

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LOS ANGELES REGION

ORDER NO. R4-2011-0036

WASTE DISCHARGE REQUIREMENTS  
FOR  
ANADITE CALIFORNIA RESTORATION TRUST  
IN-SITU ENHANCED ANAEROBIC BIOREMEDIATION OF  
VOLATILE ORGANIC COMPOUNDS IMPACTED GROUNDWATER  
FORMER ANADITE SOUTH GATE FACILITY

(FILE NO. 97-019, SCP NO. 0541)

The California Regional Water Quality Control Board, Los Angeles Region, (hereafter Regional Board) herein finds that:

1. Anadite California Restoration Trust (hereafter Discharger) has filed a Report of Waste Discharge and applied for Waste Discharge Requirements (WDR) to inject electron donors (primarily lactate [either as sodium lactate or lactic acid], glycerin, waste glycerin, whey powder, or emulsified vegetable oil [EVO-Newman Zone™ or EOS™]); and amended with a non-pathogenic, naturally derived, chlorinated ethene degrading bacterial culture (Shaw's SDC-9™ or SiREM's KB-1™) to remediate chlorinated volatile organic compounds (VOCs) in groundwater at and originating from the Former Anadite South Gate Facility (Facility), identified below.
2. The Facility is currently owned and administered by the Discharger, and located at 10647 Garfield Avenue in South Gate, California (Latitude 33° 55' 56" N, Longitude -118° 10' 2" W; see Figure 1). The Facility is comprised of approximately 3.4 acres and is located approximately 2,200 feet east of the Long Beach Freeway (710 Freeway), and 1,800 feet east of the confluence of the Los Angeles and Rio Hondo rivers. The Facility is bordered by a paved parking lot and residential houses on the north; Garfield Avenue on the east; Meadow Road on the south; and Sessler Street on the west (Figure 2).
3. The Facility is located in the Central Groundwater Basin within the Los Angeles Coastal Plain, and underlain by approximately 150 feet of Recent alluvium, including the Bellflower aquiclude (clay and sandy clay) and the Gaspur aquifer (sand and gravel with some interbedded clay). At least two water-bearing layers of fine grained sand and silts (to be referred later on as the 50-Foot and 80-Foot Zones) are interbedded with clay layers of the Bellflower aquiclude. Groundwater monitoring wells have been installed to several depths: 50-foot, 80-foot, 100-foot, 150-foot, and 200-foot zones. The 50-foot zone consists primarily of interbedded sandy silt, silty sand, and fine sand. The 80-foot zone consists primarily of fine to medium sand with lesser amounts of silty sand and sandy silt. The 100-foot zone consists primarily of medium to coarse-grained sand and sandy gravel. The 150-Foot and 200-Foot zones consist of fine to coarse-grained sand with gravels. The 100-foot, 150-foot, and 200-foot zone groundwater wells are all considered to be screened within the Gaspur aquifer, which is presumed to be approximately 100 feet thick.

February 3, 2011

Anadite California Restoration Trust  
Former Anadite South Gate Facility

4. The Discharger has been conducting soil and groundwater investigations since 1991 under the oversight of the Regional Board. In January 1998, the Regional Board issued Cleanup and Abatement Order (CAO) No. 98-004 requiring Anadite to cleanup and abate the on site and off site soil and groundwater contamination originating from the Facility. Numerous soil borings have been drilled and sampled for VOCs into the vadose and saturated zones, at the Facility and off site locations. A total of 65 groundwater monitoring wells have been installed on and off site to different depths (50-Foot, 80-Foot, 100-Foot, 150-Foot, and 200-Foot zones) to monitor the groundwater conditions at the Facility and vicinity. Results from the soil and groundwater assessments indicate that the primary compounds of concern are the following chlorinated volatile organic compounds (VOCs): trichloroethylene (TCE), tetrachloroethylene (PCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), vinyl chloride (VC), and 1,4-dioxane (dioxane).
5. Soil vapor extraction (SVE) pilot tests were conducted at the Facility from 1999 to 2002 to address soil impacted with VOCs. Full-scale SVE system operations were initiated in 2003, and have been operating to date. An estimated 11,912 pounds of VOCs have been removed from soils beneath the Facility since 2003.
6. The maximum concentration of TCE detected in samples from the 50-foot zone was 6,820 micrograms per liter ( $\mu\text{g/l}$ ), the maximum concentration of PCE was 28,000  $\mu\text{g/l}$ , and the maximum concentration of cis-1,2-DCE was 2,600  $\mu\text{g/l}$ . For samples from the 80-foot zone the maximum concentrations of the three VOCs were 10,000  $\mu\text{g/l}$ , 34,000  $\mu\text{g/l}$ , and 5,300  $\mu\text{g/l}$ , respectively. For samples from the 100-foot zone the maximum concentrations of the three VOCs were 14,000  $\mu\text{g/l}$ , 2,200  $\mu\text{g/l}$ , and 8,300  $\mu\text{g/l}$ , respectively. The extent of the VOCs plume in groundwater in the 50-foot, 80-foot, and 100-foot zones is largely encompassed with the TCE plume (Figures 3, 4, and 5).
7. Three pilot tests were conducted at the Facility from 2004 to 2006 to address groundwater impacted with VOCs. In-situ enhanced anaerobic bioremediation (EAB) and in-situ chemical oxidation (ISCO) technologies were tested at three areas of the site. As a result of these tests, enhanced anaerobic bioremediation (EAB) demonstrated to be effective in achieving dechlorination of VOCs, but recirculation of groundwater is required for an effective electron donor delivery; and to increase the rate of complete reductive dechlorination, bioaugmentation may be required.
8. Based upon the results of the groundwater remediation pilot tests, the Discharger submitted "Groundwater Remediation Pilot Study Report and Remedial Action Plan" (Plan) dated January 26, 2007. The Plan identified twelve candidate technologies for groundwater remediation, of which EAB followed by monitored natural attenuation (MNA) was proposed. On November 9, 2007, the Executive Officer approved EAB as an interim measure to remediate source zone area-source reduction.
9. The Discharger submitted "Groundwater Remedial Design and Implementation Plan" (Implementation Plan) dated May 30, 2008. The Implementation Plan described the major components of EAB technology. Groundwater extraction wells will be located off site in the

Anadite California Restoration Trust  
Former Anadite South Gate Facility

downgradient direction of the Facility, and screened within the 50-foot, 80-foot, and 100-foot zones (Figure 6). A remedial compound will be located at the Facility (Figure 7) and will house an aboveground mixing tank for treating the extracted groundwater with the electron donor solution prior re-injection. Groundwater re-injection wells will be located at the Facility and screened at the 50-foot, 80-foot, and 100-foot zones.

10. The Discharger submitted the "Bench-Scale Treatability Study Results for the Former Anadite Facility" (Report) dated June 30, 2009. The Report evaluated the performance of several electron donors and culture in VOCs-impacted groundwater samples. All electron donors used (lactate, glycerin, waste glycerin and whey) were capable of supporting complete dechlorination; however, glycerin was recommended based on costs, availability, and ease of use. Shaw's SDC-9™ culture was used to promote reductive dechlorination of VOCs in the groundwater samples within shorter periods of time.
11. During the proposed EAB, a solution containing an electron donor and bioaugmentation culture will be added to groundwater to create a reducing environment (i.e., anaerobic) in which specific microorganisms, notably bacteria of the *Dehalococcoides* (DHC) 16SrDNA gene and functional genes *iceA*, *bvcA*, and *vcrA*, can grow and biodegrade the chlorinated VOCs. The activity of these microorganisms will be used in an effort to remediate the source areas impacted by chlorinated ethenes, namely TCE, PCE, and cis-1,2-DCE. The Discharger proposes to use one or more of the following electron donors: lactate (either as sodium lactate or lactic acid), glycerin, waste glycerin, whey powder, or emulsified vegetable oil (EVO-Newman Zone™ or EOS™). The electron donor solution will be added to the extracted groundwater in pulses at frequencies ranging from 5 to 50 percent of the flow-weighted operational time. Based on groundwater modeling results, the selected electron donor solution concentration is approximately 2,400 to 3,600 parts per million (ppm) of pure donor in extracted groundwater.
12. The Discharger may elect to implement EAB system including wells on a phased implementation schedule. However, electron donor concentrations, injections rates and frequencies may vary to best match the site conditions, based on performance monitoring during system operations.
13. If required, the Discharger proposes to use a bioaugmentation culture (SiREM's KB-1™ or Shaw's SDC-9™) to promote a reducing environment, which will be added directly into the injection well to minimize exposure of the culture to oxygen. A maximum of approximately 40 liters of bioaugmentation culture will be injected per well, but the amount may vary based upon results of the performance monitoring during system operations.
14. The periodic/pulsed injection of electron donor is expected to minimize the potential for biofouling. However, if necessary, low concentrations of biofouling control chemicals which are routinely used for rehabilitation of drinking water wells (chlorine dioxide [CAS 10049-04-4], sodium hypochlorite [5 to 15% solution, CAS 7681-52-9] or a weak organic acid [i.e., LBA™ cleaner] may be added, as part of non-routine maintenance. A tracer such as sodium or potassium bromide may be added to the re-injected groundwater in order to improve understanding of the local hydraulics.

15. The Discharger may also elect to continue and/or expand the EAB if necessary by using a combination of existing well/pipeline network and/or new infrastructure. The Discharger may also elect to use perform episodic or slug injections of donor amended groundwater or donor amended potable water as a contingency option for solubilizing dense non-aqueous phase liquids (DNAPL), if any, as part of EAB at the site using a combination of existing injection well/pipeline network and/or new infrastructure. Prior to implementing any such changes, the Discharger will submit Addendum(s) to the May 30, 2008, Implementation Plan, and any proposed changes to the injection, sampling, and report scheduling for Regional Board approval.
16. The Discharger proposes two remedial actions as contingency technologies for groundwater remediation. These contingencies will be implemented if performance monitoring shows that EAB is not successful in reducing the VOCs concentrations as expected. The first proposed contingency technology is in-situ chemical oxidation (ISCO). ISCO involves the introduction of chemical oxidants such as permanganate, persulfate, Fenton's reagent, or ozone into groundwater to treat VOCs. The second proposed contingency technology is groundwater extraction and treatment. Due to the vertical and lateral extent of the VOCs plume, the second technology is not considered to be applicable as a first course of action, and will be retained as a reasonable contingency action for source contamination containment.
17. Seven water production wells were identified within a 1-mile radius of the Facility (Figure 8). The closest wells to the Facility are located approximately 1,600 feet northeast, in the upgradient direction of the Facility. The closest downgradient well is located approximately 3,300 feet southeast of the Facility. This well is screened from 578 to 595 feet below ground surface (bgs) and currently in production. The most recent groundwater analytical data available for this well indicates PCE concentration of 0.51 µg/L in 2004.
18. Any injection of chemicals or materials into the groundwater is a discharge of waste as defined by the California Water Code. However, the discharge of an electron donor solution with bioaugmentation culture is intended to provide more effective remediation of chlorinated VOCs impacted groundwater and is expected to significantly reduce the anticipated cleanup time as compared to pump-and-treat technology or enhanced in-situ bioremediation without addition of a bioaugmentation culture.
19. The application of electron donors and bioaugmentation cultures to groundwater may result in temporary adverse impacts to groundwater quality, but impacts that may result will be localized, and of short-term duration, and will not impact any existing or prospective uses of groundwater.
20. The Regional Board adopted a revised Water Quality Control Plan (Plan) for the Los Angeles Region on June 13, 1994. The Plan contains beneficial uses and water quality objectives for the Central Groundwater Basin. The requirements contained in this Order, as they are met, will be in conformance with the goals of the Plan.
21. The beneficial uses for the Central Groundwater Basin are municipal and domestic supply, industrial service supply, industrial process supply, and agricultural supply.

22. The permitted discharge is consistent with the anti-degradation provisions of State Water Resources Control Board Resolution No. 68-16 (Anti-degradation Policy). The discharge may result in some localized temporary exceedances of background concentrations of total organic carbon, iron, manganese, arsenic, TDS, and certain microorganisms. However, after the injection of amendments, these parameters are not anticipated to exceed the primary or secondary standards to the extent that these parameters do not already exceed the respective standard. Moreover, any parameter change resulting from the discharge:
  - a. Will be consistent with maximum benefit to the people of the State.
  - b. Will not unreasonably affect present and anticipated beneficial uses of such water, and
  - c. Will not result in water quality less than that prescribed in the Water Quality Control Plan for the Central Groundwater Basin.
23. The Regional Board has assumed lead agency role for this project under the California Environmental Quality Act (CEQA) [Public Resources Code section 21000 et seq.] and has conducted an Initial Study in accordance with section 15063 of the "State CEQA Guidelines" at California Code of Regulations, title 14, section 15000 et seq. Based upon the Initial Study, the Regional Board prepared a Mitigated Negative Declaration documenting that the project, as mitigated, will not have a significant adverse effect on the environment.
24. The Regional Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for this discharge and has provided them with an opportunity for a public hearing and an opportunity to submit their written comments and recommendations. The Regional Board, in a public meeting, heard and considered all comments pertaining to the discharge and to the tentative requirements.

**IT IS HEREBY ORDERED** that Anadite California Restoration Trust, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted there under, shall comply with the following:

**A. Discharge Limits**

1. The Discharger shall not cause the groundwater outside of the treatment area, including the identified VOCs plume (as defined by the upgradient and downgradient wells in Figures 3, 4 and 5) to exceed background concentrations of chloride and TDS established prior to start of discharge.
2. The discharge of elected bioaugmentation culture and electron donor amendment solution into the groundwater shall be only performed while this Order is in force.
3. During the active remediation, the injection volume for the application of EAB, consisting of electron donor solution (from the approved list) shall not exceed 500,000 gallons unless

approved in writing by the Executive Officer in advance. The selected bioaugmentation culture would be applied at a volume sufficient to result in target VOC reduction. Not more than 900 liters (L) per event for a maximum of two events (1,800 L maximum) of Dehalococcoides based culture would be applied unless approved by the Executive Officer. Actual volumes of all amendments will be monitored and recorded for each injection location, as well as summed for the entire program.

4. The amendment solution shall be limited to potable water, extracted groundwater, and amendments specified in work plans and addendums as approved. The amendments will consist of a mixture of water with one or more of the following: electron donors (primarily lactate [either as sodium lactate or lactic acid], glycerin, waste glycerin, whey powder, or emulsified vegetable oil [EVO-Newman Zone™ or EOS™]), and bacterial cultures (Shaw's SDC-9™ or SiREM's KB-1™).
5. Discharge duration shall not exceed five years, unless approved in writing by the Executive Officer in advance.

**B. Discharge Specifications**

1. The Discharger shall stop further addition of amendments to the groundwater if amendment solution is observed to be migrating beyond the treatment area. After this control measure has been implemented the remaining amendments in the groundwater will naturally break down, effectively removing the oxidant or food source and allowing the groundwater system to return to more aerobic conditions.
2. The Discharger shall not cause the amendment solution and the by-products of the remediation process to migrate outside of the treatment area established by the Discharger and approved by the Executive Officer.
3. The discharge of the amendment solution or any by-products into any surface water or surface water drainage course is prohibited.
4. The Discharger shall not cause the groundwater to contain taste or odor producing substances in concentrations that cause nuisance or adversely affect beneficial uses outside the treatment area.
5. The Discharger shall not cause the groundwater to contain concentrations of chemical substances or its by-products, including the electron donor amendments and bioaugmentation culture solution in amounts that adversely affect any designated beneficial use as a result of the injection of solution.
6. The Discharger shall implement hydraulic control to prevent off-site migration if necessary.

**C. Provisions:**

1. This Order includes the attached "Standard Provisions Applicable to Waste Discharge Requirements," which is incorporated herein by reference. If there is any conflict between provisions stated herein before and the attached "Standard Provisions," those provisions stated herein shall prevail.
2. Discharges of wastes to any point other than specifically described in this Order or its amendment is prohibited and constitutes a violation thereof.
3. In the event of any change in name, ownership, or control of the Site, the Discharger shall notify this Regional Board in writing and shall notify any succeeding owner or operator of the existence of this Order by a letter, a copy of which shall be forwarded to this Regional Board.
4. A copy of these requirements shall be maintained at an on-site office and be available at all times to operating personnel.
5. In accordance with section 13260 of the California Water Code, the Discharger shall file a report of any material change or proposed change in the character, location, or volume of discharge.
6. The Discharger shall notify Regional Board immediately by telephone of any adverse condition resulting from this discharge or from operations producing this waste discharge, such notifications to be affirmed in writing within one week from the date of such occurrence.
7. This Regional Board considers the property administrator, operator, and owner to have continuing responsibility of correcting any problem that may arise in the future as a result of this discharge.
8. All work must be performed by or under the direction of a California professional civil engineer, professional geologist, or registered certified specialty geologist. A statement is required in all technical reports that the registered professional in direct responsible charge actually supervised or personally conducted all the work associated with the project.
9. The use of an electron donor amendment shall not cause a condition of pollution or nuisance as defined by California Water Code, section 13050.
10. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports as specified in the attached Monitoring and Reporting Program No. CI-8685. Violations of any conditions may result in enforcement action, including Regional Board or Court Order requiring corrective action or imposition of civil monetary liability, or revision, or rescission of the Order.
11. This Order does not exempt the Discharger from compliance with any other laws, regulations, or ordinances, which may be applicable. This Order does not legalize the waste treatment Site, and

leaves unaffected any further restraints on the Site that may be contained in other statutes or required by other agencies.

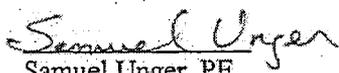
12. The Discharger shall cleanup and abate the effects of injecting amendment solution as specified in this Order, including extraction of any by-products which adversely affect beneficial uses, and shall provide an alternate water supply for municipal, domestic or other water use wells that become contaminated in exceedance of water quality objectives as a result of using the solution.
13. In accordance with section 13263 of the California Water Code, these requirements are subject to periodic review and revision by this Regional Board.
14. After notice and opportunity for a hearing, this Order may be terminated or modified for cause including, but not limited to:
  - a. Violation of any term or condition contained in this Order.
  - b. Obtaining this Order by misrepresentation, or failure to disclose all relevant facts.
  - c. A change in any condition that requires either a temporary or permanent reduction or elimination of authorized discharge.
15. The Regional Board, through its Executive Officer, will modify the Monitoring and Reporting Program, as necessary. The CEQA Initial Study and associated public comment were conducted once as part of the Waste Discharge Requirement (WDR) permit application process and will not be required for the expansion or modification of this remediation program.

**D. Expiration Date**

This Order expires on February 3, 2016.

The Discharger must file a Report of Waste Discharge in accordance with Title 27, California Code of Regulations, not later than 180 days in advance of such date as application for issuance of new waste discharge requirements.

I, Samuel Unger, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region on February 3, 2011.

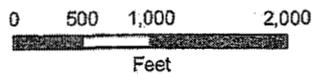
  
Samuel Unger, PE  
Executive Officer



**CDM**

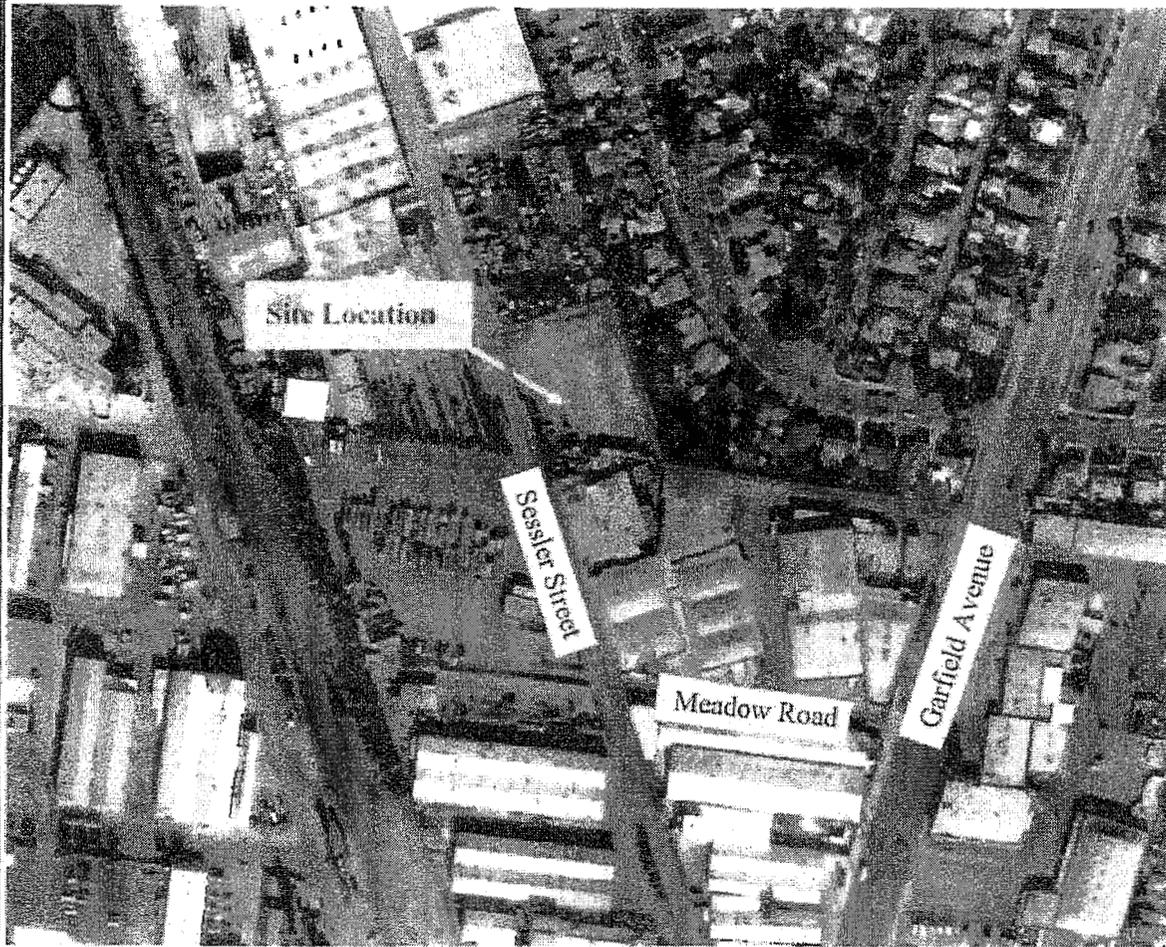
**Legend**

-  City Boundary
-  Facility Boundary



**Former Anadite Inc., Facility**  
**10647 Garfield Avenue**  
**South Gate, California**

**Figure 1**  
**Site Vicinity Map**



*Faint, illegible text, possibly a copyright notice or scale information.*

**Aerial Photo of Site with Adjacent  
Land Uses**

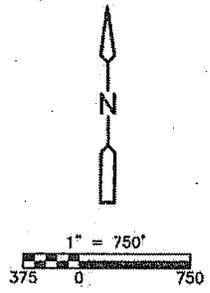
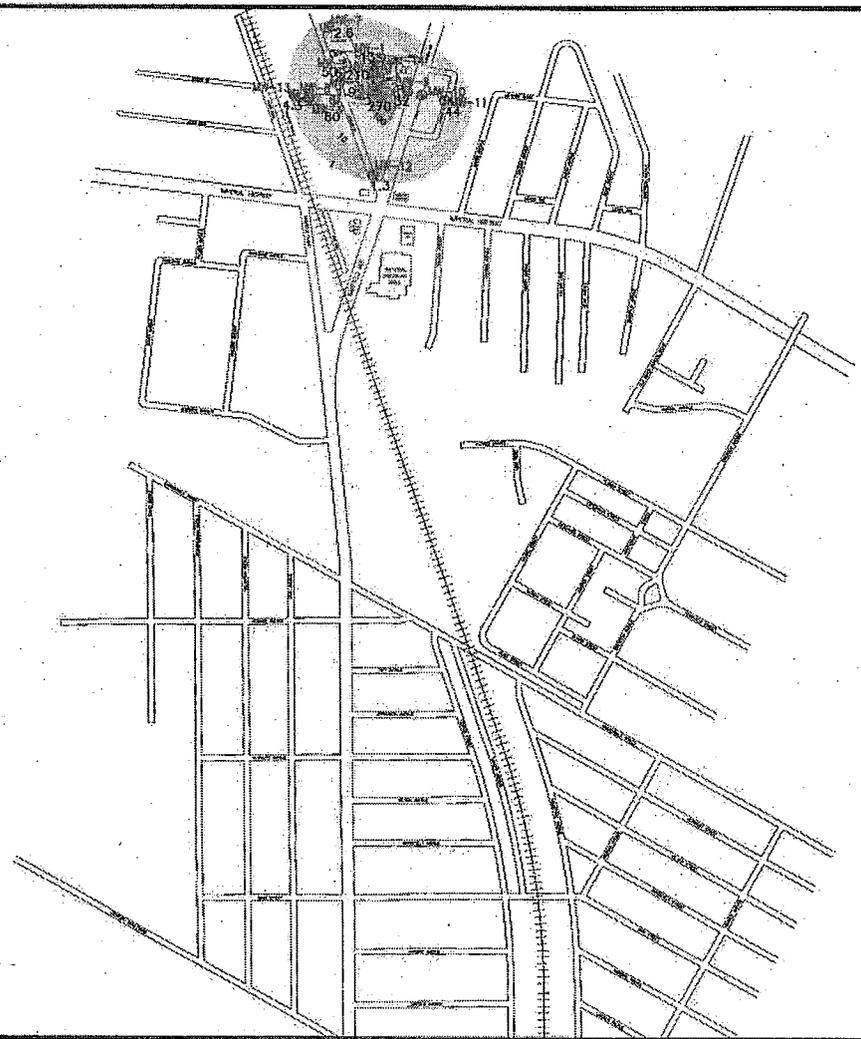
Anadite, Inc.

10647 Garfield Avenue, South Gate, CA

**FIGURE 2**

CDM Project 2639-50191

DATE: Jun 21, 2010 10:58am  
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USDT: msnery



**LEGEND**

- SR-12 50-FOOT ZONE MONITORING WELL LOCATION AND DESIGNATION WITH TCE CONCENTRATION IN ug/L
- 2.6
- ESTIMATED TCE PLUME AREA EXCEEDING 1 ug/L
- ESTIMATED TCE PLUME AREA EXCEEDING 10 ug/L
- ESTIMATED TCE PLUME AREA EXCEEDING 100 ug/L
- ESTIMATED TCE PLUME AREA EXCEEDING 1,000 ug/L

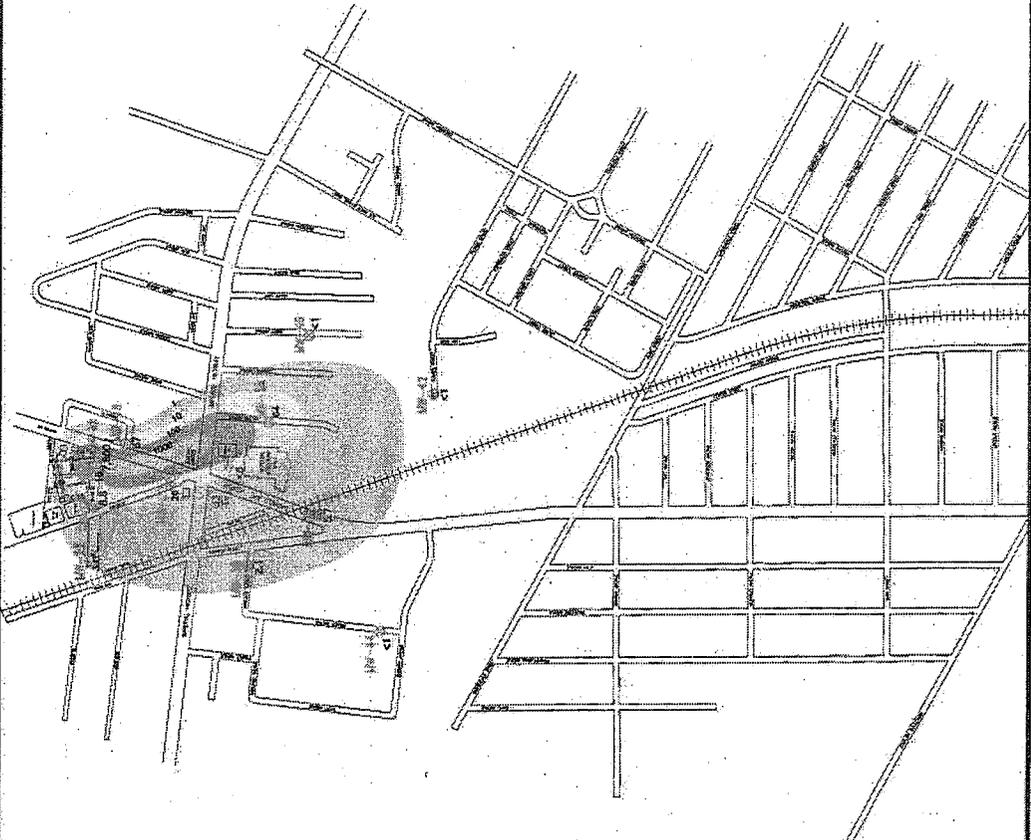
**NOTES**

- 1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
- 2. THIS FIGURE REPRESENTS ONE INTERPRETATION OF THE DATA. OTHER INTERPRETATIONS ARE POSSIBLE.
- 3. ug/L = MICROGRAMS PER LITER.

ANADITE, INC.  
10647 S. GARFIELD AVE., SOUTH GATE, CALIFORNIA  
**Site Plan Showing Interpreted  
TCE Concentration Contours  
in the 50-Foot Zone - May 2010**



Figure 3-8



**LEGEND**

- 80-FOOT ZONE MONITORING WELL LOCATIONS AND DESIGNATION WITH TCE CONCENTRATION IN  $\mu\text{g/L}$
- ESTIMATED TCE PLUME AREA EXCEEDING 1  $\mu\text{g/L}$
  - ESTIMATED TCE PLUME AREA EXCEEDING 10  $\mu\text{g/L}$
  - ESTIMATED TCE PLUME AREA EXCEEDING 100  $\mu\text{g/L}$
  - ESTIMATED TCE PLUME AREA EXCEEDING 1,000  $\mu\text{g/L}$

**NOTES**

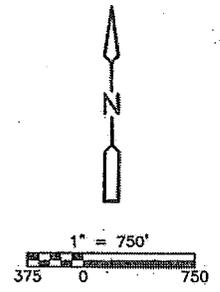
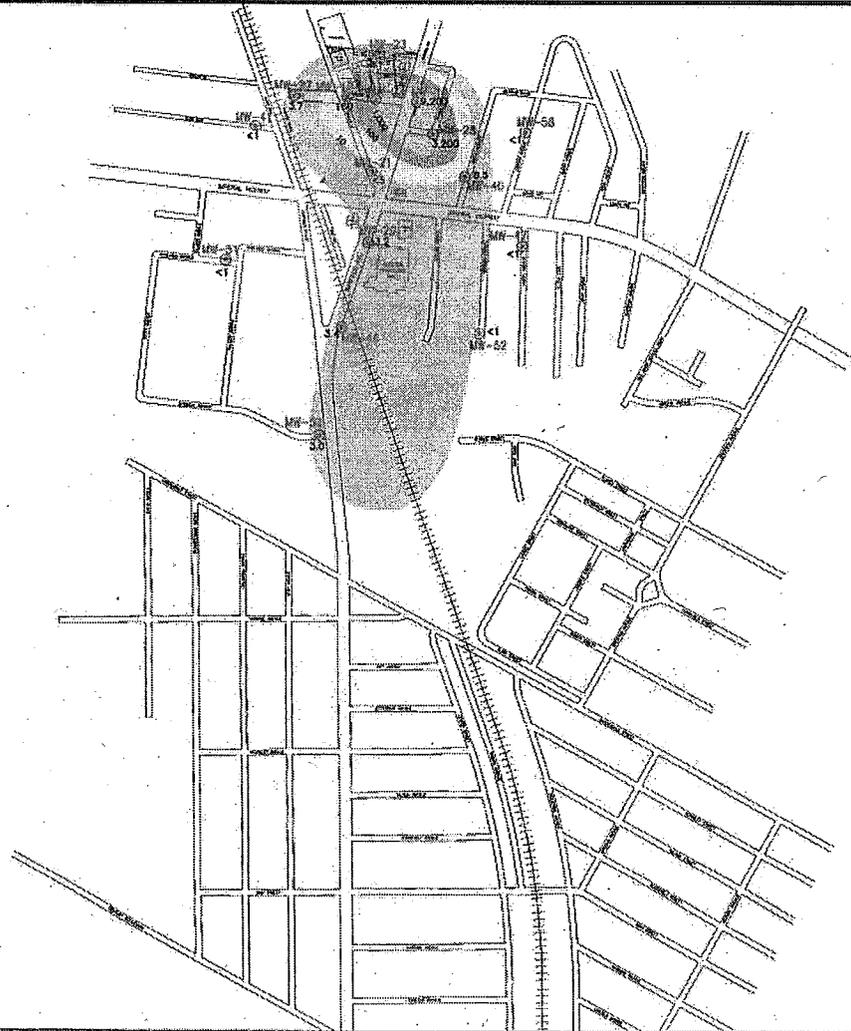
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE REPRESENTS ARE INTERPOLATION OF THE DATA. OTHER INTERPRETATIONS ARE POSSIBLE.
2.  $\mu\text{g/L}$  = MICROGRAMS PER LITER.

ANADITE, INC.  
 10647 S. GARFIELD AVE., SOUTH GATE, CALIFORNIA  
**Site Plan Showing Interpreted  
 TCE Concentration Contours  
 in the 80-Foot Zone - May 2010**



Figure 3-14

DATE: JUN 22, 2010 10:45am USER: wester  
DWG: P:\3333 Anadite South Gate\3333101 - 2009\Contaminated\Site Plan\CA\VP 3-20 TCE 100 CON.dwg



- LEGEND**
-  100-FOOT ZONE MONITORING WELL LOCATION AND DESIGNATION WITH TCE CONCENTRATION IN ug/L
  -  ESTIMATED TCE PLUME AREA EXCEEDING 1 ug/L
  -  ESTIMATED TCE PLUME AREA EXCEEDING 10 ug/L
  -  ESTIMATED TCE PLUME AREA EXCEEDING 100 ug/L
  -  ESTIMATED TCE PLUME AREA EXCEEDING 1,000 ug/L

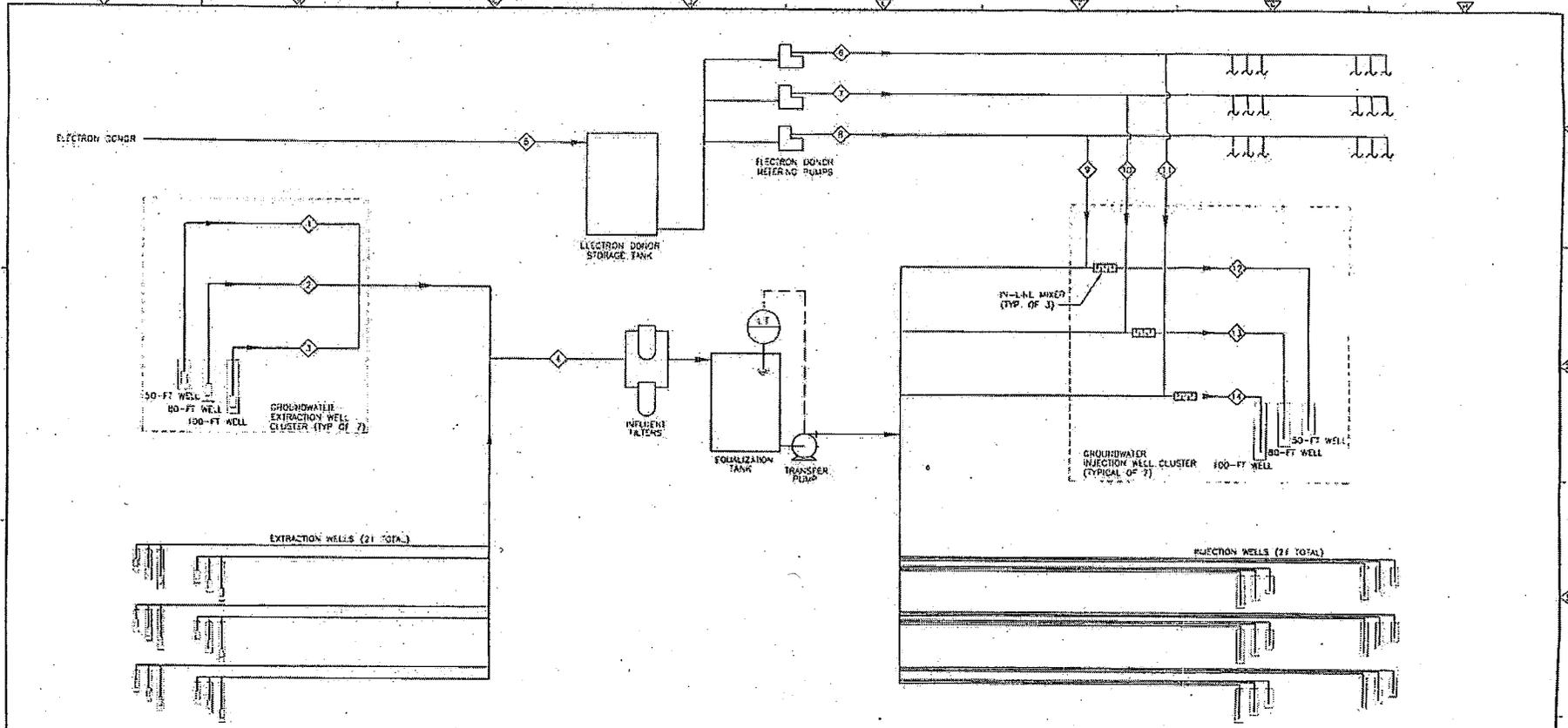
- NOTES**
1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
  2. THIS FIGURE REPRESENTS ONE INTERPRETATION OF THE DATA, OTHER INTERPRETATIONS ARE POSSIBLE.

ANADITE, INC.  
10647 S. GARFIELD AVE., SOUTH GATE, CALIFORNIA  
**Site Plan Showing Interpreted  
TCE Concentration Contours  
in the 100-Foot Zone - May 2010**

Figure 3-20







PROCESS STEP	1	2	3	4	5	6	7	8	9	10	11	12	13	14
WATER FLOW (GPM)	10	2.0	5	25	-	-	-	-	-	-	-	1.5	2.5	0
ELECTRON DONOR FLOW - OVERALL (GPM)	-	-	-	1.5	1.7	2.8	5.7	-	-	-	-	-	-	-
ELECTRON DONOR FLOW - INSTANTANEOUS (GPM)	-	-	-	-	-	2.4	4.0	5.1	2.4	4.0	5.7	2.4	4	5.1

- NOTES:
1. BRUAGUMENTATION WILL BE MANUALLY PERFORMED AT THE SELECTED INJECTION WELLS AND WILL NOT REQUIRE ANY PERMANENT TREATMENT SYSTEM EQUIPMENT. FRACTURES WILL BE INJECTED DIRECTLY INTO THE SELECTED WELLS.
  2. ELECTRON DONOR PUMPING WILL INITIALLY BE SET TO INJECT DONOR INTERMITTENTLY SUCH THAT DONOR IS INJECTED INTO EACH WELL APPROXIMATELY 10% OF THE TIME THE SYSTEM IS OPERATIONAL.

**PRELIMINARY NOT FOR CONSTRUCTION**

CALL BEFORE YOU DIG:  
UNDERGROUND SERVICE ALERT OF  
SOUTHERN CALIFORNIA  
TWO WORKING DAYS BEFORE YOU DIG  
1-800-227-2600

REV	DATE	BY	CHKD	DESCRIPTION
1				
2				
3				
4				
5				

DESIGNED BY: JTB  
 CHECKED BY: SWB  
 DATE: 10/2/99  
 SCALE: AS SHOWN  
 PROJECT NO.: 2539-20/99  
 SHEET NO.: 5-3

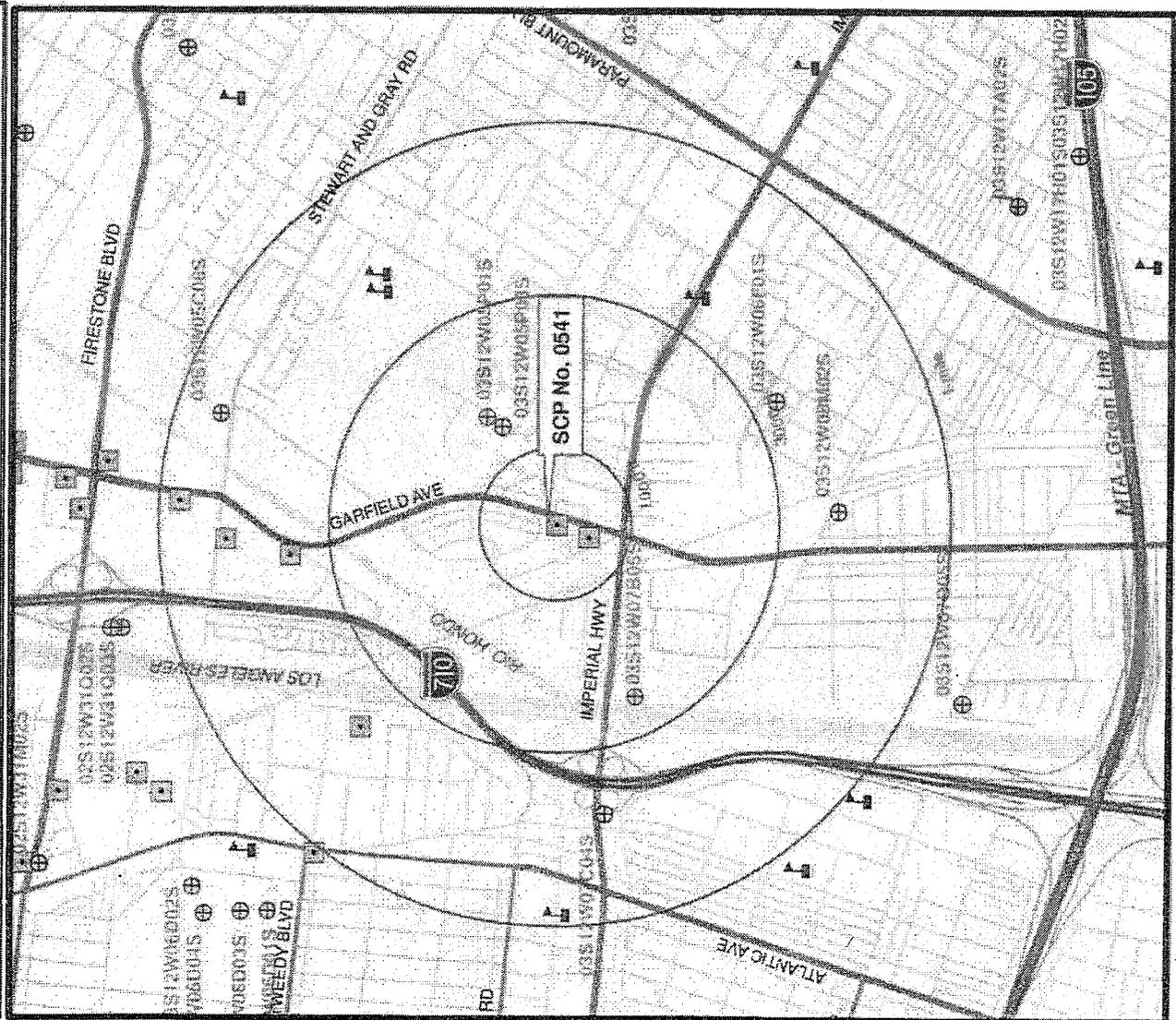
**CDM**  
 CONSULTING & DESIGN  
 1111 RAVENWOOD DRIVE, SUITE 100  
 SANTA ANA, CALIFORNIA 92705  
 TEL: (714) 952-3300  
 FAX: (714) 952-3378  
 WWW.CDM.COM

ANADITE INC.  
 10647 S. GARFIELD AVENUE, SOUTH GATE, CALIFORNIA  
 REMEDIAL DESIGN

**PROCESS FLOW DIAGRAM**

PROJECT NO. 2539-20/99  
 SHEET NO. 5-3  
**FIGURE 4**

# Site and Receptor Map

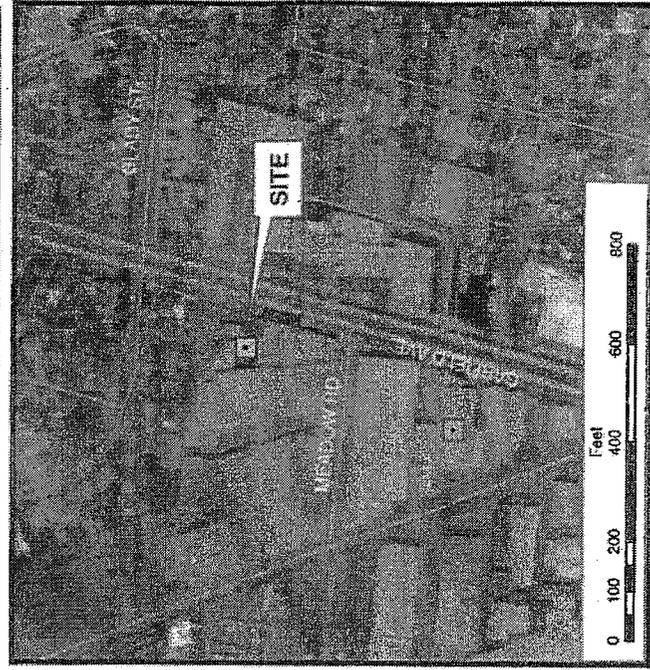
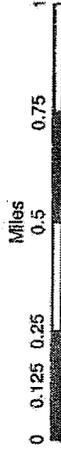


**Anadite South Gate  
10647 Garfield Avenue  
South Gate, 90280**

- Production Wells
- SCP Site
- Schools

**FIGURE 8**

Scale 1:24,000



01/06/10

STATE OF CALIFORNIA  
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LOS ANGELES REGION

MONITORING AND REPORTING PROGRAM NO. CI-8685

FOR  
ANADITE CALIFORNIA RESTORATION TRUST  
FORMER ANADITE SOUTH GATE FACILITY  
SOUTH GATE, CALIFORNIA

(FILE NO. 97-019, SCP NO. 0541)

The Discharger shall implement this monitoring and reporting program (MRP) on the effective date of this Order.

**I. GROUNDWATER MONITORING PROGRAM**

It is anticipated that injection activities will be initiated in the third quarter of 2011. Monitoring of the application of Enhanced Anaerobic Bioremediation (EAB) shall consist of samples collected from the following groundwater wells:

Group A (Treatment Area): 50-foot zone: MW-2, MW-3, MW-4, MW-5, MW-6, MW-9,  
MW-14  
80-foot zone: MW-15, MW-16, MW-22  
100-foot zone: MW-17, MW-19, MW-24  
150-foot zone: MW-30

Group B (Downgradient Area): 50-foot zone: MW-12  
80-foot zone: MW-18, MW-20, MW-26, MW-38  
100-foot zone: MW-21, MW-28, MW-29, MW-40, MW-46  
150-foot zone: MW-31, MW-32, MW-49, MW-60

Group C (Upgradient Area): 50-foot zone: MW-1, MW-7  
80-foot zone: New well (in parking lot northwest of the Facility)  
100-foot zone: New well (in parking lot northwest of the  
Facility), MW-23  
150-foot zone: New well (in parking lot northwest of the Facility)

Group D (Crossgradient Area): 50-foot zone: MW-11, MW-13  
80-foot zone: MW-25, MW-36  
100-foot zone: MW-27

Extraction Wells: Seven new clusters, each with 50, 80, and 100-foot zone wells.  
(Operating wells only) Well identification numbers to be determined.

Injection Wells: Seven new clusters, each with 50, 80, and 100-foot zone wells.  
(Operating wells only) Well identification numbers to be determined.

Figure 1 shows the location of the Facility. Groundwater monitoring wells located at the Facility and vicinity are shown in Figures 2 and 3. Groups A, B, C, and D include monitoring wells screened in the 50-foot, 80-foot, 100-foot, and 150-foot zones. Group A wells are located in the treatment area where extraction and injection wells are located. Group B wells are located in the downgradient area, group C wells are located in the upgradient area, and group D wells are located in the crossgradient direction from the extraction and injection wells.

Groundwater samples will be collected once from the Groups A, B, C, and D monitoring wells, extraction and injection wells prior to extraction and injection (baseline). Once EAB starts, groundwater samples shall be collected and analyzed in accordance with the following program.

CONSTITUENT	UNITS	TYPE OF SAMPLE	MINIMUM FREQUENCY OF ANALYSIS
Total Daily Injections	Liters or Gallons	Measurement	Per injection
Depth to Groundwater	feet below ground surface (ft bgs)	In-situ	<u>Groups A, B, C, D, extraction and injection wells: Baseline.</u> <u>Group A: Monthly for first through sixth months; Quarterly for two quarters; semi-annual thereafter</u>
Groundwater Elevation	Feet above mean sea level	Calculation	<u>Group B: Quarterly for first year, and semi-annual thereafter</u> <u>Group C: Quarterly for first year, and semi-annual thereafter</u> <u>Group D: Annually</u>
Field Parameters (dissolved Oxygen, Oxidation-Reduction Potential, pH, Temperatures, Specific Conductance, and Turbidity)	m/L, millivolts, pH units, degrees C, $\mu\text{S/cm}$ , and NTU, respectively	Grab	<u>Groups A, B, C, D, extraction and injection wells: Baseline.</u> <u>Group A: Monthly for first through sixth months; Quarterly for two quarters; semi-annual thereafter</u> <u>Group B: Quarterly for first year, and semi-annual thereafter</u> <u>Group C: Quarterly for first year, and semi-annual thereafter</u> <u>Group D: Annually</u>
1,4-Dioxane	micrograms per liter ( $\mu\text{g/L}$ )	Grab	<u>Groups A, B, C, D, extraction and injection wells: Baseline and annually for selected wells based on annual plume-wide sampling results</u>
Volatile Organic Compounds	$\mu\text{g/L}$	Grab	<u>Groups A, B, C, D, extraction and injection wells: Baseline</u> <u>Group A: Monthly for first through sixth months; Quarterly for two quarters; semi-annual thereafter</u> <u>Group B: Quarterly for first year, and semi-annual thereafter</u> <u>Group C: Quarterly for first year, and semi-annual thereafter</u> <u>Group D: Annually</u> Extraction wells: Annually
Dissolved Hydrogen Gases: Ethane, ethene, methane	$\mu\text{g/L}$	Grab	<u>Groups A, B, C, D, extraction and injection wells: Baseline</u> <u>Group A: Monthly for first through sixth months; Quarterly for two quarters; semi-annual thereafter</u> <u>Group B: Quarterly for first year, and semi-annual thereafter</u> <u>Group C: Quarterly for first year, and semi-annual thereafter</u> <u>Group D: Annually</u> Extraction wells: Annually

Total Organic Carbon	µg/L	Grab	Groups A, B, C, D, extraction and injection wells: Baseline <u>Group A:</u> Monthly for first through sixth months; Quarterly for two quarters; semi-annual thereafter <u>Group B:</u> Quarterly for first year, and semi-annual thereafter <u>Group C:</u> Quarterly for first year, and semi-annual thereafter <u>Group D:</u> Annually
Anions: Sulfate, nitrate, nitrite, chloride)	µg/L	Grab	Groups A, B, C, D, extraction and injection wells: Baseline <u>Group A:</u> Monthly for first through sixth months; Quarterly for two quarters; semi-annual thereafter <u>Group B:</u> Quarterly for first year, and semi-annual thereafter <u>Group C:</u> Quarterly for first year, and semi-annual thereafter <u>Group D:</u> Annually
Alkalinity	µg/L	Grab	Groups A, B, C, D, extraction and injection wells: Baseline <u>Group A:</u> Monthly for first through sixth months; Quarterly for two quarters; semi-annual thereafter <u>Group B:</u> Quarterly for first year, and semi-annual thereafter <u>Group C:</u> Quarterly for first year, and semi-annual thereafter <u>Group D:</u> Annually Extraction wells: Annually
Volatile Fatty Acids	µg/L	Grab	Groups A, B, C, D, extraction and injection wells: Baseline <u>Group A:</u> Monthly for first through sixth months; Quarterly for two quarters; semi-annual thereafter <u>Group B:</u> Quarterly for first year, and semi-annual thereafter <u>Group C:</u> Quarterly for first year, and semi-annual thereafter <u>Group D:</u> Annually
Bacterial DNA analysis*	gene copies/mL	Grab	Groups A, B, C, D, extraction and injection wells: Baseline <u>Group A:</u> Monthly for first through sixth months; Quarterly for two quarters; semi-annual thereafter <u>Group B:</u> Quarterly for first year, and semi-annual thereafter <u>Group C:</u> Quarterly for first year, and semi-annual thereafter <u>Group D:</u> Annually
Total Dissolved Solids	µg/L	Grab	Groups A, B, C, D, extraction and injection wells: Baseline <u>Group A:</u> Monthly for first through sixth months; Quarterly for two quarters; semi-annual thereafter <u>Group B:</u> Quarterly for first year, and semi-annual thereafter <u>Group C:</u> Quarterly for first year, and semi-annual thereafter <u>Group D:</u> Annually

Notes:

\* Bacterial DNA Analysis = Quantitative Polymerase Chain Reaction (qPCR) test for Dehalococcoides bacteria and functional analyses for the three reductase (RDase) genes – tceA (TCE RDase), vcrA, and bvcA (BAVI RDase)

**II. AMENDMENT INJECTION REPORTING REQUIREMENTS**

The EAB monitoring reports shall contain the following information regarding injection activities:

- a. Depth of injection points/zones;
- b. Quantity and concentration of amendment injected and dates injected; and
- c. Total amount of amendment injected during the reporting period and to date.

### III. GROUNDWATER MONITORING REPORTING REQUIREMENTS

All groundwater monitoring reports must include, at a minimum, the following:

- a. Well identification, date and time of sampling;
- b. Sampler identification and laboratory identification; and
- c. Routine observation of groundwater elevation levels, recorded to 0.01 feet above mean sea level (ft amsl) and groundwater flow direction.

The Discharger is required to submit an installation report 45 days following the installation of the extraction and injection wells. Subsequent MRP reports shall include data collected during the baseline, monthly, quarterly, semi-annual, and annual sampling events. The groundwater monitoring wells shall be gauged and sampled as outlined in Section I, and results shall be reported to the California Regional Water Quality Control Board, Los Angeles Region (Regional Board) under the MRP for the Individual Waste Discharge Requirements according to the following schedule. Any future changes in the injections, sampling, and reporting schedule will be provided in a revised MRP approved by the Regional Board.

Reporting Period	Sampling Period	Report Due Date
Baseline	Prior to extraction and injection	February 1, 2012 (including in the first quarterly report)
Monthly (1 <sup>st</sup> , 2 <sup>nd</sup> , 3 <sup>rd</sup> , 4 <sup>th</sup> , 5 <sup>th</sup> , 6 <sup>th</sup> ) and Quarterly for two quarters	The first through sixth months, and following up with two quarters	February 1, 2012, May 1, 2012, August 1, 2012 and November 1, 2012
Semi-annual (from the 2 <sup>nd</sup> year onwards)	Fifth month every six-month	May 1 and November 1 each year beginning in 2013
Annual (from the 2 <sup>nd</sup> year onwards)	Eleventh month every 12-month	May 1 each year beginning in 2013
Final Report	Active remediation period	To be determined

The Discharger shall submit reports detailing the results of the remediation. The reports should include a discussion of the use of electron donor and bioaugmentation culture to treat VOC-contaminated groundwater at and in the vicinity of the site.

If there is no discharge or injection during the reporting period, the report shall so state. Groundwater monitoring reports must be addressed to the Regional Board, Attention: Information Technology Unit.

Whenever wastes associated with the discharge under this Order, are transported to a different disposal site, the following shall be reported in the monitoring report: type and quantity of wastes; name and address of the hauler (or method of transport if other than by hauling); and location of the final point(s) of disposal.

#### IV. CERTIFICATION STATEMENT

Each report shall contain the following completed declaration:

"I certify under penalty of law that this document, including all attachments and supplemental information, was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

Executed on the \_\_\_\_\_ day of \_\_\_\_\_ at \_\_\_\_\_.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Title)

#### V. MONITORING FREQUENCIES

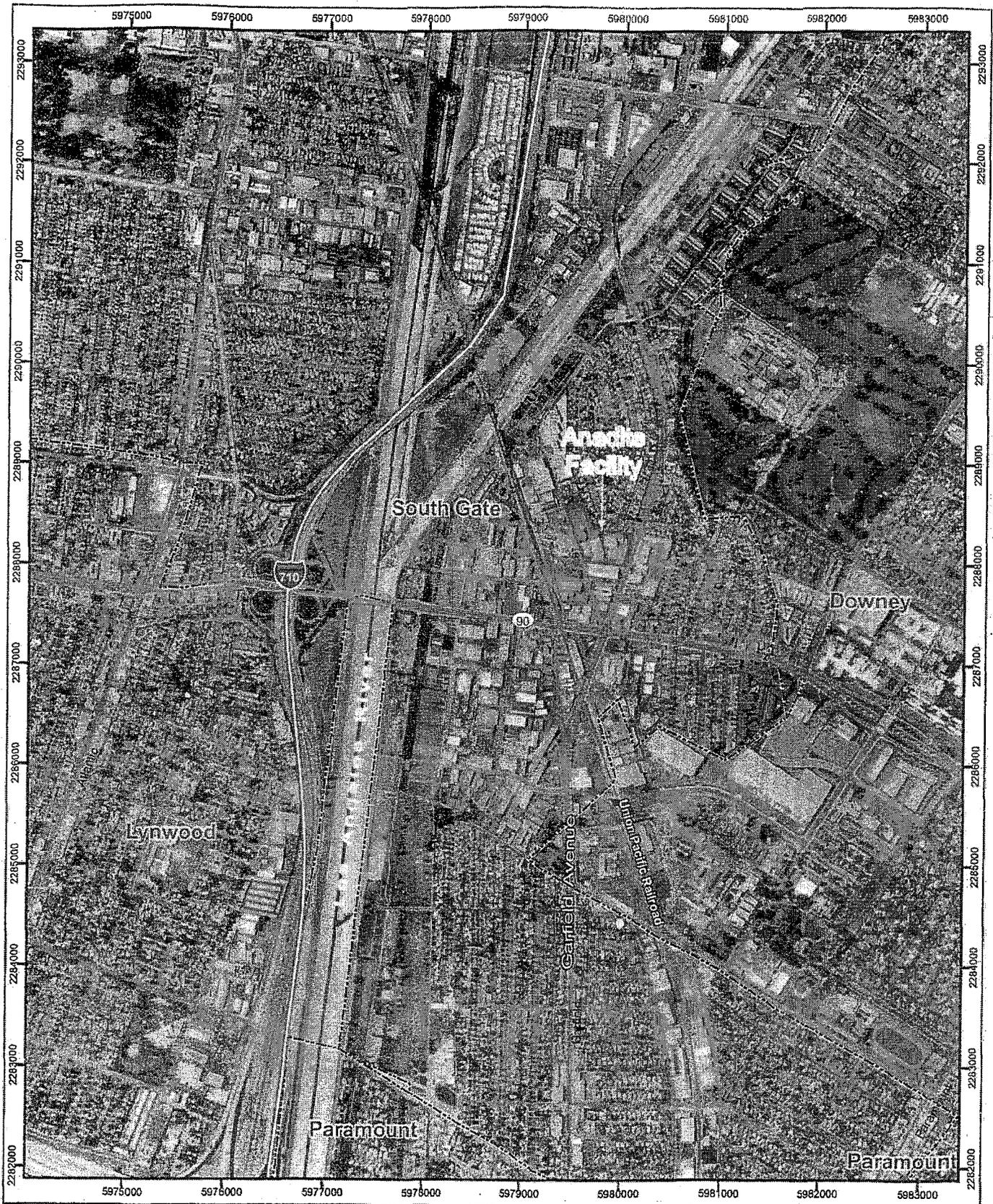
Specifications in this monitoring program are subject to periodic revisions. Monitoring requirements may be modified or revised by the Executive Officer based on review of monitoring data submitted pursuant to this Order. Monitoring frequencies may be adjusted to a less frequent basis or parameters and locations dropped by the Executive Officer if the Discharger makes a request and the request is backed by statistical trends of monitoring data submitted.

#### VI. PUBLIC DOCUMENTS

All records and reports submitted in compliance with this Order are public documents and shall be made available for inspection during normal business hours at the office of the California Regional Water Quality Control Board, Los Angeles Region, upon request by interested parties. Only proprietary information, and only at the request of the Discharger will be treated as confidential.

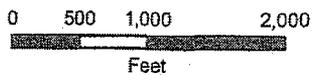
Ordered by: Samuel Unger  
Samuel Unger, PE  
Executive Officer

Date: February 3, 2011



**Legend**

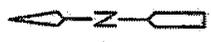
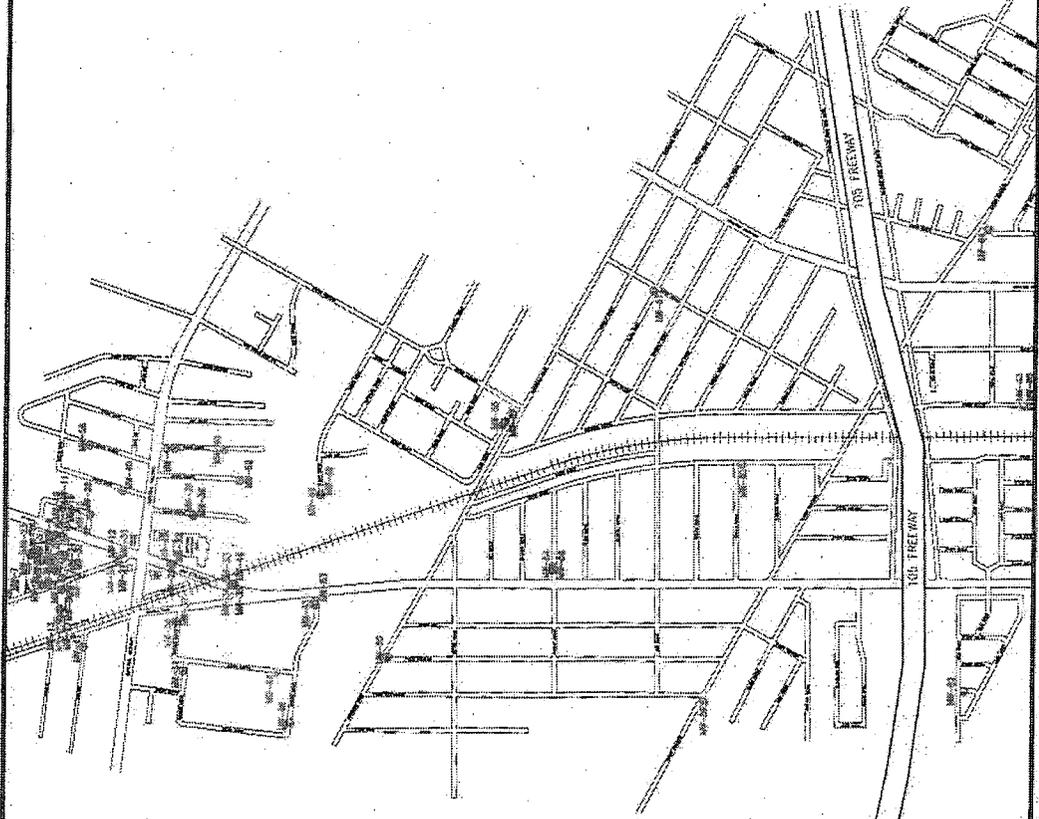
-  City Boundary
-  Facility Boundary



**Former Anadite Inc., Facility**  
**10647 Garfield Avenue**  
**South Gate, California**

**Figure 1**  
**Site Vicinity Map**





**LEGEND**

- MW-12 50-FOOT ZONE MONITORING WELL LOCATION AND DESIGNATION
- MW-49 80-FOOT ZONE MONITORING WELL LOCATION AND DESIGNATION
- MW-24 100-FOOT ZONE MONITORING WELL LOCATION AND DESIGNATION
- MW-35 150-FOOT ZONE MONITORING WELL LOCATION AND DESIGNATION
- MW-35 200-FOOT ZONE MONITORING WELL LOCATION AND DESIGNATION

**NOTES**

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. THIS FIGURE REPRESENTS ONE INTERPRETATION OF THE DATA. OTHER INTERPRETATIONS ARE POSSIBLE.

ANADITE, INC.  
10547 S. GARFIELD AVE., SOUTH GATE, CALIFORNIA

**Site Plan Showing  
Monitoring Well Locations**

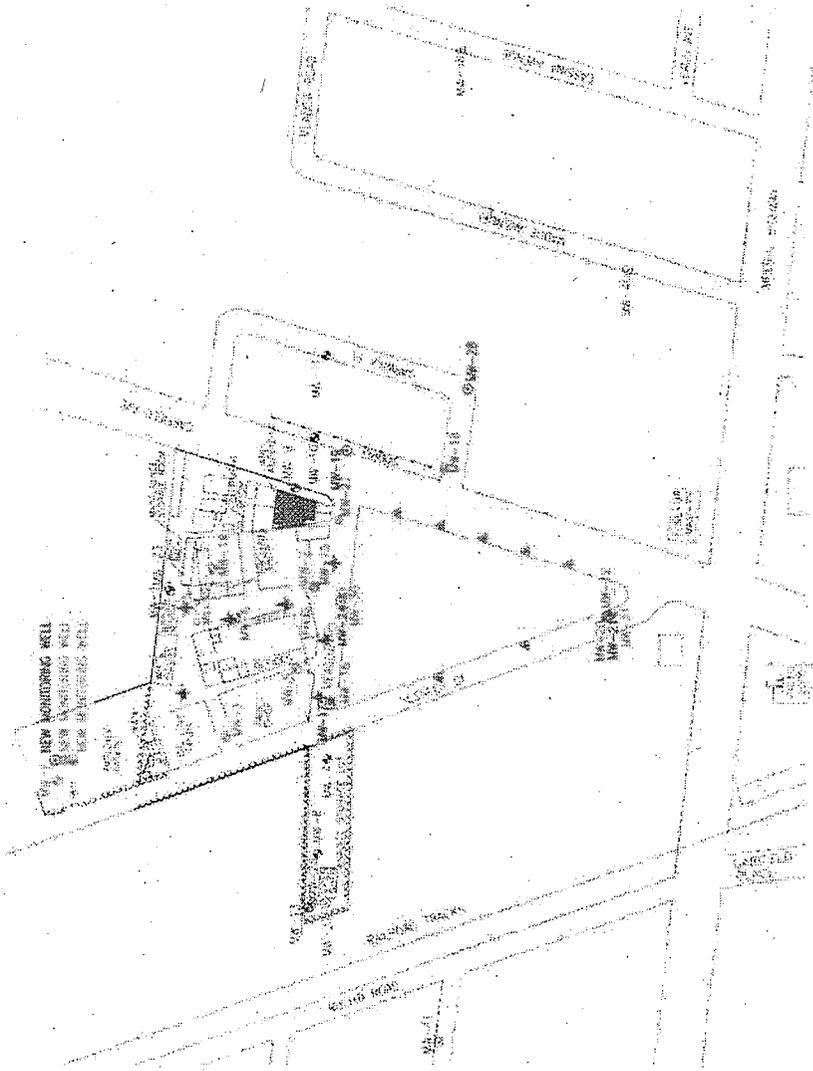
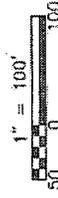
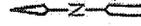
Figure 1-2



- NOTES:
1. SITE LOCATIONS OF REMEDIAL ACTION COMPONENTS ARE APPROXIMATE AND WILL BE FIELD VERIFIED TO ACCOUNT FOR SITE UTILITIES AND OTHER OBSTRUCTIONS AND CONFLICTS.
  2. GRAYED-BACK WELLS WILL NOT BE USED FOR WDR MONITORING DURING FAB.

LEGEND:

- ▲ EXTRACTION WELL CLUSTER (50, 80, AND 100 FT ZONES)
- ★ INJECTION WELL CLUSTER (50, 80, AND 100 FT ZONES)
- ④ 50-FT ZONE MONITORING WELL AND DESIGNATION
- ④ 80-FT ZONE MONITORING WELL AND DESIGNATION
- ④ 100-FT ZONE MONITORING WELL AND DESIGNATION
- ④ 150-FT ZONE MONITORING WELL AND DESIGNATION
- TREATMENT SYSTEM LOCATION



ANACOSTIA, INC.  
10647 S. GARFIELD AVE., SOUTH GATE, CALIFORNIA

**WDR Monitoring Well  
Location Plan For EAB**

