Rec'd 9/15/95

SECOR
International Incorporated

WORKPLAN FOR INTERIM REMEDIAL ACTIONS AND PRELIMINARY GROUNDWATER CHARACTERIZATION

Former Gasoline Service Station
575 Paseo Grande
San Lorenzo, California

Prepared For:
Bohannon Development Company
60 Hillsdale Mall
San Mateo, California 94403

Sep 1995

***SECOR* Job No. 70074-001-01**

Submitted By:
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September 14, 1995

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1.0 INTRODUCTION

This Work Plan presents the scope-of-work for implementation of interim remedial actions and preliminary groundwater characterization activities at the Site referenced above (Figures 1 and 2). This work includes excavation and aeration of gasoline impacted soil, excavation and disposal of soil impacted by heavy end hydrocarbons and metals, and the installation of three groundwater monitoring wells. This scope-of-work has been developed based on the results presented in the *SECOR* June 29, 1995 "Preliminary Characterization Report" and on additional soil sampling conducted at the Site on July 26, 1995.

2.0 BACKGROUND

The site has been an asphalt paved parking area for the last 25 years. The site was a gasoline station prior to 1969. Little information is known about the site history related to it's use as a gasoline service station. In anticipation of property redevelopment, initial investigation activities were conducted in March 1995 at the Site to determine if underground facilities remain from past Site use as a gasoline service station. The work was conducted by Twining Laboratories, Inc. (TLI), as documented in their letter report dated April 15, 1995. The work conducted included a magnetometer survey followed by an exploratory excavation. *In summary*, the work conducted identified former gasoline service station facilities which include what appears to be the former tank pit, approximately 110 feet of fuel delivery system piping, and what appears to have been a grease sump and/or hydraulic lift pit in an area which may have been the former service garage (Figure 2). Field evidence and one soil sample indicated the potential for soil contamination along the piping runs, around the grease sump, and around the inferred location of the former tank pit. Characterization of the magnitude and extent of potential soil contamination was not conducted. The excavations at the Site were left open, and the excavated soil and debris stockpiled.

In June 1995, *SECOR* conducted additional activities at the Site which included removal of former UST system piping and the former grease sump, and characterization soil sampling along piping lines and around the former grease sump and former tank pit areas. This work was summarized in SECOR's letter report dated June 29, 1995. The analytical results for soil sampling are summarized in Table 1. The characterization data from this investigation indicated that there are two areas of concern at the Site. These areas are the former grease sump area and the former gasoline distribution system area. The major area of soil impact appears to be around the former gasoline distribution system components. Soil around the former gasoline tank location and along one of the piping trenches has been impacted with total petroleum hydrocarbons (TPH) above 100 parts per million (ppm). Soil around the former grease sump is impacted by waste oil range hydrocarbons. The initial sampling indicated that both areas were impacted with some heavy metal compounds which include lead and chromium (Table 1).

Based on the lead concentrations reported for samples collected as described above, **additional soil sampling was conducted by SECOR on July 26, 1995 to determine if lead concentrations detected are naturally occurring or are related to gasoline contamination.** A total of three soil samples were collected, one from the tank pit area, one from the grease sump, and one from a background location (See figure 2). The soil samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg), BTEX, WET test for lead, barium, cadmium, chromium, cobalt, copper, nickel, vanadium and zone. The background sample was also analyzed for total lead and organic lead. The former grease sump sample was also analyzed for VOCs by U.S. Environmental Protection Agency (EPA) Method 8240. The analytical results from these samples are summarized in Table 2. **The concentrations of lead reported for these samples from both the contaminated areas and the background area are much lower than those reported for the characterization samples collected in June, 1995. The results from this sampling indicate values that are more consistent with concentrations found at a "typical" gas station site, indicating that the initial analytical results for metals may be erroneously elevated.**

Need lab data
w/Chain-of-Cust.

3.0 SCOPE OF WORK

Based on characterization data collected to date, remedial actions for impacted soil will be required for both the gasoline UST system areas and the former grease sump. This Work Plan is based on the assumption that lead concentrations in soil around the former gasoline system components will not be high enough to classify the excavated soil as hazardous or require any special handling or management of the soil based on the lead levels alone.

Review of soil remediation options indicates that three options are potentially feasible, cost effective and cost comparable at the Site. The options differ in regard to the time required for completion, impact to the Site and it's use, and the relative certainty of successful completion. These options are: 1) soil excavation and disposal off-site, 2) soil excavation and aeration; and 3) soil vapor extraction. Based on comparable costs and the pending property redevelopment plans, the soil excavation and aeration remedial action alternative is recommended for the Site. However, the soil around the former sump are impacted with waste oil hydrocarbons which can not be successfully aerated. Therefore, these soils will be excavated and disposed of off-site at a proper disposal facility. The following sections detail the major work steps associated with this source removal option.

Additionally, Regional Water Quality Control Board (RWQCB) regulations for UST removals require that groundwater monitoring be conducted if soil impacts are documented above 100 ppm and the depth to groundwater is known to be less than 50 feet. Thus, the data indicate that groundwater monitor well/s be installed to determine the condition of Site groundwater.

The following tasks will be implemented as part of the initial remedial actions and preliminary groundwater characterization activities for the Site:

Task 1) Pre-field work which will consist of preparing a Site Health and Safety Plan per Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1910.120, and obtaining appropriate permits for constructing soil aeration piles and for monitor well installation.

Task 2) Excavation and off-site disposal of soils containing TPH concentrations in excess of 10 ppm form the former sump location.

Task 3) Excavation and aeration of soils containing TPH concentrations in excess of 10 ppm from the former UST/piping area(s).

Task 4) Site Restoration which will include excavation backfilling and compaction.

Task 5) Installation of three monitor wells on the site to determine groundwater conditions and flow direction.

Task 6) Preparation of a Report detailing the results of excavation and the groundwater investigation for submittal to the Alameda County Department of Environmental Health.

The following sections detail the scope-of-work:

3.1 Pre-Field Work

Prior to implementation of field work at the Site, a Site Health & Safety Plan will be prepared. This safety plan will reflect the safety issues related to monitor well installation and soil excavation. The safety plan will comply with the requirements of OSHA standard 29 outlined in CFR 1910.120. It is anticipated that work will be conducted under Level D conditions.

Additionally, the appropriate permits will be obtained from the Bay Area Air Quality Management District (BAAQMD) for construction of the soil aeration piles and from Alameda County for monitor well installation.

3.2 Soil Excavation - Former Sump Location

Because impacted soils surrounding the former sump contain non-aeratable petroleum hydrocarbons (i.e., total petroleum hydrocarbons as mineral spirits (TPHmo), and total petroleum hydrocarbon as kerosene (TPHk)), they will be excavated and disposed of off-site at an appropriate disposal facility.

3.2.1 Excavation and Confirmation Sampling

The excavation will be conducted utilizing a backhoe which will stockpile the soil on plastic sheeting. Grab soil samples will be collected on a regular basis from the backhoe bucket and field screened with a PID to determine when the limits of the impacted soil have been reached. The excavation will be deepened until all obviously impacted soil in the vertical direction has been removed, or until groundwater is encountered. The depth to groundwater is anticipated to be from 10 to 15 feet below grade Because the excavation will not extend below the water table, de-watering of the pit will not be required.

Once the limits of the excavation have been reached, **confirmation soil samples will be collected from the sidewalls of the excavation for every 20 linear feet of excavation and bottom samples** will be collected for at least every 100 square feet of excavation. Sample locations will be documented in relationship to past and future property configuration. Additionally, soil samples will be collected from the stockpiled soil for waste characterization purposes. **These soil samples will be submitted to a state certified laboratory for CAM 17 metals and hydrocarbon scan analyses on a 24-hour turn around time.** (TTLC + STLC , TPH + BTEX ?

The analytical results for soil samples collected from the excavation limits will be evaluated to verify that all of the impacted soil above 10 ppm was successfully excavated. The specific limits of the excavation will be documented by a licensed surveyor and with photographs.

3.2.2 Soil Profiling and Disposal

The analytical results for the stockpiled soil samples will be used to profile the excavated material for disposal at an appropriate facility. Once the excavated material has been profiled at either a Class II or Class I disposal facility, it will be loaded and transported for proper disposal. Copies of the shipping and disposal papers will be included in the report detailing the results of this investigation.

3.3 Soil Excavation-UST Pit and Pipeline Area

All soil containing TPH concentration in excess of 10 ppm in the former tank pit/product lines excavation will be excavated (as feasible). A soil aeration pile will be created from the excavated soil on the parking lot to the northeast of the Site.

3.3.1 Excavation and Confirmation Sampling

The excavation will be conducted utilizing a backhoe which will temporarily stockpile the soil and then create an aeration pile as specified in section 2.3.2. Grab soil samples will be collected on a regular basis from the backhoe bucket and field screened with a PID to determine when the limits of the impacted soil have been reached. The excavation will be deepened until all the impacted soil in the vertical direction has been removed, or until groundwater is encountered, whichever is shallower. Because the excavation will not extend below the water table, de-watering of the pit will not be required.

Once the limits of the excavation have been reached, confirmation soil samples will be collected from the sidewalls of the excavation for every 20 linear feet of excavation and bottom samples will be collected for at least every 100 square feet of excavation. Sample locations will be documented in relationship to past and future property configuration. **These soil samples will be submitted to a state certified laboratory for CAM 17 metals and hydrocarbon scan analyses on a 24-hour turn around time.**

The analytical results for soil samples collected from the excavation limits will be evaluated to verify that all of the impacted soil above 10 ppm was successfully excavated. The specific limits of the excavation will be documented by a licensed surveyor and with photographs.

3.3.2 Soil Aeration

Excavated soil will be worked and fluffed and placed in a one foot thick layer on a high density polyethylene (HDPE) liner in a designated treatment area. The treatment area will be enclosed with a locking chain link fence with proper Proposition 65 signage posted. The soil will then be aerated in accordance with BAAQMD Regulation 8, Rule 40 regarding the uncontrolled emission — Permit? of volatile organics from soil aeration. The soil will be disced and turned weekly to enhance and expedite the aeration process. Confirmation sampling will be conducted as deemed appropriate based on field headspace readings using a PID. A total of four samples will be collected for every 50 cubic yards of soil. The four samples from each 50 cubic yard section will be composited in a California certified laboratory and analyzed for TPHg by EPA Method 8015.

1/20 for on site reuse — BTEX

3.4 Site Restoration

The completed excavations will be backfilled with imported clean fill material, or with the original material following it's successful aeration. The excavation backfill will be compacted to meet the requirements of the planned use of the area as appropriate.

3.5 Groundwater Investigation

Because soil impacts of TPH are documented above 100 ppm and the depth to groundwater is known to be less than 50 feet, three groundwater monitor wells will be installed to determine the condition of Site groundwater. One of these wells will be located within 10 feet of the former tank pit (required by RWQCB), one will be located near the former product line trenches, and the third will be located in the interpreted upgradient direction. → Only see 2 wells on map

Prior to implementation of monitor well installation activities, any remaining utilities in the excavation area will be marked using a private utilities locator service. Electrical service will be double checked to ensure that "live" conduits do not remain in the excavation area.

3.5.1 Drilling And Soil Sampling

→ Sampling requirements

Three soil borings will be drilled using a truck-mounted drill rig equipped with 7.5-inch outside diameter hollow stem augers (Figure 2). Continuous cores will be collected from each boring using a 3.5-inch diameter by 5-foot long core barrel. The cores will be logged in the field by a geologist to produce an accurate lithologic and stratigraphic profile. The soil borings will be drilled to a total depth of approximately 20 feet below ground surface (bgs), or approximately 5 feet below the first encountered groundwater, unless a competent aquitard is intercepted.

10' below

how often?

The soil cores will be field screened using a photo-ionization detector (PID) equipped with a 10.2 eV lamp. Soil samples will be collected from the cores in brass tubes and sealed with teflon tape, plastic caps and tape. The soil samples will be labeled with the appropriate borehole information, time and date of collection, and placed on ice for subsequent transport and analysis at a state-certified analytical laboratory. Chain-of-custody procedures will be followed at all times. **The selected soil samples will be analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX) and TPHg using EPA Methods 8020/8015 modified.**

→ Based on previous results this ok!

3.5.2 Monitor Well Installation

Groundwater monitor wells will be installed in the three borings drilled to approximately 20 feet bgs. The wells will be constructed of 2-inch diameter, 0.020-inch machine slotted, Schedule 40 polyvinylchloride (PVC) well screen. The well screen will be installed from the bottom of the borehole to approximately 5-feet above the discovered potentiometric surface. Two-inch diameter blank PVC casing will complete the wells from the top of the screened interval to within 1-foot of surface grade. A gravel pack consisting of #2/12 Monterey sand will be placed in the annular space from the bottom of the boring to approximately 2 feet above the screened interval. A sanitary seal consisting of hydrated bentonite slurry followed by cement slurry will be placed on top of the gravel pack to surface grade. The monitor wells will be completed at surface grade with a water tight traffic-rated street box set in cement, and a water tight locking well cap. A well identification number will be permanently affixed to the inside of the street box. ← ok

Waiting period ?

3.5.3 Monitor Well Development and Surveying

Subsequent to monitor well installation, the wells will be developed by using a PVC bailer to alternately surge the screened portion of the well bore and purge the sediment laden water. Development will continue until five to ten well volumes of groundwater have been removed, and/or the water produced is relatively sediment free. The completed groundwater monitor well will then be surveyed to a baseline datum (mean sea level).

3.5.4 Groundwater Monitoring and Sampling

24 Hr wait

Depth-to-groundwater will be obtained from the surveyed casing elevations using a water level indicator graduated to 0.01 foot. The depth to groundwater measurements will be converted to a groundwater elevation for each well. Following monitoring, each existing well will be purged by hand bailing at least four well volumes, or until the well goes dry.

After allowing the water levels in the monitor wells to recover to at least 80 percent of its static level, groundwater samples will be collected using a disposable PVC bailer and will be decanted into laboratory supplied sample containers. Samples will be tightly capped with zero headspace, then labeled with the sample number, sample time and date, and immediately placed on ice in an insulated cooler. The sample will be logged onto a chain-of-custody manifest for subsequent delivery to a state-certified laboratory. **Groundwater samples will be analyzed for BTEX and TPHg using EPA Methods 8020/8015 modified.** — ?

3.5.5 Decontamination Procedures

During drilling operations, all augers, sampling tools, and down-hole equipment will be decontaminated by steam cleaning prior to use. Rinsate water will be contained during drilling operations and will be stored in 55 gallon drums. All soil cuttings generated during the drilling operations will be stored on-site pending laboratory analysis for a determination of proper disposal. Prior to using any equipment in a monitor well, the equipment will be decontaminated by double washing with a laboratory grade detergent in clean water, and triple rinsing using deionized water. All purge water generated during groundwater sampling procedures will be contained on site in 55 gallon drums pending proper disposal.

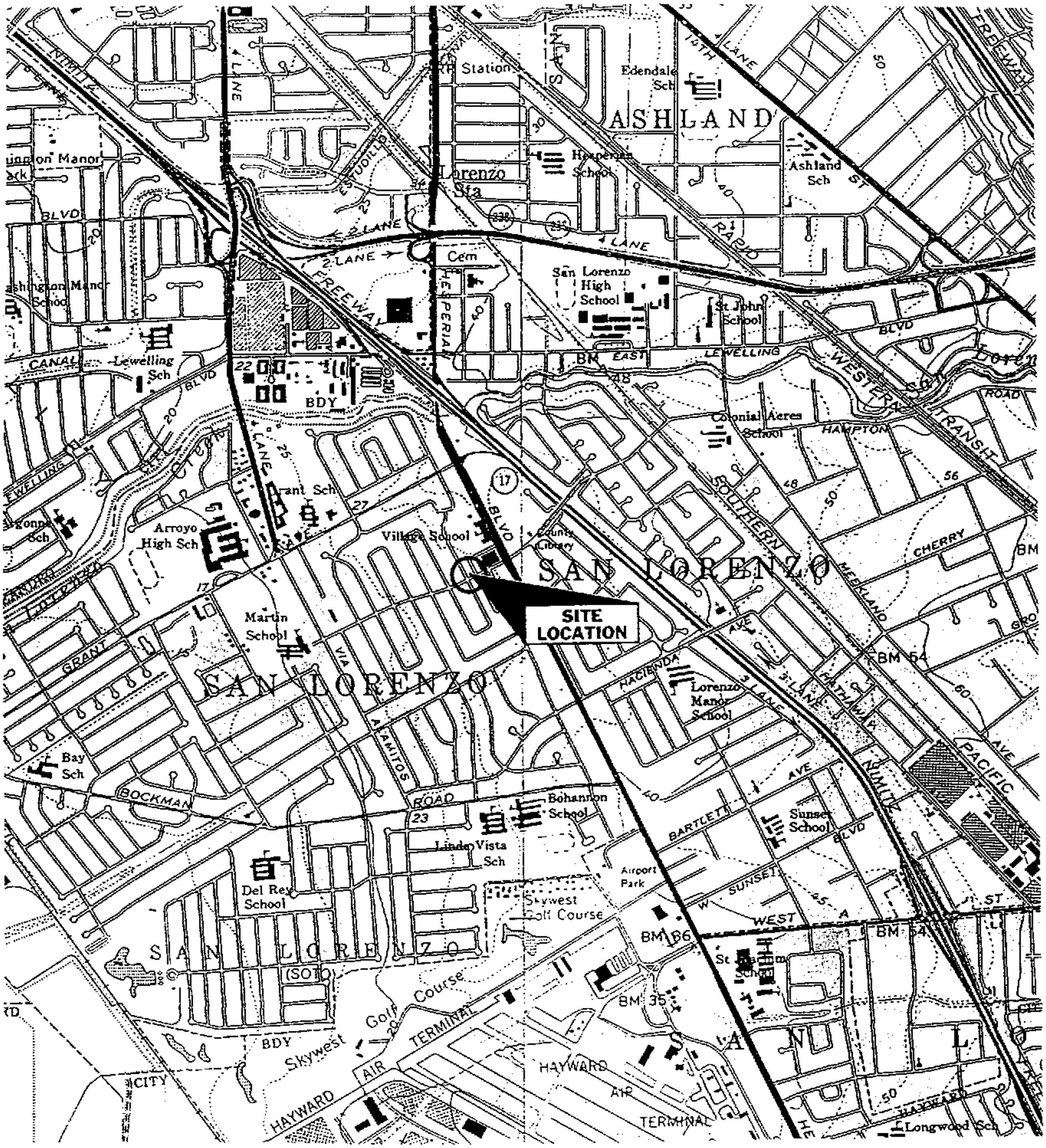
3.6 Final Reporting

SECOR will prepare a characterization report based on data from the excavation/aeration activities and from the newly installed groundwater monitor wells. The report will contain details of field procedures and operations, copies of boring logs with as-built well construction details, and laboratory analysis data in addition to a groundwater gradient map.

4.0 CLOSURE

SECOR is pleased to be Bohannon Development Company's technical consultant for this phase of work. If you have any questions or require additional information, please contact Mr. Steve McCabe at our Concord office at 510/686-9780.

SAN LEANDRO AND HAYWARD QUADRANGLE
California
7.5 Minute Series (Topographic)



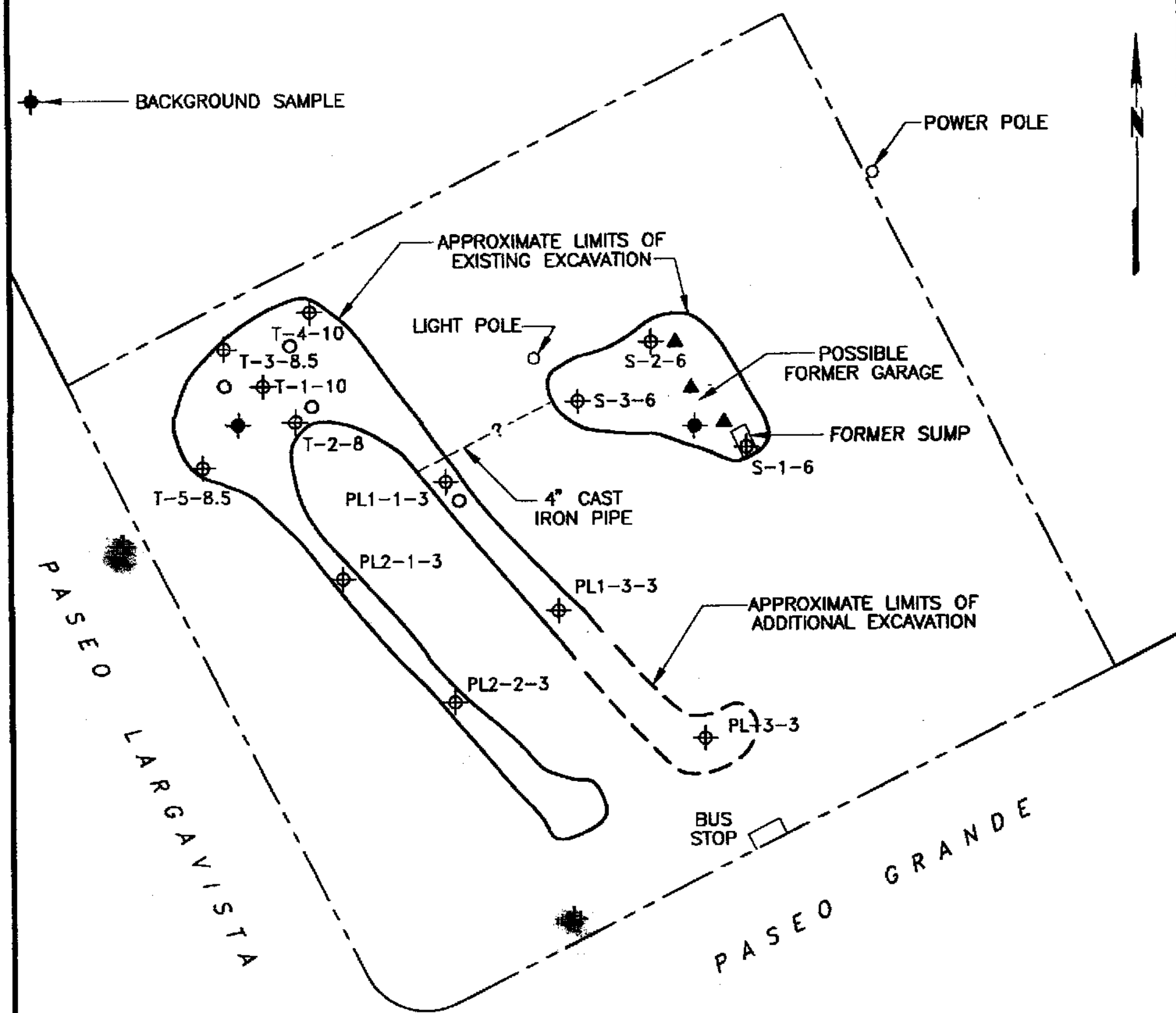
N

SCALE 1:24000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

DRAFTED BY:	CHECKED BY:			
JLH	SM	PROJECT NO. 70074-001-01	FIGURE 1	***SECOR*** 1390 Willow Pass Road Suite 360 Concord, CA 94520
DWG. DATE: 06-16-95	REV. DATE:	Bohannon Development Northeast corner of Paseo Grande and Paseo Largavista San Lorenzo, California	Site Location Map	
FILE NAME: slorenz.f01				



LEGEND:

T-4-10	SOIL SAMPLE LOCATION, JUNE 1995
	SOIL SAMPLE LOCATION, JULY 26, 1995
	PROPOSED MONITORING WELLS
o	TANK PIT COMPOSITE SAMPLE LOCATIONS
▲	SUMP COMPOSITE SAMPLE LOCATIONS
-------	PROPERTY LINE

0 20 40
SCALE FEET

99506.171336 X:\JOBS\BOHANNON\SITEPLAN

SECOR
INTERNATIONAL INCORPORATED

DRAWN	CCR
APPR	SM
DATE	28AUG95
JOB NO.	70074-001-01

FIGURE 2
BOHANNON DEVELOPMENT
SAN LORENZO, CALIFORNIA

SITE PLAN AND SAMPLE LOCATION MAP

Table 1
Summary of Detected Constituents in Soil (mg/kg)
Initial Sampling Event
Bohannon Development

Sample I.D.	Benzene	Toluene	Ethylbenzene	Xylenes	TPH	TPHms*	TPHk	TPHmo	Cadmium	Chromium	Lead	Nickel	Zinc
Grease Sump Excavation													
S-1-6	<0.02	0.2	1	13	2200	<10	1100	660	26	3900	670	4300	4600
S-2-6	0.02	0.2	0.92	0.94	120	<10	20	<100	15	3500	680	4500	4500
S-3-6	<0.02	<0.02	<0.02	<0.06	6	<10	<10	<100	37	3800	700	4900	5200
Tank Pit Excavation													
T-1-10	0.38	2	4.9	14	NA	230	<10	<100	NA	NA	1000	NA	NA
T-2-8	0.14	0.81	2.2	7.8	NA	340	<10	<100	NA	NA	1300	NA	NA
T-3-8.5	0.56	1.7	2.8	8	NA	860	<10	<100	NA	NA	9	NA	NA
T-4-10	1.1	2.4	5	9	NA	100	<10	<100	NA	NA	1100	NA	NA
T-5-8.5	0.033	0.19	0.57	1.9	NA	150	<10	<100	NA	NA	960	NA	NA
Pipeline Trenches													
PL1-1-3	3.1	12	55	200	NA	7800	<10	<100	NA	NA	1300	NA	NA
PL1-2-3	<0.005	<0.005	<0.005	<0.015	NA	<10	<10	<100	NA	NA	890	NA	NA
PL1-3-3	0.18	0.77	2	5.7	NA	950	<10	<100	NA	NA	1100	NA	NA
PL2-1-3	<0.005	<0.005	<0.005	<0.015	NA	<10	<10	<100	NA	NA	400	NA	NA
PL2-2-3	0.008	<0.005	<0.005	<0.015	NA	<10	<10	<100	NA	NA	500	NA	NA
Stockpiled Soils													
SP-A-D	<0.005	<0.005	<0.005	<0.015	NA	17	<10	100	NA	NA	NA	NA	NA
PRG	3.2	2700	3100	980	100**	100**	100**	100**	850	1600	1000	34000	100000

* = interpreted to be degraded gasoline
TPH = Total Petroleum Hydrocarbons
TPHms = Total Petroleum Hydrocarbons as mineral spirts
TPHk = Total Petroleum Hydrocarbons as kerosene
TPH mo = Total Petroleum Hydrocarbons as motor oil
PRG = Preliminary Remedial Goals for Industrial Soil (EPA, Region IX)
** = There are no PRGs established for TPH compounds; however, 100 mg/kg is the action level specified in the Tri-Regional Guidelines

TTLC

Acid Digest HNO_3

$Pb^{+}(NO_3^-)_2$

TEL

Table 2
Summary of Detected Constituents in Soil (mg/kg)
Second Sampling Event
Bohannon Development

		mg/kg						
Sample Location	Date	TPHg	Benzene	Toluene	Ethylbenzene	Xylenes	Total Lead	Organic Lead
Tank Pit	07/26/95	52	<0.025	<0.025	0.16	1.1	NA	NA
Sump	07/26/95	2400	<0.025	<0.025	1.9	15	NA	NA
Background	07/26/95	NA	NA	NA	NA	NA	18	<2
STLC (mg/l)	-	-	-	-	-	-	-	-
TTLC (mg/kg)	-	-	-	-	-	-	1000	-

dispersed

		WET Test mg/l									mg/kg			
Sample Location	Date	Lead	Barium	Cadmium	Chromium	Cobalt	Copper	Nickel	Vanadi	Zinc	NNDP	ISO	DNB	4M2P
Tank Pit	07/26/95	0.58	10.5	<0.025	0.09	1.5	0.2	1	0.29	<10	NA	NA	NA	NA
Sump	07/26/95	0.61	<10	0.05	0.14	1.6	0.2	1.3	0.68	11	1	0.36	0.43	0.22
Background	07/26/95	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
STLC (mg/l)	-	5	100	1	5	80	25	20	24	250	-	-	-	-
TTLC (mg/kg)	-	-	-	-	-	-	-	-	-	-	-	-	-	-

NA = Not Analized
\- = not applicable
NNDP = n-nitroso-di-n-propylamine
ISO = isophorone
DNB = di-n-butylphthlate
4M2P = 4-methyl-2-pentanone
STLC = Soluble Threshold Limit Concentration
TTLC = Total Threshold Limit Concentration