Pacific Gas and Electric Company®

Anne P. Conner
Remediation Project Manager
Environmental Remediation

3401 Crow Canyon Rd.
San Ramon, CA 94583

(925) 415-6381
(925) 415-6852
apb1@pge.com

July 2, 2012

RECEIVED

10:19 am, Jul 11, 2012

Alameda County
Environmental Health

Mr. Jerry Wickham
Alameda County Environmental Health Department
Division of Environmental Protection
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Subject: ***Corrective Action Plan***

Dear Mr. Wickham

Please find enclosed the Corrective Action Plan, dated July 2, 2012, for the Pacific Gas and Electric (PG&E) Oakland General Construction Yard at 4930 Coliseum Way, Oakland, California. This Corrective Action Plan was prepared by AMEC on behalf of PG&E.

Please contact me at (925) 415-6381 if you have any questions about this Corrective Action Plan.

Sincerely,

Anne Conner

Anne Conner
Sr. Remediation Project Manager
Pacific Gas and Electric Company

Enclosure: Corrective Action Plan

DECLARATION:

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached Corrective Action Plan are true and correct to the best of my knowledge.

Loren Loo
Pacific Gas and Electric Company

Corrective Action Plan

PG&E Oakland Construction Yard
4930 Coliseum Way
Oakland, California

Prepared for:

Pacific Gas and Electric Company
San Ramon, California

Prepared by:

AMEC, Oakland, California

July 2, 2012

Project 013045007F

amec

July 2, 2012

Project 0135045007F.00002

Ms. Anne Conner
Senior Remediation Project Manager
Pacific Gas and Electric Company
3401 Crow Canyon Road
San Ramon, California 94583

Subject: Corrective Action Plan
PG&E Oakland, Construction Yard
4930 Coliseum Way
Oakland, California

Dear Ms. Conner:

AMEC Environment & Infrastructure, Inc. (AMEC) is pleased to provide the enclosed Corrective Action Plan (CAP) for the Pacific Gas and Electric Company (PG&E) Oakland Construction Yard. This CAP has been prepared in response to a request from the Alameda County Environmental Health Care Services Agency (ACEH) in a letter to PG&E dated February 15, 2012. The purpose of the CAP is to serve as a remedy selection document to move the site towards regulatory closure.

In the CAP, four potential remedial alternatives to mitigate the presence of elevated concentrations of lead in shallow soil were compared on the basis of effectiveness and reliability, technical and administrative implementability, cost, and acceptance. Based on these factors, expansion of the existing asphalt cap in conjunction with administrative controls, which include a deed restriction and Site Management Plan (SMP), is the proposed corrective action.

Please contact either of the undersigned at (510) 663-4100 should you have any questions.

Sincerely yours,
AMEC Environment & Infrastructure, Inc.

Yemia Hashimoto
Yemia Hashimoto, CHG #782
Senior Hydrogeologist

PROFESSIONAL GEOLOGIST
YEMIA T. HASHIMOTO
No. 782
CERTIFIED HYDRO GEOLOGIST
STATE OF CALIFORNIA
YH 12/31/12

Susan Gallardo
Susan Gallardo, PE #C38154
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
SUSAN MARIE GALLARDO
No. C038154
CIVIL
STATE OF CALIFORNIA
3/2013

YH/kwg
x:\13000s\13045.007.f\4000\cap_070212\01_txt\cvr ltr.docx

Enclosure: Corrective Action Plan

AMEC Environment & Infrastructure, Inc.
2101 Webster Street, 12th Floor
Oakland, California 94612-3066
USA
Tel (510) 663-4100
Fax (510) 663-4141
amec.com

amec

TABLE OF CONTENTS

TABLES

FIGURES

TABLE OF CONTENTS
(Cont'd)

APPENDIX

CORRECTIVE ACTION PLAN

Pacific Gas and Electric Oakland Construction Yard
4930 Coliseum Way
Oakland, California

1.0 INTRODUCTION

This Corrective Action Plan submitted on behalf of Pacific Gas and Electric (PG&E) for the property located at 4930 Coliseum Way in Oakland, California (the "site"), has been prepared in response to a request from the Alameda County Environmental Health Care Services Agency (ACEH) in a letter to PG&E dated February 15, 2012. The purpose of this Corrective Action Plan is to serve as a remedy selection document to move the site towards regulatory closure.

1.1 REGULATORY

The site regulatory history has focused on two subsurface concerns: (1) petroleum in soil and groundwater from underground storage tanks (USTs), and (2) lead in soil from the sandblasting of a former gas holder tank (GHT) painted with lead-based paint. The site formerly contained five USTs; these were removed in 1988. By 2008, the source area consisting of petroleum hydrocarbons released from the former USTs had been remediated, and soil and groundwater conditions had been adequately characterized. ACEH agreed in a letter dated March 2, 2010, that groundwater monitoring and reporting may be discontinued pending further direction from the agency. Lead in soil is managed with a June 14, 1992, Covenant of Deed Restriction (PG&E, 1992). The deed restriction condition B.2.e mandates that the site "shall be covered with engineered asphalt (hereinafter collectively referred to as 'Cap') designed to prevent the lateral and vertical spread of contamination to ground and surface water. The Cap will require annual inspection." An engineered asphalt concrete (AC) Cap, which is inspected as required, is in place over the lead-impacted soil. The Cap is maintained to meet the objectives of the deed restriction.

1.2 OBJECTIVES

The objectives of this Corrective Action Plan are as follows:

- Present and evaluate existing site conditions.
- Establish appropriate remedial action objectives (RAOs) for protection of human health and the environment.
- Evaluate alternatives and develop a final recommendation for a remedial action at the site that is protective of human health and the environment.

2.0 BACKGROUND

This section presents background information for the site, including brief descriptions of the site setting, operational history, the geology and hydrogeology at the site, and the planned future use.

2.1 SITE DESCRIPTION AND SETTING

The approximately 5-acre site is bounded by Coliseum Way to the south, 50th Avenue to the southeast, and industrial properties to the north (Figures 1 and 2). The surrounding area consists primarily of commercial and light industrial businesses. The site was used by PG&E as a natural-gas distribution center and equipment storage facility from at least the late 1930s until 1990, when the former GHT was removed. Since 1990, the site has been used as an equipment and vehicle storage facility. Currently, Baker tanks for PG&E's hydrostatic testing program are staged over a portion of the site, including the current Cap (Figure 3). Full-time PG&E personnel occupy a small office on site. The office facilities are connected to the municipal water supply.

2.2 SITE LITHOLOGY AND HYDROGEOLOGY

The site is located approximately ¼ mile east of the margin of San Leandro Bay on a plain gently sloping toward San Francisco Bay. According to lithologic logs developed by others from investigations at the site, the uppermost portion of the site subsurface is underlain by interbedded deposits of clays, sands, and gravels to at least 19 feet below ground surface (bgs), the maximum depth drilled. The uppermost groundwater is unconfined.

Based on depth-to-groundwater measurements collected from three monitoring wells during the most recent groundwater monitoring event (January 2011), groundwater depth ranged from approximately 2 to 3 feet bgs at the site. These depths to groundwater are consistent with previous depth-to-groundwater measurements, which have been documented as between 3.5 and 8 feet bgs. Groundwater-level measurements collected during the January 2011 monitoring event also indicated groundwater flow direction was toward the south-southwest, with a hydraulic gradient of approximately 0.003 foot per foot; this flow direction and gradient is consistent with that previously documented.

2.3 PLANNED FUTURE USE

The site is in a commercial and industrial area of Oakland. PG&E will retain ownership and the site use will remain in industrial use for the foreseeable future.

2.4 SITE INVESTIGATION SUMMARY

This section describes the results of historical site investigation activities related specifically to lead in soil. A more comprehensive discussion of these and other site investigation activities is presented in previously submitted documents by AMEC (2010, 2011a, 2011b, 2011c) and Aqua Resources, Inc. (ARI; 1992).

ARI conducted investigations at the site in 1990 and 1991 to delineate the lateral and vertical extent of lead in soil. ARI noted that 72 cubic yards of soil was excavated and stockpiled during the removal of the former GHT in 1990; this soil was sampled by ARI in 1991 for off-site disposal characterization[1]. However, as stated in the ARI report, two excavated areas of the site may have been backfilled with on-site material affected by lead (ARI, 1992). PG&E conducted additional sampling and analysis for lead in 1992. These investigations provided a basis for the investigation conducted by AMEC in October 2010 and subsequent investigation in 2011. The data collected during AMEC's 2010 soil investigation supersede data provided from investigations completed by ARI and PG&E in 1990 through 1992.

Analytical results from the AMEC 2010 and 2011 investigations were reported to ACEH in May 2011 and December 2011, respectively; the results for lead are presented in Table 1. Figure 3 shows soil sampling locations for depth intervals between 0 and 8 feet bgs. The highest concentrations of lead in soil are detected in the surface samples collected from 0 to 0.5 feet bgs. Concentrations of lead in soil samples collected at depths below 4.5 feet bgs did not exceed the California Human Health Screening Level (CHHSL; OEHHA 2005, 2009) for commercial/industrial land-use scenarios. In general, at those locations where vertical sampling was conducted, lead concentrations in soil samples typically decrease with sample depth.

2.5 SITE CONDITIONS

The results of the investigation programs are shown on Figure 4 and indicate the general site conditions described below.

2.5.1 Soil

In 2010 and 2011, two site investigations were conducted to delineate the extent of lead in soil. The sampling was conducted using a grid system across the site, with samples collected in 30-square-foot (sf) nodes to represent the concentration of soil within the 900 sf area (Figure 3). Following the 2010 and 2011 investigations, the lateral and vertical distributions of

[1] In addition to the 72 cubic yards excavated during the GHT removal effort, 2,000 cubic yards of soil containing petroleum hydrocarbons were excavated and off-hauled in November and December 1991. This soil was present in a former UST area, unrelated to the former GHT.

lead were defined relative to the industrial CHHSL, except as noted below. The elevated detections of lead in shallow soil are bounded by other soil sample results, except to the west of the sample location C12. West of this location is the street, which is paved; as noted in the work plan (AMEC, 2011b), the paved surface would have prevented the aerial deposition of lead west of C12. Therefore, the presence of lead at concentrations greater than the commercial/industrial CHHSL is considered defined to the edge of the unpaved surface.

Within the area of the 2010 and 2011 investigations, the distribution of lead is not continuous, suggesting that mechanisms in addition to sandblasting, such as reworking of soil and laydown of the former GHT components during dismantling, may have contributed to a larger distribution of lead at the site beyond the immediate perimeter (within 30 feet) of the former GHT.

As stated in Section 1.1, an engineered AC Cap was installed at the site by PG&E in 1992 to minimize human exposure to the lead-affected soil and to prevent lead-impacted soil from spreading to ground and surface water (PG&E, 1992). In July 2010, PG&E repaired approximately 19,260 square feet (sf) of the AC Cap and sealed 6,750 sf of cracks within the Cap area (AMEC, 2010). The repaired areas, shown on Figure 5, do not consistently coincide with the presence of lead in soil at concentrations greater than the commercial/industrial CHHSL. The current Cap extends over some areas where soil is not impacted relative to the commercial/industrial CHHSL for lead; other areas where lead concentrations in soil are greater than the CHHSL are not covered.

2.5.2 Groundwater and Surface Water

The results of the site investigations indicate that no lead was detected in the groundwater at the site or downgradient of the site. Based on the relative insolubility of lead in the environment and the period of time that these constituents likely have been present in subsurface soil, it is reasonable to assume that the current groundwater conditions represent long-term conditions at the site, and no degradation in the future is contemplated. The deed restriction requires that surface water is not degraded; however, surface water is not in contact with lead-affected soil. ACEH agreed in a letter dated March 2, 2010, that groundwater monitoring and reporting may be discontinued pending further direction from the agency.

3.0 REMEDIAL ACTION OBJECTIVE

Remedial action objectives (RAOs) are site-specific goals for protecting human health and the environment. The results of the 2010 and 2011 site remedial investigations are used to develop RAOs for the site. The site-specific RAOs are as follows:

- Minimize or eliminate potential exposure of humans to lead in site soil at concentrations exceeding the commercial/industrial CHHSLs.
- Minimize the potential for lead in soil to impact groundwater and surface water.

Per the conditions described in Section 2.5.2, the RAO to minimize the potential for chemicals of concern in soil to impact groundwater and surface water has been achieved. Based on these findings, the RAO for the site is to minimize or eliminate potential exposure of humans to lead in site soil through direct contact and ingestion.

4.0 IDENTIFICATION OF POTENTIAL CORRECTIVE ACTIONS

In consideration of technological, site, medium, and chemical-specific factors, corrective action alternatives for soil were developed to address the RAO. Four potential corrective action alternatives were identified and are explained in the following sections.

4.1 ALTERNATIVE 1—NO ACTION

Under the no action alternative, no additional corrective actions would be conducted at the site**.** This alternative is typically selected and evaluated as a comparison for other actions. A Cap currently exists at the site as part of a former corrective action. This alternative assumes that some Cap maintenance would be conducted.

4.2 ALTERNATIVE 2—ASPHALT CAP AND INSTITUTIONAL CONTROLS

This alternative proposes establishing the Cap boundaries to cover those areas where lead concentrations in soil exceed the CHHSLs for industrial/commercial use (320 milligrams per kilogram [mg/kg]). Areas under the existing AC Cap where concentrations of lead in soil are less than the commercial/industrial CHHSL will be excluded from the formal Cap boundaries. The Cap boundaries are shown on Figure 5. Implementation of this alternative involves removing the upper 3 inches of AC material within the new Cap boundaries and repaving these areas with 3 inches of AC (Figure 5) to form the Cap. Approximately 27,200 square feet of the site would be repaved. This alternative would maintain the existing grade of the site so that current surface water drainage patterns are not disturbed. This alternative minimizes future on-site workers' direct contact with lead-affected soil. Implementation of this alternative would be accompanied by development of a Soil Management Plan (SMP), which would include details of the Cap boundaries, operation and maintenance (O&M) of the Cap and describe general soil management procedures for future site construction. The Cap would be maintained every five years. The current covenant of deed restriction would remain effective. A Site Management Plan (SMP) will be prepared and formalized in the deed restriction for the site property and will include procedures for handling residual contaminated soils that may be excavated from the site during future redevelopment or that become exposed after demolition and removal of existing structures. The SMP will also include a Cap Maintenance Plan.

4.3 ALTERNATIVE 3—EXCAVATION

This alternative involves the excavation and removal of targeted soil containing elevated lead concentrations (exceeding 320 mg/kg) to reduce the concentration of lead in the soil to below the commercial/industrial CHHSL for the site. As stated in Section 2.5, the site investigations were conducted in a grid with 900 sf grid areas represented by a soil boring collected within; the soil boring samples were collected at depths of 0 to 0.5 feet, 1.5 to 2 feet, and 4.5 to 5 feet below the bottom of the existing asphalt. Excavation would be performed in 30 grid areas to a depth of approximately 1 or 4 feet bgs. These depths were determined by the analytical results for soil samples collected in the 2010 and 2011 investigations. An excavation to 1 foot indicates the 0.5-foot sample exceeds the commercial/industrial CHHSL for lead (320 mg/kg), but the 1.5- to 2.0-foot sample does not. An excavation to 4 feet indicates that the 1.5- to 2-foot sample exceeds the commercial/industrial CHHSL for lead (320 mg/kg), but the 4.5- to 5.0-foot sample does not. These excavations would be performed at and around soil boring locations shown on Figure 6 (C9, C12, D5, D10, D12, E3, E4, E5, E8, E10, E12, F8, F9, F10, F12, G8, G11, G12, G13, H11, I9, I11, J9, K11, J1, K1, L12, M2, M3, and M9). Currently Baker tanks located on the site prevented the advancement of soil borings at locations C10, D10, E10, F10, C11, D11, E11, and F11. Based on the soil sample results from borings located in areas sampled to the north and south of the Baker tanks, the area beneath the Baker tanks will be included in the remediation scope. For estimation purposes, these locations will be excavated to 1 ft; these locations will be sampled to confirm the depth prior to performing the excavation. A total of approximately 3,000 cubic yards of material including AC and aggregate base would be removed (assuming excavation sidewalls are shored). The lateral and vertical extents of the proposed excavations are shown on Figure 6.

The affected soil could be removed by traditional excavation methods using a backhoe or excavator. Bracing or shoring would be provided in the areas being excavated to 4 feet; the areas to be excavated to 1 foot will not be shored and will have vertical walls. If groundwater is encountered in the area of the deeper excavation, the saturated soil will be excavated and stockpiled at a designated area. The water will be allowed to drain from the soil, then the water will be collected, containerized, sampled and appropriately disposed. The soil sampling programs completed in 2010 and 2011 (ETIC, 2011, AMEC 2011a, 2011c) provided pre-excavation soil sampling information to determine the vertical and lateral extent of the excavation, provide information for the engineering design of the excavation, and support waste characterization before starting the work. Results from the pre-excavation samples document the concentrations of lead left in place at the extents of the planned excavations.

The excavated areas will be backfilled with clean fill from an approved off-site location and repaved to match the existing asphalt. The excavation will be backfilled to a depth of 3 inches bgs and compacted to at least 95% relative compaction before the installation of a 3-inch layer of AC. The AC will match the surface of the remainder of the site, and existing grades will be maintained to ensure that site drainage patterns are not disturbed. The Cap would not need to be maintained and the current covenant of deed restriction may need to be revised or rescinded. The site will be managed by a Site Management Plan (SMP) as detailed in Section 4.2.

4.4 ALTERNATIVE 4—LEAD FIXATION

This alternative involves the fixation of lead with a phosphatein (i.e. bone meal) in targeted soil containing elevated lead (exceeding 320 mg/kg) such that the lead is not bioavailable. The use of bone meal has been documented by the EPA to crystallize lead into pyromorphite, an insoluble, immobile form of lead phosphate (EPA-OSC, n.d.). The chemical reaction between bone meal (Apatite II) and the lead does not remove the lead from soil, but makes the lead inaccessible and removes the human health and environmental risks (Scheckel and Ryan, 2004; Wright et al., 2004). Approximately 27, 900 sf feet would be tilled with a hollow stem auger to provide appropriate in situ mixing of the bonemeal with the elevated-lead-affected soil (Figure 6); a pilot test would be implemented at a smaller scale prior to full scale remediation. The lead fixation area corresponds to the same area described in section 4.3 and may change pending results of samples collected in the area currently covered by Baker tanks. The appropriate volume of bonemeal addition will be calculated using stoichiometry with a factor of safety considered in the calculations.

Following treatment of the lead-affected soil, the treated areas would be paved to match the existing site conditions, and existing grades will be maintained to ensure that site drainage patterns are not disturbed. The Cap would not need to be maintained and the current covenant of deed restriction may need to be revised or rescinded. A Site Management Plan (SMP) will be prepared and formalized in the deed restriction for the site property as detailed in Section 4.2.

5.0 EVALUATION OF POTENTIAL CORRECTIVE ACTIONS

The evaluation criteria and the feasibility evaluation of the remedial technologies to achieve the corrective action objective (described in Section 3) are presented in the following sections and in Table 2.

5.1 EVALUATION CRITERIA

This section describes the three evaluation criteria: effectiveness, implementability, and cost, to be used to evaluate the remedial technologies described in Section 4.

5.1.1 Effectiveness

Effectiveness is evaluated based on the proven reliability of the remedial technology to achieve the RAO for the site (described in Section 3). The following four factors were considered under this criterion:

- Overall protection of human health and the environment.
- Long-term effectiveness and permanence.
- Reduction of toxicity, mobility, or volume of the constituent(s).
- Short-term effectiveness.

The effectiveness criteria of the remedial technology are as follows:

- Effective—would meet the RAO.
- Potentially effective—there is a likelihood of not meeting the RAO.
- Not effective—would not meet the RAO.

5.1.2 Implementability

The implementability evaluation focuses on the availability of the technology, efficiency of treatment, permitting complexity, and acceptance by the regulatory agencies and public. The implementability criteria of the corrective action are as follows:

- Easy to implement—the equipment or materials are commercially available, the technology has high treatment efficiency, low to moderate permitting complexity, and/or is readily acceptable to the regulatory agencies/public.
- Moderately complex to implement—the equipment or materials are not readily available, the technology has moderate treatment efficiency, moderate to complex permitting requirements, requires longer-term management, and/or is not easily acceptable to the regulatory agencies/public.
- Difficult to implement—the equipment or materials are not commercially available, the technology has low treatment efficiency, complex permitting requirements, requires longer-term management, and/or is not acceptable to the regulatory agencies/public.

5.1.3 Cost

The comparisons of capital cost and operation and maintenance (O&M) cost are based on experience on similar projects in the area. Detailed cost estimates have not been developed for the corrective actions being considered at the site. Based on experience, the cost for a corrective action would be considered high, moderate, or low relative to the other actions evaluated.

5.2 EVALUATION OF CORRECTIVE ACTIONS

Four alternative corrective actions were evaluated to meet the RAO at the site: (1) No Further Action, (2) Asphalt Cap and Institutional Controls, (3) Excavation, and (4) Lead Fixation. A comparison of the corrective actions for soil using the three evaluation criteria described in Section 5.1 is presented below.

5.2.1 Alternative 1—No Action

Under the no action alternative, no corrective actions would be conducted. This alternative is low cost and easily implementable but implementation is unlikely to achieve regulatory approval because it is not effective in meeting the RAO, in that the existing Cap does not cover all those areas where elevated concentrations of lead in soil exist.

5.2.2 Alternative 2—Asphalt Cap and Institutional Controls

Constructing an asphalt Cap at the site would be effective in the short term but would require O&M of the Cap to be effective in the long term. Experienced labor, material, and equipment are readily available locally, making this easily implementable in the short term. The long-term implementability is contingent upon the effectiveness of the required long-term O&M for the site. However, long-term implementability has proven to be easy to moderate because Alternative 2 was implemented over 20 years ago and has been maintained with annual inspections and repairs by PG&E in accordance with the deed restriction requirements; PG&E will continue to retain ownership and operate the site in the foreseeable future. The conceptual cost of the soil cover Cap installation would be low. Placement of a Cap does not reduce the mass of lead-affected soil; therefore, it would be effective in meeting the RAO in the long term only if the Cap were maintained.

5.2.3 Alternative 3—Excavation

Excavation and off-site disposal would effectively and permanently reduce the mass of lead at the site and achieve the RAO. The technology would be moderately easy to implement at the site because experienced labor (contractors for excavation), materials, and equipment are available locally. The estimated cost for implementing excavation at this site would be high and includes the replacement of asphalt. This alternative is less sustainable than the others because it induces greenhouse gas emissions for removal and transport of the lead-affected soil and placement of new soil. Excavation is still a more expensive option than the asphalt Cap alternative even when long-term O&M costs for the Cap are included.

5.2.4 Alternative 4—Lead Fixation

Lead fixation would effectively immobilize the mass of lead at the site and achieve the RAO. The lead mass would not be reduced, but rather it would be altered to an immobile form that is inaccessible to humans and the environment. Achievement of the RAOs would be documented using appropriate laboratory methods. This technology would be moderately easy to implement at the site because experienced labor, materials, and equipment are available locally. The estimated cost for implementing lead fixation at this site would be moderate.

6.0 PROPOSED CORRECTIVE ACTION

The four potential remedial alternatives are compared on the basis of effectiveness and reliability, technical and administrative implementability, cost, and acceptance (Table 2). The detailed costs of the four corrective actions are compared in Appendix A. Alternative 2 has been implemented at the site since 1992, demonstrating that over the past decade Alternative 2 has met the criteria for the RAOs, effectiveness and reliability, implementability, and acceptance. PG&E has maintained and repaired the Cap per deed restriction requirements and would continue this procedure into the foreseeable future. The cost of Alternative 2 is less than half the cost of either Alternatives 3 and 4. Based on these factors, Alternative 2 is the proposed corrective action. After ACEH approves Alternative 2, AMEC will prepare an implementation work plan and SMP and submit these documents to ACEH for final approval.

6.1 SCHEDULE

An implementation work plan and SMP will be prepared and submitted to ACEH within six months following approval of the proposed corrective action. Implementation of the corrective action is expected to be conducted within the next two years when Baker tanks and equipment that are currently situated over areas targeted for remediation are scheduled for removal. PG&E will remain in contact with ACEH regarding the ability to implement the corrective action in this time frame.

7.0 REFERENCES

AMEC Geomatrix, Inc. (AMEC), 2010, Asphalt Cap Repair Completion Report, Pacific Gas and Electric Company Oakland General Construction Yard, 4930 Coliseum Way, Oakland, California, September 1.

AMEC, 2011a, Soil Investigation Report, PG&E Oakland Construction Yard, 4950 Coliseum Way, Oakland, California, March 17.

AMEC, 2011b, Additional Soil Investigation Work Plan, PG&E Oakland Construction Yard, 4950 Coliseum Way, Oakland, California, July 5.

AMEC, 2011c, Additional Soil Investigation Report, PG&E Oakland Construction Yard, 4950 Coliseum Way, Oakland, California, December 21.

Aqua Resources, Inc. (ARI), 1992, Preliminary Site Assessment and Work Plan for Additional Investigation, PG&E, ENCON-GAS Transmission and Distribution Construction Yard, Former GHT Area, 4930 Coliseum Way, Oakland, California, March 6.

Office of Environmental Health Hazard Assessment (OEHHA), 2005, Soil-Screening Numbers (mg/kg soil) for Nonvolatile Chemicals Based on Total Exposure to Contaminated Soil:

Inhalation, Ingestion and Dermal Absorption: Table 5 in Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, January.

OEHHA, 2009, Revised California Human Health Screening Levels for Lead: http://www.oehha.ca.gov/risk/pdf/LeadCHHSL091709.pdf.

Pacific Gas and Electric Company (PG&E), 1992, Covenant of Deed Restriction, Covenant and Agreement to Restrict Use of Property, June 14 (draft document; not recorded).

Scheckel, K.G., and Ryan, J.A., 2004, Spectroscopic speciation and quantification of lead in phosphate-amended soils: Journal of Environmental Quality, vol. 33, pp. 1288-1295.

Wright, J., Conca, J.L., Rice, K.R., and Murphy, B. (eds.), 2004, Sustainable Range Management-2004, Proceedings of the Conference on Sustainable Range Management, January 5-8, 2004, New Orleans, Battelle Memorial Institute, Columbus, Ohio.

U.S. EPA On Scene Coordinator (EPA-OSC), n.d., Treatment Technologies Screening Matrix, Table 3-2, http://www.epaosc.org/sites/5604/files/Treatment%20Technologies%20Matrix.pdf, accessed May 2012.

TABLES

TABLE 1

ANALYTICAL RESULTS OF LEAD IN SOIL [1]

PG&E Oakland—General Construction Yard

Oakland, California

All concentrations reported in units of milligrams per kilogram

Sample Location	Sample Depth (ft bas)	Sample ID	Sample Date [2]	Lead
BB9	0.5	BB9-0.5+13	11/2/2011	6.8 J [3]
	2.0	BB9-2.0+13	11/2/2011	27 J
BB10	0.5	BB10-0.5+16	11/2/2011	30 J
	2.0	BB10-0.5+16	11/2/2011	45 J
C2	0.5	C2-0.5+13	10/25/2010	14 J+ [4]
	2.0	C2-2.0+13	10/25/2010	40 J+
C4	0.5	C-4-0.5+15	10/25/2010	240
	2.0	C-4-2.0+15	10/25/2010	35 J+
C6	0.5	C6-0.5+18	10/26/2010	310
	2.0	C6-2.0+18	10/26/2010	18 J+
C8	0.5	C8-0.5+24	10/26/2010	180
	2.0	C8-2.0+24	10/26/2010	14 J+
C7	0.5	C-7-0.5+24	10/26/2010	36 J+
	2.0	C-7-2.0+24	10/26/2010	34 J+
C9	0.5	C-9-0.5+23	10/26/2010	**340** [5]
	2.0	C-9-2.0+23	10/26/2010	11 J+
C12	0.5	C12-0.5+21	11/2/2011	**1800 J**
	2.0	C12-2.0+21	11/2/2011	42 J
D2	0.5	D-2-0.5+10	10/25/2010	9.7 J+
	2.0	D-2-2.0+10	10/25/2010	220
	5.0	D-2-5.0+10	10/25/2010	6.0 J+
D3	0.5	D-3-0.5+10	10/25/2010	70 J+
	2.0	D-3-2.0+10	10/25/2010	18 J+
D4	0.5	D4-0.5+13	10/25/2010	290
	2.0	D4-2.0+13	10/25/2010	26 J+
D5	0.5	D5-0.5+12	10/25/2010	**330**
D5R	0.5	D5R-0.5+13	10/25/2010	**2400**
	2.0	D5R-2.0+13	10/25/2010	57 J+
D6	0.5	D6-0.5+18	10/25/2010	**320**
	2.0	D6-2.0+18	10/25/2010	14 J+
D7	0.5	D-7-0.5+28	10/26/2010	110
	2.0	D-7-2.0+28	10/26/2010	9.6 J+
D8	0.5	D-8-0.5+20	10/26/2010	150
	2.0	D-8-2.0+20	10/26/2010	16 J+
D9	0.5	D9-0.5+18	10/26/2010	24 J+
	2.0	D9-2.0+18	10/26/2010	25 J+
D10	0.5	D10-0.5+24	10/26/2010	**620**
	2.0	D10-2.0+24	10/26/2010	210
	5.0	D10-5.0+24	10/26/2010	5.0 J+

TABLE 1

ANALYTICAL RESULTS OF LEAD IN SOIL [1]

PG&E Oakland—General Construction Yard
Oakland, California

All concentrations reported in units of milligrams per kilogram

Sample Location	Sample Depth (ft bas)	Sample ID	Sample Date [2]	Lead
D12	0.5	D12-0.5+21	11/2/2011	32 J
	2.0	D12-2.0+21	11/2/2011	**360 J**
	5.0	D12-5.0+21	11/2/2011	5.3
D13	0.5	D13-0.5+21	11/3/2011	31 J
	2.0	D13-2.0+21	11/3/2011	61 J
E2	0.5	E2-0.5+10	10/25/2010	110
	2.0	E2-2.0+10	10/25/2010	41 J+
E3	0.5	E-3-0.5+12	10/25/2010	**1300**
	2.0	E-3-2.0+12	10/25/2010	120
	5.0	E-3-5.0+12	10/25/2010	3.8 J+
E4	0.5	E-4-0.5+10	10/25/2010	**1400**
	2.0	E-4-2.0+10	10/25/2010	14 J+
E5	0.5	E-5-0.5+15	10/25/2010	**8700**
	2.0	E-5-2.0+15	10/25/2010	**2200**
	5.0	E-5-5.0+15	10/25/2010	6.1 J+
E6	0.5	E6-0.5+24	10/26/2010	57 J+
	2.0	E6-2.0+24	10/26/2010	130
	5.0	E6-5.0+24	10/26/2010	4.6 J+
E7	0.5	E7-0.5+24	10/26/2010	36 J+
	2.0	E7-2.0+24	10/26/2010	140
	5.0	E7-5.0+24	10/26/2010	4.3 J+
E8	0.5	E8-0.5+24	10/26/2010	42 J+
	2.0	E8-2.0+24	10/26/2010	**420**
	5.0	E8-5.0+24	10/26/2010	6.8 J+
E9	0.5	E9-0.5+26	10/26/2010	50 J+
	2.0	E9-2.0+26	10/26/2010	53 J+
E10	0.5	E-10-0.5+24	10/26/2010	220
	2.0	E-10-2.0+24	10/26/2010	**460**
	5.0	E-10-5.0+24	10/26/2010	4.7 J+
E12	0.5	E12-0.5+22	11/2/2011	**2600 J**
	2.0	E12-2.0+22	11/2/2011	18 J
E13	0.5	E13-0.5+12	11/3/2011	25
F1	0.5	F1-0.5+11	10/25/2010	11 J+
	2.0	F1-2.0+11	10/25/2010	100
	5.0	F1-5.0+11	10/25/2010	8.8 J+
F2	0.5	F2-0.5+13	10/25/2010	150 [6]
	0.5	F2-0.5+13	10/25/2010	130
	2.0	F2-2.0+13	10/25/2010	55 [6]
	2.0	F2-2.0+13	10/25/2010	57 J+

TABLE 1

ANALYTICAL RESULTS OF LEAD IN SOIL [1]

PG&E Oakland—General Construction Yard
Oakland, California

All concentrations reported in units of milligrams per kilogram

Sample Location	Sample Depth (ft bas)	Sample ID	Sample Date [2]	Lead
F8	0.5	F-8-0.5+20	10/26/2010	**4400** [6]
	0.5	F-8-0.5+20	10/26/2010	**9800**
	2.0	F-8-2.0+20	10/26/2010	**730** [6]
	2.0	F-8-2.0+20	10/26/2010	200
	5.0	F-8-5.0+20	10/26/2010	4.8 J+
F9	0.5	F-9-0.5+24	10/26/2010	**540**
	2.0	F-9-2.0+24	10/26/2010	120
	5.0	F-9-5.0+24	10/26/2010	5.5 J+
F10	0.5	F10-0.5+18	10/26/2010	**4700**
	2.0	F10-2.0+18	10/26/2010	160
	5.0	F10-5.0+18	10/26/2010	6.8 J+
F12	0.5	F12-0.5+12	11/3/2011	170 J
	2.0	F12-2.0+12	11/3/2011	**530 J**
	5.0	F12-5.0+12	11/3/2011	17
G1	0.5	G1-0.5+10	10/25/2010	72 J+
	2.0	G1-2.0+10	10/25/2010	5.0 J+
G8	0.5	G8-0.5+24	10/27/2010	**2500**
	2.0	G8-2.0+24	10/27/2010	140
	5.0	G8-5.0+24	10/27/2010	7.6 J+
	6.0	G8-6.0+24	10/27/2010	6.7 J+
	8.0	G8-8.0+24	10/27/2010	11 J+
G9	0.5	G-9-0.5+22	10/27/2010	21 J+
	2.0	G-9-2.0+22	10/27/2010	170
	5.0	G-9-5.0+22	10/27/2010	5.3 J+
G10	0.5	G-10-0.5+24	10/27/2010	230
	2.0	G-10-2.0+24	10/27/2010	16 J+
G11	0.5	G-11-0.5+20	10/27/2010	**500**
	2.0	G-11-2.0+20	10/27/2010	6.2 J+
G12	0.5	G12-0.5+16	11/2/2011	190 J
	2.0	G12-2.0+16	11/2/2011	**680 J**
	5.0	G12-5.0+16	11/2/2011	6.8
G13	0.5	G13-0.5+12	11/2/2011	**340 J**
	2.0	G13-2.0+12	11/2/2011	**590 J**
G14	0.5	G14-0.5+14	11/3/2011	47
	2.0	G14-2.0+14	11/3/2011	51
H9	0.5	H-9-0.5+15	10/28/2010	14.0 J+
H9R	0.5	HR9-0.5+19	10/28/2010	69 J+
	2.0	HR9-2.0+19	10/28/2010	55 J+
H10	0.5	H10-0.5+12	10/27/2010	110 J+
	2.0	H10-2.0+12	10/27/2010	70 J+

TABLE 1

ANALYTICAL RESULTS OF LEAD IN SOIL [1]

PG&E Oakland—General Construction Yard

Oakland, California

All concentrations reported in units of milligrams per kilogram

Sample Location	Sample Depth (ft bas)	Sample ID	Sample Date [2]	Lead
H11	0.5	H11-0.5+12	10/27/2010	24 [6]
	0.5	H11-0.5+12	10/27/2010	20 J+
	2.0	H11-2.0+12	10/27/2010	6.1 [6]
	2.0	H11-2.0+12	10/27/2010	3.9 J+
H12	0.5	H-12-0.5+9	10/27/2010	150
H12R	0.5	H12R-0.5+6	10/27/2010	**660**
	2.0	H12R-2.0+6	10/27/2010	53 J+
I9	0.5	I9-0.5+24	10/28/2010	**660**
	2.0	I9-2.0+24	10/28/2010	210
	5.0	I9-5.0+24	10/28/2010	7.1 J+
I10R	0.5	I-10R-0.5+15	10/28/2010	**2600**
	2.0	I-10R-2.0+15	10/28/2010	9.3 J+
I10	0.5	I-10-0.5+15	10/27/2010	24 J+
	2.0	I-10-2.0+15	10/27/2010	**320**
	refusal at 5.0	NA	NA	NA
I11	0.5	I11-0.5+15	10/27/2010	22 J+
	2.0	I11-2.0+15	10/27/2010	**350**
	5.0	I11-5.0+15	10/27/2010	6.9 J+
J0	0.5	J0-0.5+21	11/1/2011	21 J
	2.0	J0-2.0+21	11/1/2011	51 J
J1	0.5	J1-0.5+16	10/29/2010	**550**
	2.0	J1-2.0+16	10/29/2010	110 J+
	5.0	J1-5.0+16	10/29/2010	8.5 J+
	6.0	J1-6.0+16	10/29/2010	11 J+
	8.0	J1-8.0+16	10/29/2010	8.8 J+
J9	0.5	J-9-0.5+24	10/27/2010	**1200**
	2.0	J-9-2.0+24	10/27/2010	**1200**
	5.0	J-9-5.0+24	10/27/2010	7.7 J+
J10	0.5	J10-0.5+16	10/27/2010	21 J+
	2.0	J10-2.0+16	10/27/2010	220
	5.0	J10-5.0+16	10/27/2010	5.1 J+
J11	0.5	J11-0.5+15	10/27/2010	6.5 J+
	2.0	J11-2.0+15	10/27/2010	210
	5.0	J11-5.0+15	10/27/2010	7.0 J+
J12	0.5	J-12-0.5+9	10/27/2010	94
	2.0	J-12-2.0+9	10/27/2010	43 J+
K0	0.5	K0-0.5+20	11/1/2011	110 J
	2.0	K0-2.0+20	11/1/2011	24 J

TABLE 1

ANALYTICAL RESULTS OF LEAD IN SOIL [1]
PG&E Oakland—General Construction Yard
Oakland, California

All concentrations reported in units of milligrams per kilogram

Sample Location	Sample Depth (ft bas)	Sample ID	Sample Date [2]	Lead
K1	0.5	K1-0.5+17	10/29/2010	**1200**
	2.0	K1-2.0+17	10/29/2010	5.4 J+
K10	0.5	K10-0.5+18	10/27/2010	16 J+
	2.0	K10-2.0+18	10/27/2010	290
	5.0	K10-5.0+18	10/27/2010	9.4 J+
K11	0.5	K11-0.5+15	10/27/2010	15 J+
	2.0	K11-2.0+15	10/27/2010	**330**
	5.0	K11-5.0+15	10/27/2010	7.5 J+
K12	0.5	K-12-0.5+9	10/27/2010	220
	2.0	K-12-2.0+9	10/27/2010	240
	5.0	K-12-5.0+9	10/27/2010	7 J+
L1	0.5	L1-0.5+15	10/28/2010	180
	2.0	L1-2.0+15	10/28/2010	6.0 J+
	5.0	L1-5.0+15	10/28/2010	9.7 J+
L8	0.5	L8-0.5+24	10/28/2010	120 [6]
	0.5	L8-0.5+24	10/28/2010	16 J+
	2.0	L8-2.0+24	10/28/2010	6 [6]
	2.0	L8-2.0+24	10/28/2010	92 J+
	5.0	L8-5.0+24	10/28/2010	7.1 J+
L9R	0.5	L9R-0.5+24	10/28/2010	300
	2.0	L9R-2.0+24	10/28/2010	6.4 J+
L10	0.5	L-10-0.5+15	10/27/2010	7.4 J+
	2.0	L-10-2.0+15	10/27/2010	130
	5.0	L-10-5.0+15	10/27/2010	7.5 J+
L11	0.5	L11-0.5+12	10/27/2010	84 J+
	2.0	L11-2.0+12	10/27/2010	210
	5.0	L11-5.0+12	10/27/2010	9.3 J+
L12	0.5	L-12-0.5+9	10/27/2010	**530**
	2.0	L-12-2.0+9	10/27/2010	**610**
	5.0	L-12-5.0+9	10/27/2010	5.2 J+
M1	0.5	M1-0.5+12	10/29/2010	43 J+
	2.0	M1-2.0+12	10/29/2010	11 J+
M2	0.5	M2-0.5+16	10/29/2010	**450** [6]
	0.5	M2-0.5+16	10/29/2010	**1100**
	2.0	M2-2.0+16	10/29/2010	49 J+[6]
	2.0	M2-2.0+16	10/29/2010	9.7 J+

TABLE 1

ANALYTICAL RESULTS OF LEAD IN SOIL [1]

PG&E Oakland—General Construction Yard

Oakland, California

All concentrations reported in units of milligrams per kilogram

Sample Location	Sample Depth (ft bas)	Sample ID	Sample Date [2]	Lead
M3	0.5	M3-0.5+14	10/28/2010	**730**
	2.0	M3-2.0+14	10/28/2010	5.8 J+
	5.0	M3-5.0+14	10/28/2010	8.5 J+
	6.0	M3-6.0+14	10/28/2010	6.1 J+
	8.0	M3-8.0+14	10/28/2010	10 J+
M4	0.5	M-4-0.5+15	10/28/2010	120 J+
	2.0	M-4-2.0+15	10/28/2010	170
M5	0.5	M5-0.5+22	10/28/2010	220
	2.0	M5-2.0+22	10/28/2010	4.8 J+
M6	0.5	M-6-0.5+20	10/28/2010	20 J+
	2.0	M-6-2.0+20	10/28/2010	240
	5.0	M-6-5.0+20	10/28/2010	5.0 J+
M7	0.5	M-7-0.5+22	10/28/2010	21 J+
	2.0	M-7-2.0+22	10/28/2010	9.6 J+
M9	0.5	M-9-0.5+12	10/28/2010	**1100**
CHHSLs Industrial/Commercial [7,8]				320

Notes

1. Soil samples were collected by ETIC Engineering of Pleasant Hill, California, and analyzed by TestAmerica for lead and other Title 22 metals using U.S. EPA Method 6010B, and for mercury using U.S. EPA Method 7470A.
2. Gray shading indicates the samples were collected in November 2011.
3. J indicates the result is an estimated quantity.
4. J+ indicates the result is an estimated quantity, but the result may be biased high.
5. Bold type indicates constituent detected above the commercial CHHSL.
6. The laboratory analyzed the sample for lead twice. Due to soil matrix heterogeneities, the lead values differ. The larger of the two values is shown on Figures 4 and 5.
7. Office of Environmental Health Hazard Assessment (OEHHA), 2005, Soil-Screening Numbers (mg/kg soil) for Nonvolatile Chemicals Based on Total Exposure to Contaminated Soil: Inhalation, Ingestion and Dermal Absorption: Table 5 in Human-Exposure-Based Screening Numbers Developed to Aid Estimation of Cleanup Costs for Contaminated Soil, January.
8. Office of Environmental Health Hazard Assessment (OEHHA), 2009, Revised California Human Health Screening Levels for Lead, http://www.oehha.ca.gov/risk/pdf/LeadCHHSL091709.pdf.

Abbreviations

ft bas= feet below asphalt subgrade

U.S. EPA = United States Environmental Protection Agency

NA = not applicable

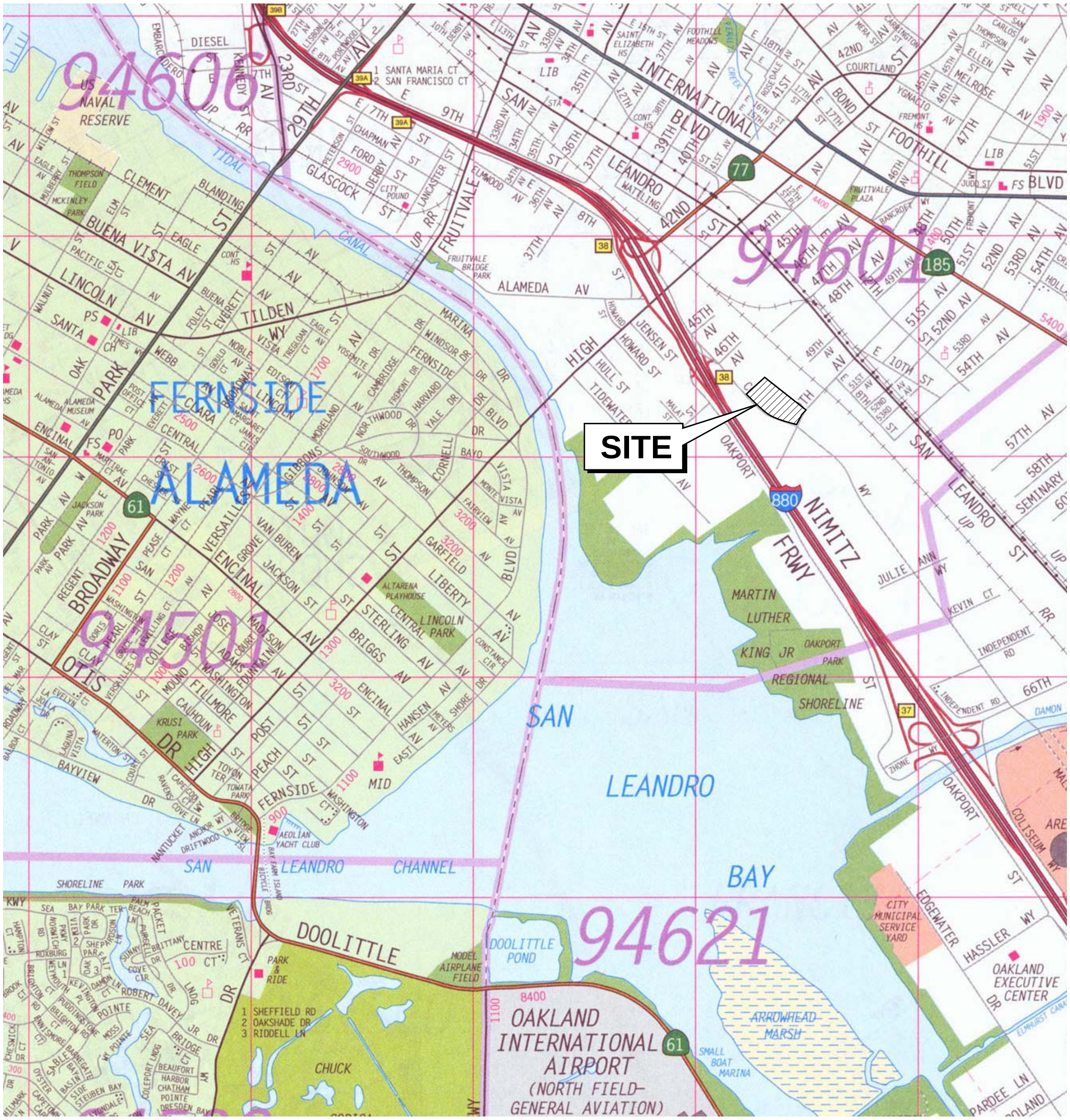
TABLE 2

EVALUATION OF ALTERNATIVES[1]
PG&E Oakland General Construction Yard
Oakland, California

Alternative	Achievement of Remedial Objectives	Effectiveness and Reliability: Short-term Effectiveness	Effectiveness and Reliability: Long-term Effectiveness	Effectiveness and Reliability: Reduction of Toxicity, Mobility, and Volume	Technical and Administrative Implementability	Cost[2,3] (in thousand dollars)	Acceptance: Regulatory	Acceptance: Community
1. No Action	No	Not Effective	Not Effective	No reduction of T, M, or V	Implementable	$ 42	Low	Low
2. Cap and Institutional Controls	Yes	Effective	Effective contingent upon maintenance	No reduction of T, M, or V	Implementable	$ 460	High	High
3. Excavation	Yes	Effective	Effective	Reduction of V; no reduction of T or M	More difficult to implement than 1 and 2	$ 3,050	High	High
4. Lead Fixation	Yes	Effective	Effective	Reduction of T and M; no reduction of V	More difficult to implement than 1 and 2	$ 1,835	Unknown	Unknown

Notes
1. An explanation of the evaluation criteria is provided in Section 5.0 of this report.
2. Costs inclusive of 10 year amortization of any scheduled costs applicable for maintenance of selected alternative (i.e. monitoring, repair, reporting).
3. Costs are rounded and presented for comparative purpose only. Detailed cost estimates for each alternative are presented in Appendix A, Tables A-1, A-2, A-3, and A-4.

FIGURES

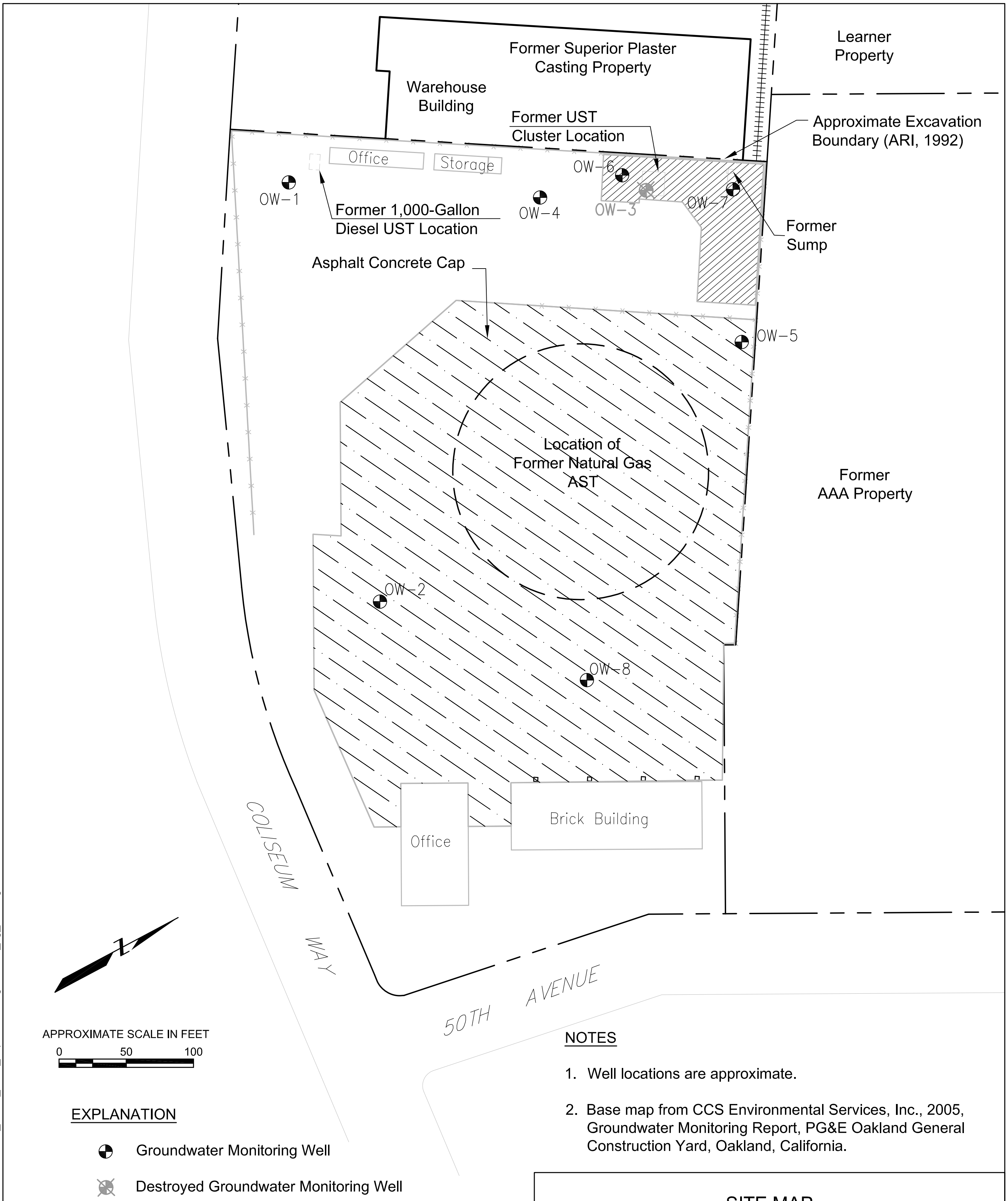


0 2000 feet

SITE LOCATION MAP
Pacific Gas and Electric Company
Oakland General Construction Yard
4930 Coliseum Way
Oakland, California

By: TK	Date: 06/06/2012	Project No. 13045.007.F
amec		Figure 1

S:\13000\13045\13045.007.F\task_0212_0502_cap_fig_01(01)_SLM.ai



NOTES

1. Well locations are approximate.

2. Base map from CCS Environmental Services, Inc., 2005, Groundwater Monitoring Report, PG&E Oakland General Construction Yard, Oakland, California.

EXPLANATION

- Groundwater Monitoring Well
- Destroyed Groundwater Monitoring Well
- Approximate Property Boundary
- Railroad Spur

ABBREVIATIONS

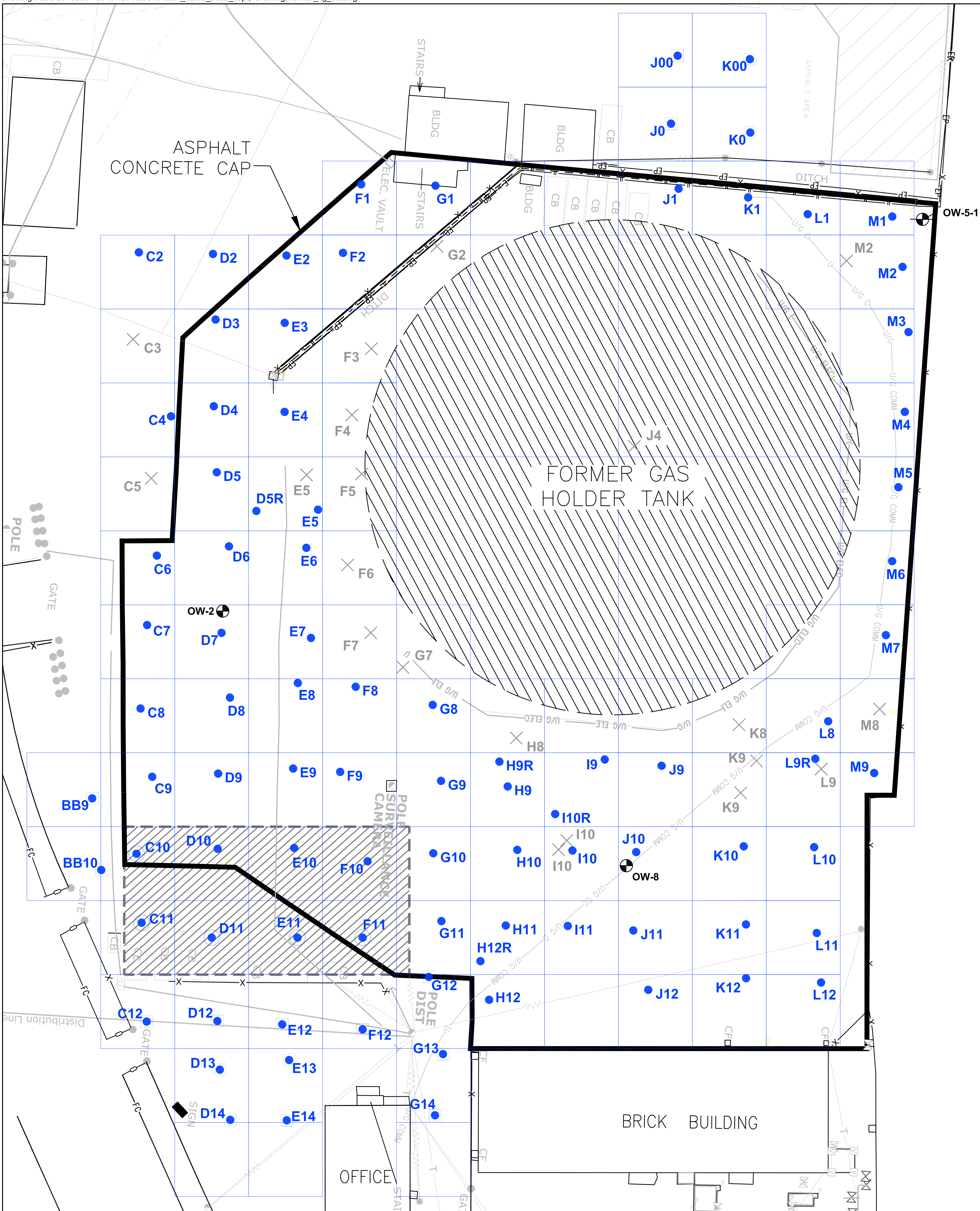
AST Aboveground Storage Tank
UST Underground Storage Tank

SITE MAP
Pacific Gas and Electric Company
Oakland General Construction Yard
4930 Coliseum Way, Oakland, California

By: TK	Date: 06/06/2012	Project No. 13045.007.F
amec		Figure 2

Plot Date: 06/06/12 - 8:21am, Plotted by: dave.oshea
Drawing Path: S:\13000\13045\13045.007.F\task_02\12_0502_cap\, Drawing Name: _fig_02.dwg

Plot Date: 06/06/12 - 8:22am, Plotted by: dave.oshea
Drawing Path: S:\13000\13045\13045.007.F\task_02\12_0502_cap\, Drawing Name: _fig_03.dwg



EXPLANATION

- Sampling grid
- C2 Sampling location and ID (2010)
- C3 Attempted sampling location (refusal encountered 2010)
- C12 Sampling location and ID (2011)
- C10 Proposed sampling location and ID. No samping was attempted (2011)
- Groundwater monitoring well
- Asphalt cap boundary
- Location of former gas holder tank footprint
- Approximate location of baker tanks

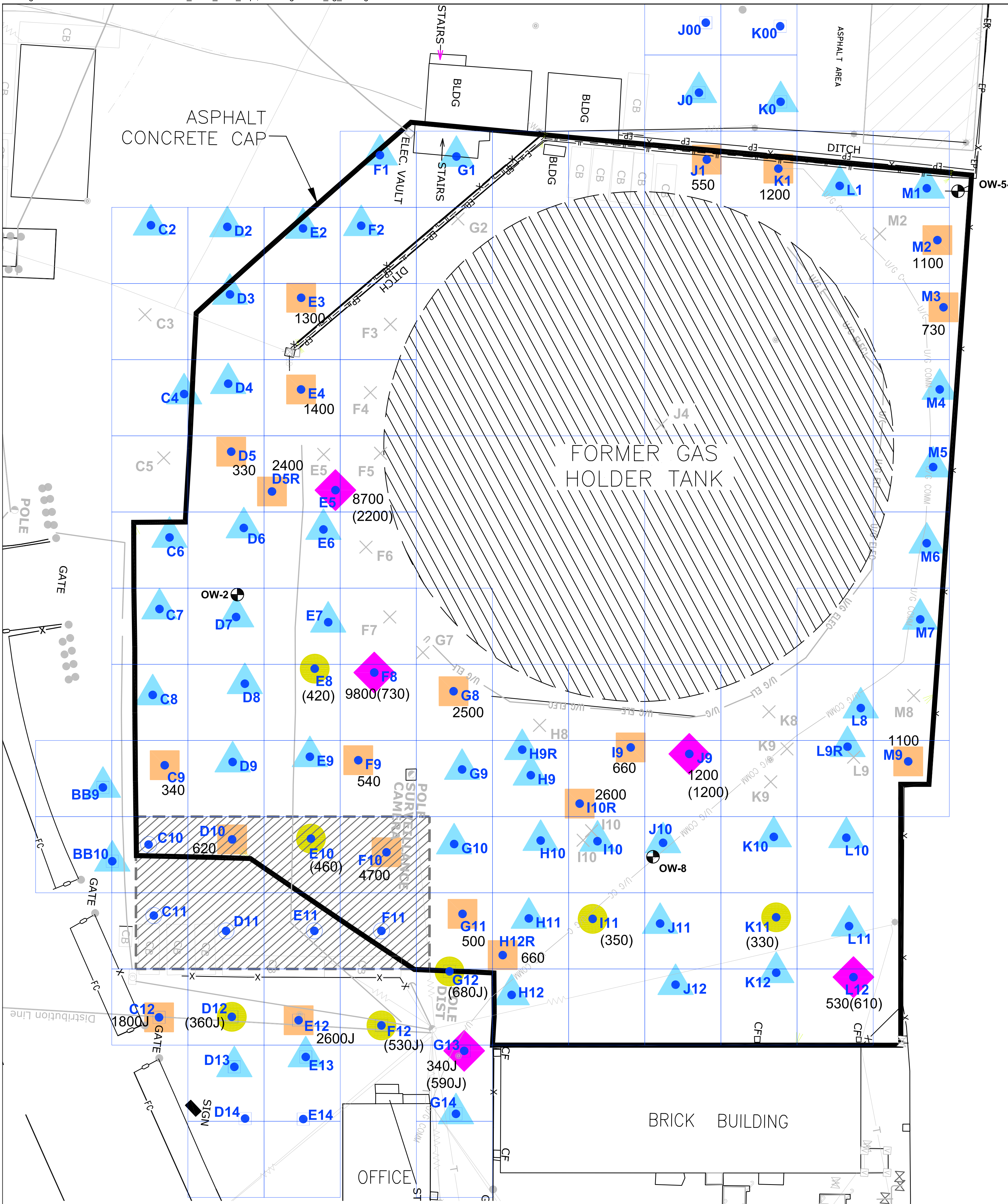
APPROXIMATE SCALE IN FEET
0 20 40

Base map modified from Pacific Gas & Electric Company, Drawing Number Z-0912: "Oakland G.C. Yard Topo," dated 04/06/2010.

SAMPLING LOCATIONS
Pacific Gas and Electric Company
Oakland General Construction Yard
4930 Coliseum Way, Oakland, California

By: TK	Date: 06/06/12	Project No. 13045.007.F
amec		Figure 3

Plot Date: 06/06/12 - 8:33am, Plotted by: dave.oshea
Drawing Path: S:\13000\13045\13045.007.F\task_02\12_0502_cap\, Drawing Name: _fig_04.dwg



EXPLANATION

C2	Sampling grid Sampling location and ID (2010)
C3 ×	Attempted sampling location (refusal encountered 2010)
C12	Sampling location and ID (2011)
C10	Proposed sampling location and ID. No samping was attempted (2011)
	Groundwater monitoring well
	Asphalt cap boundary
4700	Lead concentration (mg/kg) at 0 to 0.5 feet bgs
(2200)	Lead concentration (mg/kg) at 1.5 to 2.0 feet bgs
	Location of former gas holder tank footprint
	Approximate location of baker tanks

Concentration of Lead in Soil (Color Code)

- Does not exceed CHHSL for commercial/industrial use at any depth from 0 to 5 feet bgs
- Exceeds CHHSL for commercial/industrial land use (320 mg/kg); 0 to 0.5 feet bgs
- Exceeds CHHSL for commercial/ industrial land use (320 mg/kg); 1.5 to 2.0 feet bgs
- Exceeds CHHSL for commercial/ industrial land use (320 mg/kg); 0 to 0.5 and 1.5 to 2.0 feet bgs

ABBREVIATIONS

J	Value is an estimate
bgs	Below ground surface
mg/kg	Milligrams per kilogram
CHHSL	California human health screening level

NOTES

1. Below ground surface reference begins with soil below asphalt and underlying subgrade. Table 1 provides thickness of asphalt and subgrade at each sampling location.

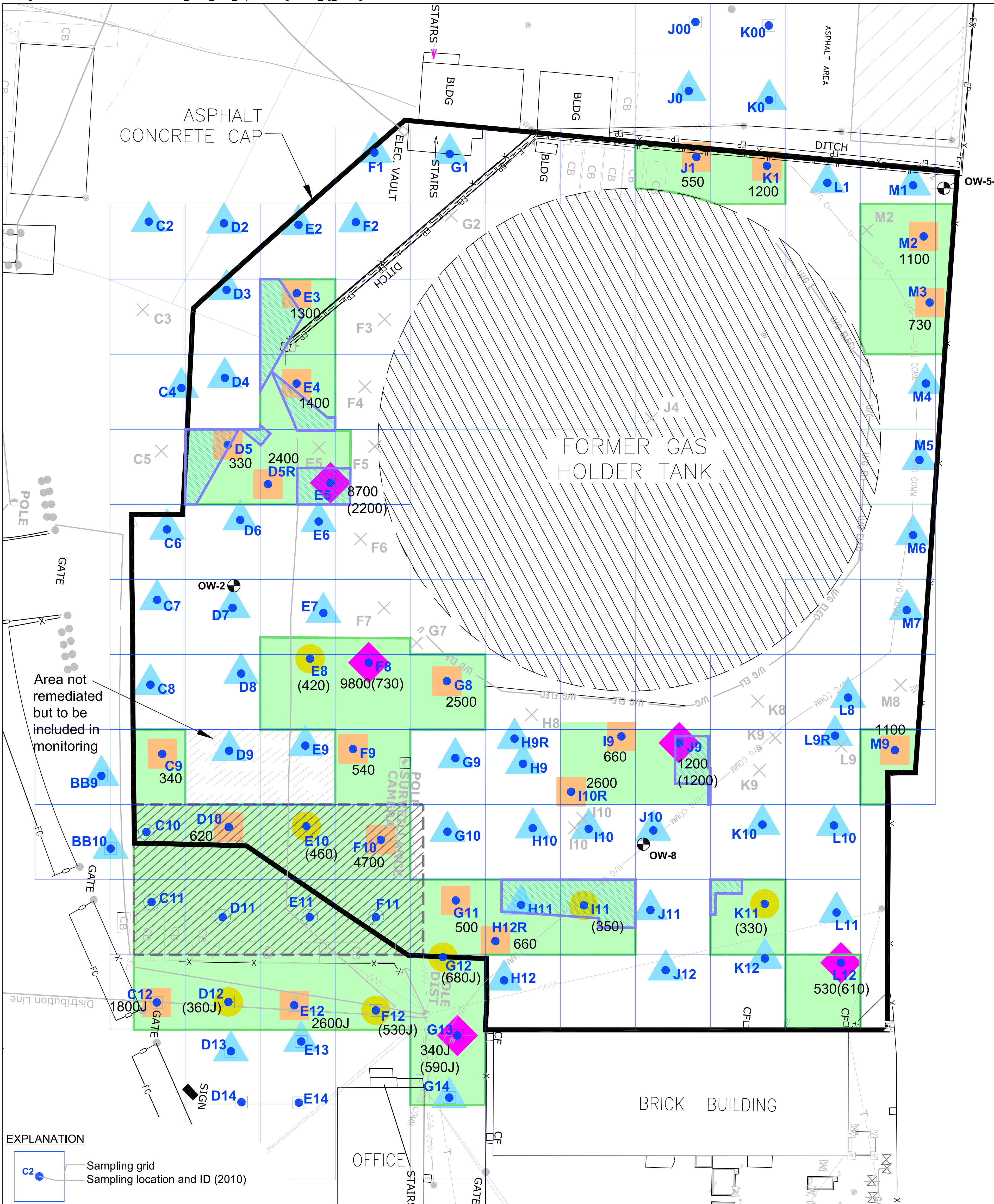
APPROXIMATE SCALE IN FEET
0 20 40

Base map modified from by Pacific Gas & Electric Company, Drawing Number Z-0912: "Oakland G.C. Yard Topo," dated 04/06/2010.

LEAD IN SOIL, 0 TO 2.0 FEET BGS
Pacific Gas and Electric Company
Oakland General Construction Yard
4930 Coliseum Way, Oakland, California

By: RM	Date: 06/06/12	Project No. 13045.007.F
amec		Figure 4

Plot Date: 07/02/12 - 10:42am, Plotted by: kristin.uber
Drawing Path: S:\13000\13045\13045.007.F\task_02\12_0502_cap\, Drawing Name: _fig_05.dwg



EXPLANATION

C2	Sampling grid Sampling location and ID (2010)
C3	Attempted sampling location (refusal encountered 2010)
C12	Sampling location and ID (2011)
C10	Proposed sampling location and ID. No samping was attempted (2011)
	Groundwater monitoring well
	Asphalt cap boundary
4700	Lead concentration (mg/kg) at 0 to 0.5 feet bgs
(2200)	Lead concentration (mg/kg) at 1.5 to 2.0 feet bgs
	Location of former gas holder tank footprint
	Approximate location of baker tanks
	Extent of asphalt surface replacement
	Impacted areas paved in May 2010 and therefore not being repaved as part of Alternative 2 (~2,505 sq. ft.)

Concentration of Lead in Soil (Color Code)

- Does not exceed CHHSL for commercial/industrial use at any depth from 0 to 5 feet
- Exceeds CHHSL for commercial/industrial land use (320 mg/kg); 0 to 0.5 feet
- Exceeds CHHSL for commercial/ industrial land use (320 mg/kg); 1.5 to 2.0 feet
- Exceeds CHHSL for commercial/ industrial land use (320 mg/kg); 0 to 0.5 and 1.5 to 2.0 feet

ABBREVIATIONS

J	Value is an estimate
bgs	Below ground surface
mg/kg	Milligrams per kilogram
CHHSL	California human health screening level

NOTES

1. Below ground surface reference begins with soil below asphalt and underlying subgrade. Table 1 provides thickness of asphalt and subgrade at each sampling location.

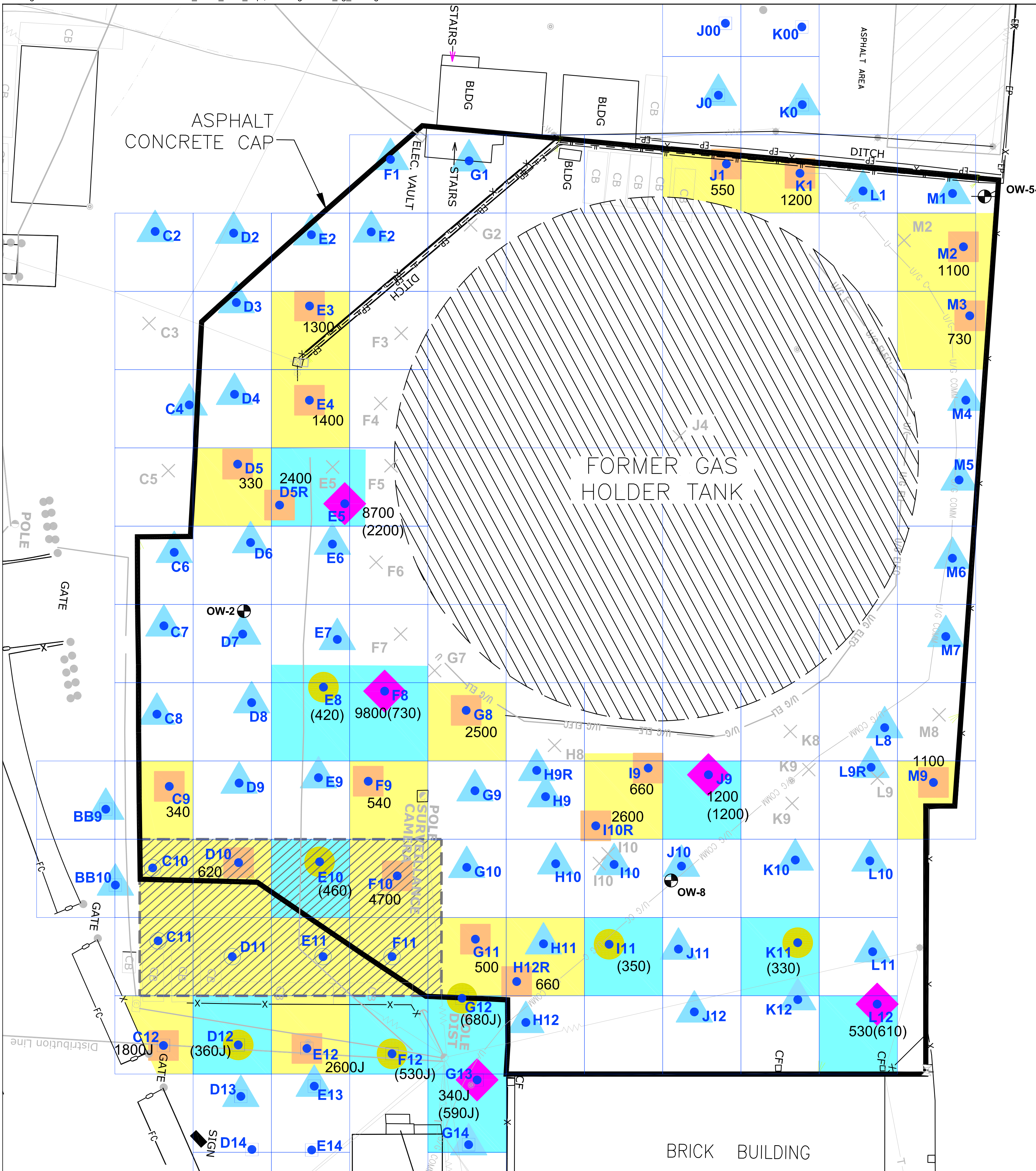
APPROXIMATE SCALE IN FEET
0 20 40

Base map modified from by Pacific Gas & Electric Company, Drawing Number Z-0912: "Oakland G.C. Yard Topo," dated 04/06/2010.

ALTERNATIVE 2 - AREAS PROPOSED FOR ASPHALT SURFACE REPLACEMENT
Pacific Gas and Electric Company
Oakland General Construction Yard
4930 Coliseum Way, Oakland, California

By: RM	Date: 07/02/12	Project No. 13045.007.F
amec		Figure 5

Plot Date: 06/12/12 - 11:28am, Plotted by: dave.oshea
Drawing Path: S:\13000\13045\13045.007.F\task_02\12_0502_cap\, Drawing Name: _fig_06.dwg



EXPLANATION

- C2 — Sampling grid; Sampling location and ID (2010)
- C3 × — Attempted sampling location (refusal encountered 2010)
- C12 — Sampling location and ID (2011)
- C10 — Proposed sampling location and ID. No samping was attempted (2011)
- Groundwater monitoring well
- Asphalt cap boundary
- 4700 — Lead concentration (mg/kg) at 0 to 0.5 feet bgs
- (2200) — Lead concentration (mg/kg) at 1.5 to 2.0 feet bgs
- Location of former gas holder tank footprint
- Approximate location of baker tanks
- Extent of 1-foot deep excavation/lead fixation
- Extent of 4-feet deep excavation/lead fixation

Concentration of Lead in Soil (Color Code)

- Does not exceed CHHSL for commercial/industrial use at any depth from 0 to 5 feet
- Exceeds CHHSL for commercial/industrial land use (320 mg/kg); 0 to 0.5 feet
- Exceeds CHHSL for commercial/ industrial land use (320 mg/kg); 1.5 to 2.0 feet
- Exceeds CHHSL for commercial/ industrial land use (320 mg/kg); 0 to 0.5 and 1.5 to 2.0 feet

ABBREVIATIONS

J	Value is an estimate
bgs	Below ground surface
mg/kg	Milligrams per kilogram
CHHSL	California human health screening level

NOTES

1. Below ground surface reference begins with soil below asphalt and underlying subgrade. Table 1 provides thickness of asphalt and subgrade at each sampling location.

APPROXIMATE SCALE IN FEET
0 20 40

Base map modified from by Pacific Gas & Electric Company, Drawing Number Z-0912: "Oakland G.C. Yard Topo," dated 04/06/2010.

ALTERNATIVE 3 AND 4 - AREAS PROPOSED FOR EXCAVATION AND LEAD FIXATION
Pacific Gas and Electric Company
Oakland General Construction Yard
4930 Coliseum Way, Oakland, California

By: RM	Date: 06/12/12	Project No. 13045.007.F
amec		Figure 6

APPENDIX A

Detailed Cost Estimate Remedial Design Alternatives

TABLE A-1

PRELIMINARY COST ESTIMATE
REMEDIAL ALTERNATIVE 1 - NO ACTION
Pacific Gas and Electric General Construction Yard
Oakland, California

ITEM DESCRIPTION	UNIT PRICE	UNIT	EST. QTY.	TOTAL
POST CONSTRUCTON AND OPERATION AND MAINTENANCE COSTS				
Cap Maintenance				
Site Cap Operation and Maintenance/Monitoring	$6,000	annually for 10 years	NPV	$42,141
				$42,141
				$42,150

TABLE A-2

PRELIMINARY COST ESTIMATE
REMEDIAL ALTERNATIVE 2 - ASPHALT CAP AND INSTITUTIONAL CONTROLS
Pacific Gas and Electric General Construction Yard
Oakland, California

ITEM DESCRIPTION	UNIT PRICE	UNIT	EST. QTY.	TOTAL
CAPITAL COSTS				
PRE CONSTRUCTION ACTIVITIES	$13,500	Lump Sum	1	$13,500
Utility Survey	$1,000	Lump Sum	1	$1,000
Topographic Survey	$10,000	Lump Sum	1	$10,000
Total Estimated Cost of Permits	$2,500	Lump Sum	1	$2,500
CONSTRUCTION COSTS				
Mobilization/Demobilization				
Mobilization/Demobilization	10%	percentage	214,032	$21,403
Asphalt Removal and Disposal, Install AC Pavement				
Removal and Disposal of designated AC, prepare asphalt subgrade, place and compact AC	$4.85	sf	27,195	$131,896
Environmental Controls				
Dust Control	$2,000	week	2	$4,000
Air Monitoring (Equipment, Labor and Sampling)	$29,418	week	2	$58,836
Miscellaneous Equipment/ Supplies/Rentals				
Miscellaneous Rental Charges	$500	per day	10	$5,000
Temporary Fence Rental	$800	lump sum	1	$800
Subtotal Capital Costs				**$235,435**
CONTINGENCY COSTS				
Scope Contingencies	25%	percentage	235,435	**$58,859**
Bid Contingencies	15%	percentage	235,435	**$35,315**
Total Estimated Contingency Cost				**$94,174**
PROFESSIONAL SERVICES COSTS				
Project Management	8%	percentage	329,609	**$26,369**
Construction Management	10%	percentage	329,609	**$32,961**
Total Estimated Professional Services Cost				**$59,330**
Total Capital Costs				**$388,938**
POST CONSTRUCTON AND OPERATION AND MAINTENANCE COSTS				
Site Management Plan	$25,000	lump sum	1	$ 25,000.00
Site Cap Operation and Maintenance/Monitoring	$6,000	annually for 10 years	NPV	$42,141
TOTAL POST CONSTRUCTION AND O&M COSTS				**$ 67,141**
TOTAL PROJECT COST				**$456,080**

TABLE A-3

PRELIMINARY COST ESTIMATE
REMEDIAL ALTERNATIVE 3 - EXCAVATION
Pacific Gas and Electric General Construction Yard
Oakland, California

ITEM DESCRIPTION	UNIT PRICE	UNIT	EST. QTY.	TOTAL
CAPITAL COSTS				
PRE CONSTRUCTION ACTIVITIES	$23,500	Lump Sum	1	$23,500
Private Subsurface Locator	$1,000	Lump Sum	1	$ 1,000
Buried utility investigation	$10,000	Lump Sum	1	$ 10,000
Topographic Survey	$10,000	Lump Sum	1	$ 10,000
Total Estimated Permits Cost	$2,500	Lump Sum	1	$ 2,500
CONSTRUCTION COSTS				
Mobilization/Demobilization				
Mobilization/Demobilization	10%	percentage	973,086	$ 97,309
Asphalt Removal and Disposal, Install AC Pavement				
Removal and Disposal of designated AC, prepare asphalt subgrade, place and compact AC	$4.85	sf	31,500	$ 152,775
Removal of AB	$30	cy	583	$ 17,500
Excavation, Shoring and Backfill Activities				
Difficult Excavation	$45	cy	2,467	$ 111,000
Shoring and Excavation Protection	$61	sf	5,040	$ 307,440
Environmental Controls				
Dust Control	$2,000	week	6	$ 12,000
Air Monitoring (Equipment, Labor and Sampling)	$29,418	week	3	$ 88,254
Backfill				
Furnish AB -from local quarry, backfill and compact	$76	cy	3,207	$ 242,317
Compaction Testing	$2,600	Lump Sum	1	$ 2,600
Transportion and Disposal				
Aggregate base as non-haz soil	$42	ton	1108	$ 45,996
Transportation and disposal: lead implacted Class I non-RCRA Cal Haz Soil	$112	ton	3,103	$ 346,087
Transportation and disposal: RCRA hazardous soil	$258	ton	1,090	$ 281,475
Groundwater Disposal/Discharge to Sanitary Sewer	$0.02	gallon	175,044	$ 3,501
Taxes (BOE)				
Board of Equalization Tax 2012	varies	Lump Sum	1	$ 81,880
Miscellaneous Equipment/ Supplies/Rentals				
Miscellaneous Rental Charges	$500	per day	35	$ 17,500
Temporary Fence Rental	$800	lump sum	1	$ 800
Subtotal Capital Costs				**$ 1,831,933**

TABLE A-3

PRELIMINARY COST ESTIMATE
REMEDIAL ALTERNATIVE 3 - EXCAVATION
Pacific Gas and Electric General Construction Yard
Oakland, California

ITEM DESCRIPTION	UNIT PRICE	UNIT	EST. QTY.	TOTAL
CONTINGENCY COSTS				
Scope Contingencies	25%	percentage	1,831,933	**$457,983**
Bid Contingencies	15%	percentage	1,831,933	**$274,790**
Total Estimated Contingency Cost				**$732,773**
PROFESSIONAL SERVICES COSTS				
Project Management	8%	percentage	2,564,706	**$205,176**
Construction Management	10%	percentage	2,564,706	**$256,471**
Total Estimated Professional Services Cost				**$461,647**
Total Capital Costs				**$3,026,353**
POST CONSTRUCTON AND OPERATION AND MAINTENANCE COSTS				
Site Management Plan	$25,000	lump sum	1	$ 25,000
TOTAL POST CONSTRUCTION AND O&M COSTS				**$ 25,000.00**
TOTAL PROJECT COST				**$3,051,360**

TABLE A-4

PRELIMINARY COST ESTIMATE
REMEDIAL ALTERNATIVE 4 - LEAD FIXATION
Pacific Gas and Electric General Construction Yard
Oakland, California

ITEM DESCRIPTION	Unit Price	Unit	Est. Qty.	Total
CAPITAL COSTS				
PRE CONSTRUCTION ACTIVITIES	$23,500	Lump Sum	1	$23,500
Private Subsurface Locator	$1,000	Lump Sum	1	$ 1,000
Buried utility investigation	$10,000	Lump Sum	1	$ 10,000
Topographic Survey	$10,000	Lump Sum	1	$ 10,000
Total Estimated Cost (Permits)	$2,500	Lump Sum	1	$ 2,500
CONSTRUCTION COSTS				
Mobilization/Demobilization				
Mobilization/Demobilization	10%	percentage	901,204	$ 90,120
Asphalt Removal and Disposal, Install AC Pavement				
Removal and Disposal of designated AC, prepare asphalt subgrade, pl	$4.85	sf	-	$ -
Removal of AB	$30	cy	583	$ 17,500
Lead Fixation				
Pilot Study	$50,000	Lump Sum	1	$ 50,000
Asphalt pavement removal and disposal, and concrete cap	$10.50	sf	31,500	$ 330,750
Remediation of impacted soil to 1 foot depth	$5.2	cf	19,800	$ 102,960
Remediation of impacted soil to 4 foot depth	$5.8	cf	46,800	$ 271,440
Environmental Controls				
Dust Control	$2,000	week	3	$ 6,000
Air Monitoring (Equipment, Labor and Sampling)	$29,418	week	3	$ 88,254
Backfill				
Furnish AB -from local quarry, backfill and compact	$76	cy		$ -
Compaction Testing	$2,600	Lump Sum		
Transportion and Disposal				
Aggregate base as non-haz soil	$42	ton	1108	$ 45,996
Transportation and disposal: lead implacted Class I non-RCRA Cal Haz Soil	$112	ton	-	$ -
Transportation and disposal: RCRA hazardous soil	$258	ton	210	$ 54,130
Groundwater Disposal/Discharge to Sanitary Sewer	$0.02	gallon		
Taxes (BOE)				
Board of Equalization Tax 2012	varies	Lump Sum	1	$ 4,094
Miscellaneous Equipment/ Supplies/Rentals				
Miscellaneous Rental Charges	$500	per day	20	$10,000
Temporary Fence Rental	$800	lump sum	1	$800
Subtotal Capital Costs				**$ 1,095,544**
CONTINGENCY COSTS				
Scope Contingencies	25%	percentage	1,095,544	**$273,886**
Bid Contingencies	15%	percentage	1,095,544	**$164,332**
Total Estimated Contingency Cost				**$438,218**
PROFESSIONAL SERVICES COSTS				
Project Management	8%	percentage	1,533,762	**$122,701**
Construction Management	10%	percentage	1,533,762	**$153,376**

TABLE A-4

PRELIMINARY COST ESTIMATE
REMEDIAL ALTERNATIVE 4 - LEAD FIXATION
Pacific Gas and Electric General Construction Yard
Oakland, California

ITEM DESCRIPTION	Unit Price	Unit	Est. Qty.	Total
Total Estimated Professional Services Cost				**$276,077**
Total Capital Costs				**$1,809,839**
POST CONSTRUCTON AND OPERATION AND MAINTENANCE COSTS				
Site Management Plan	$25,000	lump sum	1	$ 25,000
TOTAL POST CONSTRUCTION AND O&M COSTS				**$ 25,000.00**
TOTAL PROJECT COST				**$1,834,840**