. To illustrate how the plant would be operated in conjunction with CalAm's other supplies, **Table 8.2.13-2** shows an example of typical monthly operations for the proposed 9.6 mgd desalination plant assuming a 6 percent SVGB return water obligation.[4] The EIR/EIS assumption that the plant would operate primarily at or near full production capacity (e.g., at 95 to 100 percent most months in the monthly operations table below and at 100 percent capacity in EIR/EIS Tables 2-4 and 6.3-4) is conservative from the perspective of evaluating the environmental impacts of plant operations and indirect effects of water supply the project would provide, but operating at 95 to 100 percent capacity is a higher operating capacity than would likely be considered practical. Most industrial facilities do not operate this close to 100 percent capacity.[5] Should supplies be somewhat greater than demand, or longer-term demand decline due to conservation programs, the plant could be operated at a somewhat lower capacity. Indeed, although MPWMD has not determined the allocation of water that would be provided by the project, MPWMD stated in a comment on the Draft EIR/EIS that it may not allocate all of the water produced by the project. One reason MPWMD may choose not to allocate the full amount that could be produced would be to allow the plant to operate at a lower capacity (see comment MPWMD-21). Absent assurance that the plant would be operated at a lower level, the EIR/EIS analysis assumed that the plant would operate at or near full capacity. The monthly operations shown in Table 8.2.13-2 assume normal rainfall conditions. In dry years, less water may be available from the Carmel River, e.g., for diversion to the ASR system. In extended dry periods, such as the recent drought, even water that may have previously been injected into the ASR system over a period years[6] could be depleted. In such periods, supplies provided by the desalination plant would be even more critical.

4 This table is based on a monthly operations table showing a 7 percent SVGB return water obligation that was prepared by CalAm. The table was revised for this example to show a 6% return obligation, for consistency with the mid-range return obligation percentage considered in EIR/EIS groundwater modeling, by reducing the amount of return water delivered from May to October to CSIP.

5 For example, according to the U.S. Census Bureau's quarterly surveys of plant capacity utilization rate, U.S. domestic manufacturing plants on average used 71 to 73 percent of their full production capacity in 2016, although a few industries operated above 90 to 95 percent in some or all quarters. Reverse osmosis desalination was not listed as a category of industrial facilities in the survey (U.S. Census Bureau, 2017).

6 As noted in the ASR discussion above, it is assumed when CalAm has a replacement supply that enables it to cease unlawful diversions that it will not be required to use stored ASR water in the same year it is injected.

TABLE 8.2.13-2
AVERAGE DAILY SUPPLY AND DEMAND ASSUMING 9.6 MGD DESALINATION PLANT, BY MONTH[a]

	MGD												Acre-Feet
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual[b]**
Average Demand	9.5	9.7	10.3	10.9	14.1	16.1	16.7	16.4	16.1	13.0	11.1	9.1	14,300
Salinas Valley Return – Castroville[c]	0.5	0.5	0.6	0.7	0.8	0.9	0.9	0.8	0.8	0.8	0.7	0.5	800
Salinas Valley Return – CSIP[c]	0.0	0.0	0.0	0.0	1.5	1.6	1.6	1.6	1.6	0.9	0.0	0.0	820
Total System Production Demand	**10.0**	**10.2**	**10.9**	**11.6**	**16.4**	**18.6**	**19.1**	**18.8**	**18.6**	**14.7**	**11.7**	**9.6**	**15,920**
Supplies													
Carmel River to Distribution System	5.7	5.7	5.7	5.2	2.2	1.0	1.0	1.0	1.0	1.0	1.0	5.7	3,366
Seaside GW Supply to Distribution System	0.0	0.0	0.0	0.0	1.1	1.2	1.3	1.3	1.1	1.1	1.1	0.0	771
Sand City Desalinated Supplies to Distribution System	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	94
ASR – GWR Supplies Extracted from Seaside GW Basin	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
ASR – Carmel River Supplies Extracted from Seaside GW Basin	0.0	0.0	0.0	0.6	1.6	2.3	2.5	2.5	2.3	1.4	1.0	0.0	1,332
ASR – Desalinated Supplies Extracted from Seaside GW Basin	0.0	0.0	0.0	0.0	2.8	5.0	5.3	4.9	5.1	1.9	0.0	0.0	2,343
MPWSP Desalinated Supplies to Distribution System	3.8	4.0	4.6	5.1	6.3	6.5	6.5	6.6	6.5	7.5	7.9	3.3	6,394
Total Supplies to Distribution System	**9.5**	**9.8**	**10.3**	**10.9**	**14.1**	**16.1**	**16.7**	**16.4**	**16.1**	**13.0**	**11.1**	**9.1**	**14,300**
Total Supplies to Distribution System and SVGB	**10.0**	**10.2**	**10.9**	**11.6**	**16.4**	**18.6**	**19.1**	**18.8**	**18.6**	**14.6**	**11.7**	**9.6**	**15,914**
Difference: Total Supplies minus Total Production Demand	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.1	0.0	0.0	0.0

TABLE 8.2.13-2 (Continued)
AVERAGE DAILY SUPPLY AND DEMAND ASSUMING 9.6 MGD DESALINATION PLANT, BY MONTH[a]

	mgd												Acre-Feet
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual[a]**
Supply Provided by MPWSP Desalination Plant													
Desalinated Supplies to Distribution System	3.8	4.0	4.6	5.1	6.3	6.5	6.5	6.6	6.5	7.5	7.9	3.3	6,394
Desalinated Supplies to ASR Injection	5.4	5.0	4.5	3.5	0.0	0.0	0.0	0.0	0.0	0.0	1.1	5.8	2,347
Desalinated Supplies to Salinas Valley Return – Castroville	0.5	0.5	0.6	0.7	0.8	0.9	0.9	0.8	0.8	0.8	0.7	0.5	800
Desalinated Supplies to Salinas Valley Return – CSIP	0.0	0.0	0.0	0.0	1.5	1.6	1.6	1.6	1.6	0.9	0.0	0.0	820
Total Desalinated Supplies	**9.6**	**9.5**	**9.6**	**9.3**	**8.6**	**9.0**	**8.9**	**9.0**	**9.0**	**9.2**	**9.6**	**9.6**	**10,361**
Supply Extracted from Seaside Groundwater Basin via ASR System													
GWR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
Carmel River	0.0	0.0	0.0	0.6	1.6	2.3	2.5	2.5	2.3	1.4	1.0	0.0	1,332
MPWSP Desalinated Supplies	0.0	0.0	0.0	0.0	2.8	5.0	5.3	4.9	5.1	1.9	0.0	0.0	2,343
Total Extraction	**0.0**	**0.0**	**0.0**	**0.6**	**4.4**	**7.3**	**7.8**	**7.4**	**7.4**	**3.3**	**1.0**	**0.0**	**3,675**

NOTES: MGD = million gallons per day
Components may not sum to the totals shown due to rounding.

[a] Based on MPWSP supply and demand assumptions: average demand of 14,275 afy, 94 afy supply from the Sand City desalination plant, and 1,300 afy from the ASR system.
[b] Annual totals in acre-feet/year are calculated by converting the estimated monthly averages in mgd shown here, provided for information purposes. 1 mgd = 1,120 afy
[c] Assumes a 6 percent Salinas Valley Groundwater Basin return water obligation.

SOURCE: CalAm, 2016; ESA, 2017.

Water Available after Seaside Groundwater Basin Replenishment

For the first 25 years of operations, CalAm would pump 700 afy less than its adjudicated right from the SGB to provide “in-lieu” replenishment of water it has pumped in excess of its adjudicated rights since that basin was adjudicated. At the end of the 25-year period, CalAm would have access to its full 1,474 afy adjudicated right. The additional 700 afy that would then be available to CalAm could be used to offset loss of capacity at Los Padres Reservoir, as stated in comment MPWMD-17; to reduce the operating level of the desalination plant; or to serve additional growth within the CalAm service area, as stated in “Conclusion: MPWSP Water Service Capacity” in EIR/EIS Section 6.3.5.1. Added to the supply available for future development assuming either 6 or 12 percent SVGB return obligation, shown in Draft EIR/EIS Table 6.3-8, this would still be less than the revised MPWMD estimate of future supply needs. If no water is needed to be returned to the SVGB, supplies with the additional 700 afy from the SGB that would be available for future development would total 4,149 afy. This **would exceed the amount of water needed for growth** under adopted general plans based on the revised MPWMD estimate of future supply needs (3,526 afy) shown in Draft EIR/EIS Table 6.3-8. Supply available for future development would exceed this estimate of future supply needs by 623 afy, which represents 2.3 percent of the source water needed for a 9.6 mgd plant (assumed to be 24.1 mgd, or 26,990 afy). Therefore, if the SVGB return water obligation turned out to be an amount less than 2.3 percent, the amount of water available after the Seaside Basin replenishment period would change the Draft EIR/EIS conclusion regarding the consistency of the project with planned growth and thus the project’s growth inducing impact. However, as explained in Master Response 4, Section 8.2.4.3 (see also EIR/EIS Appendix E3), the actual annual volume of return water could be 10 percent in the first few months of project pumping and would be no more than 5 percent within 5 years of project pumping. Therefore, based on current available information, the Draft EIR/EIS conclusion – that the supply provided by the project would be consistent with growth anticipated in jurisdictions’ adopted general plans – remains valid.

Summary of Supply Assumptions

For the reasons discussed above, the amount of water supply provided by the project and CalAm’s other supply sources shown in Draft EIR/EIS Table 2-4 has not changed. Based on current groundwater investigations, the SVGB return water obligation would be about 5 percent within 5 years and therefore, Draft EIR/EIS conclusion about the consistency of water supply provided by the project with water needed for growth under adopted general plans would not change.

8.2.13.4 Growth Inducement

Water Available for Growth

Comments claimed that demand is overestimated and available supply underestimated, and therefore, the project would provide more water than needed, inducing more growth than identified in the Draft EIR/EIS. Some comments asserted that because demand has been decreasing, the project would result in more water than the analysis assumed for new development, and that the amount of water available for growth would exceed water needed for general plan buildout in the service area. Related comments asserted that the EIR/EIS approach of looking at growth projections and buildout in general plan EIRs is not appropriate because the general plans and their environmental documents are outdated and baseline conditions have changed. Sections 8.2.13.2 and 8.2.13.3, above, address comments concerning the EIR/EIS demand and supply assumptions and document why they remain reasonable – and, consequently, why the quantity of water assumed to be available to serve additional growth is also reasonable. As discussed in EIR/EIS Section 6.3.2.1, a jurisdiction's general plan is its comprehensive, long-term plan for physical development, including the general distribution, location, and extent of land uses, and recommended standards of population density and building intensity. Consequently, service area jurisdictions' adopted general plans provide an appropriate indication of the development anticipated in CalAm's service area. The comparison in EIR/EIS Table 6.3-8 of water supply available for future development provided by the project and CalAm's other supply sources with future water supply needs is based on the estimate of future water needs prepared by MPWMD in 2006, in consultation with representatives of service area jurisdictions. As described in Section 6.3.5.3, the jurisdictions provided estimates of anticipated development at the time, consistent with their adopted plans. All of the subsequent updates of the 2006 estimates, which are shown in Draft EIR/EIS Table 2-5, were provided since 2009, when the moratorium on new water connections was in effect. Therefore, the MPWMD estimate of future water supply needs, as revised, remains a reasonable point of comparison for growth that would be supported by project water supply. The Draft EIR/EIS analysis confirmed that the project water supply available to support new development would be consistent with that estimate of future water needs and no change has been made to the EIR/EIS.

One commenter asserted that the EIR/EIS assumption that project water not needed to meet existing demand potentially could be used for any purpose was inconsistent with stated project objectives and could lead to the need for another water supply project in the future with the same objectives – serving lots of record, Pebble Beach entitlements, and tourism demand – if the MPWSP water supply was not reserved for the stated project objectives. The commenter stated that the EIR/EIS should include mitigation to limit use of project water to the stated purposes, and if the CPUC does not have authority to impose such mitigation, the EIR/EIS should be revised to identify this as a potentially significant impact. CalAm is responsible for providing water within its service territory. The MPWMD – not CalAm, the CPUC or MBNMS – is responsible for allocating water supply within CalAm's service territory (see EIR/EIS Section 2.5.4), but has not yet prepared an allocation for the proposed MPWSP supply. Note that comment MPWMD-21 presents some options that the MPWMD would consider in the allocation process, including reserving some water for lots of record, economic recovery, and Pebble Beach entitlements. The "impact" suggested by this commenter would flow from the inability of all parties to make water available per the project objectives. This is speculative and also not reasonably foreseeable given that water for Pebble Beach is based on established entitlements, and especially given the MPWMD's comments about allocation. In the absence of definitive information about how MPWMD would allocate the proposed water supply, and given that CalAm and the Lead Agencies cannot dictate how project water is used, the EIR/EIS properly discloses the potential that jurisdictions that are allocated project water would be able to use it for purposes other than those underlying CalAm's project objectives. EIR/EIS Section 6.3.6 identifies the project's growth inducing impact as significant and unavoidable.

Impacts of Growth

Comments regarding growth impacts stated that the Draft EIR/EIS analysis cannot avoid or ignore the impacts of growth induced by the project on the theory that the growth may have been included in the analysis of various general plans; that induced growth would contribute to cumulative GHG emissions and global climate change; and that the impacts of growth induced by cumulative water supply projects were not adequately described or analyzed. Draft EIR/EIS Section 6.3 acknowledges that the project would remove an obstacle to growth by removing, to a degree, water supply limitations in CalAm's service area. The analysis identifies the impacts of growth that the project would support. The impacts of planned growth that would be supported, in part, by the project have been identified in the general plan CEQA documents of service area jurisdictions; as discussed in EIR/EIS Section 6.3.6, some of the identified indirect impacts of growth are significant and unavoidable; others are significant but can be mitigated. These are the impacts to which the project would indirectly contribute by providing water supply, and are the basis for the determination that the project's growth inducing impact would be significant and unavoidable. Section 6.3.6 and Table 6.3-9 summarized the impacts of this growth. Draft EIR/EIS Appendix J2 provided a more detailed summary of the impacts and the mitigation measures identified in the general plan CEQA documents to mitigate the effects of that growth. Table 6.3-9 identified 'contribution to cumulative greenhouse gas emissions and global climate change' as one of the significant unavoidable impacts associated with growth supported by the project. In addition, the EIR/EIS growth inducement analysis states that although some of the general plan CEQA documents of service area jurisdictions were prepared before passage of the California Global Warming Solutions Act of 2006, the project was indeed expected to indirectly contribute to a significant and unavoidable increase in greenhouse gas emissions as a result of growth supported by project water supply; see EIR/EIS Section 6.3.6. The general plans and their respective CEQA documents are not unrelated to the project water supply, as one comment suggested. Project water not needed as Carmel River and SGB replacement supply to meet existing demand would be allocated to jurisdictions or reserved by MPWMD. Decisions relating to project water that is allocated to jurisdictions would be the responsibility of the respective jurisdictions and subject to their land use plans, policies and regulations, chief among which typically is the general plan. Comments to the effect that the analysis "wrote-off" growth-related impacts as an obligation of the municipal planning process may misunderstand Section 6.3.6.2, Authority to Mitigate Effects of Growth. As discussed above, the Draft EIR/EIS identified growth inducement as a significant and unavoidable impact of the proposed project. However, as stated in section 6.3.6.2, the CPUC, MBNMS, and CalAm do not have the authority to approve, deny, or impose mitigation measures upon land uses that may rely on project water for their development. Urban growth typically results in many common impacts – those impacts are described and disclosed for the MPWSP in Section 6.3.6. Multiple water projects in the region would increase growth in the region, as discussed in Draft EIR/EIS Section 6.3.7. The cumulative analysis accurately concludes that the effect of growth induced by cumulative water projects would be to increase the severity of the impacts and expand the area that would be affected by these impacts.

8.2.13.5 Alternative Supply and Demand Assumptions

Questions have been raised as to whether the project may or may not be necessary or could be smaller if one considered different supply and demand numbers that some commenters believe are more reasonable than those used in the Draft EIR/EIS. In order to test out that possibility, Appendix L was prepared for informational purposes only (i.e., without change to the assumptions in the EIR/EIS, as addressed above throughout this Master Response) to consider the results of using different supply and demand numbers. The primary consideration is whether facts exist to support a smaller desalination plant (e.g., having one less reverse osmosis [RO] unit) such that either a smaller plant or a phased plant could be approved for the 9.6 mgd project or the 6.4 mgd Alternative 5a. The results of that sensitivity analysis could inform and affect the ultimate project decision.

The first scenario considered in Appendix L is based on the following demand assumptions:

- Demand in 2013 (rather than 2010), the year before the drought emergency was declared, represented existing annual demand of 11,360 afy rather than 12,270 afy
- The same amount of water would be needed to serve Pebble Beach entitlements as assumed in the EIR/EIS (325 afy)
- Economic recovery of the tourism industry would require half the supply shown in EIR/EIS Table 2-3 for this demand component (250 afy rather than 500 afy)
- Development of lots of record would require half the supply shown in EIR/EIS Table 2-3 for this demand component (590 afy rather than 1,180 afy)

Together these assumptions would thus reduce overall service area demand to 12,521 afy, compared to the 14,275 afy assumed for the project.

These demand assumptions were paired with three different ASR supply assumptions and two different Sand City desalination supply assumptions, shown below, to create six variations of Scenario 1, Scenarios 1a through 1f.

- ASR supply of 0 (during a drought), 1300 afy (as assumed in the EIR/EIS), or 1,600 afy (as currently estimated by MPWMD)
- Sand City desalination plant supply of 94 afy (CalAm's long term supply assumed for the MPWSP) or 230 afy (CalAm's near-term supply assumed for the No Project Alternative)

Under Scenario 1, assuming that the ASR system provided at least as much supply as assumed in the Draft EIR/EIS (i.e., 1,300 or 1,600 afy), the plant size could be reduced by one 1.6 mgd RO unit. This would reduce the plant size from 9.6 to 8.0 mgd for the proposed project or from 6.4 to 4.8 mgd for Alternative 5a. However, in a drought when little or no supply was available from the ASR system, there would be insufficient supply to meet assumed demands if the plants were one RO unit smaller. Based on the above demand and supply assumptions that would allow for elimination of an RO unit, if a unit were *not* eliminated, the amount of supply that could be provided in excess of demand would still be within the amount of water needed for growth under adopted general plans discussed in the Draft EIR/EIS. Therefore, these assumptions would not change the Draft EIR/EIS conclusions about the project's growth inducing impact. Moreover, the recent severe, five-year drought demonstrated that it is not reasonable to assume that there would never be drought conditions that could deplete ASR reserves and prevent new ASR supplies being diverted from the Carmel River for storage and use. Consequently, changes in plant sizing based on scenarios that assume the availability of adequate ASR supplies would need to be considered carefully.

Scenario 2 considered in Appendix L is based on the following assumptions:

- Demand in 2015 (rather than 2010), well into the recent drought, represented existing annual demand of 9,545 afy rather than 12,270 afy
- The same assumptions regarding the other demand components described above for Scenario 1 (Pebble Beach entitlements = 325 afy, economic recovery demand = 250 afy, and lots of record demand = 250 afy)
- The same assumptions regarding ASR and Sand City supply described above for Scenario 1 (ASR supply = 0, 1,300 afy, or 1,600 afy; Sand City supply = 94 or 230 afy)

These demand and supply assumptions were combined to create six variations, Scenarios 2a through 2f.

Under Scenario 2, the plant size could be reduced by one RO unit even in drought conditions when no water was available from the ASR system. Assuming the availability of ASR system supplies, i.e., non-drought conditions, plant size could be reduced by two RO units – from 9.6 to 6.4 mgd for the proposed project or from 6.4 to 3.2 mgd for Alternative 5a. However, in a drought when little or no supply was available from the ASR system, there would be insufficient supply to meet assumed demands if the plant was two RO units smaller. If the 2015 demand and supply assumptions that include 1,300 or 1,600 afy from the ASR system (i.e., those that allow for elimination of two units) were assumed to be correct, but the proposed plant size was *not* reduced by at least one unit, the amount of supply that could be provided above demand **would exceed the amount of water needed for growth under adopted general plans described in the Draft EIR/EIS. This would change the Draft EIR/EIS conclusion regarding the consistency of the project with planned growth and thus the project's growth inducing impact.** However, as noted above regarding Scenario 1, the recent drought has shown that it is not reasonable to assume there will never be drought conditions that could deplete ASR reserves and eliminate this as a supply source in some years. Given that development under general plan buildout would require adequate supply in all water year types, including droughts, the amount of supply available for additional development when no water was available from the ASR system is therefore, a more reasonable volume with which to compare with the amount of water needed for general plan buildout. When ASR supply is not available, the amount of water that would be provided in excess of demand under Scenario 2 is within the amount of water needed for growth under adopted general plans discussed in the Draft EIR/EIS.

Refer to Appendix L for more information on the alternative supply and demand scenarios that were explored.

References

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8.2.14 Master Response 14: CEMEX Settlement Agreement

COMMENTERS ADDRESSED IN MASTER RESPONSE 14

City of Marina	CEMEX
Marina Coast Water District	

This Master Response provides an update to the status of the CEMEX sand mining facility, also known as the Lapis #110 Pit, the Lapis Sand Pit, and the Lapis Sand Plant. As explained in EIR/EIS Section 4.17.1.2, the California Coastal Commission (CCC) on March 17, 2016, issued a Notice of Intent (NOI) to Commence a Cease and Desist Order to CEMEX property owners (CCC, 2016). The NOI described past discussions between the CCC and CEMEX regarding CCC staff's allegations of the lack of proper coastal development permits and several other violations of the Coastal Act related to sensitive dune habitat in the vicinity of the active mining operations and coastal access. CEMEX has disputed and continues to dispute the CCC's allegations set forth in the NOI and asserts that it conducts the Lapis sand plant operations lawfully, and between March 2016 and July 2017, engaged in discussions with CCC regarding the cease and desist order proceedings.

Further, following publication of the Draft EIR/EIS, on May 16, 2017, the California State Lands Commission (CLSC) issued a letter to CEMEX concluding that the Lapis Sand Mine engaged in unlawful conversion of state public trust resources and indicated that CEMEX must either immediately submit a lease application or cease dredge pond (mining) operations. On June 6, 2017, the City of Marina passed Resolution No. 2017-57 that authorized the City Attorney to pursue the possibility of a civil action against CEMEX to declare and abate the Lapis Sand Mine as a public nuisance under sections 3479 and 3480 of the California Civil Code pursuant to California Code of Civil Procedure section 731, and to pursue the possibility of commencing action or proceedings for abatement under section 17.60.040 and section 17.25.030 of the Marina Municipal Code.

The following subsections describe the settlement agreement ultimately reached among CEMEX, the CCC, the CSLC, and the City of Marina, the Removal Plan required by that agreement, and the effects of the agreement on the proposed project and the EIR/EIS analysis. Because the settlement agreement was reached after the close of the Draft EIR/EIS comment period, no comments have been received that pertain specifically to this agreement. However, some comments (e.g., MCWD, City of Marina) pertain to ongoing CEMEX mining operations described in the Draft EIR/EIS that now are expected to cease, such as references to the active or retired portions of the mining operation, the availability of on-site habitat mitigation opportunities, or CalAm's access to its permanent easement, or how the mining operation affects coastal erosion. This Master Response therefore provides a consolidated explanation of reasonably foreseeable changes relevant to the proposed project and EIR/EIS associated with the expected change in mining activities.

8.2.14.1 CEMEX and CCC Settlement Agreement

Subsequent to the publication of the Draft EIR/EIS, in July 2017, the CCC, the CSLC, and the City of Marina reached an agreement with CEMEX to end the sand mining operations at the CEMEX site. Among other things, the Consent Settlement Agreement and Cease and Desist Order CCC-17-CD-02 (Settlement Agreement; CCC, 2017) requires that CEMEX stop sand mining on the CEMEX property by December 31, 2020, pursuant to a cessation plan; put a cap on the amount of sand that can be mined until that time; remove dredges, equipment associated with dredges, a pump station, and other facilities from the CEMEX property pursuant to a removal plan; abstain from causing any further changes in intensity of use of the property; undertake reclamation of the property and protect sensitive species on site; and transfer the property to an approved non-profit or governmental entity for conservation at a reduced price, with a deed restriction to protect the access and the habitat at the site in perpetuity. The deed restriction must preserve the open space and habitat values of the property, and must reflect that improvements to provide low-impact passive recreation, public access, and public education; removal activities; and activities to restore native habitat will be consistent with existing easements or other rights of record.

Removal Plan

Section 5.0 of the Settlement Agreement requires CEMEX to prepare and submit to the CCC Executive Director, no later than 90 days following the December 31, 2020 end of the sand mining phase-out period, a Removal Plan that summarizes all measures to be taken in connection with the removal of the physical structures and materials from the site, including erosion control measures to be used during removal activities. The Removal Plan shall describe the equipment to be used, and the schedule to complete removal, consistent with a schedule provided in the Settlement Agreement, with all CEMEX buildings and facilities to be removed by December 31, 2024 and final grading and seeding to occur by December 31, 2025.

CalAm Easement at CEMEX

Section 23.2 of the Settlement Agreement states that, "Notwithstanding anything in this Agreement to the contrary, this Agreement . . . shall not . . . interfere with any existing rights or obligations of California-American Water Company . . . related to the Property, including, but not limited, to the recorded easement and related option in favor of CalAm and does not require the removal of such easement and related option."

In November 2014, CalAm and CEMEX entered into an "Agreement for Temporary Investigatory Easement, Option for Permanent Easements and Joint Escrow Instructions" (CalAm-CEMEX Agreement). In that easement agreement, CEMEX granted to CalAm an option to purchase permanent easements on, across, and under the property, solely for the purpose of accessing, constructing, installing, operating, and maintaining slant wells and related pipelines and utilities for the desalination facility proposed to be constructed as part of the MPWSP. The permanent easement granted to CalAm would occupy approximately 30 acres of the CEMEX property, situated south of the existing access road. Starting at the point where the existing access road intersects the beach, the trapezoidal-shaped easement area would run south along the front (ocean-side) of the dunes for about 1,800 feet before turning inland (east) for about 700 feet, then turning north for about 1,500 feet where it would intersect with the existing access road about 800 feet inland from the beach. CalAm would also maintain an additional 30-foot-wide easement along approximately 4,000 feet of the Source Water Pipeline alignment for another approximately 3 acres. See **Figure 8.2.14-1**.

8.2.14.2 Final EIR/EIS Considerations

Impacts of Settlement Agreement on MPWSP Access

As described in EIR/EIS Section 3.4.1, the analysis assumes that CalAm maintenance workers would access the slant wells via the existing CEMEX access road. Access to the CalAm easement across the CEMEX property is provided for in the CalAm-CEMEX Agreement. Section 3(h) of that agreement specifies that CalAm and CEMEX will determine a route for a vehicular access easement across the greater CEMEX property to the CalAm easement (see Figure 8.2.14-1), although CEMEX retained the right to relocate the vehicular access easement at any time so long as CalAm is provided with equivalent access to its easement. If the vehicular access easement is relocated such that the existing access road is no longer used, the new route would still be within the area analyzed as the extent of project disturbance and shown on EIR/EIS Figure 3-3a. Since the Settlement Agreement allows for public access and low-impact passive recreation on the property (Settlement Agreement Sections 6.1, 6.2(D)(3)), the new owners of the property will likely prepare a public access plan. Pursuant to Section 23.2 of the Settlement Agreement and the terms of the CalAm-CEMEX Agreement, the new owners and any public access plan would necessarily respect the access provision of the CalAm-CEMEX Agreement. Therefore, the assumptions regarding ongoing access to the slant well sites for project maintenance have not been changed in the Final EIR/EIS.

Impacts of Settlement Agreement on Coastal Erosion

As explained in the EIR/EIS Coastal Erosion Study (see Appendix C2, and EIR/EIS Section 4.2.4.5), one of the most important variables in the coastal erosion model is the historic erosion trend. Shoreline change data were compiled from a variety of sources and were combined with the Thornton et al., 2006 dune erosion rates, where available (see Appendix C2, Section 2.2) since estimated erosion based on dune crest recession is a more robust estimate of erosion than shoreline change. In this region where beaches have been controlled in part by sand mining, the coastal retreat study assumed there would be no changes to existing sand mining practices. With the closure of the Lapis Sand Plant in 2020 as a result of the Settlement Agreement, ongoing coastal erosion at this location is expected to slow compared to erosion rates that have occurred with sand mining. Therefore, the erosion profiles in the EIR/EIS likely overestimate the rate of future shoreline change. The analyses and conclusions related to coastal erosion in the EIR/EIS have not been revised, and instead have been retained as conservative estimates of potential erosion-related impacts. From a practical standpoint, a slower rate of erosion would mean that the slant wells would be unimpaired and not exposed by coastal erosion for a longer period of time (such that they would not need to be relocated until a later time).

Consideration of Removal Plan and Reclamation Plan Implementation in Cumulative Scenario

EIR/EIS Section 4.17, Mineral Resources, describes the existing mining operations at CEMEX, as well as the Lapis Plant Reclamation Plan that was approved by the State Mining and Geology Board on June 15, 1992. As noted in Section 4.17.1.2, Mining Operations, Phase I revegetation and recontouring measures have been carried out along the slopes of the southern portion of the CEMEX property, while Phase II reclamation plans call for revegetation of the northeastern slope once mining operations have ceased. At the time of publication of the Draft EIR/EIS, the Reclamation Plan anticipated that sand mining could continue until or beyond 2039; therefore, a timeframe for the required reclamation under Phase II was not known. However, as noted in Section 3.4 of the Settlement Agreement, the initiation of reclamation activities consistent with the Reclamation Plan, including restorative grading, revegetation and monitoring, shall begin no later than December 2023.

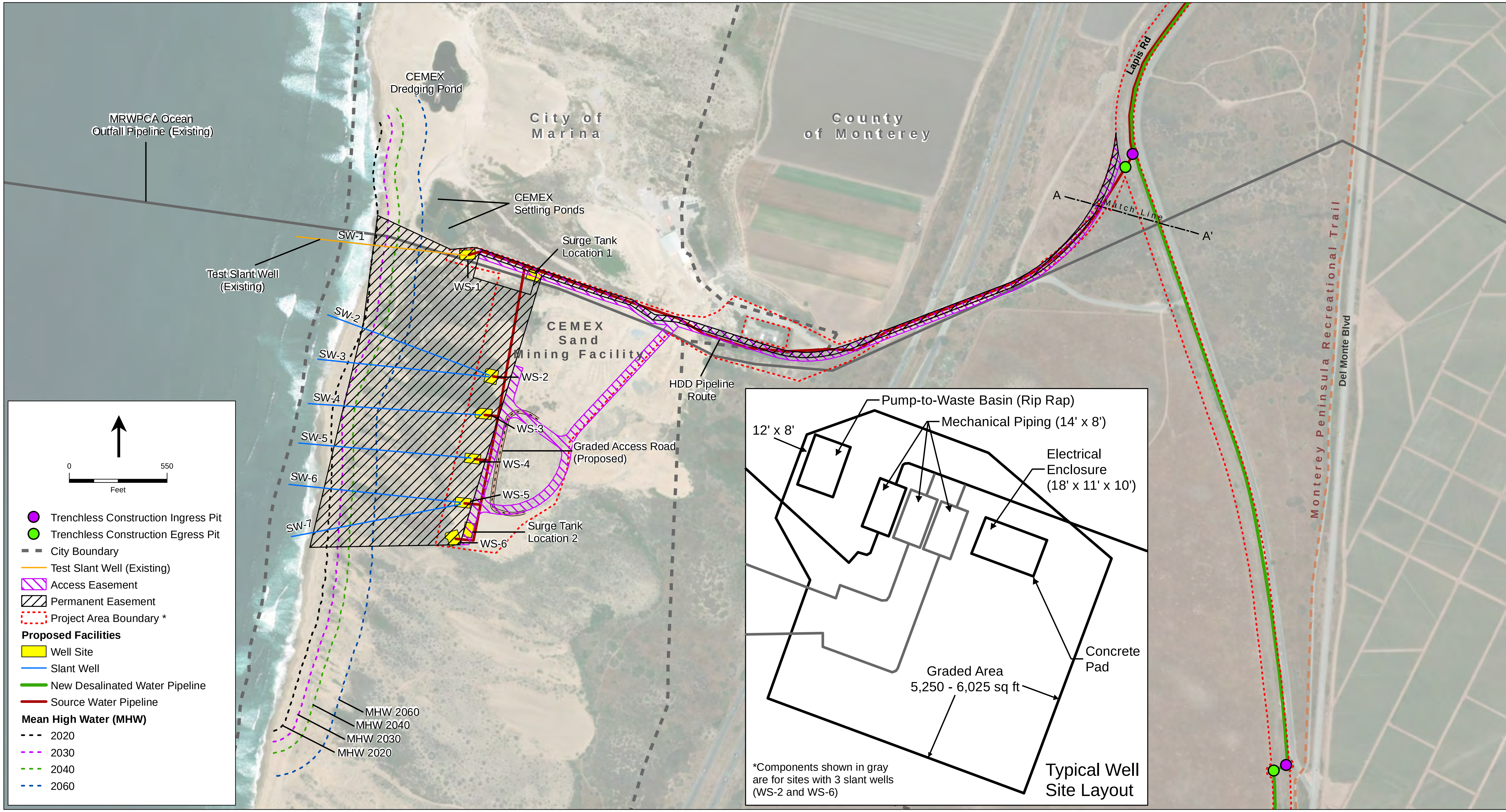
Additionally, the Removal Plan described in Section 8.2.14.1, above, will require the removal of CEMEX structures and facilities by no later than December 2024.

Given this increased certainty regarding the implementation schedule for the Reclamation Plan and the nature and timing of the Removal Plan, both have been added to the list of projects to be analyzed in the EIR/EIS for potential cumulative effects along with the proposed project impacts (see Project No. 63 in Final EIR/EIS Table 4.1-2), and have been incorporated into the analysis of cumulative impacts as appropriate throughout Chapter 4 and Section 5.5 of the Final EIR/EIS. No new significant impacts or substantial changes to previously-identified significant impacts were identified as a result of this addition of the Removal Plan and Reclamation Plan to the cumulative scenario.

8.2.14.3 References

California Coastal Commission (CCC), 2016. Notice of Intent to Commence Cease and Desist Order and Restoration Order Proceedings and Administrative Civil Penalties Proceedings. Letter to Eric Wittman and RMC Pacific Materials, LLC, dba CEMEX. March 17.

California Coastal Commission (CCC), 2017. Consent Settlement Agreement and Cease and Desist Order CCC-17-CD-02. July 13.



NOTE:
*Project area boundary refers to the area within which all construction related disturbance would occur.

SOURCE: ESA, 2016; Michael Baker International, 2018

205335.01 Monterey Peninsula Water Supply Project

Figure 8.2.14-1
CalAm Easement and Access at CEMEX

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8.2.15 Master Response 15: Alternative Desalination Projects – Status, Information Sources, and Cumulative Scenario

COMMENTERS ADDRESSED BY MASTER RESPONSE 15

Marina Coast Water District	David Beech
California Unions for Reliable Energy (CURE)	Margaret-Anne Coppernoll
Deep Water Desal, LLC	Myrleen Fisher
Ecological Rights Foundation, the Center for Biological Diversity, and Our Children's Earth Foundation	Juli Hofmann
Public Water Now	Nancy Selfridge
Surfrider Foundation	

The currently proposed Monterey Bay Regional Water Project (MBRWP or DeepWater Desal Project) and People's Moss Landing Water Desalination Project (People's Project) are considered in the EIR/EIS as alternatives to the proposed MPWSP. This Master Response provides clarification on these two projects and their status, and also addresses questions (further explained below) on the assumptions used for considering cumulative impacts of these projects. The DeepWater Desal Project (Alternative 3) is described in EIR/EIS Section 5.4.5 and the People's Project (Alternative 4) is described in Section 5.4.6.

8.2.15.1 Monterey Bay Regional Water Project (MBRWP or DeepWater Desal) Status

The status of this project is as follows:

- An NOP/NOI was issued on June 1, 2015, by the California State Lands Commission and the Monterey Bay National Marine Sanctuary (MBNMS), explaining that a joint EIR/EIS would be prepared.
- The joint CEQA/NEPA document has been initiated, and some studies completed, yet it is currently unknown when the Draft EIR/EIS will be published due to outstanding information needs.
- The Applicant is in the process of completing additional studies necessary for the Draft EIR/EIS impact analysis.

8.2.15.2 People's Project Status and Basis for Analysis

Project Status

Several comments indicated that the People's Project appeared to be more feasible than other desalination projects due to the timeline for its approval since it would be utilizing existing infrastructure. The Moss Landing Harbor District is the CEQA lead agency for the People's Project; however, the project has been on hold since 2016 due to outstanding information needed to complete the CEQA analysis. MBNMS is the federal NEPA lead agency for the proposed

People's Project, and since 2015 the project's application to MBNMS has been deemed incomplete. The initial application was filed on October 7, 2015, and was determined by MBNMS to be incomplete on October 27, 2015. At that time, MBNMS notified the applicant of additional information required to complete the application and start the environmental review process. MBNMS also advised the applicant it would be most efficient to move forward with a joint CEQA/NEPA document.

On March 25, 2016, the applicant submitted additional information, including an administrative draft project description for the People's Project. MBNMS notified the applicant in writing on April 25, 2016 that the application was still incomplete. MBNMS provided specific details on what additional information was needed for a complete application and to start the environmental analysis. As of March, 2018, MBNMS has received a revised project description from the applicant and will review the submittal for completeness. Since the application to MBNMS is still incomplete, a Notice of Intent (NOI) to prepare an EIS has not been published, and cannot be published until MBNMS determines the application is complete. If MBNMS determines that sufficient information has been submitted to initiate the NEPA process, it will issue a Notice of Intent to start the EIS scoping process. Additional studies will be required to complete the NEPA document or joint CEQA/NEPA document. Given the current status of the application to MBNMS, no date has been established for completion of a NEPA document.

The People's Project applicant submitted an Administrative Draft EIR to the Moss Landing Harbor District, the CEQA lead agency. After thorough review, the Harbor District determined that the Administrative Draft EIR was not adequate under CEQA; the Harbor District informed the applicant of the document deficiencies and provided details on additional studies and data needed to complete the CEQA process. At this time, (March 2018), the applicant has developed additional project description information for consideration by the Harbor District. However, no date has been established for the completion and publication of the CEQA environmental document.

Basis for Impact Analysis of People's Project and Applicant Contact

Comments suggested that neither the CEQA lead agency for the People's Project (Moss Landing Harbor District) nor the People's Project applicant and counsel were contacted to obtain information for the MPWSP alternatives analysis and that available information was not utilized in the EIR/EIS alternatives analysis. On the contrary, MBNMS contacted the People's Project applicant, the consultant, and legal counsel verbally and in writing in February and March 2016, to request project description information. The MPWSP EIR/EIS preparers worked with MBNMS to obtain this project information from the People's Project applicant since MBNMS is the federal lead agency for the People's Project, DeepWater Desal project, and MPWSP. The EIR/EIS includes the same project description information that was submitted to the Moss Landing Harbor District in 2016. MBNMS requested permission to share project information submitted by the People's Project applicant on March 25, 2016 with the MPWSP EIR/EIS preparers. The People's Project's counsel granted MBNMS permission to share the project description information with the MPWSP EIR/EIS preparers on June 6, 2016. However, the applicant did not grant permission to share the remainder of the Administrative Draft EIR or any supporting studies. The analysis in the MPWSP Draft EIR/EIS was based on project description information that was shared by the People's Project applicant in June 2016.

One comment noted that solar panels are part of the People's Project. The 2016 Project description information received from the applicant stated that the primary source of electricity for the project would be either direct service from the Moss Landing Power Plant through an agreement with Dynegy, or from Pacific Gas and Electric Company (PG&E) from the existing local electrical grid. Circuits feeding the desalination plant would be provided from an existing 12 kV electrical system through a 460-volt circuit. In the future, the Moss Landing Commercial Park also intends to install a solar photovoltaic (PV) facility of 3.5 MW at the existing site to serve a portion of the project's energy requirements in order to provide a "green and clean" energy source to the project. The project site has sufficient available space outside wetland areas to install such a facility. The solar PV facility would be constructed as a separate project in the future once sufficient details are known, and therefore it is not an integral part of the proposed project at this point in time.

The EIR/EIS analysis did not assume installation/operation of the solar panels as part of the People's Project since: 1) sufficient details were not available for the solar project; 2) the timing of this future project was uncertain; and 3) the applicant stated that the main source of power would not be from the solar field. The applicant was fully informed of the data that was being shared with the EIR/EIS preparers and did not amend or update the project description regarding the solar panel project.

Regarding comments related to the Draft EIR/EIS's lack of cultural resources information at the People's Project plant site, the applicant did not provide information on available cultural resources surveys or studies at the time that MBNMS requested project information from the applicant, and MBNMS has no knowledge of site-specific cultural resource surveys conducted by a qualified cultural resource professional. Given the limited information that was provided to the EIR/EIS preparers, the impact conclusions assumed no cultural resources studies had been conducted, impacts on currently unknown cultural resources would be a potentially significant impact, and mitigation measures were necessary.

8.2.15.3 Cumulative Impact Scenario Related to DeepWater Desal Project and People's Project

Several comments suggested that all three proposed desalination projects in the Monterey area – CalAm's MPWSP, the DeepWater Desal Project, and the People's Project – should be considered in the cumulative impact analysis since commenters suggested that all three might ultimately be built. The Lead Agencies have not implemented this suggestion for the reasons described below.

EIR/EIS Section 4.1.7.2 explains in detail the assumptions used to determine which projects would be considered in conjunction with the proposed project and with each of the alternatives in the cumulative impacts scenario. Projects included in the cumulative impact scenario are listed in EIR/EIS Table 4.1-2.

As stated in EIR/EIS Section 4.1.7, the cumulative impact analysis focuses on the impacts on the environment that result from the incremental impact of the proposed project (or alternative under consideration) when added to other past, present, and reasonably foreseeable future actions. As explained in EIR/EIS Section 5.1.1, under CEQA and NEPA, the EIR/EIS must identify and analyze the impacts of reasonable alternatives that would also meet the purpose and need, and would avoid or minimize adverse environmental impacts of the proposed project. The DeepWater Desal Project and the People's Project are considered in the EIR/EIS as alternatives to the MPWSP because they each are desalination plants being separately proposed to meet, in part, the objectives of the MPWSP (and sometimes other objectives as well). However, as explained below, the DeepWater Desal Project is also considered in the cumulative impacts analysis for the MPWSP because the DeepWater Desal project proponent has indicated that it intends to proceed even if another desalination plant (e.g., the proposed project) is selected to serve CalAm's Monterey Service District. Conversely, the People's Project is not considered in the cumulative analysis with the MPWSP because the MPWSP and People's Project share the same objectives to provide water to CalAm's Monterey District, thus, it is not reasonably foreseeable that the People's Project would proceed if the MPWSP is approved.

Reasonably Foreseeable Projects

The Surfrider Foundation, in its comment letter on the Draft EIR/EIS, claims that unless there is a "binding restriction" prohibiting the development of all three desalination projects, then the EIR/EIS must include all three in the cumulative analysis. There is no "binding restriction," as all three projects must be reviewed on their own merits by the numerous agencies with permit jurisdiction. However, as described in EIR/EIS Section 4.1.7, CEQA and NEPA cumulative impact analysis requirements are based on projects that are reasonably foreseeable or probable to occur. Further, CEQA Guidelines Section 15130(b) specifies that one of two methods must be used to analyze cumulative impacts. For the first method (used for the majority of the analyses in the EIR/EIS), Section 15130(b)(1) defines the list of projects that must be considered as "A list of past, present, and probable future projects producing related or cumulative impacts…" Similarly, NEPA refers to cumulative effects as the "impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions…" (40 CFR 1508.7, NAO 216-6A). The key words here are "probable," or "reasonably foreseeable," which limits the analysis to those projects that are likely to occur. The EIR/EIS analysis is consistent with these provisions, as described in more detail below. See also Master Response 13, Demand (Project Need) and Growth, for a discussion of current and projected water demand in the region.

DeepWater Desal Project

As noted in EIR/EIS Table 4.1-2, the DeepWater Desal Project would provide up to 25,000 afy of potable water supply to participating communities in the Monterey Bay region, potentially including the Monterey Peninsula, Castroville, Salinas, and parts of Santa Cruz County. DeepWater Desal's project business model includes a co-located data center. As proposed by DeepWater Desal, the project would develop supplemental water supplies to serve the customers in CalAm's Monterey District service area. However, if the proposed MPWSP is built, DeepWater Desal indicates that it can provide water to other areas, as described above. Therefore, the EIR/EIS considers two reasonably foreseeable scenarios that include development of the DeepWater Desal Project:

1. Development of the DeepWater Desal Project as an alternative to the MPWSP, as described in Chapter 5 (serving CalAm's Monterey District service area, as well as other areas). This is Alternative 3 described and analyzed in Chapter 5.
2. Development as a separate project *in addition* to the MPWSP or another alternative that would serve CalAm's Monterey District service area. In this case, the impacts of the DeepWater Desal Project are considered in the cumulative scenario as they relate to the provision of water to Santa Cruz County and the City of Salinas. The DeepWater Desal Project with provision of water to Santa Cruz County and the City of Salinas is a reasonably foreseeable project in the cumulative scenario relevant to the proposed project and Alternatives 1 (slant wells at Potrero Road), 2 (open water intake), 4 (People's Project), and 5a and 5b (reduced-scale projects).

People's Project

As proposed by its applicant, the primary purpose of the People's Project is to develop 12 mgd (13,400 afy) of desalinated water to serve customers in CalAm's Monterey District service area. The NOP for the project states that a small portion (3.3 mgd) of the water may serve north Monterey County: "These demands have not yet been fully verified, but there has been strong interest for the Proposed Project to serve demands in the North Monterey County Area. Through the EIR process these demands will be evaluated in order that the Proposed Project can serve these potential North County demands" (Moss Landing Harbor District, 2015). However, subsequent information received from the applicant indicates that the northern Monterey County service is uncertain.

Since the People's Project and the MPWSP would both serve the same customers in the CalAm Monterey District Service Area, this EIR/EIS assumes the People's Moss Landing Project is an *alternative* to the MPWSP (see Chapter 5). Unlike the DeepWater Desal Project proponent, who has publicly stated its intent to proceed even if the MPWSP is built and whose business model would allow the project to serve its entire output to customers in Santa Cruz County and the City of Salinas, there is no other available information that indicates that the People's Project would be built *in addition* to the proposed MPWSP, based on the People's Project's stated purpose and objectives to meet the exact same demand that is proposed to be met by the MPWSP. Therefore, it is not a reasonably foreseeable project in the cumulative scenario relevant to the MPWSP. Similarly, if the DeepWater Desal Project were developed as an alternative to the MPWSP (i.e., Alternative 3), the People's Project would not be a reasonably foreseeable project in the cumulative scenario, because Alternative 3 assumes that all of the Monterey Peninsula's needs would be met by the DeepWater Desal Project and no demand (and therefore, no market) would remain in the Monterey Peninsula for the People's Project to serve. As noted above, however, if the People's Project were approved to serve the water needs of the Monterey Peninsula, the EIR/EIS cumulative analysis does assume that the DeepWater Desal project would be a cumulative project in that scenario. Furthermore, the California Ocean Plan requires that desalination project applicants document the need for water. The Ocean Plan states that the regional water board shall require the owner to: "Consider whether the identified need for desalinated water is consistent with an applicable adopted urban water management plan prepared in accordance with California Water Code Section 10631, or if no urban water management plan is available, other water planning documents such as a county general plan or integrated regional water management plan." If any project is approved to serve demand in the Monterey Peninsula, it is unlikely that another project with the intent to serve this same population would be able to provide the necessary documentation of the need for water. Despite this, and in light of DeepWater Desal's stated intention to serve other areas, this EIR/EIS takes a conservative approach and considers DeepWater Desal in the cumulative scenarios as described above.

Therefore, although acknowledged as an alternative to the proposed project (as described in Chapter 5), the People's Project contributions to cumulative impacts are not considered as part of the cumulative scenario relevant to the proposed project or another alternative. If, in the future, the People's Project objectives change, the cumulative impact analysis in the CEQA and/or NEPA documents prepared for the People's Project would be required to assess cumulative effects based on the changed intent of that project.

8.2.15.4 References

Moss Landing Harbor District, 2015. Notice of Preparation, Environmental Impact Report for People's Moss Landing Water Desalination Project. June.