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CENTRAL VALLEY REGION

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Waste Discharge Requirements Order R5-2020-0009

ORDER INFORMATION

Order Type(s):	Waste Discharge Requirements (WDRs)
Status:	ADOPTED
Program:	Title 27 Discharges to Land
Region 5 Office:	Sacramento (Rancho Cordova)
Discharger(s):	Stanislaus County, Dept. of Environmental Resources and City of Modesto
Facility:	Geer Road Landfill
Address:	750 Geer Road, Modesto, California 95357
County:	Stanislaus County
Parcel Nos.:	009-029-012; 009-029-009; 018-003-021; 009-029-015
CIWQS ID:	737139
Prior Order(s):	70-153; 77-189; 89-205; 92-131; 95-099; R5-2009-0051

CERTIFICATION

I, PATRICK PULUPA, Executive Officer, hereby certify that the following is a full, true, and correct copy of the order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 20 February 2020.

Patrick Pulupa 2020.03.18 09:42:20 -07'00'

PATRICK PULUPA, Executive Officer

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GLOSSARY

ADC	Alternative Daily Cover
Antidegradation Policy	Statement of Policy with Respect to Maintaining High Quality Waters in California, State Water Board Resolution 68-16
Basin Plan	Water Quality Control Plan for [Basin]
bgs	Below Ground Surface
BOD	Biochemical Oxygen Demand
BPTC	Best Practicable Treatment and Control
C&D	Construction and Demolition Materials
CalRecycle	California Department of Resources Recovery and Recycling
CAP	Corrective Action Program
CAMP	Corrective Action Monitoring Program
CEQA	California Environmental Quality Act
CEQA Guidelines	California Code of Regulations, Title 14, section 15000 et seq.
CFR.	Code of Federal Regulations
COCs	Constituents of Concern
C-Soil	Contaminated Soil
CQA	Construction Quality Assurance
DEIR	Draft Environmental Impact Report
DMP	Detection Monitoring Program
DTSC	California Department of Toxic Substances Control

GLOSSARY

DWR.....California Department of Water Resources

EC .....Electrical Conductivity

EIR .....Environmental Impact Report

EMP .....Evaluation Monitoring Plan

FCPMP.....Final Closure and Post-Closure Maintenance Plan

FEIR .....Final Environmental Impact Report

FEMA .....Federal Emergency Management Agency

GCL.....Geosynthetic Clay Liner

HDPE .....High Density Polyethylene

JTD.....Joint Technical Document

LCRS.....Leachate Collection and Recovery System

LEA .....Local Enforcement Agency

LFG .....Landfill Gas

MCE .....Maximum Credible Earthquake

MDB&M.....Mount Diablo Base and Meridian

MDL.....Method Detection Limit

µg/L .....Micrograms per Liter

mg/L .....Milligrams per Liter

MPE .....Maximum Probable Earthquake

MSL.....Mean Sea Level

MRP .....Monitoring and Reporting Program

MSW .....Municipal Solid Waste

GLOSSARY

MSWLF	Municipal Solid Waste Landfill
MW	Monitoring Well
NAVD88	North American Vertical Datum of 1988
PCPMP	Preliminary Closure and Post-Closure Maintenance Plan
SPRRs	Standard Provisions and Reporting Requirements
Subtitle D	USEPA-promulgated MSW regulations under RCRA (see 40 C.F.R. part 258)
RCRA	Resource Conservation and Recovery Act
ROWD	Report of Waste Discharge
TDS	Total Dissolved Solids
Title 22	California Code of Regulations, Title 22
Title 23	California Code of Regulations, Title 23
Title 27	California Code of Regulations, Title 27
USEPA	United States Environmental Protection Agency
VOCs	Volatile Organic Compounds
WDRs	Waste Discharge Requirements
WMU	Waste Management Unit
WQPS	Water Quality Protection Standard

FINDINGS

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) hereby finds as follows:

1. The County of Stanislaus and the City of Modesto own, and the County of Stanislaus (Department of Environmental Resources) operated and now maintains, the Geer Road Landfill (Facility), a closed, municipal solid waste (MSW) landfill located about eight miles east of downtown Modesto near the Tuolumne River. The Facility is in Section 34, T3S, R10E, and Section 3, T4S, R10E, Mount Diablo Base and Meridian (MDB&M). See Attachment A: Location Map.

2. For the purposes of this Order, the Facility is comprised in part of Stanislaus County Assessor's Parcel Numbers (APNs), four of which are owned by the City of Modesto and County of Stanislaus:

   a. APN 009-029-012 (85 acres);

   b. APN 009-029-009 (40 acres);

   c. APN 018-003-021 (36 acres); and

   d. APN 009-029-015.[1]

3. As owners of the Facility, the County of Stanislaus and City of Modesto (Dischargers) are responsible for compliance with this Order. (The County of Stanislaus is also responsible for compliance with this Order as operator of the Facility.)

4. This Order encompasses post-closure maintenance and corrective action of two landfill waste management units (WMUs or Units), Landfill 1 (LF-1) and Landfill 2 (LF-2), covering a total of 154 acres at the Facility. As discussed in Finding 10, neither Landfill 1 (LF-1) nor Landfill 2 (LF-2) are subject to Subtitle D. Information for LF-1 and LF-2 is summarized below.

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[1] The Facility includes a portion of an adjacent parcel northwest of the site (i.e., Triangle Ranch Property, APN 009-029-015) where treated effluent from the Facility is discharged to land under separate, Non-Title 27 WDRs. See Findings 57 and 58.

Table 1—Landfill Units

WMU	Area (acres)	Liner and/or LCRS	Underlying Trenches	Unit Class	Subtitle D	Primary Wastes	Status
Landfill 1	89.8	None	20	III	Not Applicable (See Finding 10)	Household; C&D; Inert	Closed
Landfill 2	64.2	[same]	13	[same]	[same]	[same]	[same]

Each landfill unit at the Facility consists of an area fill overlying trench fill. See Attachment C and Attachment 1 to Information Sheet.

The Facility operated (i.e., accepted wastes for onsite disposal) from 1970 until 1 July 1990, and was closed in 1995. Approximately 4.5 million tons of waste was discharged to the landfill during its active life. See Finding 12.

Materials Accompanying this Order

5. The following documents are attached to this Order and incorporated herein:

   a. Attachment A – Location Map

   b. Attachment B – Area Map

   c. Attachment C – Site Map

   d. Attachment D – Gas Monitoring & Controls

   e. Attachment E – Groundwater Monitoring System

   f. Attachment F – Groundwater Monitoring Summary Table

   g. Attachment G – Groundwater Extraction & Treatment System (GWETS)

   h. Attachment H – Groundwater Treatment Plant Schematic

   i. Attachment I – Surface Water Monitoring and Drainage Controls

j. Standard Provisions and Reporting Requirements, December 2015 Edition (SPRRs)

k. Information Sheet, including Attachments 1 (1974 Trench Fill Plan) and 2 (Nearby Supply Wells)

6. Attached and incorporated as part of this Order is the separately issued Monitoring and Reporting Program R5-2020-0009 (MRP), which sets forth the approved Water Quality Protection Standard (WQPS). (Title 27, § 20390 et seq.) Compliance with the operative MRP (including subsequent amendments) is required under this Order.

7. Additional information set forth in the attached **Information Sheet** is incorporated herein as part of these findings.

8. On 21 June 2019, upon referral from the Central Valley Water Board's Compliance and Enforcement Unit, Water Board permitting staff issued a letter requesting that the Dischargers submit an application for revised WDRs and an updated Joint Technical Document (JTD) documenting changes at the Facility since 2009, including completion of evaluation monitoring and corrective action tasks to address historical groundwater impacts from the landfill. See Finding 43. On 23 August 2019, the Dischargers submitted the updated JTD, including, but not limited to, the following information:

a. A May 2019 request for authorization for start-up of a new groundwater extraction and treatment system (GWETS), including the results of preliminary batch testing and an operations and maintenance (O&M) plan for the system.

b. A March 2018 certification report documenting construction of the new GWETS and an associated offsite infiltration gallery.

c. A December 2012 Report of Waste Discharge (ROWD) and an August 2016 Amended ROWD documenting various evaluation monitoring and corrective action measures implemented under Cease and Desist Order (CDO) R5-2011-0021 adopted by the Central Valley Water Board in April 2011. See Finding 53;

d. A proposed updated Water Quality Protection Standard (WQPS);

e. Financial assurance cost estimates for post-closure maintenance and corrective action; and

f. Updated facility maps and descriptions showing the new GWETS and other site improvements implemented since 2009.

These revised WDRs prescribe Title 27 requirements applicable to the facility based on information in the JTD and project files.

9. On-site facilities include the landfill units; landfill access roads; precipitation and drainage controls, including a sedimentation pond; erosion controls; an LFG extraction system and flare station; a GWETS; a treated groundwater infiltration area; leachate collection and storage facilities; monitoring wells/probes, and various other landfill facilities. See Attachment C: Site Map.

Wastes & Unit Classifications

10. The Facility is not subject to federal municipal solid waste (MSW) landfill regulations (Title 40, Code of Federal Regulations, Part 258, or "Subtitle D") because it ceased accepting wastes before the effective date of those regulations, 9 October 1991.

11. Previous WDRs re-classified/continued the landfill as a single, unlined Class III landfill unit, but did not include a Finding supporting this classification.[2] These WDRs find that the geologic materials underlying the site do not meet Class III standards for waste containment, but re-classify the landfill as two separate Class III landfill units given that both fill areas at the site were closed with Title 27-compliant final covers that constitute their principle containment features. See Finding 64. Both units are also "existing" units because they operated prior to the effective date of Chapter 15 regulations (27 November 1984).

12. Both landfill units primarily accepted household, commercial, industrial, and construction and demolition wastes classified as "nonhazardous" and "inert" per Title 27 sections 20220(a) and 20230(a). Disposal rates averaged about 770 tons per day (tpd) of which approximately 0.3 percent (about 3.4 tons per day) is estimated to have been hazardous. It is also likely, given groundwater impacts at the site, that some of the wastes may have been designated wastes. The landfill also accepted "substantial quantities" of cannery (i.e., high moisture content)

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2. Previous WDRs Order 77-189 classified both units as a single, Class II-2 unit under former Subchapter 15 regulations notwithstanding Finding that soils underlying the landfill were in hydraulic communication with groundwater. WDRs Order 89-205 re-classified the units as a Class III landfill but required that the units ("landfill") be closed with a Chapter 15-compliant cover. WDR Orders 92-131, 95-099, and R5-2009-0051 continued the Class III classification of the units as a single unit.

wastes, which were co-disposed of with non-MSW nonhazardous wastes. See WDR Orders 77-189 and 85-205.[3]

13. The quality and volumes of leachate produced by the landfill units are unknown given that neither was constructed with an LCRS. Also, two leachate monitoring wells (LWs-1 & 2) installed through landfill waste at the site in 2002 have been historically dry. See Attachment D.

Site Description

14. The Facility site is situated on a 168-acre site located about one-half mile south of Yosemite Boulevard east of the City of Modesto. The geographic coordinates of the site are Latitude 37.626°north, Longitude -120.848° west. The address is 750 Geer Road, Modesto, California 95357. See Attachments A-B.

15. The site lies on a bluff overlooking a meander bend of the Tuolumne River to the south. The terrain generally slopes toward the river with elevations ranging from about 138 feet NAVD88 along the northern perimeter of the site to about 72 feet NAVD88 along the southwest perimeter near the river.

16. Land uses in the vicinity of the Facility include industrial (i.e., the landfill), irrigated agriculture (adjacent orchards and vineyard), water conveyance (Modesto Irrigation District canal), buffer land (a ranch), rural residential (adjacent Streeter property) and a mobile home park (Pine Wood Meadows). See Attachment B: Area Map.

17. Federal Emergency Management Agency (FEMA) Flood Insurance Rate (FIRM) Maps for the area show the southern toe of LF-1 is within the 100-year flood plain (i.e. “Zone A”). The remainder of LF-1 and all of LF-2 lie outside the 100-year flood plain (“Zone X”).[4] The landfill area is protected by a 10-foot high berm.

18. The 100-year, 24-hour precipitation event for the site is about 2.5 inches based

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3. The discharge of cannery waste was limited to at least 90 feet above mean sea level (MSL) and the discharge of “Group 2” wastes (e.g., MSW, designated wastes) was limited to at least 77 feet MSL (highest anticipated river elevation). There was no minimum elevation limit on the discharge of “Group 3” (i.e., inert) wastes, which were stated to have been deposited below 77 feet MSL. See WDR Order 77-189, Finding 4.

4. Based on FIRM Map Nos. 06099C0365E (northern half of site) and 06099C0600E (southern half of site) for Stanislaus County, Community Panel No. 060384, both updated on 26 September 2008. See https://msc.fema.gov/portal.

on the *Rainfall Depth Duration Frequency Data* provided on the Department of Water Resources' (DWR) Flood Emergency Response Information Exchange (FERIX) website for the Modesto Station (B00 5738 00) approximately eight miles west of the site. The facility receives an average of about 11.5 inches of precipitation per year based on historical data for this station. The mean pan evaporation rate is about 54 inches per year (6.7 inches per month during the dry season and 2.5 inches per month during the wet season).[5] Average monthly evaporation typically exceeds average monthly precipitation 10 consecutive months (February through November) out of the year.[6]

19. A December 2019 Department of Water Resources (DWR) well survey identified at least 95 groundwater supply wells within a one-mile radius of the site, including three municipal supply wells, 77 domestic supply wells, 14 agricultural/irrigation wells, and one industrial supply well. The locations of these wells relative to the Facility are shown on Information Sheet, Attachment 2: Nearby Supply Wells. Five of the supply wells near the landfill were monitored under the CDO but are not required to be monitored under this Order. See Information Sheet.

20. The site is located at the northeastern end of the San Joaquin Valley, a deep structural trough bounded by the Sacramento Valley to the north, the Sierra Nevada Mountains to the east, the San Emigdio and Tehachapi Mountains to the south, and by the Coast Ranges Mountains to the west. San Joaquin Valley deposits generally consist of alluvial, fluvial, delta, and flood plain sediments generated over geologic time by glaciation and weathering/erosion processes of the Sierra Nevada and deposited by the San Joaquin River and its tributaries. San Joaquin Valley sediments are estimated to be up to 11,000 feet thick in the Modesto area. Underlying the continental deposits are ancient marine deposits.

21. The site is underlain by the Modesto Formation, which ranges from about 65 to 130 feet thick regionally; the Riverbank Formation, which ranges from about 150 to 250 feet thick; the Turlock Lake Formation, which ranges up to 800 feet thick; and then Mehrten Formation, which consists of andesitic sediments referred to as "black sands." To the west and south, the Turlock Lake Formation includes the Corcoran Clay, a significant geological marker representing the confining layer separating aquifer systems on the western half of the San Joaquin Valley. A semi-confining blue clay layer logged in some wells beneath the site is believed to represent the eastern margins of the Corcoran Clay.

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5. Estimate based on historical data collected at DWR's Oakdale California Irrigation Management Information System (CIMIS) Station about 6.5 miles north of the site.

6. Estimate based on raiLF-1ll data from the Modesto Station (A00 7633 00).

22. Surface soils at the site consist primarily of sandy, silty loam and loamy silty sand to a depth of five feet.[7] Underlying soils generally consist of laterally and vertically discontinuous interbedded stream channel deposits consisting of clay, silt, sand, and/or gravel. Having been cut and eroded over geologic time by the meandering Tuolumne River, the grain size distribution of the deposits is highly variable, and the deposits are difficult to correlate laterally, even in closely spaced wells. See also Finding 31.

23. There are no known Holocene faults beneath the landfill unit. The nearest historically active fault system is the Foothills Fault System about 28 miles northeast of the site. In 1975, an earthquake registering 5.8 on the Richter scale occurred along the Cleveland Hills Fault in the Foothills Fault System near Oroville. This may be the maximum probable earthquake (MPE) for this site using a deterministic approach.

24. Class III WMUs must be designed and constructed to withstand a maximum probable earthquake (MPE). The maximum credible earthquake (MCE), a more stringent slope stability standard applicable to Class II units, can alternatively be used as the design standard for a Class III unit. (Title 27, § 20370). A 1988 site-specific seismic hazard analysis for the Facility conducted by the Discharger using the MCE as the design standard indicated an MCE event occurring along the Calaveras Fault Zone about 50 miles west-southwest of the site.[8] Probabilistic analysis using the online USGS seismic hazard tool based the San Andreas and related Coast Range fault systems indicates an MPE of about 6.6

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7. Surface soils at the site generally consist of Hanford Sandy Loam and Tujunga Loamy Sand soils which derive from erosion of Sierran granitic deposits. See Sept. 1964 *U.S. Dept. of Agriculture, Natural Resources Conservation Service, Soil Survey of Eastern Stanislaus Area* (CA644).

8. See 1988 report *Geotechnical Services Geer Road Landfill, Stanislaus County, California*, prepared by J.H. Kleinfelder & Associates in 1994 FC/PCMP, Vol. III, Appendix C.

occurring a mean distance of about 40 miles from the site. [9,10] The data may be summarized as follows:

Table 2 - Site Specific Seismic Analysis

Seismic Event	Magnitude	Peak Ground Acceleration	Return Period	Notes
Maximum Credible Earthquake (MCE)	7.5 M_L	0.13 g	(Not Applicable)	Magnitude based on deterministic approach (Richter or Local scale units).
Maximum Probable Earthquake (MPE)	5.8 M_L	(Not Estimated)	(Not Applicable)	Magnitude based on deterministic approach (Richter or Local scale units).
--	6.6 M_W	0.10 g	103 years	Magnitude based on probabilistic approach (Moment Magnitude scale units).

Unsaturated Zone

25. The unsaturated zone beneath the site generally consists of Modesto Formation deposits, as described in Finding 22. The unsaturated zone column outside of the landfill area ranges from about 15 to 75 feet in thickness depending on topography and depth to groundwater. Beneath the landfill where there is subsurface fill, the thickness of the unsaturated zone may be less the five feet in some areas, especially during periods of flooding or seasonal high groundwater. See Findings 34-36.

26. Migration of LFG from the oldest portion of the landfill (i.e., LF-2) was identified in 1981. A 1982 CalRecycle study found indications of LFG displacing oxygen in

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9. USGS Unified Earthquake Hazard Tool (Dynamic: Coterminous US 2014 v4.1.1) used in analysis. See https://earthquake.usgs.gov/hazards/interactive. Model assumed a 100-year return period and a mean shear wave velocity (Vs30) of 360 m/s in the upper 30 meters (98.4 feet) of soil.

10. One fault zone included in the model (i.e., relevant in probabilistic analysis), the San Andreas (Santa Cruz Mountains), was outside of the 100 km search radius required under Title 27.

soils underlying a walnut orchard off-site on the landfill's southern perimeter. Soil gas investigations conducted from 1988 to 1990 identified gas migration off-site on both the northwestern and northeastern perimeters of the landfill.

27. Soil gas monitoring wells were first installed at selected locations along the site perimeter where LFG migration issues were identified. There are currently 37 soil gas monitoring locations at the site, including 17 with triple completion probes (shallow, medium & deep), six with double completion probes (shallow & deep), and 14 single completion probes (entire interval). Alternatively stated, there are a total of 77 gas probes, including 23 shallow probes, 17 medium depth probes, 23 deep probes and 14 probes screened over the entire interval opposite waste. (See MRP, § A.2.a.) All soil gas monitoring probes are along the site perimeter and the probes screened in the unsaturated zone opposite landfill waste.

28. All perimeter soil gas probes at the site have been at or near non-detect levels for methane for several years. VOC sampling of the probes conducted in 2006 showed the presence of several halogenated VOCs in several of the probes (e.g., GPs-01 through -03, and GPs-8 through 11), including PCE up to 220 parts per billion (ppb) in GP-02. Freon was also detected in the probes up to 230 ppb. See also Finding 48.

29. No pan lysimeters or soil pore liquid monitoring devices were installed (or required under then-existing regulations) beneath either LF-1 or LF-2 prior to subsurface filling in the 1970s and 1980s. Given number of trenches excavated and filled at the site, and variations in groundwater separation at the site, retrofitting the landfill with vadose zone monitoring devices is not technically or economically feasible. See Findings 59 and 34. The groundwater monitoring system therefore provides the earliest detection of a release from the unit. (See Title 27, section 20415, subdivision (d)(5).)

Surface & Groundwater Conditions

30. Surface drainage is to the Tuolumne River (about 250 feet south and southwest of the site) which meanders from east to west (via the Don Pedro Reservoir 34 miles northeast of the site) from its source in the Sierra Nevada. The Tuolumne River is tributary to the San Joaquin River, which empties into the Sacramento-San Joaquin River Delta. Tuolumne River levels in the area typically vary up to about 10 feet seasonally, except during infrequent flood events. See Finding 17.

31. The uppermost aquifer occurs in Modesto Formation about 20 to 60 feet below ground surface (bgs) at the site, depending on topography. Shallow and lower water-bearing zones (also referred to as shallow and deep zones) separated by a confining or semi-confining bed have been identified beneath the site based on

lithology.[11] The shallow zone (unconfined) ranges from about two to 15 feet thick and generally consists of fine-to-medium grained sand or silty sand. Wells installed in the shallow zone typically have 20-foot screens beginning at about 48 to 76 feet NAVD88 depending on location. The deepest shallow zone wells are on the east side of the site. The deep zone averages about 15 feet thick and generally consists of sand and gravel. As such, the upper portion of the deep zone is generally more permeable than the shallow zone. Top screen elevations of deep zone wells at the site range from about 2 to 39 feet NAVD88. The deepest deep zone wells are generally on the northern and eastern sides of the site.

32. Shallow groundwater elevations generally range from about 61 feet NAVD88 (east) to 51 NAVD88 (west). The depth to groundwater is typically about 77 feet bgs along the northern part of the site (i.e., LF-1), about 59 feet bgs along the eastern perimeter (LF-2), and about 21 feet bgs along the southern perimeter (LF-1 and LF-2). Shallow groundwater generally flows from east to west in the northern part of the site and toward the southwest in the southern half of the site at an average gradient of about 0.0033 feet per foot (ft/ft). Deep zone flow is generally more westerly at about the same gradient. Estimated groundwater velocities in the shallow and deep zones, respectively, have averaged about 290 ft/year and 340 ft/year since 2015.

33. Aquifer testing at the site indicates the shallow and deep zones are in hydraulic communication with each other in some areas. Flow in each zone is influenced by a variety of hydrogeological factors (e.g., pumping, river level, vertical gradients, surface infiltration) that can result in non-linear elevation contours.[12] Extrapolation of groundwater elevation contours in areas where there is a lack of groundwater elevation monitoring data (e.g., within the landfill area and offsite to the southeast) may also introduce errors in estimating the gradient and flow direction. In general, vertical gradients appear to be downward (shallow zone to

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11. A conceptual model constructed using boring logs from wells at the site showed a discontinuous confining unit between the shallow and deep zone aquifers, a confining unit beneath the deep aquifer, and a confining unit beneath the deeper aquifer (as observed in MW-25D3). The extent of the deeper aquifer and the over and underlying confining units is not known as it has only been encountered in one boring.

12. Paired monitoring well data shows a positive difference in hydraulic head between the upper and deep zones on the eastern side of the site and a negative hydraulic head on the western side of the site.

deep zone) on the eastern side of the site (LF-2) and upward (deep zone to shallow zone) on the western side of the site (LF-1).

34. Shallow groundwater elevations are strongly influenced by river levels and generally vary up to about six feet seasonally (half the typical river rise), except during historical river flood events that cause a rise in the groundwater elevation well above the usual seasonal range and flow reversals.[13] In 2018, for example, the groundwater elevation measured along the southwest perimeter of the site ranged from a high of about 57 feet NAVD88 in May 2018 to low of about 51 feet NAVD88 in August 2018. Groundwater flow reversals may also occur during high river stages without flooding. Other characteristics of the river (e.g., flow velocity and bank contour) may also affect shallow groundwater hydrology at the site. For example, the 2018 groundwater elevation contours also showed mounding on the southeast side of the site in line with the river bend southeast (i.e., upstream of the site).

Groundwater Separation

35. Title 27, section 20240(c), a siting requirement, requires that existing landfill units be operated to maintain at least five feet of separation between the lowest elevation of landfill wastes and highest anticipated elevation of groundwater. Exemptions from this prescriptive standard may be approved upon a showing of infeasibility provided adequate separation is maintained per Title 27, sections 20080(b) and 20260(a).

36. As noted in Finding 59, waste was historically discharged to trenches and, as noted in Finding 12, Footnote 3, previous (pre-Chapter 15) WDRs did not specify a minimum groundwater separation for inert wastes. It is therefore possible that some areas of the landfill may have less than five feet of separation from waste. For example, groundwater elevation monitoring data for the First Half 2018 indicated that the toe area of LF-1 in southwestern part of site may be below the water table during seasonal high river/groundwater levels).[14]

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13. The most recent historical flood events on record occurred in the 1997 and 2017 wet seasons, during which period shallow groundwater elevations in monitoring wells at the site rose up to 15 feet.

14. Based on depth of nearest trench (18 feet) from 1974 Trench Fill Plan, surface elevation from 2015 aerial topographic survey (72 feet NAVD88), and May 2018 groundwater elevations reported for monitoring wells MW-4S and MW-4D (57.2 feet NAVD88 and 58.5 feet NAVD88).

These WDRs require that the Dischargers maintain at least the prescriptive minimum five feet of groundwater separation at both landfill units absent Executive Officer approval of alternative minimum separation. In addition, the MRP under these WDRs requires that the Dischargers estimate and report groundwater separation at representative locations within LF-1 and LF-2, based on the trench depths noted in the 1974 Trench Fill Plan, including any areas where there is less than the prescriptive (or approved alternative) minimum separation. See Facility Specifications C.2 and C.3 and MRP Section D.1.e.

37. In some areas (i.e., both onsite and offsite), LF-1 and LF-2 are monitored contiguously, including upgradient; along the western perimeter of LF-1; and offsite to west, southwest and northwest. See MRP Sections A.1.a (Table 9) and A.1.b (Table 10). Title 27 regulations generally require that WMUs have separate groundwater monitoring systems and a separate Point of Compliance along the down gradient perimeter of each unit, absent an approved, site-specific demonstration for a shared monitoring system and/or Point of Compliance. Previous WDRs did not address this issue, however, and no such demonstration was located on file.

These WDRs therefore require that the Dischargers monitor LF-1 and LF-2 separately, absent an approved demonstration for contiguous monitoring (i.e., shared monitoring system and/or Point of Compliance) for each unit submitted as part of the updated WQPS Report required under this Order. See Finding 42 and Monitoring Specification G.5.

Groundwater Monitoring

38. The Dischargers conduct concurrent background, detection, and corrective action monitoring of both the shallow and deep zones of the upper aquifer beneath the site. There are currently 59 groundwater monitoring wells for the site, including 21 shallow/deep zone (S/D) well pairs (1-4, 7, 15, 17-19, 21-24; and 26-30); four deeper zone (D2/D3) well pairs (25 and 31-33); nine shallow zone single wells (5S, 8S-13S, 14SR and 16S); and five shallow zone piezometers (PZ-1 through PZ-4, and PZ-6). Eleven of the paired wells (15, 19, 21-24, 27-31), five of the non-paired wells (5S, 10S, 12S, 13S and 16S) and the five piezometers (PZ-1 through PZ-4, and PZ-6) are offsite. One well pair (24S/D) installed in 2012 currently monitors background in the shallow and deep zones.[15] The remaining wells are along or within the landfill perimeter. The groundwater monitoring system also includes piezometers that monitor groundwater

15. Two other monitoring wells, MW-6 and MW-20 (a former background well), were abandoned in 1991 and 2011.

elevations in groundwater extraction and infiltration areas along or near the landfill's western and northwestern compliance boundary. See MRP Sections A.1.a and A.1.b.

The Discharger also proposes to abandon several existing monitoring wells at the site but has not yet submitted the requisite abandonment proposals. These WDRs require that the Discharger submit a work plan for review and approval at least 60 days prior to installation or abandonment of groundwater monitoring wells. See Attachment G; MRP Sections A.1.a and A.1.b, and Standard Monitoring Specifications I.23 and I.24, SPRR.

39. Groundwater detection monitoring of constituents that can be evaluated statistically (i.e., general minerals and inorganic constituents naturally occurring in background) is conducted using an interwell approach (i.e., by comparing of downgradient sample results with concentration limits derived from statistical evaluation of historical upgradient data) in accordance with Title 27 regulations, while groundwater detection monitoring of non-statistical parameters (i.e., organic and inorganic constituents not naturally present in background) is conducted using a non-statistical, intrawell approach (i.e., by comparing of sample results from a given monitoring well with the method detect limit for that inorganic constituent). See MRP, Section C4.

40. Sample collection and analysis is currently conducted in accordance with a 2012 Sample Collection and Analysis Plan submitted under previous WDRs, the CDO and Revised MRP.[16] These WDRs require that the Dischargers submit an updated Sample Collection and Analysis Plan consistent with the requirements of this Order, including the MRP (and any future revision thereof). See Monitoring Specification G.8 and Standard Monitoring Specification I.7, SPRR.

41. Title 27 specifies the prescriptive requirements and performance standards applicable to monitoring data analysis and requires that such methods be implemented as follows:

    a. As specified in the existing MRP under the WDRs; or

    b. In accordance with a technical report (certified by an appropriately registered professional) documenting such methods, submitted to, and approved by, the Central Valley Water Board; or

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16. See 20 January 2012 *Sampling and Analysis Plan, Version 3*, prepared by SCS Engineers.

c. In accordance with any water quality data analysis software deemed appropriate for such use by either the Central Valley Water Board or State Water Resources Control Board (SWRCB).

(See Title 27, § 20415, subds. (e)(7), (10).)

These WDRs require that the Dischargers submit a technical report (Monitoring Data Evaluation Methods Report) describing the statistical and nonstatistical data analysis methods used to evaluate background, detection and corrective action monitoring data at the site, including documentation of the software program used. The report may be submitted as part of the updated WQPS Report required under this order. See Finding 42, Monitoring Specifications G.6 and G.7, and Provision H.6.d.i.

42. Title 27, section 20390 requires that the Central Valley Water Board establish a Water Quality Protection Standard (WQPS) in the WDRs for each unit, including Constituents of Concern (COCs), Concentration Limits, Point of Compliance, and Monitoring Points. The August 2016 Amended ROWD (referenced in Finding 8.c), included an updated WQPS Report proposing statistically-derived concentration limits for the shallow and deep zones based on monitoring data from background wells MW-24S and MW-24D, which were installed in 2012 per a 2011 compliance letter issued under the CDO.[17] The August 2019 Amended JTD included a further updated WQPS report (referenced in Finding 8.d) proposing pooling of the background data from these two wells and a description of the monitoring data analysis methods per Finding 41.b. See MRP Section E.4.b.

Neither the August 2016 nor August 2019 updated WQPS reports have been previously approved by Water Board staff. Also, these WDRs require that the Dischargers submit a further updated WQPS Report consistent with the monitoring specifications of this Order, including MRP, and historical monitoring data collected at the site. See Finding 37 and Monitoring Specification G.7, and Provision H.6.d.ii.

Groundwater Impacts and Corrective Action

43. Groundwater impacts from the landfill were first discovered in 1985. A follow-up groundwater investigation confirmed the presence of volatile organic compounds (VOCs) in several landfill monitoring wells, primarily along the southwestern

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17. Wells previously used for background monitoring (e.g., 16S, 20S and 20D) were determined to be inadequate for various reasons (e.g., spatial variability, impacted by LFG, influenced by irrigation canal).

perimeter of the landfill (e.g., MWs-1S, 2S and 6S).[18,19] The highest concentrations of VOCs were detected in the shallow zone, including tetrachloroethene (PCE) up to 54 µg/L; 1,1 trichloroethene (TCE) up to 140 µg/L; vinyl chloride up to 52 µg/L; 1,2-dichloroethane (1,2-DCA) up to 28 µg/L; 1,2-dichloroethene (1,2-DCE) up to 28 µg/L; 1,1-dichloroethene (1,1-DCA) up to 23 µg/L; methylene chloride up to 65 µg/L; and dichlorodifluoromethane (Freon 12) up to 480 µg/L. Low concentrations of VOCs were also detected in some deep zone wells.

44. Elevated concentrations of inorganic constituents have also been historically detected at the site, including dissolved arsenic, iron, lead and manganese. Elevated arsenic for example, has been historically detected in several wells (e.g., MWs-4S, 7D, and 14S) including up to 130 µg/L in MW-14S. It is unknown to what extent this spatial variability is natural or attributable to impacts from LFG and/or leachate.[20]

45. Various corrective action measures have been implemented over the years to address groundwater impacts from the landfill, including an LFG air curtain along the southern perimeter of both units during active operations; phased landfill closure; LFG extraction/flaring; and groundwater extraction and treatment. See Findings 46, 49, 55, 68 and 69.

LFG Controls

46. In 1992, as part of phased landfill closure, the Dischargers installed an LFG control system at LF-1, including a flare station in the northeast corner of the site. A separate LFG control system, including flare station (located at the southern end of the access road between the two fill areas) was also installed at LF-2 during LF-2 closure in 1995. (Air curtain operations were continued until the southern LFG system was up and running.) In 2006, the LFG control systems for both fill areas were connected after LF-1's flare station was rendered inoperable by vandalism, and all extracted LFG routed to the southern flare station. Various repairs and improvements have since been made to the system since closure,

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18. See 4 January 1988 Revised Phase II Report, Soil and Groundwater Investigation and SWAT Report, Geer Road Landfill, prepared by Kleinfelder.

19. Monitoring well sampling was limited to the southern and central perimeters of the landfill, including wells MWs-1S through 14S; MWs-1D through 3D; and MW-7D.

20. In 2007, a study of arsenic concentrations in the area of the landfill concluded that natural background concentrations of arsenic ranged from non-detect up to about 4.42 µg/L.

and the system currently consists of a total of 108 vertical LFG extraction wells and associated facilities (e.g., lateral and header piping, condensate sumps, blower and flare). See MRP Section A.1.b.

These WDRs require that the Dischargers submit an updated O&M plan (or O&M plan amendment) for the LFG extraction system consistent with the requirements of this Order. See Facility Specification C.4.a and Information Sheet.

47. During the Second Half 2018, the rate of LFG flow into the flare station averaged about 620 standard cubic feet per minute (SCFM) with an average methane concentration of about 30 percent by volume.[21] Concentrations of methane detected in the landfill perimeter probes were at or near non-detect. TO-15 analysis of LFG extraction system effluent and landfill perimeter probe gas samples continues to show the presence of VOCs in soil gas at the site, however. See Finding 28.

48. Sampling of LFG Flare Station influent for TO-15 VOCs conducted in the Second Half 2018 showed the presence of various VOCs also detected in groundwater, including BTEX, Freon, halogenated VOCs and Ketones. The highest VOC concentrations by volume included acetone (1,600 ppbv), methyl ethyl ketone (MEK)(1,500 ppbv), toluene (1,000 ppbv), total xylenes (780 ppbv), vinyl chloride (970 ppbv), Freon 12 (470 ppbv), and benzene (220 ppbv). About 3 million standard cubic feet of gas and 15,685 pounds of VOCs have been cumulatively extracted from the landfill by the LFG extraction system since 2009 when flow metering and sampling of the system was initiated. Approximately 300 pounds of VOCs were removed by the system in the Second Half 2018.

Groundwater Extraction and Treatment

49. In 1993, the Dischargers installed a groundwater extraction and treatment system (GWETS) at the site consisting of 12 extraction wells (EW-1 through EW-12) along the exterior perimeter of LF-2 and a granular activated carbon (GAC) treatment plant near the eastern side of LF-2 immediately south of EW-2. The system also included an adjacent, 10-trench infiltration gallery immediately south of the treatment plant. Although overhauled and improved over the years, this original GWETS was ultimately found to not adequately capture and remediate the release and a new/replacement GWETS was installed in March 2018. See Information Sheet and Finding 53.

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21. The LFG control system is operated (e.g., by vacuum) to maximize the amount of LFG extracted and flared without drawing in air, which dilutes the LFG flow stream and could cause a landfill fire.

50. Historical corrective action monitoring data collected at the site since 2006 indicates a decline in the number and concentration of all VOCs detected in shallow and deep zone groundwater along the exterior perimeter of the landfill units, except for acetone and (in one case) Freon 12. Tabular summaries of maximum concentrations of these VOCs are provided in Attachment F and summarized below in Table 3.[22]

Table 3 - Maximum Total Concentration of VOCs Detected (µg/L)

Exterior Perimeter	Aquifer Zone	2006-2010	2011-2015	2016-2018
Northern	Shallow	62.2	21.6	11
--	Deep	40.6	14.5	2.4
Western	Shallow	98	62.9	25.4
--	Deep	34.5	27.2	28.5 (increase attributed to Freon 12)
Southern	Shallow	27.7	10.4	8.5
--	Deep	40.7	36.9	8.8

51. Concentrations of total VOCs in the shallow and deep zones generally appeared to have equilibrated in the western and southern perimeter areas, while significant differences remained between the two zones along the northern perimeter, suggesting there may be less hydraulic communication between the zones in the northern part of the site. The general decline in the number and concentrations of VOCs detected in groundwater at LF-1 and LF-2 is likely attributable to corrective action measures implemented at the site to date, such as closure, groundwater extraction, LFG extraction, as well as dispersion and natural attenuation processes.

52. Acetone, where and when detected in groundwater, typically exceeded 40 percent of total VOC concentrations with maximum concentrations up to about 170 µg/L. Reasons for the higher concentrations of acetone detected in

22. Acetone (not included) was also detected along the northern and western perimeters in 2011-2018. See Attachment F.

groundwater compared to other VOCs are unknown. A review of the GWETS influent and effluent sampling data collected since 2006 under previous WDRs indicated acetone in only one influent sample. All effluent samples were non-detect for acetone.

53. In 2011, the Water Board adopted Cease and Desist Order (CDO) R5-2011-0022 ordering the Dischargers to complete delineation of the nature and extent of the release; evaluate the effectiveness of existing corrective action measures and need for additional corrective action measures; and submit an updated Engineering Feasibility Study (EFS) proposing additional corrective action measures, as necessary. A revised Monitoring and Reporting Program (Revised MRP R5-2011-0022) was also issued with the CDO.

54. The 2016 Amended ROWD submitted under the CDO (referenced in Finding 8.c) included an updated EFS recommending granular activated carbon (GAC) treatment for removal of VOCs from extracted groundwater, rather than passive air stripping.

55. In March 2018, after completing evaluation monitoring tasks under the CDO, the Dischargers completed installation of a new GWETS at the site, including 20 new groundwater extraction wells along the western perimeter of the landfill; a 200 gpm GAC groundwater treatment plant at the northern end of the landfill; and an offsite infiltration gallery on County-owned land northwest of the site (the adjacent Triangle Ranch Property) for the discharge of treated effluent.[23] Piezometers were also installed near the extraction wells and infiltration trenches to monitor groundwater capture and mounding, respectively. See Attachment G: GWETS.

56. The new GWETS includes two parallel, multi-stage treatment trains for groundwater treatment. The treatment stages include chlorine injection for pre-treatment of metals; a filter for metals removal; a filter for turbidity removal; and two GAC filters in series for VOC removal.[24] The built-in redundancy of the dual-train feature was included to allow running the system on one train while conducting O&M on the other. Influent and effluent equalization tanks were also included in the system design.

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23. See 30 March 2018 Expanded Groundwater Extraction and Treatment System Installation and Construction Completion Report, prepared by Tetra Tech BAS.

24. An arsenic specific media and two water softening filters originally included in the design were removed from the treatment system based on the results of startup testing, as approved by Water Board Compliance and Enforcement Unit staff.

These WDRs require that the Dischargers submit an updated O&M plan (or O&M plan amendment) for the GWETS and Infiltration Area consistent with the requirements of this Order. See Facility Specification C.4.b. A related Facility Liquids O&M plan is also required that addresses how liquids generated at the site will be handled. See Facility Specification C.4.c.

57. The infiltration gallery for the disposal of treated effluent from the GWETS (constructed on a bluff northwest of the GWETS) includes three, 350-foot perforated pipe runs, set in crushed drain rock and encased in non-woven polypropylene geotextile fabric. The area also includes dedicated piezometers to monitor for groundwater mounding. See Attachment G.

58. After several months of testing and sampling, the new GWETS started up on 25 June 2019 and the original GWETS taken out of service two days later pending decommissioning. On 5 June 2019, the Dischargers submitted a Notice of Intent (NOI) to Comply with the *General WDR Order R5-2015-0012* (*Waste Discharge Requirements, General Order for In-Situ Groundwater Remediation and Discharge of Treated Groundwater to Land*) applicable to operation of the GWETS. Water Board staff issued a Notice of Applicability (NOA) of the General Order to the Facility on 27 January 2020. The NOA incorporates by reference groundwater treatment system monitoring required under these WDRs. See Finding 56 and MRP Section C.1.b.

Landfill Design and Construction

59. The landfill was originally constructed as a trench-fill operation with rows of trenches beneath LF-1 and LF-2, separated by the central access road. An historical design drawing of the site indicates that there were likely 20 trenches beneath LF-1 and 13 trenches beneath LF-2, all aligned NW-SE. Trench depths ranged from about 18 to 52 feet bgs beneath LF-1 and 18 to 36 feet bgs beneath LF-2.[25] See Information Sheet, Attachment 1: Trench Fill Map. After the trenches were filled to ground surface, the LF-1 and LF-2 areas were developed above ground surface as contiguous area fill cells adjoined in the southwest part of the site.

60. The landfill was not constructed with a liner or leachate collection and recovery system (LCRS).

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25. Information based on aerial photograph annotated “1974 Final Closure Plan” in Appendix C of 2019 JTD (referred to herein as 1974 Trench Fill Plan). See Attachment 1, Information Sheet.

61. The design capacity of the landfill, including trenches and overlying fill cells, was estimated to be about five million cubic yards (about 10 million tons) of waste.

Landfill Operations

62. Landfill operations included both trench and area fill methods. Waste was first tipped and pushed into place and compacted. Six inches of daily cover (obtained from trench excavation) was applied at the end of each day.

63. After a trench was filled with refuse and daily cover, overlying fill cells were developed to elevations ranging from about 130 to 150 feet NAVD88 (about 20 feet above surrounding grade), consistent with final cover grades (3H:1V side slopes and 3% top slopes). Approximately 1.5 feet of interim cover was then applied in inactive areas pending closure.

Landfill Closure

64. A landfill's containment system includes its base liner, and, after closure, its final cover. Title 27, section 20950, subdivision (a)(2)(A).1 states, in part:

> Closure — for landfills . . . and surface impoundments closed as landfills, the goal of closure, including but not limited to the installation of a final cover, is to minimize the infiltration of water into the waste, thereby minimizing the production of leachate and gas. For such Units, after closure, the final cover constitutes the Unit's principal waste containment feature….

65. The Title 27 prescriptive final cover design for a non-Subtitle D, non-compositely lined Class III landfill includes the following components, from top to bottom:

    a. Erosion Resistant Layer -- At least one foot of vegetative cover soil with established vegetative cover;

    b. Low Hydraulic Conductivity (LHC) Layer -- Minimum one foot of compacted clay soil with a permeability not exceeding the lesser of $1x10^{-6}$ cm/s or the permeability of underlying clay soil liner or natural geologic materials, as applicable;

    c. Foundation Layer - At least two feet of materials (soil and/or waste) with appropriate engineering properties to support the overlying cover.

66. The Central Valley Water Board is authorized to approve an engineered alternative to Title 27 prescriptive standards (see, e.g., Title 27, § 20330, subd. (c)), provided that the Dischargers demonstrate that compliance with the prescriptive standard would be unreasonably and unnecessarily burdensome in

comparison to the proposed alternative. (Title 27, § 20080, subds. (b), (c); State Water Board Resolution 93-62).

67. On 19 September 1994, Water Board staff approved a 15 September 1994 amended Final Closure and Post-Closure Maintenance Plan (FC/PCMP) submitted by the Discharger. The approved FC/PCMP included an engineered alternative final cover design that included the following elements, from top to bottom:

Table 4 - Final Cover Design

Layer	Top Deck Design (shallow slopes; 10% max grade)	Side Slope Design
Erosion Resistant/ Vegetative	12-Inch Vegetative Cover Soil (¾" max particle size where contacting geomembrane)	12-Inch Vegetative Cover Soil (¾" max particle size where contacting geomembrane)
Low Hydraulic Conductivity (LHC)	60-mil VLDPE Flexible Geomembrane	Ione Clay/Soil Admixture[3] ($k \leq 1 \times 10^{-6}$ cm/sec) (1" max particle size)
Foundation	At least 24 Inches of Imported Fill Soil (silty sand/sandy silt compacted to 90 percent relative compaction) ($k \leq 1 \times 10^{-4}$ cm/sec) (max particle size: ¾" if contacting geomembrane; otherwise 1")	Same as for top deck.

The foundation layer was installed in 1992 under a previously approved work plan prior to approval of the FC/PCMP. An additional half-foot of foundation soil was placed beneath the crest area of LF-1 where chip seal had been previously installed as intermediate cover to provide additional cushion for the planned overlying geomembrane layer. See Attachment C.

68. In 1995, both units were graded with 3H:1V side slopes, 10 percent minimum upper slopes, and a three percent minimum top deck grade. The VLDPE geomembrane was placed over approximately 102 acres in top deck/upper slope (≤ 10 percent grade) areas and anchored (i.e., trench backfilled with compacted

clay) in the foundation layer along its perimeter. The clay soil admixture was then placed and compacted over approximately 52 acres along the side slopes. The vegetative cover layer was then installed over the LHC layer of each unit, mulched and hydroseeded.

69. Completed cover deck elevations at LF-1 ranged from about 150 feet NAVD88 (crest/NFA) to about 130 feet NAVD88 (toe), while at LF-2 they ranged from 160 feet NAVD88 (crest) to 124 feet NAVD88 (toe/SFA2). The results of the landfill closure activities were documented in a 1996 Closure Certification Report approved by Water Board staff in July 1996. See Attachment C.

70. Slope stability analysis provided in the 1994 FC/PCMP based on seismic hazardous analysis indicated stable (3H:1V) final cover slopes with a minimum static safety factor of 1.57 and a yield acceleration of 0.18g. Dynamic analysis indicated “negligible” seismic slope deformation. These WDRs require that the Discharger maintain the final cover slopes in this condition. See Finding 24 and Post-Closure Maintenance Specification E.4.

71. Precipitation and drainage controls designed to handle flows from a 100-year 24-hour storm event were also installed at each landfill unit, including top deck perimeter swales/berms, drop inlets/over-side drains; roadside ditches (exterior perimeter of LF-2); a paved central drainage corridor between the two units; and a gunite-lined drainage ditch along the lower slopes (western perimeter) of LF-1. The perimeter drains and paved central corridor were graded to drain to the unlined sedimentation basin at the southern end the site, which spills over into the Tuolumne River during peak wet season flows. See Attachment I.

Landfill Post-Closure Maintenance

72. Title 27, section 20950, subdivision (a)(2) provides in relevant part that “ the goal of post-closure maintenance … is to assure that the Unit continues to comply with the performance standard of [Title 27, section 20950(a)(2)(A).1] until such time as the waste in the Unit no longer constitutes a potential threat to water quality…..”

73. The 1994 FC/PCMP included plans for “routine” (e.g., monthly) post-closure maintenance and monitoring of then-existing landfill facilities and monitoring systems, including final cover, drainage controls, LFG controls, GWETS, and gas

and groundwater monitoring systems.[26] Plans for monitoring referenced previous WDRs Order 92-131. See Findings 46 and 49.

74. In 2005, the Dischargers implemented a final cover repair work plan to address settlement issues that had occurred since the landfill was closed in 1995. Approximately 150,500 cubic yards of vegetative cover soil was placed in areas of settlement on the landfill top decks and side slopes. The drainage grade of the vegetative cover layer on the crest of each unit was also increased slightly (up to 4 percent) and additional over side drains installed on the side slopes to improve drainage. The final cover repair work did not include review of the required five-year iso-settlement map to identify any LHC or geomembrane layer settlement, however. Subsequent site inspections by Water Board staff have also founding ongoing cover maintenance issues (e.g., rodent burrows, cover grade undulations).

    Given the amount of time since closure of the landfill (almost 25 years), these WDRs require that the Discharger submit a work plan to identify or estimate areas of settlement of the LHC and geomembrane layers in the final cover and to implement any necessary repairs in accordance with the revised PCMP required under this Order. See Finding 75 and Post-Closure Maintenance Specification E.5.

75. Since landfill closure, the PCMP has been updated as follows:

    a. In 2012, as part of the ROWD referenced in Finding 8.a, the PCMP was revised to reflect facility improvements and changes implemented at the site since 1995, including landfill closure and then-existing landfill controls and monitoring systems, including LFG extraction and GWETS.

    b. In May 2017, as part of CalRecycle's five-year Solid Waste Facility Permit review process, the PCMP was updated to reflect facility improvements and changes implemented at the site since 2016, including those described in the ROWD referenced in Finding 8.c.

    c. In February 2019, the PCMP was amended at the request of CalRecycle to include revised post-closure maintenance cost estimates reflecting the replacement costs of all landfill "capital facilities", including precipitation and drainage controls, site security features, groundwater monitoring

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26. When the landfill was closed in 1994, there were 19 groundwater monitoring wells at the site (MWs-1S through 5S, 7S through 16S, 1D through 4D, and 7D).

wells, gas migration monitoring wells/probes, and LFG flare. See Finding 78.

These WDRs require that the Dischargers submit a revised PCMP addressing all current landfill facilities subject to post-closure maintenance and monitoring under Title 27 not included under corrective action financial assurances. The revised PCMP is also required to include an updated final cover repair plan and current post-closure maintenance cost estimates. See Closure and Post-Closure Maintenance Specification E.12 and Financial Assurances Specification F.1.

76. The most recent aerial topographic survey of the facility was last completed on 3 March 2015. Consistent with Title 27 requirements, this Order requires that the Discharger complete and submit an aerial topographic survey of the site (including immediate surrounding areas) and iso-settlement map of the landfill final cover's LHC layer every five years. See Standard Post-Closure Maintenance Specification G.22, SPRR and the MRP).

Cost Estimates and Financial Assurances

77. The Dischargers are required to demonstrate financial assurances for post-closure maintenance to CalRecycle per Title 27, Section 22210(b) because the landfill operated on or after 1 January 1988. The Dischargers are not required to demonstrate financial assurances to CalRecycle for corrective action per 22220(b), however, because the landfill ceased operations before 1 July 1991.[27]

78. The post-closure and corrective action cost estimates reported in the JTD, escalated to 2019 dollars, were as follows:

Table 5 - Financial Assurance Cost Estimates

Financial Assurance Requirement	Est. Cost (2019 Dollars)
Post-Closure Maintenance (Title 27, §§ 20950(f), 21840, & 22210–22211, 22212)	$17,415,480
Corrective Action (Title 27, §§ 20380(b), 22222)	$6,107,528

27. Dischargers also not required to fund a non-water release corrective action with CalRecycle because the landfill ceased operations prior to 1 July 2011.

The above post-closure and corrective action cost estimates are based on escalation of 2016 or earlier estimates and do not reflect the current status of the facility, such as the new GWETS and infiltration system described in Findings 55 through 57 and the replacement capital costs requested by CalRecycle noted in Finding 75.c. These WDRs therefore require that the Dischargers submit updated financial assurance cost estimates for post-closure maintenance and corrective action per the applicable Title 27 sections noted in the above table. See Post-Closure Maintenance Specification E.12, Provision H.6.b.iii, and Finding 79.

79. In a 19 June 2009 memorandum prepared by SCS Engineers, the Dischargers provided corrective action cost estimates for then-existing LFG extraction and GWETs system improvements and O&M to address the known VOC release from the landfill. The initial capital cost for the system improvements was estimated to be $1,601,100 and the O&M (including electrical power costs) for 20 years was estimated to be $3,827,000 ($191,350 per year), all in 2009 dollars.

Given the changes at the Facility since 2009, and corrective action monitoring data collected since then, these WDRs require that the Dischargers submit an updated corrective action (i.e., known or reasonably foreseeable release) cost estimates report for Central Valley Water Board review and approval. See Financial Assurances Specification F.6 and Provision H.6.c.i.

80. This Order requires the Dischargers to maintain, consistent with applicable Title 27 regulations, post-closure maintenance financial assurances with CalRecycle and corrective action financial assurances with the Central Valley Water Board based on currently approved cost estimates, as annually adjusted for inflation. (Actual funding of the mechanism may be reduced as funds are spent on these items.) See Financial Assurance Specifications F.1 and F.7.

81. The Dischargers maintain a Pledge of Revenue as the approved financial assurance mechanism for both post-closure maintenance and corrective action. This mechanism (last approved by CalRecycle in July 2019) requires reporting of estimated annual amounts of the pledge (rather than account balances) for each financial assurance type. For post-closure maintenance and corrective action, these amounts were $580,516 and $890,563 in 2019 dollars.

California Environmental Quality Act

82. The issuance of this Order, which prescribes requirements and monitoring of waste discharges at an existing facility, with negligible or no expansion of its existing use, is exempt from the procedural requirements of the California Environmental Quality Act (CEQA), Public Resources Code section 21000 et seq., pursuant to California Code of Regulations, title 14, section 15301 (CEQA

Guidelines). The discharges authorized under this Order are substantially within parameters established under prior WDRs, particularly with respect to character and volume of discharges.

83. In accordance with the California Environmental Quality Act (CEQA), Public Resources Code section 21000 et seq., on 2 February 1993, the Stanislaus County Board of Supervisors adopted a Negative Declaration in connection with issuance of a Closure and Post-Closure Maintenance Plan for the Geer Road Landfill. In the Negative Declaration, Stanislaus County, as lead agency, found that the "project," (e.g., landfill closure, post-closure maintenance, and monitoring) would not have a significant effect on the environment:

84. The Central Valley Water Board was consulted with in the development of the Negative Declaration and the discharges and other activities authorized under this Order fall within the scope of the project as contemplated in the Negative Declaration. Additionally, there are no substantial changes to either the proposed project or the attendant circumstances under which it will be undertaken, and no new information requiring revision of the Negative Declaration. The Negative Declaration is therefore conclusively presumed compliant with CEQA for use by the Central Valley Water Board as a "responsible agency" under CEQA. Accordingly, no further environmental review is required under CEQA. (See Cal. Code Regs., tit. 14, § 15162.)

Other Regulatory Matters

85. This Order is issued in part pursuant to Water Code section 13263, subdivision (a), which provides as follows:

> The regional board, after any necessary hearing, shall prescribe requirements as to the nature of any proposed discharge, existing discharge, or material change in an existing discharge…, with relation to the conditions existing in the disposal area … into which, the discharge is made or proposed. The requirements shall implement any relevant water quality control plans that have been adopted, and shall take into consideration the beneficial uses to be protected, the water quality objectives reasonably required for that purpose, other waste discharges, the need to prevent nuisance, and the provisions of [Water Code] Section 13241.

86. This Order implements the Central Valley Water Board's revised May 2018 *Water Quality Control Plan for the Sacramento and San Joaquin River Basins* (*Basin Plan*), which designates beneficial uses for surface water and groundwater and establishes water quality objectives (WQOs) necessary to preserve such beneficial uses. (See Wat. Code, § 13241 et seq.)

87. According to the Basin Plan, the designated beneficial uses of the Tuolumne River downstream of the Don Pedro Reservoir are municipal and domestic supply (MUN); agricultural supply (AGR); water contact recreation (REC-1); non-water contact recreation (REC-2); warm fresh water habitat (WARM); cold fresh water habitat (COLD); migration of aquatic organisms (MIGR); spawning, reproduction, and/or early development (SPWN); and wildlife habitat (WILD). All beneficial uses for this water body are listed as "existing" except for MUN, which is listed as a potential beneficial use.

88. According to the *Basin Plan*, designated beneficial uses of groundwater at the Facility include municipal and domestic supply (MUN); agricultural supply (AGR); industrial service supply (IND); and industrial process supply (PRO).

89. This Order implements the prescriptive standards and performance goals of Title 27.

90. The State Water Resources Control Board's *Statement of Policy with Respect to Maintaining High Quality Waters in California*, Resolution 68-16 (*Antidegradation Policy*) prohibits the Central Valley Water Board from authorizing degradation of "high quality waters" unless it is shown that such degradation: (1) will be consistent with the maximum benefit to the people of California; (2) will not unreasonably affect beneficial uses, or otherwise result in water quality less than as prescribed in applicable policies; and (3) is minimized through the discharger's best practicable treatment or control.

91. Consistent with Title 27, this Order requires that the Dischargers to maintain the Facility to contain waste within WMUs, thereby preventing degradation of water quality. To the extent that there are releases from Facility WMUs, including the existing historical release described in Findings 43, 44 and 50, the Dischargers are required to address such releases through a Corrective Action Program and landfill closure. (See Title 27, §§ 20385, 20415, 20430 & 21090.).[28] Accordingly, this Order complies with the *Antidegradation Policy*.

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28. With regard to corrective action, the landfill was graded and closed with an engineered alternative final cover to promote runoff and minimize infiltration of precipitation into the landfill as required under Title 27. These measures should minimize any leachate generation in the landfill that could potentially threaten or impact groundwater. The Order also requires that the Dischargers continue LFG extraction from the landfill and operation of the new GWETS, which was designed to remediate groundwater impacts at the site to Concentration Limits. Continued post-closure maintenance, monitoring, and reporting are also required to ensure the

92. For the purposes of California Code of Regulations, title 23 (Title 23), section 2200, the Facility has a threat-complexity rating of **1**-**B**, where:

    a. Threat Category "1" reflects waste discharges that that could cause the long-term loss of a designated beneficial use of the receiving water. Examples of long-term loss of a beneficial use include the loss of drinking water supply, the closure of an area used for water contact recreation, or the posting of an area used for spawning or growth of aquatic resources, including shellfish and migratory fish.

    b. Complexity Category "B" reflects any discharger not included in Category A, with either (1) physical, chemical or biological treatment systems (except for septic systems with subsurface disposal), or (2) any Class II or Class III WMUs.

93. Water Code section 13263, subdivision (b)(1) provides that:

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

94. The technical reports required under this Order, as well as those required under the separately issued MRP, are necessary to ensure compliance with prescribed WDRs and the provisions of Title 27.

Procedural Matters

95. All local agencies with regulatory jurisdiction over land-use, solid waste disposal, air pollution and public health protection have approved the use of the Facility's site for the discharge of waste to land as provided for herein.

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integrity of the landfill cover as the principle waste containment system of each unlined WMU.

96. The Dischargers interested agencies and interested persons were notified of the Central Valley Water Board's intent to prescribe the WDRs in this Order and provided an opportunity to submit their written views and recommendations at a public hearing. (Wat. Code, § 13167.5; Title 27, § 21730.)

97. At a public meeting, the Central Valley Water Board heard and considered all comments pertaining to the discharges regulated under this Order.

98. The Central Valley Water Board will review and revise the WDRs in this Order as necessary.

REQUIREMENTS

IT IS HEREBY ORDERED, pursuant to Water Code sections 13263 and 13267, that WDR Order R5-2009-0051, CDO R5-2011-0021, and Revised MRP Order R5-2011-0022 are hereby rescinded (except for enforcement purposes); and that the Stanislaus County Department of Environmental Resources and City of Modesto, their agents, successors, and assigns, in accordance with Water Code division 7 (§ 13000 et seq.), shall comply with the following.

A. Discharge Prohibitions—Except for requirements of Subtitle D regulations (as referenced in 40 C.F.R. § 258), or as otherwise expressly directed within this section below, the Dischargers shall comply with all Standard Prohibitions (SPRRs, § C), which are incorporated herein, as well as the following Discharge Prohibitions.

1. Discharges of "hazardous waste" (as defined per Title 23, § 2601) at the Facility are strictly prohibited. The Department of Toxic Substances

Control (DTSC) shall be immediately notified of any such discharges in violation of this Order.

2. Discharges of "designated waste" (as defined per Wat. Code, § 13173) at the Facility are also strictly prohibited.

3. Except as expressly authorized per Section B.1 of this Order, leachate and landfill gas (LFG) condensate shall not be discharged to any of the Facility's WMUs.

4. The discharge of new or additional waste to the landfill WMUs at the Facility is prohibited.

5. Landfill gas (LFG) condensate and/or leachate seepage collected from a landfill WMU shall not be returned to that WMU or discharged another WMU at the Facility.

B. Discharge Specifications—Except for requirements of Subtitle D regulations (as referenced in 40 C.F.R. § 258), or as otherwise expressly directed within this section below, the Dischargers shall comply with all Standard Discharge Specifications (SPRRs, § D), which are incorporated herein, as well as the following.

1. The discharge shall continuously remain within the designated disposal WMUs.

2. Storm water runoff from the Facility shall be discharged in accordance with applicable storm water regulations.

3. All landfill-related liquids (e.g., LFG condensate, any leachate collected from the landfill WMUs, monitoring well purge water, extracted groundwater not sent through the treatment system, and any GWETS effluent not discharged to the Infiltration Area) shall be appropriately handled (i.e., temporarily stored or disposed of at an authorized offsite facility) in accordance with the Facility Liquids O&M Plan required under this Order, as approved by Water Board staff. See Facility Specification C.4.c.

4. The Discharger shall obtain and maintain coverage under applicable State Water Board or Central Valley Water Board permits for all non-Title 27 discharges to land or surface water.

C. Facility Specifications—Except for requirements of Subtitle D regulations (as referenced in 40 C.F.R. § 258), or as otherwise expressly directed within this section below, the Dischargers shall comply with all Standard Facility

Specifications (SPRRs, § E) and Standard Storm Water Provisions (SPRRs, §§ D, L), which are incorporated herein.

1. A minimum separation of five feet shall be maintained between the bottom of wastes and the highest anticipated elevation of underlying groundwater per Section 20240(c) of Title 27, absent approval of alternative minimum separation under Facility Specification C.2.

2. Proposals for less than minimum five-feet of separation between the lowest elevation of landfill waste and the highest anticipated elevation of groundwater (i.e., prescriptive standard) required under Title 27, section 20240 may be approved by the Executive Officer upon sufficient demonstration by the Dischargers that compliance with the five-foot prescriptive standard is infeasible per Title 27, section 20080(c) and that the proposed lesser minimum separation meets Title 27 performance standards (i.e., is adequate) per Title 27, section 20240. To the extent that the highest anticipated elevation of groundwater is the result of surface water influence (e.g., river flooding or flow reversals) that cannot be feasibility mitigated by dewatering, more than one alternative minimum separation may be proposed.

3. Annually, prior to the anticipated rainy season but no later than 31 October, any necessary erosion control measures shall be implemented, and any necessary construction, maintenance, or repairs of precipitation and drainage control facilities shall be completed to prevent storm water flows from:

    a. Contacting or percolating through wastes,

    b. Causing erosion or inundation of the landfill cover or other WMUs of the site, or

    c. Causing sedimentation and clogging of the storm drains.

4. By **31 March 2021**, the Dischargers shall submit the following Facility O&M plans:

    a. An updated LFG Extraction System O&M Plan;

    b. An updated GWETS and Infiltration Area O&M Plan; and

    c. A Facility Liquids O&M Plan,

    Each of the above Facility O&M plans shall accurately describe the subject portion of the Facility (e.g., purpose, physical layout, major

elements, function); include plans and procedures necessary to maintain each system in good working order and to maximize its effectiveness in achieving its purpose; and how it will be operated so as not to interfere with or impair the effectiveness of the other system/plan. Contingency plans shall also be included as needed. Each plan may also incorporate by reference (rather than repeat) relevant information contained in another Facility O&M plan or the updated PCMP required under this Order. Submission of an O&M plan amendment may suffice for updating previously submitted O&M plans. See Provision H.6.e.

5. The Dischargers shall inspect, maintain, and operate all Facility control, treatment, and/or disposal systems (i.e., GWETS, LFG extraction system/flare station, and offsite Infiltration Area) and handle all Facility liquids, in accordance with their respective O&M plans, as approved by Water Board staff.

6. Measures implemented as part of a Corrective Action Program (e.g. extraction, operation of the GWETS) shall not be terminated without express written approval by the Executive Officer. Central Valley Water Board staff shall be notified of all corrective action system shutdowns lasting longer than one wek. For the purposes of this provision, “terminated” does not include:

7. LFG extraction well shutdowns of less than one week (e.g., routine maintenance); and

8. Planned periods of LFG extraction well nonoperation, if previously-approved in writing by Central Valley Water Board staff.

D. Corrective Action Specifications

1. The GWETS shall be operated, and modified or expanded, if necessary, to prevent, to the extent possible, further lateral and vertical migration of VOCs from the landfill. See Facility Specification C.4.b.

2. The LFG extraction system shall be operated, and modified or expanded, if necessary, to prevent, to the extent possible, further impacts to groundwater from LFG. The Discharger shall specifically evaluate the need for separate LFG controls, including blower and flare station, for each unit. See Facility Specification C.4.b and MRP Section C.3.

3. The concentration of VOCs and other non-naturally occurring organic compounds in the GWETS effluent shall be non-detect. The method detection limit for VOC analysis shall not exceed 0.5 ug/L or the lowest

detection limit for a VOC using EPA Method 8260B. See MRP Sections C.1 and D for required GWETS effluent monitoring and reporting.

4. The Discharger shall continue implementation of the Corrective Action Program under this Order until such time as impacts to groundwater in all corrective action monitoring wells have been reduced to Concentration Limits and the Discharger has completed the requisite "proof period" under Title 27, Section 20430(g). See Monitoring Specification G.11.

E. Post-Closure Maintenance Specifications—Except for requirements of Subtitle D regulations (as referenced in 40 C.F.R. § 258), or as otherwise directed within this section below, the Dischargers shall comply with all Standard Closure and Post-Closure Specifications (SPRRs, § G) and closure-related Standard Construction Specifications (SPRRs, § F), as well as the following with respect to closure of landfills at the Facility.

1. The Dischargers shall not change the approved, as-built landfill final cover design, including drainage controls, absent Central Valley Water Board approval of the proposed changes, except as follows:

   a. Previously approved components are not eliminated;

   b. The engineering properties of previously approved components are not substantially reduced; and

   c. The proposed changes will result in water quality equal to or greater than the design(s) prescribed per Title 27, section 20310 et seq., and this Order.

   Proposed changes that do not meet the above criteria are considered "material," and will require the revision of this Order.

2. The Dischargers shall not alter the design or disturb containment components of any portion of the final cover (e.g., LHC or barrier layer) over a landfill unit, other than preparatory work, until the Central Valley Water Board has approved in writing all necessary construction plans, specifications and construction quality assurance plans related to the final cover repairs or revisions.

3. Earthen materials used in repair of the LHC layer shall consist of a mixture of clay and other suitable fine-grained soils which have the following characteristics, and which, in combination, can be compacted to attain the required hydraulic conductivity when installed.

   a. At least 30 percent of the material, by weight, shall pass a No. 200

U.S. Standard sieve.

b. The materials shall be fine grained soils with a significant clay content and without organic matter, and which is a clayey sand, clay, sandy or silty clay, or sandy clay under a soil classification system having industry-wide use [e.g., the “SC”, “CL”, or “CH” soil classes under ASTM Designation: A2487-93 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)]. See Title 27, section 20320(d).

4. All final cover slopes, including side slopes and top deck areas, shall be maintained and repaired, as necessary, to withstand their design MCE. See Findings 24 and 70; and Standard Construction Specification F.8.

5. By **31 July 2020**, the Discharger submit a work plan and schedule to identify or estimate areas of settlement of the LHC and geomembrane layers in the final cover and to implement any necessary repairs in accordance with the final cover repair plan in the revised PCMP required under Closure and Post-Closure Maintenance Specification E.11, as approved by the Water Board and CalRecycle. See Provision H.6.b.i.

6. A certification report documenting completion of repairs to areas of the LHC layer and/or geomembrane, as applicable, identified in the above work plan, including project CQA, shall be submitted by **30 September 2021**. See Finding 74 and Provision H.6.b.ii.

7. The Discharger shall maintain the final cover over the closed landfill units, including monitoring and control systems (e.g., monitoring wells, precipitation and drainage controls, LFG controls, and GWETS) in accordance with the requirements of this Order (including MRP) and currently approved PCMP throughout the post-closure maintenance period. See also Standard Closure and Post-Closure Specifications G.26 through G.29.

8. The erosion resistant/vegetative cover layer shall be maintained with native or other vegetation capable of providing effective erosion resistance.

9. The PCMP may incorporate by reference (rather than repeat) post-closure maintenance plans already described in one of the subject Facility O&M plans required under Facility Specification 4.

10. The Discharger shall perform all post-closure maintenance activities specified in the facility's PCMP that are not specifically referred to in this Order.

11. The PCMP shall include all components required per Title 27, section 21769, subdivision (c), and include detailed cost estimates for:

    a. Completion of all actions required for repair of the WMU's containment system (final cover), if needed based on the results of inspection;

    b. Preparation of detailed design specifications;

    c. Updating the PCMP; and

    d. The annual and 30-year cost of post-closure maintenance, in current dollars.

12. By **1 May 2022**, the Dischargers shall submit, for CalRecycle and Central Valley Water Board approval, a revised PCMP describing post-closure maintenance plans and associated cost estimates for all landfill facilities not covered under corrective action financial assurances. The revised PCMP shall also include an updated final cover repair plan. See Finding 75, Provision .b.iii, and Section G, SPRRs. See also Title 27, sections 21769 (a, c & d) and 21865.

13. Whenever changed conditions increase the estimated costs of closure and post-closure maintenance, the Dischargers shall promptly submit an updated PCMP to the Central Valley Water Board, CalRecycle and the LEA.

14. Any proposed change in post-closure use shall be in accordance with Section 21190 of Title 27.

F. Financial Assurances—Except as otherwise directed below, the Dischargers shall comply with all Standard Financial Assurance Provisions (SPRRs, § H), as well as the following.

1. The Dischargers shall maintain with CalRecycle assurances of financial responsibility for the estimated costs of post-closure maintenance, adjusted annually for inflation, as provided in the most-recently approved

PCMP or amendment thereto. See Findings 77-81 and Post-Closure Maintenance Specification E.12.

2. A report regarding financial assurances for post-closure maintenance, or a copy of the financial assurances report submitted to CalRecycle, shall be submitted to the Central Valley Water Board annually, no later than 1 June of each year.

3. If CalRecycle determines that the Dischargers post-closure maintenance financial assurances for the Facility are inadequate based on the cost estimates in the currently approved PCMP, the Dischargers shall within 90 days of such determination:

4. Obtain a new financial assurance mechanism for the amount specified by CalRecycle; and

5. Submit a report documenting such financial assurances to CalRecycle and the Central Valley Water Board.

6. By **30 April 2020**, the Dischargers shall submit, for Central Valley Water Board approval, an updated report providing scenario(s) and corresponding cost estimates for addressing a known or reasonably foreseeable release from the landfill. See Finding 79 and Provision H.6.c.i.

7. The Discharger shall maintain with the Central Valley Water Board assurances of financial responsibility for the estimated costs of corrective action specified in the most recently approved corrective action cost estimates report, adjusted annually for inflation. See Financial Assurances Specification F.6 and Standard Financial Assurances Specification H.2.

8. The Dischargers shall establish an approved financial assurance mechanism pursuant to the CalRecycle-promulgated sections of Title 27, but with the RWQCB named as beneficiary, to ensure funds are available to address a known or reasonably foreseeable release from the Unit, pursuant to Title 27, Section 20380(b) and Title 27, Chapter 6, Subchapter 3 (“Allowable Mechanisms”). Article 2.

9. A report regarding corrective action financial assurances shall be submitted to the Central Valley Water Board annually, no later than 1 June of each year.

10. If the Central Valley Water Board determines that the Discharger’s corrective action financial assurances for the Facility are inadequate, the Discharger shall, within 90 days of such determination:

c. Obtain a new or revised financial assurance mechanism satisfying CalRecycle requirements for the amount specified by the Central Valley Water Board; and

d. Submit a report documenting such financial assurances to the Central Valley Water Board and CalRecycle.

G. Monitoring Specifications—Except as otherwise directed below, the Dischargers shall comply with all applicable Standard Monitoring Specifications (SPRRs, § I) and Standard Response to Release Specifications (SPRRs, § J), as well as the following:

1. The Dischargers shall comply with all provisions of the separately issued MRP R5-2020-0009 and any subsequent revisions thereto.

2. The Dischargers shall comply with the Water Quality Protection Standard (WQPS) set forth in the operative MRP (see also Title 27, § 20390); and shall verify the compliance of each WMU with each subsequent monitoring event.

3. For all WMUs, the Dischargers shall implement a groundwater, surface water and unsaturated zone detection monitoring program (DMP), including background monitoring, in accordance with Title 27, sections 20385, 20415 and 20420. Unsaturated zone monitoring at the site may be limited to soil gas monitoring given that the landfill units are unlined.

4. For each WMU subject to corrective action, the Dischargers shall implement a corrective action program (CAP), including corrective action monitoring, in accordance with Title 27, sections 20385, 20415 and 20430, and Section I of the SPRRs.

5. Absent approval of shared monitoring of landfill units consistent with Title 27 regulations, each WMU (i.e., LF-1 and LF-2) shall, by 1 July 2021, have a separate groundwater monitoring system. Approval of shared monitoring shall require a technical demonstration to the satisfaction of the Central Valley Water Board as to the following:

   a. Section 20405 (b) - That the subject units are contiguous and that monitoring along a shared boundary would impair the integrity of a containment or structural feature of any of the Units; and/or

   b. Section 20415(e)(3) - That the subject units are contiguous, and that the proposed shared monitoring system will comply with Title 27 performance standards for background, detection and corrective

action monitoring per Title 27, section 20415, subdivisions (b)(1), (2); and/or

c. Title 27, sections 20380(e) – That the proposed shared monitoring system qualifies as an engineered alternative design per Title 27, section 20080(c)-(d).

The above demonstration may be included in the updated WQPS Report submitted under Monitoring Specification G.7. See also Finding 37.

6. By **31 October 2020**, the Dischargers shall submit an updated Monitoring Data Evaluation Methods Report consistent with the requirements of this Order per Finding 41 and MRP section E, and Provision H.6.

7. By **31 October 2020**, the Dischargers shall submit an updated WQPS report per Finding 42, MRP Section E.1, and Provision H.6.

8. By **1 February 2021**, the Dischargers shall submit an updated Sample Collection and Analysis Plan per Finding 40 and Provision H.6.d.iii. The plan may be submitted as part of the Second Semiannual 2020 monitoring report (described in MRP Section D.1) or 2020 Annual Report (described in MRP Section D.2.)

9. Constituents of concern (COC) in water passing through each WMU's Point of Compliance shall not exceed concentration limits specified (or referenced) in the MRP.

10. Absent an approved demonstration under Monitoring Specification G.5.a above, the Point of Compliance shall be a vertical plane situated at the hydraulically downgradient limit of each WMU, extending through the uppermost underlying aquifer. (See Title 27, §§ 20164, 20405.)

11. Detection monitoring shall be conducted for at least three years after completion of corrective action of a unit (including any applicable "proof period") to demonstrate that groundwater down gradient of the unit is in compliance with the Water Quality Protection Standard. See Title 27, sections 20380(d) and 20430(g).

H. Provisions—Except as otherwise expressly directed below, the Dischargers shall comply with the Standard Provisions (SPRRs, § K), as well as the following.

1. Notwithstanding Section G.1, the provisions of this Order shall supersede any contrary provision in MRP R5-2020-0009 and revisions thereto.

2. The Dischargers shall comply with all applicable provisions of Title 27 not specifically referenced in this Order.

3. The Dischargers shall ensure that operating personnel are familiar with this Order (including all attachments and SPRRs) and MRP R5-2020-0009 (or any revision thereto) both of which shall always be kept onsite and made available to operating personnel and regulatory agency personnel.

4. All reports and monitoring data shall be submitted online in an appropriately formatted file via the State Water Board's Geotracker. Database, at (https://geotracker.waterboards.ca.gov/). (Title 23, §§ 3892(d), 3893.) Additional information regarding electronic submittals is accessible through the "Information" tab on the GeoTracker homepage. After uploading a document via GeoTracker, the submitting party shall notify Central Valley Water Board staff via email at centralvalleysacramento@waterboards.ca.gov, including the following information body of the email:

Attention:	Title 27 Compliance & Enforcement Unit, or Title 27 Permitting & Mining Unit
Report Title:	[title of submitted report]
Discharger:	County of Stanislaus Department of Environmental Resources and City of Modesto
Facility:	Geer Road Landfill
County:	Stanislaus
CIWQS ID:	737139

5. All reports and workplans that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geological sciences, shall:

   a. Be prepared by, or under the direction of, professionals registered to practice in California pursuant to Business and Professions Code sections 6735, 7835 and 7835.1; and

   b. Bear the signature(s) and seal(s) of the responsible registered professional(s) described above.

6. The Dischargers shall submit the following technical reports for Central Valley Water Board review and approval:

Table 6—Compliance Schedule

Task			Compliance Date
a.	**Construction**		--
	i.	Construction and design plans, including quality assurance (CQA) plan.	**90 days prior to proposed construction date**
	ii.	Upon completion of WMU construction or repair, including associated control systems, a certification report demonstrating construction in accordance with approved construction plans.	**Within 60 days of completing construction**
b.	**Post-Closure**		--
	i.	Final Cover Settlement Repair Work Plan per Post-Closure Maintenance Specification E.5.	**31 July 2020**
	ii.	A certification report documenting completion of LHC layer/geomembrane repairs per Post-Closure Maintenance Specification E.6.	**30 September 2021**
	iii.	An updated PCMP (including post-closure maintenance cost estimates) per Post-Closure Maintenance Specification E.12.	**1 May 2022**
c.	**Financial Assurances**		--
	i.	An updated Corrective Action Cost Estimates Report per Financial Assurance Specification F.6.	**30 April 2020**
	ii.	Submit proof of required financial assurances per Financial Assurance Specifications F.2 and F.8.	**1 June 2020 and annually thereafter**

Task			Compliance Date
d.	**Monitoring**		--
	i.	A Monitoring Data Evaluation Methods Report per Monitoring Specification G.6.	**31 October 2020**
	ii.	An Updated Water Quality Protection Standard Report per Monitoring Specification G.7.	**31 October 2020**
	iii.	An updated Sample Collection and Analysis Plan per Monitoring Specification G.8.	**1 February 2021**
e.	**Facility**		--
	i.	An updated LFG Extraction System O&M Plan per Facility Specification C.4.a.	**31 March 2021**
	ii.	An updated GWETS and Infiltration Area O&M Plan per Facility Specification C.4.b.	**31 March 2021**
	iii.	A Facility Liquids O&M Plan per Facility Specification C.4.c.	**31 March 2021**

ENFORCEMENT

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

ADMINISTRATIVE REVIEW

Any person aggrieved by this Central Valley Water Board action may petition the State Water Board for review in accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050 et seq. The State Water Board must receive the petition by 5:00 p.m. on the 30th day after the date of this Order; if the 30th day falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations (http://www.waterboards.ca.gov/public_notices/petitions/water_quality) applicable to

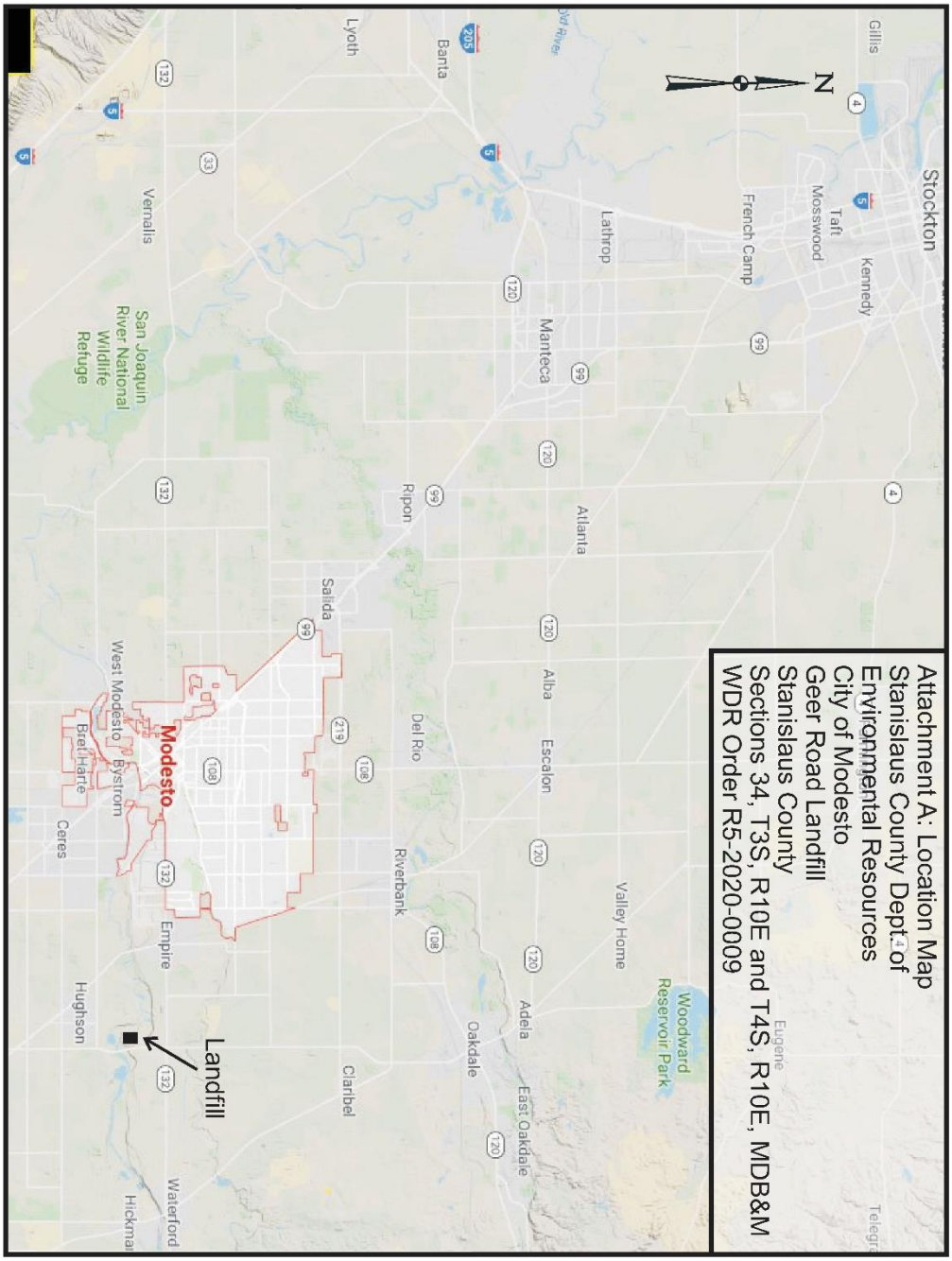
filing petitions are available on the Internet (at the address below) and will be provided upon request.

ATTACHMENTS

Attachment A—Location Map
Attachment B—Area Map
Attachment C—Site Map
Attachment D—Gas Monitoring & Controls
Attachment E—Groundwater Monitoring SYSTEM
Attachment F—Groundwater Monitoring Summary Table
Attachment G—Groundwater Extraction and Treatment System
Attachment H—Groundwater Treatment Plan Schematic
Attachment I—Surface Water Monitoring & Drainage Controls
Information Sheet

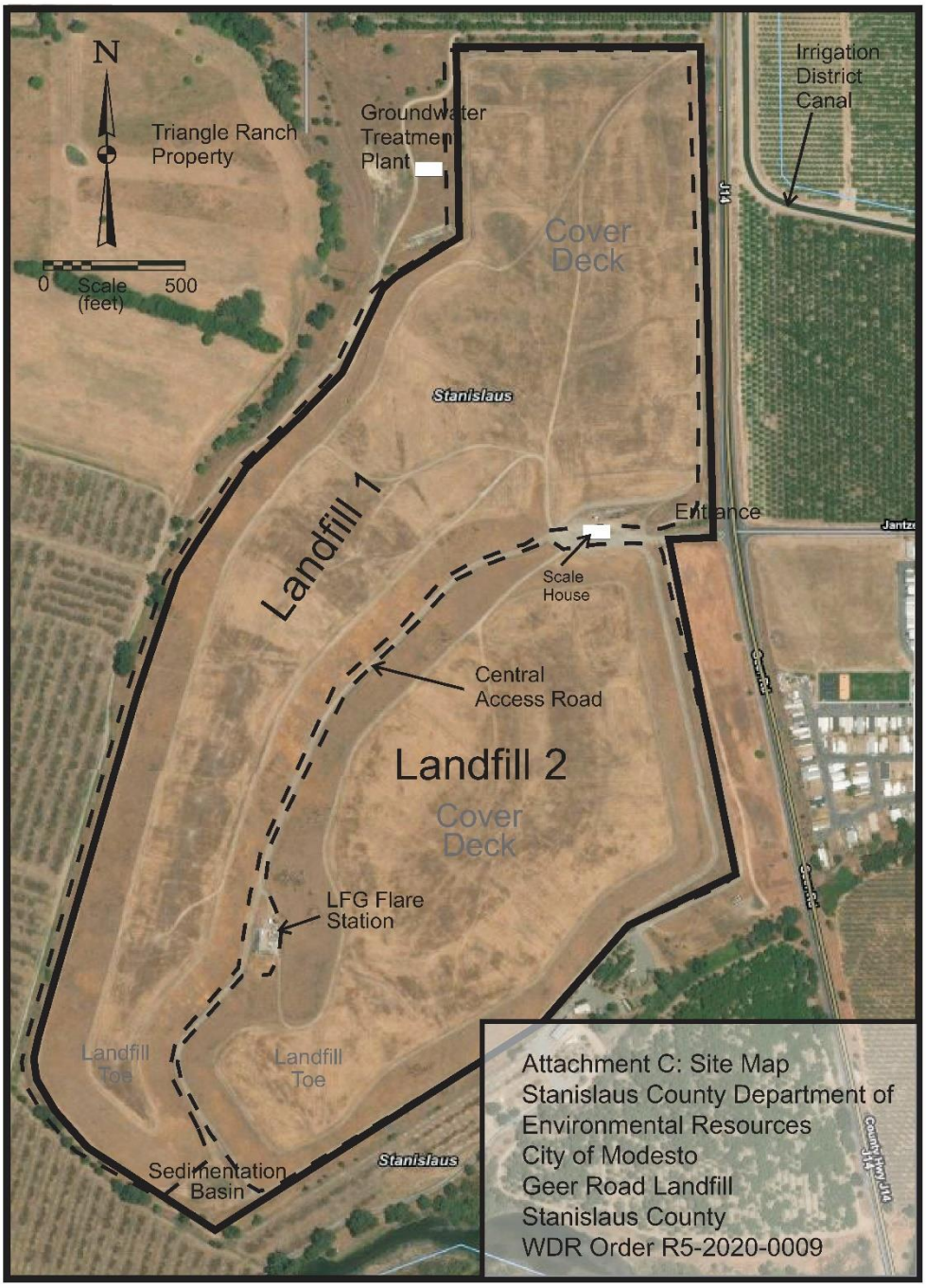
Monitoring and Reporting Program R5-2020-0009

ATTACHMENT A—LOCATION MAP

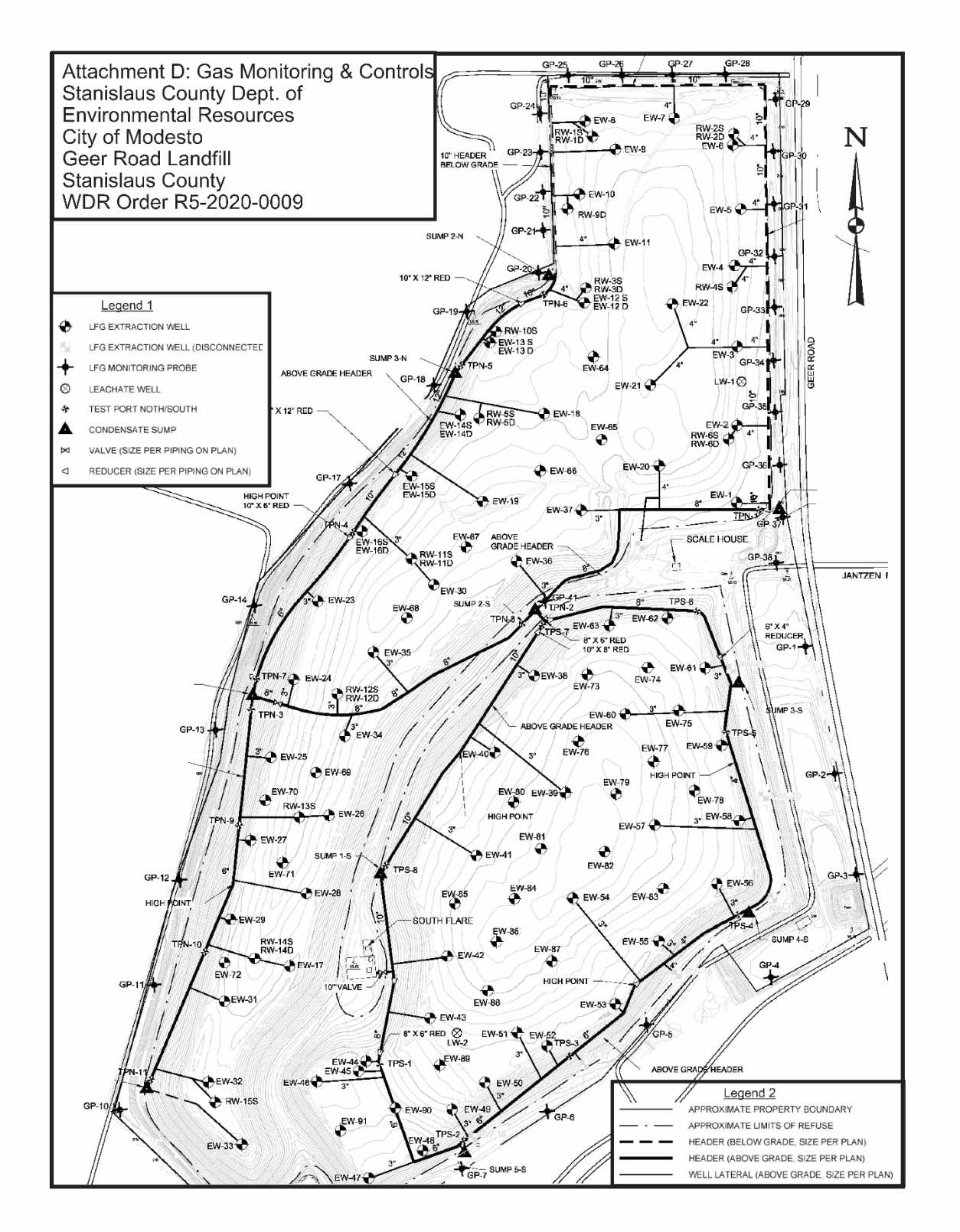


ATTACHMENT B—AREA MAP

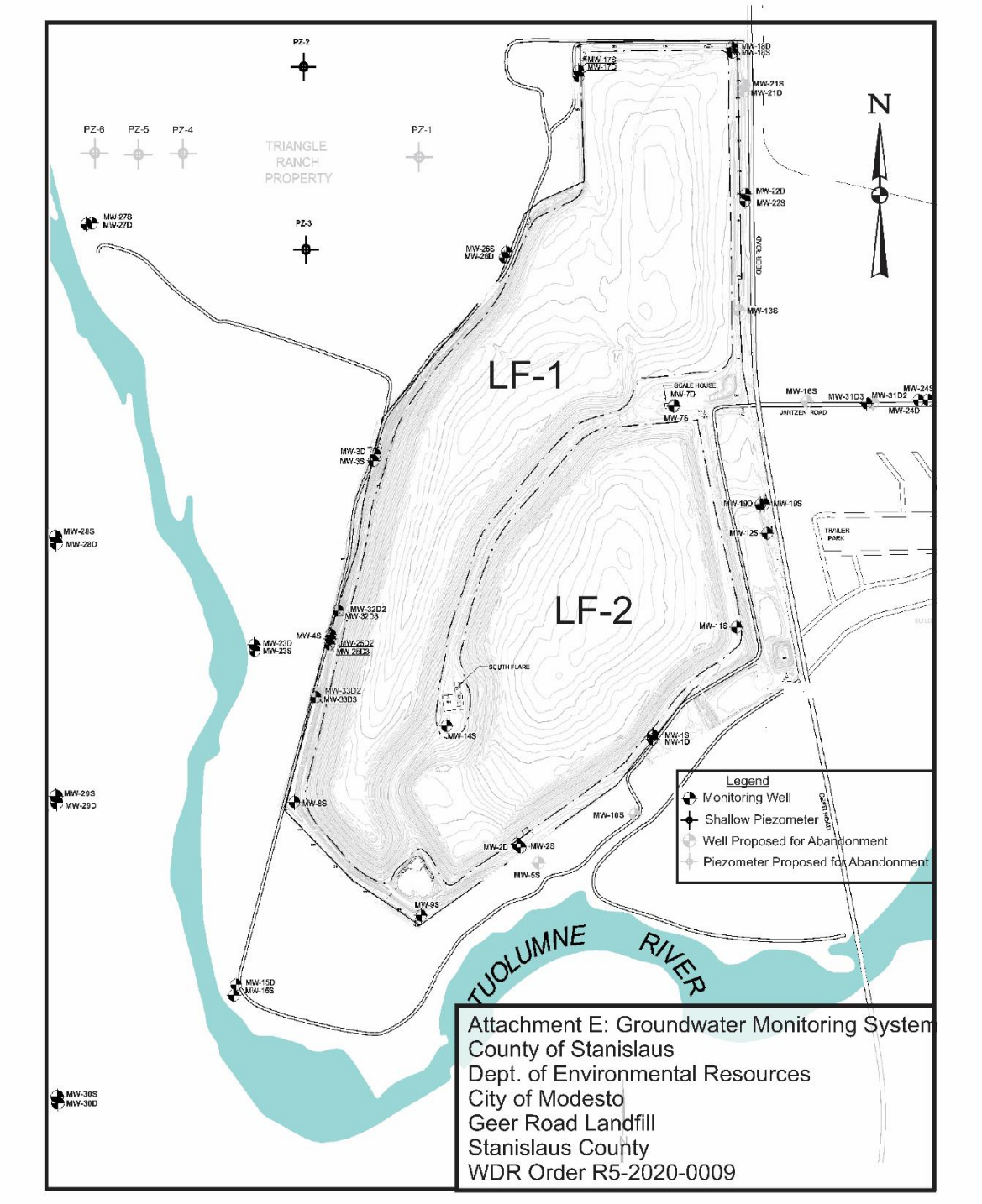
ATTACHMENT C—SITE MAP



ATTACHMENT D—GAS MONITORING & CONTROLS



ATTACHMENT E—GROUNDWATER MONITORING SYSTEM



ATTACHMENT F—GROUNDWATER MONITORING SUMMARY TABLE

Geer Road Landfill
Historical Monitoring Data - VOCs[29]

Southeast Perimeter – Upper Zone

Volatile Organic Compound	*Max Concentration (µg/L)*			*Wells*[1]
	2006-10	2011-15	2016-18	
Chloroform	0.3	0.4	ND	---
Chloromethane	0.4	ND	ND	---
1,1-DCA	2.9	2.4	1.1	2S, 11S, 5S, 1S
1,2-DCE	0.6	ND	ND	---
cis-1,2-DCE	1.3	0.9	ND	---
Dichlorodifluoromethane (Freon 12)	13	2.5	4.8	1S, 5S, 11S
PCE	5.2	2.4	1.0	11S, 5S, 1S, 2S
TCE	1.6	0.6	0.3	---
Trichlorofluoromethane (TCFM)	2.4	0.4	0.8	1S
Xylenes, Total	ND	0.8	0.5	11S, 5S
Total VOCs:	27.7	10.4	8.5	

1. SE perimeter wells include MWs-1S, 2S, 5S, 9S, 10S, and 11S.

29. For purposes of these tables, non-detect (ND) includes trace concentrations below 0.3 µg/L.

ATTACHMENT F

Southeast Perimeter – Lower Zone

Volatile Organic Compound	*Max Concentration (µg/L)*			*Wells*
	2006-10	2011-15	2016-18	
Bromodichloromethane	ND	1.4	ND	---
Chloroform	ND	4.0	ND	---
Chloromethane	ND	0.2	0.6	2D
1,1-DCA	3.9	2.7	0.7	2D
1,1-DCE	0.3	ND	ND	---
1,2-DCE	1.0	ND	ND	---
cis-1,2-DCE	1.8	1.0	ND	---
1,2-Dichloropropane	0.3	0.2	ND	---
Dichlorodifluoromethane (Freon 12)	22	15	3	2D, 1D
Napthalene	ND	1.9	ND	---
PCE	5.6	5.7	1.9	2D, 1D
TCE	2.4	1.7	0.7	2D
Toluene	ND	0.4	0.6	2D
Trichlorofluoromethane (TCFM)	3.4	1.6	0.6	2D
Xylenes, Total	ND	1.1	0.7	2D, 1D
Total VOCs:	40.7	36.9	8.8	

ATTACHMENT F

Western Perimeter – Upper Zone

Volatile Organic Compound	*Max Concentration (µg/L)*			*Wells*
	2006-10	2011-15	2016-18	
Acetone	ND	39	23	3S, 23S
Benzene	0.6	0.5	0.4	4S
Chlorobenzene	0.7	3.5	3	3S
Chloromethane	ND	ND	1.8	4S
1,3-Dichlorobenzene	0.8	ND	ND	---
1,4-Dichlorobenzene	1.0	1.0	1.1	4S
1,1-DCA	7.2	5.3	0.7	4S, 8S, 23S, 3S
1,2-DCA	0.3	0.4	0.2	4S
1,2-DCE, Total	9.9	ND	ND	---
Cis-1,2-DCE	19	15	ND	---
Trans-1,2-DCE	1.1	0.9	0.6	4S
1,2-Dichloropropane	1.2	0.9	1.0	4S
Dichlorodifluoromethane (Freon 12)	21	9.9	4	8S, 4S, 23S, 3S
Di-Isopropyl Ether (DIPE)	0.4	0.3	0.3	4S
PCE	5.3	3.1	1.9	8S, 3S
TCE	4.9	4.1	0.7	8S, 4S, 23S, 3S
Toluene	0.6	ND	ND	---
Trichlorofluoromethane (TCFM)	1.0	1.8	0.3	8S
Vinyl Chloride	23	15	8	4S, 23S, 3S
Xylenes, Total	ND	1.2	1.4	23S, 8S
Total VOCs:	98	101.9	48.4	

ATTACHMENT F

Western Perimeter – Lower Zone

Volatile Organic Compound	*Max Concentration (µg/L)*			*Wells*
	2006-10	2011-15	2016-18	
Acetone	ND	110	23	25D2, 3D
Benzene	ND	ND	0.3	4D
Chloroform	ND	0.3	ND	
Ethylbenzene	ND	0.7	0.5	25D3
1,1-DCA	0.9	2.1	1.8	23D, 3D, 4D, 25D2
Cis-1,2-DCE	1.1	2.7	4.9	23D. 4D, 25D2, 3D
Trans-1,2-DCE	ND	ND	0.5	4D
1,2-Dichloropropane	ND	ND	0.3	23D
Dichlorodifluoromethane (Freon 12)	14	11	14	4D, 23D, 25D2
Methylene Chloride	ND	0.6	ND	
PCE	2.3	2.1	2	4D, 23D, 3D. 25D2
TCE	0.9	0.7	0.8	23D, 4D, 3D
Trichlorofluoromethane (TCFM)	1	1.2	1.3	4D, 23D
Trihalomethanes, Total	14	ND	ND	
Vinyl Chloride	0.3	2	ND	
Xylenes, Total	ND	3.8	2.1	25D3, 4D, 23D, 3D, 25D2
Total VOCs:	34.5	137.2	51.5	

ATTACHMENT F

Northern Perimeter – Shallow Zone

Volatile Organic Compound	*Max Concentration (µg/L)*			*Wells*[1]
	2006-10	2011-15	2016-18	
Acetone	ND	170	ND	
Carbon Disulfide	ND	0.5	ND	
Chloromethane	0.5	ND	ND	
Ethylbenzene	ND	0.3	ND	
1,1-DCA	2.1	2.5	1.5	13S, 26S, 17S, 22S
1,1-DCE	0.4	ND	ND	
Cis-1,2-DCE	ND	5.7	2.3	26S
Dichlorodifluoromethane (Freon 12)	15	4.6	2.7	17S, 26S, 13S
PCE	23	2.8	1.5	17S, 26S, 13S
TCE	0.7	1.2	0.4	26S
Toluene	1.1	ND	ND	
Trichlorofluoromethane (TCFM)	4.4	2.4	1.3	17S, 13S, 26S
Trihalomethanes, Total	15	ND	ND	
Xylenes, Total	ND	1.6	1.3	26S
Total VOCs:	62.2	191.6	11	

1. Northern perimeter wells include MWs-13S, 17S, 18S, 21S, 22S, and 26S.

ATTACHMENT F

Northern Perimeter – Lower Zone

Volatile Organic Compound	*Max Concentration (µg/L)*			*Wells*
	2006-10	2011-15	2016-18	
Acetone	ND	36	170	26D, 17D, 18D
Chloroform	ND	0.5	ND	
Ethylbenzene	ND	0.6	ND	
1,1-DCA	1.1	ND	ND	
Cis-1,2-DCE	ND	2	ND	
Dichlorodifluoromethane (Freon 12)	14	4.1	0.7	18D, 21D
PCE	6.8	1.1	ND	
TCE	0.4	ND	ND	
Trichlorofluoromethane (TCFM)	4.3	2.9	0.5	18D
Trihalomethanes, Total	14	ND	ND	
Xylenes, Total	ND	3.3	1.2	22D, 26D, 21D, 17D
Total VOCs:	40.6	50.5	172.4	

ATTACHMENT F

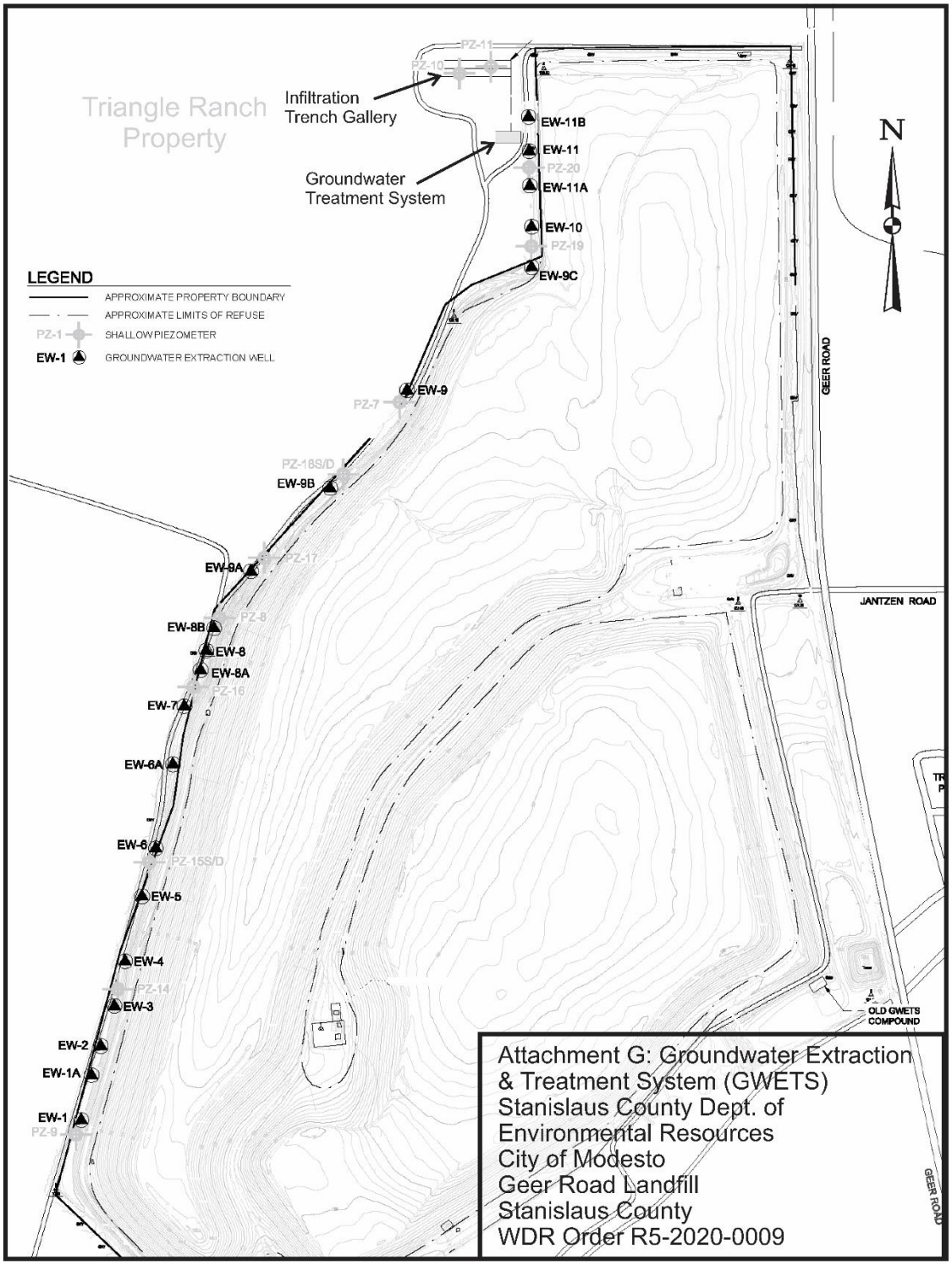
Total VOCs Summary Table

Landfill Perimeter

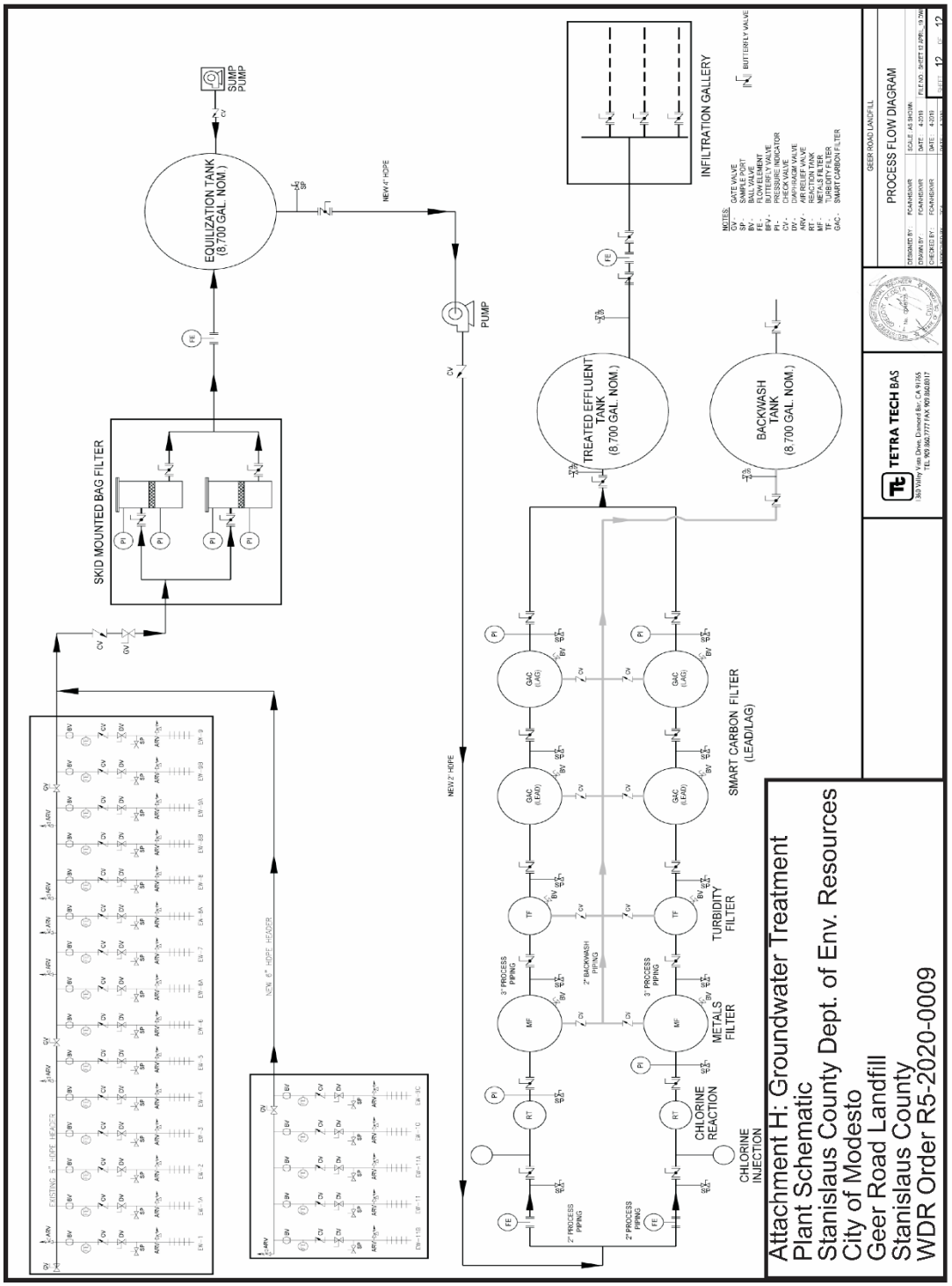
Unit Perimeter	*Aquifer Zone*	*Max Concentration (µg/L)*		
		2006-10	2011-15	2016-18
South/SE	Upper	27.7	10.4	8.5
	Lower	40.7	36.9	8.8
Western	Upper	98	101.9[1]	48.4[1]
	Lower	34.5	137.2[1]	51.5[1]
Northern	Upper	62.2	191.6[1]	11
	Lower	40.6	50.5[1]	172.4[1]

1. Acetone detected at concentrations equal to or exceeding 40 percent at these locations.

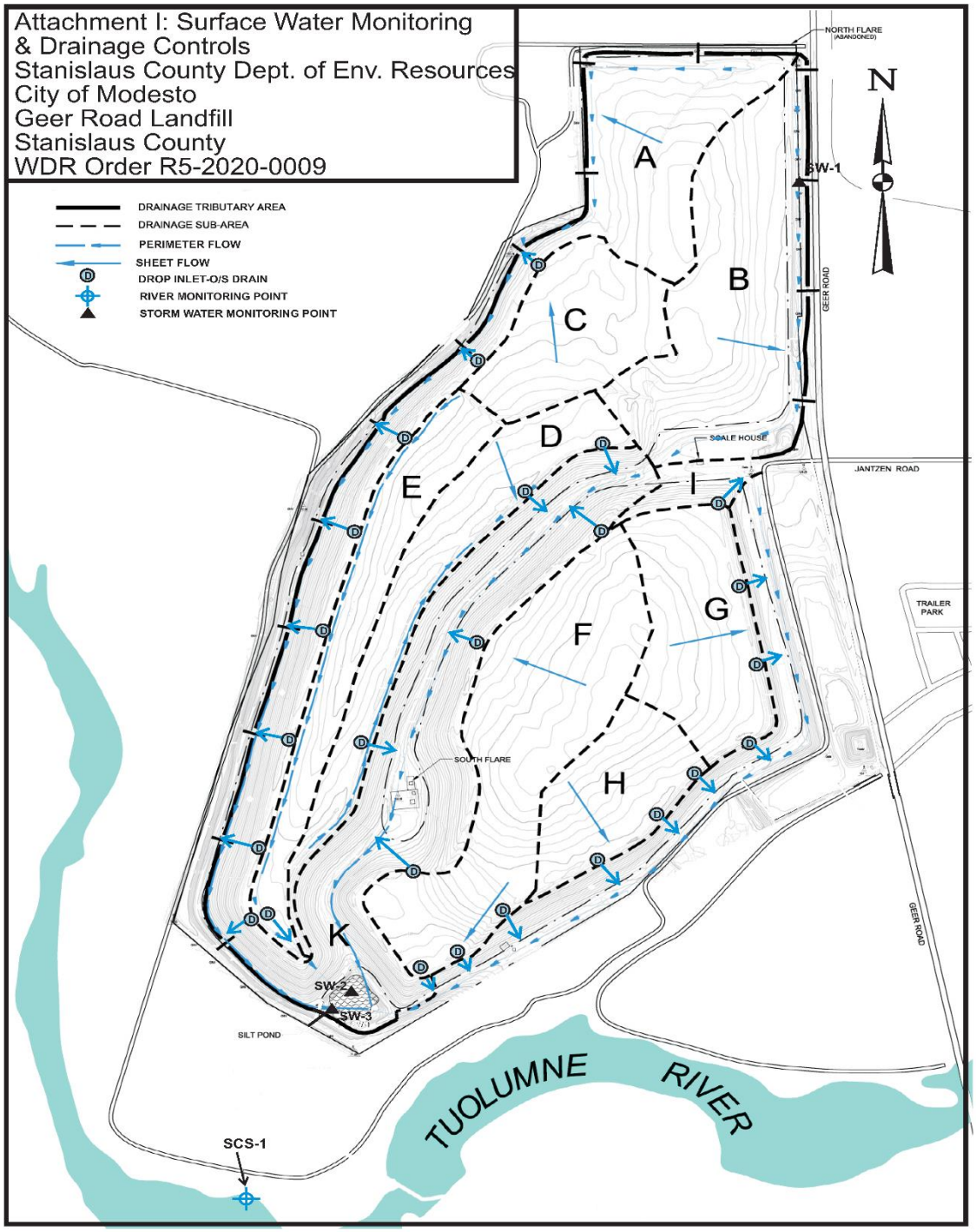
ATTACHMENT G—GROUNDWATER EXTRACTION AND TREATMENT SYSTEM



ATTACHMENT H—GROUNDWATER TREATMENT PLAN SCHEMATIC



ATTACHMENT I—SURFACE WATER MONITORING & DRAINAGE CONTROLS



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

WASTE DISCHARGE REQUIREMENTS ORDER R5 2020 0009
FOR
STANISLAUS COUNTY, DEPT. OF ENVIRONMENTAL RESOURCES AND
CITY OF MODESTO
GEER ROAD LANDFILL

INFORMATION SHEET

The Geer Road Landfill is a 168-acre, closed MSW landfill located about eight miles east of downtown Modesto near the Tuolumne River. The Facility operated from 1970 to 1990 accepting primarily household, cannery, and construction and demolition (C&D) wastes. Two unlined trench fill areas were historically developed at the site, separated by a central access road. See Attachment 1. Unlined area fill cells were subsequently developed to closure grades over the two trench fill areas. In 1995, the landfill was closed with a Title 27-compliant final covers over the two fill areas. The landfill contains approximately 4.5 million tons of waste.

Unit Classification

A review of the files indicates that the two unlined fill areas at the site constitute two separate landfill units, each with a Title 27-compliant final cover. Although unlined with no leachate collection and recovery system (LCRS), both units are Class III units because their final cover constitutes their principle containment system under Title 27 regulations. See WDR Finding 30. These WDRs maintain the landfill's Class III designation but re-classify the landfill as two separate Class III units referred to as Landfill 1 (LF-1) and Landfill 2 (LF-2).

Site Description

The site lies on a bluff overlooking a meander bend of the Tuolumne River to the south. Land uses in the vicinity of the Facility include industrial, irrigated agriculture, water conveyance, buffer land, rural residential and a mobile home park. A December 2019 DWR well survey identified at least 95 groundwater supply wells within a one-mile radius of the site, five of which closest to the landfill (i.e., Streeter (Shop), Streeter (House), and TRs-1 through 3 (mobile home park)) were monitored under the CDO. See WDR Finding 19 and Attachment 2.

The site is underlain by the Modesto formation, which consists of (laterally and vertically discontinuous) braided stream channel deposits composed of varying percentages of sand, silt, clay and/or gravel. The uppermost aquifer in the Modesto formation includes shallow and deep zones, separated by a thin confining or semi-confining layer. The

shallow zone ranges from about two to 15 feet thick and consists of fine-to-medium grained sand or silty sand. Shallow zone groundwater occurs at depths ranging from about 77 feet bgs on the north side of the site to about 21 feet bgs along the south side near the Tuolumne River. Shallow zone groundwater generally flows to the west or southwest with occasional flow reversals due to seasonal high river levels. The deep zone averages about 15 feet thick and consists of sand and gravel.

Storm runoff from the site is routed to the sedimentation basin. The basin allows suspended material to settle out from surface water runoff prior to discharge into the Tuolumne River. Discharge from the basin only occurs in very wet weather years. Flooding of the Tuolumne River has historically occurred at the site, but such events are rare. The landfill is protected from river flooding by a 10-foot high berm. See WDR Finding 17.

Groundwater Monitoring and Impacts

Groundwater impacts from the landfill including, volatile organic compounds (VOCs) and elevated concentrations of inorganic constituents were first detected at the site in the mid-1980s. The VOC release consisted primarily of halogenated VOCs and Freon Compounds (e.g., PCE up to 54 µg/L; TCE up to 140 µg/L; and Freon 12 up to 480 µg/L). Aromatic VOCs and ketones (e.g., acetone) were also sporadically detected in groundwater. Deep concentrations of VOCs were detected in some deep zone wells. Inorganic components of the release consisted primarily of dissolved arsenic (up to 130 µg/L), iron, lead and manganese.

Corrective action monitoring of since 2006 indicates a general decline in the number and concentration of VOCs detected in groundwater in both the shallow and deep zones. For example, maximum total VOCs (excluding acetone) have declined from about 100 µg/L to 25 µg/L in the shallow zone and from about 35 µg/L to 29 µg/L along the downgradient (western) site perimeter. Acetone continues to be sporadically detected in the shallow zone up to 170 µg/L, however. The general improvement in groundwater quality at the site is likely attributable to the partial effectiveness of corrective action measures historically implemented at the site (described below) and natural attenuation processes. See WDR Findings 50 through 52.

Corrective Action

In 1993, the Dischargers installed a groundwater extraction and treatment system (GWETS) at the site consisting of 12 extraction wells (EW-1 through EW-12) along the exterior perimeter of LF-2 and a granular activated carbon (GAC) treatment plant near the southeastern side of LF-2. See WDR Attachment G: GWETS. The system also included an adjacent, 10-trench infiltration gallery immediately south of the treatment plant. Although overhauled and improved over the years, this original GWETS was

ultimately found to be insufficient to capture and remediate the release and in 2011, the Central Valley Water Board adopted Cease and Desist Order (CDO) R5-2011-0022 ordering the Dischargers to complete delineation of the release; evaluate the need for additional corrective action measures; and submit an updated Engineering Feasibility Study (EFS) proposing additional corrective action measures, as necessary. A revised Monitoring and Reporting Program (Revised MRP R5-2011-0022) was also issued with the CDO.

After completing investigations under the CDO, the Discharger installed a new, expanded GWETS in the northeastern part of the site in March 2018. The new GWETS includes 20 extraction wells installed along the western site perimeter and a 200 gpm, dual train GAC system designed to remove both VOCs and the elevated inorganic constituents detected in groundwater. Treated effluent from the system will be discharged to an offsite infiltration gallery constructed on the adjacent Triangle Ranch property (owned by the County of Stanislaus) upon completion of start-up testing and permitting of the discharge under applicable non-Chapter 15 General Order.

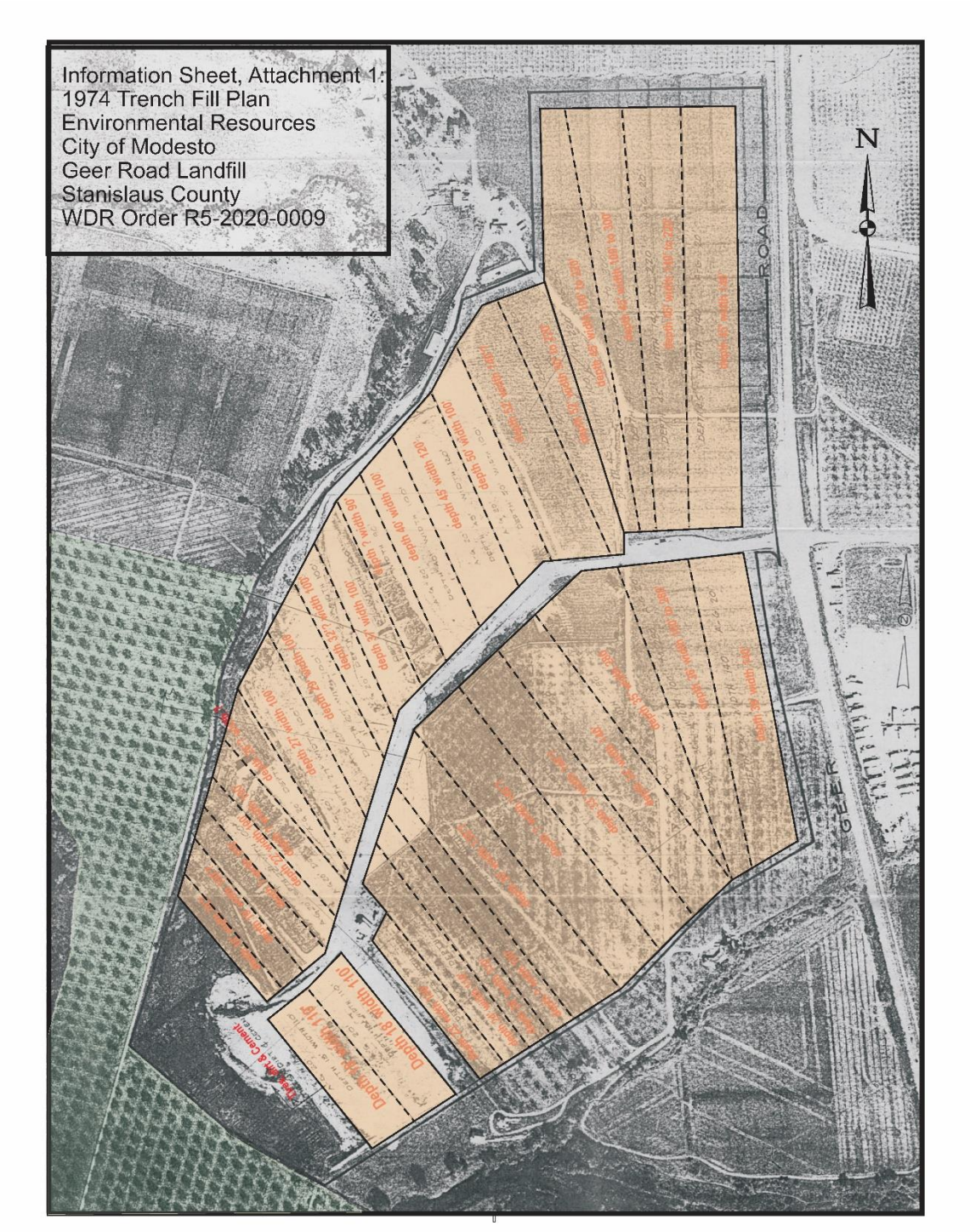
Landfill gas (LFG) controls were also historically installed to address the release and expanded and improved over the years. The LFG extraction system currently consists of a total of 108 vertical LFG extraction wells and associated facilities. See WDR Finding 26 and 46 and WDR Attachment D.

These WDRs prescribe requirements for post-closure maintenance and corrective action monitoring of the landfill relevant to the site improvements implemented under the 2011 CDO and revised MRP, both of which will be rescinded by adoption of this Order.

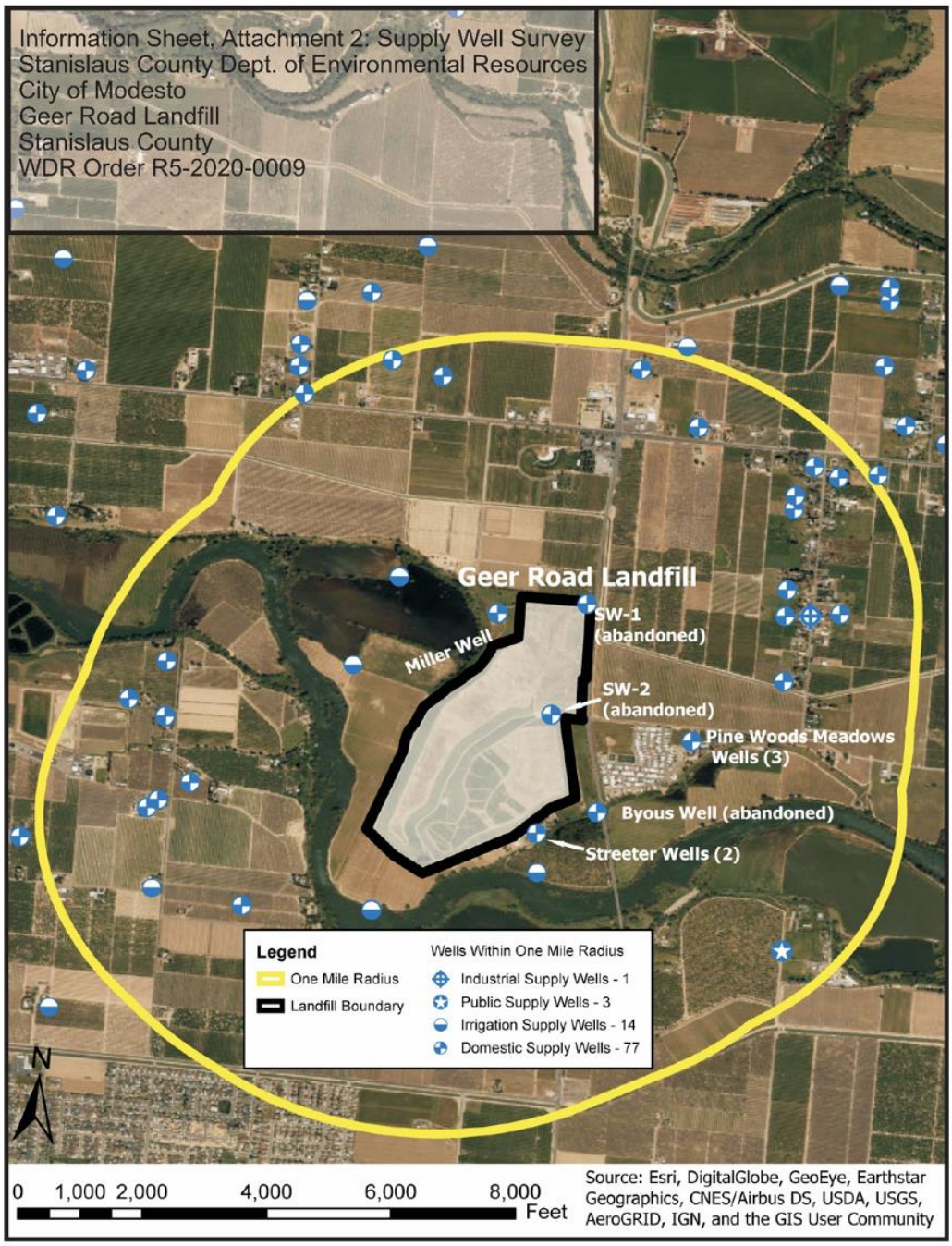
JDM

INFORMATION SHEET

ATTACHMENT 1—1974 TRENCH FILL PLAN



ATTACHMENT 2—SUPPLY WELL SURVEY



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING ORDER R5-2020-0009

MONITORING AND REPORTING PROGRAM
FOR
COUNTY OF STANISLAUS
AND
CITY OF MODESTO
GEER ROAD LANDFILL
STANISLAUS COUNTY

Preface

Adopted pursuant to Water Code section 13267, this Order establishes a Monitoring and Reporting Program (MRP) incorporating the prescriptive monitoring and reporting requirements and performance standards of California Code of Regulations, title 27 (Title 27), section 20005 et seq. Although incorporated as part of Waste Discharge Requirements Order (WDRs Order) R5-2020-0009, this MRP Order is separately enforceable, and may be separately revised by the Executive Officer under authority delegated pursuant to Water Code section 13223. Except as otherwise provided below in this MRP Order, each of the Findings set forth in the WDRs Order are incorporated herein.

A. **Monitoring Requirements**—The Discharger shall comply with the detection monitoring program (DMP) and corrective action monitoring program (CMP) provisions of Title 27, as applicable, for groundwater, surface water, and the unsaturated zone, as specified herein, in accordance with Standard Monitoring Specifications in Section I of the SPRRs and the Monitoring Specifications in Section G of the WDRs. All detection and corrective action monitoring systems, including background monitoring, shall be designed and constructed consistent with this Order and certified by a California-licensed professional civil engineer or geologist (Qualified Professional) as meeting the requirements of Title 27.

1. **Groundwater Monitoring**—The Discharger shall implement a groundwater corrective action monitoring program (CMP) along the Point of Compliance and in other water bearing zones and locations necessary to meet Title 27 performance standards for groundwater correction action monitoring, including monitoring the nature and extent of the release and the progress of corrective action. Data analysis methods for corrective action monitoring shall include applicable detection and evaluation monitoring protocols, such as verification testing and notification of any

new or previously unconfirmed constituents of the release to meet corrective action objectives.[30] (See SPRRs, §§ I.45-I.47.)

a. Monitoring Points—Corrective Action Monitoring for the Facility shall include (at a minimum), for the shallow zone, those monitoring points (groundwater wells and piezometers) in Table 7, and for the deep zone, those monitoring points (groundwater wells) in Table 8.

In accordance with Title 27, contiguous monitoring for LF-1 and LF-2, per **Table 7** (Shallow Zone) and **Table 8** (Deep Zone), is contingent on an approved demonstration per Section G.5 of the WDRs Order (Monitoring Specifications). Absent such a demonstration, additional wells may be needed between LF-1 and LF-2.

The Dischargers shall install a sufficient number of piezometers and/or groundwater water monitoring wells to provide the groundwater elevation monitoring data necessary to accurately plot the groundwater elevation contours and adequately define the direction(s) of groundwater flow and corresponding flow gradient(s) in the shallow and deep zones beneath the Facility.

Any monitoring wells or piezometers installed after the adoption of this Order shall become groundwater corrective action monitoring points subject to monitoring under this section, unless otherwise approved by Water Board staff. Any existing or future monitoring wells (or piezometers) properly abandoned or replaced as approved by Water Board staff may be removed as groundwater monitoring points subject to monitoring under this section. See Standard Monitoring Specification I.23, SPRR.

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30 Incorporation of detection and evaluation monitoring protocols into the CMP may alternatively be viewed as running concurrent detection, evaluation, and correction action monitoring on a constituent-by-constituent basis. A DMP may also be run independent of the CMP at any wells that have successfully completed a Title 27 proof period per WDR Monitoring Specification G.11.

Table 7—Groundwater Corrective Action Monitoring Points, Shallow Zone

Unit(s) Monitored	Wells	Program / Function	Location	Notes
LF-1 and LF-2 (Contiguous)	MW-24S	Background	Offsite to East	See discussion below regarding demonstrations for contiguous monitoring.
LF-1	7S	Background	Between LF-1 and LF-2	See discussion below regarding demonstrations for contiguous monitoring.
LF-1	MW-17S MW-18S MW-22S MW-26S	Corrective Action	Northern Perimeter	(none)
LF-1	MWs-13S MW-21S	Corrective Action	Northern Perimeter	Proposed for abandonment. To date, no workplans have been submitted.
LF-1	MW-27S PZ-2 PZ-3	Corrective Action	Offsite to Northwest	PZ monitoring may be limited to groundwater elevation (shallow zone).
LF-1	PZ-1 PZ-4 PZ-5 PZ-6	Corrective Action	Offsite to Northwest	(1) Proposed for abandonment. To date, no workplans have been submitted. See Findings in WDRs Order. (2) PZ monitoring may be limited to groundwater elevation (shallow zone).
LF-1 and LF-2 (Contiguous)	MW-3S MW-4S MW-8S	Corrective Action	Western Perimeter	See discussion regarding demonstrations for contiguous monitoring.

Unit(s) Monitored	Wells	Program / Function	Location	Notes
LF-1 and LF-2 (Contiguous)	MW-23S MW-28S MW-29S MW-30S MW-15S	Corrective Action	Offsite to West/ Southwest	See discussion below regarding demonstrations for contiguous monitoring.
LF-1 and LF-2 (Contiguous)	MW-16S	Corrective Action	Offsite to East	(1) Proposed for abandonment. To date, no workplans have been submitted. See Findings in WDRs Order. (2) See discussion regarding demonstrations for contiguous monitoring.
LF-2	MW-7S MW-14SR	Corrective Action	Between LF-1 and LF-2	See discussion regarding demonstrations for contiguous monitoring.
LF-2	MW-1S MW-2S MW-9S MW-11S	Corrective Action	Southeast Perimeter	(none)
LF-2	MW-12S MW-19S	Corrective Action	Offsite to East/Southeast	(none)
LF-2	MW-5S[4] MW-10S[4]	Corrective Action	Offsite to East/Southeast	Proposed for abandonment. To date, no workplans have been submitted. See Findings in WDRs Order.

Table 8—Groundwater Corrective Action Monitoring Points, Deep Zone

Unit(s) Monitored	Wells	Program / Function	Location	Notes
LF-1 and LF-2 (Contiguous)	MW-24D MW-31D3	Background	Offsite to East	See discussion regarding demonstrations for contiguous monitoring.
LF-1 and LF-2 (Contiguous)	MW-31D2	Background	Offsite to East	(1) Proposed for abandonment. To date, no workplans have been submitted. See Findings in WDRs Order. (2) See discussion regarding demonstrations for contiguous monitoring.
LF-1	7D	Corrective Action	Between LF-1 and LF-2	See discussion regarding demonstrations for contiguous monitoring.
LF-1	MW-17D MW-18D MW-22D MW-26D	Corrective Action	Northern Perimeter	(none)
LF-1	MW-21D	Corrective Action	Northern Perimeter	Proposed for abandonment. To date, no workplans have been submitted. See Findings in WDRs Order.
LF-1	MW- 27D	Corrective Action	Offsite to Northwest	(none)

Unit(s) Monitored	Wells	Program / Function	Location	Notes
LF-1 and LF-2 (Contiguous)	MW-3D MW-4D MW-25D2 MW-25D3 MW-32D3 MW-33D3	Corrective Action	Western Perimeter	See discussion regarding demonstrations for contiguous monitoring.
LF-1 and LF-2 (Contiguous)	MW-32D2 MW-33D2	Corrective Action	Western Perimeter	(1) Proposed for abandonment. To date, no workplans have been submitted. See Findings in WDRs Order. (2) See discussion regarding demonstrations for contiguous monitoring.
LF-1 and LF-2 (Contiguous)	MW-15D MW-23D MW-28D MW-29D MW-30D	Corrective Action	Offsite to West/ Southwest	See discussion regarding demonstrations for contiguous monitoring.
LF-1 and LF-2 (Contiguous)	MW-31D2 MW-31D3	Corrective Action	Offsite to East	See discussion regarding demonstrations for contiguous monitoring.
LF-2	MW-7D	Corrective Action	Between LF-1 and LF-2	See discussion below regarding demonstrations for contiguous monitoring.
LF-2	MW-1D MW-2D	Corrective Action	Southeast Perimeter	(none)
LF-2	MW-19D	Corrective Action	Offsite to East/Southeast	(none)

b. **Monitoring Schedule**—Ground water samples shall be collected from each well and analyzed for the Field Parameters and Monitoring Parameters listed in **Attachment A**, and the Five-Year COCs Monitoring Parameters referenced in **Table 9**, and listed in **Attachments A** and **B** of this MRP. Sampling shall be conducted in accordance with the frequencies listed above for each parameter/constituent group.

Using groundwater elevation data from monitoring, the Discharger shall determine (calculate or estimate) the ground water flow rate and direction in the uppermost aquifer; and, to the extent feasible, any zones of perched water or other saturated zones monitored pursuant to Title 27, section 20415, subdivision (b)(1).

Annually (or more frequently, if appropriate), groundwater chemistry shall also be evaluated at least annually for cation/anion balance, and the results graphically presented using an appropriate method (e.g., Stiff diagram, Piper diagram, and/or Schoeller plot).

Table 9—Groundwater Corrective Action Monitoring Schedule, Shallow and Deep Zones

Parameter	Units	Sampling Frequency
Field Parameters (See Attachment A)	(various)	Quarterly
General Monitoring Parameters (See Attachment A)	mg/L	Semiannually
General Minerals—Major Anions (See Attachment A)	mg/L	Annually
General Minerals—Major Cations (See Attachment A)	mg/L	Annually
VOCs, Short List (See Attachment A)	µg/L	Semiannually
Dissolved Metals, Short List (See Attachment A)	µg/L	Semiannually
Five-Year COCs (See Attachment B)	(various)	Every 5 Years (Last Monitored in 2017)

Note: Piezometer monitoring may be limited to groundwater elevation (shallow zone) or hydraulic head (deep zone).

2. **Unsaturated Zone Monitoring (Soil Pore Gas)**—Given that the landfill units at the site are unlined and it was not feasible to install lysimeters beneath the units, unsaturated zone monitoring at the Facility may be limited to soil pore gas monitoring.

   a. Monitoring Points—The soil pore gas monitoring network for the landfill units shall include of all existing perimeter gas monitoring wells/probes specified in **Table 10**, and any future soil gas monitoring probes installed at the site.

Table 10—Soil Pore Gas Monitoring Points

Gas Wells	Completion Type	Probe Screen Interval (Relative to Waste Column)	Adjacent Unit	Location (Relative to Adjacent Unit)
GP-1 GP-2	Triple	Shallow, Middle, Deep	LF-2	East
GPs-3 GP-4 GP-5	Double	Shallow, Deep	LF-2	Southeast
GP-6 GP-7 GP-8	Single	All	LF-2	Southeast
GP-9 GP-10 GP-11 GP-12 GP-13 GP-14	Single	All	LF-1	West/ Southwest
GP-17 GP-18 GP-19	Double	Shallow, Deep	LF-1	West/ Northwest

Gas Wells	Completion Type	Probe Screen Interval (Relative to Waste Column)	Adjacent Unit	Location (Relative to Adjacent Unit)
GP-20 GP-21 GP-22 GP-23 GP-24	Single	All	LF-1	West/ Northwest
GP-25 GP-26 GP-27 GP-28	Triple	Shallow, Middle, Deep	LF-1	North/ Northeast
GP-29 GP-30 GP-31 GP-32 GP-33 GP-34 GP-35 GP-36	Triple	Shallow, Middle, Deep	LF-1	North/ Northeast
GP-37 GP-38 GP-41	Triple	Shallow, Middle, Deep	LF-1 and LF-2	North of LF-2

b. **Monitoring Schedule**—Soil pore gas shall be monitored for LFG constituents in accordance with **Table 11**. Soil pore water monitoring for the Facility is not required or possible because it is unlined and does not have lysimeters. See WDR Finding 29. Monitoring results for the unsaturated zone shall be included in monitoring reports and shall include an evaluation of potential impacts of the Facility on the unsaturated zone and compliance with the Water Quality Protection Standard.

Table 11—Soil Pore Gas Monitoring Schedule

Parameters	Units	Monitoring Frequency	Notes
Field Parameters	---	---	---
Weather	(not applicable)		(none)
Atmospheric Pressure	Inches Hg	Semiannually	(none)
Atmospheric Temperature	°F	Semiannually	(none)
Gas Temperature	°F		Take readings before and after adjustment.
Gas Pressure	Inches H_2O		Take readings before and after adjustment.
Field Gases: Carbon Dioxide Methane Nitrogen Oxygen	%	Semiannually	(none)
Organic Vapors	ppmv	Semiannually	(none)
Monitoring Parameters	---	---	---
Volatile Organic Compounds	$\mu g/cm^3$	Semiannually	(1) VOC sampling shall be required in all probes in which methane detected above 1% by volume and/or total organic vapors detected above 1 ppmv during monitoring event. (2) VOC analysis shall be conducted using USEPA Method TO-15.

Note: All field gas monitoring shall be conducted using appropriate field meter(s).

3. **Leachate Seep Monitoring**—Leachate seep monitoring shall be conducted to detect physical evidence of a release from the landfill units per Standard Monitoring Specification I.48, SPRR.

   a. **Monitoring Points**—The monitoring points for leachate seep monitoring shall include the *landfill cover deck*, *slopes* and *perimeter*.

   b. **Monitoring Schedule**—Leachate seep monitoring shall be conducted according to the schedule set forth in **Table 12**.

Table 12—Leachate Seep Monitoring Schedule

Parameter/Constituent	Units	GeoTracker Code	Sampling Freq.
Field Parameters	---	---	---
Total Flow (estimate)	Gallons		Each Occurrence
Flow Rate (estimate)	Gallons/Day	FLOW	Each Occurrence
Specific Conductance	µmhos/cm	SC	Each Occurrence
pH	pH units	PH	Each Occurrence
Monitoring Parameters	---	---	---
(Same as Corrective Action Monitoring)	See Table 9.	---	Each Occurrence
Five-Year COCs		---	Each Occurrence
(Same as Corrective Action Monitoring)	See Table 9, Attachment B.	---	Each Occurrence

   c. **Detection of Leachate**—If leachate is observed emanating from the landfill, the Discharger shall: (i) within seven days, verbally notify Central Valley Water Board staff; and (ii) immediately, sample

and test leachate in accordance with the Field Parameters and Monitoring Parameters specified in **Table 12**.

d. **Reporting**—Reporting for leachate seeps shall be conducted as required in Section D.3 of this MRP, below.

4. **Surface Water Monitoring—Storm Water**[31]—Storm water runoff from the units at the Facility shall be collected from each monitoring point listed above when there is sufficient liquid at each monitoring point to collect a representative sample of the liquid at that point. Each sample shall be analyzed in accordance with the methods and frequency specified in **Table 13**.

Storm water runoff from the units at the Facility shall be collected from each monitoring point listed above when there is sufficient liquid at each monitoring point to collect a representative sample of the liquid at that point. Each sample shall be analyzed in accordance with the methods and frequency specified in **Table 14**.

Table 13—Surface Water Monitoring Points

WMUs	Monitoring Program	Location	Monitoring Point(s)	Notes
LF-1 & LF-2	Background	Upstream	SW-1	Representative point upstream of both units
LF-1 & LF-2	Detection	Sedimentation Basin	SW-2	Representative monitoring point of liquid in sedimentation basin.
LF-1 & LF-2	Detection	Sedimentation Basin	SW-3	Point of discharge from sedimentation basin.

[31] Runoff from landfill areas within the Facility flows to sedimentation basins, which periodically discharge to Tuolumne River, which is a water of the United States.

Table 14—Storm Water Monitoring Schedule

Parameter	GeoTracker Code	Units	Sampling Frequency
Field Parameters (See Attachment A)	---	---	---
Specific Conductance	SC	µmhos/cm	Semiannually
pH	PH	pH units	Semiannually
Turbidity	TURB	NTU	Semiannually
Flow to Waters of U.S.	FLOW	Yes/No	Semiannually
Monitoring Parameters (See Attachment A)	---	---	---
General Parameters	(various)	mg/L	Semiannually
General Minerals Major Anions Major Cations	(various)	mg/L	Annually
Volatile Organic Compounds, Short List	(various)	µg/L	Annually
Dissolved Metals, Short List	(various)	µg/L	Annually
Five-Year COCs (See Attachment B)	---	---	---
(See Attachment B for Complete List)	(various)	(various)	Every Five Years (Due in 2022)

5. **Surface Water Monitoring—Tuolumne River—**Surface water monitoring in the Tuolumne River shall consist of the monitoring points specified in Table 15, with monitoring conducted in accordance with Table 16.

Table 15—Tuolumne River Monitoring Points

WMUs	Monitoring Program	Location	Monitoring Point(s)	Notes
LF-1 and LF-2	Detection	River Bend South of Site	SCS-1	Point in reference to stake location 54.4 ft. NAVD88

Table 16—Tuolumne River Monitoring Schedule

Field Parameters	GeoTracker Code	Units	Sampling Frequency
River Level	(none)	Feet & Tenths, NAVD88	Quarterly
Specific Conductance	SC	µmhos/cm	Annually

6. **Facility Monitoring**

a. **Regular Visual Inspections**—The Discharger shall perform regular visual inspections listed in **Table 17** in accordance with the schedule specified in **Table 18**. Results of these regular visual inspections shall be included in Semiannual Monitoring Reports (SMRs) per Section D.1 of this MRP Order.

Table 17—Regular Visual Inspections

Category	Observations
Within Unit	• Evidence of ponded water at any point on unit outside of any contact storm water/leachate diversions structures on the active face of unit (record affected areas on map). • Evidence of erosion and/or of day-lighted refuse.

Category	Observations
Unit Perimeter	• Evidence of leachate seep, estimated size of affected area and flow rate (record affected areas on map). • Evidence of erosion and/or of day-lighted refuse.
Receiving Waters	• Floating and suspended materials of waste origin—presence or absence, source and size of affected areas. • Discoloration and turbidity—description of color, source and size of affected areas.

Table 18—Regular Visual Inspection Schedule

Category	Wet Season (1 Oct. to 30 April)	Dry Season (1 May to 30 Sept.)
Inactive or Closed Units	Monthly	Quarterly

b. **Annual Facility Inspections**—Prior to **30 September** of each year, the Discharger shall inspect the Facility to assess repair and maintenance needs for drainage control systems, cover systems and groundwater monitoring wells; and preparedness for winter conditions (e.g., erosion and sedimentation control).

i. If repairs are made as result of the annual inspection, problem areas shall be photographed before and after repairs. Any necessary construction, maintenance, or repairs shall be completed by 31 October.

ii. Annual facility inspection reporting shall be submitted as required in Section C.4 of this MRP.

c. **Major Storm Events**—Within seven days of any storm event capable of causing damage or significant erosion (Major Storm Event), the Dischargers shall inspect the Facility for damage to any precipitation, diversion and drainage facilities, and all landfill side slopes. Necessary repairs shall be completed within 30 days of the inspection. The Discharger shall take photos of any problem areas before and after repairs. Notification and reporting requirements for

major storm events shall be conducted as required in Section C.5 of this MRP.

d. Five-Year Iso-Settlement Surveys for Closed Landfill Units—The Dischargers shall conduct a five-year iso-settlement survey of each closed landfill unit and produce an iso-settlement map accurately depicting the estimated total change in elevation of each portion of the final cover's low-hydraulic-conductivity layer. For each portion of the landfill, this map shall show the total lowering of the surface elevation of the final cover, relative to the baseline topographic map. (Title 27, § 21090, subds. (e)(1)-(2).) See Section C.6 for iso-settlement survey reporting requirements.[32]

7. **Additional Corrective Action Monitoring**—In addition to groundwater corrective action monitoring conducted in Section A.1 above, the Discharger shall monitor all landfill corrective action systems at the site, as specified in this section, to demonstrate the effectiveness of the Corrective Action Program (CAP) in accordance with Title 27, section 20430 and this MRP.

a. Groundwater Extraction and Treatment System (GWETS)—In addition to groundwater corrective action monitoring conducted in Section A.1 above, the Dischargers shall monitor the GWETS to ensure it is in good working order consistent with this Order and the most recently approved GWETS O&M plan to remove VOCs and other constituents from the groundwater and prevent migration of the VOC plume.

Groundwater Extraction System

(A) Monitoring Points—The groundwater extraction system monitoring points shall include all existing groundwater extraction wells and associated piezometers in **Table 19**. Any groundwater extraction wells and/or associated piezometers installed after the adoption of this Order shall become groundwater corrective action monitoring points subject to monitoring under this section, unless otherwise approved by Central Valley Water Board staff.

[32] The next iso-settlement survey shall be conducted in the first half of 2020.

Any existing or future groundwater extraction wells and/or piezometers properly abandoned or replaced may be removed as groundwater corrective action monitoring points subject to monitoring under this section upon approval by Water Board staff. See Standard Monitoring Specification I.23, SPRR.

Table 19—Groundwater Extraction Monitoring Points

Extraction Well	Associated Piezometer	Nearest Monitoring Well	Location
EW-1	PZ-9	MW-8S	Western Perimeter of LF-1
EW-1A EW-2	---	---	Western Perimeter of LF-1
EW-3 EW-4	PZ-14	MW-4S	Western Perimeter of LF-1
EW-5 EW-6	PZ-15S/D	---	Western Perimeter of LF-1
EW-6A	---	---	Western Perimeter of LF-1
EW-7 EW-8A	PZ-16	MW-3S	Western Perimeter of LF-1
EW-8 EW-8B	PZ-8	---	Western Perimeter of LF-1
EW-9A	PZ-17	---	Western Perimeter of LF-1
EW-9B	PZ-18S/D	---	Northern Perimeter of LF-1
EW-9	PZ-7	MW-26S	Northern Perimeter of LF-1
EW-9C EW-10	PZ-19	---	Northern Perimeter of LF-1
EW-11 EW-11A	PZ-20	---	Northern Perimeter of LF-1
EW-11B	---	MW-17S	Northern Perimeter of LF-1

Note: These wells do not need to be separately monitored under this section, given that they are included as groundwater corrective action monitoring points in Section A.1.a.

(B) Monitoring Schedule—Piezometer monitoring may be limited to groundwater elevation measurement. The monitoring schedule for the extraction wells shall be as set forth in **Table 20**.

Table 20—Groundwater Extraction Well Monitoring Schedule

Parameter	GeoTracker Code	Units	Sampling Freq.	Notes
Field Parameters	---	---	---	---
Flow Rate	FLOW	Gallons/Day	Weekly	(none)
Totalizer Reading	---	Gallons	Weekly	(none)
Groundwater Elevation	GWELEV	Ft. & 100ths, NAVD88	Monthly	(none)
Monitoring Parameters	---	---	---	---
Total Dissolved Solids	TDS	mg/L	Semiannually	(none)
Major Anions Major Cations (See Attachment A)	(various)	mg/L	Every 2 years	(none)
VOCs, Short List	(various)	µg/L	Semiannually	Not required if Extended List VOCs are monitored within same semiannual period.
VOCs, Long List	(various)	µg/L	Annually	(none)

Parameter	GeoTracker Code	Units	Sampling Freq.	Notes
Dissolved Metals: Arsenic Iron, Dissolved Manganese	 AS FE MN	µg/L	Annually	(none)

Groundwater Treatment System—The monitoring points for the groundwater treatment system shall consist of sampling ports on each operating[33] process train: (i) at each inlet; (ii) between lead and lag granular activated carbon filters[34]; and (iii) at each outlet. Monitoring shall be conducted in accordance with **Table 21**, provided that sampling is not required for non-operating process trains.

Table 21—Groundwater Treatment System Monitoring Schedule

Parameter	GeoTracker Code	Units	Sampling Frequency	Notes
Field Parameters	---	---	---	---
Flow Rate	FLOW	Gallons per Day	Weekly	Not required between GACs
Totalizer Reading	---	Gallons	Weekly	Not required between GACs
Gauge Pressure	---	PSIG	Weekly	Not required between GACs
Monitoring Parameters	---	---	---	---

[33] Sampling is not required when a process train is not operating.

[34] These sampling ports are depicted on Attachment H to the WDRs Order. This point need only be sampled for Short List VOCs.

Parameter	GeoTracker Code	Units	Sampling Frequency	Notes
Total Dissolved Solids	TDS	mg/L	Semiannually	Not required between GACs
Major Anions Major Cations	(various)	mg/L	Annually	Not required between GACs
VOCs, Short List (See Attachment A)	(various)	µg/L	Monthly	Not required if Extended List VOCs are monitored within same semiannual period.
VOCs, Long List	(various)	µg/L	Semiannually	Not required between GACs
Arsenic Iron, Dissolved Manganese	AS FE MN	µg/L	Quarterly	Not required between GACs

b. **Landfill Gas Extraction System (Excluding Flare Station)**—The Discharger shall operate and maintain the landfill gas (LFG) extraction system for each unit (or for the units combined as the system is currently configured), to remove LFG from the landfill units and prevent, to the extent possible, migration into the unsaturated zone beneath the landfill units.

i. **Monitoring Points**—LFG extraction and monitoring shall be conducted at the system locations specified in **Table 22**. Additionally, LFG monitoring shall also be conducted at any new or replacement LFG extraction wells installed after adoption of this Order; a representative sampling port along

LF-1 header; the connection between LF-1 and LF-2 header pipes; and a representative sampling port along LF-2 header

Table 22—Landfill Gas Extraction Wells

Landfill 1				Landfill 2		
EW-1	EW-14D	EW-28	EW-70	EW-38	EW-54	EW-80
EW-2	EW-15S	EW-29	EW-71	EW-39	EW-55	EW-81
EW-3	EW-15D	EW-30	EW-72	EW-40	EW-56	EW-82
EW-4	EW-16S	EW-31	RW-1S	EW-41	EW-57	EW-83
EW-5	EW-16D	EW-32	RW-2S	EW-42	EW-58	EW-84
EW-6	EW-17	EW-33	RW-3S	EW-43	EW-59	EW-85
EW-7	EW-18	EW-34	RW-4S	EW-44	EW-60	EW-86
EW-8	EW-19	EW-35	RW-5S	EW-45	EW-61	EW-87
EW-9	EW-20	EW-36	RW-6S	EW-46	EW-62	EW-88
EW-10	EW-21	EW-37	RW-10S	EW-47	EW-63	EW-89
EW-11	EW-22	EW-64	RW-11S	EW-48	EW-64	EW-90
EW-12S	EW-23	EW-65	RW-12S	EW-49	EW-73	EW-91
EW-12D	EW-24	EW-66	RW-13S	EW-50	EW-74	
EW-13S	EW-25	EW-67	RW-14S	EW-51	EW-75	
EW-13D	EW-26	EW-68	RW-15S	EW-52	EW-76	
EW-14S	EW-27	EW-69		EW-53	EW-77	

ii. **Monitoring Schedule**—Monitoring shall be conducted in accordance with **Table 23**. Field monitoring shall be conducted with appropriate measuring devices for each parameter.

Table 23—Landfill Gas Extraction Monitoring Schedule

Parameter	Units	Sampling Frequency	Notes
Field Parameters[1]	---	---	---
Flow rate	cu ft/min	Monthly	Only required if well flow control valve is metered.
Vacuum	Inches of H_2O	Monthly	(none)
LFG Temperature	^oF	Monthly	(none)
Field Gases	%	Monthly	See list of field gases in Table 11.
Monitoring Parameters[2]	---	---	---
VOCs (USEPA Method TO-15)	$\mu g/cm^3$	Semiannually	(none)

c. **Landfill Gas Flare Station**

i. **Inlet Monitoring**—The inlet to the Landfill Gas Flare Station shall be monitored in accordance with Table 24.

Table 24—Landfill Gas Flare Monitoring Schedule

Parameter	Units	Sampling Frequency
Field Parameters[1]	---	---
Atmospheric Temperature	^{o}F	Monthly
Atmospheric Pressure	PSIG	Monthly
Temperature into LFG Plant	^{o}F	Monthly
Pressure into the LFG plant	Inches of H_2O vacuum	Monthly
Totalized flow	Cubic feet	Monthly
Flow rate	CFM	Monthly
Total VOCs	$\mu g/cm^3$	Monthly[1]
Monitoring Parameters[2]	---	---
Methane	% by volume	Semiannually
VOCs USEPA Method TO-15)	$\mu g/cm^3$	Semiannually

ii. **Additional Monitoring at Flare Station**—The Discharger shall also record and monitor the following for the LFG Flare Station:(i) hours of operation and percentage of time operating since the last monitoring period; (ii) average flow rate since the last monitoring period for the station; and (iii) highest, lowest, and average methane concentrations since the last monitoring period for the station.

In the event of a shutdown of the landfill gas extraction system and/or flare, the Discharger shall notify Board staff via e-mail, fax, or telephone within 24 hours of knowledge and shall provide weekly status updates. This requirement excludes shutdown events where the landfill gas system restarts itself or whether the system is

restarted manually within 24 hours. All shutdowns, regardless of the type of restart, shall be summarized in the semiannual reports.

Evaluation of the effectiveness of the LFG extraction system shall include whether separate LFG controls, including blower and flare station, are needed for each unit to achieve corrective action goals per Title 27, section 20430. See Facility Specification C.4.a.

The Discharger shall report all recorded data and conduct a comprehensive evaluation of the effectiveness of the CAP in the Annual Monitoring Report required in Section C.2 of this MRP.

B. Reporting Requirements—The results of monitoring required at least semiannually (i.e., semiannually or more frequently) under this Order shall be reported semiannually, while the reporting frequency for monitoring required less frequently than semiannually (e.g., annually or every five years) shall be the same as the monitoring frequency. The following monitoring reports containing the results of monitoring required under this Order shall be submitted by the specified due dates.

Table 25—Summary of Required Reporting

Report	End of Reporting Period	Due Date
Semiannual	30 June	1 Aug.
Monitoring Reports (SMRs)	31 Dec.	1 Feb.
Annual Monitoring Report (AMRs)	31 Dec.	1 Feb.
Seep Reporting	(continuous)	Immediately (Notice within 7 Days)
Annual Facility Inspection Report	31 Oct.	15 Nov.
Major Storm Event Report	(continuous)	7 Days after Discovery of Damage
Iso-Settlement Survey and Mapping Report	Every 5 Years	1 July 2020

1. **Semiannual Monitoring Reports (SMRs)**—On **1 August** and **1 February** of each year, the Discharger shall submit a Semiannual Monitoring Reports (SMRs) in accordance with the provisions below.

    a. For each groundwater monitoring point addressed by the report, a description of:

        i. The time of water level measurement;

        ii. The type of pump (or other device) used for purging and the elevation of the pump intake relative to the elevation of the screened interval;

        iii. The method of purging used to stabilize water in the well bore before the sample is taken including the pumping rate; the equipment and methods used to monitor field pH, temperature, and conductivity during purging; results of pH, temperature, conductivity, and turbidity testing; and the method of disposing of the purge water;

        iii. The type of pump (or other device) used for sampling, if different than the pump or device used for purging; and

        iv. A statement that the sampling procedure was conducted in accordance with the approved Sample Collection and Analysis Plan.

    b. A map or aerial photograph showing the locations of observation stations, monitoring points, and background monitoring points.

    c. An estimated quarterly groundwater flow rate and direction in: (1) the uppermost aquifer; (2) any zones of perched water; and (3) any additional zone of saturation monitored based upon water level elevations taken prior to the collection of the water quality data submitted in the report. (See Title 27, § 20415, subd. (e)(15).)

    d. Times of expected highest and lowest elevations of the water levels in the wells. (See Title 27, § 20415, subd. (e)(15).)

    e. Estimated groundwater separation at representative locations within LF-1 and LF-2, based on the trench depths/configurations noted on the 1974 Trench Fill Plan (i.e., Attachment 1, Information Sheet), including areas of less than five feet of separation or alternative minimum separation approved by the Executive Officer per WDR Facility Specification C.2.

f. Cumulative tabulated monitoring data for all monitoring points and constituents for groundwater, unsaturated zone, leachate, and surface water.

   i. Concentrations below the laboratory reporting limit shall not be reported as “ND” unless the reporting limit is also given in the table. Otherwise they shall be reported “<” the reporting limit (e.g., <0.10).

   ii. Units shall be as required in Tables I through IV unless specific justification is given to report in other units. Refer to the SPRRs Section I “Standard Monitoring Specifications” for requirements regarding MDLs and PQLs.

g. Laboratory statements of results of all analyses evaluating compliance with requirements.

h. An evaluation of the concentration of each monitoring parameter (or 5-year COC when five-year COC sampling is conducted) as compared to the current concentration limits, and the results of any required verification testing for constituents exceeding a concentration limit . Report any actions taken under Section J: Response to a Release for verified exceedances of a concentration limit for wells/constituents not already in corrective action monitoring.

i. An evaluation of the effectiveness of the leachate monitoring and control facilities, and of the landfill precipitation and drainage control facilities.

j. A summary of all Regular Visual Observations for the reporting period required in Section A.6.a of this MRP.

k. A summary of inspection, leak search, and repair of final covers on any closed landfill units in accordance with an approved final post-closure maintenance plan as required by Standard Closure and post-Closure Maintenance Specifications G.26 through G.29 of the SPRRs.

l. A comprehensive discussion of the Corrective Action Monitoring Program required by this MRP under Section A.7.

2. **Annual Monitoring Reports (AMRs)**—On 1 February of each year, the Dischargers shall submit Annual Monitoring Reports (AMRs) containing each of the following components.

   a. Graphs showing historical trends for monitoring parameters at each background and compliance monitoring point.

      i. All monitoring parameters shall be graphed to show historical trends at each monitoring point and background monitoring point, for all samples taken within at least the previous five calendar years.

      ii. If a 5-year COC event was performed during any monitoring period of the subject year of the Annual Report, then these parameters shall also be graphically presented.

      iii. Each such graph shall plot the concentration of one or more constituents for the period of record for a given monitoring point or background monitoring point, at a scale appropriate to show trends or variations in water quality.

      iv. The graphs shall plot each datum, rather than plotting mean values.

      v. Graphical analysis of monitoring data may be used to provide significant evidence of a release.

   b. An evaluation of the monitoring parameters with regards to the cation/anion balance, and a graphical presentation using a Stiff diagram, a Piper graph, or a Schoeller plot.

   c. All historical monitoring data for which there are detectable results, including data for the previous year, shall be submitted in tabular form in a digital file format such as a computer disk. The Central Valley Water Board regards the submittal of data in hard copy and in digital format as "...the form necessary for..." statistical analysis [Title 27, section 20420(h)], that facilitates periodic review by the Central Valley Water Board.

   d. Hydrographs of each well showing the elevation of groundwater with respect to the elevations of the top and bottom of the screened

interval and the elevation of the pump intake. Hydrographs of each well shall be prepared quarterly and submitted annually.

e. A comprehensive discussion of the compliance record, and the result of any corrective actions taken or planned which may be needed to bring the Discharger into full compliance with the waste discharge requirements.

f. A written summary of the monitoring results, indicating any changes made or observed since the previous Annual Monitoring Report.

g. Updated concentration limits for each monitoring parameter at each monitoring well based on the new data set.

3. **Seep Reporting**—Upon discovery of seepage from any disposal area within the Facility, the Dischargers shall immediately report such seepage to the Central Valley Water Board via telephone or email; and within seven days, submit a written report with the following information:

a. Map(s) depicting the location(s) of seepage;

b. Estimated flow rate(s);

c. A description of the nature of the discharge (e.g., all pertinent observations and analyses);

d. Verification that samples have been submitted for analyses of the Field Parameters and Monitoring Parameters listed in Table III of this MRP, and an estimated date that the results will be submitted to the Central Valley Water Board; and

e. Corrective measures underway or proposed, and corresponding time schedule.

4. **Annual Facility Inspection Reports**—By **15 November** of each year, the Discharger shall submit a report describing the results of the inspection and the repair measures implemented, preparations for winter, and include photographs of any problem areas and the repairs. Refer to Section A.1.b of this MRP, above.

5. **Major Storm Event Reports**—Following major storm events capable of causing damage or significant erosion, the Discharger immediately shall notify Central Valley Water Board staff of any damage or significant erosion upon discovery and report subsequent repairs within 14 days of

completion of the repairs, including photographs of the problem and the repairs. See Section A.1.c.

6. **Survey and Iso-Settlement Map (Closed Landfill)**—The Dischargers shall submit all iso settlement maps prepared in accordance with Section A.6.d of this MRP. (See Title 27, § 21090, subd. (e).) The next survey maps are due on **1 April 2020**.

7. **Financial Assurance Report**—By **1 June** of each year, the Discharger shall submit a copy of the annual financial assurances report due to CalRecycle that updates the financial assurances for closure, post-closure maintenance, and corrective action. See Financial Assurance Specifications F.2 and F.7 of WDRs

C. Water Quality Protection Standard—For each waste management unit, the WQPS shall consist of all COCs, the concentration limit for each COC, the verification retesting procedure to confirm measurably significant evidence of a release, the point of compliance, and all water quality monitoring points for each monitored medium.

1. **WQPS Report**—The WQPS for each WMU at the Facility shall be described in a WQPS Report approved by the Central Valley Water Board. Any proposed changes to the WQPS, other than annual update of the concentration limits, shall be submitted in a revised WQPS Report for review and approval. The WQPS report shall:

   a. Identify all distinct bodies of surface water and groundwater that could be affected in the event of a release from a waste management unit or portion of a unit. This list shall include at least the uppermost aquifer and any permanent or ephemeral zones of perched groundwater underlying the facility.

   b. Include a map showing the monitoring points and background monitoring points for the surface water monitoring program, groundwater monitoring program, and the unsaturated zone monitoring program. The map shall include the point of compliance in accordance with Title 27, section 20405.

   c. Evaluate the perennial direction(s) of groundwater movement within the uppermost groundwater zone(s).

   d. Include a proposed statistical method for calculating concentration limits for monitoring parameters and constituents of concern that are detected in 10% or greater of the background data (naturally-

occurring constituents) using a statistical procedure from Title 27, section 20415(e)(8)(A-D)] or section 20415(e)(8)(E).

e. Include a retesting procedure to confirm or deny measurably significant evidence of a release (See Title 27, §§ 20415, subd. (e)(8)(E), 20420, subds. (j)(1)-(3).

f. Be updated annually for each monitoring well using new and historical monitoring data.

g. Be certified by a California-registered civil engineer or geologist as meeting the requirements of Title 27.

If subsequent sampling of the background monitoring point(s) indicates significant water quality changes due to either seasonal fluctuations or other reasons unrelated to waste management activities at the site, the Dischargers may request modification of the WQPS.

2. **Monitoring Parameters**—A select group of constituents monitored during each sampling event, monitoring parameters are the waste constituents, reaction products, hazardous constituents and physical parameters that provide a reliable indication of a release from a given WMU.

The monitoring parameters are listed in Table 9 (groundwater), Table 11 (unsaturated zone) and Table 14 & Table 16 (surface water).

3. **Constituents of Concern (COCs)**—COCs include a larger group of waste constituents, their reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste contained in the waste management unit and are required to be monitored every five years. (See Title 27, §§ 20395, 20420(g).)

The surface and groundwater COCs for both landfill units at the facility are listed in Attachment B. The Discharger shall monitor all COCs every five years, or more frequently as required in accordance with a Corrective Action Program. The last 5-year COC report was submitted to the Central Valley Water Board in the 2017 Annual Monitoring Report, and 5-year COCs are due to be monitored again in 2022.

4. **Concentration Limits**—Proposed concentration limits for all monitored water bearing media (i.e., surface water and groundwater) shall be included in the revised WQPS Report required under WDR Monitoring Specification G.7. For a naturally occurring constituent of concern, the concentration limit for each constituent of concern shall be determined by calculation in accordance with a statistical method pursuant to Title 27,

section 20415(e)(8); or by an alternate statistical method meeting the requirements of Title 27, section 20415(e)(8)(E).

a. Detection Monitoring

Non-Naturally Occurring COCs—The concentration limits for non-naturally occurring constituents of concern, including organic compounds (e.g., VOCs and dissolved metals not detectable in background), shall be the laboratory detection limit.

Naturally Occurring COCs—The Discharger shall use interwell statistics for naturally occurring constituents. Each unit shall be separately monitored absent an approved demonstration per WDR Monitoring Specification G.5. The data analysis method for calculating concentration limits for naturally occurring COCs under this Order shall be the interwell Tolerance Limit Method at 95% confidence and 95% coverage based on background data or as otherwise proposed in the currently approved WQPS Report or separate technical report reference therein. Concentration limits for naturally occurring COCs shall be updated annually and included in the Annual Monitoring Report submitted under this MRP.

b. Corrective Action Monitoring—For wells in the corrective action program, the concentration limits represent cleanup levels to achieve background concentrations. The concentration limits for corrective action monitoring shall generally be the same as those for detection monitoring absent approval of a proposal for concentration limits greater than background (CLGBs) under Title 27 Section 20400(c) and revision of the WDRs. Time series plots and/or an intrawell statistical procedure (e.g., Mann-Kendall test) shall be used for trend analysis to monitor corrective action progress.

As noted in WDR Finding 8.d, the JTD included an August 2019 revised WQPS Report describing data analysis methods used for groundwater monitoring, including calculation of concentration limits using the Interwell Tolerance Method referenced above. The report also proposed pooling of shallow and deep zone data collected from background wells 24S and 24D based on a similarly of the water quality data collected from the wells since their installation in 2011 and a hydrogeologic evaluation indicating that the zones are

in communication upgradient of the landfill. The proposed corrective action concentration limits for naturally occurring COCs in the August 2019 revised WQPS are set forth in **Table 26**.

Table 26—Corrective Action Concentration Limits

Constituent	Units	Concentration Limit
Field Parameters	--	--
Specific Conductance	µmhos/cm	972
pH	pH Units	6.00 - 7.60
General Parameters		
Alkalinity, Total	mg/L	300
Carbonate	mg/L	5.0 (PQL)
Total Dissolved Solids	mg/L	690
Total Organic Carbon	mg/L	0.9
General Minerals	--	--
Major Anions	--	--
Chloride	mg/L	120
Major Cations	--	--
Bicarbonate	mg/L	300
Sulfate	mg/L	48
Nitrate as N	mg/L	25
Total Organic Carbon	mg/L	
Dissolved Inorganics	--	--
Aluminum	µg/L	110
Antimony	µg/L	2.5

Constituent	Units	Concentration Limit
Arsenic	µg/L	4.5
Barium	µg/L	146
Beryllium	µg/L	10 (PQL)
Cadmium	µg/L	1.0
Chromium	µg/L	10 (PQL)
Chromium VI+	µg/L	No Data
Cobalt	µg/L	50 (PQL)
Copper	µg/L	13
Iron	µg/L	170
Lead	µg/L	3.5
Manganese	µg/L	21
Mercury	µg/L	0.2 (PQL)
Nickel	µg/L	3.9
Selenium	µg/L	2.5
Silver	µg/L	10 (PQL)
Sulfide	µg/L	No Data
Thallium	µg/L	1.0 (PQL)
Tin	µg/L	50 (PQL)

These WDRs require that, by **31 October 2020**, the Dischargers submit a revised WQPS Report to reflect the requirements of this Order, including, but not limited to, the need for separate

detection/corrective action monitoring of units absent the requisite demonstration for shared monitoring and/or Point of Compliance.[35]

5. Retesting Procedures to Confirm Release—If monitoring results indicate measurably significant evidence of a release per Section I.45 of the SPRRs, the Dischargers shall:

   a. For analytes that are detected in less than 10% of the background samples (such as non-naturally occurring constituents), the Discharger shall use the non-statistical retesting procedure required in Standard Monitoring Specification I.46 of the SPRRs.

   b. For analytes that are detected in 10% or greater of the background samples (naturally occurring constituents), the Discharger shall use one of the statistical retesting procedures as required in Standard Monitoring Specification I.47 of the SPRRs.

6. **Point of Compliance (POC)**—For purposes of the WQPS, the POC of each WMU shall be the vertical surface located at the hydraulically down-gradient limit of the Unit that extends through the uppermost aquifer underlying the unit. Title 27 alternatively also allows for the Discharger to demonstrate that the Point of Compliance be located along the downgradient perimeter of contiguous units (or contiguous portions thereof) provided the requisite demonstration is made. See WDR Monitoring Specification G.5.a. The following are monitoring locations at the point of compliance:

7. Monitoring Points—A monitoring point is a well, device, or location specified in the waste discharge requirements, which monitoring is conducted and at which the water quality protection standard applies. The monitoring points for each monitored medium are listed in Section A of this MRP.

   a. Groundwater – The monitoring points for shallow and deep zone groundwater shall be as listed in Table 7 and Table 8 herein.

   b. Unsaturated Zone – not applicable

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35. The Discharger may use the proposed limits in as temporary concentration limits for inorganic constituents pending approval of the revised WQPS Report required under this Order.

c. Surface Water – See Table 13 and Table 14.

8. **Compliance Period**—The compliance period for each WMU shall be the number of years equal to the active life of the unit plus the closure period. The compliance period is the minimum period during which the Discharger shall conduct a water quality monitoring program subsequent to a release from the WMU. The compliance period shall restart each time the Discharger initiates an evaluation monitoring program. (See Title 27, § 20410.)

ENFORCEMENT

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

ADMINISTRATIVE REVIEW

Any person aggrieved by this Central Valley Water Board action may petition the State Water Board for review in accordance with Water Code section 13320 and California Code of Regulations, title 23, section 2050 et seq. The State Water Board must receive the petition by 5:00 p.m. on the 30th day after the date of this Order; if the 30th day falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations (http://www.waterboards.ca.gov/public_notices/petitions/water_quality**)** applicable to filing petitions are available on the Internet (at the address below) and will be provided upon request.

ATTACHMENTS

ATTACHMENT A – CORRECTIVE ACTION MONITORING PARAMETERS
ATTACHMENT B—FIVE-YEAR CONSTITUENTS OF CONCERN (COCS)

ATTACHMENT A—CORRECTIVE ACTION MONITORING PARAMETERS

Field Parameters

Parameter	**GeoTracker Code**
Groundwater Elevation	GWELEV
Temperature	TEMP
Specific Conductance	SC
pH	PH
Turbidity	TURB
Dissolved Oxygen	DO
Oxidation-Reduction Potential	REDOX

General Parameters

Parameter / Analytical Method	**GeoTracker Code**
Chemical Oxygen Demand Method E410.4	COD
Total Alkalinity Method SW2320B	ALKH
Total Dissolved Solids Method SM2540C	TDS
Total Hardness Method E130.2	HARD
Total Organic Carbon Method SM5310B	TOC

ATTACHMENT A

General Minerals—Major Anions

Constituent / Analytical Method ..... **GeoTracker Code**

Bicarbonate Alkalinity
Method E310.1 ..... BICACO3

Chloride
Method E300.0 CL

Nitrate – Nitrogen
Method E300.0 ..... NO3

Sulfate
Method E300.0 ..... SO4

General Minerals—Major Cations

Constituent / Analytical Method ..... **GeoTracker Code**

Calcium
Method E200.7 ..... CA

Magnesium
Method E200.7 ..... MG

Potassium
Method E200.7 ..... K

Sodium
Method E200.7 ..... NA

Dissolved Inorganics—Short List

Constituent / Analytical Method ..... **GeoTracker Code**

Arsenic
Method E200.8 ..... AS

Barium
Method SW6010B ..... BA

Iron
Method SW6010B ..... FE

Manganese
Method SW6010B ..... MN

ATTACHMENT A

Volatile Organic Compounds—USEPA Method 8260B, Short List

Constituent	**GeoTracker Code**
Acetone	ACE
Acrylonitrile	ACRAMD
Benzene	BZ
Bromochloromethane	BRCLME
Bromodichloromethane	BDCME
Bromoform (Tribromomethane)	TBME
Carbon disulfide	CDS
Carbon tetrachloride	CTCL
Chlorobenzene	CLBZ
Chloroethane (Ethyl chloride)	CLEA
Chloroform (Trichloromethane)	TCLME
Dibromochloromethane (Chlorodibromomethane)	DBCME
1,2-Dibromo-3-chloropropane (DBCP)	DBCP
1,2-Dibromoethane (Ethylene dibromide; EDB)	EDB
o-Dichlorobenzene (1,2-Dichlorobenzene)	DCBZ12
m-Dichlorobenzene (1,3-Dichlorobenzene)	DCBZ13
p-Dichlorobenzene (1,4-Dichlorobenzene)	DCBZ14
trans- l ,4-Dichloro-2-butene	DCBE14T
Dichlorodifluoromethane (CFC-12)	FC12
1,1-Dichloroethane (Ethylidene chloride)	DCA11
1,2-Dichloroethane (Ethylene dichloride)	DCA12
1,1 -Dichloroethylene (1,1 -Dichloroethene; Vinylidene chloride)	DCE11
cis- 1,2-Dichloroethylene (cis- 1,2-Dichloroethene)	DCE12C
trans-1,2-Dichloroethylene (trans-1,2-Dichloroethene)	DCE12T
1,2-Dichloropropane (Propylene dichloride)	DCPA12
cis- 1,3-Dichloropropene	DCP13C
trans- 1,3-Dichloropropene	DCP13T

ATTACHMENT A

Di-isopropylether (DIPE) ..... DIPE
Ethanol ..... ETHANOL
Ethyltertiary butyl ether ..... ETBE
Ethylbenzene ..... EBZ
2-Hexanone (Methyl butyl ketone) HXO2
Hexachlorobutadiene ..... HCBU
Methyl bromide (Bromomethene) ..... BRME
Methyl chloride (Chloromethane) ..... CLME
Methylene bromide (Dibromomethane) ..... DBMA
Methylene chloride (Dichloromethane) ..... DCMA
Methyl ethyl ketone (MEK: 2-Butanone) ..... MEK
Methyl iodide (Iodomethane) ..... IME
Methyl t-butyl ether ..... MTBE
4-Methyl-2-pentanone (Methyl isobutylketone) ..... MIBK
Naphthalene ..... NAPH
Styrene ..... STY
Tertiary amyl methyl ether ..... TAME
Tertiary butyl alcohol ..... TBA
1,1,1,2-Tetrachloroethane TC1112
1,1.2,2-Tetrachloroethane ..... PCA
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene) ..... PCE
Toluene ..... BZME
1,2,4-Trichlorobenzene TCB124
1,1,1-Trichloroethane (Methylchloroform) TCA111
1,1,2-Trichloroethane TCA112
Trichloroethylene (Trichloroethene) ..... TCE
Trichlorofluoromethane (CFC- 11) FC11
1,2,3-Trichloropropane TCPR123
Vinyl acetate ..... VA

ATTACHMENT A

Vinyl chloride VC
Xylenes ..... XYLENES

ATTACHMENT B—FIVE-YEAR CONSTITUENTS OF CONCERN (COCS)

Dissolved Inorganics/Metals

Parameter / Analytical Method ..... **GeoTracker Code**

Aluminum
Method 6010 ..... AL

Antimony
Method 7041 ..... SB

Arsenic
Method 7062 ..... AS

Barium
Method 6010 ..... BA

Beryllium
Method 6010 ..... BE

Cadmium
Method 7131A ..... CD

Chromium
Method 6010 ..... CR

Cobalt
Method 6010 ..... CO

Copper
Method 6010 ..... CU

Cyanide
Method 9010C ..... CN

Iron
Method 6010 ..... FE

Lead
Method 7421 ..... PB

Manganese
Method 6010 ..... MN

Mercury
Method 7470A ..... HG

Nickel
Method 7521 ..... NI

ATTACHMENT B

Selenium
Method 7742 ..... SE

Silver
Method 6010 ..... AG

Sulfide
Method 9030B ..... S

Thallium
Method 7841 ..... TL

Tin
Method 6010 ..... SN

Vanadium
Method 6010 V

Zinc
Method 6010 ..... ZN

ATTACHMENT B

Volatile Organic Compounds—USEPA Method 8260, Extended List

Constituent	**GeoTracker Code**
Acetone	ACE
Acetonitrile (Methyl cyanide)	ACCN
Acrolein	ACRL
Acrylonitrile	ACRAMD
Allyl chloride (3-Chloropropene)	CLPE3
Benzene	BZ
Bromochloromethane (Chlorobromomethane)	BRCLME
Bromodichloromethane (Dibromochloromethane)	DBCME
Bromoform (Tribromomethane)	TBME
Carbon disulfide	CDS
Carbon tetrachloride	CTCL
Chlorobenzene	CLBZ
Chloroethane (Ethyl chloride)	CLEA
Chloroform (Trichloromethane)	TCLME
Chloroprene	CHLOROPRENE
Dibromochloromethane (Chlorodibromomethane)	DBCME
1,2-Dibromo-3-chloropropane (DBCP)	DBCP
1,2-Dibromoethane (Ethylene dibromide; EDB)	EDB
o-Dichlorobenzene (1,2-Dichlorobenzene)	DCBZ12
m-Dichlorobenzene(1,3-Dichlorobenzene)	DCBZ13
p-Dichlorobenzene (1,4-Dichlorobenzene)	DCBZ14
trans- 1,4-Dichloro-2-butene	DCBE14T
Dichlorodifluoromethane (CFC 12)	FC12
1,1 -Dichloroethane (Ethylidene chloride)	DCA11
1,2-Dichloroethane (Ethylene dichloride)	DCA12
1,1 -Dichloroethylene (1, l-Dichloroethene; Vinylidene chloride)	DCE11
cis- l ,2-Dichloroethylene (cis- 1,2-Dichloroethene)	DCE12C
trans- l ,2-Dichloroethylene (trans- 1,2-Dichloroethene)	DCE12T
1,2-Dichloropropane (Propylene dichloride)	DCPA12
1,3-Dichloropropane (Trimethylene dichloride)	DCPA13
2,2-Dichloropropane (Isopropylidene chloride)	DCPA22
1,1 -Dichloropropene	DCP11
cis- 1,3-Dichloropropene	DCP13C
trans- l ,3-Dichloropropene	DCP13T
Di-isopropylether (DIPE)	DIPE
Ethanol	ETHANOL
Ethyltertiary butyl ether	ETBE
Ethylbenzene	EBZ
Ethyl methacrylate	EMETHACRY

ATTACHMENT B

Hexachlorobutadiene ..... HCBU
2-Hexanone (Methyl butyl ketone) HXO2
Isobutyl alcohol ..... ISOBTOH
Methacrylonitrile ..... METHACRN
Methyl bromide (Bromomethane) ..... BRME
Methyl chloride (Chloromethane) ..... CLME
Methyl ethyl ketone (MEK; 2-Butanone) ..... MEK
Methyl iodide (Iodomethane) ..... IME
Methyl t-butyl ether ..... MTBE
Methyl methacrylate ..... MMTHACRY
4-Methyl-2-pentanone (Methyl isobutyl ketone) ..... MIBK
Methylene bromide (Dibromomethane) ..... DBMA
Methylene chloride (Dichloromethane) ..... DCMA
Naphthalene ..... NAPH
Propionitrile (Ethyl cyanide) ..... PACN
Styrene ..... STY
Tertiary amyl methyl ether ..... TAME
Tertiary butyl alcohol ..... TBA
1,1,1,2-Tetrachloroethane TC1112
1,1,2,2-Tetrachloroethane ..... PCA
Tetrachloroethylene (Tetrachloroethene; Perchloroethylene; PCE) ..... PCE
Toluene ..... BZME
1,2,4-Trichlorobenzene TCB124
1,1,1 -Trichloroethane (Methylchloroform) TCA111
1,1,2-Trichloroethane TCA112
Trichloroethylene (Trichloroethene; TCE) ..... TCE
Trichlorofluoromethane (CFC-11) FC11
1,2,3-Trichloropropane TCPR123
Vinyl acetate ..... VA
Vinyl chloride (Chloroethene) VC
Xylene (total) ..... XYLENES

ATTACHMENT B

Semi-Volatile Organic Compounds—USEPA Methods 8270C or 8270D (Base, Neutral & Acid Extractables)

Constituent	**GeoTracker Code**
Acenaphthene	ACNP
Acenaphthylene	ACNPY
Acetophenone	ACPHN
2 Acetylaminofluorene (2 AAF)	ACAMFL2
Aldrin	ALDRIN
4 Aminobiphenyl	AMINOBPH4
Anthracene	ANTH
Benzo[a]anthracene (Benzanthracene)	BZAA
Benzo[b]fluoranthene	BZBF
Benzo[k]fluoranthene	BZKF
Benzo[g,h,i]perylene	BZGHIP
Benzo[a]pyrene	BZAP
Benzyl alcohol	BZLAL
Bis(2 ethylhexyl) phthalate	BIS2EHP
alpha BHC	BHCALPHA
beta BHC	BHCBETA
delta BHC	BHCDELTA
gamma BHC (Lindane)	BHCGAMMA
Bis(2 chloroethoxy) methane	BECEM
Bis(2 chloroethyl) ether (Dichloroethyl ether)	BIS2CEE
Bis(2 chloro 1 methyethyl) ether (Bis(2 chloroisopropyl) ether	BIS2CIE
4 Bromophenyl phenyl ether	BPPE4
Butyl benzyl phthalate (Benzyl butyl phthalate)	BBP
Chlordane	CHLORDANE
p Chloroaniline	CLANIL4
Chlorobenzilate	CLBZLATE
p Chloro m cresol (4 Chloro 3 methylphenol)	C4M3PH
2 Chloronaphthalene	CNPH2
2 Chlorophenol	CLPH2
4 Chlorophenyl phenyl ether	CPPE4
Chrysene	CHRYSENE
o Cresol (2 methylphenol)	MEPH2
m Cresol (3 methylphenol)	MEPH3
p Cresol (4 methylphenol)	MEPH4
4,4' DDD	DDD44
4,4' DDE	DDE44
4,4' DDT	DDT44
Diallate	DIALLATE

ATTACHMENT B

Dibenz[a,h]anthracene ..... DBAHA
Dibenzofuran ..... DBF
Di n butyl phthalate ..... DNBP
3,3' Dichlorobenzidine DBZD33
2,4 Dichlorophenol DCP24
2,6 Dichlorophenol DCP26
Dieldrin ..... DIELDRIN
Diethyl phthalate ..... DEPH
p (Dimethylamino) azobenzene ..... PDMAABZ
7,12 Dimethylbenz[a]anthracene DMBZA712
3,3' Dimethylbenzidine DMBZD33
2,4 Dimehtylphenol (m Xylenol) DMP24
Dimethyl phthalate ..... DMPH
m Dinitrobenzene DNB13
4,6 Dinitro o cresol (4,6 Dinitro 2 methylphenol) DN46M
2,4 Dinitrophenol DNP24
2,4 Dinitrotoluene DNT24
2,6 Dinitrotoluene DNT26
Di n octyl phthalate ..... DNOP
Diphenylamine ..... DPA
Endosulfan I ..... ENDOSULFANA
Endosulfan II ..... ENDOSULFANB
Endosulfan sulfate ..... ENDOSULFANS
Endrin ..... ENDRIN
Endrin aldehyde ..... ENDRINALD
Ethyl methanesulfonate ..... EMSULFN
Famphur ..... FAMPHUR
Fluoranthene ..... FLA
Fluorene ..... FL
Heptachlor ..... HEPTACHLOR
Heptachlor epoxide ..... HEPT-EPOX
Hexachlorobenzene ..... HCLBZ
Hexachlorocyclopentadiene ..... HCCP
Hexachloroethane ..... HCLEA
Hexachloropropene ..... HCPR
Indeno(1,2,3 c,d) pyrene INP123
Isodrin ..... ISODRIN
Isophorone ..... ISOP
Isosafrole ..... ISOSAFR
Kepone ..... KEP
Methapyrilene ..... MTPYRLN
Methoxychlor ..... MTXYCL

ATTACHMENT B

3 Methylcholanthrene MECHLAN3
Methyl methanesulfonate ..... MMSULFN
2 Methylnaphthalene MTNPH2
1,4 Naphthoquinone NAPHQ14
1 Naphthylamine AMINONAPH1
2 Naphthylamine AMINONAPH2
o Nitroaniline (2 Nitroaniline) NO2ANIL2
m Nitroaniline (3 Nitroaniline) NO2ANIL3
p Nitroaniline (4 Nitroaniline) NO2ANIL4
Nitrobenzene NO2BZ
o Nitrophenol (2 Nitrophenol) NTPH2
p Nitrophenol (4 Nitrophenol) NTPH4
N Nitrosodi n butylamine (Di n butylnitrosamine) ..... NNSBU
N Nitrosodiethylamine (Diethylnitrosamine) ..... NNSE
N Nitrosodimethylamine (Dimethylnitrosamine) ..... NNSM
N Nitrosodiphenylamine (Diphenylnitrosamine) ..... NNSPH
N Nitrosodipropylamine (N Nitroso N dipropylamine; Di n propylnitrosamine) ..... NNSPR
N Nitrosomethylethylamine (Methylethylnitrosamine) ..... NNSME
N Nitrosopiperidine ..... NNSPPRD
N Nitrosospyrrolidine ..... NNSPYRL
5 Nitro o toluidine TLDNONT5
Pentachlorobenzene ..... PECLBZ
Pentachloronitrobenzene (PCNB) PECLNO2BZ
Pentachlorophenol ..... PCP
Phenacetin ..... PHNACTN
Phenanthrene ..... PHAN
Phenol ..... PHENOL
p Phenylenediamine ANLNAM4
Polychlorinated biphenyls (PCBs; Aroclors) ..... PCBS
Pronamide ..... PRONAMD
Pyrene ..... PYR
Safrole ..... SAFROLE
1,2,4,5 Tetrachlorobenzene C4BZ1245
2,3,4,6 Tetrachlorophenol TCP2346
o Toluidine ..... TLDNO
Toxaphene ..... TOXAP
2,4,5 Trichlorophenol TCP245
0,0,0 Triethyl phosphorothioate ..... TEPTH
sym Trinitrobenzene TNB135

ATTACHMENT B

Chlorophenoxy Herbicides, USEPA Method 8151A

Constituent	**GeoTracker Code**
2,4 D (2,4 Dichlorophenoxyacetic acid)	24D
Dinoseb (DNBP; 2 sec Butyl 4,6 dinitrophenol)	DINOSEB
Silvex (2,4,5 Trichlorophenoxypropionic acid; 2,4,5 TP)	SILVEX
2,4,5 T (2,4,5 Trichlorophenoxyacetic acid)	245T

Organophosphorus Compounds, USEPA Method 8141B

Constituent	**GeoTracker Code**
Atrazine	ATRAZINE
Chlorpyrifos	CLPYRIFOS
0,0 Diethyl 0 2 pyrazinyl phosphorothioate (Thionazin)	ZINOPHOS
Diazinon	DIAZ
Dimethoate	DIMETHAT
Disulfoton	DISUL
Methyl parathion (Parathion methyl)	PARAM
Parathion	PARAE
Phorate	PHORATE
Simazine	SIMAZINE