CDM Camp Dresser & McKee

Workplan for Screening Level Soil and Groundwater Sampling

BART Fruitvale Station
Oakland, California

July 17, 2000

Prepared for:

San Francisco Bay Area Rapid Transit District
800 Madison Avenue
Oakland, CA 94607

Prepared by:

Camp Dresser & McKee Inc.
100 Pringle Avenue, Suite 300
Walnut Creek, California 94596

WD-21A
Agreement No. 7G8210
CDM Project No. 8245-28614-WD21

Workplan

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Workplan

CDM Camp Dresser & McKee Inc.

consulting
engineering
construction
operations

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Tel: 925 933-2900 Fax: 925 933-4174

July 17, 2000

Mr. Barney Chan
Hazardous Material Specialist
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94602-6577

Subject: Workplan for Screening Level Soil and Groundwater Sampling
Former Union Pacific Railroad Site
Western Edge of Fruitvale Avenue to Eastern Edge of 37th Avenue,
Oakland, CA
CDM Project No.: 8245-28614-WD21

Dear Mr. Chan:

Camp Dresser & McKee Inc. (CDM) is pleased to submit this Workplan for Screening Level Soil and Groundwater Sampling to perform additional sampling at the former railroad right-of-way adjacent to the existing station for the Fruitvale Station Intermodal Project. This Workplan was prepared at the request of the San Francisco Bay Area Rapid Transit District (BART).

Please review the Workplan at your earliest convenience. Following your approval of the Workplan, CDM is prepared to commence field sampling during the week of July 31, 2000.

Please contact Michael Gray at (925) 933-2900 if you have any questions regarding this Workplan or the project.

Very truly yours,

CAMP DRESSER & McKEE INC.

Michael G. Gray, R.G., C.E.G.
Work Directive Manager

cc: Gary Jensen, BART
Janie Layton, BART
Jeff Ordway, BART

Attachment

Contents

Figures

Section 1
Introduction

Camp Dresser & McKee Inc. (CDM) has prepared this Field Sampling Workplan (Workplan) for the San Francisco Bay Area Rapid Transit District (BART) to perform additional soil and groundwater sampling within the former Union Pacific Railroad (UPRR) Corridor (site) adjacent to the BART Fruitvale Station site. On March 30, 2000, at the request of BART, CDM performed soil sampling to characterize surface soil for waste disposal purposes. The results of this initial sampling are presented in the following section.

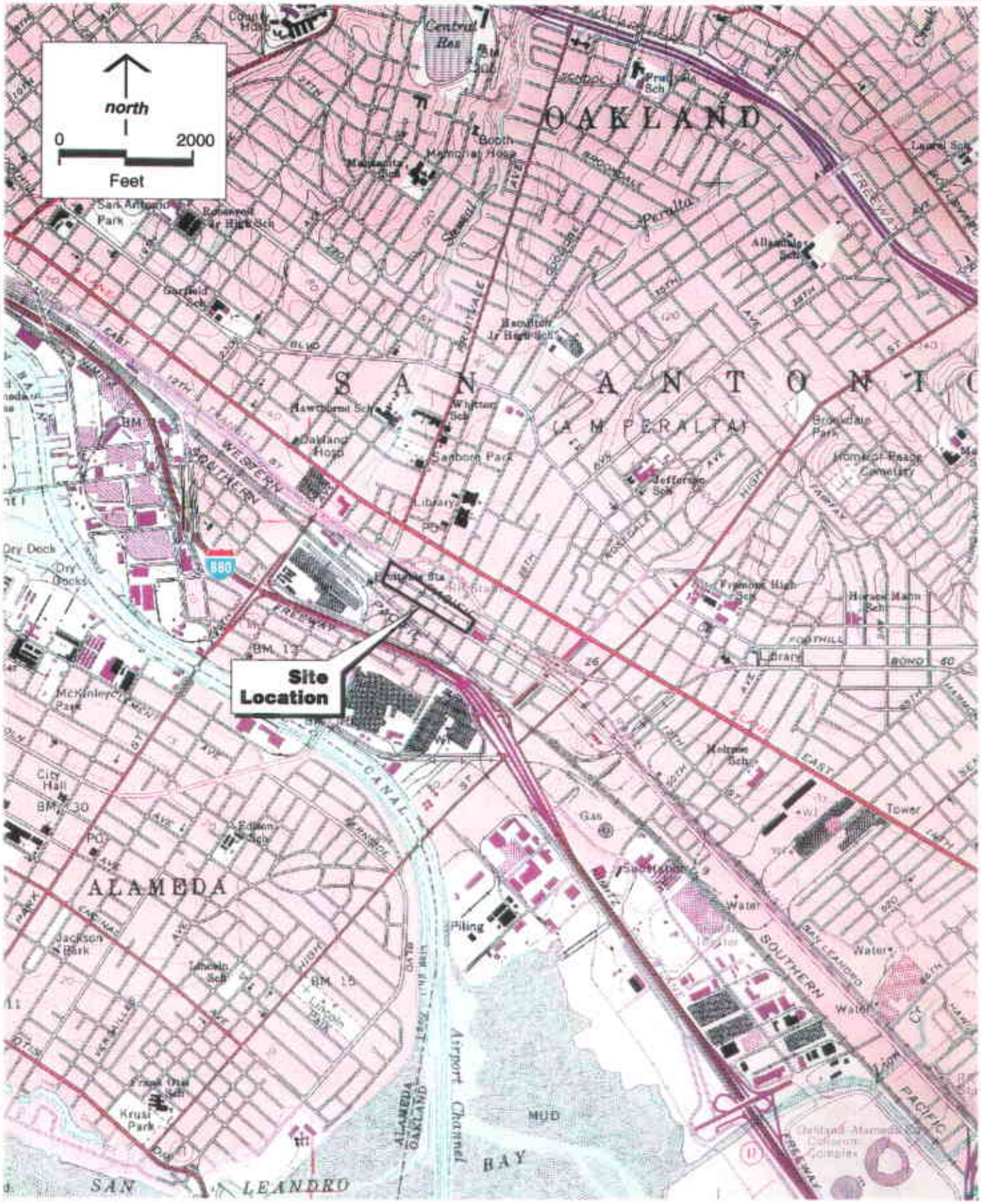
1.1 Background

The BART Fruitvale Station site is located in Oakland, California, refer to Figure 1, Site Location Map. Planned improvement activities at the site include construction of a multi-story parking structure and an at grade parking lot to accommodate patrons for the forthcoming transit village development. Within the site between Fruitvale Avenue and 37th Street, surficial soils will be excavated to a depth of approximately two feet and foundation piers will be placed between Fruitvale Avenue and 33rd Avenue.

In March 2000, CDM collected and analyzed surficial soil samples to define areas of impacted soil within the site. The purpose of this sampling was to characterize surficial soils for waste disposal purposes. Results of this investigation identified elevated levels of petroleum hydrocarbons, arsenic and lead. Based on these results, selected samples were analyzed using the soluble threshold limit concentration (STLC) and toxicity characteristic leaching procedure (TCLP) for the primary constituents of concern (COC), namely arsenic and lead. Results of these analyses indicated certain areas were either impacted (Non-RCRA hazardous) or not impacted (non-hazardous). A copy of CDM's May 2000 report is included as Appendix A, Revised Final In-Situ Soil Characterization Report.

1.2 Purpose

The purpose of this Workplan is to present the rationale and methodology for sampling and analysis of surficial soil and groundwater within the UPRR Corridor between Fruitvale Avenue and 37th Street. The objective of the sampling is to provide data for a screening level evaluation of the surface soil and groundwater quality beneath the former UPRR Corridor. Specifically, the sampling and analysis will identify the COC in surface soils and general groundwater quality. This information will augment the previous surface soil data (CDM, 2000) for use in developing soil reuse and/or disposal criteria.



Source: USGS 7.5' Quad Map, Oakland East,Calif. (1990)

Site Location Map

Screening Level Soil and Groundwater Sampling Workplan

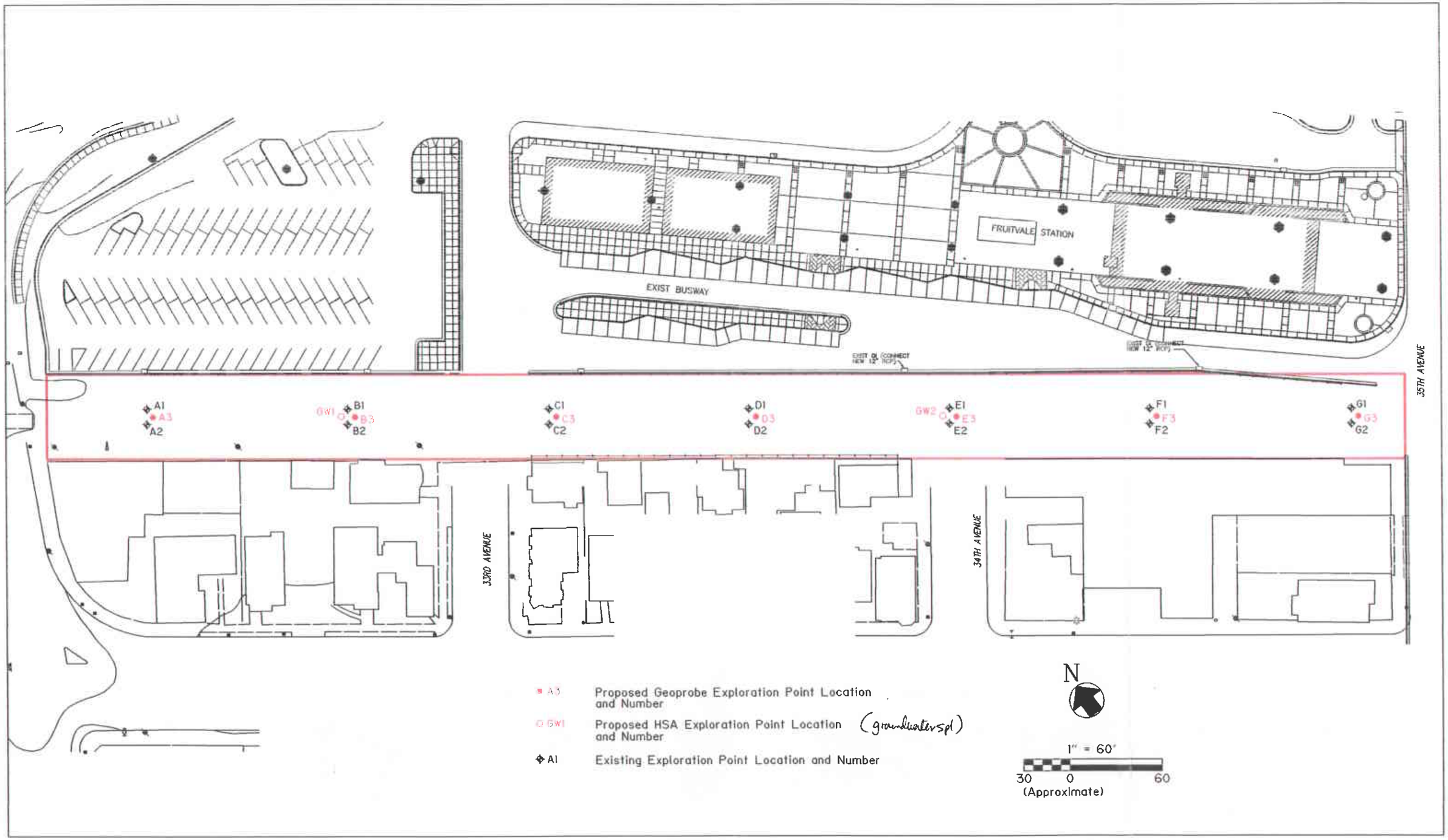
BART Fruitvale Station

Oakland, CA

CDM

environmental engineers, scientists, planners, & management consultants

Figure 1



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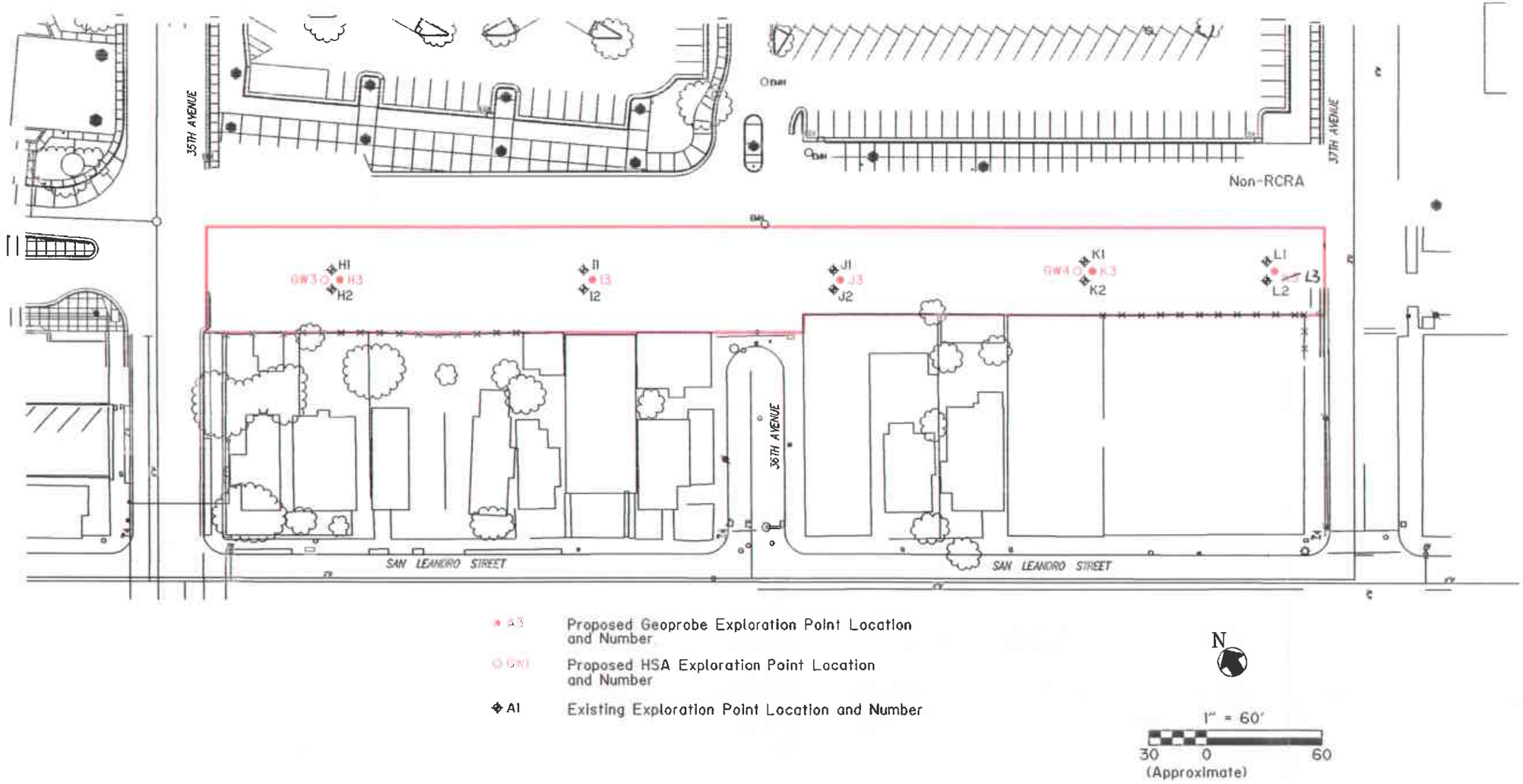
Sample Location Map

Fruitvale Avenue to 35th Avenue
BART Fruitvale Station
Oakland, CA

Figure 2a

CDM Camp Dresser & McKee



Sample Location Map

35th Avenue to 37th Avenue
BART Fruitvale Station
Oakland, CA

CDM Camp Dresser & McKee

Figure 2b

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It is our understanding that BART intends to leave soil in place that is greater than two feet in depth. This investigation is designed with the intent to minimize the volume of soil requiring special handling prior to and during construction and to provide analytical data for the in-place characterization of soil to remain following grading and construction. During construction, BART intends to stockpile excavated impacted soil on-site, collect a 4-point composite sample for each 500 cubic yard stockpile, and analyze the sample for the COCs identified at the site.

Section 2
Sampling Methodology

This section presents a description of the sampling approaches to further characterize surface soil and groundwater beneath the site.

2.1 Sampling Approach

Sampling will consist of collecting discrete soil and groundwater samples at evenly spaced intervals within the UPRR Corridor between Fruitvale Avenue and 37th Avenue. A total of 15 soil samples (A3 through L3) and four groundwater samples (GW1 through GW4) will be collected using a Geoprobe® and hollow stem auger (HSA) drill method, respectively.

Based on the length of the former UPPR Corridor (1,500 feet), the 15 soil samples will be separated by approximately 130 feet and will be located at a minimum of 15 feet inside of the alignment boundaries (refer to Figures 2a and 2b). Of the 15 soil samples, 12 samples (A3 through L3) will be collected at a depth of 3 feet below ground surface (bgs) while the remaining three samples (A3, E3, and F3) will be collected at 1 foot bgs. These samples will be collected using a Geoprobe® drill rig because of the rail ballast within the former UPRR Corridor.

Four groundwater samples, will be collected at intervals of approximately 390 feet and will also be located at a minimum of 15 feet inside of the alignment boundaries (refer to Figure 2a and 2b). All groundwater samples will be collected at first encountered groundwater, anticipated to be between 15 to 30 feet bgs. The groundwater samples will be collected using a Hydropunch® sampler through the drill auger.

2.2 Sampling Procedures

Geoprobe® Drill Rig

A Geoprobe® drill rig will be used to reach the required depth to collect a soil sample. An undisturbed sample will be collected by hydraulically pushing a pre-cleaned core barrel equipped with an acetate or polyvinyl chloride liner into the soil. The liner will be cut at the desired sample interval, capped on both ends with Teflon patches and plastic end caps. Duct tape will then be used to secure and seal the caps to the tube.

Each sample will be labeled with the following information: sample ID, date, time, site name, and sampler's initials. Relevant observations will be noted in a field notebook. Sample identifications (IDs) will be based on the sample area, exploration point number, and the depth of the sample. For example, a soil sample collected at exploration point A3 at a depth of one foot will be assigned a sample ID of A3-1. Each sample will be placed in a cooler with ice.

All samples at each exploration point will be submitted to the analytical laboratory. Sample depths for each exploration point are identified in Appendix B, Sample Collection Schedule and Laboratory Analyses. Laboratory Analyses for the soil and groundwater samples are presented in Section 3.

If visual or odor observations at an exploration point indicate the presence of volatile-organic compounds in the soil, the soil will be screened with a field photo-ionization detector (PID) capable of measuring organic vapor concentrations.

HSA Drill Rig with Hydropunch®

A HSA drill rig will be used to reach the required depth to collect a groundwater sample, estimated to be between 15 to 30 feet bgs. When groundwater is encountered, a discrete sample will be collected by pushing a Hydropunch sampler through the annulus of the augers. Upon retrieval of groundwater to the surface, water samples will be transferred to the appropriate laboratory-supplied bottles and preserved as appropriate for the analyses to be performed.

Each sample will be labeled with the following information: sample ID, date, time, site name, and sampler's initials. Relevant observations will be noted in a field notebook. Sample identifications (IDs) will be based on the sample area, exploration point number, and the depth of the sample. For example, a groundwater sample collected at exploration point GW1 will be assigned a sample ID of GW1. Each sample will be placed in a cooler with ice.

All samples at each exploration point will be submitted to the analytical laboratory. Sample depths for each exploration point are identified in Appendix B, Sample Collection Schedule and Laboratory Analyses. Laboratory Analyses for the soil and groundwater samples are presented in Section 3.

2.3 Decontamination and Backfill Procedures

All downhole equipment will be decontaminated before and after each use to minimize the potential for cross-contamination. Decontamination will be accomplished by washing in a solution of Alconox or equivalent non-phosphate detergent, followed by a double rinsing with clean water. Soil cuttings from the HSA drilling activities will be contained in 55-gallon drums and stored on-site pending receipt of analytical results. The drums will be properly labeled and then secured with a chain to the chain-link fence. Disposition of the drummed soil will be addressed following receipt of soil analytical results.

Following collection of groundwater samples from the four HSA borings, the borings will be backfilled using either bentonite pellets or a 5% bentonite cement mixture. The shallow Geoprobe borings will be backfilled using soil material retained following sample collection.

Section 3
Laboratory Analyses and Quality Control

This section describes the laboratory analyses and analytical procedures for the soil and groundwater samples and project quality control procedures.

3.1 Laboratory Analyses

All soil and groundwater samples will be analyzed for the following:

Analytes	EPA Method
VOCs	8260
SVOCs	8270
TPH as motor oil and diesel	8015M
TPH as gas	8015
Benzene, toluene, ethlybenzene, total xylenes, and methyl teriary butyl ether (MTBE)	8015 / 8020
CAM 17	ICP / Hg cold vapor 6010B/7471

In addition, groundwater samples will be filtered in the laboratory and then analyzed for Title 22 Metals using EPA Method 6010B/7471. All samples will be submitted under chain-of-custody to Chromalab, Inc. and analyzed on a standard turnaround time basis.

3.2 Quality Control and Quality Assurance

Project, data acquisition, management, and evaluation procedures are and will be based on the procedures and guidelines established in CDM's Quality Assurance/Quality Control Plan developed for a BART project site located in Oakland, California (CDM, 1999).

Section 4
References

California Code of Regulations, 1995. Title 22.

CDM 1999. Removal Action Workplan, 349 Mandela Parkway, Oakland California, August 9.

CDM 2000. Revised Final In-Situ Soil Characterization Report, Fruitvale Station Intermodal Station, May 30.

BART, updated (no date provided). Fruitvale Station Intermodel Project, Phase II Maps.

Appendix A
Revised Final In-Situ
Soil Characterization Report

CDM Camp Dresser & McKee Inc.

consulting engineering construction operations

One Walnut Creek Center
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Walnut Creek, California 94596
Tel: 925 933-2900 Fax: 925 933-4174

May 30, 2000

Mr. Gary Jensen
GES Project Director
Bay Area Rapid Transit District
979 Broadway
Millbrae, California 94030

Subject: *Revised Final In-Situ Soil Characterization Report*
Fruitvale Station Intermodal Station
BART General Environmental Services Agreement No. 7G8210
CDM Project No.: 8245-28614-WD21

Dear Mr. Jensen:

Camp Dresser & McKee Inc. (CDM) presents this revised final letter report to summarize the results of the in-situ soil characterization performed within the former Union Pacific Railroad (UPRR) Corridor (site). This report updates and supercedes CDM's final in-situ soil characterization report dated April 25, 2000. The site is located adjacent to the San Francisco Bay Area Rapid Transit District (BART) Fruitvale Station (see Figure 1, Site Location Map). Planned improvement activities at the site include construction of an intermodal transit facility and an at grade and an elevated parking structure for BART patrons. As part of the construction, surficial soil will be removed to an approximate depth of 2 feet below ground surface (bgs) across the site between Fruitvale Avenue and 37th Street, and thirteen sets of foundation piers will be constructed between Fruitvale Avenue and 33rd Street.

To support BART's construction efforts, soil sampling was performed to define areas of impacted soil from the ground surface to a depth of 2 feet bgs for waste disposal purposes, and to identify areas of impacted soils from a depth of 2 to 5 feet bgs that may remain in-place following construction. This work was designed to minimize the volume of impacted soil requiring special handling prior to and during construction and to characterize the extent of potentially impacted soils that will remain in place following grading and construction. In addition, soil disposal designation and volumetric estimates were determined for each area of impacted soil. The scope of this work was presented in Camp Dresser & McKee Inc.'s (CDM's) proposal to BART, dated March 22, 2000.

Project-Specific Action Levels

Areas of impact were identified by comparing soil analytical results against the project-specific action levels. These levels are presented in Table 1, Project-Specific Action Levels.

Table 1
Project-Specific Action Levels
BART Fruitvale Station

Analyte	*Project-Specific Action Level*
VOCs, SVOCs	EPA Residential PRGs
Metals	Ten times STLC
Arsenic / lead	19 mg/kg / ?
TEPH	300 mg/kg

NOTES:
VOCs - Volatile Organic Compounds
SVOCs - Semi-Volatile Organic Compounds
STLC - Soluble Threshold Limit Concentration
TEPH - Total Extractable Petroleum Hydrocarbons

As 19
Pb - 1000
} RBSLS

Has waste

Except for arsenic, ten times the soluble limit threshold concentration (STLC) was used as an action level for metals because it is more stringent than EPA residential PRGs for metals. The project-specific action level for arsenic was established at 19 milligrams per kilogram (mg/kg) based upon personal communication with Ms. Barbara Cook of the DTSC (CH2MHill/DMJM and CDM, 1997). According to Ms. Cook, background arsenic concentrations for the San Francisco Bay Area are typically 10 to 20 mg/kg. Because total extractable petroleum hydrocarbon (TEPH) has not been assigned an EPA preliminary remediation goal (PRG), the site-specific action level for TEPH was established at 300 mg/kg.

Soil Sample Collection

No Copy

The rationale and methodology for the soil sample collection was presented in CDM's Field Sampling Workplan, dated March 28, 2000 (CDM, 2000). On March 30, 2000, a Geoprobe drill rig was used to collect discrete soil samples at the required depth.

In accordance with local Class II landfill acceptance criteria for lead-impacted soils, one four-point composite sample was collected for every 750 cubic yards of excavated soil. Based on an estimated total excavated soil volume of approximately 8,400 cubic yards (1,470 feet long x 60 feet wide x 2 feet deep x 1.3 soil bulking factor), the site was divided into 12 sample groups (areas A through L). Based upon site maps provided by BART, the initial soil volume estimates have been reduced. As a result, each sample group represents approximately 690 cubic yards of soil, except for sample groups G and L which represent approximately 530 and 260 cubic yards of excavated soil, respectively.

In addition to the four-point composite samples, two discrete samples were collected at a depth of 3-feet bgs from each sample group and four discrete samples were collected at depths of 4- and 5-feet bgs from sample groups A and B only. A total of 80 discrete samples were collected at the site (see Figures 2a and 2b – Area of Impact Map).

At each sample location, undisturbed samples were collected by hydraulically pushing a pre-cleaned core barrel equipped with a 2-inch diameter polyvinyl chloride liner into the subsurface. Following retrieval of the core barrel, the liner was cut at the desired sample interval, capped on both ends with Teflon patches and plastic end caps and were secured with duct tape. Each sample was properly labeled with the sample ID (sample group-depth), date, time, site name, and sampler's initials. All samples were stored in a cooler chilled with ice and maintained under chain-of-custody pending submittal to the laboratory.

Soil Sample Analyses

On March 30, 2000, all samples were submitted to Chromalab and selected samples were analyzed for the following:

Analytes	EPA Method
Volatile organic compounds (VOCs)	8260
Semi-volatile organic compounds (SVOCs)	8270
TEPH as motor oil and diesel	8025M
TEPH as gas	8015
CAM 17 metals	6010B/7471

Samples collected from exploration points B1/B2 and I1/I2 at depths from 0.5 to 1.5 feet were composited by the laboratory into two four-point composite samples (B1-0.5-1.5, B2-0.5-1.5 and I1-0.5-1.5, I2-0.5-1.5) and analyzed for the constituents presented above. Based on the results of these two four-point composite samples, arsenic and lead were detected at concentrations greater than the project-specific action levels. Therefore, only total arsenic and lead were analyzed for the remaining ten sample groups.

To facilitate waste characterization, the methodology described below was employed. If a sample contained a constituent concentration greater than 10 times the soluble threshold limit concentration (STLC), the sample was analyzed for that constituent using STLC analysis. If the sample exceeded a concentration of 5 milligrams/liter (mg/l) using STLC analysis, the sample was analyzed using toxicity characteristic leaching procedure (TCLP) for the constituent of concern. Soil analytical results from the samples collected during this investigation are summarized in Attachment 1.

for Pb

Identification of Areas of Impact and Waste Classification

Based upon soil analytical results, areas of impact were identified according to the following criteria and assumptions:

than

- Sample groups with soil concentrations less the project-specific action levels are considered non-impacted and are designated as non-hazardous.
- Sample groups with soil concentrations greater than the project-specific action levels are considered impacted and are designated as either Non-RCRA (California hazardous) or RCRA Hazardous Waste. (TCLP)
- Impacted soils identified from composite samples extend to the width of the UPRR Corridor, to a depth of 2 feet bgs, and to the midpoint of the adjacent sample group.
- Impacted soils identified from discrete samples extend to the lateral and vertical midpoint from the sample with constituent concentrations greater than the project-

specific action levels to the sample with constituent concentrations less than the project-specific action levels, to the midpoint of the adjacent sample group.

Presented below is a discussion of the analytical results for each Area of Impact. Of the twelve sample groups, only three groups A, E, and F are designated as non-hazardous. The analytical results are presented in Attachment 1 and the waste category designation of the Areas of Impact is shown on Figures 2a and 2b in Attachment 1.

Sample Group A

The four-point composite analytical results from this sample group did not indicate elevated concentrations of arsenic or lead. Soil associated with this sample group are characterized as Non-Hazardous Waste.

The discrete analytical results did not indicate elevated concentrations of arsenic or lead.

Sample Group B

The four-point composite analytical results from this sample group indicated elevated concentrations of arsenic and lead. In addition, the STLC for arsenic was exceeded. The TCLP result for arsenic was non-detect. Soil associated with this sample group are characterized as Non-RCRA Hazardous Waste.

The discrete analytical results indicated elevated arsenic concentrations from sample B2-3, however the STLC for arsenic from this sample was not exceeded. The elevated arsenic concentrations are located within Area B and extend from the midpoint of exploration points B1 and B2 and across the southern half of the alignment, and from 2 feet to 3.5 feet bgs.

Sample Group C

The four-point composite analytical results from this sample group indicated elevated concentrations of arsenic. In addition, the STLC for arsenic was exceeded. The TCLP result for arsenic was non-detect. Soil associated with this sample group are characterized as Non-RCRA Hazardous Waste.

The discrete analytical results did not indicate elevated concentrations of arsenic.

Sample Group D

The four-point composite analytical results from this sample group indicated elevated concentrations of arsenic and lead. In addition, the STLC for arsenic and lead was exceeded. The TCLP results for arsenic and lead were non-detect. Soil associated with this sample group are characterized as Non-RCRA Hazardous Waste.

The discrete analytical results indicated elevated arsenic concentrations from sample D2-3. The elevated arsenic concentrations are located within Area D and extend from the

midpoint of exploration points D1 and D2 across the southern half of the alignment. Additional samples are required to identify the depth of arsenic impact at this location.

Sample Group E

The four-point composite analytical results from this sample group did not indicate elevated concentrations of arsenic or lead. Soil associated with this sample group are characterized as Non-Hazardous Waste.

The discrete analytical results indicated elevated concentrations of arsenic and lead from sample E1-3. The elevated arsenic and lead concentrations are located within Area E and extend from the midpoint of exploration points E1 and E2 across the northern half of the alignment. Additional samples are required to identify the depth of arsenic and lead impact at this location.

Sample Group F

The four-point composite analytical results from this sample group did not indicate elevated concentrations of arsenic or lead. Soil associated with this sample group are characterized as Non-Hazardous Waste.

The discrete analytical results indicated elevated concentrations of lead from sample F1-3. The elevated lead concentrations are located within Area F and extend from the midpoint of exploration points F1 and F2 across the northern half of the alignment. Additional samples are required to identify the depth of lead impact at this location.

Sample Group G

The four-point composite analytical results from this sample group indicated elevated concentrations of arsenic and lead. In addition, the STLC for arsenic was exceeded. The TCLP result for arsenic was non-detect. Soil associated with this sample group are characterized as Non-RCRA Hazardous Waste.

The discrete analytical results did not indicate elevated concentrations of arsenic or lead.

Sample Group H

The four-point composite analytical results from this sample group indicated elevated concentrations of arsenic. In addition, the STLC for arsenic was exceeded. The TCLP result for arsenic did not exceed Federal waste criteria. Soil associated with this sample group are characterized as Non-RCRA Hazardous Waste.

The discrete analytical results did not indicate elevated concentrations of arsenic or lead.

Sample Group I

The four-point composite analytical results from this sample group indicated elevated concentrations of arsenic and lead. In addition, the STLC for arsenic was exceeded. The TCLP result for arsenic was non-detect. Soil associated with this sample group are characterized as Non-RCRA Hazardous Waste.

The discrete analytical results did not indicate elevated concentrations of arsenic or lead.

Sample Group J

The four-point composite analytical results from this sample group indicated elevated concentrations of arsenic and lead. In addition, the STLC results for arsenic and lead were exceeded. TCLP results for arsenic and lead were non-detect. Soil associated with this sample group are characterized as Non-RCRA Hazardous Waste.

The discrete analytical results did not indicate elevated concentrations of arsenic or lead.

Sample Group K

The four-point composite analytical results from this sample group indicated elevated concentrations of arsenic and lead. In addition, the STLC results for arsenic and lead were exceeded. The TCLP results for arsenic and lead were non-detect. Soil associated with this sample group are characterized as Non-RCRA Hazardous Waste.

The discrete analytical results did not indicate elevated concentrations of arsenic or lead.

Sample Group L

The four-point composite analytical results from this sample group indicated elevated concentrations of arsenic and lead. In addition, the STLC for lead was exceeded. The TCLP result for lead was non-detect. Soil associated with this sample group are characterized as Non-RCRA Hazardous Waste.

The discrete analytical results indicated elevated arsenic concentrations from sample L1-3. The elevated arsenic concentrations are located within Area L and extend from the midpoint of exploration points L1 and L2 across the northern half of the alignment. Additional samples are required to identify the depth of arsenic impact at this location.

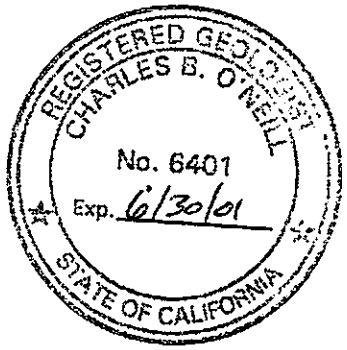
If you have any questions or require additional information regarding this report, please do not hesitate to call us at (925) 933-2900.

Very truly yours,

CAMP DRESSER & McKEE INC.

Michael G. Gray, R.G., C.E.G.
Work Directive Manager

Charles B. O'Neill, R.G.
Task Manager



Attachments

W00/8245/052.doc

References

CDM, 2000. *Field Sampling Workplan, BART Fruitvale Station.* Camp Dresser & McKee Inc., March 28, 2000.

CH2MHill/DMJM and CDM, 1997. *Technical Memorandum, Status of the Phase II Site Investigation for BART's SFO Extension.* CH2MHill/DMJM and Camp Dresser & McKee Inc. November 7, 1997.

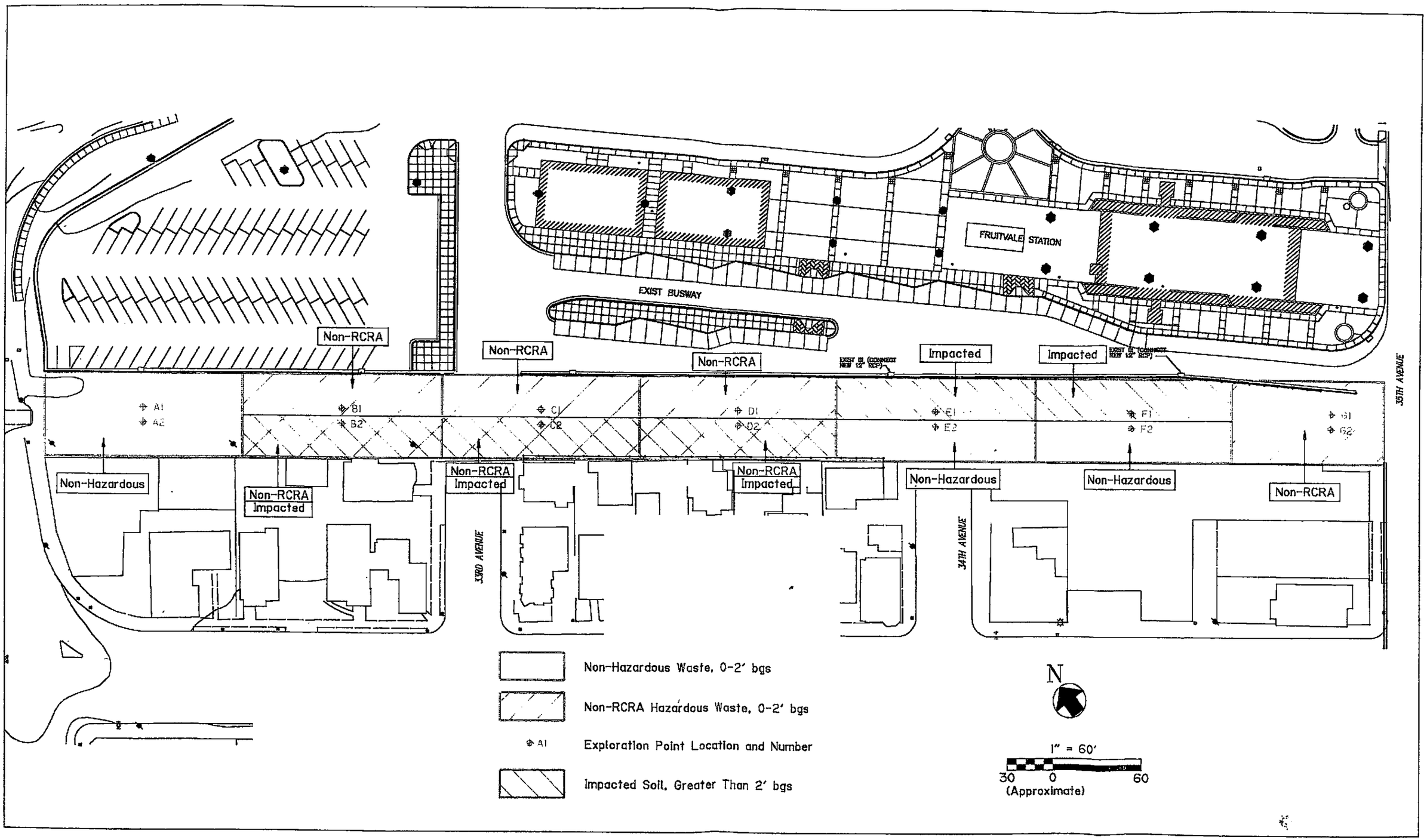
Attachment 1
Soil Analytical Results

Attachment 1
Summary of Selected Soil Analytical Results
BART Fruitvale Station

NOAA RBSA

SAMPLE INFORMATION			TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS (EPA 8015M)			CAM 17 METALS (ICP)																CA SOLUBLE METALS (STLC)		FED SOLUBLE METALS (TCLP)	
			GASOLINE	DIESEL	MOTOR OIL	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CHROMIUM	COBALT	COPPER	LEAD	MOLYBDENUM	NICKEL	SELENIUM	SILVER	THALLIUM	VANADIUM	ZINC	MERCURY	ARSENIC	LEAD	ARSENIC	LEAD
PROJECT-SPECIFIC ACTION LEVEL (mg/kg)			300	300	300	150	19	1000	7.5	10	50	800	250	50	3500	200	10	50	70	240	2500	2	5	5	5	5
DETECTION LIMIT (mg/kg)			1	1	50	2	1	1	0.5	0.5	1	1	1	1	1	1	2	1	1	1	1	0.05	0.5	0.5	0.5	0.5
EXPLORATION POINTS	SAMPLE ID	SAMPLE DATE	RESULTS (mg/kg)																				RESULTS (mg/L)		RESULTS (mg/L)	
A1 & A2	A1-0.5-1.5, A2-0.5-1.5	3/30/2000	--	--	--	--	22	--	--	--	--	--	--	26	--	--	--	--	--	--	--	--	--	ND	--	--
A1	A1-3	3/30/2000	--	--	--	--	4.4	--	--	--	--	--	--	7.9	--	--	--	--	--	--	--	--	--	--	--	--
A2	A2-3	3/30/2000	--	--	--	--	3.5	--	--	--	--	--	--	5.4	--	--	--	--	--	--	--	--	--	--	--	--
B1 & B2	B1-0.5-1.5, B2-0.5-1.5	3/30/2000	ND	6.9	54	ND	120	190	ND	ND	43	8.1	39	90	ND	50	ND	ND	ND	33	160	0.16	11	3.9	ND	--
B1	B1-3	3/30/2000	--	--	--	--	3.6	--	--	--	--	--	--	7.6	--	--	--	--	--	--	--	--	--	--	--	--
B1	B1-4	3/30/2000	--	--	--	--	9	--	--	--	--	--	--	4.5	--	--	--	--	--	--	--	--	--	--	--	--
B1	B1-5	3/30/2000	--	--	--	--	2.8	--	--	--	--	--	--	4.4	--	--	--	--	--	--	--	--	--	--	--	--
B2	B2-3	3/30/2000	--	--	--	--	120	--	--	--	--	--	--	9.9	--	--	--	--	--	--	--	--	2.4	--	--	--
B2	B2-4	3/30/2000	--	--	--	--	5.1	--	--	--	--	--	--	8	--	--	--	--	--	--	--	--	--	--	--	--
B2	B2-5	3/30/2000	--	--	--	--	4.6	--	--	--	--	--	--	8.8	--	--	--	--	--	--	--	--	--	--	--	--
C1 & C2	C1-0.5-1.5, C2-0.5-1.5	3/30/2000	--	--	--	--	98	--	--	--	--	--	--	29	--	--	--	--	--	--	--	--	5.1	--	ND	--
C1	C1-3	3/30/2000	--	--	--	--	8.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
C2	C2-3	3/30/2000	--	--	--	--	2.5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
D1 & D2	D1-0.5-1.5, D2-0.5-1.5	3/30/2000	--	--	--	--	120	--	--	--	--	--	--	180	--	--	--	--	--	--	--	--	6.8	6.5	ND	ND
D1	D1-3	3/30/2000	--	--	--	--	2.3	--	--	--	--	--	--	6.1	--	--	--	--	--	--	--	--	--	--	--	--
D2	D2-3	3/30/2000	--	--	--	--	120	--	--	--	--	--	--	7.7	--	--	--	--	--	--	--	--	--	--	--	--
E1 & E2	E1-0.5-1.5, E2-0.5-1.5	3/30/2000	--	--	--	--	56	--	--	--	--	--	--	110	--	--	--	--	--	--	--	--	1.8	1.8	--	--
E1	E1-3	3/30/2000	--	--	--	--	130	--	--	--	--	--	--	150	--	--	--	--	--	--	--	--	--	--	--	--
E2	E2-3	3/30/2000	--	--	--	--	6	--	--	--	--	--	--	7.6	--	--	--	--	--	--	--	--	--	--	--	--
F1 & F2	F1-0.5-1.5, F2-0.5-1.5	3/30/2000	--	--	--	--	120	--	--	--	--	--	--	72	--	--	--	--	--	--	--	--	4.9	--	--	--
F1	F1-3	3/30/2000	--	--	--	--	4.1	--	--	--	--	--	--	50	--	--	--	--	--	--	--	--	--	--	--	--
F2	F2-3	3/30/2000	--	--	--	--	2	--	--	--	--	--	--	24	--	--	--	--	--	--	--	--	--	--	--	--
G1 & G2	G1-0.5-1.5, G2-0.5-1.5	3/30/2000	--	--	--	--	230	--	--	--	--	--	--	170	--	--	--	--	--	--	--	--	8.1	3.8	ND	--
G1	G1-3	3/30/2000	--	--	--	--	20	--	--	--	--	--	--	22	--	--	--	--	--	--	--	--	--	--	--	--
G2	G2-3	3/30/2000	--	--	--	--	3.8	--	--	--	--	--	--	13	--	--	--	--	--	--	--	--	--	--	--	--
H1 & H2	H1-0.5-1.5, H2-0.5-1.5	3/30/2000	--	--	--	--	160	--	--	--	--	--	--	36	--	--	--	--	--	--	--	--	7.1	--	0.62	--
H1	H1-3	3/30/2000	--	--	--	--	17	--	--	--	--	--	--	9.3	--	--	--	--	--	--	--	--	--	--	--	--
H2	H2-3	3/30/2000	--	--	--	--	17	--	--	--	--	--	--	8.6	--	--	--	--	--	--	--	--	--	--	--	--
I1 & I2	I1-0.5-1.5, I2-0.5-1.5	3/30/2000	ND	15	110	ND	80	230	ND	0.52	48	9.9	72	96	3.6	71	ND	ND	ND	28	200	0.13	6.8	4.6	ND	--
I1	I1-3	3/30/2000	--	--	--	--	10	--	--	--	--	--	--	8.3	--	--	--	--	--	--	--	--	--	--	--	--
I2	I2-3	3/30/2000	--	--	--	--	2.5	--	--	--	--	--	--	19	--	--	--	--	--	--	--	--	--	--	--	--
J1 & J2	J1-0.5-1.5, J2-0.5-1.5	3/30/2000	--	--	--	--	150	--	--	--	--	--	--	310	--	--	--	--	--	--	--	--	8.9	16	ND	ND
J1	J1-3	3/30/2000	--	--	--	--	2.1	--	--	--	--	--	--	6.7	--	--	--	--	--	--	--	--	--	--	--	--
J2	J2-3	3/30/2000	--	--	--	--	2	--	--	--	--	--	--	5.2	--	--	--	--	--	--	--	--	--	--	--	--
K1 & K2	K1-0.5-1.5, K2-0.5-1.5	3/30/2000	--	--	--	--	150	--	--	--	--	--	--	140	--	--	--	--	--	--	--	--	5.4	6.2	ND	ND
K1	K1-3	3/30/2000	--	--	--	--	3.7	--	--	--	--	--	--	6.1	--	--	--	--	--	--	--	--	--	--	--	--
K2	K2-3	3/30/2000	--	--	--	--	2.7	--	--	--	--	--	--	5.9	--	--	--	--	--	--	--	--	--	--	--	--
L1 & L2	L1-0.5-1.5, L2-0.5-1.5	3/30/2000	--	--	--	--	110	--	--	--	--	--	--	250	--	--	--	--	--	--	--	--	3.9	8.5	--	ND
L1	L1-8	3/30/2000	--	--	--	--	130	--	--	--	--	--	--	9.4	--	--	--	--	--	--	--	--	--	--	--	--
L2	L2-3	3/30/2000	--	--	--	--	3.5	--	--	--	--	--	--	7	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
Samples B1-0.5-1.5, B2-0.5-1.5 and I1-0.5-1.5, I2-0.5-1.5 were non-detect for SVOCs by EPA Method 8270A
Samples B1-0.5-1.5, B2-0.5-1.5 and I1-0.5-1.5, I2-0.5-1.5 were non-detect for VOCs by EPA Method 8260A
ND = Not Detected
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
-- = Not Analyzed
Sample results in shaded cells indicate constituent reported at concentration greater than ten times the Soluble Threshold Limit Concentration
Sample results in bold text indicate constituent reported at concentration greater than the Soluble Threshold Limit Concentration



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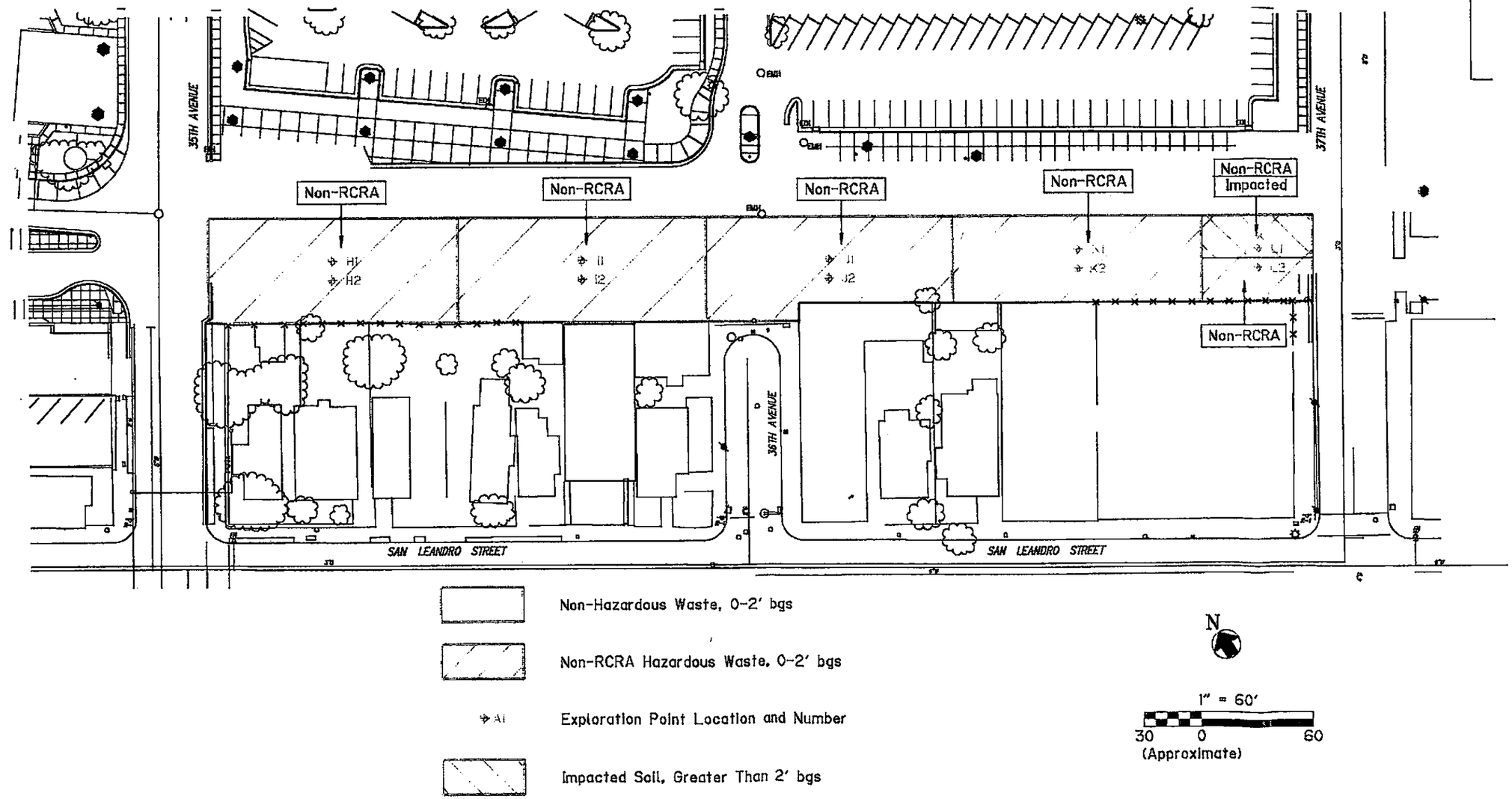
CDM Camp Dresser & McKee

Area of Impact Map

Fruitvale Avenue to 35th Avenue
BART Fruitvale Station
Oakland, CA

Figure 2a



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CDM Camp Dresser & McKee

Area of Impact Map

35th Avenue to 37th Avenue
BART Fruitvale Station
Oakland, CA

Figure 2b

Appendix B
Sample Collection Schedule and Laboratory Analyses

Appendix B
Sample Collection Schedule and Laboratory Analyses
Screening Level Soil and Groundwater Sampling Workplan
BART Fruitvale Station
Oakland, CA

Matrix	Exploration Point	Sample Depth (ft bgs)	Sample ID	VOCs 8260	SVOCs 8270	TPH mo, d 8015M	TPH gas 8015	BTEX/MTBE 8015	CAM 17 6010B / 7471	Title 22 Metals 6010B/7471
Soil	A3	1.0	A3 - 1.0	X	X	X	X	X	X	
	A3	3.0	A3 - 3.0	X	X	X	X	X	X	
	B3	3.0	B3 - 3.0	X	X	X	X	X	X	
	C3	3.0	C3 - 3.0	X	X	X	X	X	X	
	D3	3.0	D3 - 3.0	X	X	X	X	X	X	
	E3	1.0	E3 - 1.0	X	X	X	X	X	X	
	E3	3.0	E3 - 3.0	X	X	X	X	X	X	
	F3	1.0	F3 - 1.0	X	X	X	X	X	X	
	F3	3.0	F3 - 3.0	X	X	X	X	X	X	
	G3	3.0	G3 - 3.0	X	X	X	X	X	X	
	H3	3.0	H3 - 3.0	X	X	X	X	X	X	
	I3	3.0	I3 - 3.0	X	X	X	X	X	X	
	J3	3.0	J3 - 3.0	X	X	X	X	X	X	
	K3	3.0	K3 - 3.0	X	X	X	X	X	X	
	L3	3.0	L3 - 3.0	X	X	X	X	X	X	
Groundwater	GW1	15 - 30	GW1	X	X	X	X	X	X	X
	GW2	15 - 30	GW2	X	X	X	X	X	X	X
	GW3	15 - 30	GW3	X	X	X	X	X	X	X
	GW4	15 - 30	GW4	X	X	X	X	X	X	X