CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2007-0179

WASTE DISCHARGE REQUIREMENTS

FOR

LOCKEFORD COMMUNITY SERVICES DISTRICT
WASTEWATER TREATMENT FACILITY
SAN JOAQUIN COUNTY

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

1. The Lockeford Community Services District (hereafter referred to as Discharger) submitted a Report of Waste Discharge (RWD) on 9 June 2006 for updating existing Waste Discharge Requirements (WDRs) for its wastewater treatment facility. The purpose of the update is to provide effluent disinfection, add a new land application area, and modify an existing wastewater storage pond to treat and dispose of domestic wastewater generated in existing and new residential developments. Supplemental information to the RWD was received on 8 March 2007.

2. For the purposes of this Order, the term "Wastewater Treatment Facility" (WWTF) shall mean the wastewater collection system, the wastewater treatment ponds, recycled water distribution piping, recycled water storage ponds, and the land application areas. The general location of the facility is shown on Attachment A, which is attached hereto and made part of this Order by reference.

3. Improvements at the facility are referred to as the Disposal Improvement Project, which will be implemented by the Discharger when this Order is adopted, and the Treatment Improvement Project, which has not yet been scheduled for implementation by the Discharger.

4. The WWTF is presently located in two areas and a third area will be added as part of the Disposal Improvement Project. The areas are named Treatment Area, Land Application Area No. 1, and Land Application Area No. 2. The locations of the areas are presented on Attachment A.

5. The Treatment Area is at 17725 North Tully Road, Lockeford, in Section 6, T3N, R8E, MDB&M. The Lockeford Community Services District owns and operates the WWTF, Treatment Area, Land Application Area (LAA) No. 1 and LAA No. 2. LAA No. 1 is in Section 6 T3N, R8E, MDB&M. LAA No. 2 is in Section 5 T3N, R8E, MDB&M. The Treatment Area site plan is shown on Attachment B, which is attached hereto and made part of this Order by reference.

6. WDRs Order No. 90-312 and Wastewater Reclamation Requirements (WRRs) Order No. 90-313, adopted by the Regional Water Board on 2 November 1990, prescribe requirements for the Lockeford Community Services District WWTF and LAA No. 1. Continued use of Orders 90-312 and 90-313 is not consistent with the current plans and policies of the Regional Water Board, nor with the Discharger's need to expand capacity.

7. The Assessor's Parcel Numbers (APNs) for the WWTF are presented below:

Area	APN
Treatment Area	053-030-39
LAA No. 1	053-030-58
	053-030-51
LAA No. 2	053-070-03

Existing Facility, Facility Improvements, and Discharge

8. The existing WWTF treats and disposes of wastewater from the unincorporated community of Lockeford. The WWTF is being expanded and disinfection is being added to provide better treatment for the wastewater that will be generated due to future land development. Currently, the flow rate varies from 0.24 to 0.29 Million gallons per day (Mgal/day).

9. Wastewater is delivered to the treatment system from two pump stations; one of the pump stations is equipped with an alarm that will alert the system operator of malfunctions. The other pump station is checked on a daily basis. This order requires all pumping stations to be equipped with alarm systems. Additional pump stations will be added based on need.

10. Wastewater is metered using ultrasonic flow meters at the headworks (prior to treatment), downstream of treatment/storage ponds and prior to chlorination, and downstream of the chlorination pipe.

11. Presently, five wastewater ponds exist. Ponds No. 1 through 4 are located at the Treatment Area; Pond No. 5 is located at LAA No. 1. A sixth pond, Pond No. 6, will be constructed at LAA No. 2 as part of the Treatment Improvement Project.

12. A wastewater treatment schematic is presented on Attachment C, which is attached hereto and made part of this Order by reference. The following summarizes the treatment process:

    a. Wastewater is biologically treated in a mechanically aerated treatment pond (Pond No. 1) prior to discharge to three storage ponds (Ponds No. 2, 3, and 4). The existing treatment capacity is in excess of 0.40 Mgal/day.

    b. Wastewater in Ponds No. 2, 3, and 4 has undergone biological treatment but has not been disinfected. This wastewater is currently pumped either to Pond No. 5 for storage

or to LAA No. 1 for disposal. In this Order, wastewater that is disinfected is considered "recycled water."

c. Effluent disinfection processes will be added as part of the Disposal Improvement Project. The disinfectant will be chlorine gas. The chlorine contact chamber will consist of a 20-inch diameter pipe that is 500 feet long. Recycled water will be pumped to either Pond No. 5, to Pond No. 6 (when built), or directly to LAAs No. 1 or 2.

d. Until the disinfection process is operable, the Discharger is prohibited from applying undisinfected wastewater to land.

13. Pond configurations are expected to change as part of the future Treatment Improvement Project, which will provide better wastewater treatment and flexibility of operation. However, the footprint of the ponds at the Treatment Area will not change. The wastewater ponds are described below:

    a. At the Treatment Area, four ponds presently exist.

        i) Pond No. 1 is a treatment pond and is equipped with two 10-horsepower brush aerators and three 7.5-horsepower aspirator type aerators. The pond does not contain a synthetic liner. As part of the Treatment Improvement Project, two 10-horsepower brush type mechanical aerators will be added to the treatment pond to increase treatment capacity, improve mixing, and reduce the potential for short-circuiting in the pond. The pond is 39 ac•ft in size and holds 13-million gallons at two feet of freeboard.

        ii) Ponds No. 2, 3, and 4 are used for wastewater storage but could be converted to treatment ponds if needed (to allow sludge removal from Pond No. 1 or other operation and maintenance needs). The ponds do not contain synthetic liners. The three ponds hold a total of 156 ac•ft and 51 million gallons at two feet of freeboard.

    b. Each LAA will contain a recycled water storage pond. The acreage that the ponds occupy is not part of the LAA irrigation acreage used in water balance calculations.

        i) Pond No. 5 is located at LAA No. 1 and is presently used to store treated (undisinfected) wastewater; however, in the future it will store recycled water. The pond does not contain a synthetic liner. Pond No. 5 will be deepened to increase the storage capacity from the current volume of 40 million gallons (123 ac•ft), to 51 million gallons (157 ac•ft) at two feet of freeboard as part of the Disposal Improvement Project.

        ii) Pond No. 6 will be constructed at LAA No. 2 as part of the Treatment Improvement Project and will be used to store recycled water. As described in the RWD, the pond will not contain a synthetic liner. The pond will be constructed when sludge is removed from Pond No. 1 as part of the Treatment Improvement Project, which

will remove Pond No. 1 from service temporarily. Pond No. 6 will be 52 ac•ft in size and will hold 17 million gallons at two feet of freeboard. The parcel for LAA No. 2 consists of 60 acres; however, only 38 acres are proposed for land application of recycled water because of Pond No. 6 and setbacks from natural drainages throughout the parcel.

14. The Disposal Improvement Project will consist of the activities listed below. This project will formally begin when this Order is adopted.

    a. Deepening of Pond No. 5 to increase storage capacity by at least 11 million gallons.

    b. Installation of new groundwater monitoring wells for the ponds and land application areas.

    c. Installation of disinfection equipment.

    d. Improvements on 38 acres to allow the land application of recycled water on LAA No. 2.

    e. Submittal of documentation showing that a legal covenant regarding land use has been signed with the property owner located south of LAA No. 2.

    f. Preparation and submittal of a technical report documenting completion of the foregoing.

15. The Treatment Improvement Project will consist of the following activities, and while not currently scheduled, will be performed two years prior to sludge removal from the existing treatment pond (Pond No. 1):

    a. At least 17 Mgal of new storage will be constructed as Pond No. 6. The planned site for the new Pond No. 6 is the northwest corner of LAA No. 2.

    b. A storage pond at the Treatment Area will be converted to a new 0.4 Mgal/day, two-cell aerated treatment pond system so that Pond No. 1 can be taken out of service.

    c. Once the new storage Pond No. 6 is constructed and a storage pond has been converted to a treatment pond, Pond No. 1 will be taken out of service, the sludge will be removed, and Pond No. 1 will be converted into a second 0.4 Mgal/day, two-cell aerated treatment pond system.

    d. At the end of the Treatment Improvement Project, the Discharger will have a 0.6 Mgal/day, three-cell treatment plant with a fourth cell in reserve to allow any of the three cells to be taken out of service for any reason.

    e. The Treatment Improvement Project will be initiated when any of the following occurs:

i) The flow rate is projected to exceed 0.4 Mgal/day within 2.5 years;

ii) The treatment system threatens to violate WDRs.

iii) Sludge becomes problematic in the treatment pond system for any reason.

16. The Discharger has two portable generators. They are used to operate the lift stations and some of the water supply wells. The Discharger is planning to install an electrical transfer switch at the Treatment Area to run key components such as pumps, instruments, and the office but will not be completed until 2008. All new pump stations are designed with an emergency generator and automatic transfer switch.

17. Stormwater that falls on the roadways surrounding the ponds at the Treatment Area drains into the ponds. Other stormwater falling on roofs and paved areas drains to the surrounding unpaved areas where it infiltrates. Stormwater that falls on turf areas at the treatment facility will infiltrate.

18. Influent wastewater quality has been characterized by the Discharger. Based on samples collected since January 2004 until March 2006, wastewater quality is as follows:

Constituent	Units	Average
Monthly Average Flow Rate	Mgal/day	0.254
Biochemical Oxygen Demand	mg/L	184

19. Effluent wastewater quality has also been characterized by the Dischager. The following table summarizes average effluent quality since August 2005. Samples were collected at the Pond No. 1 (treatment pond) outlet.

Constituent	Units	Effluent Quality
Biochemical Oxygen Demand	mg/L	17
Total Dissolved Solids	mg/L	479
Nitrate as Nitrogen	mg/L	Not Detectable
Total Nitrogen	mg/L	4.0
Chloride	mg/L	97.3
Sodium	mg/L	69.3

Recycled Water Application

20. Undisinfected wastewater is currently applied to 95 acres at LAA No. 1 using flood irrigation. Pasture grass is presently grown and beef cattle are allowed to graze the area.

21. Upon implementation of the Disposal Improvement Project, the Discharger will apply recycled water to the LAAs as follows:

    a. A total of 133 acres of land application areas will be available to the Discharger. The LAAs will be divided into five 26.6 acre irrigation checks.

b. Each 26.6 acre irrigation check will be sequentially rotated in alfalfa production for three years and fallow for two years. Every year 79.8 acres will be used for wastewater application.

c. The fallow 53.2 acres can be used to grow pasture grass or other crop if deemed appropriate, but the Discharger states that action would be an unusual occurrence.

22. Wastewater will be applied by flood irrigation. LAAs will be deep-ripped to allow drainage and deep rooting of the alfalfa crop. LAAs will be graded to allow effective flood irrigation and minimize ponding. Beef cattle will be allowed to graze LAA No. 1; no livestock will be allowed on LAA No. 2.

23. To further reduce the salinity of shallow groundwater underlying and downgradient of the LAAs, the LAAs will be designed and operated to capture and percolate most of the rain falling on the LAAs. Upon completion of the Disposal Improvement Project, the captured rainfall runoff will be applied to the irrigation fields to minimize pooling along runoff containment berms, and the associated risk of mosquito breeding. The Discharger estimates only five-percent of rainfall will runoff the LAA during an average rainfall year. Allowing runoff from the LAAs is acceptable because the wastewater will be disinfected and wastewater application will not occur during winter months except when climatic conditions allow.

24. Effluent will be applied at plant uptake rates for both nitrogen and water application. Irrigation tailwater will be controlled through such measures as controlling application and grading the area to prevent off-site drainage.

25. The RWD contains a water balance that demonstrates hydraulic capacity for a wastewater flow rate of 400,000 gpd when the Disposal Improvement Project has been completed. The water balance requires 101.9 million gallons of storage capacity and 80 acres of land application area. Presently, the Discharger has 90.9 million gallons of storage capacity and 95 acres of land application area at LAA No. 1. To increase the storage capacity, Pond No. 5 will be deepened to add 11 million gallons of storage capacity for a total of 101.9 million gallons. The water balance does not require any wastewater to be applied from November through March. However, this Order does not prohibit such application when conditions allow.

26. As described in Water Recycling Specification No. E.5, Title 22, Division 4, Chapter 3, Article 3 requires recycled water application setbacks based on adjacent land uses. To allow application of recycled water closer than allowed by setbacks, the Discharger has obtained an easement on the property south of LAA No. 2. The agreement limits where groundwater wells can be placed on the affected area. The easement allows application of recycled water within 20-feet of the property boundary, which is enough room for a tailwater return ditch, containment levee, and road.

Wastewater Collection System

27. Parts of the collection system are upwards of 50 years old. Approximately 40-percent of the system is believed to consist of clay pipe; the remaining is poly vinyl chloride (PVC) pipe. Based on seasonal flow rate variations, infiltration and inflow appears to be minimal. New wastewater collection system piping will consist primarily of schedule-40 PVC pipe. If excessive inflow and infiltration is identified in new or existing collection system piping, it can be replaced or repaired as needed.

28. The sanitary sewer system collects wastewater and consists of sewer pipes, manholes, and/or other conveyance system elements that direct raw sewage to the treatment facility. A "sanitary sewer overflow" is defined as a discharge to ground or surface water from the sanitary sewer system at any point upstream of the treatment facility. Temporary storage and conveyance facilities (such as wet wells, regulated impoundments, tanks, highlines, etc.) may be part of a sanitary sewer system and discharges to these facilities are not considered sanitary sewer overflows, provided that the waste is fully contained within these temporary storage/conveyance facilities. Sanitary sewer overflow is also defined in State Water Resources Control Board (State Water Board) Order No. 2006-0003-DWQ, *Statewide General Waste Discharge Requirements for Sanitary Sewer Systems*, which can be found at:
http://www.waterboards.ca.gov/resdec/wqorders/2006/wqo/wqo2006_0003.pdf.

29. For this facility, any sanitary sewer overflows would consist of varying mixtures of domestic and commercial wastewater, depending on land uses in the sewage collection system. The chief causes of sanitary sewer overflows include grease blockages, root blockages, debris blockages, sewer line flood damage, manhole structure failures, vandalism, pump station mechanical failures, power outages, storm or groundwater inflow/infiltration, lack of capacity, and/or contractor caused blockages.

30. Sanitary sewer overflows often contain high levels of suspended solids, pathogenic organisms, toxic pollutants, nutrients, oxygen demanding organic compounds, oil and grease, and other pollutants. Sanitary sewer overflows can cause temporary exceedences of applicable water quality objectives, pose a threat to public health, adversely affect aquatic life, and impair the public recreational use and aesthetic enjoyment of surface waters in the area.

31. The Discharger is expected to take all necessary steps to adequately maintain, operate, and prevent discharges from its sanitary sewer collection system. This Order requires the Discharger to prepare and implement a *Sewer System Management Plan* (SSMP) consistent with State Water Board Order No. 2006-0003-DWQ.

Site-Specific Conditions

32. Annual precipitation in the vicinity averages approximately 16.91 inches. The mean evapotranspiration rate is approximately 67.94 inches per year. All portions of the WWTF are outside the 100-year flood zone.

33. The facility lies within the Lower Mokelumne River Hydrologic Unit Area No. 531.20, as depicted on interagency hydrologic maps prepared by the Department of Water Resources in August 1986.

34. Based on the National Resource Conservation Service soil survey, the soils at the LAAs consist primarily of the Exeter sandy loam and San Joaquin Loam.

35. Published infiltration rates for the soils range from 0.06 to 2.0 in/hr.

Groundwater Considerations

36. The Lockeford community obtains its potable water from groundwater. Water quality data from 2005 and 2006 are presented below:

Analyte	Units	2005	2006
Boron	mg/L	ND (0.10)	ND (0.50)
Chloride	mg/L	21	23
Manganese	mg/L	ND (0.020)	ND
Nitrate (as N)	mg/L	1.3	0.87
Ammonia	mg/L	ND (0.50)	ND (0.50)
Sodium	mg/L	27	32
Electrical Conductivity	umhos/cm	350	387
PH	Std.	7.3	7.2
Total Dissolved Solids	mg/L	278	296
Total Hardness	mg/L	104	124

37. The following table presents a summary of the monitoring wells that have been installed to date and their status. Wells TPMW-5 and R1MW-2 were drilled deeper than the depth of well casing; the excess borings were sealed with bentonite clay. Well TPMW-1 was constructed with an unusually long sand filter pack. The well locations are presented on Attachments A and B.

Well Name	Location	Dia. (in.)	Depth (ft.)	Screen Int (ft. bgs)	Filter Pack	Status
TP MW-1	Treatment	4	120	90-120	85-120	Perched
TP MW-2	Treatment	4	132	102-132	96-132	Water Table
TP MW-3	Treatment	4	135	105-135	100-135	Water Table
TP MW-4	Treatment	4	145	130-145	128-145	Water Table
TP MW-5	Treatment	4	63	44.5-54.5	42.5-54.5	Perched
R1 MW-1	LAA No. 1	4	145	130-145	128-145	Water Table

Well Name	Location	Dia. (in.)	Depth (ft.)	Screen Int (ft. bgs)	Filter Pack	Status
R1 MW-2	LAA No. 1	4	100	68-83	66-83	Perched
R1 MW-3	LAA No. 1	4	140	125-140	123.4-140	Water Table
R1 MW-4	LAA No. 1	4	145	130-145	128-145	Water Table
BMW-1	Backgnd	4	145	130-145	124-145	Water Table
BMW-2	Backgnd	4	145	130-145	128-145	Water Table
R2 MW-1	LAA No. 2	4	145	115-145	112-145	Water Table
R2 MW-2	LAA No. 2	4	145	115-145	112-145	Water Table
R2 MW-3	LAA No. 2	4	145	115-145	112-145	Water Table
R2 MW-4	LAA No. 2	4	145	115-145	112-145	Water Table
R2 MW-5	LAA No. 2	4	145	115-145	112-145	Water Table

TP denotes Treatment Area. R1 denotes Reclamation Area (LAA Area) No. 1. BMW denotes Background Monitoring Well. R2 denotes Reclamation Area (LAA Area) No. 2.

38. The RWD presents the following information about groundwater conditions at the site:

    a. Groundwater monitoring wells have been installed at the wastewater treatment system and both LAAs. The unlined wastewater treatment ponds appear to have created a groundwater mound that complicates determination of groundwater flow direction.

    b. Two water bearing zones have been identified: a local perched zone and the regional water table. The perched zone has been identified at the Treatment Area and at LAA No. 1. Wells TPMW-1, TPMW-5, and R1MW-2 exhibit groundwater elevations above the regional water table elevations. Review of the groundwater elevation data from wells screened in the perched and regional water table indicates a downward vertical gradient exists between the saturated zones. However, the existence of the perched zone at the Treatment Area wells is questionable and may be the result of a groundwater mound generated by the unlined wastewater ponds percolating wastewater into the subsurface.

    c. Groundwater elevations in each zone are discussed below:

        i. The groundwater flow direction of the perched zone wells could not be determined because no continuous perched zone between the wells could be identified. Typical depths to perched groundwater are 50 to 70 feet below ground surface.

        ii. The groundwater flow direction in the water table zone is to the southeast with a slight gradient (0.00073 to 0.0013 ft./ft.). Typical depths to groundwater are 120-130 feet below ground surface.

        iii. Regional groundwater maps prepared by the Department of Water Resources indicate that groundwater flow is to the south or southeast.

iv. Although Well No. TPMW-1 was constructed with a sand pack presumably deep enough to show a groundwater elevation typical of the regional water table, it possesses a groundwater elevation higher than expected. The cause of the elevation anomaly is unknown but the well may be acting as a vertical conduit allowing mounded wastewater to move to lower saturated zones more quickly. Further investigation and possible replacement of Well TPMW-1 is warranted.

39. Groundwater quality has been characterized by quarterly sampling of monitoring wells. A summary of average groundwater quality for all the wells (except total coliform organisms as described in Finding No. 39.g) is presented in the table below as well as the Water Quality Limit for each analyte.

Treatment Area monitoring wells TPMW-1, TPMW-2, and TPMW-3 have been sampled since March 2000; Background Wells BMW-1 and BMW-2; Treatment Area Wells TPMW-4 and TPMW-5; and LAA No. 1 Wells R1MW-1 through R1MW-4 have been sampled since November 2006; LAA No. 2 Wells R2MW-1 through R2MW-4 have been sampled since August 2005; and LAA No. 2 Well R2MW-5 has been sampled since October 2005.

Well	Location	Units	NO_3 as N	TKN	TDS	Hardness	Na	Cl	Alkalinity	TCO (MPN/100ml)
WQL	--	mg/L	10 [1]	NA	450 [2]	NA	69 [2]	106 [2]	NA	<2.2 [3]
BMW-1	Bkgnd	mg/L	0.7	ND (1.0)	367	124	51	82	67	<2
BMW-2	Bkgnd	mg/L	4.0	ND (1.0)	354	161	37	38	130	<2
TPMW-1	Trtmt	mg/L	4.0	ND (1.0)	636	415	62	136	313	<2
TPMW-2	Trtmt	mg/L	3.6	ND (1.0)	351	118	48	45	127	<2
TPMW-3	Trtmt	mg/L	1.9	ND (1.0)	548	347	59	77	328	<2
TPMW-4	Trtmt	mg/L	2.8	ND (1.0)	249	92	39	37	98	<2
TPMW-5	Trtmt	mg/L	0.9	ND (1.0)	653	273	177	84	346	<2
R1MW-1	LAA 1	mg/L	1.8	ND (1.0)	283	65	47	22	72	<2
R1MW-2	LAA 1	mg/L	6.3	ND (1.0)	449	189	62	72	155	<2
R1MW-3	LAA 1	mg/L	3.5	ND (1.0)	286	75	37	31	81	<2
R1MW-4	LAA 1	mg/L	6.0	ND (1.0)	246	87	26	27	67	<2
R2MW-1	LAA 2	mg/L	2.7	0.4	288	48	27	17	86	<2
R2MW-2	LAA 2	mg/L	1.1	0.3	224	57	28	19	92	<2
R2MW-3	LAA 2	mg/L	2.1	0.3	236	66	26	16	95	<2
R2MW-4	LAA 2	mg/L	3.7	0.3	252	73	34	28	90	<2
R2MW-5	LAA 2	mg/L	1.8	0.3	204	47	28	25	71	<2

Bkgnd denotes background well. Trtmt denotes Treatment Area well. LAA 1 denotes Land Application Area No. 1 well. LAA 2 denotes Land Application Area No. 2 well. NO_3-N denotes Nitrate as Nitrogen. TKN denotes Total Kjeldahl Nitrogen. TDS denotes Total Dissolved Solids. Na denotes sodium. Cl denotes chloride. TCO denotes Total Coliform Organisms. MPN/100mL denotes Most Probable Number per 100 mL. ND denotes Not Detected. NA denotes Not Applicable. WQL denotes Water Quality Limit. [1] USEPA Primary Maximum Contaminant Level (Drinking Water). [2] Agricultural Water Quality Goals. [3] Water Quality Control Plan.

40. In general, groundwater quality is good and the analyte concentrations are less than the Water Quality Limit values. However, the Treatment Area wells contain waste constituents

at higher concentrations than the background wells and the land application area wells. Similarly, LAA No. 1 wells tend to contain waste constituents at higher concentrations than the wells located at LAA No. 2 (where no wastewater has yet been applied). The water quality trends are described below:

a. None of the monitoring wells contained average nitrate concentrations that exceed the water quality limit. Average concentrations in background wells are approximately 4 mg/L or less. At the Treatment Area, the concentrations vary from 4 mg/L to less than 2 mg/L. At LAA No. 1 average concentrations range from 6.3 mg/L to 1.8 mg/L. At LAA No. 2 average concentrations range from 1.1 mg/L to 3.7 mg/L.

b. Three of the monitoring wells contain average TDS concentrations that exceed the TDS water quality limit of 450 mg/L. Average concentrations in background wells are approximately 350 mg/L or less. At the treatment facility, three wells exceed the limit; they are Well TPMW-1 (636 mg/L), TPMW-3 (548 mg/L), and TPMW-5 (653 mg/L). At LAA No. 1 average concentrations range from 449 mg/L to 246 mg/L. At LAA No. 2 average concentrations range from 288 mg/L to 204 mg/L.

    i) It is noted that Well TPMW-3 possesses an elevated TDS average concentration (548 mg/L) and is located upgradient of the wastewater ponds. This seems to indicate the well is located within a groundwater mound, but the groundwater elevation in the well is not higher than the regional water table.

c. One well contained average sodium concentrations that exceeded the water quality limit of 69 mg/L. Background concentrations range from 37 mg/L to 51 mg/L. The remaining concentrations ranged from 62 mg/L to 26 mg/L. Concentrations were lowest in wells located at LAA No. 2.

d. One well contained average chloride concentrations that exceed the water quality limit of 106 mg/L. Average concentrations in background wells varied from 82 mg/L to 38 mg/L. At the treatment facility, one well exceeded the limit; it is Well TPMW-1 (136 mg/L). At LAA No. 1 average chloride concentrations range from 72 mg/L to 22 mg/L. At LAA No. 2 average concentrations range from 28 mg/L to 16 mg/L.

e. Although there are not water quality limits for hardness or alkalinity the analytes can be used to determine if groundwater quality degradation has occurred. The average concentrations of hardness and alkalinity are highest in wells located at the Treatment Area.

f. The wells that are screened (or have sand pack that extends to shallow zones) in perched zone groundwater tend to have higher concentrations of waste constituents. Those wells are TPMW-1, TPMW-5, and R1MW-2. It is noted that Well TPMW-4 was installed adjacent to Well TPMW-5 but was constructed to only monitor the lower regional water table zone. Significant differences between the chemistry of the two wells have been observed.

g. Detectable levels of Total Coliform Organisms (TCO) were reported in 13 of 16 wells since monitoring was initiated but the concentrations have reduced to non-detectable in the most recent sampling events. Upon installation, the wells were not disinfected. Because coliform organisms are normally filtered as they migrate through soil media, the presence of TCO in the wells is likely a result of contamination during well installation or sampling. The current non-detectable TCO concentration complies with the Basin Plan.

h. Although not presented in the table above due to space limitations, total trihalomethanes (THMs) were included in the analyses for LAA No. 2. No detectable total THM was reported. Because wastewater has not been chlorinated to date there is little reason to expect THMs to be present in the wastewater or groundwater. However, once wastewater is disinfected, it will be reasonable to require monitoring for these constituents. The non-detectable THM concentration complies with the Basin Plan.

41. Based on the average total nitrogen concentration in effluent (4 mg/L), and the flow rate (0.4 Mgal/day), the total nitrogen applied to the land application areas (80 acres active each year) is expected to be approximately 61 lbs/acre•year. The Discharger plans to grow alfalfa in the LAAs. According to the *Western Fertilizer Handbook*, alfalfa is capable of taking up 480 lbs/acre•year of nitrogen. When wastewater is properly applied to land, the alfalfa should take up all the applied nitrogen. Groundwater beneath land application areas is not anticipated to be degraded by nitrogen compounds as a result of the wastewater application.

42. Based on the average TDS concentration in effluent from the treatment pond (479 mg/L), and the flow rate (0.4 Mgal/day), the total TDS applied to the land application areas (80 acres active each year) is expected to be 7,256 lbs/acre•year. Because TDS consists of biodegradable dissolved solids and Fixed Dissolved Solids (FDS), the loading rate of FDS should be slightly less than the TDS loading rate. Groundwater beneath land application areas and wastewater ponds is expected to be degraded by TDS compounds as a result of the wastewater application and storage. However, the degradation is consistent with the Antidegradation Policy as described below:

    a. The RWD describes a groundwater model that predicts the concentration of wastewater percolate and the potential impact on groundwater quality. The model estimates groundwater quality degradation to be limited to a value below the water quality objective. Degradation of groundwater quality is expected to remain under the water quality limit of 450 mg/L. The model assumptions are presented below:

        i) The alfalfa crop will remove approximately 1,200 pounds of FDS. That is based on 6 tons per acre of alfalfa and a 10-percent ash content. Crops will be removed from the LAAs so that the accumulated salt is removed from the system.

ii) Wastewater will be applied at night to minimize evaporation, even with that measure approximately 47 percent will be lost to the atmosphere through evapotranspiration.

iii) Approximately 50-percent of the wastewater applied will be leached through the soil to prevent salt buildup in the root zone.

iv) Precipitation will be collected and applied to land application areas to dilute the salinity of wastewater applied.

v) The overall, long-term average salinity of percolate (of rainfall and wastewater origins) is estimated to be 446 mg/L.

vi) The resulting salinity of shallow zone groundwater immediately downgradient from the LAAs is also estimated to have an overall, long-term average salinity of 446 mg/L because the percolate concentration is the dominant factor in determining shallow groundwater quality.

vii) Because the recycled water storage ponds will not be lined, groundwater quality may be degraded by THMs. Additional groundwater monitoring wells will be required to monitor the ponds where recycled water is stored.

Antidegradation Analysis

43. State Water Resources Control Board (State Board) Resolution No. 68-16 (hereafter Resolution 68-16 or the "Antidegradation Policy") requires the Regional Water Board in regulating the discharge of waste to maintain high quality waters of the state (i.e., background water quality) until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the state, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Water Board's policies (e.g., quality that exceeds water quality objectives). Resolution 68-16 requires that any discharge that could degrade the waters of the state be regulated to assure use of best practicable treatment or control of the discharge to assure that pollution or nuisance will not occur, and the highest water quality consistent with maximum benefit to the people of the State will be maintained.

44. The Discharger has not provided an antidegradation analysis except for TDS. Staff's review of the information in the Findings finds that effluent disposal has the potential to degrade or pollute the underlying groundwater with respect to salinity constituents. However, as discussed in Finding No. 41, the Discharger believes that the degradation will remain below the salinity water quality objective for the beneficial use of agriculture, 450 mg/L TDS.

45. The average concentration of TDS in the potable water supplied to the City of Lockeford is approximately 290 mg/L. The recent TDS concentration in the effluent discharged to the percolation ponds is approximately 480 mg/L. The incremental addition of dissolved salts

though water usage at this facility (about 190 mg/L) is within the normal range for domestic use and is considered reasonable.

46. The Regional Board further finds that some degradation of the groundwater beneath the WWTP is consistent with the maximum benefit to the people of the state provided that:

    a. The degradation is confined within a specified boundary;

    b. The Discharger minimizes the degradation by fully implementing, regularly maintaining, and optimally operating Best Practicable Treatment and Control (BPTC) measures;

    c. The degradation is limited to waste constituents typically encountered in municipal wastewater as specified in the groundwater limitations in this Order; and

    d. The degradation does not result in water quality less than that prescribed in the Basin Plan.

47. Some degradation of groundwater by some of the typical waste constituents released with discharge from a municipal wastewater utility after effective source control, treatment, and control is consistent with maximum benefit to the people of California. The technology, energy, and waste management advantages of municipal utility service far exceed any benefits derived from a community otherwise reliant on numerous concentrated individual wastewater systems, and the impact on water quality will be substantially less. Degradation of groundwater by constituents (e.g., toxic chemicals) other than those specified in the groundwater limitations in this Order, and by constituents that can be effectively removed by conventional treatment (e.g., total coliform bacteria) is prohibited. When allowed, the degree of degradation permitted depends upon many factors (i.e., background water quality, the waste constituent, the beneficial uses and most stringent water quality objective, source control measures, waste constituent treatability).

48. This Order acknowledges that some degradation may occur as a result of the application of treated wastewater to land, but the Regional Board finds that such degradation at this facility is consistent with the maximum benefit to the people of the state. Economic prosperity of local communities and associated industry is of benefit to the people of California, and therefore sufficient reason exists to accommodate growth and some groundwater degradation, provided that the terms of the Basin Plan are met. State Board Resolution No. 77-1, *Policy with Respect to Water Recycling in California*, encourages recycling projects that replace or supplement the use of fresh water, and *The Water Recycling Law* (CWC section 13500-13529.4) declares that utilization of recycled water is of primary interest to the people of the state in meeting future water needs. This Order is consistent with State Water Board policy.

Treatment and Control Practices

49. Resolution No. 68-16 requires the discharge to be regulated to assure use of best practicable treatment or control (BPTC). The Regional Water Board may not, in general,

specify the manner of compliance; therefore, to implement Resolution No. 68-16, the Regional Water Board sets forth effluent and receiving water limitations. To be consistent with Resolution No. 68-16, the Discharger must assure that it is complying with the requirements of this Order and complying with the receiving water limits. The Discharger will provide treatment and control of the discharge that incorporates:

a. Alarms to prevent system bypass or overflow;

b. Future disinfection of treated effluent;

c. Future application of recycled water at plant uptake (for nitrogen and water) rates;

d. Appropriate biosolids storage and disposal practices;

e. An Operation and Maintenance (O&M) manual; and

f. Certified operators to assure proper operation and maintenance.

50. In order to determine compliance with Resolution No. 68-16 it is appropriate to establish a schedule for sampling of groundwater monitoring wells and to formally determine background groundwater concentrations for selected constituents. If groundwater is degraded or there is evidence that the discharge may cause degradation, then the Discharger will be required to evaluate and implement additional BPTC measures for each conveyance, treatment, storage, and disposal component of the system. Completion of these tasks will ensure that BPTC and the highest water quality consistent with the maximum benefit to the people of the state will be achieved.

51. This Order establishes interim groundwater limitations for the WWTF that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan. This Order also contains tasks for assuring that BPTC and the highest water quality consistent with the maximum benefit to the people of the state will be achieved. Accordingly, the discharge is consistent with Resolution 68-16 and the Basin Plan. Based on the results of the scheduled tasks, the Regional Water Board may reopen this Order to reconsider groundwater limitations and other requirements to comply with Resolution 68-16.

Basin Plan, Beneficial Uses, and Regulatory Considerations

52. 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 Board. These requirements implement the Basin Plan.

53. The beneficial uses of the Mokelumne River between Camanche Reservoir and the Delta are agricultural supply; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning, reproduction, and/or early development; and wildlife habitat.

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

55. The Basin Plan encourages water recycling.

56. The Basin Plan establishes numerical and narrative water quality objectives for surface water and groundwater within the basin. Numerical and narrative water quality objectives are maximum (i.e., least stringent) limits directly applicable to the protection of designated beneficial uses of the water. Controllable water quality factors are not allowed to cause further degradation of water quality in instances where other factors have already resulted in water quality objectives being exceeded. Controllable factors are those actions, conditions, or circumstances resulting from human activities that may influence the quality of the waters of the State are subject to the authority of the State or Regional Board, and that may be reasonably controlled. In addition, the water quality objectives do not require improvement over naturally occurring background concentrations. As described in the attached Information Sheet, the Basin Plan requires that the Regional Water Board, on a case-by-case basis, follow specified procedures to determine maximum numerical limitations that apply the narrative objectives when it adopts waste discharge requirements.

57. The Basin Plan includes a water quality objective for Chemical Constituents that, at a minimum, requires waters designated as domestic or municipal supply to meet the maximum contaminant levels (MCLs) specified in the following provisions of Title 22, California Code of Regulations (CCR): Tables 64431-A (Inorganic Chemicals) and 64431-B (Fluoride) of Section 64431, Table 64444-A (Organic Chemicals) of Section 64444, Table 64449-A (Secondary Maximum Contaminant Levels-Consumer Acceptance Limits) of Section 64449, and 64449-B (Secondary Maximum Contaminant Levels-Ranges) of Section 64449. The Basin Plan's incorporation of these provisions by reference is prospective, and includes future changes to the incorporated provisions as the changes take effect. The Basin Plan recognizes that that the Regional 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.

58. State Board Order No.WQO-2003-0014 upheld the Regional Board's use of numeric groundwater limits, and states that numeric groundwater limits must be restricted to those constituents present in the waste, breakdown products of constituents present in the waste, and those that might be leached from the soil beneath the wastewater disposal area. The Groundwater Limitations of this Order complies with State Board Order No. WQO-2003-0014, as described below. Additional information regarding each of these chemicals is found in the Information Sheet.

    a. The Discharger has not yet sampled its effluent for boron. However, boron occurs naturally in waters, and is known to be present in the cleaning products used in

domestic households[1]. Boron has been found in the wastewater effluent at other domestic wastewater treatment facilities at concentrations ranging from 0.7 to 2.2 mg/l, and is expected to be present in the wastewater at this facility. Boron has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to LAAs. The groundwater underlying the facility has the designated beneficial use of agricultural supply. According to Ayers and Westcot[2], boron can damage sensitive crops if present in excess of 0.7 mg/L in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of boron is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 0.7 mg/L for boron, based on Ayers and Westcot, is appropriate to apply the narrative Chemical Constituents objective to protect the agricultural use of groundwater. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge.

b. The Discharger's effluent contains an average chloride concentration of 97.3 mg/L. Chloride is known to be present in wastewater, as it is one of the major components of total dissolved solids. Chloride is a major anion in natural water and wastewater, and is added to the waste stream because chloride is present in the human diet and is excreted unchanged from the human body[1,3]. Chloride concentrations at other facilities vary depending on the salinity of the source water and the activities resulting in wastewater discharge. At other domestic wastewater facilities, chloride has been present in the wastewater at concentrations ranging from 48 to 310 mg/l. Chloride has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to LAAs. According to Ayers and Westcot[2], chloride can damage sensitive crops if present in excess of 106 mg/L in irrigation water applied by sprinklers, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of chloride is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 106 mg/L for chloride, based on Ayers and Westcot, is appropriate to apply the narrative Chemical Constituents objective to protect the agricultural use of groundwater. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge.

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[1] American Public Health Association et al., 1985.Standard Method for the Examination of Water and Wastewater, 16th Edition.

[2] Ayers, R.S. and D.W. Westcot, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations- Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985). This paper contains the results of studies of the impacts of various chemicals on agricultural uses including crop irrigation and stock watering. Therefore, it is appropriate to use the data contained therein to apply the narrative Chemical Constituent water quality objective.

[3] Metcalf and Eddy, 2003. Wastewater Engineering Treatment and Reuse, 4th Edition.

c. The Discharger has not yet sampled its effluent for iron. Iron is naturally occurring in all waters due to its presence in soils and rocks[1], and is liberated from the soil under oxidizing conditions associated with the biodegradation of organic matter. Iron is known to be present in domestic wastewater, and at other domestic wastewater facilities has been found at concentrations ranging from 70 to 190 ug/L. It is also expected to be present in the effluent from this facility. Iron has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to LAAs. In addition, naturally occurring iron can be solubilized from soil under reducing conditions caused by the land disposal of domestic wastewater[1]. The Chemical Constituents objective prohibits concentrations of chemical constituents in excess of California MCLs in groundwater that is designated as municipal or domestic supply. The California secondary MCL for iron is 0.3 mg/L, and groundwater beneath the facility is designated as municipal or domestic supply. It is therefore appropriate to adopt a numerical groundwater limitation of 0.3 mg/L for iron to implement the Chemical Constituents objective to protect the municipal and domestic use of groundwater.

d. The Discharger has not yet sampled its effluent for manganese. Manganese occurs naturally in waters and is added to the waste stream through both domestic and industrial use[1]. Manganese has been found at other facilities at concentrations ranging from 2 to 21 ug/L, and is expected to be present at this facility. Manganese has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to LAAs. In addition, naturally occurring manganese can be solubilized from soil under reducing conditions caused by the land disposal of domestic wastewater, and is more prevalent in dissolved forms in groundwater[1]. The Chemical Constituents objective prohibits concentrations of chemical constituents in excess of California MCLs in groundwater that is designated as municipal or domestic supply. The California secondary MCL for manganese is 50 ug/L, and groundwater beneath the facility is designated as municipal or domestic supply. It is therefore appropriate to adopt a numerical groundwater limitation of 50 ug/L for manganese to implement the Chemical Constituents objective to protect the municipal and domestic use of groundwater.

e. The average sodium concentration in the effluent from this facility is 69.3 mg/L. Sodium is known to be present in wastewater, as it is one of the major components of total dissolved solids. Sodium is a major cation in natural water, due to its prevalence in the earth's crust, and in wastewater because sodium chloride is present in the human diet and is excreted unchanged by the body[1]. Sodium concentrations at other facilities vary depending on the salinity of the source water and the activities resulting in wastewater discharge. At other domestic wastewater facilities, sodium has been present in the wastewater at concentrations ranging from 89 to 300 mg/l. Sodium has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to LAAs.. According to Ayers and Westcot[2], sodium can damage sensitive crops if present in excess of 69 mg/L in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality

objective to protect the agricultural use from discharges of sodium is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 69 mg/L for sodium, based on Ayers and Westcot, is appropriate to apply the narrative Chemical Constituents objective to protect the agricultural use of groundwater. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge.

f. Total dissolved solids, which were found to be present in the wastewater at average concentrations of 476 mg/L, have the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to LAAs. According to Ayers and Westcot[2], dissolved solids can damage sensitive crops if present in excess of 450 mg/L in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of total dissolved solids is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 450 mg/L for total dissolved solids, based on Ayers and Westcot, is appropriate to apply the narrative Chemical Constituents objective to protect the agricultural use of groundwater. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge.

g. Nitrate, which was not found in the wastewater at the detection limit (0.05 mg/L), has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to LAAs. The Chemical Constituents objective prohibits concentrations of chemical constituents in excess of California MCLs in groundwater that is designated as municipal or domestic supply. The California primary MCL for nitrate is equivalent to 10 mg/L as nitrogen, and groundwater beneath the facility is designated as municipal or domestic supply. It is therefore appropriate to adopt a numerical groundwater limitation of 10 mg/L for nitrate as nitrogen to implement the Chemical Constituents objective to protect the municipal and domestic use of groundwater.

h. The Discharger has not yet sampled its effluent for ammonia. However, wastewater has been found in the influent to other wastewater treatment facilities at concentrations ranging from 17 to 30 mg/l, and in the effluent from 1.4 to 1.6 mg/L. Ammonia has the potential to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to LAAs. According to Amoore and Hautala[4], the odor of ammonia can be detected in water at a

[4] Amoore, J.E. and E. Hautala, *Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution*, Journal of Applied Toxicology, Vol. 3, No. 6, (1983). These authors studied the concentration of chemicals in air that caused adverse odors and then calculated the concentration in water that would be equivalent to that amount in air.

concentration of 1.5 mg/L (as ammonia), and concentrations that exceed this value can impair the municipal or domestic use of the resource due to the adverse odor. The applicable water quality objective to protect the municipal and domestic use from discharges of ammonia is the narrative Tastes and Odors objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation of 1.5 mg/L for ammonia (as ammonia), based on Amoore and Hautala, is appropriate to apply the narrative Tastes and Odors objective to protect the municipal and domestic use of groundwater.

i. pH, which ranged from 7.6 to 10.1 standard units in the wastewater, has the ability to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to LAAs. According to Ayers and Westcot[2], pH less than 6.5 or greater than 8.4 can damage sensitive crops if present in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of substances that affect pH is the narrative Chemical Constituents objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. A numerical groundwater limitation range of 6.5 to 8.4 for pH, based on Ayers and Westcot, is appropriate to apply the narrative Chemical Constituents objective to protect the agricultural use of groundwater. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge.

j. The trihalomethane chemicals bromoform, bromodichloromethane, chloroform, and dibromochloromethane are found in wastewater that has been chlorinated and have the ability to degrade groundwater quality due to the unlined wastewater ponds, as well as the application of wastewater to LAAs. These byproducts are formed from reactions with organic matter during the disinfection process. Although the Discharger has not yet begun disinfecting its wastewater, it is reasonable to assume that trihalomethanes will be present in the effluent after disinfection. These volatile organic chemicals do not naturally occur in groundwater, and are toxic priority pollutants. Local groundwater is designated as municipal and domestic supply and is used as a source of drinking water by the Discharger. According to the USEPA and the Cal/EPA Office of Environmental Health Hazard Assessment, these four chemicals pose a cancer risk at low concentrations in drinking water, and could thereby impair the municipal and domestic beneficial use by imposing toxicity. The applicable water quality objective to protect the municipal and domestic beneficial use from discharges of these trihaolmethanes is the narrative Toxicity objective, which is implemented following the "Policy of Application of Water Quality Objectives" in the Basin Plan. For bromoform, a numerical groundwater limitation of 4 ug/L, based on the USEPA IRIS[5] cancer risk level, is appropriate to apply the narrative Toxicity

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Therefore, it is appropriate to use the data contained therein to apply the narrative Tastes and Odors water quality objective.

5 U.S. Environmental Protection Agency, Integrated Risk Information System, http://www.epa.gov/iris.

objective to protect the municipal and domestic beneficial use of groundwater. For bromodichloromethane, a numerical groundwater limitation of 0.27 ug/L, based on the Cal/EPA Cancer Potency Factor[6], is appropriate to apply the narrative Toxicity objective to protect the municipal and domestic beneficial use of groundwater. For chloroform, a numerical groundwater limitation of 1.1 ug/L, based on the Cal/EPA Cancer Potency Factor, is appropriate to apply the narrative Toxicity objective to protect the municipal and domestic beneficial use of groundwater. For dibromochloromethane, a numerical groundwater limitation of 0.37 ug/L, based on the Cal/EPA Cancer Potency Factor, is appropriate to apply the narrative Toxicity objective to protect the municipal and domestic beneficial use of groundwater.

59. The Basin Plan contains narrative water quality objectives for Chemical Constituents, Tastes and Odors, and Toxicity. The Toxicity objective, in summary, requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial uses. The Chemical Constituents objective requires that groundwater "shall not contain chemical constituents in concentrations that adversely affect beneficial uses." The Tastes and Odors objective requires that groundwater "shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses." Chapter IV, Implementation, of the Basin Plan contains the "Policy for Application of Water Quality Objectives." This Policy specifies, in part, that numerical receiving water limitations will be established in Board orders which will, at a minimum, meet all applicable water quality objectives, that where compliance with narrative objectives is required (i.e., where the objectives are applicable to protect specified beneficial uses), the Regional Water Board will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives, and that compliance with narrative water quality objectives may be evaluated considering numerical criteria and guidelines developed and/or published by other agencies and organizations.

60. The "Antidegradation" section of the attached Information Sheet lists the various waste constituents identified thus far as fitting the restriction of the Findings, along with limits of each constituent necessary to protect beneficial uses known to be adversely affected by waste constituents in groundwater. The listing identifies each constituent, the beneficial uses, water quality objective, and its associated limit, as well as the technical reference for the limit. Some limits may become less restrictive when the water supply is limited to certain applications of a beneficial use. However, in the absence of specific factual information supplied by the discharger to justify restricting certain beneficial uses, groundwater limits have been selected so as to provide protection of unrestricted beneficial uses. Interim groundwater limitations for each constituent reflect the most restrictive listed limit for the waste constituent, except if natural background quality is greater, in which case background becomes the interim limitation.

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[6] California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, California Environmental Protection Agency Toxicity Criteria Database, http://www.oehha.org/risk/ChemicalDB/index.asp.

Water Recycling

61. As noted above, State Water Board Resolution No. 77-1, *Policy with Respect to Water Recycling in California*, encourages recycling projects that replace or supplement the use of fresh water, and *The Water Recycling Law* (CWC sections 13500-13529.4) declares that utilization of recycled water is of primary interest to the people of the State in meeting future water needs.

62. The California Department of Public Health (CDPH) has established statewide water recycling criteria in Title 22, CCR, Section 60301 et. seq. (hereafter Title 22). After expansion, the Discharger will treat the wastewater to secondary-23 recycled water standards and disinfect the effluent per Title 22 requirements.

63. A 1988 Memorandum of Understanding between CDPH and the State Water Board on the use of recycled water establishes basic principles relative to the two agencies and the regional water boards. The Memorandum allocates primary areas of responsibility and authority between the agencies and provides for methods and mechanisms necessary to assure ongoing, continuous future coordination of activities relative to use of recycled water.

64. Section 60323(a) of Title 22 states that no person shall produce or supply recycled water for direct reuse from a proposed water recycling plant unless an engineering report is submitted for review by CDPH. Irrigation of fodder crops is considered a beneficial reuse. The Discharger submitted a Title 22 Engineering Report to CDPH on 21 August 2007 and an Amended Title 22 Engineering Report on 10 September 2007. CDPH provided comments on the Amended Title 22 Report on 26 September 2007; those comments are addressed in these WDRs.

Other Regulatory Considerations

65. On 2 May 2006, the State Water Board adopted Statewide General Waste Discharge Requirements For Sanitary Sewer Systems General Order No. 2006-0003-DWQ (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, therefore the General Order is applicable.

66. 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.

67. The Regional Water Board is using the Standards in 40 CFR 503 as guidelines in establishing this Order, but the Regional 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. All biosolids will be hauled to a separate permitted facility.

68. The State Water Board adopted Order No. 97-03-DWQ (General Permit No. CAS000001) specifying waste discharge requirements for discharges of stormwater associated with industrial activities, and requiring submittal of a Notice of Intent by all affected industrial dischargers. This Order requires the Discharger to obtain coverage under the General Permit.

69. A mitigated negative declaration was adopted by the Lockeford Community Services District on 27 July 2006. The mitigated negative declaration was adopted in accordance with the California Environmental Quality Act (CCR, Title 14, Section 15261 et. seq.). The proposed wastewater treatment and disposal system is consistent with the project as analyzed when mitigation measures are implemented. Potentially significant impacts were identified in the Initial Study and Mitigated Negative Declaration. The potentially significant impacts consisted of:

    a. Objectionable odors that might be generated by the wastewater system. Maintaining adequate treatment and complying with the WDRs will reduce this potential impact to less than significant.

    b. Degradation of surface water and groundwater quality by wastewater application. This Order protects surface waters by prohibiting the discharge of tailwater from the LAAs, and controlling recycled water application rates should prevent groundwater degradation. The controls should reduce the potential impact to less than significant.

    The Regional Water Board finds that this Order contains requirements that, if complied with, implement the mitigation measures related to wastewater issues and will reasonably protect the beneficial uses of waters of the state and prevent nuisance.

70. Section 13267(b) of the CWC provides that: “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, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of discharging, or who proposes to discharge waste outside of its region that could affect the quality of the waters of the state 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 attached Monitoring and Reporting Program No. R5-2007-0179 is necessary to assure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

71. 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 CWC Section 13801, apply to all monitoring wells used to monitor the impacts of wastewater storage or disposal governed by this Order. Those wells that do not have a construction log, boring log, or County permit may not be used for monitoring associated with this Order.

72. State regulations that prescribe procedures for detecting and characterizing the impact of waste constituents from waste management units on groundwater are found in Title 27 CCR Section 20380. While the WWTF is exempt from Title 27, the data analysis methods of Title 27 may be appropriate for determining whether the discharge complies with the terms for protection of groundwater specified in this Order.

73. The discharge authorized herein and the treatment and storage facilities associated with the discharge, except for discharges of residual sludge and solid waste, are exempt from the requirements of Title 27, CCR, Section 20380 et seq.. The exemption, pursuant to Title 27 CCR Section 20090(a), is based on the following
    a. The waste consists primarily of domestic sewage and treated effluent;
    b. The waste discharge requirements are consistent with water quality objectives; and
    c. The treatment and storage facilities described herein are associated with a municipal wastewater treatment facility.

74. Pursuant to CWC 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

75. The recommendations of the State Department of Public Health regarding the public health aspects of water recycling have been considered in preparation of this Order.

76. All the above and the supplemental information and details in the attached Information Sheet, which is incorporated by reference herein, as well as the Regional Water Board's administrative record, were considered in establishing the following conditions of discharge.

77. The Discharger and interested agencies and persons have been notified of the Regional 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.

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

IT IS HEREBY ORDERED that Orders No. 90-312 and 90-313 are rescinded, and that pursuant to Sections 13263 and 13267 of the California Water Code, Lockeford Community Services District, their agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted hereunder, shall comply with the following:

[Note: Other prohibitions, conditions, definitions, and some methods of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements" dated 1 March 1991.]

A. Discharge Prohibitions

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

2. Bypass or overflow of untreated or partially treated waste is prohibited.

3. Discharge of sewage from a sanitary sewer system at any point upstream of a wastewater treatment facility is prohibited. Discharge of treated recycled water downstream of the wastewater treatment facility, other than at the designated storage ponds or land application areas, is prohibited.

4. Discharge of waste classified as "hazardous" under Title 23 CCR Chapter 15, Section 2521, or "designated," as defined in Section 13173 of CWC is prohibited.

5. Application of recycled water in a manner or location other than that described herein is prohibited.

6. The use of recycled water for purposes other than irrigation as defined in Title 22 CCR Section 60304(a) and this Order is prohibited.

B. Discharge Specifications

1. The monthly average flow rate may not exceed 300,000 gpd. Upon approval of the *Recycled Water Expansion Report* (RWER) by the Executive Officer, the monthly average flow rate may be increased to a maximum of 400,000 gpd.

2. The Discharger shall not take Pond No. 1 out of service without first submitting the report required by Provision No. G.1.h, and receiving written approval from the Executive Officer.

3. Only disinfected water may be applied to LAA No. 1 and Pond No. 5. Only disinfected water shall be applied to LAA No. 2.

4. Wastewater treatment and use of recycled water shall not cause pollution or a nuisance as defined by Section 13050 of the CWC.

5. Public contact with wastewater and recycled water shall be precluded or controlled through such means as fences, signs, or acceptable alternatives.

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

7. Objectionable odors originating at the facility shall not be perceivable beyond the limits of the property owned by the Discharger.

8. As a means of discerning compliance with Discharge Specification B.7, the dissolved oxygen content in the upper one foot of any wastewater treatment or storage pond shall not be less than 1.0 mg/L.

9. The Discharger shall operate all systems and equipment to maximize treatment of wastewater and optimize the quality of the discharge.

10. Effective with the approval of the RWER, the Discharger shall treat the wastewater such that it complies with Title 22 CCR, Section 60301.225 (“Disinfected Secondary-23 Recycled Water”).

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

12. Wastewater and recycled water ponds shall be managed to prevent breeding of mosquitoes. In particular,

    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.

13. The facility shall have sufficient treatment, storage, and disposal capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary inflow and infiltration. 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.

14. Freeboard in any pond containing wastewater or recycled water shall never be less than two feet as measured from the water surface to the lowest point of overflow.

15. On or about **15 October** of each year, available pond storage capacity shall at least equal the volume necessary to comply with Discharge Specifications B.13 and B.14.

16. The application of recycled water to land application areas by spray irrigation is prohibited.

17. All recycled water conveyance and distribution piping and equipment shall comply with California Department of Public Health requirements and the American Water Works Association (AWWA) *Guidelines for Distribution of Non-Potable Water* and *Guidelines for the On-site Retrofit of Facilities Using Disinfected Tertiary Recycled Water*.

18. A use supervisor shall be appointed by the Discharger. The use supervisor shall be responsible for installation, operation, and maintenance of the recycled water system, prevention of potential hazards, implementing these requirements, and coordination with the cross-connection control program of the water purveyor or the San Joaquin County Environmental Health Department.

C. Effluent Limitations

1. Effective immediately, effluent discharged from the treatment pond (Pond No. 1 or alternative treatment pond) shall not exceed the following limits:

Constituent	Units	Monthly Average
BOD_5	mg/L	40
Total Nitrogen	mg/L	10
TDS	mg/L	550

BOD_5 denotes 5-day Biochemical Oxygen Demand. Total N denotes Total Nitrogen. TDS denotes Total Dissolved Solids.

2. Effluent discharged from the Treatment Area to Pond No. 5, Pond No. 6 (future), or directly to LAA No. 1 or 2 shall not exceed the following limits for total coliform organisms:

   a. The median concentration of total coliform bacteria measured in the disinfected effluent shall not exceed a most probable number (MPN) of 23 per 100 milliliters utilizing the bacteriological results of the last seven days for which analyses have been completed

   b. The number of total coliform bacteria shall not exceed an MPN of 240 per 100 milliliters in more than one sample in any 30-day period.

3. No stored wastewater or recycled water shall have a pH less than 6.5 or greater than 10.0.

D. General Solids Disposal Specifications

1. Sludge means the solid, semisolid, and liquid residues removed during primary, secondary, or advanced wastewater treatment processes. Solid waste refers to grit and screenings generated during preliminary treatment. Residual sludge means sludge that will not be subject to further treatment at the facility. Biosolids refers to sludge that has undergone sufficient treatment and testing to qualify for reuse pursuant to federal and state regulations as a soil amendment for agriculture, silviculture, horticulture, and land recycling.

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

3. Treatment and storage of sludge shall be confined to the treatment facility property, and shall be conducted in a manner that precludes infiltration of waste constituents into soils in a mass or at concentrations that will violate the Groundwater Limitations of this Order.

4. Any storage of residual sludge, solid waste, and biosolids at the facility shall be temporary, and the waste shall be controlled and contained in a manner that minimizes leachate formation and precludes infiltration of waste constituents into soils in a mass or at concentrations that will violate the Groundwater Limitations of this Order.

5. Residual sludge, biosolids, and solid waste shall be disposed of in a manner approved by the Executive Officer and consistent with Title 27 CCR Division 2. Removal for further treatment, disposal, or reuse at disposal sites operated in accordance with valid waste discharge requirements issued by a regional water quality control board will satisfy this specification.

6. Use and disposal of biosolids shall comply with the self-implementing Federal regulations of 40 CFR 503, which are subject to enforcement by the U.S. EPA, not the Regional Water Board. If during the life of this Order, the state accepts primacy for implementation of 40 CFR 503, the Regional Water Board may also initiate enforcement where appropriate.

E. Water Recycling Specifications

1. Application of recycled water shall be confined to the designated application areas as defined in this Order.

2. Recycled water shall be used in compliance with Title 22, Division 4, Chapter 3, Article 3, *Uses of Recycled Water.*

3. Public contact with recycled water shall be controlled through use of fences, signs, and/or other appropriate means. All use areas where recycled water is used that are accessible to the public shall be posted with signs that are visible to the public, in a size no less than 4 inches by 8 inches and include the following wording, “Recycled Water – Do Not Drink.” The size and content of these signs shall be as described in Section 60310(g) of Title 22.

4. 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. Quick couplers, if used, shall be of a type, or secured in a manner, that permits operation only by authorized personnel. Hose bibs shall not be used.

5. Application of recycled water shall comply with the following setback requirements:

Setback Definition	Minimum Setback (feet)
Edge of land application area to domestic well	100
Wastewater/Recycled water storage pond to domestic well	100
Spray irrigation to residence or exposure similar to park, playground, or school yard.	100
Impoundment of undisinfected secondary wastewater to domestic well	150
Land Application Area to Surface Water[1]	50

1. Excluding ditches used exclusively for tailwater return from the land application area.

The setbacks may be modified by written approval of the Executive Officer if they are described in the Title 22 Engineering Report, are approved by the California Department of Public Health, legal agreements are executed and recorded at the County Recorder's Office, the documents are provided to the Regional Water Board, and the Discharger shows that water quality will still be protected with smaller setbacks.

6. Any use of recycled water shall comply with the following:
   a. Any irrigation runoff shall be confined to the recycled water use area, unless the runoff does not pose a public health threat and is authorized by the regulatory agency.
   b. Spray, mist, or runoff shall not enter dwellings, designated outdoor eating areas, or food handling facilities.
   c. Drinking water fountains shall be protected against contact with recycled water spray, mist, or runoff.

7. Any connection between the recycled water conveyance system and any potable water conveyance system, groundwater supply well, or surface water supply source for the purpose of supplementing recycled water shall be equipped with a CDPH-approved backflow prevention device.

8. Application rates for recycled water shall not exceed nitrogen and water uptake rates considering the plant, soil, climate, and irrigation management system in accordance with the water balance submitted with the RWD.

9. Irrigation runoff (i.e., tailwater) shall be completely contained within the designated land application area and shall not enter any surface water drainage course or stormwater drainage system.

10. Sprinkler heads shall be of the type approved for recycled water and shall create a minimum amount of mist. Drainage through sprinkler heads is prohibited.

11. Irrigation of land application areas with recycled water shall not be performed within 24 hours of a forecasted storm, during or within 24 hours after any precipitation event, nor when the ground is saturated.

12. Wastewater shall not be applied to LAA No. 1 (or any other land application area) until the disinfection system is operable and all applied wastewater complies with Effluent Limitation C.2.

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

F. Groundwater Limitations

1. Release of waste constituents from any portion of the WWTF and land application areas shall not cause groundwater to:

    a. Contain any of the following constituents in concentrations greater than listed or greater than natural background quality, whichever is greater. Note that natural background conditions have not yet been established for the land application areas.

Constituent	Units	Limitation
Boron	mg/L	0.7
Chloride	mg/L	106
Iron	mg/L	0.3
Manganese	mg/L	0.05
Sodium	mg/L	69
Total Coliform Organisms	MPN/100 mL	<2.2
Total Dissolved Solids	mg/L	450 [1]

Constituent	Units	Limitation
Total Nitrogen	mg/L	10
Nitrate (as N)	mg/L	10
Ammonia (as NH_4)	mg/L	1.5
Bromoform	µg/L	4
Bromodichloromethane	µg/L	0.27
Chloroform	µg/L	1.1
Dibromochloromethane	µg/L	0.37

[1] A cumulative impact limit that accounts for several dissolved constituents in addition to those listed here separately [e.g., alkalinity (carbonate and bicarbonate), calcium, hardness, phosphate, and potassium].

2. Exhibit a pH of less than 6.5 or greater than 8.4 pH units.

3. Impart taste, odor, toxicity, or color that creates nuisance or impairs any beneficial use.

G. Provisions

1. All of the following reports shall be submitted pursuant to Section 13267 of the California Water Code and shall be prepared as described in Provision G.3.

   a. By **5 February 2008**, the Discharger shall either apply for coverage or submit a Notice of Non Applicability for Order No. 97-03-DWQ, Discharges of Stormwater Associated With Industrial Activities.

   b. Regardless of the status of any RWER submittal, by **6 March 2008**, documentation of the completed ownership transfer of LAA No. 2 to Lockeford CSD shall be submitted to the Regional Water Board.

   c. By **5 May 2008**, the Discharger shall submit a report describing installation of alarms at all wastewater pumping stations.

   d. By **6 March 2008**, the Discharger shall submit a *Groundwater Monitoring Workplan and Well Construction Evaluation* prepared in accordance with, and including the items listed in, the first section of Attachment D: *"Requirements for Monitoring Well Installation Workplans and Monitoring Well Installation Reports."* The workplan shall describe installation of groundwater monitoring wells at Ponds No. 5 and (future) Pond 6. The wells shall be designed to ensure that background water quality is adequately characterized and any potential water quality impacts from the discharges are detected. The system shall be designed to yield samples representative of the uppermost portion of the first aquifer underlying the site (anticipated to be the perched zone).

The Well Construction Evaluation portion of the report shall include an evaluation of Wells TPMW-1, 2, 3, and 4. The evaluation shall present and analyze the well construction details, groundwater elevations, chemical constituent concentrations, and determine the need for further investigation, well modification, or replacement. If it is determined that a well could be acting as a vertical conduit for waste constituents to migrate to lower intervals, those wells shall be properly destroyed and replaced as needed.

e. By **7 April 2008**, the Discharger shall submit an *Operation and Maintenance Plan* (O&M Plan) for the WWTF. A copy of the O&M Plan shall be kept at the facility for reference by operating personnel. Key personnel shall be familiar with its contents. The O&M Plan shall provide the following:

   i. Operation and Control of Wastewater Treatment - A description of the wastewater treatment equipment; operational controls; treatment requirements/effluent limitations; flow diagrams including valve/gate locations; operation of the treatment systems during start-up, normal operation, by-pass, shut-down, and draining procedures; potential operational problems including a troubleshooting guide.

   ii. Sludge Handling - A description of the biosolids handling equipment, operational controls, control tests and observations related to process control, potential operational problems including a troubleshooting guide, and disposal procedures.

   iii. Operation and Control of Recycled Water Distribution System – A description of the recycled water distribution system, operational controls, flow diagrams including valve/gate locations; potential operational problems including a troubleshooting guide and backflow and cross-connection controls.

   iv. Personnel - Recommended staffing requirements, staff qualifications, training requirements and schedule, and operator certification requirements.

   v. Maintenance – Maintenance procedures, equipment record system, scheduling and use of the maintenance record system, inventory system, special tools, warranty provisions and expiration dates, maintenance cost and budgeting system, maintenance schedule of all equipment.

   vi. Emergency Response – A description of the vulnerability analysis including emergencies such as power outage, severe weather, or flooding. An equipment and telephone list for emergency personnel and equipment vendors. Coordination procedures with fire, police, and health department personnel, and an emergency operating plan.

   vii. Safety – A general discussion of the hazards of collection systems, mechanical equipment, explosion, pathogens, oxygen deficiencies, chemical and electrical hazards, etc.

viii. Appendices – Shall include flow diagrams, valve/gate locations, copy of WDRs, miscellaneous form samples, manufacturers manuals, and a list of reference materials.

f. By **4 June 2008**, the Discharger shall submit a *Monitoring Well Installation/ Destruction Report* prepared in accordance with, and including the items listed in, the second section of Attachment D. The report shall describe the installation or destruction of any wells, describe well development, and explain any deviation from the approved workplan.

g. By **30 September 2008,** the Discharger shall submit a *Disposal Improvement Project Report of Results* demonstrating that the work described in Finding No. 14 has been completed in compliance with the specifications of this Order.

h. By **31 August 2010**, the Discharger shall submit a *Background Groundwater Quality Study Report*. For each groundwater monitoring parameter/constituent identified in the MRP, the report shall present a summary of monitoring data and calculation of the concentration in background monitoring wells. Determination of background quality shall be made using the methods described in Title 27 CCR, Section 20415(e)(10), and shall be based on data from at least eight consecutive quarterly (or more frequent) groundwater monitoring events. For each monitoring parameter/constituent, the report shall compare the calculated background concentration with the interim numeric limitations set forth in Groundwater Limitation F.1.a. Where background concentrations are statistically greater than the interim limitations specified in Groundwater Limitation F.1.a, the report shall recommend final groundwater limitations which comply with Resolution 68-16 for the waste constituents listed therein. Subsequent use of a concentration as a final groundwater limitation will be subject to the discretion of the Executive Officer.

i. **At least 60 days** before the Discharger wishes to take Pond No. 1 out of service so that sludge may be removed, the Discharger shall submit a report showing that Pond No. 6 has been constructed to provide 52 acre-feet (17 million gallons) of storage, and that at least one of Ponds No. 2, 3, or 4 has been converted to a treatment pond. The report shall also document how the Discharger proposes to remove, dry, store, and dispose of sludge in a manner consistent with this Order.

j. **At least 90 days** before the Discharger wishes to increase the wastewater flow rate, the Discharger shall submit a *Recycled Water Expansion Report* that shall contain the following:

i. At least two groundwater well sampling events at wells installed at the new land application areas and/or recycled water storage ponds. It is the Discharger's responsibility to submit, as needed, the *Groundwater Monitoring Workplan* and the *Monitoring Well Installation Report* in accordance with a

schedule that allows the sample event data to be included in the *Recycled Water Expansion Report*.

ii. A copy of the executed *Agreement of Use Restriction and Grant of Easement* and documentation of recording at the San Joaquin County Recorder's Office. If the easement could not be executed or recorded, provide an updated water balance for the reduced land area.

iii. Documentation that notification signs are installed as required by Water Recycling Specification E.3.

iv. Documentation of the property ownership transfer of LAA No. 2 to the Lockeford CSD.

v. Documentation of Pond No. 5 storage capacity increase. The increase must provide at least 11 million gallons of additional storage, resulting in at least 51 million gallons of storage provided by Pond No. 5.

vi. Documentation of improvements to the LAAs to allow wastewater application as described in the Water Recycling Specifications.

vii. Documentation that the wastewater disinfection system is operational, has been tested, and complies with Effluent Limitation C.2.

viii. Updates to the Operation and Maintenance Plan.

2. If groundwater monitoring results show that the discharge of waste is causing groundwater to contain waste constituents in concentrations statistically greater than background water quality then, 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 listed in the Groundwater Limitation F.1.a of this Order. The workplan shall contain a preliminary evaluation of each component of the WWTF and effluent disposal system and propose a time schedule for completing the comprehensive technical evaluation. The schedule to complete the evaluation shall be as short as practicable, and shall not exceed one year.

3. 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.

4. The Discharger shall comply with Monitoring and Reporting Program No. R5-2007-0179, which is part of this Order, and any revisions thereto as ordered by the Executive Officer.

5. 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)."

6. The Discharger shall use the best practicable cost-effective control technique(s) including proper operation and maintenance, to comply with discharge limits specified in this order.

7. The Discharger shall provide certified wastewater treatment facility operators in accordance with Title 23 CCR, Division 3, Chapter 26.

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

9. Upon the reduction, loss, or failure of the sanitary sewer system resulting in a sanitary sewer overflow, the Discharger shall take any necessary remedial action to (a) control or limit the volume of sewage discharged, (b) terminate the sewage discharge as rapidly as possible, and (c) recover as much as possible of the sewage discharged (including wash down water) for proper disposal. The Discharger shall implement all applicable remedial actions including, but not limited to, the following:

    a. Interception and rerouting of sewage flows around the sewage line failure.

    b. Vacuum truck recovery of sanitary sewer overflows and wash down water.

    c. Use of portable aerators where complete recovery of the sanitary sewer overflows are not practicable and where severe oxygen depletion is expected in surface waters.

    d. Cleanup of sewage-related debris at the overflow site.

10. The Discharger shall report to the Regional 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.”

11. The Discharger shall not allow pollutant-free wastewater to be discharged into the wastewater collection, treatment, and disposal system 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.

12. The Discharger shall submit to the Regional Water Board on or before each compliance report due date, the specified document or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharge 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 Regional Water Board in writing when it returns to compliance with the time schedule.

13. In the event of any change in control or ownership of the facility or wastewater disposal areas, 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 this office. 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 Regional 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 California Water Code. Transfer shall be approved or disapproved by the Executive Officer.

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

15. The Discharger must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Violations may result in enforcement action, including Regional Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or recession of this Order.

16. A copy of this Order shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.

17. The Regional Water Board will review this Order periodically and will revise requirements when necessary.

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 6 December 2007.

PAMELA C. CREEDON, Executive Officer

TRO/WSW: 12/6/07

REVISED

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2007-0179

FOR

LOCKEFORD COMMUNITY SERVICES DISTRICT
WASTEWATER TREATMENT FACILITY
SAN JOAQUIN COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring influent wastewater, treated effluent, treatment/storage/recycled water ponds, land application areas, groundwater, 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. Regional Board staff shall approve specific sample station locations prior to implementation of sampling activities.

This MRP is effective upon date of signature; however, portions of the MRP will not be relevant until the Wastewater Treatment Facility (WWTF) is expanded and is in use. In the meantime, the Discharger shall submit the monitoring data that is possible to collect, monthly construction status reports, and quarterly groundwater monitoring reports as described in the "Reporting" section of this MRP.

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. Influent monitoring shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow[1]	gpd	Continuous Meter	Daily	Monthly
Average Daily Flow[2]	gpd	Calculated	Monthly	Monthly
BOD_5[3]	mg/L	Grab	Monthly	Monthly

[1] Flow represents the daily flow rate.
[2] Average Daily Flow represents the daily flow rate averaged over the month.
[3] BOD denotes 5-day Biochemical Oxygen Demand.

EFFLUENT MONITORING

Effluent samples shall be collected immediately downstream of the treatment pond, and prior to discharge to any storage pond or LAA. Samples shall be collected for total coliform analysis and trihalomethanes immediately downstream of the disinfection equipment. All samples shall be representative of the volume and nature of the discharge. Effluent monitoring shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
BOD_5	mg/L	Grab/Composite[1]	Weekly	Monthly
Total Coliform Organisms [2]	MPN/100 ml [3]	Grab	Daily [4]	Monthly
Total Dissolved Solids	mg/L	Grab/Composite[1]	Monthly	Monthly
Fixed Dissolved Solids	mg/L	Grab/Composite[1]	Monthly	Monthly
Sodium	mg/L	Grab/Composite[1]	Monthly	Monthly
Chloride	mg/L	Grab/Composite[1]	Monthly	Monthly
Nitrate as Nitrogen	mg/L	Grab/Composite[1]	Monthly	Monthly
Total Kjeldahl Nitrogen	mg/L	Grab/Composite[1]	Monthly	Monthly
Total Nitrogen (as N)	mg/L	Grab/Composite[1]	Monthly	Monthly
Standard Minerals [5]	mg/L	Grab/Composite[1]	Annually	Annually
Trihalomethanes [6]	ug/L	Grab/Composite[1]	Annually	Annually

1. Grab/Composite indicates samples may be collected by composite sampler or grab method.
2. Using a minimum of 15 tubes or 3 dilutions.
3. Most probable number per 100 ml.
4. Coliform sampling is required whenever treated effluent is discharged to LAA Nos. 1 or 2, Pond No. 5, or Pond No. 6 (upon construction).
5. Standard Minerals shall include, at a minimum, the following elements/compounds: boron, calcium, magnesium, potassium, sulfate, iron, manganese, total alkalinity (including alkalinity series), and hardness.
6. Individual trihalomethane constituent concentrations shall be identified, using EPA Method 8260B or equivalent.

TREATMENT/STORAGE/RECYCLED WATER POND MONITORING

Each treatment and recycled water storage pond shall be monitored as specified below:

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
Total Dissolved Solids	mg/L	Grab	Monthly	Monthly
Fixed Dissolved Solids	mg/L	Grab	Monthly	Monthly
Berm condition	--	Observation	Monthly	Monthly

1 Samples shall be collected at a depth of one foot from each pond in use, opposite the inlet. Samples shall be collected between 0700 and 0900 hours.

LAND APPLICATION AREA MONITORING

Monitoring of each land application area shall be conducted **daily** when irrigation is occurring, and the results shall be included in the monthly monitoring report. All land application areas shall be inspected following an irrigation event to identify any equipment malfunction or other circumstance that might allow recycled water or treated wastewater to runoff the land application area and/or create ponding conditions that violate the Waste Discharge Requirements. Evidence of erosion, saturation, irrigation runoff, or the presence of nuisance conditions shall be noted in the report. A log of these inspections as well as any public complaints of runoff shall be kept at the facility and made available for review upon request.

Effluent monitoring results shall be used in calculations to ascertain loading rates at the land application area. Monitoring of the land application area shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow	Gallons	Continuous	Daily	Monthly
Rainfall	Inches	Observation	Daily	Monthly
Acreage Applied [1]	Acres	Calculated	Daily	Monthly
Water Application Rate [2]	gal/acre·day	Calculated	Daily	Monthly
Total Nitrogen Loading Rate [2]	lbs/ac•month	Calculated	Monthly	Monthly
Nitrogen from Fertilizer Application	lbs/ac•month	Calculated	Monthly	Monthly
TDS Loading Rate [2]	lbs/ac•month	Calculated	Monthly	Monthly

[1] Land application areas shall be identified and a map identifying all land application areas included.
[2] For each land application area, including other sources of nitrogen including fertilizers.

GROUNDWATER MONITORING

Prior to construction and/or sampling of any groundwater monitoring wells, the Discharger shall submit plans and specifications to the Board for review and approval. All wells identified in the groundwater monitoring well network in the Findings of this Order, as well as any wells installed after adoption of this Order, shall be sampled and analyzed according to the schedule below.

Prior to sampling, the groundwater elevations shall be measured and the wells shall be purged of at least three well volumes until temperature, pH, and electrical conductivity have stabilized. 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:

Constituent	Units	Type of Sample	Sampling and Reporting Frequency
Depth to Groundwater	0.01 feet	Measurement	Quarterly
Groundwater Elevation [1]	0.01 feet	Calculated	Quarterly
Gradient	feet/feet	Calculated	Quarterly
Gradient Direction	Degrees	Calculated	Quarterly
Total Dissolved Solids	mg/L	Grab	Quarterly
Fixed Dissolved Solids	mg/L	Grab	Quarterly
Nitrate as Nitrogen	mg/L	Grab	Quarterly
Total Kjeldahl Nitrogen	mg/L	Grab	Quarterly
pH	pH units	Grab	Quarterly
Trihalomethanes [2,3]	µg/l	Grab	Quarterly
Boron	mg/L	Grab	Quarterly
Chloride	mg/L	Grab	Quarterly
Iron	mg/L	Grab	Quarterly
Manganese	mg/L	Grab	Quarterly
Sodium	mg/L	Grab	Quarterly
Total Coliform Organisms	MPN/100 mL	Grab	Quarterly
Standard Minerals [4]	mg/L	Grab	Annually
Metals [5]	ug/L	Grab	Annually

1 Groundwater elevation shall be determined based on depth-to-water measurements using a surveyed measuring point elevation on the well and a surveyed reference elevation.

2 Individual trihalomethane constituent concentrations shall be identified, using EPA Method 8260B or equivalent.

3 Trihalomethanes analysis only required in samples collected from wells located in LAA areas.

4 Standard Minerals shall include, at a minimum, the following elements/compounds: calcium, magnesium, potassium, sulfate, total alkalinity (including alkalinity series), and hardness.

5 At a minimum, the following metals shall be included: arsenic, copper, lead, iron, manganese, molybdenum, nickel, and zinc. Analytical methods shall be selected to provide reporting limits below the Water Quality Limit for each constituent.

SLUDGE MONITORING

A composite sample of digested sludge shall be collected at least once per year when sludge is removed from the wastewater treatment system for disposal in accordance with EPA's POTW Sludge Sampling and Analysis Guidance Document, August 1989, and analyzed for cadmium, copper, nickel, chromium, lead, and zinc.

Sampling records shall be retained for a minimum of five years. A log shall be kept of sludge quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis for part of the annual report.

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:

Constituents	Units	Sampling Frequency
Total Dissolved Solids	mg/L	Annually
pH	Std. Unit	Annually
Standard Minerals [1]	mg/L	Annually

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

REPORTING

In reporting monitoring data, the District 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 to the Regional Board.

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 Regional 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. The report shall include the following:
    a. Results of influent; effluent; treatment/storage/recycled water ponds; and land application area monitoring.
    b. A comparison of monitoring data to the discharge specifications and an explanation of any violation of those requirements. Data shall be presented in tabular format;
    c. If requested by staff, copies of laboratory analytical report(s); and

d. A calibration log verifying calibration of all hand-held monitoring instruments and devices used to comply with the prescribed monitoring program.
e. Monthly construction reports that briefly describe WWTF construction activities.

B. Quarterly Monitoring Reports

The Discharger shall establish a quarterly sampling schedule for 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) and may be combined with the monthly report. 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 groundwater 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 locations monitored including spatial and temporal tends, with reference to summary data tables, graphs, and appended analytical reports (as applicable);
5. A comparison of monitoring data to the groundwater limitations and an explanation of any violation of those requirements;
6. Summary data tables of historical and current water table elevations and analytical results;
7. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and any other sampling stations, and groundwater elevation contours referenced to mean sea level datum; and
8. Copies of laboratory analytical report(s) for groundwater monitoring.

C. Annual Report

An Annual Report shall be prepared as the fourth quarter monitoring report. The Annual Report will include all monitoring data required in the monthly/quarterly schedule. The Annual Report shall be submitted to the Regional Board by **1 February** each year. In addition to the data normally presented, the Annual Report shall include the following:

1. The contents of the regular groundwater monitoring report for the last sampling event of the year;
2. If requested by staff, tabular and graphical summaries of all data collected during the year;
3. An evaluation of the groundwater quality beneath the wastewater treatment facility, recycled water storage ponds, and land application areas;
4. 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;
5. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program;
6. 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.
7. Summary of information on the disposal of sludge and/or solid waste;
8. The results from annual monitoring of the groundwater wells and water supply;
9. The results from any sludge monitoring required by the disposal facility;
10. Equipment maintenance and calibration records, as described in Standard Provision No. C.4;
11. A forecast of influent flows, as described in Standard Provision No. E.4;
12. A discussion of whether the treatment plant upgrade project is projected to begin within the next year. Include a specific discussion about (a) whether the wastewater flow rate is expected to exceed 300,000 gpd within 2.5 years, (b) whether the treatment system is unable to perform according to the requirements of the WDRs; and (c) an estimate of the volume of sludge in the treatment pond and its effect on the system's treatment ability.
13. A discussion of the following:
    a. Compliance with any interim effluent performance limits as specified in the Effluent Limitations of the WDRs;
    b. Salinity reduction efforts implemented in accordance with any required workplan;
    c. Other best practical treatment and control measures implemented pursuant to any approved BPTC Workplan (if required by the Executive Officer); and
    d. Based on monitoring data, an evaluation of the BPTC measures that were implemented.

A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility

modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program on the first day of the month following adoption of this Order.

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

6 December 2007
(Date)

TRO: 12/6/07

INFORMATION SHEET

ORDER NO. R5-2007-0179
LOCKEFORD COMMUNITY SERVICES DISTRICT
WASTEWATER TREATMENT FACILITY
SAN JOAQUIN COUNTY

Background

The Lockeford Community Services District (CSD) is planning a Wastewater Treatment Facility (WWTF) expansion that will result in improved treatment, more flexibility in how the WWTF is operated, and lower waste constituent loading rates. The improvements will serve existing and future residential and commercial developments and will be completed in two projects: the Disposal Improvement Project and the Treatment Improvement Project, although some aspects of the Treatment Improvement Project will be performed sooner to improve present treatment.

The Wastewater Treatment Facility (WWTF) includes the wastewater treatment equipment, wastewater collection system, recycled water storage ponds, recycled water delivery system, and land application areas. The Discharger owns all the equipment and land Lockeford CSD is hereafter referred to as "Discharger."

The facility presently treats approximately 240,000 to 290,000 gallons per day (gpd). Initially, the flow limit in this Order will allow discharge of up to 300,000 gallons per day (gpd) to the existing facility. Upon completion of improvements and submittal of technical documents describing the improvements, the flow limit can be increased through submittal of a *Recycled Water Expansion Report* (RWER), which must be approved by the Executive Officer. This Order will allow the wastewater flow rate to increase to a maximum of 400,000 gpd.

The WWTF is located in three places. The Treatment Area is the location of the headworks, the Treatment Pond (Pond No. 1), and three wastewater storage ponds (Ponds No. 2, 3, and 4). An existing off-site Land Application Area (LAA) (LAA No. 1) is equipped with a storage pond (Pond No. 5). A second off-site land application area (LAA No. 2) is also planned and a storage pond is planned for that location (Pond No. 6), but the pond will not be constructed until the treatment improvements at the Treatment Area are scheduled to begin. Pond No. 5 requires deepening to provide adequate storage for the increased flow rate. None of the ponds are, or are planned to be, equipped with synthetic liners.

Wastewater Treatment

The treatment facility provides biological treatment in an oxidation pond. Present treatment capacity is in excess of 400,000 gpd. However, this Order limits the discharge flow rate to 300,000 gpd, as the wastewater system is limited by the disposal capacity. The Disposal Improvement Project will increase the disposal capacity to 400,000 gpd. To improve operational flexibility and reliability, the Discharger has also developed the Treatment Improvement Project. Each of those projects is described below.

The Disposal Improvement Project will be performed upon adoption of this Order. . The project includes the following: deepening an existing pond to increase storage capacity,

installation of groundwater monitoring wells, installation of disinfection equipment, preparing a new LAA for wastewater application, securing a legal covenant regarding land use with an adjacent property owner, and technical report preparation and submittal. The improvements will be described in a Disposal Improvement Project Report.

The Treatment Improvement Project will be performed based on treatment system performance criteria described in the WDRs. The project includes the following: construction of at least 17 million gallons (Mgal) of storage in a new pond located at LAA No. 2, conversion of an existing wastewater storage pond to a two-cell treatment pond, rehabilitation of the existing treatment pond and conversion to a two-cell treatment pond, and addition of two 10-horsepower mechanical aerators in the existing treatment pond. The addition of new aerators in the existing pond will be performed before the rest of the items in the Treatment Improvement Project.

Sludge will be allowed to accumulate in the treatment or storage ponds and will be removed on an as needed basis to maintain pond capacity and treatment effectiveness. There are two pump stations that deliver wastewater to the WWTF. One of the stations is equipped with an alarm, the other is visually inspected daily. This Order requires all new and existing lift stations to be equipped with alarms. Additional pump stations will be added as needed with new developments.

Land Application

The Discharger owns 133 acres of land application areas, but plans to apply wastewater to only 80 acres each year through a LAA rotation that will result in LAAs in use three out of five years. The fallow land will minimize the impact of salinity on groundwater quality. The water balance submitted in the RWD states the storage capacity required is 101 Million gallons (Mgal) (395 ac•ft) and 80-acres of LAA is required for the designed flow rate of 400,000 gallons per day (gpd).

Recycled water will be applied during spring, summer, and fall months, and if conditions allow, application during winter months is acceptable. Recycled water will be applied to cropped LAAs. Recycled water will be applied by flood irrigation but sprinkler irrigation is also acceptable if performed in accordance with the WDRs. Recycled water will be applied at crop uptake rates for both nitrogen and water application with a 47-percent irrigation efficiency. (Indicates 47-percent of wastewater applied is transpired by the crop). Irrigation tailwater will be controlled using perimeter berms, grading the area to prevent off-site drainage, and/or management controls. This Order requires that wastewater be disinfected to secondary standards before application to land. Therefore, stormwater runoff from the land application areas is acceptable if wastewater is not applied at least 24-hours before a precipitation event. The RWD states stormwater will be retained on-site at the land application areas to the extent possible to dilute concentrations of wastewater percolate.

Basin Plan, Beneficial Uses, and Regulatory Considerations

Surface water from the WWTF is to the Mokelumne River between Camanche Reservoir and the Delta. The beneficial uses are agricultural supply; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning, reproduction, and/or early development; and wildlife habitat
The *Water Quality Control Plan for the California Regional Water Quality Control Board Central Valley Region, Fourth Edition* (Basin Plan), designates beneficial uses, establishes water quality objectives, and contains implementation plans and policies for all waters of the Basin. Beneficial uses often determine the water quality objectives that apply to a water body. For example, waters designated as municipal and domestic supply must meet the Maximum Contaminant Levels (MCLs) for drinking waters. The Basin Plan sets forth the applicable beneficial uses (industrial, agricultural, and domestic and municipal supply in this instance) of groundwater, procedure for application of water quality objectives, and the process for and factors to consider in allocating waste assimilation capacity.

Antidegradation

The antidegradation directives of State Water Board Resolution No. 68-16, "Statement of Policy With Respect to Maintaining High Quality Waters in California," or "Antidegradation Policy" require that waters of the State that are better in quality than established water quality objectives be maintained "consistent with the maximum benefit to the people of the State." Waters can be of high quality for some constituents or beneficial uses and not others. Policies and procedures for complying with this directive are set forth in the Basin Plan.

Resolution 68-16 is applied on a case-by-case, constituent-by-constituent basis in determining whether a certain degree of degradation can be justified. It is incumbent upon the Discharger to provide technical information for the Regional Board to evaluate that fully characterizes:

- All waste constituents to be discharged;
- The background water quality of the uppermost layer of the uppermost aquifer;
- The background quality of other waters that may be affected;
- The underlying hydrogeologic conditions;
- Waste treatment and control measures;
- How treatment and control measures are justified as best practicable treatment and control;
- The extent the discharge will impact the quality of each aquifer; and
- The expected degree of degradation below water quality objectives.

In allowing a discharge, the Regional Water Board must comply with CWC Section 13263 in setting appropriate conditions. The Regional Water Board is required, relative to the groundwater that may be affected by the discharge, to implement the Basin Plan and consider the beneficial uses to be protected along with the water quality objectives essential for that

purpose. The Regional Board need not authorize the full utilization of the waste assimilation capacity of the groundwater (CWC 13263(b)) and must consider other waste discharges and factors that affect that capacity.

Certain domestic wastewater constituents are not fully amenable to waste treatment and control and it is reasonable to expect some impact on groundwater. Some degradation for certain constituents is consistent with maximum benefit to the people of California because the technology, energy, water recycling, and waste management advantages of municipal utility service to the State far outweigh the environmental impact of a community that would otherwise be reliant on numerous concentrated individual wastewater systems. Economic prosperity of local communities is of maximum benefit to the people of California, and therefore sufficient reason to accommodate wastewater discharge provided terms of reasonable degradation are defined and met. The proposed Order authorizes some degradation consistent with the maximum benefit to the People of the State but does not authorize pollution (i.e., violation of any water quality objective).

Groundwater monitoring has been conducted at the site but the area monitored is large and additional investigation is needed at the off-site storage ponds and land application areas, and possibly at the Treatment Area; therefore staff is unable to establish the most appropriate groundwater limits. In addition, certain aspects of wastewater treatment and control practices may not be justified as representative of Best Practicable Treatment and Control (BPTC). Reasonable time is necessary to gather specific information about the WWTF to make informed, appropriate, long-term decisions. This Order, therefore, establishes interim groundwater limitations to assure protection of the beneficial uses of groundwater of the State pending the completion of certain tasks and provides time schedules to complete specified tasks. During this period, degradation may occur from certain constituents, but can never exceed water quality objectives (or natural background water quality should it exceed objectives) or cause nuisance.

According to the Basin Plan, water quality objectives define the least stringent limits that could apply as water quality limitations for groundwater at this location, except where natural background quality unaffected by the discharge of waste already exceeds the objective. The interim groundwater limits below apply numeric and narrative water quality objectives that must be met to maintain specific beneficial uses of groundwater. The constituents listed are those that are expected to be found in treated domestic wastewater or to be released from the soil upon the application of such waste. The *Policy for Application of Water Quality Objectives* in Chapter IV of the Basin Plan provides a mechanism to apply narrative objectives using relevant and appropriate numeric limits published by other agencies and organizations. Due to the expected high quality of natural background groundwater in the location of the discharge, numeric limits were selected so as to require that conditions of nuisance, adverse tastes and odors, toxicity, or impact to sensitive agricultural uses would not be expected to occur. For the same reason, where incorporated drinking water MCLs are expressed as ranges, limits were selected that represent no impact on the municipal or domestic supply beneficial use. Unless

natural background for a constituent proves to be higher, the groundwater quality limit established in proposed Order is the most stringent of the values for the listed constituents. Once the discharger provides information on background water quality and best practicable treatment or control, the groundwater limits may need to be adjusted (see *Reopener* below).

Constituent	Units	Limit	Beneficial Use	Water Quality Objective	Criteria or Justification
Ammonia	mg/L	1.5	MUN [1]	Tastes and Odors	Odor Threshold [2]
Boron	mg/L	0.7	AGR [3]	Chemical Constituents	Protect sensitive crops [4]
	mg/L	1.0	MUN[1]	Toxicity	Calif. Drinking Water Notification Level based on toxicity[11]
Chloride	mg/L	106	AGR [3]	Chemical Constituents	Sensitivity of certain crops irrigated via sprinklers [4]
Chloride (cont.)	mg/L	142	AGR [3]	Chemical Constituents	Chloride sensitivity on certain crops [4]
	mg/L	250	MUN [1]	Chemical Constituents	Recommended Secondary MCL [5]
	mg/L	500	MUN [1]	Chemical Constituents	Upper Secondary MCL [5]
Iron	mg/L	0.3	MUN [1]	Chemical Constituents	Secondary MCL [6]
Manganese	mg/L	0.05	MUN [1]	Chemical Constituents	Secondary MCL [6]
Nitrate plus Nitrite as N	mg/L	10	MUN [1]	Chemical Constituents	Primary MCL [7]
Nitrite as N	mg/L	1	MUN [1]	Chemical Constituents	Primary MCL [7]
Sodium	mg/L	69	AGR [3]	Chemical Constituents	Sensitivity of certain crops [4]
Total Dissolved Solids	mg/L	450[8]	AGR [3]	Chemical Constituents	Crop sensitivity [4]
	mg/L	500	MUN [1]	Chemical Constituents	Recommended Secondary MCL [5]
	mg/L	1,000	MUN [1]	Chemical Constituents	Upper Secondary MCL [5]
Total Coliform Organisms	MPN/100 ml	<2.2	MUN [1]	Bacteria	Basin Plan and non-detect
Trihalomethanes	ug/L	80	MUN [1]	Chemical Constituents	MCL [8]
Bromoform	ug/L	4	MUN [1]	Toxicity	USEPA IRIS Cancer Risk Level [9]
Bromodichloromethane	ug/L	0.27	MUN [1]	Toxicity	Cal/EPA Cancer Potency Factor [12]

Constituent	Units	Limit	Beneficial Use	Water Quality Objective	Criteria or Justification
Chloroform	ug/L	1.1	MUN [1]	Toxicity	Cal/EPA Cancer Potency Factor [12]
Dibromochloromethane	ug/L	0.37	MUN [1]	Toxicity	Cal/EPA Cancer Potency Factor [12]
pH	pH Units	6.5 to 8.5	MUN [1]	Chemical Constituents	Secondary MCL [10]
		6.5 to 8.4	AGR [3]	Chemical Constituents	Protect sensitive crops [4]

1 Municipal and domestic supply
2 J.E. Amoore and E. Hautala, *Odor as an Aid to Chemical Safety: Odor Thresholds Compared with Threshold Limit Values and Volatilities for 214 Industrial Chemicals in Air and Water Dilution*, Journal of Applied Toxicology, Vol. 3, No. 6 (1983).
3 Agricultural supply
4 Ayers, R. S. and D. W. Westcot, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations – Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985)
5 Title 22, California Code of Regulations (CCR), Section 64449, Table 64449-B which is incorporated by reference into the Basin Plan.
6 Title 22, CCR, Section 64449, Table 64449-A which is incorporated by reference into the Basin Plan.
7 Title 22, CCR, Section 64431, Table 64431-A which is incorporated by reference into the Basin Plan.
8 Title 22, CCR, Section 64439, which applies the narrative objective to fully protect the cited beneficial use.
9 USEPA Integrated Risk Information System, http://www.epa.gov/iris.
10 Title 40, Code of Federal Regulations, Section 143.3, which applies the narrative objective to fully protect the cited beneficial use.
11 California Department of Health Services, Division of Drinking Water and Environmental Management, Drinking Water Notification Levels, http://www.dhs.ca.gov/ps/ddwem.
12 CAL/EPA Toxicity Criteria Database (OEHHA), http://www.oehha.org/risk/ChemicalDB.

Domestic wastewater contains numerous dissolved organic and inorganic constituents that together comprise Total Dissolved Solids (TDS). Each component constituent is not individually critical to any beneficial use. Critical constituents are individually listed. The cumulative impact from the other constituents, along with the cumulative affect of the constituents that are individually listed can be effectively controlled using TDS as a generic indicator parameter. The relevant numerical water quality limit for salinity is 450 mg/L, and is used through Basin Plan procedures to apply the narrative Chemical Constituents water quality objective for the protection of agricultural supply, the beneficial use most sensitive to TDS. This limit assumes no impact on sensitive agricultural uses, consistent with the high quality of expected natural background water quality in the area of the discharge. Most individual salt components can safely be assumed to be proportionately low such that TDS can be an effective indicator parameter in their regulation.

Not all TDS constituents pass through the treatment process and soil profile in the same manner or rate. Chloride tends to pass through both rapidly to groundwater. As chloride concentrations in most groundwaters in the region are much lower than in treated municipal wastewater, chloride is a useful indicator parameter for evaluating the extent to which effluent reaches groundwater. Boron is another TDS constituent that may occur in wastewater in concentrations greater than groundwater depending on the source water and the extent

residents use cleaning products containing boron. Other indicator constituents for monitoring for groundwater degradation due to recharged effluent include total coliform bacteria, ammonia and total nitrogen, and Total Trihalomethanes (TTHMs), a by-product of chlorination.

A Groundwater Limitation for chloroform is included in this Order and is based on the Basin Plan Toxicity objective and OEHHA Toxicity Criteria for the protection of human health. The Office of Environmental Health Hazard Assessment (OEHHA) has published and maintains the Toxicity Criteria Database, which contains cancer potency factors for chemicals, including chloroform, that have been used as a basis for regulatory actions by the boards, departments and offices within the California Environmental Protection Agency (Cal/EPA). The cancer potency factor for oral exposure to chloroform in this database is 0.031 milligrams per kilogram body weight per day (mg/kg-day). By applying standard toxicologic assumptions used by OEHHA, USEPA and other environmental agencies in evaluating health risks via drinking water exposure (i.e., 70 kg body weight and 2 liters per day water consumption), this cancer potency factor is equivalent to a concentration in drinking water of 1.1 ug/L (ppb) at the 1-in-a-million cancer risk level. The 1-in-a-million risk level is consistent with that used by the California Department of Public Health (CDPH) to set *de minimis* risks from involuntary exposure to carcinogens in drinking water in the development of drinking water MCLs and Action Levels and by OEHHA to set negligible cancer risks in the development of Public Health Goals for drinking water. The one-in-a-million cancer risk level is also mandated by USEPA in applying human health protective criteria contained in the National Toxics Rule and the California Toxics Rule for priority toxic pollutants in California surface waters.

Similarly, Groundwater Limitations for bromodichloromethane and dibromochloromethane are included in this Order and are based on the Basin Plan Toxicity objective and the Cal/EPA cancer potency factor. Ther Groundwater Limitation for bromoform included in this Order is based on the Basin Plan Toxicity objective and USEPA IRIS cancer risk level for the protection of human health. The U.S. Environmental Protection Agency maintains the Integrated Risk Information System (IRIS), which contains concentrations of constituents in drinking water associated with specified cancer risk levels. The Groundwater Limitations for bromoform, bromodichloromethane, and dibromochloromethane were also based on the 1-in-a-million risk level. Assumptions and rationale for selection of these limitations are identical to those discussed above for chloroform.

Treatment Technology and Control

Given the character of domestic wastewater, secondary treatment technology is generally sufficient to control degradation of groundwater from decomposable organic constituents. Adding disinfection significantly reduces populations of pathogenic organisms, and reasonable soil infiltration rates and unsaturated soils can reduce them further. Neither organics nor total coliform organisms, the indicator parameter for pathogenic organisms, should be found in groundwater in a well-designed, well-operated facility. The bacteria objective in the Basin Plan, cited as a groundwater limitation in the order, is equivalent to requiring that coliform

organisms not be detected in groundwater. Because all stormwater will not be prevented from running off the land application areas disinfection of wastewater is required. Chlorine disinfection of effluent causes formation of trihalomethanes, which are toxic priority pollutants. Treatment to reduce these in wastewater generally has not been performed, and little is known at this point on the typical impact on groundwater. Because the Discharger did not disinfect wastewater previously, THMs are unlikely to exist in groundwater at the site. However, the Discharger will begin disinfecting wastewater prior to storage or application at the off-site land application areas. As a result, groundwater monitoring of land application areas includes THMs on the analyte list.

Domestic wastewater typically contains nitrogen in concentrations greater than water quality objectives, which vary according to the form of nitrogen. Groundwater degradation by nitrogen can be controlled by an appropriate secondary treatment system, soil bacteria which naturally remove some nitrogen, and growing crops that are harvested and removed from the land application area. The effectiveness varies, but generally best practicable treatment and control is able to control nitrogen degradation of groundwater at a concentration well below the water quality objectives. The proposed interim limitation reflects water quality objectives.

Dissolved solids can pass through the treatment process and soil profile; effective control of such constituents relies primarily upon source control and pretreatment measures. In the best of circumstances, long-term land discharge of recycled water will degrade groundwater with dissolved solids (as measured by TDS and EC). The proposed Order sets water quality objectives for the interim while site-specific, constituent-specific limits are developed in conjunction with a BPTC evaluation of source control and pretreatment.

Other constituents in domestic wastewater that may pass through the treatment process and the soil profile, include recalcitrant organic compounds, radionuclides, and pharmaceuticals. Hazardous compounds are not usually associated with domestic wastewater and when present are reduced in the discharge to inconsequential concentrations through dilution and treatment. It is inappropriate to allow degradation of groundwater with such constituents, so proposed limits are nondetectable concentrations.

A discharge of recycled water that overloads soils with nutrients and organics can result in anaerobic conditions in the soil profile, which in turn creates organic acids and decreases soil pH. Under conditions of low soil pH (below 5), iron and manganese compounds in the soil can solubilize and leach into groundwater. Overloading the land application areas is preventable. Though iron and manganese limits are set at the water quality objective, groundwater pH is expected to remain the same as background.

Title 27

Title 27, CCR, Section 20005 et seq. (“Title 27”), contains regulations to address certain discharges to land. Title 27 establishes a waste classification system, specifies siting and construction standards for containment of classified waste, requires extensive monitoring of

groundwater and the unsaturated zone for any indication of failure of containment, and specifies closure and post-closure maintenance requirements. Generally, no degradation of groundwater quality by any waste constituent is acceptable under Title 27 regulations.

Discharges of domestic sewage and recycled water can be treated and controlled to a degree that will not result in unreasonable degradation of groundwater. For this reason, they have been conditionally exempted from Title 27. Discharges of domestic sewage and treated effluent that are regulated by WDRs and treatment and storage facilities associated with the WWTF are considered exempt from Title 27 under Section 20090(a), provided that the discharges and facilities will not result in a violation of any water quality objective. As the exemption specifically excludes the discharge to land of: 1) solid waste such as grit and screenings that result from treatment of domestic sewage, and 2) residual sludge that will not be further treated at the WWTF, such discharges must comply with provisions of Title 27. The discharge of recycled water and the operation of treatment and/or storage facilities associated with a wastewater treatment plant can be allowed without requiring compliance with Title 27 only if groundwater degradation complies with the Basin Plan, Resolution No. 68-16 (Antidegradation Policy), and does not violate any water quality objectives.

Proposed Order Terms and Conditions

Discharge Prohibitions and Specifications

The Order allows the flow rate to increase based on submittal, and approval by the Executive Officer, of a *Recycled Water Expansion Report* which will document the treatment system capacity, and the availability of land application areas.

The proposed Order's Effluent Limitations for BOD_5, TDS, and total nitrogen are based on reasonable loading limits, odor control, and groundwater quality protection. Historical effluent sampling indicates the Discharger has been able to meet the limits. Effluent TDS concentrations average approximately 505 mg/L; that is an increase over domestic water supply of approximately 218 mg/L, a reasonable increase in salinity based on domestic water use. The discharge specifications regarding dissolved oxygen and freeboard are consistent with Regional Board policy for the prevention of nuisance conditions and overtopping, and are applied to all such facilities.

In order to protect public health and safety, the proposed Order requires the Discharger to comply with the provisions of Title 22 and to implement best management practices with respect to recycled water application (application at reasonable rates considering the crop, soil, and climate).

Monitoring Requirements

Section 13267 of the CWC authorizes the Regional Board to require monitoring and technical reports as necessary to investigate the impact of a waste discharge on waters of the state. In recent years there has been increased emphasis on obtaining all necessary information, assuring the information is timely as well as representative and accurate, and thereby improving accountability of any discharger for meeting the conditions of discharge. Section 13268 of the CWC authorizes assessment of civil administrative liability where appropriate.

The proposed Order includes influent and effluent monitoring requirements, wastewater and storage pond monitoring, land application area monitoring, sludge monitoring, groundwater monitoring, and water supply monitoring. In order to adequately characterize the effluent, the Discharger is required to monitor for BOD, total coliform organisms, TDS, sodium, chloride, nitrogen, pH, and other constituents. Monitoring of additional minerals is required on an annual basis. To ensure that storage ponds do not create nuisance conditions, the Discharger is required to monitor freeboard and dissolved oxygen weekly.

The Title 27 zero leakage protection strategy relies heavily on extensive groundwater monitoring to increase a discharger's awareness of, and accountability for, compliance with the prescriptive and performance standards. With treated wastewater application to land, monitoring takes on even greater importance. The proposed Order includes monitoring of effluent quality, application rates, and groundwater quality.

Title 27 regulations pertaining to groundwater monitoring and the detection and characterization of waste constituents in groundwater have been in effect and successfully implemented for many years. No regulation currently specifies similar criteria more suitable for a situation where extensive land application of recycled water occurs. It is appropriate that the Title 27 groundwater monitoring procedures be extended and applied on a case-by-case basis under Water Code Section 13267.

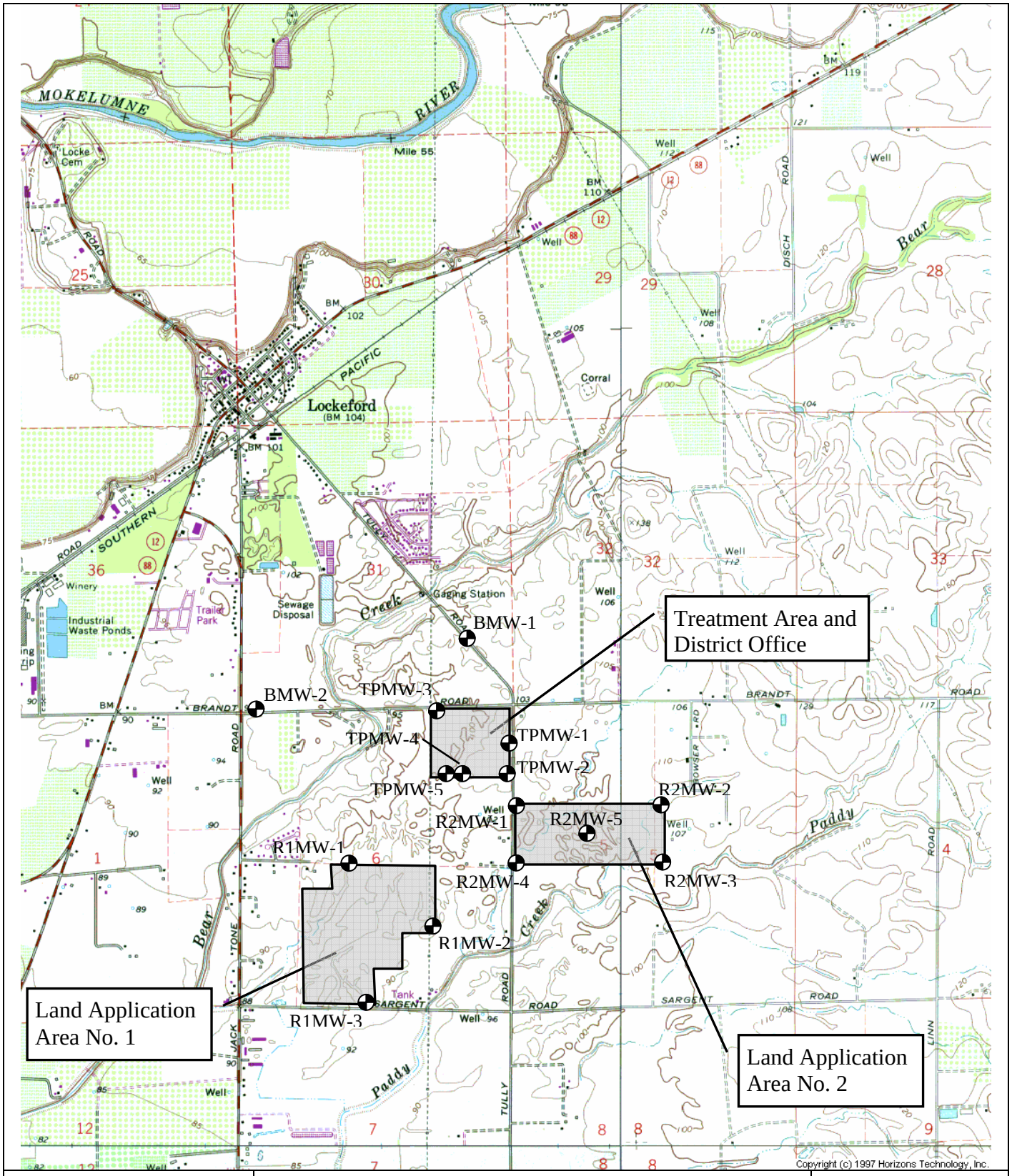
The Discharger must monitor groundwater for wastewater constituents expected to be present in the discharge, capable of reaching groundwater, and violating groundwater limitations if treatment, control, and environmental attenuation proves inadequate. This Order requires evaluation of the existing monitoring wells for suitability, and additional wells to be installed in areas most likely to detect groundwater impacts. Those areas were identified to be locations of storage ponds and land application areas.

For each constituent listed in the Groundwater Limitations section, the Discharger must, as part of each monitoring event, compare concentrations of constituents found in each monitoring well (or similar type of groundwater monitoring device) to the background concentration or to prescribed numerical limitations to determine compliance.

Reopener

The conditions of discharge in the proposed Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. However, information is presently insufficient to develop final recycled water and groundwater limitations, so the proposed Order contains interim limitations. Additional information must be developed and documented by the Discharger as required by schedules set forth in the proposed Order. As this additional information is obtained, decisions will be made concerning the best means of assuring the highest water quality possible and that could involve substantial cost. It may be appropriate to reopen the Order if applicable laws and regulations change, but the mere possibility that such laws and regulations may change is not sufficient basis for reopening the Order. The CWC requires that WDRs implement all applicable requirements.

TRO/WSW: 12/6/07



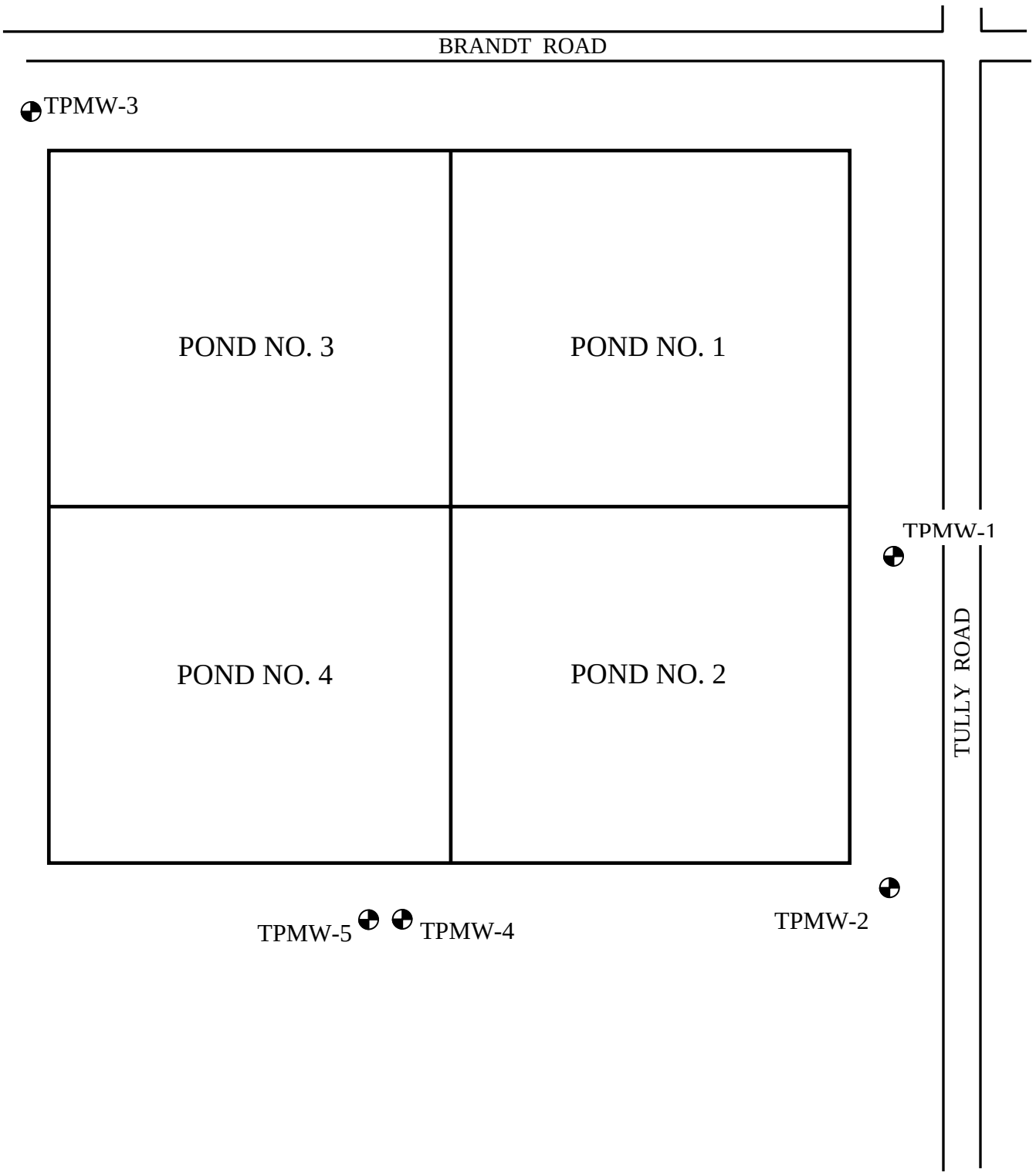
Drawing Reference:
U.S.G.S
LOCKEFORD
TOPOGRAPHIC MAP
7.5 MINUTE QUAD

SITE LOCATION MAP

Lockeford Community Services District
17725 North Tully Road
Lockeford, San Joaquin County

N
W E
S

approx. scale
1 in. = 0.5 mile

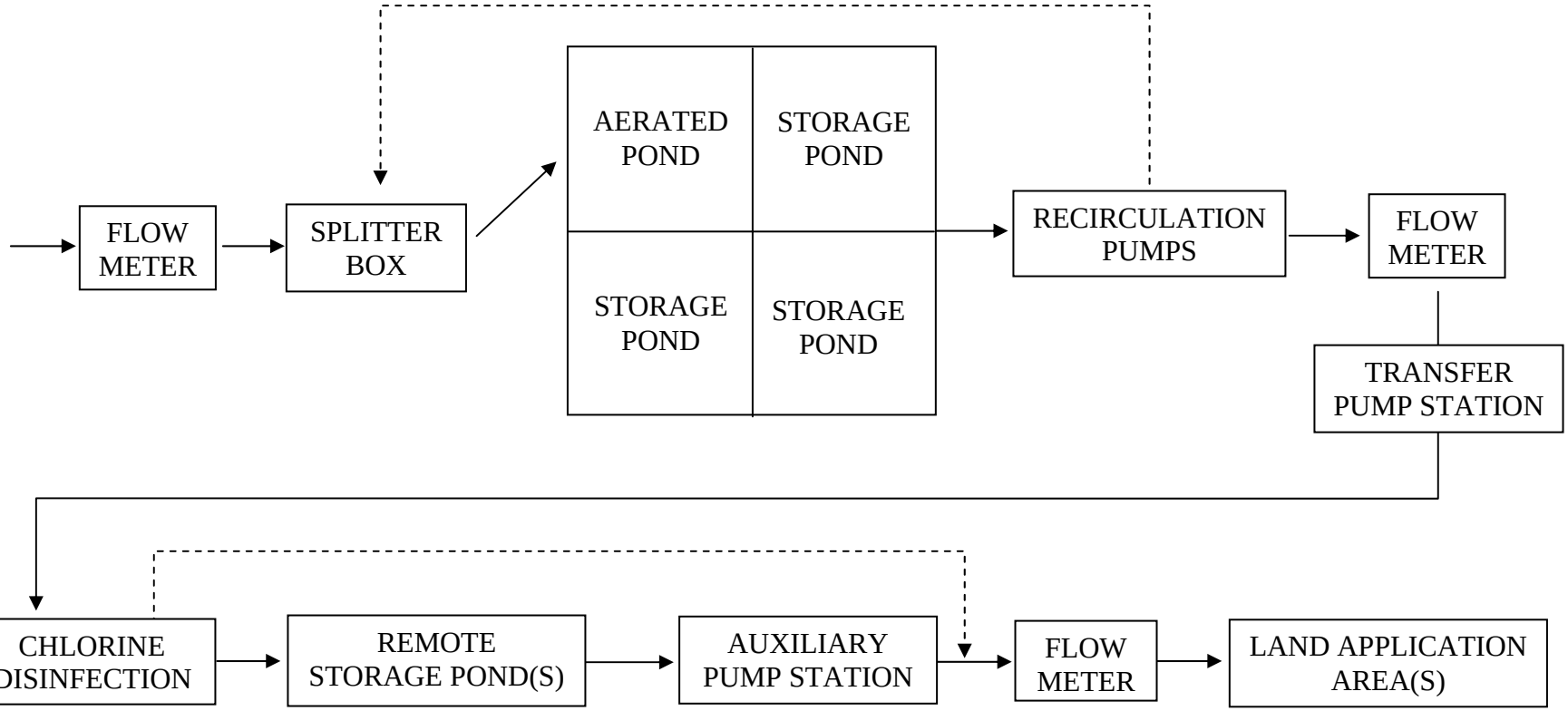


Drawing Reference:
U.S.G.S
Quad Name
TOPOGRAPHIC MAP
7.5 MINUTE QUAD

TREATMENT AREA SITE PLAN

Lockeford Community Services District
17725 North Tully Road
Lockeford, San Joaquin County

not to scale



Drawing Reference:
Adapted from Figure 4-1
Treatment Process Schematic
June 2006 RWD, ECO:LOGIC Engineering

Treatment Process Schematic
Lockeford Community Services District
17725 North Tully Road
Lockeford, San Joaquin County

Linda Adams
Secretary for Environmental Protection

California Regional Water Quality Control Board
Central Valley Region

Karl E. Longley, ScD, P.E., Chair

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Arnold Schwarzenegger
Governor

ORDER NO. R5-2007-0179
ATTACHMENT D
REQUIREMENTS FOR MONITORING WELL INSTALLATION WORKPLANS AND MONITORING WELL INSTALLATION REPORTS

Prior to installation of groundwater monitoring wells, the Discharger shall submit a workplan containing, at a minimum, the information listed in Section 1, below. Wells may be installed after staff approve the workplan. Upon installation of the monitoring wells, the Discharger shall submit a well installation report which includes the information contained in Section 2, below. All workplans and reports must be prepared under the direction of, and signed by, a registered geologist or civil engineer licensed by the State of California.

SECTION 1 - Monitoring Well Installation Workplan and Groundwater Sampling and Analysis Plan

The monitoring well installation workplan shall contain the following minimum information:

A. General Information:
- Purpose of the well installation project
- Brief description of local geologic and hydrogeologic conditions
- Proposed monitoring well locations and rationale for well locations
- Topographic map showing facility location, roads, and surface water bodies
- Large scaled site map showing all existing on-site wells, proposed wells, surface drainage courses, surface water bodies, buildings, waste handling facilities, utilities, and major physical and man-made features

B. Drilling Details:
- On-site supervision of drilling and well installation activities
- Description of drilling equipment and techniques
- Equipment decontamination procedures
- Soil sampling intervals (if appropriate) and logging methods

C. Monitoring Well Design (in narrative and/or graphic form):
- Diagram of proposed well construction details
  - Borehole diameter
  - Casing and screen material, diameter, and centralizer spacing (if needed)
  - Type of well caps (bottom cap either screw on or secured with stainless steel screws)
  - Anticipated depth of well, length of well casing, and length and position of perforated interval
  - Thickness, position and composition of surface seal, sanitary seal, and sand pack
  - Anticipated screen slot size and filter pack

D. Well Development (not to be performed until at least 48 hours after sanitary seal placement):
Method of development to be used (i.e., surge, bail, pump, etc.)
Parameters to be monitored during development and record keeping technique
Method of determining when development is complete
Disposal of development water

E. Well Survey (precision of vertical survey data shall be at least 0.01 foot):
Identify the Licensed Land Surveyor or Civil Engineer that will perform the survey
Datum for survey measurements
List well features to be surveyed (i.e. top of casing, horizontal and vertical coordinates, etc.)

F. Schedule for Completion of Work

G. Appendix: Groundwater Sampling and Analysis Plan (SAP)
The Groundwater SAP shall be included as an appendix to the workplan, and shall be utilized as a guidance document that is referred to by individuals responsible for conducting groundwater monitoring and sampling activities.

Provide a detailed written description of standard operating procedures for the following:
- Equipment to be used during sampling
- Equipment decontamination procedures
- Water level measurement procedures
- Well purging (include a discussion of procedures to follow if three casing volumes cannot be purged)
- Monitoring and record keeping during water level measurement and well purging (include copies of record keeping logs to be used)
- Purge water disposal
- Analytical methods and required reporting limits
- Sample containers and preservatives
- Sampling
  - General sampling techniques
  - Record keeping during sampling (include copies of record keeping logs to be used)
  - QA/QC samples
- Chain of Custody
- Sample handling and transport

SECTION 2 - Monitoring Well Installation Report

The monitoring well installation report must provide the information listed below. In addition, the report must also clearly identify, describe, and justify any deviations from the approved workplan.

A. General Information:
Purpose of the well installation project
Brief description of local geologic and hydrogeologic conditions encountered during installation of the wells
Number of monitoring wells installed and copies of County Well Construction Permits
Topographic map showing facility location, roads, surface water bodies

Scaled site map showing all previously existing wells, newly installed wells, surface water bodies, buildings, waste handling facilities, utilities, and other major physical and man-made features.

B. Drilling Details (in narrative and/or graphic form):
On-site supervision of drilling and well installation activities
Drilling contractor and driller's name
Description of drilling equipment and techniques
Equipment decontamination procedures
Soil sampling intervals and logging methods
Well boring log
- Well boring number and date drilled
- Borehole diameter and total depth
- Total depth of open hole (same as total depth drilled if no caving or back-grouting occurs)
- Depth to first encountered groundwater and stabilized groundwater depth
- Detailed description of soils encountered, using the Unified Soil Classification System

C. Well Construction Details (in narrative and/or graphic form):
Well construction diagram, including:
- Monitoring well number and date constructed
- Casing and screen material, diameter, and centralizer spacing (if needed)
- Length of well casing, and length and position of perforated interval
- Thickness, position and composition of surface seal, sanitary seal, and sand pack
- Type of well caps (bottom cap either screw on or secured with stainless steel screws)

E. Well Development:
Date(s) and method of development
How well development completion was determined
Volume of water purged from well and method of development water disposal
Field notes from well development should be included in report

F. Well Survey (survey the top rim of the well casing with the cap removed):
Identify the coordinate system and datum for survey measurements
Describe the measuring points (i.e. ground surface, top of casing, etc.)
Present the well survey report data in a table
Include the Registered Engineer or Licensed Surveyor's report and field notes in appendix