State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ORDER NO. R4-2014-xxx

WASTE DISCHARGE REQUIREMENTS AND
WATER RECLAMATION REQUIREMENTS

FOR THE

LEO J. VANDER LANS WATER TREATMENT FACILITY AND THE
ALAMITOS BARRIER RECYCLED WATER PROJECT

ISSUED TO

Water Replenishment District of Southern California and
Los Angeles County Department of Public Works

DRAFT TENTATIVE

The California Regional Water Quality Control Board, Los Angeles Region (Regional Water Board) finds the following:

BACKGROUND

1. The Los Angeles County Department of Public Works (LACDPW) owns and operates the Alamitos Gap Seawater Intrusion Barrier (Barrier) which began operations in 1965 to protect the groundwater resources of the Central Groundwater Basin and the southwestern portion of the Orange County Groundwater Basin from seawater intrusion. Figure 1 shows the location of the Barrier. Prior to 2005, only potable water was injected into the Barrier.

2. The Water Replenishment District of Southern California (WRD) manages the Central and West Coast Groundwater Basins. WRD owns and manages the Leo J. Vander Lans Water Treatment Facility (Vander Lans WTF or Facility) in the City of Long Beach and is the purveyor of recycled water produced by the Facility to the Barrier. Figure 2 shows the location of the Facility. Since October 2005, the Facility has produced up to 3 million gallons per day (mgd) of high quality advanced-treated recycled water that is injected into the Barrier in combination with potable water pursuant to Regional Water Board Order No. R4-2005-0061. The program of producing and delivering advanced treated recycled water (AWT) to the Barrier is known as the Alamitos Barrier Recycled Water Project (ABRWP or Project).

3. Together, WRD and LACDPW (collectively referred as Dischargers or Project Sponsors) propose to produce up to 8 mgd of AWT recycled water for injection into the Barrier to replace the potable water currently used.

4. Other parties involved with the Project include the County Sanitation Districts of Los Angeles County (CSDLAC), the City of Long Beach Water Department (City), and the Orange County Water District (OCWD). CSDLAC owns and operates the Long

Beach Water Reclamation Plant (WRP) that produces disinfected tertiary recycled water that is the source water for advanced treatment at the Facility. In order to better meet the needs for additional source water at the expanded Vander Lans WTF, disinfected tertiary recycled water from CSDLAC's Los Coyotes WRP may be used to supplement the existing supply from the Long Beach WRP. Residual solids and brine from the Facility are discharged to CSDLAC's sewerage system. The City owns the rights to the recycled water produced at the Long Beach WRP and currently serves recycled water to users for unrestricted irrigation and industrial uses throughout its service area. The City operates and maintains the Vander Lans WTF. The OCWD co-owns the Barrier with LACDPW and purchases the potable and recycled water delivered to the Orange County side of the Barrier.

5. The Alamitos Barrier straddles the border between the jurisdictional areas of the Los Angeles Regional Water Board and the Santa Ana Regional Water Board. In a February 8, 2004 letter to the Santa Ana Regional Water Board, based on the specifics of the Project, the Los Angeles Regional Water Board requested the lead on permitting the Project. This request was granted by the Santa Ana Regional Water Board in a letter dated July 30, 2004.

6. State authority to oversee recycled water is shared by the California Department of Public Health (CDPH) and the State Water Resource Control Boards (SWRCB) with their Regional Water Boards. CDPH is the agency with the primary responsibility for establishing water recycling criteria under Title 22 of the Code of Regulations to protect the health of the public using the groundwater basins as a source of potable water and the protect the water quality in the receiving aquifers as a source of water quality.[1] The SWRCB is responsible for granting waste discharge requirements and water recycling requirements which regulate recycled water discharge. In addition, the SWRCB adopted the Recycled Water Policy which further describes the authority of the Regional Water Boards as follows: "Regional Water Boards shall appropriately rely on the expertise of CDPH for the establishment of permit conditions needed to protect human health. (page 5)"; "Nothing in this paragraph shall be construed to limit the authority of a Regional Water Board to protect designated beneficial uses, *provided* that any proposed limitations for the protection of public health may only be imposed following regular consultation by the Regional Water Board with CDPH, consistent with State Water Board Orders WQ 2005-0007 and 2006-0001 (page 12)."; "Nothing in this Policy shall be construed to prevent a Regional Water Board from imposing additional requirements for a proposed recharge project that has a substantial adverse effect on the fate and transport of a contaminant plume or changes the geochemistry of an aquifer thereby causing dissolution of constituents, such as arsenic, from the geologic formation into groundwater (Page 12); and the Policy also cites pre-existing requirements: "The State Water Board adopted Resolution No. 68-16 as a policy statement to implement the legislature's intent that waters of the state shall be regulated to achieve the highest water quality consistent with the maximum benefit to the people of the state. (page 12)"

[1] Any successor agency to CDPH's responsibilities to oversee groundwater replenishment with recycled water in aquifers designated as sources of drinking water shall be substituted in place of every reference to CDPH in the findings, conditions, and requirements of this Order.

7. Barrier and Groundwater Basins. Prior to the construction of the Barrier, decades of over pumping caused the water levels in the Central Groundwater Basin and Orange County Groundwater Basin to drop, resulting in a loss of groundwater from storage and seawater intrusion into the potable aquifers, rendering portions of the Basins unsuitable for beneficial use. The Barrier is designed to protect the Central Groundwater Basin and portions of the Orange County Groundwater Basin from seawater intrusion through the creation of a pressure ridge by injection of fresh water into the Barrier through an alignment of 41 injection wells located approximately two miles inland from the mouth of the San Gabriel River at the Los Angeles/Orange County boundary. The pressure ridge created by the Barrier prevents seawater from passing the Barrier and entering further into the groundwater basins. The injected water flows inland, providing needed replenishment water to the groundwater basins. The failure to maintain an effective seawater intrusion barrier would cause serious water quality degradation in drinking water aquifers in southeastern Los Angeles County and southwestern Orange County, and the potential loss of this water resource.

8. There are seven groundwater-bearing units defined in the vicinity of the Barrier, including from shallowest to deepest the Recent Aquifer, Zones C, B, A, and I, the Main Aquifer (also known as the Silverado Aquifer), and the Lower Main Aquifer (also known as the Sunnyside Aquifer or Lower San Pedro Aquifer). The geological cross-section for these aquifers is illustrated in Figure 4. Due to geologic conditions, seawater intrusion has a direct pathway into the Recent Aquifer and the C, B, A, and I Zones. The deeper Main and Lower Main aquifers are protected from intrusion by the Seal Beach Fault and overlying low-permeability layers.

PURPOSE OF ORDER

9. The Vander Lans WTF and the injection of recycled water into the Barrier were previously permitted under Order R4-2005-0061 (2005 Order), issued by the Regional Water Board on September 1, 2005, as amended by WQ-2006-0001 issued by the SWRCB on April 5, 2006.

10. On October 23, 2012, the Project Sponsors submitted a Report of Waste Discharge (ROWD) requesting amendment/reissuance of the Waste Discharge Requirements and Water Recycling Requirements (WDRs/WRRs) for the Facility and injection of recycled water into the Barrier to reflect a proposal to expand the Facility. The Regional Water Board found the ROWD to be complete on November 6, 2012.

11. On October 23, 2012, the Project Sponsors also submitted an amended Title 22 Engineering Report (Engineering Report) for the expansion of the Facility to the Regional Water Board and CDPH. The Engineering Report was revised per the comments received from CDPH. A final version was submitted on March 29, 2013, for review by the CDPH and Regional Water Board and approved by CDPH on April 4, 2013. On June 26, 2013, the CDPH held a Public Hearing on the Project at WRD's office in Lakewood, CA to provide details of the planned Facility expansion, water quality information, and safeguards of the Project to ensure protection of public health. There were no objections voiced concerning the Project at the Public Hearing. On July 12, 2013, the CDPH submitted a letter to the Regional Water Board with a summary of the Public Hearing and their Findings of Fact and

Conditions for the Project. The CDPH found that the Project will not degrade the quality of the water in the receiving aquifers as a source of domestic water supply provided that all of their Conditions are met.

ALAMITOS BARRIER RECYCLED WATER PROJECT

12. The Vander Lans WTF is located at 7380 East Willow Street, Long Beach, adjacent to the CSDLAC's Long Beach WRP and between the San Gabriel River and Coyote Creek (Figure 2).

13. CSDLAC maintains a comprehensive industrial and pretreatment control program approved by the U.S. Environmental Protection Agency for control of waste discharges from industrial and commercial sources into CSDLAC's wastewater collection system. This program protects CSDLAC's treatment facilities and downstream beneficial uses and can address contaminants specified by CDPH and Regional Water Board that could be harmful to the use of recycled water for groundwater replenishment.

14. Tertiary Treatment.

    a. The source water for the expanded Vander Lans WTF will be disinfected tertiary recycled water from the Long Beach WRP. The production of tertiary recycled water at the Long Beach WRP is regulated by Order No. 97-07206 and Order No. R4-2007-0047.

    b. In the future, disinfected tertiary effluent may also be supplied to the Vander Lans WTF by the Los Coyotes WRP, which is regulated separately under Order No. 97-07204 and Order R4-2007-0048.

    c. Treatment at the Long Beach and Los Coyotes WRPs is very similar and consists of primary sedimentation, activated sludge biological treatment with nitrification and denitrification, secondary sedimentation, inert media filtration, and chlorine disinfection treatment processes. The design capacity of the Long Beach WRP is 25 mgd. The design capacity of the Los Coyotes WRP is 37 mgd.

15. The current treatment train at Vander Lans WTF consists of microfiltration (MF) to reduce the turbidity and silt density of the feed water; reverse osmosis (RO) to remove additional salts, minerals, metal ions, organic compounds and microorganisms; ultraviolet irradiation (UV) to provide disinfection and N-Nitrosodimethylamine (NDMA) reduction; decarbonation; pH adjustment; corrosivity stabilization; and, blending with potable water. WRD has developed an operating plan for the Vander Lans WTF, which will be updated prior to operation of the expanded Facility.

16. The Project Sponsors seek to change the quantity of the recycled water injected at the Barrier from approximately 50 percent recycled water and 50 percent potable water to 100 percent recycled water. The percentage will be calculated based on the running monthly average recycled water contribution for the preceding period of 120 months. The total amount of water injected into the aquifers will not change (up to 8 mgd). To maintain the quality of the injected water, the expanded Vander Lans WTF

will include treatment enhancements (See Figure 3). The expanded Facility is designed to produce approximately 8,960 acre-feet of recycled water per year (AFY), which is equivalent to 8 mgd.

17. The treatment approach and technology used at the expanded Facility is depicted in Figure 3 and will consist of the following:

    a. Influent Equalization (EQ): If tertiary effluent from the Los Coyotes WRP is used as influent to the Vander Lans WTF, the flow will be equalized in the influent EQ basin and pump-fed to the Primary Micro Filtration (MF) system. Pumping is not required when disinfected tertiary effluent from the Long Beach WRP is used as influent to the Vander Lans WTF since the Long Beach WRP effluent has 60 to 100 pounds per square inch (psi) of pressure, sufficient to feed Primary MF without pumping.

    b. Micro Filtration (MF):

        i. MF Pretreatment Chemical Addition: If tertiary effluent before chlorination from the Los Coyotes WRP is used for the Vander Lans WTF influent, then chloramination (using sodium hypochlorite and aqueous ammonia) may be added to the equalized flow to control bio-fouling of the MF and RO membranes. Additional chemical addition before MF filtration is unnecessary and will not be used if the Facility uses tertiary effluent from the Long Beach WRP only.

        ii. Primary MF Automatic Strainers: Subsequently, the flows will be fed into three (two duty and one standby) automatic self-cleaning 500-micron strainers to protect the downstream MF membranes from damage and/or fouling from large particles. The backwash waste from the Primary MF automatic strainers may be discharged to either the backwash waste (BWW) equalization basin or the Facility waste EQ basin.

        iii. Primary MF System: Then the flow will be fed into six 100-module MF skids. The MF system consists of pressurized MF units with hollow fiber, polyvinylidine fluoride membranes having a maximum pore size of 0.1 micron. The MF system will produce 8.1 mgd. The MF filtrate will be stored in a break tank. The MF Units will be periodically backwashed to clean the membranes.

        iv. Backwash Treatment (BWT): The BWW flows from the Primary MF automatic strainers and Primary MF system will be equalized in the BWW EQ Basin and pumped to dissolved air floatation (DAF) system for treatment. Ferric chloride is utilized as a coagulant injected upstream of the DAF system. DAF effluent flow will be equalized in the DAF Effluent EQ Basin and pumped to the BWT MF system, which consists of four 25-module MF skids. Similar to the Primary MF system, the BWT MF automatic strainer is provided upstream of the BWT MF membranes to protect the BWT MF membranes from damage and/or fouling from large particles. One automatic strainer will be provided as a duty unit, and one manual basket strainer will be provided as a standby. The Primary MF

effluent and the BWT MF effluent will be mixed and discharged into the existing MF Filtrate Tank.

c. Reverse Osmosis (RO): Stored MF filtrate will be pumped from the MF Filtrate Tank to the RO system, which will consist of two 2-stage RO trains in parallel and three (two duty and one standby) third stage RO Trains. To control scaling and to protect the RO membranes, the pretreatment (consisting of addition of sulfuric acid for pH control, a threshold inhibitor; and cartridge filters) is provided both upstream of the two 2-stage RO trains and also immediately upstream of the third stage RO process. The RO process will produce approximately 8.0 mgd. The RO process will consist of a high pressure feed pump and pressure vessels. Each pressure vessel will contain high rejection thin film composite polyamide membrane elements. The entire RO system is designed for an overall 92 percent recovery rate. Permeate from the RO system will be fed to the advanced oxidation process (AOP). Concentrated brine from the RO system will be discharged directly to CSDLAC's Joint Outfall System sewer system.

d. Ultra Violet/Advanced Oxidation Process (UV/AOP): The UV/AOP at the Vander Lans WTF will consist of UV with hydrogen peroxide addition upstream of the UV trains. The UV/AOP is used to disinfect RO permeate and destroy some constituents of emerging concern (CECs) that pass through RO membranes due to their low molecular weight and low ionic charge, notably N-Nitrosodimethylamine (NDMA), flame retardants, and, 1,4-dioxane. The UV system conforms to the requirements delineated in the "Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse" (August 2012) published by the National Water Research Institute (NWRI). The UV system consists of the existing (pre-expansion) system as well as an add-on system. The existing UV system consists of nine 30AL50 Trojan UVPhox™ reactors that employ low-pressure, high-output technology, with each reactor containing 30 lamps, utilized in a tower arrangement with three reactors per level over three levels. The expansion will add two new trains of three stacked D72AL75 Trojan UVPhox™ reactor chambers, where the third reactor chamber in each train is redundant and includes only one 72-lamp reactor zone. There are two reactor chambers in each UV vessel. The third vessel only utilizes one of the reactors. No waste will be generated. The total nominal capacity of the existing UV system is 8.0 mgd. At this flow rate and UV transmittance of 95 percent, the delivered UV dosage from the proposed system is estimated to exceed 300 millijoule per square centimeter (mJ/cm2).

e. Decarbonation: Following UV/AOP treatment, the water will pass through a decarbonator to reduce carbon dioxide, increase pH, and stabilize the product water.

f. Post-Treatment Systems (pH Adjustment/Corrosivity Stabilization/ Disinfection): Caustic soda (sodium hydroxide) will be added to the water to increase pH, and calcium chloride will be added to reduce the potential for minerals to be leached from the cement lining used in the transmission pipeline. In order to maintain a certain threshold of total chlorine residuals required by the LACDPW to prevent bio-fouling and clogging of the injection

wells, sodium hypochlorite and aqueous ammonia will be added to the product water to maintain the required level of total chorine residuals. The levels of sodium hypochlorite and aqueous ammonia to be added will be fine-tuned to effectively manage potential formation of disinfection byproducts.

18. The Facility may bypass or discharge partially-treated or treated water to a trunk sewer leading to the CSDLAC's Joint Water Pollution Control Plant in Carson.

RECYCLED WATER INJECTION SYSTEM

19. Transmission of Recycled Water: The transmission of the recycled water from the Facility will not change as a result of the expansion. Currently, the recycled water is pumped westward along Willow Street to the Blend Station where it mixes with imported water before being conveyed two miles to the distribution header. From the header, the recycled water is injected into the Barrier. The alignment of injection wells extends westward along 7th Street from Margo Avenue to the San Gabriel River, where it turns towards the south along the Los Alamitos Channel (see Figure 1 for the well alignment). Two types of injection wells were constructed at the Barrier: nested and composite. Nested wells are constructed with a single casing, but can inject water into different aquifers separated by grout seals. The composite type injection wells are comprised of casings similar to the nested casings, except that they are screened in multiple aquifer zones without grout seals between them. The injection wells include 41 wells of which 16 are single injection wells, injecting only into either A or I aquifer; 19 are dual injection wells, injecting separately into the A/I or C/B aquifers; and seven wells are composite wells, and, inject simultaneously into C/B/A/I aquifers. Distances between injection wells vary between approximately 50 feet to 1,200 feet, for a total span of approximately 1.2 miles.

20. The Orange County Water District (OCWD) is in the planning stages to construct eight additional injection well locations (20 separate casings) to better control seawater intrusion into the Orange County Groundwater Basin. Total injection rates for the eight new wells are anticipated to be approximately 1,011 AFY. The location, design, and injection rates of these new wells were included in the updated modeling studies for the amended Engineering Report and Findings of Fact to predict travel time and movement of the Barrier water after their construction. Project Sponsors will provide the location and design for any new injection wells to CDPH and the Regional Water Board in accordance with the requirements specified in this Order.

GROUNDWATER STUDIES

21. The April 15, 2011, *Addendum to the Five-year Engineering Report for the Barrier* contained a technical memorandum from INTERA, reviewing the ability of the Project Sponsors groundwater model to predict the fate and transport of the recycled water through the aquifers. Between 2006 and 2010, the water in Zones C, B, A and I compared favorably to predicted aquifer conditions predicted using the numerical flow and transport model, with a transmissivity-weighting scheme. Particle tracking simulations were used to confirm the modeled and observed break-through analysis for recycled water concentrations at the monitoring wells. Figure 1 is a map showing the injection well locations. Figure 4 is a cross section for that map delineating the

aquifer zones. For the 2013 Engineering Report, the INTERA model was updated to include the Facility expansion plans and the 8 new injection wells that will be constructed by OCWD to improve Barrier performance. The model was used to update calculations and predictions of future recycled water fate and transport in the aquifers based on groundwater conditions after the expanded Facility and the new wells are in operation.

22. The closest active domestic well to the Barrier is SB-LEI owned and operated by the City of Seal Beach and is located approximately 4,840 feet to the east of the Barrier. Groundwater travels at different velocities in the different aquifers based on hydraulic gradients and hydraulic conductivity. The I-Zone aquifer tends to have the fastest moving groundwater in the Project area. Tracer studies and groundwater models determined that recycled water will remain underground for approximately 4.3 years before reaching SB-LEI in the I-Zone. The estimated travel time is shorter than suggested by previous modeling since the new models were run with the current barrier injection amounts and accounts for the anticipated increased injection by OCWD from the 8 new wells. Figure 5 shows the model-predicted travel time to well SB-LEI in the I-Zone based on the updated model, including the expanded Facility and the new OCWD wells. Because of the tracer studies and modeling work previously done for the Project, a new tracer study will not be required for the Facility expansion.

23. Drinking water standards have not been exceeded at the nearest drinking water well, Seal Beach well SB-LEI as a result of the injection project, as shown by the Title 22 drinking water reports. Recycled water is thought to have reached the well. The SB-LEI well is perforated in both Zone I, which is recharged at the Barrier, and the Main Aquifer, which contains no recycled water. As a result, it is possible dilution from deeper horizons may disguise any water quality changes resulting from recycled water contributions. Figure 6 shows “break-through” curves, which predict the percentage of recycled water produced at SB-LEI annually through 2035 taking into account the effects of dilution.

24. The 2005 Order required annual assessment of the data prior to and after recharge in ten monitoring wells located at the distance it takes groundwater to travel for three months away from the Barrier, or located one quarter of the distance to the nearest drinking water wells. Eight of the wells are used for compliance purposes, and two of the wells monitor background conditions. A detailed review of groundwater quality data for the Barrier Project area indicates that in general, water quality is within primary and secondary drinking water standards. Exceedances were most commonly observed in the Recent Aquifer, the shallowest aquifer, which does not receive injection water. The same constituents were present in 2005 in the initial background monitoring (pre-injection period) in similar concentrations except for arsenic and selenium, which have increased since 2005. Arsenic and selenium in the recycled water have consistently not been detected. The cause for the elevated levels of arsenic and selenium concentrations has not been established, but arsenic and selenium levels are known to increase through solution of minerals existing in an aquifer. In the C-Zone, B-Zone, A-Zone, and I Zone Aquifers, manganese has been measured at elevated concentrations. In the Main Aquifer, which does not receive injection water, only chloride, specific conductance, and TDS were consistently observed at elevated concentrations (indicative of influence of seawater intrusion)

but generally showing a decreasing trend from the 2005 initial background monitoring, thus indicative of improved groundwater quality in the aquifer as a result of the injection project.

Of 230 constituents measured at the ten monitoring wells, only seven constituents did not stay constant or improve in comparison to background groundwater quality information collected in 2005 and 2006, as shown in Table 1.

Table 1 – INCREASES IN GROUNDWATER CONCENTRATION (means)

Constituents (MCLs)	Units	2012	2011	2010	2005 or 2006 Background
3 month travel time in Recent aquifer					
Arsenic (10)	µg/L	17	22	16	ND
Selenium (50)	µg/L	61	53	35	ND
Chloride (500)	mg/L	7025	6275	5475	5407
TDS[2] (1,000)	mg/L	13500	13000	9925	13350
3 month travel time in C-Zone					
Manganese (50)	µg/L	101	108	97	94
Odor(3)	TON	11	2	3	4
3 month travel time in B-Zone					
Manganese (50)	µg/L	62	62	61	68
Odor(3)	TON	3	2	1	4
Total Coliform(1.1)[3]	MPN/100mL	ND-1.1	ND	ND	ND
3 month travel time in I-Zone					
Odor	TON	14	3	3	5
1 year travel time in C Zone					
Manganese (50)	µg/L	101	113	98	95
Odor(3)	TON	3	2	3	7
1 year travel time in B Zone					
Manganese (50)	µg/L	63	66	63	77
Odor	TON	3	2	3	6
1 year travel time in I Zone					
Odor(3)	TON	3	2	1	4
Total Coliform(1.1)	MPN/100mL	ND-1.1	ND	ND	ND

Based on the review of the recycled water monitoring data for the past five years (2009-2013), the highest concentration detected in recycled water for chloride ,total dissolved solids, manganese, and odor are 28 milligrams per liter (mg/L), 110 mg/L, 2.7 micrograms per liter (µg/L) and 4 threshold odor number (TON), respectively.

25. A total of 220 observation wells are currently operated at the Barrier. These wells are monitored by LACDPW for water levels and chloride concentrations to determine the effectiveness of the seawater barrier. The monitoring wells tap the Recent, C, B, A, and I aquifers. WRD monitors the movement of the injected recycled water using 21 observation wells at 8 locations. The 21 wells include the eight monitoring wells where routine water quality sampling is conducted pursuant to the WDRs/WRRs, and 13 tracer wells, whose primary function is to trace the movement of recycled water. Prior to project initiation, CDPH concurred with WRD that recycled water should be

[2] Total Dissolved Solids
[3] Basin Plan limit is 1.1 MPN/100 mL.

chemically distinct from previously injected potable water and native groundwater due to advanced treatment process, particularly RO that produces water with much lower mineral content than the other waters. Therefore, properties of the recycled water can be used as a groundwater tracer to follow recycled water movement and travel time. The tracer well program was terminated in December 2009 since it met the 2005 WDRs/WRRs.

APPLICABLE PLANS, POLICIES AND REGULATIONS

26. The Regional Water Board adopted a revised Water Quality Control Plan for the Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan) on June 13, 1994, as amended by various Regional Water Board resolutions. The Basin Plan designates beneficial uses for surface and groundwater; establishes narrative and numeric water quality objectives that must be attained or maintained to protect the designated (existing and potential) beneficial uses and to conform with the state's antidegradation policy; and includes implementation provisions, programs, and policies to protect all waters in the region. In addition, the Basin Plan incorporates all applicable State Water Resources Control Board (State Water Board) and Regional Water Board plans and policies and other pertinent water quality policies and regulations.

27. The Basin Plan incorporates the California Code of Regulations (CCR) title 22 primary Maximum Contaminant Levels (MCLs) by reference. This incorporation is prospective, including future changes to the incorporated provisions as the changes take effect. Also, because the Basin Plan specifies that "ground waters shall not contain taste or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses," this Order also incorporates all secondary MCLs, limits based on aesthetic and organoleptic standards.

28. 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 MCLs designed to protect public health and ensure that water is safe for domestic use 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 MCLs designed to protect human health and ensure that water is safe for domestic use.

29. The Basin Plan contains water quality objectives for the Central Groundwater Basin, considered to be the receiving waters affected by the current recycled water reuse Facility. The beneficial uses of the receiving groundwaters are as follows:

Table 2 - Beneficial Uses of Groundwater	
Receiving Water Name	**Beneficial Use(s)**

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Receiving Water Name	**Beneficial Use(s)**
Los Angeles Coastal Plain (Central Basin); Department of Water Resources (DWR) Basin No. 4-11.04)	Confined Aquifer Existing Beneficial Uses: Municipal and domestic water supply (MUN); industrial service supply (IND); industrial process supply (PROC); and agricultural supply (AGR).

30. The mineral water quality objectives for these groundwater basins are:

Table 3 - Water Quality Objectives for Groundwater					
DWR Basin No.	**Basin**	**Objectives (mg/L)**			
		TDS	**Sulfate**	**Chloride**	**Boron**
4-11.04	Central Basin Confined aquifers	700	250	150	1.0

31. The State Water Board adopted Resolution No. 77-1, *Policy with Respect to Water Reclamation in California*, which includes principles that encourage and recommend funding for water recycling and its use in water-short areas of the state. On September 26, 1988, the Regional Water Board also adopted Resolution No. 88-012, which encourages the beneficial use of recycled wastewater and supports water recycling projects.

32. The State Water Board adopted the Recycled Water Policy (State Water Board Resolution No. 2009-0011) on February 3, 2009, and amended the Policy on January 22, 2013. The purpose of the Recycled Water Policy is to protect groundwater resources and to increase the beneficial use of recycled water from municipal wastewater sources in a manner consistent with state and federal water quality laws and regulations.

33. Groundwater is a water of the State.[4] The quality of groundwater is protected and maintained through the issuance of requirements for waste discharge by the Regional Water Boards. Should monitoring of groundwater in the Central Basin indicate contamination[5] or pollution[6] has resulted, or can reasonably be assumed to have resulted, from the injection of recycled water into the Barrier, then the waste contained in the injectate would be degrading a water of the state.

[4]Division 7, chapter 2, section 13050 (e) of California Water Code (CWC): "Waters of the State" means any surface water or groundwater, including saline waters, within the boundaries of the state.
[5] Division 7, chapter 2, section 13050 (k) of CWC: "Contamination" means an impairment of the quality of the waters of the state by waste to a degree which creates a hazard to the public health through poisoning or through the spread of disease.
[6] Division 7, chapter 2, section 13050 (l) (1) of CWC: "Pollution" means an alteration of the quality of the waters of the state by waste to a degree which unreasonably affects either of the following: (A) the waters for beneficial use and (B) facilities which serve these beneficial uses. (2) "Pollution" may include "contamination."

34. A 1996 Memorandum of Agreement (MOA) between CDPH and the State Water Board on behalf of itself and the Regional Water Boards allocates the primary areas of responsibility and authority between these agencies regarding the use of recycled water. The MOA provides methods and mechanisms necessary to ensure ongoing and continuous future coordination of activities relative to the use of recycled water in California. This Order includes requirements consistent with the MOA.

35. Section 13523 of the California Water Code (CWC) provides that a Regional Water Board, after consulting with and receiving recommendations from CDPH or its delegated local health agency, and after any necessary hearing, shall, if it determines such action to be necessary to protect the health, safety, or welfare of the public, prescribe WRRs for water that is used or proposed to be used as recycled water. Section 13523 of the CWC further provides that, at a minimum, the WRRs shall include, or be in conformance with, the statewide water recycling criteria established by CDPH pursuant to CWC section 13521.

36. Pursuant to CWC section 13523, the Regional Water Board has consulted with CDPH and has incorporated their recommendations into this Order. On June 26, 2013, CDPH held a public hearing in Lakewood, California to consider the proposed expansion of the Vander Lans WTF and use of recycled water for the Barrier. On July 12, 2013, CDPH transmitted to the Regional Water Board its Findings of Fact and Conditions concerning the expansion of the Vander Lans WTF.

37. Section 13540 of the CWC requires that recycled water may only be injected into an aquifer used as a source of domestic water supply if CDPH finds the recharge will not degrade the quality of the receiving aquifer as a source of water supply for domestic purposes. To facilitate determination of whether a recharge project will not degrade the receiving groundwater, CDPH has developed draft Recycling Criteria for Groundwater Recharge Reuse (GWRR) (latest version is dated June 26, 2013).

38. CDPH is developing regulations (GWRR) that address groundwater replenishment for aquifers designated as sources of drinking water using recycled water from domestic wastewater sources. The latest version is dated June 26, 2013. The GWRR is a draft of a proposed revision to CCR title 22, division 4, chapter 3, article 1, sections 60301.050 to 60323. Following section IV.G. of the MOA, CDPH indicated it will require the Project Sponsors to comply with that draft policy and recommended the Regional Water Board implement it through this Order. In accordance with the Recycled Water Policy, groundwater recharge projects must comply with regulations adopted by CDPH for groundwater recharge or, in the interim until such regulations are approved, CDPH's recommendations for the project as reflected in the July 21, 2013 CDPH Conditions.

39. The GWRR is a revision of previous requirements for groundwater recharge and has the following requirements as reflected in Table 4: (1) 100 percent recycled water can be used if the water is treated with an approved technology after tertiary treatment and disinfection; (2) two months travel time must elapse between recharge location and extraction.; (3) numerical or analytical modeling, instead of tracer studies, may be used to characterize subsurface hydrology; (4) nitrogen control guidance recommends additional monitoring when limits are exceeded; and (5) when water quality conditions deteriorate relative to a background condition and may affect

extraction for public use, an alternative water supply must be available for use between the time the deteriorated quality is identified and municipal use would begin. In addition, a treatment plan for unregulated chemicals has been developed to protect public supplies against chemicals found in waste and groundwater with unknown impact on human or aquatic life.

Table 4 – Change in Recycling Criteria for Groundwater Recharge Recycled Water

Factors	2005 Minimum Recommendations	2014 Minimum Recommendations
Maximum recycled water contribution	50 percent	No maximum
Minimum retention time underground[7]	12 months	Time necessary to identify and replace recycled supply or 2 months
Horizontal separations recommendations	At least 2,000 feet between point of recycled water direct injection and domestic water supply wells.	2-month travel time for pathogen control
Monitoring well recommendations [8]	3-months travel time and intermediate between barrier and the nearest downgradient domestic water well	Less than 6-months travel time, intermediate between barrier and nearest downgradient domestic water well, and 30 days travel time to well.
Total nitrogen[9]	5 mg/L	10 mg/L
Total organic carbon[10]	1 mg/L[11]	0.5 mg/L
MCL sampling	Quarterly	Monthly, then quarterly
Advanced Treatment	None	CEC, indicator or surrogate, removal more than 90% or approved Advanced Oxidation Process

40. The Draft GWRR require that for a subsurface application project that the recycled water used as recharge water receives treatment that achieves a total 12-log virus reduction, and 10-log reductions in *Giardia* and *Cryptosporidium* to address the higher risk of pathogens in the recycled water. The treatment system must consist of at least three separate treatment processes as defined by the Project Sponsors.

[7] The Project Sponsor estimates the time to identify treatment failures and implement actions necessary for the protection of public health, called the response retention time, which shall not be less than 2 months according to CDPH criteria. Retention time affords extra treatment through soil filtration. The longer the water stays underground, the more likely trace organic and inorganic chemicals will be removed through biological, chemical and physical processes. In addition, virus decay with time and a 2-month retention time provides additional log reduction in the virus density in the recycled water.

[8] The wells shall be installed such that samples can be obtained independently from each aquifer potentially conveying the recharge water. Monitoring well locations shall be determined based on a numerical model, tracer, or other method to determine the estimated underground travel time from the recharge operation to the monitoring well sites.

[9] Total nitrogen shall be defined as the sum of ammonia, nitrite, nitrate, and organic nitrogen concentrations, expressed as total nitrogen.

[10] Total organic carbon means oxidizable organic carbon measured by an approved laboratory pursuant to subsection 64415(a) using Method 5310C, *Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998*, with a reporting level of 0.10 mg/L, and precision and accuracy within plus-and-minus 20 percent.

[11] Assumed 50% diluent water (not treated wastewater) added to reverse osmosis and that is used to supplement the recycled water in the Barrier.

Each process can be credited with no more than a 6-log removal and must achieve at least a 1-log removal. For each month the recycled water is retained underground, the project can be credited with 1-log virus removal (up to 6-log removal). Table 5 summaries the pathogen reduction credits for the expanded Vander Lans WTF.

Table 5 - Pathogen Credits applied at Vander Lans WTF under the GWRR

Pathogen	2013 Draft GWRR Minimum	Proposed Pathogen Treatment Credits					Total Credits
		WRP[a]	MF	RO	UV/AOP	Travel Time	
Giardia	10	2[b]	2.7[c]	1.5[c]	6[d]	0	12.2
Crypto-sporidium	10	1[b]	2.7[c]	1.5[c]	6[d]	0	11.2
Viruses	12	2[b]	N/A[e]	1.5[c]	6[d]	6[f]	15.5

a. WRP refers to the Long Beach and Los Coyotes WRPs.
b. To be conservative, WRD has only claimed pathogen removal credit associated with treatment processes from influent through secondary treatment.
c. Per discussions with CDPH, based on membrane integrity and concomitant minimum reductions. Pathogen reduction credit includes the potential impact of the backwash water cycled.
d. To be further confirmed by completing a limited scope phage study for the existing UV trains.
e. Not applicable.
f. The closest production well is located further than 6 months travel time from the Barrier.

41. The Draft GWRR includes provisions for Response Retention Time (RRT) regarding the time recycled water must be retained underground between recharge and extraction to allow a project sponsor ample time to identify treatment failures and implement appropriate actions to protect public health from inadequately treated recycled water or recharge water. The minimum RRT allowed is 2 months. WRD has justified an RRT of 5 months. Because WRD is claiming a 6-log virus removal credit corresponding to underground retention time of 6 months, the minimum underground retention time for recycled water is 6 months, the longer of the two retention times.

42. CDPH considers the treatment to be the best available treatment technology for recycled water used for groundwater recharge by direct injection when the required conditions are met. CDPH's recommendations are incorporated into this Order.

43. The requirements contained in this Order are in conformance with the goals and objectives of the Basin Plan and implement the requirements of the CWC and CCR title 22, division 4, chapter 3.

    a. Results of sampling collected from the Vander Lans WTF for past pilot studies simulating the expanded Facility indicate that the product water will meet all requirements of the primary and secondary MCLs. Tests conducted on MF/RO/UV treatment processes also have indicated that certain pharmaceutically active compounds and other toxic contaminants not included in the drinking water standards are removed or reduced to low levels in the product water.

44. Pursuant to Order R4-2005-0061, policies and resolutions have been implemented to prevent the use of groundwater for drinking water at wells no closer than 2,000 feet and less than 12 months retention time from the Alamitos Barrier Project. WRD has chosen to continue to implement the 2,000-foot buffer zone, but may revise the existing policy to reflect a new buffer zone of six months underground retention time (Figure 5).

45. The WRD adopted Resolution No. 04-710 on September 1, 2004, which made the WRD responsible for developing a plan for providing an alternative source of domestic water supply, or a CDPH-approved treatment mechanism, to any user whose domestic water well is found to violate California drinking water quality regulations and can be reasonably related to the Barrier, or when the CDPH makes an analysis and finding that the domestic water well is unsuitable for human consumption and can be reasonably related to the Barrier. Such alternative sources can include water delivered for blending at the producing well, imported water, water produced at a well head treatment plant, and water produced from new wells. WRD must notify CDPH and the Regional Water Board in a timely manner, when such a determination is made. An updated copy of Resolution No. 04-710 has been supplied to the Regional Water Board.

46. The Facility must comply with requirements and agreements from multiple agencies, municipalities, resource agencies, and water managers. Some include CDPH, the Los Angeles Regional Water Board, the Santa Ana Regional Water Board, the State Water Board, the CSDLAC, and the cities of Seal Beach and Long Beach. It is the intent of this Order to implement and enforce the most restrictive and protective requirements among those which apply. Where monitoring is required to be completed by one facility, such as the Long Beach WRP, and the failure to execute that requirement prevents conformance with this permit, the failure to monitor shall be reported by the Project Sponsors in the next monitoring report.

47. Pursuant to CWC section 13263(g), discharges of waste into waters of the state are privileges, not rights. Nothing in this Order creates a vested right to continue the discharge.

48. Section 13267(b) of the CWC states, in part:

    In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging or who proposes to discharge within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste outside of its region shall furnish under penalty of perjury, technical or monitoring program reports which the regional 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.

    Section 13267(d) of the CWC states, in part:

[A] regional board may require any person, including a person subject to waste discharge requirements under Section 13263, who is discharging, or who proposes to discharge, wastes or fluid into an injection well, to furnish the state board or regional board with a complete report on the condition and operation of the facility or injection well, or any other information that may be reasonably required to determine whether the injection well could affect the quality of the waters of the state.

49. The need for the technical and monitoring reports required by this Order, including the Monitoring and Reporting Program, are based on the CDPH Finding of Facts and Conditions, the project description as explained in the CEQA Initial Study, and other information in the Regional Water Board's files for the Facility. The technical and monitoring reports are necessary to assure compliance with these waste discharge requirements and to:

    a. Detect, track, and monitor the underground movement of the recharge water and the water quality of various aquifers comprising the groundwater basins.

    b. Monitor whether the groundwater meets MCLs and other water quality standards.

    c. Identify any changes in the operations of the Facility or effectiveness of treatment.

    The burden, including costs, of providing the technical reports required by this Order bears a reasonable relationship to the need for the reports and the benefits to be obtained from the reports.

50. On October 28, 1968, the State Water Board adopted Resolution No. 68-16*, Statement of Policy with Respect to Maintaining High Quality of Waters in California* (Resolution 68-16), establishing an antidegradation policy for the State Water Board and Regional Water Boards. Resolution No. 68-16 states, in part:

    Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any changes will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water and will not result in water quality less than that prescribed in the policies.

    Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

51. This Order is consistent with Resolution No. 68-16. None of the constituents would be present at concentrations that exceed drinking water maximum contaminant levels (MCLs) in water injected into the aquifer, because this Order requires that the

injected water meet all drinking water standards. This Order prohibits injection of water that would cause violation of any water quality objective within the aquifer, or operation of the wells in a matter that causes a condition of pollution or nuisance.

52. The maintenance of the Barrier by injection of recycled water into the aquifers in accordance with this Order will provide important economic and environmental benefits, and is consistent with the maximum benefit to the people of the State.

    a. Groundwater recharge with recycled water for later extraction and use enhances sustainable local water supplies, decreases the need for trans-basin water diversions and transport, and conserves water resources by utilizing recycled water that would otherwise flow to the ocean.

    b. Use of recycled water instead of imported water for injection at the Barrier is cost effective and helps to advance the statewide goal of increasing the use of recycled water to promote local water reliability.

    c. Recycled water is a more reliable source of supply than imported sources, and is available even in times of drought.

CEQA AND NOTIFICATION

53. The Project Sponsors prepared an Initial Study for a proposed project to inject 100 percent recycled wastewater into the Alamitos Barrier, with WRD serving as the lead agency. Based on the Initial Study, WRD determined that the proposed project would not have a significant impact on the environment. On March 9, 2012, WRD issued a revised Notice of Intent (NOI) to adopt a Negative Declaration for the proposed project. The NOI was posted on the WRD website and in the Long Beach Press Telegram, with mailings to interested parties, and circulation through the State Clearinghouse (#20120205) and the Los Angeles County Clerk's Office. The 30 day public review process ended on April 9, 2012. WRD received and responded to four comments, none of which necessitated changes in the Negative Declaration. The Negative Declaration was adopted by the WRD Board of Directors on April 20, 2012, and the project was approved by the WRD Board of Directors on May 4, 2012. The Negative Declaration was filed with the State Clearinghouse on May 7, 2012. No further comments or objections were received during the subsequent 30 days. An addendum to the Negative Declaration was approved by the WRD Board of Directors on May 14, 2013. The Project has completed the notification and review process required by CEQA. The Regional Water Board is a responsible agency for purposes of CEQA. The Regional Water Board has considered the Initial Study, which did not identify significant environmental effects with respect to water quality.

54. Pursuant to CWC section 13320, any aggrieved person may seek review of this Order by filing a petition with the State Water Board in accordance with CCR title 23, sections 2050-2068. A petition must be sent to the State Water Board, P.O. Box 100, Sacramento, CA 95812, within 30 days of adoption of this Order. The regulations are available at http://www.waterboards.ca.gov/public_notices/petitions/water_quality/index.shtml The State Water Board must receive the petition within 30 days of the date of this Order.

55. The Regional Water Board has notified the Project Sponsors and interested agencies and persons of its intent to issue WDRs/WRRs Order No. R4-2014-xx for the production and use of recycled water and has provided them with an opportunity to submit written comments.

56. The Regional Water Board, in a public meeting, heard and considered all comments pertaining to these WDRs/WRRs.

THEREFORE, IT IS HEREBY ORDERED that Order No. R4-2005-0061, with MRP No. CI-8956, is rescinded upon the effective date of this Order except for enforcement purposes, and, in order to meet the provisions contained in division 7 of the CWC (commencing with section 13000) and regulations and guidelines adopted thereunder, and California Code of Regulations title 22, division 4, chapter 3, the Project Sponsors shall comply with the requirements in this Order. This action in no way prevents the Los Angeles Regional Water Board from taking enforcement action for past violations of the previous Order.

I. INFLUENT LIMITATIONS

1. The influent to the Vander Lans WTF shall be tertiary treated effluent , and shall at all times be adequately oxidized. The influent shall be considered adequately oxidized when it meets the following requirements:

    a. The monthly[12] average Biochemical Oxygen Demand value (BOD_5 20°C) shall not exceed 15 mg/L. Compliance shall be determined monthly using the average of the analytical results of all 24-hour composite samples taken at least weekly during the month.

    b. The monthly average Total Suspended Solids (TSS) concentration shall not exceed 15 mg/L. Compliance shall be determined monthly using the average of the analytical results of all 24-hour composite samples taken daily during the month.

II. PRETREATMENT

The Project Sponsors shall maintain a legal agreement with the CSDLAC that shall include provisions for an Industrial Pretreatment and Pollution Source Control Program applicable to the Long Beach WRP and for the Los Coyotes WRP at the time the disinfected tertiary recycled water is used as source water for the Facility. The agreement shall require that CSDLAC maintain a comprehensive industrial wastewater pretreatment and source control program for controlling discharges of waste from commercial and industrial sources that could adversely affect the quality of the recycled water from the Vander Lans WTF or production of recycled water. The agreement shall also require that CSDLAC comply with all applicable federal and state legal and regulatory requirements with respect to its pretreatment program, and that the program shall be consistent with the most recent recommendations issued by CDPH with respect to pretreatment and source control requirements for groundwater recharge project. The agreement shall include

[12] "Monthly" is a calendar period, not necessarily 30 days.

provisions that allow for the inclusion in the Pretreatment and Source Control Program any contaminants that CDPH has identified that may pose a risk of contamination to a drinking water supply as a result of the groundwater injection project. The CSDLAC in conjunction with the Project Sponsors shall do the following:

a. Make an assessment of the fate of CDPH-specified and Regional Water Board-specified chemicals and contaminants through the wastewater and recycled water treatment systems;

b. Conduct a source investigation and monitoring program focused on CDPH-specified and Regional Water Board-specified chemicals and contaminants;

c. Conduct a comprehensive outreach program to industrial, commercial and residential communities within the Long Beach and Los Coyotes WRPs wastewater collection service areas to manage and minimize the discharge of the compounds of concern at the source; and,

d. Develop a proactive program for maintaining an inventory of compounds discharged into the Long Beach and Los Coyotes WRPs wastewater collection service areas so that new compounds of concern can be evaluated rapidly.

II. RECYCLED WATER EFFLUENT LIMITATIONS

1. For the purposes of this Order, the recycled water shall be the product water from the Vander Lans WTF that has undergone treatment consisting of primary sedimentation, secondary treatment (including nitrification and denitrification), granular media filtration, disinfection, MF, RO, UV with hydrogen peroxide addition to provide AOP, decarbonation and caustic soda addition.

2. Recycled used for injection shall be, at all times, adequately oxidized, filtered, disinfected, and subject to organics removal by RO and UV/AOP treatment. There shall be no bypassing of any treatment process, except for decarbonation and caustic soda addition, which provide pH adjustment as required for stabilization.

3. The recycled effluent water produced by the Vander Lans WTF shall not contain pollutants at end-of-pipe[13] or at the specific designated measurement locations within the treatment train, in excess of the limits listed in Table 6.

[13] End-of-pipe is a sampling location after all treatment, before blending with other water, and before injection. Where specified, the quality measured at end-of-pipe may be determined by the conditions expected after injection. Where specified, the quality measured at end-of-pipe may be quantified and assessed by a measurement collected at a location in the treatment train.

Table 6 –Recycled Water Effluent Limitations					
Constituents	**Units**	**30-Day Ave**	**Daily Max**	**Rolling Annual Average[14] or Other**	**Authority**
Total Recycled Water Flow	mgd			8	Existing Limit
Total Organic Carbon	mg/L			0.5[15]	CDPH
Turbidity	NTU	.2	.5		Existing Limit, CDPH[16]
Lead	mg/L			.015	CDPH
Copper	mg/L			1	CDPH
TDS	mg/L		700		Basin Plan
Chloride	mg/L		150		Basin Plan
Sulfate	mg/L		250		Basin Plan
Boron	mg/L		1.0		Basin Plan
Total Nitrogen[17]	mg/L			5	Existing Limit
Nitrate plus Nitrite as N	mg/L			5[17]	Basin Plan, BPJ
Nitrate	mg/L			5[17]	Basin Plan, BPJ

[14] Based on quarterly measurement

[15] Compliance with 0.5 mg/L based on the 20-week running average of all TOC results and the average of the last four TOC results;

[16] The turbidity of the RO feed water after MF shall not exceed 0.2 nepholometric turbidity units (NTU) more than 5 percent of the time within a 24-hour period or 0.5 NTU at any time. Compliance with the daily average turbidity shall be determined based on using the recorded turbidity taken at intervals of no more than 1.2 hours over a 24-hour period.

[17] A total nitrogen effluent limit of 5 mg/l is included in this Order because the Facility operated in compliance with this limit during the prior permit term. The background concentration of total nitrogen in the coastal pressure zone of the Central Basin averages 1.1 mg/L. There is no Basin Plan limit for total nitrogen in groundwater, but the surface water standard for nitrate plus nitrite nitrogen is 10 mg/L. The maximum groundwater concentration recorded in monitoring wells adjacent to the Barrier between 2007 and 2010 was 2.6 mg/L. Relaxation of the current treatment practices would not be consistent with the anti-degradation policy, which requires the best practicable treatment or control necessary to assure the highest water quality consistent with maximum benefit to the people of the State. The policy also requires existing high quality water to be maintained until a demonstration is made that any change will be consistent with the maximum benefit to the people of the State and will not unreasonably affect present and anticipated beneficial uses. This demonstration, which would be necessary to justify relaxation of the 5 mg/L limit, has not been made.

Total nitrogen shall be defined as the sum of ammonia, nitrite, nitrate, and organic nitrogen concentrations, expressed as nitrogen. The Project Sponsors shall collect each week, one grab or 24-hour composite samples of the recycled water for total nitrogen, nitrite plus nitrate as nitrogen, nitrate and nitrate and nitrite

,[18] The Regional Board has imposed a limit on this chemical in the effluent from an upstream NPDES plant, which is the influent for the Vander Lans WTF. That limit was set because the upstream treatment process may not sufficiently reduce the concentrations to the water quality objectives for tertiary treated effluent. In an abundance of caution, the effluent for the Vander Lans WTF will be monitored to ensure that this chemical meets the MCL and the concentrations are protective of human health before injection Zinc is also limited in upstream NPDES plant, but no human health water quality limits have been established or are set here.

Table 6 –Recycled Water Effluent Limitations					
Constituents	**Units**	**30-Day Ave**	**Daily Max**	**Rolling Annual Average[14] or Other**	**Authority**
Nitrite	mg/L			1[17]	Basin Plan, BPJ
Cyanide	µg/L			700	MCL[18]
4,4"-DDE	µg/L			.00059	MCL[18]
Total Coliform	MPN/100 ml	23		2.2[19]	CDPH
Enteric virus	Log			TBD[21]	CDPH[20]
Giardia	Log			TBD[21]	CDPH[20]
Cryptosporidium	Log			TBD[21]	CDPH[20]
UV power level	%			TBD[21]	CDPH[21]
Hydrogen Peroxide	ml/min			TBD[21]	CDPH[21]
Hydrogen Peroxide	mg/L			TBD[21]	CDPH[21]

4. The pH of the product water for injection or recharge water shall be, at all times, within the range of 6.5 to 8.0 pH units.

5. The recycled water intended for recharge via injection shall be disinfected such that

[18] The Regional Board has imposed a limit on this chemical in the effluent from an upstream NPDES plant, which is the influent for the Vander Lans WTF. That limit was set because the upstream treatment process may not sufficiently reduce the concentrations to the water quality objectives for tertiary treated effluent. In an abundance of caution, the effluent for the Vander Lans WTF will be monitored to ensure that this chemical meets the MCL and the concentrations are protective of human health before injection Zinc is also limited in upstream NPDES plant, but no human health water quality limits have been established or are set here.

[19] 7 day median. This limit assumes achievement of the 1.1 MPN/100 mL groundwater quality objective upon injection.

[20] CDPH conditions specify that the Vander Lans WTF effluent shall achieve a log reduction of 12-10-10 for these pathogens through UV and hydrogen peroxide treatment with subsurface attenuation. When the calculated log reduction is less than 12-10-10, additional sampling and operational adjustments are required as specified in the CDPH Requirements Section below. A log reduction of less than 9-8-8, as defined by CDPH's calculation and report to the Regional Water Board, may indicate that disinfection is not sufficient to allow continued discharge. Under such conditions the quality of the effluent leaving the end of the pipe may not sufficient to protect human health and a violation of the water reclamation requirements has occurred. See the Order's provision which triggers reopening the permit if a limit is defined.

[21] CDPH conditions specify that the Vander Lans WTF effluent shall achieve a log reduction of 12-10-10 for these pathogens through UV and hydrogen peroxide treatment with subsurface attenuation. A log reduction of less than 9-8-8, as defined by CDPH's calculation and report to the Regional Water Board, may indicate that disinfection is not sufficient to allow continued discharge. A UV power level and hydrogen peroxide concentration and application rate quantified under such conditions are to be defined by CDPH calculation and report to the Regional Water Board, and if identified, included as operational limits, representing measurements collected during the treatment process which indicate that the quality of the effluent leaving the end of the pipe may not sufficient to protect human health and is discharged in violation of the water reclamation requirements. See the Order's provision which triggers reopening the permit if a limit is defined.

the 7-day median number of total coliforms shall not exceed 2.2 total coliform bacteria per 100 milliliters (mL), and the number of total coliform organisms shall not exceed 23 total coliform bacteria per 100 mL in more than one sample in any 30-day period prior to injection.

6. Concentrations of contaminants in the recycled water shall, at all times, not exceed the following DHS' MCL for drinking water. These limits are prospective, new state and federal MCL will be added as they are adopted. Compliance with primary MCLs shall be determined on the basis of a running quarterly average, calculated each quarter using the previous four quarters of data. Compliance with secondary MCLs shall be determined annually based on a representative grab sample or the average of samples collected during the year, if more than one. In case of a violation of any of either primary or secondary MCLs, the Project Sponsors shall notify and submit a report according to the provisions of this Order.

    a. Primary MCLs specified in Chapter 15, Domestic Water Quality and Monitoring, Title 22, California Code of Regulations (CCR):

        i. Inorganic chemicals in Section 64431, Table 64431-A, except for nitrogen compounds, Table M-4 of this Order;
        ii. Radionuclides in Section 6443, Table 4, Table M-6 of this Order;
        iii. Regulated organic chemicals in Section 64444, Table 64444-A, Table M-7 this Order; and,

    b. Primary MCLs for disinfection byproducts specified in Chapter 15.5, Article 2, Section 64533, Table 64533-A, Table M-8 of this Order;

    c. Secondary MCLs in Chapter 15, Domestic Water Quality Monitoring, Title 22, CCR, Table 64449-A, Table M-5 of this Order. The Corrosivity Index in Table 64449-A is not applicable for 100% recycled water. The Corrosivity Index after adding lime to the recycled water should be within ±0.5 Langelir Saturation Index(LSI).

    d. Any new Federal or State MCL upon adoption.

7. The recycled water shall not contain taste or odor-producing substances in concentrations that cause nuisance or adversely affect the beneficial uses of the receiving groundwater.

III. DISCUSSION OF EFFLUENT LIMITS

1. Treatment of wastewater intended for groundwater recharge injection shall be as proposed in the Findings of this Order. Additional descriptions of the major modifications to the treatment process are described in this Order and in the *Engineering Report for the Alamitos Barrier Recycled Water Project* (August 1999) and the *Amended Engineering Report for the Alamitos Barrier Recycled Water Project* (May 2002), both prepared by the WRD, and other supplemental information on this Project reviewed by CDPH and the Regional Water Board.

2. In previous waste discharge requirements and water recycling requirements issued

by this Regional Board, the Title 22 requirements set by the CDPH were incorporated in the Order and were considered enforceable. However, the Title 22 requirements have not always been evaluated as effluent limits. In this Order CDPH has established conditions which must be achieved by the treatment plant to ensure protection of public health during consumption of the injected water. Failure to meet the conditions required before the end-of-pipe or calculated from factors before and after discharge, is operationally equivalent to the violation of an effluent limit. The CDPH Requirements are included, as adopted by that agency, in the following section and the full Findings of Fact (FOF) is Attachment C.

3. The monitoring requirements for log reduction, UV intensity, Hydrogen Peroxide concentration and feed rate are calculated by CDPH based on information collected throughout the treatment train. Such complex analyses differ from those simple numeric limits calculated more frequently in Regional Water Board Order. However, effluent limits may be based upon calculations as is found in Basin Plan limits for ammonia or metals where water effects ratios are quantified. Clarification of the monitoring frequency and protocols which provide the information needed by CDPH to quantify the effluent limits in table above and which may allow CDPH to notify RWQCB that conditions are consistent with an effluent violation, have been developed in consultation between the Regional Water Board and CDPH and are included here. The following items shall be reportedly monthly to CDPH and included in the quarterly reports to RWQCB.

    a. Daily total coliform analysis shall be performed after treatment, but before injection. Additional notification requirements are found in Condition 18 under the CDPH Requirements

    b. Membrane Filtration system – A daily MIT shall be performed and results shall be reported for each train that is in operation. The turbidity of the RO feed water shall be continuously measured with an online turbidity meter and recorder, with at least one reading recorded every 1.2 hours. Compliance with the daily average turbidity shall be determined based on using the recorded turbidity taken at intervals of no more than 1.2 hours over a 24-hour period. Should the continuous turbidity meter and recorder fail, grab sampling at a minimum frequency of 1.2 hours shall be substituted for a period of up to 24 hours. The results of the daily average turbidity determinations shall be reported monthly to the Department and included in the quarterly reports to the RWQCB.

    c. RO facility, Conductivity and TOC shall be continuously measured upstream and downstream of the RO using online analyzers, and for each day of operation, the following shall be reported for both conductivity and TOC – daily minimum and maximum, average, and percent reduction calculated from daily average values.

    d. AOP (UV and H2O2) – WRD shall measure and report each day the calculated daily peroxide dose, percent reduction based on daily average of chloramine (via total residual chlorine) measured upstream and downstream

of AOP and the applied UV power will be reported. For UV, WRD shall measure and report the UV system dose, UV transmittance (daily minimum, maximum and average), and UV intensity for each reactor (daily minimum, maximum and average).

e. Based on the calculation of log reduction achieved each day by the entire treatment system, WRD shall report a "Yes" or "No" for each day as to whether the necessary log reductions have been attained in the monthly report. An overall log reduction calculation shall be completed for those days when a portion of the treatment system does not achieve the credits proposed in the Engineering Report. The CDPH shall receive confirmation that the log reduction is being met daily in the monthly report. If a portion of the treatment system is not meeting the goals set forth in the engineering report, a calculation of each train and an overall log reduction determination will be needed for that day in the monthly report

IV. PERFORMANCE GOAL

This Order includes a performance goal of 10 ng/L for n-Nitrosodimethylamine (NDMA), in the recycled water effluent, that was developed by the Regional Water Board. The performance goal has been met by current treatment practices at the Facility and is not expected to require any change in those practices. This performance goal reflects the best practicable treatment and is protective of high quality water in the Basin.

CDPH has established a notification level of 10 ng/L and a reporting level of 300 ng/L for NDMA, at which concentration the responsible water agency is required to notify the public or stop drinking water delivery, respectively. At this time, CDPH has not established an MCL for NDMA. NDMA is identified by the Regional Water Board as a constituent of concern because it is created by the disinfection process and has a known cancer risk. Further, NDMA has been identified by the SWRCB in the Recycled Water Policy as a chemical of emerging concern which should be sampled in recycled water used for groundwater replenishment through injection because of the human health risks. In May 2008, the Vander Lans facility water quality control measures failed to prevent the injection of NDMA at high levels that topped out at concentrations of 445 ng/L. The resulting subsurface plume is calculated to have arrived at the nearest drinking water well in 2012, where the concentration was reduced through dilution from the main aquifer before delivery. Modifications were added to the operating proceedures and treatment process to prevent a recurrance. In the absence of an MCL or objective established by a public process, the Regional Water Board and CDPH agree that the Vander Lans WTF must prevent similar concentrations of NDMA from entering the groundwater. As a result, staff's best professional judgment is that the notification level recommended by CDPH, at which concentration water purveyors must notify their customers, is an appropriate performance goal, in anticipation of the establishment of an MCL for NDMA and as reflective of the best practicable treatment.

Table 7 –Performance Goals			
Constituents	**Units**	**Daily Maximum**	**Authority**
NDMA	ng/l	10	Best Professional Judgement using CDPH Notification Limit

V. CDPH REQUIREMENTS

After a public hearing on June 26, 2013, CDPH finalized and issued its Findings of Fact and Conditions on July 12, 2013. CDPH characterized the treatment process as the best available treatment technology for recycled water used for groundwater recharge by direct injection. Provided that all the Conditions are met, the CDPH finds that the Barrier Project can provide injection recharge water 'that will not degrade the groundwater basins as a source of supply for domestic purposes." The Conditions are incorporated into this Order and are as follows.

1. The total volume of recycled water recharged by injection from the Barrier Project shall not exceed 8.0 mgd.

2. Treatment of recycled water intended for groundwater replenishment shall consist of primary sedimentation, secondary treatment (including nitrification/denitrifcation), granular media filtration, disinfection, MF, RO, UV with hydrogen peroxide addition to provide AOP treatment, with decarbonation and caustic soda addition as needed for pH adjustment and stabilization. Modifications to the treatment train as described in the March 29, 2013 Title 22 Engineering Report on the Vander Lans WTF expansion were reviewed by CDPH and the Regional Water Board.

3. Recycled water used for injection shall be, at all times, adequately oxidized, filtered, disinfected, and subject to organics removal by RO and UV/AOP treatment. There shall be no bypassing of any treatment process, except for decarbonation and caustic soda addition, which provide pH adjustment as required for stabilization in Condition 2.

4. The advanced treatment process at the Vander Lans WTF will include RO and an UV/AOP that, at a minimum, meet the following criteria: The RO membrane shall comply with ASTM method D4194-03 (2008), which achieves a minimum rejection of sodium chloride of no less than 99.0 percent and an average (nominal) rejection of sodium chloride of no less than 99.2 percent under the following conditions:

    a. Recovery: 15 percent;

    b. Temperature: 25C;

    c. Influent pH: between 6.5 and 8.5;

    d. Sodium chloride rejection is based on three or more successive measurements, after flushing and following at least 30 minutes of operation having demonstrated that rejection has stabilized;

    e. An influent sodium chloride concentration of no greater than 2,000 mg/L; and

f. During the first 20-weeks of full-scale operation the membrane produces a permeate having no TOC concentration greater than 0.25 mg/L, 5 percent of the time, as verified through monitoring no less frequent than weekly.

5. The UV/AOP treatment system at the Vander Lans WTF shall provide a sufficient oxidation process to provide no less than 0.5-log (69 percent) reduction of 1,4-dioxane. WRD will conduct spiking challenge testing to demonstrate the proposed oxidation process will achieve the minimum 0.5-log reduction under the proposed oxidation process's normal full-scale operating conditions. WRD shall establish surrogate and/or operational parameter(s) that reflect whether the minimum 0.5- log 1,4-dioxane reduction design criterion is being met. At least one surrogate or operational parameter shall be capable of being monitored continuously, recorded, and have associated alarms that indicate when the process no longer operates as designed.

   Each quarter, WRD shall tabulate the percent of the monitoring results that did not meet the surrogate and/or operational parameter limits established to assure proper on-going performance of the RO and UV/AOP. If the calculated value is more than ten percent, within 30 days after the end of the quarter, the WRD shall submit a report to CDPH and the Regional Water Board describing the corrective actions planned or taken to reduce the percentage to ten percent or less; and consult with CDPH and, if required by CDPH, comply with an alternative monitoring plan approved by CDPH.

6. The recycled water used as recharge water in the Barrier Project shall receive pathogen reduction treatment that achieves at least 12-log enteric virus reduction, 10-log Giardia cyst reduction and 10-log Cryptosporidium oocyst reduction. The treatment train shall consist of at least three separate treatment processes. Each separate treatment process may be credited with no more than 6-log reduction. With the exception of retention time underground, each treatment process of the treatment train shall be validated for their log reduction by report or challenge tests. WRD has demonstrated that it achieves a 6-month underground retention time based on tracer tests. No further tracer tests are required. Each treatment process of the treatment train shall be validated for their log reduction by monitoring conducted pursuant to the Operations Plan or challenge tests. The Operations Plan shall specify that WRD will conduct on-going monitoring to verify the performance of each treatment process's ability to achieve its credited log reduction on a daily basis, with the results to be reported monthly.

7. If the pathogen reduction of the combined treatment trains is not met based on ongoing monitoring required in Requirement 6, within 24 hours of being aware, WRD shall initiate corrective actions. For failing to meet the pathogen reduction criteria for longer than 4 consecutive hours or more than 8 hours during any 7-day period, CDPH and the Regional Water Board shall be immediately notified. Failures of shorter duration shall be reported to the Regional Water Board no later than 10 days after the month in which the failure occurs. If the effectiveness of the treatment train's ability to reduce enteric virus is less than 9-logs, Giardia Cyst or Cryptosporidium oocysts is less than 8-logs, the use of recycled water shall be

discontinued at the Barrier Project and CDPH and the Regional Water Board shall be notified immediately.

8. WRD shall enter into an agreement with CSDLAC to ensure that a comprehensive industrial pretreatment and pollutant source control program implemented to prevent contaminants that might adversely impact the quality of the reclaimed water being produced by the Vander Lans WTF from entering the sewer system. At a minimum the program shall include:

    a. an assessment of the fate of CDPH and Regional Water Board-specified contaminants through the wastewater and recycled municipal wastewater treatment systems,

    b. contaminant source investigations and contaminant monitoring that focus on CDPH and Regional Water Board-specified contaminants,

    c. an outreach program to industrial, commercial, and residential communities within the portions of the sewage collection agency's service area that flows into the water reclamation facility subsequently supplying the Barrier Project, for the purpose of managing and minimizing the discharge of contaminants at the source, and

    d. a current inventory of contaminants identified pursuant to this section, including new contaminants resulting from new sources or changes to existing sources, that may be discharged into the wastewater collection system.

9. The monthly running average recycled water contribution (RWC) that is injected into the Barrier Project may be up to 100 percent of the total water injected at the Barrier Project. Any diluent water for the Barrier Project shall be imported treated drinking water. For each month, a monthly running average RWC shall be determined by dividing the total volume of recycled water injected by the total volume of injection water associated with a time period not to exceed the preceding 120 months.

10. Analyses for contaminants having primary or secondary MCLs shall be performed by laboratories approved to perform such analyses by CDPH utilizing CDPH-approved drinking water methods. Analyses for constituents other than those having a primary or secondary MCLs shall be described in the Operations Plan.

11. The recycled water injected shall meet all MCLs and other limits specified in the Drinking Water Quality and Monitoring Requirements, California Code of Regulations (CCR), Title 22, Chapter 15 and other limits as follows:

    a. Inorganic chemicals in Table 64431-A (except for nitrogen compounds);
    b. Radionuclides in Table 4, Section 64442 and 64443;
    c. Organic chemicals in Table 64444-A;
    d. Any new Federal or State maximum contaminant level upon adoption;
    e. Disinfection byproducts in Table 64533-A;
    f. Lead and copper; and
    g. g. Secondary maximum contaminant levels in Tables 64449-A and 64449-B

("Upper" levels).

Recycled water shall be monitored on a quarterly basis at regular intervals by analyzing a 24-hour composite or grab sample to determine compliance with primary MCLs referenced above for inorganic chemicals, radionuclides, organic chemicals, and disinfection byproducts, and lead and copper referenced above. Compliance shall be based on the running-annual average, calculated each quarter using the previous four quarters of data.

Each year, WRD shall collect at least one representative grab sample of the recycled municipal wastewater and have the sample(s) analyzed for the secondary drinking water constituents in Tables 64449-A and 64449-B.

If a result of the monitoring performed exceeds a contaminant's MCL or action level (for lead and copper), within 72 hours of notification of the result, WRD shall collect another confirmation sample.

For a contaminant whose compliance with its MCL or action level is not based on a running annual average, if the average of the initial and confirmation sample exceeds the contaminant's MCL or action level, or the confirmation sample is not collected and analyzed pursuant to this subsection, WRD shall notify CDPH and the Regional Water Board within 24 hours of knowledge (of the exceedance or of the sampling lapse) and initiate weekly monitoring until four consecutive weekly results are below the contaminant's MCL or action level. If the running four-week average exceeds the contaminant's MCL or action level, WRD shall notify CDPH and the Regional Water Board within 24 hours and, if directed by CDPH or the Regional Water Board, suspend application of the recycled municipal wastewater.

For a contaminant whose compliance with its MCL is based on a running annual average, if the average of the initial and confirmation sample exceeds the contaminant's MCL, or a confirmation sample is not collected and analyzed pursuant to this subsection, WRD shall initiate weekly monitoring for the contaminant until the running four-week average no longer exceeds the contaminant's MCL.

If the running four-week average exceeds the contaminant's MCL, WRD shall describe the reason(s) for the exceedance and provide a schedule for completion of corrective actions in the next quarterly report submitted to the Regional Water Board with a copy provided to CDPH.

If the running four-week average exceeds the contaminant's MCL for sixteen consecutive weeks, WRD shall notify CDPH and the Regional Water Board within 48 hours of knowledge of the exceedance and, if directed by CDPH or the Regional Water Board, suspend application of the recycled municipal wastewater.

With the exception of color, if an annual result of the monitoring performed for secondary drinking water constituents exceeds a constituent's secondary MCL in Table 64449-A or the upper limit in Table 64449-B, WRD shall initiate quarterly monitoring of the recycled municipal wastewater for the constituent, and if the running annual average of quarterly results exceeds a constituent's secondary MCL or upper limit, describe the reason(s) for the exceedance and any corrective actions

taken in the next quarterly report submitted to Regional Water Board pursuant to section 60321, with a copy provided to CDPH. The annual monitoring of secondary drinking water constituents in Tables 64449-A and 64449-B may resume if the running annual average of quarterly results does not exceed a constituent's secondary MCL or upper limit.

Since all of the past monitoring results for asbestos have been below the detection limit for asbestos, monitoring of the recycled water for asbestos may be performed once every three years. If asbestos is detected, quarterly monitoring shall be initiated. If four consecutive quarterly monitoring results for asbestos have been below the detection limit for asbestos, monitoring for asbestos may return to once every three years.

12. Any recycled water that may already be present in the groundwater because of on-going project related activities should be accounted for as a part of the total amount of recycled water in calculating the percent of recycled water in an aquifer.

13. The total nitrogen concentration of the Barrier Project recycled water shall not exceed 10 mg/L as nitrogen[22]. Total nitrogen shall be defined as the sum of ammonia, nitrite, nitrate, and organic nitrogen concentrations, expressed as nitrogen. WRD has sampled twice a week for total nitrogen and for the past 12 months, results show the total nitrogen is consistently below 5 mg/L and one-half the nitrate and nitrite MCL. WRD shall collect each week, one grab or 24-hour composite samples of the recycled water for total nitrogen analysis. If the total nitrogen concentration exceeds 10 mg/L as nitrogen, the laboratory must report the result to the WRD within 72 hours of completion of the analysis results and WRD will initiate additional monitoring as described in the Operations Plan. If two consecutive samples exceed 10 mg/L total nitrogen, WRD shall notify the Regional Water Board and CDPH, investigate the cause of the exceedance and take actions to reduce the total nitrogen concentration and investigate the groundwater basin to identify elevated concentrations and determine whether such elevated concentrations of nitrogen exceed or may lead to an exceedance of a nitrogen-based MCL. If the average of four consecutive samples collected exceeds 10 mg/L total nitrogen, suspend the subsurface application of recycled water. Subsurface application shall not resume until corrective actions have been taken and at least two consecutive total nitrogen sampling results are less than 10 mg/L.

    After such an exceedance event, total nitrogen samples (grab or 24-hour composite) shall be twice per week, at least three days apart between samples. WRD may reapply for CDPH's approval of weekly monitoring based on the demonstration that the following conditions have been met for the most recent 12 months: (a) the average of all results did not exceed 5 mg/L total nitrogen; and (b) the average of a result and its confirmation sample (taken within 3 business days of receipt of the initial result) did not exceed 10 mg/L total nitrogen.

14. If necessary to supplement the recycled water injection with diluent water, WRD will utilize a CPDH-approved drinking water source as diluent water. As such, WRD

[22] The more stringent limit set by the Regional Water Board in the effluent limits will supersede this CDPH condition as discussed as a footnote to Table 6.

shall be exempt from diluent water monitoring for nitrate and nitrite as long as the approved drinking water source is utilized.

15. The Total Organic Carbon (TOC) concentration of the recycled water shall not exceed 0.5 mg/L based on the 20-week running average of all TOC results and the average of the last four TOC results. Each month, compliance shall be determined based on the running average of the most recent 20 samples and the average of the last four samples. Each week a grab or 24-hour composite sample of the recycled water shall be collected for TOC analysis. If the average TOC concentration exceeds 0.5 mg/L based on the 20-week running average, then injection of recycled water shall be suspended until at least two consecutive results, three days apart, are less than the limit. Within seven days of the suspension, the WRD shall notify CDPH and the Regional Water Board. Within 60 days of knowledge of a TOC limit exceedance, WRD shall submit a report to CDPH and the Regional Water Board describing the reasons for the exceedance and the corrective actions planned to avoid future exceedances. At a minimum, the corrective actions shall include a reduction of RWC sufficient to comply with the limit.

16. The turbidity of the RO feed water after the MF treatment shall not exceed 0.2 NTU more than 5 percent of the time in any 24-hour period, and shall not exceed 0.5 NTU at any time. The turbidity of the RO feed water shall be continuously measured with an online turbidity meter and recorder, with at least one reading recorded every 1.2 hours. Compliance with the daily average turbidity shall be determined based on using the recorded turbidity taken at intervals of no more than 1.2 hours over a 24-hour period. Should the continuous turbidity meter and recorder fail, grab sampling at a minimum frequency of 1.2 hours may be substituted for a period of up to 24 hours. The results of the daily average turbidity determinations shall be reported quarterly to CDPH and the Regional Water Board. Whenever the turbidity limit is exceeded, the Vander Lans WTF shall be shut down automatically and result in the suspension of injection of recycled water until such time that the cause of the high turbidity condition has been identified and corrected. Any failure to meet the turbidity performance requirements shall be reported to CDPH and the Regional Water Board in the next monthly report.

17. Using online analyzers, the conductivity and TOC of the RO feedwater and RO product water upstream of the UV system shall be continuously measured and recorded. For both conductivity and TOC, daily minimum, maximum, average, and percent reductions based on daily average values shall be reported.

18. The recycled water intended for recharge via injection shall be disinfected such that the 7-day median number of total coliforms shall not exceed 2.2 total coliform bacteria per 100 milliliters (ml), and the number of total coliform organisms shall not exceed 23 total coliform bacteria per 100 ml in more than one sample in any 30-day period prior to injection. No sample shall exceed 240 total coliform bacteria per 100 ml. A grab sample shall be analyzed daily for total coliform bacteria. A failure to meet these requirements shall require a report describing the cause of the failure and the corrective actions taken to avoid future violations of these requirements. Failure to meet the 7-day median coliform requirement for two consecutive days shall result in the suspension of the injection of recycled water until such time as the cause of the failure has been identified and corrected. Any failure to meet the total

coliform requirements shall be reported to CDPH and the Regional Water Board in the next quarterly report.

19. Each quarter or annually, samples of the recycled water shall be collected and analyzed as follows, and any results greater than analytical reporting levels (RLs) shall be reported to CDPH and the Regional Water Board in the next quarterly report:

    a. Priority toxic pollutants (chemicals listed in the Water Quality Standards, Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California, and 40 Code of Federal Regulations (CFR) Part 131, Federal Register 65 (97), May 18, 2000, p.31682) specified by CDPH based on CDPH's review of the engineering report; and

    b. Chemicals with state notification levels that CDPH has specified based on the review of the engineering report; and

    c. Chemicals the CDPH has specified, based on a review of the Engineering Report, the affected groundwater basin(s), and the results of the source control assessment.

    The CDPH may request the WRD to further investigate results greater than RLs and identify, if appropriate, corrective actions. An investigation may include such actions as positive result confirmation, comparison to diluent water quality (if used), groundwater monitoring, source control and/or treatment.

    The Barrier Project has been in operation and conducted monitoring which has been evaluated by CDPH and the Regional Water Board. WRD has completed the initial quarterly monitoring. Reduced monitoring may continue as outlined in the Engineering Report, Section 12.

    If a result is greater than an NL, within 72 hours of knowledge of the result, WRD shall collect another sample for the contaminant as confirmation. If the average of the initial and confirmation sample is greater than the contaminant's NL, or a confirmation sample is not collected and analyzed pursuant to this subsection, WRD shall initiate weekly monitoring for the contaminant until the running four- week average is less than the NL. If the running four-week average is greater than the contaminant's NL, WRD shall describe the reason(s) for the results and provide a schedule for completion of corrective actions in the next quarterly report submitted to the Regional Water Board, with a copy provided to CDPH. If the running four-week average is greater than the contaminant's NL for sixteen consecutive weeks, WRD shall notify CDPH and the Regional Water Board within 48 hours of knowledge of the exceedance and, if directed by CDPH, suspend application of the recycled municipal wastewater.

20. The WRD shall monitor the performance of the UV treatment at the Vander Lans WTF for NDMA reduction by sampling the influent to the Vander Lans WTF quarterly for NDMA. The influent sampling to the Vander Lans WTF for NDMA may be incorporated into the NDMA sampling of the Long Beach WRP and in the future Los Coyotes WRP conducted by CSDLAC, provided that the sampling is performed using the same analytical method and laboratory.

21. To ensure that the Vander Lans WTF meets all of the performance criteria for the purposes of protecting health, the WRD shall operate all equipment and facilities for treatment and recharge at levels of peak performance in order to limit the presence of contaminants in the recycled water.

22. Prior to startup of the expanded Vander Lans WTF, WRD shall submit an Operations Plan to CDPH and the Regional Water Board for approval. At a minimum, the Operations Plan shall identify the operations, maintenance, analytical methods, monitoring, and reporting of monitoring results to CDPH and the Regional Water Board. The monitoring procedures should be described for normal, start-up, off-spec and emergency conditions. The Operations Plan shall also include a contingency plan for off-spec water and an emergency response plan. The WRD shall operate its facilities in accordance with the approved Operations Plan. After six months of operation, the Operations Plan shall be updated as necessary and submitted to CDPH and Regional Water Board for review and approval. The Operations Plan shall cover critical operational parameters to include routine testing procedures for the MF, RO, and UV/AOP systems, optimization of the UV dose for disinfection and reduction of light-sensitive contaminants, and all treatment processes, maintenance and calibration schedules for all monitoring equipment, process alarm set points, and response procedures for all alarms in each treatment process of the Vander Lans WTF, including criteria for diverting recycled water if water quality requirements are not met, start-up, emergency response and contingency plans. During the first year of operation of the expanded Vander Lans WTF, all treatment processes shall be operated in a manner to provide optimal reduction of microbial, regulated and nonregulated contaminants. Based on this experience and anytime operational changes are made, the Operations Plan shall be updated. The Operations Plan shall include staffing levels with applicable certification levels for Vander Lans WTF operations personnel. Significant changes in the operation of any of the treatment processes shall be reported to CDPH and the Regional Water Board. Significant changes in the approved Operations Plan must be approved by CDPH and the Regional Water Board prior to instituting changes. WRD shall be responsible for ensuring that the Operations Plan is, at all times, representative of the current operations, maintenance, and monitoring of the Vander Lans WTF.

23. At the Barrier Project, the recycled water shall be retained in the groundwater basins for a minimum of 6 months prior to being withdrawn at a domestic water supply well based on information provided in Section 5 (Pathogen Microorganism Control) of the Engineering Report. A numerical model and tracer study has been completed, whose results verified the retention and response time is adequate prior to the recycled water reaching the nearest domestic water supply well. WRD shall monitor the Barrier Project and area between the barrier and the nearest domestic wells. If additional extraction wells are utilized in the future that would alter the flow path of the recycled water or the speed in which the recycled water travels, the numerical model and possibly additional tracer testing would need to be conducted for recalibration.

24. WRD shall maintain ordinances, resolutions, and policies that effectively prevent within the area required to achieve 6 months underground retention and response time from the Barrier Project, the use of groundwater for drinking water purposes and

construction of any domestic supply wells.

25. Groundwater monitoring to detect the influence of the recycled water injection operation at the Barrier Project shall be performed. Monitoring wells have been sited at a location within approximately three months travel time of the Barrier Project injection wells and at additional intermediate points between the Barrier Project and the nearest downgradient domestic water well, and such that samples can be obtained independently from each aquifer potentially conveying the recharge water.

26. Two sets of nested (multi-depth) groundwater (3-month and ¼ distance wells) have been located between the Barrier Project injection wells and the nearest domestic water supply well, City of Seal Beach SB-LEI. WRD has conducted previous tracer monitoring and determined the travel time from the Barrier to SB-LEI is approximately 4.3 years. The 3-month underground travel time monitoring wells are 503BF in the C-Zone, 503BE in the B-Zone, 502BX in the A-Zone and 502BW in the I-Zone. The ¼ distance monitoring wells, which are located approximately quarter distance from the Barrier to the SB-LEI, are 502AK for the C-Zone, 502AL for the B-Zone, 502AM for the A-Zone, and 502AN for the I-Zone. WRD has conducted and submitted the baseline groundwater monitoring for the monitoring wells prior to project startup. WRD will also utilize wells 503P, recent aquifer, and 503M, main aquifer, as background monitoring for aquifers that recycled water is not injected into.

27. The groundwater monitoring program shall be periodically reviewed and modified based on results of the monitoring program. Changes to the monitoring program, including well locations, shall be approved by CDPH and the Regional Water Board. The groundwater monitoring program will be implemented in accordance with Section 13.7 of the March 29, 2013 Title 22 Engineering Report approved by CDPH.

    If a result from the monitoring conducted above exceeds 80 percent of a nitrate, nitrite, or nitrate plus nitrite MCL, WRD shall, within 24 hours of being notified of the result by the laboratory, collect another sample. If the average of the result of the initial sample and the confirmation sample exceed the contaminant's MCL, WRD shall within 24 hours of being notified by the laboratory of the confirmation sample result, notify CDPH and the Regional Water Board and discontinue subsurface application of recycled municipal wastewater until corrective actions have been taken or evidence is provided to the CDPH and the Regional Water Board that the contamination was not a result of the Vander Lans WTF.

28. The WRD shall submit all water quality data associated with groundwater monitoring in a format acceptable to CDPH and the Regional Water Board. Analytical results shall be reported electronically using the format prescribed by the Regional Water Board.

29. The WRD shall submit, no later than six months after the end of each calendar year, a report to CDPH, the Regional Water Board, and any public water systems having downgradient sources potentially affected by the Barrier Project within 10 years travel time shall be notified by direct mail and/or electronic mail of the availability of the report. The report shall be prepared by an engineer licensed in California and experienced in the field of wastewater treatment and public water supply ..The

annual report shall include:

a. a summary of the Barrier Project and Vander Lans WTF compliance status with the applicable monitoring requirements during the previous calendar year

b. for any violations during the previous calendar year; the date, duration, and nature of any violation; a summary of any corrective actions and/or suspensions of subsurface application of recycled municipal wastewater resulting from a violation; and if uncorrected, a schedule for and summary of all remedial actions

c. any detections of monitored chemicals or contaminants, and any observed trends in the monitoring wells and diluent water supplies;

d. information pertaining to the vertical and horizontal migration of the recharge water plume;

e. a description of any changes in the operation of any unit processes or facilities;

f. the estimated quantity and quality of the recycled municipal wastewater and diluent water to be utilized for the next calendar year;

g. increases in RWC during the previous calendar year and RWC increases anticipated for the current calendar year; and

h. a summary of the measures taken to provide an effective source control program and the effectiveness of the implementation of the measures.

30. WRD already has in place and shall continue to maintain a resolution adopted by its governing board ensuring that it will be responsible for developing a plan for providing an alternative source of domestic water supply, or a CDPH approved treatment mechanism, to any user whose domestic water well is found to violate California drinking water quality regulations as a direct result of the Barrier Project or Vander Lans WTF, or when CDPH makes an analysis and finding that the domestic water well is unsuitable for human consumption as a direct result of the Barrier Project or Vander Lans WTF, which will include failure to meet Condition 11above. Alternative sources may include water delivered for blending of the production well, imported water, water produced at a well head treatment plant, and water produced from new wells.

31. The WRD shall provide an update to the 2013 Title 22 Engineering Report every five years after startup of the expanded Vander Lans WTF to CDPH and the Regional Water Board.

V. GROUNDWATER LIMITATIONS

The Project Sponsors shall monitor the quality of groundwater, the receiving water, to assess any impact(s) from the recharge of recycled water. Representative samples of groundwater shall be collected from each independent aquifer as follows.

Table 8 – Groundwater Limitations				
Constituents/parameters	**Units**	**Daily Maximum**	**Annual Average**	**Authority**
Water Level Elevation	feet			Existing Order
Total coliform	MPN/100ml	1.1		Basin Plan
Nitrate-nitrogen as N	mg/L	10		Basin Plan
Nitrite-nitrogen as N	mg/L	1		Basin Plan
Nitrate-Nitrogen plus Nitrite-Nitrogen as N	mg/L	10		Basin Plan
Total dissolved solids	mg/L		700	Basin Plan
Sulfate	mg/L		250	Basin Plan
Chloride	mg/L		150	Basin Plan
Boron	mg/L	.	1.0	Basin Plan

VIII. GENERAL REQUIREMENTS

16. Recycled water shall not be used for direct human consumption or for the processing of food or drink intended for human consumption.

17. Bypass, discharge, or delivery to the use area of inadequately treated recycled water, at any time, is prohibited.

18. The recycling facility shall be adequately protected from inundation and damage by storm flows.

19. Recycled water use or disposal shall not result in earth movement in geologically unstable areas.

20. Odors of sewage origin shall not be perceivable at any time outside the boundary of the treatment facility.

21. The Project Sponsors shall, at all times, properly operate and maintain all treatment facilities and control systems (and related appurtenances) which are installed or used by the Project Sponsors to achieve compliance with the conditions of this Order. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls (including appropriate quality assurance procedures).

22. A copy of these requirements shall be maintained at the Facility so as to be available at all times to operating personnel.

23. Supervisors and operators of this advanced water treatment plant shall possess a certificate of appropriate grade as specified in CCR title 23, Division 3, Chapter 26.

24. For any material change or proposed change in character, location, or volume of recycled water, or its uses, the Project Sponsors shall submit at least 120 days prior to the proposed change an engineering report or addendum to the existing

engineering report to the Regional Water Board and CDPH (pursuant to CWC Division 7, Chapter 7, Article 4, Section 13522.5 and CCR Title 22, Division 4, Chapter 3, Article 7, Section 60323) for approval. The Engineering Report shall be prepared by a qualified engineer registered in California.

IX. PROVISIONS

1. Replacement or addition of injection wells to the Alamitos Barrier will not require a report of material change, filing of a new Report of Waste Discharge, or submitting an updated Engineering Report, provided:

    a. the additional injection capacity does not violate any requirement in this Order;

    b. at least 30 days prior to installation, the WRD submit in writing the purpose and location of the wells to CDPH and the Regional Water Board; and,

    c. within 90 days after the installation of the wells, the WRD submit in writing the complete geologic and electrical logs and as-built construction diagrams of the injection wells, to the CDPH and the Regional Water Board.

2. Project Sponsors will submit the well location, design, and rationale for the construction to CDPH and the Regional Water Board for approval before construction. The Regional Board shall provide approval within 30 days, or the approval for construction shall be granted.

3. The Project Sponsors shall submit to the Regional Water Board, under penalty of perjury, self-monitoring reports according to the specifications contained in the MRP, as directed by the Executive Officer and signed by a designated responsible party.

4. The Project Sponsors shall notify this Regional Water Board and CDPH by telephone or electronic means within 24 hours of knowledge of any violations of recycled water use conditions or any adverse conditions as a result of the use of recycled water from this facility; written confirmation shall follow within 5 working days from date of notification. The report shall include, but not be limited to, the following information, as appropriate:

    a. The nature and extent of the violation;

    b. The date and time when the violation started, when compliance was achieved, and when injection was suspended and restored, as applicable;

    c. The duration of the violation;

    d. The cause(s) of the violation;

    e. Any corrective and/or remedial actions that have been taken and/or will be taken with a time schedule for implementation to prevent future violations; and,

    f. Any impact of the violation.

5. This Order does not exempt the Project Sponsors from compliance with any other laws, regulations, or ordinances which may be applicable; it does not legalize the recycling and use facilities; and it leaves unaffected any further constraint on the use of recycled water at certain site(s) that may be contained in other statutes or required by other agencies.

6. This Order does not alleviate the responsibility of the Project Sponsors to obtain other necessary local, state, and federal permits to construct facilities necessary for compliance with this Order; nor does this Order prevent imposition of additional standards, requirements, or conditions by any other regulatory agency.

7. After notice and opportunity for a hearing, this Order may be modified, revoked and reissued, or terminated for cause, including but not limited to, failure to comply with any condition in this Order; endangerment of human health or environment resulting from the permitted activities in this Order; obtaining this Order by misrepresentation or failure to disclose all relevant facts; or, acquisition of new information that could have justified the application of different conditions if known at the time of Order adoption. The filing of a request by the Project Sponsors for modification, revocation and reissuance, or termination of the Order or a notification of planned changes or anticipated noncompliance does not stay any condition of this Order.

8. The Project Sponsors shall furnish, within a reasonable time, any information the Regional Water Board or CDPH may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Order. The Project Sponsors shall also furnish the Regional Water Board, upon request, with copies of records required to be kept under this Order for at least three years.

9. In an enforcement action, it shall not be a defense for the Project Sponsors that it would have been necessary to halt or to reduce the permitted activity in order to maintain compliance with this Order. Upon reduction, loss, or failure of the treatment facility, the Project Sponsors shall, to the extent necessary to maintain compliance with this Order, control production or all discharges, or both, until the facility is restored or an alternative method of treatment is provided. This provision applies, for example, when the primary source of power of the treatment facility fails, is reduced, or is lost.

10. This Order includes the attached *Standard Provisions Applicable to Waste Discharge Requirements*. If there is any conflict between the provisions stated hereinbefore and the Standard Provisions, the provisions stated hereinbefore shall prevail.

11. This Order includes the attached MRP No. CI-8956. If there is any conflict between provisions stated in the MRP and the Standard Provisions, those provisions stated in the MRP prevail.

X. REOPENER

1. This Order may be reopened to include the most scientifically relevant and appropriate limitations for this discharge, including a revised Basin Plan limit based on monitoring results, antidegradation studies, or other Board policy or the

application of an attenuation factor based upon an approved site-specific attenuation study.

2. The WDRs/WRRs may be reopened to modify limitations for constituents which show reasonable potential to cause or contribute to an exceedance of a Basin Plan water quality objective based on additional data.

3. Upon completion and adoption of the SNMP into the Basin Plan, this Order may be reopened to ensure that the requirements listed here adequately implement that plan.

4. This Order may be reopened to incorporate any new regulatory requirements for sources of drinking water or injection of recycled water for groundwater recharge to aquifers that are used as a source of drinking water, that are adopted after the effective date of this Order.

5. This Order may be reopened to incorporate values calculated by CDPH which may indicate that disinfection is not sufficient to allow continued discharge. Under such conditions the quality of the effluent leaving the end of the pipe may not sufficient to protect human health.

XI. EFFECTIVE DATE OF THE ORDER

This Order takes effect upon its adoption.

I, Samuel Unger, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the Regional Water Board, Los Angeles Region on March 7, 2014.

_____
Samuel Unger, P.E.
Executive Officer

DRAFT TENTATIVE

FIGURE 1 – LOCATION OF ALAMITOS SEAWATER INJECTION BARRIER

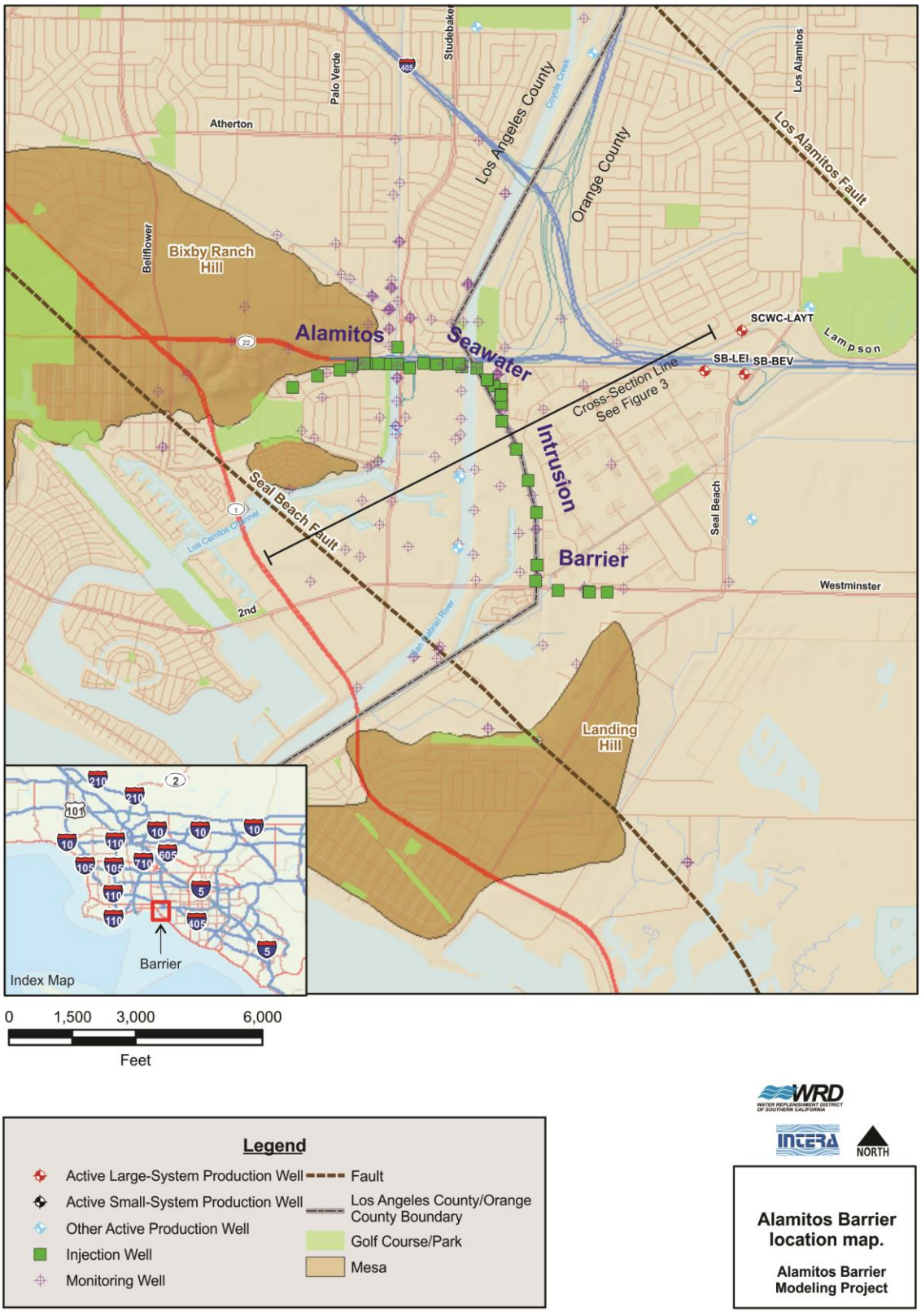

FIGURE 2 – Leo J. Vander Lans Water Treatment Facility

DRAFT TENTATIVE

FIGURE 3– PROCESS FLOW DIAGRAM

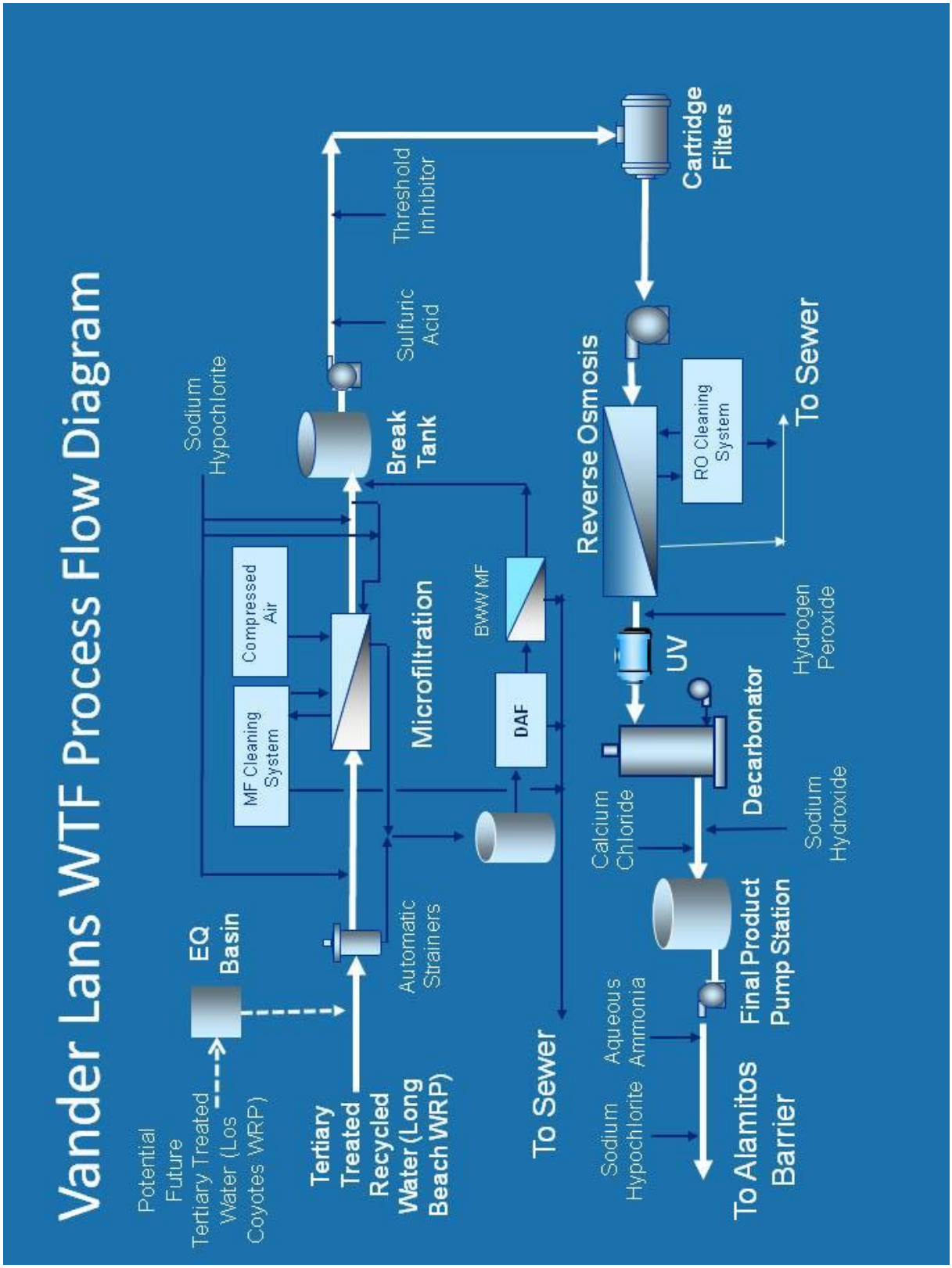

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FIGURE 4- CROSS SECTION OF WELL INJECTION FIELD

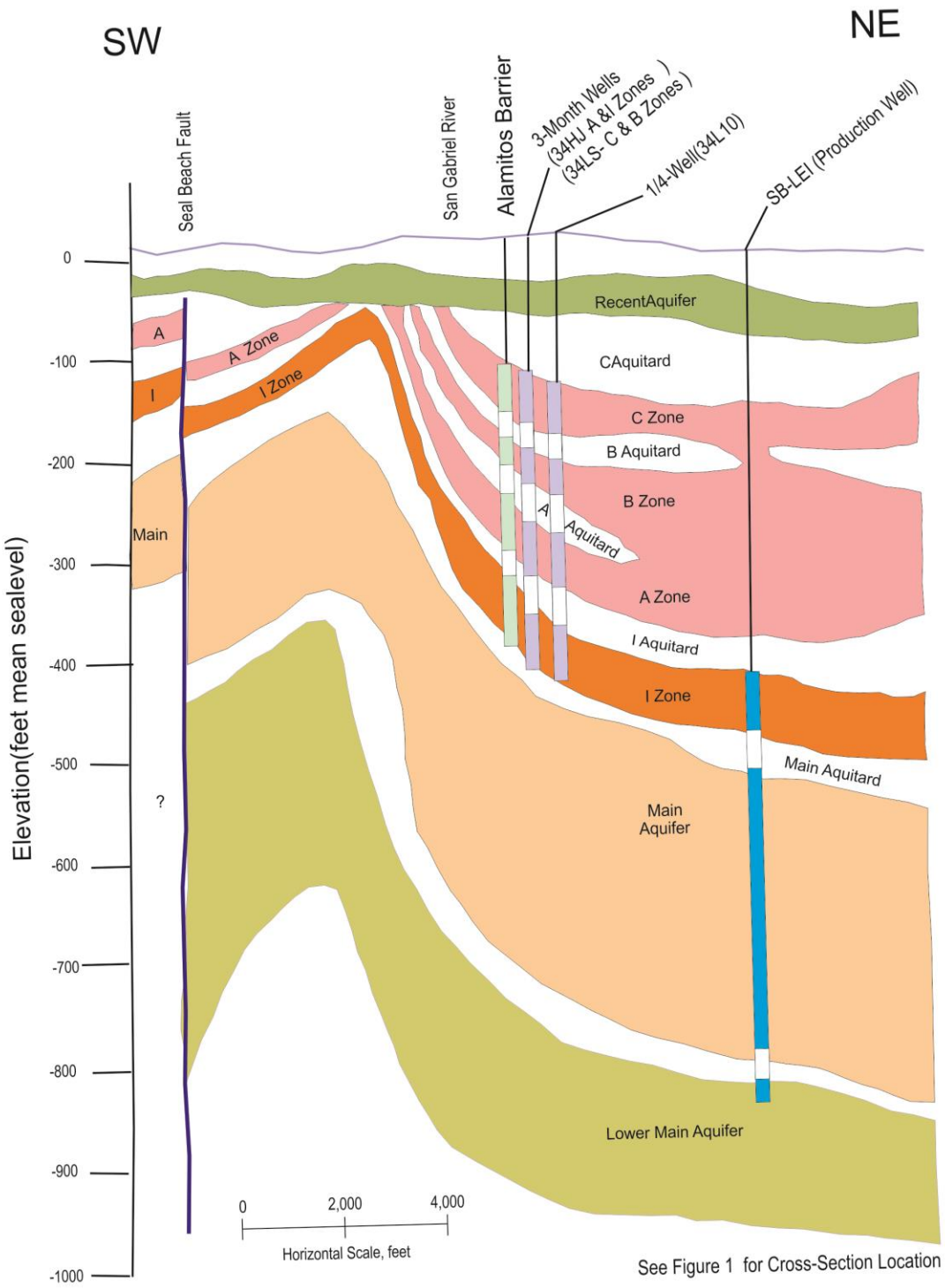
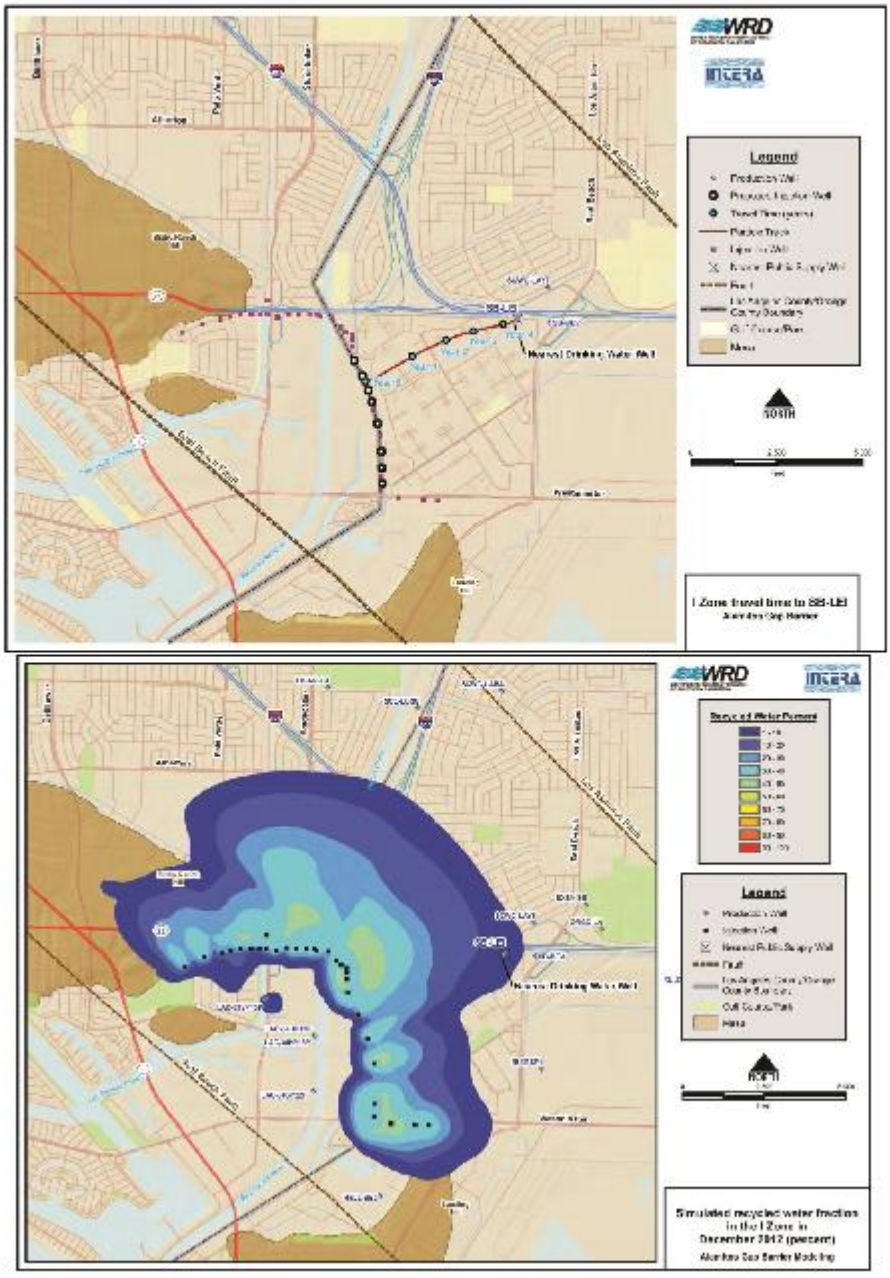


FIGURE 5 – TRAVEL TIME TO NEAREST DRINKING WATER WELL
AND PERCENT RECYCLED WATER IN THE I-ZONE AQUIFER IN 2012



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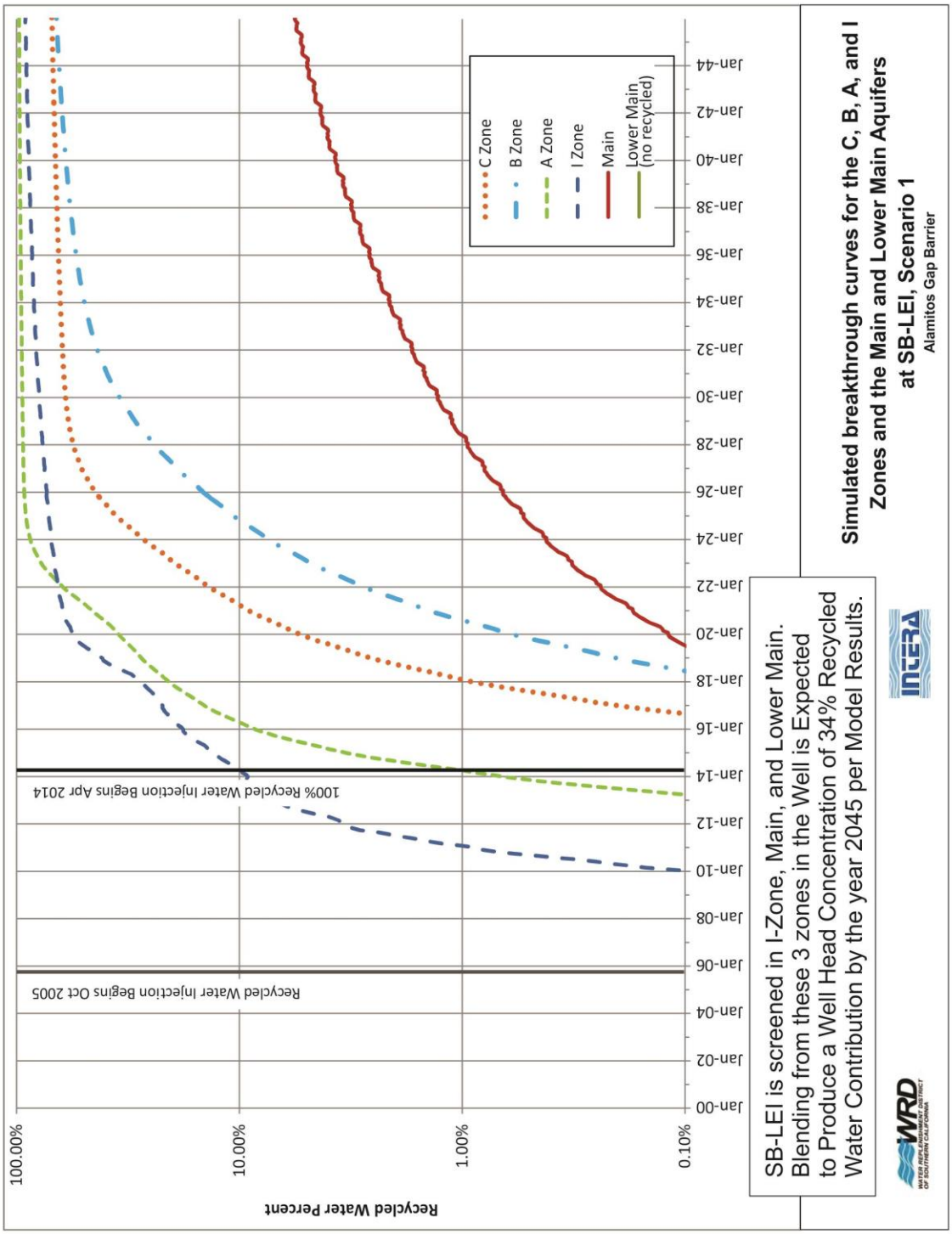
DRAFT TENTATIVE

FIGURE 6 – PREDICTED RECYCLED WATER CONCENTRATIONS IN AQUIFERS AT NEAREST DRINKING WATER WELL WITH 100% RECYCLED WATER INJECTION



State of California
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION

ORDER NO. R4-2014-XXX

MONITORING AND REPORTING PROGRAM NO. CI-8956
FOR THE
ALAMITOS BARRIER RECYCLED WATER PROJECT
(File No. 93-076)

ISSUED TO

Los Angeles County Department of Public Works
Water Replenishment District of Southern California

The Los Angeles County Department of Public Works (LACDPW) and the Water Replenishment District of Southern California (WRD) collectively referred to as Project Sponsors, shall implement this Monitoring and Reporting Program (MRP) on the first of the month following the month this Order was adopted and the startup of the expanded Leo J. Vander Lans Water Treatment Facility (Vander Lans WTF or Facility).

I. SUBMITTAL OF REPORTS

1. The Project Sponsors shall submit the required reports, outlined in the following paragraphs, to the State Water Resources Control Board (State Water Board)'s Geotracker database and to the California Department of Public Health (CDPH), Drinking Water Field Operations, Los Angeles Region by the dates indicated in the following:

    a. Quarterly Monitoring: Quarterly Monitoring Reports shall be received by the State Water Board's Geotracker and the CDPH by the 15th day of the second month following the end of each quarterly monitoring period according to Table M-1.

Table M1: Quarterly Report Periods and Due Dates

Reporting Period	Report Due
January – March	May 15
April – June	August 15
July – September	November 15
October – December	February 15

The contents of the Geotracker Quarterly Monitoring Report shall include a one page summary summarizing operational concerns, showing changes in reporting conditions, including influent, effluent, and groundwater monitoring requirements, since the last report and an explanation of the change. Where

monitoring has been reduced to semi-annually or annually, a similar summary shall be provided for the constituents on the applicable report.

b. Annual Summary: Annual Summary Report shall be received by the State Water Board's Geotracker and the CDPH by April 15 of each year. This Annual Summary Report shall contain a discussion of the previous calendar year's analytical results, as well as graphical and tabular summaries of the monitoring analytical data. Public water systems having downgradient sources potentially affected by the Barrier or within 10 years groundwater travel time from the Barrier shall be notified by direct mail and/or electronic mail of the availability of the report.

c. Vander Lans WTF Operation Plan: Prior to startup of the expanded Vander Lans WTF, the Project Sponsors shall submit an Operations Plan to the CDPH and the Los Angeles Regional Water Quality Control Board (Regional Water Board) for approval. Also, after six months of operation of the expanded Leo J. Vander Lans Water Treatment Facility, the Operations Plan shall be updated as necessary and submitted to the Regional Water Board and the CDPH for review and approval.

   i. The Operations Plan shall cover critical operational parameters to include routine testing procedures for the microfiltration (MF), reverse osmosis (RO), and ultraviolet (UV)/advanced oxidation process (AOP) systems, optimization of the UV dose for disinfection and reduction of light-sensitive contaminants, and all treatment processes, maintenance and calibration schedules for all monitoring equipment, process alarm set points, and response procedures for all alarms in each treatment process of the Vander Lans WTF, including criteria for diverting recycled water if water quality requirements are not met, start-up, emergency response and contingency plans. During the first year of operation of the expanded Vander Lans WTF, all treatment processes shall be operated in a manner to provide optimal reduction of microbial, regulated and nonregulated contaminants. Based on this experience and anytime operational changes are made, the Operations Plan shall be updated.

   ii. The Operations Plan shall include staffing levels with applicable certification levels for Facility operations personnel. Significant changes in the operation of any of the treatment processes shall be reported to the CDPH and Regional Water Board. Significant changes in the approved Operations Plan must be approved by the CDPH and the Regional Water Board prior to instituting changes. The Project Sponsors shall be responsible for ensuring that the Operations Plan is, at all times, representative of the current operations, maintenance, and monitoring of the Vander Lans WTF.

d. Five-Year Engineering Report: Project Sponsors shall update the 2013 Title 22 Engineering Report and submit the updated report to the State Water Board's Geotracker and the CDPH five years after the startup of the expanded Vander Lans WTF, and every five years thereafter.

2. All reports to the State Water Board's Geotracker shall reference the Compliance File No. CI-8956. Compliance monitoring reports shall be submitted separately from other technical reports.

3. All reports shall be submitted as a pdf file and uploaded electronically to the State Water Board's Geotracker and provided via email to the CDPH (if the file exceeds 10 MB, either a CD containing the file shall be mailed to CDPH, Attention: CDPH, Drinking Water Field Operations, Los Angeles Region, or a link for downloading an electronic copy of the file shall be provided).

4. By the reporting due dates specified in Table M1, groundwater data shall be uploaded electronically to the State Water Board's Geotracker in an electronic deliverable format specified by the State Water Board.

II. MONITORING REQUIREMENTS

1. Project Sponsors shall monitor the flow and quality of the following according to the manner and frequency specified in this MRP:

    a. Influent to the Vander Lans WTF;

    b. Effluent (Recycled water) from Vander Lans WTF;

    c. If potable water is used, blend of recycled water and diluent water; and,

    d. Receiving groundwater (monitoring wells specified in Table M-19).

    e. For the production well SB-LEI (State Well No. 05S/12W-01A03) nearest to the barrier, the Project Sponsors shall review and evaluate the publicly available Title 22 monitoring data.

2. Monitoring reports shall include, but not limited to, the following:

    a. Analytical results;

    b. Location of each sampling station where representative samples are obtained, including a map, at a scale of 1 inch equals 1,200 feet or less, that clearly identifies the locations of all injection wells, monitoring wells, and production wells;

    c. Analytical test methods used and the corresponding minimum reporting levels (MRLs);

    d. Name(s) of the laboratory, which conducted the analyses;

    e. Copy of laboratory certifications by the CDPH's Environmental Laboratory Accreditation Program (ELAP);and,

f. Quality assurance and control information, including documentation of chain of custody.

3. Though not required to be included in the monitoring reports unless specifically requested by the Regional Water Board or the CDPH, the Project Sponsors shall have in place written sampling protocols. For groundwater monitoring, the sampling protocols shall outline the methods and procedures used for measuring water levels; purging wells; collecting samples; decontaminating equipment; containing, preserving, and shipping samples, and maintaining appropriate documentation. Also, the sampling protocols shall include the procedures for handling, storing, testing, and disposing of purge and decontamination waters generated from the sampling events.

4. Where multiple EPA approved methods are available, especially between drinking water (500 series) and waste water (600 series), the method with the lowest minimum reporting level shall be used and in every case, drinking water minimum reporting levels shall be achieved.

5. The samples shall be analyzed using analytical methods described in 40 Code of Federal Regulations (CFR) Part 141; or where no methods are specified for a given pollutant, by methods approved by the CDPH, Regional Water Board and/or State Water Board. The Project Sponsors shall select the analytical methods that provide Minimum Reporting Levels (MRLs) lower than the limits prescribed in this Order or as low as possible that will provide reliable data.

6. The Project Sponsors shall instruct its laboratories to establish calibration standards so that the MRLs (or its equivalent if there is a different treatment of samples relative to calibration standards) are the lowest calibration standard. At no time shall analytical data derived from extrapolation beyond the lowest point of the calibration curve be used, except as stated in section III.1.B of this MRP.

7. Upon request by the Project Sponsors, the Regional Water Board, in consultation with the CDPH and the State Water Board Quality Assurance Program, may establish MRLs, in any of the following situations:

   a. When the pollutant has no established method under 40 CFR 141;

   b. When the method under 40 CFR 141 for the pollutant has a MRL higher than the limit specified in this Order; or

   c. When the Project Sponsors agree to use a test method that is more sensitive than those specified in 40 CFR Part 141.

8. For regulated constituents, the laboratory conducting the analyses shall be certified by ELAP or approved by the CDPH, Regional Water Board, or State Water Board, for a particular pollutant or parameter.

9. Samples shall be analyzed within allowable holding time limits as specified in 40 CFR Part 141. All Quality Assurance/Quality Control (QA/QC) analyses shall be run on the same dates that samples are actually analyzed. The Project Sponsors shall

retain the QA/QC documentation in its files for 3 years and make available for inspection and/or submit them when requested by the Regional Water Board or the CDPH. Proper chain of custody procedures shall be followed, and a copy of this documentation shall be submitted with the quarterly report.

10. For all bacterial analyses, sample dilutions shall be performed so the range of values extends from 1 to 800. The detection methods used for each analysis shall be reported with the results of the analyses.

11. Quarterly monitoring for effluent and groundwater shall be performed during the months of February, May, August, and November. Semiannual monitoring for effluent shall be performed during the months of February and August. Semiannual monitoring for groundwater shall be performed during the months of May and November. Should there be instances when monitoring could not be done during these specified months, the Project Sponsors shall conduct the monitoring as soon as it can and state in the monitoring report the reason monitoring could not be conducted during the specified month. Results of quarterly analyses shall be reported in the quarterly monitoring report following the analysis.

12. For unregulated chemical analyses, the Project Sponsors shall select methods according to the following approach:

    a. Use drinking water methods, if available;

    b. Use CDPH-recommended methods for unregulated chemicals, if available;

    c. If there is no CDPH-recommended drinking water method for a chemical, and more than a single United States Environmental Protection Agency (USEPA)-approved method is available, use the most sensitive of the USEPA-approved methods;

    d. If there is no USEPA-approved method for a chemical, and more than one method is available from the scientific literature and commercial laboratory, after consultation with CDPH, use the most sensitive method;

    e. If no approved method is available for a specific chemical, the Project Sponsors' laboratory may develop or use its own methods and should provide the analytical methods to CDPH for review. Those methods may be used until CDPH-recommended or USEPA-approved methods are available.

    f. For CECs subject to the State Water Board Recycled Water Policy as amended January 22, 2013, analytical methods for laboratory analysis of CECs shall be selected to achieve the RLs presented in Table 1 of Attachment A of the Recycled Water Policy. The analytical methods shall be based on methods published by the USEPA, methods certified by the CDPH, or peer review reviewed and published methods that have been reviewed by CDPH, including those published by voluntary consensus standards bodies such as the Standards Methods Committee and the American Society for Testing and Materials International. Any modifications to the published or certified methods shall be reviewed by CDPH and subsequently submitted to the Regional

Water Board in an updated quality assurance project plan.

III. REPORTING REQUIREMENTS

1. Quarterly Reports

   a. These reports shall include, at a minimum, the following information:

      i. The volume of the influent, recycled water injected, and if used, potable water injected into the barrier. If no recycled water was injected, or delivered for blending and injection, into the Alamitos Gap Seawater Intrusion Barrier (Barrier) during the quarter/month, the report shall so state.

      ii. The date and time of sampling and analyses.

      iii. All analytical results of samples collected during the monitoring period of the influent, recycled water, groundwater, and if potable water was used, then of the blend of recycled water and potable water injected.

      iv. Records of any operational problems, plant upset and equipment breakdowns or malfunctions, and any diversion(s) of off-specification recycled water and the location(s) of final disposal.

      v. Discussion of compliance, noncompliance, or violation of requirements.

      vi. All corrective or preventive action(s) taken or planned with schedule of implementation, if any.

      vii. Certification by the Project Sponsors that no groundwater for drinking purposes has been pumped from wells within the boundary representing the greatest of the horizontal and vertical distances reflecting 6 months.

   b. Verification of compliance with the 20 week running average Total Organic Carbon (TOC) limit, presented in numerical and graphical formats.

   c. Monitoring results associated with the evaluation of pathogenic microorganism removal as described in section IV.3 of this MRP.

   d. For the purpose of reporting compliance with numerical limitations, analytical data shall be reported using the following reporting protocols:

      i. Sample results greater than or equal to the MRL must be reported “as measured” by the laboratory (i.e., the measured chemical concentration in the sample); or

      ii. Sample results less than the MRL, but greater than or equal to the laboratory’s Minimum Detection Limit (MDL), shall be reported as “Detected, but Not Quantified”, “DNQ”, or “J”. The laboratory shall write the estimated chemical concentration of the sample next to “DNQ” or

"J"; or

iii. Sample results less than the laboratory's MDL shall be reported as "Not-Detected", or ND.

e. If the Project Sponsors sample and perform analyses on any sample more frequently than required in this MRP using approved analytical methods, the results of those analyses shall be included in the report. These results shall be reflected in the calculation of the average used in demonstrating compliance with average effluent, receiving water, etc., limitations.

f. The Regional Water Board or CDPH may request supporting documentation, such as daily logs of operations.

2. Annual Summary Reports shall include, at a minimum, the following information:

a. Tabular and graphical summaries of the monitoring data obtained during the previous calendar year;

b. A summary of compliance status with the applicable monitoring requirements during the previous calendar year;

c. For any non-compliance during the previous calendar year, a description of:

i. the date, duration, and nature of the violation;

ii. a summary of any corrective actions and/or suspensions of surface application of recycled municipal wastewater resulting from a violation; and

iii. if uncorrected, a schedule for and summary of all remedial actions;

d. Any detections of monitored chemicals or contaminants, and any observed trends in the monitoring wells (and if applicable, in diluent water supplies);

e. Information pertaining to the vertical and horizontal migration of the recharge water plume;

f. Title 22 drinking water quality data for the nearest domestic water supply well SB-LEI;

g. A description of any changes in the operation of any unit processes or facilities;

h. the estimated quantity and quality of the recycled municipal wastewater and diluent water to be utilized for the next calendar year;

i. A summary of the measures taken by CSDLAC to comply with wastewater source control program and the effectiveness of the implementation of the

measures;

j. A list of the analytical methods used for each test and associated laboratory quality assurance/quality control procedures shall be included. The report shall identify the laboratories used by the Project Sponsors to monitor compliance with this Order, their status of certification, and provide a summary of proficiency test;

k. A list of current operating personnel, their responsibilities, and their corresponding grade of certification; and

l. The Annual Report shall be prepared by a properly qualified engineer registered and licensed in California and experienced in the field of wastewater treatment.

3. The existing Operations Plan shall be updated to accurately reflect: the operations of the expanded Vander Lans WTF's, the date the plan was last reviewed, and whether the plan is valid and current.

4. Five-Year Engineering Report: Five years after the startup of the expanded Vander Lans WTF and every five years thereafter, the Project Sponsors shall update the engineering report to address any project changes and submit the report to the Regional Water Board and the CDPH. The Five-Year Engineering Report Update shall include, but not be limited to:

   a. Evidence that the requirements associated with retention time have been met (Note: This may be done using past tracer studies.); and

   b. A description of any inconsistencies between previous groundwater model predictions and the observed and/or measured values. For this requirement, the Project Sponsors shall summarize the groundwater flow and transport including the injection and extraction operations for the Barrier during the previous five calendar years. This summary shall also use the most current data for the evaluation of the transport of recycled water; such evaluations shall include, at a minimum, the following information:

      i. Total quantity of water injected into each major aquifer, and the proportions of recycled water and diluent water that comprise the total quantity;

      ii. Estimates of the rate and path of flow of the injected water within each major aquifer;

      iii. Projections of the arrival time of the recycled water at the closest extraction well (SB-LEI), and the percent of recycled water at the wellhead.

      iv. Clear presentation on any assumptions and/or calculations used for determining the rates of flow and for projecting arrival times and dilution levels.

v. A discussion of the underground retention time of recycled water, a numerical model, or other methods used to determine the recycled water contribution to each aquifer.

vi. A revised flow and transport model to match actual flow patterns observed within the aquifer if the flow paths have significantly changed.

vii. Revised estimates, if applicable, on hydrogeologic conditions including the retention time and the amount of the recycled water in the aquifers and at the production well field at the end of that calendar year. The revised estimates shall be based upon actual data collected during that year on recharge rates (including recycled water, native water, and portable water), hydrostatic head values, groundwater production rates, basin storage changes, and any other data needed to revise the estimates of the retention time and the amount of the recycled water in the aquifers and at the production well field. Significant differences, and the reasons for such differences, between the estimates presented in the 2013 Engineering Report and subsequently revised estimates, shall be clearly presented. Additionally, the Project Sponsors shall use the most recently available data to predict the retention time of recycled water in the subsurface.

c. Evaluation of the ability of Project Sponsors to comply with all regulations and provisions over the following five years.

d. The Five-Year Engineering Report shall be prepared by a properly qualified engineer registered and licensed in California and experienced in the field of wastewater treatment.

IV. MONITORING PROGRAMS

1. Influent Monitoring

a. Monitoring is required to:

i. Determine compliance with water quality conditions and standards; and

ii. Assess Vander Lans WTF performance.

b. The influent sampling station is located before tertiary treated water from Long Beach WRP (and if applicable, from Los Coyotes WRP) enters the MF treatment system of the Vander Lans WTF. Influent samples shall be obtained on the same day that effluent samples are obtained. The date and time of sampling shall be reported with the analytical values determined. Table M-2 constitutes the influent monitoring program.

Table M2: Influent Monitoring			
Constituents	**Units**	**Type of Sample**	**Minimum Frequency of Analysis**
Total flow	mgd	Recorder	Continuous[23]
pH	pH	Recorder	Continuous[32]
Turbidity	NTU	Recorder	Continuous[32]
Total suspended solids (TSS)	mg/L	24-hour comp.	Daily
Total Organic Carbon	mg/L	24-hour comp.	Weekly
Biological Oxygen Demand$_5$ 20°C	mg/L	24-hour comp.	Weekly
N-Nitrosodimethylamine(NDMA)[24]	ng/L	Grab	Monthly

2. Turbidity Monitoring

The turbidity of the RO feed water shall be continuously measured with an online turbidity meter and recorder, with at least one reading recorded every 1.2 hours. Should the continuous turbidity meter and recorder fail, grab sampling at a minimum frequency of 1.2 hours may be substituted for a period of up to 24 hours. The results of the daily average turbidity determinations shall be reported quarterly to the Regional Water Board and the CDPH. Any failure to meet the turbidity performance requirements shall be reported to the CDPH and the Regional Water Board in the next quarterly report.

3. Recycled Water Effluent Monitoring

a. Recycled water effluent monitoring is required to:

i. Determine compliance with the Permit conditions;

ii. Identify operational problems and aid in improving facility performance; and,

iii. Provide information on wastewater characteristics and flows for use in interpreting water quality and biological data.

v. Determine if effluent limits are attained.

Recycled water effluent samples shall be collected from the channel downstream of the sodium hydroxide injection point, with the exception of Chemicals of

[23] For those constituents that are continuously monitored, the Project Sponsors shall report the monthly minimum and maximum, and daily average values.
[24] The sampling for NDMA may be incorporated into the sampling of the Long Beach WRP (and if applicable, of the Los Coyotes WRP) conducted by the LACSD, provided that the sampling is performed using the same analytical method and laboratory. Should LACSD fail to sample, the Project Sponsors are responsible for the sampling to comply with this Order.

Emergent Concern (CEC)s and surrogates, whose sampling locations are determined by the State Water Board's Recycled Water Policy, amended on January 22, 2013. The amendment to the Recycled Water Policy Attachment A states that the effluent shall be sampled for the constituents in Table M-3. Should the need for a change in the sampling station(s) arise in the future, the Project Sponsors shall seek approval of the proposed station by the Executive Officer prior to use.

Table M-3 – Sampling of Constituents of Emergent Concern

Parameter	Constituent Group	Reporting Limit (µg/L)
17β-estradiol	Steroid Hormones	.001
Caffeine	Stimulant	.05
NDMA	Disinfection Byproduct	.002
Triclosan	Antimicrobial	.05
DEET	Personal Care Product	.05
Sucralose	Food additive	.1

XII. CDPH has not determined that AOP removes certain constituents which may impact aquatic life as shown in Table M-4. The Project Sponsors have demonstrated that the following constituents are currently absent in the influent, but if they are detected in the effluent from the Long Beach or Los Coyotes WRPs, they shall be monitored in the effluent to evaluate their removal by the AOP.

Table M-4 – Sampling of Additional Constituents of Emergent Concern

CEC	Reporting Level in ng/L
Polybrominated Diphenyl Ethers (PBDE 28, 47, 99, 100, 153, 154, 183, 209)	100 for PBDE 209 and 5 for all others
Bifenthrin	5
Permethrin	10
Chlorpyrifos	10
Perfluorooctane Sulfonate (PFOS)	40
Fipronil	2

b. Table M-3 shall constitute the effluent monitoring program. Where the specific monitoring parameter differs from that listed as an effluent limit, both results shall be reported.

Table M3: Effluent Monitoring

Constituent/Parameters	Units	Type of Sample	Minimum Frequency of Analysis

Table M3: Effluent Monitoring

Constituent/Parameters	Units	Type of Sample	Minimum Frequency of Analysis
Total recycled water flow	mgd	Recorder	Continuous[25]
pH	pH units	Recorder	Continuous[33]
Conductivity	µS/cm	Recorder	Continuous[33]
Total residual chlorine	mg/L	Recorder	Continuous[33,]
Total coliform	MPN/100 ml	Grab	Daily
Enteric virus	Log	Grab	Weekly
Giardia	Log	Calculated	Weekly
Cryptosporidium	Log	Calculated	Weekly
UV power level	% change	Recorder	Continuous[33]
Hydrogen Peroxide	Ml/ min	Recorder	Continuous[33]
Hydrogen Peroxide	mg/L	Grab	Weekly
TOC	mg/L	24-hour comp. or grab	Weekly
Temperature	°F	Grab	Weekly
BOD_5 20°C	mg/L	24-hour comp.	Weekly
Turbidity	NPU	24-hour comp.	Weekly
Total nitrogen[26]	mg/L	24-hour comp or grab	Weekly
Nitrate-N	mg/L	24-hour comp or grab	Weekly
Nitrite-N	mg/L	24-hour comp or grab	Weekly
Nitrate plus Nitrite	mg/L	24-hour comp or grab	Weekly
Inorganics[27] with primary MCLs	µg/L	Grab	Quarterly
Constituents/parameters with secondary MCL[33]	---	Grab	Quarterly
Fluoride	µg/L	Grab	Quarterly
Radioactivity[33]	pCi/L	Grab	Quarterly
Regulated organic chemicals[33]	µg/L	24-hour comp or grab	Quarterly
Disinfection byproducts[33]	µg/L	24-hour comp or grab	Quarterly

[25] For those constituents that are continuously monitored, the Project Sponsors shall report the monthly minimum and maximum, and daily average values.
[26] Total Nitrogen includes nitrate-N, nitrite-N, ammonia-N, and organic-N.
[27] For specific constituents to be monitored and their monitoring frequency, refer to Table M-6 through M-14.

Table M3: Effluent Monitoring			
Constituent/Parameters	**Units**	**Type of Sample**	**Minimum Frequency of Analysis**
General physical[33]	---	Grab	Quarterly
General minerals[33]	µg/L	Grab	Quarterly
Lead	µg/L	Grab	Quarterly
Copper	µg/L	Grab	Quarterly
Constituents with Notification Levels[3]	µg/L	Grab	Varies[33]
Remaining priority pollutants[33]	µg/L	Grab	Annually
Constituents of Emerging Concern (CECs) [33]	ng/L	Grab	Varies [33]
Surrogates [35]	mg/L	Online	Continuous
N- Nitrosodimethylamine (NDMA)[28]	µg/L	Grab	Quarterly

Table M-4: Inorganics with Primary MCLs		
Constituents		
Aluminum	Cadmium	Nitrate (as nitrogen)
Antimony	Chromium (Total)	Nitrite (as nitrogen)
Arsenic	Cyanide	Nitrate + Nitrite
Asbestos	Fluoride	Perchlorate
Barium	Mercury	Selenium
Beryllium	Nickel	Thallium

Table M-5: Constituents/parameters with secondary MCLs		
Constituents		
Aluminum	Manganese	Thiobencarb
Chloride	Methyl-tert-butyl-ether (MTBE)	Total Dissolved Solids
Color	Odor – Threshold	Turbidity
Copper	Silver	Zinc
Foam Agents (MBAS)	Specific Conductance	
Iron	Sulfate	

Since this table refers to MCLs and the Order states that the list should remain consistent with the most recent regulations, any redefinitions of MCL should be reflected in a change in the monitoring requirements.

Table M-6: Radioactivity		
Constituent		
Gross Alpha Particle Activity (Including Radium-226 but Excluding Radon and Uranium)	Combined Radium-226 and Radium-228	Tritium
Gross Beta Particle Activity	Strontium-90	Uranium

Table M-7: Regulated Organics		
Constituents		
(a) Volatile Organic Chemicals	1,1,1-Trichloroethane	Endothal
Benzene	1,1,2-Trichloroethane	Endrin
Carbon Tetrachloride (CTC)	Trichloroethylene (TCE)	Ethylene Dibromide (EDB)
1,2-Dichlorobenzene	Trichlorofluoromethane	Glyphosate
1,4-Dichlorobenzene	1,1,2-Trichloro-1,2,2-Trifluoroethane	Heptachlor
1,1-Dichloroethane	Vinyl Chloride	Heptachlor Epoxide
1,2-Dichloroethane (1,2-DCA)	Xylenes (m,p)	Hexachlorobenzene
1,1-Dichloroethene (1,1-DCE)	**(b) Non-Volatile synthetic Organic Constituents**	Hexachlorocyclopentadiene
Cis-1,2-Dichloroethylene	Alachlor	Lindane
Trans-1,2-Dichloroethylene	Atrazine	Methoxychlor
Dichloromethane	Bentazon	Molinate
1,2-Dichloropropane	Benzo(a)pyrene	Oxamyl
1,3-Dichloropropene	Carbofuran	Pentachlorophenol
Ethylbenzene	Chlordane	Picloram
Methyl-tert-butyl-ether (MTBE)	Dalapon	Polychlorinated Biphenyls
Monochlorobenzene	1,2-Dibromo-3-chloropropane (DBCP)	Simazine
Styrene	2,4-Dichlorophenoxyacetic acid (2,4-D)	Thiobencarb
1,1,2,2-Tetrachloroethane	Di(2-ethylhexyl)adipate	Toxaphene
Tetrachloroethylene (PCE)	Di(2-ethylhexyl)phthalate	2,3,7,8-TCDD (Dioxin)

Table M-7: Regulated Organics		
Toluene	Dinoseb	2,4,5-TP (Silvex)
1,2,4-Trichlorobenzene	Diquat	

Table M-8: Disinfection Byproducts		
Constituent		
Total Trihalomethanes (TTHM)	**Haloacetic Acid (five) (HAA5)**	Bromate
Bromodichloromethane	Monochloroacetic acid	Chlorite
Bromoform	Dichloroacetic acid	
Chloroform	Trichloroacetic acid	
Dibromochloromethane	Monobromoacetic acid	
	Dibromoacetic acid	

Table M-9: General Physical and General Minerals		
Constituents		
Asbestos	Potassium	Foaming Agents
Calcium	Sodium	Odor
Chloride	Sulfate	Specific Conductance
Copper	Zinc	Total Dissolved Solids
Iron	Color	Total Hardness
Manganese	Corrosivity	

Table M-10: Constituents with Notification Levels			
Constituents	**Units**	**Type of Sample**	**Minimum Frequency of Analysis**
Boron	µg/L	Grab	Quarterly
n-Butylbenzene	µg/L	Grab	Annually
sec-Butylbenzene	µg/L	Grab	Annually
tert-Butylbenzene	µg/L	Grab	Annually
Carbon disulfide	µg/L	Grab	Quarterly
Chlorate	µg/L	Grab	Quarterly
2-Chlorotoluene	µg/L	Grab	Annually
4-Chlorotoluene	µg/L	Grab	Annually
Diazinon	µg/L	Grab	Annually

Table M-10: Constituents with Notification Levels			
Constituents	**Units**	**Type of Sample**	**Minimum Frequency of Analysis**
Dichlorodifluoromethane (Freon 12)	µg/L	Grab	Annually
1,4-Dioxane	µg/L	Grab	Annually
Ethylene glycol	µg/L	Grab	Annually
Formaldehyde	µg/L	Grab	Annually
HMX	µg/L	Grab	Quarterly[37]
Isopropylbenzene	µg/L	Grab	Annually
Manganese	µg/L	Grab	Quarterly
Methyl isobutyl ketone (MIBK)	µg/L	Grab	Annually
Naphthalene	µg/L	Grab	Annually
n-Nitrosodiethyamine (NDEA)	µg/L	Grab	Annually
n-Nitrosodimethylamine (NDMA)	µg/L	Grab	Quarterly
n-Nitrosodi-n-propylamine (NDPA)	µg/L	Grab	Annually
Propachlor	µg/L	Grab	Annually
n-Propylbenzene	µg/L	Grab	Annually
RDX	µg/L	Grab	Quarterly[29]
Tertiary butyl alcohol (TBA)	µg/L	Grab	Quarterly
1,2,3-Trichloropropane (1,2,3-TCP)	µg/L	Grab	Annually
1,2,4-Trimethylbenzene	µg/L	Grab	Annually
1,3,5-Trimethylbenzene	µg/L	Grab	Annually
2,4,6-Trinitrotoluene (TNT)	µg/L	Grab	Quarterly[35]
Vanadium	µg/L	Grab	Annually

[29] The Project Sponsors shall monitor these constituents quarterly for the first year and, starting the second year, implement annual monitoring for constituents that were always less than the Minimum Reporting Level.

Table M-11: Remaining Priority Pollutants		
Constituents		
Pesticides	**Metals**	Di-n-butyl phthalate
Aldrin	Chromium III	Di-n-octyl phthalate
Dieldrin	Chromium VI	Diethyl phthalate
4,4'-DDT	**Base/Neutral Extractables**	Dimethyl phthalate
4,4'-DDE	Acenaphthene	Benzo(a)anthracene
4,4'-DDD	Benzidine	Benzo(a)fluoranthene
Alpha-endosulfan	Hexachloroethane	Benzo(k)fluoranthene
Beta-endosulfan	Bis(2-chloroethyl)ether	Chrysene
Endosulfan sulfate	2-chloronaphthalene	Acenaphthylene
Endrin aldehyde	1,3-dichlorobenzene	Anthracene
Alpha-BHC	3,3'-dichlorobenzidine	1,12-benzoperylene
Beta-BHC	2,4-dinitrotoluene	Fluorene
Delta-BHC	2,6-dinitrotoluene	Phenanthrene
Acid Extractables	1,2-diphenylhydrazine	1,2,5,6-dibenzanthracene
2,4,6-trichlorophenol	Fluoranthene	Indeno(1,2,3-cd)pyrene
P-chloro-m-cresol	4-chlorophenyl phenyl ether	Pyrene
2-chlorophenol	4-bromophenyl phenyl ether	**Volatile Organics**
2,4-dichlorophenol	Bis(2-chloroisopropyl)ether	Acrolein
2,4-dimethylphenol	Bis(2-chloroethoxyl)methane	Acrylonitrile
2-nitrophenol	Hexachlorobutadiene	Chlorobenzene
4-nitrophenol	Isophorone	Chloroethane
2,4-dinitrophenol	Nitrobenzene	1,1-dichloroethylene
4,6-dinitro-o-cresol	N-nitrosodiphenylamine	Methyl chloride
Phenol	Bis(2-ethylhexyl)phthalate	Methyl bromide
	Butyl benzyl phthalate	2-chloroethyl vinyl ether

Table M-12: Constituents of Emerging Concern

Constituent	Relevance/ Indicator Type	Type of Sample	Minimum Frequency of Analysis	Reporting Limit (µg/L)	Monitoring Locations[30]	
					Prior to RO	Following treatment prior to well injection
17β-estradiol	Health	grab	Annually	0.001		X
Caffeine	Health & Performance	grab	Annually	0.05	X	X
NDMA	Health & Performance	grab	Quarterly	0.002	X	X
Triclosan	Health	grab	Annually	0.05		X
DEET	Performance	grab	Annually	0.05	X	X
Sucralose	Performance	grab	Annually	0.1	X	X

Table M-13: Surrogates

Constituent	Type of Sample	Minimum Frequency	Monitoring Locations	
			Prior to RO Treatment	Following Treatment prior to Well Injection
Electrical Conductivity	Online	Continuous[31]	X	X
TOC	24-hour composite	Weekly	X	X

[30] The January 22, 2013 Recycled Water Policy Attachment A makes a distinction between health-based and performance-based CEC indicators for purposes of monitoring locations. For subsurface applications, the health-based CECs are 17β-estradiol, caffeine, NDMA, and triclosan, with monitoring required for final recycled water only. The health-based and performance-based CECs are caffeine, NDMA, DEET, and sucralose, with monitoring required prior to Reverse Osmosis and post- treatment prior to release to the aquifer. Caffeine and NDMA serve both as health-based and performance based indicators

[31] Since monitoring will be continuous using online analyzers, monthly averages for each monitoring location shall be reported in the quarterly compliance monitoring reports.

i. Consistent with the January 22, 2013 amended Recycled Water Policy, the Project Sponsor may request the removal of specific CECs from the monitoring program if supported by the data. The Project Sponsors may submit a request to the Executive Officer and CDPH to exclude the compound from future monitoring. For the above health indicator CECs, if no more than 25 percent of the samples exceed a measured environmental concentration/monitoring trigger level (MEC/MTL) ratio of 0.1, the January 22, 2013 amended Recycled Water Policy allows the Project Sponsor to request the removal of the CEC from the monitoring program. In keeping with the recommendations of the State Water Board's 2010 CEC Blue Ribbon Panel, this request may be based on updated MTLs, if available.

ii. Analytical methods for CECs shall be selected to achieve the reporting limits presented in Table M-14 in accordance with the Recycled Water Policy. The analytical methods shall be based on methods published by the USEPA, methods certified by CDPH, or peer reviewed and published methods that have been reviewed by CDPH. Any modifications to the published or certified methods shall be reviewed and approved by the Regional Water Board and CDPH.

iii. For performance indicator CECs and surrogates, removal percentages shall be reported in addition to the measured concentrations.

[1] The removal percentage shall be calculated based on the following formula:

Removal Percentage = $([X_{in} – X_{out}]/X_{in})*100$
X_{in} = Concentration in recycled water prior to a treatment process
X_{out} = Concentration in recycled water after a treatment process

[2] The removal percentages for the surrogates shall be determined based on the daily averages for electrical conductivity and weekly values for TOC and included in the quarterly compliance monitoring reports.

[3] The removal percentages for the performance indicator CECs shall be included in the Annual Summary Report. For NDMA, a performance indicator CEC proposed to be monitored quarterly, the removal percentages shall also be included in the quarterly compliance monitoring reports.

c. Evaluation of Pathogenic Microorganism Removal

For the purposes of evaluating the performance of the following treatment facilities/units with regards to pathogenic microorganism removal, the Project Sponsors shall include the results of the monitoring specified below in its quarterly compliance monitoring reports:

i. Long Beach WRP (and Los Coyotes WRP, if the effluent is used as a source water): For the purpose of demonstrating that the necessary log reductions (2-logs for *Giardia*, 1-log for *Cryptosporidium*, and 2-logs for viruses) are achieved at the WRP(s), Project Sponsors shall report the daily average and maximum turbidity, percent of time more than 5 nephelometric turbidity units (NTU), and daily coliform results associated with the WRP(s);

ii. MF (Vander Lans WTF): For each day of operation, the membrane integrity test(MIT) sampling shall be performed, the value, and the daily "Pass" or "Fail" results shall be reported;

iii. RO (Vander Lans WTF): Conductivity and TOC shall be continuously measured upstream and downstream of the RO using online analyzers, and for each day of operation, the following shall be reported for both conductivity and TOC - daily minimum, maximum, average, and percent reductions based on daily average values;

iv. AOP (UV and hydrogen peroxide at Vander Lans WTF): For each day of operation, Project Sponsors shall report the calculated daily peroxide dose (based on the peroxide pump speed and bulk feed concentration), percent reduction based on daily average of chloramine (via total residual chlorine) measured upstream and downstream of AOP, and the applied UV power shall be reported. For UV, Project Sponsors shall report the UV system dose (expressed as greater than a certain threshold such as 300 milli-joules/cm^2), UV transmittance (daily minimum, maximum, and average), and UV intensity for each reactor (daily minimum, maximum, and average); and

v. Based on the calculation of log reduction achieved each day by the entire treatment system, Project Sponsors shall report the value and "Yes" or "No" for each day as to whether the necessary log reductions (i.e. 10-logs for *Giardia*, 10-logs for *Cryptosporidium*, and 12-logs for virus) have been attained. An overall log reduction calculation shall be provided only for those days when a portion of the treatment system does not achieve the credits proposed in Table 5-1 of the engineering report.

d. Pilot Test to Demonstrate Oxidation Process

i. The expanded Vander Lans WTF will include an advanced oxidation system developed in consultation with CDPH and designed to remove consitutents of emerging concern. To demonstrate a sufficient oxidation process has been designed, the GWRRs require project proponents of subsurface application using full advanced treatment to perform a pilot test to demonstrate that the oxidation process will provide a 0.5-log (69 percent) reduction of 1,4-dioxane. To satisfy the requirement, a spiking test shall be conducted during the commissioning phase of the expanded Vander Lans WTF per the testing protocol, which shall be described in a separate technical memo and submitted for CDPH's review and approval.

The pilot test shall also confirm the suitability of using chloramine (via total residual chlorine) as the surrogate and/or operational parameter. (Based on the data provided by CSDLAC for the Long Beach WRP's existing recycled water from January 2007 through June 2011, 1,4-dioxane in the Vander Lans WTF influent averaged at 1.9 µg/L, with a range of 1.5 µg/L and 2.6 µg/L,. After the full treatment at Vander Lans WTF (including RO and UV but no hydrogen peroxide), 1,4-dioxane was never detected above the MRL of 1 ug/L in Vander Lans WTF's recycled water. Once hydrogen peroxide is added to the treatment train (i.e., post-expansion), greater removal efficiency is anticipated from the use of full AOP).

ii. During the full-scale operation of the oxidation process, continuous online monitoring of chloramine (via total residual chlorine) shall be provided for the recycled water to serve as a surrogate or operational parameter for the purpose of ensuring that the process is operating as designed. Because the influent consists of fully chloraminated water (absent of free chlorine), the total residual chlorine measurements should adequately represent chloramine levels in the recycled water. The treatment system shall also have alarms associated with certain critical points (as fully detailed in Section 14 of the 2013 Title 22 Engineering Report for the Vander Lans WTF Expansion) to alert the operators of any potential concerns with the operational performance. Should the results of the pilot test identify an alternate surrogate that is more effective or suitable than chloramine, the Project Sponsors may submit for review and approval by CDPH a request to use the alternate surrogate instead of chloramine.

iii. Each quarter, the Project Sponsors shall tabulate the percent of the quarter's monitoring that did not meet the surrogate limits established to assure proper on-going performance of the RO and UV/AOP. If the value is more than ten percent, within 30 days after the end of the quarter, the Project Sponsors shall:

[1]. Submit a report to the CDPH and Regional Water Board describing the corrective actions planned or taken to reduce the percent to ten percent or less; and

B. Consult with the CDPH and, if required, comply with an alternative monitoring plan approved by the CDPH.

iv. Within 60 days after completing the initial 12-months of monitoring during the full-scale operation, the Project Sponsors shall submit a report to the CDPH and Regional Water Board that includes:

[1]. The results of chloramine (via total residual chlorine) monitoring performed;

[2]. A description of the efficacy of the chloramine (via total residual chlorine) to reflect the removal differential of 1,4-dioxane; and

[3]. A description of actions taken, or those that would be taken, if the indicator compound removal did not meet the associated design criteria, the continuous surrogate monitoring failed to correspond to the indicator compound removal percentage, or the surrogate and/or operational parameter established was not met.

iv. Within 60 days after completing 12 months of operation of the RO and AOP, the Project Sponsors shall submit a report to the CDPH and Regional Water Board describing the effectiveness of the treatment, process failures, and actions taken in the event the on-going monitoring that process integrity was compromised.

e. Diluent Water Monitoring

i. The Project Sponsors propose to use 100 percent recycled water for injection at the Barrier. However, if this becomes infeasible due to unforeseen circumstances (e.g., insufficient supply of recycled water, treatment issues, etc.), injection of diluent water (i.e., Metropolitan Water District of Southern California's (MWD) potable water) will become necessary in order to prevent seawater intrusion. Pursuant to Section 60320.214 of the GWRR, the Project Sponsors are exempted from nitrate and nitrite monitoring in diluent water when using a CDPH-approved drinking water source for diluent water. This exemption is applicable to Project Sponsors since MWD's potable water is a CDPH-approved drinking water source.

ii. Section 60320.214 of the GWRR requires ensuring diluent water does not exceed primary MCLs or NLs and implementing a CDPH-approved water quality monitoring plan for CDPH-specified contaminants to demonstrate compliance with the primary MCLs and NLs.

iii. MWD currently delivers an average of 1.7 billion gallons of water per day to a 5,200-square-mile service area covering parts of Los Angeles, Orange, San Diego, Riverside, San Bernardino and Ventura counties. As part of its operation, MWD performs rigorous monitoring to comply with all necessary drinking water standards. Regular updates of water quality monitoring data are provided to its customers throughout the year to assure delivery of high quality water and to demonstrate regulatory compliance. During the circumstance when diluent water use becomes necessary, the Project Sponsors shall diligently review and track the quality of MWD potable water for compliance with primary MCLs and NLs based on the information provided by MWD's Water Quality Compliance Team.

f. Blended Recycled Water Monitoring

The Project Sponsors propose to use 100 percent recycled water for injection at the Barrier. Should the use of potable water become necessary to supplement the recycled water, monitoring for blended recycled water shall be implemented consistent with the current MRP, as follows:

Table M-14: Blended Recycled Water Monitoring			
Constituent	**Units**	**Type of Sample**	**Minimum Frequency of Analysis**
Total Blended Flow	mgd	---	Total monthly
Chlorine residual	mg/L	Grab	Weekly
TDS	mg/L	Grab	Weekly
Sulfate	mg/L	Grab	Weekly
Chloride	mg/L	Grab	Weekly
Boron	mg/L	Grab	Weekly
Total nitrogen [32]	mg/L	Grab	Weekly

4. Groundwater Monitoring

a. The Project Sponsors shall monitor the quality of groundwater to assess any impact(s) from the recharge of recycled water. Representative samples of groundwater shall be collected from major aquifers, from the shallowest to the deepest, including the Recent Zone, Zone C, Zone B, Zone A, Zone I, and the Main Aquifer. Table M-15 and M-16 sets forth the minimum constituents and parameters for monitoring groundwater quality in Los Angeles County Flood Control District monitoring wells (LACFCD Well Nos. 503BF, 503BE, 502BW, 502BX, 502AK, 502AL, 502AM, and 502AN).

b. The Project Sponsors shall implement the following groundwater monitoring program as described in Tables M-17. Some constituents may be eligible for reduced monitoring due to the consistent historic lack of detection, upon approval by the Executive Officer.

c. If any of the monitoring results indicate that an MCL has been exceeded or coliforms are present in the monitoring wells as a result of the recycled water injected at the Alamitos Barrier, the Project Sponsors shall notify the CDPH and Regional Water Board within 72 hours of receiving the results and make note of any positive finding in the next monitoring report submitted to the Regional Water Board.

d. CDPH allowed a reduction in groundwater monitoring frequency based upon the performance between 2007 and 2012, when the recycled water injection volume was 50% or less. The modified groundwater monitoring frequency shall be maintained for each well until 6 months before the arrival of recycled water is anticipated by modeling estimates. The Project Sponsors, in consultation with CDPH and the Regional Water Board, shall submit a revised groundwater monitoring plan within one year of adoption of this Order,

[32] Total nitrogen shall be defined as the sum of ammonia, nitrite, nitrate, and organic nitrogen concentrations, expressed as nitrogen. Consistent with the recycled water monitoring, weekly total nitrogen monitoring is proposed.

recommending revisions to the monitoring frequency to ensure sufficient sampling of constituents may occur at each groundwater monitoring well to monitor changes to water quality which may be present after injection of higher concentration of recycled water.

Table M-15 Groundwater Monitoring Wells

Project No.	Well No.	WRD Monitoring Well ID	Top of Well Casing (TOWC) Elevation (ft above mean sea level)	Perforated Interval (ft below TOWC)	Aquifer	Well Use
34L'1	503P	100254	10.2	15 – 25	Recent	Background
34L'1	503M	100253	10.5	610 – 620	Main	Background
34LS	503BF	100258	7	136 – 181	C-Zone	3-Month
34LS	503BE	100257	7	191 – 216	B-Zone	3-Month
34HJ	502BX	100242	9.4	314 – 344	A-Zone	3-Month
34HJ	502BW	100243	9.5	400 – 440	I-Zone	3-Month
34L10	502AK	100252	5.6	165 – 185	C-Zone	¼ Distance
34L10	502AL	100251	5.6	225 – 260	B-Zone	¼ Distance
34L10	502AM	100250	5.6	311 – 365	A-Zone	¼ Distance
34L10	502AN	100249	5.6	405 – 450	I-Zone	¼ Distance

Table M-16: Groundwater Monitoring

Constituents/Parameters	Units	Type of Sample	Minimum Frequency of Analysis
Water level elevation[33]	feet	---	Quarterly
Chlorine residual	mg/L	Grab	Quarterly
TOC	mg/L	Grab	Quarterly
Total coliform	MPN/100ml	Grab	Quarterly
BOD_5 20°C	mg/L	Grab	Quarterly
Oil and grease	mg/L	Grab	Quarterly
Total nitrogen	mg/L	Grab	Quarterly
TSS	mg/L	Grab	Quarterly
Turbidity	NTU	Grab	Quarterly
Inorganics with primary MCLs	µg/L	Grab	Quarterly
Constituents/parameters with secondary MCLs	---	Grab	Quarterly
Fluoride	µg/L	Grab	Quarterly

[33] Water level elevations shall be measured to the nearest 0.01 feet, and referenced to mean sea level.

Table M-16: Groundwater Monitoring

Constituents/Parameters	Units	Type of Sample	Minimum Frequency of Analysis
Radioactivity	pci/L	Grab	Semiannually
Regulated organics	µg/L	Grab	Quarterly
Disinfection byproducts (DBPs)	µg/L	Grab	Quarterly
General physical		Grab	Quarterly
General minerals	µg/L	Grab	Quarterly
Chemicals with NLs	µg/L	Grab	Quarterly
N-Nitrosopyrrolidine	µg/L	Grab	Annually
Remaining priority pollutants	µg/L	Grab	Quarterly

Table M-17: Monitoring Frequency

Constituent	Frequency									
	Well 100242	**Well 100243**	**Well 100249**	**Well 100250**	**Well 100251**	**Well 100252**	**Well 100253**	**Well 100254**	**Well 100257**	**Well 100258**
Total Suspended Solids (TSS)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Turbidity	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Radioactivity										
Gross Alpha Particle Activity (including Radium-226 but excluding radon and uranium)	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual
Gross Beta Particle Activity	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Qtrly	Semi Annual
Radium-226	Semi Annual	Semi Annual	Qtrly	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual
Radium-226 & Radium-228 (Combined)	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Qtrly
Radium-228	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual
Strontium-90	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual
Tritium	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual*	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual
Uranium	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual	Semi Annual

Table M-17: Monitoring Frequency										
Constituent	**Frequency**									
Organic Chemicals										
(a) Volatile Organic Chemicals										
1,1,1-Trichloroethane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,1,2,2-Tetrachloroethane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,1,2-Trichloro-1,2,2-Trifluoroethane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,1,2-Trichloroethane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,1-Dichloroethane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,1-Dichloroethene (1,1 DCE)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,2,4-Trichlorobenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,2-Dichlorobenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,2-Dichloroethane (1,2 DCA)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,2-Dichloropropane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,3-Dichloropropene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,4-Dichlorobenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Benzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Carbon Tetrachloride (CTC)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
cis-1,2-Dichloroethylene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Dichloromethane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Ethylbenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Methyl-tert-butyl-ether (MTBE)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Monochlorobenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Styrene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Tetrachloroethylene (PCE)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Toluene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
trans-1,2-Dichloroethylene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly

Table M-17: Monitoring Frequency

Constituent	Frequency									
Trichloroethylene (TCE)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Trichlorofluoro-methane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Vinyl Chloride	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Xylenes (m, p)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
(b) non-volatile synthetic organic chemicals										
1,2-Dibromo-3-Chloropropane (DBCP)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2,3,7,8-TCDD (Dioxin)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2,4,5-TP (Silvex)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2,4-Dichlorophenoxya cetic acid (2,4-D)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Alachlor	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Atrazine	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Bentazon	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Benzo (a) pyrene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Carbofuran	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Chlordane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Dalapon	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Di (2-ethylhexyl) adipate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Di (2-ethylhexyl) phthalate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Dinoseb	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Diquat	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Endothal	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Endrin	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Ethylene Dibromide (EDB)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Glyphosate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Heptachlor	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Heptachlor Epoxide	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Hexachlorobenzen e	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Hexachlorocyclo-pentadiene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly

Table M-17: Monitoring Frequency

Constituent	Frequency									
Lindane (Gamma BHC)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Methoxychlor	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Molinate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Oxamyl	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
PCB 1016	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
PCB 1221	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
PCB 1232	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
PCB 1242	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
PCB 1248	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
PCB 1254	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
PCB 1260	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Pentachlorophenol	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Picloram	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Simazine	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Thiobencarb	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Toxaphene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Disinfection Byproducts										
Bromate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Bromodichloro-methane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Bromoform	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Chlorite	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Chloroform	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Dibromoacetic Acid	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Dibromochloro-methane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Dichloroacetic Acid	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Haloacetic Acid (Five) (HAA5)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Monobromoacetic Acid	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Monochloroacetic Acid	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Total Trihalomethanes	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Trichloroacetic Acid	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly

Table M-17: Monitoring Frequency

Constituent	Frequency									
Chemicals with Notification Levels										
1,2,3-Trichloropropane (1,2,3 TCP)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,2,4-Trimethylbenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,3,5-Trimethylbenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,4-Dioxane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2-Chlorotoluene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2,4,6-Trinitrotoluene (TNT)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
4-Chlorotoluene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Boron	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Carbon Disulfide	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Chlorate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Diazinon	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Dichlorodifluoro-methane (Freon 12)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Ethylene Glycol	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Formaldehyde	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
HMX	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Isopropylbenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Manganese	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Methyl-isobutyl-keytone (MIBK)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Naphthalene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
n-Butylbenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
n-Nitrosodiethyl-amine (NDEA)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
n-Nitrosodimethylamine (NDMA)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly

Table M-17: Monitoring Frequency

Constituent	Frequency									
n-Nitrosodi-n-propylamine (NDPA)	Annual[34]	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual	Annual
n-Propylbenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Propachlor	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
RDX	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
sec-Butlybenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
tert-Butylbenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Tertiary-butyl-alcohol (TBA)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Vanadium	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Remaining Priority Pollutants										
Pesticides										
4,4,4'-DDD	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
4,4,4'-DDE	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
4,4,4-DDT	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Aldrin	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Alpha BHC	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Alpha Endosulfan	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Beta BHC	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Beta Endosulfan	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Chromium III	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Chromium VI	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Delta BHC	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Dieldrin	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Endosulfan Sulfate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Endrin Aldehyde	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Acid Extractables										
2,4,6-Trichlorophenol	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2,4-Dichlorophenol	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2,4-Dimethylphenol	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2,4-Dinitrophenol	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly

[34] A March 23, 2007 letter from the CDPH approved semi-annual monitoring for BOD_5 20°C and annual monitoring for N-Nitrosopyrrolidine in 10 wells when the injected water contained 50% recycled water. All monitoring frequencies have been returned to quarterly, expect for NDPA and radioactive chemicals, where an increase in the influent is not anticipated.

Table M-17: Monitoring Frequency

Constituent	Frequency									
2-Chlorophenol	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2-Nitrophenol	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
4,6-Dinitro-o-Cresol (2-Methly-4,6-Dinitrophenol)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
4-Nitrophenol	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
p-Chloro-m-Cresol (3-Methyl-4-Chlorophenol)	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Phenol	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Base/Neutral Extractables										
1,12-Benzoperylene ((Benzo(g,h,i)-perylene))	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,2,5,6-Dibenzanthracene ((Dibenzo(a,h) anthracene))	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,2-Diphenylhydrazine	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
1,3-Dichlorobenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2,4-Dinitrotoluene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2,6-Dinitrotoluene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2-Chloronaphthalene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
3,3'-Dichlorobenzidine	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
4-Bromophenyl phenyl ether	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
4-Chlorophenyl phenyl ether	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Acenaphthene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Acenaphthylene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Anthracene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Benzidine	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Benzo(a)anthracene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Benzo(b)fluoranthene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Benzo(k)fluoranthene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly

Table M-17: Monitoring Frequency

Constituent	Frequency									
Bis(2-chloroethoxyl)-methane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Bis(2-chloroethyl)ether	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Bis(2-chloroisopropyl)ether	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Butyl benzyl phthalate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Chrysene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Di(2-ethylhexyl) phthlate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Dimethyl phthalate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Di-n-butyl phthalate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Di-n-octyl phthalate	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Fluoranthene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Fluorene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Hexachlorobutadiene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Hexachloroethane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Indeno(1,2,3-cd) pyrene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Isophorone	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Nitrobenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
n-Nitrosodi-n-propylamine	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
n-Nitrosodiphenylamine	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Phenanthrene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Pyrene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Volatile Organics										
1,1-Dichloroethylene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
2-Chloroethyl vinyl ether	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Acrolein	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Acrylonitrile	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Chlorobenzene	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly

Table M-17: Monitoring Frequency										
Constituent	**Frequency**									
Chloroethane	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Methyl bromide	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly
Methyl chloride	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly	Qtrly

V. CERTIFICATION STATEMENT

Each report shall contain the following declaration[35]:

"I certify under penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a find and imprisonment.

Executed on the _____day of _____at _____

_____(Signature)

_____(Title)"

VI. OTHER MONITORING REQUIREMENTS

The list of parameters and monitoring frequencies may be adjusted by the Executive Officer if the Project Sponsor makes a request and the Executive Officer determines that the modification is adequately supported by statistical trends of monitoring data submitted.

[35] The Project Sponsors shall submit written documentation identifying the responsible party who certifies the perjury document.

Atachment
CDPH Findings Of Fact

DRAFT TENTATIVE

SUMMARY OF PUBLIC HEARING

In the Matter of:

Water Replenishment District of Southern California
Expansion of Alamitos Barrier Recycled Water Project

On June 26, 2013, the California Department of Public Health (Department) held a public hearing in Lakewood, California to consider the proposed expansion of the Alamitos Barrier Recycled Water Project (ABRWP), which provides recycled water as a source of water supply to the existing Alamitos Barrier Project (ABP), a seawater barrier located between Los Angeles and Orange Counties, and is sponsored by the Water Replenishment District of Southern California (WRD). The purpose of the ABRWP expansion project is to help eliminate the use of imported potable water at the ABP, while ensuring the same level of protection of public health and safeguards against seawater intrusion.

A list of public hearing attendees is included in Attachment A.

Hearing Officer

Cindy Forbes, P.E., Chief of the Southern California Branch, Drinking Water Field Operations, State of California Department of Public Health.

The Department made a presentation on the current and draft Groundwater Replenishment Reuse Regulations and how they pertain to this project. Next, the WRD staff made a presentation on the proposed ABRWP expansion project, including the planned augmentation of the production capacity of and treatment enhancements at the Leo J. Vander Lans Advanced Water Treatment Facility (LVLWTF), which produces the recycled water used at the ABP. Describing the background of and the need for the project expansion, they noted that the expansion will further improve the reliability of water supply to the existing seawater barrier, the ABP, and will also help the local region conserve local and imported water supplies. The expanded ABRWP will produce additional recycled water necessary to completely replace the imported potable water currently blended with recycled water for injection at the ABP. Details of the LVLWTF expansion were described, and water quality information and additional safeguards of the project to ensure protection of public health were provided. The WRD pledged their commitment to assure the highest water quality appropriate for this new water supply.

About 20 people were in attendance. The presentation was followed by a public comment period. There were no objections voiced concerning the project.

FINDINGS OF FACT

1. Section 13540 of the California Water Code requires that recycled water may only be injected into an aquifer that is used as a source of domestic water supply if the California Department of Public Health (Department) finds that the recharge will not degrade the

quality of water in the receiving aquifer as a source of water supply for domestic purposes.

2. The Water Replenishment District of Southern California (WRD) is a public agency formed in 1959 under the Water Replenishment District Act, originally adopted in 1955. It is responsible for the replenishment, protection, and preservation of groundwater supplies and quality in the Central Basin and West Coast Basin. Groundwater constitutes approximately 40 percent of the water demand needed for the nearly 4 million residents of the 43 southern Los Angeles County cities in the WRD service area. Since 1962, the WRD has been using recycled water as one source of supply to replenish the local groundwater basins by spreading and percolating water in nearly 900 acres of recharge facilities in the Montebello Forebay. Since 1995 and 2005, the WRD has also been purchasing recycled water for injection into the West Coast Basin and Central Basin, respectively, to mitigate seawater intrusion into the groundwater basins.

3. The County Sanitation Districts of Los Angeles County (CSDLAC) were formed under the County Sanitation Act, originally adopted in 1923, and are a confederation of independent special districts serving over 5 million people in Los Angeles County. The CSDLAC service area covers approximately 800 square miles and encompasses 78 cities and unincorporated areas within the County. The CSDLAC construct, operate, and maintain facilities to collect, treat, recycle, and dispose of sewage and industrial wastes and provide for the management of solid wastes, including disposal, transfer operations and materials recovery. Local sewers and laterals that connect to the CSDLAC trunk sewer lines are the responsibility of the local jurisdictions, as is the collection of solid wastes. The agency's 1,400 miles of main trunk sewers and 11 wastewater treatment plants convey and treat approximately 425 million gallons per day (mgd), 160 mgd of which are available for reuse in the dry Southern California climate. The Long Beach Water Reclamation Plant (LBWRP) and the Los Coyotoes Water Reclamation Plant (LCWRP) are owned and operated by the Joint Outfall System[36].

4. The Los Angeles County Department of Public Works (LACDPW or the County) was formed on January 1, 1985, consolidating the former County Road Department, a portion of the County Engineer-Facilities, and the County Flood Control District. In 1995, it assumed the responsibility for capital projects from the County Internal Services Department. It is responsible for the design, construction, operation, maintenance, and repair of roads, bridges, airports, sewers, water supply, flood control, water quality, and water conservation facilities and for the design and construction of capital projects. Additional responsibilities include regulatory and ministerial programs for the County of Los Angeles, Los Angeles County Flood Control District (LACFCD), other special districts, and contract cities that request services. The County owns and operates the three seawater barriers in the County, including the Alamitos Seawater Barrier Project (ABP). In 2012, approximately 2.6 mgd of imported water and 2.1 mgd of recycled water were injected into 41 injection wells at the ABP to prevent seawater intrusion and to artificially recharge the Central Groundwater Basin of Los Angeles County and the

[36] Ownership and operation of the Joint Outfall System is proportionally shared among the signatory parties to the amended Joint Outfall Agreement effective July 1, 1995. These parties include County Sanitation Districts of Los Angeles County Nos. 1, 2, 3, 5, 8, 15, 16,17, 18, 19, 21, 22, 23, 28, 29, and 34, and South Bay Cities Sanitation District of Los Angeles County.

Orange County Groundwater Basin, which are used as sources of domestic water supply in both counties.

5. The Orange County Water District (OCWD), with LACDPW, jointly constructed and co-owns the Alamitos Barrier Facilities and purchases the water injected into the Orange County side of the Barrier. The OCWD manages the groundwater basin under northern and central Orange County.

6. The WRD owns the Leo J. Vander Lans Water Treatment Facility (LVLWTF), which receives disinfected tertiary wastewater from the LBWRP owned and operated by the Joint Outfall System. Located at 7400 E. Willow Street, Long Beach, California, the LBWRP treats an average wastewater flow of approximately 18 mgd and is regulated under a National Pollutant Discharge Elimination System (NPDES) permit issued by the California Regional Water Quality Control Board, Los Angeles Region (LARWQCB), NPDES No. CA0054119, Order No. R4-2007-0047, CI No. 5662. The LBWRP provides primary, secondary and tertiary treatment and has a design capacity of 25 mgd.

7. Since 2005, the LVLWTF has been treating the disinfected tertiary effluent further, producing up to 3 mgd of advanced treated recycled water for blending with imported water. The blend is delivered and injected into the ABP. This injection activity is regulated under the Waste Discharge and Water Recycling Requirements (WDR/WRR) Order No. R4-2005-0061 issued by the LARWQCB and State Water Resources Control Board Order WQ 2006-0001. WRD is proposing to expand the production capacity of the LVLWTF from 3 mgd to 8 mgd in order to generate sufficient additional recycled water to replace the imported water currently being pumped into the ABP. The expanded LVLWTF will include some treatment enhancements and will continue to treat wastewater to meet drinking water maximum contaminant levels and other limits imposed on recycled water intended for groundwater replenishment. The LVLWTF expansion requires an amendment of the existing WDR/WRR permit.

8. In order to better meet the needs for additional source water at the expanded LVLWTF, disinfected tertiary wastewater from the LCWRP owned and operated by the Joint Outfall System may be used to supplement the existing supply from LBWRP. Located at 16515 Piuma Avenue, Cerritos, California, the LCWRP treats an average wastewater flow of approximately 30 mgd and is regulated under a NPDES permit issued by the LARWQCB, NPDES No. CA0054011, Order No. R4-2007-0048, CI No. 5059. The LCWRP provides primary, secondary and tertiary treatment and has a design capacity of 37 mgd.

9. The WRD has submitted an amended Title 22 Engineering Report and other supplemental information and responses to the Department comments pertaining to the LVLWTF expansion. The Title 22 Engineering Report has been reviewed and approved by the Department by letter dated April 4, 2013.

10. The treatment approach and technology used for the expanded ABRWP will consist of (the first two steps pertain to LBWRP/CSDLAC and the rest to the expanded LVLWTF):

    - Source Control: The CSDLAC maintains a comprehensive industrial pretreatment and source control program approved by the U.S. Environmental Protection Agency

for control of waste discharges from industrial sources into the wastewater collection system.

- Tertiary Treatment: Wastewater will be treated at the LBWRP. The treatment system consists of primary sedimentation, activated sludge biological treatment with nitrification and denitrification, secondary sedimentation, inert media filtration, and chlorine disinfection treatment processes. The design capacity of the LBWRP is 25 mgd. Disinfected tertiary effluent from the LBWRP will be the initial source water supplied to the ABRWP. (The LCWRP, with a design capacity of 37 mgd, provides a treatment process very similar to the LBWRP.)

- Influent Equalization (EQ): If tertiary effluent from the LCWRP is used as influent to the LVLWTF, the flow will be equalized in the influent EQ basin and pump-fed to the Primary Microfiltration (MF) system. (Pumping is not required when disinfected tertiary effluent from the LBWRP is used as influent to the LVLWTF since the LBWRP effluent has 60 to 100 pounds per square inch (psi) of pressure, sufficient to feed Primary MF without pumping.)

- Microfiltration (MF):

  - MF Pretreatment Chemical Addition: If tertiary effluent before chlorination from the LCWRP is used for the LVLWTF influent, then chloramination (using sodium hypochlorite and aqueous ammonia) may be added to the equalized flow to control bio-fouling of the MF and reverse osmosis membranes. Additional chemical addition before MF filtration is unnecessary and will not be used if using Title 22 water from the LBWRP only.

  - Primary MF Automatic Strainers: Subsequently, the flows will be fed into three (two duty and one standby) automatic self cleaning 500-micron strainers to protect the downstream MF membranes from damage and/or fouling from large particles. The backwash waste from the Primary MF automatic strainers may be discharged to either the backwash waste (BWW) EQ basin or the plant waste EQ basin.

  - Primary MF System: Then the flow will be fed into six 100-module MF skids. The MF system consists of pressurized MF units with hollow fiber, polyvinylidine fluoride membranes having a maximum pore size of 0.1 micron. The MF system will produce 8.1 mgd. The MF filtrate will be stored in a break tank. The MF Units will be periodically backwashed to clean the membranes.

  - Backwash Treatment: The BWW flows from the Primary MF automatic strainers and Primary MF system will be equalized in the BWW EQ Basin and pumped to dissolved air floatation (DAF) system for treatment. Ferric chloride is utilized as coagulant injected upstream of the DAF system. DAF effluent flow will be equalized in the DAF Effluent EQ Basin and pumped to the Backwash Treatment (BWT) MF system, which consists of four 25-module MF skids. Similar to the Primary MF system, the BWT MF automatic strainer is provided upstream of the BWT MF membranes to protect the BWT MF membranes from damage and/or fouling from large particles. One automatic strainer will be provided as a duty

unit, and one manual basket strainer will be provided as a standby. The Primary MF effluent and the BWT MF effluent will be mixed and discharged into the existing MF Filtrate Tank.

- Reverse Osmosis (RO): Stored MF filtrate will be pumped from the MF Filtrate Tank to the RO system, which will consist of two 2-stage RO trains in parallel and three (two duty and one standby) 3rd stage RO Trains. To control scaling of and to protect the RO membranes, the pretreatment (consisting of: addition of sulfuric acid for pH control, a threshold inhibitor; and cartridge filters) is provided both upstream of the two 2-stage RO trains and also immediately upstream of the 3rd stage RO process. The RO process will produce approximately 8.0 mgd, and consists of a high pressure feed pump and pressure vessels. Each pressure vessel will contain high rejection thin film composite polyamide membrane elements. The entire RO system is designed for an overall 92 percent recovery rate. Permeate from the RO system will be fed to the advanced oxidation process (AOP). Concentrated brine from the RO system will be discharged directly to the Joint Outfall System sewer system.

- Advanced Oxidation Process (AOP): The AOP at the LVLWTF will consist of ultraviolet irradiation (UV) with hydrogen peroxide addition upstream of the UV trains. The UV/AOP is used to disinfect RO permeate and destroy constituents of emerging concern (CECs) that pass through RO membranes due to their low molecular weight and low ionic charge, notably N-Nitrosodimethylamine (NDMA), flame retardants, and 1,4-dioxane. The UV system conforms to the requirements delineated in the "Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse" (August 2012) published by the National Water Research Institute (NWRI). The UV system consists of the existing (pre-expansion) system as well as an add-on system. The existing UV system consists of nine 30AL50 Trojan UVPhox™ reactors that employ low-pressure, high-output technology, with each reactor containing 30 lamps, utilized in a tower arrangement with 3 reactors per level over 3 levels. The expansion will add two new trains of three stacked D72AL75 Trojan UVPhox™ reactor chambers, where the third reactor chamber in each train is redundant and includes only one (1) 72-lamp reactor zone. There are two reactor chambers in each UV vessel. The third vessel only utilizes one of the reactors. No waste will be generated. The total nominal capacity of the existing UV system is 8.0 mgd. At this flow rate and UV Transmittance of 95 percent, the delivered UV dosage from the proposed system is estimated to exceed 300 millijoule per square centimeter (mJ/cm^2).

- Decarbonation: Following UV/AOP treatment, the water will pass through a decarbonator to reduce carbon dioxide, increase pH, and stabilize the product water.

- Post-Treatment Systems (pH Adjustment/Corrosivity Stabilization/ Disinfection): Caustic soda (sodium hydroxide) will be added to the water to increase pH, and calcium chloride will be added to reduce the potential for minerals to be leached from the cement lining used in the transmission pipeline. In order to maintain a certain threshold of total chlorine residuals required by the LACDPW to prevent bio-fouling and clogging of the injection wells, sodium hypochlorite and aqueous ammonia will be added to the product water to maintain the required level of total chorine residuals. The levels of sodium hypochlorite and aqueous ammonia to be added will be fine-tuned to effectively manage potential formation of disinfection byproducts.

The proposed project complies with Section 60320 of Article 5.1, entitled "Groundwater Recharge", of the California Code of Regulations Title 22, Division 4, Chapter 3, entitled "Water Recycling Criteria." The Department considers the above treatment to be a best available treatment technology for recycled water used for groundwater replenishment by direct injection.

11. An effective source control program is currently administered by the CSDLAC to minimize the risk that wastewater treated at the LBWRP and LCWRP will be contaminated with toxic chemicals to protect the treatment facilities and downstream beneficial uses. This program may be expanded to include not only contaminants that may be detrimental to the facilities and the environment, but also include contaminants specified by the Department that may be harmful to human health and drinking water supplies. CSDLAC, through a comprehensive monitoring program, will be able to reasonably ensure that the recycled water produced at the ABRWP for recharge into the groundwater basins via injection at the ABP is not contaminated with toxic chemicals of industrial origin that are of concern to the Department in drinking water sources.

12. The WRD has developed an operating plan for the LVLWTF, which will be updated prior to startup of the expanded LVLWTF, per the operating parameters defined in section 14 (General Operations Plan) of the final amended Engineering Report approved by the Department.

13. The Draft Groundwater Replenishment Reuse Regulation requires that for a subsurface application project, the recycled water used as recharge water for a Groundwater Replenishment Reuse Project (GRRP) receives treatment that achieves at a total 12-log virus reduction and 10-log reduction in *Giardia* and *Cryptosporidium* to address the higher risk of pathogens in the recycled source water. The treatment system must consist of at least three separate treatment processes (as defined by the project sponsor). Each process can be credited with no more than a 6-log removal and must achieve at least a 1-log removal. For each month the recycled water is retained underground, the project can be credited with 1-log virus removal (up to 6-log removal). Process credit can be based on information in the literature, previously conducted studies, and other information considered relevant by the Department. The following table summarizes the pathogen reduction credits for the expanded ABRWP. Total pathogen removal credits are expected to exceed 10-logs for *Giardia* and *Cryptosporidium* and 12-logs for viruses.

Pathogen Log Removal/Inactivation Requirements

Pathogen	2013 Draft GWR Regulations	Proposed Pathogen LVLWTF Treatment Credits					Total Credits
	Min	WRP[a]	MF	RO	UV/AOP	Travel time	
Giardia	10	2[b]	2.7[c]	1.5[c]	6[d]	0	12.2
Cryptosporidium	10	1[b]	2.7[c]	1.5[c]	6[d]	0	11.2
Viruses	12	2[b]	N/A	1.5[c]	6[d]	6[e]	15.5

Notes:

a. WRP refers to the LBWRP and LCWRP.
b. To be conservative, WRD has only claimed pathogen removal credits associated treatment processes from influent through secondary treatment using the data shown in Table 5-3.a through Table 5-3.c in the final amended Title 22 Engineering Report.
c. Per discussions with the Department, based on membrane integrity and concomitant minimum reductions. Pathogen reduction credit for MF includes potential impact of backwash water recycle.
d. To be further confirmed by completing a limited scope phage study for the existing UV train.
e. The closest production well is greater than 6 months travel time.

14. The Draft Groundwater Replenishment Reuse Regulation also includes provisions for Response Retention Time (RRT) regarding the time recycled water must be retained underground between recharge and extraction to allow a project sponsor ample time to identify treatment failures and implement appropriate actions to protect public health from inadequately treated recycled water or recharge water. The minimum RRT allowed is 2 months. WRD has justified a RRT of 5 months. Because WRD is claiming a 6-log virus removal credit corresponding to an underground retention time of 6 months, the minimum required underground retention time for the recycled water is 6 months, the longer of the two retention times.

15. Since 1965, the County has operated the ABP by injecting imported potable water to prevent seawater intrusion into the Central Groundwater Basin of Los Angeles County and the Orange County Groundwater Basins. Since 2005, advanced treated recycled water from the LVLWTF has been injected at the ABP as well. In 2012, a total of 2,865 acre-feet (AF) of imported water and 2,336 AF of advanced treated recycled water were injected. The majority of injected water replenishes the inland aquifers, which are a source of municipal water supplies. The failure to maintain an effective seawater intrusion barrier would cause serious water quality degradation in drinking water aquifers in southeastern Los Angeles County and northwestern Orange County and the potential loss of this water resource.

16. The ABP is located at the southeastern end of the Central Groundwater Basin in Los Angeles County. Part of the ABP also extends into the adjacent Orange County Groundwater Basin in Orange County, which is the same groundwater basin as the Central Basin, but divided by the county line. Seven aquifers have been identified at the ABP, including, from the shallowest to the deepest, the Recent Zone, C Zone, B Zone, A zone, I Zone, Main Aquifer and the Lower Main Aquifer. The majority of the potable groundwater production near the ABP is from the Main Aquifer (also known as the Silverado Aquifer in the rest of the Central Basin), with lesser amounts from the B, A, I, and Lower Main. The Central Basin is bounded on the north by the Hollywood Basin and a series of low hills extending from the Elysian Hills on the northwest to the Puente Hills on the southeast. It is bounded on the west and south by the Newport-Inglewood uplift and on the east and southeast by the Los Angeles County - Orange County line. The Central Basin covers approximately 280 square miles and has numerous Quaternary sedimentary aquifers to depths greater than 1,500 feet that transmit and store groundwater for potable, irrigation, and industrial use. Nearly 500 water wells are listed as active in the basin and extract groundwater up to the adjudicated amount of 217,367 acre-feet per year (AFY). Groundwater recharge to the basin is primarily at the Montebello Forebay spreading grounds located in the northeast portion of the basin. In addition, recharge is achieved through percolation of rainfall and applied water over the

basin floor, groundwater underflow from adjacent basins, and from injection at the ABP. The basin is impacted by many variables including factors that are some distance from the proposed project. Some of these include drought, pumping patterns and volumes, new and existing extraction projects and amounts of recharge.

17. The ABP currently consists of 41 injection wells. Sixteen are single injection wells, injecting only into either the A or the I aquifer. Another 19 are dual injection wells, injecting separately into the A/I or C/B aquifers. The remaining six wells are composite wells, injecting simultaneously into C, B, A, and I aquifers. Distances between injection wells vary between about 50 feet to 1,200 feet, for a total span of approximately 1.2 miles. The OCWD is in the planning stages to construct eight additional injection well locations (20 separate casings) to better control seawater intrusion into the Orange County Groundwater Basin. Total injection rates for the eight new wells are anticipated to be approximately 1,011 AFY. The ABP also consists of four extraction wells located seaward of the injection wells. Prior to 2003, LACDPW operated the four extraction wells as additional hydraulic controls for seawater intrusion and to help remove salty groundwater from the Recent and I Zone aquifers. These wells were screened in the Recent Aquifer and I-Zone Aquifer and pumped on average approximately 1,000 AFY from the Recent Aquifer and 300 AFY from the I-Zone. Based on an extraction well efficiency study, which demonstrated that chloride levels tended to decrease during well shut off, the extraction wells were turned off in mid 2002/2003 and have since not been utilized. Minimum maintenance activities are performed on the wells' electrical systems, pumps, and screen condition so that they can be returned to operational status, if needed.

18. The WRD proposes to inject a maximum of 100 percent recycled water into the ABP. The percentage will be calculated based on the running monthly average recycled water contribution for the preceding period up to 120 months.

19. The closest active domestic water well to the ABP is SB-LEI (State Well No. 05S/12W-01A03) owned and operated by the City of Seal Beach and is located approximately 4,840 feet to the east of the ABP. Groundwater travels at different velocities in the different aquifers based on hydraulic gradients and hydraulic conductivity. The I-Zone aquifer tends to have the fastest moving groundwater in the ABP area. Tracer studies and groundwater models determined that recycled water will remain underground for approximately 4.3 years before reaching SB-LEI in the I-Zone. This estimated travel time is shorter than suggested by previous modeling since the new models were run with the current barrier injection amounts and accounts for the anticipated increased injection by OCWD starting in 2014.

20. Pursuant to the WDR/WRR Order No. R4-2005-0061, policies and resolutions have been adopted to effectively prevent the use of groundwater for drinking water purposes within the aquifer treatment zone that has been established as no wells closer than 2,000 feet and less than 12 months underground retention time from the ABP. The policies and resolutions also prohibit the construction of new domestic water wells in the buffer zone. The existing buffer zone of 2,000 feet exceeds the response retention time (five months) and the travel time (six months, used for purposes of determining the pathogen removal credit of 6-logs for virus) described in the WRD's final amended Title 22 Engineering Report approved by the LARWQCB and the Department in April 2013.

To be conservative, WRD will choose to continue to implement the existing policy of 2,000 feet buffer zone, but if necessary, may revise the existing policy to reflect a new buffer zone of six months underground retention time. This is important in order to achieve the necessary log reduction of organism density and to allow the project sponsor ample time to identify potential treatment failures and implement appropriate actions to protect public health from inadequately treated recycled water.

21. Currently, the following ten monitoring wells are used to monitor the underground movement of the recharge water and the water quality of various aquifers comprising the Groundwater basins. With the exception of Wells 503P and 503M, which monitor the background conditions, the remaining eight monitoring wells are used for compliance purposes.

Permit Compliance Wells				
LACDPW Project No.	LACFCD Well No.	Distance from Barrier	Aquifer(s) Monitored and Interval (feet)	Well Use
34LS	503BF	350 feet	C-Zone (136 – 181)	3-Month
34LS	503BE	350 feet	B-Zone (191 – 216)	3-Month
34HJ	502 BX	170 feet	A-Zone (304 – 334)	3-Month
34HJ	502 BW	170 feet	I-Zone (400 – 440)	3-Month
34L10	502AK	900 feet	Zone C	¼ Distance
34L10	502AL	900 feet	Zone B	¼ Distance
34L10	502AM	900 feet	Zone A	¼ Distance
34L10	502AN	900 feet	Zone I	¼ Distance
Background Monitoring Wells				
34’1	503P		Recent	Background
34’1	503M		Main	Background

22. A total of 220 observations wells are currently operating at the ABP. These wells are monitored regularly by the LACFCD for water levels and chloride concentrations to determine the effectiveness of the seawater barrier. The monitoring wells tap the following aquifers, from shallowest to deepest: Recent, C, B, A, and I. WRD monitors the movement of the injected recycled water through the aquifers using 21 observation wells at 8 locations. The 21 observation wells include the eight monitoring wells, where routine, extensive water quality sampling is conducted pursuant to the WDR/WRR requirements, and the 13 tracer wells, whose primary function is to track the movement of the recycled water. Prior to project initiation, the Department concurred with WRD’s proposal that the recycled water should be chemically distinct from the previously injected MWD imported potable water and native groundwater due to the advanced treatment process, particularly RO that produces water with much lower mineral content than the other waters. Therefore, certain properties of the recycled water can be used as a groundwater tracer to follow the recycled water movement and retention time. The Department allowed WRD a 6-month time frame to observe the recycled water in the tracer wells to prove that it could be used as a tracer. The First Annual Summary Report for 2006 submitted by WRD demonstrated that recycled water was observed at several of the tracer wells within the six-month time frame, and as a result, WRD continued to

use recycled water as a groundwater tracer to monitor the movement and retention time of recycled water.

23. As part of the Tracer Program, groundwater samples were collected by WRD from all 21 observation wells prior to project startup for background concentrations, and then sampled the wells on a monthly basis following project initiation and continuing through the end of calendar year 2009. These wells are screened within each of the various aquifers into which injection occurs including the "I-Zone", the "A-Zone", the "B-Zone", and the "C-Zone" aquifers. The laboratory analysis performed on the samples included major cations and anions along with selected general physical parameters. Based on the groundwater sample results from the entire history of recycled water use at the ABP, recycled water is: likely present in four of the wells; possibly present in five of the wells, and absent from 12 of the wells as shown in the following table along with the time for recycled water to first appear at a well. The shortest estimated time of recycled water appearance is two to three months. The tracer tests performed from 2005 through 2009 demonstrated that the recycled water met all retention times. The WRD's Tracer Program ended in 2009, and no new additional tracer tests are planned for the expanded ABRWP.

WRD Tracer Wells – Presence of Recycled Water and Estimated Travel Time

LACDPW Project No.	LACFCD Well No.	Distance from Alamitos Barrier (feet)	Aquifer(s) Monitored	Recycled Water Present	Time to first appear
33ST	492BL	100	Zone A	Possibly	19 months
33XY	502BN	100	Zone A	Yes	6 months
33XY	502BM	100	Zone B	Yes	2 months
34F5	502BR	200	Zone A	Yes	6 months
34F5	502BU	200	Zone C	Yes	3 month
34L10	502AM	900	Zone A	Possibly	18 months
34L10	502AK	900	Zone C	Possibly	10 months
34LS	503BF	350	Zone C	Possibly	15 months
34TO.1	503AC	330	Zone A	Possibly	7 months
34HJ	502BW	170	Zone I	Absent	
34HJ	502BX	170	Zone A	Absent	
34LS	503BE	350	Zone B	Absent	
34L10	502AL	900	Zone B	Absent	
33ST	492BK	100	Zones B, C	Absent	
33ST	492BM	100	Zone I	Absent	
33XY	502BL	100	Zone C	Absent	
33XY	502BP	100	Zone I	Absent	
34F5	502BS	200	Zone B	Absent	

34JL	503AR	320	Zone C	Absent	
34TO.1	503AB	330	Zone B	Absent	

24. Results of sampling collected from the pilot studies simulating the expanded LVLWTF indicate that the product water will meet all requirements of the California Drinking Water Primary and Secondary Maximum Contaminant Levels (MCLs). Tests conducted on MF/RO/UV treatment processes also have indicated that certain pharmaceutically active compounds and other toxic contaminants not included in the drinking water standards are removed or reduced to low levels in the product water.

CONDITIONS

Based on the above revised FINDINGS OF FACT, which are made pursuant to the information provided by the Water Replenishment District of Southern California (WRD) in the Title 22 Engineering Report on the Leo J. Vander Lans Water Treatment Facility (LVLWTF) Expansion: Alamitos Barrier Recycled Water Project (ABRWP) dated March 29, 2013, and the presentation by WRD and public comment at the Public Hearing held by the California Department of Public Health (Department), Drinking Water Field Operations Branch and WRD, on June 26, 2013, in Lakewood, California, the Department FINDS that the proposed changes to the existing operation of the Alamitos Barrier Project (ABP), existing operation of the County Sanitation Districts of Los Angeles County's (CSDLAC) Long Beach Water Reclamation Plant (LBWRP) and Los Coyotes Water Reclamation Plant (LCWRP), and the expanded LVLWTF will not degrade the quality of the water in the receiving aquifers as a source of domestic water supply PROVIDED ALL OF THE FOLLOWING CONDITIONS ARE MET:

1. The total volume of recycled water recharged by injection from the ABRWP shall not exceed 8.0 million gallons per day (mgd).

2. Treatment of recycled water intended for groundwater replenishment shall consist of primary sedimentation, secondary treatment (including nitrification/ denitrification), granular media filtration, disinfection, microfiltration (MF), reverse osmosis (RO), and ultraviolet light (UV) with hydrogen peroxide addition to provide advanced oxidation process (AOP) treatment, with decarbonation and caustic soda addition as needed for pH adjustment and stabilization. Modifications to the treatment train as described in the March 29, 2013 Title 22 Engineering Report on the LVLWTF expansion were reviewed by the Department and the Los Angeles Regional Water Quality Control Board (RWQCB).

3. Recycled water used for injection shall be, at all times, adequately oxidized, filtered, disinfected, and subject to organics removal by RO and UV/AOP treatment. There shall be no bypassing of any treatment process, except for decarbonation and caustic soda addition, which provide pH adjustment as required for stabilization in Condition 2.

4. The advanced treatment process at the LVLWTF will include RO and an UV/AOP that, at a minimum, meet the following criteria: The RO membrane shall comply with ASTM method D4194-03 (2008), which achieves a minimum rejection of sodium chloride of no less than 99.0 percent and an average (nominal) rejection of sodium chloride of no less than 99.2 percent under the following condition:

    - Recovery: 15 percent
    - Temperature: 25C
    - Influent pH: between 6.5 and 8.5
    - Sodium chloride rejection is based on three or more successive measurements, after flushing and following at least 30 minutes of operation having demonstrated that rejection has stabilized
    - An influent sodium chloride concentration of no greater than 2,000 mg/L, and

- During the first 20-weeks of full-scale operation the membrane produces a permeate having no TOC concentration greater than 0.25 mg/L, 5% of the time, as verified through monitoring no less frequent than weekly.

5. The UV/AOP treatment system at the LVLWTF shall provide a sufficient oxidation process to provide no less than 0.5-log (69 percent) reduction of 1,4-dioxane. WRD will conduct spiking challenge testing to demonstrate the proposed oxidation process will achieve the minimum 0.5-log reduction under the proposed oxidation process's normal full-scale operating conditions. WRD shall establish surrogate and/or operational parameter(s) that reflect whether the minimum 0.5-log 1,4-dioxane reduction design criterion is being met. At least one surrogate or operational parameter shall be capable of being monitored continuously, recorded, and have associated alarms that indicate when the process no longer operates as designed.

   Each quarter, WRD shall tabulate the percent of the monitoring results that did not meet the surrogate and/or operational parameter limits established to assure proper on-going performance of the RO and UV/AOP. If the calculated value is more than ten percent, within 30 days after the end of the quarter, the WRD shall submit a report to the Department and RWQCB describing the corrective actions planned or taken to reduce the percentage to ten percent or less; and consult with the Department and, if required by the Department, comply with an alternative monitoring plan approved by the Department.

6. The recycled water used as recharge water in the ABP shall receive pathogen reduction treatment that achieves at least 12-log enteric virus reduction, 10-log Giardia cyst reduction and 10-log Cryptosporidium oocyst reduction. The treatment train shall consist of at least three separate treatment processes. Each separate treatment process may be credited with no more than 6-log reduction. With the exception of retention time underground, each treatment process of the treatment train shall be validated for their log reduction by report or challenge tests. WRD has demonstrated that it achieves a 6-month underground retention time based on tracer tests. No further tracer tests are required. Each treatment process of the treatment train shall be validated for their log reduction by monitoring conducted pursuant to the Operations Plan or challenge tests. The Operations Plan shall specify that WRD will conduct on-going monitoring to verify the performance of each treatment process's ability to achieve its credited log reduction on a daily basis, with the results to be reported monthly.

7. If the pathogen reduction of the combined treatment trains is not met based on ongoing monitoring required in Condition 6, within 24 hours of being aware, WRD shall initiate corrective actions. For failing to meet the pathogen reduction criteria for longer than 4 consecutive hours or more than 8 hours during any 7-day period, the Department and RWQCB shall be immediately notified. Failures of shorter duration shall be reported to the RWQCB no later than 10 days after the month in which the failure occurs. If the effectiveness of the treatment train's ability to reduce enteric virus is less than 9-logs, Giardia Cyst or Cryptosporidium oocysts is less than 8-logs, the use of recycled water shall be discontinued at the ABP and the Department and RWQCB shall be notified immediately.

8. WRD shall enter into an agreement with CSDLAC to ensure that a comprehensive industrial pretreatment and pollutant source control program implemented to prevent

contaminants that might adversely impact the quality of the reclaimed water being produced by the LVLWTF from entering the sewer system. At a minimum the program shall include:

- an assessment of the fate of Department and RWQCB-specified contaminants through the wastewater and recycled municipal wastewater treatment systems,
- contaminant source investigations and contaminant monitoring that focus on Department and RWQCB-specified contaminants,
- an outreach program to industrial, commercial, and residential communities within the portions of the sewage collection agency's service area that flows into the water reclamation facility subsequently supplying the ABP, for the purpose of managing and minimizing the discharge of contaminants at the source,
- a current inventory of contaminants identified pursuant to this section, including new contaminants resulting from new sources or changes to existing sources, that may be discharged into the wastewater collection system; and

9. The monthly running average recycled water contribution (RWC) that is injected into the ABP may be up to 100% of the total water injected at the ABP. Any diluent water for the ABP shall be imported treated drinking water. For each month, a monthly running average RWC shall be determined by dividing the total volume of recycled water injected by the total volume of injection water associated with a time period not to exceed the preceding 120 months.

10. Analyses for contaminants having primary or secondary MCLs shall be performed by laboratories approved to perform such analyses by the Department utilizing Department-approved drinking water methods. Analyses for constituents other than those having a primary or secondary MCLs shall be described in the Operations Plan.

11. The recycled water injected shall meet all MCLs and other limits specified in the Drinking Water Quality and Monitoring Requirements, California Code of Regulations (CCR), Title 22, Chapter 15 and other limits as follows:

- Inorganic chemicals in Table 64431-A (except for nitrogen compounds);
- Radionuclides in Table 4, Section 64442 and 64443;
- Organic chemicals in Table 64444-A;
- Any new Federal or State maximum contaminant level upon adoption;
- Disinfection byproduct in Table 64533-A;
- Lead and copper; and
- Secondary maximum contaminant levels in Tables 64449-A and 64449-B (“Upper” levels).

Recycled water shall be monitored on a quarterly basis at regular intervals by analyzing a 24-hour composite or grab sample to determine compliance with primary

MCLs referenced above for inorganic chemicals, radionuclides, organic chemicals, and disinfection byproducts, and lead and copper referenced above. Compliance shall be based on the running-annual average, calculated each quarter using the previous four quarters of data.

Each year, WRD shall collect at least one representative grab sample of the recycled municipal wastewater and have the sample(s) analyzed for the secondary drinking water constituents in Tables 64449-A and 64449-B.

If a result of the monitoring performed exceeds a contaminant's MCL or action level (for lead and copper), within 72 hours of notification of the result, WRD shall collect another confirmation sample.

For a contaminant whose compliance with its MCL or action level is not based on a running annual average, if the average of the initial and confirmation sample exceeds the contaminant's MCL or action level, or the confirmation sample is not collected and analyzed pursuant to this subsection, WRD shall notify the Department and RWQCB within 24 hours of knowledge (of the exceedance or of the sampling lapse) and initiate weekly monitoring until four consecutive weekly results are below the contaminant's MCL or action level. If the running four-week average exceeds the contaminant's MCL or action level, WRD shall notify the Department and RWQCB within 24 hours and, if directed by the Department or RWQCB, suspend application of the recycled municipal wastewater.

For a contaminant whose compliance with its MCL is based on a running annual average, if the average of the initial and confirmation sample exceeds the contaminant's MCL, or a confirmation sample is not collected and analyzed pursuant to this subsection, WRD shall initiate weekly monitoring for the contaminant until the running four-week average no longer exceeds the contaminant's MCL.

If the running four-week average exceeds the contaminant's MCL, WRD shall describe the reason(s) for the exceedance and provide a schedule for completion of corrective actions in the next quarterly report submitted to RWQCB with a copy provided to the Department.

If the running four-week average exceeds the contaminant's MCL for sixteen consecutive weeks, WRD shall notify the Department and RWQCB within 48 hours of knowledge of the exceedance and, if directed by the Department or RWQCB, suspend application of the recycled municipal wastewater.

With the exception of color, if an annual result of the monitoring performed for secondary drinking water constituents exceeds a constituent's secondary MCL in Table 64449-A or the upper limit in Table 64449-B, WRD shall initiate quarterly monitoring of the recycled municipal wastewater for the constituent, and if the running annual average of quarterly results exceeds a constituent's secondary MCL or upper limit, describe the reason(s) for the exceedance and any corrective actions taken in the next quarterly report submitted to RWQCB pursuant to section 60321, with a copy provided to the Department. The annual monitoring of secondary drinking water constituents in Tables 64449-A and 64449-B may resume if the running annual average of quarterly results does not exceed a constituent's secondary MCL or upper limit.

Since all of the past monitoring results for asbestos have been below the detection limit for asbestos, monitoring of the recycled water for asbestos may be performed once every three years. If asbestos is detected, quarterly monitoring shall be initiated. If four consecutive quarterly monitoring results for asbestos have been below the detection limit for asbestos, monitoring for asbestos may return to once every three years.

12. Any recycled water that may already be present in the groundwater because of on-going project related activities should be accounted for as a part of the total amount of recycled water in calculating the percent of recycled water in an aquifer.

13. The total nitrogen concentration of the ABP recycled water shall not exceed 10 mg/L as nitrogen. Total nitrogen shall be defined as the sum of ammonia, nitrite, nitrate, and organic nitrogen concentrations, expressed as nitrogen. WRD has sampled twice a week for total nitrogen and for the past 12 months, results show the total nitrogen is consistently below 5 mg/L and one-half the nitrate and nitrite MCL. WRD shall collect each week, one grab or 24-hour composite samples of the recycled water for total nitrogen analysis. If the total nitrogen concentration exceeds 10 mg/L as nitrogen, the laboratory must report the result to the WRD within 72 hours of completion of the analysis results and WRD will initiate additional monitoring as described in the Operations Plan. If two consecutive samples exceed 10 mg/L total nitrogen, WRD shall notify the RWQCB and the Department, investigate the cause of the exceedance and take actions to reduce the total nitrogen concentration and investigate the groundwater basin to identify elevated concentrations and determine whether such elevated concentrations of nitrogen exceed or may lead to an exceedance of a nitrogen-based MCL. If the average of four consecutive samples collected exceeds 10 mg/L total nitrogen, suspend the subsurface application of recycled water. Subsurface application shall not resume until corrective actions have been taken and at least two consecutive total nitrogen sampling results are less than 10 mg/L.

    After such an exceedance event, total nitrogen samples (grab or 24-hour composite) shall be twice per week, at least three days apart between samples. WRD may reapply for the Department's approval of weekly monitoring based on the demonstration that the following conditions have been met for the most recent 12 months: (a) the average of all results did not exceed 5 mg/L total nitrogen; and (b) the average of a result and its confirmation sample (taken within 3 business days of receipt of the initial result) did not exceed 10 mg/L total nitrogen.

14. If necessary to supplement the recycled water injection with diluent water, WRD will utilize a Department-approved drinking water source as diluent water. As such, WRD shall be exempt from diluent water monitoring for nitrate and nitrite as long as a Department-approved drinking water source is utilized.

15. The Total Organic Carbon (TOC) concentration of the recycled water shall not exceed 0.5 mg/L based on the 20-week running average of all TOC results and the average of the last four TOC results. Each month, compliance shall be determined based on the running average of the most recent 20 samples and the average of the last four samples. Each week a grab or 24-hour composite sample of the recycled water shall be collected for TOC analysis. If the average TOC concentration exceeds 0.5 mg/L based on the 20-week running average, then injection of recycled water shall be suspended

until at least two consecutive results, three days apart, are less than the limit. Within seven days of the suspension, the WRD shall notify the Department and RWQCB. Within 60 days of knowledge of a TOC limit exceedance, WRD shall submit a report to the Department and RWQCB describing the reasons for the exceedance and the corrective actions planned to avoid future exceedances. At a minimum, the corrective actions shall include a reduction of RWC sufficient to comply with the limit.

16. The turbidity of the RO feed water after the MF treatment shall not exceed 0.2 NTU more than 5 percent of the time in any 24-hour period, and shall not exceed 0.5 NTU at any time. The turbidity of the RO feed water shall be continuously measured with an online turbidity meter and recorder, with at least one reading recorded every 1.2 hours. Compliance with the daily average turbidity shall be determined based on using the recorded turbidity taken at intervals of no more than 1.2 hours over a 24-hour period. Should the continuous turbidity meter and recorder fail, grab sampling at a minimum frequency of 1.2 hours may be substituted for a period of up to 24 hours. The results of the daily average turbidity determinations shall be reported quarterly to the Department and the RWQCB. Whenever the turbidity limit is exceeded, the LVLWTF shall be shut down automatically and result in the suspension of injection of recycled water until such time that the cause of the high turbidity condition has been identified and corrected. Any failure to meet the turbidity performance requirements shall be reported to the Department and the RWQCB in the next monthly report.

17. Using online analyzers, the conductivity and TOC of the RO feedwater and RO product water upstream of the UV system shall be continuously measured and recorded. For both conductivity and TOC, daily minimum, maximum, average, and percent reductions based on daily average values shall be reported.

18. The recycled water intended for recharge via injection shall be disinfected such that the 7-day median number of total coliforms shall not exceed 2.2 total coliform bacteria per 100 milliliters (mL), and the number of total coliform organisms shall not exceed 23 total coliform bacteria per 100 mL in more than one sample in any 30-day period prior to injection. No sample shall exceed 240 total coliform bacteria per 100 mL. A grab sample shall be analyzed daily for total coliform bacteria. A failure to meet these requirements shall require a report describing the cause of the failure and the corrective actions taken to avoid future violations of these requirements. Failure to meet the 7-day median coliform requirement for two consecutive days shall result in the suspension of the injection of recycled water until such time the cause of the failure has been identified and corrected. Any failure to meet the total coliform requirements shall be reported to the Department and RWQCB in the next monthly report.

19. Each quarter or annually, samples of the recycled water shall be collected and analyzed as follows, and any results greater than analytical reporting levels (RLs) shall be reported to the Department and RWQCB in the next quarterly report:

    - Priority toxic pollutants (chemicals listed in the Water Quality Standards, Establishment of Numeric Criteria for Priority Toxic Pollutants for the State of California, and 40 Code of Federal Regulations (CFR) Part 131, Federal Register 65 (97), May 18, 2000, p. 31682) specified by the Department based on the Department's review of the engineering report; and

- Chemicals with state notification levels that the Department has specified based on the review of the engineering report; and

- Chemicals the Department has specified, based on a review of the Engineering Report, the affected groundwater basin(s), and the results of the source control assessment.

The Department may request the WRD to further investigate results greater than RLs and identify, if appropriate, corrective actions. An investigation may include such actions as positive result confirmation, comparison to diluent water quality (if used), groundwater monitoring, source control and/or treatment.

The ABP has been in operation and conducted monitoring which has been evaluated by the Department and RWQCB. WRD has completed the initial quarterly monitoring. Reduced monitoring may continue as outlined in the Engineering Report, Section 13.

If a result is greater than an NL, within 72 hours of knowledge of the result, WRD shall collect another sample for the contaminant as confirmation. If the average of the initial and confirmation sample is greater than the contaminant's NL, or a confirmation sample is not collected and analyzed pursuant to this subsection, WRD shall initiate weekly monitoring for the contaminant until the running four-week average is less than the NL. If the running four-week average is greater than the contaminant's NL, WRD shall describe the reason(s) for the results and provide a schedule for completion of corrective actions in the next quarterly report submitted to RWQCB, with a copy provided to the Department. If the running four-week average is greater than the contaminant's NL for sixteen consecutive weeks, WRD shall notify the Department and RWQCB within 48 hours of knowledge of the exceedance and, if directed by the Department, suspend application of the recycled municipal wastewater.

20. The WRD shall monitor the performance of the UV treatment at the ABRWP for NDMA reduction by sampling the influent to the ABRWP quarterly for NDMA. The influent sampling to the ABRWP for NDMA may be incorporated into the NDMA sampling of the LBWRP and in the future LCWRP conducted by CSDLAC, provided that the sampling is performed using the same analytical method and laboratory.

21. To ensure that the LVLWTF meets all of the performance criteria for the purposes of protecting health, the WRD shall operate all equipment and facilities for treatment and recharge at levels of peak performance in order to limit the presence of contaminants in the recycled water.

22. Prior to startup of the expanded LVLWTF, WRD shall submit an Operations Plan to the Department and the RWQCB for approval. At a minimum, the Operations Plan shall identify the operations, maintenance, analytical methods, monitoring, and reporting of monitoring results to the Department and RWQCB. The monitoring procedures should be described for normal, start-up, off-spec and emergency conditions. The Operations Plan shall also include a contingency plan for off-spec water and an emergency response plan. The WRD shall operate its facilities in accordance with the approved Operations Plan. After six months of operation, the Operations Plan shall be updated as necessary and submitted to the Department and RWQCB for review and approval. The Operations Plan shall cover critical operational parameters to include routine testing

procedures for the MF, RO, and UV/AOP systems, optimization of the UV dose for disinfection and reduction of light-sensitive contaminants, and all treatment processes, maintenance and calibration schedules for all monitoring equipment, process alarm set points, and response procedures for all alarms in each treatment process of the LVLWTF, including criteria for diverting recycled water if water quality requirements are not met, start-up, emergency response and contingency plans. During the first year of operation of the expanded LVLWTF, all treatment processes shall be operated in a manner to provide optimal reduction of microbial, regulated and nonregulated contaminants. Based on this experience and anytime operational changes are made, the Operations Plan shall be updated. The Operations Plan shall include staffing levels with applicable certification levels for ABRWP operations personnel. Significant changes in the operation of any of the treatment processes shall be reported to the Department and RWQCB. Significant changes in the approved Operations Plan must be approved by the Department and RWQCB prior to instituting changes. WRD shall be responsible for ensuring that the Operations Plan is, at all times, representative of the current operations, maintenance, and monitoring of the ABRWP.

23. At the ABP, the recycled water shall be retained in the groundwater basins for a minimum of 6 months prior to being withdrawn at a domestic water supply well based on information provided in Section 5 (Pathogen Microorganism Control) of the Engineer Report. A numerical model and tracer study has been completed, whose results verified the retention and response time is adequate prior to the recycled water reaching the nearest domestic water supply well. WRD shall monitor the ABP and area between the barrier and the nearest domestic wells. If additional extraction wells are utilized in the future that would alter the flow path of the recycled water or the speed in which the recycled water travels, the numerical model and possibly additional tracer testing would need to be conducted for recalibration.

24. WRD shall maintain ordinances, resolutions, and policies that effectively prevent within the area required to achieve 6 months underground retention and response time from the ABP, the use of groundwater for drinking water purposes and construction of any domestic supply wells.

25. Groundwater monitoring to detect the influence of the recycled water injection operation at the ABP shall be performed. Monitoring wells have been sited at a location within approximately three months travel time of the ABP injection wells and at additional intermediate points between the ABP and the nearest downgradient domestic water well, and such that samples can be obtained independently from each aquifer potentially conveying the recharge water.

26. Two sets of nested (multi-depth) groundwater monitoring wells (3-month and ¼ distance wells) have been located between the ABP injection wells and the nearest domestic water supply well, City of Seal Beach SB-LEI. WRD has conducted previous tracer monitoring and determined the travel time from the Barrier to SB-LEI is approximately 4.3 years. The 3-month underground travel time monitoring wells are 503BF in the C-Zone, 503BE in the B-Zone, 502BX in the A-Zone and 502BW in the I-Zone. The ¼ distance monitoring wells which are located approximately quarter distance from the Barrier to the SB-LEI are 502AK for the C-Zone, 502AL for the B-Zone, 502AM for the A-Zone, and 502AN for the I-Zone. WRD has conducted and submitted the baseline groundwater monitoring for the monitoring wells prior to project startup. WRD will also

utilize wells 503P, recent aquifer, and 503M, main aquifer, as background monitoring for aquifers that recycled water is not injected into.

27. The groundwater monitoring program shall be periodically reviewed and modified based on results of the monitoring program. Changes to the monitoring program, including well locations, shall be approved by the Department and the RWQCB. The groundwater monitoring program will be implemented in accordance with Section 13.7 of the March 29, 2013 Title 22 Engineering Report approved by the Department.

If a result from the monitoring conducted above exceeds 80 percent of a nitrate, nitrite, or nitrate plus nitrite MCL, WRD shall, within 24 hours of being notified of the result by the laboratory, collect another sample. If the average of the result of the initial sample and the confirmation sample exceed the contaminant's MCL, WRD shall within 24 hours of being notified by the laboratory of the confirmation sample result, notify the Department and RWQCB and discontinue subsurface application of recycled municipal wastewater until corrective actions have been taken or evidence is provided to the Department and RWQCB that the contamination was not a result of the ABRWP.

28. The WRD shall submit all water quality data associated with groundwater monitoring in a format acceptable to the Department and the RWQCB. Analytical results shall be reported electronically using the format prescribed by the RWQCB.

29. The WRD shall submit, no later than six months after the end of each calendar year, a report to the Department, the RWQCB, and any public water systems having downgradient sources potentially affected by the ABP and within 10 years travel time shall be notified by direct mail and/or electronic mail of the availability of the report. The report shall be prepared by an engineer licensed in California and experienced in the fields of wastewater treatment and public water supply. The annual report shall include:

- a summary of the ABP and ABRWP's compliance status with the applicable monitoring requirements during the previous calendar year;
- For any violations during the previous calendar year;
  - the date, duration, and nature of any violation;
  - a summary of any corrective actions and/or suspensions of subsurface application of recycled municipal wastewater resulting from a violation; and
  - if uncorrected, a schedule for and summary of all remedial actions,
- any detections of monitored chemicals or contaminants, and any observed trends in the monitoring wells and diluent water supplies;
- information pertaining to the vertical and horizontal migration of the recharge water plume;
- a description of any changes in the operation of any unit processes or facilities;
- the estimated quantity and quality of the recycled municipal wastewater and diluent water to be utilized for the next calendar year;
- increases in RWC during the previous calendar year and RWC increases anticipated for the current calendar year; and
- a summary of the measures taken to provide an effective source control program and the effectiveness of the implementation of the measures.

30. WRD already has in place and shall continue to maintain a resolution adopted by its governing board ensuring that it will be responsible for developing a plan for providing

an alternative source of domestic water supply, or a Department approved treatment mechanism, to any user whose domestic water well is found to violate California drinking water quality regulations as a direct result of the ABP or ABRWP, or when the Department makes an analysis and finding that the domestic water well is unsuitable for human consumption as a direct result of the ABP or ABRWP, which will include failure to meet Condition 11 above. Alternative sources may include water delivered for blending of the production well, imported water, water produced at a well head treatment plant, and water produced from new wells.

31. The WRD shall provide an update to the 2013 Title 22 Engineering Report every five years after startup of the expanded LVLWTF to the Department and the RWQCB.

Provided that WRD meets all of the above conditions and findings of fact, the Department finds that the ABRWP can provide injection recharge water that will not degrade the groundwater basins as a source of water supply for domestic purposes.

_____ _____

Date

Cindy Forbes, P.E.
Chief of the Southern California Branch
Drinking Water Field Operations Branch
California Department of Public Health
Hearing Officer

Attachment A

Attendees of Public Hearing

Name	Affiliation
Cindy Forbes	State Department of Public Health
Kurt Souza	State Department of Public Health
Jeff O'Keefe	State Department of Public Health
Oliver Pacifico	State Department of Public Health
Ted Johnson	Water Replenishment District of Southern California
Cathy Chang	Water Replenishment District of Southern California
Jim McDavid	Water Replenishment District of Southern California
Thomas Martin	Water Replenishment District of Southern California
Tracy Burke	Water Replenishment District of Southern California
Jeff Henderson	Water Replenishment District of Southern California
Everett Ferguson	Water Replenishment District of Southern California
Vanessa Robles	Water Replenishment District of Southern California
Jason Dadakis	Orange County Water District
Doug McPherson	United States Bureau of Reclamation
Ann Heil	County Sanitation Districts of Los Angeles County
Margie Nellor	Nellor Environmental Associates, Inc.
Bruce Chalmers	CDM Smith
Debbie Burris	DDB Engineering, Inc.
Kate Nutting	Golden State Water Company