

State of California
Department of Water Resources
Sustainable Groundwater Management Program
Alternative Assessment Staff Report

Groundwater Basin Name: Santa Clara Valley – Santa Clara (Basin No. 2-009.02)
Submitting Agency: Santa Clara Valley Water District
Recommendation: Approve
Date Issued: July 17, 2019

I. Summary

The Santa Clara Valley Water District (District) submitted an alternative (Santa Clara Alternative or Alternative) to the Department of Water Resources (Department) for evaluation and assessment as provided by the Sustainable Groundwater Management Act (SGMA).¹ The District submitted an existing plan, which relies primarily on the District's 2016 Groundwater Management Plan (Groundwater Management Plan or Plan).²

The District was formed in 1929, following enactment of the first voter-approved groundwater protection law in Santa Clara County. The law charged the District with the responsibility of stopping groundwater overdraft and subsidence in accordance with the Santa Clara Valley Water District Act (District Act).³ The District manages water resources for the entire County, which includes two groundwater subbasins, the Santa Clara Subbasin of the Santa Clara Valley Groundwater Basin (Santa Clara Subbasin or Subbasin) and the Llagas Subbasin of the Gilroy-Hollister Valley Groundwater Basin. The District's Groundwater Management Plan includes both subbasins.⁴

The Alternative demonstrates a long history of implementing the requirements of the District Act. The District has done this by developing a good understanding of the hydrogeologic conditions of the Subbasin, establishing significant water imports, and managing those resources to meet the demands of the beneficial uses and users. The

¹ Water Code § 10720 *et seq.*

² Water Code § 10733.6(b)(1)

³ Wat. Code, § App. § 60-1 *et seq.* (Stats.1951, c. 1405, p. 3337)

⁴ The District submitted the 2016 Groundwater Management Plan as an Alternative for both the Santa Clara and Llagas subbasins. This assessment is specifically related to the Department's review for the Santa Clara Subbasin.

District has conducted numerous studies to identify appropriate actions to capture surface water runoff and store it for the purposes of replenishment of the groundwater. The quantification of required volumes, timing, and distribution of recharge have resulted in management of the Subbasin that has avoided overdraft and subsidence. The District's Groundwater Management Plan has established objectives to maintain the avoidance of adverse groundwater conditions in the Subbasin and documents specific plans and management actions to achieve those objectives. These plans and management actions are based on proven technologies, are reasonable and feasible, and present solutions to meet the objectives of the District Act.

Based on review of the Groundwater Management Plan, other related documents, and consideration of public comments, Department staff believe the Santa Clara Alternative satisfies the objectives of SGMA for the Santa Clara Subbasin and recommends approval of the Alternative. Staff consider the information provided by the District to be sufficient and credible, and that implementation of the District's Groundwater Management Plan is reasonably likely to lead to sustainable groundwater management⁵ of the Subbasin. In addition, staff have identified recommended actions that are designed to facilitate the Department's ongoing evaluation and assessment of the Alternative including implementation and a determination of whether the Alternative continues to satisfy the objectives of SGMA or adversely affects an adjacent basin.

The remainder of this assessment is organized as follows:

- **Section II. Review Principles** describes legal and other considerations regarding Department staff's assessment and evaluation of alternatives.
- **Section III. Alternative Materials** describes materials (i.e., plans, reports, data, and other information) submitted by the Agency that, collectively, the Department staff considered as the Alternative.
- **Section IV. Required Conditions** describes whether the Alternative satisfies each of the four conditions required for the Department to review an alternative.
- **Section V. Alternative Contents** describes the information contained in the Alternative submittal.
- **Section VI. Assessment** describes Department staff's evaluation of the Alternative, whether it satisfies the objectives of SGMA, and, if applicable, describes recommended actions proposed for the first five-year update.

⁵ Water Code § 10721(v). See also discussion in Section II. Review Principles. Sustainable groundwater management is achieved by meeting the basin's sustainability goal.

II. Review Principles

The District submitted an alternative based on a groundwater management plan to the Department for evaluation and assessment to determine whether it satisfies the objectives of SGMA for the Santa Clara Subbasin. To satisfy the objectives of SGMA, an alternative based on a groundwater management plan prepared pursuant to Part 2.75 of Division 6 of the Water Code⁶ or a plan developed pursuant to another law authorizing groundwater management must demonstrate that implementation of the plan has led to or will lead to sustainable groundwater management, which means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results.⁷ Undesirable results are defined quantitatively by the managing agency.⁸

An alternative, to be evaluated by the Department, must be submitted by the statutory deadline and be within a basin that complies with Part 2.11 of Division 6 of the Water Code.⁹ The submitted alternative must also be complete and must cover the entire basin.¹⁰ The Groundwater Sustainability Plan (GSP) Regulations¹¹ require the Department to evaluate an Alternative “in accordance with Sections 355.2, 355.4(b), and Section 355.6, *as applicable*, to determine whether the Alternative complies with the objectives of the Act”.¹² The elements of the cited sections are not all applicable to alternatives. Some provisions apply to GSPs and alternatives alike, to alternatives only prospectively, or do not apply to alternatives at all.¹³ Ultimately, the purpose of the evaluation is to determine whether an alternative satisfies the objectives of SGMA.¹⁴ The agency must explain how the elements of an alternative are “functionally equivalent” to the elements of a GSP required by Articles 5 and 7 of the GSP Regulations and are

⁶ Water Code § 10750 *et seq.*

⁷ Water Code § 10721(v)

⁸ 23 CCR § 354.26

⁹ Water Code § 10733.6(c)-(d)

¹⁰ 23 CCR § 358.4(a)

¹¹ 23 CCR § 350 *et seq.*

¹² 23 CCR § 358.4(b) (emphasis added)

¹³ Procedural requirements, including submissions by the agency, posting by the Department, and the public comment period, apply equally to plans and alternatives (23 CCR § 355.2(a)-(c)). The periodic review of Plans (23 CCR § 355.6(a)) applies to alternatives prospectively but does not apply to initial submissions. Other regulatory provisions are inapplicable to alternatives, including the two-year review period (23 CCR § 355.2(e)), which is based on the statutory time-frame that applies to Plans but not alternatives (Water Code § 10733.4(d)); the “incomplete” status that allows the agency to address “one or more deficiencies that preclude approval, but which may be capable of being corrected by the Agency in a timely manner” (23 CCR § 355.2(e)(2)), which applies to plans undergoing development, but not alternatives that purportedly satisfy the objectives of SGMA at the time of their submission (Water Code § 10733.6(a)); and, for the same reason, corrective actions to address deficiencies in plans (23 CCR § 355.4(a)(4)), which applies to plans developed after the adoption of SGMA, but is inapplicable to alternatives that predate SGMA.

¹⁴ 23 CCR § 358.2(d), based on the statutory threshold of “whether the alternative satisfies the objectives of [SGMA] for the basin” (Water Code § 10733.6(a)).

sufficient to demonstrate the ability of an alternative to achieve the objectives of SGMA.¹⁵ The explanation by the agency that elements of an alternative are functionally equivalent to elements of a GSP furthers the objective of demonstrating that an alternative satisfies the objectives of SGMA. Alternatives based on groundwater management plans or historical basin management practices that predate the passage of SGMA or adoption of GSP Regulations, although required to satisfy the objectives of SGMA, are not necessarily expected to conform to the precise format and content of a GSP. The Department's assessment is thus focused on the ability of an alternative to satisfy the objectives of SGMA as demonstrated by information provided by the agency; it is not a determination of the degree to which an alternative matched the specific requirements of the GSP Regulations.

When evaluating whether an alternative satisfies the objectives of SGMA and thus is likely to achieve the sustainability goal for the basin, staff review the information provided by and relied upon by the agency for sufficiency, credibility, and consistency with scientific and engineering professional standards of practice.¹⁶ The Department's review considers whether there is a reasonable relationship between the information provided and the assumptions and conclusions made by the agency, whether sustainable management criteria and projects and management actions described in an alternative are commensurate with the level of understanding of the basin setting, and whether those projects and management actions are feasible and likely to prevent undesirable results.¹⁷ Staff will recommend that an alternative be approved if staff believe, in light of these factors, that alternative has achieved or is likely to achieve the sustainability goal for the basin.¹⁸

An alternative that relies on an existing plan may be approved based on information that demonstrates the basin is being or will be managed sustainably based on groundwater management pursuant to that plan, including any related projects and management actions, as necessary. Even when staff review indicates that an alternative will satisfy the objective of SGMA, the Department may recommend actions to facilitate future evaluation of that alternative and to allow the Department to better evaluate whether an alternative adversely affects adjacent basins. The Department proposes that recommended actions be addressed by the submission date for the first periodic evaluation.

Staff assessment of an alternative involves the review of information presented by the agency, including models and assumptions, and an evaluation of that information based on scientific reasonableness. The assessment does not require Department staff to recalculate or reevaluate technical information provided in an alternative or to perform its

¹⁵ 23 CCR § 358.2(d)

¹⁶ 23 CCR § 351(h)

¹⁷ 23 CCR § 355.4(b)(1), (3), and (5).

¹⁸ 23 CCR § 355.4(b)

own geologic or engineering analysis of that information. The staff recommendation to approve an alternative does not signify that Department staff, were they to exercise the professional judgment required to develop a plan for the basin, would make the same assumptions and interpretations as those contained in an alternative, but simply that Department staff have determined that the assumptions and interpretations relied upon by the submitting agency are supported by adequate, credible evidence, and are scientifically reasonable.

III. Alternative Materials

The District submitted an alternative based on a groundwater management plan pursuant to Water Code Section 10733.6(b)(1). The Alternative thus relies primarily upon the following document:

- Santa Clara Valley Water District 2016 Groundwater Management Plan, November 2016 (Groundwater Management Plan or Plan)

The District submitted the following additional plans, reports, and other documents prepared prior to the implementation of SGMA that the Department has determined to be sufficiently related to the Groundwater Management Plan to warrant their consideration as part of the Alternative:

- Santa Clara Valley Water District, 2016, Annual Groundwater Report for Calendar Year 2015 (2015 Annual Report)
- Santa Clara Valley Water District, June 2016, Revised Final Salt and Nutrient Management Plan (Salt and Nutrient Management Plan)
- Santa Clara Valley Water District, 2016, 2015 Urban Water Management Plan (2015 Urban Water Management Plan)
- Santa Clara Valley Water District, Online – Historical Groundwater Elevation Data, <https://gis.valleywater.org/groundwaterelevations/map.php>
- Santa Clara Valley Water District Act (District Act), <https://www.valleywater.org/how-we-operate/about-the-water-district/district-act>

The District submitted a Groundwater Management Plan Appendix B - Demonstration of Functional Equivalency of the Alternative to address the required Alternative Elements Guide. The Agency has also submitted Annual Reports.¹⁹ Other material submitted by the District, public comments, other documents submitted by third parties,

¹⁹ The Annual Report is not part of the Alternative and was not reviewed by the Department for the purpose of approving the Alternative.

correspondence, and other information provided to or relied upon by the Department have been posted on the Department's website.²⁰

IV. Required Conditions

An alternative, to be evaluated by the Department, must be submitted by the statutory deadline and be within a basin that complies with Part 2.11 of Division 6 of the Water Code.²¹ The submitted alternative must also be complete and must cover the entire basin.²²

A. Submission Deadline

SGMA requires that an alternative for a basin categorized as high- or medium-priority as of January 31, 2015, be submitted no later than January 1, 2017.²³

The District submitted its Alternative on December 21, 2016, before the statutory deadline.

B. Part 2.11 (CASGEM) Compliance

SGMA requires that the Department assess whether an alternative is within a basin that is in compliance with Part 2.11 of Division 6 of the Water Code,²⁴ which requires that groundwater elevations in all groundwater basins be regularly and systematically monitored and that groundwater elevation reports be submitted to the Department.²⁵ To manage its obligations under this law, the Department established the California Statewide Groundwater Elevation Monitoring (CASGEM) Program. The acronym CASGEM is used in this document to denote both the program and the groundwater monitoring law.²⁶

SGMA specifies that an alternative does not satisfy the objectives of SGMA if the basin is not in compliance with the requirements of CASGEM.²⁷ The Department confirmed that the Santa Clara Subbasin was in compliance with the requirements of CASGEM prior to evaluating the Alternative and confirmed that the Subbasin remained in compliance with CASGEM through the last reporting deadline prior to issuing this assessment.

²⁰ <https://sgma.water.ca.gov/portal/alternative/print/18>

²¹ Water Code § 10733.6(c)-(d)

²² 23 CCR § 358.4(a)

²³ Water Code § 10733.6(c). Pursuant to Water Code § 10722.4(d), a different deadline applies to a basin that has been elevated from low- or very low-priority to high- or medium-priority after January 31, 2015.

²⁴ Water Code § 10733.6(d)

²⁵ Water Code § 10920 *et seq.*

²⁶ Stats.2009-2010, 7th Ex.Sess., c. 1 (S.B.6), § 1

²⁷ Water Code § 10733.6(d)

C. Completeness

GSP Regulations specify that the Department shall evaluate an alternative if that alternative is complete and includes the information required by SGMA and the GSP Regulations.²⁸ An alternative submitted pursuant to Water Code Section 10733.6(b)(1) must include a copy of the groundwater management plan and an explanation of how the elements of the Alternative are functionally equivalent to the elements of a GSP required by Articles 5 and 7 of the GSP Regulations and are sufficient to demonstrate the ability of the Alternative to achieve the objectives of SGMA.²⁹

The District submitted a completed and final Groundwater Management Plan for the Santa Clara Subbasin, complementary documents, as indicated above, and other materials as required. Department staff found the Alternative to be complete and containing the required information, sufficient to warrant an evaluation by the Department.

D. Basin Coverage

An alternative must cover the entire basin.³⁰ An alternative that is intended to cover the entire basin may be presumed to do so if the basin is fully contained within the jurisdictional boundaries of the submitting agency.

The jurisdictional boundaries of the District cover the entire Santa Clara Subbasin.³¹ The Districts' authority aligns with Santa Clara County's jurisdictional boundaries and wholly cover the Santa Clara Subbasin.

V. Alternative Contents

GSP Regulations require the submitting agency to explain how the elements of an alternative are functionally equivalent to the elements of a GSP as required by Article 5 of the GSP Regulations³² and are sufficient to demonstrate the ability of an alternative to achieve the objectives of SGMA.³³

As stated previously, alternatives based on historical basin management practices that predate the passage of SGMA or adoption of GSP Regulations, although required to satisfy the objectives of SGMA, are not necessarily expected to conform to the precise format and content of a GSP, and the criteria for adequacy of an alternative is whether

²⁸ 23 CCR § 358.4(a)(3)

²⁹ 23 CCR § 358.2(c)-(d)

³⁰ 23 CCR § 358.4(a)(4)

³¹ SGMA Alternative Portal, Attachment B-3 (<https://sgma.water.ca.gov/portal/alternative/print/18>)

³² 23 CCR § 354-354.44

³³ 23 CCR § 358.2(d). The requirements pertaining to Article 7 of the GSP Regulations (23 CCR § 356-356.4) relate to annual reports and periodic evaluation and are not applicable to review of the initial alternative.

the Department is able to determine that an alternative satisfies the objectives of SGMA. Department staff rely on the submitting agency's determination of functional equivalence of alternative elements to facilitate its evaluation and assessment of an alternative (see Assessment, below). Although the exact components of a GSP are not required for an alternative, for organizational purposes the discussion of information contained in the Groundwater Management Plan and related documents provided by the District generally follows the elements of a GSP provided in Article 5 of the GSP Regulations. The reference to requirements of the GSP Regulations at the beginning of each section is to provide context regarding the nature of the element discussed but is not meant to define a strict standard applicable to alternatives.

A. Administrative Information

GSP Regulations require information identifying the submitting agency, describing the plan area, and demonstrating the legal authority and ability of the submitting agency to develop and implement a plan for that area.³⁴

The Groundwater Management Plan contains information describing the history, governance structure, and financial capabilities for the District.³⁵ The Plan describes the structure the District, a water wholesaler, uses to engage with the various water retailers, land use agencies, local, state, and federal agencies, and other stakeholders. A discussion with supporting documentation of the specific public outreach conducted as part of the Plan development is also provided.³⁶

The District Act, established in 1929 to address the primary objectives of overdraft and subsidence, provides the District with the statutory authority to manage groundwater in the county, identifies the consideration of all beneficial uses and users, and defines the primary objectives for the Subbasin.³⁷ The description of the administration and groundwater management associated with the District Act implementation includes an overview of decades of engagement by a public agency responsible for managing the groundwater and surface water resources of the basin. The District determined that, to meet water demand in the basin and avoid adverse conditions, additional supply was necessary and developed agreements to receive surface waters from the San Francisco Public Utility Commission and the Central Valley Project through a series of projects to store and distribute these waters.³⁸ The Plan also describes the District's ability to adapt to changing demands and conditions in the basin, such as the evolution of land use from agricultural to urban and industrial, with concomitant changes to water quality protection

³⁴ 23 CCR § 354.2 et seq.

³⁵ Groundwater Management Plan, Section 1-4, p. 1-3

³⁶ Groundwater Management Plan, Appendix A, p. A-1

³⁷ District Act, Section 5(5)

³⁸ Groundwater Management Plan Section 1.4.1, p. 1-8

efforts including hazardous materials storage permit requirements.³⁹ Other examples include conservation programs, recycled water programs, and cooperative engagement with the Regional Water Quality Control Boards to address point source contaminants from leaky underground storage tank sites and other significant industrial contaminant release sites.⁴⁰

B. Basin Setting

GSP Regulations require information about the physical setting and characteristics of the basin and current conditions of the basin, including a hydrogeologic conceptual model, a description of historical and current groundwater conditions, and an assessment of the water budget.⁴¹

1. Hydrogeologic Conceptual Model

The GSP Regulations require a descriptive hydrogeologic conceptual model of the basin that includes a written description supported by cross sections and maps.⁴²

The Groundwater Management Plan includes a hydrogeologic conceptual model that describes the lateral and vertical extents of the Subbasin, recharge areas, principal aquifers and aquitards, and significant faults within the basin.⁴³ The basin is situated between faults associated with the San Andreas system and generally drains from south to north into the San Francisco Bay. The District has subdivided the Santa Clara Subbasin into two primary management areas: the Santa Clara Plain area and the Coyote Valley area⁴⁴ (see Management Areas, below). Figure 1 illustrates the relationship of the Santa Clara Plain area and Coyote Valley area including confined and recharge areas, and location of cross section line A-A'.

³⁹ Groundwater Management Plan Section 1.4.1, p. 1-9

⁴⁰ Groundwater Management Plan Section 1.4.1, p. 1-7

⁴¹ 23 CCR § 354.12 et seq.

⁴² 23 CCR § 354.14(a)

⁴³ Groundwater Management Plan, Section 2.1, p. 2-1

⁴⁴ Groundwater Management Plan, Section 2.1, p. 2-1

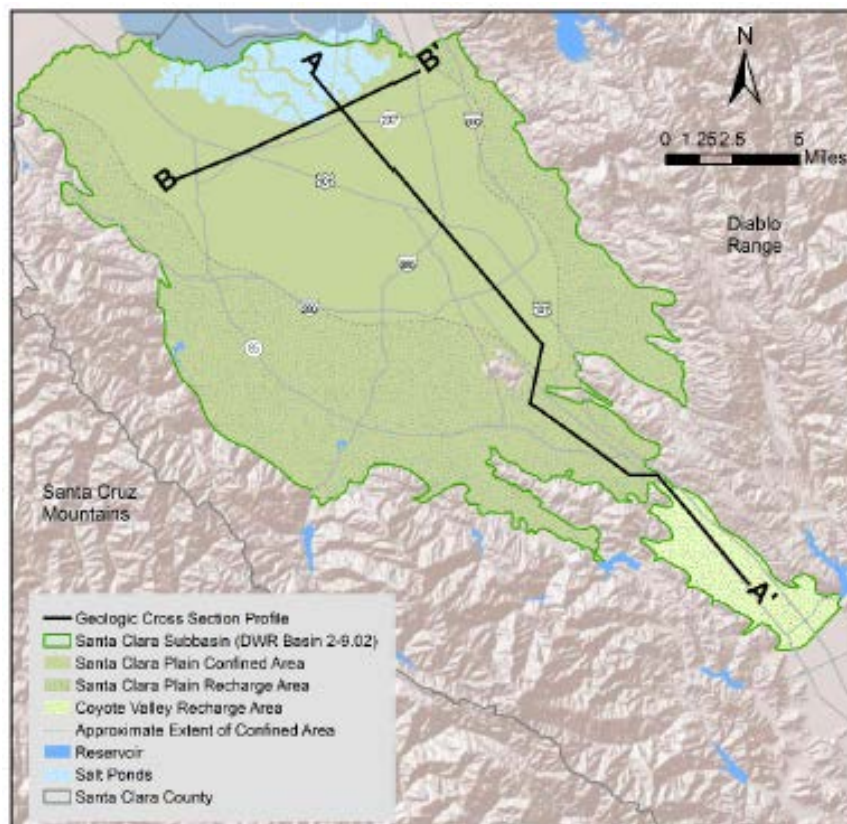


Figure 1 - Cross-Section Locations (Figure 2-3 of Groundwater Management Plan)

These two areas differ in geology, hydrology, land use, and water use. The Plan describes the Coyote Valley area as being in the southern portion of the basin with groundwater flowing northward through a bedrock constriction into the Santa Clara Plain area.⁴⁵ The Santa Clara Plain area is described as containing two significant aquifers, identified as the “shallow aquifer zone” and the “principal aquifer zone”, which are separated by an aquitard and are generally dipping toward the bay.⁴⁶ The Coyote Valley area is characterized by unconsolidated sand and gravels with discontinuous clays. Figure 2 presents cross-section A-A’ which illustrates the relationship of the shallow aquifer zone, major aquitard, and principal aquifer zone for the Coyote Valley and Santa Clara Plain areas, and also shows the general dip toward the north and San Francisco Bay.⁴⁷ The Plan provides maps of the depth to bedrock based on geophysical and borehole cutting analysis and characterizes the Subbasin as ranging in depth from approximately 150 feet in Coyote Valley area to approximately 1,500-feet deep in the center of the Santa Clara Plain area.⁴⁸ The Plan describes the recharge areas as occurring where the principal

⁴⁵ Groundwater Management Plan, Section 2.2.1, p. 2-9

⁴⁶ Groundwater Management Plan Section 2.1.3, p. 2-3

⁴⁷ Groundwater Management Plan, pp. 2-4 through 2-6 and Figures 2-3, 2-4, and 2-5

⁴⁸ Groundwater Management Plan Section 2.1.4, p. 2-7

aquifer zone is generally unconfined - along the margins of the basin - allowing for percolation of water into the strata that dip northward and continuing into areas that are overlain by a fine grained confining layer in the center of the basin.

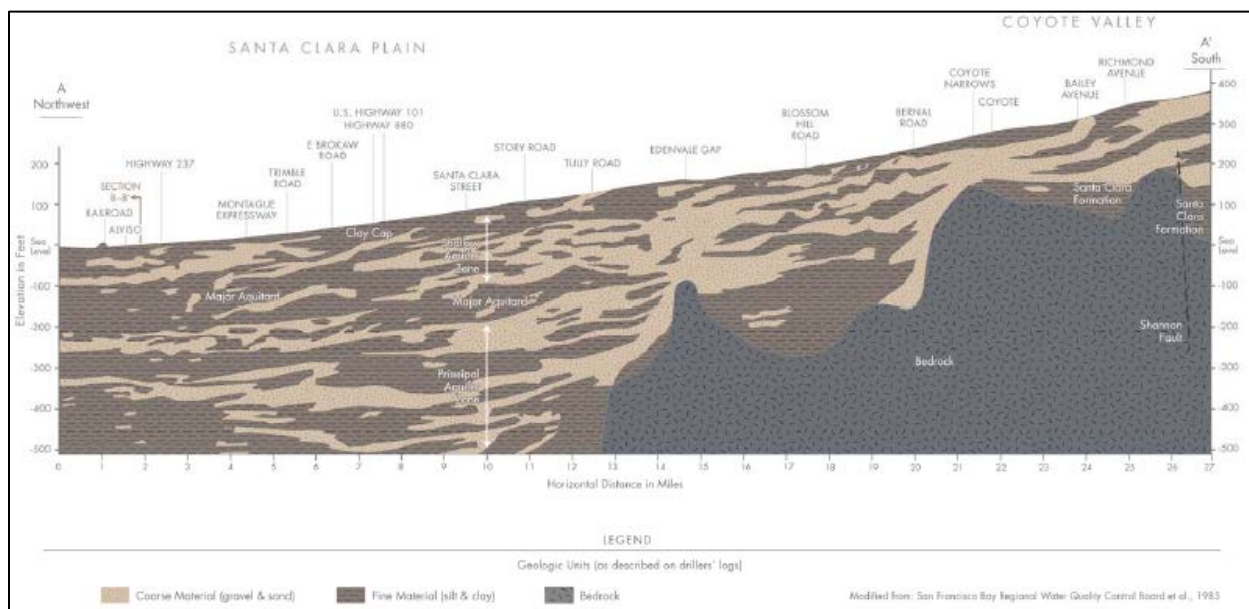


Figure 2 - Cross-Section A-A' (Fig 2-4 of Groundwater Management Plan)

2. Groundwater Conditions

The GSP Regulations require a description of historical and current groundwater conditions in the basin that includes information related to groundwater elevations, groundwater storage, seawater intrusion, groundwater quality, subsidence, and interconnected surface water, as applicable. The GSP Regulations also require an identification of groundwater dependent ecosystems.⁴⁹

The Groundwater Management Plan characterizes current and historical groundwater conditions including groundwater elevations, land subsidence, surface water and groundwater interactions, water quality, and seawater intrusion.⁵⁰ Additional and supporting information regarding groundwater conditions in the Subbasin are provided in the 2015 Annual Report, online Historical Groundwater Elevation Data, Salt and Nutrient Management Plan, and the 2015 Urban Water Management Plan which were submitted to the Department as part of the Alternative.

Groundwater elevation information is presented in the Plan based upon a monitoring network that collects information on water quality, water elevation, and subsidence (see Monitoring Network, below). The District compiles data from its monitoring network to

⁴⁹ 23 CCR § 354.16

⁵⁰ Groundwater Management Plan, Section 2.2, p. 2-9

produce groundwater elevation contour maps and hydrographs that illustrate small-scale variations in groundwater conditions of the principal aquifer zone. The District provides information about current groundwater elevations in contour maps representing spring and fall conditions from its most recent annual report,⁵¹ and provides maps from 2012 in the Plan, which the District describes as characterizing “typical” basin conditions.⁵² These maps illustrate the general groundwater flow directions and gradients within the principal aquifer zone and the change in seasonal flow patterns associated with recharge operations and typical pumping conditions and depressions. The Plan and the 2015 Annual Report also provide hydrographs for index wells from pre-1950 to present.⁵³ Each of the index wells have long periods of record and are described as being representative of the general aquifer response in Coyote Valley and Santa Clara Plain areas. Historical Groundwater Elevation Data, showing groundwater elevation trends for the wells monitored in the basin, is made available online for public review.⁵⁴

The District estimated the operational storage capacity for the Santa Clara Plain area to be 350,000 acre-feet and estimated a range from 23,000 to 33,000 acre-feet for the Coyote Valley Area. The Subbasin has a total estimated groundwater storage of 1.9 million acre-feet; however, much of this total is deemed inaccessible by the District using wells without causing undesirable results. The storage estimates are based on numerical modeling studies that describe the annual change in storage from 1970 to 2016 and from 1987 to 2016 in the Santa Clara Plain and Coyote Valley areas, respectively.⁵⁵

The District describes seawater intrusion as impacting the Santa Clara Plain area, but not the Coyote Valley area which is isolated inland and outside the potential for seawater intrusion conditions (see Figure 2). Within the Santa Clara Plain area, the District describes seawater intrusion as most prevalent in the shallow aquifer zone which is believed to be impacted by saline water intruding through interconnected intertidal salt marshes and creeks on the flanks of the bay. The District conducts regular monitoring and tracking of chloride concentrations in the shallow aquifer zone.⁵⁶ Impacts to the principal aquifer zone are believed to be from old poorly constructed wells that penetrate the shallow and principal aquifer zones, allowing for vertical migration of seawater.⁵⁷ The hydrogeologic conceptual model referenced above describes the extent of bay muds that isolate the principal aquifer zone strata from direct connection with seawater in the bay. The District also describes chloride concentrations in the principal aquifer zone as relatively low, but specific information regarding the extent of impacts were not included.

⁵¹ 2015 Annual Groundwater Report, Figures 14, 15, 16, pp. 21-23

⁵² Groundwater Management Plan, Section 2.2.1 p. 2-9

⁵³ Groundwater Management Plan, Section 2.2.1 p. 2-11

⁵⁴ Historical Groundwater Elevation Data, <https://gis.valleywater.org/GroundwaterElevations/map.php>

⁵⁵ Groundwater Management Plan, Section 4.4.1.3, p. 4-11

⁵⁶ Groundwater Management Plan, Section 2.2.5, p. 2-29

⁵⁷ Groundwater Management Plan, Section 2.2.5, p. 2-29

According to the District, chloride isoconcentration contours for 1945, 1980, and 2015 demonstrate a progressive retreat of the chloride contour following the import of Central Valley Project water in the 1980's.⁵⁸

Other groundwater quality issues have evolved as the Santa Clara Subbasin has changed from an agricultural area to an industrial and urban one.⁵⁹ Water quality issues affecting groundwater include contaminants from legacy agriculture, domestic septic discharges, and industrial chemical and waste releases. The District coordinates with federal and state agencies to address known point source contaminants and aids with legacy domestic nitrate concerns. The Plan characterizes the water quality conditions within the Santa Clara and Coyote Valley areas from the period of 2006 to 2015, although water quality conditions in the Santa Clara and Coyote Valley areas have been monitored and managed for decades.⁶⁰ The water quality data presented is based on ongoing monitoring conducted by the District and its member agencies, including data reported to the State Water Resources Control Board, Division of Drinking Water to provide a spatially distributed understanding of water quality. The Plan identifies the distribution of key constituents with respect to the maximum contaminant level (MCL) and secondary maximum contaminant level (SMCL) from 2006 to 2015.⁶¹ Tabular water quality summary information for organic and inorganic constituents of the Santa Clara Plain and Coyote Valley areas provide a generalized 10-year perspective of the distribution and relative exceedances of primary and secondary MCLs.⁶²

In association with the District's recycled water program, a detailed analysis of the Subbasin-wide salt and nutrient loading was presented in the Salt and Nutrient Management Plan. The Salt and Nutrient Management Plan was prepared with respect to the San Francisco Water Quality Control Board's Basin Plan objectives for all beneficial uses and users. The Salt and Nutrient Management Plan presents additional information regarding the existing distribution of total dissolved solids and nitrates and impacts associated with additional salt and nutrient loading within the basin using an assimilative capacity analysis.⁶³ The Groundwater Management Plan provides a map of locations of known contaminated sites managed by other regulatory agencies.⁶⁴

The Plan states that the Santa Clara Valley was the first area in the United States where permanent land subsidence due to groundwater withdrawal was recognized. Land subsidence was a driving force behind the District Act, whose purposes included to address overdraft, subsidence, and increased potential and occurrence of flooding

⁵⁸ Groundwater Management Plan, Figure 2-21, p. 2-30

⁵⁹ Groundwater Management Plan, Section 1.5.2, p. 1-15

⁶⁰ Groundwater Management Plan, Section 2.2.2, p. 2-12

⁶¹ Groundwater Management Plan, Figures 2-18 and 2-19, p. 2-20

⁶² Groundwater Management Plan, Section 2.2.4, p. 2-28

⁶³ Salt and Nutrient Management Plan, Section 3.4.5.7, p. 83

⁶⁴ Groundwater Management Plan, Figure 6-1, p. 6-16

because of subsidence.⁶⁵ The Groundwater Management Plan notes that subsidence in the Santa Clara Subbasin has been a significant issue in the past, but explains that whereas subsidence has been documented in the Santa Clara Plain area, it is absent from the Coyote Valley area due to geologic differences in the two areas. Basin fill in the Santa Clara Plain area consists of discontinuous sand lenses and fine-grained clay and muds which are subject to compaction due to groundwater extraction, whereas the Coyote Valley area contains predominantly coarser grained sands and gravel basin fill, with significantly less fine-grained material susceptible to compaction that causes subsidence(See Figure 2 above).⁶⁶ The Plan provides analysis of the spatial distribution of total subsidence that has occurred in the Subbasin as well as the remaining potential for subsidence⁶⁷ and describes how additional detailed studies have established specific groundwater levels at key wells to avoid conditions when subsidence has been observed (see Land Subsidence, below).

As described in the Groundwater Management Plan, the District utilizes the creeks and streams as part of its management practices to recharge groundwater in the Subbasin.⁶⁸ The District describes that its recharge activities are an important factor in maintaining flows in the surface water bodies in the Subbasin, many of which would only flow intermittently in the absence of that recharge.⁶⁹ The District has identified relatively short stream segments with suspected groundwater-surface water interactions on the margins of the basin,⁷⁰ and stated they were not aware of any areas where groundwater pumping has a significant or unreasonable effect on interconnected surface water.⁷¹ The Plan provides a historical ecology map described as representing conditions from “circa the early 1800s” depicting the distribution of vegetative communities and the occurrence of historical intermittent and perennial creeks.⁷² The Plan describes that historically, only the Guadalupe River was perennial and other creeks were intermittent.

3. Water Budget

GSP Regulations require a water budget for the basin that provides an accounting and assessment of the total annual volume of groundwater and surface water entering and leaving the basin, including historical, current and projected water budget conditions, and the change in the volume of water stored, as applicable.⁷³

⁶⁵ Groundwater Management Plan, Section 2.2.2, p. 2-12

⁶⁶ Groundwater Management Plan, Section 2.2.2, p. 2-13

⁶⁷ Groundwater Management Plan, Section 2.2.2, p. 2-13

⁶⁸ Groundwater Management Plan, Section 2.2.3, p. 2-17

⁶⁹ Groundwater Management Plan, Section 2.2.3, p. 2-14

⁷⁰ Groundwater Management Plan, Figure 2-14, p. 2-15

⁷¹ Groundwater Management Plan, Section 2.2.3, p. 2-14

⁷² Groundwater Management Plan, Section 2.2.3, p. 2-16

⁷³ 23 CCR § 354.18

The Groundwater Management Plan provides a description of the countywide water supplies, use, and management for the Santa Clara Subbasin.⁷⁴ The Plan also provides a detailed quantification of the groundwater budget summarizing natural and managed inflows and outflows for a period of 2003 through 2012. The District selected this 10-year period as representing dry, wet, and normal years, without incorporating recent periods of exceptionally dry years.⁷⁵ A summary of the water budget over this period indicates the Santa Clara Plain area and the Coyote Valley area have an average annual change in storage of positive 2,000 and 500 acre-feet per year, respectively.⁷⁶ The District utilizes groundwater models to support development of the groundwater budget in conjunction with monitoring data.⁷⁷ The models provide a quantification of groundwater flow, recharge, and discharge conditions for both the Santa Clara Plain area and the Coyote Valley area. Projected water budget is described in the Groundwater Management Plan and the 2015 Urban Water Management Plan. The Groundwater Management Plan describes increasing demand in both the Santa Clara Plain and Coyote Valley areas.⁷⁸ Climate change is indirectly addressed in the 2015 Urban Water Management Plan acknowledging that climate change is expected to have an effect on future water supply and demands, but due to viability of the current hydrology it is difficult to quantify climate change impact on future year demands.⁷⁹ The 2015 Urban Water Management Plan provides descriptions of projected water demand through 2040 for various water use sectors and are summarized in Table 4-1 and Figure 4-5, which indicate an anticipated steady increase in population and water use dominated by water retailer water use increases.⁸⁰

4. Management Areas

GSP Regulations authorizes, but does not require, an agency to define one or more management areas within a basin if the agency has determined that creation of management areas will facilitate implementation of the GSP.⁸¹

The District has identified two management areas in the Santa Clara Subbasin: the Santa Clara Plain area and the Coyote Valley area. These areas are based on significant differences in geologic setting, land use, and water use (see Hydrogeologic Conceptual Model, above). The District considers these as discrete areas for quantification of water

⁷⁴ Groundwater Management Plan, Sections 4.1 – 4.3, p. 4-1

⁷⁵ Groundwater Management Plan, Section 4.4, p. 4-7

⁷⁶ Groundwater Management Plan, Section 4.4.1.4, p. 4-12

⁷⁷ Groundwater Management Plan, Section 4.4.1.3, p. 4-11

⁷⁸ Groundwater Management Plan, Section 4.5, p. 4-17

⁷⁹ 2015 Urban Water Management Plan, Section 4.4, p. 4-8

⁸⁰ 2015 Urban Water Management Plan, Section 4.2, p. 4-2

⁸¹ 23 CCR § 354.20

budget, groundwater monitoring, and for setting specific sustainable management criteria.

C. Sustainable Management Criteria

GSP Regulations require a sustainability goal that defines conditions that constitute sustainable groundwater management for the basin, the characterization of undesirable results, and establishment of minimum thresholds and measurable objectives for each applicable sustainability indicator, as appropriate.⁸²

1. Sustainability Goal

GSP Regulations require that sustainable management criteria include a sustainability goal that culminates in the absence of undesirable results within the appropriate timeframe, and includes a description of the sustainability goal, describes information used to establish the goal for the basin, describes measures that will be implemented to ensure the basin operates within its sustainable yield, and contains an explanation of how the sustainability goal will be met.⁸³

The Groundwater Management Plan describes the correlation of the sustainable management criteria defined in SGMA with the driving principles of the District Act.⁸⁴ The Plan identifies two sustainability goals: (1) “groundwater supplies are managed to optimize water supply reliability and minimize subsidence”, and (2) “groundwater is protected from contamination, including salt water intrusion.”⁸⁵ The implementation of groundwater management activities associated with the District Act resulted in establishing organizational terminology and policy to implement the necessary actions to achieve these objectives. Figure 5-1 and 5-2 of the Plan illustrate the policy framework and definitions of the sustainability goals down to specific measurable outcomes.⁸⁶

2. Sustainability Indicators

GSP Regulations specify that an agency define conditions that constitute sustainable groundwater management for a basin, including the characterization of undesirable results and the establishment of minimum thresholds and measurable objectives for each applicable sustainability indicator.⁸⁷

Sustainability indicators are defined as any of the effects caused by groundwater conditions occurring throughout the basin that, *when significant and unreasonable*, cause

⁸² 23 CCR § 354.22

⁸³ 23 CCR § 354.24

⁸⁴ Groundwater Management Plan, Section 5.1, p. 5-1

⁸⁵ Groundwater Management Plan, Section 5.2, p. 5-2

⁸⁶ Groundwater Management Plan, Section 5.1, p. 5-1

⁸⁷ 23 CCR § 354.22

undesirable results.⁸⁸ Sustainability indicators thus correspond with the six undesirable results – chronic lowering of groundwater levels indicating a depletion of supply if continued over the planning and implementation horizon, reduction of groundwater storage, seawater intrusion, degraded water quality, including the migration of contaminant plumes that impair water supplies, land subsidence that substantially interferes with surface land uses, and depletions of interconnected surface water that have adverse impacts on beneficial uses of the surface water⁸⁹ – but refer to groundwater conditions that are not, in and of themselves, significant and unreasonable. Rather, sustainability indicators refer to the effects caused by changing groundwater conditions that are monitored, and for which criteria in the form of minimum thresholds are established by the agency to define when the effect becomes significant and unreasonable, producing an undesirable result.

This section thus consolidates three facets of sustainable management criteria: undesirable results, minimum thresholds, and measurable objectives. Information pertaining to the processes and criteria relied upon to define undesirable results applicable to the basin, as quantified through the establishment of minimum thresholds, are addressed for each sustainability indicator. However, a submitting agency is not required to establish criteria for undesirable results that the agency can demonstrate are not present and are not likely to occur in a basin.⁹⁰

a. Chronic Lowering of Groundwater Levels.

GSP Regulations specify that the minimum threshold for chronic lowering of groundwater levels be based on groundwater elevations indicating a depletion of supply that may lead to undesirable results.⁹¹

The Plan describes that the District developed groundwater-level-based thresholds for the avoidance of land subsidence in 1991 and has since managed the Subbasin to those levels.⁹² Description of those thresholds is provided below (see Land Subsidence).

b. Reduction of Groundwater Storage

GSP Regulations specify that the minimum threshold for reduction of groundwater storage shall be a total volume of groundwater that can be withdrawn from the basin without causing conditions that may lead to undesirable results.⁹³

⁸⁸ 23 CCR § 351(ah)

⁸⁹ Water Code § 10721(x)

⁹⁰ 23 CCR § 354.26(d)

⁹¹ 23 CCR § 354.28(c)(1)

⁹² Groundwater Management Plan, Section 5.4.2, p. 5-6

⁹³ 23 CCR § 354.28(c)(2)

The Plan describes end-of-year storage targets of 278,000 and 5,000 acre-feet for the Santa Clara Plain and Coyote Valley areas, respectively.⁹⁴ The District's Functional Equivalency Report cites the sections of the Plan describing the storage targets as being equivalent to the minimum thresholds required in a GSP.⁹⁵ The storage targets were derived from the District's 2015 Urban Water Management Plan, which identified a combined storage target of 300,000 acre-feet for the Santa Clara and Llagas subbasins as the bottom of the "normal" range where no contingency actions are needed.⁹⁶ The Urban Water Management Plan provides additional details of the storage analysis and describes subsequent contingency actions to be taken if the end-of-year storage targets are not met.⁹⁷ The 2015 Annual Groundwater Report describes that the end-of-year storage volumes were not met in 2015 (a drought year), when a total of approximately 215,000 acre-feet of groundwater was in storage.⁹⁸ This condition triggered a countywide water use reduction of 30 percent in 2015, which was reduced to a 20 percent reduction in 2016; the water use reduction triggers were described as being consistent with District's Water Shortage Contingency Plan.⁹⁹

c. Seawater Intrusion

GSP Regulations specify that the minimum threshold for seawater intrusion be defined by a chloride concentration isocontour for each principal aquifer where seawater intrusion may lead to undesirable results.¹⁰⁰

The Plan provides chloride isoconcentration contours to support its description of historical seawater intrusion in the shallow aquifer (see Groundwater Conditions, above). A specific contour depicting an operational threshold was not used for the District's groundwater management planning. The District also includes chloride in its water quality outcome measure (see Degraded Water Quality, below) for the stated purpose of evaluating potential seawater intrusion.¹⁰¹

d. Degraded Water Quality

GSP Regulations specify that the minimum threshold for degraded water quality shall be the degradation of water quality, including the migration of contaminant plumes that impair

⁹⁴ Groundwater Management Plan, Section 5.4.1, p. 5-6

⁹⁵ Groundwater Management Plan, Appendix B, p. B-13

⁹⁶ Groundwater Management Plan, Section 5.4.1, p. 5-6

⁹⁷ 2015 Urban Water Management Plan, Table 8-1, p. 8-3

⁹⁸ 2015 Annual Groundwater Report, Section 3.2, p. 24

⁹⁹ 2015 Annual Groundwater Report, Section 3.2, p. 19

¹⁰⁰ 23 CCR § 354.28(c)(3)

¹⁰¹ Groundwater Management Plan, Section 5.4.3, p. 5-8

water supplies or other indicator of water quality as determined by the agency that may lead to undesirable results.¹⁰²

The Plan describes two water quality outcome measures for the Plan area, which covers both the Santa Clara Subbasin and the adjacent Llagas Subbasin. The first outcome measure is that at least 95 percent of countywide water supply wells meet primary drinking water standards and 90 percent of wells in the “South County” area (comprised of the Coyote Valley management area of the Santa Clara Subbasin and the adjacent Llagas Subbasin) meet agricultural objectives defined in the Regional Water Quality Control Board’s Basin Plan.¹⁰³ The Plan describes that this outcome measure is primarily related to groundwater that is used (i.e., extracted) and, because most groundwater is extracted from the principal aquifer zone, only wells in that zone are tracked for this measure.¹⁰⁴ The 2015 Annual Report describes that the drinking water component of this outcome measure was not met in 2015, when 84 percent of wells county-wide met primary drinking water standards.¹⁰⁵ The 2015 Annual Report explained that all of the instances where drinking water standards were not met were due to nitrate detections in domestic wells located in the “South County” area. The agricultural water quality component of the outcome measure was met in 2015, with 98 percent of wells meeting agricultural water quality objectives.

The second outcome measure is that at least 90 percent of wells in both the shallow and principal aquifer zones have stable or decreasing concentrations of nitrate, chloride, and total dissolved solids.¹⁰⁶ The 2015 Annual Report describes that the nitrate and total dissolved solids components of this outcome measure were met in 2015, but that it was not met for chloride, when 84 percent of wells showed stable or decreasing chloride concentrations.

e. Land Subsidence

GSP Regulations specify that the minimum threshold for land subsidence shall be the rate and extent of subsidence that substantially interferes with surface land uses and may lead to undesirable results.¹⁰⁷

The Plan states the District defined groundwater-level thresholds for land subsidence in 1991 and identifies maintenance of groundwater levels above the thresholds, which are identified at 10 monitoring sites, as an outcome measure for the Subbasin.¹⁰⁸ The Plan

¹⁰² 23 CCR § 354.28(c)(4)

¹⁰³ Groundwater Management Plan, Section 5.4.3, p. 5-7

¹⁰⁴ Groundwater Management Plan, Section 5.4.3, p. 5-7

¹⁰⁵ 2015 Annual Groundwater Report, Section 5, p. 34

¹⁰⁶ Groundwater Management Plan, Section 5.4.3, p. 5-8

¹⁰⁷ 23 CCR § 354.28(c)(5)

¹⁰⁸ Groundwater Management Plan, Table 5-1, p. 5-7

notes that exceedance of those groundwater-level thresholds may represent conditions under which subsidence could exceed the 0.01 foot per year rate that was agreed to in 1991 as a maximum acceptable rate of subsidence.¹⁰⁹

f. Depletion of Interconnected Surface Water

GSP Regulations specify that the minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results.¹¹⁰

The District identifies interconnected surface water as only occurring in discrete areas on the margins of the Subbasin which are associated with recharge and discharge zones and largely appear to be controlled by the underlying geologic conditions.¹¹¹ The Plan states surface water flows are an integral part of the District's groundwater management, as creeks and streams are largely utilized for the purpose of controlled, deliberate groundwater recharge and the District relies on losing stream reaches to achieve this purpose.¹¹² As such, sustainable management criteria have not been established to avoid significant and unreasonable depletion of interconnected surface water.¹¹³

D. Monitoring Networks

GSP Regulations require that each basin be monitored, and that a monitoring network include monitoring objectives, monitoring protocols, and data reporting requirements be developed that shall promote the collection of data of sufficient quality, frequency, and distribution to characterize groundwater and related surface water conditions in the basin and evaluate changing conditions.¹¹⁴

The Plan describes the groundwater level, subsidence, water quality, and surface water (flow and quality) monitoring programs in place to measure progress or maintenance of the District's outcome measures and sustainability goals.

Groundwater level monitoring includes a network of 158 wells monitored directly by the District, and in addition to these, over 100 production wells monitored by water retailers in the Subbasin.¹¹⁵ The wells are distributed throughout the basin to describe various pumping and recharge locations such that detailed mapping of the potentiometric surface can be performed. The District provides detailed descriptions of the monitoring well

¹⁰⁹ Groundwater Management Plan, Section 5.4.2, p. 5-6

¹¹⁰ 23 CCR § 354.28(c)(6)

¹¹¹ Groundwater Management Plan, Section 2.2.3, p. 2-14

¹¹² Groundwater Management Plan, Section 2.2.3, p. 2-14

¹¹³ Groundwater Management Plan, Section 2.2.3, p. 2-14

¹¹⁴ 23 CCR § 354.32

¹¹⁵ Groundwater Management Plan, Section 7.1.1, p. 7-1

network including construction details, well type, monitoring frequency, and other details.¹¹⁶ The District provides a description of the range of monitoring frequency for these wells based upon management needs and include frequencies of daily, weekly/biweekly, monthly, bimonthly, and quarterly. The 158 District monitoring wells are all monitored at least monthly to provide the agency timely information to support management actions.¹¹⁷ The Groundwater Management Plan provides a description of accuracy of well head reference elevation and potential error associated with the variety of methods used.¹¹⁸

Subsidence monitoring is an essential element and driving condition for management of the groundwater resources in the Subbasin. As such the District describes a monitoring network that includes annual surveys of over 150 benchmarks, use of two continuously monitoring extensometers, and a network of 10 subsidence index wells monitoring groundwater levels.¹¹⁹ The subsidence index wells serve as an early warning effort to monitor if groundwater levels are above minimum thresholds on at least a monthly basis. The monitoring results are confirmed by use of the additional extensometer measurements and benchmark surveys to evaluate progress toward the District's outcome measures and sustainability goals.

The District maintains a water quality monitoring network of 55 wells in the Subbasin (30 in the shallow aquifer zone and 25 in the principal aquifer zone) that are sampled annually for trace elements, ions, nutrients, and field parameters (e.g., pH, specific conductance, and temperature), and every three years for volatile organic compounds.¹²⁰ In addition, results from annual Division of Drinking Water quality compliance testing are included for approximately 225 production wells from the Santa Clara and Llagas subbasins.¹²¹ The District also collects water quality samples from more than 200 domestic wells in the Santa Clara and Llagas subbasins and near recycled water irrigation sites. The District also incorporates, on an as-needed basis, water quality information from other agencies and programs including, the State Water Resources Control Board's Groundwater Ambient Monitoring and Assessment Program and the Irrigated Lands Regulatory Program.¹²²

Surface water monitoring described by the District includes the evaluation of water quality and discharge of surface waters within the Subbasin to properly manage recharge efforts. The District identifies the sampling locations for water quality and discharge locations throughout the Subbasin. Water quality samples are collected at seven stream recharge

¹¹⁶ Groundwater Management Plan, Appendix E, p. E-3

¹¹⁷ Groundwater Management Plan, Section 7.1.1, p. 7-1

¹¹⁸ Groundwater Management Plan, Section 7.1.2.1, p. 7-3

¹¹⁹ Groundwater Management Plan, Section 7.2, p. 7-6

¹²⁰ Groundwater Management Plan, Section 7.3, p. 7-9

¹²¹ Groundwater Management Plan, Section 7.3.2, p. 7-13

¹²² Groundwater Management Plan, Section 7.3.5, p. 7-19

system sites on a triennial rotating basis during both dry and wet seasonal conditions with 90 samples being collected in total over the three-year period.¹²³ In addition to collecting surface water quality and discharge data, the District coordinates and incorporates data from other agencies and programs including: the Santa Clara Valley Urban Runoff Pollution Prevention Program and the Central Coast Regional Water Quality Control Board's Central Coast Ambient Monitoring Program.

Data collected as part of the District's monitoring programs are stored in databases and are largely available on the District's websites. The monitoring data is incorporated into various reporting structures that regularly inform management actions by the District, these include: Water Tracker (monthly), Monthly Groundwater Condition Report, Protection and Augmentation of Water Supplies Report (annual), and the Annual Groundwater Report.¹²⁴ These data and reports support ongoing modelling efforts to support the District's forecasting ability and ongoing evaluation of conditions in the Subbasin.

E. Projects and Management Actions.

GSP Regulations require a description of the projects and management actions the submitting agency has determined will achieve the sustainability goal for the basin, including projects and management actions to respond to changing conditions in the basin.¹²⁵

The Groundwater Management Plan provides a portfolio of projects and management actions that are currently being implemented by the District or other agencies to address the sustainability goals of optimizing groundwater reliability and the protection of groundwater quality. The District also explains that the District Act provides the authority to advance additional projects on an as-needed basis and advancement of significant projects through the capital improvement program. The Plan organizes these projects and management actions into three primary categories; projects supporting groundwater reliability, groundwater quality, and surface water - groundwater interactions.

Programs to maintain reliable groundwater supply include managed aquifer recharge, in-lieu recharge, protection of natural recharge, groundwater production management, water accounting, groundwater level and storage assessments, and asset management.¹²⁶ Programs to protect groundwater quality include a well ordinance program, domestic well testing program, salt and nutrient management, nitrate treatment system rebate program, vulnerability assessment studies, coordination with land use agencies, coordination with

¹²³ Groundwater Management Plan, Section 7.4, p. 7-23

¹²⁴ Groundwater Management Plan, Section 7.5, p. 7-28

¹²⁵ 23 CCR § 354.44

¹²⁶ Groundwater Management Plan Section 6.1, p. 6-1

regulatory agencies, and public outreach.¹²⁷ Programs related to surface water - groundwater interaction provide ongoing integrated management of these resources serve to address both reliability and quality needs of the beneficial uses and users in the Subbasin and include the managed in-stream releases of surface water, stormwater management, prevention of salt water intrusion, and watershed management.¹²⁸

VI. Assessment

The following describes the evaluation and assessment of the Alternative for the Santa Clara Subbasin as determined by Department staff. In undertaking this assessment, Department staff did not conduct geologic or engineering studies, although Department staff may have relied on publicly available geologic or engineering or other technical information to verify claims or assumptions presented in the Alternative.¹²⁹ As discussed above, Department staff have determined that the Santa Clara Alternative satisfied the conditions for submission of an alternative.¹³⁰ The Alternative was submitted within the statutory period, the Subbasin was found to be in compliance with the reporting requirements of CASGEM, and staff find the Alternative to be complete and to cover the entire basin (see Required Conditions, above). Based on its evaluation and assessment of the Santa Clara Alternative, as discussed below, Department staff find that the Alternative satisfies the objectives of SGMA.¹³¹

A. Evaluation of Alternative Contents

The District describes in sufficient detail its authority to manage groundwater within its statutory boundaries, which encompasses the Santa Clara Subbasin. The Groundwater Management Plan and the District Act document the legal authority and describe past and planned future authority to implement and finance necessary projects. The District describes the evolution of the District dating back to 1929 with the Santa Clara Valley Water Conservation District charged with the initial mission of stopping groundwater overdraft and subsidence. Since that time the District has grown through consolidation and annexation of other flood control and water districts. The District has demonstrated implementation of numerous projects and management actions to address the primary drivers of flood control, water reliability, and water quality conditions in the Subbasin. The District has funded and cooperated with numerous studies to characterize groundwater conditions in the County for a variety of factors to inform management strategies. That history of management in the Subbasin provides a reasonable level of confidence that

¹²⁷ Groundwater Management Plan, Section 6.2, p. 6-9

¹²⁸ Groundwater Management Plan, Section 6.3, p. 6-18

¹²⁹ Instances where the Department review relied upon publicly available data that was not part of the Alternative are specifically noted in the assessment.

¹³⁰ 23 CCR § 358.4(a)

¹³¹ Water Code § 10733.6(a); 23 CCR § 358.4(b)

the District can continue implementation of the Groundwater Management Plan to meet its sustainability goals.

The Groundwater Management Plan and associated technical studies and plans demonstrate a sufficient understanding of the basin setting, including the geology and groundwater conditions of the Santa Clara Subbasin. The Plan and supporting technical studies, including the 2015 Annual Report, 2015 Urban Water Management Plan, and the Salt and Nutrient Management Plan appear to rely on best available information and best available science and their conclusions are consistent with the Department's understanding of conditions in the Santa Clara Subbasin. The hydrogeologic conceptual model described in the Plan incorporates the relevant hydrologic processes in the entire basin to support analysis presented. The use of numerical models in the Subbasin to support operational and long-term planning decisions also provide support for water budget estimates. The District's numerical models are used to provide on-going estimates of groundwater storage to support management actions of required replenishment activities. The District's understanding of the basin setting is adequate to develop and implement a plan for sustainable groundwater management. However, Department staff recommend that the District address identification of groundwater dependent ecosystems (see Recommended Action 1) and incorporation of climate change into its projected water budget (see Recommended Action 2).

The Plan identifies sustainability goals for the County and specific, quantitative outcome measures for groundwater storage and land subsidence in the Santa Clara Subbasin and for water quality in the combined Santa Clara and Llagas subbasins. The District's storage outcome measure is an end-of-year storage target of 278,000 and 5,000 acre-feet for the Santa Clara Plain and Coyote Valley areas, respectively. The District has identified specific actions that occur if that storage target is not met, as defined in the 2015 Urban Water Management Plan. Land subsidence outcome measures are based on maintaining groundwater elevations above identified thresholds at a set of index wells. Except for minor exceedances at one of the ten subsidence index wells during the most recent drought, water levels have remained above these thresholds since approximately the mid-1990s. Water quality outcome measures utilize primary drinking water standards and Central Coast Regional Water Quality Control Board Basin Plan agricultural water quality standards. The water quality outcome measure address both the number of detections above the identified thresholds and trends of key constituents identified for the County. Department staff recommend that the water quality outcome measures, which in the Plan are defined County-wide (i.e., they are set based on water quality in both the Santa Clara and Llagas subbasins), be refined in future updates to the Alternative with separate quantitative measures specific to the respective subbasins (see Recommended Action 3). The District already reports water quality detections and trends separately by subbasin but, as presently configured in the Plan, it is not possible to determine whether failure to

achieve the outcome measures represents an undesirable result for both subbasins or whether the undesirable result is applicable to a specific subbasin.¹³² In separating the water quality outcome measures by subbasin and in light of the described anticipated sea level rise, Department staff also recommend identifying specific water quality measures to track for potential seawater intrusion in the Santa Clara Plain area (see Recommended Action 4).

Additionally, the outcome measures defined by the District are the only quantitative standards outlined in the Plan and, as indicated in the 2015 Annual Groundwater Report, several of those standards were not met in 2015 (e.g., for end-of-year storage). While alternatives are not required to follow the exact format of a GSP, the GSP Regulations do outline a process for GSP development that includes quantitative standards both for measurable objectives, which represent conditions that the basin is operated toward; and minimum thresholds, which represent conditions that generally are to be avoided so as to not cause undesirable results. It was not clear to Department staff whether those outcome measures were generally more equivalent to measurable objectives or minimum thresholds but, in the absence of any other quantifiable standard, the Department's ongoing review of whether the Alternative satisfies the objectives of SGMA will focus on whether the District is able to meet those outcomes to avoid undesirable results in the Subbasin. If the outcome measures are more equivalent to measurable objectives and there is another metric that is generally more representative of conditions that the District intends to avoid in the Subbasin to prevent undesirable results, then the District should provide those metrics in an update to the Alternative (see Recommended Action 5).

The District describes specific monitoring networks that address groundwater levels, groundwater quality, subsidence conditions, surface water quality, and surface water flows. The data collected from these locations typically represent long periods of observations and data collection. Based upon the description of the hydrogeologic system, the distribution of dedicated monitoring wells, subsidence monitoring locations, and use of existing water supply wells appears to be reasonable. The data provide an adequate and reasonable distribution of direct observations of conditions within the Subbasin to allow for informed decisions and planning for sustainable groundwater management. The frequency of data collected from the monitoring networks is adequate to characterize the seasonal variability and management-action based variability of the groundwater and related systems.

Management actions and projects described in the Plan are consistent with the requirements of SGMA and the GSP Regulations. The management actions and projects the District has implemented and is planning on implementing provide for continued progress toward meeting the sustainability goal for the Subbasin. The projects and

¹³² 2015 Annual Groundwater Report, Table 8, p. 37

management actions the District has developed have led to meeting or making significant progress to their specific measurable objectives for storage, land subsidence, and water quality. The groundwater conditions described in the Plan illustrate the maintenance of the targeted conditions described in the measurable objectives, with exception of drought periods where additional prescribed actions were implemented, such as water conservation and calls on banked water options. In addition, recovery following drought or dry periods was accomplished in accordance to the Plan and typically occurred within the next water year. Continued implementation of planned projects, programs, and coordinated effort on water quality objectives will likely result in continued progress toward this objective. Discussions of funding for projects appears to be reasonable. The District describes a clear process previously implemented to apply an adaptive management strategy for development, funding, and implementation of necessary projects to support the sustainability goals.

The Groundwater Management Plan for the Santa Clara Subbasin is specifically designed to manage groundwater supplies to optimize water supply reliability and to protect the basin against undesirable results including overdraft, subsidence, seawater intrusion, and other sources of groundwater contamination, and so appears consistent with Water Code Section 106.3, which establishes the state policy that “every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes.” Department staff consider that the Groundwater Management Plan, which utilizes natural waterways in the basin to recharge the aquifers, appears also to be consistent with the public trust doctrine.

B. Recommended Actions

The following recommended actions include information that the District may wish to include in the first five-year update of the Alternative to facilitate the Department’s ongoing evaluation and assessment of the Alternative as well as recommendations for improvements to the Alternative.

Recommended Action 1.

Staff recommend that the District provide an identification of groundwater dependent ecosystems in the Subbasin.

Recommended Action 2.

Staff recommend that the District provide a projected water budget incorporating climate change and expected population growth over the planning and implementation horizon of 50 years.

Recommended Action 3.

Staff recommend that the District create separate outcome measures related to water quality in the Santa Clara and Llagas subbasins. Separate subbasin-specific criteria will allow for a determination of whether each subbasin, separately, is meeting or making progress toward the outcome measures.

Recommended Action 4.

Staff recommend the District develop specific seawater intrusion outcome measures separate from other water quality outcome measures.

Recommended Action 5.

Staff recommend that the District clarify how meeting its outcome measures relates to the avoidance of undesirable results in the Santa Clara Subbasin. Specifically, it should clarify whether not meeting the outcome measures represents an undesirable result for the applicable sustainability indicator. If that is not the intent of the District, then it should provide additional clarification and additional metrics that can be used by the District, and by the Department as it reviews the Alternative on an ongoing basis, to determine what effects represent undesirable results and to objectively assess the presence or absence of those undesirable results.