California Regional Water Quality Control Board
Central Valley Region
Karl E. Longley, ScD, P.E., Chair

Linda S. Adams
Secretary for
Environmental Protection

Sacramento Main Office
11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114
Phone (916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

Arnold Schwarzenegger
Governor

1 November 2007

CERTIFIED MAIL
7005 1820 0001 0037 1342

Mike Willett, Director
City of Patterson Department of Public Works
1 Plaza
P.0. Box 667
Patterson, CA 95363

NOTICE OF ADOPTION
OF
CITY OF PATTERSON
WATER QUALITY CONTROL FACILITY
STANISLAUS COUNTY

Waste Discharge Requirements (WDRs) Order No. R5-2007-0147 for the Water Quality Control Facility was adopted by the California Regional Water Quality Control Board, Central Valley Region, at its 26 October 2007 meeting.

Please note that the WDRs contain compliance schedules with specific timetables for submitting reports and conducting studies to the wastewater system. The first scheduled due date is **1 August 2008**, when you must submit a Groundwater Monitoring Well Installation Workplan. In addition, the WDRs contain a Monitoring and Reporting Program (MRP), which contains specified monitoring requirements for you to implement. Please review the MRP closely so that you may establish the appropriate sampling schedules and protocols. A copy of the Order must be maintained at the facility and must be accessible to anyone operating the waste treatment system.

In order to conserve paper and reduce mailing costs, a paper copy of the order has been sent only to the Discharger. Interested parties are advised that the full text of this order is available on the Regional Water Board's web site at http://www.waterboards.ca.gov/centralvalley/adopted_orders. Anyone without access to the Internet who needs a paper copy of the order can obtain one by calling Regional Water Board staff.

If you have any questions regarding your new WDRs, please call me (916) 464-4732.

MARY E. SERRA; P.E., Chief
Waste Discharge to Land Unit

Enclosures: see next page

cc w/o enc: see next page

Enclosures - Adopted WDRs Order No. R5-2007-0147
Standard Provisions (discharger only)

cc w/o enc: Lori Okun, Office of Chief Counsel, State Water Resources Control Board, Sacramento
Gordon Innes, State Water Resources Control Board, Sacramento
Department of Health Services Office of Drinking Water, Sacramento
Department of Water Resources, Sacramento
Stanislaus County Planning Department, Modesto
Stanislaus County Environmental Health Department, Modesto
Joel Cockrell, City of Patterson, Patterson
Bob Godwin, Lee & Ro, Inc., Rancho Cordova
Chuck Ferry, Homeowner, Patterson

Chuck Ferry
2818 Olive Avenue
Patterson, CA 95363

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. R5-2007-0147

WASTE DISCHARGE REQUIREMENTS

FOR

CITY OF PATTERSON
WATER QUALITY CONTROL FACILITY
STANISLAUS COUNTY

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

1. The City of Patterson submitted a Report of Waste Discharge (RWD) on 6 March 2003 and an amended Report of Waste Discharge (RWD) on 9 June 2003 for updating Waste Discharge Requirements Order No. 5-00-146 for the City of Patterson's wastewater collection, treatment and disposal system. However, because these RWDs did not reflect the proposed expansion of the Wastewater Treatment Plant (WWTP) to 3.5 million gallons per day (mgd), a replacement RWD was received on 16 March 2007, and a water balance and supplemental information were received on 2 August 2007.

2. For the purposes of this Order, the term "Wastewater Treatment Plant" shall mean the wastewater collection system, the wastewater treatment system, and the evaporation/percolation ponds.

3. The WWTP is located approximately three miles northeast of the City of Patterson at 14901 Poplar Avenue in Stanislaus County (T5S, R8E, MDB&M). The WWTP is located in the following Assessor's Parcel Numbers: 047-027-003, 047-027-011, 047-027-012, 047-027-013, 047-027-014, 047-028-003, 047-028-011, 047-028-012, 047-028-014, 047-028-016, 047-028-017, 047-029-003, 047-037-017, and 047-037-018 and is shown on Attachment A, which is attached hereto and made part of this Order by reference. The City of Patterson owns the treatment facility and the land on which it is located.

4. WDRs Order No. 5-00-146, adopted by the Regional Water Board on 16 June 2000, prescribes requirements for the discharge of up to 1.3 million gallons of wastewater per day to 12 percolation ponds encompassing approximately 80 acres. The Discharger is proposing an expansion of the treatment plant capacity from approximately 1.3 mgd to approximately 3.5 mgd, and therefore the WDRs must be updated.

5. Wastewater from the City of Patterson, the Villa Del Lago commercial development and the Diablo Grande residential and golf course resort community (located approximately seven miles southwest of the City) is treated by the wastewater treatment system.

6. The following table presents a summary of existing and projected flow rates:

	Existing Flow (mgd)	Proposed Flow (mgd)	Total Flow (mgd)
Combined Residential Development	0.81	0.77	1.58
Commercial/Industrial Development	0.44	0.51	0.95
Diablo Grande Service Commitment		0.75	0.75
Total Projected Wastewater Flow	1.25	2.03	**3.28**

Existing Facility, Proposed Facility Expansion, and Discharge

7. The existing wastewater treatment and disposal system consists of the north activated sludge treatment system (NASTS) constructed in 1979, an advanced integrated pond system (AIPS) constructed in 1999, and the south activated sludge treatment system (SASTS) constructed in 2005. A general site plan of the treatment and disposal system is shown on Attachment B, which is attached hereto and made part of this Order by reference. Process flow diagrams for these systems are presented on Attachments C and D, which are attached hereto and made part of this Order by reference.

8. Wastewater enters an influent pumping station consisting of five submersible pumps that are designed to handle flows over 4 millon gallons per day (mgd), and a high level alarm system. Two of the pumps are for the NASTS and AIPS, and three pumps are for the SASTS. Influent flows enter a mechanical bar screen before being pumped from the influent pump station to the NASTS distribution structure and the SASTS grinders/flow splitter structure. Influent flows to the NASTS are measured using a magnetic flow meter and flows to the AIPS are calculated at the metering structure. Influent flows to the SASTS are measured using a magnetic flow meter. In addition, a Supervisory Control and Data Acquisition (SCADA) System is used to monitor flow data associated with the SASTS.

9. The NASTS contains an aeration oxidation ditch and two clarifiers for solids separation. The waste activated sludge that is produced by this system is discharged to the area drain system and returned to the influent pumping station where it is transferred to the SASTS for digestion and disposal. Treated wastewater from the secondary clarifier is discharged into Percolation Pond No. 8.

10. The SASTS contains an aeration oxidation ditch, a clarifier, a return activated sludge/waste activated sludge pump station, three aerobic digesters, and six sludge drying beds. Treated wastewater from this system enters the effluent pump station and is then transferred to Percolation Pond No. 2.

11. The AIPS consists of a series of three separate ponds (primary, secondary, and tertiary), each covering an area of approximately five acres. The primary pond is separated into three cells, with the first cell being the deepest and used as the anaerobic digester. The primary pond contains two aspirating and one splash aerator. The secondary pond is

divided into two cells and contains one aspirating aerator. The last pond is the tertiary pond that is used for algae sedimentation and containment. Transfer pumps are located between each of the ponds. Wastewater from the AIPS ponds drains to the effluent pump station and is then transferred to Percolation Pond Nos. 3, and 8 through 14.

12. The following table presents a summary of the volumes of the AIPS ponds.

Pond	Volume at 2-feet Freeboard (acre-feet)	Volume at 2-feet Freeboard (million gallons)
Primary	4.14	1.348
Secondary	2.55	0.830
Tertirary	1.22	0.398

The AIPS ponds are constructed with a concrete apron and the pond bottoms are underlain with one foot of clay with a hydraulic conductivity of 1×10^{-6} cm/sec. Slopes of the pond embankments are 2:1 slopes on the dry sides and 2.5:1 on the sides retaining the water.

13. The RWD states that the following changes or improvements to the NASTS are proposed in order to produce a higher quality effluent: (a) install new brush aerators equipped with on/off timers to replace the existing equipment to control dissolved oxygen levels in the oxidation ditch, (b) replace the three existing pumps at the return activated sludge pump station with two pumps, (c), independently use the two existing magnetic effluent flow meters to measure flows to the AIPS and the North Oxidation Ditch, (d) sandblast and recoat all of the steel equipment associated with the North Clarifier No. 1 to prevent further corrosion from damaging the collector mechanism and effluent trough and (e) install an effluent pump station and pipeline that will allow secondary effluent to be pumped into Pond No. 12 instead of Pond No. 8. The RWD also states that the above improvements would be completed pending financing from the State Revolving Fund or an alternative source.

14. The RWD states that an additional oxidation ditch and clarifier (South Oxidation Ditch 2 and South Clarifier 2) will be constructed adjacent to the SASTS. This will increase the treatment capacity in SASTS to 2.5 mgd. The additional ditch and clarifier will consist of a biological oxygen nutrient removal oxidation ditch and a single secondary clarifier producing average daily effluent limits of less than 20 mg/L BOD, 20 mg/L Total Suspended Solids (TSS), and 10 mg/L nitrate measured as nitrogen. The RWD states that in order to divert flow to the existing and proposed oxidation ditch, the Discharger proposes to demolish and replace the existing grinder/flow splitter structure with a larger capacity structure. In addition, the Discharger states that a new return activated sludge and waste activated sludge pump station will be constructed to direct return activated sludge to a proposed grinder/splitter structure or to direct waste activated sludge to the proposed existing aerobic digesters for additional biological treatment.

15. The following table presents the existing and proposed design capacity of each of the treatment processes after the upgrades have been completed:

Process Treatment	Existing Design Capacity (mgd)	Proposed Design Capacity (mgd)
North Activated Sludge System	1.0	0.8[1]
South Activated Sludge System	1.25	2.5
AIPS	0.2	0.2
Total	2.45	3.5

[1]Proposed design capacity reduced to meet average daily effluent limits of less than 20 mg/L BOD, 20 mg/L Total Suspended Solids (TSS), and 10 mg/L nitrate measured as nitrogen.

16. The RWD states that in 2005, six biosolids drying beds, and a biosolids storage and loading facility were constructed. The drying beds are constructed on reinforced concrete underlain by a geotextile material and a 60-mil High Density Polyethylene (HDPE) liner. Slotted tiles are used to enhance the dewatering, and drains are present in the bottoms of each of the beds that are connected to the SASTS system. Two of the drying beds are covered. Because of staffing issues associated with the management of biosolids, the Discharger proposes to install a mechanical dewatering unit. Polymer will be injected into the biosolids as it is pumped from the dewatering unit. The dewatered biosolids will then be containerized and any drainage from the dewatering unit will be returned to the treatment plant headworks. The proposed dewatering unit will be placed in a pre-fabricated metal building with a capacity to hold up to three dewatering units. The dewatered biosolids will be stored until they are disposed offsite by a licensed disposal contractor. In addition to the drying beds and storage facility, sand drying beds located adjacent to Pond No. 8 are used for the temporary storage of dewatered biosolids. These beds contain an underdrain system connected to the headworks facility.

17. The following table presents a summary of the percolation ponds that receive wastewater from the three treatment trains:

Pond No.	Surface Area at 2-feet of freeboard (acres)	Max Water Depth at 2-feet of freeboard (feet)	Volume at 2-feet freeboard (acre-feet)	Volume at 2-feet freeboard (million gallons)
2	7.5	4	30.00	9.78
3	14.1	4	56.40	18.38
4	2.69	4	10.76	3.51
5	4.80	4	19.20	6.26
6	4.81	4	19.24	6.27
7	6.59	4	26.36	8.59
9	6.13	4	24.52	7.99
10	6.12	4	24.48	7.98
11	7.15	4	28.60	9.32

Pond No.	Surface Area at 2-feet of freeboard (acres)	Max Water Depth at 2-feet of freeboard (feet)	Volume at 2-feet freeboard (acre-feet)	Volume at 2-feet freeboard (million gallons)
13	6.01	4	24.04	7.83
14	6.47	4	25.88	8.43
15	9.07	4	36.28	11.82
16	9.07	4	36.28	11.82
17	9.07	4	36.28	11.82
18	9.07	4	36.28	11.82
Total	**108.65**		**434.60**	**141.62**

Note: Pond Nos. 1, 8, and 12 are constructed but are not used for storage.

18. The percolation pond embankments are constructed with onsite materials excavated from pond bottoms. Slopes of the pond embankments are 2:1 on the dry sides and 2.5:1 on the sides retaining the water. The northern ponds (Ponds 15 through 18) were constructed in 2005 and the other ponds were constructed prior to 2001. Design percolation rates range from 0.02 to 0.1 inches/hour with the highest percolation rates in the northern ponds.

19. The August 2007 water balance for the wastewater treatment, storage, and disposal system shows that the percolation ponds have adequate capacity to accommodate a monthly average wastewater inflow rate of 3.38 mgd and a total annual inflow of approximately 1,300 million gallons. The water balance is based on 100-year annual precipitation, average pond percolation rates of 0.05 inches/hour, and 3 mgd infiltration/inflow.

20. The average flow and the quality of influent entering the WWTP from August 2005 through July 2006 is presented below:

Constituent	Units	Average Concentration
Average Flow	mgd	1.2
pH	Std Units	7.3
Electrical Conductivity (EC)	umhos/cm	2,090
Biochemical Oxygen Demand (BOD)	mg/L	266
Total Suspended Solids (TSS)	mg/L	264

21. The average flow and the quality of effluent entering the percolation ponds from the three treatment systems from August 2005 through July 2006 is presented below:

Treatment System	Flow (mgd)	pH (std.)	EC (umhos/cm)	TDS (mg/L)	BOD (mg/L)	TSS (mg/L)	Nitrate as N (mg/L)
North ASTS	0.345	7.3	2,078	1,246	3.7	13.3	33.9
South ASTS Sludge	0.779	7.2	2,074	1,180	3.3	3.3	2.6
AIPS	0.233	8.0	2,300	1,248	34.1	50.3	2.9

Wastewater Collection System

22. 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. The wastewater collection system generally consists of gravity flow pipes ranging in diameter from 6-inch to 27 inches. The older portion of the sewer system, constructed before 1960, serves the downtown residential and commercial areas of the City of Patterson. The RWD states that the sewer pipelines are less than 18-inches in diameter and are made of vitrified clay. Wastewater flows into the downstream mains are controlled by two small pump stations. The Discharger states that in 1999, a new 33-inch pipeline was installed from the treatment plant to a point approximately 1,200 feet upstream along Walnut Avenue into the 18-inch pipeline. The Discharger also plans to extend this 33-inch pipeline to Sycamore Street near downtown Patterson and replace the 18-inch sewer line with a new 27-inch line from Sycamore to North 6th Street.

23. 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, high lines, 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*, found at http://www.waterboards.ca.gov/resdec/wqorders/2006/wqo/wqo2006_0003.pdf.

24. 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.

25. 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.

26. 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. According to the State Water Board, the Discharger has submitted a Notice of Intent for coverage under Order No. 2006-0003-DWQ. Although State Water Board Order No. 2006-0003-DWQ does not require that the operation and maintenance and overflow emergency response program portions of the SSMP plan be completed before May 2009, and the communication program portion of the SSMP plan before August 2009, it is appropriate to require that the Discharger submit these portions sooner. The Discharger's September 2004 Sanitary Sewer Overflow and Backup Response Plan does not meet the requirements of the SSMP.

Site-Specific Conditions

27. Annual precipitation in the area is approximately 10.7 inches. The mean evapotranspiration rate is approximately 73.9 inches annually.

28. The facility is located immediately adjacent to the floodplain of the San Joaquin River.

29. The Flood Emergency Management Agency (FEMA) performed a flood insurance study for Stanislaus County in November 1987 and a revised study in March 2001. Following these studies, the State Reclamation Board designated a portion of the San Joaquin River floodplain as a floodway. A hydraulic analysis report dated 29 January 2003 indicates that the water surface elevation of the San Joaquin River ranges from approximately 50.70 to 52.45 feet above mean sea level (msl) from north to south. Because the AIPs and percolation pond levee elevations range from 54 to 59.50 feet above msl and are above the water surface elevation of the San Joaquin River, they are protected from inundation by a 100 year flood.

30. The facility lies within the Patterson Hydrologic Unit Area No. 541.10, as depicted on interagency hydrologic maps prepared by the Department of Water Resources in August 1986.

31. The area surrounding the facility consists primarily of agricultural farmland. The nearest home with a domestic well is located on the east side of Pond No. 15. Because of the proximity of this well to the percolation ponds, this domestic well or a newly installed monitoring well shall be included as part of the groundwater monitoring network if the property owner allows access.

32. In 1999, sixteen soil test borings were drilled in area of the proposed southern ponds. In general, surface soils consisted of clay underlain by varying gradations of medium to dense sand. Clay varies in depth from approximately two to twenty feet. Ten percolation

tests were conducted near four of the borings revealed percolation rates between 0.01 and 0.03 inches/hour.

33. In 2003, fifteen soil test borings were drilled in area of the proposed northern ponds. In general, surface soils consisted on clay, silt, and sand to an average thickness of approximately five feet underlain by high permeability sand and silty sand mixture to a boring depth of 16 to 21.5 feet. Twelve percolation tests near four of the boring locations revealed percolation rates between 0.2 and 134 inches/hour. In a silty clay layer at approximately 1.5 to 7.5 feet, percolation rates were 0.05 to 0.11 inches per hour.

34. Stormwater from the facility is captured through a series of drains that are connected to a stormwater retention pond.

Groundwater Considerations

35. The City's municipal water is obtained from six groundwater production wells which yield groundwater from the lower confined zone. The wells range from 360 to 547 feet below ground surface (bgs), and are pumped at 600 to 1,500 gpm.

36. The RWD states that the potable water supply quality, as reported in the 2006 *Annual Drinking Water Quality Report* is as follows:

Analyte	Units	Concentration Average	Concentration Range
Aluminum	mg/L	0.015	ND – 0.09
Arsenic	ug/L	ND	ND – 6
Barium	mg/L	0.0250	0.0167 – 0.0352
Total Chromium	ug/L	16.8	14 – 19
Nitrate as Nitrogen	mg/L	4.8	0.6 – 8.4
Total Nitrogen	mg/L	4.26	1.0 – 6.9
Total Trihalomethanes	ug/L	2.92	ND – 33
Chloride	mg/L	147	25 – 250
Electrical Conductivity	umhos/cm	1,290	757 – 1140
Sulfate	mg/L	295	191 – 380
Total Dissolved Solids	mg/L	877	500 –1,000

37. Nine groundwater monitoring wells, ranging in depths from approximately 28 to 31 feet bgs and constructed with 15-foot of screen, are located around the wastewater treatment and disposal facility. Monitoring wells MW-1 through MW-5 were constructed in March 2001 and have been sampled on a quarterly basis since April 2001. Five additional wells (MWs 6 through 10) were constructed in July and August 2004 and have been sampled on a quarterly basis since that time. The location of MW-9 was disputed by neighbors and therefore was removed in accordance with Stanislaus County requirements as of 10 May 2005. The well locations are show on Attachment B.

38. Depth to groundwater ranges from approximately 6 to 23.6 feet bgs and varies depending on location, season, and local influences such as irrigation practices, groundwater

extraction, the presence and stage of surface water bodies. The groundwater flow direction is generally from west to east with a slight gradient (0.000275 to 0.00112 ft/ft).

39. Groundwater quality has been characterized by sampling groundwater monitoring wells on a quarterly basis. Because the wells were installed at different times, varying amounts of data exist for each area. A summary of selected quarterly groundwater quality data from July 2004 through January 2007 is presented in the table below as well. As a comparison, the appropriate Water Quality Objective (WQO) for each analyte is also listed.

Analyte	**Units**	**MW-1** *	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6** *	**MW-7**	**MW-8**	**MW-9** **	**MW-10**	**WQO**
pH	std.	7- 8	6.8 – 7.8	6.8 – 7.7	6.6 – 7.5	6.3 – 7.3	6.6 – 7.8	6.6 – 7.8	6.5 – 7.6	7 – 7.4	6.6 – 7.6	6.5 – 8.4[1]
EC	umhos/cm	1860-3020	2860-3860	3200-4920	1210-3140	2070-2900	1920-2420	2070-3620	2630-3730	2030-3220	2360-3570	700[1]
TDS	mg/L	1140-1800	1850-2410	1410-2500	807-2100	1280-1800	1110-1420	1240-2200	1710-1960	1310-1570	1520-1870	450[1]
NO_3-N	mg/L	8.4 – 17	7.6 - 24	5 - 15	ND - 48	0.3 - 30	1.5 - 7	0.3 – 9.5	5.9 – 7.4	13 - 19	3.2 – 9.1	10[2]
NH_3 N	mg/L	NS	ND	ND	ND	ND	ND	ND	ND	NS	NS	1.5[3]
TKN	mg/L	2	ND	ND	ND	ND	1.2	ND	ND	NS	1.2	None
Total Coliform Organims	MPN/100 mL	<1 – 30	<1 – 4	<1 - 17	<1 - 1100	<1 - 730	<2 - >2420	<1 - 13	<1 - 17	<2	<2 - 13	2.2/100
Arsenic	ug/L	ND – 2	0.003 - 3	0.006 -6	0.015 - 22	0.005 -4	0.002- 2	0.007 - 11	0.007 - 8	NS	2	0.004[5]
Molybdenum	ug/L	14	11	ND – 0.005	ND – 0.01	0.014 - 10	ND – 0.013	0.017-11	ND – 0.006	NS	ND	10[1]
Nickel	ug/L	0.001 - 3	0.001 -3.7	0.002 -4	0.01 - 4	0.01 -7.2	0.01 -3.2	0.02 -5.9	0.01 -7.9	NS	10.4	12[5]
Selenium	ug/L	0.008 - 9.9	0.012 -23	0.004 -4.5	0.003 - 4.3	0.006 - 6.1	0.005 - 5.3	ND - 8	0.005 - 8.2	NS	3	20[1]
Sodium	mg/L	290 -312	360 -417	460 -611	160 - 342	300 -445	210 -245	372 -480	280 -393	NS	250	20[6]
Manganese	mg/L	ND –0.02	ND	ND	0.03 – 1.06	ND – 0.01	ND – 0.04	ND – 0.27	ND – 0.10	NS	ND	0.05[3]
Chloride	mg/L	190 -209	280 -315	443 - 480	93 -370	399 -450	134-158	360 -445	339 -390	NS	321	106[1]
Sulfate	mg/L	400 - 409	540 -754	590 - 628	199 - 210	280 -377	339 -410	280 -461	432 -450	NS	293 - 450	250[3]

*MW-1 and MW-6 are located upgradient of the WWTP and Pond No. 15 and 16. ** MW-9 was removed as of 10 May 2005 in accordance with Stanislaus County requirements. TDS denotes Total Dissolved Solids. EC denotes Electrical Conductivity. NO_3-N denotes Nitrate as Nitrogen. NH_3 denotes Ammonia. ND denotes Not Detected. WQO denotes Water Quality Objective. [1] Agricultural Water Quality Goals. [2] Primary Maximum Contaminant Level (Drinking Water). [3]Secondary Maximum Contaminant Level (Drinking Water), [4] Taste and Odor Threshold. [5] California Public Health Goal, [6]U.S. EPA Health Advisory

40. The following constituents were not detected in the monitoring wells: barium, cadmium, copper, lead, mercury, zinc, and methylene blue active substances.

41. In general, groundwater exceeds Water Quality Objectives (WQOs) for electrical conductivity, nitrate, TDS, total coliform organisms, arsenic, chloride, molybdenum, sodium, sulfate. A summary of the results are presented below:

    a. Electrical Conductivity (EC) reported in all of the existing monitoring wells at concentrations exceeding the WQO. Concentrations range from 1,210 to 4,920 umhos/cm. The lowest average EC concentration was 2,105 umhos/cm in MW-6 located west and upgradient of Pond Nos. 15 and 16. The highest average EC concentration was 3,820 umhos/cm in MW-3 located on the east side and downgradient of Pond No.13. The average EC concentration in MW-1, the other upgradient well, was 2,422 umhos/cm.

    b. TDS concentrations reported in all of the existing monitoring wells exceeds the WQO. Concentrations range from 807 to 2,500 mg/L. The lowest average TDS concentration was 1,237 mg/L in upgradient MW-6 and the highest average concentration was 2,192 mg/L in downgradient MW-3. Average TDS concentrations in upgradient MW-1 were 1,508 mg/L.

    c. Nitrate concentrations reported in MWs 1, 2, 3, 4, 5, and 9 exceeds the WQO. The highest concentration was 48 mg/L reported in MW-4.

    d. Total Coliform Organisms (TCO) reported at concentrations ranging from nondetect to greater than 2,430 Most Probable Number (MPN)/100 mL. The highest concentration was reported in MW-6. TCO concentrations exceed the WQO in MWs 4, 5, and 6.

    e. Arsenic reported at concentrations exceeding the WQO in all of the existing monitoring wells. Concentrations were reported up to 22 ug/L in MW-4.

    f. Molybdenum reported at concentrations exceeding the WQO in MWs 1, 2, 5 and 7. The highest concentration was 14 ug/L reported in MW-1.

    g. Sodium reported at concentrations exceeding the WQO in all of the existing monitoring wells. Concentrations range from 160 to 480 mg/L, with the highest concentration in MW-3.

    h. Chloride concentrations reported in all of the existing monitoring wells exceed the WQO. Concentrations were reported up to 480 mg/L in MW-3. The highest average concentration of 461 mg/L was reported in MW-3. The lowest average concentrations were 146 mg/L in MW-6 and 199 mg/L in MW-1.

    i. Sulfate concentrations exceed the WQO in all of the existing monitoring wells except for MW-4. The highest concentration of 628 mg/L reported in MW-3.

42. A comparison of groundwater monitoring results shows that EC, TDS, and chloride concentrations are higher in the downgradient wells than the upgradient wells MW-1 and MW-2. The discharge of wastewater has therefore degraded or polluted groundwater quality. This Order therefore requires the submittal of a Salinity Evaluation and

Minimization Plan to address and minimize sources of salinity to the wastewater treatment system, which will in turn result in improved groundwater quality.

43. The Discharger proposes to install five additional groundwater monitoring wells around the facility. Two of these wells (MW-11 and MW-12) will be located west and upgradient of the WWTP and used to obtain additional background groundwater quality data. The remaining three groundwater monitoring wells (MW-13, MW-14 and MW-15) will be located downgradient of the WWTP and be used to monitor the downgradient groundwater quality. This Order requires the submittal of a groundwater monitoring well installation workplan and the installation of the additional groundwater monitoring wells.

Antidegradation Analysis

44. State Water Board Resolution No. 68-16 ("Policy with Respect to Maintaining High Quality Waters of the State') (hereafter Resolution 68-16 or the "Antidegradation Policy") requires a 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 as described in the plans and policies, including water quality objectives in the applicable Basin Plan. The discharge is required to meet waste discharge requirements that will result in the best practicable treatment or control of the discharge necessary to assure that pollution or nuisance will not occur, and highest water quality consistent with maximum benefit to the people of the State will be maintained. It is the responsibility of the Discharger to provide information for the Regional Water Board to evaluate whether any degradation caused by the discharge is consistent with this policy, as well as the amount of degradation that would be consistent.

45. The Discharger has not provided an antidegradation analysis. The information in the Findings shows that effluent effluent disposal has the potential to degrade or pollute the underlying groundwater with respect to salinity constituents and nitrogen compounds.

46. The average concentrations of TDS in the potable water supplied to the City of Patterson is 877 mg/L. The TDS in the effluent discharged to the percolation ponds averaged between 1,180 and 1,248 mg/L for the period from August 2005 through July 2006. The incremental addition of dissolved salts though water usage at this facility (about 370 mg/L) is higher than the normal range for domestic use and may not be considered reasonable. When this analysis is made using electrical conductivity as a measure of salinity, the incremental increase is higher. This Order contains an interim effluent limit of 1,250 mg/L TDS (that which the Discharger currently achieves), and requires the Discharger to complete a salinity BPTC analysis to determine additional best practicable treatment and control measures for salinity constituents, as well as an appropriate final effluent limit.

47. The average concentrations of nitrate (as nitrogen) in the potable water supplied to the City of Patterson is 4.8 mg/L. Nitrate-N concentrations in the effluent discharged to the percolation ponds averaged between 2.6 and 33.9 mg/L for the period from August 2005

through July 2006. The highest value is from the north activated sludge treatment system. Nitrate-N concentrations in background groundwater monitoring wells ranges from 1.5 to 17 mg/L (as compared to the MCL of 10 mg/L). Monitoring wells downgradient of the wastewater treatment ponds contain nitrate-N at concentrations up to 48 mg/L. The information in the Findings show that nitrate in the effluent from the NASTS has the potential, or already has, caused groundwater pollution. Therefore this Order contains an interim effluent limit for nitrate and requires the Discharger to complete improvements to the NASTS such that it meets a nitrogen effluent limit of <10mg/L as of 1 June 2009.

48. The Regional Water 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.

49. In general, 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 inconsistent with maximum benefit and/or BPTC. 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 applicable water quality objective, source control measures, waste constituent treatability).

50. This Order acknowledges that some degradation may occur as a result of the application of treated wastewater to land, but the Regional Water 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 and the factors in Finding No. 48 are met. This Order is consistent with State Water Board policy.

Treatment and Control Practices

51. 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. An alarm and automatic flow diversion system to prevent system bypass or overflow;
    b. Treatment to secondary standards;
    c. Appropriate biosolids storage and disposal practices;
    d. An Operation and Maintenance (O&M) manual; and
    e. The use of certified operators to assure proper operation and maintenance.

52. In order to determine compliance with Resolution No. 68-16 it is appropriate to establish a schedule for the installation and sampling of additional groundwater monitoring wells, formally determine background groundwater concentrations for selected constituents, and implement BPTC measures to reduce salinity in the effluent. Groundwater monitoring is insufficient to determine true background conditions. If groundwater is degraded or there is evidence that the discharge may cause degradation, then the Discharger will be required to evaluate and implement 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.

53. This Order establishes interim effluent limitations for salinity and nitrogen, and interim groundwater limitations 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 effluent and groundwater limitations and other requirements to comply with Resolution 68-16.

Basin Plan, Beneficial Uses, and Regulatory Considerations

54. 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.

55. The beneficial uses of the San Joaquin River (within the Sacramento San Joaquin Delta Hydrologic Area) are municipal and domestic supply; agricultural supply; industrial

process supply; industrial service supply; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning, reproduction, and/or early development; wildlife habitat; and navigation.

56. The Basin Plan designates the beneficial uses of underlying groundwater as municipal and domestic supply (MUN), agricultural supply (AGR), industrial service supply (IND), and industrial process supply (PRO).

57. 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 limits directly applicable to the protection of designated beneficial uses of the water. 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.

58. The Basin Plan includes a water quality objective for Bacteria that requires that the most probable number (MPN) of coliform organisms over any seven day period shall be less than 2.2 per 100 mL in MUN groundwater. The applicability of this objective to groundwater designated as MUN has been affirmed by State Water Board Order No. WQO-2003-0014 and by subsequent decisions of the Sacramento County Superior Court and California Court of Appeal, 3rd Appellate District. The numerical value of this objective is equal to the limit of analytical detection for coliform organisms in water. Properly sited and operated facilities that discharge treated domestic wastewater to land should not cause detectable levels of coliform organisms in groundwater. Therefore a coliform limit of less than 2.2 MPN/100 mL is consistent with both the water quality objective for Bacteria and antidegradation directives of State Water Board Resolution No. 68-16.

59. 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.

60. 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."

61. Chapter IV, Implementation, of the Basin Plan contains the "Policy for Application of Water Quality Objectives." This Policy specifies, in part, that "[w]here compliance with these 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." The Policy also states:

> *"[t]o evaluate compliance with the narrative water quality objectives, the Regional Water Board considers, on a case-by-case basis, direct evidence of beneficial use impacts, all material and relevant information submitted by the discharger and other interested parties, and relevant numerical criteria and guidelines developed and/or published by other agencies and organizations…"* and
>
> *"[i]n considering such criteria, the Board evaluates whether the specific numerical criteria, which are available through these sources and through other information supplied to the Board, are relevant and appropriate to the situation at hand and, therefore, should be used in determining compliance with the narrative objective. For example, compliance with the narrative objective for taste and odor may be evaluated by comparing concentrations of pollutants in water with numerical taste and odor thresholds that have been published by other agencies."*

62. To apply narrative water quality objectives, interim numerical limits in this order have been selected based on case-specific information, including applicable beneficial uses of groundwater beneath the facility and information provided by the Discharger. Based on the information available and consistent with Resolution No. 68-16, interim numerical limits have been selected to protect the beneficial uses and prevent degradation. State Water Board Resolution No. 68-16 requires that existing water quality be maintained unless specific demonstrations are made, and does not allow degradation that would impair beneficial uses or violate applicable policies, including water quality objectives. In the future, should the Discharger supply case-specific information justifying that alternate limits are more appropriate; these interim numerical limits may be reevaluated.

63. 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 at this facility because there is little ability for attenuation in the shallow permeable vadose zone beneath this facility. The groundwater underlying the facility has the designated beneficial use of agricultural supply. According to Ayers and Westcot[2], boron can cause yield or vegetative growth reductions of 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 applied 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 relevant and appropriate to apply the narrative Chemical Constituents objective to protect agricultural use of groundwater in the absence of information to support less protective limits.

b. The Discharger has not yet sampled its effluent for chloride. However, chloride is known to be present in domestic 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, and is expected to be present at this facility. Chloride has the potential to degrade groundwater quality at this site because there is little ability for attenuation in the shallow permeable vadose zone beneath this facility. According to Ayers and Westcot[2], chloride can cause yield or vegetative growth reductions of 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 applied 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 relevant and appropriate to

[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.

apply the narrative Chemical Constituents objective to protect agricultural use of groundwater in the absence of information to support less protective limits.

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 reducing 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 at this site because there is little ability for attenuation in the shallow permeable vadose zone beneath this facility. 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 domestic wastewater treatment 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 at this site because there is little ability for attenuation in the shallow permeable vadose zone beneath this facility. 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 0.05 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 0.05 mg/L for manganese to implement the Chemical Constituents objective to protect the municipal and domestic use of groundwater.

e. The Discharger has not yet sampled its effluent for sodium. However, sodium is known to be present in domestic 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 domestic wastewater 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, and it is also expected to be found in the effluent at this facility. Sodium has the potential to degrade groundwater quality at this site because there is little ability for attenuation in the shallow permeable vadose zone beneath this facility. According to Ayers and Westcot[2], sodium can cause yield or vegetative growth reductions of 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 applied 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 relevant and appropriate to apply the narrative Chemical Constituents objective to protect agricultural use of groundwater in the absence of information to support a less protective limit.

f. Total dissolved solids, which were found to be present in the wastewater at an average concentration of 1,248 mg/L, have the potential to degrade groundwater quality at this site because there is little ability for attenuation in the shallow permeable vadose zone beneath this facility. According to Ayers and Westcot[2], dissolved solids can cause yield or vegetative growth reductions of 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 applied 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 unrestricted agricultural use of groundwater in the absence of information to support a less protective limit.

g. Nitrate, which was found to be present in the wastewater at an average concentration of up to 33.9 mg/L as nitrogen, has the potential to degrade groundwater quality because there is little ability for attenuation in the shallow permeable vadose zone beneath this facility. 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 nitrite. However, nitrate as nitrogen was present at an average concentration of up to 33.9 mg/L. This constituent has the potential to degrade groundwater quality with nitrite because ammonia nitrogen in wastewater readily converts to nitrate and nitrite and there is little ability for nitrite attenuation in the vadose zone at this site. 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 nitrite is 1 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 1 mg/L for nitrite as nitrogen to implement the Chemical Constituents objective to protect the municipal and domestic use of groundwater.

i. The Discharger has not yet sampled its effluent for ammonia. However, ammonia has been found in the influent to other wastewater treatement 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 because there is little ability for ammonia attenuation in the shallow permeable vadose zone at this site. According to Amoore and Hautala[4], who evaluated odor of ammonia in water, the odor threshold for ammonia in water is 1.5 mg/L (as ammonia). Concentrations that exceed this value can impair the municipal or domestic use of the resource by causing adverse odors. The applicable water quality objective to protect the municipal and domestic use from discharges of odor producing substances is the narrative Tastes and Odors objective, which is applied 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 relevant and appropriate to apply the narrative Tastes and Odors objective to protect the municipal and domestic use of groundwater.

j. pH, which ranged 7.2 to 8.0 standard units in the domestic wastewater, has the ability to degrade groundwater quality at this site because there is little potential for buffering in the shallow permeable vadose zone. According to Ayers and Westcot[2], pH less than 6.5 or greater than 8.4 can cause yield or vegetative growth reductions of 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 applied 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 relevant and appropriate to apply the narrative Chemical Constituents objective to protect unrestricted agricultural use of groundwater in the absence of information to support a less protective limit.

64. 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

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

uses, water quality objective, and its associated limit, as well as the technical reference for the limit. Some limits may become less stringent when the water supply is limited to certain applications of a beneficial use and due to other case specific circumstances. However, relaxing limits designed to protect beneficial uses requires additional factual information which is not currently available. Pursuant to Controllable Factors Policy in Chapter IV of the Basin Plan, groundwater limitations for each constituent reflect the most stringent listed limit for the waste constituent so as to apply all narrative and numeric water quality objectives, unless natural background quality is worse than the objective, in which case the background background level becomes the limitation.

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 will exceed one mile in length, therefore the General Order is applicable. The Discharger has filed a Notice of Intent (NOI) for coverage under the General Order with the State Water Resources Control Board.

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. The RWD states that dewatered biosolids will be disposed offsite in a manner compliant with California state law.

68. The Discharger has filed a Notice of Intent to obtain coverage under the State Board's Water Quality Order No. 97-03-DWQ National Pollutant Discharge Elimination System (NPDES), General Permit No. CAS 000001, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Associated with Industrial Activities.

69. An Environmental Impact Report (EIR) was prepared for the project titled *"Patterson Wastewater Master Plan and Diablo Grande Sewer Line."* The EIR allows for the buildout of the City of Patterson's General Plan and the Diablo Grande Project, which would generate approximately 4.1 mgd of wastewater. The EIR was certified by the Patterson City Council on 7 October 2003, in accordance with the California Environmental Quality Act (CCR, Title 14, Section 15261 et. seq.). The wastewater treatment and disposal system is consistent with the project as described in the EIR when the following mitigation measure is implemented:

Impact No.	Description of Impact	Mitigation
8-3	Long Term Odor Impacts - Potential increase in odors generated with the operation of the wastewater facility due to the increased area of additional percolation ponds.	Ensure that appropriate engineering controls have been incorporated into the design and construction of the expanded wastewater treatment and conveyance facility to minimize the production of unpleasant odors. During operation of the expanded wastewater treatment and conveyance facilities, ensure that engineering controls are properly functioning by periodically evaluating odor levels adjacent to the facility. Appropriate action will be conducted should offensive odors be present.

70. 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.

71. 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 it's 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 monitoring and reporting program required by this Order and the attached Monitoring and Reporting Program No. R5-2007-0147 are necessary to assure compliance with these waste discharge requirements. The Discharger operates the facility that discharges the waste subject to this Order.

72. 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.

73. 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 WWTP 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.

74. 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 plant.

75. 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

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 Order No. 5-00-146 is rescinded, and that pursuant to Sections 13263 and 13267 of the California Water Code, the City of Patterson, its 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 plant is prohibited. Discharge of treated recycled water downstream of the wastewater treatment plant, 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 inflow to the WWTP shall not exceed 2.45 mgd (and shall not exceed 1.0 mgd for the NASTS, 1.25 mgd for the SASTS, and 0.2 mgd for the AIPS). If the Discharger wishes to increase the monthly average inflow to 3.38 mgd, then the Discharger shall submit the technical report required by Provision F.1.a of this Order at least 60 days before the planned flow increase. Upon approval by the Executive Officer, the discharge may increase up to 3.38 mgd as long as the design capacities described in Finding No. 16 for the NASTS, SASTS, and AIPS are not exceeded.

2. Wastewater treatment shall not cause pollution or a nuisance as defined by Section 13050 of the CWC.

3. Public contact with wastewater shall be precluded or controlled through such means as fences, signs, or acceptable alternatives.

4. 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.

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

6. As a means of discerning compliance with Discharge Specification B.5, the dissolved oxygen content in the upper one foot of any wastewater or recycled water storage pond shall not be less than 1.0 mg/L.

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

8. 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.

9. All wastewater 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.

10. 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.

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

12. 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.10 and B.11.

C. Effluent Limitations

1. Effluent discharged to the percolation ponds shall not exceed the following limits, or lower values as necessary to comply with the Groundwater Limitations:

Constituent	Units	NASTS Monthly Average	SASTS Monthly Average	AIPS Monthly Average
BOD_5	mg/L	<20	<20	<40
TSS	mg/L	<20	<20	<40
Total Nitrogen	mg/L	NA	<8	<8
Total Nitrogen (Interim Limit)	mg/L	<35	NA	NA

Constituent	Units	NASTS Monthly Average	SASTS Monthly Average	AIPS Monthly Average
Total Nitrogen (As of 1 June 2009)	mg/L	<10	<8	<8
TDS (Interim Limit)	mg/L	1,250	1,250	1,250

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

2. No stored wastewater shall have a pH less than 6.5 or greater than 10.0.

D. General Solids Disposal Specifications

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.

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

2. 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.

3. 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.

4. 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.

5. 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. Interim Groundwater Limitations

1. Release of waste constituents from any portion of the WWTP 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.

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
Electrical Conductivity[1]	umhos/cm	700
Total Dissolved Solids[1]	mg/L	450
Nitrite (as N)	mg/L	1
Nitrate (as N)	mg/L	10
Ammonia (as NH_4)	mg/L	1.5
Bromoform	ug/L	4
Bromodichloromethane	ug/L	0.27
Chloroform	ug/L	1.1
Dibromochloromethane	ug/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].

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

   c. Impart taste, odor, chemical constituents, toxicity, or color that creates nuisance or impairs any beneficial use.

F. 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 F.3.

   a. **At least 60 days** before requesting an increase in the average wastewater inflow into the WWTP to 3.38 mgd, the Discharger shall submit an *As-Built Report* certifying the completed installation of an additional oxidation ditch and clarifier at the SASTS. The report shall show that the system was constructed as described in the Findings of this Order and shall justify the requested flow increase.

b. By **1 August 2008**, the Discharger shall submit a *Groundwater Monitoring Well Installation Workplan* prepared in accordance with, and including the items listed in, the first section of Attachment E: *"Requirements for Monitoring Well Installation Workplans and Monitoring Well Installation Reports."* The workplan shall describe the proposed expansion to the existing groundwater monitoring network as described in Finding No. 43, specifically designed to ensure that background water quality is adequately characterized and any potential water quality impacts from the discharge are detected. The system shall be designed to yield samples representative of the uppermost portion of the first aquifer underlying the site. The Workplan shall include a plan for disinfection of groundwater monitoring wells that contain detectable concentrations of coliform, additional sampling to confirm disinfection was effective, and a discussion of the potential sources of coliform in the well(s). In addition, the workplan shall provide information showing that MW-9 has been properly destroyed in accordance with applicable county and state requirements.

c. By **1 August 2008**, the Discharger shall submit a *Groundwater Well Disinfection Report* that describes the disinfection of the monitoring wells, follow-up sampling results, and if bacteria is detected in the wells, additional proposed work to control the discharge of coliform bacteria, well construction repairs, additional treatment of the effluent, or other methods to prevent groundwater contamination with coliform. If additional work is required, the report shall include an implementation schedule.

d. By **1 October 2008**, the Discharger shall prepare and implement and implement a *Salinity Evaluation and Minimization Plan* to address sources of salinity to the wastewater treatment system. At a minimum, the plan shall meet the following requirements outlined in CWC Section 13263.3(d)(3) Pollution Prevention Plans:

   i. An estimate of all of the sources of a pollutant contributing, or potentially contributing, to the loadings of salinity in the treatment plant influent including water supply, water softeners, and other residential, commercial and industrial salinity sources.

   ii. An analysis of the methods that could be used to prevent the discharge of salinity into the facility, including application of local limits to industrial or commercial dischargers regarding pollution prevention techniques, public education and outreach, or other innovative and alternative approaches to reduce discharges of the pollutant to the facility. The analysis shall also identify sources, or potential sources, not within the ability or authority of the Discharger to control.

   iii. An estimate of load reductions that may be identified through the methods identified in subparagraph ii.

   iv. A plan for monitoring the results of the salinity pollution prevention program.

v. A description of the tasks, costs, and time required to investigate and implement various elements in the salinity pollution prevention plan.

vi. A statement of the Discharger's salinity pollution prevention goals and strategies, including priorities for short-term and long term action, and a description of the Dischargers intended pollution prevention activities for the immediate future.

vii. A description of the Discharger's existing salinity pollution prevention programs.

viii. An analysis, to the extent feasible, of any adverse environmental impacts, including cross-media impacts or substitute chemicals that may result from the implementation of the pollution prevention program.

ix. An analysis, to the extent feasible, of the costs and benefits that may be incurred to implement the pollution prevention program.

x. Progress to date in reducing the concentration and/or mass of salinity in the discharge.

xi. Progress in reducing salinity shall be reported each year in the annual report required as part of Monitoring and Reporting Program No. R5-2007-0147.

e. By **1 November 2008**, the Discharger shall submit an *Interim Sewer System Management Plan* (SSMP), which shall contain technical reports consistent with the requirements of the State Water Board General Order No. 2006-0003-DWQ. The following portions of the SSMP shall be submitted in the Interim SSMP:

i. Item D.13.iv, Operation and Maintenance Plan.

ii. Item D.13.vi, Overflow Emergency Response Plan.

iii. Item D.13.xi, Communication Program.

f. By **1 December 2008**, the Discharger shall submit a *Monitoring Well Installation Report* prepared in accordance with, and including the items listed in, the second section of Attachment E. The report shall describe the installation and development of the new monitoring wells and explain any deviation from the approved workplan.

g. By **1 August 2009**, the Discharger shall submit a *Technical Report* showing that the proposed improvements to produce a higher quality effluent from the NASTS as described in Finding No. 13 have been completed. Each improvement shall be described. In particular, the Discharger shall show that the improvements to the NASTS have resulted in and effluent with a monthly average nitrogen concentration of <10 mg/L.

h. By **1 October 2010**, the Discharger shall submit a *Background Groundwater Quality Study Report*. For each groundwater monitoring parameter/constituent identified in the MRP (including coliform organisms), 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 E.1.a. Where background concentrations are statistically greater than the interim limitations specified in Groundwater Limitation E.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. The report shall also recommend final effluent limitations that will result in the maximum protection of the groundwater, consistent with State Water Board Resolution No. 68-16. If desired, the Discharger may include site- and/or locale-specific information regarding the crops that farmers can reasonably expect to grow in the area based on soil types and weather patterns, as well as other relevant data and/or information to demonstrate that groundwater limitations for salinity constituents higher than the Interim Groundwater Limitations of this Order would not unreasonably impair the beneficial uses of groundwater for agricultural irrigation. The sources and interpretation of such information shall be thoroughly discussed in the report.

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 E.1.a of this Order. The workplan shall contain a preliminary evaluation of each component of the WWTP 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. R5-2007-0147, 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 plant 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; and

    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. 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.

15. 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.

16. 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 26 October 2007.

PAMELA C. CREEDON, Executive Officer

REVISED

gjc:26-Oct-07

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2007-0147

FOR

CITY OF PATTERSON
WATER QUALITY CONTROL FACILITY
STANISLAUS COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring influent wastewater, treated effluent, effluent storage ponds, recycled water land application areas, groundwater, sludge, and water supply. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. 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 Plant (WWTP) 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 distribution structure to each of the treatment systems. 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/Composite[4]	Weekly	Monthly

[1] Flow represents the total combined daily flow to the treatment systems.
[2] Average Daily Flow represents the daily flow rate averaged over the month.
[3] BOD denotes 5-day Biochemical Oxygen Demand.
[4] Grab/Composite indicates samples may be collected by composite sampler or grab method.

EFFLUENT MONITORING

Effluent samples shall be collected from each treatment system: the NASTS, SASTS, and AIPS, before discharge to any percolation pond and 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
Flow from each system	gpd	Continuous Meter	Daily	Monthly
pH	Standard	Grab/Composite[1]	Monthly	Monthly
Specific Conductivity	umhos/cm	Grab/Composite[1]	Monthly	Monthly
BOD_5	mg/L	Grab/Composite[1]	Weekly	Monthly
Total 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
Total Suspended Solids	mg/L	Grab/Composite[1]	Monthly	Monthly
Standard Minerals [4]	mg/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. 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.

TREATMENT AND PERCOLATION POND MONITORING

Each treatment and percolation 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	Standard	Grab	Weekly	Monthly
Odors	--	Observation	Weekly	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.

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 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
Nitrate as Nitrogen	mg/L	Grab	Quarterly
Total Kjeldahl Nitrogen	mg/L	Grab	Quarterly
pH	pH units	Grab	Quarterly
Chloride	mg/L	Grab	Quarterly
Sodium	mg/L	Grab	Quarterly
Total Coliform Organisms	MPN/100 mL	Grab	Quarterly
Standard Minerals [2]	mg/L	Grab	Annually
Metals [3]	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] Standard Minerals shall include, at a minimum, the following elements/compounds: calcium, magnesium, manganese, boron, iron, potassium, sulfate, total alkalinity (including alkalinity series), and hardness.

[3] 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.

In addition, the private domestic water supply well located east of Pond No. 15 approximately 100 feet from Olive Avenue) or a newly installed groundwater monitoring well located in the proximity of the private well shall be sampled for the constituents as described in the above table if access is allowed by the property owner. If access is not allowed, the Discharger must note its efforts to seek access in the monitoring reports.

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

Representative samples of municipal water supply must be obtained on an annual basis. The Discharge can either choose to submit its *Annual Drinking Water Quality Report* or it cab establish a sampling station were representative samples 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
Specific Conductivity	umhos/cm	Annually
Standard Minerals [1]	mg/L	Annually

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

REPORTING

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

a. Results of influent; effluent; and treatment and percolation pond 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.

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 Water 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 and percolation ponds;
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; and
12. A discussion of the following:
    a. Compliance with the interim effluent performance limit for salinity and nitrogen as specified in the Effluent Limitations of the WDRs;
    b. Salinity and nitrogen reduction efforts implemented in accordance the approved 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 salinity and nitrogen reduction and/or 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

26 October 2007
(Date)

REVISED

gjc:26-Oct-07

INFORMATION SHEET

ORDER NO. R5-2007-0147
CITY OF PATTERSON
WATER QUALITY CONTROL FACILITY
STANISLAUS COUNTY

Background

The City of Patterson wastewater facility is located approximately three miles northeast of Patterson, at 14901 Poplar Avenue in Stanislaus County. The facility is located along the west bank of the San Joaquin River and treats wastewater from the City of Patterson, the Villa Del Lago commercial development and Diablo Grande (a residential and golf course resort community located approximately seven miles southwest of the City). The City's previous Waste Discharge Requirements (WDRs) Order 5-00-146 prescribes requirements for the treatment discharge of up to 1.3 million gallons per day (mgd) of wastewater to 12 evaporation/percolation ponds encompassing approximately 80 acres. However, because these WDRs do not reflect the expansion of the Wastewater Treatment Plant (WWTP) to 3.5 mgd, updated WDRs are necessary.

The current wastewater treatment and disposal system consists of the North Activated Sludge Treatment System (NASTS; constructed in 1979), an Advanced Integrated Pond (AIP) System (constructed in 1999), and the South Activated Sludge Treatment System (SASTS; constructed in 2005). Wastewater enters a mechanical bar screen prior to being pumped from an influent pumping station designed to handle flows over 4 millon gallons per day (mgd) to the NASTS distribution structure and SASTS grinder/flow splitter structure. The activated sludge treatment process consists of screening, aeration through an oxidation ditch, aerobic digestion, solids seperation through the use of clariifers, and discharge to percolation ponds. The AIPs system consists of a series of three separate ponds (primary, secondary, and tertiary) . The primary pond is used for anaerobic digestion. Aeration occurs in both the primary and secondary ponds. The tertiary pond is used for algae sedimentation and containment. The AIP ponds are constructed with concrete aprons and contain a one foot clay bottom with a hydraulic conductivity of 1×10^{-6} cm/sec.

A total of 18 percolation ponds can receive wastewater from the north and south activated sludge treatment and AIP systems. The percolation pond embankments are constructed with onsite materials excavated from pond bottoms. Slopes of the pond embankments are 2:1 slopes on the dry sides and 2.5:1 on the sides retaining the water. The northern ponds (Ponds 15 through 18) were constructed in 2005 and the other ponds were constructed prior to 2001. Design percolation rates range from 0.02 to 0.06 inches/hour with the highest percolation rates in the northern ponds.

Initially, the monthly average inflow to the WWTP shall not exceed 2.45 mgd (existing design capacity of the treatment system). However, the monthly average inflow to the WWTP may be increased to 3.38 mgd (based on water balance calculations) if the Discharger submits an *As-Built Report* that is approved by the Executive Officer certifying the completed installation of an additional oxidation ditch and clarifier at the South Activated Sludge Treatment System.

Solids and Biosolids Disposal

Waste activated sludge (WAS) that is produced from the north activated sludge treatment process is discharged to the area drain system and returned to the influent pumping station where it is transferred to the SASTS for digestion and disposal. WAS generated from the south activated sludge treatment process is sent to six biosolids drying beds, The drying beds are constructed of reinforced concrete underlain by a geotextile material and a 60-mil High Density Polyethylene (HDPE) liner. Slotted tiles are used to enhance the dewatering, and drains are present in the bottoms of each of the beds that are connected to the south activated sludge system. Two of the drying beds are covered. The Discharger proposes to install a mechanical dewatering unit where a polymer will be injected into the biosolids as it is pumped from the dewatering unit. The dewatered biosolids will then be containerized and any drainage from the dewatering unit will be returned to the treatment plant headworks. The dewatered biosolids are temporarily stored onsite at the biosolids storage and loading facility and sand drying beds at the north system until they are disposed offsite by a licensed disposal contractor.

Basin Plan, Beneficial Uses, and Regulatory Considerations

Surface water from the WWTP is to the San Joaquin River (within the Sacramento San Joaquin Delta). 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 to which 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 around the facility; however, additional background groundwater quality are needed, and 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 WWTP to make informed, appropriate, long-term decisions. This Order, therefore, establishes interim groundwater limitations to assure protection of beneficial uses of groundwater of the State pending the completion of certain tasks and provides time schedules to complete those tasks. During this period, degradation may occur from certain constituents, but cannot 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	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	Protect sensitive crops irrigated via sprinklers [4]
		142	AGR [3]	Chemical Constituents	Protect sensitive crops [4]
		250	MUN [1]	Chemical Constituents	Recommended Secondary MCL [5]
		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	Protect sensitive crops [4]
Total Dissolved Solids	mg/L	450[8]	AGR [3]	Chemical Constituents	Protect sensitive crops [4]
		500	MUN [1]	Chemical Constituents	Recommended Secondary MCL [5]
		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 MCL [8]
Trihalomethanes	ug/L	80	MUN [1]	Chemical Constituents	
Bromoform	ug/L	4	MUN [1]	Toxicity	USEPA IRIS Cancer Risk

Constituent	Units	Limit	Beneficial Use	Water Quality	Criteria or Justification
Bromodichloromethane	ug/L	0.27	MUN [1]	Toxicity	Cal/EPA Cancer Potency Factor [12]
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 Public Health, Division of Drinking Water and Environmental Management, Drinking Water Notification Levels, http://www.cdph.ca.gov/programs/pages/ddwem.aspx.
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.

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 beneath a facility that is well-sited, well-designed, and well-operated. 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.

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 (e.g., oxidation ditch), tertiary treatment with nitrogen reduction, and agronomic reuse 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 treated wastewater will degrade groundwater with dissolved solids (as measured by TDS and EC). The quality of source water for the City is fairly good, with a TDS of approximately 877 mg/L. Salt addition through use higher than the expected range, as effluent reveals a TDS of approximately 1,248 mg/L. For comparison, the national average increment for TDS ranges from 100 to 300 mg/L, according to *Wastewater Engineering* by Metcalf & Eddy; the incremental maximum in the Basin Plan for the Tulare Lake Basin is 500 umhos/cm (about 300 mg/L); and the incremental average standard allowed in the Santa Ana Basin in 230 mg/L. The proposed Order sets for interim effluent limits at the current discharge concentration, while requiring the development of salinity reduction BPTC measures. The proposed Order also sets interim groundwater limitations equivalent to water quality objectives, 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 treated wastewater 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 their respective water quality objectives, 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 treated wastewater 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 which are regulated by WDRs and treatment and storage facilities associated with the WWTP 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 WWTP, such discharges must comply with provisions of Title 27.

The discharge of treated wastewater 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 requires the Discharger to submit a technical report documenting that the following improvements to produce a higher quality effluent from the North Activated Sludge Treatment System has been completed. Those improvements include: (a) install new brush aerators equipped with on/off timers to replace the existing equipment to control dissolved oxygen levels in the oxidation ditch, (b) replace the three existing pumps at the north RAS pump station with two new pumps, (c), independently use the two existing magnetic effluent flow meters to measure flows to the AIPs and the north oxidation ditch, (d) sandblast and recoat all of the steel equipment associated with the north clarifier no. 1 to prevent further corrosion from damaging the collector mechanism and effluent trough and (e) install an effluent pump

station and pipeline that will allow secondary effluent to be pumped into Pond No. 12 instead of Pond No. 6.

The Order allows the monthly average inflow rate to the WWTP to increase to 3.38 mgd based on submittal, and approval by the Executive Officer, of an *As-Built Report* certifying the completed installation of an additional oxidation ditch and clarifier at the South Activated Sludge Treatment System.

The Order's Effluent Limitations for $BOD_{5,}$ TSS, and nitrogen are based on information provided in the RWD, and on subsequent conversations with the Discharger.

The Order's Effluent Limitation for TDS is based on average effluent quality data provided in the August 2005 through July 2006 monthly monitoring reports, and is an interim limit based on current conditions. The Discharger is expected to provide a final effluent limit that will be protective of water quality. 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.

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 civil administrative liability where appropriate.

The proposed Order includes influent and effluent monitoring requirements, groundwater monitoring, sludge monitoring, and water supply monitoring.

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. 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 treated wastewater 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, and capable of reaching groundwater, and violating groundwater limitations if its treatment, control, and environmental attenuation, proves inadequate. The Discharger proposes to install five additional groundwater monitoring wells around the facility. Two of these wells will be located west and upgradient of the WWTP and used to obtain additional background groundwater quality data. The remaining three groundwater

monitoring wells will be located downgradient of the WWTP and be used to monitor the downgradient groundwater quality.

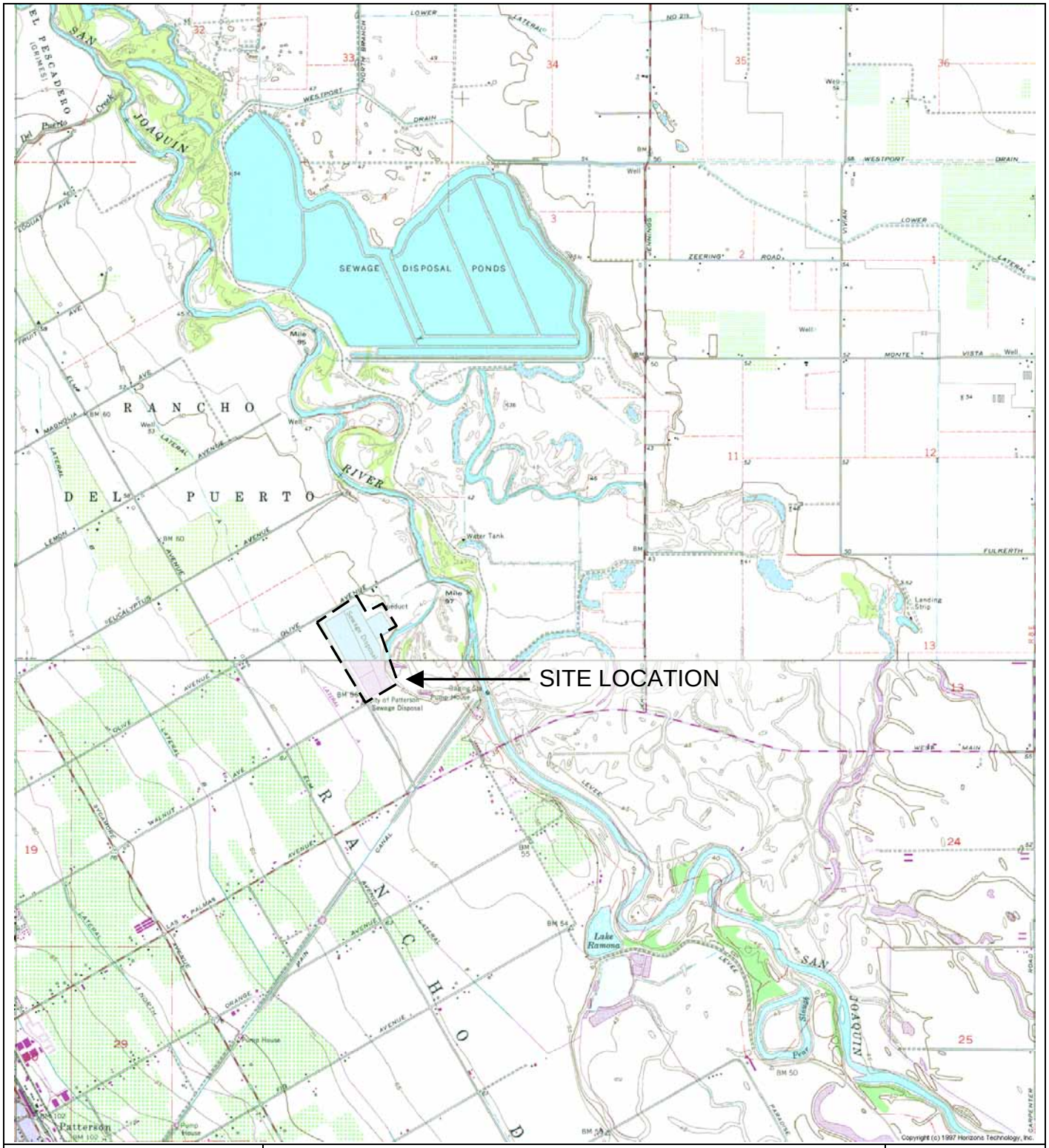
For each constituent listed in the Groundwater Limitations section, the Discharger must, as part of each monitoring event, compare concentrations of constituents found in each monitoring well (or similar type of groundwater monitoring device) to the background concentration or to prescribed numerical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

Reopener

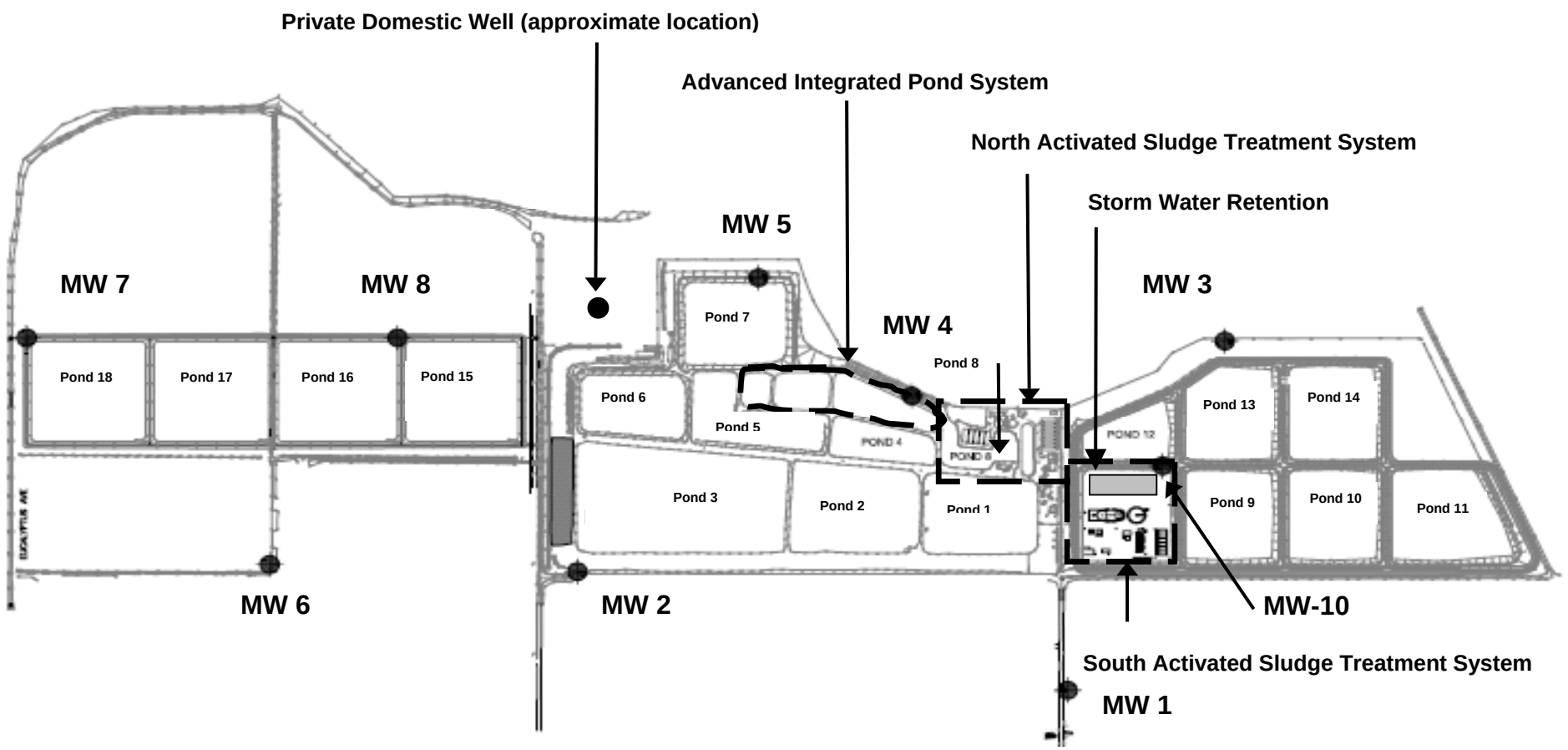
The conditions of discharge in the proposed Order were developed based on currently available technical information and applicable water quality laws, regulations, policies, and plans, and are intended to assure conformance with them. However, information is presently insufficient to develop final groundwater 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 at reasonable 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 waste discharge requirements implement all applicable requirements.

REVISED

gjc:26-Oct-07

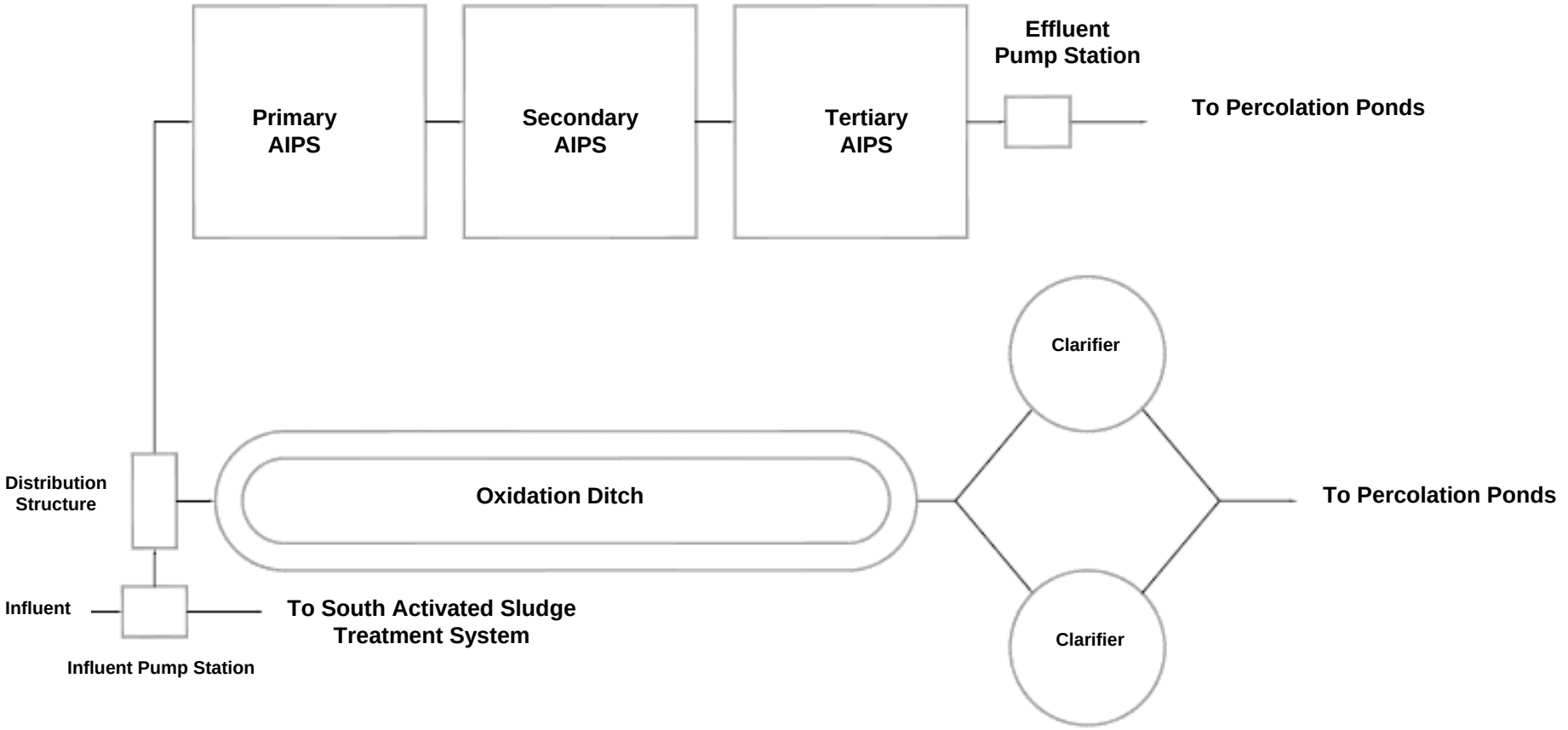


Drawing Reference: U.S.G.S Quad Name TOPOGRAPHIC MAP 7.5 MINUTE QUAD	**SITE LOCATION MAP** CITY OF PATTERSON WATER QUALITY CONTROL FACILITY STANISLAUS COUNTY	N W E S approx. scale 1 in. = 2,400 ft.

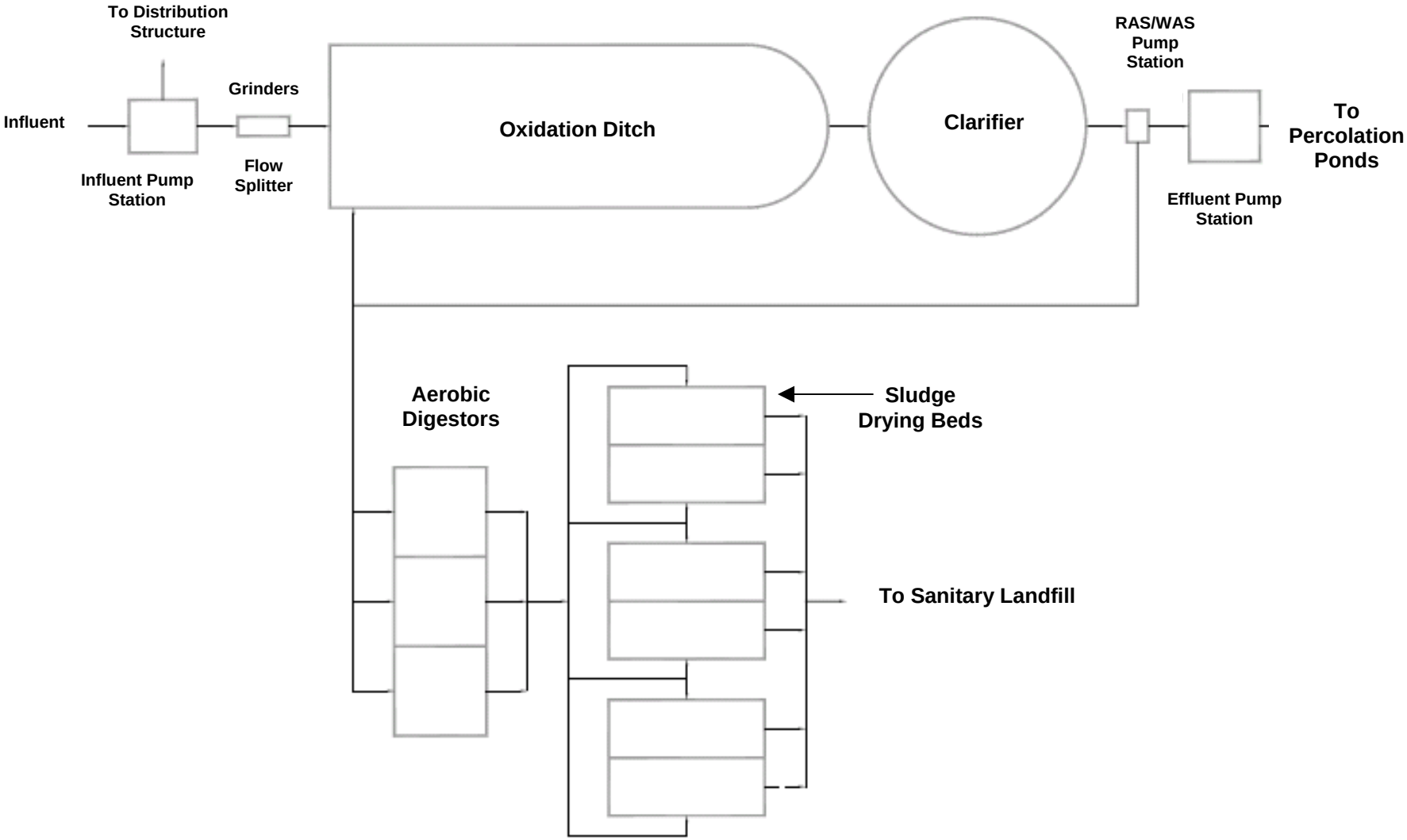


Notes:
Pond Nos. 1, 8, and 12 constructed but not used.

Drawing Reference: Lee & RO, Inc.	**WASTEWATER TREATMENT SYSTEM SITE PLAN** CITY OF PATTERSON WATER QUALITY CONTROL FACILITY STANISLAUS COUNTY	**Not to Scale**



Drawing Reference: Lee & RO, Inc.	**NORTH ACTIVATED SLUDGE TREATMENT SYSTEM AND ADVANCED INTEGRATED POND SYSTEM (AIPS)** CITY OF PATTERSON WATER QUALITY CONTROL FACILITY STANISLAUS COUNTY



Drawing Reference: Lee & RO, Inc.	**SOUTH ACTIVATED SLUDGE TREATMENT PROCESS FLOW DIAGRAM** CITY OF PATTERSON WATER QUALITY CONTROL FACILITY STANISLAUS COUNTY

Linda S. Adams
Secretary for
Environmental Protection

California Regional Water Quality Control Board
Central Valley Region

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

Sacramento Main Office
11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114
Phone (916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

Arnold Schwarzenegger
Governor

ORDER NO. R5-2007-0147
ATTACHMENT E
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