Corrective Action Plan Conceptual Remedial Design
Former Cox Cadillac Site
230 Bay Place
Oakland, CA

September, 1996

Prepared by

Subsurface Consultants, Inc.
3736 Mt. Diablo Blvd., Suite 200
Lafayette, CA 94549

and

EOA, Inc.
1410 Jackson St.
Oakland, CA 94612

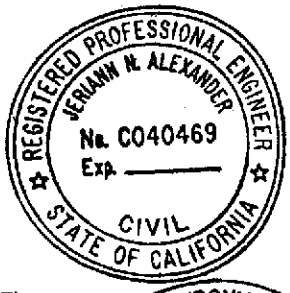
CORRECTIVE ACTION PLAN
CONCEPTUAL REMEDIAL DESIGN
FORMER COX CADILLAC SITE
230 BAY PLACE
OAKLAND, CALIFORNIA
SCI 805.010

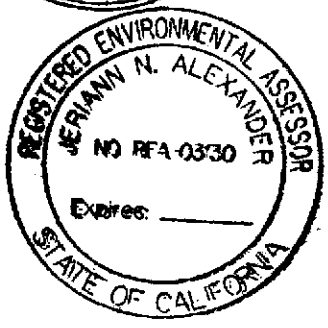
By:

Samuel C. Won
Project Engineer

Jeriann N. Alexander
Civil Engineer 40469 (exp. 3/31/99)
Registered Environmental Assessor 03130 (exp. 6/30/97)

Subsurface Consultants, Inc.
3736 Mount Diablo Boulevard, Suite 200
Lafayette, California 94549
September 5, 1996





DRAFT

CORRECTIVE ACTION PLAN
CONCEPTUAL REMEDIAL DESIGN
FORMER COX CADILLAC SITE
230 BAY PLACE
OAKLAND, CALIFORNIA

STID 494

By:

_____

Samuel C. Won
Project Engineer

_____

Jeriann N. Alexander
Civil Engineer 40469 (exp. 3/31/99)
Registered Environmental Assessor 03130 (exp. 6/30/97)

Subsurface Consultants, Inc.
171 - 12th Street, Suite 201
Oakland, California 94607
(510) 268-0461

September 5, 1996

EOA, Inc.

Eisenberg, Olivieri, & Associates
Environmental and Public Health Engineering

September 6, 1996

Mr. Dale Klettke
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, #250
Alameda, CA 94502-6577

Re: 230 Bay Place, Oakland, CA - Transmittal of CAP Conceptual Remedial Design.

Dear Mr. Klettke:

Enclosed is the Corrective Action Plan - Conceptual Remedial Design for the former Cox Cadillac Site at 230 Bay Place in Oakland. Mr. Cox is out of the country through the end of September. In order to maintain the schedule proposed in his last submittal, he asked that we submit this section as a draft. He is reviewing this draft concurrently with the County's review. When any comments are received and addressed, this section and the cost-effectiveness section will be finalized to complete the Corrective Action Plan Report.

It is our understanding that this CAP report will be submitted to the UST Fund for pre-approval. Mr. Chris Stevens of the UST Fund staff indicated that he would assist Mr. Cox with this pre-approval process, including assistance in obtaining bids or cost estimates and confirming cost-effectiveness based on the actual determined costs.

I will be following up with you by phone to discuss this letter and to determine whether we need to have another meeting after Mr. Cox returns. In the interim, if you have any questions, or wish to discuss this letter, please don't hesitate to call me.

Sincerely,
EOA, Inc.

Don M. Eisenberg, Ph.D., P.E.
Principal Engineer

Attachments:
1) Conceptual Remedial Design

cc: Bill Cox
Bob Cross
Rory Campbell
Andy Briefer
Kevin Graves
Gil Jensen (letter only)

96 SEP 10 AM 10:07
ENVIRONMENTAL PROTECTION

1410 Jackson Street • Oakland, CA 94612 • (510) 832-2852 • Fax 832-2856

SITE DESCRIPTION

The Cox Cadillac site is located at 230 Bay Place, Oakland, California. The site consists of approximately 2 acres of land bounded by Harrison Street to the northwest, Bay Street to the southwest and Vernon Street to the southeast. The northeastern site boundary abuts a steep embankment that is partially supported by a retaining wall. Single- and multiple-unit residential buildings are located on the hillside above the site. The property contains a single, large building, constructed sometime prior to 1903. The remainder of the site consists of two paved areas used for storage and for parking automobiles. The site plan is presented on Plate 2.

SITE BACKGROUND

A 10,000-gallon underground storage tank (UST) was used from 1980 until mid-1993 by Cox Cadillac to store unleaded gasoline. A 3,000-gallon UST (referred to as the waste oil tank) was removed in December 1988. In March 1993, petroleum hydrocarbons and traces of 1,2-dichloroethane (DCA) were detected in a monitoring well which was installed in response to a 1989 request by the Alameda County Health Care Services Agency (County) to investigate groundwater impacts from the observed 3,000-gallon tank release. The monitoring well was installed in response to a leak that had been detected in an underground tank that had previously been excavated from an adjacent, upgradient location. Additional sampling carried out in October 1993 from shallow temporary wells in the vicinity confirmed that hydrocarbons were present in groundwater extending at least as far as the property boundary.

The 10,000-gallon fuel tank was excavated to determine whether hydrocarbons detected in the monitoring wells were originating from this tank and/or associated piping or, if not, from the 3,000-gallon UST or other unknown sources. Use of the tank was discontinued, and on January 26, 1994, the tank and associated piping were removed and excavated soils were stockpiled. The tank was found to be in good condition, but a corrosion hole was observed in a joint in the galvanized steel vacuum line between the tank and the dispenser. Hydrocarbons were observed in soil at the trench bottom and walls, between the leak location and the tank excavation. Hydrocarbons were also observed in groundwater which entered the tank excavation, and in the tank excavation sidewalls below what appeared to be the highest seasonal groundwater elevation.

The possibility of a subsurface wall exists in the vicinity of the former fuel tank and waste oil tank areas. During excavation of the 10,000-gallon fuel tank, considerable amount of concrete debris, and at least one subsurface brick wall was observed at the north end of the excavation. A search of historical records indicate that a former swimming pool structure was located below the present ground surface in the immediate area of the USTs. It appeared that the former waste oil tank and the former dispenser locations were within the perimeter of the pool structure. Observations made during the tank excavation indicate that at least part of the 9 ft. high concrete walls of the pool are still present beneath the surface.

After further excavation of the pipe trench soils, confirmation soil sampling of the excavation walls indicated that some hydrocarbons were still present in remaining soils. In a letter dated January 9, 1996, the County required that a Corrective Action Plan (CAP) be prepared and

implemented. The purpose of the CAP is to develop additional information about subsurface conditions, carry out a screening level risk assessment, carry out biotreatability testing to determine biodegradation activity and nutrient characteristics of groundwater, and evaluate remedial alternatives for decreasing the benzene concentration in groundwater. Excavation areas are presented on Plate 1.

The first phase of the CAP was submitted to the County in April 1996. The second phase includes: 1) the evaluation of remedial alternatives which was submitted to the County in July 1996, and 2) this scope of work which describes the remediation activities selected for implementation at this site.

GROUNDWATER SETTING

Depth to groundwater at the site is shallow, and ranges from 1.87 to 6.45 feet below ground surface (bgs). The general direction of groundwater flow is in a southwesterly direction. Groundwater beneath the site is not tidally influenced.

EXTENT OF SOIL CONTAMINATION

Waste Oil Tank Area

In 1988, during the 3,000-gallon tank removal, a soil sample was collected from the excavation. Analytical data was inconclusive as to the presence of petroleum hydrocarbon compounds. In March 1989, at the request of the County, the tank area was re-excavated and a soil sample was collected from the excavation. Results of the analysis indicated the presence of gasoline and diesel range petroleum hydrocarbons at concentrations of 45 milligrams per kilogram (mg/kg) and 150 mg/kg, respectively, at a depth of 8 feet bgs. Benzene was not detected in the soil sample at the time of this investigation.[1]

Fuel Tank Area

Data collected from soil sampling investigations indicate that total volatile hydrocarbons (TVH) in soil is limited to the area adjacent to and downgradient from the former fuel tank piping including the former tank excavation area. The depth of impacted soils is dependent on groundwater fluctuations. Virtually all remaining hydrocarbon pollution in soil is located at depths of 4 to 6 feet bgs, within the "smear" zone. Benzene concentrations in soil remaining after excavation of the former tank location vary from less than 0.0016 mg/kg to 0.04 mg/kg. The area with relatively high benzene concentrations in soil is limited to the immediate vicinity of the former piping leak (3.1 mg/kg to 7.1 mg/kg benzene).

[1] PES Environmental, Inc., Report of Soil and Groundwater Investigation, Bill Cox Cadillac, December 23, 1993

EXTENT OF GROUNDWATER CONTAMINATION

Historical results indicate that benzene in groundwater is at its highest concentration in the vicinity of MW-1, TW-6, and TW-7. Data from the February 1996 event shows that benzene was present in monitoring well MW-1, upgradient from the former dispenser line and downgradient from the former waste oil tank location, at a concentration of 4.8 milligrams per liter (mg/L). Groundwater samples collected from temporary wells TW-6 and TW-7, downgradient of the former waste oil tank and cross-gradient to former 10,000-gallon fuel tank, contained benzene at concentrations of 13 mg/L and 50 mg/L, respectively. Monitoring well locations are presented on Plate 2.

FEASIBILITY STUDY

In a letter dated June 25, 1996, a request was made by the County to evaluate remedial alternatives of reducing benzene and TVH in the saturated and unsaturated zone at the subject site. In response, a technology screening study was conducted to assess the feasibility and cost-effectiveness of the following remedial alternatives: no action, excavation, vapor extraction, active in-situ bioremediation, passive in-situ bioremediation, bioaugmentation, bioventing, dual-phase extraction, bioslurping, and air sparging/biosparging.

The results of the technology screening indicates that a combination of technologies presents the most effective alternative in remediating hydrocarbon impacted soil and groundwater at the site. For soil remediation in the unsaturated zone, the most effective and cost-effective approach involves additional excavation at the former piping leak area and portions of the former UST excavation. Active in-situ bioremediation would be the most effective and cost-effective alternative to remediate impacted groundwater and soils within the "smear" zone. Active in-situ bioremediation would require additional testing to evaluate hydraulic conditions at the site and to develop final design parameters.

The concept of implementing some type of short-term (interim) measure to enhance insitu bioremediation by introducing bacteria, nutrients and/or dissolved oxygen was also evaluated. Based on the site conditions and in consultation with specialty contractors, it was determined that the site would not benefit significantly from occasional introduction of bacteria and nutrients into the existing monitoring wells. However, benefit may result from the introduction of an oxygen releasing compound (ORC) into the environment.

Following their review of the feasibility study, the County concurred that remedial actions should at a minimum consist of additional removal of source material. In addition, interim measures involving the introduction of ORC and monitoring its effectiveness should be implemented.

PROPOSED CORRECTIVE ACTION

In general, the proposed corrective action is an integrated approach that includes 1) excavation to remove source material, and 2) enhanced in-situ bioremediation using ORC. The goal of remediation will be to effectively reduce benzene concentrations in both soil and groundwater.

Excavation will involve removing impacted soil within the area of the former 10,000-gallon gasoline UST, its associated distribution piping and at its former dispenser, and the former 3,000-gallon waste oil UST. A preliminary plan showing the extent of excavation is presented on Plate 1. The progress of excavation will be monitored in the field using several techniques including visual and olfactory senses, organic vapor meters (OVM) and a mobile laboratory. Excavation will be performed within the delineated area to the groundwater surface, which varies at the site up to depths of 4 to 6 feet, but will not exceed 6 feet. Laterally, the excavation will be extended to within about 2 feet of the exterior building wall, and hence will not extend into the existing structure. Excavation will be performed inside the delineated area during this phase of work. The Contractor will assume no excavation outside the delineated area, but shall be prepared to perform additional excavation (at additional costs) beyond the delineated area under the Consultant's direction, if necessary. Additional excavation in the northeast direction toward MW-1 and the former waste oil tank may be carried out at the Consultant's direction if high benzene concentrations are detected in the excavation wall at the delineated boundary.

Excavated soil will be disposed of at an appropriate Class II or Class III landfill. Treatment of the soil prior to disposition may be required. The resulting excavation will be backfilled with imported soil and clean excavated soil, placed and compacted under engineering supervision. The work area then will be capped with asphalt concrete to match existing conditions.

Following excavation activities and most likely concurrent with soil treatment and disposal activities, a concentrated ORC mixture will be introduced into the former source area in an attempt to enhance petroleum degrading microbial growth. The ORC will be contained in a slurry which will be tremied into a grid of boreholes schematically shown on Plate 3. The ORC treatment will be implemented on a trial basis, as its effectiveness will need to be evaluated. If the ORC is shown to be effective after four quarters of groundwater monitoring, it may be expanded into other impacted areas of the site.

Various engineering and contractor services are required to implement the corrective actions outlined above. The project engineer and contractor selected for this project should possess recent relevant remedial experience. Tasks to be performed by the engineer and the contractor are outlined below. Specific details of these services are described in the attached scopes of engineering and contractor services.

Engineering Services

Review Contractor Submittals
Excavation Observation and Direction
Excavation Pit Sampling
Review Plans for Soil Sampling and Disposal
Soil and Groundwater Investigation
ORC Layout Confirmation
ORC Installation Observation
Groundwater Monitoring
Reporting

Contractor Services

Permits and Plans
Utility Clearances
Shoring
Excavation Activities
Soil Treatment and Disposal
Backfill Placement
ORC Layout
ORC Grid Construction
Site Restoration

SCOPE OF ENGINEERING SERVICES
CORRECTIVE REMEDIAL ACTIONS
FORMER COX CADILLAC FACILITY
OAKLAND, CALIFORNIA

EXCAVATION AND INVESTIGATION ACTIONS

- ***Review Contractor Submittals***

The Consultant shall review Contractor submittals for performing site activities. This will entail a review of all permits, plans and procedures to check them for conformance with the project goals. Types of submittals would include, but not necessarily be limited to, site specific health and safety plan, BAAQMD permit, project phasing plans, and analytical data. Consultant should review the methodologies, cost effectiveness and timing of the soil excavation and treatment plans. The Consultant will immediately notify the Client of any inconsistencies.

- ***Excavation Observation and Direction***

The Consultant shall direct excavation activities using visual and olfactory sense, organic vapor meters (OVM) and the services of a mobile laboratory. The Consultant shall collect random soil samples for headspace analyses and for testing by a California Environmental Protection Agency certified mobile laboratory to determine the limits of excavation and to assist in the segregation of materials. The number of random samples collected should equal the number of samples that the mobile laboratory can analyze per day of excavation. The samples should be analyzed for total volatile hydrocarbons (TVH) as gasoline and benzene, toluene, ethylbenzene, and total xylenes (BTEX).

The Consultant shall observe backfill placement and compaction. If necessary, the Consultant shall retain the services of a qualified geotechnical engineer to check the degree of compaction.

- ***Excavation Pit Sampling***

Following completion of excavation activities, the Consultant shall collect a minimum of 4 soil samples from the bottom, 10 soil samples from the sidewalls of the excavation and one groundwater sample from the excavation to verify source removal. Upon completion of sampling, the Consultant shall submit all samples to the mobile laboratory for TVH and BTEX analysis.

- ***Review Plans for Soil Sampling and Disposal***

The Consultant shall review the Contractor's plans and procedures for soil sampling and treatment or disposal of impacted soil generated during excavation. The Consultant shall review soil stockpile sampling locations and analytical data generated from this profiling activity. The Consultant shall evaluate and comment on the Contractor's preferred treatment or disposal

option. Upon acceptance, the Consultant shall give approval to the Contractor for proceeding with the selected treatment or disposal option.

- ***Soil and Groundwater Investigation***

The Consultant shall perform an investigation to further define the extent of soil and groundwater contamination under the building. The investigation shall include conducting soil and groundwater sampling at four locations within the existing building as shown on Plate 2. The Consultant shall obtain necessary permits to perform the investigation. Two soil borings shall be placed approximately 20 feet and 40 feet northwest of the former tank excavation within the southern portion of the former sales room area. The other soil borings shall be placed approximately 10 feet apart, 20 feet north of the former dispenser within the former indoor service area of the building. Soil samples shall be frequently obtained from the borings.

A temporary well shall be installed in one boring located in the former indoor service area to facilitate the collection of grab groundwater samples. One soil boring in the former sales room shall be converted to a permanent groundwater monitoring well. The Consultant shall develop and sample the new monitoring well and the temporary well.

One selected soil sample from soil/groundwater interface and the groundwater samples shall be submitted to a DHS certified laboratory for TVH and BTEX analysis. In addition, groundwater samples should be analyzed to obtain pH and the content of dissolved oxygen, dissolved carbon dioxide, and nitrogen.

- ***Reporting***

The Consultant shall prepare a report summarizing source removal activities and the results of the additional soil and groundwater investigation. The report shall include a site plan showing soil boring locations, the limits of excavation, a summary of field activities, a description of conditions encountered during drilling, and an evaluation of the extent of impacts to soil and groundwater.

ORC TREATMENT ACTIONS

- ***ORC Layout***

A preliminary plan for the installation of the ORC grid is presented in Plate 3. As shown, the ORC grid consists of 11 geoprobe type boreholes spaced at 8 feet on center within the backfilled excavation. The borings shall be completed to a depth of 12 feet bgs. An ORC slurry shall be delivered under pressure into each borehole until filled to the near surface. Cement grout will be placed into each borehole to provide a surface seal.

Suppliers of ORC compounds indicate that as a rule of thumb approximately 3 pounds of ORC should be sufficient to inoculate 1 pound of hydrocarbon mass. Hence, it has been assumed that

approximately 57 pounds of ORC and 6 pounds of water should be introduced into each borehole.

The Consultant in consultation with the Contractor and any pertinent subcontractors shall check the rationale and layout of the ORC grid presented herein. If necessary, for technical reasons or cost effectiveness, the Consultant shall propose modifications to the Client. If the Client is in agreement with the proposed modifications, then the Consultant shall negotiate desired modifications with the County.

- ***ORC Installation Observation***

The Consultant shall sample and log the ORC grid borings. Soil samples shall be screened using an OVM to detect the presence of organic vapors. The Consultant shall observe and document the placement of the ORC slurry into the boreholes. A report summarizing field activities shall be prepared by the Consultant.

- ***Groundwater Monitoring***

Approximately three months following installation of the ORC grid, the Consultant shall conduct groundwater sampling of all monitoring and temporary wells on-site. Groundwater samples collected shall be submitted to a DHS certified laboratory for TVH, BTEX, pH, and dissolved oxygen analyses. The Consultant shall prepare a report summarizing results of the groundwater monitoring event. The Consultant shall continue groundwater monitoring on a quarterly basis for one year. The Consultant shall include engineering consultation regarding the effectiveness of the grid with each monitoring letter.

SCOPE OF CONTRACTOR SERVICES
CORRECTIVE REMEDIAL ACTIONS
FORMER COX CADILLAC FACILITY
OAKLAND, CALIFORNIA

EXCAVATION ACTIONS

- ***Permits and Plans***

The Contractor shall obtain all necessary permits from, but not necessarily limited to, the City of Oakland, Alameda County and BAAQMD to conduct excavation and soil treatment activities. The Contractor shall submit copies of all permits to the Consultant for their approval prior to submitting to the requiring agency.

The Contractor shall prepare and submit to the Consultant a site specific health and safety plan, a project phasing plan, and a plan which indicates their excavation procedures. The Contractor will implement the plans upon written approval of the Consultant.

- ***Utility Clearances***

The Contractor shall obtain and review all available information on the locations of buried active and abandoned utilities. The Contractor shall notify Underground Services Alert (USA) and provide adequate time for utility marking. The Contractor shall use a utility locating service to mark possible utility lines within the site boundaries.

- ***Shoring***

The Contractor shall obtain the services of a registered Structural Engineer to evaluate the excavation setback (2 feet) and/or the necessity for shoring the foundation of the building during excavation. If shoring is necessary, the Contractor shall either prepare or retain the Structural Engineer to prepare shoring plans. The plans shall be stamped by a registered Structural Engineer and submitted to a qualified Geotechnical Engineer for their review and comment.

The Contractor shall utilize appropriate methods of shoring and bracing, in accordance with all applicable OSHA regulations where required. All applicable Federal, State, and local regulations shall be met prior to personnel entering the excavation. The Contractor shall take all necessary steps to ensure the safety of personnel.

- ***Excavation Activities***

The Contractor shall mobilize all necessary excavation equipment and materials. The Contractor shall excavate within the delineated boundaries to remove soil within the "smear" zone. The "smear" zone shall be defined as the soil zone between the highest and lowest seasonal groundwater elevation. The Contractor shall perform excavation with care as not to exceed the delineated boundary of excavation or beyond the "smear" zone unless otherwise authorized by the Consultant's Project Manager. With the assistance of the Consultant, the Contractor shall segregate impacted and non-impacted soil excavated from the site. No excavated material shall be deposited closer than 5 feet from the edge of the excavation. Impacted soil stored at the site shall be covered with plastic sheeting and anchored with weights. Non-impacted soil shall be analyzed to confirm that it is suitable for reuse in the excavation. Non-impacted soil shall be free of debris, vegetation, and other deleterious materials prior to being reused on-site.

- ***Soil Treatment and Disposal***

The Contractor shall propose treatment and disposal options for the impacted soil. Depending on the length of time required, the Contractor may consider using available space on-site for treatment. The Contractor shall submit plans and procedures to the Consultant for review. The Contractor shall implement treatment and disposal upon receiving approval from the Consultant.

The Contractor shall be responsible for soil characterization sampling activities. The Contractor shall submit results of the soil characterization sampling activities for review and approval. The Contractor shall be responsible for coordinating and providing transport and disposal services. Impacted soil transported off-site shall be properly manifested.

- ***Backfill Placement***

The Contractor shall backfill the excavation with imported fill and/or acceptable on-site fill materials. Fill shall be free of rocks in excess of 2 inches, vegetation, debris, toxic substances, and other deleterious materials. A sample of the fill materials shall be submitted to a qualified Geotechnical Engineer for their review and comment prior to use at the site. Fill shall be placed in 6 to 12 inch maximum compacted lifts. Each lift shall be compacted to a minimum density of 90 percent of the maximum laboratory dry density as determined by ASTM D1557. The upper 6 inches of fill placed within pavement areas shall be compacted to a minimum of 95 percent of the maximum dry density. All lifts shall be placed and compacted at -3 to +3 percent of the optimum moisture content (ASTM D1557). The Contractor shall have concurrence by a qualified geotechnical engineer that the fill has been placed and compacted in general accordance with the specifications.

- ***Site Restoration***

Upon completion of excavation activities, the Contractor shall restore site features to their original condition prior to construction. The backfill shall be graded to allow the placement of an asphalt concrete cap to match existing conditions.

All debris and waste materials generated during excavation shall be collected and transported to appropriate disposal facilities.

ORC TREATMENT ACTIONS

- ***ORC Layout***

A preliminary plan for the installation of the ORC grid is presented in Plate 3. As shown, the ORC grid consists of 11 geoprobe type boreholes spaced at 8 feet on center within the backfilled excavation. The borings shall be completed to a depth of 12 feet bgs. An ORC slurry shall be delivered under pressure into each borehole until filled to the near surface. Cement grout will be placed into each borehole to provide a surface seal.

Suppliers of ORC compounds indicate that as a rule of thumb approximately 3 pounds of ORC should be sufficient to inoculate 1 pound of hydrocarbon mass. Hence, it has been assumed that approximately 57 pounds of ORC and 6 pounds of water should be introduced into each borehole.

The Contractor shall review and discuss the ORC plan with the Consultant. The Contractor shall retain an ORC vendor and experienced installation contractor to verify the accuracy of the plan and the quantities proposed. The Contractor shall present to the Consultant a list of the subcontractors proposed for this phase of the work.

- ***ORC Grid Construction***

Upon completion of excavation and backfilling activities, the Contractor shall mobilize all drilling, mixing, and delivery equipment in preparation for ORC installation. Boreholes shall be cored using direct push technology (DTP) equipment. The Contractor shall inject the ORC slurry into each borehole under a pressure of 60 to 120 pounds per square inch (psi). Following delivery of the ORC slurry, the Contractor shall top off each borehole with cement grout in order to seal the boreholes.

- ***Site Restoration***

Upon completion of ORC installation activities, the Contractor shall restore site features to their original conditions prior to construction. All miscellaneous debris generated during ORC installation shall be transported off-site for disposal by the Contractor.

List of Illustration:

Plate 1 - Proposed Excavation Plan

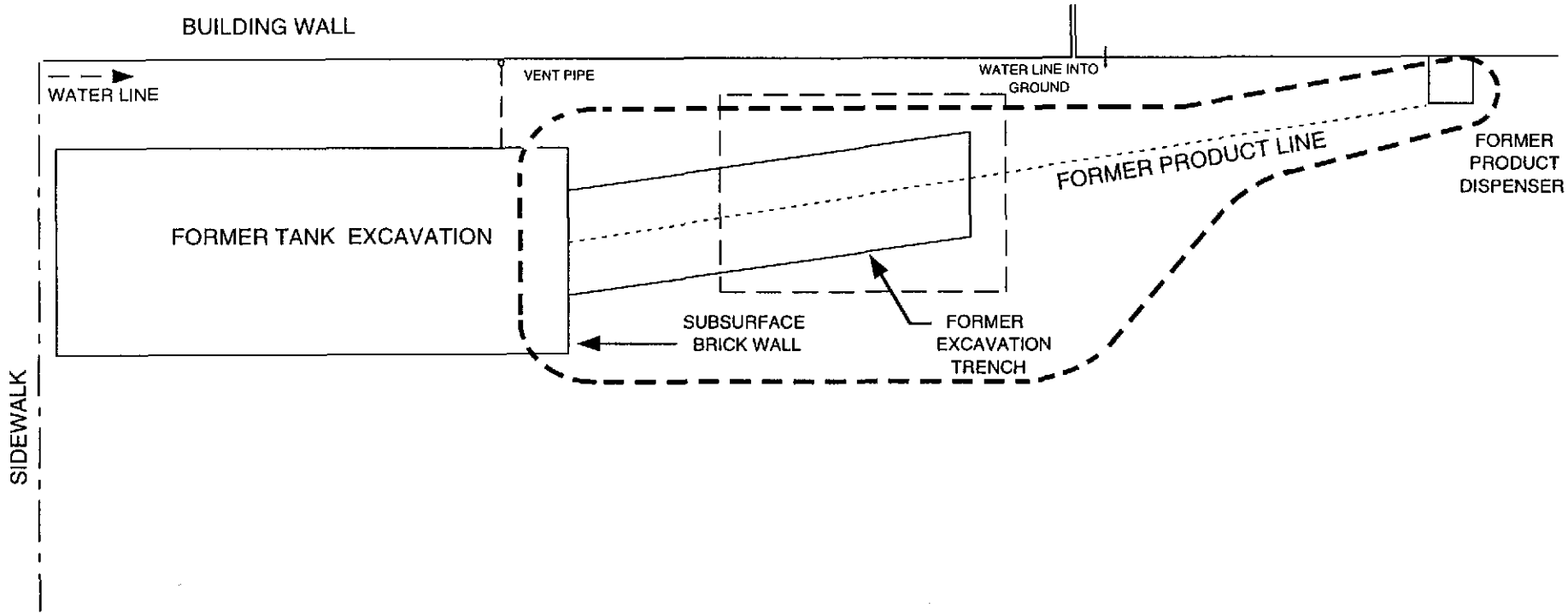
Plate 2 - Proposed Well Locations

Plate 3 - ORC Boring Plan

Distribution:

1 copy Bill Cox

1 copy Don Eisenberg



LEGEND

PROPOSED EXTENT OF EXCAVATION

N

APPROXIMATE SCALE (feet)

0 10 20

SOURCE: EOA, DRAFT CORRECTIVE ACTION PLAN DEVELOPMENT REPORT

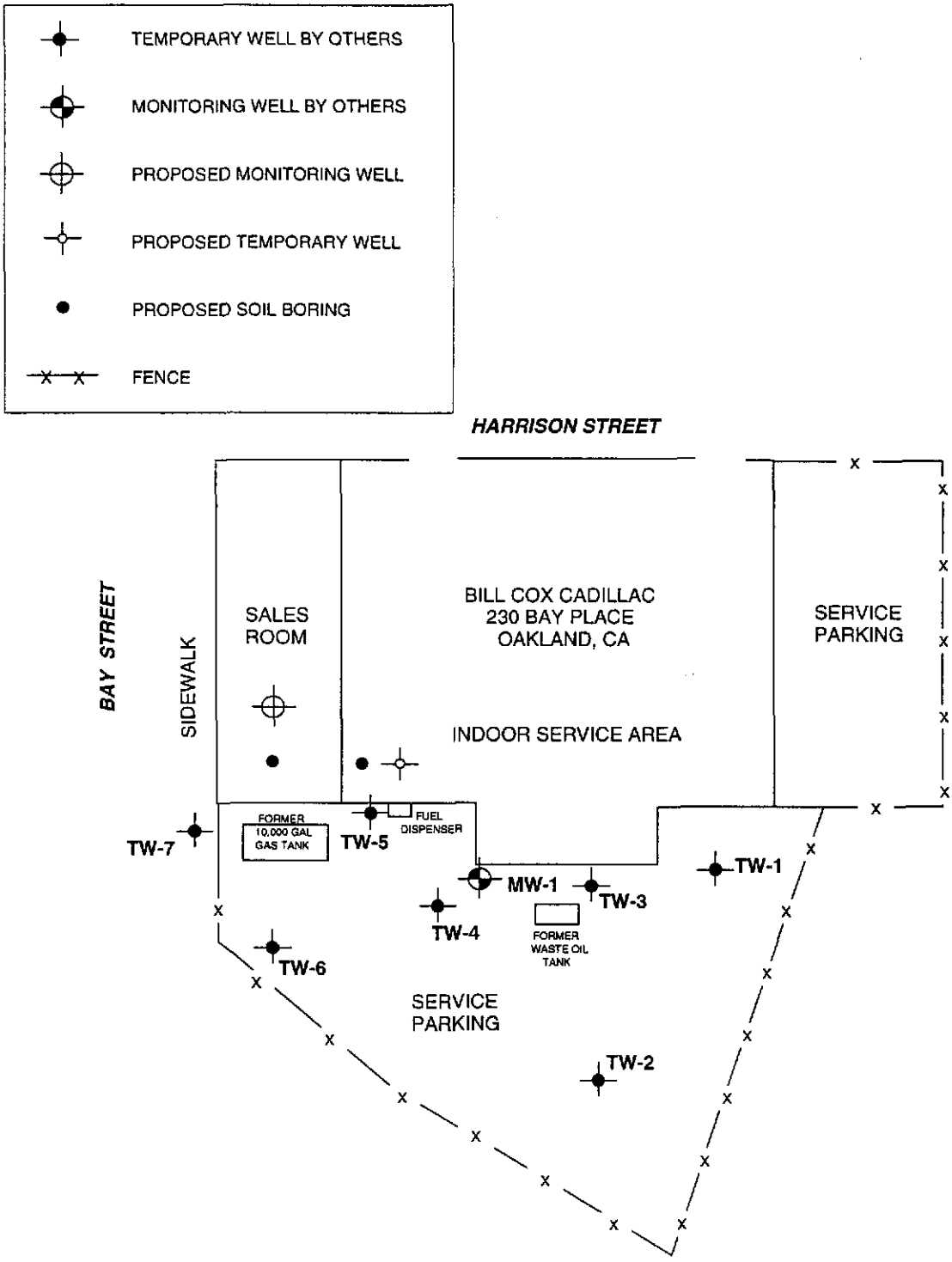
PROPOSED EXCAVATION PLAN

Subsurface Consultants

230 BAY PLACE
OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
805.010	9/4/96	

PLATE 1



SOURCE: EOA, DRAFT CORRECTIVE ACTION PLAN DEVELOPMENT REPORT

APPROXIMATE SCALE IN FEET

0 60 1200

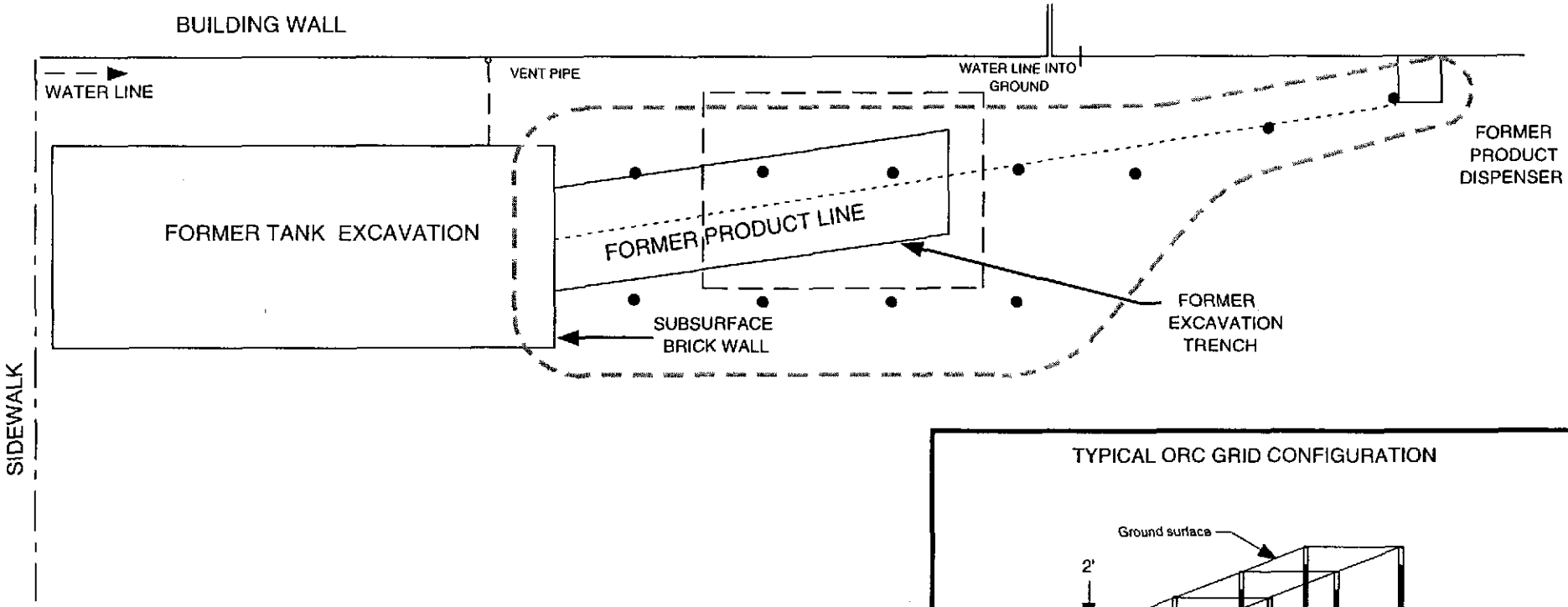
PROPOSED WELL LOCATIONS

Subsurface Consultants

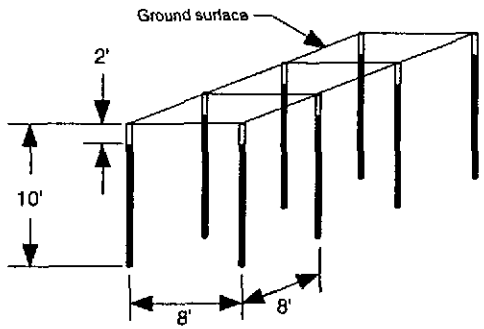
230 BAY PLACE - OAKLAND, CA

JOB NUMBER	DATE	APPROVED
805.010	9/4/96	

PLATE 2



TYPICAL ORC GRID CONFIGURATION



LEGEND

- ORC BOREHOLE
- EXTENT OF BACKFILLED EXCAVATION

N

APPROXIMATE SCALE (feet)

0 10 20

SOURCE: EOA, DRAFT CORRECTIVE ACTION PLAN DEVELOPMENT REPORT

ORC BORING PLAN

Subsurface Consultants

230 BAY PLACE
OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
805.010	9/4/96	

PLATE 3

DRAFT

SITE DESCRIPTION

The Cox Cadillac site is located at 230 Bay Place, Oakland, California. The site consists of approximately 2 acres of land bounded by Harrison Street to the northwest, Bay Street to the southwest and Vernon Street to the southeast. The northeastern site boundary abuts a steep embankment that is partially supported by a retaining wall. Single- and multiple-unit residential buildings are located on the hillside above the site. The property contains a single, large building, constructed sometime prior to 1903. The remainder of the site consists of two paved areas used for storage and for parking automobiles.

SITE BACKGROUND

A 10,000-gallon underground storage tank (UST) was used from 1980 until mid-1993 by Cox Cadillac to store unleaded gasoline. A 3,000-gallon UST (referred to as the waste oil tank) was removed in December 1988. In March 1993, petroleum hydrocarbons and traces of 1,2-dichloroethane (DCA) were detected in a monitoring well which was installed in response to a 1989 request by the Alameda County Health Care Agency, Department of Environmental Health (County) for a groundwater investigation to investigate groundwater impact of the observed release from the 3,000-gallon tank. The monitoring well was installed in response to a leak that had been detected in an underground tank that had previously been excavated from an adjacent, upgradient location. Additional sampling carried out in October 1993 in shallow temporary wells in the vicinity confirmed that hydrocarbons were present in the groundwater extending at least as far as the property boundary.

The 10,000-gallon fuel tank was excavated to determine whether hydrocarbons detected in the monitoring wells were originating from this tank and/or associated piping or, if not, from the 3,000-gallon UST or other unknown sources. Use of the tank was discontinued, and on January 26, 1994, the tank and associated piping were removed and excavated soils were stockpiled. The tank was found to be in good condition, but a corrosion hole was observed in a joint in the galvanized steel vacuum line between the tank and the dispenser. Hydrocarbons were observed in soil at the trench bottom and walls, between the leak location and the tank excavation. Hydrocarbons were also observed in groundwater which entered the tank excavation, and in the tank excavation sidewalls below what appeared to be the highest seasonal groundwater elevation.

The possibility of a subsurface wall exists in vicinity of the former fuel tank and waste oil tank areas. During excavation of the 10,000-gallon fuel tank, considerable amount of concrete debris, and at least one subsurface brick wall was observed at the north end of the excavation. A search of historical records indicate that a former swimming pool structure was located below the present ground surface in the immediate area of the USTs. It appeared that the former waste oil tank and the former dispenser locations were within the perimeter of the pool structure. Observations made during the tank excavation indicate that at least part of the 9 ft. high concrete walls of the pool are still present beneath the surface.

After further excavation of pipe trench soils, confirmation soil sampling of the excavation walls indicated that some hydrocarbons were still present in remaining soils. In a letter dated January 9, 1996, the County required that a Corrective Action Plan (CAP) be prepared and implemented. The purpose of the CAP was to develop additional information about subsurface conditions, carry out a screening level risk assessment, to carry out biotreatability testing to determine biodegradation activity and nutrient characteristics of groundwater, and to evaluate remedial alternatives for decreasing the benzene concentration in groundwater.

The first phase of the CAP was submitted to the County in April 1996. The second phase includes: 1) the evaluation of remedial alternatives which was submitted to the County in July 1996, and 2) this scope of work which describes the remediation activities selected for implementation at this site.

GROUNDWATER SETTING

Depth to groundwater at the site is shallow, and ranges from 1.87 to 6.45 feet below ground surface. The general direction of groundwater flow is in a southwesterly direction. Groundwater beneath the site is not tidally influenced.

EXTENT OF SOIL CONTAMINATION

Waste Oil Tank Area

In 1988, during the 3,000-gallon tank removal, a soil sample was collected from the excavation. Analytical data was inconclusive as to the presence of petroleum hydrocarbon compounds. In March 1989, at the request of the County, the tank area was re-excavated and a soil sample was collected from the excavation. Results of the analysis indicated the presence of gasoline and diesel range petroleum hydrocarbons at concentrations of 45 mg/Kg and 150 mg/Kg, respectively at a depth of 8 feet bgs. Benzene was not detected in the soil sample at the time of this investigation.[1]

Fuel Tank Area

Data collected from soil sampling investigations indicate that total volatile hydrocarbons (TVH) in soil is limited to the area adjacent to and downgradient from the former fuel tank piping including the former tank excavation area. The depth of impacted soils is dependent on groundwater fluctuations. Virtually all remaining hydrocarbon pollution in soil is located at depths of 4 to 6 feet below ground surface (bgs), within the "smear" zone. Benzene concentrations in soil remaining after excavation of the former tank location vary from less than 0.0016 milligram per kilogram (mg/Kg) to 0.04 mg/Kg. The area with relatively high benzene concentrations in soil is limited to the immediate vicinity of the former piping leak (3.1 mg/Kg to 7.1 mg/Kg benzene).

[1] PES Environmental, Inc., Report of Soil and Groundwater Investigation, Bill Cox Cadillac, December 23, 1993

DRAFT

EXTENT OF GROUNDWATER CONTAMINATION

Historic results from groundwater sampling indicate that benzene in groundwater is at its highest concentration in the vicinity of MW-1, TW-6, and TW-7. Data from the February 1996 event shows that benzene was present in monitoring well MW-1, upgradient from the former dispenser line and downgradient from the former waste oil tank location, at a concentration of 4.8 milligrams per liter (mg/L). Groundwater samples collected from temporary wells TW-6 and TW-7, downgradient of the former waste oil tank and cross-gradient to former 10,000-gallon fuel tank, contained benzene at concentrations of 13 mg/L and 50 mg/L, respectively.

FEASIBILITY STUDY

In a letter dated June 25, 1996, a request was made by the County to evaluate remedial alternatives of reducing benzene and TVH in the saturated and unsaturated zone at the subject site. In response, a technology screening study was conducted to assess the feasibility and cost-effectiveness of the following remedial alternatives: no action, excavation, vapor extraction, active in-situ bioremediation, passive in-situ bioremediation, bioaugmentation, bioventing, dual-phase extraction, bioslurping, and air sparging/biosparging.

The results of the technology screening indicates that a combination of technologies present the most effective alternative in remediating hydrocarbon impacted soil and groundwater at the site. For soil remediation in the unsaturated zone, the most effective and cost-effective approach involves additional excavation at the former piping leak area and portions of the former UST excavation. Active in-situ bioremediation would be the most effective and cost-effective remedial alternative to remediate impacted groundwater and soils within the "smear" zone. Active in-situ bioremediation would require additional testing to evaluate hydraulic conditions at the site and to develop final design parameters.

The concept of implementing some type of short-term (interim) measure to enhance insitu bioremediation by introducing bacteria, nutrients and/or dissolved oxygen was also evaluated. Based on the site conditions and in consultation with specialty contractors, it was determined that the site would not benefit significantly from occasional introduction of bacteria and nutrients into the existing monitoring wells. However, more benefit may result from the introduction of an oxygen releasing compound (ORC) into the environment.

Following their review of the feasibility study, the County concurred that remedial actions should at a minimum consist of additional removal of source material. In addition, interim measures involving the introduction of ORC and monitoring its effectiveness should be implemented.

PROPOSED CORRECTIVE ACTION

[redacted] to effectively reduce benzene concentrations in both soil and groundwater.

Excavation will involve removing impacted soil within the area of the former 10,000-gallon gasoline UST, its associated distribution piping and at its former dispenser, and the former 3,000-gallon waste oil UST. A preliminary plan showing the extent of excavation is presented on Plate 1. The progress of excavation will be monitored in the field using several techniques including visual and olfactory senses, organic vapor meters (OVM) and a mobile laboratory. Excavation will be performed within the delineated area to the groundwater surface, which varies at the site up to depths of 4 to 6 feet, but will not exceed 6 feet. Laterally, the excavation will be extended to within about 2 feet of the exterior building wall, and hence will not extend into the existing structure. Excavation will be performed inside the delineated area during this phase of work. The Contractor will assume no excavation outside the delineated area, but shall be prepared to perform additional excavation (at additional costs) beyond the delineated area under the Consultant's direction, if necessary. Additional excavation in the northeast direction toward MW-1 and the former waste oil tank may be carried out at the Consultant's direction if high benzene concentrations are detected in the excavation wall at the delineated boundary.

Excavated soil will be disposed of at an appropriate Class II or Class III landfill. Treatment of the soil prior to disposition maybe required. The resulting excavation will be backfilled with imported soil and clean excavated soil, placed and compacted under engineering supervision. The work area then will be capped with asphalt concrete to match existing conditions.

Following excavation activities and most likely concurrent with soil treatment and disposal activities, a concentrated ORC mixture will be introduced into the former source area in an attempt to enhance petroleum degrading microbial growth. The ORC will be contained in a slurry which will be tremied into a grid of boreholes schematically shown on Plate 3. The ORC treatment will be implemented on a trial basis, as its effectiveness will need to be evaluated. If the ORC is shown to be effective after four quarters of groundwater monitoring, it may be expanded into other impacted areas of the site.

Various engineering and contractor services are required to implement the corrective actions outlined above. The project engineer and contractor selected for this project should possess recent relevant remedial experience. Tasks to be performed by the engineer and the contractor are outlined below. Specific details of these services are described in the attached scopes of engineering and contractor services.

Engineering Services

Review Contractor Submittals
Excavation Observation and Direction
Excavation Pit Sampling
Review Plans for Soil Sampling and Disposal
Soil and Groundwater Investigation
ORC Layout Confirmation
ORC Installation Observation
Groundwater Monitoring
Reporting

Contractor Services

Permits and Plans
Utility Clearances
Shoring
Excavation Activities
Soil Treatment and Disposal
Backfill Placement
ORC Layout
ORC Grid Construction
Site Restoration

DRAFT

SCOPE OF ENGINEERING SERVICES
CORRECTIVE REMEDIAL ACTIONS
FORMER COX CADILLAC FACILITY
OAKLAND, CALIFORNIA

EXCAVATION AND INVESTIGATION ACTIONS

- ***Review Contractor Submittals***

The Consultant shall review Contractor submittals for performing site activities. This will entail a review of all permits, plans and procedures to check them for conformance with the project goals. Types of submittals would include, but not necessarily be limited to, site specific health and safety plan, BAAQMD permit, project phasing plans, and analytical data. Consultant should review the methodologies, cost effectiveness and timing of the soil excavation and treatment plans. The Consultant will immediately notify the Client of any inconsistencies.

- ***Excavation Observation and Direction***

The Consultant shall direct excavation activities using visual and olfactory sense, organic vapor meters (OVM) and the services of a mobile laboratory. The Consultant shall collect random soil samples for headspace analysis and for testing by a California Environmental Protection Agency certified mobile laboratory to determine the limits of excavation and to assist in the segregation of materials. The number of random samples collected should equal the number of samples that the mobile laboratory can analyze per day of excavation. The samples should be analyzed for total volatile hydrocarbons (TVH) as gasoline and benzene, toluene, ethylbenzene, and total xylenes (BTEX).

The Consultant shall observe backfill placement and compaction. If necessary, the Consultant shall retain the services of a qualified geotechnical engineer to check the degree of compaction.

- ***Excavation Pit Sampling***

Following completion of excavation activities, the Consultant shall collect a minimum of 4 soil samples from the bottom, 10 soil samples from the sidewalls of the excavation and one groundwater sample from the excavation to verify source removal. Upon completion of sampling, the Consultant shall submit all samples to the mobile laboratory for TVH and BTEX analysis.

- ***Review Plans for Soil Sampling and Disposal***

The Consultant shall review the Contractor's plans and procedures for soil sampling and treatment or disposal of impacted soil generated during excavation. The Consultant shall review soil stockpile sampling locations and analytical data generated from this profiling activity. The

Consultant shall evaluate and comment on the Contractor's preferred treatment or disposal option. Upon acceptance, the Consultant shall give approval to the Contractor for proceeding with the selected treatment or disposal option.

- ***Soil and Groundwater Investigation***

The Consultant shall perform an investigation to further define the extent of soil and groundwater contamination under the building. The investigation shall include conducting soil and groundwater sampling at four locations within the existing building as shown on Plate 2. The Consultant shall obtain necessary permits to perform the investigation. Two soil borings shall be placed approximately 20 feet and 40 feet northwest of the former tank excavation within the southern portion of the former sales room area. The other soil borings shall be placed approximately 10 feet apart, 20 feet north of the former dispenser within the former indoor service area of the building. Soil samples shall be frequently obtained from the borings.

A temporary well shall be installed in one boring located in the former indoor service area to facilitate the collection of grab groundwater samples. One soil boring in the former sales room shall be converted to a permanent groundwater monitoring well. The Consultant shall develop and sample the new monitoring well and the temporary well.

One selected soil sample from soil/groundwater interface and the groundwater samples shall be submitted to a DHS certified laboratory for TVH and BTEX analysis. In addition, groundwater samples should be analyzed to obtain pH and the content of dissolved oxygen, dissolved carbon dioxide, and nitrogen.

- ***Reporting***

The Consultant shall prepare a report summarizing source removal activities and the results of the additional soil and groundwater investigation. The report shall include a site plan showing soil boring locations, the limits of excavation, a summary of field activities, a description of conditions encountered during drilling, and an evaluation of the extent of impacts to soil and groundwater.

ORC TREATMENT ACTIONS

- ***ORC Layout***

A preliminary plan for the installation of the ORC grid is presented in Plate 3. As shown, the ORC grid consists of 11
geoprobe type boreholes spaced at 8 feet on center within the backfilled excavation. The borings shall be completed to a depth of 12 feet bgs. An ORC slurry shall be delivered under pressure into each borehole until filled to the near surface. Cement grout will be placed into each borehole to provide a surface seal.

Suppliers of ORC compounds indicate that as a rule of thumb approximately 3 pounds of ORC should be sufficient to inoculate 1 pound of hydrocarbon mass. Hence, it has been assumed that approximately 57 pounds of ORC and 6 pounds of water should be introduced into each borehole.

The Consultant in consultation with the Contractor and any pertinent subcontractors shall check the rationale and layout of the ORC grid presented herein. If necessary, for technical reasons or cost effectiveness, the Consultant shall propose modifications to the Client. If the Client is in agreement with the proposed modifications, then the Consultant shall negotiate desired modifications with the County.

- ***ORC Installation Observation***

The Consultant shall sample and log the ORC grid borings. Soil samples shall be screened using an OVM to detect the presence of organic vapors. The Consultant shall observe and document the placement of the ORC slurry into the boreholes. A report summarizing field activities shall be prepared by the Consultant.

- ***Groundwater Monitoring***

Approximately three months following installation of the ORC grid, the Consultant shall conduct groundwater sampling of all monitoring and temporary wells on-site. Groundwater samples collected shall be submitted to a DHS certified laboratory for TVH, BTEX, pH, and dissolved oxygen analysis. The Consultant shall prepare a report summarizing results of the groundwater monitoring event. The Consultant shall continue groundwater monitoring on quarterly basis for one year. The Consultant shall include engineering consultation regarding the effectiveness of the grid with each monitoring letter.

DRAFT

SCOPE OF CONTRACTOR SERVICES
CORRECTIVE REMEDIAL ACTIONS
FORMER COX CADILLAC FACILITY
OAKLAND, CALIFORNIA

EXCAVATION ACTIONS

- ***Permits and Plans***

The Contractor shall obtain all necessary permits from, but not necessarily limited to, the City of Oakland, Alameda County and BAAQMD to conduct excavation and soil treatment activities. The Contractor shall submit copies of all permits to the Consultant for their approval prior to submitting to the requiring agency.

The Contractor shall prepare and submit to the Consultant a site specific health and safety plan, a project phasing plan, and a plan which indicates their excavation procedures. The Contractor will implement the plans upon written approval of the Consultant.

- ***Utility Clearances***

The Contractor shall obtain and review all available information on the locations of buried active and abandoned utilities. The Contractor shall notify Underground Services Alert (USA) and provide adequate time for utility marking. The Contractor shall use a utility locating service to mark possible utility lines within the site boundaries.

- ***Shoring***

The Contractor shall obtain the services of a registered Structural Engineer to evaluate the excavation setback (2 feet) and/or the necessity for shoring the foundation of the building during excavation. If shoring is necessary, the Contractor shall either prepare or retain the Structural Engineer to prepare shoring plans. The plans shall be stamped by a registered Structural Engineer and submitted to a qualified Geotechnical Engineer for their review and comment.

The Contractor shall utilize appropriate methods of shoring and bracing, in accordance with all applicable OSHA regulations where required. All applicable Federal, State, and local regulations shall be met prior to personnel entering the excavation. The Contractor shall take all necessary steps to ensure the safety of personnel.

- ***Excavation Activities***

The Contractor shall mobilize all necessary excavation equipment and materials. The Contractor shall excavate within the delineated boundaries to remove soil within the "smear" zone. The "smear" zone shall be defined as the soil zone between the highest and lowest seasonal groundwater elevation. The Contractor shall perform excavation with care as not to exceed the delineated boundary of excavation or beyond the "smear" zone unless otherwise authorized by the Consultant's Project Manager. With the assistance of the Consultant, the Contractor shall segregate impacted and non-impacted soil excavated from the site. No excavated material shall be deposited closer than 5 feet from the edge of the excavation. Impacted soil stored at the site shall be covered with plastic sheeting and anchored with weights. Non-impacted soil shall be analyzed to confirm that it is suitable for reuse in the excavation. Non-impacted soil shall be free of debris, vegetation, and other deleterious materials prior to being reused on-site.

- ***Soil Treatment and Disposal***

The Contractor shall propose treatment and disposal options for the impacted soil. Depending on the length of time required, the Contractor may consider using available space on-site for treatment. The Contractor shall submit plans and procedures to the Consultant for review. The Contractor shall implement treatment and disposal upon receiving approval from the Consultant.

The Contractor shall be responsible for soil characterization sampling activities. The Contractor shall submit results of the soil characterization sampling activities for review and approval. The Contractor shall be responsible for coordinating and providing transport and disposal services. Impacted soil transported off-site shall be properly manifested.

- ***Backfill Placement***

The Contractor shall backfill the excavation with imported fill and/or acceptable on-site fill materials. Fill shall be free of rocks in excess of 2 inches, vegetation, debris, toxic substances, and other deleterious materials. A sample of the fill materials shall be submitted to a qualified Geotechnical Engineer for their review and comment prior to use at the site. Fill shall be placed in 6 to 12 inch maximum compacted lifts. Each lift shall be compacted to a minimum density of 90 percent of the maximum laboratory dry density as determined by ASTM D1557. The upper 6 inches of fill placed within pavement areas shall be compacted to a minimum of 95 percent of the maximum dry density. All lifts shall be placed and compacted at -3 to +3 percent of the optimum moisture content (ASTM D1557). The Contractor shall have concurrence by a qualified geotechnical engineer that the fill has been placed and compacted in general accordance with the specifications.

- ***Site Restoration***

Upon completion of excavation activities, the Contractor shall restore site features to their original condition prior to construction. The backfill shall be graded to allow the placement of an asphalt concrete cap to match existing conditions.

All debris and waste materials generated during excavation shall be collected and transported to appropriate disposal facilities.

ORC TREATMENT ACTIONS

- ***ORC Layout***

A preliminary plan for the installation of the ORC grid is presented in Plate 3. As shown, the ORC grid consists of 11 geoprobe type boreholes spaced at 8 feet on center within the backfilled excavation. The borings shall be completed to a depth of 12 feet bgs. An ORC slurry shall be delivered under pressure into each borehole until filled to the near surface. Cement grout will be placed into each borehole to provide a surface seal.

Suppliers of ORC compounds indicate that as a rule of thumb approximately 3 pounds of ORC should be sufficient to inoculate 1 pound of hydrocarbon mass. Hence, it has been assumed that approximately 57 pounds of ORC and 6 pounds of water should be introduced into each borehole.

The Contractor shall review and discuss the ORC plan with the Consultant. The Contractor shall retain an ORC vendor and experienced installation contractor to verify the accuracy of the plan and the quantities proposed. The Contractor shall present to the Consultant a list of the subcontractors proposed for this phase of the work.

- ***ORC Grid Construction***

Upon completion of excavation and backfilling activities, the Contractor shall mobilize all drilling, mixing, and delivery equipment in preparation for ORC installation. Boreholes shall be cored using direct push technology (DTP) equipment. The Contractor shall inject the ORC slurry into each borehole under a pressure of 60 to 120 pounds per square inch (psi). Following delivery of the ORC slurry, the Contractor shall top off each borehole with cement grout in order to seal the boreholes.

- ***Site Restoration***

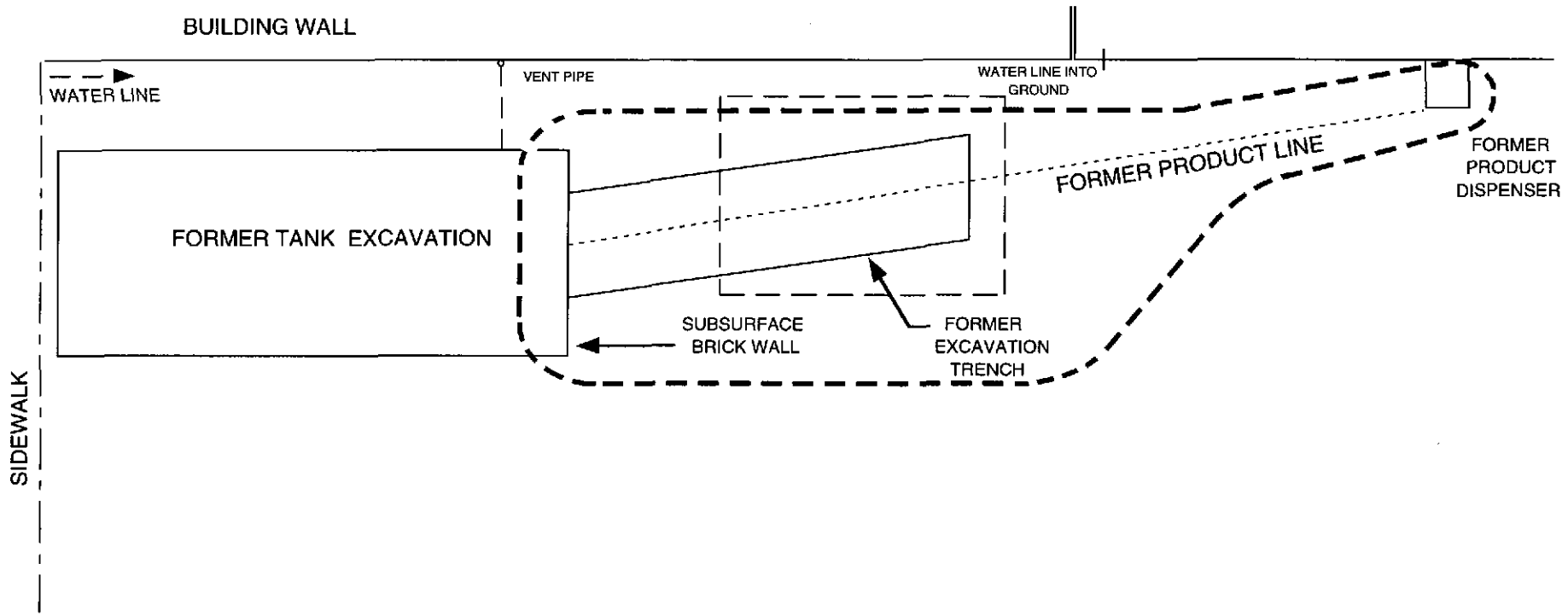
Upon completion of ORC installation activities, the Contractor shall restore site features to their original conditions prior to construction. All miscellaneous debris generated during ORC installation shall be transported off-site for disposal by the Contractor.

Attachments:

Plate 1- Proposed Excavation Plan
Plate 2- Proposed Well Locations
Plate 3- ORC Boring Plan

FAX Distribution:

1 copy	Bill Cox
1 copy	Don Eisenberg



DRAFT

LEGEND

PROPOSED EXTENT OF EXCAVATION

N

APPROXIMATE SCALE (feet)

0 10 20

PROPOSED EXCAVATION PLAN

SOURCE: EOA, DRAFT CORRECTIVE ACTION PLAN DEVELOPMENT REPORT

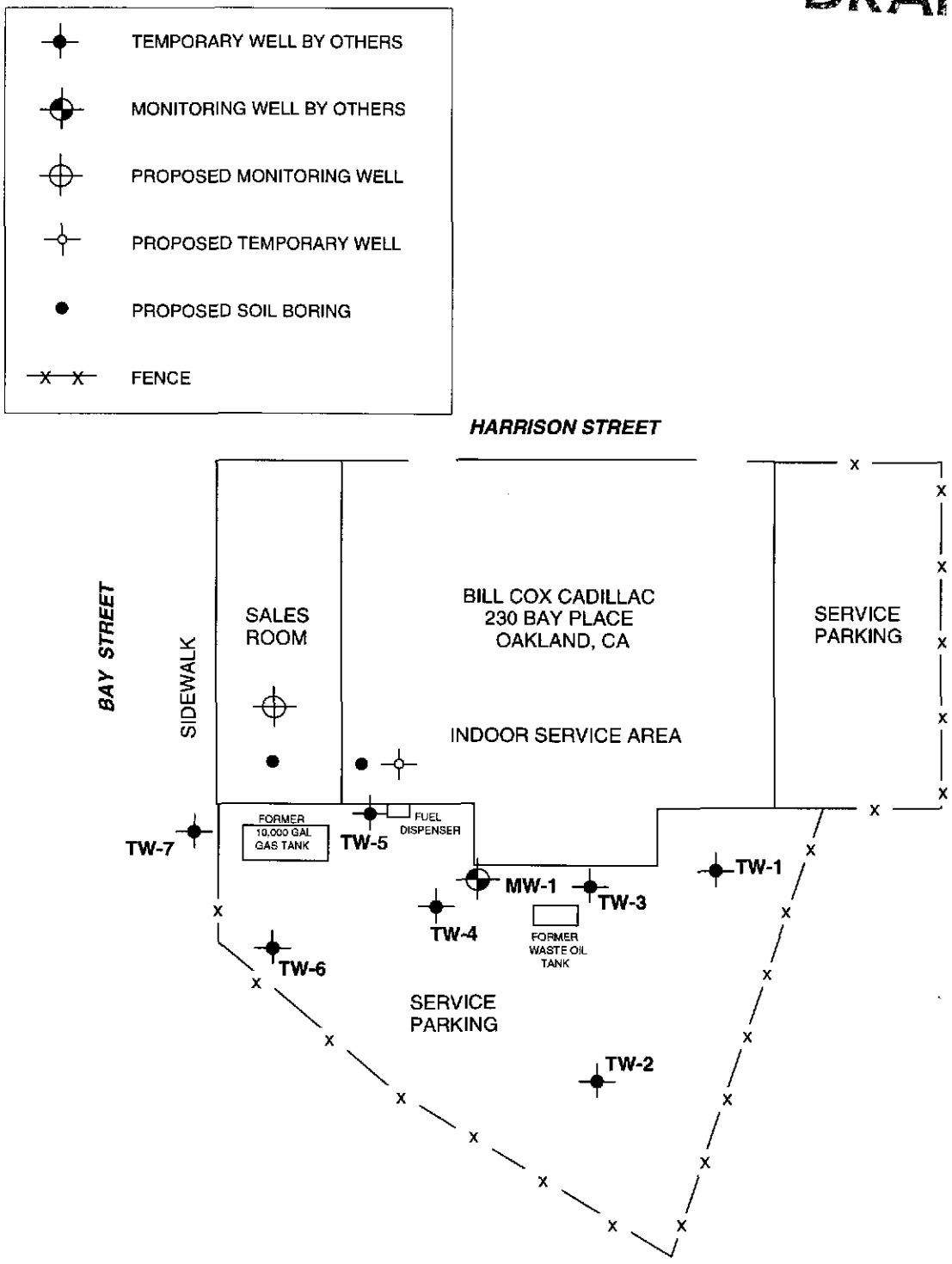
Subsurface Consultants

230 BAY PLACE
OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
805.010	9/4/96	

PLATE 1

DRAFT



SOURCE: EOA, DRAFT CORRECTIVE ACTION PLAN DEVELOPMENT REPORT

APPROXIMATE SCALE IN FEET

0 60 1200

PROPOSED WELL LOCATIONS

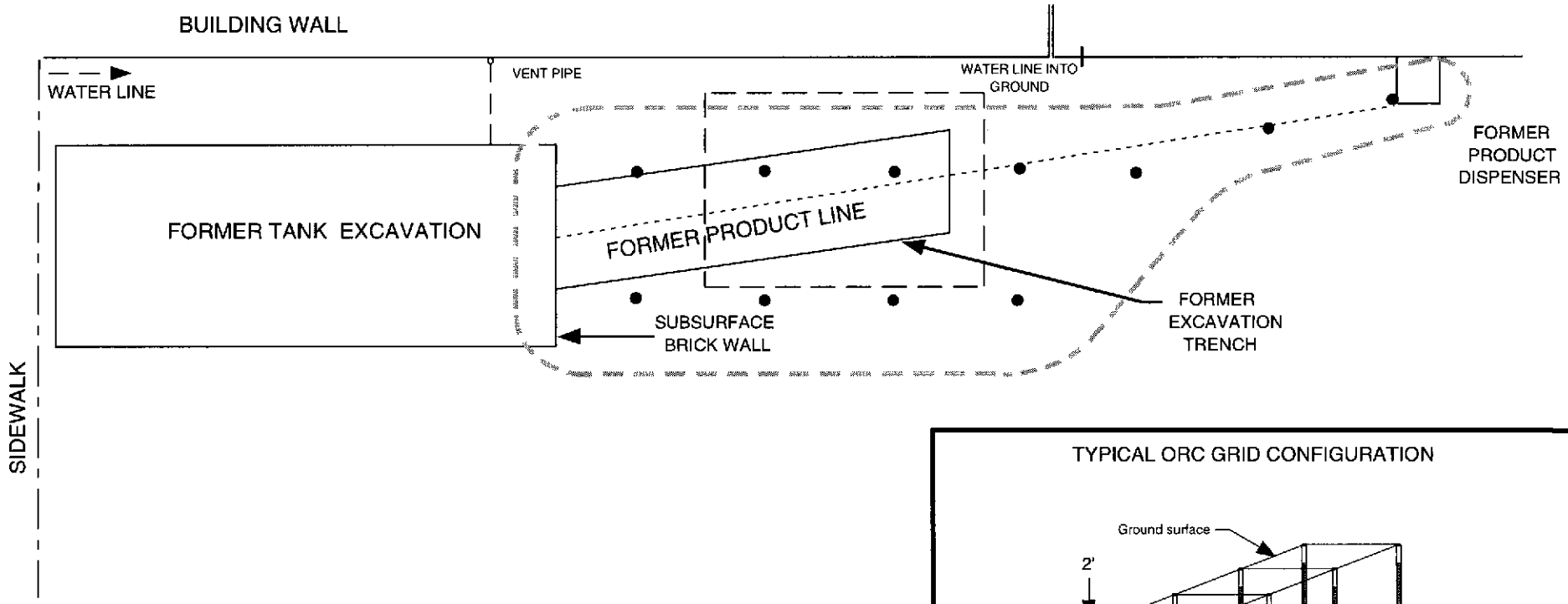
Subsurface Consultants

230 BAY PLACE - OAKLAND, CA

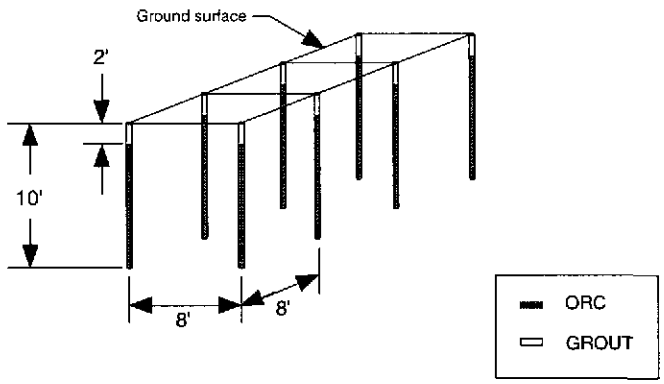
JOB NUMBER	DATE	APPROVED
805.010	9/4/96	

PLATE 2

DRAFT



TYPICAL ORC GRID CONFIGURATION



LEGEND

- ORC BOREHOLE
- EXTENT OF BACKFILLED EXCAVATION

N

APPROXIMATE SCALE (feet)

0 10 20

SOURCE: EOA, DRAFT CORRECTIVE ACTION PLAN DEVELOPMENT REPORT

ORC BORING PLAN

Subsurface Consultants

230 BAY PLACE
OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
805.010	9/4/96	

PLATE 3