CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER __

WASTE DISCHARGE REQUIREMENTS

FOR
CITY OF DIXON
DIXON WASTEWATER TREATMENT FACILITY
SOLANO COUNTY

The California Regional Water Quality Control Regional Board, Central Valley Region, (hereafter Central Valley Water Board) finds that:

1. On 27 November 2013, the City of Dixon submitted a Report of Waste Discharge (RWD) to apply for revised Waste Discharge Requirements (WDRs) for the existing wastewater treatment facility (WWTF) that serves the City of Dixon. Additional information to complete the RWD was submitted on 14 January, 7 February, 14 February, 24 February 2014, and 8 May 2014.

2. The City of Dixon (hereafter "Discharger") owns and operates the WWTF and is responsible for compliance with these Waste Discharge Requirements (WDRs).

3. The WWTF is at 6915 Pedrick Road in Dixon (Section 1, T6N, R1E; Sections 6 and 7, T6N, R2E MDB&M). The WWTF occupies Assessor's Parcel Numbers (APN) 14301-0040, 14301-0050, 14302-0080, and 14306-0060, as shown on Attachment A, which is attached hereto and made part of this Order by reference.

4. WDRs Order 94-187, adopted by the Central Valley Water Board on 24 June 1994, and Cease and Desist Order (CDO) R5-2008-0136, adopted by the Central Valley Water Board on 11 September 2008, prescribe requirements for the WWTF.

5. Cease and Desist Order R5-2008-0136 required the Discharger to implement salinity source control and complete WWTF improvements if necessary to comply with the Basin Plan and the 2008 CDO requirements. The Discharger has completed salinity source control efforts and now proposes to achieve compliance by upgrading the WWTF. Therefore, WDR Order 94-187 will be rescinded and replaced with this Order.

Existing Facility and Discharge

6. The City of Dixon WWTF has been in operation since 1952, currently serves a population of 18,500 residents, and has approximately 5,000 connections.

7. The existing headworks, influent pump, and the initial collection system including a 27-inch trunk line were constructed in 1952. The sewer system has since expanded to accommodate growth. A new 42-inch trunk line was constructed in 2003. Both trunk lines suffered from inflow and infiltration until the 42-inch trunk line was repaired and the 27-inch trunk line was isolated from service in April 2005. The Discharger plans to fully repair the 27-inch trunk line before bringing it back into service. As a result of

fixing the 42-inch trunk line and temporarily removing the 27-inch trunk line, inflow and infiltration has become negligible.

8. Wastewater is currently treated using nine stabilization treatment ponds and four polishing ponds. The ponds are unlined and have a total surface area of 122 acres. Treated wastewater is disposed using percolation basins that have a total surface area of 160 acres. The WWTF also has 120 acres of land application area but the fields have not been used for disposal since 2009.

9. The average annual influent flow has been less than 1.3 MGD since 2008 and the following table summarizes the influent character from 2013.

Constituent	Units	Average Concentration	Range
BOD	mg/L	380	120 to 990
Total Nitrogen	mg/L	70	n/a
Total Dissolved Solids	mg/L	610	320 to 700
Sodium	mg/L	140	110 to 350
Chloride	mg/L	110	53 to 140
Boron	mg/L	0.85	0.51 to 1.5

10. The influent wastewater includes flows from five industrial dischargers that make up approximately seven percent of the annual flow. The RWD states that three of the industries discharge an average biochemical oxygen demand (BOD) concentration of 50 mg/L.

11. The 2012 effluent character is summarized in the following table. Data from 2013 were not considered due to drought conditions and the fact that discharge to the percolation basins did not occur from July through December 2013.

Constituent	Units	Average Concentration	Range
BOD	mg/L	30	12 to 72
Total Nitrogen	mg/L	15	7 to 33
Total Dissolved Solids	mg/L	740	600 to 960
Sodium	mg/L	175	110 to 230
Chloride	mg/L	145	92 to 230
Boron	mg/L	1.05	0.75 to 1.5
Sulfate	mg/L	45	42 to 56

12. The current WWTF is designed to allow sludge to accumulate in the wastewater treatment ponds before it is removed for disposal. The RWD states that the majority of sludge accumulation has occurred in the first three treatment ponds (Pond 1, Pond 2, and Pond 3).

Compliance History

13. Prior to CDO R5-2008-0136, the City was previously regulated by CDO 96-152, CDO 97-193, and CDO R5-2005-0078. The previous CDOs required the Discharger to construct capacity improvements, address sewer inflow and infiltration (I/I) problems, and comply with groundwater limitations, particularly those related to salinity, which was determined to primarily be caused by residential and commercial self-regenerating water softeners. The City complied with the capacity and I/I requirements but did not take sufficient action resulting in full compliance with the 2005 CDO. Compliance with the 2005 CDO was partly hampered by a ratepayer initiative that prevented approval of a bond issue intended to fund the majority of planned compliance projects.

14. In September 2008, the Central Valley Water Board adopted CDO R5-2008-0136 due to noncompliance with CDO R5-2005-0078. The 2008 CDO provided site-specific numeric groundwater limitations based on an assessment of background groundwater quality data available at that time or the most stringent interpretation of narrative water quality objectives set forth in the Basin Plan, whichever was greater. Based on those limits, the findings of the CDO concluded that the City caused pollution for chloride, sodium, electrical conductivity (EC), total dissolved solids (TDS), and boron. The 2008 CDO set interim performance-based effluent limits for chloride (340 mg/L) and sodium (330 mg/L), and final effluent limits (effective 1 January 2014) for chloride (106 mg/L) and sodium (143 mg/L). The final effluent limits were based on the most stringent interpretation of the narrative water quality objective to protect agricultural beneficial uses of groundwater or the background groundwater concentration, whichever was greater. The 2008 CDO also set an average daily dry weather flow limit of 1.82 MGD based on the treatment, storage, and disposal capacity of the WWTF.

15. The Discharger stated that many residences and businesses use self-regenerating water softeners, and the discharge of brine accounted for a significant portion of salinity at the WWTF. Residential discharges alone were estimated to account for 40 to 50 percent of the total chloride load. The 2008 CDO required that the Discharger implement salinity source control, evaluate the effectiveness of the source control, submit progress reports, and submit a RWD if WWTF improvements were necessary to comply with the CDO requirements. The key requirements and due dates of the 2008 CDO are summarized in the following table.

Requirement	Due Date
Submit a *Salinity Source Study*.	30 September 2008
Adopt an Ordinance prohibiting installation of new self-regenerating water softeners.	30 November 2008
Adopt an Ordinance setting sodium and chloride limits for industrial and commercial sewer system dischargers.	30 November 2008
Submit a *Residential Salinity Source Control Plan* that describes measures and timelines to reduce sodium and chloride discharged to the sewer resulting from residential water softening.	30 April 2009
Submit a *Salinity Source Control Effectiveness Report*.	31 January 2012
Submit a RWD if WWTF improvements are necessary to comply with the CDO requirements	31 January 2013*
Submit a *Facilities Plan* if wastewater treatment facility improvements are necessary and will be financed by the State Revolving Fund loan program.	30 April 2014*
Comply with final effluent limits	1 January 2014*

* Due date was subsequently extended as discussed below.

The 2008 CDO allowed the Discharger to request re-evaluation of the groundwater limits and final effluent limits by providing an updated groundwater quality evaluation.

16. In a 30 January 2013 letter from the Executive Officer and pursuant to Item 11 of the 2008 CDO, the due dates of the RWD, *Facilities Plan*, and compliance with the final effluent limits were extended. The extension was based on the number of days that the Executive Officer's letter exceeded the 60-day response deadline after receiving the Discharger's *Salinity Source Control Effectiveness Report*. The extended due dates are tabulated below.

Requirement	Due Date
Submit a RWD if WWTF improvements are necessary to comply with the CDO requirements	30 November 2013
Submit a *Facilities Plan* if wastewater treatment facility improvements are necessary and will be financed by the State Revolving Fund loan program.	31 January 2014
Comply with final effluent limits	31 October 2014

17. All reports required by the 2008 CDO were submitted complete and on time. The Discharger has complied with the requirements of CDO R5-2008-0136 and has implemented a salinity source control program as follows:

    - Approximately 50 percent of the influent chloride load was identified to originate from self-regenerating water softeners. In November 2008, the Discharger passed ordinances that prohibit installation of self-regenerating water softeners and set industrial effluent limits for TDS, sodium, and chloride (800 mg/L, 107 mg/L, and 80 mg/L, respectively).
    - In late 2009, the Discharger worked with a new industrial discharger that accounts for about 4 percent of flow to the WWTF to achieve an average sodium concentration of 64 mg/L and 19 mg/L for chloride – well below the industrial effluent limit. The industrial discharger now utilizes potassium chloride for water softener regeneration, which results in about 400 percent higher cost compared to using sodium chloride. The Discharger states that it is not likely that all industrial dischargers could achieve the same results due to the cost.
    - The Discharger actively supported the passing of AB 1366, which allows local agencies to prohibit the installation of residential self-regenerating water softeners and require the removal of currently installed water softeners with a buyback program. The Discharger reports investing $650,000 in a water softener buyback program that began in October 2010 and has removed more than 600 self-regenerating water softeners. The buyback program ended in November 2012.
    - The Discharger performs routine sewer line monitoring for salinity to assess effectiveness of salinity control measures, verify compliance by industrial dischargers, and identify areas that require focus of the public outreach campaign.
    - The Discharger began working with the City's two water suppliers to install deeper wells and preferentially operate water wells with better quality to reduce salinity and hardness.

18. In January 2012, the Discharger submitted a *Source Control Effectiveness Report* as required by the CDO. The report shows that the Discharger's salinity source control efforts have been effective at reducing influent salinity concentrations. Using recent data through 2013, the influent TDS and chloride concentrations have been reduced by 18 percent and 23 percent, respectively. The influent sodium concentration has not changed and the influent boron concentration has unexpectedly increased by 35 percent, from 0.63 to 0.85 mg/L as an annual average. The boron increase is not associated with any changes in the domestic source water and the cause is not clear but may be associated with the removal of ion exchange water softeners. The following table summarizes the results of the Discharger's salinity source control efforts.

Constituent	2008 Influent Average Concentration (mg/L)	2013 Influent Average Concentration (mg/L)	Approximate Percent Change
Total Dissolved Solids	740	610	18% Decrease
Chloride	150	115	23% Decrease
Sodium	140	140	0%
Boron	0.63	0.85	35% Increase

19. Based on the results of the *Source Control Effectiveness Report* and the voluntarily submitted *Groundwater Characterization Report*, the Discharger concluded that source control alone was insufficient and that WWTF improvements are required to comply with the Basin Plan. The Discharger estimates that the large foot print of the treatment ponds and percolation basins causes salinity concentrations to increase by approximately 80 percent due to evapoconcentration from the time wastewater flows through treatment ponds until it percolates below the percolation basins.

20. In January 2014, the Discharger finalized and submitted a *WWTF Facilities Plan Report* that evaluated WWTF improvements and a range of other compliance alternatives and proposed a WWTF improvement project that will bring the facility into compliance with the Basin Plan and the CDO R5-2008-0136.

Planned Changes in the Facility and Discharge

21. The Discharger plans to decommission the 122 acres of treatment ponds and construct an activated sludge treatment system to minimize evapoconcentration of salts. The new system will contain two treatment trains operated in parallel. Each treatment train will consist of a concrete oxidation ditch and a secondary clarifier. The RWD states that evapoconcentration during treatment will be negligible. The activated sludge treatment system will be constructed in the northern area of the current wastewater ponds as shown on Attachment B. A flow schematic of the new system is shown on Attachment C. Both Attachment B and C are attached hereto and made part of this Order by reference.

22. Influent wastewater character is not expected to change except with respect to salinity and boron. The boron concentration may increase if residents use boron containing detergents to improve the cleaning efficiency of hard water and the loss of water softeners. Additionally, overall influent salinity could increase due to increased household water conservation. The following table compares current influent water quality (as an annual average from 2013), current effluent quality (as an annual average from 2012), and projected effluent character from the new wastewater treatment system. The effluent quality from 2013 was not used because discharge to the percolation basins did not occur after July 2013 due to drought conditions and there was no effluent to be sampled. The projected effluent quality for chloride and boron is

based on a statistical analysis of the annual average concentrations from 2012 and 2013 and accounts for an expected 20 percent increase due to water conservation and/or use of boron-containing cleaning products.

Constituent	Units	2013 Influent Concentration	2012 Effluent Concentration	Projected Effluent Concentration
BOD	mg/L	380	32	30
Nitrate-N	mg/L	70	15	10
Total Dissolved Solids	mg/L	610	740	640
Sodium	mg/L	140	175	150
Chloride	mg/L	110	145	150
Boron	mg/L	0.85	1.05	1.6

23. Flow equalization may be provided by an equalization basin after the treatment process. The basin may or may not be lined and will be maintained to prevent weed growth and rodent intrusion.

24. Treated wastewater will continue to be disposed in the existing percolation basins and/or former treatment /polishing ponds. The basins will be operated to maximize percolation and minimize evaporation. As a result of the new wastewater treatment system and improved operation of the percolation basins, the overall salinity increase due to evapoconcentration is expected to be reduced from 80 percent to 20 percent.

25. The Discharger has not used the 120 acres of former land application area (LAA) for effluent disposal since 2009 and does not plan to in the future. However, the Discharger may use the former LAA and/or the decommissioned treatment pond area to add additional percolation basins as operational backup of hydraulic capacity.

26. The RWD included a water balance based on reasonable estimates of influent flows, inflow and infiltration (I/I), precipitation, percolation, and evaporation. The water balance was used to model disposal capacity during a year with average precipitation followed by a 100-year, 365-day precipitation event. The model shows that the new WWTF will provide the capacities in the following table. During an average precipitation year, only one or two percolation basins will be needed. During a 100-year, 365-day precipitation event, the WWTF may need to use all eight percolation basins.

Influent Flow Measurement	Capacity
Total Annual Flow	701 MG
Average Annual Flow	1.92 MGD
Maximum Monthly Average Flow	2.0 MGD

27. Decommissioning the wastewater treatment ponds will require the removal of accumulated sludge. The sludge depth is estimated to be less than two feet in the first three ponds and the total accumulation is estimated to be about 2,000 dry tons. This Order requires the submittal of a pond closure workplan and closure report.

28. The new treatment system will use secondary clarifiers. Wasted sludge will be mechanically dewatered and further dewatering may occur seasonally using asphalt paved drying beds. Leachate and storm water runoff from the drying beds will be returned to the treatment system. Dried solids will be disposed of at a landfill or other approved disposal or reuse site.

Site-Specific Conditions

29. The Dixon community obtains its potable water supply from groundwater supply wells, which are owned and operated by two water service suppliers, California Water Service and Dixon-Solano Water Authority. The following table summarizes data from the 2012 California Water Service and Dixon-Solano Water Authority Drinking Water Quality Reports.

Constituent	Average Concentration (mg/L)	
	California Water Service	Dixon-Solano Water Authority
Total Dissolved Solids	385	392
Chloride	14.5	16
Sodium	50	54
Hardness	250	226
Boron[1]	--	--
Sulfate	28	34

[1] 2013 RWD states that the boron concentration in the source water averages approximately 0.46 mg/L.

-- = Not provided

30. The WWTF is relatively level at an approximate elevation of 40 feet mean sea level (MSL). Based on the FEMA flood insurance map, the WWTF is within the 100-year flood plain with an undetermined base flood elevation. The RWD states that the base flood elevation is 39.7 feet. All building slab elevations will be built at a minimum elevation of 40.7 feet and the berm crests of the percolation basins are at least two feet higher than the base flood elevation.

31. Soils at the site generally consist of clays and silty clay loams from the ground surface to 15 to 30 feet below ground surface.

32. The average annual precipitation for the site was determined using the average of two

nearby monitoring stations (Davis2 WSW and Vacaville) and found to be 21.24 inches. The 100 year return annual precipitation was calculated to be 44.6 inches using Gumbel's distribution method. The annual pan evaporation for the site is reported to be 81.7 inches per year based on data from the Davis1 WSW monitoring station.

33. Surrounding land use is primarily agricultural. The Discharger's site-specific water quality objective study surveyed 5,400 acres within one mile of the WWTF and found that alfalfa and mixed pasture crops make-up approximately 55 percent of the surveyed area. In decreasing order of percent area, other crops include corn, sunflowers, tomatoes, wheat, sudan, grapes, and almonds. These crops range from 18 percent to two percent of the surveyed area.

34. Irrigation water used for agriculture upgradient of the WWTF is primarily high quality surface water from Lake Berryessa supplied by Solano Irrigation District (SID). In the vicinity and downgradient of the WWTF irrigation water is mainly supplied by groundwater wells and previously used drainage water. The TDS concentration of SID irrigation water is approximately 50 mg/L and the TDS concentration from groundwater wells is approximately 1,000 mg/l.

Groundwater Conditions

35. The majority of the site is underlain by Holocene to Late Pleistocene alluvial sediments consisting of poorly sorted stream and basin deposits, ranging in size from clay to boulders. Mid Pleistocene alluvium is generally found along the western boundary of the project area and noted as being dissected/cut by erosional features. To a lesser degree, fingers of the Pliocene Tehama formation are also found in the southwestern portion of the site and composed of sand, silt, and volcaniclastic rocks.

36. The depth to groundwater in the vicinity of the WWTF ranges from 15 to 40 feet below ground surface. Groundwater elevation data from the California Department of Water Resources indicate that the local groundwater flow direction is generally from west northwest toward east southeast at a gradient of approximately 0.001.

37. Prior to the 2008 CDO, the Discharger's monitoring network contained 12 monitoring wells: TW-1, TW-2, TW-3, NW-2, SW-MWR, NE-MW, SE-MW, and MW-6 through MW-10. Groundwater monitoring wells are shown on Attachment D, which is attached hereto and made part of this Order by reference.

38. In 2007, the Discharger submitted a *Background Groundwater Quality Report* that provided a numerical assessment of background groundwater quality. In 2007, the report was amended based on comments from Central Valley Water Board staff and the numerical values were revised based on a statistical analysis of the 99 percent upper prediction limit (UPL) from individual background groundwater monitoring wells TW-1, NW-MW, or NW-2. Based on the results of this report, the 2008 CDO provided site-specific numeric groundwater limitations that satisfied the requirements of WDRs Order 94-187 and the 2005 CDO. The site-specific limitations were set at either the 99 percent UPL or the most stringent interpretation of narrative water quality objectives

set forth in the Basin Plan, whichever was greater. The following table summarizes these results.

Constituent	Units	2008 CDO Background Groundwater Quality (99% UPL)	2008 CDO Water Quality Objective	2008 CDO Site-specific Numeric Groundwater Limitation
Electrical conductivity	µmhos/cm	1,302	700	1,302
TDS	mg/L	808	450	808
Nitrate-N	mg/L	18.7	10	18.7
Boron	mg/L	0.65	0.7	0.7
Chloride	mg/L	50	106	106
Sodium	mg/L	143	69	143
Iron	mg/L	0.1	0.3	0.3
Manganese	mg/L	0.01	0.05	0.05
Barium	mg/L	0.345	1.0	1.0
Sulfate	mg/L	76	250	250

39. Based on the above site-specific groundwater limits, the 2008 CDO found that the discharge caused pollution or degradation for chloride, sodium, electrical conductivity (EC), total dissolved solids (TDS), and boron.

40. In January 2012 and in conjunction with the *Source Control Effectiveness Report*, the Discharger voluntarily submitted a *Groundwater Evaluation Report* that reevaluated background groundwater quality. The monitoring well network was expanded in 2010 by installing five new monitoring wells (MW-11 through MW-15). Existing monitoring wells SE-MW, MW-6, and MW-8 were over drilled, made deeper, and reconstructed to correct silting or casing problems and designed to be consistent with the new monitoring wells. Based on a tracer study, the report determined which monitoring wells best represent background groundwater to assess background groundwater quality and site-specific water quality objectives. The report identified the following wells to be representative of either background or downgradient groundwater quality.

Background Wells	Downgradient Wells
SW-MWR	SE-MW
MW-11	MW-6
MW-12	MW-7
MW-13	MW-8
MW-14	MW-9

Background Wells	Downgradient Wells
MW-15	MW-10

41. Limited duration pumping tests of monitoring wells NW-2, SW-MWR, MW-8, MW-9, and MW-10 indicate that the average hydraulic conductivity of sediments at the depth of the well screen is approximately 7.2×10^{-3} centimeters per second. This conductivity is typical of sands and silty sands and likely represents the transmission of groundwater typically occurring 15 to 30 feet below ground surface. The linear velocity of shallow groundwater underlying the site is estimated to be 25 feet per year based on an estimated porosity of 0.3 and a calculated hydraulic gradient of 0.001.

42. The shallow groundwater flow direction underlying the site varies seasonally and appears to be influenced by neighboring irrigation practices utilizing agricultural drainage waters and/or groundwater pumping for irrigation supply. The groundwater elevation gradient is typically to the east or northeast but has also been reported to be towards the north and northwest, which contrasts with the local east-southeast groundwater gradient.

43. Based on the groundwater monitoring wells identified in the 2012 *Groundwater Evaluation Report*, background groundwater quality is highly spatially variable. This spatial variability would typically warrant an intrawell analysis of compliance wells. However, the compliance wells were expected to already be impacted by the discharge and an intrawell analysis was not considered appropriate. Therefore, an interwell analysis was conducted by grouping the background monitoring well data to determine current background groundwater quality and evaluating if the discharge has caused degradation in the compliance wells. Background groundwater quality for each constituent of concern was determined using a nonparametric distribution and calculating the upper tolerance limit of the grouped background groundwater data with 95 percent confidence and 95 percent population coverage. This limit gives 95 percent confidence that 95 percent of future background groundwater samples will be below the calculated value. Non-detects were substituted using a random value less than the detection limit.

44. The table below shows the average concentration for each background monitoring well calculated from the second quarter of 2010 (when data was first collected from monitoring wells MW-11 through MW-15) through the fourth quarter of 2013. The table also shows the background groundwater quality value that was calculated using the upper tolerance limit described above.

Constituent	SW-MWR	MW-11	MW-12	MW-13	MW-14	MW-15	Background Groundwater Quality
Nitrate-N (mg/L)	24	31	14	11	51	9	61
TDS (mg/L)	1,280	830	960	1,310	1,410	1,430	1,600

Constituent	SW-MWR	MW-11	MW-12	MW-13	MW-14	MW-15	Background Groundwater Quality
Chloride (mg/L)	110	80	115	175	165	250	270
Sodium (mg/L)	235	95	120	215	160	85	280
Boron (mg/L)	0.35	0.25	0.75	0.60	0.35	0.70	0.8
Sulfate (mg/L)	280	100	145	205	130	385	410
Iron (mg/L)	<0.1*	<0.1	<0.1	<0.1	<0.1	<0.1	0.1
Manganese (mg/L)	<0.02*	<0.02	<0.02	<0.02	<0.02	<0.02	0.02

* One or more outliers were removed using the Thompson tau technique

45. In August 2013, the Discharger submitted a site-specific water quality objective workplan for boron to the Central Valley Salinity Alternatives for Long-term Sustainability (CV-SALTS) Technical Advisory Committee. In October 2013, the CV-SALTS Technical Advisory Committee issued a letter stating that they were in agreement with the workplan.

46. The Discharger submitted a boron study report in February 2014, and subsequent information thereafter, which recommends a site-specific agricultural water quality objective of 1.65 to 1.83 mg/L and provides a technical justification for the water quality objective. The Discharger also submitted a salinity study report using the same methodology described in the site-specific agricultural water quality objective workplan for boron. The salinity study report developed site-specific agricultural water quality objectives for total dissolved solids, chloride, and sodium based on assumed molar ratios to electrical conductivity and known electrical conductivity response curves. The resulting values were 1,500 mg/L for total dissolved solids, 880 mg/L for chloride, and 340 mg/L for sodium. The following table summarizes the municipal water quality objectives and the Discharger's proposed site-specific agricultural water quality objectives.

Constituent	Municipal WQO	Discharger Proposed Agricultural WQO
Nitrate-N (mg/L)	10[2]	--
TDS (mg/L)	500 – 1,500[3]	>1,500
Chloride (mg/L)	250 – 600[3]	>880
Sodium (mg/L)	NA	>340
Boron (mg/L)	NA	>1.65
Sulfate (mg/L)	250 – 600[3]	--
Iron (mg/L)	0.3[3]	--

Constituent	Municipal WQO	Discharger Proposed Agricultural WQO
Manganese (mg/L)	0.05[3]	--

[1] Municipal or agricultural WQO, whichever is lower.

[2] Primary MCL.

[3] Secondary MCL range or specified value.

NA = Not applicable

- - = Not proposed

47. On 11 April 2014, the CV-SALTS Technical Advisory Committee (TAC) issued comments about whether Discharger's site-specific boron and salinity water quality objective study reports meet the objectives of the workplan. The letter stated that, in general, all statements and assumptions need to be supported by literature citations and/or data. The letter also provided specific comments on the boron and salinity study reports, which can be summarized as follows:

    a. For boron, the letter states that the boron study should use methods to select sensitive commercial crops previously discussed by CV-SALTS. Therefore, sunflowers should be the crop under consideration rather than a crop rotation of wheat and beans, which was chosen by the Discharger in an effort to be more conservative in the absence of published sensitivity curves for sunflower.

    b. For salinity, the letter states that the proposed site-specific agricultural water quality objectives for sodium and chloride are too conservative and should not be considered as objectives. The values are likely lower than necessary to be protective of agricultural beneficial uses and may not be appropriate for other study areas. This Order uses the Discharger's proposed values as a basis for comparison to municipal water quality objectives and/or background ground quality to determine protective groundwater limits.

48. On 27 May 2014, the Discharger requested the CV-SALTS TAC for clarification on the use of sunflower to determine a site-specific agricultural water quality objective for boron. On 16 June 2014, the CV-SALTS Executive Committee submitted a letter stating that based on the available information and procedures specified in the Discharger's workplan, the Discharger's proposed boron concentration range of 1.65 to 1.83 mg/L would be protective of the 95 percent yield for sunflowers and that no additional information is required to finalize the boron study report. The CVSALTS TAC stated that it would be reasonably conservative to set the agricultural water objective at 1.65 mg/L to ensure that all agricultural beneficial uses are adequately protected.

49. The following table summarizes the site-specific water quality objectives, which is the lower value of either the municipal water quality objective or the agricultural water quality objective proposed by the Discharger and reviewed by CV-SALTS.

Constituent	Municipal WQO	Agricultural WQO	Site-specific WQO[1]
Nitrate-N (mg/L)	10[2]	--	10
TDS (mg/L)	500 – 1,500[3]	1,500	1,500
Chloride (mg/L)	250 – 600[3]	>880[4]	600
Sodium (mg/L)	NA	>340[4]	>340[4]
Boron (mg/L)	NA	1.65	1.65
Sulfate (mg/L)	250 – 600[3]	--	500[2]
Iron (mg/L)	0.3[3]	--	0.3
Manganese (mg/L)	0.05[3]	--	0.05

[1] Municipal or agricultural WQO, whichever is lower.

[2] Primary MCL.

[3] Secondary MCL range or specified value.

[4] Conservative value not recommended as a water quality objective; but can be used to determine protective groundwater limit.

NA = Not applicable

- - = Not proposed

50. The following table provides a comparison of the site-specific water quality objective, background groundwater quality, and each compliance well's worst case annual average concentration from 2010 through 2013.

Constituent	Site-specific WQO (mg/L)	Background Groundwater Quality (mg/L)	Maximum Annual Average Concentration (mg/L)					
			SE-MW	MW-6	MW-7	MW-8	MW-9	MW-10
Nitrate-N	10	61	30	<0.1	1.6	1.7	8.5	10.6
TDS	1,500	1,600	1530	1380	980	820	1120	880
Chloride	600	270	310	285	90	75	235	135
Sodium	>340[1]	280	235	105	200	115	120	150
Boron	1.65	0.8	0.7	1.0	1.5	1.0	0.7	0.7
Sulfate	500	410	330	370	120	115	130	155
Iron	0.3	<0.1	<0.1*	0.25	<0.1	<0.1	<0.1	<0.1
Manganese	0.05	<0.02	<0.02*	1.0	<0.02	0.06	<0.02	<0.02

[1] Conservative value not recommended as a water quality objective; but can be used to determine protective groundwater limit.

* One or more outliers were removed using the Thompson tau technique.

Degradation has occurred if the compliance well concentration exceeds the background

quality but not the site-specific water quality objective. Pollution has occurred if the compliance well exceeds both the background quality and the site-specific water quality objective. Monitoring well SE-MW shows degradation for chloride. Monitoring MW-6 shows degradation for boron, chloride, and iron and shows pollution for manganese. Monitoring well MW-7 shows degradation for boron. Monitoring well MW-8 shows degradation for boron and pollution for manganese.

51. In regard to monitoring well MW-6, the Discharger's quarterly groundwater monitoring reports have stated that the historically high concentration of sulfate and low concentration of sodium are not characteristic of the effluent. MW-6 also shows uncharacteristically high concentrations of manganese compared to the other monitoring wells. The Discharger's RWD states that local farmers apply gypsum, which is 39 percent sulfate by weight, as part of a multi-year crop rotation. On average, one ton of gypsum, which equates to approximately 800 pounds of sulfate, is estimated to be applied annually. Therefore, MW-6 is most likely impacted by background groundwater influences and not a reliable compliance monitoring well.

52. Since the reconstruction of monitoring well SE-MW in 2010, the Discharger's quarterly monitoring reports have noted an increasing trend in nitrate and sulfate. The report states that deepening this well likely resulted in a lesser fraction of percolated wastewater being present. As explained above, the increasing trend of sulfate is not likely a result of the discharge. The typical concentration of nitrate in this monitoring well is greater than the average concentration of total nitrogen in the effluent. It is unclear whether the increasing trend in nitrate degradation is a result of local agricultural influences on background groundwater or, potentially, the accumulation of biosolids in the treatment ponds.

53. Since the reconstruction of monitoring well MW-8 in 2010, the Discharger's quarterly monitoring reports have noted an increasing trend in manganese that has caused an exceedance of the site-specific water quality objective. The reports do not address the increasing trend but, similar to SE-MW, it is likely a result of a lesser fraction of percolated wastewater being present. Therefore, the apparent manganese pollution in MW-8 is not likely a result of the discharge.

54. Once the new wastewater treatment system is completed and operational, the improved effluent quality and reduced evapoconcentration is expected to decrease degradation with respect to chloride and boron over time.

Basin Plan, Beneficial Uses, and Regulatory Considerations

55. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins,* Fourth Edition (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Board. Pursuant to California Water Code section13263(a), waste discharge requirements must implement the Basin Plan.

56. Local drainage is to Dickson Creek, which is a tributary of the Sacramento San Joaquin Delta. The beneficial uses of the Sacramento San Joaquin Delta, as stated in the Basin Plan, are municipal and domestic supply; agricultural supply; industrial service supply; industrial process supply; navigation; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; wildlife habitat; migration of aquatic organisms; and spawning, reproduction, and/or early development.

57. The beneficial uses of underlying groundwater as set forth in the Basin Plan are municipal and domestic supply, agricultural supply, industrial service supply and industrial process supply.

58. The Basin Plan establishes narrative water quality objectives for chemical constituents, tastes and odors, and toxicity in groundwater. It also sets forth a numeric objective for total coliform organisms.

59. The Basin Plan's numeric water quality objective for bacteria requires that the most probable number (MPN) of coliform organisms over any seven-day period shall be less than 2.2 per 100 mL in MUN groundwater.

60. The Basin Plan's narrative water quality objectives for chemical constituents, at a minimum, require waters designated as domestic or municipal supply to meet the MCLs specified in Title 22 of the California Code of Regulations (hereafter Title 22). The Basin Plan recognizes that the Central Valley Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

61. The narrative toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, animal, plant, or aquatic life associated with designated beneficial uses.

62. Quantifying a narrative water quality objective requires a site-specific evaluation of those constituents that have the potential to impact water quality and beneficial uses. The Basin Plan states that when compliance with a narrative objective is required to protect specific beneficial uses, the Central Valley Water Board will, on a case-by-case basis, adopt numerical limitations in order to implement the narrative objective. This Order includes numerical limits to implement the narrative objectives that protect the agricultural beneficial use.

Antidegradation Analysis

63. State Water Resources Control Board Resolution 68-16 ("Policy with Respect to Maintaining High Quality Waters of the State") (hereafter Resolution 68-16) prohibits degradation of groundwater unless it has been shown that:

    a. The degradation is consistent with the maximum benefit to the people of the state.

b. The degradation will not unreasonably affect present and anticipated future beneficial uses.

c. The degradation does not result in water quality less than that prescribed in state and regional policies, including violation of one or more water quality objectives, and

d. The discharger employs best practicable treatment or control (BPTC) to minimize degradation.

64. Degradation of groundwater by some of the typical waste constituents associated with discharges from a municipal wastewater treatment facility, after effective source control, treatment, and control measures are implemented, is consistent with the maximum benefit to the people of the state. The technology, energy, water recycling, and waste management advantages of a municipal wastewater treatment facility far exceed any benefits derived from reliance on numerous, concentrated individual wastewater systems, and the impact on water quality will be substantially less. The economic prosperity of valley communities and associated industry is of maximum benefit to the people of the State, and provides sufficient justification for allowing the limited groundwater degradation that may occur pursuant to this Order.

65. The Discharger has been monitoring groundwater quality at the site since 1987. Based on the data available, it is not possible to determine pre-1968 groundwater quality. Therefore, determination of compliance with Resolution 68-16 for this facility must be based on existing background groundwater quality. Potential constituents of concern and water quality objectives are summarized in the following table and discussed below.

Constituent	Concentrations (mg/L)			
	Effluent [1]	Background Groundwater [2]	Compliance Monitoring Wells [3]	Site Specific Water Quality Objective
TDS	740	1,600	820 – 1,530	1,500 [4]
Sodium	175	280	115 – 235	>340 [5]
Chloride	145	270	75 – 310	600 [6]
Nitrate Nitrogen	--	61	1.6 – 30	10 [7]
Total Nitrogen	15	--	--	--
Boron	1.05	0.8	0.7 – 1.5	1.65
Sulfate	45	410	115 – 155	500 [7]
Iron	<0.05*	0.1	<0.1	0.3 [6]
Manganese	0.076	0.02	<0.02	0.05 [6]
Total Coliform Organisms	--	<1[+]	<1[+]	2.2 [9]

[1] 2012 average concentration.
[2] Upper tolerance limit of grouped background monitoring wells.
[3] Range of worst case annual averages from 2010 through 2013 in compliance wells MW-7 through M-10, and SE-MW. Sulfate excludes SE-MW. Manganese excludes MW-8.
[4] Discharger proposed agricultural water quality objective.

[5] Conservative value not recommended as a water quality objective; but can be used to determine protective groundwater limit.
[6] Secondary Maximum Contaminant Level.
[7] Primary Maximum Contaminant Level.
[8] Basin Plan numeric objective.
* One or more outliers were removed using the Thompson tau technique
\+ Detection of total coliform organisms have occurred but coincided with monitoring well installation, reconstruction, and/or do not show a historical trend and may be the result of cross contamination during sampling.

Based on the information tabulated above, the following constituents of concern have the potential to degrade groundwater.

a. **Total Dissolved Solids (TDS).** The annual average TDS concentration in compliance monitoring well SE-MW exceeds the water quality objective (1,500 mg/L) and has the potential to exceed the background quality concentration (1,600 mg/L). While the discharge appears to improve groundwater quality with respect to TDS in some monitoring wells, the discharge may pose a future threat to degrade groundwater quality without facility improvements as indicated by data from monitoring well SE-MW.

   The Discharger is planning to replace the wastewater treatment ponds with a treatment system that is concrete lined and that has a smaller foot print to reduce evapoconcentration. As a result, effluent quality with respect to TDS is expected to improve and subsequently improve groundwater quality over time. However, it is not possible to predict the level of improvement that can be achieved or when it might occur.

   The requirement to complete WWTF upgrades is included in a companion CDO, which sets a time schedule requiring the Discharger to complete the proposed improvements by December 2016 and be fully operational and in compliance with final effluent limits by June 2017. This Order sets a groundwater limit for TDS at the current background groundwater quality of 1,600 mg/L.

b. **Chloride.** Monitoring well SE-MW has the highest annual average chloride concentration (310 mg/L), which exceeds background water quality (270 mg/L) but not the water quality objective, which is the secondary maximum contaminant level of 600 mg/L. As described earlier, this indicates the discharge is causing degradation of groundwater with respect to chloride, but not an exceedance of the water quality objective. Monitoring data indicate that chloride follows a similar trend as TDS and that limiting the chloride concentration will also limit the TDS concentration.

   The Discharger is planning to replace the wastewater treatment ponds with a treatment system that is concrete lined and has a smaller foot print to reduce evapoconcentration. As a result, effluent quality with respect to chloride is expected to improve and subsequently improve groundwater quality over time. However, it is not possible to predict the level of improvement that can be achieved or when it might occur.

   The requirement to complete WWTF upgrades is included in a companion CDO, which sets a time schedule requiring the Discharger to complete the proposed

improvements by December 2016 and be fully operational and in compliance with final effluent limits by June 2017.

This Order sets interim and final effluent limits on chloride. The interim effluent limit of this Order does not allow the chloride concentration to increase over the performance of the current system. The final effluent limit of this Order does not allow the chloride concentration to exceed the expected performance of the new wastewater treatment system. This Order sets a groundwater limit for chloride that is equal to the site-specific water quality objective of 600 mg/L.

c. **Sodium.** The discharge appears to improve groundwater quality with respect to sodium. The sodium concentration in all compliance monitoring wells is below background quality and the proposed water quality objective, and therefore, does not pose a potential threat to groundwater. The Discharger's proposed agricultural water quality objective for sodium is considered to be conservative by CV-SALTS. However, the proposed water quality objective is appropriate as a groundwater limit to protect all beneficial uses.

d. **Nitrate.** For nutrients such as nitrate, the potential for degradation depends not only on the quality of the treated effluent, but the ability of the vadose zone below the effluent disposal ponds to provide an environment conducive to nitrification and denitrification to convert the effluent nitrogen to nitrate and the nitrate to nitrogen gas before it reaches the water table. The discharge appears to improve groundwater quality with respect to nitrate. The effluent total nitrogen concentration currently averages 15 mg/L and the background groundwater nitrate-nitrogen concentration is 61 mg/L. All compliance monitoring wells also have annual average concentrations less than the background quality.

The Discharger is planning to replace the wastewater treatment ponds with a treatment system that is more efficient at denitrification and removal of nitrogen. The total nitrogen effluent quality of the newly constructed WWTF is expected to improve to 10 mg/L. Therefore, the discharge is not likely to cause or contribute to the pollution.

The requirement to complete WWTF upgrades is included in a companion CDO, which sets a time schedule requiring the Discharger to complete the proposed improvements by December 2016 and be fully operational and in compliance with final effluent limits by June 2017.

This Order sets interim and final effluent limits for total nitrogen. The interim effluent limit of this Order does not allow the total nitrogen concentration to increase over the performance of the current system. The final effluent limit of this Order does not allow the effective nitrate-nitrogen concentration to exceed the water quality objective.

e. **Boron.** Monitoring wells MW-6, MW-7, and MW-8 have annual average boron concentrations that exceed background water quality (0.8 mg/L). As described earlier, MW-6 is not an adequate compliance monitoring well. However, the concentrations of boron in MW-7 and MW-8 indicate the discharge may be causing degradation of groundwater with respect to boron.

The Discharger is planning to replace the wastewater treatment ponds with a treatment system that is concrete lined and that has a smaller foot print to reduce evapoconcentration. As a result, effluent quality with respect to boron is expected to improve and subsequently improve groundwater quality over time. However, it is not possible to predict the level of improvement that can be achieved or when it might occur.

This Order sets interim and final boron effluent limits and a groundwater limit to prevent exceedance of the water quality objective. The requirement to complete the WWTF upgrades are included in a companion CDO, which sets a time schedule requiring the Discharger to complete the proposed improvements by December 2016 and be fully operational and in compliance with final effluent limits by June 2017.

The Discharger states that residential use of boron-containing detergents may cause an increase in the influent and effluent boron concentration. Currently, there are only two years of representative effluent data. The Discharger used these data and estimated 20 percent increase due to water conservation to project an expected effluent boron concentration of 1.6 mg/L. Two years of data is insufficient to be able to establish a performance based effluent limit. Therefore, a boron effluent limit of 1.4 mg/L is set in this Order to protect the 1.65 mg/L boron groundwater quality objective while accounting for an expected 20 percent concentration increase due to evapoconcentration. The Discharger is currently able to comply with this limit but may need to implement further source control if the effluent boron concentration increases.

f. **Sulfate.** The annual average concentration of sulfate in the compliance monitoring wells is less than the background groundwater quality (410 mg/L) and proposed water quality objective (500 mg/L). As described earlier, the compliance monitoring wells with the highest sulfate concentration are either not an adequate compliance well (MW-6) or show an increase in sulfate concentration that coincide with well construction alterations (SE-MW). Additionally, the sulfate concentration in these wells greatly exceeds the effluent sulfate concentration. Therefore, sulfate is not considered to be a constituent of concern that has the potential to cause groundwater degradation.

g. **Iron.** Monitoring well MW-6 is the only compliance well that has detectable iron concentrations. The annual average concentration exceeds background water quality (0.1 mg/L) but not the proposed water quality objective (0.3 mg/L), which indicates degradation of groundwater quality. However, MW-6 is not an adequate compliance monitoring well as described earlier. Therefore, iron is not considered to be a constituent of concern that has the potential to cause groundwater degradation.

h. **Manganese.** Monitoring wells MW-6 and MW-8 have annual average manganese concentrations that exceed background water quality (0.02 mg/L) and the proposed water quality objective (0.05 mg/L), which indicates pollution of groundwater quality. As described earlier, MW-6 is not an adequate compliance monitoring well and the manganese concentration increase in MW-8 coincides with well construction alterations. The remaining compliance wells have undetectable concentrations of manganese. Therefore, manganese is not considered to be a constituent of concern that has the potential to cause groundwater degradation.

i. **Total Coliform Organisms.** For coliform organisms, the potential for exceedance of the Basin Plan's numeric water quality objective depends on the ability of vadose zone soils below the effluent storage/disposal ponds and saturated soils within the shallow water bearing zone to provide adequate filtration. Detection of total coliform organisms has occurred but coincided with monitoring well reconstruction and/or do not show a historical trend and may be the result of cross contamination during sampling.

The Discharger is planning to replace the wastewater treatment ponds with a treatment system that is concrete lined and the soil underlying the percolation basins, which consists of clays and silty clay loams is expected to filter out coliform organisms and to prevent groundwater degradation.

66. This Order establishes effluent and groundwater limitations for the WWTF that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan.

For total dissolved solids, sodium, nitrate, sulfate, iron, manganese, and total coliform organisms, current groundwater monitoring data indicate that groundwater has not been degraded beyond background groundwater quality by the previous discharge and that the future discharge does not pose a threat of degradation in the future. The requirements of this Order do not allow exceedance of a water quality objective.

For chloride and boron, current groundwater monitoring data indicate that groundwater has been degraded by the previous discharge but the degradation has not caused exceedance of a water quality objective. The Discharger has implemented treatment and control measures and is proposing further measures that when completed would be considered best practicable treatment or control (BPTC), so the degradation is allowable under Resolution 68-16.

67. The Discharger has implemented and is proposing treatment and control of the discharge that incorporates:

a. Installing deeper municipal supply wells and preferentially operating water supply wells with better quality to reduce salinity and hardness.

b. Prohibiting the installation of residential self-regenerating water softeners.

c. Investing $650,000 in a buyback program that removed more than 600 existing self-regenerating water softeners.

d. Setting TDS, sodium, and chloride effluent limits on industrial dischargers.

e. Performing routine sewer line monitoring for salinity to assess effectiveness of salinity control measures, verify compliance by industrial dischargers, and identify areas that require focus of a public outreach campaign.

f. Repairing sewer trunk lines that suffer from infiltration of agricultural percolate water that is high in salinity.

g. Proposing a new wastewater treatment design that minimizes evapoconcentration to reduce effluent salinity concentrations and is more effective at removing nitrogen.

68. All but one of the requirements from CDO R5-2008-0136 have been completed. The remaining CDO R5-2008-0136 requirement to finish WWTF upgrades still needs to be completed. It is therefore appropriate for the Board to rescind CDO Order R5-2008-0136 and issue a companion Cease and Desist Order that will set forth an enforceable schedule to complete the proposed improvements and any other work needed to ensure that the discharge will not impact the beneficial uses of groundwater. The Board has the obligation to ensure that this compliance period will be as short as practicable. The companion CDO sets a time schedule requiring the Discharger to complete the proposed improvements by December 2016 and be fully operational and in compliance with final effluent limits by August 2017.

Other Regulatory Considerations

69. In compliance with Water Code section 106.3, it is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This order promotes that policy by requiring discharges to meet maximum contaminant levels designed to protect human health and ensure that water is safe for domestic use.

70. Based on the threat and complexity of the discharge, the facility is determined to be classified as 2B as defined below:

a. Category 2 threat to water quality: “Those discharges of waste that could impair the designated beneficial uses of the receiving water, cause short-term violations of water quality objectives, cause secondary drinking water standards to be violated, or cause a nuisance.”

b. Category B complexity, defined as: “Any discharger not included [as Category A] that has physical, chemical, or biological treatment systems (except for septic systems with subsurface disposal) or any Class 2 or Class 3 waste management units.”

71. Title 27 of the California Code of Regulations (hereafter Title 27) contains regulatory requirements for the treatment, storage, processing, and disposal of solid waste. However, Title 27 exempts certain activities from its provisions. Discharges regulated by this Order are exempt from Title 27 pursuant to provisions that exempt domestic sewage, wastewater, and reuse. Title 27, section 20090 states in part:

> The following activities shall be exempt from the SWRCB-promulgated provisions of this subdivision, so long as the activity meets, and continues to meet, all preconditions listed:
>
> (a) Sewage - Discharges of domestic sewage or treated effluent which are regulated by WDRs issued pursuant to Chapter 9, Division 3, Title 23 of this code, or for which

> WDRs have been waived, and which are consistent with applicable water quality objectives, and treatment or storage facilities associated with municipal wastewater treatment plants, provided that residual sludges or solid waste from wastewater treatment facilities shall be discharged only in accordance with the applicable SWRCB-promulgated provisions of this division.
>
> (b) Wastewater - Discharges of wastewater to land, including but not limited to evaporation ponds, percolation ponds, or subsurface leachfields if the following conditions are met:
>
> (1) the applicable RWQCB has issued WDRs, reclamation requirements, or waived such issuance;
>
> (2) the discharge is in compliance with the applicable water quality control plan; and
>
> (3) the wastewater does not need to be managed according to Chapter 11, Division 4.5, Title 22 of this code as a hazardous waste.
>
> (…)

72. The discharge authorized herein (except for the discharge of residual sludge and solid waste), and the treatment and storage facilities associated with the discharge, are exempt from the requirements of Title 27 as follows:

    a. The oxidation ditch and clarifiers are exempt pursuant to Title 27, section 20090(a) because they are treatment and storage facilities associated with a municipal domestic wastewater treatment plant.

    b. The percolation basins are exempt pursuant to Title 27, section 20090(b) because they are wastewater percolation ponds and:

        i. The Central Valley Water Board is issuing WDRs.

        ii. The discharge is in compliance with the Basin Plan, and;

        iii. The treated effluent discharged to the ponds does not need to be managed as hazardous waste.

73. The U.S. EPA published *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (hereafter "Unified Guidance") in 2009. As stated in the Unified Guidance, the document .

> …is tailored to the context of the RCRA groundwater monitoring regulations … [however, t]here are enough commonalities with other regulatory groundwater monitoring programs … to allow for more general use of the tests and methods in the Unified Guidance… Groundwater detection monitoring involves either a comparison between different monitoring stations … or a contrast between past and present data within a given station… The Unified Guidance also details methods to compare background data against measurements from regulatory compliance points … [as well as] techniques for comparing datasets against fixed numerical standards … [such as those] encountered in many regulatory programs.

The statistical data analysis methods in the Unified Guidance are appropriate for determining whether the discharge complies with Groundwater Limitations of this Order.

74. The State Water Board adopted Order 97-03-DWQ (NPDES General Permit CAS000001) specifying waste discharge requirements for discharges of storm water associated with industrial activities, and requiring submittal of a Notice of Intent by all affected industrial dischargers. The wastewater treatment facility has a design capacity of more than 1.0 MGD and the Discharger is not covered under Order 97-03-DWQ. This Order requires the Discharger to submit either a Notice of Non-Applicability, an application for a No Exposure Certification, or a Notice of Intent to comply with State Board Water Quality Order No. 97-03-DWQ for discharges of storm water from the facility.

75. On 2 May 2006, the State Water Board adopted Statewide General Waste Discharge Requirements for Sanitary Sewer Systems General Order 2006-0003-DWQ (the General Order). The General Order requires all public agencies that own or operate sanitary sewer systems greater than one mile in length to comply with the Order. The Discharger's collection system exceeds one mile in length and the Discharger is enrolled under the General Order.

76. Water Code section 13267(b) states:

> In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of discharging, or who proposes to discharge within its region … shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

The technical reports required by this Order and the attached Monitoring and Reporting Program __ are necessary to ensure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

77. The California Department of Water Resources sets standards for the construction and destruction of groundwater wells (hereafter DWR Well Standards), as described in *California Well Standards Bulletin 74-90* (June 1991) and *Water Well Standards: State of California Bulletin 94-81* (December 1981). These standards, and any more stringent standards adopted by the state or county pursuant to Water Code section 13801, apply to all monitoring wells used to monitor the impacts of wastewater storage or disposal governed by this Order.

78. The action to adopt waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality (CEQA), in accordance with the California Code of Regulations, title 14, section 15301.

79. A Mitigated Negative Declaration was certified by the City of Dixon on 11 March 2014 in accordance with the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). The Mitigated Negative Declaration describes the project as construction of secondary treatment at the WWTF. Secondary treatment will be provided by replacing the existing treatment ponds with a nitrifying/denitrifying activated sludge process. Construction will include a new influent pump station, a headworks with mechanical screening and flow measurement, and a new potable well. Flow equalization may be provided by constructing an equalization basin post treatment. Upgrades of piping and pumping capacities throughout the WWTF and disposal area will be included. Construction is scheduled to begin in spring 2015.

80. The Mitigated Negative Declaration evaluated the potential impacts to groundwater quality and found that operation of the new wastewater treatment system will improve water quality. Sources of contamination may occur with maintenance and operation of equipment that require use of hazardous materials such as engine oil and gasoline. During construction, additional sources of polluted discharge may be present such as hazardous material and sediment. Implementation of best management practices or a spill prevention control and countermeasure plan will mitigate the potential of contamination and reduce impacts to less than significant.

81. The United States Environmental Protection Agency (EPA) has promulgated biosolids reuse regulations in 40 CFR 503, *Standard for the Use or Disposal of Sewage Sludge,* which establishes management criteria for protection of ground and surface waters, sets application rates for heavy metals, and establishes stabilization and disinfection criteria.

82. The Central Valley Water Board is using the Standards in 40 CFR 503 as guidelines in establishing this Order, but the Central Valley Water Board is not the implementing agency for 40 CFR 503 regulations. The Discharger may have separate and/or additional compliance, reporting, and permitting responsibilities to the EPA.

83. Pursuant to Water Code section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

Public Notice

84. All the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, were considered in establishing the following conditions of discharge.

85. The Discharger and interested agencies and persons have been notified of the Central Valley Water Board's intent to prescribe waste discharge requirements for this

discharge, and they have been provided an opportunity to submit written comments and an opportunity for a public hearing.

86. All comments pertaining to the discharge were heard and considered in a public hearing.

IT IS HEREBY ORDERED that Order 94-187 is rescinded, and, pursuant to Water Code sections 13263 and 13267, the City of Dixon, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the Water Code and regulations adopted hereunder, shall comply with the following:

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.

2. Discharge of waste classified as 'hazardous', as defined in the California Code of Regulations, title 23, section 2510 et seq., is prohibited.

3. Treatment system bypass of untreated or partially treated waste is prohibited, except as allowed by Standard Provision E.2 of the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements*.

4. Discharge of waste at a location or in a manner different from that described in the Findings is prohibited.

5. The Discharger shall not allow toxic substances to be discharged into the wastewater treatment system such that biological treatment mechanisms are disrupted is.

B. Flow Limitations

1. **Effectively immediately**, influent flows to the WWTF shall not exceed the following interim limits:

Flow Measurement	Flow Limit
Total Annual Flow [1]	701 MG
Average Annual Flow [2]	1.92 MGD

[1] As determined by the total flow for the calendar year.

[2] As determined by the total flow for the months of June through August, inclusive, divided by 92 days.

C. Effluent Limitations

1. **Effective immediately and continuing through 30 June 2017**, effluent discharged to the percolation basins shall not exceed the following limits:

Constituent	Units	Limit	Basis of Compliance Determination
BOD_5 [1]	mg/L	50	Monthly average
BOD_5 [1]	mg/L	80	Monthly maximum
Total nitrogen	mg/L	25	Flow-weighted annual average
Chloride	mg/L	200	Flow-weighted annual average
Boron	mg/L	1.2	Flow-weighted annual average

[1] 5-day biochemical oxygen demand at 20˚C.

2. **Effective 1 July 2017**, effluent discharged to the percolation basins shall not exceed the following final limits:

Constituent	Units	Limit	Basis of Compliance Determination
BOD_5 [1]	mg/L	30	Monthly average
BOD_5 [1]	mg/L	50	Monthly maximum
Nitrate nitrogen	mg/L	10	Flow-weighted monthly average
Total Kjeldahl Nitrogen	mg/L	3	Flow-weighted monthly average
Chloride	mg/L	150	Flow-weighted annual average
Boron	mg/L	1.4	Flow-weighted annual average

[1] 5-day biochemical oxygen demand at 20˚C.

The flow-weighted annual average concentration for total nitrogen, chloride, and boron shall be calculated using the following formula:

$$C_a = \frac{\sum_{1}^{12}(C_i \times V_i)}{\sum_{1}^{12}(V_i)}$$

Where: C_a = Flow-weighted average annual constituent concentration in mg/L.

$_i$ = The number of the month (e.g., January = 1, February = 2, etc.).

C_i = Monthly average effluent concentration for calendar month *i* in mg/L.

V_i = Volume of effluent discharged to the percolation basins during calendar month *i* in million gallons.

D. Discharge Specifications

1. No waste constituent shall be released, discharged, or placed where it will cause violation of the Groundwater Limitations of this Order.

2. Wastewater treatment, storage, and disposal shall not cause pollution or a nuisance as defined by Water Code section 13050.

3. The discharge shall remain within the permitted waste treatment/disposal structures at all times.

4. The Discharger shall operate all systems and equipment to optimize the quality of the discharge.

5. All conveyance, treatment, storage, and disposal systems shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

6. Public contact with wastewater shall be prevented through such means as fences, signs, or acceptable alternatives.

7. Objectionable odors shall not be perceivable beyond the limits of the WWTF property at an intensity that creates or threatens to create nuisance conditions.

8. As a means of discerning compliance with Discharge Specification D.8, the dissolved oxygen (DO) content in the upper one foot of any wastewater treatment, storage, or disposal pond shall not be less than 1.0 mg/L for three consecutive weekly sampling events. If the DO in any single pond is below 1.0 mg/L for three consecutive sampling events, the Discharger shall report the findings to the Regional Water Board in writing within 10 days and shall include a specific plan to resolve the low DO results within 30 days.

9. The Discharger shall operate and maintain all ponds sufficiently to protect the integrity of containment dams and berms and prevent overtopping and/or structural failure. Unless a California-registered civil engineer certifies (based on design, construction, and conditions of operation and maintenance) that less freeboard is adequate, the operating freeboard in any pond shall never be less than two feet (measured vertically from the lowest possible point of overflow). As a means of management and to discern compliance with this requirement, the Discharger shall install and maintain in each pond a permanent staff gauge with calibration marks that clearly show the water level at design capacity and enable determination of available operational freeboard.

10. Wastewater treatment, storage, and disposal ponds or structures shall have sufficient capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary inflow and infiltration during the winter while ensuring continuous compliance with all requirements of this Order. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.

11. On or about **1 October** of each year, available capacity shall at least equal the volume necessary to comply with Discharge Specifications D.10 and D.11.

12. All ponds and open containment structures shall be managed to prevent breeding of mosquitoes. Specifically:

    a. An erosion control program shall be implemented to ensure that small coves and irregularities are not created around the perimeter of the water surface.

    b. Weeds shall be minimized through control of water depth, harvesting, or herbicides.

    c. Dead algae, vegetation, and debris shall not accumulate on the water surface.

    d. The Discharger shall consult and coordinate with the local Mosquito Abatement District to minimize the potential for mosquito breeding as needed to supplement the above measures.

13. Newly constructed or rehabilitated berms or levees (excluding internal berms that separate ponds or control the flow of water within a pond) shall be designed and constructed under the supervision of a California Registered Civil Engineer.

14. Wastewater contained in any unlined pond shall not have a pH less than 6.0 or greater than 9.0 as a weekly average.

E. Groundwater Limitations

Release of waste constituents from any portion of the WWTF shall not cause groundwater to:

1. Contain any of the specified constituents in a concentration statistically greater than the maximum allowable concentration tabulated below. The wells to which these requirements apply are specified in the Monitoring and Reporting Program.

Constituent	Units	Groundwater Limit [1]
Nitrate-N	mg/L	No temporal increase [2]
TDS	mg/L	1,600
Chloride	mg/L	600

Sodium	mg/L	340
Boron	mg/L	1.65

[1] Applies to all compliance monitoring wells listed in the Monitoring and Reporting Program.
[2] Temporal increase is defined as an increase relative to the 2013 annual average concentration for each individual compliance well.

2. For all compliance monitoring wells, exceed a total coliform organism level of 2.2 MPN/100 mL over any seven-day period.

3. For all compliance monitoring wells, except as specified in E.1 above, contain constituents in concentrations that exceed either the Primary or Secondary MCLs established in Title 22 of the California Code of Regulations.

4. For all compliance monitoring wells, except as specified in E.1 above, contain taste or odor-producing constituents, toxic substances, or any other constituents in concentrations that cause nuisance or adversely affect beneficial uses.

Compliance with these limitations shall be determined anually based on comparison of compliance well concentrations to the above specified limits using approved statistical methods.

F. Solids Disposal Specifications

Sludge, as used in this document, means the solid, semisolid, and liquid residues removed during primary, secondary, or advanced wastewater treatment processes. Solid waste refers to grit and screenings generated during preliminary treatment. Residual sludge means sludge that will not be subject to further treatment at the WWTF. Biosolids refers to sludge that has been treated and tested and shown to be capable of being beneficially used as a soil amendment for agriculture, silviculture, horticulture, and land reclamation activities pursuant to federal and state regulations .

1. Sludge and solid waste shall be removed from screens, sumps, ponds, and clarifiers as needed to ensure optimal plant operation.

2. Any handling and storage of residual sludge, solid waste, and biosolids at the WWTF shall be temporary (i.e., no longer than twelve months) and controlled and contained in a manner that minimizes leachate formation and precludes infiltration of waste constituents into soils in a mass or concentration that will violate the groundwater limitations of this Order.

3. Residual sludge, biosolids, and solid waste shall be disposed of in a manner approved by the Executive Officer and consistent with Title 27, division 2. Removal for further treatment, disposal, or reuse at disposal sites (i.e., landfills, WWTFs, composting sites, soil amendment sites) operated in accordance with valid waste discharge requirements issued by a Regional Water Board will satisfy this specification.

4. Use of biosolids as a soil amendment shall comply with valid waste discharge requirements issued by a regional water board or the State Water Board except in cases where a local (e.g., county) program has been authorized by a regional water board. In most cases, this will mean the General Biosolids Order (State Water Resources Control Board Water Quality Order 2004-12-DWQ, "General Waste Discharge Requirements for the Discharge of Biosolids to Land for Use as a Soil Amendment in Agricultural, Silvicultural, Horticultural, and Land Reclamation Activities"). For a biosolids use project to be covered by Order 2004-12-DWQ, the Discharger must file a complete Notice of Intent and receive a Notice of Applicability for each project.

5. Use and disposal of biosolids shall comply with the self-implementing federal regulations of 40 Code of Federal Regulations part 503, which are subject to enforcement by the U.S. EPA, not the Central Valley Water Board. If during the life of this Order, the State accepts primacy for implementation of part 503, the Central Valley Water Board may also initiate enforcement where appropriate.

6. Any proposed change in sludge use or disposal practice shall be reported in writing to the Executive Officer at least 90 days in advance of the change.

G. Provisions

1. The following reports shall be submitted pursuant to Water Code section 13267 and shall be prepared as described in Provision G.4:

   a. By **1 October 2014**, the Discharger shall submit either a Notice of Non-Applicability, an application for a No Exposure Certification, or a Notice of Intent to comply with State Board Water Quality Order No. 97-03-DWQ for discharges of storm water from the facility.

   b. By **1 December 2014**, the Discharger shall submit a *Groundwater Limitations Compliance Assessment Plan*. The plan shall describe and justify the statistical methods used to evaluate compliance with Groundwater Limitation E.1 of this Order for the specified compliance wells and constituents. Compliance shall be determined using appropriate statistical methods that have been selected based on site-specific information and the U.S. EPA Unified Guidance document cited in Finding 73 of this Order. The report shall explain and justify the selection of the appropriate statistical methods.

   c. By **20 January 2015**, the Discharger shall submit a *Wastewater Pond Closure Plan* that describes the proposed plan to close the existing unlined wastewater treatment ponds. The plan shall identify which ponds will be backfilled for construction of the new WWTF or converted to storm water collection basins. The closure plan shall describe the specific means that will be implemented to prevent percolation of residual waste constituents in the soil underlying the former wastewater ponds, including proposed procedures to remove sludge and waste-containing sediments, provide verification of waste removal, plans for

disposal of those materials, and plans, if any, for placement of clean fill or other lining material to reduce the percolation rate beneath the former pond(s).

d. By **1 September 2015**, if the *Wastewater Pond Closure Plan* identifies ponds that will be backfilled prior to construction of the new WWTF, the Discharger shall submit a *Pond Closure Report* that documents implementation of the approved *Wastewater Pond Closure Plan*, provides results of any analyses performed to characterize soil/sludge removed from the ponds, and describes the sludge disposal method and location. If the work deviated from the approved workplan, the report shall explain and justify the deviations.

e. By **1 September 2018**, the Discharger shall submit a *Pond Closure Report* for all remaining wastewater treatment ponds that were not closed by September 2015. The report shall document implementation of the approved *Wastewater Pond Closure Plan*, provide results of any analyses performed to characterize soil/sludge removed from the ponds, and describe the sludge disposal method and location. If the work deviated from the approved workplan, the report shall explain and justify the deviations.

f. **At least 60 days after** installing an additional percolation basin within the area of the current treatment ponds or former LAAs, the Discharger shall submit a *Percolation Basin Construction Report* that describes the location, as-built geometry, and means to maintain and measure freeboard. The report must state which groundwater monitoring wells will monitor background groundwater and groundwater downgradient of the new percolation basin.

2. If groundwater monitoring results show that the discharge of waste is causing groundwater to contain any waste constituents in concentrations statistically greater than the Groundwater Limitations of this Order, within 120 days of the request of the Executive Officer, the Discharger shall submit an Action Workplan that sets forth the scope and schedule for a systematic and comprehensive technical evaluation of each component of the facility's waste treatment and disposal system to determine best practicable treatment and control for each waste constituent that exceeds a Groundwater Limitation. The workplan shall contain a preliminary evaluation of each component of the WWTF and effluent disposal system and propose a time schedule for completing the comprehensive technical evaluation. The schedule to complete the evaluation shall be as short as practicable, and shall not exceed one year.

3. A discharger whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment, collection, and disposal facilities. The projections shall be made in January, based on the last three years' average dry weather flows, peak wet weather flows and total annual flows, as appropriate. When any projection shows that capacity of any part of the facilities may be exceeded in four years, the discharger shall notify the Central Valley Water Board by **31 January**.

4. In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed

by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for investigations and studies, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall bear the professional's signature and stamp.

5. The Discharger shall submit the technical reports and work plans required by this Order for consideration by the Executive Officer, and incorporate comments the Executive Officer may have in a timely manner, as appropriate. Unless expressly stated otherwise in this Order, the Discharger shall proceed with all work required by the foregoing provisions by the due dates specified.

6. The Discharger shall comply with Monitoring and Reporting Program <order number>, which is part of this Order, and any revisions thereto as ordered by the Executive Officer. The submittal dates of Discharger self-monitoring reports shall be no later than the submittal date specified in the MRP.

7. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991, which are attached hereto and made part of this Order by reference. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."

8. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports. On or before each report due date, the Discharger shall submit the specified document to the Central Valley Water Board or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharger shall state the reasons for such noncompliance and provide an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Central Valley Water Board in writing when it returns to compliance with the time schedule. Violations may result in enforcement action, including Central Valley Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

9. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the Discharger when the operation is necessary to achieve compliance with the conditions of this Order.

10. The Discharger shall provide certified wastewater treatment plant operators in accordance with Title 23, division 3, chapter 2

11. The Discharger shall use the best practicable cost-effective control technique(s) including proper operation and maintenance, to comply with this Order.

12. As described in the Standard Provisions, the Discharger shall report promptly to the Central Valley Water Board any material change or proposed change in the character, location, or volume of the discharge.

13. The Discharger shall report to the Central Valley Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act of 1986."

14. The Discharger shall comply with the requirements of the Statewide General Waste Discharge Requirements (General WDRs) for Sanitary Sewer Systems (Water Quality Order 2006-0003), the Revised General WDRs Monitoring and Reporting Program (Water Quality Order 2008-0002-EXEC), and any subsequent revisions thereto. Water Quality Order 2006-0003 and Order 2008-0002-EXEC require the Discharger to notify the Central Valley Water Board and take remedial action upon the reduction, loss, or failure of the sanitary sewer system resulting in a sanitary sewer overflow.

15. The Discharger shall not allow pollutant-free wastewater to be discharged into the wastewater collection, treatment, and disposal systems in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that are essentially free of pollutants.

16. At least **90 days** prior to termination or expiration of any lease, contract, or agreement involving disposal or recycling areas or off-site reuse of effluent, used to justify the capacity authorized herein and assure compliance with this Order, the Discharger shall notify the Central Valley Water Board in writing of the situation and of what measures have been taken or are being taken to assure full compliance with this Order.

17. In the event of any change in control or ownership of the WWTF, the Discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Central Valley Water Board.

18. To assume operation as Discharger under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a

statement. The statement shall comply with the signatory paragraph of Standard Provision B.3 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code. If approved by the Executive Officer, the transfer request will be submitted to the Central Valley Water Board for its consideration of transferring the ownership of this Order at one of its regularly scheduled meetings.

19. A copy of this Order including the MRP, Information Sheet, Attachments, and Standard Provisions, shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.

20. The Central Valley Water Board will review this Order periodically and will revise requirements when necessary.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order may result in the assessment of Administrative Civil Liability of up to $10,000 per violation, per day, depending on the violation, pursuant to the Water Code, including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify that the foregoing is a full true, and correct copy of an Order adopted by the California Regional Water Quality Control Board on __

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PAMELA C. CREEDON, Executive Officer