CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO.

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 is included as part of the groundwater monitoring network.

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

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

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

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

c. The Discharger has not yet sampled its effluent for iron. Iron is naturally occurring in all waters due to its presence in soils and rocks[1], and is liberated from the soil under 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 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

[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.

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

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. _____ 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. _____.

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. ____, 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 _____.

PAMELA C. CREEDON, Executive Officer

gjc:5-Oct-07