

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

TENTATIVE ORDER

**UPDATED WASTE DISCHARGE REQUIREMENTS AND RESCISSION OF ORDER
NO. 95-110 FOR:**

**REDWOOD LANDFILL, INC.
CLASS III SOLID WASTE DISPOSAL FACILITY
NOVATO, MARIN COUNTY, CALIFORNIA**

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Regional Water Board), finds that:

1. Redwood Landfill, Inc. (hereinafter called the Discharger, RLI or landfill) owns and operates the Redwood Landfill, a Class III municipal refuse disposal site located in an unincorporated area of the County of Marin.
2. The Landfill began operation in 1958 on the 420-acre southern area of a 600-acre site. In 2003, RLI sold the 180-acre northern area of the property to the Audubon Society which restored the property to tidal wetlands. Currently, RLI provides disposal services for communities predominately within the Counties of Marin and Sonoma. When the original Solid Waste Facility Permit (SWFP) was issued in 1978, approximately 150 acres of the 420-acre southern area had been filled with refuse. The remaining 270 acres were used for agriculture, infrastructure, storage, facility operations and maintenance structures. To date, approximately 15.5 million cubic yards of waste have been placed over the existing Class III landfill footprint.

PURPOSE OF ORDER

3. This Order updates the groundwater, surface water and leachate monitoring programs; approves a slope reconfiguration and volumetric expansion of the landfill; incorporates operation of the 14.5 acre Area G waste management unit; incorporates the approved leachate collection and removal system (LCRS) perimeter trench design as part of the engineered alternative to the Title 27 five-foot separation criterion; and, incorporates chemical acceptance criteria for biosolids disposal into the landfill. This Order rescinds previous Regional Water Board Order No. 95-110.
4. This Order updates the Discharge Monitoring Program (DMP). RLI has made modifications to the program based on observed conditions and requests from Water Board staff. To consolidate these modifications and to incorporate relevant Mitigation Measures from the Final Environmental Impact Report (FEIR) as certified by the Local Enforcement Agency of the County of Marin (Marin County LEA) on June, 10 2008 and

the Mitigation Monitoring and Report Program adopted by Marin County LEA on November 17, 2008, RLI has prepared a revised Self Monitoring Program incorporated into this Order. Additionally, this Order requires installation of a new leachate pond for additional storage capacity and updated leachate management protocols dust control.

5. The 1995 solid waste facility permit (SWFP) listed a design capacity of 19.1 million cubic yards. This number was based on the estimates provided in the 1995 Revised Report of Disposal Site Information. As presented in Section 4.5 of the 1995 Revised RDSI, the capacity of 19.1 million cubic yards excludes the volume of daily cover, intermediate cover, and final cover. Therefore, the design volume shown in the 1995 SWFP was a “waste-only” volume with assumptions about the future cover to waste ratios. If the daily, intermediate and final cover volumes are included in the capacity, the total volume of the previously permitted landfill was 25.3 million cubic yards. The new SWFP issued on December 18, 2008 incorporated a final grading plan and volume which is inclusive of daily cover, intermediate cover, and final cover rather than a “waste-only” volume.
6. Consistent with the SWFP, this Order incorporates a vertical expansion to increase the total landfill capacity to approximately 26.1 million cubic yards (inclusive of waste and daily, intermediate and final covers). The expansion does not increase the maximum height of the landfill nor the landfill footprint. The expansion is achieved by changing the configurations of the landfill sideslopes and mid-slope benches.
7. This Order does not authorize lateral expansion into areas not currently used for waste disposal because evaluation for lateral expansion requires submittal of a Report of Waste Discharge (ROWD), which includes technical designs for a composite liner and LCRS and demonstrates that the facility meets the siting criteria for a Class III municipal solid waste (MSW) facility in compliance with requirements of Subtitle D (Part 258 of Title 40 of the Code of Federal Regulations) and Title 27 of the California Code of Regulations.
8. This Order does not authorize the filling of wetlands or waters of the State at the landfill. Such activities require certification of water quality impacts by the Regional Water Board or Executive Officer pursuant to Section 401 of the Clean Water Act. Such activities would require amendment or update of Waste Discharge Requirements (WDRs) for any proposed fill area.

SITE DESCRIPTION AND LOCATION

9. The project site is located in northeast Marin County, approximately 5 miles north of central Novato and 8 miles southeast of central Petaluma. The landfill is located east of State Highway 101 at 8950 Redwood Highway, between San Antonio Creek and the Northwestern Pacific Railroad tracks (Figure 1).
10. The property consists of 420 acres, of which 380 acres are used for operations associated with waste disposal. RLI is permitted to dispose of waste within the 222.5 acre Class III

landfill footprint. The facility includes the following waste management units as defined by Title 27 CCR Sections 20240 through 20260:

- i. Class III landfill Areas A-F that receives nonhazardous solid waste (208 acres).
 - ii. Class III composite lined landfill Area G, constructed in 1997, that receives nonhazardous solid waste (14.5 acres)
 - iii. Class II lined surface impoundment that receives site generated leachate and contact water (11 acres).
 - iv. Class II Sludge containment lagoons bordering the southern edge of the landfill footprint.
11. The landfill has an estimated lifespan of approximately 16 years with an anticipated closure date of 2025 and total capacity of approximately 26.1 million cubic yards (inclusive of waste, daily/intermediate cover, final cover, and base liner). For purposes of this site life estimate, it is assumed that site operations will remain consistent throughout the remaining life of the site.
12. In the 1940s and 1950s the land was used for agricultural purposes. There are two levees at the site: (1) the perimeter levee which is an earthen berm located along the toe of the waste slopes and extends around the perimeter of the landfill; and (2) the exterior levee located beyond the toe of the landfill which provides flood protection to the other operational areas of the site.
13. A perimeter leachate collection and removal system (LCRS) trench surrounds Areas A through F and mitigates the potential for horizontal migration of leachate beyond the perimeter of the landfill. The LCRS trench is described in Findings 44 - 49. The location of the LCRS trench is shown in Figures 2 and 4.
14. The current facilities on the 420-acre site include the following (Figure 2):
 - a. 222.5 –acre Class III landfill comprised of:
 - i. 14.5-acre composite lined Class III Landfill (Area G); and
 - ii. 208-acre Class III landfill (Area A-F)
 - b. Stormwater impoundment
 - c. Main sludge impoundment
 - d. Sludge drying and processing areas
 - e. Compost pad
 - f. Leachate impoundment
 - g. Administration and other ancillary use areas
 - h. Levees, roads and drainage control facilities
 - i. Areas outside the existing levee crest

Note that the stormwater impoundment (b.) is used to store stormwater and the leachate impoundment (f.) is used to store leachate.

REGULATORY HISTORY

15. The Regional Water Board adopted Order No. 85-15 on February 20, 1985. Order 85-15 was amended on May 24, 1995, by Order No. 95-110 which updated groundwater, surface water, leachate monitoring programs, approved the vertical expansion of the landfill and incorporated limits for sludges and petroleum contaminated soils for disposal. This Order rescinds Order No. 95-110.
16. The 14.5-acre Area G waste disposal unit is located within the southwestern part of the landfill footprint. This area formerly included facilities for sludge processing and a storm-water impoundment. As required by Order No. 95-110, RLI submitted to the Water Board and the Marin County Local Enforcement Agency a Report of Waste Discharge (ROWD) for Area G in 1997. The ROWD demonstrated compliance with all applicable requirements of Order No. 95-110, Title 27, State Water Resources Control Board (SWRCB) Resolution No. 93-62, Order No. 93-113, as well as federal regulations contained in Subtitle D. The Area G design was developed to isolate waste from the surrounding environment, and allows for containment, collection, and removal of leachate. After approval of the Area G design by the Regional Water Board staff, construction of the Area G waste containment system was completed in two phases; Phase 1 was constructed in 2004 and Phase 2 in 2006.
17. On October 20, 2005 RLI submitted a report summarizing the engineered alternative to the five-foot separation criterion of Title 27 Section 20240, subsection (c). The engineered alternative applied to existing Areas A through F and consists of a perimeter LCRS trench, a program to extract leachate from the interior of the landfill, the physical containment properties of the underlying Bay mud, and a demonstrated inward gradient.
18. On February 9, 2006 the Regional Water Board approved the engineered alternative to the five-foot separation criterion for Areas A through F. The engineered alternative consists of a perimeter leachate collection and removal trench, an interior leachate collection and removal well network, and a requirement to maintain an inward gradient for perpetuity. An inward gradient currently exists, based on the drawdown of leachate in the landfill and data from the well network.
19. On June 10, 2008, the County of Marin LEA, as lead agency, certified the 2008 FEIR for the vertical expansion. The FEIR identified water quality impacts for which mitigation measures would be necessary.
20. On December 18, 2008, the Marin County LEA to the California Integrated Waste Management Board (CIWMB) issued Solid Waste Facility Permit (SWFP) Number 21-AA-0001 for the landfill. The 2008 SWFP was a substantial modification to the previous July 28, 1995 permit to reflect changes to landfill operations and landfill design, and to incorporate the findings and mitigation measures as detailed in the LEA adopted Mitigation Monitoring and Reporting Plan (MMRP) of the 2008 FEIR.
21. In 2006, the Discharger submitted to this Board evidence of an Irrevocable Fund acceptable to the Executive Officer, to ensure any corrective action and remediation actions that may be necessary as a result of current or future unforeseen releases from the landfill.

SURFACE HYDROLOGY

22. The landfill is situated in flat-lying, drained marshlands along the western margin of Petaluma Valley and adjacent to the gently sloping alluvial fans and the steep uplands immediately west. The site contains and is surrounded by a network of natural and manmade surface-water bodies that drain to the Petaluma River and flow into San Pablo Bay. These include the tidally influenced San Antonio Creek, Hans Slough, and the manmade West Slough, which border the eastern, northern, and western margins of the site, respectively. Another tidally influenced channel is located along the southern margin of the site, informally denoted as the South Slough. These sloughs are tributaries of San Antonio Creek and are separated from the site by the perimeter and exterior levees.
23. San Antonio Creek, forming the northern and eastern boundaries of the site, is approximately 120 to 230 feet wide near the landfill levees and is influenced by tidal fluctuations. The bottom elevation of the creek varies from -5 to -12 feet mean sea level (msl). According to the Sonoma County Water Agency, San Antonio Creek drains a 33-square-mile area and has an estimated 100-year flow of 5,900 cubic feet per second (cfs) with a time of concentration of 3 hours and 53 minutes. Due to the breadth of the floodplain at this location, the correspondingly low velocities and density of vegetation, no scouring action is evident or anticipated.
24. The West Slough, which borders the west side and a portion of the north side of the Redwood Landfill, is approximately 10 to 50 feet wide and has a bottom elevation ranging from -2 to -5 feet mean sea level (msl). The West and South sloughs are subject to tidal inundation and also intercept surface-water runoff from surrounding hills. This runoff can amount to 1,250 cfs during a 100-year event. The South Slough is approximately 10 feet wide; slough bottom elevations have not been surveyed.
25. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (effective date May 4, 2009) show that most of the facility, including the Class III landfill and administrative facilities area, are outside the flood hazard area for a 100-year flood. However, areas east (i.e., the Oxbow Area, Field 2 and Field 3) and south (i.e., storm-water impoundment, Field 1, and sludge processing areas) of the landfill (Figure 2) are within the 100-year floodplain of San Antonio Creek as shown in the Flood Insurance Rate Map. Levees constructed by the Discharger protect these areas from the 100-year flood. The peak flood stage associated with the 100-year event is approximately 8 ft (NAVD88) which is equivalent to 5.3 feet msl (NGVD29). The previous FEMA Flood Insurance Rate Maps showed a higher 100-year flood elevation of 6.0 ft msl (NGVD29). The EIR and the current design criterion are based on the older (and higher) flood elevation of 6.0 ft msl. The levees have a design elevation of 9.0 feet msl to provide freeboard and allow for settlement. The Long-Term Flood Protection Plan for the site dated October 16, 2008 requires that the design elevation be periodically updated as new information becomes available

26. The mean annual precipitation for the site is about 23.7 inches. The 100-year, 24-hour storm event is estimated to be 6.23 inches. The mean annual evaporation is estimated to be 71.2 inches.

GEOLOGIC SETTING

27. The surface and subsurface geology of the site has been evaluated based on field mapping, literature review, geophysical surveys (seismic refraction and vertical electrical sounding) and review of geologic logs from well borings.
28. The subsurface is composed of three geologic units listed from deepest to shallowest below:
- a. Franciscan bedrock;
 - b. Pleistocene alluvium; and
 - c. Holocene Bay mud
29. Franciscan bedrock – The landfill is underlain by bedrock of the Franciscan Complex. The bedrock is exposed adjacent and west of the northern portion of the 420-acre Southern Area. Bedrock borings encountered very dark grey-brown mudstone/claystone, which is believed to be sheared shale and intensely fractured and deeply weathered sandstone, greywacke and greenstone.
30. Pleistocene alluvium – The Franciscan bedrock is overlain by Pleistocene alluvium, however the alluvium is locally absent on buried bedrock ridges, where bedrock is directly overlain by the younger Bay mud deposits. The alluvium locally consists of very stiff to hard sandy clay/clayey sand that contains laterally discontinuous lenses of coarse grained sand and gravel. The clayey layers have a lower hydraulic conductivity than the sand and gravel lenses and therefore act as aquitards.
31. Holocene Bay mud – The majority of the Redwood Landfill is underlain by native Bay mud, except where bedrock cropped out in the former 4-acre pond area and compacted clay was placed before waste filling. The Bay mud overlies Pleistocene alluvium and, in some locations, Franciscan bedrock. The Bay mud at the landfill consists of soft compressible fat clays (CH) and elastic silts (MH) that contain varying amounts of organic material and sand. The thickness of the Bay mud throughout the site varies from 5 to 56 feet. Locally, the Bay mud unit contains silty sand channel/lens deposits. These channel/lens deposits range from less than a foot to several feet in thickness. The deposits represent areas of increased permeability and are the likely preferential groundwater flow pathways and therefore the point of earliest detection for groundwater monitoring at the facility.
32. The site lies within the northern California Coast Ranges Geomorphic Province. This Province consists of northwest trending mountain ranges, broad basins, and narrow valley generally paralleling major geologic structures. There are no known active faults within the site. The major faults in this region are the San Andreas, Hayward, Healdsburg-Rogers Creek, Calaveras, Concord-Green Valley, and Palo Colorado-San Gregorio Faults.

HYDROGEOLOGY

33. Groundwater at the Redwood Landfill is found in the Holocene Bay mud unit, the Pleistocene alluvium and the Franciscan bedrock.
34. The Bay mud unit occurs as an eastward thickening wedge with a thickness ranging from 5 feet along the extreme western/northwestern perimeter of the site to 56 feet in the Oxbow Area. The Bay mud is composed predominantly of soft high-plasticity clays and clayey silts. Several silty sand zones, ranging in thickness from less than 1 foot to several feet, occur locally across the site. In addition, thin stringers of decomposed organic material occur as local, discontinuous lenses. These thin lenses within the Bay mud are considered to be the zone of early detection with respect to groundwater monitoring at the site.
35. The laboratory hydraulic conductivity of recovered Bay mud samples, tested in conjunction with Area G field explorations, yielded an average value of 2.9×10^{-8} cm/s under an effective confining stress of 2,160 psf.
36. The pre-development groundwater table within the Bay mud is near sea level with seasonal and tidal variations. With the development of the site through waste placement, excess pore pressures are generated and the groundwater gradient within Bay mud is split into two primary components: (i) upward towards the refuse; and (ii) downward toward the alluvium below. Additionally, there is a small outward radial component of groundwater flow within the Bay mud from the center of the landfill toward the perimeter.
37. The Pleistocene alluvium water-bearing unit consists of predominantly fine-grained deposits that contain lenses of sand and gravel. The unit is confined, with hydraulic conductivities ranging from 4×10^{-4} to 9×10^{-4} cm/s. Historic water-level elevations indicate that groundwater in the Pleistocene alluvium is generally confined across the site. Recent measurements of the groundwater within the alluvium show the general direction of groundwater flow to the south and east. The direction of the vertical hydraulic gradient is upward from the Pleistocene alluvium to the Bay mud unit.
38. The Franciscan bedrock consists primarily of sheared shale and fractured sandstone, graywacke, and greenstone, and is generally considered a non-water-bearing unit relative to the overlying (Pleistocene) alluvium. Consequently, the bedrock is not a monitored hydrostratigraphic unit at the Redwood Landfill.
39. Groundwater flow at the perimeter of the landfill is inward toward the LCRS trench.
40. Tidal influence on nearby Bay mud monitoring wells is limited and has a delayed response due to the low permeability of the Bay mud. Larger tidal influence was observed in one well located farther from the creek within a higher permeability lens.

Based on the tidal response data, this hydraulic communication is limited to areas in close proximity to surface water bodies.

FILL PLAN

41. Waste fill placement follows the February 23, 2007 Fill Sequencing Plan detailed in the Joint Technical Document (JTD). The fill sequencing plan is based on geotechnical analyses which account for the time-dependent consolidation strength gain of the Bay mud to optimize fill placement in the proposed Final Grading Plan. The approach assumes that the Final Grading Plan will be built in increments. The plan considers that as each increment of waste is placed, consolidation of the underlying Bay mud is initiated, gradually making the Bay mud denser and stronger. To analyze the changing conditions, the remaining fill volume was divided into increments, which will be placed in succession. The fill plan employed limit equilibrium slope stability analyses to determine the maximum waste elevation which maintains a short-term static factor of safety against slope instability of 1.3 and long-term factor of safety of 1.5. Using pseudo-static slope stability analyses, site response and double-integration methods, permanent seismically-induced displacements during the maximum probable earthquake (MPE) were estimated for each phase of filling and for the long term, post-closure case.

LANDFILL DESIGN, CONSTRUCTION, AND OPERATION

42. Because of Redwood Landfill's age and the state of practice during its inception, the majority of the initial landfill construction occurred without a formal design. Refuse was placed directly on the Bay mud deposits of the tidal flats. The natural low-permeability soil beneath the landfill serves as a natural geologic liner (barrier) for the protection of underlying groundwater.

Area G

43. The containment system of the 14.5-acre Area G waste disposal unit is constructed to Class II WMU containment system standards and accepts Class III wastes. The base containment system consists of the following elements (from bottom to top):
- Prepared base grading/subgrade;
 - 6-inch minimum thickness capillary break/underdrain system consisting of a blanket layer of crushed and recycled concrete encapsulated by an 8 oz/yd² geotextile filter layer.
 - 24-inch minimum thickness compacted clay liner (CCL), with a hydraulic conductivity of 1×10^{-7} cm/s or less,
 - 80-mil thick HDPE geomembrane liner;

- LCRS layer consisting of:
 - Floor areas: 12-inch minimum thickness of granular material, with a minimum hydraulic conductivity of 1 cm/s.
 - Sideslopes: geocomposite (geonet between two 8 oz/yd² geotextile layers)
 - 12-inch minimum thickness operations layer.
44. In Area G, leachate is collected by the blanket LCRS layer which is sloped to allow for leachate collection in two LCRS sumps (north and south) with pumps that discharge into to the existing leachate conveyance system which discharges into the leachate pond. The LCRS for Area G is hydraulically connected with the adjoining landfill in order to collect leachate along the boundary between Areas D and F with Area G.
45. The Area G underdrain/capillary break layer was designed as part of the engineered alternative to the 5-foot separation criterion. Consolidation water entering the underdrain from the underlying Bay mud flows to two underdrain sumps (north and south) which drain to subdrain pumps. The conveyance lines are designed to pump the subdrain water to either the leachate impoundment or the surface water impoundment.

Perimeter LCRS Trench

46. The perimeter LCRS trench was designed to provide hydraulic containment at the landfill perimeter via continuous collection, removal, and conveyance of leachate to the onsite leachate impoundment. This perimeter LCRS is also one of four components of the engineered alternative to feet groundwater separation required by Section 20240(c) of Title 27.
47. The perimeter LCRS trench is located at the margin of the waste/Bay mud contact; the bottom elevation of the trench is typically -5.5 feet msl. The trench forms a vertical hydraulic control barrier such that liquids on either side of the trench flow toward and into the trench and leachate within the landfill is prevented from potential lateral migration outside the landfill. The operations and monitoring of the LCRS trench, including monitoring of the groundwater hydraulic gradient, is conducted as described in the Leachate Management Plan (LMP) dated October 14, 2008.
48. The original perimeter trench design was presented in the 1992 LMP. The perimeter trench has been developed in stages (i.e., Stages 1A, 1B, 1C, 1D, 1D extension, 1E, and 1F) and provides containment around the entire unlined portion of the landfill (Areas A through F) (Figure 4). The composite lined Area G cell includes a blanket LCRS system and, therefore, does not require a perimeter trench.
49. The LCRS trench consists of a perforated HDPE conveyance pipe surrounded by Caltrans Class 2 permeable material and capped with low-permeability soil to prevent infiltration of surface/storm water. Continuous HDPE piping conveys the flow of leachate toward

the sumps where it is pumped and then discharged to the onsite leachate impoundment via above or below ground conveyance pipes. Cleanouts are provided at various locations to allow for pipe maintenance. The sump pumps are controlled automatically by a series of level float switches. A low fluid elevation is maintained within the sumps which creates the hydraulic gradient that induces leachate flow toward the LCRS trench.

50. The design plans for each phase of construction were submitted to the Water Board. Construction Quality Assurance (CQA) reports for each construction stage.

Leachate Extraction Wells

51. In addition to leachate collection from the perimeter trench and Area G, a supplemental leachate extraction program is conducted to extract leachate from selected landfill gas wells within the landfill footprint. This program was implemented November 2006 with the objective of reducing the volume of leachate within the central portion of the landfill. Leachate is pumped from the extraction wells and transferred to either a gas condensate collection line or directly to a LCRS sump for eventual discharge into the leachate impoundment. Leachate extraction rates and volumes are monitored and reported annually in accordance with the LMP and Provision 5 of this Order.

Leachate Impoundment

52. The Class II leachate impoundment is located to the east of the landfill in the Oxbow area. The leachate impoundment is used for the temporary storage of leachate. The leachate impoundment is separate from the stormwater impoundment. The leachate impoundment is lined with a minimum 2-feet thick low permeability soil liner constructed in 1990 in accordance with the design criteria of Title 23, Division 3, Chapter 15 of the California Code of Regulations. Field construction quality assurance (CQA) testing demonstrated that the low-permeability soil liner has a saturated hydraulic conductivity of less than 1×10^{-6} cm/s on the floor of the impoundment. CQA testing of the soil liner on the impoundment side slopes is addressed in Provision 10

Perimeter and Exterior Levee Systems

53. Two different levees surround the landfill facility: the perimeter levee and the exterior levee. The perimeter levee is an earthen berm located along the toe of the waste slopes, around the perimeter of the Class III landfill. The exterior levee is located beyond the toe of the landfill and provides flood protection to the other operational areas of the site. In accordance with Sections 20250 and 20260 of Title 27, both perimeter and exterior levee systems are to be designed, constructed, operated, and maintained to prevent inundation or washout due to flood with a 100-year return period. The levee crest elevation of +9 feet msl and top width of 10 feet provides protection against a 100-year return period flood of 6.3 feet msl.
54. The existing exterior levee ranges in elevation from approximately +6 to +9 feet msl and is approximately 4 to 10 feet wide at the crest. RLI is improving the exterior levee to meet the design criteria as part of ongoing maintenance. The first phase of these

improvements was constructed in late summer and fall of 2006. In December 2006, after the completion of Phase 1 exterior levee construction, a failure occurred in an approximate 400-foot long section of the newly improved levee. A phased repair to restore the +9 feet msl flood protection criterion is underway and includes an outboard sheet pile wall anchored with tiebacks to an inboard below-grade continuous row of sheet piles with earthfill between the outboard and inboard sheet piles. Phased improvements to the exterior levee follow the improvement schedule entitled "Exterior Levee Improvement Schedule, Redwood Landfill, Novato, California" dated October 3, 2008 and previously submitted to the Regional Water Board.

55. Long term flood protection planning at the site is done in accordance with the long-term flood protection plan dated October 16, 2008 which takes into account rising sea level and 100-year storm run-off associated with estimated climate change in the San Francisco Bay Region.

Storm-Water Management System

56. Storm-water management system (SWMS) on and in the vicinity of the Redwood Landfill consists of two discrete components: (i) contact storm-water runoff generated during site operations in the active landfill area; and (ii) non-contact storm-water runoff from the onsite drainage areas outside of the active landfill area. Each component is segregated and controlled by separate systems.
57. Contact storm-water runoff, during site operations in the active landfill area and non-contact storm-water runoff generated when intermediate cover is in place, is managed as described in RLI's Storm Water Pollution Prevention Plan (SWPPP). Also described in the SWPPP is how green waste is used on site to augment the SWMS. Green waste in this instance is defined as vegetative material such as chipped or ground yard trimmings, tree trimmings, and logs and excludes other compostable material such as biosolids, food, and manure waste.
58. Permanent and major temporary diversion and drainage facilities are designed and constructed to accommodate the anticipated volume of precipitation and peak flow from surface run-off associated with precipitation of the 100-year, 24-hour duration storm (design event). Drainage ditches, culverts, cross drains and overside downdrains are designed to accommodate peak flows. The non-contact storm-water within the landfill footprint is directed toward site discharge locations along/under the perimeter levee road, or to the surface water pond on the southern end of the site.

WASTES AND THEIR CLASSIFICATION

59. The Class III landfill was designed to receive nonhazardous solid waste as classified in CCR Title 27, Section 20220(a) from residential, commercial, and industrial sources.
60. The Discharger disposes of the following wastes in the landfill:

- a. Municipal solid waste – classified as “nonhazardous solid wastes or inert wastes” using criteria set forth in Title 27;
 - b. Non-friable asbestos – consistent with Title 22 of the Health and Safety Code (Section 25143.7);
 - c. Agricultural waste, dead animals, construction and demolition debris and industrial waste; and
 - d. Nontypical Wastes(pursuant to Title 27): biosolids or sewage sludge, incinerator ash, grit and grease, storm drain cleanings, nonhazardous holding tank pumpings, petroleum contaminated soil, dredge and fill material and triple-rinsed chemical containers.
61. Subtitle D prohibits recirculation of leachate and landfill gas condensate except where landfill units are equipped with composite liner systems and a LCRS.
62. The reuse of leachate for dust control on access roads and intermediate cover is permitted provided leachate is treated and/or confirmed to be “clean” (i.e., non detectable organics per EPA Method 8260 and lower than background inorganics). An updated dust control plan is required in Provision 4.

MONITORING, COLLECTION, AND CONTROL PROGRAMS

Groundwater and Leachate:

63. The site is under a detection monitoring program (DMP) in accordance with Section 20420 of Title 27 of the CCR.
64. The DMP network at the Redwood Landfill currently includes eight Bay mud monitoring wells, four alluvial monitoring wells, five leachate wells, and the leachate impoundment (Figure 3). The current DMP will be updated in coordination with the Regional Water Board as noted below.
65. Inorganic groundwater monitoring data are statistically evaluated for detection monitoring purposes in accordance with Sections 20415 and 20420 of Title 27 of the CCR. Site detection monitoring wells are evaluated on an "intra-well" basis, which compares each well's historical background data set to newly collected monitoring data. Control chart limits calculated using well-specific background data represent statistical background for each parameter/well combination. Background concentrations are fixed for a minimum period of two years with approval of the Regional Water Board and are generally updated at the end of that time (by request to and upon approval from the Regional Water Board) for all wells that have not exhibited a verified statistical exceedance. The site-specific detection monitoring parameters, as described in the self-monitoring program (SMP), have been statistically evaluated using Shewart-Cumulative Summary control charts. Additional inorganic chemical information is collected from each monitoring well to allow routine geochemical analysis and to show general mixing relationships. These are detailed in the SMP.

66. If groundwater monitoring performed as part of the DMP detects impacts of leachate outside the perimeter levee, RLI will follow Title 27 regulations in the development of an Evaluation Monitoring Program (EMP) to determine the appropriate site-specific methods for evaluating the scope of a release, its mitigation, and subsequent monitoring program or corrective action program pursuant to Sections 20385 and 20430 of Title 27.
67. The landfill was constructed on saturated Bay mud deposits. Hence, there is no known unsaturated soil between the waste and groundwater, and accordingly, vadose zone monitoring is not feasible, warranted or required

Storm Water and Surface Water

68. Title 40 of the CFR, Parts 122, 123, and 124, require specific categories of industrial activities, including landfills, to obtain a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharges. The State Water Resources Control Board (State Board) has issued a General Permit for Storm Water Discharges Associated with Industrial Activities (NPDES Permit No. CAS000001). The landfill is subject to the requirements of the State Board's General Permit and as such is required to (1) submit a Notice of Intent (NOI) for coverage under the General Permit, (2) prepare and implement a monitoring program, and (3) submit an annual report.

Landfill Gas

69. The Gas Collection and Control System (GCCS) is regulated by the Bay Area Air Management District (BAAQMD). The GCCS consists of collection wells located in the landfill that are connected to a header pipeline network to transmit landfill gas under vacuum pressure to the landfill gas flare system. The landfill gas flare combusts the landfill gas to mitigate potential pollutant emissions.

BASIN PLAN AND RESOLUTIONS

70. The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Regional Water Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan was duly adopted by the Regional Water Board and approved by the State Water Resources Control Board, U.S. EPA, and the Office of Administrative Law where required.
71. The Basin Plan provides that all groundwater is considered suitable, or potentially suitable, for municipal or domestic water supply (MUN) and that, in making any exceptions, the Regional Water Board will consider the criteria referenced in Water Board Resolution No. 89-39, "Sources of Drinking Water," where:
- (a) The total dissolved solids exceed 3,000 mg/l (5,000 μ S/cm, electrical conductivity), and it is not reasonably expected by the Regional Water Board that the groundwater could supply a public water system, or

- (b) There is contamination, either by natural processes or human activity (unrelated to the specific pollution incident), that cannot reasonably be treated for domestic use using best management practices or best economically achievable treatment practices, or
- (c) The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

BENEFICIAL USES OF SURFACE WATER AND GROUNDWATER

72. The future beneficial uses of the groundwater in the alluvial deposits surrounding the Redwood Landfill are industrial process supply. Since TDS in both the Bay mud and alluvium groundwater underlying the Redwood Landfill is high, domestic water supply is not considered a probable future beneficial use. Beneficial uses of San Antonio Creek and the Mud Slough are estuarine habitat and wildlife habitat.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

73. The Marin County LEA as lead agency certified a final Environmental Impact Report (FEIR) on June 10, 2008 for the 420-acre Redwood Landfill property in accordance with the California Environmental Quality Act (Public Resources Code Section 21000 et. seq. (CEQA)). The final SWFP was issued on December 18, 2008 and a Notice of Determination was filed on December 19, 2008. Regional Water Board staff participated in the development of the FEIR and consulted with the Marin County LEA as a responsible agency pursuant to Section 15096, Title 14 of the CCR. The findings, prohibitions, specifications, and provisions of this Order are consistent with the certified FEIR.
74. The Marin County LEA adopted a mitigation monitoring and report plan (MMRP) on November 17, 2008, which includes mitigation measures for each potentially significant environmental impact associated with issuance of the revised SWFP. The MMRP includes additional studies, monitoring, and operational activities which will mitigate all potentially significant groundwater and surface water impacts identified in the FEIR. Specifically, the adopted MMRP includes requirements for updating stormwater analyses, the Leachate Management Plan, the Leachate Facilities Leak or Spill Contingency Plan, a Leachate Collection and Removal System Operations and Maintenance Manual, a Long-Term Flood Protection Plan, and Peer Review of the Long-Term Flood Protection Plan.
75. Adoption of this Order is consistent with the analysis included in the certified FEIR prepared for the revised SWFP. The Regional Water Board has considered the FEIR and has reached its own conclusions regarding environmental impacts associated with operations under the revised SWFP. Compliance with these WDRs, in combination with other applicable requirements, including the MMRP, will mitigate all significant adverse groundwater and surface water impacts from facility operations under the revised SWFP to less than significant levels. Additionally, adoption of this Order relates to operation of waste management units within a permitted waste disposal area at an existing facility,

which is categorically exempt from CEQA pursuant to Section 15301, Title 14 of the CCR.

NOTIFICATION AND PUBLIC MEETING

76. The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to update WDRs and has provided them with an opportunity to submit their written views and recommendations.
77. The Regional Water Board in a public meeting heard and considered all comments pertaining to the proposed WDRs for the site.

IT IS HEREBY ORDERED pursuant to the authority in Division 7, Section 13263 of the California Water Code (CWC), Title 27, Division 2, Subdivision 1 of the California Code of Regulations (Title 27), and State Board Resolution No. 93-62 that the Discharger, its agents, successors, and assigns shall meet the applicable provisions contained in Title 27, Division 7 CWC, and State Board Resolution No. 93-62, and shall comply with the following:

A. PROHIBITIONS

1. Waste shall not be exposed at the surface of any WMU at the end of waste placement operations in that area.
2. The discharge of treated auto shredder waste is prohibited.
3. Wastes shall not be disposed of in any position where they can be carried from the disposal site and discharged into waters of the State or of the United States.
4. The discharge of wastes, which have the potential to reduce or impair the integrity of the containment structures or which, if commingled with other wastes in the unit could produce chemical reactions that create adverse heat, pressure, fire, explosion, toxic by-products, or reaction products, is prohibited.
5. The relocation of wastes is prohibited without prior Regional Water Board staff concurrence.
6. The relocation of wastes to or from any WMU shall not create a condition of pollution or nuisance as defined in Section 13050 (l) and (m) of the CWC. Any relocated waste shall not be placed in or allowed to contact ponded water from any source whatsoever. Wastes shall not be relocated to any location where they can be discharged into waters of the State or of the United States.
7. Excavation within or reconfiguration of any existing WMU is prohibited without prior concurrence of Regional Water Board staff. Minor excavation or reconfiguration activities do not require prior staff concurrence.
8. Wastes shall not be placed in any area of a newly designed unit without Executive Officer approval based on receipt of an adequate construction quality assurance (CQA) report(s)

certified by a California - registered civil engineer or California - certified engineering geologist.

9. Construction of the containment features of all future WMUs must be in compliance with this Order, Title 27, and State Board Resolution No. 93-62.
10. The discharge or storage of hazardous waste, as defined in Sections 2521 and 2522 of Title 23 and Chapter 11 of Division 4 of Title 22 at the landfill is prohibited.
11. The groundwater shall not be degraded as a result of the waste disposal operation.
12. Filling of wetlands or waters of the State without certification of water quality impacts associated with the proposed filling by the Regional Water Board pursuant to Section 401 of the Clean Water Act is prohibited.
13. Surface drainage from tributary areas and internal site drainage from surface or subsurface sources shall not contact or percolate through wastes during the life of the site.
14. Buildup or mounding of leachate levels within the landfill is prohibited and shall be prevented by operation of a leachate extraction system. The depth of leachate in Area G shall not be greater than 12-inches above the liner of Area G.
15. Leachate, or storm water or groundwater containing leachate, or in contact with waste, shall not be discharged to waters of the State or of the United States unless specifically authorized under an NPDES permit.
16. The treatment, storage, or discharge of groundwater or leachate shall not create a condition of pollution or nuisance as defined in Section 13050(m) CWC, nor degrade the quality of waters of the State or of the United States.
17. The Discharger shall not cause the following conditions to exist in waters of the State or of the United States at any place outside the landfill boundary:
 - a. Surface Waters:
 - (1) Floating, suspended, or deposited macroscopic particulate matter
 - (2) Bottom deposits or aquatic growth
 - (3) Adverse changes in temperature, turbidity, or apparent color beyond natural background levels
 - (4) Visible, floating, suspended, or deposited oil or other products of petroleum origin
 - (5) Toxic or other deleterious substances to be present in concentrations or quantities which may cause deleterious effects on aquatic biota, wildlife or waterfowl, or which render any of these unfit for human consumption either at levels created in the receiving waters or as a result of biological concentrations.
 - b. Groundwater:
 - (1) Degradation of groundwater quality; or

(2) Substantial worsening of existing groundwater impacts.

18. Migration of pollutants through subsurface transport to waters of the State is prohibited.

B. SPECIFICATIONS

1. The Discharger shall conduct monitoring activities according to the Self Monitoring Program (SMP) attached to this Order, and as may be amended by the Executive Officer, to verify the effectiveness of landfill environmental control systems including groundwater, surface water, leachate, and landfill gas containment, collection, treatment, and removal.
2. The Discharger may file a written request (including supporting documentation) with the Executive Officer, proposing modifications to the attached SMP. If the proposed modifications are acceptable, the Executive Officer may issue a letter of approval that incorporates the proposed revisions into the SMP.
3. The Discharger shall install any reasonable additional monitoring devices for groundwater, surface water, leachate, and landfill gas required to fulfill the terms of any future SMP issued by the Executive Officer for the landfill.
4. The Discharger shall maintain an inward hydraulic gradient for the landfill.
5. The Discharger shall maintain, inspect, repair, and replace all environmental control devices installed in accordance with this Order such that they continue to operate as intended without interruption.
6. Precipitation and drainage control facilities shall be designed with a minimum capacity to accommodate a 100-year, 24-hour storm event.
7. All reports pursuant to this order shall be prepared under the supervision of a registered civil engineer, California registered geologist or certified engineering geologist.
8. Water used during disposal operations shall be limited to a minimal amount necessary for construction, dust control and fire suppression.
9. The site shall be protected from any washout or erosion of wastes or covering material and from inundation which could occur as a result of a 100 year 24 hour precipitation event, or as the result of flooding with a return frequency of 100 years.
10. Hazardous wastes and infectious wastes shall not be disposed of at this landfill. Non-hazardous, inert wastes and asbestos may be disposed of at this landfill provided that all regulations and provisions of the CIWMB, California Department of Toxic Substance Control (DTSC), local health agencies and County Land Use Permit requirements are complied with.

11. Additional leachate impoundment(s) may be considered upon submittal of technical designs for liner and demonstration that the facility meets the siting criteria for a Class II surface impoundment in compliance with requirements of Title 27.
12. Surface drainage from tributary areas, and internal site drainage from surface or subsurface sources, shall not contact or percolate through wastes during disposal operation or during the life of the site.
13. Measures shall be taken to ensure that leachate in the leachate collection system can flow freely into the leachate collection sumps. Measures shall also be taken to assure that the leachate collection sumps and extraction wells will remain operational with minimal interruption.
14. Each monitoring well shall target only one hydrostratigraphic unit such as the Bay mud and the Pleistocene alluvium.
15. The Discharger shall assure that the foundation of the site, the solid waste fill, and the structures which control leachate, surface drainage, erosion and landfill gas for this site are constructed and maintained to withstand conditions generated during the maximum probable earthquake (MPE) as defined by Title 27 of the CCR.
16. Final and interim covers for the landfill shall be graded and maintained to promote lateral runoff of precipitation and prevent ponding or infiltration of water on or within the landfill. As portions of the landfill are closed, the exterior surfaces shall be graded to a minimum slope of three percent in order to promote lateral runoff of precipitation. In addition, all completed disposal areas shall be covered with a cover meeting the requirements of Title 27 of the CCR.
17. The Discharger shall maintain and monitor the waste unit so as not to cause a statistically significant difference to exist between water quality parameters at the compliance points and the Water Quality Protection Standards (WQPS) as defined in Section 20390 of Title 27. The point of compliance as per Section 20405 of Title 27 is the vertical surface located at the hydraulically downgradient limit of the WMU that extends through the uppermost aquifer underlying the unit at the point of earliest detection.
18. Whenever there is verified "measurably significant" evidence (as defined in Title 27, Section 20164) or significant physical evidence of a release, the Discharger shall be prepared to implement an evaluation monitoring program (EMP) pursuant to Title 27, Section 20425, at the direction of the Regional Water Board. In such a case, the Discharger shall continue implementing the DMP as prescribed in any SMP attached to this Order. If required, the EMP shall be implemented to determine the nature and extent of any release detected by the DMP.
19. The Discharger shall install any reasonable additional groundwater and leachate monitoring devices required to fulfill the terms of any Discharge Monitoring Program issued by the Executive officer.

20. Interim cover shall be maintained over all waste, at all times, except for the active face area of the disposal operations and areas where additional solid waste will be deposited within 180 days or as provided for by the performance standards adopted by the CIWMB.
21. Landfill gases shall be adequately vented, removed from the landfill, or otherwise controlled to minimize the danger of explosion, adverse health effects, nuisance conditions, or the impairment of beneficial uses of water due to migration through the vadose (unsaturated) zone.
22. The Discharger shall provide a minimum of two surveyed permanent monuments near the landfill from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the operation and post-closure maintenance period. These monuments shall be installed by a licensed land surveyor or registered civil engineer.
23. The Regional Water Board shall be notified immediately of any failure occurring in the waste management unit. Any failure which threatens the integrity of containment features or the landfill shall be promptly corrected after approval of the method and schedule by the Executive Officer.
24. The Discharger shall notify the Regional Water Board at least 180 days prior to beginning any final closure activities. This notice shall include a statement that all activities will conform to the most recently approved closure plan and that the plan provides for site closure in compliance with all applicable regulations.
25. The Discharger shall submit, within 90 days after the closure of any portion of the landfill, a closure certification report which documents that the area has been closed according to the requirements of this order, approved Final Closure Plan, and Title 27. The Discharger shall certify under penalty of perjury that all closure activities were performed in accordance with the most recently approved closure plan as defined by CIWMB and in accordance with all applicable regulations.
26. The Discharger shall comply with all applicable provisions of Title 27 that are not specifically referred to in this Order.
27. Recirculation of leachate or landfill gas condensate in the composite lined Area G shall be allowed with an acceptable operation, monitoring, and maintenance plan approved by the Executive Officer. At a minimum, 1) the receiving cell or WMU must have a liner and LCRS designed to federal (Subtitle D) and California (Title 27) standards (i.e., Area G); and 2) the leachate generation and buildup above the liner must be monitored separately for each receiving cell or unit and is limited to 12 inches or less, and 3) recirculation may not occur under pressures exceeding gravity drainage.
28. The Discharger shall undertake a leachate extraction program from landfill gas wells where sufficient liquid is present and pumping is beneficial to reduce the volume of leachate in the landfill. Leachate volume reduction shall be empirically verified and shall continue until one of the following criteria is met; 1) the piezometric head of

leachate at the base of the landfill is no greater than 1-ft msl, 2) the extracted leachate is chemically indistinguishable from groundwater, or 3) an inward gradient has been achieved.

29. The Discharger shall implement a DMP, pursuant to Title 27, Section 20420. The DMP shall be designed to identify any water quality impacts from the landfill and demonstrate compliance with the water quality protection standard (WQPS) required pursuant to Title 27, Section 20390. The SMP attached to this Order is intended to constitute the DMP for the landfill.
30. The reuse of leachate for dust control on access roads and intermediate cover is permitted provided leachate is treated and/or confirmed to be “clean” (i.e., non detectable organics per EPA Method 8260 and lower than background inorganics).
31. The Discharger shall comply with the engineered alternative as described in Finding 18.
32. The WQPS for RLI shall include the following:
 - a. Constituents of Concern: Section 20395 of Title 27 defines Constituents of Concern (COCs) as “all waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the Unit.” COCs for RLI include monitoring parameters identified in the SMP attached to this Order, or any future amendment thereof, and all Appendix II parameters in the federal Subtitle D regulations.
 - b. Monitoring Parameters: Monitoring parameters (MPs), a subset of the COCs, are typically the most mobile and commonly detected COCs in groundwater at the site and are measured on a more frequent basis than the entire list of COCs. The MPs for RLI shall include, at a minimum, all constituents identified as such in the SMP attached to this Order, or any future amendments thereof. The Discharger may propose modification to the MPs as additional data become available concerning site-specific source characteristics and natural background water quality. However, modifications shall only be made upon written concurrence from the Executive Officer.
 - c. Concentration Limits: Concentration limits (CLs) for all COCs detected at the specified points of compliance shall be established using the background data set pursuant to Title 27, Section 20400. A prediction limit (PL) or control limit (CL) shall be calculated from the background data set using statistical methods as appropriate. Per Title 27, Section 20400(a), CLs are equal to background values for individual constituents in individual wells and are re-determined periodically in accordance with the approved statistical procedure. Specific CLs are, therefore, presented in monitoring reports submitted to the Regional Water Board, with the most recent report providing the most up-to-date concentration limits.
 - d. Point of Compliance: Title 27 defines the Point of Compliance (POC) as the "vertical surface located at the hydraulically downgradient limit of the Unit that extends through the uppermost aquifer underlying the Unit."

- e. Monitoring Points: Title 27 defines Monitoring Points as “a well, device, or location specified in the WDRs at which monitoring is conducted and at which the water quality protection standard applies.” Monitoring points for RLI, which are located along the POC and at additional locations, are specified in the SMP attached to this Order, or any future amendments thereof.
33. When there are multiple landowners or lease holders involved, the Discharger shall provide reasonable access to any property they own or lease at the site to allow for installation, sampling, monitoring, etc., of all devices and equipment necessary for compliance with the requirements of this Order.

C. PROVISIONS

1. Compliance: The Discharger shall comply immediately, or as prescribed by the time schedule below, with all Prohibitions, Specifications and Provisions of this Order. All required submittals must be acceptable to the Executive Officer. The Discharger must also comply with all conditions of these WDRs. Violations may result in enforcement actions, including Board orders or court orders requiring corrective action or imposing civil monetary liability, or in modification or revocation of these waste discharge requirements by the Regional Board. [CWC Sections 13261, 13263, 13265, 13267, 13268, 13300, 13301, 13304, 13340, and 13350].
2. Authority: All technical and monitoring reports required pursuant to this Order are being requested pursuant to Section 13267 of the California Water Code (CWC). Failure to submit reports in accordance with schedules established by this Order or failure to submit a report of sufficient technical quality acceptable to the Executive Officer may subject the Discharger to enforcement action pursuant to Section 13268 of the CWC.
3. Self-Monitoring Program: The Discharger shall comply with the Self-Monitoring SMP attached to this Order and as may be amended by the Executive Officer. The SMP is intended to constitute a DMP pursuant to Title 27, Section 20420 and is designed to identify significant water quality impacts from the landfill and demonstrate compliance with the WQPS established pursuant to Title 27, Section 20390. The SMP may be amended as necessary at the discretion of the Executive Officer.

COMPLIANCE DATE: Immediate

4. Dust Control Plan: The Discharger shall submit a technical report, acceptable to the Executive Officer, which describes how dust will be managed at the landfill. This report shall describe what analytes will be tested of leachate prior to use as dust control.

COMPLIANCE DATE: August 15, 2009

5. Annual Leachate Management and Monitoring Plan: The Discharger shall submit a technical report, acceptable to the Executive Officer, that monitors and provides annual

reporting of the leachate management.. The annual report shall evaluate and update the site-wide water balance considering leachate generation, extraction and storage. The annual monitoring program shall be used to demonstrate leachate that the extraction of leachate exceeds the production of leachate. The annual report shall also present an annual summary of the results of hydraulic gradient monitoring described in Provision 9.

COMPLIANCE DATE: March 30 of each year

6. Storm Water Pollution Prevention Plan: The Discharger shall submit and implement a Stormwater Pollution Prevention Plan (SWPPP) as required under the storm water discharge permit and be acceptable to the Executive Officer. The SWPPP will provide the best management practices that shall be implemented at the site to control storm water runoff and reduce erosion.

COMPLIANCE DATE: August 1, 2009 and each year thereafter

7. Leachate Facilities Leak or Spill Contingency Plan: The Discharger shall submit and implement a leachate facilities leak or spill contingency plan, acceptable to the Executive Officer and consistent with Water Board-issued WDRs and Water Board-approved Leachate Facilities Leak or Spill Contingency Plan (LFLSCP). The LFLSCP will describe procedures for the control of leaks or spills of leachate or contact storm water runoff from Redwood Landfill. The procedures in the plan shall be instituted in the event of a surface leak or spill from the leachate facilities. The Discharger shall initiate its contingency action plan to stop and contain the migration of pollutants to receiving waters.

COMPLIANCE DATE: September 15, 2009

8. Geotechnical Monitoring Plan: The Discharger shall submit, implement, and maintain a Geotechnical Monitoring Plan, acceptable to the Executive Officer, to evaluate the performance of the landfill as waste filling proceeds. The purpose of the geotechnical monitoring plan is to collect data on subsurface movement of the levee and exterior landfill slopes and Bay mud consolidation rates so that the assumptions made for landfill design and stability analyses can be verified and to determine whether modifications to the fill sequencing plan are necessary.

COMPLIANCE DATE: September 15, 2009

9. Hydraulic Gradient Monitoring Report: The Discharger shall submit and implement a hydraulic gradient monitoring report, acceptable to the Executive Officer and consistent with Regional Water Board-issued WDRs and Regional Water Board approved leachate management plan (LMP) (per Provision 5). RLI shall compile monitoring data according to the requirements of the WDRs and notify the LEA and Regional Water Board within fourteen days in the event that monitoring indicates a gradient away from the trench. If monitoring indicates a consistent gradient toward the trench, monitoring results shall be reported as part of the facility's annual Leachate Management and Monitoring Report. If monitoring reveals evidence of a gradient away from (not toward) the trench, RLI shall evaluate the potential cause(s) of the reversed gradient and implement measures to remediate the problem and provide a consistent inward gradient for the landfill in accordance with the LMP.

COMPLIANCE DATE: March 30 of each year or fourteen days after an inward gradient is not maintained

10. Existing Leachate Impoundment Report: The Discharger shall submit a report, acceptable to the Executive Officer, that demonstrates that the floor and side slopes of the existing leachate impoundment are lined with a minimum 2-feet thick low permeability soil liner in accordance with the design criteria of Title 23, Division 3, Chapter 15 of the California Code of Regulations.

COMPLIANCE DATE: January 18, 2010

11. Additional Leachate Impoundment(s) Report: The Discharger shall submit a report, acceptable to the Executive Officer, that details the construction of additional impoundment(s) for the temporary storage of leachate. The additional impoundments shall be sited, designed, and constructed in accordance with the Class II surface impoundment requirements of Title 27. The storage capacity of the existing and new impoundments shall be sufficient to accommodate twice the anticipated peak daily leachate production for the site and maintaining a minimum of 2-feet of freeboard in accordance with Section 20340 of Title 27.

COMPLIANCE DATE: January 18, 2010

12. Trench Fill Evaluation Report: The Discharger shall, through historical research and site investigations, approximately determine the location and dimensions (including depth to the extent practical) of all trench fills located in the 222.5-acre active landfill footprint. This report shall be acceptable to the Executive Officer, describe necessary research and/or subsurface investigations, without creating additional risk to the environment, to

ascertain whether any trench fills were excavated into the Pleistocene Alluvium underlying the Bay mud. The Discharger shall consider data from the US Geological Survey (USGS). If available information determines that trenches are not excavated into the Pleistocene Alluvium, no further action is required. If otherwise, the Discharger shall develop and implement a plan to effectively monitor the condition, and if necessary, mitigate this condition. After completion of this plan, the Regional Water Board shall make a determination as to whether a revision to the DMP is warranted to expand groundwater monitoring within the Pleistocene Alluvium underlying the Bay mud. If a revision is warranted to ensure that localized inconsistencies in the hydrogeologic system are considered, the Discharger shall consult with the Water Board regarding the need to locate and install additional alluvial wells to augment the four existing alluvial wells.

COMPLIANCE DATE: December 18, 2010

13. Exterior Levee Improvement Report: The Discharger shall submit a report, acceptable to the Executive Officer, which increases the height of the entire exterior levee to an elevation of +9-feet above mean sea level to prevent inundation or washout due to floods with a 100-year return period.

COMPLIANCE DATE: December 31, 2011

14. Long-Term Flood Protection Report: This Discharger shall submit a report, acceptable to the Executive Officer, for long-term flood protection at the site. The plan shall include a consideration of feasible options for achieving protection from the 100-year flood in the face of rising sea levels and increased flood frequency and intensity. The plan shall consider the methods developed by the San Francisco Bay Conservation and Development Commission to predict and protect against future flooding. The Plan shall be updated every 5 years throughout the operational life and post-closure maintenance period of the site with the most recently available and credible information at the time of the update.

COMPLIANCE DATE: December 31, 2013 and every 5 years
thereafter

15. Final Closure and Post-Closure Maintenance Plans: Prior to landfill closure, the Discharger shall prepare and submit for approval a final Closure and Post-Closure Maintenance plan, acceptable to the Executive Officer, for the waste in the southwest corner of the landfill property but outside of the landfill footprint as required under Title 27, Chapter 3, Subchapter 5, Closure and Post-Closure Maintenance. The Closure and Post-Closure plan shall demonstrate that the proposed alternative final cover design and existing base underlying the waste unit, in conjunction with post-closure monitoring, will continue to isolate the waste in the 11.5-acre area and prevent the degradation of groundwater.

COMPLIANCE DATE: Prior to Closure

16. Financial Assurance for Closure and Post Closure Monitoring and Maintenance: The Discharger shall submit to this Water Board evidence of an irrevocable fund acceptable to the Executive Officer, to ensure closure and monitoring and maintenance of the landfill during the post-closure period (Section 22207 and 22212 of Title 27). Every five years, for the duration of the post-closure monitoring period, the Discharger shall submit a report that includes an outline of the financial assurance mechanism and verification that the fund has been created. Fund value should be supported by calculations, to be included with this submittal, providing cost estimates for all closure and post-closure monitoring, maintenance, repair and replacement of landfill containment, cover, and monitoring systems. The fund value shall be based on the sum of these estimates. The cost estimates and funding should be updated to reflect change to monitoring systems as it may occur. The post-closure maintenance period shall extend as long as the landfill wastes pose a threat to water quality, however for purposes of calculating cost estimates, a period of no less than 30 years may be used.

COMPLIANCE DATE: July 15, 2009, then every five years thereafter

17. Well Installation Report: The Discharger shall submit a technical report, acceptable to the Executive Officer, that provides well construction details, geologic boring logs, and well development logs for all new wells installed as part of the Discharge Monitoring Program (Attachment A).

COMPLIANCE DATE: 60 days following completion of well installation

18. Post-Earthquake Inspection: The Discharger shall submit a Post Earthquake Inspection Report acceptable to the Executive Officer, in the event of any earthquake generating Moment Magnitude of 6.0 or greater at or within 30 miles of the landfill. The report shall describe the general site conditions, containment features, leachate conveyance and storage facilities, landfill gas flare, gas collection piping, levees, and stormwater control features.

COMPLIANCE DATE: Verbally as soon as the data becomes available and in writing within 72 hours of a triggering seismic event

19. Availability: A copy of these WDRs shall be maintained by the Discharger and shall be made available by the Discharger to all employees or contractors performing work (maintenance, monitoring, repair, construction, etc.) at the landfill.
20. Change In Ownership: The Discharger must notify the Executive Officer in writing at least 30 days in advance of any proposed transfer of this Order's responsibility and coverage to a new Discharger. The notice must include a written agreement between the existing Discharger and the new Discharger containing a specific date for the transfer of this Order's responsibility and coverage between the current Discharger and the new Discharger. This agreement shall include an acknowledgment of which Discharger is

liable for violations up to the transfer date and which Discharger is liable after the transfer date. [CWC Sections 13267 and 13263]

21. Revision: These WDRs are subject to review and revision by the Water Board. [CCR Section 13263]
22. Termination: Where a Discharger becomes aware that it failed to submit any relevant facts in a Report of Waste Discharge or submitted incorrect information in a Report of Waste Discharge or in any report to the Regional Water Board, it shall promptly submit such facts or information. [CWC Sections 13260 and 13267]
23. Vested Rights: This Order does not convey any property rights of any sort or any exclusive privileges. The requirements prescribed herein do not authorize the commission of any act causing injury to persons or property, do not protect the Discharger from liability under Federal, State or local laws, nor do they create a vested right for the Discharger to continue the waste discharge. [CWC Section 13263(g)]
24. Severability: Provisions of these WDRs are severable. If any provisions of these requirements are found invalid, the remainder of these requirements shall not be affected. [CWC 9213]
25. Operation and Maintenance: The Discharger shall, at all times, properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Discharger to achieve compliance with conditions of this Order. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this order. [CWC Section 13263(f)]
26. Reporting of Hazardous Substance Release: If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, the Discharger shall report such discharge to the Water Board by calling (510) 622-2300 during regular office hours (Monday through Friday, 8:00 to 5:00). A written report shall be filed with the Water Board within five working days. The report shall describe: the nature of the hazardous substance, estimated quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, schedule of corrective actions planned, and persons/agencies notified.
27. Entry and Inspection: The Discharger shall allow the Regional Water Board, or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:
 - a. Enter upon the Discharger's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this order;
 - b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this order;

- c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
 - d. Sample or monitor at reasonable times, for the purposes of assuring compliance with this order or as otherwise authorized by the CWC, any substances or parameters at any location. [CWC Section 13267]
28. Discharges To Navigable Waters: Any person discharging or proposing to discharge to navigable waters from a point source (except for discharge of dredged or fill material subject to Section 404 of the Clean Water Act and discharge subject to a general NPDES permit) must file an NPDES permit application with the Regional Water Board. [CCR Title 2 Section 223571]
29. Endangerment of Health or the Environment: The Discharger shall report any noncompliance that may endanger health or the environment. Any such information shall be provided orally to the Executive Officer, or an authorized representative, within 24 hours from the time the Discharger becomes aware of the circumstances. A written submission to the Regional Water Board shall also be provided within five days of the time a Discharger becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected; the anticipated time it is expected to continue and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.
30. Document Distribution: Copies of all correspondence, technical reports, and other documents pertaining to compliance with this Order shall be provided to the following agencies:
 - a. San Francisco Bay Regional Water Board; and
 - b. County of Marin, Local Enforcement Agency representative.

The Executive Officer may modify this distribution list as needed.
31. Duty to Comply: The Discharger shall comply immediately, or as prescribed by the time schedule above, with all Prohibitions, Specifications and Provisions of this Order. All required submittals must be acceptable to the Executive Officer. The Discharger must also comply with all conditions of these WDRs. Violations may result in enforcement actions, including Regional Water Board orders or court orders requiring corrective action or imposing civil monetary liability, or in modification or revocation of these WDRs by the Water Board. (CWC Section 13261, 13263, 13265, 13268, 13300, 13301, 13304, 13340, 13350).
32. Requests for Technical Reports: All technical and monitoring reports required by this Order are requested pursuant to Section 13267 of the CWC. Failure to submit reports in accordance with schedules established by this Order or failure to submit a report of

sufficient technical quality acceptable to the Executive Officer may subject the Discharger to enforcement action pursuant to Section 13268 of the CWC.

33. Electronic Reporting Format: In addition to print submittals, all reports submitted pursuant to this Order must be submitted as electronic files in PDF format. The Regional Water Board has implemented a document imaging system, which is ultimately intended to reduce the need for printed report storage space and streamline the public file review process. Documents in the imaging system may be viewed, and print copies made, by the public, during file reviews conducted at the Regional Water Board's office. PDF files can be created by converting the original electronic file format (e.g., Microsoft Word[®]) and/or by scanning printed text, figures and tables. Upon request by Regional Water Board staff, monitoring results, including water level measurements, sample analytical results, coordinates, elevations, etc., shall be provided electronically in Microsoft Excel[®] or similar spreadsheet format. This format facilitates data computations and/or plotting that Regional Water Board staff may undertake during their review. Data tables submitted in electronic spreadsheet format will not be included in the case file for public review. All electronic files, whether in PDF or spreadsheet format, shall be submitted via the Regional Water Board's Geotracker site. Email notification shall be provided to Regional Water Board staff whenever a file is uploaded to the Regional Water Board's Geotracker site.

34. This Order supersedes and rescinds Order No. 95-110.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, complete, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on July 8, 2009.

Bruce H. Wolfe
Executive Officer

Attachments:
Figure 1 - Vicinity Map
Figure 2 – Site Layout
Figure 3 – Groundwater and Leachate Monitoring Locations
Figure 4 – Leachate Extraction System
Self Monitoring Program (Part A and Part B)

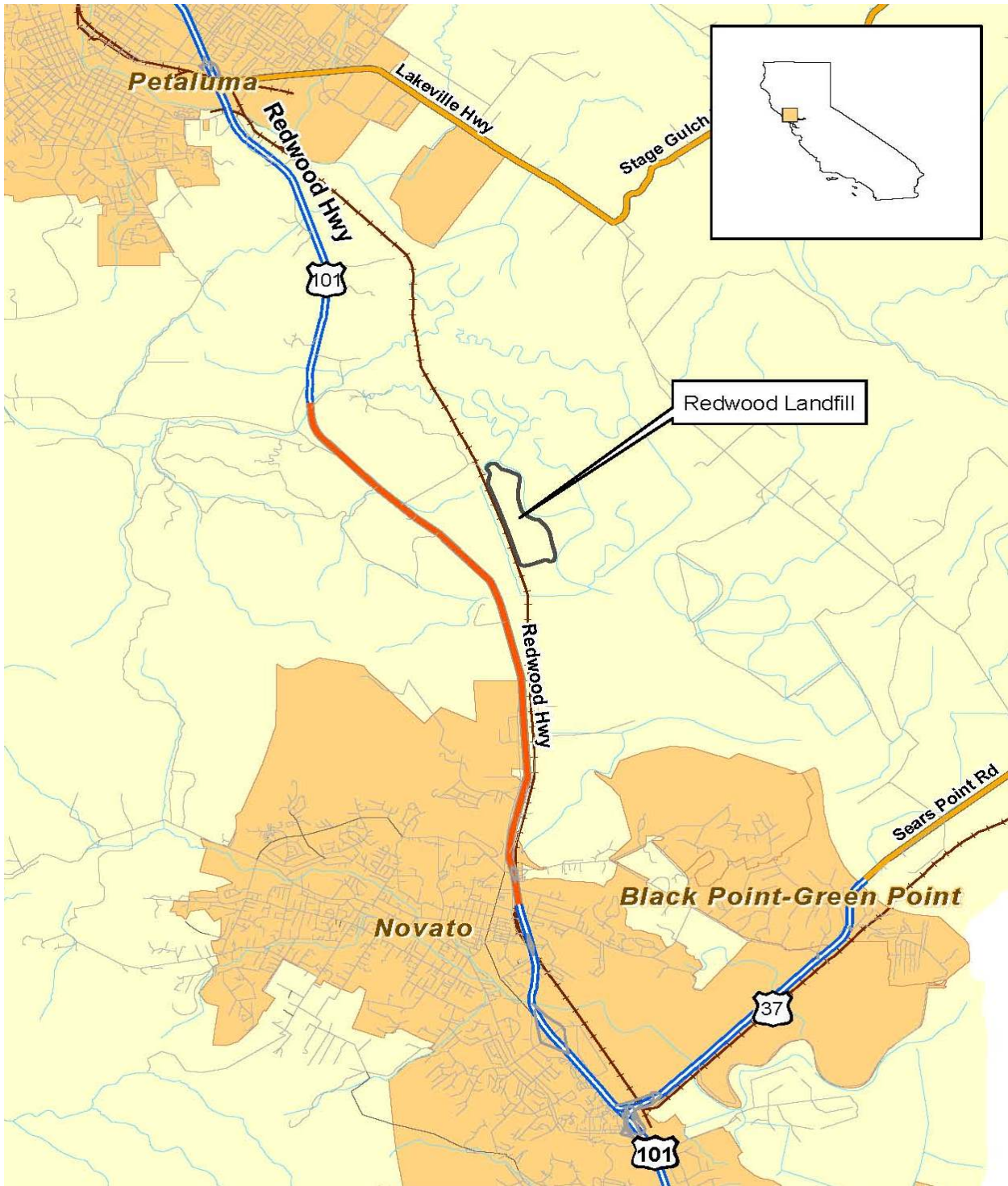


FIGURE 1. VICINITY MAP

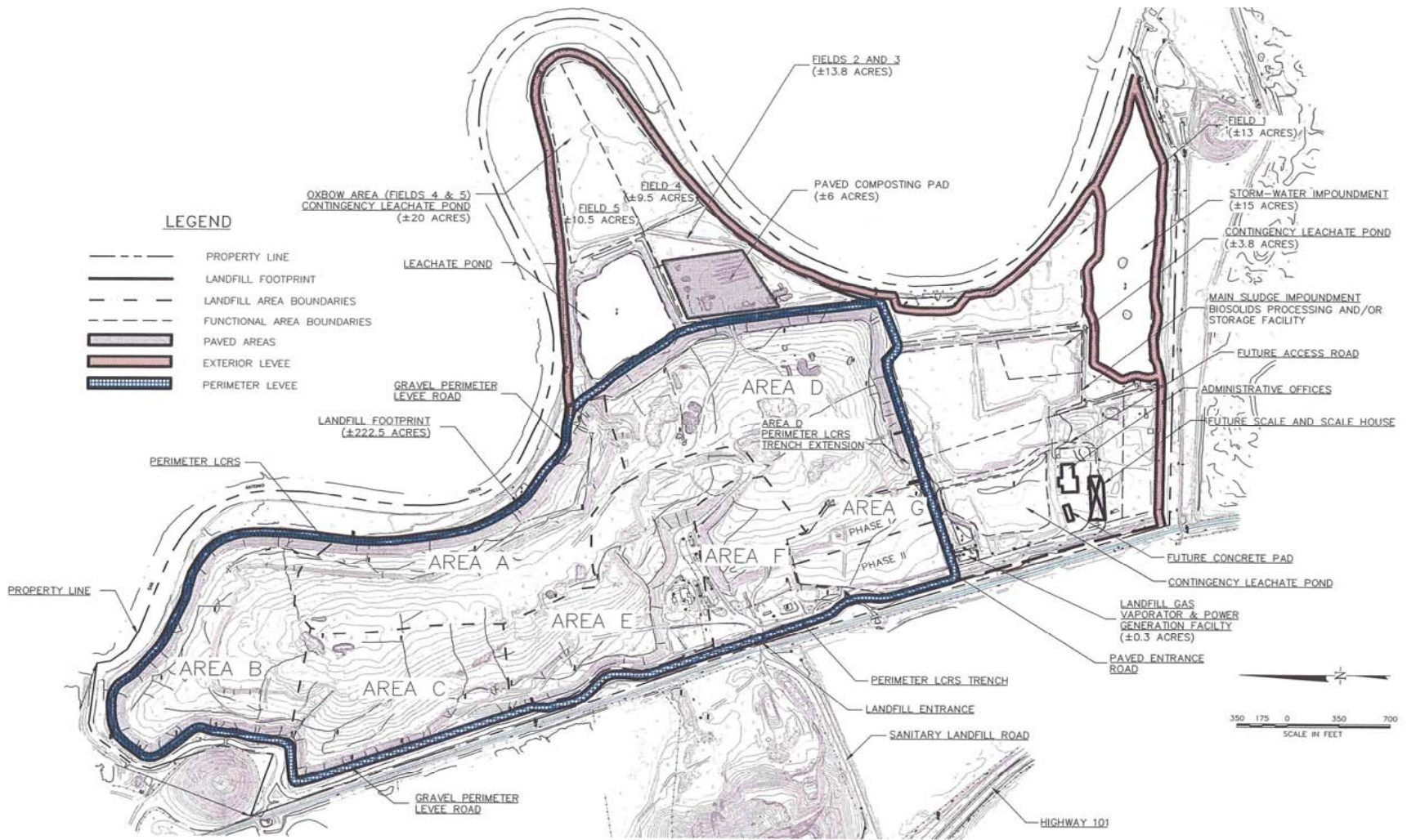


FIGURE 2. SITE LAYOUT



FIGURE 3. GROUNDWATER AND LEACHATE MONITORING LOCATIONS

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION
SELF-MONITORING PROGRAM**

**FOR
REDWOOD LANDFILL, INC.
REDWOOD LANDFILL**

**CLASS III SOLID WASTE DISPOSAL FACILITY
NOVATO, MARIN COUNTY
ORDER No. R2-2009-XXXX**

CONSISTS OF

PART A

AND

PART B

PART A

This self monitoring program (SMP) specifies monitoring and reporting requirements, including:

- General monitoring requirements for landfills and waste management units (Part A)
- Self monitoring report content and format (Part A)
- Self monitoring report submittal frequency and schedule (Part B)
- Monitoring locations and frequency (Part B)
- Monitoring parameters and analytes (Part B)

A. AUTHORITY AND PURPOSE

For discharges of waste to land, water quality monitoring is required pursuant to the California Code of Regulations, Division 2, Title 27, Subdivision 1, Chapter 3, Subchapter 3, Sections 20380 through 20435. The principal purposes of a SMP are: (1) to document compliance with waste discharge requirements and prohibitions established by the Water Board, (2) to facilitate self-policing by the waste Discharger in the prevention and abatement of pollution arising from the waste discharge, (3) to develop or assist in the development of effluent standards of performance, and toxicity standards, and (4) to assist the Discharger in complying with the requirements of Title 27.

This SMP supersedes the previous site discharge monitoring programs outlined in Order No. 95-110 (issued May 24, 1995). Furthermore, this SMP supersedes the monitoring requirements of Regional Board Order No. 93-113 and takes precedent over any conflict with any Standard Provisions that may be attached as part of this Order.

B. MONITORING REQUIREMENTS

Monitoring refers to the observation, inspection, measurement, and/or sampling of environmental media, waste management units (WMUs), containment and control facilities, and waste disposed in each WMU. The following defines the types of monitoring that may be required.

Monitoring of Environmental Media

The Water Board may require monitoring of groundwater, surface water, storm water, landfill gas and any other environmental media that may pose a threat to water quality or provide an indication of a water quality threat at the site.

Sample collection, storage, and analyses shall be performed according to the most recent version of EPA-approved methods or in accordance with a sampling and analysis plan approved by Water Board staff. Analytical testing of environmental media required by this SMP shall be performed by a California State approved laboratory for the required analyses. The director of the laboratory whose name appears on the certification shall be responsible for supervision of all

analytical work in his/her laboratory and shall have signing authority for all reports or may designate signing of all such work submitted to the Water Board.

All monitoring instruments and devices used to conduct monitoring in accordance with this SMP shall be maintained and calibrated as necessary to ensure their continued accuracy. All flow measurement devices shall be calibrated at least once every two years.

Standard Observations

Standard observations refer to observations within the limits of each WMU, at their perimeter, and of the receiving waters beyond their limits. Standard observations include:

1. WMUs:

- a. Evidence of ponded water at any point on the WMU
- b. Evidence of odors, including their presence or absence, characterization, source, and distance of travel from source
- c. Evidence of erosion and/or daylighted waste

2. Perimeter of WMUs:

- a. Evidence of liquid leaving or entering the WMU, estimated size of affected area and flow rate (show affected area on map)
- b. Evidence of odors, including their presence or absence, characterization, source, and distance of travel from source
- c. Evidence of erosion and/or daylighted waste

3. Receiving Waters:

- a. Floating and suspended materials of waste origin: including their presence or absence, source, and size of affected area
- b. Discoloration and turbidity: description of color, source, and size of affected area
- c. Evidence of odors, presence or absence, characterization, source, and distance of travel from source
- d. Evidence of beneficial use: presence of water associated with wildlife
- e. Flow rate
- f. Weather conditions: wind direction and estimated velocity, total precipitation

Facilities Inspections

Facilities inspections refer to the inspection of all containment and control structures and devices associated with WMUs. Containment and control facilities may include the following:

1. Asphalt or earthen covers
2. Perimeter drainage or diversion channels
3. Detention ponds or collection tanks

C. REPORTING REQUIREMENTS

Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13383, and 13387(b) of the California Water Code and this Water Board's Resolution No.73-16 and Order No. 93-113. At a minimum, each Self Monitoring Report (SMR) shall include the following information:

1. **Transmittal Letter:** A cover letter transmitting the essential points shall be included with each monitoring report. The transmittal letter shall discuss any violations during the reporting period and actions taken or planned to correct the problem. The letter shall also certify the completion of all monitoring requirements. The letter shall be signed by the Discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.

2. **Graphic Presentation:** The following maps, figures, and graphs (if applicable) shall be included in each SMR to visually present data collected pursuant to this SMP:

a. Plan-view maps showing all monitoring and sampling locations, waste management units, containment and control structures, treatment facilities, surface water bodies, and site/property boundaries

b. Groundwater level/piezometric surface contour maps for each groundwater-bearing zone of interest showing inferred groundwater gradients and flow directions around each waste management unit, based upon the past and present water level elevations and pertinent visual observations

c. Concentration vs. time graphs for key sampling parameters for each sampling location

d. Any other maps, figures, photographs, cross-sections, graphs, and charts necessary to visually demonstrate the appropriateness and effectiveness of sampling, monitoring, characterization, investigation, or remediation activities relative to the goals of this SMP.

3. **Tabular Presentation:** The following data (if applicable) shall be presented in tabular form and included in each SMR to show a chronological history and allow quick and easy reference:

a. Well designations

b. Well location coordinates (latitude and longitude)

c. Well construction (including top of well casing elevation, total well depth, screen interval depth below ground surface, and screen interval elevation)

d. Groundwater depths

e. Groundwater elevations

f. Phase-separated product elevations, if applicable

g. Phase-separated product thicknesses, if applicable

h. Current analytical results (including analytical method and detection limits for each constituent)

- i. Historical analytical results (including at least the past five years unless otherwise requested)
- j. Measurement dates
- k. Groundwater extraction, including:
 - (1) Average daily extraction rate
 - (2) Total volume extracted for monitoring period
 - (3) Cumulative total volume extracted since system inception
- l. Contaminant mass removal, including:
 - (1) Average daily removal rate
 - (2) Total mass removed for monitoring period
 - (3) Cumulative total mass removed since system inception

4. Compliance Evaluation Summary and Discussion:

- a. A summary and certification of completion of all environmental media monitoring, standard observations, and facilities inspections
- b. The quantity and types of wastes disposed of during each reporting period, and the locations of the disposal operations, if applicable
- c. The signature of the laboratory director or his/her designee indicating that he/she has supervised all analytical work in his/her laboratory
- d. Provide a discussion of the field and laboratory results that includes the following information:
 - (1) Data Interpretations
 - (2) Conclusions
 - (3) Recommendations
 - (4) Newly implemented or planned investigations and remedial measures
 - (5) Data anomalies
 - (6) Variations from protocols
 - (7) Condition of wells
 - (8) Effectiveness of leachate monitoring and control facilities

5. Appendices: The following information shall be provided as appendices in electronic format only unless requested otherwise by Water Board staff and unless the information is already contained in a Sampling and Analysis Plan approved by Water Board staff.

- a. New boring and well logs
- b. Method and time of water level measurements
- c. Purging methods and results including the type of pump used, pump placement in the well, pumping rate, equipment and methods used to monitor field pH, temperature, and conductivity, calibration of the field equipment, pH, temperature, conductivity, and turbidity measurements, and method of disposing of the purge water.

d. Sampling procedures, field and trip blanks, number and description of duplicate samples, type of sample containers and preservatives used, the date and time of sampling, the name of the person actually taking the samples, and any other relevant observations.

e. Documentation of laboratory results, analytical methods, detection limits, and Quality Assurance/Quality Control (QA/QC) procedures for the required sampling.

D. CONTINGENCY REPORTING

1. The Discharger shall report by telephone to the Water Board, any discharge from the disposal area immediately after it is discovered. The Discharger shall submit a written report to the Water Board within five days of discovery of any discharge. The written report shall contain the following information:

- a. A map showing the location(s) of discharge
- b. Approximate flow rate
- c. Nature of effects (e.g., all pertinent observations and analyses)
- d. Corrective measures underway or proposed

2. The Discharger shall submit a written report to the Water Board within seven days of determining a measurably significant result relative to the Site's Water Quality Protection Standard (WQPS), as defined in Title 27. Notification shall indicate: (1) what measurably significant result(s) have been identified; (2) whether or not the discharger intends to make an Optional Demonstration pursuant to Section 20420(k)(7); and (3) whether or not the discharger intends to resample the compliance point(s) where the measurably significant result(s) was identified. If the discharger chooses to resample, resampling must be performed at the next regularly scheduled sampling event. The result(s) will be reported within 7 days of determining whether the resample(s) confirm or refute the initial measurably significant result(s). One resample is sufficient to confirm or refute an initial measurably significant result.

3. If re-sampling and analysis confirms the earlier finding of a measurably significant result, the Discharger shall, upon determination by the Executive Officer, submit to the Water Board an amended Report of Waste Discharge as specified in Title 27, Section 20420 for establishment of an Evaluation Monitoring program meeting the requirements of Title 27, Section 20425, unless the Discharger submits a successful Optional Demonstration within 90 days of identifying a measurably significant result pursuant to Section 20420(k)(7).

4. A measurably significant result is defined below for statistically and non-statistically evaluated parameters. Statistically and non-statistically evaluated parameters include site-specific detection monitoring parameters indicated on Table B-1 attached hereto.

a. Statistically Evaluated Parameters: a measurably significant result is indicated when the reported parameter concentration is above an intrawell Shewart-CUSUM control chart limit or, as appropriate, an intra-well prediction limit.

b. Non-Statistically Evaluated Parameters: for the composite VOC_{water} monitoring parameter, a measurably significant result is indicated when the reported concentration of at least one parameter exceeds the Practical Quantitation Limit (PQL) or laboratory Reporting Limit (RL), whichever is lower. Common field and laboratory contaminants such as acetone, 2-butanone, methylene chloride, toluene, carbon disulfide, and chloroform are generally excluded from the non-statistical evaluation.

E. MAINTENANCE OF WRITTEN RECORDS

Dischargers shall maintain information required pursuant to this SMP for at least five years. The five-year period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Water Board.

PART B

A. MONITORING LOCATIONS AND FREQUENCY

Monitoring locations, frequencies, parameters, and analytes are specified in Tables B-1, B-2, and B-3 of this SMP and as indicated below. Monitoring locations are shown in Figure B-1.

1. Environmental Media

a. Groundwater:

Groundwater shall be monitored at the locations specified in Table B-1 and shown in Figure B-1. Monitoring frequencies, parameters, and analytes shall be in accordance with Table B-1.

b. Leachate:

Leachate shall be monitored at the locations specified in Table B-1 and shown in Figure B-1. Monitoring frequencies, parameters, and analytes shall be in accordance with Table B-1.

c. Storm Water:

Storm Water shall be monitored as required in the site's Industrial Activities Stormwater General Permit requirements. Surface water flows from on and around the landfill shall be sampled at the point(s) where they leave the facility boundary. Samples shall be taken twice during the wet season (October 1 to May 30) starting with the first storm of the rainy season which produces significant flows. Samples shall be collected from discharge points as required by Discharger's Industrial Activities Stormwater General Permit and shall be analyzed for the parameters listed in the Discharger's Industrial Activities Stormwater General Permit requirements.

d. Sludges and Petroleum-Contaminated Soils

High-moisture-content waste (those containing less than 50% solids) other than water treatment and waste-water treatment sludges shall not be discharged into the disposal area without prior approval by the Executive Officer. Such approval shall be granted only if there is adequate moisture holding capacity in the landfill based upon mass balances and previous monitoring of the relevant leachate control facility. A minimum solid-to-liquids ration of 5:1 by weight must be maintained for the disposal operation overall. Furthermore, sludges shall not be discharged into the disposal area unless they contain at least 20% solids if primary sludges, or at least 15% solids if secondary sludge, mixtures of primary and secondary sludges, or water treatment sludge.

Sludges and petroleum contaminated soils are acceptable for disposal into the landfill provided that concentrations do not exceed the acceptance limit for the constituents identified below:

Parameter	Acceptance limit (mg/l)
Benzene	0.015
Dichloromethane	0.075
Diesel	0.15
Ethylbenzene	0.45

MEK	3.0
PCB's	0.0075
Perchloroethylene (PCE)	0.075
Phenol	0.075
Styrene	0.15
Toluene	0.6
Trichloroethylene	0.075
Vinyl Chloride	0.03
Xylenes	0.3
Aluminum	10
Arsenic	0.25
Barium	50
Berellium	0.05
Cadmium	0.25
Chloride	12500
Chromium, VI	2.5
Cobalt	2.5
Copper	10
Lead	0.75
Manganese	2.5
Mercury	0.0006
Molybdenum	0.5
Nickel	5
Nitrate	500
Nitrite	50
Selenium	0.5
Silver	2.5
Sulfate	12500
Thallium	0.1
Vanadium	1
Zinc	100

(From: "Redwood Landfill: Proposed Waste Acceptance Criteria" Letter from the Water Board to Redwood Landfill, Inc. January 13, 1993.)

Acceptance limit is defined as the highest average concentration for each constituent of concern within a waste per disposal event. Event is the disposal of a specified quantity of waste; ongoing, long term disposal of a waste stream would consist of a series of individual events

2. Standard Observations

Standard observations shall be made within the limits of each landfill cell, at their perimeter, and of the water courses and receiving waters beyond their limits. Standard observations shall be conducted at the locations and frequencies specified in Table B-2

3. Facilities Inspections

The Discharger shall inspect all containment and control structures and devices associated with each landfill cell and the landfill as a whole to ensure proper and safe operation. Facilities inspections shall be conducted at the locations and frequencies specified in Table B-3.

B. REPORTING SCHEDULE

The Dischargers shall submit SMRs to Water Board staff in accordance with the schedule indicated in Table B-4. Reports due at the same time may be combined into one report for convenience, as long as monitoring activities and results pertaining to each monitoring period are clearly distinguishable.

Attachments: SMP Tables B-1, B-2, B-3, & B-4
SMP Figure B-1

Table B-1												
Redwood Landfill, Self Monitoring Program (SMP) for Order No. R2-2009-XXXX												
Parameter (Method)	Groundwater								Alluvium			
	Bay Mud											
	MW H-08	MW H-09	MW H-18	MW H-19	MW H-21	MW H-24	P-17C	P-2R	MW H-25R	P-5B	P-6B	P-10
Construction	4-in PVC	4-in PVC	4-in PVC	4-in PVC	4-in PVC	4-in PVC	4-in PVC	4-in PVC	4-in PVC	4-in PVC	4-in PVC	4-in PVC
Well Casing Depth (ft bgs)	34	29	19	21	24	34	38	29.5		63	102.5	42
Screen Interval (ft bgs)	23-29	12-22	11-14	17-20	19-24	32-34	34-38	22-29.5		53-63	89.5-102.5	25-42
<u>Field Measurements</u>												
Water Elevation	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q	Q
Electrical Conductivity	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A
pH	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A
Temperature	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A
Turbidity	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A	S/A
<u>Laboratory Analyses</u>												

Mo, Ni, Se, Ag, Tl,
Sn, V, Zn)
(6010B/7470A)

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Parameter (Method)	Leachate					
	LCS Pond	GR-7R	GR-8R	GR-9R	GR-10R	GR-11R
<u>Field Measurements</u>						
Water Elevation	NA	Q	Q	Q	Q	Q
Electrical Conductivity	Q ⁽³⁾	A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
pH	Q ⁽³⁾	A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Temperature	Q ⁽³⁾	A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Turbidity	NA	A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
<u>Laboratory Analyses</u>						
<u>Leachate Monitoring Parameters</u>						
VOCs (8260B); incl. MtBE	Q ⁽³⁾	A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Alkalinity (speciated) (2320B)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Calcium, total (6010B)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Sodium, total (6010B)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Potassium, total (6010B)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Magnesium, total (6010B)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Nitrate as N (353.2)	Q ⁽³⁾	A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Chloride (9251)	Q ⁽³⁾	A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Sulfate (9038)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Total Dissolved Solids (2540C)	Q ⁽³⁾	A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Total Organic Carbon (9060)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Total Kjeldahl Nitrogen (351.2)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5

Cyanide, total (9010B/9012A)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Sulfide, total (9030B/9034)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
SVOCs (8270C)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Pesticides (8081A)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Herbicides (8151A)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
PCBs (8082)		A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5
Trace Metals, total (Sb, As, Ba, Be, Cd, Cr, Co, Cu, Pb, Hg, Mo, Ni, Se, Ag, Tl, Sn, V, Zn) (6010B/7470A)	Q ^(3,4)	A - 2/5	A - 2/5	A - 2/5	A - 2/5	A - 2/5

Notes and Explanations:

⁽¹⁾ Constituents of Concern are monitored every 5 years in conjunction with Site-Specific Detection Monitoring Parameters and Supply

⁽²⁾ Next 5-year Constituents of Concern sampling event will occur during the first semester of 2013

⁽³⁾ The LCS pond is sampled on a quarterly basis only if liquid from this pond is used for dust control purposes.

⁽⁴⁾ A modified list of trace metals is used for LCS pond. These are: **As, Ba, Cd, Cr, Cu, Fe, Mg, Mn, Pb, Hg, Se, Ag, Zn**

⁽⁵⁾ this parameter used to evaluate compliance with WQPS using non-statistical evaluation

⁽⁶⁾ this parameter used to evaluate compliance with WQPS using statistical evaluation

Q = quarterly monitoring

S/A = semiannual monitoring

A - 2/5 = annual monitoring of two of five leachate wells on a rotating basis

NA = Not Applicable

Water Quality Protection Standard (WOPS) for Redwood Landfill

Constituents of Concern: Section 20395 of Title 27 defines Constituents of Concern (COCs) as “all waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the Unit”. COCs for the Redwood Landfill include the site-specific detection monitoring parameters identified in the SMP attached to this Order, or any amendment thereof, and all Appendix II parameters in the federal Subtitle D regulations. The Discharger may propose modifications to the parameter list as additional data becomes available concerning site-specific source characteristics and natural background water quality. However, modifications shall only be made upon written concurrence from the Executive Officer.

Site-Specific Detection Monitoring Parameters: these parameters are statistically evaluated using either statistical or non-statistical methods, as described in the Concentration Limits section, below. These parameters were selected based on site-specific evaluation designed to

identify optimal leak-detection performance and control of statistical false-positive error rate. Specifically, leachate-groundwater contrast and other factors such as expected mobility were considered in the selection of these parameters, using the strategies outlined in ASTM (2004) Standard Guide for Optimization of Ground Water Monitoring Constituents for Detection Monitoring Programs for RCRA Waste Disposal Facilities, ASTM D7045 – 04. However, experience at Redwood Landfill shows that even the parameters predicted to have optimal performance for leak-detection can produce false-positive results using conventional statistical and non-statistical methods of compliance evaluation due to the site's complex geochemical environment.

Concentration Limits: Pursuant to Title 27, Section 20400, the Discharger utilizes both statistical and non-statistical concentration limits (CLs). Statistically-derived CLs that are based upon evaluation of natural background groundwater conditions. Intra-well Shewhart-CUSUM control charts are used to statistically evaluate the site-specific detection monitoring parameters. The Shewhart-CUSUM analytical test calculates a control limit to which each new result is compared. The cumulative sum of each new result is incorporated into the statistical calculation so that increasing trends are easily detected. In cases where the detection frequency for a given parameter in a given well is less than 25%, a non-parametric prediction limit in lieu of a Shewhart-CUSUM control chart will be used provided sufficient data are available. If the statistical tests indicate no change in groundwater quality, then the background dataset is updated every two-years to provide more robust statistical comparisons for future analysis. A verified result or CUSUM value above a Shewhart-CUSUM control chart limit is regarded as a measurably significant result requiring response action.

The CL for organic compounds, which are not naturally occurring and not detected in background groundwater samples, shall be taken as the practical quantitation limit (PQL) or the contract laboratory's Reporting Limit (RL) of the analytical method used (e.g., US-EPA Methods 8260 and 8270). A verified detection of one or more non-naturally occurring organic compounds above the PQL/RL in samples from groundwater monitoring points is regarded as a measurably significant result requiring response action.

Monitoring Points: Title 27 defines Monitoring Points as “a well, device, or location specified in the waste discharge requirements at which monitoring is conducted and at which the water quality protection standard applies”. Monitoring points for the Redwood Landfill, which are located along the POC and at additional locations, are specified in the SMP attached to this Order, or any future amendments thereof.

Table B-2 Standard Observations

STATION	FREQUENCY
WMUs	Monthly
WMU Perimeter	Monthly
Receiving Waters	Monthly

Table B-3 Facilities Inspections

CONTAINMENT AND CONTROL FACILITY	FREQUENCY
Leachate Collection and Removal Systems (LCRS)	Quarterly
Perimeter and Exterior Levees	Quarterly
Surface Water Impoundment	Quarterly
Sumps and Subdrain Collection Systems	Quarterly
Perimeter diversion channels	Quarterly
Leachate management facilities and secondary containment (Leachate Storage Impoundments, piping, treatment facilities, etc.)	Quarterly

Table B-4 Reports and Due Dates

Report Type	Reporting Frequency	Report Due Dates
Environmental Media Monitoring (Groundwater and Leachate)	Semi-Annual	January 31 & July 31
Standard Observations & Facilities Inspections	Semi-Annual	January 31 & July 31



FIGURE B-1. GROUNDWATER AND LEACHATE MONITORING LOCATIONS