SEPTEMBER 2014

IRONHOUSE SANITARY DISTRICT

Salinity Pollution Prevention Plan for the Ironhouse Sanitary District Water Recycling Facility

prepared by

LARRY WALKER ASSOCIATES IN 2010

updated by

IRONHOUSE SANITARY DISTRICT IN 2014

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Introduction

A draft Salinity Pollution Prevention Plan was completed in October 2010. The Plan was never finalized or adopted by the Ironhouse Sanitary District (ISD) Board of Directors due to concerns that 30% of the salinity was from "unknown" sources. ISD staff in 2014 reviewed the 2010 Plan and associated backup data, made corrections and adjustments and updated it to correlate with 2013 salinity data. With these corrections and adjustment only 13% of the influent salinity is from "unknown" sources, which is reasonable for this type of Plan.

Ironhouse Sanitary District (ISD) owns and operates the ISD Water Recycling Facility (WRF), which treats wastewater from the communities of Oakley, Bethel Island, and unincorporated Contra Costa County. Wastewater is collected from domestic and commercial sources although the dominant source is residential. The ISD service area does not contain any Significant Industrial Users (SIUs).

The 2013 annual average flow to the WRF was 2.41 MGD with Oakley contributing an estimated 1.89 MGD and Bethel Island contributing an estimated 0.52 MGD. ISD constructed a new 4.3 mgd average dry weather flow membrane bioreactor Water Recycling Facility (WRF) in 2011 with treated effluent discharged to the San Joaquin River or stored in ponds prior to its use as irrigation water on ISD-owned agricultural lands on Jersey Island.

The WRF operates under two permits. The NPDES permit which regulates discharge to the San Joaquin River became effective January 25, 2013. The Waste Discharge Requirements for the land disposal operation became effective February 1, 2013. Only the NPDES permit has limits for electrical conductivity (EC) which states the EC in the effluent shall not exceed 1,505 µmhos/cm.

The NPDES permit requires that ISD continue implementation of the October 20, 2008 pollution prevention workplan for salinity. The workplan involves completing a Salinity Pollution Prevention Plan. As established in §13263.3 of the California Water Code, the P3 must contain the following elements:

1. Estimate of all the sources of a pollutant contributing to the pollutant's influent loading
2. Analysis of methods to prevent the discharge of pollutants from the identified sources
3. Estimated load reductions that may be achieved through implementation of the methods identified in item 2
4. A plan for monitoring the results of the pollution prevention program
5. A statement of the POTW's short-term and long-term pollution prevention goals
6. Description of the POTW's existing pollution prevention programs
7. Analysis of any adverse environmental impacts resulting from the proposed pollution prevention program
8. Cost-benefit analysis to implement the pollution prevention program

This report is organized into five main sections: a description of EC sources, an evaluation of their load contributions, an assessment of source control feasibility, strategies, and reductions, and, finally, pollution prevention goals and the implementation schedule for source control activities.

Sources of Electrical Conductivity

EC provides an estimate of the conductivity of various ions present as total dissolved solids (TDS) in the water. Most of the TDS of natural waters is comprised of inorganic compounds - mineral as opposed to the organic compounds. Although there are at least traces of many elements, the great majority of the TDS load is from four negative ions (bicarbonate, carbonate, chloride, and sulfate) and four positive ions (calcium, magnesium, sodium, and potassium). EC measures the conductivity of these and other ions. TDS is being used in this report as an indication of EC levels because EC loads cannot be calculated (because EC is a measure of the conductivity of various ions present in the water, and not strictly a mass per unit volume concentration). The report uses estimates of TDS concentrations and loadings to determine the potential effectiveness of pollution prevention and source control efforts. The conversion between EC levels and TDS concentrations was determined through comparison of EC levels and TDS concentrations measured on the same day in ISD influent from the period 2008-2010. Using this method, the conversion factor from EC to TDS was calculated to be 0.52 mg/L per µmhos/cm.

Typically, the primary sources of EC in wastewater include water supply, self-regenerating water softener (SRWS) discharges, day-to-day residential discharges from human waste, food, or cleaning activities, food processing, and specialized activities at industrial facilities. Secondary sources include commercial sources from sanitizing activities. There are no SIUs in ISD's service area and the high salinity of water supply is likely the dominant source. Due to higher than average salinity of the water supply, residential SRWSs are also a source.

Oakley's potable water is supplied by Diablo Water District (DWD) through a combination of surface water (treated water from Contra Costa Water District's Randall Bold water treatment plant) and two groundwater wells. The groundwater wells have higher EC than the surface water source. During 2007/08, ISD experienced a surge in growth. A large percentage of homes built during this time were plumbed for water softeners. Hence, a large number of new homes installed water softeners. These factors caused an increase in influent EC which peaked in 2008 with a yearly average of 1497 µmhos/cm and peak day of 1730 µmhos/cm. After the housing market crashed ISD's influent EC also decreased and in 2013 the average annual EC was 1175 µmhos/cm. ISD staff believes this EC reduction was the result of a decrease in the number of water softeners being used. **Table 1** present average annual salinity data for the period 2003 to 2013.

Table 1. Average Annual Influent EC and TDS Data

Year	Influent EC	Influent TDS
2003	1233	624
2004	1172	592
2005	1205	595
2006	1263	624
2007	1304	646
2008	1497	745
2009	1314	700
2010	1224	663
2011	1202	650
2012	1181	655
2013	1175	627

Controllable versus uncontrollable sources are shown in **Table 2**. Uncontrollable sources, such as normal residential uses, are innate to sewer use and are generally considered technically or financially infeasible to reduce. In contrast, controllable sources may be addressed through voluntary outreach-based approaches and regulatory actions such as an ordinance banning SRWSs.

Table 2. Potential Sources of Electrical Conductivity

Electrical Conductivity Sources	Controllable?
Residential	
Water Supply	Yes
Self-Regenerating Water Softeners	Yes
Food, Human Waste, and Cleaning Products	No
Commercial	
Food Waste, Sanitizing, and Cleaning Activities	Yes
Other	
Groundwater Inflow and Infiltration on Bethel Island	Yes, but difficult to identify and correct

RESIDENTIAL SOURCES

Residential sources include water supply, SRWS, and other normal use as described below.

Water Supply

High salinity in Oakley's and Bethel Island's groundwater wells makes water supply a large source of EC to the WRF. In 2013, EC levels in DWD water supply to City of Oakley residents ranged from 460 to 660 µmhos/cm, with an annual average of 562 µmhos/cm[1] (308 mg/L TDS).

[1] Annual Water Quality Report 2013: http://www.ccwater.com/files/AWQR09.pdf

Bethel Island's water is supplied by over 45 water purveyors exclusively through groundwater wells. Based on data collected by Contra Costa County for the Bethel Island purveyors, the EC level is estimated to be an average of 1,452 µmhos/cm (902 mg/L TDS).

Self-Regenerating Water Softeners

SRWSs can be an additional source of EC to wastewater treatment plants, especially where the water supply has high hardness, or high calcium and magnesium content. The typical water softener uses a cation exchange column to replace multivalent hardness ions (e.g., calcium and magnesium) with single valence ions (e.g., sodium). To maintain the effectiveness of the exchange, the column is "regenerated" with a concentrated salt solution. A byproduct of the regeneration is a concentrated solution of the hardness ions and chloride that is discharged to the sewer.

DWD's average water hardness is 140 mg/L, which is considered hard. Houses built during the housing boom were often plumbed for SRWSs, with intensive marketing from water softener manufacturers a large number of homes installed SRWSs. During this housing boom, ISD observed a large increase in EC in the WRF influent. When this sector of housing was affected by the down turn in the economy, ISD observed a decrease in influent EC. Therefore, it is believed that SRWSs are a significant source of EC to the WRF.

While EC is not directly correlated to hardness, it measures the same ions that create hardness. Since EC values from Bethel Island water are exceptionally high, it is assumed the water is very hard. Using a rough correlation between EC and hardness, Bethel Island's supply water hardness is estimated to be 363 mg/L. This is considered very hard water.

ISD has conducted surveys of water softener use at the Oakley Almond Festival and the Bethel Island Safety Fair. The sum total of data collected at these events is shown in **Table 3**. Based on 436 responses, it is estimated that 27% of Oakley residents have water softeners. 72% of Bethel Island residents responding to the survey responses indicated they own a water softener. However, only 25 Bethel Island residents responded to the survey so there may be more uncertainty associated with this response. Due to the low number of surveys completed for Bethel Island and knowing the poor water quality of the potable water, this Plan assumes 95% of Bethel Island homes have water softeners.

Table 3. Survey of Water Softener Use in Oakley and Bethel Island

Community	Number Surveyed	Number with Water Softeners	% with Water Softeners
Oakley	436	116	27%
Bethel Island (1)	25	18	72%

Food, Human Waste, and Cleaning Products

Salts are added to wastewater via disposal of food wastes and plate scrapings down the drain. The salt (sodium chloride) naturally present in all foods or added for seasoning contributes to higher EC levels in WRF influent. Salts are also present in human waste flushed to the sewer, and in sweat washed off during bathing. Bleach (hypochlorite ion), a common household cleaner and disinfectant, will break down to chloride ion as part of the disinfection/cleaning process.

There are many residential uses, including and in addition to these, that likely are additional sources of EC.

In a recent source identification study, Ventura County Waterworks District No. 16[2] studied the contribution of residential uses to TDS loading in the town of Piru. The district estimated that excluding SRWS discharge, residential uses added 116 mg/L of TDS to wastewater.

COMMERCIAL SOURCES

Based on literature review, businesses with elevated levels of EC in their discharge were identified. These businesses that are in Oakley and Bethel Island are included in

Table 4. ISD sampled the discharge from one of the fitness centers in 2010 and found it had an EC level of 660 µmhos/cm and a TDS concentration of 332 mg/L. ISD also sampled the discharge from a shopping center with a laundromat in 2008 to 2009 and found it had an EC level of 1061 µmhos/cm and a TDS concentration of 535 mg/L. As all commercial facilities discharge some TDS, the total number of equivalent dwelling units (EDUs) categorized as commercial was also counted and was found to be 2,134 out of 14,750 EDUs (approximately 15%)

Table 4. Businesses in Oakley and Bethel Island that Discharge Elevated Levels of EC

Category	No. of Businesses	Category	No. of Businesses
Auto Repair and Service	9	Hotels and Motels	2
Beauty Salons	8	Laundries/Dry Cleaners	4
Car Washes	3	Pharmacies	3
Chiropractic Offices	2	Printing Services / Silk Screeners	1
Fitness Centers/Gyms	2	Restaurants	21
Grocery Stores	2	Schools and Public Buildings	9

GROUNDWATER INFLOW AND INFILTRATION

Based on the population in Oakley vs. Bethel Island, it would be expected that about 6% of the total influent flow would come from Bethel Island. Instead about 21% of influent flow comes from the island. This indicates that at least part of the additional inflow is from inflow and infiltration (I&I). Groundwater on Bethel Island at the level of collection system pipes is estimated to have an EC level comparable to local surface water, which is 600 µmhos/cm (380 mg/L TDS).

Load Calculations

Loads are based on estimates of flows from residential and commercial sources as well as I&I and estimated TDS concentrations from these sources. These estimates are then compared to measured WRF influent flow and TDS concentrations in the influent to give an idea of the estimates' accuracy. While the rationale behind these estimates is discussed in the following sections, a brief comparison of flow estimates is given in **Table 5**.

[2] Data not published, but collected by Ventura County Waterworks District No. 16 for the *Chloride Source Identification Study for the Piru Wastewater Treatment Plant*, November 2009.

Table 5. Estimated and Measured Influent Flows

	Flow (MGD)	Percent of Measured 2013 Influent Flow
Estimated Residential Flow	1.75	73%
Estimated Commercial Flow	0.30	12%
Bethel Island Inflow and Infiltration	0.36	15%
Measured 2013 Influent Flow	2.41	100%

The first step in calculating these flow estimates was to separate flows from Oakley and Bethel Island and determine the I&I flow on Bethel Island. Based on 2013 flow data, 79% of influent flow comes from Oakley and 21% comes from Bethel Island. Based on the most recent available population estimates in the ISD service area from the 2010 census, 35,432 (94%) people live in Oakley and 2,137 (6%) live on Bethel Island. Based on population then, roughly 6% of the influent flow should come from Bethel Island residential and commercial sources. So, it was estimated that 15% of influent flow (21% - 6%) was from Bethel Island I&I. The remaining flow from Oakley and Bethel Island (2.05 MGD) was assumed to be from residential and commercial sources.

The second step was to determine the water use of one EDU and determine total residential and commercial flows. The total residential and commercial flow was assumed to be the measured influent flow minus the Bethel Island I&I. The 2013/2014 tax roll information gave the total residential and commercial EDUs in Oakley and Bethel Island combined as 14,750 EDUs. The influent flow minus the Bethel Island I&I was then divided by the total number of EDUs to determine one EDU uses 139 gal/day. The number of residential vs. commercial EDUs was then used to determine the residential and commercial flows. 2,134 commercial EDUs resulted in a total commercial flow from Oakley and Bethel Island of 0.30 MGD. 12,616 residential EDUs resulted in a total residential flow from Oakley and Bethel Island of 1.75 MGD.

As discussed previously, EC measurements can be correlated to TDS concentrations. Where only EC data were available, load estimates for TDS were developed by converting EC level measurements into equivalent concentrations of TDS. The conversion used was 0.52 mg/L per µmhos/cm.

RESIDENTIAL LOAD

Loads from residential sources were calculated based on estimated flows and TDS concentration data as described below.

Water Supply

The TDS load from water supply is estimated by breaking down the water supplies from Oakley and Bethel Island. The total residential flow from Oakley was estimated at 1.59 MGD and 0.16 MGD from Bethel Island. Multiplying the flows times the TDS concentrations given in the sources section gives the TDS loads to the WRF. Oakley's residential load is 746 tons/yr. of TDS and Bethel Island's residential load is 220 tons/yr. for a total of 966 tons/yr. of TDS.

Self-Regenerating Water Softeners

While water softeners only contribute NaCl to wastewater, this compound is included in EC levels and TDS concentration measurements. To determine the load of TDS from SRWSs, it was assumed that SRWSs remove hardness at an efficiency of 3,300 grains of hardness removed per pound of salt discharged to the WRF. Assuming the given efficiency, SRWSs in Oakley and Bethel Island are estimated to contribute 314 tons/yr. of salt.

Food, Human Waste, and Cleaning Products

As discussed in the sources section, a TDS concentration of 116 mg/L may be added to residential discharges from day-to-day residential water uses. A total residential flow of 1.75 MGD is used to determine a total TDS load from normal residential uses of 309 tons/yr.

COMMERCIAL LOAD

As noted previously, the total commercial flow from Oakley and Bethel Island is based on EDUs from the 2013-2014 tax roll. TDS concentration in commercial flow is assumed to be equal to the average concentration of samples taken in 2008 and 2009 which is 535 mg/L at Lucky's Shopping Center. Lucky's Shopping Center is considered to be representative of commerce in the area because it includes an auto repair/service business, beauty salons, a grocery store, a dry cleaner, a laundromat, a pharmacy, and restaurants as well as retail stores. Using the estimated commercial flow of 0.30 MGD and the average concentration of TDS discharge from Lucky Shopping Center of 535 mg/L, the total commercial load is estimated to be 244 tons/yr.

BETHEL ISLAND GROUNDWATER INFLOW AND INFILTRATION

In addition, the concentration of TDS in I&I is roughly estimated. It is assumed that I&I originates from groundwater inflow that contains TDS in concentrations similar to local surface waters. Additionally, it is assumed that I&I is from groundwater alone as opposed to rainwater inflow during storm events. While there is certainly rainwater I&I, the flow of this water cannot be estimated. Therefore the I&I load calculations are an upper estimate of the total load of TDS from I&I. Based on a flow of 0.36 MGD and an average TDS concentration of 311 mg/L, I&I may contribute as much as 171 tons/yr. of TDS.

TOTAL LOADS

The total influent load of TDS received by the WRF is calculated using 2013influent flow data and paired TDS concentrations. The average influent TDS concentration for 2013 was 627 mg/L. Average annual influent flow for 2013 was 2.41 MGD. Based on these measurements, the known TDS influent load is 2,300 tons/yr.

Table 6 summarizes the sources of influent TDS loads. It is rare that all sources of TDS can be estimated to the order of accuracy that calculated influent TDS load will equal the estimated sum of residential, commercial, and other loads. Therefore, the summary table below includes an "unknown" category to account for sources that may not have been identified or were underestimated. Overall, the difference between the estimated sources and the measured TDS load is 13%. The discrepancy is associated with the uncertainties inherent in estimating loads.

Table 6. Source of Influent Flow and Total Dissolved Solids Loads*

Source of Total Dissolved Solids	Estimated Flow (MGD)	Estimated Loads (tons/yr.)	Percent of Measured Influent Load
Residential	1.75		
Water Supply		966	42%
Water Softeners		314	14%
Food, Human Waste, and Cleaning Products		309	13%
Commercial	0.30	244	11%
Bethel Island Inflow and Infiltration	0.36	171	7%
Sum of Estimates	2.41	2004	87%*
Unknown Sources	N/A**	296	13%
Total Measured Influent Load	2.41	2,300	100%

*Total loads and percentages may not equal the sum of individual loads or percentages exactly due to rounding

** Unknown sources are not from additional unidentified flow, but flow with higher TDS concentrations than estimated.

Figure 1 further displays the relative contributions of TDS from each source to the total influent load of 2,682 tons/yr.

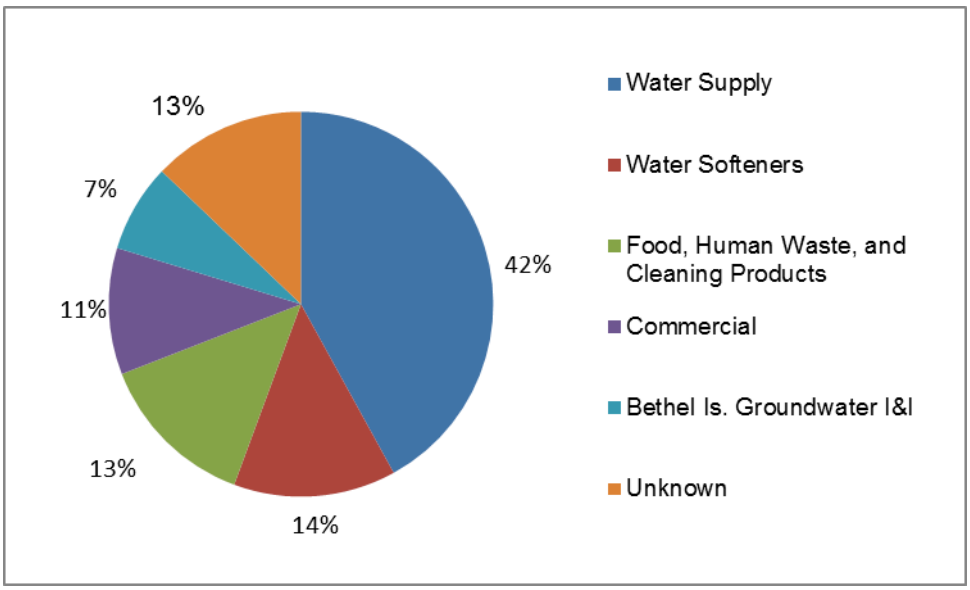

Figure 1. Relative Contribution to Total Estimated Influent Load

The primary source of TDS loading is from residential sources: residential water supply, water softeners, and normal residential uses. This is in keeping with the makeup of the WRF influent which is primarily residential. Unknown sources comprise 13% of the TDS load. These sources are most likely SRWSs and commercial sources. ISD staff believes the majority of the 13% unknown source is from SRWSs. However, the commercial load is based off collection system sampling from one shopping center, so it is possible other businesses are discharging higher concentrations of TDS as well.

Source Control Feasibility, Strategies, and Reductions

In its Salinity Pollution Prevention Work Plan, ISD identified the following possible actions that could be taken to reduce influent EC:

- Reduce the use of groundwater wells to supplement surface water supply in Oakley
- Encourage a change from groundwater to surface water supply on Bethel Island
- Improve groundwater supply quality on Bethel Island
- Develop a water softener ordinance to restrict the type of water softeners allowed to be installed
- Develop an incentive program for the replacement of existing water softeners
- Implement a public outreach program to raise awareness about salinity concerns

These actions are evaluated in the following sections, as well as outreach to businesses which may reduce the commercial load and infrastructure upgrades that could reduce the I&I load from Bethel Island. Food, human waste, and cleaning product sources are considered uncontrollable and are not further discussed.

WATER SUPPLY

ISD does not have direct control over water supply quality, but has begun discussions with DWD to mitigate the degradation of water supply quality in Oakley. DWD supplies primarily surface water, but currently has 2 groundwater wells. DWD has agreed to keep the combined water supply hardness below 140 mg/L, except during declared drought conditions. In addition, as part of the mitigation for the increase in water hardness, due to the use of groundwater wells, DWD has agreed to contribute $250,000, over a 10 year period, to aid ISD in an effort to prevent the installation of new water softeners and remove or exchange existing water softeners. ISD will continue to discourage DWD's installation of groundwater wells, but with the installation of the most recent groundwater well, hardness is likely to remain at 140 mg/L.

Negotiations with Bethel Island water purveyors present a greater challenge because there are at least 45 water purveyors supplying the island. In addition, the cost to switch from groundwater to a surface water supply is very costly. Connection fees alone are approximately $30,000 and this does not include costs for constructing the infrastructure needed to get the water to the homes. A surface water supply may be available in the next couple years as DWD is currently in the planning stages to construct a potable water pipe to the Delta Coves development which is located on Bethel Island. If a switch to surface water supply could be negotiated, the TDS load reductions would be 134 tons/year. This reduction is based on a water hardness of 140 mg/L from the new supply versus 363 mg/L from the current supply. Changing the water supply would also cause a reduction in water softener use which equates to 15 tons/yr. assuming water softener use is reduced from 95% to 27%.

Another option may be to optimize the use of the well supply network to pump from wells that have lower EC levels and/or to require treatment of the groundwater supply. The load reductions from these actions would be dependent on the extent to which the water supply could be optimized or treated. The technical and financial feasibility of any changes to water supply on

Bethel Island would have to be assessed before a load reduction and costs could confidently be calculated.

SELF REGENERATING WATER SOFTENERS

California Assembly Bill 1366 (AB 1366) authorizes agencies that maintain a community sewer system to restrict or ban the installation of water softeners provided the following conditions are met:

- The agency is in one of the hydrologic regions specified by the bill
- The local Regional Board has made a finding, such as a waste discharge requirement, that control of residential salinity loading will contribute to achievement of water quality objectives. This finding must be made at a public hearing, based on evidence in record.
- The agency holds at least one public meeting to consider local economic issues and other community input before instituting the ordinance

ISD meets the first two of these initial requirements:

- The bill applies to the San Joaquin River hydrologic region and ISD discharges to the San Joaquin River.
- In issuing ISD an NPDES permit, the local Regional Board has invoked the salinity objectives set in the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta Plan) and therefore set a waste discharge requirement for salinity. The NPDES permit was adopted in a public hearing based on evidence in record (e.g., ISD's Report of Waste Discharge). A key phrase is that 'control … will *contribute* to achievement of water quality objectives.' Banning of water softeners will contribute even if it does not result in achievement of water quality objectives. In addition, it is the largest controllable source within the District's direct jurisdiction (as opposed to the water supply which the District does not have direct jurisdiction over).

In order to pass an ordinance that requires the removal of SRWSs currently in place, ISD must compensate the owners of the water softeners a "reasonable value", in the words of AB 1366. This compensation value can be determined by ISD. However, before any ordinance is passed ISD will hold a public hearing to comply with the third requirement of AB1366.

Installation Ban

AB 1366 gives a range of options for installation bans that an agency can require. It can require that:

- Residential self-regenerating water softeners sold within its jurisdiction be rated at the highest efficiency commercially available
- Plumbing permits be obtained prior to installation of self-regenerating water softeners
- Residential self-regenerating water softeners be plumbed to hot water only
- Self-regenerating water softeners not be installed

If the goal is to reduce salinity discharge to the maximum extent possible, the most cost-effective option is to simply ban the installation of SRWSs. This does not require negotiations about what

the highest efficiency self-regenerating water softener is, or staff time evaluating permit applications. Among the options above, a ban on installation reduces salinity in residential discharge the most.

To calculate the impact of an installation ban, influent loads must be projected into the future with anticipated population growth and increased influent flow. The average annual increase in EDUs between 2007/08 and 2013/14 was 1.54%. Assuming this growth continued through 2018/19 and the load of TDS from water softeners increased at the same rate, an additional 25 tons/yr. would be contributed to the total influent load. Therefore, the ban would prevent 25 tons/yr. from being added to influent load.

Voluntary Rebate Program

AB 1366 also allows ISD to institute a voluntary rebate program to encourage the removal or replacement of previously installed water softeners. The reductions from this type of program would be dependent on public outreach, the amount of the rebate offered, and consequent public participation. The Santa Clarita Valley Sanitation District (SCVSD) enacted a voluntary rebate program in 2005 offering $150 for the replacement of SRWSs with a non-salt conditioning device or $100 for simply removing an SRWS with no replacement. SCVSD estimated that there were 6,500 residential SRWSs in its service area and, by 2007 it had only received roughly 400 rebate applications. In response, SCVSD convened focus group meeting and residents indicated that they would be satisfied with a $1,000 rebate. SCVSD decided to increase the rebate to $325 - $1,000 with documentation of the SRWSs value. Participation increased to roughly 50%.

Obligatory Removal of Previously Installed Self Regenerating Water Softeners

If ISD elects to enact an ordinance requiring the removal or replacement of previously installed SRWSs, AB 1366 requires ISD to refund residents a “reasonable value” for their SRWSs. A 100% reduction in SRWSs would be unlikely because of enforcement challenges. Assuming that resources were available to adopt this type of ordinance, the total TDS load from water softeners in 2018/19 could be projected to be 10% of the load in 2013/14, a reduction of 313 tons/yr.

FOOD, HUMAN WASTE, AND CLEANING PRODUCTS

Oakley Disposal service provides garbage service to the ISD service area and currently allows homeowners to place food waste in their yard waste can. The number of people who participate in this program is unknown. For purposes of this Plan it is assumed a 10% reduction of the 2013/14 load is projected, a reduction of 31 tons/yr.

COMMERCIAL USES

Further information is needed to determine the most significant commercial sources of EC and appropriate source control activities. ISD has identified a fitness center as one source and has sampled its discharge. The fitness center discharges a TDS concentration of 332 mg/L. However, ISD has also sampled at Lucky’s Shopping Center, which consists of a range of businesses, and its discharge has a TDS concentration of 535 mg/L. The businesses in the shopping center include an auto repair/service business, beauty salons, a grocery store, a dry cleaner, a laundromat, a pharmacy and restaurants as well as retail stores. One or more of these businesses may be discharging TDS concentrations that are higher than the fitness center and should be a

priority for outreach. Literature data indicates that grocery stores, photo processing facilities, and laundromats may be especially significant sources of TDS. Therefore it may be appropriate to develop and distribute BMPs to these types of businesses. Additional collection system sampling could also be conducted to further characterize commercial sources. Follow-up inspections would assess the extent to which BMPs have been integrated into the facilities' operations. Follow up collection system monitoring would determine the effectiveness of these changes. An estimated 10% reduction based on working with individual sources is included in the reduction estimate. A 10% reduction in 2013/14 commercial load would result in a 24 ton/yr. load reduction.

BETHEL ISLAND GROUNDWATER INFLOW AND INFILTRATION

As previously discussed in the load calculation section, there is a great deal of uncertainty in calculating the TDS load from I&I on Bethel Island. The load represents an upper limit of the possible contribution and is based on limited data. ISD would have to invest in infrastructure upgrades to reduce this load, and these upgrades would likely be expensive due to the high groundwater table on Bethel Island. ISD could try to isolate areas that are the "hot spots" for I&I through collection system monitoring timed to isolate I&I rather than residential contributions (e.g. at night, during dry weather). Potential load reductions cannot be calculated without additional information such as possible I&I flow reduction, the TDS concentration of flow at hot spots, and financial assessment of feasible upgrades. Therefore, source control does not focus on this source. Even if complete reduction in I&I were achieved, total loading would only be reduced by 7%. Most likely, upgrades would not be able to achieve this complete reduction.

TOTAL FEASIBLE REDUCTIONS

As explained in the previous SRWS load reduction section, loads must be projected into the future to estimate possible reductions for the range of water softener controls possible. Therefore, all loads are projected to 2018/19 (five years from 2013/14. Between 2007/08 and 2013/14, residential and commercial EDUs in ISD's service area increased 9.6%. For the purposes of these calculations, residential and commercial flow is then assumed to increase 9.6% between 2013/14 and 2018/19. I&I is not estimated to increase because even if there are additions to the collection system, new pipes would not be expected to contribute significantly to I&I. Consequently, residential and commercial loads are shown in **Table 7** to increase by 9.6% without any source control whereas the I&I load remains the same. Unknown loads are also projected to increase 9.6% as the unknown load is suspected to be residential or commercial. **Table 7** shows how reductions proposed decrease the projected load and how the projected TDS load to the WRF.

Table 7. Projected 2014 Total Dissolved Solids Loads and Potential Reductions (tons/yr.)*

	A	B	C	D	E

Total Influent Loads	Estimated 2013/14 Influent Load	Projected 2018/19 Loads without Reductions	Projected 2018/19 Loads with Reductions	Reduction from Column B	% Change from Total 2013/14 Load
Water Supply	**966**	**1059**	**1059**	**0**	**10%**
Water Softeners	**314**	**344**	**31 to 319**	**25 to 313**	**-90% to 1%**
Food, Human Waste, and Cleaning Products	**309**	**339**	**278**	**31**	**-10%**
Commercial	**244**	**267**	**220**	**24**	**-10%**
Bethel Is. Groundwater I&I	**171**	**171**	**171**	**0**	**0%**
Total Estimated Load	**2018**	**2195**	**1774 to 2062**	**133 to 421**	**2% to -12%**
Unknown	**296**	**322**	**322**	**0**	**9%**
Estimated TDS Concentration (mg/L)	**627**	**627**	**525 to 598**	**29 to 102**	**-16% to -5%**
Estimated EC Level (µmhos/cm)	**1175**	**1175**	**984 to 1121**	**54 to 191**	**-16% to -5%**

*Total loads and percentages may not equal sum of individual loads or percentages exactly due to rounding

While TDS concentrations for all sources are not expected to increase, **Table 7** reflects that TDS loads will increase with increased influent flow if reductions are not made. There are no businesses that stand out as large sources of TDS; however, general outreach may be able to achieve a 10% reduction in commercial loads. If the installation of new SRWSs is banned, then the load from SRWSs will not decrease, but the TDS concentration to the WRF will decrease with increased influent flow. This is reflected in the final row of **Table 7**, which shows that with a SRWS installation ban along with a decrease in food scrap and commercial loads EC levels would decrease by 5%. If an ordinance requiring the removal of SRWSs reduces the load from SRWSs by 90%, this reduction coupled with a reduction in commercial load will cause EC to decrease by 16%. Because there is a range of load reductions that could be achieved through ordinances and outreach, percent change in total influent load, TDS concentrations, and EC levels are given as a range. While loading will increase even with all control measures, EC levels will decrease. If unknown sources can be identified and controlled, the reduction may be even greater.

If potable water on Bethel Island were provided by DWD, the total 2013/14 influent load would decrease by 134 tons/yr. Changing the water supply would also cause a reduction in water softener use which equates to 15 tons/yr. assuming water softener use is reduced from 95% to 27%.

Self-Regenerating Water Softener Source Control

SRWSs account for 14% of the TDS load to the WRF which is the second largest source of TDS behind water supply which accounts for 43% of the TDS to the WRF. SRWS source control offers the greatest possibility for the reduction of TDS loading. Programs to control SRWSs are discussed below.

BACKGROUND

SRWSs pretreat water before it is used in homes for residential purposes. They work by exchanging sodium ions on a resin cartridge with magnesium and calcium ions, which are responsible for water hardness. Magnesium and calcium remain on the cartridge, and sodium becomes part of the supply delivered to the household. Once all of the sodium on the cartridge is depleted and the cartridge has a high magnesium and calcium content, the cartridge must be regenerated. This is achieved by immersing the cartridge in a brine of sodium chloride. The sodium displaces the magnesium and calcium, and the chloride, magnesium, and calcium are all discharged to the sewer. The discharge of these ions to the sewer is responsible for increasing EC levels in influent.

Alternatives to SRWSs include portable tank exchange services, magnetic/electronic/catalytic water conditioners, water softener chemicals, reverse osmosis, filtration, carbon filtration, and distillation. The effectiveness of each of these technologies with respect to improving water quality varies greatly as do associated costs and efficiencies. These technologies are described below.

Portable Tank Exchange Systems

Portable tank exchange systems operate on the same principal as an SRWS except that when the unit needs to be recharged, a service comes to replace the unit with a fresh resin tank. The spent resin tank is then recharged at a central location. When recommending this as an alternative, an agency should confirm that the regeneration facility's discharge is treated to remove salts or that it is discharged to a water body for which salinity is not an issue (e.g., ocean outfall, San Francisco Bay). This exchange service is offered on a monthly or weekly basis depending on the household's needs.

Magnetic/Electronic/Catalytic Water Conditioners

Magnetic/electronic/catalytic water conditioners use various methods to alter the formation of calcium carbonate crystals (limescale), so that they remain in suspension in small particles and do not form hard crystalline deposits inside pipes, boilers, and domestic appliances. These conditioners are designed to gradually erode existing limescale deposits, thereby increasing the flow and efficiency of plumbing systems. This technology has been successfully used in industrial applications. Although the effectiveness of different units may vary, these units may be effective where the concern is the maintenance of the home's plumbing system.

Packaged Water Softener Chemicals

Packaged water softener chemicals are additives that help control water hardness. They fall into two categories: precipitating and non-precipitating. These additives are used only in laundry, not for softening water for an entire house. Precipitating water softeners include washing soda and borax. These products form an insoluble precipitate with calcium and magnesium ions. The mineral ions then cannot interfere with cleaning efficiency, but the precipitate makes water cloudy and can build up on surfaces. Precipitating water softeners increase alkalinity of the cleaning solution and this may damage skin and other materials being cleaned. Non-precipitating water softeners use complex phosphates to sequester calcium and magnesium ions. There is no precipitate to form deposits and alkalinity is not increased.

Filtration

Filtration removes suspended matter from water by mechanical screening. Basic filters usually are porous beds of insoluble material. Other types of filters include cast forms, plates of sheet material, synthetic membranes, finely perforated plastic or specially sized beds of inert particles. The filtration process removes suspended silt, clay, colloids, and some microorganisms. Simple cartridge filters may be effective for low levels of turbidity.

Activated Carbon Filtration Systems

Activated carbon filtration systems involve the adhesion of one material on the surface of a second solid substance based on opposing electrical charges of each material. These systems are widely used to eliminate certain hazardous compounds related to industrial wastes, chemicals, and pesticides. This treatment method can also remove unpleasant tastes and odors caused by decaying organic matter, dissolved gases, and residual chlorine.

Reverse Osmosis Systems

In reverse osmosis (RO) systems, contaminants are removed by forcing water through a membrane having microscopic holes that allow water molecules, but not larger compounds, to pass through. Water flushes away the contaminants held by the membrane. Membranes are made of a variety of materials that differ in effectiveness for different chemicals. The RO membrane needs replacing according to the manufacturer's recommended schedule. Typically, RO is used to treat water for drinking and cooking rather than for all household uses.

In addition to being expensive, RO has limitations that affect its applicability. RO units waste large amounts of water. Most units will discharge up to 50% or more of total water as waste. The membrane can develop problems from precipitate buildup and scaling. However, this is primarily a concern in areas with extremely hard water.

Distillers

Distillers produce almost pure water. When the distiller is operating, tap water in a boiling tank (often made of stainless steel) is heated to boiling. Steam is produced, rises, and leaves most impurities behind. The steam enters condensing coils, where it is cooled and condensed back to water. The distilled water then goes into a storage container or is piped to a special faucet.

Large distillers can distill about one-half gallon of water per hour. Smaller units produce less than one quart of water per hour. The cost of producing distilled water depends on the appliance and the local electric rate. Although the distiller has no parts to replace, it is not maintenance-free. Scale must be removed from the boiling tank. Frequency of cleaning the distiller varies with the quantity of impurities in the water and the amount of water distilled. White vinegar or a manufacturer's cleaner is used for cleaning. Because of the small throughput of these units, this technology is not applicable to whole house use.

Summary

Of the alternatives described above, the portable tank exchange unit is the only alternative that provides the exact same treatment (e.g., removal of hardness ions) for household water supply. However, depending on the needs of the individual household, the homeowner may be able to

find another suitable alternative for their purposes. For example, if corrosion or scale build-up in pipes is the resident's primary concern the magnetic/electronic/catalytic water conditioners may be adequate. If drinking or cooking water is the primary concern, common in-sink filtration systems use RO, carbon filtration, and/or mechanical filters, which may serve the homeowner's purpose. Distillers may also meet this need. While distillers are not commonly distributed by water softener manufacturers, some manufacturers do provide maintenance services for these units. Because they are not readily available, distillers are not further discussed.

BAN ON DISCHARGING WATER SOFTENER INSTALLATION

A ban on the installation of new discharging SRWSs would require ISD to develop an ordinance and hold a public hearing to allow those affected to voice their concerns. New Bethel Island residents, not on DWD water, would most likely need to install a portable tank exchange type softener due to the hardness of the potable groundwater.

Costs of owning an SRWS vary widely based on lifetime and other technologies that the system may include. At Home Depot, costs range from $500 for a standard unit (30,000 grain/gallon) to $900 for a high-efficiency unit (>45,000 grains/gallon). However, these are low-end units, and SRWSs can cost thousands of dollars. Installation costs are dependent on each residence's plumbing, but are estimated to be at least $200 to $250. Maintenance consists of refilling the SRWS with salt, which costs about $5 per month[3].

Portable tank exchange services are available from water softener manufacturers. Costs for installation and maintenance of these softeners are highly dependent on the amount of water used by a residence. For an average residence, the initial installation cost is about $350. The number of tanks exchanged can range from 2 tanks per week to 1 tank every 8 weeks. Assuming a typical use of two tanks exchanged every 8 weeks, the maintenance fee is $59 per month[4].

Like SRWSs, electronic, magnetic, and catalytic water conditioners range widely in price, with some units costing thousands of dollars. Low -end electronic and magnetic are available for less than $500. Low-end catalytic conditioners range from $550 to $1,000. Again, installation is dependent on plumbing, but is estimated to be at least $500. No maintenance is needed for electronic and magnetic water conditioners. Catalytic systems may require weekly cleaning, but this can be accomplished in a few minutes with a stainless steel pad[5].

In-sink filtration systems can be rented or purchased from water softener manufacturers. Rented systems can be installed and maintained for $37 per month. Water softener manufacturers will charge $1,000 for purchase and installation of these systems. This type of system then needs a new filter installed each year, which costs $240[6]. **Table 8** compares low-end SRWSs and magnetic, electronic, and catalytic water conditioners to tank exchange and in-sink filtration services available in Oakley and Bethel Island. Low-end alternatives are presented because it is

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[3] Home Depot website: http://www.homedepot.com/Appliances-Water-Dispensers-Filters-Water-Softeners/h_d1/N-5yc1vZ1xg1Zaq3y/h_d2/Navigation?langId=-1&storeId=10051&catalogId=10053; Personal communication with Stuart Dennis, General Manager of Livermore Culligan Office (925) 447-3717; Personal communication with OBD Plumbing (925) 679-8989.

[4] Personal communication with Stuart Dennis, General Manager of Livermore Culligan Office (925) 447-3717

[5] Sanitation Districts of Los Angeles County. Salt Free Water Conditioning Alternatives website; Personal communication with American Plumbing (925) 754-4990.

[6] Personal communication with Stuart Dennis, General Manager of Livermore Culligan Office (925) 447-3717

not possible at this point to determine how much residents would be willing to pay for water softener alternatives. It is believed that water softeners installed during the 2007 housing boom may have cost $4,000 to $5,000. If most residents own these more expensive SRWSs, then they may be willing to pay for more expensive alternatives as well.

Table 8. Cost Comparison of Inexpensive Water Softeners and Conditioners

System	Purchase Cost	Installation Cost	Maintenance Cost
Self-Regenerating Water Softener	$500-$900	>$200	$5/month
Tank Exchange System	$0	$350	$59/month
Magnetic/Electronic Conditioner	<$500	>$500	$0
Catalytic Conditioner	$500-$1,000	>$500	$0
In-Sink Filtration System	$1,000	Included with purchase	$20/month
In-Sink Filtration System Rental	N/A	N/A	$37/month

The costs to ISD for an installation ban on discharging SRWSs would be primarily public outreach costs and outreach to water softener manufacturers. Administration costs would include developing and passing the ordinance, and informing local water softener manufacturers of the ban. Public outreach materials could include, articles in ISD's "Insider" newsletter, develop pamphlets to handout at local events and inexpensive inserts included with Diablo Water District bills. The outreach material would have information on the need for the ordinance and alternatives to discharging SRWSs. There may also be some cost associated staff time related to enforcement of the ban on SRWSs. A rebate program as described below may increase the effectiveness of a ban.

While there is likely to be some public resistance to the ban, an effective public outreach campaign can counteract this problem. There may also be resistance from water softener manufacturers because they could no longer market many of their products to residents in the ISD service area. However, water softener manufacturers offer exchange tank systems and in-sink filtration systems which they could continue to install. Other communities have worked effectively with water softener manufacturers to address these issues.

VOLUNTARY REBATE PROGRAM

Rebate programs can include programs that encourage the replacement of SRWSs with alternatives, programs that compensate residents for merely removing SRWSs or programs that do both. Different rebate values may be given for removal versus replacement.

For residents, there is a cost to remove and dispose of the SRWSs. Most residents will likely opt to have a plumber remove the SRWS, and costs will vary significantly depending on the resident's system. Removal is estimated to cost between $200 and $350 and disposal would cost at least $35[7]. The costs of installing alternatives to the SRWS would then be similar to those listed in the previous section.

[7] Personal communication with William H Anderson Plumbing on Bethel Island (925) 684-2469 and Oakley Plumbing (925) 625-0529. Disposal costs also estimated for direct disposal at Recycling Center and Transfer Station in Pittsburg, which is the closest transfer station.

ISD would have control over the cost of a rebate program by simply determining the number of rebates it can afford to offer considering the rebate amount chosen. Given SCVSD's experience, however, even a voluntary rebate program should offer a rebate similar to the reasonable value of the SRWS in order to achieve significant participation. Convening a focus group of residents from both Oakley and Bethel Island may be an effective method to determine what residents consider a reasonable value.

Additional costs to ISD would include administrative costs to verify the replacement or removal of an SRWS. This could include:

- Certification from a licensed contractor
- Certification form a realtor during the transfer of a home
- Receipt from landfill or other disposal service

The final option allows for those that choose to remove the SRWS themselves to have an equal opportunity to receive the rebate. In addition the rebate should include an agreement that the residence may be inspected to confirm that an SRWS has been replaced or removed. If ISD elects to conduct inspections, this will add the cost of staff time.

The challenge of any rebate is fraud, which may require inspections. If ISD chooses to inspect residences, the following steps should be taken:

- Resident calls in or sends in rebate application
- Staff records customer information, determines eligibility for rebate, and schedules appointment for inspection to confirm ownership of SRWS
- Staff conduct pre-inspection of residence to confirm that SRWS is in place
- Resident purchases new alternative water softener and has it installed
- Resident sends in completed rebate form with original UPC code and a copy of the receipt, and removal of SRWS is certified as listed above
- Information for qualified customers is submitted to finance office
- Finance office issues a rebate check to customer

To further reduce the risk of fraud, post-installation visits may also be conducted.

Objections may come from the community if it is perceived that those who remove their SRWSs themselves have to meet more criteria to receive the rebate. If fraud is not controlled, the public may also perceive that the rebate is not fair.

ORDINANCE REQUIRING THE REMOVAL OF SELF REGENERATING WATER SOFTENERS

An ordinance requiring the removal of water softeners would include significant staff time to develop and implement the program, in order to more accurately determine a reasonable value and prevent fraud. The ordinance could use one of the following approaches.

- **Approach 1**: The rebate is calculated using a sales receipt provided by the applicant and straight line depreciation based on a useful life of 12 years with no salvage value. A maximum rebate amount would be established with a case-by-case appeal procedure. If documentation is not available on when a unit was purchased, the default time of ownership could be based on a purchase date such as the date when many developments in Oakley were established and equipped with water softeners. In cases where receipts are

not available, a default value would be applied to derive a rebate using the method in Approach 2.

- **Approach 2**: A default rebate is derived based on the cost for a selected set of SRWS model(s) most commonly owned by Oakley and Bethel Island residents and straight-line depreciation based on a useful life of 12 years with no salvage value. The default time of ownership could be based on the same date used in Approach 1. This alternative should also include an appeal procedure if a resident has a sales receipt or other documents that can be used to derive a rebate based on Approach 1.

Essentially, the approaches are different in how the standard rebate is determined. In approach 1, the standard rebate would be based on evidence of cost provided by the owner. In approach 2, the standard rebate would be a default value. It is also possible to use different methods of depreciation. Example ordinances are provided in **Appendix A**.

Staff time would be needed to determine the method to estimate SRWS value and handle a large volume of requests for rebates. Given the amount of money that would be expended on rebates for the entire community, it would be especially important to prevent fraud. Therefore, inspections would be highly recommended.

It is estimated that there are up to 3,814 SRWSs in the ISD service area[8]. As discussed previously, many were installed in new developments during 2007/08 in addition to the many older installations particularly on Bethel Island. Assuming on average the SRWSs are worth $1,500 this equates to a total rebate cost of $5,721,000 not including any costs for staff time. However, because many SRWS alternatives are significantly less expensive than $1,500, residents may accept a lower rebate. Convening a focus group of residents from both Oakley and Bethel Island may therefore be particularly important if SRWS removal or replacement is required.

A requirement to remove SRWSs might not be well received by residents. Water softener manufacturers that do not offer alternatives to SRWSs would also be expected to oppose the requirement. Conversely, water softener manufacturers that do offer alternatives would likely accept the requirement if adequate communication with them is included in the outreach program.

Costs, Benefits, and Potential Adverse Impacts

SELF REGENERATING WATER SOFTENER SOURCE CONTROL

Costs of water softener source control have been discussed in the previous section. The obvious benefit would be reduced salts discharged to the sewer system. Adverse effects of programs encouraging removal would be the trash generated from removing units. Green gas emission would be created from people driving to the local transfer station to dispose of the units. Using a

[8] Based on population, census estimated average household size, and survey of residents indicating what percentage of the population lives in a home with a water softener. For Oakley: 35,432 people / 3.37 people per household * 27% of population living in household with a water softener = 2,838 SRWSs. For Bethel Island: 2,137 people / 2.08 people per household * 95% of population living in household with a water softener = 976 SRWSs. This assumes all people who responded to the survey that they had a water softener specifically had a SRWS.

tank exchange system in place of SRWSs would also increase greenhouse gas emissions due to the increased need for trucking waste and energy used at the recycling center.

WATER SUPPLY IMPROVEMENT ON BETHEL ISLAND

Water supply improvements on Bethel Island would require the substitution of surface water for groundwater and/or the treatment of groundwater. Both would incur significant costs to build infrastructure, although the costs would be to Bethel Island residents through water purveyors rather than through ISD. The extent of these costs would most likely be limited by the resources that could be allocated to such projects. It may be possible to limit the distribution of surface water supply to certain areas, or to phase in surface water supply by spreading development of the infrastructure needed over many years. Treatment of groundwater could similarly be phased in slowly. One adverse effect of this approach would be that improvements in influent quality would also occur slowly. Another adverse effect would be the financial hardship to the Bethel Island community. If modifying groundwater wells to reduce EC levels in supply water involves the use of reverse osmosis the brine or salt waste created could also pose disposal challenges. Benefits, however, include improvement of drinking water quality and a reduction in the purchase of bottled water. Bottled water use is believed to be common on Bethel Island, and reducing this use would prevent the production of plastic bottle waste and reduce greenhouse gas emissions from water service vehicles distributing water to houses. Improved water quality would also reduce the need for water softeners.

As mentioned previously, a surface water supply for Bethel Island maybe available in the next couple years as DWD is currently in the planning stages to construct a potable water pipe to the Delta Coves development which is located on Bethel Island. However, the cost for current Bethel Island residents to switch from groundwater to a surface water supply is very costly. Connection fees alone are approximately $30,000 and this does not include costs for constructing the infrastructure needed to get the water to the homes.

Pollution Prevention Goals and Implementation Schedule

ISD's immediate goals for its salinity pollution prevention program are:

- Develop an ordinance that bans installation of new SRWS. Only new portable exchange type water softeners will be allowed.
- Continue to inform ISD customers on salinity issues through our "Insider" newsletter.

ISD's near-term goals for its salinity pollution prevention program:

- Consider developing a voluntary rebate program to encourage the replacement or removal of SRWS's.
- Work with DWD and water purveyors on Bethel Island to develop a better potable water supply
- Source control of SRWSs could reduce 9% to 39% of the influent salinity load. If further actions are needed, ISD may conduct additional collection system monitoring to help identify other sources of EC.

Implementation of the tasks that will need to be performed to control the identified sources as well as to further identify sources of EC are outlined in **Table 9.**

Table 9. Pollution Prevention Plan & Implementation Schedule

	Task	Estimated Year of Completion
1.	Conduct influent and effluent EC monitoring to determine the impact of pollution prevention activities	Ongoing, as required
2.	Continue discussions with Diablo Water District to maintain/improve water supply quality in Oakley	Ongoing
3.	Develop ordinance to ban installation of new SRWS's	2014
4.	Consider implementing self-regenerating water softener removal or replacement ordinance. Implementation of this task will depend on future regulatory requirement imposed on ISD.	2016
5.	Work with Bethel Island water purveyors to improve supply water quality	2015
6.	Evaluate need for additional source control actions	2016

Appendix A. Examples of Water Softener Ordinances

ORDINANCE PROHIBITING THE INSTALLATION OF CERTAIN WATER SOFTENING APPLIANCES

The Board of Directors of County Sanitation District No. 32 of Los Angeles County ordain as follows:

1. AUTHORIZATION

This Ordinance is enacted pursuant to authority contained in the County Sanitation District Act, California Health and Safety Code Sections 4700 et seq. and exercises authority conferred by law including, but not limited to, Chapter 5, Part 12, Division 104 of the California Health and Safety Code.

2. PURPOSE

The purpose of this Ordinance is to protect the quality of the waters of the State including, but not limited to, protecting beneficial uses of the Santa Clara River downstream of the County Sanitation District No. 32 of Los Angeles County's Valencia Water Reclamation Plant.

3. DEFINITIONS

The following definitions shall apply to the terms used in this Ordinance:

(a) "District" means County Sanitation District No. 32 of Los Angeles County.

(b) "Person" includes any person, firm, association, organization, partnership, business, trust, corporation, company, district, county, city and county, city, town, the state, the federal government and any of the agencies and political subdivisions of such entities.

(c) "Regional Board" means the California Regional Water Quality Control Board, Los Angeles Region, created and exercising its powers pursuant to the Porter-Cologne Water Quality Control Act, California Water Code Sections 13000 et seq.

(d) "Residence" means a structure which is or is intended to be, in whole or in part, a place of dwelling, whether occupied or not, whether fully constructed or not, and includes, without limitation, homes, whether attached to another structure or not, apartments, condominiums and mobile homes.

(e) "Residential self-regenerating water softening appliance" means a water softening device located within or adjacent to a residence located within the District or which discharges into a community sewer system that is tributary to the sewer system owned and operated by the District, whereby the capability of the appliance to remove hardness from water is renewed by the on-site application of a chloride salt-containing brine solution to the active softening or conditioning material contained therein, followed by a subsequent rinsing of the active softening or conditioning material.

4. **FINDINGS**

(a) The state legislature has found and declared that pollution prevention should be the first step in a hierarchy for reducing pollution and managing wastes, and to achieve environmental stewardship for society.

(b) The District is not in compliance with waste discharge requirements issued by the Regional Board pursuant to Chapter 5.5 (commencing with Section 13370) of Division 7 of the Water Code.

(c) Limiting the availability, or prohibiting the installation, of self-regenerating water softening appliances is the only available means of achieving compliance with waste discharge requirements issued by the Regional Board.

(d) The District has adopted and is enforcing regulatory requirements that limit the volumes and the concentrations of saline discharges from nonresidential sources in the community waste disposal system to the extent technologically and economically feasible.

Findings 4 (b), (c), and (d) have been substantiated by an independent study of discharges from all sources of salinity, including, but not limited to, residential water softening or conditioning appliances, residential consumptive use, industrial and commercial discharges, and seawater or brackish water infiltration and inflow into the sewer collection system. This study has been made in accordance with the requirements of Section 116786(c) of the California Health and Safety Code. A copy of said study is on file at the District's Joint Administration Office, 1955 Workman Mill Road, Whittier, California 90601-1400.

5. **PROHIBITION**

No person shall install or in any manner assist in the installation of a residential self-regenerating water softening appliance that discharges into the community sewer system owned and operated by the District or that discharges into a community sewer system that is tributary to the sewer system owned and operated by the District.

6. **VIOLATION**

A violation of this Ordinance, is a misdemeanor punishable by a fine not to exceed $1,000, imprisonment not to exceed thirty days, or both.

7. **ENFORCEMENT**

The Chief Engineer and General Manager of the District shall administer, implement and enforce the provisions of this Ordinance. Any powers granted to or duties imposed upon the Chief Engineer and General Manager may be delegated to persons acting in the beneficial interest of or in the employ of the District.

8. **SEVERABILITY**

If any provision of this Ordinance or the applicability thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this Ordinance which can be given effect without the invalid portion or application, and to that end the provisions of this Ordinance are severable.

9. **EFFECTIVE DATE**

This Ordinance shall become effective thirty days from the date of final passage and shall be prospective in nature.

Chairperson, Board of Directors
County Sanitation District No. 32
of Los Angeles County

ATTEST:

M. Alma Horvath

Clerk, Board of Directors
County Sanitation District No. 32
of Los Angeles County

PASSED AND ADOPTED by the Board of Directors of County Sanitation District No. 32 of Los Angeles County on February 25, 2003, by the following vote:

AYES: Directors Weste and Smyth

NOES: None

ABSTAIN: None

ABSENT: Director Burke

M. Alma Horvath

Secretary of the Board of Directors of
County Sanitation District No. 32
of Los Angeles County

SANTA CLARA RIVER
CHLORIDE REDUCTION ORDINANCE OF 2008

The Board of Directors of the Santa Clarita Valley Sanitation District of Los Angeles County ordains as follows:

1. AUTHORIZATION

This Ordinance is enacted pursuant to authority contained in the County Sanitation District Act, California Health and Safety Code Sections 4700 *et seq.*, and exercises authority conferred by law including, but not limited to, Chapter 5, Part 12, Division 104 of the California Health and Safety Code, and Article 4, Chapter 1, Part 1, Division 2 beginning with Section 53069.4 of the Government Code.

2. SHORT TITLE

This Ordinance shall be known and referred to as the *Santa Clara River Chloride Reduction Ordinance of 2008.*

3. PURPOSE

The purpose of this Ordinance is to limit the discharge of chlorides to the Santa Clara River thereby improving the potential for the Santa Clarita Valley Sanitation District of Los Angeles County to comply with requirements of the California Regional Water Quality Control Board, Los Angeles Region. It is also the purpose of this Ordinance to reduce the expenditure of public funds and mitigate rate increases by lessening the need for new capital facilities.

4. DEFINITIONS

The following definitions shall apply to the terms used in this Ordinance:

(a.) "District" means the Santa Clarita Valley Sanitation District of Los Angeles County. The District owns and operates a sewer system that conveys wastewater to the Saugus and Valencia Water Reclamation Plants.

(b.) "Person" means any person, firm, association, organization, partnership, business, trust, corporation, company, district, county, city and county, city, town, the state, the federal government, and any of the agencies and political subdivisions of such entities.

(c.) "Plants" means the District's Saugus and Valencia Water Reclamation Plants.

(d.) "Community Sewer System" means the network of facilities owned and operated by the District or that are tributary to the District-owned and operated facilities that convey wastewater from within the District's service area to the Plants.

(e.) "Regional Board" means the California Regional Water Quality Control Board, Los Angeles Region, created and exercising its powers pursuant to the Porter-Cologne Water Quality Control Act, California Water Code Sections 13000 *et seq.*

(f.) "Brine" means a heavily saturated salt solution containing chloride.

(g.) "Residence" means a structure that is, or is intended to be, in whole or in part, a place of dwelling, whether occupied or not, whether fully constructed or not, and includes, without limitation, homes, whether attached to another structure or not, apartments, condominiums, and mobile homes.

(h.) "Residential self-regenerating water softener" and/or "appliance" means residential water softening or conditioning appliances that discharge Brine into the Community Sewer System. Residential self-regenerating water softeners are also more commonly known as "automatic" water softeners. Residential self-regenerating water softeners only include water softening or conditioning devices that renew their capability to remove hardness from water by the on-site application of a chloride solution to the active softening or conditioning material contained therein, followed by a subsequent rinsing of the active softening or conditioning material.

5. **FINDINGS**

The Board of Directors of the District finds and declares the following:

a) The Santa Clara River is one of the only remaining natural rivers in Southern California, supporting fish and wildlife, recreation and agriculture in Los Angeles and Ventura Counties.

b) The District's Plants discharge to the Santa Clara River.

c) Use of residential self-regenerating water softeners installed prior to 2003 is the most significant controllable source of chloride entering the Community Sewer System and the Plants. Residential self-regenerating water softeners use salt to renew their capacity to remove hardness, and then discharge Brine to the Community Sewer System. Residential self-regenerating water softeners account for approximately 30% of all chloride in the Plant's discharge. Although wastewater is treated to a high level at the District's Plants, the Plants are not designed to remove chloride.

d) The Regional Board has determined that chloride levels in the Santa Clara River must be reduced, and pursuant to a Total Maximum Daily Load ("TMDL") for chloride established by the Regional Board for Reaches 5 and 6 of the Santa Clara River in Los Angeles County, which became effective May 4, 2005, has required the District to reduce the chloride levels in its Plants' discharge.

e) The District has adopted and is enforcing regulatory requirements that limit the volume and concentrations of chloride discharges from non-residential sources to the Community Sewer System to the extent technologically and economically feasible.

f) The District has adopted and is enforcing an ordinance prohibiting the prospective installation of residential self-regenerating water softeners pursuant to Health & Safety Code Section 116786.

g) To further reduce chloride in the Plants' discharge, the District must either reduce sources of chloride in wastewater discharged to the Community Sewer System, remove chloride from wastewater at the Plants through construction and operation of expensive and energy-intensive advanced treatment facilities, or both. Construction and operation of advanced treatment facilities for chloride removal at the Plants will result in the production of Brine, which will also require disposal. If residential self-regenerating water softeners are not removed, the incremental present worth of construction and operation of advanced treatment

and Brine disposal facilities to remove chloride contributed by residential self-regenerating water softeners is approximately $73 million.

h) Reducing chloride levels by requiring the removal of all remaining installed residential self-regenerating water softeners discharging to the Community Sewer System will cost the District approximately $2-3 million.

i) Reducing chloride levels by requiring the removal of all installed residential self-regenerating water softeners would save the District's ratepayers approximately $70 million, based on the difference between the cost of residential self-regenerating water softener removal and the incremental cost of new advanced treatment and Brine disposal facilities to remove the same amount of chloride.

j) Removal of residential self-regenerating water softeners within the District is estimated to take approximately one year after the effective date of this Ordinance. Under the TMDL, the District must perform environmental review, permitting, design and construction of new advanced treatment and Brine disposal facilities for the removal of chloride by May 4, 2016. Therefore, removing residential self-regenerating water softeners will reduce chloride in discharges to the Santa Clara River sooner than installing advanced treatment and Brine disposal facilities to achieve an equivalent level of chloride reduction.

k) The removal of all installed residential self-regenerating water softeners is a necessary and cost-effective means of achieving timely compliance with a TMDL issued by the Regional Board for the Santa Clara River.

l) Residents within the District will maintain the ability to soften or condition their water by using water softening or conditioning devices that do not discharge Brine to the Community Sewer System. Among these are portable exchange water softeners, which use a removable tank to soften water. These tanks are serviced by facilities located outside the District's service area that are permitted to treat and dispose of the Brine used to regenerate them. Based on available information, sufficient capacity to treat Brine exists in Los Angeles County, and therefore, portable exchange water softeners remain available as a water softening option for residents affected by this Ordinance.

m) Based on available information, the adoption and implementation of this Ordinance will avoid or significantly reduce the costs associated with advanced treatment for chloride removal and Brine disposal that otherwise would be necessary to meet the TMDL.

n) The District has established a voluntary program to compensate owners of residential self-regenerating water softeners within its service area for 100% of the reasonable value of each removed residential self-regenerating water softener and the reasonable cost of the removal and disposal of that residential self-regenerating water softener. This program shall remain in effect until the Effective Date of this Ordinance. The program is expected to result in the removal of 3,300 self-regenerating water softeners. The reduction in chloride levels resulting from the voluntary program is expected to be 4,400 pounds per day.

o) On and after the Effective Date of this Ordinance, the District will continue a program to compensate owners of residential self-regenerating water softeners within its service area for 75% of the reasonable value of each removed residential self-regenerating water softener and the reasonable cost of the removal and disposal of that residential self-regenerating water

softener. Approximately 3,200 self-regenerating water softeners are expected to be removed. The potential reduction in chloride levels expected as a result of the program is 4,300 pounds per day.

6. REQUIREMENT FOR REMOVAL OF RESIDENTIAL SELF-REGENERATING WATER SOFTENERS

Every person who has a residential self-regenerating water softener that is installed upon his or her property or premises, and every person occupying or leasing the property or premises of another who has a residential self-regenerating water softener installed thereon, that discharges into the Community Sewer System shall remove and dispose of the installed residential self-regenerating water softener within 180 days after the Effective Date of this Ordinance.

7. ADMINISTRATIVE ENFORCEMENT

a) The Chief Engineer and General Manager of the District ("Chief Engineer") shall administer, implement, and enforce the provisions of this Ordinance. Any powers granted to or duties imposed upon the Chief Engineer may be delegated to persons acting in the beneficial interest of or in the employ of the District. The Chief Engineer shall enforce this Ordinance by (1) performing public outreach to inform residents of the terms of this Ordinance and to encourage voluntary compliance, (2) withholding administrative enforcement actions until 180 days after the Effective Date of the Ordinance have passed to allow all affected residents adequate time to remove their installed residential self-regenerating water softeners, (3) monitoring flows within the Community Sewer System to determine the locations of residential self-regenerating water softeners, and/or (4) conducting inspections upon reasonable notice of any residence that discharges to the Community Sewer System.

b) The Chief Engineer may issue a Notice of Violation to any Person who fails to remove a residential self-regenerating water softener as required by this Ordinance. A Notice of Violation shall allow a period of 60 days to correct the violation and to remove and dispose of the installed residential self-regenerating water softener. Any Person violating this Ordinance after issuance of Notice of Violation and the subsequent 60-day period shall pay an administrative fine to the District in an amount not to exceed $1,000.00 for such violation.

c) Any Person who has received a Notice of Violation may within 30 days request a hearing and review by a hearing officer of the District. The hearing shall be held within 30 days of the request. Following the hearing, the District's hearing officer may dismiss the violation or issue an Administrative Order for the imposition of an administrative fine and the removal of any installed appliance. Service of the Administrative Order may be made by personal delivery or by first class mail addressed to the Person at the address listed in the notice. An Administrative Order may be appealed in accordance with the provisions of Government Code Section 53069.4.

d) The owner of a residential self-regenerating water softener subject to administrative enforcement under this section may elect to have the District remove the residential self-regenerating water softener from the residence. The owner retains the right to compensation for 75% of the reasonable value of the residential self-regenerating water softener.

8. VIOLATION

Any Person who violates any of the provisions of this Ordinance following the issuance of a final Administrative Order under Section 7 is guilty of a misdemeanor punishable by a fine of not to exceed $1,000.00 or by imprisonment not to exceed 30 days or by both such fine and imprisonment. The amount of any such fine shall be first allocated to pay the District's costs of enforcement.

9. SEVERABILITY

If any provision of this Ordinance or the applicability thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this Ordinance that can be given effect without the invalid portion or application, and to that end the provisions of this Ordinance are severable.

10. REFERENDUM

Pursuant to California Health & Safety Code Section 116787(b), this Ordinance shall not be effective until it is approved by a majority vote of the qualified votes cast in a regularly scheduled election, held in the District's service area, in a referendum in accordance with applicable provisions of the Elections Code.

11. **EFFECTIVE DATE**

This Ordinance shall become effective 30 days from the date of final passage by the Board of Directors and subsequent approval by the voters pursuant to referendum, but no earlier than January 1, 2009.

Laurene Weste

PRO TEM Chairperson, Board of Directors
Santa Clarita Valley Sanitation District
of Los Angeles County

JUN 1 1 2008

ATTEST:

Kimberly S. Lopez

Clerk, Board of Directors
Santa Clarita Valley Sanitation District
of Los Angeles County

PASSED AND ADOPTED by the Board of Directors of the Santa Clarita Valley Sanitation District of Los Angeles County on June 11, 2008 by the following vote:

AYES: Directors Burke and Weste

NOES: None

ABSENT: Director Kellar

ABSTAIN: None

Kimberly S. Lopez

Secretary of the Board of Directors
Santa Clarita Valley Sanitation District
ofLos Angeles County

CITY OF FILLMORE ORDINANCE # 04-777

ORDINANCE PROHIBITING BRINE DISCHARGING WATER SOFTENING APPLIANCES IN NON-RESIDENTIAL APPLICATIONS AND PROHIBITING THE INSTALLATION IN RESIDENTIAL APPLICATIONS

The City Council of the City of Fillmore ordains as follows:

1. AUTHORIZATION

This Ordinance is enacted pursuant to the authority contained in Health and safety Code 116786.

2. PURPOSE

The purpose of this Ordinance is to protect the quality of the waters of the State including, but not limited to, protecting the beneficial uses of the Santa Clara River downstream of the City of Fillmore Wastewater Treatment Plant.

3. DEFINITIONS

The following definitions shall apply to the terms used in this Ordinance:

(a) "City" means the City of Fillmore, California. [12.04.020 (10)]
(b) "Non-residential" means any structure which is not included in the definition of residence as defined in this ordinance.
(c) "Non-residential brine discharging water softening appliance" means a water softening device located within or adjacent to a non-residential structure located within the City or which discharges into a community sewer system that is tributary to the sewer system owned and operated by the City, whereby the capacity of the appliance to remove hardness from water is renewed by the on-site application of a chloride salt-containing brine solution to the active softening or conditioning material contained therein, followed by a subsequent rinsing of the active softening or conditioning material.
(d) "Person" means any natural person, or any firm, association, joint venture, joint stock company, partnership, trust, estate, governmental entity, organization, club, company, corporation, business trust, or the manager, lessee, agent, servant, officer or employee of any of them. [12.04.020 (49)]
(e) "Regional Board" means the California Regional Water Quality Control Board, Los Angeles Region, created and exercising its powers pursuant to the Porter-Cologne Water Quality Control Act, California Water Code Sections 13000 et seq.
(f) "Residence" means a structure which is or is intended to be, in whole or in part, a place of dwelling, whether occupied or not, whether fully constructed or not, and includes, without limitation, homes, whether attached to another structure or not, apartments, condominiums and mobile homes.

(g) "Residential brine discharging water softening appliance" means a water softening device located within or adjacent to a residence located within the City or which discharges into a community sewer system that is tributary to the sewer system owned and operated by the City, whereby the capacity of the appliance to remove hardness from water is renewed by the on-site application of a chloride salt-containing brine solution to the active softening or conditioning material contained therein, followed by a subsequent rinsing of the active softening or conditioning material.

4. FINDINGS

(a) The state legislature has found and declared that pollution prevention should be the first step in a hierarchy for reducing pollution and managing wastes, and to achieve environmental stewardship for society.
(b) The City is not in compliance with waste discharge requirements issued by the Regional Board pursuant to Chapter 5.5 (commencing with Section 13370) of Division 7 of the Water Code.
(c) Limiting the availability, or prohibiting the installation, of brine discharging water softening appliances is a necessary means of achieving compliance with waste discharge requirements issued by the Regional Board.
(d) This ordinance adopts and the City will enforce regulatory requirements that prohibit the volumes and concentrations of saline discharges from non-residential sources in the community waste disposal system.

Findings 4 (b), (c) and (d) have been substantiated by an independent study of discharges from all sources of salinity, including, but not limited to, residential water softening or conditioning appliances, residential consumptive use, industrial and commercial discharges, and seawater or brackish water infiltration and inflow into the sewage collection system. This study has been made in accordance with the requirements of Section 116786(c) of the California Health and Safety Code. A copy of said study is on file at the City's administrative office, 250 Central Avenue, Fillmore, CA 93015-1907.

5. MEDICAL EXEMPTION

The City Manager shall have the authority to allow medical exemptions and may permit individual residential brine discharging water softeners provided that all of the following conditions are met:

a. The medical need for soft water is verified in writing by a physician.
b. The resident has a financial hardship which in the opinion of the City Manager precludes using canister softener service.

The City Manager shall have the authority to rescind medical exclusions if the City is in violation of State chloride discharge limits and in the opinion of the City Manager it is essential that the medical exemption be terminated. Such termination shall become effective 60 days after written notice from the City to the subject resident. ***All decisions***

by the City Manager regarding Section 5 of this Ordinance may be appealed to the City Council for reconsideration. Such appeals must be submitted in writing to the City Clerk within fourteen (14) days of the date of the City Manager's written decision.

6. PROHIBITION

(a) Residential -- No person shall install or in any manner assist in the installation of a residential brine discharging water softening appliance that discharges into the community sewer system owned and operated by the City or that discharges into a private sewer or community sewer system that is tributary to the sewer system owned and operated by the City or that discharges to land within the City.

(b) Non-Residential – All existing brine discharging water softeners in non-residential uses shall be removed within 120 days of the effective date of this ordinance. Hence forth no person shall install or in any manner assist in the installation of a brine discharging water softening appliance of any sort that discharges into the community sewer system owned and operated by the City or that discharges into a private sewer or community sewer system that is tributary to the sewer system owned and operated by the City or that discharges to land within the City.

7. VIOLATION

A violation of this Ordinance is a misdemeanor punishable by a fine not to exceed $1,000, imprisonment not to exceed thirty days or both.

8. ENFORCEMENT

The City Manager of the City shall administer, implement and enforce the provisions of this Ordinance. Any powers granted to or duties imposed upon the City Manager may be delegated to persons acting in the beneficial interest of or in the employ of the City.

9. SEVERABILITY

If any provision of this Ordinance or the applicability thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this Ordinance which can be given effect without the invalid portion or application, and to that end the provisions of this Ordinance are severable.

10. EFFECTIVE DATE

This Ordinance shall become effective thirty days from the date of final passage and shall be prospective in nature.

TOWN OF DISCOVERY BAY
COMMUNITY SERVICES DISTRICT
ORDINANCE NO. 24

AN ORDINANCE OF THE BOARD OF DIRECTORS
OF DISCOVERY BAY COMMUNITY SERVICES DISTRICT
ESTABLISHING BRINE DISCHARGING WATER SOFTENING
APPLIANCE USE REGULATION

Be it ordained by the Board of Directors of the Town of Discovery Bay Community Services District as follows:

SECTION 1. Short Title

This Ordinance shall be known and may be cited as Town of Discovery Bay Water Softening Regulation Ordinance.

SECTION 2. Purpose

The purpose of this Ordinance is to protect the health, safety and welfare for the Town of Discovery Bay Community Services District ("District") and its waterways through the regulation of the discharge of sodium, potassium, and chloride products into the District; to impose regulations regarding to compliance with requirements of the California Water Code and the California Health and Safety Code §116775 et seq. and to regulate the use of self-generating water softeners and sodium, potassium, and chloride based products.

SECTION 3. Definitions and Abbreviations

The following definitions shall apply to the terms used in this Ordinance:

"Authorized Office" means the District Manager and Engineer or any person designated by the District Board.

"Brine" means a heavily concentrated solution containing sodium, potassium, or chloride.

"District" means Town of Discovery Bay Community Services District.

"Person" means any individual, partnership, co-partnership, firm, company, corporation, association, joint stock company, trust, estate, governmental entity or any other legal entity, or its legal representatives, agents or assigns.

"Residence" means a structure which is or is intended to be, in whole or in part, a place of dwelling, whether occupied or not, whether fully constructed or not, and includes, without limitation, homes, whether attached to another structure or not, apartments, condominiums and mobile homes.

"Residential self-regenerating water softening appliance" means a water softening device located within or adjacent to a residence located within the District or which discharges into a community sewer system that is tributary to the sewer system owned and operated by the District, whereby the capability of the appliance to remove hardness from water is renewed by the on-site application of a chloride, potassium or similar slat-containing brine solution to the active softening or conditioning material contained therein, followed by a subsequent rinsing of the active softening or conditioning material.

SECTION 4. Regulations

No person shall install or in any manner assist in the installation of a residential or non-residential self-regenerating water softening appliance that discharges in to the District sewer system owned and operated by the District or that discharges into the District sewer system that is tributary to the sewer system owned and operated by the District.

New water softening devices installed for all users or structures shall be of a type and style as selected by the user at their expense, provided however that any such appliances or devises must comply with the terms and conditions of this Ordinance. Use of non-brine discharging water softening devices such as membrane or carbon systems are not prohibited by the District.

SECTION 5. Enforcement

The General Manager and the Engineer of the District shall administer, implement and enforce the provisions of this Ordinance. Any powers granted to or duties imposed upon the General Manager and District Engineer may be delegated to persons acting in the beneficial interest of or in the employ of the District.

SECTION 6. Violation

The District Manager or any other person designated by the Board, may issue a Notice of Violation to any person who fails to comply with any conditions of this Ordinance. A Notice of Violation shall allow a period of 30 days to correct the violation and/or to remove and dispose of the non-compliant self-regenerating water softener. Any person violating this Ordinance after issuance of a Notice of Violation and the subsequent 30-day period shall pay an administrative fine to the District in an amount of $_250_/month until such system is removed.

Any use or activity in violation of the terms of this Ordinance is declared to be a nuisance per se, and may be abated by order of any court of competent jurisdiction. The District Board, in addition to other remedies, may institute any appropriate action or proceedings to prevent, abate, or restrain the violation. All costs, fees and expenses in connection with such action shall be assessed as damages against the violation.

SECTION 7. Severability

The various parts, paragraphs, section and clauses of this Ordinance are declared to be severable. If any part, sentence, paragraph, section or clause is adjudged unconstitutional or invalid by a court of competent jurisdiction, the remainder of the Ordinance shall not be affected.

SECTION 8. Adoption and Effective Date

This Ordinance is hereby declared to have been adopted by the District Board at a meeting thereof duly called and held on the 8th day of January, 2014, and ordered to be given effect thirty (30) days after its first publication as mandated by statute.

CERFITICATION

Passed and adopted at a regular meeting of the Board of Directors of the Town of Discovery Bay Community Services District held on January 22, 2014 by the following vote:

Mark Simon
Board President

AYES: 5
NOES: Ø
ABSENT: Ø
ABSTAIN: Ø

Richard J. Howard
Board Secretary

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