CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

MONITORING AND REPORTING PROGRAM NO. R5-2015-0012-XXX

FOR
IN-SITU GROUNDWATER REMEDIATION
AND DISCHARGE OF TREATED GROUNDWATER TO LAND

THE DAVIS CENTER
670 G STREET
DAVIS, YOLO COUNTY

This Monitoring and Reporting Program (MRP) describes requirements for monitoring groundwater remediation for the Davis Center property. This MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. As appropriate, California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) 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

Monitoring wells associated with this site are shown on Figure 1. The groundwater monitoring program for these wells and any treatment system wells installed subsequent to the issuance of this MRP shall follow the schedule in Table 1 below. Sample collection and analysis shall follow standard EPA protocol for the constituents listed in Table 2 below.

Table 1: Sampling Frequency

Well Number	Frequency	Monitoring Objective
IE-GW-2A/2B/2C	Baseline, Quarterly for first year, Semiannual for second year, Annual for third to fifth years	Compliance wells used to determine compliance with groundwater limitations.
LCW-1, LCW-2, IE-GW-1B/1C	Baseline, Quarterly for first year, Semiannual for second year, Annual for third to fifth years	Treatment Zone wells sampled to evaluate in-situ bioremediation progress inside the treatment zone.
IE-GW-3B/3C	Baseline, Semiannual for second year	Transition Zone well sampled to evaluate migration of pollutants from the treatment zone.
LCW-3	Baseline, Semiannual for first year, Annual for second and third years	Background wells used to develop background concentrations.

Table 2: Constituent Suite

Well Number	Constituent
LCW-1, LCW-2, LCW-3, IE-GW-1B/1C, IE-GW-2A/2B/2C, IE-GW-3B/3C	Volatile Organic Compounds analyzed by EPA Method 8260B
LCW-1, LCW-2, IE-GW-1B, IE-GW-2B	Biological Oxygen Demand by EPA Method 405; Volatile fatty acids by Dionex App. Note 291; Dissolved gases including methane, carbon dioxide, ethane, and ethene by EPA Method RSKSOP-175; Anions by EPA Method 300.0; Ferrous iron by SM 3500

FIELD SAMPLING

In addition to the above sampling and laboratory analyses, 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	Practical Quantitation Limit	Analytical Method
Groundwater Elevation	Feet, Mean Sea Level	0.01 feet	Measurement
Oxidation-Reduction Potential	Millivolts	10 millivolts	Field Meter
Electrical Conductivity	uhmos/cm	50 µS/cm^2	Field Meter
Dissolved Oxygen	mg/L	0.2 mg/L	Field Meter
pH	pH Units (to 0.1 units)	0.1 units	Field Meter
Temperature	ºF/ºC	0.1 ºF/ºC	Field Meter

All wells that are purged shall be purged until pH, temperature, conductivity and dissolved oxygen are within 10% of the previous value.

Field test instruments (such as those used to test pH and dissolved oxygen in-well and/or during purging) 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 item (b) of the “Reporting” section of this MRP.

IN-SITU DISCHARGE MONITORING

The Discharger shall monitor daily 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	pounds per day	Measured

AMENDMENT ANALYSIS

Prior to use, amendments shall be analyzed for the constituents listed in Table 5 using the listed method or an equivalent EPA Method that achieves the maximum Practical Quantitation Limit. The analysis should be done on a mixture of the amendment and deionized water at the estimated concentration that would be injected during the pilot project. All concentrations between the Method Detection Limit and the Practical Quantitation Limit shall be reported, and reported as an estimated value.

Table 5: Amendment Analytical Requirements

Constituent	Method	Maximum Practical Quantitation Limit (ug/L)
Volatile Organic Compounds	EPA 8260B	0.5
General Minerals including alkalinity, bicarbonate, potassium, chloride, sulfate, total hardness, nitrate, nitrite, ammonia.	Various	Various
Metals, Total and Dissolved, including arsenic, barium, cadmium, calcium, total chromium, copper, iron, lead, manganese, magnesium, mercury, molybdenum, nickel, selenium and silica.	EPA 200.7, 200.8	Various
Semi-Volatile Organic Compounds	EPA 8270	5.0
Total Dissolved Solids	EPA 160.1	10,000
pH	meter	Not Applicable
Electrical Conductivity	meter	Not Applicable

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 Central Valley Water 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 Central Valley Water 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 Civil Engineer or Geologist or their subordinate and signed by the registered professional.

The Discharger shall submit electronic data reports, which conform to the requirements of the California Code of Regulations, Title 23, Division 3, Chapter 30. Quarterly reports for the first year of monitoring shall submitted by the 1st day of the second month following the end of each calendar quarter by **1 February, 1 May, 1 August, and 1 November**. Semi-annual reports for the second year shall be submitted by **1 February and 1 August**. Annual reports for the third through fifth years of monitoring shall be submitted by **1 February** for the previous year. All reports shall be submitted electronically over the internet to the Geotracker database system.

Each monitoring report shall include 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;

(i) A discussion of the long-term trends in the concentrations of the pollutants in the groundwater monitoring wells;

(j) An analysis of whether the pollutant plume is being effectively treated;

(k) 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;

(l) The status of any ongoing remediation, including an estimate of the cumulative mass of pollutant removed from or treated in the subsurface, system operating time, the effectiveness of the remediation system, and any field notes pertaining to the operation and maintenance of the system; and

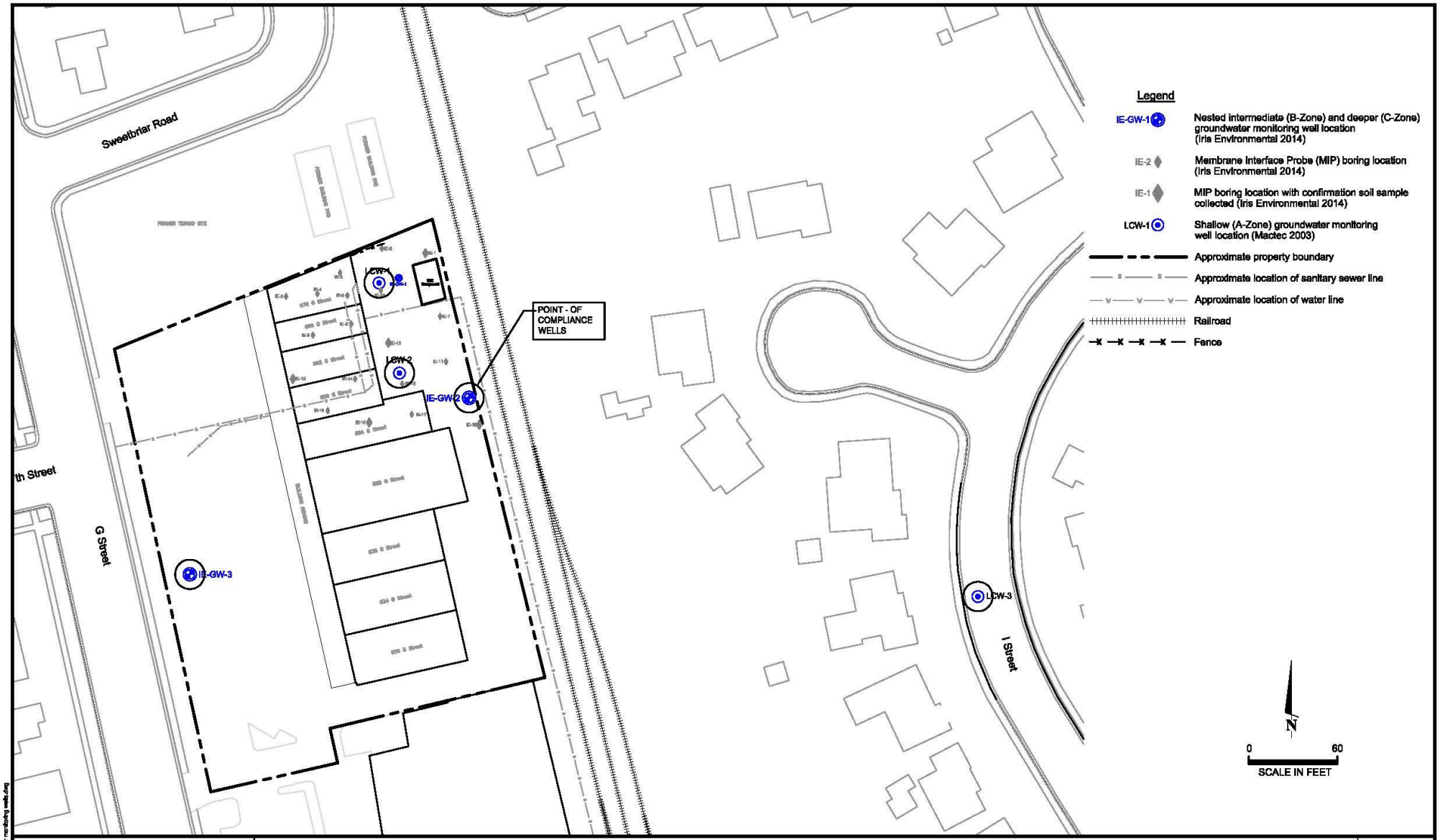
(m)If applicable, the reasons for and duration of all interruptions in the operation of any remediation system, and actions planned or taken to correct and prevent interruptions.

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: _____
PATRICK PULUPA Executive Officer

_____
(Date)



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Groundwater Monitoring Wells

Figure
1

Drafter: EC

Date: 05/06/16

Contract Number: 12-916A

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