COOPERATIVE MONITORING/ADAPTIVE GROUNDWATER MANAGEMENT AGREEMENT
CITY OF SANTA CRUZ/SOQUEL CREEK WATER DISTRICT

The City of Santa Cruz Water Department (City) and the Soquel Creek Water District (District) jointly developed this agreement to ensure the following groundwater management objectives are met:

1. Protect the shared groundwater resource in the Soquel-Aptos Basin area from seawater intrusion.
2. Allow for the redistribution of pumping inland away from the Purisima A-unit offshore outcrop area.
3. Maintain inland groundwater levels that promote continued groundwater flow toward coastal wells and the Purisima A offshore outcrop area; and while maintaining coastal groundwater levels that will abate seawater intrusion.
4. Provide both agencies adequate flexibility to respond to changing water demands, changing water supply availability, and infrastructure limitations.

A. The Agencies agree that a specific objective for the shared portion of the Purisima Formation is to abate or prevent seawater intrusion at key coastal monitoring wells as shown in Attachment A.

1. For the purpose of this Agreement, coastal monitoring wells will include SC-1A, Pleasure Point Medium, Soquel Point Medium, Moran Lake Medium.

2. Target coastal groundwater levels are defined as follows:

Table 1 – Target Groundwater Elevations

Coastal Monitoring Well	Annual Average, Target Groundwater Elevation (Non-Critically Dry years) (feet AMSL*)	30 Day Running Average, Minimum Groundwater Elevation (All years) (feet AMSL*)
SC-1A	6.2	2.0
Pleasure Point Medium**	6.1	2.0
Soquel Point Medium**	6.0 (5.2***)	2.0
Moran Lake Medium**	5.0	2.0

*NGVD 29

**Medium zone wells have been selected to maintain target groundwater elevations because seawater has been previously detected in this zone.

*** Groundwater levels are currently below the target elevation at the Soquel Point well. Until groundwater levels recover to target elevation, the interim goal is to maintain the annual average above the existing conditions. 5.2 ft amsl represents the annual average for calendar year 2011 and is the interim goal.

3. Groundwater levels will be recorded at least hourly at coastal monitoring wells using transducers or data loggers installed by the respective monitoring well owner and will be confirmed by monthly soundings. This data will be collected continuously during future District operations under the Well Master Plan (WMP) and future City operations at the Beltz #12 Well

   Average annual groundwater levels will be reported as the average of all hourly readings in a calendar year. While all years will be reported for

historical analysis, targets will be calculated based on the annual averages of non-critically dry years only.

Minimum protective groundwater levels will be calculated as the 30-day running average of all hourly readings of all years.

In the event of hourly groundwater level data gaps the monthly soundings measured during the data gap should be used to replace missing data in calculating averages. If no sounding measurement occurred during the data gap, the average of available hourly readings in the 7 days before and the 7 days after the data gap (up to 336 total hourly readings) should be used to replace the missing data in calculating averages. If hourly groundwater level data are deemed by the District and the City to be inconsistent with a sounding measurement, the sounding measurement should be used to replace the inconsistent hourly data in the calculation of averages. For the purposes of this agreement, inconsistent shall be defined as a variation of 0.5-feet between transducer/data logger data and manual well soundings.

4. In addition, groundwater quality samples will be obtained quarterly at coastal monitoring wells and analyzed for general minerals. This data will be collected quarterly during future District operations under the WMP and future City operations at the Beltz #12 Well and quarterly for at least one full pumping season prior to operation of the O'Neill Ranch Well or the Beltz #12 Well.
5. The District and the City will meet at least annually to discuss data and report results to their respective governing boards. In early March, the agencies will meet and review the previous calendar year's monitoring data, trends, progress toward goals, potential changes to goals, potential changes to pumping distribution for the current year.
6. The District and the City do not anticipate that groundwater levels at all coastal monitoring wells will recover to target elevations until pumping is reduced which could be achieved with the addition of a supplemental source of supply is available. When a substantial supplemental source of supply is secured, the District and City shall develop a plan to recover the basin such that all coastal monitoring wells recover to target elevations.

B. The Agencies agree that the redistribution of pumping away from the Purisima A offshore outcrop area will assist in abating or preventing seawater intrusion in the shared portion of the Purisima formation and for that purpose have established annual pumping goals.

1. For the City, annual pumping goals are defined for pumping from January to December (calendar year). Critically dry years are calendar years when flow at the Felton gauge in the San Lorenzo River from October 1 of the previous year through September is less than 29,000 acre-feet. Non-critically dry years are calendar years when flow at the Felton gauge in the San Lorenzo River from October 1 of the previous year through September is greater than or equal to 29,000 acre-feet.

2. The District is implementing its WMP with the overall goals of securing a reliable groundwater supply by improving redundancy and flexibility in the system, redistributing pumping away from the coastal area, and providing a more uniform drawdown of the groundwater basin. The District will increase its annual pumping from its 25-year average (1985-2009) of 1,500 acre-feet to a total maximum annual pumping of 1,660 acre-feet for the western Purisima A and AA and Tu (Santa Margarita) (O'Neill Ranch, Garnet, Main Street, Rosedale wells) for all calendar years.

3. The City installed a new inland production well with the overall goal of securing a reliable groundwater supply by improving redundancy and flexibility in the system and redistributing a portion of its pumping away from the coastal area to provide a more uniform drawdown of the groundwater basin. The City agrees to maintain its 25-year average annual pumping of 520 acre-feet. The City further agrees to a total maximum annual pumping goal of 645 acre-feet from the Purisima A and AA and Tu (Beltz #8, #9, #10, and Beltz #12 wells) during critically dry years and proposes to limit annual pumping from Purisima A and AA and Tu (Beltz #8, #9, #10, and Beltz #12 wells) to 520 acre-feet in non-critically dry years.

C. The Agencies agree that there are two potentially restrictive effects of redistributed pumping that could impact either agency's continued use of the shared portion of the Purisima Formation.

1. Lowered groundwater levels that induce seawater intrusion. A restrictive effect will have occurred if average annual groundwater levels at any of the coastal monitoring wells fall below the target elevations in Table 1 for non-critically dry years.

   During all years including critically dry years, the restrictive effect would be demonstrated if 30 day running average groundwater levels at any of the coastal monitoring wells fall below the minimum elevation of 2 feet above mean sea level.

   A restrictive effect could also be demonstrated if groundwater quality sampling at the City's and District's coastal monitoring wells, at the City's Live Oak well field, or at the District's Garnet well detect chloride concentrations above 150 milligrams per liter and an increasing trend covering 10 years (or since completion if less than 10 years). If an upward trending of chloride concentrations above 150 milligrams per liter is detected, or a drop in the Sodium to Chloride ratio, it could indicate that seawater intrusion (and the resulting restrictive effect) is occurring and that the established target groundwater levels are not high enough.

2. Lowered static and pumping groundwater levels at production wells that fall below the top of well screens or to pump suction levels. This effect could occur if static or pumping groundwater levels are above the top of the well screen prior to pumping at the O'Neill Ranch Well and/or Beltz #12 Well, and subsequently fall below the top of the well screen after the O'Neill Ranch

Well and/or Beltz #12 Well is brought online and District and City pumping in the vicinity is increased.

The restrictive effects described above will be identified based on review of groundwater level and groundwater quality data. Prior to bringing the O'Neill Ranch Well and Beltz 12 Well online, the District and City will review the available groundwater level and groundwater quality data from the wells. The Agencies will review the groundwater level and groundwater quality data provided by the District and City on a quarterly basis to evaluate whether either restrictive effect is occurring.

D. The Agencies agree that if either restrictive effect described above is demonstrated, then the Agencies shall implement the mitigation actions described below.

1. The District and City shall modify pumping in the Purisima A and AA, and Tu (all City Live Oak wells including Beltz #12, O'Neill Ranch Well, Garnet Well, Main Street Well, Rosedale Well, Tannery Well, Monterey Well, and Maplethorpe Well) until the restrictive effect is eliminated. The performance criteria for this action will be to raise annual groundwater levels in the coastal monitoring wells to target elevations, raise 30 day running average groundwater levels in the coastal monitoring wells to minimum elevations, or reduce mineral content of groundwater quality samples; or raise static and pumping groundwater levels at production wells above the top of well screen or pump suction levels.
2. When a restrictive effect is identified, the District and City shall discuss possible pumping redistributions to eliminate restrictive effects that do not require pumping reductions from the goals outlined above in B.2 and B.3. Feasible pumping redistributions should be implemented in an attempt to eliminate restrictive effects. If the restrictive effect is groundwater levels below target annual elevations, the pumping redistribution must raise groundwater levels above target elevations within 90 days or pumping reductions shall be implemented. For other restrictive effects, the pumping redistribution must eliminate the restrictive effect within 30 days or pumping reductions shall be implemented.
3. The District shall be solely responsible for pumping reductions to eliminate the restrictive effect if annual City pumping is within its 25-year average of 520 acre-feet during non-critically dry years. During critically dry years, District shall be solely responsible for pumping reductions to eliminate the restrictive effect if total annual City pumping is within 645 acre-feet. District's pumping reductions would likely take place at the Garnet Well and/or O'Neill Ranch Well, and redistributed to other District production wells in the District's service area.
4. The City shall be solely responsible for pumping reductions to eliminate the restrictive effect if annual City pumping exceeds its 25-year average of 520 acre-feet during non-critically dry years and 645 acre-feet during critically dry years if annual District pumping for the western Purisima A and AA and Tu (O'Neill Ranch, Garnet, Main Street, Rosedale wells) is no more than 1,660

acre-feet as specified in B2. The District shall not increase its annual pumping until the restrictive effect is eliminated.

5. Following critically dry years, annual average groundwater levels in the calendar year to date may not be restored above target levels in Table 1 even if the 30 day average groundwater levels during the critically dry year remain above or have been restored above minimum levels in Table 1. District and City will reduce pumping in the western Purisima A and AA and Tu (all City Live Oak wells including Beltz #12, O'Neill Ranch, Garnet, Main Street, Rosedale) by a mutually agreed upon percentage (based on combined non-critically dry year pumping goals at western Purisima A and AA and Tu wells in B above of 1,660 acre-feet for the District and 520 acre-feet for the City) following a critically dry year where the City pumped within 645 acre-feet and annual average groundwater levels were below target levels.

6. If either the City or District exceeds their respective production limits in any (critically dry or non-critically dry) year when annual average groundwater levels are below a target level in Table 1, then the respective agency will implement additional pumping reductions the following season, equivalent to the amount the production limit was exceeded by, in addition to the amounts established in D.3, D.4, or D.5 above, to help restore annual average groundwater levels above target levels.

7. In non-critically dry years following any critically dry or non-critically dry year when annual average groundwater levels are below a target level in Table 1, the District and City shall meet in August in addition to the annual March meeting to discuss progress toward restoring the annual average groundwater level for the full calendar year to target levels in Table 1. In lieu of a meeting, the agency responsible for pumping reductions specified in D2 and D3 may report to the other agency on progress of restoring groundwater levels.

8. District and City will share monitoring and mitigating for impacts to Soquel Creek. Monitoring expenses will be shared equally while pumping reductions and mitigation will be shared proportionately. If monitoring reveals impacts to stream flow, pump tests will be conducted to determine proportionality.

9. District and City will share monitoring and mitigating for impacts to third parties such as private wells found in the area of overlap of 3300 foot radius around District's O'Neill Ranch Well and 3300 foot radius around City's Beltz #12 Well. Monitoring expenses will be shared equally while mitigation expenses will be shared proportionately. If private well monitoring reveals impacts to private wells, pump tests will be conducted to determine proportionality. Monitoring and mitigation of impacts to private wells within 3300 foot radius of either O'Neill Ranch Well or Beltz #12 Well but not located in the overlap area will be the sole responsibility of the agency whose 3300 foot radius encompasses the private well. See Attachment B for map of 3300 foot radius.

E. The Agencies agree that redistribution of pumping away from the Purisima A offshore outcrop area will also require maintaining inland groundwater levels that will ensure continued groundwater flow toward coastal wells and the Purisima A offshore outcrop area.

1. Groundwater levels at inland monitoring wells will be recorded at least daily using transducers or data loggers installed by the respective monitoring well owner and should be confirmed by monthly soundings. Average annual groundwater levels will be calculated as the average of all daily readings in a calendar year.

   In the event of daily groundwater level data gaps in excess of 7 days (168 consecutive hourly readings), data gaps will be replaced by monthly soundings as described in A3. If daily groundwater level data are deemed by the District and the City to be inconsistent with a sounding measurement, the sounding measurement should be used to replace the inconsistent daily data in the calculation of averages.

2. District and City will cooperatively determine groundwater gradients and establish target inland water levels to ensure continued groundwater flow toward the Purisima coastal outcrop. (*Agencies to independently propose target inland groundwater levels to achieve the stated objectives, then to discuss and agree upon target levels).* This should be completed based on approximately one year of data collected after both O'Neill Ranch well and Beltz 12 well are in operation.

3. If a restrictive effect as discussed in C is demonstrated, a comparison of inland groundwater levels to target inland groundwater levels will be used to provide a guide to develop a reduction and redistribution strategy for addressing the restrictive effect.

F. District Mandatory Restrictions to Recover Groundwater Basin

In the event of an action by the District to invoke mandatory restrictions for its customers in order to recover the groundwater basin, the City will reduce its use of Purisima A and AA groundwater to match the District's percentage reduction in pumping of western Purisima A and AA. E.g. a reduction of 5% in O'Neill Ranch, Garnet, Main Street, and Rosedale based on the District's 25-year average annual pumping of 1,500 acre-feet would require a corresponding 5% reduction in Purisima A, AA, and Tu pumping at all City Live Oak wells including Beltz #12 based on 520 acre-feet in non-critically dry years and 5% based on 645 acre-feet in critically dry years. Additional reductions may be necessary, should either of the restrictive effects described above be present.

G. Early Neutral Evaluation of Disputes:

At the request of either party, the parties will submit any dispute between them, arising out of or relating to this Agreement or any transaction or relationship arising from it, to (nonbinding) early neutral evaluation, in accordance with the Early Neutral Evaluation procedures of the American Arbitration Association if not otherwise agreed.

We concur that the above accurately reflects the agreed upon course of action.

Martín Bernal
City Manager
City of Santa Cruz

Date: 4-21-15

for K.A.
Kim Adamson TAJ DUFOUR
General Manager
Soquel Creek Water District

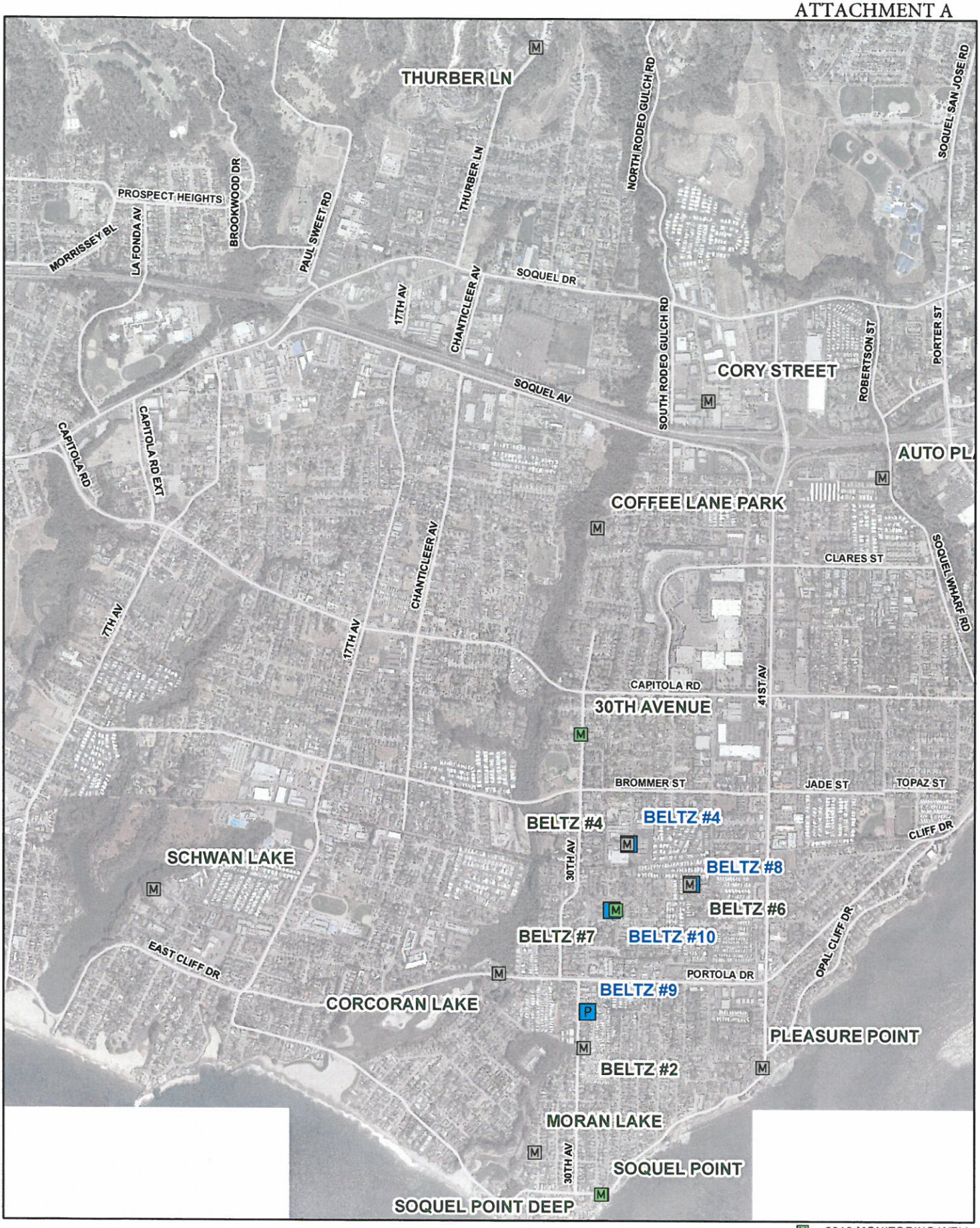
Date: 4.23.15

Approved as to Form By:

City Attorney

Date: 3-30-15

ATTACHMENT A



SANTA CRUZ

SCWD Monitoring Wells

Installed in 2012

M 2012 MONITORING WELL
M EX MONITORING WELL
P EX PRODUCTION WELL

0 400 800 1,600 Feet

N

ATTACHMENT B