SOQUEL CREEK WATER DISTRICT

Well Master Plan Project Description

Introduction

The Soquel Creek Water District (SqCWD or District) has developed a Well Master Plan (WMP or Plan) for the purpose of improving redundancy and flexibility in SqCWD's water production and distribution system while redistributing pumping away from coastal and depressed groundwater areas. The WMP, based on current groundwater conditions, the reliability of the existing water system, and the findings of a source capacity assessment, consists of developing three new groundwater production wells at four potential locations, the conversion of an existing irrigation well to a municipal well, and the destruction of two deteriorating production wells. This section describes the purpose and need for a comprehensive WMP and provides project-level information regarding implementation of the WMP as a whole, as well as proposed actions at the individual well sites.

Project Background

Overview of SqCWD

The SqCWD is a nonprofit, local government agency that provides potable water service and groundwater resource management within its service area. Founded in 1961 under the County Water District Law (Water Code, Division 12, Section 30000 et seq.), the SqCWD's original purpose was to provide flood control and water conservation services. In 1964, the SqCWD acquired the Monterey Bay Water Company and discontinued flood control services.

Today, the SqCWD serves a population of approximately 49,000 through approximately 14,900 connections in four independent service sub-areas (described below) within Santa Cruz County. The SqCWD encompasses seven miles of shoreline along Monterey Bay, and extends from one to three miles inland into the foothills of the Santa Cruz Mountains, essentially following the County Urban Services Line (USL). Ninety percent of the SqCWD's customers are residential; the remaining 10 percent are primarily commercial and institutional. There are no agricultural connections to the system. The City of Capitola is the only incorporated area within the District. Unincorporated communities include Aptos, La Selva Beach, Rio Del Mar, Seascape, Seacliff Beach, and Soquel.

Average groundwater production/pumping for the years 2001 thru 2005 indicates the SqCWD currently produces approximately 5,400 acre-feet (1.76 billion gallons) of water annually. The

District receives 100 percent of its water from groundwater aquifers within two geologic formations that underlie the SqCWD service area. The Purisima Formation aquifers provide the majority of the SqCWD's annual production for Capitola, Soquel, Seacliff Beach, and Aptos (approximately 3,400 acre-feet). The Aromas Red Sands (Aromas) aquifer provides the remaining water supply needs (2,000 acre-feet) for the communities of Seascape, Rio Del Mar, and La Selva Beach.

A five-person Board of Directors, elected to four-year terms by voters in the SqCWD service area, governs the SqCWD. The Directors are responsible for policy decisions that govern the operations of the SqCWD. District staff consists of 36 full-time-equivalent employees assigned to five departments: Administration; Engineering; Operations and Maintenance; Conservation and Customer Service Field; and Financial/Business Services.

Water Production, Storage, and Distribution Facilities

The SqCWD water supply system consists of 18 production wells, only 16 of which are currently active, roughly 130 miles of pipeline, and 18 water storage tanks. The total estimated production capacity of the system is 14 million gallons per day (mgd) and the total storage capacity is 6.81 million gallons. Over time, the District's wells, some of which are 20 to 60 years old, have lost production capacity and have grown increasingly vulnerable to mechanical failure. At least three of these wells (Monterey, Aptos Creek, and Maplethorpe) are at or near the end of their useful operational life. Other wells (Estates, Madeline, and T. Hopkins) can only be operated for limited periods during the summer season as the pumps break suction after prolonged pumping.

The SqCWD water production, storage, and distribution system is operated within four individual water service areas that are herein referred to as Service Areas I, II, III, and IV, respectively. The four service areas were originally privately-owned water systems that were consolidated and combined to form the SqCWD. Service Areas I and II are intertied by the McGregor Drive Transmission Line; Service Areas III and IV are intertied by the San Andreas Road Transmission Line. Although interconnections between Service Areas I and II, and between Service Areas III and IV allow for some movement of water between service areas, the transfer of water between Service Areas I and II east to Service Areas III and IV is not currently possible. A summary of District-owned water supply facilities by service area is provided in **Table 1** and **Table 2**, respectively.

Service Area I

Service Area I encompasses most of the City of Capitola and the community of Soquel. Service Area I contains six production wells, five water storage tanks, five booster pump stations, and five treatment plants. As indicated in **Table 1**, four of these wells (Garnet, Main Street, Rosedale, and Tannery II) are currently in production; two of these wells (Monterey[1] and Maplethorpe) have been taken out of service. All wells in Service Area I draw water from the Purisima

[1] Restoring production from Monterey Well is being evaluated.

Formation. The total source capacity[2] of all wells in Service Area I is estimated at 3,500 gallons per minute (gpm).

The Maplethorpe Well was taken out of production in the mid-nineties due to excess sand production and turbidity as well as loss of production capacity. The well is located across the street from the Tannery Treatment Plant and the new Tannery II Well and is plumbed to pump raw water to the Tannery Treatment Plant. Due to structural issues and high sand production, the Maplethorpe Well is available for emergency pumping only and is not considered part of the total source capacity of the system. Space constraints and inadequate treatment capacity preclude the possibility of installing another well at the same location.

The Monterey Well and Treatment Plant were taken out of production in 2005 due to loss of suction during prolonged periods of pumping and increased sand production[3]. In 2005, a PVC liner with pre-packed gravel was inserted into the Monterey Well in efforts to rehabilitate it. Acid treatments were also used in an attempt to dissolve the old stove pipe casing. Although past efforts to rehabilitate the well have been unsuccessful, the District is now planning to bring the well back into production with an estimated capacity of 180 gpm. Due to space constraints, the potential for a replacement well at the same site is very limited. Additionally, this well is located two blocks away from the ocean and is in the coastal zone[4].

The Garnet, Main Street, Rosedale, and Tannery II wells produce water for all of Service Area I and some of Service Area II. All four active well sites in Service Area I have treatment plants onsite. Raw water pumped from wells in Service Area I is chlorinated and treated for iron and manganese prior to distribution[5].

Collectively, the five water storage tanks in Service Area 1 (Cornwell, Pringle, Crestline No. 1, Crestline No. 2, and Ironwood) provide 2,115,000 gallons of storage capacity. Water levels in the District's tanks are controlled via radio signals using a Supervisory Control & Data Acquisition (SCADA) system. When water levels in the storage tanks are low, a radio signal is sent to the well pumps to turn on; when the storage tanks are full, a radio signal is sent to the well pumps to shut down before the storage tank reaches overflow elevation. Once filled, the storage tanks are able to deliver water to most customers in the service area by gravity flow.

[2] Source capacity represents the best estimate of the capacity of a particular water supply source (i.e. well) over an extended period of time.

[3] Sand production occurs when sand is drawn into the well through the perforations in the well casing. The perforations are the slits that are cut into the well casing to allow groundwater to enter the well. Once inside the well casing, the sand can block the well screen, damage the well pump, increase well drawdown, and perhaps even accelerate corrosion and incrustation.

[4] For the purposes of this EIR, the coastal zone refers to the interface between the land and the sea where groundwater quality is most easily influenced by saltwater. The coastal zone extends from the shoreline approximately 0.5 mile inland. Highway One is the boundary line for the Coastal Zone.

[5] Wells drilled in the Purisima Formation require iron and manganese removal to meet secondary drinking water standards.

TABLE 1
SUMMARY OF EXISTING DISTRICT-OWNED WELLS BY SERVICE AREA

Well Name	Well Location	Year Drilled	In Production?	Condition	Existing Capacity (gpm)
Service Area I					
Garnet	Garnet Street / 49th Avenue	1995	yes	Good	720
Main Street	Main Street / Bridge Street	1986	yes	Good	1,200
Rosedale	Rosedale Avenue / Soquel Drive	1983	yes	Good	460
Tannery II	Maplethorpe Lane / Soquel Drive	2004	yes	Good	940
Maplethorpe	Maplethorpe Lane / Soquel Drive	1965	no	Impacted	-
Monterey	Monterey Avenue / Kennedy Drive	1950	no	Impacted	180 [a]
			Service Area I - Total Source Capacity =		**3,500**
Service Area II					
Ledyard	Ledyard Wy / Arden Wy	1985	yes	Good	210
Madeline	Madeline Drive / Soquel Drive	1984	yes	Impaired[b]	210
Estates	Estates Drive / Borregas Drive	1985	yes	Impaired[b]	675
T. Hopkins	Village Crk Road / Aptos Crk Road	1989	yes	Impaired[b]	255
Aptos Creek	Spreckles Drive / Seacliff Drive	1965	yes	Impacted	450
			Service Area II - Total Source Capacity =		**1,800**
Service Area III					
Bonita	Bonita Drive / Zanzibar Drive	1983	yes	Good	820
Country Club	Baltusrol Drive / Baltusrol Wy	1953	yes	Impacted	500 [a]
San Andreas	San Andreas Road / Bonita Drive	1991	yes	Good	1,020
Seascape	Seascape Ridge Drive / Camino Pacifico	1981	yes	Impaired[b]	870 [b]
Aptos Jr. High	N. Polo Drive / S. Polo Drive	1927	yes	Impacted	450 [a]
			Service Area III - Total Well Capacity =		3,660
			Minus Blending to Service Area IV		-100
			Service Area III - Total Source Capacity (adjusted) =		**3,560**
Service Area IV					
Altivo	Altivo Avenue / Mar Monte Avenue	1979	yes	Good[c]	612
Sells	Sells Drive / San Andreas Road	1983	yes	Good[c]	533
Service Area IV - Total Well Capacity =					1,145
Blending from Service Area III					100
			Service Area IV - Total Source Capacity (adjusted) =		**1,245**

SOURCES: (1) SqCWD, 2006. *Well Master Plan, Production Well System Reliability Improvements*. January. (2) Personal email communication with Jeff Gailey, District Engineer, May 19, 2006.

NOTES: [a] Projected well capacity after planned improvements. [b] Pumping reduced due to advancement of freshwater/saltwater interface (i.e. saltwater intrusion) or lowered local groundwater levels that cause the well to break suction after prolonged pumping. [c] Well production is limited due to a policy decision to blend water from Service Area III to reduce Chromium 6 levels.

KEY: Impacted = well no longer maintains historic pumping capacities through prolonged pumping cycles during periods of high demand or is prone to failure due to holes in the well casings and associated production of sand and gravel; Impaired = well is located in an area vulnerable to saltwater intrusion and/or other groundwater management issues that restrict well production; Good = reliable capacity, produces acceptable water quality.

TABLE 2
SUMMARY OF DISTRICT-OWNED STORAGE TANKS BY SERVICE AREA

Tank Name	Storage Capacity (gal)
Service Area I	
Cornwell	500,000
Pringle	300,000
Crestline No. 1	500,000
Crestline No. 2	700,000
Ironwood	115,000
Service Area I - Total Storage Capacity =	**2,115,000**
Service Area II	
Austrian	500,000
Park Wilshire	200,000
Mar Vista No. 1	300,000
Mar Vista No. 2	300,000
Fairway	600,000
Service Area II - Total Storage Capacity =	**1,900,000**
Service Area III	
Vista Del Mar	500,000
Seascape	1,200,000
Rio Del Mar Estates	300,000
Monte Toyon	250,000
Service Area III - Total Storage Capacity =	**2,250,000**
Service Area IV	
Canon del Sol	300,000
Larkin Valley	400,000
Aqua View No. 1	500,000
Aqua View No. 2	60,000
Service Area IV - Total Storage Capacity =	**1,260,000**

SOURCE: SqCWD, 2006. *Well Master Plan, Production Well System Reliability Improvements*. January.

Four booster pumps and one fire pump located at the Cornwell Booster Pump Station pump water stored in the Cornwell Tank to the Sea Crest and Hilltop subdivisions. These are pressurized booster pump systems that operate based on flow and pressure and deliver water to homes located too high above the storage tank to be served by gravity flow. A fifth booster pump station, the Maplethorpe Booster Pump Station, pumps water from Service Area I to storage tanks in Service Area II (Fairway and Austrian tanks).

Service Area II

Service Area II serves the greater Aptos area. Service Area II has five active production wells, two treatment plants, five storage tanks, and two booster pump stations. All wells in Service Area II draw water from the Purisima Formation. Although all five wells in Service Area II (Ledyard, Madeline, Estates, T. Hopkins, and Aptos Creek) are active, the Aptos Creek Well has age and structural issues and is no longer reliable and the Madeline, Estates, and T. Hopkins wells are considered impaired due to loss of suction during prolonged pumping. Due to the presence of naturally-occurring arsenic at the Aptos Creek Well site, space constraints, and the close proximity of the Aptos Creek Well to Aptos Creek, it is not feasible to drill a replacement well onsite. The 1,840 gpm produced by wells located in Service Area II is augmented by approximately 500 gpm that is transferred from Service Area I.

The Estates and T. Hopkins well sites have onsite treatment plants. The Estates Treatment Plant is an iron and manganese removal plant that treats raw water from the Estates Well; the T. Hopkins Treatment Plant removes iron, manganese, and arsenic from water produced by the T. Hopkins and Aptos Creek wells. Water produced at the Madeline and Ledyard wells is below the Secondary Drinking Water Standards for iron and manganese and thus, does not require treatment.

Together, the five storage tanks in Service Area II (Austrian; Park Wilshire; Fairway, Mar Vista No. 1; and Mar Vista No. 2) provide 1,900,000 gallons of water storage. A booster pump station at the Mar Vista Tank site pumps water up to the booster pump station located at the Austrian Tank site, which in turn pumps water up to the Park Wilshire Tank.

Service Area III

Service Area III includes the communities of Rio Del Mar and Seascape, and a portion of Aptos. Service Area III consists of five production wells, four water storage tanks, and four booster pump stations. An average of 100 gpm of water produced by wells in Service Area III is transferred to Service Area IV for blending (see discussion for Service Area IV below). The total source capacity of production wells in Service Area III, minus the 100 gpm transfer to Service Area IV, is estimated at 3,560 gpm.

The active production wells in Service Area III are known as Bonita, Country Club, San Andreas, Seascape, and Aptos Jr. High. With the exception of the Aptos Jr. High Well which draws water from the Purisima Formation, active production wells in Service Area III are drilled in the Aromas Red Sands aquifer. The Country Club and Aptos Jr. High wells are 53 and 79 years old, respectively. The Country Club Well is currently being refurbished, including upgrades to the electrical service and well pump. The Aptos Jr. High Well, which was previously removed from service due to treatment requirements for iron and manganese, is currently being rehabilitated, including construction of a treatment facility. Once completed in June 2006, the Aptos Jr. High Treatment Plant will be the only treatment plant in Service Area III.

Collectively, the Vista Del Mar, Seascape, Rio Del Mar, and Monte Toyon storage tanks have a water storage capacity of 2,250,000 gallons. Booster pump stations are located at Vista Mar Court, Aptos Jr. High Well site, Seascape Tank site, and Monte Toyon Tank site.

Service Area IV

Service Area IV serves the community of La Selva Beach. This service area has two production wells (Sells and Altivo), four water storage tanks (Canon del Sol, Larkin Valley, Aqua View No. 1, and Aqua View No. 2) and one booster pump station. Both wells in Service Area IV draw water from the Aromas aquifer. Including the 100 gpm transfer from Service Area III, the total source capacity of Service Area IV is 1,245 gpm. The total storage capacity in Service Area IV is 1,260,000 gallons. The booster pump station is located at the Aqua View Tank site and boosts water from Aqua View Tanks No. 1 and No. 2 to the Larkin Valley Tank.

Due to the presence of Chromium-6 in production wells in the La Selva Beach area, water from Service Area IV is blended with water from Service Area III to reduce Chromium-6 concentrations. Prior to blending, however, water produced from Service Area IV wells is below the California Maximum Contaminant Levels (MCL[6]) for Total Chromium. Drinking water quality is discussed further in Section 4.2, Groundwater Resources.

Source Capacity Assessment

To comply with the California Waterworks Standards contained in Chapter 16, Title 22, of the California Code of Regulations (CCR), the SqCWD should have sufficient capacity from its combined individual sources (groundwater production wells) to meet maximum day water demand independent of any water stored in tanks. On a District-wide basis, the maximum day demand, which occurred on July 7, 2002, was 5,550 gpm. At 9,965 gpm, the total source capacity of all active wells in the District is more than sufficient to meet legal compliance. However, because each service area is predominantly dependent on its own internal supply, with only limited ability to import water from adjacent service areas, it is appropriate to consider the source capacity of each service area separately and under various well conditions. In December 2003, Luhdorff & Scalmanini prepared a *Water Supply Source Assessment* on behalf of the District. The adequacy of source supply was calculated for each service area under various well conditions. The results of the assessment, revised to reflect recent well improvements and current well capacities, are summarized in **Table 3**.

The results of the assessment indicate the loss of the Main Street Well at a critical time would substantially reduce the independent capacity to meet maximum day demand in Service Area I and could essentially eliminate the ability to hydraulically transfer source capacity to Service Area II. Of all of the service areas, however, Service Area III is most precarious from a source capacity standpoint in that, if the largest-producing well was to go out of service, the remaining wells could not meet current maximum day demand, taking into account the 100 gpm needed for transfer to Service Area IV. Although Service Area IV has surplus source capacity even without the largest single source, SqCWD has been transferring water from Service Area III for blending in Service Area IV due to residents' concerns about Chromium-6 levels in Service Area IV wells. A drinking water standard has not yet been established for Chromium 6.

[6] MCLs are enforceable standards that correlate to the highest level of a contaminant that is allowed in drinking water.

TABLE 3
ADEQUACY OF SOURCE CAPACITY BY SERVICE AREA

Service Area I	
Maximum Day Demand =	1,988 gpm
Total Source Capacity =	3,500 gpm
Adequacy of Source Capacity	**Surplus/Deficit**
With all sources (wells) =	1,512 gpm
Without largest single source (Main Street) =	312 gpm
During transfer to Service Area II (~500 gpm) with all sources =	1,012 gpm
During transfer to Service Area II (~500 gpm) without largest source =	- 188 gpm
Service Area II	
Maximum Day Demand =	1,081 gpm
Total Source Capacity =	1,800 gpm
Adequacy of Source Capacity	**Surplus/Deficit**
With all sources (wells) =	759 gpm
Without largest single source (Estates) =	84 gpm
Without largest single source (Estates) and without impacted wells =	- 266 gpm
With transfer from Service Area I (~500 gpm) with all sources =	1,259 gpm
With transfer from Service Area I (~500 gpm) without largest source =	584 gpm
With transfer from Service Area I (~500 gpm) without largest source and without impacted wells =	234 gpm
Service Area III	
Maximum Day Demand =	2,400 gpm
Total Source Capacity (adjusted to include ~100 gpm transfer to Service Area IV) =	3,560 gpm
Adequacy of Source Capacity	**Surplus/Deficit**
With all sources (wells) =	1,160 gpm
Without largest single source (San Andreas) =	140 gpm
Without largest single source (San Andreas) and without impacted wells =	- 310 gpm
Service Area IV	-
Maximum Day Demand =	81 gpm
Total Source Capacity (adjusted to include ~100 gpm transfer from Service Area III) =	1,245 gpm
Adequacy of Source Capacity	**Surplus/Deficit**
With all sources (wells) =	1,164 gpm
Without largest single source (Altivo) =	552 gpm

SOURCE: (1) Luhdorff & Scalmanini, 2003. *Water Supply Source Assessment*. December 24. (2) SqCWD, 2006. *Well Master Plan, Production Well System Reliability Improvements*. January. (3) Personal email communication with Jeff Gailey, District Engineer, May 19, 2006.

Current Groundwater Conditions

The SqCWD derives 100 percent of its water supplies from local groundwater resources. The Aromas Red Sands (Aromas) aquifer and the Purisima Formation are the two primary water-bearing geologic formations underlying the SqCWD. The SqCWD has been monitoring groundwater levels and groundwater quality in the Aromas aquifer and Purisima Formation since the 1980's. Groundwater monitoring allows the District to evaluate groundwater trends and the potential impact of local and regional pumping with respect to overdraft, saltwater intrusion, and groundwater quality.

The current well configuration in the Soquel-Aptos groundwater basin has resulted in adverse groundwater conditions that could be partially remedied by implementing the WMP. Significant pumping troughs and the threat of seawater intrusion are unfortunate consequences of the current pumping system.

The SqCWD must pump from all of their existing wells to meet current demands. Their inability to shift pumping to other areas of the Soquel-Aptos groundwater basin has resulted in a chronic pumping trough in the Purisima Formation. Water levels in this pumping trough are consistently below sea level. This trough increases the costs of pumping by increasing the required lift, limits the pumping rates by limiting the amount of drawdown available in wells, and induces seawater intrusion. The pumping trough could be ameliorated by more widely distributing pumping aerially, and modifying the depth of pumping.

Distributing pumping aerially would reduce interference between wells. Instead of a focused pumping trough, the SqCWD could move towards obtaining uniform drawdown throughout the basin. The SqCWD could also reduce the impacts of localized pumping troughs by taking advantage of the fact that aquifers in the Purisima Formation are fairly well confined. Pumping in one aquifer has limited impact on the overlying and underlying aquifers. Wells could be designed to pump from specific aquifers, moving pumping from impacted aquifers to relatively unimpacted aquifers.

Groundwater monitoring results indicate a landward movement of the freshwater/saltwater interface[7] along the southern coast of the District boundary in the Aromas aquifer. Furthermore, although coastal monitoring within the Purisima Formation does not show definitive signs of active saltwater intrusion, there is also reasonable concern that saltwater may leak into the deep layers of the Purisima Formation aquifers along the western coast of the District boundary. Saltwater intrusion, defined as the mixing of saltwater and fresh groundwater in a groundwater aquifer, can severely impair the quality of groundwater and can take hundreds of years to reverse.

Saltwater intrusion occurs when groundwater pumping results in depressed fresh groundwater levels along the coast, and saltwater moves inland into the aquifer. Hydrogeologic studies in the vicinity of the SqCWD area indicate that, collectively, SqCWD, the City of Santa Cruz, Central Water District (CWD), and other public and private groundwater users have lowered water levels sufficiently to induce seawater intrusion. The SqCWD and other users in the groundwater basin are currently implementing measures to reduce groundwater pumping in the basin. In addition to reduced groundwater pumping and consistent with the District's AB 3030 Groundwater

[7] The "saltwater/freshwater interface" is the groundwater zone along the coastal margin where fresh groundwater and ocean saltwater meet. Water in this zone is brackish. Aquifers that are not actively pumped provide a certain amount of freshwater outflow at the coast. Because this outflow exerts seaward hydraulic pressure, it holds seawater at equilibrium offshore from the coast and hinders its onshore advancement.

Management Plan, the SqCWD is seeking to move production wells outside of the coastal zone and more evenly redistribute pumping both horizontally and vertically throughout the District to more uniformly extract groundwater and reduce the potential for saltwater intrusion. Groundwater conditions and saltwater intrusion mechanisms are further discussed in Section 4.2, Groundwater Resources.

Previous Lawsuits

In attempts to regain lost capacity and redistribute pumping away from the coastal zone, the SqCWD separately pursued the development of two new wells (Suncatcher and O'Neill Ranch wells) in the vicinity of 41st Avenue and Soquel Drive. The Initial Study/Mitigated Negative Declarations (IS/MNDs) prepared individually for the Suncatcher and O'Neill Ranch wells were legally challenged for reasons summarized below.

O'Neill Ranch Well IS/MND

In 2002, SqCWD prepared an IS/MND for the purpose of redistributing pumping and replacing the failing Maplethorpe Well with a new production well (O'Neill Ranch Well). The O'Neill Ranch Well IS/MND was legally challenged in *Save the Habitat vs. SqCWD*.

The plaintiff, Save the Habitat, advanced two arguments against the MND. First, the plaintiff alleged that, because the replacement well was to be equipped with a larger pump than the original well, project implementation would result in an increase in the ability of the system to pump water from the groundwater aquifer and therefore, could not be considered a replacement well. Second, the plaintiff alleged that an increase in pumping from the groundwater aquifer could reduce baseflow[8] in local creeks. The court's judgment was for the plaintiff, resulting in a writ of mandate compelling the District to rescind its approval of the IS/MND and its approval of the project.

Suncatcher Well IS/MND

In *Topsail Court Homeowners Association vs. County of Santa Cruz and SqCWD*, the plaintiff, Topsail Court Homeowners Association, sought an order from the court to prohibit SqCWD from constructing the Suncatcher Court well and water treatment facility on the grounds that the proposed land use was in violation of local zoning ordinances. Topsail's petition was denied, and the court determined that SqCWD's proposed well and treatment facility was exempt from building and zoning ordinances under Government Code section 53091 because it was a facility "for the production, generation, storage, treatment, or transmission of water." That determination was ultimately confirmed on appeal.

[8] Baseflow is water that flows from groundwater into the stream bed.

Well Master Plan

Purpose, Need, and Objectives

The purpose of the WMP is to secure a reliable water supply by improving redundancy and flexibility in the system and redistributing pumping away from the coastal zone and to provide a more uniform drawdown of the groundwater basin. As discussed above, several of the District's wells are aged and are fast approaching their operational lifespan. Replacement wells on the same sites are infeasible due to space constraints and/or limited treatment capacity, or are undesirable in terms of groundwater management. Attempts to refurbish wells and restore adequate production capacities have generally been unsuccessful. Previous efforts by the SqCWD to develop new wells individually have been legally challenged, in part, for taking a "piecemeal" approach to groundwater management.

The WMP allows for a comprehensive approach to addressing water supply availability and distribution, groundwater management, and the collective effect of Plan components on local resources. The specific objectives of the WMP are as follows:

- To meet the basin management objectives of uniform drawdown of the aquifers and redistribution of pumping away from coastal areas to reduce susceptibility to saltwater intrusion; and
- To limit the typical pumping duration of any given well to less than 12 hours/day in order to maintain sufficient local groundwater levels for effective well operation and to manage the depth and radius of residual pumping depressions.
- To ensure a reliable water supply when individual wells are out of service due to maintenance, mechanical failure, or damage;
- To have adequate system capacity and flexibility to respond to peak, maximum day demand in all four service areas;

Plan Overview

The WMP calls for the installation of three new groundwater production wells (O'Neill Ranch, Cunnison Lane or Austrian Way, and Granite Way–Aptos Village), the conversion of an existing irrigation well to a municipal well (Polo Grounds), and the destruction of two deteriorating production well (Aptos Creek and Maplethorpe). Although the Cunnison Lane and Austrian Way Tank well sites are alternate sites, project-level analyses for both sites are presented in this EIR. All proposed wells would be completed in the Purisima Formation, requiring treatment for iron and manganese[9]. Some infrastructure improvements would be necessary to connect the new wells to the existing conveyance system. Proposed well site characteristics are summarized in **Table 4**.

[9] No additional production wells are proposed in the Aromas aquifer because Service Area IV already has surplus capacity and because the Aroma aquifer is currently being overdrafted and thus, the SqCWD does not want to increase production from that aquifer.

The proposed wells would restore lost capacity of the water supply system, and would enable the District to shift pumping away from impaired areas. The goal of the WMP is not to increase total production in the system, but rather, to make necessary infrastructure improvements to an aging system and improve the management of groundwater resources. Indeed, as shown in SqCWD's 2005 Urban Water Management Plan and 2006 Integrated Resources Plan, projections to 2020 indicate declining production due to conservation, and the long-term goal is to limit groundwater production to no more than 4800 acre-feet per year on average and meet demand with a supplemental supply source. Restoring and improving the system's pumping capacity will not translate into increased production from the Purisima Formation, but will enable the District to adequately respond to peak, maximum day demand in all four service areas, improve operational flexibility, reduce pumping durations for individual wells, and reduce the stress placed on any given well. Furthermore, because groundwater production wells lose capacity over time, it should be assumed that the initial capacity of new wells will gradually decline, particularly in the Purisima Formation where iron bacteria build-up clogs well screens.

Proposed Well Sites

O'Neill Ranch Well Site

The O'Neill Ranch Well Site is an undeveloped site located at 41st Avenue and Soquel Drive inland 1.62 miles from the coast. The site is part of a 1.6-acre parcel currently owned by Santa Cruz County. Bei-Scott Properties, the development company seeking to purchase the land, has orally indicated that they will donate the eastern 150-foot section of the parcel to the District for the well and treatment plant. Surrounding land uses consist of retail/commercial to the south and west, high-density residential to the east, and urban open space to the north.

The O'Neill Ranch Well site slopes north towards a large ravine that runs west-east along the northern boundary of the parcel. Several large oak trees line the top banks of the ravine, and it is likely that some of these trees would be removed to accommodate construction of the well and treatment plant. Additional site improvements include an emergency stationary generator; approximately 1,500 feet of 12-inch pipeline to tie into the SqCWD water system at Soquel Drive and Daubenbiss Avenue; the placement of engineered fill and construction of a retaining wall to stabilize the site; and the installation of security fencing. Water produced at the O'Neill Ranch Well would provide an estimated capacity of 500-1,000 gpm for Service Areas I & II. This well would be approximately 570 feet deep and completed in the A, AA and undifferentiated basal units of the Purisima Formation. At least nineteen privately-owned wells are located within 1,000 feet of the site.

Cunnison Lane Well Site

The Cunnison Lane Well site is an alternate site to the Austrian Way Tank site and thus, only one of these sites will be chosen for well development. The Cunnison Lane Well site is an undeveloped 0.35-acre parcel located on Cunnison Lane, off of Soquel Drive, about 3/4 mile inland from the coast. This site is owned by the District. Surrounding land uses consist of single-family residential to the north, southeast, and south and open space to the east and west. The parcel is relatively level and is bounded on the west by a small drainage. A wooden fence marks the perimeter of the property.

Proposed facilities at the Cunnison Lane Well site include the production well, an iron and manganese removal treatment plant, an emergency stationary generator, and security fencing. This well would provide water for Service Areas I and II. The well would be completed in the A Zone of the Purisima Formation and would have an estimated well depth of 400-500 feet. The initial capacity of this well has not yet been estimated. Several shallow privately-owned wells exist in the site vicinity.

Austrian Way Tank Site

The Austrian Way Tank site is an alternate site to the Cunnison Lane Well site. The Austrian Way Tank site is a District-owned 3.18-acre parcel located at Austrian Way and Jennifer Drive. Existing structures on the site include the Austrian Tank and a paved access road. Surrounding land uses consist of single-family residential to the west and Nicene Marks State Park to the east. Aptos Creek runs north-south approximately 750 feet east of the site.

In addition to the production well, proposed infrastructure improvements would include an iron and manganese removal treatment plant and an emergency stationary generator. Water produced at this well would serve Service Area II. Probable well depth and production capacity has not yet been evaluated. A test well is necessary to verify suitability of this site prior to development.

Granite Way – Aptos Village Site

The Granite Way – Aptos Village Well site is located at the end of Granite Way behind the proposed Aptos Village Project. Although the exact location of the well is unknown at this time, the well would likely be placed on a small portion of APN 04-011-22, a 1.09-acre parcel located off of Cathedral Drive and next to Village Drive. A portion of the site is currently used for a lumber yard. Although the remainder of the site is undeveloped, remnant pieces of concrete from previous structures have been left on the site. Surrounding current and proposed land uses consist of commercial/retail, residential, and industrial.

The Granite Way – Aptos Village Well would be drilled in the Purisima Formation and would be screened in the DEF aquifers and possibly the BC aquifers. Raw water produced at this well would be piped to the T. Hopkins Treatment Plant via approximately 700-800 lineal feet of new raw water pipeline. This well would produce an estimated 350 gpm of capacity for Service Area II.

Polo Grounds Well

As part of the WMP, ownership of the existing County-owned irrigation well at Polo Grounds Regional Park would be transferred to the District and converted to a municipal well. Polo Grounds Regional Park is a 62-acre park located in Aptos between North Drive and South Drive and above Rio del Mar Boulevard. Park facilities include three soccer fields, three baseball diamonds, a dog park, paved parking areas, and a grassy area known as the “great meadow.” The irrigation well is located at the east end of the park in the “great meadow.” Valencia Creek flows southwest along the northwest park boundary. Currently, the park does not have a source of drinking water supply and is not connected to the sanitary sewer system. Restroom facilities at the park are limited to portable toilets. Surrounding land uses are predominantly single-family residential. Homes in the site vicinity along North Drive are on septic systems.

The existing irrigation well, built in 1980, would be utilized as a mid-size municipal potable water well with a 500-750 gpm capacity and would provide water for Service Area III. The well is completed in the Purisima F aquifer unit. The project would include construction of an onsite iron and manganese removal treatment plant, which would require connection to the County’s sanitary sewer system for sludge discharge. Connecting to the County’s sanitary sewer system would involve a 3,900-foot extension of the existing sewer main along North Drive, two sewer pump stations, seven manholes, and 14 sewer laterals. The extension of the sewer main will enable homeowners to connect to the sanitary sewer and abandon their septic systems. Approximately 2,750 feet of water main would be installed to connect to the water distribution system at the east end of S. Polo Drive. All aboveground well components (production well, control building, iron and manganese removal treatment plant, and washwater reservoir) would be fenced off as required by homeland security.

TABLE 4
PROPOSED WELL SITE CHRACTERISTICS

Well Site	Service Area	Estimated Initial Capacity (gpm)	District-Owned Parcel	Associated Infrastructure Improvements & Site Considerations
O'Neill Ranch Site	1	500-1,000	No	• Fe and Mn removal treatment plant • emergency stationary generator • 1,500’ of 12” pipeline to tie into SqCWD system at Soquel Drive and Daubenbiss Avenue • retaining wall and engineered fill to stabilize site • removal of 3-4 coast live oaks is likely
Cunnison Lane Site	1 & 2	unknown	Yes	• Fe and Mn removal treatment plant • emergency stationary generator
Austrian Way Tank Site	1 & 2	unknown	Yes	• Fe and Mn removal treatment plant • emergency stationary generator
Granite Way - Aptos Village Site	2	350	No	• 700-800’ of new raw water pipeline to T. Hopkins Treatment Plant
Polo Grounds	3	500-750	No	• install larger pump and motor • emergency stationary generator • Fe and Mn removal treatment plant • water main to connect with SqCWD system on South Drive • sewer main paralleling water main from well site across park to North Drive, connecting with County sewer at Soquel Drive

Well Site Design

Proposed facilities would be designed to be consistent with surrounding land uses. Typical site dimensions would be up to 100 feet by 150 feet. Each site would have security fencing topped with razor wire in compliance with recent homeland security requirements. A building would contain the production well, pump motor, and electrical control panels. Each well site would be equipped with a radio-based Supervisory Control and Data Acquisition (SCADA) system, licensed by the FCC to allow for remote operation. The SCADA system consists of a 3-foot-long directional antenna mounted horizontally on a 2-inch diameter steel pipe. The total height of the SCADA antenna is not to exceed 20 feet. All proposed treatment plants would include the disinfection system, an iron and manganese removal filter, a reaction vessel, a washwater reservoir, and secondary containment for sodium hypochlorite and any other hazardous chemicals stored onsite[10]. All well sites would have adequate space to accommodate maintenance vehicle parking and would be equipped with an emergency stationary generator and aboveground diesel storage tank for backup power during emergency outages. Raw groundwater produced during startup/shutdown and periodic flushing at the Cunnison Lane, O'Neill Ranch, and Polo Grounds well sites would be discharged to the adjacent creeks. New wells at the Austrian Way Tank Site and the Granite Way-Aptos Village Site would connect to the existing storm drain system for discharge of raw groundwater during startup/shutdown and periodic flushing. All new wells would connect to the existing storm drain system for discharge of raw groundwater during startup/shutdown and periodic flushing. In addition, each well site with treatment facilities would be connected to the sanitary sewer for minor wastewater discharges and/or iron and manganese concentrate discharge from the treatment plants.

Operations and Maintenance

The proposed wells would be designed to allow for remote operation via a radio-based Supervisory Control and Data Acquisition (SCADA) system. The SqCWD Operations and Maintenance department makes daily visits to each well site to check well pumps and chlorination equipment and record the volume of water pumped and the chlorine residual going into the water system. Once every year or two, the well and pump equipment will require maintenance work. In this case a drill rig and crew will work on the well for 3-4 days to pull the pump and column piping and perform on-site repairs or replace electrical cable and well pump. At this time, the well may be chemically treated to restore pumping capacity.

Sodium hypochlorite deliveries are made about once a week. Sodium hypochlorite is first pumped from the large sodium hypochlorite bulk storage tank at the District's main yard and then delivered to each well site using a 5-ton flatbed truck with a tank on it.

About every six weeks, the District landscaper will visit each well site to cut and trim weeds, trees and hedges, adjust or repair the irrigation systems, and make minor repairs to the fence, gate, security lighting, or other facilities on-site.

[10] Raw water pumped at the proposed Granite Way Well site would be treated at T. Hopkins Treatment Plant. Thus, this well site would not include disinfection and treatment facilities and thus, would not require secondary containment for hazardous chemicals used during the treatment process.

Typical Construction Scenarios

Construction activities would require initial clearing and grading of an approximately 100 by 150 foot well site. Each well site would accommodate the well house, treatment plant (except the Granite Way Well, which would connect to T. Hopkins Treatment Plant), pipeline connections, and access driveway, as well as staging areas during construction activities. Excavation dimensions for installation of production well facilities would vary depending on the well site, but would require depths of 3 to 5 feet for installation of slab on grade structures.

24-hour construction is required for activities associated with drilling of the production well borehole and subsequent well construction and well development. This would last for about 3 to 4 days and would need to be done continuously because of the risk that the walls may collapse if left unsupported before the well casings can be sunk.

The next phase would entail construction of the well housing and treatment facilities and pipeline installation, which would take approximately five months. All aspects of well construction and pipeline installation would be conducted in accordance with Department of Health Services (DHS) requirements. Pipeline installation would require open trench construction. Estimated trench width and depth are up to 2 feet in width and 4 feet deep, depending on route conditions and utility conflicts. The ideal temporary construction easement for pipeline installation would be 25 feet wide (i.e. 12 feet for access by trucks and loaders, a 2-foot wide trench, and additional width for maneuvering). Pipeline construction would proceed at approximately 300 feet per day. Pipeline construction would generally occur within public right-of-way and existing roadways. Access to private driveways would be maintained with steel plates and the construction easement would likely require one lane of road closure on a block-by-block basis within the construction corridor.

Typical construction equipment used for well construction consist of a drill rig, an air compressor, a 10 kW electrical generator, a welding machine or rig, a caterpillar for site grading, a backhoe, and miscellaneous support vehicles including forklifts and pick up trucks. To the extent possible, equipment and vehicle staging would be accommodated at the site of construction for well development, therefore increasing total area of disturbance. Staging would avoid sensitive areas such as riparian or other habitat. All disturbed areas caused by construction activities would be restored to preconstruction conditions.

Proposed Implementation Schedule

Implementation of the WMP would likely occur over a four-year period, with one new well constructed each year. Assuming EIR certification in 2007, all four wells could be expected to be on-line by 2011. The order in which the wells would be developed is dependent upon when the well sites become available. For example, if Northern Santa Cruz County’s application for Prop 50 grant money is successful, which includes implementation of the Polo Grounds project, then the Polo Grounds Well would be the first well to be added to the system. Otherwise, either the O’Neill Well or the Austrian Way Well would be the first well to be constructed. The Aptos Creek Well would be destroyed after completion of the Granite Way-Aptos Village Well. The Maplethorpe Well would be destroyed after completion of the O’Neill Ranch Well.