CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2013-0010

WASTE DISCHARGE REQUIREMENTS

FOR
IRONHOUSE SANITARY DISTRICT
IRONHOUSE WATER RECYCLING FACILITY
CONTRA COSTA COUNTY

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

1. On 11 April 2011, Ironhouse Sanitary District submitted a Report of Waste Discharge (RWD) to apply for revised Waste Discharge Requirements (WDRs). An antidegradation analysis was submitted on 16 March 2012 and an RWD addendum was submitted on 13 April 2012. Additional information to complete the RWD was received in September and October 2012.

2. Ironhouse Sanitary District (hereafter "Discharger") owns and operates the Water Recycling Facility (WRF) and is responsible for compliance with these Waste Discharge Requirements (WDRs).

3. The Ironhouse WRF is at 450 Walnut Meadows Drive in Oakley (Section 24, T2N, R2E, MDB&M). The WRF occupies Assessor's Parcel Numbers (APN) 037-170-009, 037-170-010, 037-191-033, 037-191-034, 037-192-009, 037-192-011, 027-030-001, 027-030-002, 027-030-003, 027-040-001, 027-050-002, as shown on Attachment A, which is attached hereto and made part of this Order by reference.

4. WDRs Order 5-01-237, adopted by the Central Valley Water Board on 7 September 2001, prescribes requirements for the WRF. Order 5-01-237 allows an average daily effluent flow of 2.0 million gallons per day (MGD) and a maximum daily effluent flow of 2.5 MGD. Since the adoption of the current WDRs, the Discharger has constructed a new wastewater treatment plant, reduced the area used for land application of treated effluent, and obtained a National Pollutant Discharge Elimination System permit (Order R5-2008-0057, NPDES CA0085260) to regulate discharges of tertiary disinfected effluent to the San Joaquin River. Therefore, Order 5-01-237 will be rescinded and replaced with this Order.

Facility and Discharge Regulated Under Previous WDRs

5. The WRF treats and recycles residential and commercial domestic wastewater from the City of Oakley, Bethel Island, and some unincorporated areas of Contra Costa County. There are approximately 11,750 residential equivalent dwelling units (EDUs) and 2,500 commercial EDUs connected to the sewer system.

6. Prior to July 2011, the wastewater treatment plant (WWTP) portion of the WRF consisted of a headworks that provided primary solids removal, four aerated treatment ponds, and two effluent storage ponds. The unlined aerated ponds had a surface area of approximately 7.5 acres and were operated as two two-stage aerated pond systems run in parallel with a detention time of approximately 2.7 days to provide secondary treatment. The previous treatment ponds are shown on Attachment B, which is attached hereto and made part of this Order by reference.

7. Secondary treated wastewater was held in the effluent storage ponds prior to being recycled for irrigation of fodder crops. The storage ponds have a capacity of approximately 350 acre-feet with three feet of freeboard and were constructed with a low permeability, continuous, vertical cutoff wall along the centerline of the levees. The cutoff walls extend below the surrounding ground surface and are keyed into the native clay underlying the site.

8. Wastewater was disinfected with sodium hypochlorite prior to discharge to the mainland or Jersey Island land application area (LAA). Approximately, 166 acres of LAA were located on the mainland adjacent to the treatment plant and 434 acres were located on Jersey Island. The Jersey Island LAA incrementally increased from 350 acres to 434 acres between 2001 and 2006. The Jersey Island LAA is shown on Attachment C, which is attached hereto and made part of this Order by reference.

9. The previous WDRs set an average monthly effluent flow limit of 2.0 MGD and allowed an increase to up to 3.0 MGD upon expansion of the Jersey Island land application area (LAA) and a revised water balance capacity analysis approved by the Executive Officer. Completed expansions of the Jersey Island LAA were approved in September 2003, September 2005, and July 2006. The July 2006 water balance showed a capacity of 2.7 MGD as a monthly average. The following table summarizes annual average influent flow rates from 2007 through 2011.

Year	Total Annual Flow (MG)	Average Daily Flow (MGD)	ADWF [1] (MGD)
2007	960	2.63	2.62
2008	905	2.48	2.44
2009	873	2.39	2.30
2010	891	2.44	2.33
2011[2]	936	2.56	2.33

[1] Average Dry Weather Flow calculated as average daily flow for months June through September.
[2] Due to construction of the new WWTP partially treated effluent was temporarily stored in the South Pond. Higher influent flows where recorded from October through December when the stored effluent was routed back to the headworks.

10. The former Contra Costa County Sanitation District No. 15 wastewater treatment ponds on the mainland, south of Bethel Island, are used for emergency storage of untreated wastewater from Bethel Island and during sewer system maintenance on Bethel Island. Wastewater discharged to these ponds is conveyed to the WWTP as soon as conveyance capacity is available.

11. The average influent wastewater character is summarized in the table below based on monitoring data submitted by the Discharger for January 2007 through December 2011.

Year	Annual Average of Influent Data		
	BOD (mg/L)	TSS (mg/L)	TDS (mg/L)
2007	234	231	646
2008	255	245	743
2009	275	239	701
2010	288	254	664
2011	272	414[1]	647

[1] The Discharger reports that a leaking drain valve allowed mixed liquor from the aeration basins to be routed back to the headworks. The leaking drain valve has been fixed and the influent sampling location has been moved upstream of the headworks.

12. The average effluent quality discharged to the LAA prior to completion of the new WWTP is summarized in the following table based on monitoring data submitted by the Discharger for January 2007 through July 2011.

Year	Annual Average of Effluent Data					
	BOD (mg/L)	Nitrate-N (mg/L)	TKN (mg/L)	TDS (mg/L)	Total Coliform (MPN/100mL) [1]	pH
2007	24	4.2	22	724	4.0	7.2
2008	27	3.5	24	792	7.2	7.2
2009	25	2.3	23	845	1.2	7.4
2010	25	1.1	29	807	2.0	7.5
2011[2]	21	0.4	35	740	2.4	7.5

[1] Half the detection limit (1 MPN/100ml) was used to calculate the average for values reported as <2 MPN/100mL

[2] Average from January through July prior to operation of new WWTP.

Changes in the Facility and Discharge

13. The Discharger has constructed a new WWTP that began operation in July 2011. The new WWTP consists of an updated headworks, tertiary treatment, and ultraviolet disinfection. The new WWTP site location is shown on Attachment B and a flow schematic of the treatment process is shown on Attachment D, which is attached hereto and made part of this Order by reference.

14. The new WWTP was designed to meet anticipated growth through year 2025 with a treatment capacity of 4.3 MGD average dry weather flow and 8.6 MGD maximum wet weather flow. The WWTP is designed with redundancy to maintain treatment and flow capacity during routine maintenance and emergency conditions.

15. The headworks consists of an influent pump station with emergency backup pumps. Primary solids removal is achieved through two six millimeter coarse screens, a vortex grit removal system, and three one millimeter drum screens. Screened solids and grit are stored in dumpsters prior to being disposed of in a landfill.

16. In case of high influent flows that exceed treatment capacity, influent wastewater can be routed to the South Pond for emergency storage. Once capacity is available, wastewater from the South Pond is routed back to the headworks.

17. Approximately 8,940 dry tons of sludge was removed from the four former aerated ponds. These ponds are being backfilled as material becomes available from a local excavation/construction project.

18. The updated biological treatment system consists of anoxic basins, aeration basins, and membrane bioreactor (MBR) basins to achieve tertiary treatment with membrane filtration. The treatment basins are constructed of reinforced concrete. Filtered effluent flows to a backpulse tank prior to disinfection. Water from the backpulse tank is used as needed for plant utility water and to backwash and/or clean the membrane filters.

19. The Discharger no longer adds sodium hypochlorite for effluent disinfection and has constructed a UV disinfection system, which consists of two open channels with three banks of UV lights in each channel. The UV disinfection system is designed for a minimum dose of 80 millijoules per square centimeter (mJ/cm^2) and was approved by the California Department of Public Health in a 16 July 2012 letter.

20. The Discharger uses sodium hypochlorite for MBR membrane maintenance. The WWTP is also plumbed to use sodium hypochlorite for odor control and disinfection of plant utility water but the Discharger has not needed to do so since operations began in July 2011.

21. Tertiary disinfected wastewater is either stored in the North Pond prior to application to the Jersey Island LAA via the LAA Supply Pump Station or pumped directly to the Jersey Island LAA via the WWTP Effluent Pump Station. Discharge to the San Joaquin River occurs under separate NPDES requirements when discharge to the LAA is not feasible.

22. When the effluent quality does not meet the effluent limitations of this Order or the NPDES permit, effluent will be routed to the South Pond for storage prior to being reintroduced to the headworks.

23. Effluent monitoring data from operation of the new WWTP are summarized in the following table.

Date	Newly Constructed WWTP Monthly Average Effluent Data					
	BOD (mg/L)	Nitrate-N (mg/L)	TKN (mg/L)	TDS (mg/L)	Total Coliform (MPN/100mL) [1]	pH
Aug 2011	9	1.5	5.5	581	5	8.0
Sep 2011	ND	2.1	3.2	698	ND	8.5
Oct 2011	ND	6.2	0.89	545	ND	7.4
Nov 2011	0.2	4.9	NA	560	ND	NA
Dec 2011	ND	9.3	0.53	572	ND	7.2
Jan 2012	0.4	8.4	0.78	583	0.5	7.0
Feb 2012	ND	7.3	0.69	611	ND	6.9
Mar 2012	ND	7.1	0.8	606	ND	6.9
Apr 2012	ND	8.2	0.9	645	ND	7.0
May 2012	8	6.2	2.8	616	ND	7.0
Jun 2012	6	6.6	1.0	582	ND	7.0
Average	< 3.0	6.2	1.7	600	<2.0	7.3

ND = not detected.
NA = not available.

The newly constructed WWTP has resulted in improved effluent quality for all constituents except nitrate, which has approximately doubled. However, the increase in nitrate is associated with a significant decrease in TKN from about 25 mg/L to less than 2 mg/L on average due to increased nitrification, which has resulted in an overall reduction of total nitrogen in the effluent.

The effluent TDS concentration has also decreased from 2007 levels. However, effluent TDS partly depends on the domestic source water quality. The Discharger states that water softener usage has decreased since 2007 due to the economic decline and that there are a number of vacant foreclosed homes that have water softeners. When existing and new water softeners come online, the TDS concentration is expected to increase.

24. The hydraulic capacity of the WRF is not limited by the constraints of land disposal and storage because the Discharger is able to discharge to the San Joaquin River year round under the NPDES permit. This Order sets an influent flow limit at the design treatment capacity of 4.3 MGD average dry weather flow, which is the same flow limit as the NPDES permit.

25. Wasted sludge from the biological treatment system is dewatered using belt filter presses. The dried biosolids will either be applied to the LAA as a soil amendment when weather permits or disposed at a landfill. Biosolids will be stored in covered tractor trailers at the WWTP site so that no runoff or leachate from the storage containers will occur.

26. The Discharger estimates that the WWTP produces approximately 73 dry tons of biosolids each month. The previous Order allowed the Discharger to apply biosolids as soil amendment to the mainland and Jersey Island LAA fields and this Order also allows the land application of biosolids to mainland and Jersey Island LAA fields. The Discharger states that metal concentrations have increased in the biosolids and decreased in the effluent as a result of the change to membrane filtration. The most recent biosolids sampling occurred on 15 August 2011 and the results are summarized in the following table.

Constituent	Concentration [1] (mg/Kg)	Constituent	Concentration [1] (mg/Kg)
Antimony	<2.0	Lead	1.1
Arsenic	<2.0	Molybdenum	1.4
Barium	31	Nickel	2.1
Beryllium	<0.20	Selenium	<2.0
Cadmium	<0.20	Silver	<1.0
Chromium, total	2.0	Thallium	<2.0
Cobalt	<0.4	Vanadium	0.86
Copper	39	Zinc	85

[1] Measured on a wet weight basis.
ND = not detected.

27. The Discharger periodically takes water treatment (alum) sludge from three Contra Costa Water District water treatment plants. The sludge is stockpiled on Jersey Island prior to being used for maintaining levees on Jersey Island. The water treatment sludge storage area is shown on Attachment C.

Land Application Area

28. Tertiary disinfected wastewater is recycled on the Jersey Island LAA to grow fodder crops. The Discharger has ceased use of the mainland LAA for water recycling. The mainland area is approximately 165 acres and will be used to grow crops from natural precipitation. This Order allows certain mainland monitoring wells to be abandoned if requested by the Discharger (see Attachment C).

29. This Order does not prohibit future irrigation of the mainland LAA fields with treated wastewater. However, this Order requires the Discharger to submit a *LAA Expansion Workplan*, which requires approval prior to reinstating effluent recycling on the mainland LAA fields. If the Discharger proposes to reinstate wastewater recycling on the mainland LAA, the workplan requires an evaluation of whether groundwater monitoring wells need to be installed.

30. Jersey Island is an approximately 3,500 acre subsided island below the flow level of the San Joaquin River and has a land surface 6 to 11 feet below mean sea level. Reclamation District 830 maintains the levees that surround the island and dewaters the island using a network of interceptor ditches that drain to the northern pumping station. The ditches and pump station are used continuously to keep the shallow groundwater below the land surface. Attachment C shows the Jersey Island LAA.

31. The Jersey Island LAA previously consisted of 29 fields (numbered 1 through 23 and 30 through 35) totaling 435 acres. The Discharger proposes to no longer recycle treated wastewater on fields 7, 15, 16, 17, 18, and 19 due to poor soil conditions. The resulting acreage of the Jersey Island LAA will be approximately 335 acres. The Discharger proposes to apply biosolids and/or commercial fertilizer to the LAA for soil amendment and supplemental nutrients because the total nitrogen concentration of the treated wastewater is not sufficient to meet crop demand.

32. The Jersey Island LAA fields are planted and harvested either once, twice, or three times per year. Crops grown consist of mixed pasture grasses, sudan grass, ryegrass, and wheat. The fields are flood irrigated and bermed around the field perimeter to prevent tailwater discharges to the island's drainage ditches. After the fields are planted, the fields are initially irrigated and then irrigated at agronomic rates during the growing season. Previously some fields were occasionally irrigated above agronomic rates; however, with the ability to discharge to the San Joaquin River under NPDES requirements the Discharger states that over irrigation will no longer occur.

33. The Jersey Island LAA fields do not have tailwater return systems. Tailwater and storm water runoff are contained onsite by berms around each individual field.

Site-Specific Conditions

34. The City of Oakley's potable water is supplied by the Diablo Water District (DWD), which obtains water from surface water and groundwater. Bethel Island obtains potable water from groundwater wells that serve up to 210 connections per well. The following table summarizes monitoring data from the Diablo Water District and available data from Bethel Island.

	EC (µmhos/cm)	TDS (mg/L)	Chloride (mg/L)	Sodium (mg/L)	Hardness (mg/L)
DWD 2008	601	—	81	71	120
DWD 2009	608	—	80	68	140
DWD 2010	570	—	60	59	136
Bethel Island[1]	1,392	839	—	—	—

[1] Served population weighted average

The ratio of EC to TDS on Bethel Island is approximately 1.66 µmhos/cm of EC per 1 mg/L of TDS, which is similar to the typical conversion factor of 1.6 found in Title 22 California Code of Regulations. Using the conversion factor of 1.6, DWD has an average TDS concentration of approximately 370 mg/L. The DWD supply is moderately hard. As noted above, the prevalence of residential water softeners in the WRF service area is not known, but the Discharger states that use of water softening systems contributes substantially to the salinity of the WRF effluent.

35. The WWTP is at a mean sea level (MSL) elevation of 11.2 feet or greater and adjacent to the south shore of Big Break and San Joaquin River. The WWTP and Jersey Island LAA are within the 100-year flood plain. The WWTP was built on an engineered pad that is at least 2 feet above the 100-year flood elevation of 9.2 feet (1988 datum). Flood inundation of Jersey Island is prevented by a perimeter levee that is maintained by Reclamation District No. 830.

36. The area topography is relatively flat. Big Break and the San Joaquin River are to the north of the WRF and Marsh Creek is to the east of the WWTP. Storm water runoff in the area drains via Marsh Creek to the San Joaquin River.

37. The Discharger collects all storm water runoff generated at the WWTP and disposes of it into an on-site holding pond. Storm water from Jersey Island LAA is retained on the fields by berms. Storm water runoff from the mainland fields is collected in drainage ditches and either pumped to the "I parcel" or to Big Break via the Return Pump Station. The "I parcel" is a former treatment pond that has not received wastewater since the 1980's and now serves as a water fowl habitat.

38. The North Pond has an overflow structure designed to maintain a minimum of two feet freeboard at all times. In the event of overflow, effluent would be discharged through

this structure onto mainland Field A where it would be retained before being returned to the ponds via the mainland tailwater collection system.

39. On the mainland, soils in the first 20-feet are characterized by about 5-feet of dense clay and silty clay, underlain by sand, silty sand, clayey sand, and clayey silt deposits. Substantial spatial variation exists in sediment color and texture, which is likely due to the sediment source materials and depositional deposits. The mainland fields, effluent storage ponds, and previous treatment ponds are located in an area primarily consisting of Marcuse Clay and Sycamore Silty Clay Loam. The Soil Conservation Service soil survey indicates that the Marcuse and Sycamore soil types contain soluble salts, primarily gypsum and calcium carbonate minerals.

40. Jersey Island LAA fields are comprised of sand deposits and/or low-lying peat soils. LAA fields comprised of sand deposits have adequate drainage and fields comprised of low-lying peat soils have marginal to poor drainage. The Discharger has worked to add fields with adequate drainage and remove poorly drained fields from the water recycling program.

41. Based on the Discharger's 1998 Report of Waste Discharge (RWD), soil pH for Jersey Island LAA fields ranged from 4.7 to 7.9 and averaged 6.8. The 2011 RWD did not indicate that the soil pH on Jersey Island has changed. Therefore, this Order requires treatment of acid soils as needed to maintain the pH above 6.5 to minimize the mobility of metals in the vadose zone. The cation exchange capacity (CEC) on Jersey Island ranged from 16.6 to 41.7 meq/100g and averaged 30 meq/100g. This Order does not allow biosolids application on LAA fields with a CEC less than 15 meq/100g.

42. The RWD states that the average annual precipitation is 12 inches and the 100-year return total is 22.99 inches. The total evapotranspiration and pan evaporation are reported to be 54.15 inches per year and 72.39 inches per year, respectively.

43. Surrounding land uses are primarily residential and agricultural.

Groundwater Considerations

44. On the mainland, shallow groundwater generally flows northward toward Big Break and the San Joaquin River. Groundwater intercepted by the Discharger's return ditches is pumped to the "I parcel", used for mainland irrigation, or discharged to Big Break.

45. Groundwater on the mainland is typically less than 5 feet below ground surface. The base of the effluent storage ponds is about 1 to 4 feet above groundwater. Recent groundwater elevation data do not show mounding around the ponds. This indicates that percolation rates from the ponds are low compared to the groundwater transmissivity due to the constructed clay liners.

46. The Discharger has 25 groundwater monitoring wells located on the mainland property, monitoring wells MNLND-1 through MNLND-7 and MNLND-14 through MNLND-31. Monitoring wells MNLND-8 through MNLND-13 were not properly constructed and abandoned in September 2000 when MDLND-14 through MNLND-25 were installed as replacements. Monitoring wells MNLND-22 through MNLND-24 are upgradient of the WRF and represent background groundwater quality.

47. In March 2003, the Discharger installed monitoring wells MNLND-26 through MNLND-31 to study beneficial use impacts on the portion of the Contra Costa Canal that traverses the mainland LAA. In 2004 the Contra Costa Water District installed a pipeline to replace the portion of the canal that crosses the mainland LAA. Additionally, the Discharger proposes to no longer recycle wastewater on the mainland LAA and requests reduced monitoring of mainland monitoring wells.

48. The Discharger will continue to use the north and south effluent storage ponds. The following table summarizes groundwater monitoring data collected from monitoring wells upgradient and downgradient of the storage and former treatment ponds. Monitoring wells MNLND-23 and MNLND-24 are upgradient of the storage and former treatment ponds, and are representative of background groundwater quality.

Well ID	TDS[1] (mg/L)		Chloride[2] (mg/L)		Nitrate-N[3] (mg/L)		TKN[1] (mg/L)		TCO[1] (MPN/100mL)	
	median	range	median	range	median	range	median	range	median	range
22[4]	890	643-1100	130	71-260	14.0	0.2-30.0	0.3	ND-2.6	23	ND-1600
23[4]	670	170-1100	100	34-200	3.0	ND-34.0	0.3	ND-3.5	170	ND-1600
24[4]	1800	490-2700	310	64-650	5.1	ND-26.0	0.3	ND-3.7	49	ND-1600
1	2800	2000-6100	630	360-1200	<0.1	ND-4.5	1.3	0.3-4.1	13	ND-1600
2	5900	3130-17000	1100	500-2600	<0.1	ND-57.0	2.6	0.4-5.3	33	ND-1600
3	2000	1440-4500	340	140-580	<0.1	ND-3.5	0.5	ND-33.0	7.0	ND-1600
4	1900	348-2500	400	140-710	0.1	ND-5.5	32.0	0.6-47.0	2	ND-1600
5	1320	640-6200	280	180-1400	<0.1	ND-6.4	1.6	0.4-13.0	300	ND-1600
6	1400	1195-2900	120	42-250	29.0	ND-72.0	0.4	ND-2.3	11	ND-1600
7	3800	2600-7100	290	150-700	8.9	ND-33.3	1.0	ND-2.2	11	ND-1600
14	1000	645-1300	310	160-450	0.4	ND-1.1	0.6	ND-11.0	13	ND-1600

[1] Monthly data from August 2000 to October 2001 and quarterly data from January 2002 to April 2012.

[2] Quarterly data from October 2001 through April 2012

[3] Quarterly data from January 2002 through April 2012

[4] Upgradient monitoring well.

TDS – Total dissolved solids

TKN – Total Kjeldahl nitrogen
TCO – Total coliform organisms
ND – Not detected

49. Based on the data summarized above, background groundwater quality on the mainland portion of the WRF site is spatially and temporally variable. For TDS, MNLND-23 sampling data shows a consistent pattern below the upper level secondary MCL of 1,000 mg/L and above the recommended secondary MCL level of 500 mg/L. TDS concentrations in MNLND-24 significantly decreased in 2009 but are still above the recommended secondary MCL level of 500 mg/L.

    For chloride, MNLND-23 sampling data shows a consistent pattern below the recommended secondary MCL level of 250 mg/L. Chloride concentrations in MNLND-24 started a downward trend in 2005 and were consistently below 250 mg/L after mid-2008, except for a spike in 2010 and 2011.

    For nitrate as nitrogen, MNLND-23 shows a decreasing trend and since 2008 has remained below 5 mg/L. Nitrate concentrations in MNLND-24 started to increase in 2007 and spiked to 26.0 mg/L in 2008. Since 2009, concentrations in MNLND-24 show a decreasing trend but occasionally exceed the MCL of 10 mg/L.

50. Based on studies completed by the Discharger, TDS and chloride degradation shown in downgradient monitoring wells is primarily due to naturally occurring salinity. For nitrate, monitoring data show that degradation has primarily occurred in MNLND-6, which is upgradient but adjacent to the South Emergency Storage Pond. Since 2007, MNLND-6, has consistently been above the MCL of 10 mg/L. Monitoring well MNLND-7, which is also adjacent to the South Pond, showed periodic concentrations above 10 mg/L prior to mid-2009, but has since remained below the MCL. The improved quality of the effluent will likely prevent further degradation of groundwater from nitrate. For TKN, which is primarily ammonia, the highest concentrations occurred in MNLND-4, which is adjacent to the previous treatment ponds. Because these ponds are no longer in use, elevated TKN concentrations are not expected to persist.

51. Jersey Island is dewatered to maintain groundwater at a depth approximately 2 to 4-feet below the ground surface. WDRs Order 5-01-237 required that the Discharger monitor surface water in the dewatering ditches in lieu of shallow groundwater. Nine surface water sampling locations exist on Jersey Island. Sampling location SW-1 is upgradient of the LAA. Sampling locations SW-2 through SW-5 are downgradient of the LAA fields currently in use. Sampling locations SW-8 and SW-9 are side-gradient of the LAA fields and provide additional background groundwater data for Jersey Island. Sampling location SW-6 is downgradient of SW-5, SW-8, and SW-9. Sampling location SW-7 is downgradient of SW-6 and immediately upstream of the dewatering pump station, which discharges to the San Joaquin River.

52. The following table summarizes surface water monitoring data collected from Jersey

Island for the period January 2007 through June 2012. Total coliform organism data is not considered because sampling is from surface water and there are natural sources of coliform contamination beyond the Discharger's control, such as waterfowl.

Sampling Location ID	TDS[1] (mg/L)		Nitrate-N[3] (mg/L)		TKN[1] (mg/L)	
	median	range	median	range	median	range
SW-1[1]	496	312-944	<0.1	ND-0.5	3.2	ND-180
SW-8 [2]	463	111-1998	0.1	ND-2.2	1.1	ND-59
SW-9 [2]	847	141-1865	0.2	ND-2.2	1.6	ND-27
SW-2	819	628-1025	<0.1	ND-2.0	1.6	ND-34
SW-3	1220	705-1922	0.5	ND-13.0	6.5	1.1-110
SW-4	1252	653-1783	0.6	ND-18.0	5.2	1.5-48
SW-5	971	139-1693	0.4	ND-9.4	3.4	ND-22
SW-6	885	108-1580	0.3	ND-10.0	2.4	ND-11
SW-7	716	163-2080	0.4	ND-21.0	2.4	0.6-56

[1] Upgradient monitoring location.

[2] Side-gradient monitoring location

Based on the data above, wastewater recycling on the Jersey Island LAA appears to cause groundwater degradation with respect to TDS. The Discharger states that TDS concentrations generally increase after winter rainfall and irrigation events, which supports a conceptual understanding that higher groundwater elevations leach salt from shallow soil layers. The apparent groundwater salinity may also be associated with evapoconcentration of the recycled effluent during irrigation and naturally occurring salts. However, considering the hardness and salinity of the community water supply, the effluent TDS is not unreasonably elevated and evapoconcentration would still occur if another water supply was used for irrigation.

On average, wastewater recycling on the Jersey Island LAA has not degraded groundwater with respect to nitrate. Downgradient sampling locations have consistently had nitrate concentrations less than 5 mg/L except for a spike that occurred in late 2010. The improved effluent quality and agronomic fertilization rates will continue to prevent degradation.

Basin Plan, Beneficial Uses, and Regulatory Considerations

53. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins,* Fourth Edition (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting

waters of the basin, and incorporates by reference plans and policies adopted by the State Water Board. Pursuant to Water Code section 13263(a), waste discharge requirements must implement the Basin Plan.

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

55. The Basin Plan designates the beneficial uses of underlying groundwater as municipal and domestic supply, agricultural supply, and industrial supply.

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

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

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

59. In summary, the narrative toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, animal, plant, or aquatic life associated with designated beneficial uses. Quantifying a narrative water quality objective requires a site-specific evaluation of those constituents that have the potential to impact water quality and beneficial uses.

60. The Basin Plan states that when compliance with a narrative objective is required to protect specific beneficial uses, the Central Valley Water Board will, on a case-by-case basis, adopt numerical limitations in order to implement the narrative objective.

61. In the absence of specific numerical water quality limits, the Basin Plan methodology is to consider any relevant published criteria. General salt tolerance guidelines, such as *Water Quality for Agriculture* by Ayers and Westcot and similar references indicate that yield reductions in nearly all crops are not evident when irrigation water has an EC less than 700 µmhos/cm. There is, however, an eight- to ten-fold range in salt tolerance for agricultural crops and the appropriate salinity values to protect

agriculture in the Central Valley are considered on a case-by-case basis. It is possible to achieve full yield potential with waters having EC up to 3,000 µmhos/cm if the proper leaching fraction is provided to maintain soil salinity within the tolerance of the crop.

62. The list of crops in Finding 32 is not intended as a definitive inventory of crops that are or could be grown in the area affected by the discharge, but it is representative of current and historical agricultural practices in the area. The effluent concentrations for the discharge permitted by this Order are consistent with water quality objectives and will not the limit use of shallow groundwater for irrigation on all but the most salt-sensitive crops.

Antidegradation Analysis

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

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

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

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

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

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

65. The Discharger has been monitoring groundwater quality at the site since 1983 when the original wastewater treatment facility was built, and the RWD states that the California Department of Water Resources (DWR) has maintained a piezometer cluster site (DWR-351) near the northeast corner of the North Effluent Storage Pond since 1968 . Based on the data available, it is not possible to determine pre-1968 groundwater quality. Therefore, determination of compliance with Resolution 68-16

for this facility is based on groundwater monitoring data from the Discharger's monitoring well network and, in the case of mainland groundwater quality, well DWR-351.

66. Data from DWR-351 show an increasing trend in EC from 1968 to 1985 in the 10- and 20-foot deep piezometers from less than 5,000 µmhos/cm to 15,000 µmhos/cm. After 1985 (since the construction of the original wastewater treatment facility) the EC concentration has been decreasing at these piezometers. In 2002, the EC concentrations were 3,030 µmhos/cm in the 10-foot piezometer and 4,890 µmhos/cm in the 20-foot piezometer. This shows that the saline groundwater on the mainland portion of the WRF site is not from the WRF and that discharges from the wastewater treatment facility likely dilute the mainland groundwater salinity.

67. Constituents of concern that have the potential to degrade groundwater include salts (primarily TDS, sodium, chloride, and sulfate) and nutrients as discussed below:

    a. On the mainland, groundwater monitoring data show that sodium, chloride, and sulfate follow the same trend as TDS. The average effluent TDS concentration after the construction of the new WWTP is approximately 600 mg/L, which is 240 mg/L above the Diablo Water District (DWD) source water. The increase in TDS between the DWD source water and the WRF effluent is typical for a domestic wastewater treatment facility. The TDS effluent quality has improved since completion of the new WRF, which is likely due to reduced evapoconcentration during the treatment process. The mainland background groundwater TDS concentration is spatially variable and currently averages 1,120 mg/L. However, data from DWR-351 show high salinity downgradient of the WWTP that predates the discharge. Because the effluent quality is significantly less saline than the groundwater predating the discharge, the discharge has no potential to cause future groundwater degradation. Therefore, groundwater and effluent limits are not necessary for these constituents.

       On Jersey Island, the average background groundwater quality is approximately 500 mg/L. The Discharge has the potential to degrade Jersey Island groundwater but would not cause an exceedance of a water quality objective.

    b. For nutrients such as ammonia and nitrate, the potential for degradation depends not only on the quality of the treated effluent, but the ability of the vadose zone below the effluent storage ponds and LAAs to provide an environment conducive to nitrification and denitrification to convert the effluent nitrogen to nitrate and the nitrate to nitrogen gas before it reaches the water table. The effluent nitrate nitrogen concentration currently averages approximately 6.0 mg/L and the background groundwater concentration averages 7.4 mg/L on the mainland and less than 0.5 mg/L on Jersey Island. The effluent TKN concentration, which is primarily ammonia nitrogen, currently averages approximately 1.8 mg/L and the background groundwater concentration averages less than 0.5 mg/L on the mainland and approximately 3.0 mg/L on Jersey Island. Groundwater in monitoring well MW-6, which is adjacent to the South Storage Pond, has historically exceeded the nitrate MCL. However, it is not clear that the discharge is causing the elevated nitrate concentration.

Additionally, groundwater monitoring data in a downgradient monitoring well (MW-16) show that nitrate in MW-6 attenuates to below the MCL as groundwater moves downgradient. The current discharge is not likely to degrade mainland or Jersey Island groundwater quality with respect to ammonia but has the potential to degrade Jersey Island groundwater with respect to nitrate. This Order sets a performance based total nitrogen effluent limit of 15 mg/L to protect groundwater quality and allows groundwater degradation up to the water quality objective.

c. For coliform organisms, historical detections in upgradient and downgradient mainland groundwater monitoring wells exceeded the Basin Plan water quality objective and the typical effluent concentration. This implies that coliform organism detections in the groundwater are a result of previous cross-contamination and colonization. The recent effluent monitoring data show that coliform organisms have been undetected since September 2011 and coliform organisms are not expected to be a threat to groundwater quality because of the high level of containment and disinfection provided by the new WWTP. This Order sets a total coliform organisms effluent limit of 23 MPN per 100 mL to protect groundwater quality.

68. This Order establishes effluent and groundwater limitations for the WRF that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan. The level of salinity in shallow groundwater on the mainland and Jersey Island is likely naturally occurring and not a result of the discharge. Therefore, this Order does not require groundwater monitoring for TDS, chloride, sodium, or sulfate and does not set groundwater or effluent limits for these constituents. With regard to other waste constituents, the Groundwater Limitations of this Order do not allow the discharge to cause exceedance of a water quality objective.

69. The Discharger provides treatment and control of the discharge that incorporates:

a. Alarms to prevent bypass and overflow.

b. Collection system improvements to reduce the potential for sanitary sewer overflows and limit inflow and infiltration.

c. A wastewater treatment plant that provides tertiary treatment, nitrification, denitrification, and UV disinfection.

d. Fully contained treatment vessels, clay lined effluent storage ponds, and mechanical biosolids dewatering with return of filtrate to the treatment system.

e. Water recycling at agronomic loading rates for water and nutrients to minimize groundwater quality degradation.

f. A supervisory Control and Data Acquisition (SCADA) system for early detection of potential wastewater conveyance and treatment disruptions.

g. Certified operators to assure proper operation and maintenance.

70. With respect to nutrients such as nitrate and ammonia, the Discharger has implemented best practicable treatment and control through abandoning the unlined treatment ponds and replacing them with concrete treatment basins and more effective treatment methods. The current treatment system is designed to have a total nitrogen concentration less than 15 mg/L.

With respect to total coliform organisms, the Discharger has implemented best practicable treatment or control by replacing sodium hypochlorite disinfection with membrane filtration and UV disinfection. The UV disinfection system is designed to consistently achieve a total coliform organism concentration less than 2.2 MPN per 100mL and will not add salinity to the effluent. Because this level of disinfection is not necessary to protect groundwater quality at this facility, this Order sets a total coliform organism effluent limit of 23 MPN per 100 mL as a monthly median.

While the new WWTP was not designed to remove salinity, the design does limit evapoconcentration of salts during treatment and reduces the addition of salts resulting from sodium hypochlorite disinfection.

This Order requires the Discharger to implement treatment or control measures that are currently the best practicable treatment or control available, the degradation that may occur as a result of the discharges is consistent with the maximum benefit of the people of the State, the degradation will not unreasonably affect present and anticipated future beneficial uses, and the degradation will not result in water quality less than prescribed in applicable state and regional policies. Therefore, the discharge complies with the Antidegradation Policy.

Water Recycling Regulatory Considerations

71. Undisinfected domestic wastewater contains human pathogens that are typically measured using total or fecal coliform organism as indicator organisms. The California Department of Public Health (DPH), which has primary statewide responsibility for protecting public health, has established statewide criteria in Title 22, section 60301 et seq. for the use of recycled water.

72. A 1988 Memorandum of Agreement (MOA) between DPH and the State Water Board on the use of recycled water establishes basic principles relative to the agencies and the regional water boards. In addition, the MOA allocates primary areas of responsibility and authority between these agencies, and provides for methods and mechanisms necessary to assure ongoing, continuous future coordination of activities relative to the use of recycled water in California. This Order implements the applicable portions of the Title 22 water recycling regulation in accordance with the MOA.

73. On 3 February 2009, the State Water Board adopted Resolution 2009-0011, *Adoption of a Policy for Water Quality Control for Recycled Water* (Recycled Water Policy). The

Recycled Water Policy promotes the use of recycled water to achieve sustainable local water supplies and reduce greenhouse gases.

74. On 23 April 2009, the Central Valley Water Board adopted Resolution R5-2009-0028, *In Support of Regionalization, Reclamation, Recycling and Conservation for Wastewater Treatment Plant*. Resolution R5-2009-0028 encourages water recycling, water conservation, and regionalization of wastewater treatment facilities. It requires the municipal wastewater treatment agencies to document:

    a. Efforts to promote new or expanded wastewater recycling opportunities and programs;

    b. Water conservation measures; and

    c. Regional wastewater management opportunities and solutions (e.g., regionalization).

    The distribution of disinfected tertiary recycled water by the Discharger is consistent with the intent of State Board Resolution 2009-0011 and Central Valley Water Board Resolution R5-2009-0028.

75. The Discharger has not submitted a *Title 22 Engineering Report* to CDPH, stating that its water recycling program is exempt from the requirements of Title 22 pursuant to section 60603, which states:

    > *The requirements set forth in this chapter shall not apply to the use of recycled water onsite at a water recycling plant, or wastewater treatment plant, provided access by the public to the area of onsite recycled water use is restricted.*

    CDPH affirmed the exception in an electronic mail message dated 9 October 2012.

Other Regulatory Considerations

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

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

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

77. Title 27 of the California Code of Regulations (hereafter Title 27) contains regulatory requirements for the treatment, storage, processing, and disposal of solid waste. However, Title 27 exempts certain activities from its provisions. Discharges regulated

by this Order are exempt from Title 27 pursuant to provisions that exempt domestic sewage, wastewater, and reuse. Title 27, section 20090 states in part:

> The following activities shall be exempt from the SWRCB-promulgated provisions of this subdivision, so long as the activity meets, and continues to meet, all preconditions listed:
>
> (a) Sewage - Discharges of domestic sewage or treated effluent which are regulated by WDRs issued pursuant to Chapter 9, Division 3, Title 23 of this code, or for which WDRs have been waived, and which are consistent with applicable water quality objectives, and treatment or storage facilities associated with municipal wastewater treatment plants, provided that residual sludges or solid waste from wastewater treatment facilities shall be discharged only in accordance with the applicable SWRCB-promulgated provisions of this division.
>
> (b) Wastewater - Discharges of wastewater to land, including but not limited to evaporation ponds, percolation ponds, or subsurface leachfields if the following conditions are met:
>
> > (1) the applicable RWQCB has issued WDRs, reclamation requirements, or waived such issuance;
> >
> > (2) the discharge is in compliance with the applicable water quality control plan; and
> >
> > (3) the wastewater does not need to be managed according to Chapter 11, Division 4.5, Title 22 of this code as a hazardous waste.
>
> …
>
> (f) Soil Amendments -Use of nonhazardous decomposable waste as a soil amendment pursuant to applicable best management practices, provided that RWQCBs may issue waste discharge or reclamation requirements for such use.

78. The discharge authorized herein and the treatment and storage facilities associated with the discharge, are exempt from the requirements of Title 27 as follows:

    a. The anoxic and aeration basins, MBR reactors, North Storage Pond, South Storage Pond, Bethel Island emergency storage ponds, and appurtenant structures are exempt pursuant to Title 27, section 20090(a) because they are treatment and storage facilities associated with a municipal domestic wastewater treatment plant.

    b. The land application area is exempt pursuant to Title 27, section 20090(b) because it is used for the discharge of wastewater to land, and:

        i. The Central Valley Water Board is issuing WDRs.

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

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

c. Land application of biosolids is exempt pursuant to Title 27, section 20090(f) because it is nonhazardous decomposable waste and best management practices are incorporated into this Order.

79. Although the WRF is exempt from Title 27, the statistical data analysis methods of Title 27, section 20415(e) are appropriate for determining whether the discharge complies with Groundwater Limitations specified in this Order.

80. The State Water Board adopted Order 97-03-DWQ (NPDES General Permit CAS000001) specifying waste discharge requirements for discharges of storm water associated with industrial activities, and requiring submittal of a Notice of Intent by all affected industrial dischargers. The WRF has a design capacity of more than 1.0 MGD, but all storm water from the WRF is collected and disposed of in a storm water basin. The Discharger is therefore not required to obtain coverage under NPDES General Permit CAS000001.

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

82. Water Code section 13267(b) states:

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

The technical reports required by this Order and the attached Monitoring and Reporting Program R5-2013-0010 are necessary to ensure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

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

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

85. A Final Supplemental Environmental Impact Report (FSEIR) was certified by the Board of Directors of Ironhouse Sanitary District (ISD) on 16 January 2007 accordance with the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). The FSEIR describes the project as expansion of existing ISD treatment capacity on ISD's mainland property, using a two-phase construction approach with a final build out capacity of 8.6 MGD average dry weather flow and discharge of ISD treated effluent into the San Joaquin River off the north shore of Jersey Island. Included in the project is the ability for ISD to land apply treated effluent on up to 510 acres on Jersey Island and/or construct up to 217 million gallons of membrane-lined storage ponds on ISD's mainland property.

86. The expansion project that was constructed consists of the following components:

    a. Improved headworks;
    b. Anoxic basins;
    c. Aeration basins;
    d. Membrane filtration;
    e. Ultraviolet disinfection;
    f. Solids handling;
    g. Odor control facilities;
    h. Standby power;
    i. 30-inch outfall that extends 550 feet into the San Joaquin River with 16 diffusers located on the last 150 feet of outfall;
    j. An existing storage pond with an approximate capacity of 76 million gallons that will be used for storage of treated effluent;
    k. An existing storage pond with an approximate capacity of 38 million gallons that will be used for storage of raw sewage or non-compliant effluent; and,
    l. Irrigation of treated effluent on 335 acres of agricultural lands on Jersey Island owned by ISD.

    The first phase of the project, which has been completed, provides a treatment and disposal capacity of 4.3 mgd as an average dry weather flow and 8.6 mgd as a peak wet weather flow.

87. With regard to potential water quality impacts associated with the project, the 2007 FSEIR relied on the October 1994 Final Environmental Impact Report, which evaluated the potential impacts to groundwater quality and found the impact to be

less than significant with mitigation. Mitigation measures for potential water quality impacts included the following:

a. Developing and implementing a land management plan for effluent recycling and biosolids land application;

b. Performing water quality monitoring;

c. Implementing appropriate setbacks between application areas and surface waters; and

d. Compliance with Regional Board requirements.

The Discharger completed the first three mitigation measures under the previous WDRs.

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

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

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

Public Notice

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

92. The Discharger and interested agencies and persons have been notified of the Central Valley Water Board's intent to prescribe waste discharge requirements for this discharge, and they have been provided an opportunity to submit written comments and an opportunity for a public hearing.

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

IT IS HEREBY ORDERED that Order 5-01-237 is rescinded except for purposes of enforcement, and, pursuant to Water Code sections 13263 and 13267, the Discharger, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the Water Code and regulations adopted hereunder, shall comply with the following:

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses, is prohibited except as authorized by an NPDES permit.

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

3. Discharge of waste classified as 'designated', as defined in Water Code section 13173, is prohibited.

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

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

6. Discharge of toxic substances into the wastewater treatment system or land application areas such that biological treatment mechanisms are disrupted is prohibited.

B. Flow Limitations

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

Flow Measurement	Flow Limit
Total Annual Flow [1]	1,570 MG
Average Dry Weather Flow [2]	4.3 MGD
Monthly Average Flow [3]	8.6 MGD

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

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

[3] As determined by the total flow during the calendar month divided by the number of days in that month.

C. Effluent Limitations

1. Effluent discharged to the North Storage Pond shall not exceed the following limits:

Constituent	Units	Monthly Average Limit
BOD	mg/L	20
Total Nitrogen	mg/L	15

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

2. Downstream of the UV disinfection system, effluent shall not exceed the following limits for total coliform organisms:

   a. The monthly median concentration of total coliform bacteria measured in the disinfected effluent shall not exceed a most probable number (MPN) of 23 per 100 milliliters. Compliance with this requirement will be determined using data for each calendar month based on samples analyzed at least 5 times per week.

   b. The number of total coliform bacteria shall not exceed an MPN of 240 per 100 milliliters in more than one sample in any calendar month.

   Compliance with this requirement shall be determined based on samples obtained at the sampling locations shown on Attachment D.

3. No wastewater contained in any pond shall have a pH of less than 6.5 or greater than 9.0.

D. Mass Loading Limitations

1. The total nitrogen mass loading to the LAAs shall not exceed the agronomic rates for the crops grown. Compliance with this requirement shall be determined using published nitrogen uptake rates for the vegetation/crops grown and the following formula:

$$M = \sum_{i=1}^{12} \frac{C_i \times V_i \times 8.345}{A} + M_{supplemental} + M_{biosolids}$$

Where

M = annual total nitrogen loading rate in pounds per acre per year;

i = the number of the month (i.e., January = 1, February = 2, etc.);

C_i = arithmetic mean of total nitrogen monitoring results for calendar month "I" in mg/L;

V_i = total effluent flow to the LAA for calendar month "i" in million gallons;

A = the area of the LAA or field in acres; and

$M_{supplemental}$ = additional total nitrogen loading in the form of fertilizer or other sources in pounds per acre per year.

$M_{biosolids}$ = additional total nitrogen loading in the form applied biosolids in pounds per acre per year.

2. The maximum BOD_5 mass loading to each LAA shall not exceed any of the following:
   a. 300 lbs./acre on any single day;
   b. 100 lbs./acre/day as a 7-day average;
   c. The maximum loading rate that ensures that the discharge will not create a nuisance.

E. Mainland Groundwater Limitations

With the exception of TDS, chloride, sodium and sulfate, release of waste constituents from any portion of the WRF shall not cause groundwater to:

1. Contain waste constituents in concentrations statistically greater than current groundwater quality or the Primary and Secondary MCLs identified in Title 22, whichever is greater.

2. Exceed a total coliform organism level of 2.2 MPN per 100mL as a 7-day median.

3. Contain taste or odor-producing constituents, toxic substances, or any other constituents in concentrations that cause nuisance or adversely affect beneficial uses.

Compliance with these limitations shall be determined annually based on an intrawell analysis using approved statistical methods

F. Discharge Specifications

1. No waste constituent shall be released, discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations of this Order.

2. The discharge shall not cause degradation of any water supply.

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

4. The discharge shall remain within the permitted waste treatment/containment structures and land application areas at all times.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

G. Land Application Area Specifications

1. Application of waste constituents to the LAA shall be at reasonable agronomic rates to preclude creation of a nuisance or degradation of groundwater, considering the crop, soil, climate, and irrigation management system. The annual nutritive loading of the Use Area, including the nutritive value of organic and chemical fertilizers, biosolids, and wastewater shall not exceed the annual crop demand.

2. Wastewater shall not be discharged to the LAA in a manner that causes wastewater to stand for greater than 48 hours.

3. Any irrigation runoff shall be confined to the reuse area and shall not enter any surface water drainage course or storm water drainage system unless the runoff does not pose a public health threat and is authorized by the appropriate regulatory agencies.

4. Discharge of process wastewater to any LAA not having a fully functional tailwater/runoff control system is prohibited.

5. Grazing of animals on the land application areas is prohibited.

H. Water Recycling Specifications

1. For the purpose of this Order, “use area" means an area with defined boundaries where recycled water is used or discharged, and “use area” is synonymous with “LAA field”.

2. The use of recycled water shall not cause pollution or nuisance, as defined by Water Code section 13050.

3. Application of recycled water shall be confined to the use areas defined in this Order.

4. Tailwater runoff and spray of recycled water shall not be discharged outside of the use areas except in minor, incidental amounts that cannot reasonably be eliminated by implementation and good maintenance of best management practices.

5. Crops shall be grown on the use areas, and cropping activities shall be sufficient to take up all of the nitrogen applied, including any fertilizers, manure, and biosolids.

6. Use areas shall be inspected as frequently as necessary to ensure continuous compliance with the requirements of this Order.

7. Irrigation using recycled water shall not be performed during rainfall or when the ground is saturated.

8. The volume of recycled water applied to the use areas shall not exceed reasonable agronomic rates during the calendar year based on the vegetation grown, pre-discharge soil moisture conditions, and weather conditions.

9. Hydraulic loading of recycled water and supplemental irrigation water shall be at reasonable agronomic rates designed to:
   a. Maximize crop nutrient uptake;
   b. Maximize breakdown of organic waste constituents in the root zone; and
   c. Minimize the percolation of waste constituents below the root zone.

10. The irrigation with recycled water shall be managed to minimize erosion within the use areas.

11. The use areas shall be managed to prevent breeding of mosquitoes. In particular:
   a. There shall be no standing water 48 hours after irrigation ceases;
   b. Tailwater ditches shall be maintained essentially free of emergent, marginal, and floating vegetation; and
   c. Low-pressure and unpressurized pipelines and ditches accessible to mosquitoes shall not be used to store recycled water.

12. Use areas and recycled water impoundments shall be designed, maintained, and operated to comply with the following setback requirements:

Setback Definition	Minimum Irrigation Setback (feet)
Edge of use area to property boundary	25
Edge of use area to public road right of way	30
Edge of use area to manmade or natural surface water drainage course	25
Edge of use area to domestic water supply well	100

13. Irrigation with disinfected tertiary recycled water shall not take place within 50 feet of any domestic water supply well unless all of the following conditions have been met:

    a. A geological investigation demonstrates that an aquitard exists at the well between the uppermost aquifer being drawn from the ground and the surface.

    b. The well contains an annular seal that extends from the surface into the aquitard.

    c. The well is housed to prevent any recycled water spray from coming into contact with the wellhead facilities.

    d. The ground surface immediately around the wellhead is contoured to allow surface water to drain away from the well.

    e. The owner of the well approves of the elimination of the buffer zone requirement.

14. Spray irrigation with recycled water is prohibited when wind speed (including gusts) exceeds 30 mph.

15. Sprinkler heads shall be of the type approved for recycled water and shall create a minimum amount of mist.

16. *Public* contact with recycled water shall be controlled using fences, signs, and other appropriate means.

17. Recycled water controllers, valves, and similar appurtenances shall be affixed with recycled water warning signs, and shall be equipped with removable handles or locking mechanisms to prevent public access or tampering.

18. Quick couplers, if used, shall be different than those used in potable water systems.

19. Hose bibs and unlocked valves, if used, shall not be used in areas accessible to the public.

20. No physical connection shall exist between recycled water piping and any potable water supply system (including domestic wells), or between recycled water piping and any irrigation well that does not have an approved air gap or reduced pressure principle device.

21. No physical connection shall be made or allowed to exist between any recycled water system and any separate system conveying potable water or auxiliary water source system.

22. A public water supply shall not be used as backup or supplemental source of water for a recycled water system unless the connection between the two systems is protected by an air gap separation which complies with the requirements of California Code of Regulations, title 17, sections 7602(a) and 7603(a).

23. Any backflow prevention device installed to protect a public water system shall be inspected and maintained in accordance Title 17, section 7605.

I. Solids Disposal Specifications

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

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

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

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

4. Use of biosolids as a soil amendment on the mainland or Jersey Island LAA fields shall comply with the requirements of this Order.

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

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

J. Biosolids and Sludge Application Specifications

The following specifications apply to biosolids and water treatment sludges applied to agricultural land owned by the Discharger and identified in Finding 3 of this Order.

1. Application of biosolids in excess of 2,300 dry tons per year is prohibited until the Discharger completes a supplemental environmental review and certification of an environmental document that addresses environmental impacts potentially associated with application of additional biosolids.

2. Biosolids shall comply with either Class A or Class B pathogen standards listed in Appendix B of 40 CFR 503.

3. Biosolids shall comply with one of the vector attraction reduction standards listed in 40 CFR 505.33.

4. Biosolids shall be spread and incorporated into the soil within 24 hours of arrival at the disposal field. If the vector attraction reduction alternative specified at 40 CFR 503.33 (b)(10)(i) is used, the biosolids must be incorporated within six (6) hours of application.

5. Application rates for biosolids and other sludges shall not exceed crop utilization rates or rates which cause any single pollutant constituent to exceed single, annual, or lifetime application limits based on:
    a. 40 CFR 503, Standard for the Use or Disposal of Sewage Sludge;
    b. Soil cation exchange rates;
    c. Soil pH;
    d. Nitrogen demand of the crop;
    e. Nitrogen applied from other sources (i.e., recycled water, livestock waste, and other fertilizers); and
    f. Phytotoxicity.

6. Biosolids shall not be applied to any area where the soil pH is less than 6.5.

7. Biosolids shall not be applied to any area where the cation exchange capacity of the soil is less than 15 meq/100g.

8. Biosolids shall not be applied to water-saturated or frozen ground.

9. Biosolids and other sludges shall have pollutant concentrations no greater than those tabulated below.

	Measured Concentration		
Constituent	Total, dry weight basis (mg/kg)[1]	Total, wet weight basis (mg/Kg)[2]	Extractable (mg/L)[3]
Arsenic	75	500	5.0
Cadmium	85	100	1.0
Chromium	3,000	500	5.0
Copper	4,300	2,500	25.0
Lead	840	1,000	5.0
Mercury	57	20	0.2
Molybdenum	75	3,500	350.0
Nickel	420	2,000	20.0
Selenium	100	100	1.0
Zinc	7,500	5,000	250.0

[1] Ceiling concentration (40 CFR 503.13).
[2] Total Threshold Limit Concentration (TTLC).
[3] Soluble Threshold Limit Concentration (STLC) as determined by the Waste Extraction Test (citrate buffer method).

10. Biosolids and sludges shall not be applied to land in amounts that cause the following cumulative loading rates to be exceeded during the life of the WWTF:

	Maximum Cumulative Loading Rate	
Constituent	(kg per hectare)	(pounds per acre)
Arsenic	41	37
Cadmium	39	35
Chromium	3,000	2,677
Copper	1,500	1,339
Lead	300	268
Mercury	17	15
Molybdenum	18	16
Nickel	420	375
Selenium	100	89

	Maximum Cumulative Loading Rate	
Constituent	(kg per hectare)	(pounds per acre)
Zinc	2,800	2,500

11. For at least 30 days after the last application of biosolids in each field, the Discharger shall ensure that feed and fiber crops are not harvested and animals are not grazed.

12. For at least 12 months after the last application of biosolids in each field, the Discharger shall ensure the following:

    a. Turf is not harvested for placement on land with a high potential for public exposure; and

    b. If the field is used as pasture, animals used for producing milk for human consumption are not permitted to graze.

11. Biosolids staging, storage, and application areas shall be at least:

    a. 25 feet from property lines;

    b. 50 feet from public roads;

    c. 100 feet from any surface waters;

    d. 500 feet from water supply wells;

    e. 500 feet from occupied dwellings; and

    f. 2,500 feet from any domestic surface water supply intake (e.g., the Contra Costa Canal).

K. Biosolids Drying, Storage, and Transportation Specifications

1. Biosolids shall be considered to be "stored" if they are placed on the ground or in non-mobile containers (i.e., not in truck or trailer) at the application site or an intermediate storage location away from the generator/processing site prior to application. "Storage" does not include dried biosolids placed on the ground for brief periods solely to facilitate transfer the biosolids between transportation and application vehicles.

2. Biosolids shall not be stored for more than seven consecutive days prior to application.

3. All biosolids drying and storage facilities shall be constructed with a minimum buffer distance of 1,000 feet from all residential and commercial property.

4. Biosolids storage facilities shall be located, designed, and maintained to restrict public access to the biosolids.

5. Biosolids storage sites used between 1 October and 30 April shall be designed and maintained to prevent washout or inundation from a flood with a return frequency of 100 years, and shall have complete run-on and runoff control.

6. Biosolids storage facilities shall be designed, maintained, and operated to minimize the generation of leachate, and ensure that any leachate generated is completely contained for appropriate treatment and disposal.
7. Biosolids storage facilities used between 1 October and 30 April shall be designed and maintained to contain all leachate and direct precipitation from a 10-year, 24-hour storm.

8. Biosolids containing free liquids shall not be placed on the ground prior to application on an approved site, excluding equipment-cleaning operations.

9. The Discharger shall operate all biosolids storage facilities in accordance with the most recently approved Land Management Report.

10. Biosolids shall be transported in covered vehicles capable of fully containing the load.

11. Biosolids having a water content in excess of the waste's moisture holding capacity shall be transported in leak-proof containers or vehicles.

12. Biosolids transport drivers shall be trained to understand the nature of the waste and appropriate response to accidents or spills.

13. Biosolids transport drivers shall carry a copy of a spill response plan approved by the Executive Officer at all times.

L. Provisions

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

   a. **By 1 June 2013**, the Discharger shall submit a *Groundwater Limitations Compliance Assessment Plan*. The plan shall describe and justify the statistical methods proposed to determine compliance with the Groundwater Limitations of this Order. Compliance shall be determined annually based on an intrawell statistical analysis that uses methods prescribed in Title 27, section 20415(e)(10) to compare monitoring data collected from each compliance well, to the groundwater limitations of this Order. Compliance wells are MNLND-1, MNLND-2, MNLND-3, MNLND-5, and MNLND-7.

   b. **At least 120 days prior** to abandoning any groundwater monitoring wells as identified in Attachment B, the Discharger shall submit a *Groundwater Monitoring Well Destruction Workplan*. The workplan shall describe the proposed abandonment procedures, which shall comply with *California Well*

Standards Bulletin 74-90 (June 1991); *State of California Bulletin 94-81* (December 1981); and any more stringent standards adopted by the state or county pursuant to Water Code section 13801.

c. **Within 60 days after** abandoning groundwater monitoring wells approved in the Workplan, the Discharger shall submit a *Groundwater Monitoring Well Destruction Report*. The report shall detail the methods used to abandon each well and include copies of the well abandonment permits issued by the Contra Costa County Environmental Health Department.

d. **At least 120 days prior** to expansion of the LAA on Jersey Island or use of recycled water or biosolids on the mainland, the Discharger shall submit a *LAA Expansion Workplan*. The workplan shall describe any improvements or other changes made to bring the new effluent recycling areas into service and evaluate whether additional groundwater monitoring wells need to be installed. At a minimum the workplan shall contain following;

i. Site plans;

ii. Description of access controls and warning systems;

iii. Definition of each new field to be used for effluent recycling and/or biosolids application, including field name designation, total surface area, and net area to be used for waste disposal;

iv. As-built depictions of recycled water conveyance systems, other water conveyance systems, and structural best management practices (BMPs);

v. Description of typical irrigation practices and procedures;

vi. A plan for inspection and repair of all conveyances, and access controls;

vii. Emergency/contingency response procedures;

viii. Evaluation of the need to install downgradient groundwater wells on the mainland or additional Jersey Island sampling locations; and

ix. A site map showing the location of additional groundwater monitoring wells and/or Jersey Island surface water sampling locations

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

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

4. In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for investigations and studies, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall bear the professional's signature and stamp.

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

6. The Discharger shall comply with Monitoring and Reporting Program R5-2013-0010, which is part of this Order, and any revisions thereto as ordered by the Executive Officer. The submittal dates of Discharger self-monitoring reports shall be no later than the submittal date specified in the MRP.

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

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

Central Valley Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

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

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

11. The Discharger shall implement the necessary legal authorities, programs, and controls to ensure that the following incompatible wastes are not introduced to the treatment system, where incompatible wastes are:

    a. Wastes which create a fire or explosion hazard in the treatment works;

    b. Wastes which will cause corrosive structural damage to treatment works, but in no case wastes with a pH lower than 5.0, unless the works is specially designed to accommodate such wastes;

    c. Solid or viscous wastes in amounts which cause obstruction to flow in sewers, or which cause other interference with proper operation or treatment works;

    d. Any waste, including oxygen demanding pollutants (BOD, etc.), released in such volume or strength as to cause inhibition or disruption in the treatment works, and subsequent treatment process upset and loss of treatment efficiency;

    e. Heat in amounts that inhibit or disrupt biological activity in the treatment works, or that raise influent temperatures above 40 ◦C (104 ◦F), unless the treatment works is designed to accommodate such heat;

    f. Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through;

    g. Pollutants which result in the presence of toxic gases, vapors, or fumes within the treatment works in a quantity that may cause acute worker health and safety problems; and

    h. Any trucked or hauled pollutants, except at points predesignated by the Discharger.

12. The Discharger shall provide certified wastewater treatment plant operators in accordance with Title 23, division 3, chapter 26.

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

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

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

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

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

18. To assume operation as Discharger under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision B.3 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code. If approved by the Executive Officer, the transfer request will be submitted to the Central Valley Water Board for its consideration of transferring the ownership of this Order at one of its regularly scheduled meetings.

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

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

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

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

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

or will be provided upon request.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 1 February 2013.

Original signed by

PAMELA C. CREEDON, Executive Officer

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM R5-2013-0010

FOR

IRONHOUSE SANITARY DISTRICT
IRONHOUSE WATER RECYCLING FACILITY
CONTRA COSTA COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring influent wastewater, treated effluent, disposal ponds, groundwater, sludge, and water supply. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. Central Valley Water Board staff shall approve specific sample station locations prior to implementation of sampling activities.

All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form. Field test instruments (such as those used to measure pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. The instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of the MRP.

INFLUENT MONITORING

Influent flow monitoring shall be performed at the headworks. Grab samples shall be collected prior to the headworks as shown on Attachment D. Influent monitoring shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow	MGD	Meter Reading	Daily	Monthly
BOD_5[1]	mg/L	Grab	Weekly	Monthly
Total Dissolved Solids	mg/L	Grab	Monthly	Monthly

[1] 5-day Biochemical Oxygen Demand.

EFFLUENT MONITORING

Effluent samples shall be collected after the UV disinfection system and prior to discharge to the effluent storage ponds as shown on Attachment D. Grab samples will be considered representative of the effluent. Effluent monitoring shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
BOD_5	mg/L	Grab	Weekly	Monthly
Total Nitrogen [1]	mg/L	Grab	Weekly	Monthly
Total Dissolved Solids	mg/L	Grab	Weekly	Monthly
Total Coliform Organisms	MPN/100 mL	Grab	5 days per week	Monthly

[1] Total nitrogen is the sum of Total Kjeldahl Nitrogen, nitrate-nitrogen, and nitrite-nitrogen.

ULTRAVIOLET LIGHT (UV) DISINFECTION SYSTEM MONITORING

Effective 1 September 2013, The UV disinfection system shall be monitored as specified below:

Parameter	Units	Sample Type	Monitoring Frequency	Reporting Frequency
Flow	MGD	Meter	Continuous [1]	Monthly
Turbidity [2]	NTU	Meter	Continuous [1]	Monthly
UV banks in operation	Number	Observation	Continuous [1]	Monthly
UV Transmittance	Percent (%)	Meter	Continuous [1]	Monthly
UV Power Setting	Percent (%)	Meter	Continuous [1]	Monthly
UV Dose [3]	MJ/cm^2	Calculated	Continuous [1]	Monthly

[1] For continuous analyzers, the Discharger shall report documented routine meter maintenance activities including date, time of day, and duration, in which the analyzer(s) is not in operation.

[2] Turbidity shall be monitored upstream of the UV system.

[3] Report daily minimum UV dose, daily average UV dose, and weekly average UV dose. For the daily minimum UV dose, also report associated number of banks, gallons per minute per lamp, and UV transmittance used in the calculation. If effluent discharge has received less than the minimum UV dose, report the duration and dose calculation variables associated with each incident.

STORAGE POND MONITORING

The effluent storage ponds and the Bethel Island emergency storage pond shall be monitored as specified below. Dissolved oxygen monitoring applies to any pond containing more than two feet of standing water:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Dissolved Oxygen [1]	mg/L	Grab	Weekly	Monthly
Freeboard	0.1 feet	Measurement	Weekly	Monthly
pH [1]	Standard	Grab	Weekly	Monthly
Odors	--	Observation	Weekly	Monthly
Berm condition	--	Observation	Monthly	Monthly

[1] Samples shall be collected opposite the pond inlet.

In addition, the Discharger shall inspect the condition of the ponds once per week and document visual observations. Notations shall include observations of:

a. Presence of weeds in the water or along the berm;
b. Accumulations of dead algae, vegetation, scum, or debris on the pond surface;
c. Animal burrows in the berms; and
d. Evidence of seepage from the berms or downslope of the ponds.

LAND APPLICATION AREA MONITORING

A. Daily Pre-Application Inspections

The Discharger shall inspect the LAA fields at least **once daily** prior to and during irrigation events, and observations from those inspections shall be documented for inclusion in the monthly monitoring reports. The following items shall be documented for each check or field to be irrigated on that day:

a. Evidence of erosion;
b. Containment berm condition;
c. Condition of each standpipe and flow control valve (if applicable);
d. Proper use of valves;
e. Soil saturation;
f. Ponding;
g. Tailwater ditches and potential runoff to off-site areas;
h. Potential and actual discharge to surface water;
i. Odors that have the potential to be objectionable at or beyond the property boundary; and
j. Insects.

Temperature; wind direction and relative strength; and other relevant field conditions shall also be observed and recorded. The notations shall also document any corrective actions taken based on observations made. A copy of entries made in the log during each month shall be submitted as part of the Monthly Monitoring Report. If no irrigation with wastewater takes place during a given month, then the monthly monitoring report shall so state.

B. Routine Monitoring

The Discharger shall perform the following routine monitoring and loading calculations during all months when water recycling occurs, and shall present the data in the Monthly and Annual Monitoring Reports.

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Precipitation	0.1 in.	Rain Gauge [1]	Daily	Monthly, Annually
Individual LAA fields receiving recycled water	--	Observation	Daily	Monthly, Annually
Hydraulic loading rate	in.	Calculated [2]	Daily	Monthly, Annually

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Biosolids Loading Rate Wet weight Dry weight	lb/ac	Calculated [2]	Daily	Monthly, Annually
Nitrogen loading rate				
Recycled water	lb/ac/day	Calculated [2, 3]	Daily	Monthly, Annually
Other sources (fertilizer, biosolids, etc.)	lb/ac/mo.	Calculated [2, 4]	Daily	Monthly, Annually

[1] Data obtained from the nearest National Weather Service rain gauge is acceptable.

[2] Rate shall be calculated for each LAA field.

[3] Total nitrogen loading rates shall be calculated using the applied volume of recycled water, supplemental irrigation water, and actual application area using the specified method in Section D (Mass Loading Limitations) of the WDRs.

[4] Loading rates for supplemental nitrogen shall be calculated using the actual load and the application area.

MAINLAND GROUNDWATER MONITORING

The current groundwater monitoring well network consists of MNLND-1, MNLND-2, MNLND-3, MNLND-5, MNLND-7, and MNLND-14, which are all compliance wells. Prior to construction of any new groundwater monitoring wells, the Discharger shall submit plans and specifications to the Central Valley Water Board for review and approval.

Prior to sampling, the groundwater elevations shall be measured. Depth to groundwater shall be measured to the nearest 0.01 feet. Samples shall be collected using standard EPA methods. Groundwater monitoring shall include, at a minimum, the following constituents:

Constituent	Units	Type of Sample	Sampling and Reporting Frequency
Depth to Groundwater [1]	0.01 feet	Measurement	Quarterly
Groundwater Elevation [1]	0.01 feet	Calculated	Quarterly
Gradient [1]	feet/feet	Calculated	Quarterly
Gradient Direction [1]	Degrees	Calculated	Quarterly
pH	Standard	Grab	Quarterly
Nitrate (as nitrogen)	mg/L	Grab	Quarterly

[1] Groundwater elevations shall be determined based on depth-to-water measurements using a surveyed elevation reference point on the well casing.

BIOSOLIDS MONITORING

Biosolids applied to the LAA fields shall be sampled and analyzed as follows. Results for all chemical constituents shall be reported in mg/Kg on a dry weight basis. Composite samples may be used in lieu of grab samples if all required sample holding times are met.

Constituent(s)	Sample Type	Sampling and Reporting Frequency
Metals (total) [1]	Grab	Monthly [4]
Percent moisture	Grab	Monthly [4]
Total nitrogen	Grab	Monthly [4]
Ammonia nitrogen	Grab	Monthly [4]
Nitrate nitrogen	Grab	Monthly [4]
Total phosphorus	Grab	Monthly [4]
Total potassium	Grab	Monthly [4]
PCB arochlors, aldrin, dieldrin [2]	Grab	Semi-annually [4]
Semi-volatile organics [3]	Grab	Semi-annually [4]

[1] Include at least the following metals: arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, and zinc.

[2] Using SW 846 Method 8080.

[3] Using EPA Method 8270.

[4] Include analytical data in the monthly monitoring report for the month in which monitoring occurred. For months in which no monitoring takes place, the Monthly Monitoring Report shall so state.

ROUTINE FIELD MONITORING FOR BIOSOLIDS APPLICATION

The Discharger shall establish and implement an inspection and application oversight program to monitor and control biosolids application rates and ensure compliance with the WDRs. Each discrete application field shall be managed and monitored as follows:

1. Pre-application Oversight:
   a. Define crop to be planted.
   b. Calculate allowable loading rate based on soil nitrogen residual data from the previous fall and most recent plant available nitrogen (PAN) and moisture content data for the biosolids.
   c. Sample soil pH and verify it is greater than 6.5
   d. Sample soil cation exchange capacity and verify that it is greater than 15 meg/100g.
   e. Document communication of allowable loading rates to spreader operator.

2. Pre-application Inspection:
   a. Verify that setbacks are clearly delineated.
   b. Verify that runoff controls are in place and functional.
   c. Verify that culverts are blocked (where applicable).

3. Application Oversight:
   a. Verify compliance with setbacks and allowable loading rate.
   b. Verify compliance with soil incorporation requirements.

4. Post-application Oversight:
   a. Confirm with irrigation manager requirements to control runoff for the specified period after application.
   b. Calculate actual biosolids and PAN loading rates.
   c. Note anticipated dates of planting, irrigation, and harvest.

WATER SUPPLY MONITORING

A sampling station shall be established where a representative sample of the municipal water supply can be obtained. Water supply monitoring shall include at least the following for each water source used during the previous year. As an alternative, the Discharger may submit results of the most current Department of Public Health Consumer Confidence Report in the Annual Monitoring Report.

Constituents	Units	Sampling and Reporting Frequency
pH	Standard	Annually
Total Dissolved Solids	mg/L	Annually
Standard minerals [1]	mg/L	Annually

[1] Standard Minerals shall include, at a minimum, the following elements/compounds: boron, calcium, chloride, iron, magnesium, manganese, nitrogen, potassium, sodium, sulfate, total alkalinity (including alkalinity series), and hardness

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., effluent, pond, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall be reported in the next scheduled monitoring report.

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all Groundwater Monitoring Reports shall be prepared under the direct supervision of a Registered Engineer or Geologist and signed by the registered professional.

A. Monthly Monitoring Reports

Daily, weekly, and monthly monitoring data shall be reported in monthly monitoring reports. Monthly reports shall be submitted to the Central Valley Water Board on the **1st day of the second month following sampling** (i.e. the January Report is due by 1 March). At a minimum, the reports shall include:

1. Results of influent, effluent, UV disinfection, effluent storage pond, land application area, and biosolids monitoring. Data shall be presented in a tabular format.
2. Average daily flow for the month and total annual flow to date.
3. Calculated monthly median and maximum results for effluent total coliform organisms (TCO).
4. A comparison of monitoring data to the effluent limitations and discharge specifications and an explanation of any violation of those requirements.
5. A scaled site map depicting each discrete field that received biosolids, property boundaries, roads, on-site structures, surface water bodies, drainage features, and runoff controls (as applicable);
6. The results of biosolids monitoring that was applied to land during the month. Specifically, tabulated data shall be provided using the attached Biosolids Monitoring Results form (or approved revision thereof). Laboratory analytical reports need not be included, but must be provided upon request.
7. Verification of classification of biosolids as nonhazardous per 22 CCR, Article 11, Criteria for Identification of Hazardous and Extremely Hazardous Waste (California Assessment Manual procedures).
8. Verification that the application of biosolids will not exceed the maximum soluble metal concentrations or maximum cumulative loading rates of the WDRs, including supporting calculations.
9. The results of routine field monitoring for biosolids application. Specifically, tabulated information for each discrete application field used during the month shall be provided using the attached Field Monitoring Results form (or approved revision thereof). Verification that the soil pH and cation exchange capacity (CEC) limits of the WDRs are met. Describe any measures used to amend the soil to bring the pH or CEC within limits prior to biosolids application. If biosolids were not land applied, the report shall so state.
10. For each discrete application field, a comparison of monitoring data to the loading rate limitations and discharge specifications and an explanation of any violation of those requirements.
11. Copies of inspection logs.
12. Copies of laboratory analytical report(s), if requested.
13. A calibration log verifying calibration of all hand-held monitoring instruments.

B. Quarterly Monitoring Reports

The Discharger shall establish a quarterly sampling schedule for mainland groundwater monitoring such that samples are obtained approximately every three months. Quarterly monitoring reports shall be submitted to the Board by the **1st day of the second month after the quarter** (i.e. the January-March quarterly report is due by May 1st). The Quarterly Report shall include the following:

1. Results of groundwater monitoring.
2. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDR, this MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater; parameters measured before, during, and after purging; method of purging; calculation of casing volume; and total volume of water purged.
3. Calculation of groundwater elevations, an assessment of groundwater flow direction and gradient on the date of measurement, comparison of previous flow direction and gradient data, and discussion of seasonal trends if any.
4. A narrative discussion of the analytical results for all groundwater monitoring locations, including spatial and temporal tends, with reference to summary data tables, graphs, and appended analytical reports (as applicable).
5. Summary data tables of historical and current water table elevations and analytical results.
6. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells, surface water monitoring locations, and any other sampling stations, and groundwater elevation contours referenced to mean sea level datum.
7. Copies of laboratory analytical report(s) for monitoring.

C. Annual Monitoring Report

An Annual Monitoring Report shall be submitted to the Central Valley Water Board by **1 February** each year. The Annual Monitoring Report shall include the following:

1. Total annual influent flow, average monthly flows for each month of the year, and the average dry weather flow compared to the flow limitations of the WDRs.
2. Tabular and graphical summaries of all data collected during the year.
3. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program.
4. For each compliance groundwater monitoring well, a statistical evaluation of the groundwater quality beneath the wastewater treatment facility, in accordance with the approved report submitted pursuant to Provision M.1.b and a comparison of the results to the groundwater limitations.

5. A summary of all analytical data and verification of compliance with the biosolids monitoring requirements.
6. For each discrete application field, a chronological log of dates of biosolids application, irrigation, precipitation, and runoff control operations. Specifically, tabulated information for each discrete application field shall be provided using the attached Field Activities Summary form (or approved revision thereof).
7. For each discrete biosolids application field:
    a. Total cumulative metals loading rates as of the end of the previous calendar year;
    b. Calculation of the total metals and nitrogen loading rates for the year;
    c. The cumulative metals loading rates since biosolids land application began; and
    d. The cumulative metals loading rates to date as a percentage of the cumulative metals loading limits.
8. A digital database (Microsoft Excel) containing historic influent, effluent, water supply, biosolids and groundwater data.
9. An evaluation of the performance of the WWTF, including discussion of capacity issues, infiltration and inflow rates, nuisance conditions, and a forecast of the flows anticipated in the next year, as described in Standard Provision E.4
10. A discussion of compliance and the corrective actions taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with the waste discharge requirements.
11. Summary of information on the disposal of sludge and/or solid waste. The results from any sludge monitoring required by the disposal facility.
12. A copy of the certification for each certified wastewater treatment plant operator working at the facility and a statement about whether the Discharger is in compliance with Title 23, CCR, Division 3, Chapter 26.
13. Equipment maintenance and calibration records, as described in Standard Provision C.4.
14. A statement of when the O&M Manual was last reviewed for adequacy and a description of any changes made during the year.

A transmittal letter shall accompany each self-monitoring report. The letter shall include a discussion of all violations of the WDRs or this MRP during the reporting period and actions taken or planned for correcting each violation. If the Discharger has previously submitted a report describing corrective actions taken and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. Pursuant to Section B.3 of the Standard Provisions and General Reporting Requirements, the transmittal letter shall contain a statement by the Discharger or the Discharger's authorized agent certifying under penalty of perjury that the report is true, accurate and complete to the best of the signer's knowledge.

The Discharger shall implement the above monitoring program as of the date of this Order.

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

1 February 2013
(Date)

BIOSOLIDS MONITORING RESULTS

Biosolids Information

Estimated Total Mass [4] _____ dry tons this calendar year

Required EPA Certification Frequency _____

Stabilization Method _____

Pathogen Reduction Method [8] _____

Vector Attraction Reduction Option [9] _____

Sampling Information

[1] Lab Sample ID						
[2] Sampler's Sample ID						
[3] Sampler						
Sample Date						
Analysis Date						

Analytical Result	**Wet Basis**	**Dry Basis**	**Wet Basis**	**Dry Basis**	**Wet Basis**	**Dry Basis**	**Wet Basis**	**Dry Basis**	**Wet Basis**	**Dry Basis**	**Wet Basis**	**Dry Basis**
Fecal coliform, MPN/g												
Total solids, percent												
Total nitrogen, mg/Kg												
Ammonia nitrogen, mg/Kg												
Nitrate nitrogen, mg/Kg												
Total phosphorus, mg/Kg												
Total potassium, mg/Kg												

Nitrogen Loading Rate

[5] Mineralization rate, percent												
[6] Volatilization factor, percent												
[7] Units conversion factor												
PAN, lbs/ton												

Footnotes

[1] Sample ID assigned by the analytical laboratory.

[2] Sample ID from chain of custody form.

[3] Specify whether sampling was performed by Synagro or generator/generator's contractor.

[4] Estimated mass to be land applied at this site.

[6] Equals 50% for surface application; 100% for subsurface injection.

[7] Equals 0.002 lbs/ton per mg/Kg.

[8] Specify in detail. For example: "Class B - anaerobic digestion for ___ to ___ days at ___ to ___ degrees F (range for past month)".

[9] Specify in detail. For example: "Option 1 - volatile solids reduction greater than 38%; VS in = ___, VS out = ___".

OWNER NAME _____
FACILITY NAME _____

[5] Equals 20% for aerobically digested; 30 % for aerobically digested; 25 % for aerobically/anaerobically digested; 40% for lime-stabilized.

Sampling Information

[1] Lab Sample ID			
[2] Sampler's Sample ID			
[3] Sampler			
Sample Date			
Analysis Date			

Metals Analyses

	Wet Basis	Dry Basis	Wet Basis	Dry Basis	Wet Basis	Dry Basis	Regulatory Limits				
							40 CFR 503 (dry wt. basis)		22 CCR (wet wt. basis)		
							mg/Kg	mg/Kg	mg/L	mg/L	mg/Kg
							Table 1	Table 3	STLC	10 x STLC	TTLC
Arsenic, mg/Kg							75	41	5	50	500
Cadmium, mg/Kg							85	39	1	10	100
Copper, mg/Kg							4,300	1,500	25	250	2,500
Lead, mg/Kg							840	300	5	50	1,000
Mercury, mg/Kg							57	17	0.2	2.0	20
Molybdenum, mg/Kg							75		350	3,500	3,500
Nickel, mg/Kg							420	420	20	200	2,000
Selenium, mg/Kg							100	36	1	10	100
Zinc, mg/Kg							7,500	2,800	250	2,500	5,000
Semi-volatile organic compounds, detections only (mg/Kg)											
PCBs/aldrin/dieldrin, detections only (mg/Kg)											

OWNER NAME _____
FACILITY NAME _____

MONTHLY FIELD MONITORING RESULTS

Month _____ **Year** _____

Field Information

Field ID No.														
Gross Acreage														
Net Acreage														
Crop														
Anticipated Planting Date														
Anticipated Harvest Date														
Anticipated Irrigation Date(s)														
Next Allowable Runoff Date														

Biosolids Application Information (tonnage per field)

Day of Month	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.
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30																								
31																								

Total Application (tons)																								
Application Rate (tn/ac)																								
PAN Application (lb)																								
PAN Rate (lb/ac)																								
Phosphorus Rate (lb)																								
Phosphorus Rate (lb/ac)																								
Potassium Rate (lb)																								
Potassium Rate (lb/ac)																								

ANNUAL FIELD ACTIVITIES SUMMARY

Year ________ **Field ID Number** _______________

Gross Acreage ___________
Net Acreage ___________
Crop ___________
Actual Planting Date ___________
Actual Harvest Date ___________

Month	Date	Biosolids Applied wet tn	Biosolids Applied dry tn	PAN Applied tn/ac	P Applied tn/ac	K Applied tn/ac	Irrigation gallons	Irrigation inches	Precipitation inches	Runoff Control Status
Totals										

INFORMATION SHEET

WASTE DISCHARGE REQUIREMENTS R5-2013-0010
IRONHOUSE SANITARY DISTRICT
IRONHOUSE WATER RECYCLING FACILITY
CONTRA COSTA COUNTY

Background

Ironhouse Sanitary District (Discharger) owns and operates the Wastewater Treatment and Recycling Facility (WWTRF) located at 450 Walnut Meadows Drive in Oakley. The WWTRF treats residential and commercial domestic wastewater from the City of Oakley, Bethel Island, and some unincorporated areas of Contra Costa County. There are approximately 11,750 residential equivalent dwelling units (EDUs) and 2,500 commercial EDUs connected to the sewer system.

Prior to July 2011, the wastewater treatment plant (WWTP) consisted of a headworks, four aerated treatment ponds, and two effluent storage ponds. The unlined aerated ponds had a surface area of 7.5 acres and provided secondary treatment. Treated wastewater was held in effluent storage ponds prior to being recycled for irrigation of fodder crops. The storage ponds have a capacity of 350 acre-feet and were constructed with a low permeability, continuous, vertical cutoff wall along the centerline of the levees. Wastewater was disinfected with sodium hypochlorite prior to discharge to the mainland or Jersey Island land application area (LAA). Approximately, 166 acres of LAA were located on the mainland adjacent to the treatment plant and 434 acres were located on Jersey Island.

The previous WDRs set an average monthly flow limit of 2.0 MGD and allowed an increase to up to 3.0 MGD upon expansion of the Jersey Island land application area (LAA) and approval by the Executive Officer. Completed expansions of the Jersey Island LAA were approved in September 2003, September 2005, and July 2006. The July 2006 water balance showed a capacity of 2.7 MGD as a monthly average.

Changes in the Facility and Discharge

The Discharger constructed a new WWTP that began operation in July 2011 and became fully operational in October 2011. The new WWTP consists of an updated headworks, advanced tertiary treatment, and ultraviolet disinfection. The new WWTP was designed to meet anticipated growth through year 2025 with a treatment capacity of 4.3 MGD average dry weather flow and 8.6 MGD maximum wet weather flow.

Sludge was removed from the four former aerated ponds, which are being backfilled as material becomes available from a local excavation/construction project. The updated biological treatment system consists of anoxic, aeration, and membrane bioreactor (MBR) basins and achieves tertiary treatment by membrane filtration. The treatment basins are constructed of reinforced concrete. Filtered effluent is UV disinfected prior to being recycled on the land application area (LAA), stored in the North Pond prior to application, or discharged to the San Joaquin River, which is regulated under separate NPDES requirements when discharge to the LAA is not feasible.

The newly constructed WWTP has resulted in improved effluent quality for all constituents except nitrate. However, the increase in nitrate is associated with a significant decrease in TKN, which results in a total nitrogen concentration less than 15 mg/L. The effluent TDS concentration has also decreased but is also dependent on domestic use and source water quality. The Discharger states that water softener usage has decreased since 2007 due to the economic decline and that there are a number of vacant foreclosed homes that have water softeners. When existing and new water softeners come online, the TDS concentration is expected to increase.

The hydraulic capacity of the WWTRF is not limited by the constraints of land disposal and storage because the Discharger is able to discharge to the San Joaquin River year round under the NPDES permit. This Order sets an influent flow limit at the design treatment capacity of 4.3 MGD, which is the same flow limit as the NPDES permit.

The previous Order allowed the Discharger to apply biosolids as soil amendment to the LAA fields and this Order also allows the land application of biosolids. The Discharger states that metal concentrations have increased in the biosolids and decrease in the effluent as a result of changing to membrane filtration, which will make loading of metal constituents to the LAA more controllable.

The Discharger periodically takes water treatment (alum) sludge from three Contra Costa Water District water treatment plants. The sludge is stockpiled on Jersey Island prior to being used for maintaining and reinforcing LAA field berms.

Land Application Area

Tertiary disinfected wastewater is recycled on the Jersey Island LAA to grow fodder crops. Jersey Island is an approximately 3,500 acre subsided island below the flow level of the San Joaquin River. Reclamation District 830 maintains the levees that surround the island and dewaters the island using a network of interceptor ditches that drain to the northern pumping station. The ditches and pump station are used continuously to keep the shallow groundwater below the land surface. The acreage of the Jersey Island LAA has decreased to 335 acres because the Discharger has removed some LAA fields due to poor soil conditions. The Discharger proposes to apply biosolids and/or commercial fertilizer to the LAA for soil amendment and supplemental nutrients because the total nitrogen concentration of the treated wastewater is not sufficient to meet crop demand.

The Discharger has ceased use of the mainland LAA for water recycling. The mainland area is approximately 165 acres and will be used to grow crops from natural precipitation. This Order allows certain mainland monitoring wells to be abandoned as requested by the Discharger. This Order does not prohibit future irrigation of the mainland LAA fields with treated wastewater. However, this Order requires the Discharger to submit a *LAA Expansion Workplan*, which requires approval prior to use of recycled water or biosolids on the mainland LAA fields. The workplan requires an evaluation of whether groundwater monitoring wells need to be installed.

Groundwater Considerations

On the mainland, shallow groundwater generally flows northward toward Big Break and the San Joaquin River. Groundwater intercepted by the Discharger's return ditches is pumped to the "I parcel", used for mainland irrigation, or discharged to Big Break. Groundwater on the mainland is typically less than 5 feet below ground surface. The base of the effluent storage ponds is about 1 to 4 feet above groundwater. Based on background groundwater monitoring data, groundwater on the mainland is spatially and temporally variable. Based on studies completed by the Discharger, TDS and chloride degradation shown in downgradient monitoring wells is primarily due to naturally occurring salinity. For nitrate, monitoring data shows that degradation has occurred but the improved quality of the effluent will likely prevent further degradation.

Jersey Island is dewatered to maintain groundwater at a depth approximately 2 to 4-feet below the ground surface. WDRs Order 5-01-237 required that the Discharger monitor surface water in the dewatering ditches in lieu of shallow groundwater. Based on the data monitoring, wastewater recycling on the Jersey Island LAA appears to cause groundwater degradation with respect to TDS. The Discharger states that TDS concentrations generally increase after winter rainfall and irrigation events, which supports a conceptual understanding that higher groundwater elevations leach salt from shallow soil layers. The apparent groundwater salinity may also be associated with evapoconcentration of the recycled effluent during irrigation and naturally occurring salts. However, considering the hardness and salinity of the community water supply, the effluent TDS is not unreasonably elevated and evapoconcentration would still occur if another water supply was used for irrigation. On average, wastewater recycling on the Jersey Island LAA has not degraded groundwater with respect to nitrate and the improved effluent quality and agronomic fertilization rates will continue to prevent degradation.

Basin Plan, Beneficial Uses, and Regulatory Considerations

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

The Basin Plan designates the beneficial uses of underlying groundwater as municipal and domestic supply, agricultural supply, and industrial supply.

Antidegradation Analysis

The Discharger has been monitoring groundwater quality at the site since 1983 when the original wastewater treatment facility was built. The California Department of Water Resources (DWR) has also maintained a piezometer cluster site (DWR-351) near the northeast corner of the North Effluent Storage Pond since 1968. Based on the data

available, it is not possible to determine pre-1968 groundwater quality. Therefore, determination of compliance with Resolution 68-16 for this facility is based on groundwater monitoring data from the Discharger's monitoring well network and, in the case of mainland groundwater quality, well DWR-351. Data from well DWR-351 suggests that discharges from the former wastewater treatment facility diluted naturally occurring saline groundwater on the mainland.

Constituents of concern that have the potential to degrade groundwater include salts (primarily TDS, sodium, chloride, and sulfate) and nutrients. With respect to nutrients such as nitrate and ammonia, the Discharger has implemented best practicable treatment and controls through abandoning the unlined treatment ponds and replacing them with concrete treatment basins and advanced tertiary treatment. The current treatment system is designed to have a total nitrogen concentration less than 15 mg/L. With respect to total coliform organisms, the Discharger has implemented Best Practicable Treatment and Control by replacing sodium hypochlorite disinfection with membrane filtration and UV disinfection. The current disinfection system is designed to have a total coliform organism concentration less than 2.2 MPN/100mL and will not add salinity to the effluent.

While the new WWTP was not designed to remove salinity, the design does limit evapoconcentration of salts during treatment and reduces the addition of salts resulting from sodium hypochlorite disinfection. This Order requires the Discharger to implement treatment or control measures that are currently the best practicable treatment or control available. Therefore, the discharge complies with the Antidegradation Policy.

Discharge Prohibitions, Specifications, and Provisions

Influent flows to the WWTRF shall not exceed the following limits:

Flow Measurement	Flow Limit
Total Annual Flow [1]	1,570 MG
Average Dry Weather Flow [2]	4.3 MGD
Monthly Average Flow [3]	8.6 MGD

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

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

[3] As determined by the total flow during the calendar month divided by the number of days in that month.

This Order contains effluent limits for BOD, total nitrogen, and total coliform organisms and contains a mass loading rate limit for BOD and total nitrogen to the LAAs.

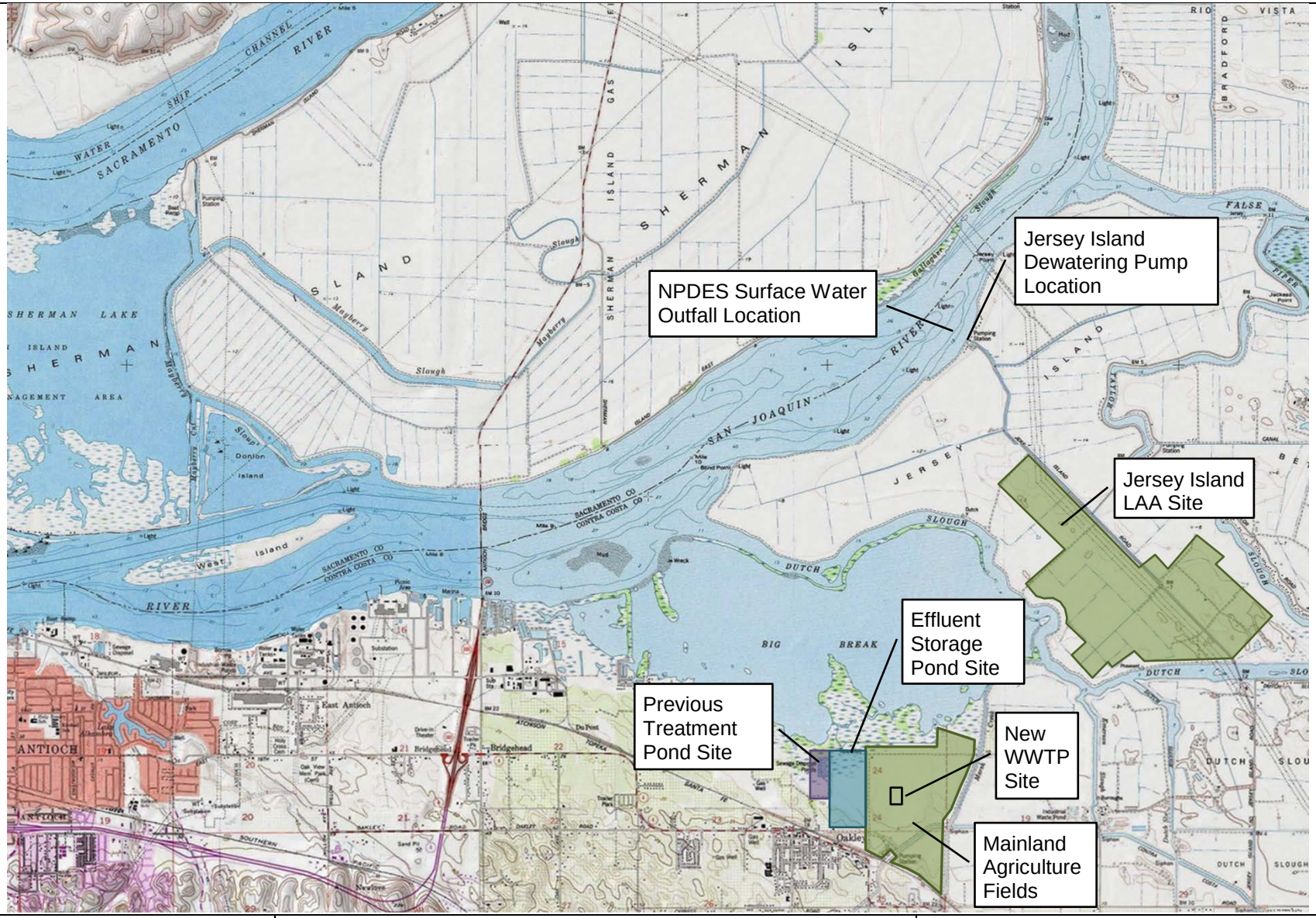
With the exception of TDS, chloride, sodium, and sulfate, this Order contains groundwater limits that do not allow groundwater degradation beyond that of Primary and Secondary

MCLs and that of current groundwater quality. Compliance with these limitations will be determined annually based on an intrawell analysis using approved statistical methods.

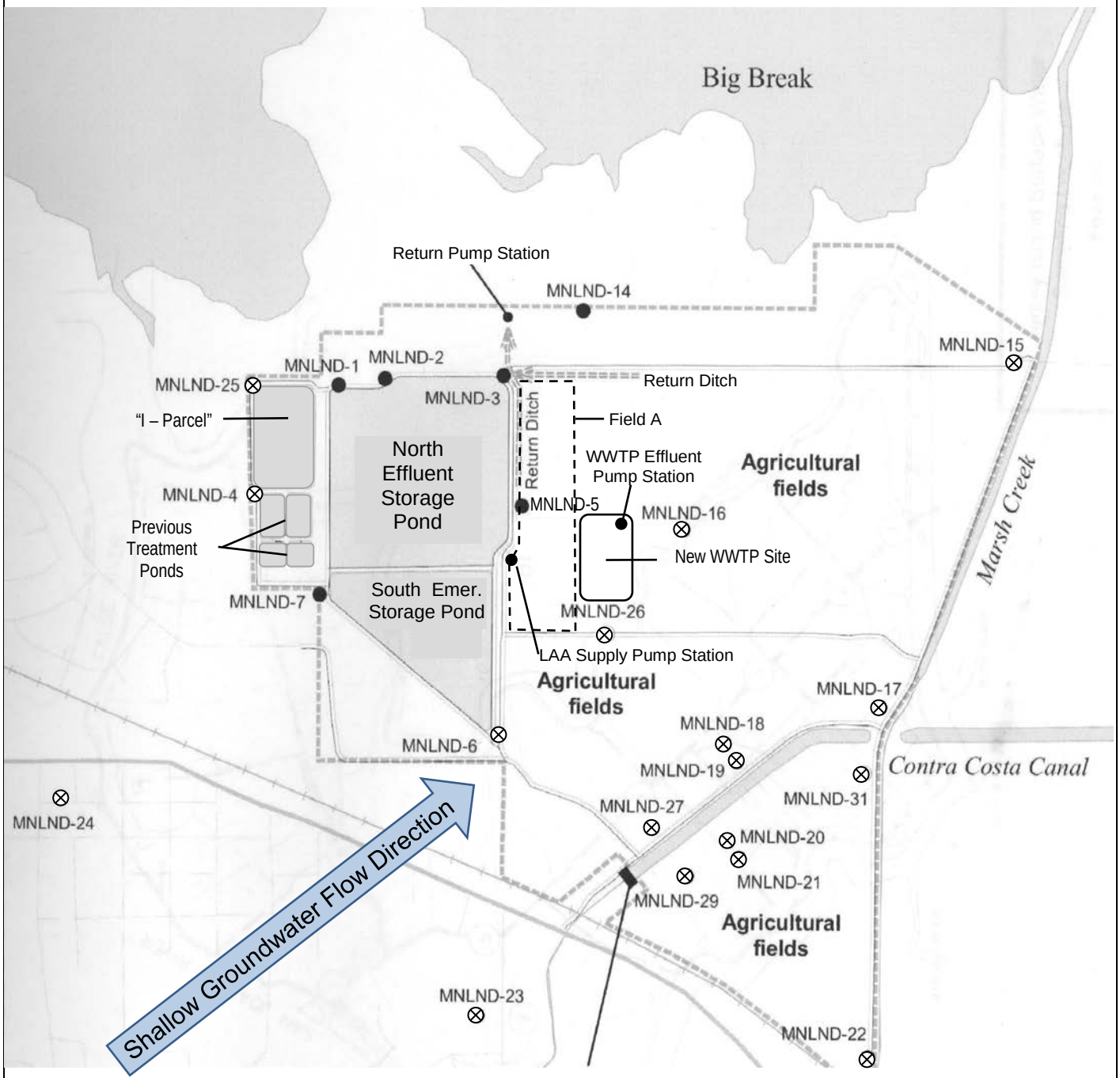
This Order also sets specifications for water recycling; solids disposal; and biosolids and sludge drying, storage, and land application.

The Provisions require the submittal of technical reports that describe the statistical methods used to determine compliance with groundwater limits, the destruction of abandoned wells on the mainland, and any planned expansion of the Jersey Island LAA or reinstating the Mainland LAA.

The Monitoring and Reporting Program is designed to verify compliance with effluent limitations, groundwater limitations, and operational requirements of the WDRs.



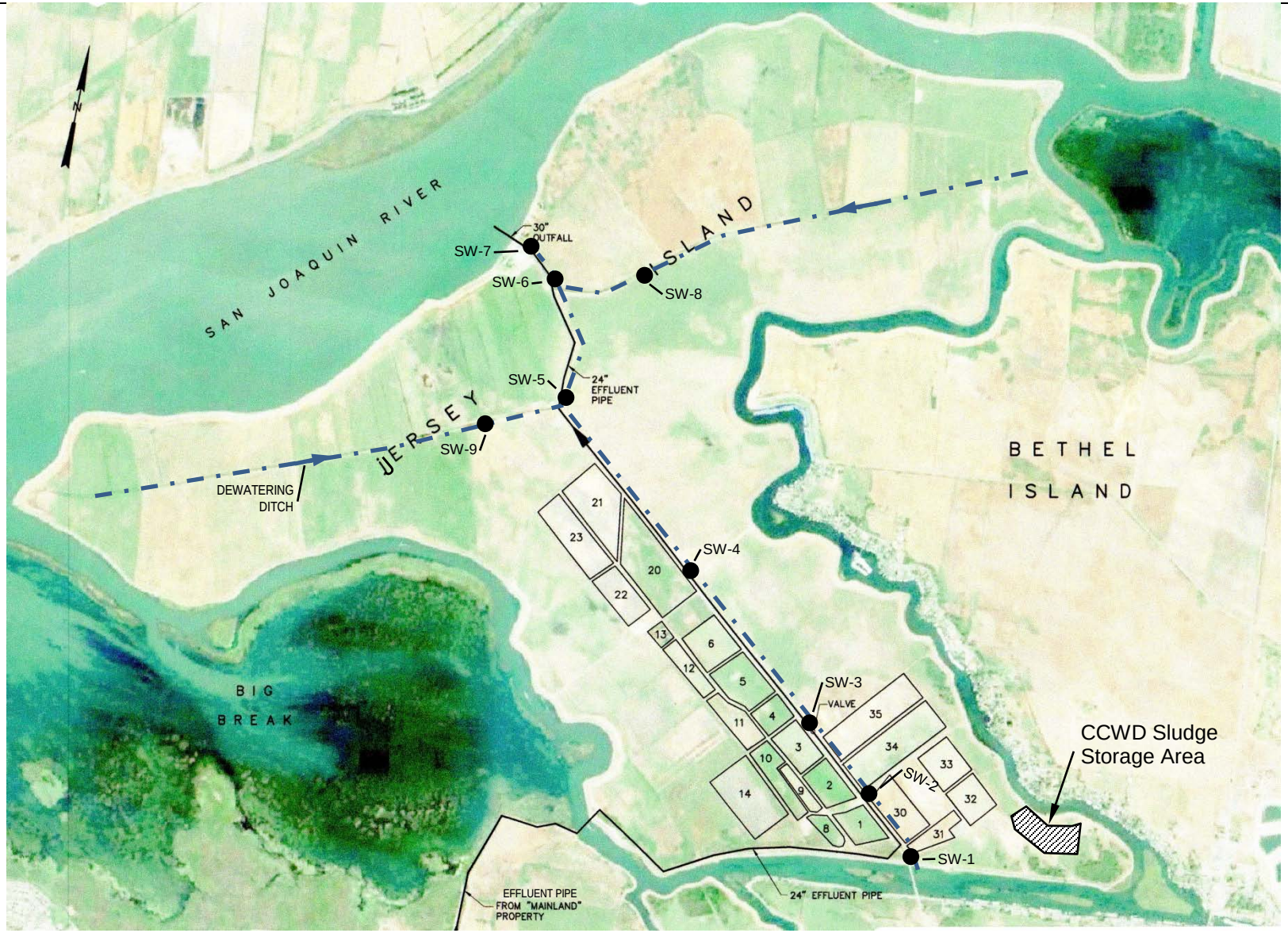
DRAWING REFERENCE:	**SITE PLAN**	Approximate Scale:
U.S.G.S. June 2010 7.5 Minute Quadrangle	IRONHOUSE SANITARY DISTRICT IRONHOUSE WATER RECYCLING FACILITY CONTRA COSTA COUNTY	1 inch = 5,000 feet



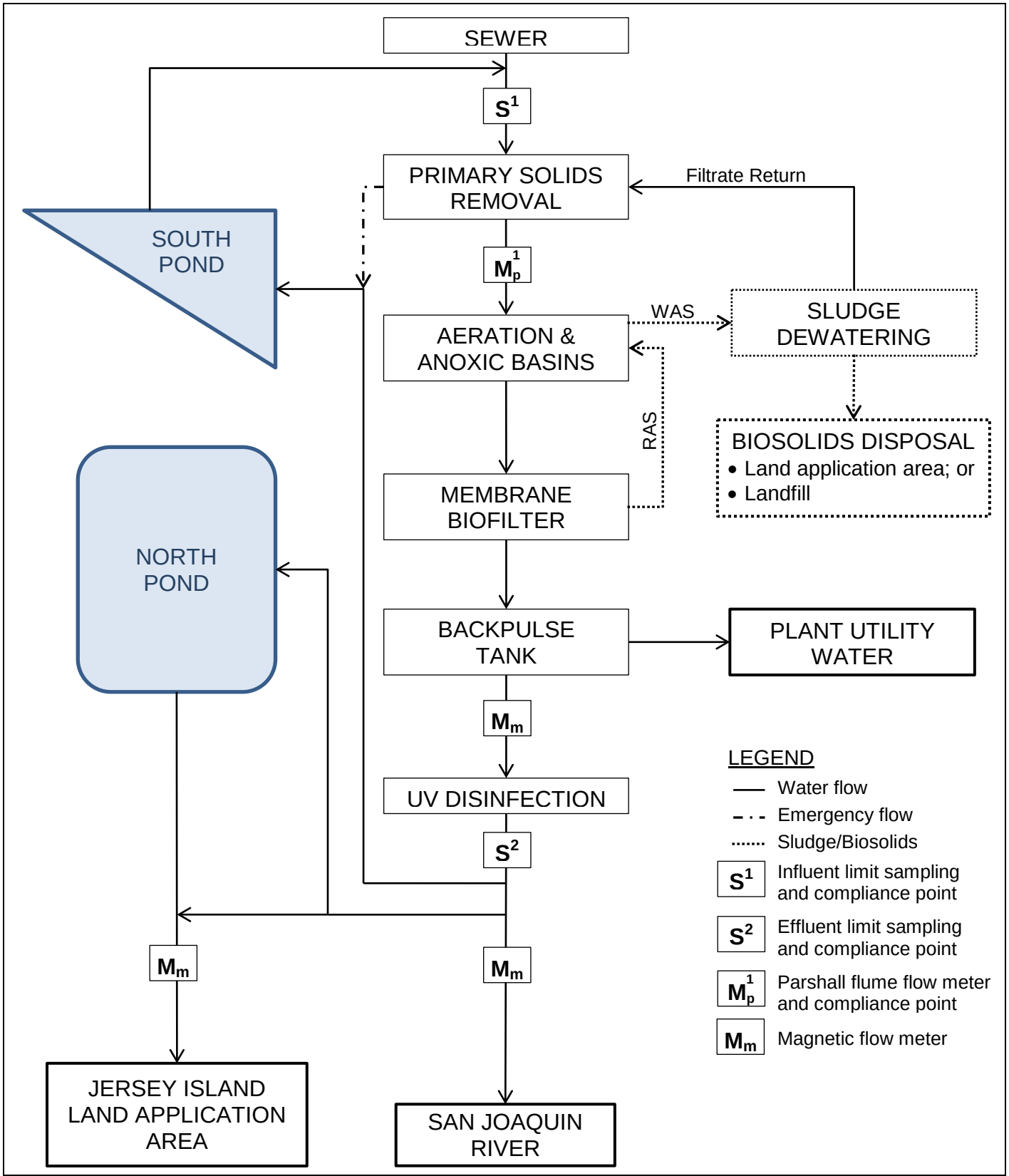
● Current monitoring well network

⊗ Monitoring wells that may be abandoned

Drawing reference:	**MAINLAND FACILITIES SITE PLAN**
Ironhouse Sanitary District, RWD Addendum, April 2012	IRONHOUSE SANITARY DISTRICT IRONHOUSE WATER RECYCLING FACILITY CONTRA COSTA COUNTY



DRAWING REFERENCE:	JERSEY ISLAND LAND APPLICATION AREA SITE PLAN	Approximate Scale:
IRONHOUSE SD RWD Addendum April 2012	IRONHOUSE SANITARY DISTRICT IRONHOUSE WATER RECYCLING FACILITY CONTRA COSTA COUNTY	1 inch = 2,870 feet



DRAWING REFERENCE:

IRONHOUSE SD
RWD Addendum
April 2012

PROCESS FLOW SCHEMATIC

IRONHOUSE SANITARY DISTRICT
IRONHOUSE WATER RECYCLING FACILITY
CONTRA COSTA COUNTY