
Central Valley Regional Water Quality Control Board

31 July 2014

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9850 Goethe Road
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NOTICE OF APPLICABILITY OF GENERAL ORDER R5-2008-0149, COUNTY OF SACRAMENTO, ELK GROVE CLASS III LANDFILL, IN-SITU REMEDIATION OF VOLATILE ORGANICS COMPOUNDS, SACRAMENTO COUNTY

The County of Sacramento Department of Waste Management and Recycling (hereinafter Discharger) submitted a Notice of Intent, dated 20 August 2013 and a revised Notice of Intent dated 27 September 2013 requesting coverage under General Order No. R5-2008-0149, *General Waste Discharge Requirements for In-situ Groundwater Remediation at Sites with Volatile Organic Compounds, Nitrogen Compound, Perchlorate, Pesticides, Semi-Volatile Compounds and/or Petroleum Compounds*. Based on information in your submittal, Water Board staff has determined that this project meets the required conditions to be approved under Order R5-2008-0149. All of the requirements contained in the general order are applicable to your project. You are assigned Order No. R5-2008-0149-048.

Project Location:

The project is in the City of Elk Grove, Sacramento County, at Section 31, T7N, R6E, MDB&M. It includes Assessor's Parcel Nos. 127-0160-012, 127-0160-57 (parcels covering landfill) and Assessor's Parcel Nos. 127-0160-033, 046, 058, 060, and 127-0190-007 (surrounding treatment area).

Project Description:

The Discharger owns and operates the Elk Grove Class III Landfill (facility) in Elk Grove, Sacramento County. The facility is regulated by the Water Board under Waste Discharge Requirements Order R5-2013-0134. The facility is a closed municipal solid waste landfill and operated for approximately 17 years until 1978 when the landfill stopped accepting waste. Approximately 930,000 cubic yards of waste was disposed of at the site using a trench and fill method. The 37-acre landfill received final closure in 1992.

The landfill closure consisted of installation of a landfill gas extraction system and the placement of a final cover. The landfill gas control system became active in 1993 and consists of 23 in-fill

landfill gas extraction wells. Landfill gas is removed from the wells under vacuum. Volatile organic compounds have been detected in groundwater, and landfill gas has been determined as the source of contamination. The Discharger's corrective action measures began in 2002, and have included groundwater extraction and treatment with reinjection into the unsaturated zone, injection of Hydrogen Release Compound (HRC[®])¹ mixture into the groundwater for in-situ treatment of VOCs, and operation of the landfill gas system to control the source area in the landfill. The corrective action efforts have reduced or eliminated VOCs in some of the impacted monitoring wells; however, groundwater impacts are still present in other monitoring wells. Therefore, the Discharger has proposed to enhance its corrective actions in groundwater.

As explained in the Notice of Intent (NOI), the HRC injection program will be expanded to address residual VOC contamination detected in groundwater. To enhance the corrective action program and monitor constituents of concern, three HRC injection wells will be installed within the treatment zone, and one background groundwater monitoring well will be installed. Injection sites will include three new HRC injection wells plus existing wells PZ-2 and SMVE-3. HRC will be injected at a rate of one gallon per injection site and will be diluted at a 10 to 1 ratio with distilled water. The injection volume will be no more than 10 gallons (1 gallon HRC plus 9 gallons distilled water). The primary compounds detected in the 10 to 1 mixture are ethanol, 2-butanone and acetone. The Discharger will also be conducting sampling of groundwater and reporting the results as described in the attached Monitoring and Reporting Program.

General Information:

1. The project will be operated in accordance with the requirements contained in General Order R5-2008-0149 and in accordance with the information submitted in the Notice of Intent.
2. The required annual fee (as specified in the annual billing from the State Water Resources Control Board) shall be submitted until this Notice of Applicability is officially revoked.
3. Injection of materials other than HRC (composed of polylactate and glycerol) into the subsurface is prohibited.
4. Failure to abide by the conditions of the General Order could result in an enforcement action as authorized by provisions of the California Water Code.
5. The Discharger will implement the plan included as part of the Notice of Intent within 30-days of signature of the NOA. The first HRC injection shall take place by August 2014. The second HRC injection shall take place by April 2015 with a report documenting the installation of the injection wells and HRC injections submitted by **15 July 2015**.
6. The Discharger shall comply with the attached Monitoring and Reporting Program (Order No. R5-2008-0149-048) or any revisions thereto as ordered by the Executive Officer

¹ Hydrogen Release Compound (HRC) is used to remediate contaminated soil and groundwater and is composed of polylactate and glycerol. A Material Safety Data Sheet is provided in the Revised Notice of Intent dated 27 September 2013.

If you have any questions regarding this matter, please call Todd Del Frate at (916) 464-4737 or contact him by email at tdelfrate@waterboards.ca.gov.

Original Signed by

PAMELA C. CREEDON
Executive Officer

Attachment: MRP

cc: Lea Gibson, Sacramento Environmental Management Department

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2008-0149-048

FOR
IN-SITU GROUNDWATER REMEDIATION AT SITES WITH VOLATILE ORGANIC
COMPOUNDS, NITROGEN COMPOUNDS, PERCHLORATE, PESTICIDES,
SEMI-VOLATILE COMPOUNDS AND/OR PETROLEUM HYDROCARBONS

ELK GROVE CLASS III LANDFILL
SACRAMENTO COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring an in-situ groundwater remediation project to address Volatile Organic Compounds (VOCs) at the Elk Grove Class III Landfill. This MRP is issued pursuant to Water Code Section 13267. The Discharger (County of Sacramento Department of Waste Management and Recycling) shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. As appropriate, Central Valley Regional Water Quality Board (CVRWQCB) staff shall approve specific sample station locations prior to implementation of sampling activities.

All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

GROUNDWATER MONITORING

As shown on Figure 1, this treatment system project (HRC Injection Program) is associated with eight existing monitoring wells (designated MW-2, MW-3, MW-6, MW-7R, MW-12, EW-1, EW-4, and EW-5), two existing injection locations (designated PZ-2 and SMVE-3), and three new injection wells (designated HRC-1, HRC-2, and HRC-3). The groundwater monitoring program for these wells and any treatment system wells installed or added to the project subsequent to the issuance of this MRP, shall follow the schedule below. All monitoring shall be conducted in accordance with the sample collection and analysis procedures in the approved April 2000 report for Low-flow micro-purging and as presented in the 2012 Annual Monitoring Report which includes quality assurance/quality control standards.

The monitoring wells and injection wells shall be sampled according to the schedule in Table 1 and the samples analyzed by the methods in Table 2. Sacramento County also conducts routine groundwater, surface water and soil gas monitoring pursuant to MRP R5-2013-0134. In the case of duplicative monitoring between the two monitoring and reporting programs, one sample may satisfy the requirements of both monitoring programs. However, the results shall be reported separately in monitoring reports required for each Order.

Table 1: Sampling Frequency and Constituent Suite

Well Number	Frequency	Constituent Suite(s) ²	Monitoring Objective
HRC-1, HRC-2, HRC-3, PZ-2	Before Injection, Quarterly/Semiannual ³	A, B, C	Treatment Zone
MW-2, MW-3, MW-7R	Monthly/Quarterly ⁴	A ⁵ , B, C ⁷	Transition Zone
MW-6, MW-12, EW-4, EW-5	Semiannual	A ⁶ , B, C ⁸	Compliance
EW-1 ¹	Semiannual	A, B	Background

1 This well will be replaced as background well by MW-13 when constructed and when sufficient data from MW-13 has been collected. The Discharger shall develop new water quality protection standards (WQPS) using data collected from MW-13. Data set must contain at least eight sampling events to conduct a meaningful statistical analysis to develop background concentrations limits. See Figure 1 for proposed MW-13 location.

2 Constituent suite components listed in Table 2.

3 Wells designated as Quarterly/Semiannual shall be sampled quarterly for at least four quarters after an injection event, and then semi-annually in the second and fourth quarters (Apr-Jun, Oct-Dec).

4 Wells designated as Monthly/Quarterly shall be sampled monthly for at least three months after an injection event. Following the monthly sampling frequency wells will be sampled quarterly for at least two quarters, and then semiannually in the 2nd and 4th quarters.

5 Only if significant methane (>28 mg/l above pre-injection condition) is detected in the treatment zone.

6 Only if significant methane (>28 mg/l) is detected in the transition zone.

Table 2: Analytical Methods

Constituent	Method ¹	Maximum Practical Quantitation Limit ² (µg/L)
Suite A		
Volatile Organic Compounds	EPA 8260B	0.5
Ethanol ⁴	EPA 8260B	5
Suite B		
Total Dissolved Solids	EPA 160.1 or SM2540C	15,000
Total Organic Carbon	EPA 415 or SM5310B	3000
Chloride	EPA 300	1000

Nitrate (as N)	EPA 300	230
Sulfate	EPA 300	1000
Dissolved Metals ⁵	EPA 200.7	Various
Suite C		
Methane	EPA RSK 175	1.0

1 Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.

2 All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported as an estimated value. Refer to MRP R5-2013-0134 for approved concentration limits.

3 Suspected breakdown product of the HRC injectant, detected at previous injection event.

4 Metals include arsenic, cadmium, chromium, copper, iron, lead, manganese, nickel, selenium, silver and zinc. Samples to be analyzed for dissolved metals shall be filtered in the field. Add analysis for hexavalent chromium to individual well analysis requirement if chromium is detected above 10 ug/l site wide background limit (Refer to MRP R5-2013-0134 for approved concentration limits) in any sample from that well.

FIELD SAMPLING

In addition to the above groundwater sampling and analysis, field sampling and analysis shall be conducted each time a monitoring well or extraction well is sampled. The sampling and analysis of field parameters shall be as specified in Table 3.

Table 3: Field Sampling Requirements

Parameters	Units	Type of Sample
Groundwater Elevation	Feet, Mean Sea Level	Measurement
Oxidation-Reduction Potential	Millivolts	Grab/Flow-through Cell
Electrical Conductivity	uhmos/cm	Grab/Flow-through Cell
Dissolved Oxygen	mg/L	Grab/Flow-through Cell
pH	pH Units (to 0.1 units)	Grab/Flow-through Cell
Sulfide using a colorimetric test kit (EPA 376.2) sensitive to 0.02 mg/l.	mg/l	Grab (if odor detected)

The groundwater flow rate and direction in the uppermost aquifer and in any zones of perched water and in any additional portions of the zone of saturation being monitored shall be determined at least quarterly [Title 27, Section 20415(e)(15)].

Field test instruments (such as those used to test pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the “Reporting” section of this MRP.

DISCHARGE MONITORING

On a daily basis, the Discharger shall monitor the discharge of water and amendments that are injected into the groundwater according to the requirements specified in Table 4. Each amendment addition shall be recorded individually, along with information regarding the time period over which the amendment was injected into the aquifer.

Table 4: Discharge Monitoring Requirements

Parameters	Units	Type of Sample
Injected Volume	gallons per day	Meter
Amendment(s) Added	kilograms per day	Measured

AMENDMENT ANALYSIS

Prior to use, amendments shall be analyzed for the constituents listed in Table 5. The analysis shall be done on the mixture of the amendment and distilled water at the estimated concentration that would be injected during the project. Analysis shall be performed once for the first injection of each calendar year.

Table 5: Amendment Analytical Requirements

Constituent	Method ¹	Maximum Practical Quantitation Limit ² (µg/L)
Volatile Organic Compounds (VOCs)	EPA 8260B	0.5
Ethanol	EPA 8260B	5
Metals, Total ³	EPA 200.7	Various
Total Dissolved Solids	SM2540B	15,000
pH	meter	NA
Electrical Conductivity	meter	NA

1 Or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit.

2 All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported, and reported as an estimated value.

3 Metals include arsenic, barium, cadmium, calcium, chromium, copper, iron, lead, magnesium, manganese, mercury, molybdenum, nickel, selenium, silica, silver and zinc.

ESTABLISHMENT OF BACKGROUND CONCENTRATION VALUES

The Discharger shall develop background values for concentrations of dissolved iron, dissolved manganese, metals, total dissolved solids and electrical conductivity in groundwater following the procedures found in CCR Section 20415(e)(10). Background values at each compliance well shall be calculated from data collected at each compliance well prior to upgradient HRC injection. The Discharger shall submit a proposal to update the background concentrations by **1 September 2014**.

REPORTING

When reporting the data, the Discharger shall arrange the information in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner as to illustrate clearly the compliance with this Order. In addition, the Discharger shall notify the Regional Board within 48 hours of any unscheduled shutdown of any soil vapor and/or groundwater extraction system. The results of any monitoring done more frequently than required at the locations specified in the Monitoring and Reporting Program shall also be reported to the Regional Board. As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all reports shall be prepared by a registered professional or their subordinate and signed by the registered professional.

All monitoring reports shall conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30 and shall be submitted by hard copy and electronically to the State Water Board's Geotracker database.

Quarterly Monitoring Reports

The quarterly reports shall be submitted by the 1st day of the second month following the end of each calendar quarter (i.e., by **1 February, 1 May, 1 August, and 1 November**) until quarterly reports are no longer appropriate pursuant to Table 1 or such time as the Executive Officer determines that the reports are no longer necessary.

The quarterly reports should include the following information:

- (a) The amendments injected, dates, volume, and injection locations.
- (b) For both monthly and quarterly sampling events, tabulated sample locations, analyses and results, including detection levels for undetected results.

- (c) A figure showing injection and sample locations.
- (d) Field calibration logs.

Semi-annual monitoring reports

Semiannual reports shall be submitted by **the 1st day of the second month following the end of each reporting period (i.e., by 1 February and 1 August)**. These reports shall contain an evaluation of the effectiveness and progress of the remediation. The content of the Semiannual Reports may NOT be combined with the Semiannual Report required by Monitoring and Reporting Program R5-2013-0134 for the Elk Grove Class III Landfill. Separate reports shall be submitted for each Order. The Semiannual Reports required by this Order shall contain the following minimum information:

- (a) A description and discussion of the groundwater sampling event and results, including trends in the concentrations of pollutants and groundwater elevations in the wells, how and when samples were collected, and whether the pollutant plume(s) is delineated;
- (b) Field logs that contain, at a minimum, water quality parameters measured before, during, and after purging, method of purging, depth of water, volume of water purged, etc.;
- (c) Groundwater contour maps for all groundwater zones, if applicable;
- (d) Pollutant concentration maps for all groundwater zones, if applicable;
- (e) A table showing well construction details such as well number, groundwater zone being monitored, coordinates (longitude and latitude), ground surface elevation, reference elevation, elevation of screen, elevation of bentonite, elevation of filter pack, and elevation of well bottom;
- (f) A table showing historical lateral and vertical (if applicable) flow directions and gradients;
- (g) Cumulative data tables containing the water quality analytical results and depth to groundwater;
- (h) A copy of the laboratory analytical data report, which may be submitted in an electronic format;
- (i) The status of any ongoing remediation, including an estimate of the system operating time, the effectiveness of the remediation system, and any field notes pertaining to the operation and maintenance of the system; and
- (j) If applicable, the reasons for and duration of all interruptions in the operation of any remediation

system, and actions planned or taken to correct and prevent interruptions.

Annual Report

An Annual Report shall be submitted to the Regional Board by **1 February** of each year. This report shall contain an evaluation of the effectiveness and progress of the investigation and remediation, and may be combined with the second semi-annual monitoring report, as long as the report cover page clearly states that the two reports have been combined into one. The Annual Report is a separate report required under this General Order and shall not be combined with the Annual Report required by MRP

R5-2013-0134. The Annual Report shall contain the following minimum information:











- (a) Both tabular and graphical summaries of all data obtained during the year;
- (b) Groundwater contour maps and pollutant concentration maps containing all data obtained during the previous year;
- (c) A discussion of the long-term trends in the concentrations of the pollutants in the groundwater monitoring wells;
- (d) An analysis of whether the pollutant plume is being effectively treated;
- (e) A description of all remedial activities conducted during the year, an analysis of their effectiveness in removing the pollutants, and plans to improve remediation system effectiveness;
- (f) An identification of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program; and
- (g) If desired, a proposal and rationale for any revisions to the groundwater sampling plan frequency and/or list of analytes.

A letter transmitting the monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

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

Ordered by: **Original Signed by** _____
PAMELA C. CREEDON, Executive Officer

LEGEND

-  Background Monitoring Wells
-  Detection Monitoring Wells
-  Corrective Action Wells
-  Water Supply Wells
-  Piezometers
-  Landfill Gas Probes
-  LFG Extraction Wells
-  Soil Vapor Extraction Wells
-  Suction Lysimeter
-  Surface Water Monitoring Pt

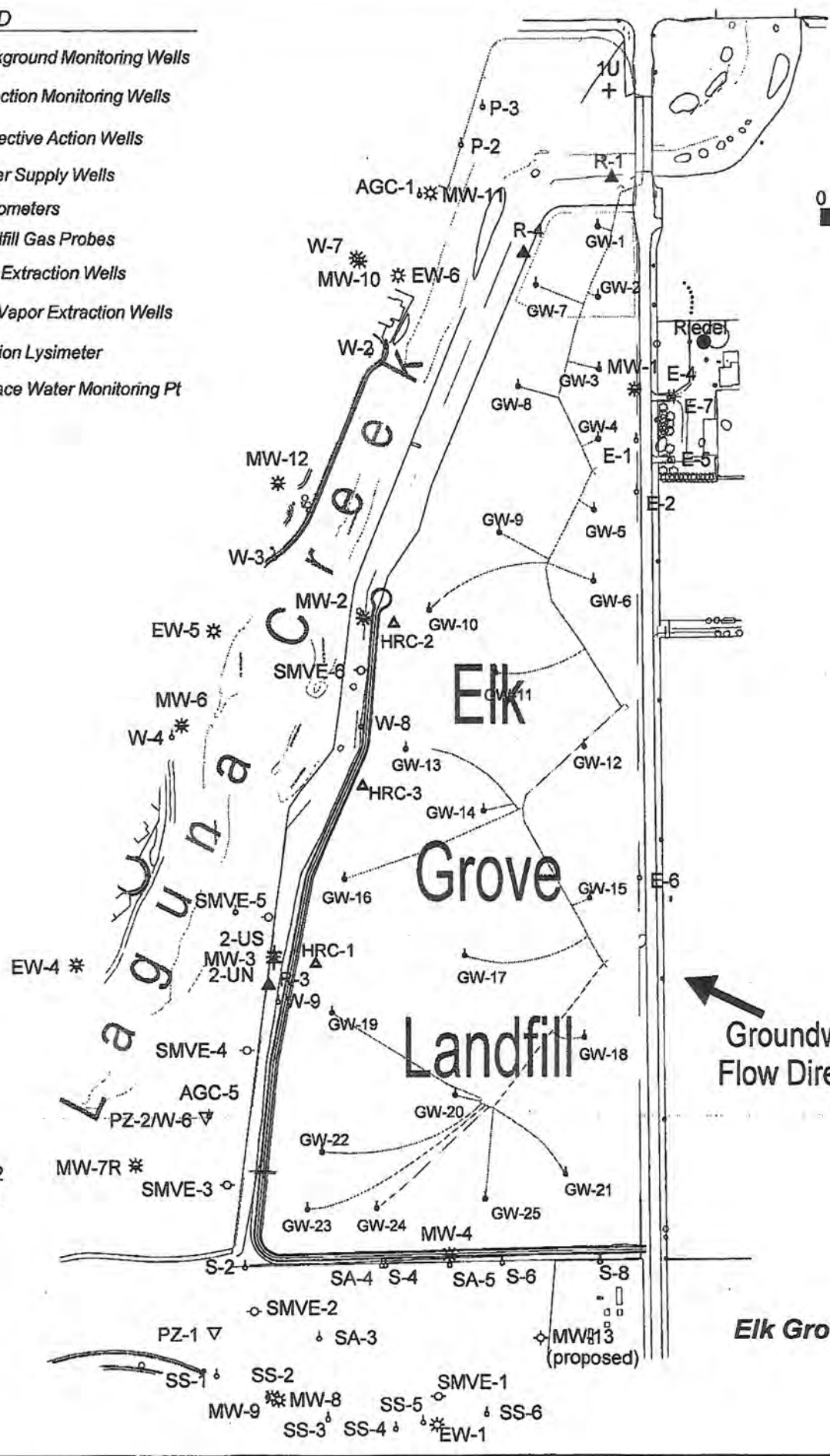
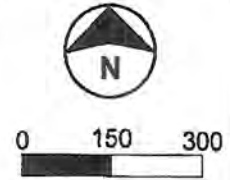


Figure 1
Elk Grove Landfill
Site Map
 Elk Grove, CA.