SEACOR
Science & Engineering Analysis Corporation

SUMMARY REPORT
ADDITIONAL SITE INVESTIGATION

GRAND MARINA FACILITY
2099 Grand Street
Alameda, California

Submitted by
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STATEMENT OF CONFIDENTIALITY

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1.0 INTRODUCTION

This Summary Report presents the findings of the Additional Site Investigation conducted by Science and Engineering Analysis Corporation (*SEACOR*) at the Grand Marina Facility located at 2099 Grand Street, Alameda, California (the Site, shown on Figure 1). The Site is presently used as a marina with docking, repair and office facilities (Figure 2). An above ground tank (AGT) farm was formerly located in the central portion of the Site. The tanks have since been demolished, although the concrete-floored and -bermed containment structure for the AGT farm remains, along with various underground conveyance pipelines.

On March 30, 1993, the Alameda County Health Care Services Agency (ACHCS) requested that a Plan of Corrective Action be submitted for the former AGT farm area, including related pipelines, and the former underground storage tank (UST) location (collectively referred to as "the Site"). The activities described in this Summary Report were implemented to further assess the source(s) and extent of petroleum hydrocarbon-affected soil and groundwater underlying specific areas of the Site in accordance with the ACHCS requests for the AGT farm area. *SEACOR* prepared a Work Plan in response to this request and submitted the document to the ACHCS on June 4, 1993. The ACHCS conditionally approved the Work Plan on August 16, 1993 provided that:

- The proposed soil borings adequately assess the lateral extent of hydrocarbon-impacted soils and shallow groundwater.
- The proposed soil borings include sample collection at the capillary fringe.
- A schedule for implementing the Work Plan be provided.
- A schedule for conducting groundwater monitoring and reporting also be provided, if necessary.

SEACOR responded with a letter submitted to the ACHCS on October 6, 1993, and subsequently implemented the Work Plan.

2.0 SITE BACKGROUND

2.1 SITE LOCATION AND DESCRIPTION

The Site is located within an irregularly-shaped parcel (Grand Marina Facility) along the southern edge of Alameda Harbor in Alameda, California (see Figure 2). The parcel is approximately 1,300 feet from east to west and approximately 1,225 feet from north to south. The northern and eastern portions of the parcel are under water. The land portion was created through filling which took place in the late 19th and early 20th centuries. The Site is bounded to the south by Grand Street, to the west by Fortmann Way, to the north by the Marin Barge and Tug facility, and to the east by Fortmann Basin. The Site is currently used as a harbor for the launching and berthing of boats.

An Environmental Assessment performed by Harding Lawson Associates (HLA, 1987) for Encinal Marina and a Site history compiled by Bloomfield (1987) described the following Site history. An AGT farm was previously operated on-site and was used until 1989. According to documentation provided by Unocal, gasoline, diesel fuel, lube oil, aviation fuel, and slop oil/bilge water were previously stored by Unocal within the AGTs. The materials stored in the AGTs were conveyed to or from the AGT farm and the pier via underground pipelines. A 1,000-gallon underground storage tank (UST) used to store gasoline, formerly located approximately 300 feet south of the AGT farm, was removed in May 1988.

Other historic Site uses may have included the following:

1893-1940s: Alaska Packers Association operated a fleet of fishing vessels.

1906-1917: Taylor and Company operated a lumber yard.

1917-1983: The City of Alameda (the City) Corporation Yard used the facility for a variety of activities including auto repair, carpentry, blacksmith, and a dog pound.

1930-1952: Union Oil Company (Union) leased a portion of the Site from HTB and used the Site for fuel storage as early as 1930. Union was responsible for constructing the AGT farm and stored gasoline, diesel fuel, fuel oil, kerosene, aviation fuel, and other petroleum compounds within the AGTs.

1953-1959: W. D. McElwain, doing business as (dba) Bay City Fuel Oil Company (BCFO) assumed the lease with the City of Alameda and operated the AGT farm as a bunker fuel depot.

1926-1989: Portions of the Site were reportedly leased by HTB.

1959-1989: HTB purchased, maintained, and operated the AGT farm.

1980-1986: Healy-Tibbets Construction Company used a portion of the Site for storage of marine construction equipment.

1986-present: Grand Marina purchased the Site and operates a marina.

2.2 SITE INVESTIGATION HISTORY

Previous Site investigations and activities were initiated during April 1987 by Crowley Environmental Services (Crowley) and HLA which installed six groundwater monitoring wells (W-1 through W-5, and B-7) and advanced six soil borings in the vicinity if the AGT farm (see Figure 3). HLA also dug six test trenches at various on-site locations during this investigation. In November 1987 approximately 285 tons of petroleum hydrocarbon-impacted soil were excavated to a maximum depth of five feet below ground surface (bgs) from the vicinity of the AGT farm. The soils were subsequently disposed of off-site. Free phase petroleum hydrocarbons were observed within the limits of the excavation. In May 1988, Uriah, Inc. removed a 1,000-gallon capacity gasoline UST. Soil adjacent to the UST was found to be impacted with petroleum hydrocarbons.

In June 1990, Versar, Inc. performed an environmental risk assessment at the Site that included collection of water samples from the estuary, four groundwater monitoring wells, and the sump within the AGT farm area. Soil samples were also collected from two areas of discolored soil. Nine cubic yards of soil were removed from the vicinity of the AGT farm.

In January 1992, Zaccor Corporation (Zaccor) conducted a Limited Environmental Site Assessment at the Site. This assessment included the removal of the AGTs, with the exception of the concrete foundation and the product lines. Zaccor also advanced soil borings and collected soil samples from the vicinity of the AGT farm, the former 1,000-gallon UST, and the product lines. Four additional groundwater monitoring wells (MW-1 through MW-4) were also installed by Zaccor. Elevated concentrations of petroleum hydrocarbons, primarily diesel and oil and grease, were detected in both soil and groundwater beneath the Site during this phase of the investigation. These data are tabulated on Table 1.

In general, the greatest hydrocarbon concentrations were detected in soils at depths to two feet beneath the AGT farm floor and beneath the former pump house. Elevated hydrocarbon concentrations were also reported in samples collected from depths of between three and seven feet beneath the AGT farm, the pump house, adjacent to the northern edge of the AGT farm, and in the vicinity of the former UST. Groundwater samples collected from on-site monitoring wells in June 1992 revealed elevated gasoline, diesel, and benzene concentrations in well MW-2 near the former UST. Significantly lower concentrations of gasoline, diesel, and/or benzene were reported in groundwater samples collected from wells W-1, W-2, W-3, and MW-4.

2.3 GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

The Site lies within the East Bay Plain along the eastern margin of San Francisco Bay. Lithologic information obtained from previously-advanced on-site soil borings and six test trenches indicate the Site is directly underlain by one to five feet of sandy fill material which is in turn underlain by native Bay Mud that extends to a depth of at least 15 feet bgs (Zaccor, 1992). The Bay Mud soils consist of unconsolidated dark gray to black clay and silty clay rich in organic material. Locally, the Bay Mud contains lenses and stringers of silt and sand as well as peat. The Bay Mud has a low permeability and generally functions as a barrier to the vertical movement of salt water from San Francisco Bay into underlying sediments. The Bay Mud is typically saturated although the water is generally not considered potable because of the low Bay Mud permeability and high salinity of the contained water.

Groundwater was encountered by Zaccor at depths of 2.5 to 3 feet bgs, primarily within the fill and fine sandy material overlying Bay Mud. Shallow groundwater was measured in four on-site monitoring wells in June 1992 at depths of 2.18 to 4.14 feet. These data correspond to groundwater elevations ranging

from 0.78 to 1.37 feet above mean sea level (msl). Zaccor (1992) reported that shallow groundwater underlying the Site flows towards the northwest under a gradient of 0.0065 feet per foot, although review of the Zaccor data suggests that groundwater may actually flow toward the northeast beneath the Site.

3.0 SCOPE AND METHODS

The Additional Site Investigation performed by *SEACOR* was composed of three primary tasks including an Historic Records Review, Pipeline Integrity Testing, and a Subsurface Investigation. The methods followed in implementing these tasks and the results of the tasks are described in the following Sections.

3.1 HISTORIC RECORDS REVIEW

Environmental Assessments were conducted at the Site in 1987 by HLA and Anne Bloomfield. To further evaluate historic Site practices and potential on-and off-site hydrocarbon release sources, *SEACOR* also reviewed historic records including information available at regulatory agencies on published lists, and in historic archives. The records review task included:

- Interviews with subject property owner(s), property manager(s), tenants, and maintenance personnel, as available or appropriate, to evaluate Site history, operation and maintenance procedures.

- Review of lists and records available from the City of Alameda, the ACHCS, the RWQCB, and other published regulatory agency lists describing known or suspected petroleum hydrocarbon releases to soil or water.

- Review of available regulatory agency waste incident databases, such as State and Federal Superfund lists, toxic substances Site lists, and UST action lists.

- Review of historical land use maps (Sanborn Fire Insurance Maps) and historic aerial photographs (Pacific Aerial Photo) of the Site and the area within a 1/2-mile radius of the Site for information regarding historical Site use that could have involved the manufacture, generation, use, storage, and/or disposal of hazardous substances.

SEACOR obtained and reviewed regulatory agency lists including the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list, the California Bond Expenditure Plan (BEP or state superfund) list, the Solid Waste Information System (SWIS) list, the Cortese list, the Regional Water Quality Control Board (RWQCB) Fuel Leaks list, the Department of Health Services' North Bay Toxics list, and the DHS's Cal Sites list.

3.2 PIPELINE INTEGRITY TESTING

Underground pipelines located at the Site were precision-tested to assess the integrity of each pipeline and evaluate whether the pipelines may have been contributing sources of petroleum hydrocarbons detected in soil and groundwater. The three tested pipelines, identified on Figure 3, were formerly used to convey diesel fuel, fuel oil, and bilge/sludge to and from the former AGT farm and fuel pier. The former diesel line now conveys bilge/sludge to and from a 25,000 gallon aboveground holding tank where it is then transported by a waste hauler for proper disposal. Subtronic Corporation (Subtronic), a California-certified precision testing contractor, performed the pipeline integrity testing. The Subtronic test report is located in Appendix A.

3.3 SUBSURFACE INVESTIGATION

The objective of the Subsurface Investigation, as described in the June 4, 1993 Work Plan, was to further characterize the horizontal and vertical extent of petroleum hydrocarbon-affected soil and groundwater beneath the Site and assess the likelihood of impact to the adjacent Bay.

To meet this objective, a phased Subsurface Investigation was initiated. Soil borings were advanced around the periphery of the former AGT farm, along the pipeline alignments, and in areas anticipated to be hydraulically downgradient of potential hydrocarbon sources. Soil and groundwater grab samples were collected. Soil samples were then chemically analyzed in the field by Mobile Chem Labs, Inc. (Mobile Chem), an on-site state-certified mobile laboratory. The mobile laboratory provided analytical data in real time and thus allowed for decisions to be made in the field regarding the placement of additional sample locations. Groundwater grab samples were analyzed by Mobile Chem at their stationary laboratory located in Martinez, California.

SEACOR personnel measured water levels in several of the on-site groundwater monitoring wells (MW-1 through MW-4, W-1, and W-2) on October 28 and November 9, 1993. The measurements were collected at different times to assess whether shallow groundwater beneath the Site is affected by tides in the adjacent San Francisco Bay. On November 9, 1993, *SEACOR* personnel performed a survey of the soil boring ground surface elevations. The boring locations were surveyed with respect to msl, using the wellhead elevations for MW-2, MW-3, and MW-4 provided by Zaccor (1992) as benchmarks. This survey allowed *SEACOR* to calculate the approximate msl elevation of the first encountered water in each borehole.

3.3.1 Soil Boring Procedures

The soil boring program proposed in the June 4, 1993 Work Plan included sixteen (16) sample locations as shown on Figure 2. The soil boring locations were intended to further assess the extent of petroleum hydrocarbon-affected soil and groundwater in the vicinity of the product pipelines, AGT farm perimeter, former UST area, and hydraulically downgradient locations. The soil borings proposed for the former UST vicinity were omitted, as it was decided that investigation of the UST vicinity was to be performed separately. Thus, a total of thirteen (13) soil borings were first cleared of underground utilities and other obstructions by California Utility Surveys, a utility locating service. However, based upon field observations and soil analytical results, four additional soil borings were advanced.

Precision Sampling, Inc. (Precision) of Santa Rosa, California performed the drilling operations. Soil borings were advanced using a portable, hydraulically-driven soil coring system to obtain soil cores for lithologic description and possible chemical analysis. Sampling rods were advanced with vibrators, a hydraulic hammer, or pushed into the ground. Two nested sampling rods were driven simultaneously: small diameter inner sampling rods were used to obtain and retrieve the soil cores, and larger diameter outer rods served as temporary drive casing. The use of drive casing prevents sloughing of the formation while the inner rods are withdrawn from the hole. This ensured that the drive sampler would sample soil from the desired depth interval, rather than soil that had sloughed in from higher up in the borehole.

As the drive casing and inner rods were advanced, soil was driven into a 1-5/8-inch diameter, three-foot-long sample barrel attached to the end of the inner rods Soil samples were collected in 1-1/2-inch diameter by six-inch long brass or stainless steel tubes fitted inside the sample barrel. After each three foot drive, the inner rods were removed from the borehole with a hydraulic winch. The tubes containing the soil samples were removed from the drive sampler and retained for lithologic description or chemical

analysis. This process was repeated until the desired depth was reached. Upon completion, each soil boring was backfilled to the surface with a cement/bentonite grout mixture.

Relatively undisturbed soil samples were collected from the ground surface to total depth using a continuous soil coring system. The *SEACOR* geologist described the soils encountered according to the Unified Soil Classification System (USCS) and maintained a boring log of these descriptions (see Appendix B). A representative sample from each three-foot soil core interval was screened in the field for the presence of total volatile organic compounds (VOCs) using a Photoionization Detector (PID). In this procedure, approximately 20 grams of soil were placed in a clean plastic ziploc bag. After approximately 10 minutes the tip of the PID instrument was inserted into the bag and a headspace concentration in parts per million (ppm) recorded. The results of the PID screening recorded directly on the boring log.

Sample tubes were retrieved for possible chemical analysis. The exposed ends of the tube were covered with aluminum foil and fitted with plastic end caps. Each sample was labeled to indicate job number, boring number, sample depth, sample number, time and date collected, and then stored in a cooler containing ice.

At each location, soil borings were advanced to depths of one to five feet below the first encountered groundwater. Vadose zone soil samples were then selected for chemical analysis based upon the soil types encountered, and upon field screening results including visual observations, odors, and/or PID readings. One sample from each borehole was chemically analyzed for total petroleum hydrocarbons as diesel (TPHd); selected samples were also analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and xylenes (BTEX) by Mobile Chem. Custody of the soil samples was relinquished in the field as documented on Chain-of-Custody Records to the on-site laboratory for immediate analysis.

At boring locations where TPHd and/or TPHg were detected at elevated concentrations in soil, a step-out boring was advanced approximately 50 feet further away from the AGT farm and the previous boring. This resulted in four additional borings (TP2A, TP2B, TP5A, and HD3A) being advanced. In addition, several borings met refusal prior to advancement to the desired depth. These borings were relocated to allow advancement beyond the first encountered water.

In two instances (borings HD1 and HD3), boreholes met refusal prior to encountering water. Repeated boring attempts in the vicinity of location HD1 yielded the same result. A step-out boring was advanced near HD3 (called HD3A). This boring was advanced to a depth sufficient for groundwater sample collection.

3.3.2 Groundwater Grab Sampling and Analysis Procedures

Groundwater grab samples were obtained from all boreholes except HD1 and HD3, both of which did not produce water. After the targeted depth of each borehole was penetrated, a one-inch diameter Schedule 40 PVC casing with five feet of 0.020-inch machined slotted screen was installed in the borehole inside the drive casing. The drive casing was then pulled up three to five feet to expose the slotted section of PVC casing and to allow groundwater to flow into the borehole. Groundwater samples were then collected using a 3/4-inch diameter stainless steel bailer. Samples were analyzed for TPHd; selected samples were also analyzed for TPHg and BTEX. After sample collection, the slotted PVC casing was removed from the borehole, and the borehole grouted to the surface.

Groundwater samples were transferred directly from the bailer into three 40-ml VOA vials and one 1-liter amber glass container. Care was taken when transferring the water from the bailer to the containers to minimize turbulence. The containers were filled and capped so that no air bubbles were trapped. Sample containers were labeled to indicate project location, job number, boring number, sample number, and time and date collected. Sample containers were placed in a cooler containing ice.

Custody of the groundwater samples was relinquished to Mobile Chem for analysis of TPHd (EPA Method 5030/8015, modified), and in selected instances, TPHg (EPA Method 5030/8015, modified) and BTEX (EPA Method 602) by their stationary laboratory. Transfer of the samples was documented on Chain-of-Custody Records provided in Appendix C.

4.0 SUMMARY OF RESULTS

The results of *SEACOR*'s Additional Site Investigation, including Historic Records Review, Pipeline Integrity Testing, and Subsurface Investigation, are described below.

4.1 HISTORIC RECORDS REVIEW

The Historic Records Review task included review of Site construction, ownership, and chain of title documents available at various City agencies, review of regulatory agency lists and files, review of historic land use maps and aerial photographs, and interviews with past and current Site personnel.

4.1.1 Site Ownership, Lease, and Construction History

To further evaluate the historic Site uses, *SEACOR* derived Site ownership and tenancy information from files obtained from the City of Alameda's City Manager, and Site construction information from the City of Alameda Building Department. Our file reviews are summarized below.

<u>City of Alameda City Manager's Files</u>

- Prior to 1926 the Site was leased by Mr. James Robinson and was utilized as a ship building yard.
- In 1926, HTB obtained a 15 year lease for the property for a tug boat repair and water launch facility.
- On October 18, 1927 HTB obtained a second lease the property for use as a tug boat repair facility and leased an additional tidelands parcel as a water launch. The lease was also for 15 years and may represent a modification of the 1926 lease to include the tidelands parcel.
- In November 3, 1929, HTB was granted permission from the City to sublet a portion of the leased tract to Union. Union was interested in constructing a petroleum product distribution center. The on-site structures which housed the City Pound were subsequently removed and rebuilt on the adjacent property (to the southwest) which housed the Alameda City Corporation Yard.

Information obtained from Unocal (then Union) revealed the follwing:

- The December 5, 1929 lease agreement between HTB and Union indicates that Union could utilize the lessor's docks for their boats and their client's boats. Union was provided the option to renew their lease with HTB under the same terms as the agreement between HTB and the City of Alameda. If HTB chose not to renew their lease, Union would be able to negotiate directly with the City.
- The sublease between HTB and Union was extended for the period from January 1, 1930 through November 30, 1942 Property described as 11'6" on Grand Street by approximately 193' in depth, together with right-of-way for pipelines out to and over an existing dock belonging to HTB, through which Union was to receive their commodities. At that time commodities were received from Oleum Trucks were also operated from this facility. The sublease was secured with Ordinance #404 of the City of Alameda which authorized the lease by HTB.

- The "Waterfront Station" was opened August 14, 1930. The facility included a 26'x 30' warehouse, a 12'x 26' platform, 5-stall garage, P.H., separate loading rack, 12'x 18' office, and the following AGTs:

TANK NO.	DIAMETER	HEIGHT	CONTENTS	GALLON CAPACITY
2596	23'9"	25'5"	Gasoline	84,000
2597	24'10"	35'3"	Fuel Oil	126,000
2598	23'9"	25'5"	Diesel (27)	84,000
2599	10'9"	29'8"	Kerosene	20,000
2600	10'9"	29'8"	Ethyl	20,000
2634	10'9"	29'8"	Aviation Gasoline	20,000

- A 20,000 gallon tank (#2634), pump, and line were installed on March 3, 1932.

- On May 24, 1933, the 2" diameter Kero-Ethyl-Unoco unloading connections were changed to 3" diameter connections.

- Data from 1939 indicates that product rates of delivery over the dock were:
  Fuel Oil - 200 bbls/hour
  Diesel - 250 bbls/hour
  Gasoline - 50 gals/min
  The rate of delivery to a 3,444 bbls barge was:
  Fuel Oil - 200 to 300 bbls/hour
  Diesel - 175 to 250 bbls/hour
  Gasoline - 175 to 250 bbls/hour

- On August 3, 1942 the lease between HTB and Union was extended until November 30, 1952.

- An October 2, 1952 tank record listed the following tanks and contents for the AGT farm:

TANK NO.	DIAMETER	HEIGHT	CONTENTS	GALLON CAPACITY
2596	25'0"	25'6"	76 Gasoline	85,000
2597	25'0"	35'4"	7600 Gasoline	Unknown
2598	25"0"	25'6"	Diesel	85,000
2599	10'9"	29'6"	S-76 Solvent	20,000
2600	10'9"	29'6"	Kerosene	20,000
2634	10'9"	29'6"	Stove Oil	20,000
2700	10'9"	29'5.5"	80/87 Aviation	20,000

- Union's Alameda Facility was closed permanently effective April 30, 1952. All of the tanks except tank 2700 (80/87 Aviation) were out of service but were still on-site pending disposition. Use of tank 2700 was temporarily continued to serve the Oakland airport account. By November 6, 1952, the Alameda Facility had been sold and Union's file closed.

- On November 12, 1952 Union sold the property located on the sublease to Richmond Sav-Mor Oil Company. A note was made on the Bill of Sale warning that the tanks may have stored leaded gasoline which would have contained tetra-ethyl lead.

Further review of the City of Alameda City Manager's files revealed the following:

- On December 1, 1942 a second 15-year lease between the City and HTB was executed. The December 1942 "Plat of Parcel Land Leased to Harbor Tug & Barge Co" indicates that the property leased to HTB by the City includes 0.57 acres north of the U.S. Bulkhead Line located at S52°55'30"E and 1.49 acres south of the bulkhead line.

- On August 7, 1947 HTB sublet a portion of the Site to H. Norman Eirman for a boat building and repair facility. It was unclear from the records which portion of the Site would be occupied by the sublease.

- The October 1950 "Proposed Lease to Harbor Tug & Barge Co. 2047 & 2051 Grand Street" indicates that City of Alameda Tract 9 Parcel 1 was leased by HTB using the street address of 2051 Grand Street. City of Alameda Tract 9, Parcel 2 was subleased by Union with an address of 2047 Grand Street. The City of Alameda Tract 9, Parcel 3 was to be utilized as a roadway right-of-way by the City (Fortmann Way). The map of these parcels is contained in the Map of Alameda Marsh Lands, Filed Book 25, Page 74, Alameda County Recorder.

- On September 2, 1952 the Alameda City Council approved leasing the Site to Mr. Clarence Garrity. This lease was noted to be a portion of the HTB lease. The property was to be used for processing and packaging of vegetable and mineral oils.

- On November 25, 1952 under the City's Resolution 6411, another 15-year lease was renewed for HTB.

- On December 16, 1952, the City assigned its interest to Encinal Terminals for the HTB lease.

- On April 17, 1953, property was leased to W.D. McElwain with all rights under the lease to be assigned to HTB. The lease was for ten years with an additional 15-year option at the end. A later lease indicates that W.D. McElwain was dba BCFO.

- A January 20, 1953 letter from BCFO was sent to the City to negotiate with both the City and Encinal Terminals for a permanent lease.

- A February 12, 1953 letter from Encinal Terminals to the City Manager indicated that they would like to give up the lease for the Union property.

- On January 20, 1959 W.D. McElwain dba BCFO requested consent from the City to assign their lease to HTB.

- On April 17, 1963 the City and HTB agreed on another 15-year lease. The property was to be used "solely for conducting and maintaining..the business of..storage and distribution of petroleum products."

- A November 23, 1977 letter from HTB to the City Mayor requested that the two ongoing 15-year leases be consolidated. The letter outlined that HTB had one lease for the land portion of property and another which was for the tidelands. The leases had been renewed on several occasions but were a year apart on their expiration. HTB suggested that it would be more convenient to extend the shorter of the two leases to match the time period for longer lease.

- A December 1, 1978 lease agreement was executed between the City and HTB for the Site to be utilized as a general shipping and warehousing terminal, with wharves, docks, yards, and ways, and the conducting of general tug boat and barging business. The Site was also to be utilized for conducting general tug boat and barging business.

- An April 27, 1981 City inter-department memo recommended the renewal of the lease between the City and HTB. The letter also recommended allowing HTB to sublease a portion of the property just east of the fuel tank farm to Longhorn Construction Company for expansion of the City Yard. The City also renewed a lease for HTB for an additional two years. However, the City intends to occupy a portion of the property (16,500 ft²) and leave access for HTB to utilize the fuel tank area and pump house.

- On March 21, 1984 an agreement was made between Encinal Industries, Inc. (dba Encinal Terminals) and Buena Vista Marina, Inc. In the agreement Encinal Terminals was to relinquish the leases of the following:
    - Seimar Ship Repair (SSR)
    - Marin Tug and Barge Inc. (MTB) - a lease between MTB and Encinal Industries
    - Harbor Tug and Barge - a lease between the City and Alameda, whereby the City transferred its interest to Encinal Industries

- A September 28, 1993 letter from Edward Marshall of Marshall & Peterson to the Assistant City Manager indicates that 26,832 ft² of Parcel C and 13,242 ft² of Parcel D were leased from Encinal Industries. The City and Encinal Industries agreed the tidelands lease area consists of 35,560 ft². The total square footage leased to HTB is approximately 75,634 ft² of which 47.02% is owned by the City and 52.98% is owned by Encinal Industries. This designation appears to describe the land designated as Tract 9, Parcels 1 and 2.

City of Alameda Building Department Files

SEACOR reviewed available information at the City of Alameda Building Department regarding permits and building records for the Site. According to Ms. Vivian Day of the City of Alameda Building Department, the City was incorporated in 1909 and building records were cataloged in 1953. Records were open for public review without assistance from 1953 to 1987. In 1987 the records became available for review through the assistance of City staff and payment of a fee. Any historical records currently unavailable are attributed to the time period between 1953 and 1987 when records review was not monitored.

According to records available from the City Manager, the City of Alameda (the City) has leased all or portions of the current Site since prior to 1926. The following information was obtained from various lease agreements between the City of Alameda and various tenants of the Site.

Available records indicated that the earliest Site address was 2051 Grand Street, which was later changed to 2099 Grand Street. A search of the City of Alameda database (Property Inquiry File) revealed a number of modifications and improvements to the Site between 1982 and 1992. The database did not list improvements or modifications to 2099 Grand Street prior to 1986 nor to 2051 Grand Street prior to 1982. Improvements of note include:

2099 Grand Street

09/02/87 - Demolition of Existing Marine Pier
04/12/88 - Addition-Renovation of Gangway/Pier/House
06/22/88 - Build Concrete/Steel Pier
06/22/88 - Demolition of Garage
07/18/88 - Demolition of Garage
10/19/88 - Installation of Storm Drains
04/07/89 - Installation of Two Underground Storage Tanks
10/17/90 - Installation of Water Line/Sump

2051 Grand Street

Unknown Date - Dredging
Unknown Date - Removal of Underground Storage Tanks
01/17/92 - Demolition of Above Ground Tank Farm

No further information was available at the City of Alameda regarding the noted improvements. Based on discussions with Mr. Curt Bolton of Grand Marina, the UST formerly located near the southeastern portion of the building was removed in 1991 under the supervision of Ms. Juliet Shinn of the ACHCS.

4.1.2 Regulatory Agency List and File Review

SEACOR obtained and reviewed regulatory agency lists including the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list, the California Bond Expenditure Plan (BEP or state superfund) list, the Solid Waste Information System (SWIS) list, the Cortese list, the Regional Water Quality Control Board (RWQCB) Fuel Leaks list, the Department of Health Services' North Bay Toxics list, and the DHS's Cal Sites list. Those cases within one-half mile of the Site are depicted on Figure 4 and are described below.

CERCLIS

The Environmental Protection Agency's CERCLIS list was reviewed for cases within one mile of the Site. Facilities listed within this system are compiled on the EPA's National Priority List (NPL) of impacted properties or those reported to the EPA by state or local agencies as needing additional investigation. No cases of interest to this study were identified from the CERCLIS list.

Bond Expenditure List

The State BEP for Hazardous Waste Sites was reviewed for cases within one mile of the subject Site. No cases of interest to this study were identified from the BEP.

SWIS List

The California Waste Management Board SWIS list and the Alameda County Solid Waste Management Authority's Location of Solid Waste Facilities Map were reviewed for cases within one mile of the subject Site. No cases within one mile of the Site were identified from either the SWIS List or Alameda County Solid Waste Map.

Cortese List

The Cortese list is compiled by the California State Office of Planning and Research (OPR) from data provided from the State Department of Health Services, the State Water Resources Control Board, and the California Waste Management Board as required by AB 3750 (Cortese) Government Code Section 65940. No cases within one mile of the Site were identified from the Cortese List.

Review of Regulatory Agency Waste Incident Database

The Environmental Protection Agency (EPA), California Department of Toxic Substances Control Division (CAL-EPA), Alameda County Health Care Department, and the San Francisco RWQCB were contacted to obtain available information on the Site and surrounding properties. Records were available at all of the above listed agencies as described in the sections below.

Cal Sites List

The Cal Sites List is generated by the California Department of Health Services (now the Department of Toxic Substances Control). The list is comprised of facilities collected using the Standard Industrial Classification (SIC) codes, historical phone book reviews, site drivebys, citizen complaints, and other sources. Several facilities were identified within one mile of the Site. Several of these properties were discussed in previous sections. All cases listed within one mile which have not been previously discussed all have a status of No Further Action (NFA).

Leaking Underground Storage Tanks List

The San Francisco RWQCB's leaking UST list (LUST) was reviewed to identify any cases within one mile of the Site. The following cases were identified from this source.

Encinal Marina - 2051 Grand Street

This property corresponds with an earlier address for the Site. An unauthorized leak report was filed on April 16, 1987 as the result of spills during offloading from a tank truck. In February 1989, Harding Lawson Associates (HLA) excavated soils 4 to 5 feet below ground surface (bgs) along a pipeline running from the on-site AGT farm to the pier. An oily material was observed to be seeping into the excavation from beneath the AGT farm structure. As a result, 285 tons of soil were excavated and a groundwater extraction system was reportedly installed to capture free product. No further information was available regarding the type or period of operation of the groundwater extraction system.

Alameda Fire Station #3 - 1703 Grand Street

The Alameda Fire Station #3 is located approximately 0.25 miles south of the Site. A single groundwater monitoring well was installed adjacent to a 280-gallon diesel UST. Groundwater analyses indicated a maximum of 5.4 parts per million (ppm) total motor fuels in groundwater samples collected from the

monitoring well. The RWQCB last reviewed the case June 1990. A significant impact to the Site from this facility is not expected.

Weyerhauser Corporation - 1801 Hibbard Street

Weyerhauser Corporation Paper Company is located approximately 0.25 miles southwest of the Site. Four USTs were removed from the Weyerhauser property in April 1991. One 10,000-gallon UST was used for diesel storage and three, 1,000-gallon USTs were used for gasoline storage. The diesel UST was located approximately 250 feet northeast of the three gasoline USTs. The soil underlying each of these USTs was found to be impacted and was excavated and disposed.

In December 1991, three monitoring wells were installed in the vicinity of the former gasoline USTs to investigate the potential impact to groundwater. Groundwater flow direction beneath this facility is reportedly westward, away from the Site. Low to moderate levels of hydrocarbon compounds were detected in groundwater collected from two of the monitoring wells. In April 1992 three additional monitoring wells were installed in the vicinity of the former gasoline USTs to further characterize the hydrocarbon impact to the subsurface.

A January 1993 report prepared by Soil Tech Engineering documented the installation of an additional monitoring well on this property. This seventh monitoring well was installed to investigate the subsurface beneath the former diesel UST. Laboratory results of soil samples generated during this well installation did not indicate the presence of reportable concentrations of total petroleum hydrocarbons as diesel (TPHd), gasoline (TPHg), and benzene, toluene, ethylbenzene, and xylenes (BTEX).

A groundwater sampling event completed in January 1993 indicated concentrations of TPHg ranging from 70 to 15,000 parts per billion (ppb) in groundwater samples collected from four of the six monitoring wells located in the immediate vicinity of the gasoline UST excavation. Based on these findings, three additional quarters of groundwater monitoring and sample collection were recommended by the firm conducting the monitoring. A significant impact to the Site from this facility is not expected.

Pennzoil Company - 2015 Grand Street

Pennzoil Company is located immediately southwest and across the street from the Site. Activities at the Pennzoil facility involve petroleum blending, packaging, and distribution for motor oils and transmission fluids. Use of this property for these activities has occurred since 1952. The facility has an AGT farm with 40 tanks containing petroleum products. Examples of waste generated at this facility are automatic transmission fluid, mixtures of waste oil and water from floor scrubbing, residuals from product tank cleaning operations, and mixtures of waste oil and heptane from the on-site quality control laboratory. Waste containing mixtures of water and oil is treated on-site by two oil-water separators. Effluent from the oil-water separator is discharged to the storm sewer. Other oil mixtures and residues are hauled off-site for disposal.

An inspection of the facility was completed by the Alameda County Department of Health Services (ACDHS) in March 1989 to identify any violations of existing environmental statutes. The violations noted by the ACDHS inspection team indicated improper completion of hazardous waste manifests and receptacle labeling.

An oil spill had occurred on the property in March 1990. Due to over-filling, approximately 3,000 gallons of a stock oil solution had been spilled to the groundsurface. The spilled solution was chemically characterized as a heavy, long carbon-chained compound with no vapor pressure, insolubility in water,

with a high boiling point. Pennzoil considered the material to be non-hazardous. The spill was confined to an area of approximately 1,400 square feet and hypothesized to have penetrated to 4 to 6 inches below groundsurface. The spill was cleaned up using a vacuum truck and by steam cleaning the affected area. At the time of the spill documentation, Pennzoil was in the process of obtaining soil samples in the affected areas. No further information was available regarding the spill or subsequent sampling activities.

The available information suggest that releases from the Pennzoil facility have not contributed significantly to the Site subsurface.

North Bay Toxics List

The North Bay Toxics List is a compilation by the RWQCB of cases which have reported chemical release. One case (Ken-Mil Company) was identified from this source within one mile of the Site.

Ken-Mil Company - 1829 Clement Avenue

The Ken-Mil Company is located approximately 0.25 miles southeast of the Site. This property formerly maintained a photo-chemical machine shop. A review of available documents indicated that soil excavation had been undertaken to remove notably stained soils. The report indicated that the staining was due to poor transfer and management of chemicals used on-site. The primary chemicals of concern were metals.

Following the soil excavation three groundwater monitoring wells were installed to investigate possible impact to groundwater. The three monitoring wells were installed in areas anticipated to be downgradient of the stained soils. Soil cuttings generated during monitoring well installation, contained detectable levels of arsenic (5.9 to 14 ppm), copper (9.4 to 15 ppm), chromium(III)(25 to 43 ppm), and cyanide (1.1 to 5.1 ppm).

The reviewed file indicated that three groundwater sampling events had been undertaken. Groundwater samples collected during two of the three sampling events were analyzed for selected metals. Arsenic, chromium(III), copper, and lead were reported in concentrations below the California State Primary Drinking Water Standards.

Groundwater samples were also collected for cyanide analysis during the three sampling events. The reviewed document indicated that total cyanide concentrations ranged from 0.35 ppm to 2.4 ppm in groundwater samples obtained from one of the monitoring wells. Groundwater samples from the other two monitoring wells did not contain detectable concentrations of cyanide.

Groundwater elevation data indicates that the groundwater flow beneath this property is north to northwest, towards the Site. The conclusion reached by the consultant for Ken-Mil indicated that the reported concentrations of metals in soil and groundwater do not represent an environmental concern and that the detected chemicals are not migrating off-property.

City of Alameda Fire Department

The City of Alameda Fire Department was also contacted with regards to information pertaining to USTs and chemical storage at the Site and adjacent properties. According to Captain Steve McKinley, the existing gasoline and diesel USTs were installed at Site in 1989 and the former USTs removed in 1988. The various subtenants on the Site are currently in compliance with handling and storage of small quantities of hazardous or potentially hazardous chemicals

County of Alameda

The County of Alameda Department of Public Works was contacted in an effort to obtain additional data. However, the County only maintains records for the unincorporated portions of the County.

4.1.3 Review of Historic Land Use Maps and Aerial Photographs

Historic aerial photographs and land use maps were reviewed to assess historic Site and vicinity land use. The earliest available Sanborn Fire Insurance map was dated 1897; this map showed the Site and vicinity to be occupied by marsh with no structures apparent on-site. A 1948 Sanborn map indicates that the southeast portion of the Site was occupied by the Union sub-station which includes the AGT farm. The HTB occupied the remainder of the Site. A machine shop was located on the western-most wharf and a floating dry dock was located between the two eastern most wharfs. The 1987 Sanborn map indicates that several of the smaller buildings had been removed from the Site by this time. The tanks in the AGT farm were noted to be empty at this time. Two warehouses and an equipment storage building are also noted.

SEACOR reviewed photographs on file at Pacific Aerial Surveys including those taken in 1947, 1950, 1953, 1957, 1959, 1966, 1971, 1975, 1981, 1985, 1990, and 1992. The earliest available photograph (March 24, 1947) reveals the presence of a small AGT farm on the central northeast portion of the Site. The AGT farm contains approximately three large tanks and four smaller tanks. Several small buildings appear to be attached to the AGT farm area. Two additional AGTs appear at the extreme south central portion of the property. Four piers appear to extend bayward from the irregular waterfront. One pier contains two small structures. The majority of the Site is occupied by many small building structures. The central portion of the Site appears to be unpaved.

- The April 14, 1950 photograph reveals slightly fewer small buildings in the unpaved portion of the Site. The remainder of the Site appears as previous.

- The August 14, 1953 photograph shows an additional pier and fewer small buildings. The Site appears to be fully paved. The AGTs previously noted in the south central portion of the Site are no longer present. Several AGTs appear to the southeast in the present location of the Pennzoil facility.

- The July 3, 1959 photograph shows still fewer buildings on-site. One of the longer piers appears to have been removed and a very short pier appears to have been added. To the south of the Site, additional AGTs and buildings at the Pennzoil facility have been added. The property to the east appears to be a boat disposal area.

- The April 20, 1966 photograph appears similar to the previous photograph.

- The May 19, 1971 photograph reveals four large AGTs on the southwestern portion of the Site. The remainder of the Site appears as previous.

- The May 29, 1975 photograph reveals that the harbor has been filled in, thereby increasing the available land area and shortening the length of the piers in water. The remainder of the Site appears as previous.

- The June 22, 1981 photograph shows the central portion of the Site as devoid of structures. The remainder of the Site is similar to previous.

- The May 15, 1985 photograph shows an increase of the infilling of the harbor with only a portion of two of the piers remaining. There are significantly fewer buildings on-site.

- The June 12, 1990 photograph shows additional infilling of the harbor and the removal of all the remaining piers.

- The April 8, 1992 photograph reveals that the AGT farm in the central northeast portion of the Site has been removed. The Site looks similar to present day.

There was no visible evidence from the aerial photographs of USTs on the Site.

4.1.4 Interviews With Past and Current Site Personnel

SEACOR interviewed past and current Site personnel familiar with activities at and near the Site to assess historic practices, particularly with respect to the construction, operation, contents, and demolition of the AGT farm. Mr. Lester Bediant was employed by HTB as General Manager. Mr. Bediant indicated the AGT farm was constructed by Union and that BCFO subsequently purchased the farm for storage and distribution of petroleum products. Mr. Bediant stated that HTB subsequently purchased the AGT farm, although he was uncertain of the date of purchase.

Mr. John Dunn and Mr. Don Holgate were formerly employed by HTB as Site workers. Mr. Dunn indicated that the AGT farm was in operation in 1956, at the date of his hire by HTB. Mr. Holgate stated that HTB took possession of the AGT farm in 1959, "...around the time of the tug boat strike." Mr. Holgate recalled that the tanks contained lube oil, diesel fuel, and heating oil. The lube oil tank was apparently the newest of the tanks, with an approximate construction date of 1958. Neither Mr. Dunn nor Mr. Holgate recalled any instances of significant spills or releases of stored fuels and oils from the AGT farm.

Mr. Holgate further recalled that the City of Alameda operated a Corporate Yard adjacent to the Site. The yard included a steam cleaning operation for equipment and machinery parts; the yard was unpaved at the time of use as steam cleaning area. Both Messrs. Dunn and Holgate recalled that a storm drain located in the middle of Grand Street transported runoff water from properties south and west of the Site; during rainy season, the water commonly exhibited an oily sheen.

Mr. Curt Bolton, Harbormaster for Grand Marina, has been employed at the Site since 1987. Mr. Bolton stated that the AGTs were demolished in 1992 by Zaccor. Mr. Bolton recalled that the AGTs were used to store diesel fuel. Mr. Bolton stated his belief that the AGTs may also have stored gasoline and kerosene, as indicated by contents labels stenciled onto the tank exteriors with the Union Oil Company logo.

4.2 PIPELINE INTEGRITY TESTING

On October 25, 1993, Subtronic examined each of three pipelines previously used to convey petroleum and bilge/sludge to and from the AGT farm. After evacuating one pipeline of its contents, and verifying that the other two pipelines were empty, Subtronic sealed both ends of each pipeline, and on October 26, 1993, introduced approximately one and one-half the operating line pressure of helium into each pipeline. The helium pressure was monitored within each pipeline for approximately one hour. The four inch diameter bilge/sludge line (former diesel line) and the four inch diameter former bilge/sludge line maintained 5.0 pounds per square inch (psi) of helium without loss of pressure. The three inch diameter

former lube oil line initially revealed a minor leak at the screw plug, which was then cleaned and sealed. This pipeline withstood a 5.0 psi charge of helium without loss of pressure.

4.3 SUBSURFACE INVESTIGATION

As noted in Section 3.3, a total of seventeen (17) soil borings were advanced to depths ranging from five to 13 feet bgs at the locations shown on Figure 2. Soil samples were collected for physical description and in some instances for chemical analysis. Groundwater grab samples were also collected for chemical analysis from each borehole. The results of these activities are described below.

4.3.1 Soils Investigation

The soil types encountered during the Subsurface Investigation were consistent with previous investigations. Encountered soils included unconsolidated artificial fill material, fine-grained sandy soils, and native Bay Mud. The fill consisted of silty sands, gravel, and debris such as brick and wood fragments. Fill at the Site extended to depths of one to six feet bgs. Fine-grained sand was often encountered beneath the fill material; the sand typically contained clay and gravel in trace to subdominant amounts. Bay Mud, consisting of soft, gray-black, black, and greenish-black silty clay, was encountered at depths between five and ten feet bgs. In some instances, the Bay Mud contained sandy horizons. Peat-like material and loam were also noted within the Bay Mud in several boreholes.

Several boreholes met with refusal, prior to advancement to the desired depths, due presumably to bricks, rocks, and other resistant objects within the fill. In these instances, the drill rig was moved laterally, and the boring advanced again. In two instances (borings HD1 and HD3), it was not possible to advance a boring below the first encountered water, despite attempts at several proximal locations. Hydrocarbon, sulphur, and organic odors were noted in most of the soil borings. In addition, elevated PID readings were common of soil samples removed from the investigatory boreholes.

4.3.2 Chemical Analysis of Soils

As noted in Section 4.3.1, elevated PID readings were commonly observed in vadose zone soil samples removed from the investigatory borings (see boring logs in Appendix B). *SEACOR* selected representative vadose zone soil samples which exhibited elevated PID readings and noticeable odors for chemical analysis. The analyzed soil samples were selected from the 3.0 to 4.0 foot bgs depth interval; the target sample interval for chemical analysis was estimated to be from 2.0 to 5.0 feet bgs, with actual samples selected based upon the observed soil types, and field observations such as staining, odor, and PID readings. The 3.0 to 4.0 foot bgs interval was selected for chemical analysis due to poor sample recoveries from the overlying 2.0 to 3.0 foot interval and from the underlying 4.0 to 5.0 foot bgs interval, and to minimize the potential for analyzing water table-level soils.

Sixteen (16) soil samples were analyzed for TPHd, five of which contained concentrations above the five milligrams per kilogram (mg/kg) detection limit for TPHd (see Figure 5). The greatest TPHd concentrations were reported in borings TP3 (800 mg/kg) and TP2 (300 mg/kg), with lesser concentrations reported in the samples collected from borings TP1 (29 mg/kg), HD1 (15 mg/kg), and PL3 (5.0 mg/kg). Five soil samples, including one sample collected from each of borings TP3, TP4, TP5, TP5A, and HD4 were also analyzed for TPHg and BTEX. The sample from boring TP3 contained reportable concentrations of TPHg (13 mg/kg), ethylbenzene (0.07 mg/kg), and xylenes (0.059 mg/kg). No other soil sample contained reportable TPHg or BTEX concentrations.

SEACOR discussed the soil analytical results with representatives of Mobile Chem to further evaluate the relationship between the observed odors, elevated PID readings, and the lack of reportable hydrocarbon concentrations. Three samples were selected as representative for further evaluation including HD4-3.5, TP2-4, and TP3-4. Sample HD4-3.5 exhibited strong petroleum odors and elevated PID readings; Mobile Chem's analysis indicated that TPHd, TPHg, and BTEX were not present in reportable concentrations. Mobile Chem personnel reviewed the chromatograms generated during analysis of this sample and confirmed that neither gasoline (and BTEX) nor diesel fuel constituents were evident in the chromatogram patterns. — Then what?

The samples selected from borings TP2 and TP3 (TP2-4 and TP3-4) each exhibited elevated PID readings and strong odors; sample TP2-4 was reported to contain TPHd at 300 mg/kg while sample TP3-4 was reported to contain TPHd (800 mg/kg), TPHg (13 mg/kg), ethylbenzene (0.07 mg/kg), and xylenes (0.059 mg/kg). Mobile Chem reported that the chromatogram for TP3-4 did not evidence a lighter hydrocarbon "signature" at "..higher than expected levels," and that the presence of xylenes and ethylbenzene and lack of benzene and toluene suggested the presence of an aged gasoline or lighter diesel fuel. Mobile Chem indicated that the TP2-4 chromatogram suggested the presence of a mixed diesel fuel and ~~gasoline~~ release.

The laboratory analytical results, Chain-of-Custody Records, and written summary of the chromatogram review by Mobile Chem are provided in Appendix C. Table 2 and Figure 5 summarize the chemical analytical results for the selected soil samples.

4.3.3 Chemical Analyses of Groundwater

A total of sixteen (16) water samples (14 primary, 1 duplicate, and 1 trip blank) were submitted for chemical analysis. Each of the submitted samples were analyzed for TPHd; the samples collected from borings TP3, ~~TP4, TP5, TP5A,~~ HD4, and PL1 were also analyzed for TPHg and BTEX. The analytical results are summarized on Table 3 and are presented on Figure 6. Four of the analyzed samples contained reportable TPHd concentrations; the samples collected from borings TP2 and TP2A contained the highest TPHd concentrations at 450,000 micrograms per liter ($\mu g/\ell$) and 31,000 $\mu g/\ell$, respectively. The duplicate sample collected at location TP2 (labeled TP2C) contained TPHd at 15,000 $\mu g/\ell$. The samples from borings PL2 and PL4 also contained respective TPHd concentrations of 630 and 1,200 $\mu g/\ell$. With the exception of the sample collected from boring HD4, TPHg and BTEX were not detected in reportable concentrations. The sample collected from boring HD4 contained respective toluene, ethylbenzene, and xylenes concentrations of 1.6, 5.3, and 4.5 $\mu g/\ell$. The laboratory reports and Chain-of-Custody Records are included in Appendix C.

4.3.4 Water Level Survey

The water level survey data collected by *SEACOR* on October 28 and November 9, 1993 were converted to msl elevations. The depth to water measured in on-site monitoring wells ranged from 1.09 to 6.24 feet bgs. These data correspond to msl elevations ranging of -3.2 to 2.18 feet, as shown on Table 4. Figures 7 and 8 depict these data as contoured groundwater elevations. As shown, both the October and November water elevation data indicate a generally northwest groundwater flow direction.

The depth to first encountered water measured in the soil borings advanced as part of this investigation ranged from 4.5 to 10 feet bgs as presented on Table 5. These data correspond to msl elevations ranging from -4.71 to 2.32 feet. The groundwater elevation data gathered from the soil borings suggest a northeast-southwest trending water table depression or "trough". The trough appears to extend from borings PL1 and HD2 southwest beneath the former AGT farm, to borings PL4 and TP3. It is important

to note that the water levels measured in each soil bore do not necessarily represent stabilized conditions; these data are therefore not considered to be as reliable as the groundwater data collected from on-site monitoring wells.

4.3.5 QA/QC

Quality assurance samples were used to evaluate the quality of the data obtained from the field program. Two distinct types of quality assurance samples were used during this project.

- **Blind duplicate samples** for soil and groundwater were submitted at a rate of one per ten primary samples obtained (two samples were analyzed including one soil and one groundwater sample). Blind duplicate samples were analyzed for the same analytical parameters as the primary samples. The blind duplicate samples provide an indication of the precision of the analytical methodology as well sampling methodology and sample matrix variability. Both duplicate samples yielded analytical results similar to the corresponding primary sample.

- **Trip blank samples** were submitted at a rate of one per shipping container (cooler). Trip blanks consist of analyte free water placed in an appropriate container. Trip blanks were prepared by the analytical laboratory and accompanied the primary samples during sampling and transport to the laboratory. One trip blank was analyzed for TPHg and BTEX compounds, only. The trip blank provides a measure of positive interferences introduced by sample preservation, transportation, and storage and analysis. The analyzed trip blank sample did not yield reportable analyte concentrations.

5.0 SUMMARY

The results of our Additional Site Investigation may be summarized as follows:

Historic Records Review

- The Site, or portions thereof, have been leased from the City of Alameda since prior to 1926. The leaseholders have included a variety of individuals and companies.

- Site activities have been included boat launching, berthing and repair, hydrocarbon storage and distribution from underground and/or aboveground storage tanks, and miscellaneous uses such as auto repair, carpentry, blacksmithing, and a kennel.

- Union Oil Company constructed the former AGT farm at the Site in 1930, and stored and distributed various hydrocarbon compounds from the AGTs until approximately 1952. The contents stored in the AGTs, as reported by Unocal, included gasoline, fuel oil, diesel fuel, kerosene, ethyl, avaiation fuel, stove oil, and an unknown solvent (S-76 solvent). The AGT farm was demolished by Zaccor on behalf of Grand Marina in 1992.

- There were no nearby Federal or State Superfund cases or solid waste management sites, identified during our review of available lists and files.

- Leaking UST cases listed by the RWQCB include Encinal Marina (the Site), Alameda Fire Station (1705 Grand Street), Pennzoil (2015 Grand Street), and Weyerhauser (1801 Hibbard Street).

- The RWQCB's chemical release list identified the Ken-Mil Company (1829 Clement Avenue) as the nearest off-site chemical release location. The released compounds include metals (arsenic, chromium, copper, cyanide, and lead). However, due to their concentrations and relative immobility, the reported metals do not appear to represent a significant potential contribution to the Site subsurface.

- Historic Site use appears to represent the most significant potential source of hydrocarbons identified in on-site subsurface soil and groundwater.

- The lack of historic groundwater elevation data for the Site makes assessment of groundwater flow direction difficult. Data presented by Zaccor (1992) are reported to represent a northwesterly groundwater flow direction. Review of Zaccor's (1992) data suggest an east-northeast flow direction.

Pipeline Integrity Testing

The pipeline integrity tests conducted by Subtronic indicate that the three lines previously used to convey petroleum liquids and bilge/sludge to and from the former AGT farm are competent and have not leaked. In the event that no repairs have been performed upon these pipelines, it seems likely that historic leakage from the pipelines has not occurred.

Subsurface Investigation

The Subsurface Investigation conducted by *SEACOR* appears to confirm much of the previously reported data and/or findings including:

- Fill composes the upper one to six feet of Site soils. The fill is locally underlain by a fine-grained sand with varying amounts of gravel and clay, but is primarily underlain by the dark gray silty clay comprising Bay Mud. The Bay Mud contains sandy and peat-rich horizons.

- The encountered soils yielded strong petroleum, organic, and/or sulfurous odors as well as elevated PID readings. With few exceptions, these odors and readings did not correspond to reportable hydrocarbon concentrations. Evaluation of a representative chromatogram for an analyzed sample which exhibited the elevated PID readings and odors but which did not contain reportable analyte concentrations, did not suggest the presence of unreported hydrocarbons.

- The samples containing the greatest reportable hydrocarbon concentrations were collected from locations south of the AGT farm (TP3-4 with TPHd and TPHg at 800 and 13 mg/kg, respectively) and northeast of the pump house adjacent to the northern wall of the AGT farm (TPHd at 300 mg/kg). Lesser hydrocarbon concentrations were reported in samples collected from the northern portion of the area of investigation (HD1-3.5, with TPHd at 15 mg/kg), north of the pump house (TP1-3.5 with TPHd at 29 mg/kg), and near the joint in the diesel fuel pipeline north of the AGT farm (PL3-4 with TPHd at 5.0 mg/kg).

- Evaluation of representative chromatograms indicate the presence of a gasoline/diesel fuel mixture in the sample collected from boring TP2 while the results for the TP3 sample suggest the presence of an "aged gasoline or lighter diesel fuel".

- The extent of hydrocarbons in subsurface soils appears to have been characterized with the exception of the vicinity of boring TP3. The vadose zone soils beneath and surrounding the AGT farm to a distance of approximately 40 feet contain elevated concentrations of TPHg, TPHd, and oil and grease. Vadose zone soils containing elevated hydrocarbon concentrations are also present in the vicinity of the former UST, extending toward the north, and boring TP3.

- Groundwater grab samples collected immediately north and northeast of the AGT farm pump house contained elevated TPHd concentrations. The extent of this condition appears to be limited to the vicinity of borings TP2 and TP2A, although a confirmatory sample to the southeast of boring TP2A was not obtained. In addition, pipeline-vicinity groundwater grab samples collected north of the AGT farm (PL2 and PL4) contained elevated TPHd concentrations. The borings surrounding PL4 suggested the TPHd extent was limited; however, samples were not collected bayward of PL2, due to refusal met by the drilling rig.

- With the exception of low toluene, ethylbenzene, and xylenes concentrations reported in one sample, gasoline-range hydrocarbons were not reported in groundwater samples analyzed for TPHg and BTEX.

- The depth to water measured in on-site wells ranged from 1.09 to 6.24 feet bgs, corresponding to msl elevations of -3.2 to 2.18 feet. These water level and elevation data suggest a northwesterly flow direction. The variation in measured water levels suggest that groundwater beneath the Site is tidally-influenced.

- The water encountered in soil borings advanced as part of this investigation generally occurred near the interface between the Bay Mud and overlying fill or sandy soils. This suggests that shallow groundwater "rides" along this interface which may partially explain the variable depth to water measured beneath the Site.

- The depth to first water encountered in soil borings advanced as part of this investigation ranged from 4.5 to 10 feet bgs, corresponding to approximate msl elevations of -3.68 to 2.32 feet. When contoured, these data suggest a groundwater low or "trough" trending northeast-southwest beneath the AGT farm. This "trough", if actually present, would result in a northeasterly groundwater flow direction beneath the Site. However, it is important to note that the water levels measured in soil borings do not represent stabilized levels and are therefore considered less accurate than monitoring well data.

6.0 REFERENCES

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Mr. Bert Barber, former HTB employee, November 1993.

Mr. Lester Bediant, former HTB employee, November 1993.

Mr. Curt Bolton, Harbormaster, Grand Marina, December 14, 1993.

Mr. John Dunn, former HTB employee, November 1993.

Mr. Don Holgate, former HTB employee, November 1993.

Mr. Dennis O'Keefe, Golden Gate Petroleum, November 1993.

TABLE 1
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

SOILS - HYDROCARBONS

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
WELLBORES							
MW-1 4.0-4.5	ND	970	ND	ND	ND	ND	2,400
MW-1 10.0-10.5	NA	NA	NA	NA	NA	NA	NA
MW-1 15.0-15.5	NA	NA	NA	NA	NA	NA	NA
MW-2 4.0-4.5	19	150	0.24	0.62	0.050	0.26	57
MW-2 10.0-10.5	NA	NA	NA	NA	NA	NA	NA
MW-2 16.0-16.5	NA	NA	NA	NA	NA	NA	NA
MW-3 6.0-6.5	ND	ND	ND	ND	ND	ND	170
MW-3 10.0-10.5	NA	NA	NA	NA	NA	NA	NA
MW-4 10.0-10.5	NA	NA	NA	NA	NA	NA	NA
MW-4 15.0-15.5	NA	NA	NA	NA	NA	NA	NA
TANK FARM FLOOR							
#1 0.0-0.5	40	1,100	ND	ND	ND	0.13	1,300
#1 6.5-7.0	ND	99	ND	ND	ND	ND	220
#2 5.5-6.0	ND	36	ND	ND	ND	ND	130
#3 0.0-0.5	780	21,000	ND	0.55	0.88	3.0	15,000
#3 5.5-6.0	44	900	ND	ND	0.10	ND	1,800
#4 4.0-4.5	800	490	ND	ND	ND	1.2	1,900

TABLE 1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
#5 0.0-0.5	500	3,500	ND	ND	ND	ND	2,800
#5 5.5-6.0	12	40	0.024	0.14	0.075	0.23	200
#6 5.5-6.0	43	1,200*	ND	ND	ND	0.085	840
#7 0.0-0.5	97	960	ND	ND	0.13	0.54	2,100
#7 5.5-6.0	0.7	19*	0.006	ND	ND	0.009	190
#8 6.5-7.0	0.9	19*	ND	ND	ND	ND	120
#9 0.0-0.5	1.2	55	ND	ND	ND	0.010	320
#9 5.5-6.0	2.4	18*	ND	ND	ND	0.010	120
#10 5.5-6.0	ND	97	ND	ND	ND	ND	200
#11 0.0-0.5	320	12,000	ND	ND	ND	ND	4,000
#11 4.0-4.5	1.3	ND	ND	ND	ND	ND	90
#12 0.0-0.5	NA	NA	NA	NA	NA	NA	1,100
#12 6.5-7.0	ND	ND	ND	ND	ND	ND	100
TANK FARM PERIMETER - DISCRETE SAMPLES							
#15 0.0-0.5	28*	160*	ND	ND	ND	0.086	470
#19 4.5-5.0	ND	ND	ND	ND	ND	ND	340
#23X 3.0-3.5	ND	ND	ND	ND	ND	ND	37

TABLE 1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
#32A 0.0-0.5	ND	ND	ND	ND	ND	ND	57
#32B 4.0-4.5	ND	ND	ND	ND	ND	ND	110
#33B 4.0-4.5	ND	550*	ND	ND	ND	ND	5,500
#45B 4.0-4.5	230*	200	ND	0.081	0.66	1.9	3,500
#49B 4.0-4.5	1,200*	16,000	ND	1.2	0.74	1.9	1,300
#51B 4.0-4.5	0.9	24	ND	ND	ND	ND	87
TANK FARM PERIMETER - COMPOSITE SAMPLES							
#13,#14,#16 0.0-0.5	ND	250	ND	ND	ND	ND	1,100
#13,#14 4.5-5.0	ND	37*	ND	ND	ND	ND	330
#17-20 0.0-0.5	0.7	230*	ND	ND	ND	0.009	680
#18,#19,#20 4.5-5.0	ND	140*	ND	ND	ND	ND	680
#21-#24 0.0-0.5	0.9	180*	ND	ND	ND	0.013	1,500
#21-#24 4.5-5.0	ND	ND	ND	ND	ND	ND	130
#25-#28 0.0-0.5	0.7	1,300*	ND	ND	ND	ND	2,300
#25-#28 4.0-4.5	ND	ND	ND	ND	ND	ND	310
#29A-32A 0.0-0.5	ND	1,100*	ND	ND	ND	ND	690
#29,#30,#32B 4.0-4.5	ND	13	ND	ND	ND	ND	43

TABLE 1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
#33,35,#36A 0.0-0.5	ND	49*	ND	ND	ND	ND	310
#33-#36B 4.0-4.5	ND	460*	ND	ND	ND	ND	2,000
#37-#40A 0.0-0.5	ND	63*	ND	ND	ND	ND	220
#37-#40B 4.0-4.5	ND	910*	ND	ND	ND	ND	2,700
#41-#44A 0.0-0.5	ND	98*	ND	0.014	ND	0.014	850
#45,#47,#48A 0.0-0.5	0.7*	240*	ND	0.005	0.013	0.040	980
#45B,#48B 4.0-4.5	120*	110	ND	ND	0.23	0.30	1,200
#49A,#50A 0.0-0.5	ND	7,900	ND	ND	ND	ND	8,600
#49B,#50B 4.0-4.5	370*	11,000	ND	ND	ND	1.1	4,500
#51A,#52A 0.0-0.5	NA	110	NA	NA	NA	NA	400
#51B,#52B 4.0-4.5	ND	28	ND	ND	ND	ND	40
FORMER UST VICINITY							
TP1 4.0-4.5	340	660**	ND	0.87	1.0	2.1	2,000
TP2 4.0-4.5	88	NA	ND	0.54	0.34	0.59	350
TP3 4.0-4.5	17	NA	0.15	0.18	0.131	0.40	4,400
TP5 4.0-4.5	ND	NA	ND	ND	ND	ND	12,000
TP6 4.0-4.5	26	NA	ND	0.088	0.20	0.64	7,500

TABLE 1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
TP7 4.0-4.5	5.2	NA	ND	0.013	0.059	0.15	480
TP8 4.0-4.5	ND	82*	ND	ND	ND	ND	410
TP9 4.0-4.5	490*	4,700	ND	ND	ND	5.8	3,100
PRODUCT LINES							
PL-2 4.0-4.5	0.7*	5,400*	ND	ND	ND	ND	10,000
PL-3 4.0-4.5	ND	31*	ND	ND	ND	ND	560
PL-4 4.5-5.0	210*	11,000*	ND	ND	0.22	0.60	11,000
PL-12 4.5-5.0	ND	21*	ND	ND	ND	ND	37
1987 HLA BORINGS							
B-1 1.0-1.5	2,300(1)	NA	NA	NA	NA	NA	NA
B-2 5.0-5.5	NR	NR	NR	NR	NR	NR	NR
B-3 1.5-2.0	11(1)	NA	NA	NA	NA	NA	NA
B-4 5.0-5.5	ND	NA	NA	NA	NA	NA	NA
B-5 5.0-5.5	ND	NA	NA	NA	NA	NA	NA
B-6 1.5-2.0	53	NA	NA	NA	NA	NA	NA
B-7/W-1 11.5-12.0	NR	NR	NR	NR	NR	NR	NR
1987 HLA TRENCHES							
T-1	ND	ND	ND	ND	ND	ND	NA

TABLE 1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample #	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Xylenes	TOG
T-2	ND	ND	ND	ND	ND	ND	NA
T-3	4(2)	ND	ND	ND	ND	ND	NA
T-4	ND	31,000	ND	130	6	20	NA
T-5	ND	ND•	ND	0.6	1.2	6	NA
T-6	ND	ND	ND	ND	ND	ND	NA
URIAH TANK PIT SAMPLES							
#1	ND	ND	ND	ND	ND	ND	NA
#2	730	ND	0.3	0.3	0.7	ND	NA
AREA OF PREVIOUS B-1 BORING							
1B-1 1.0-1.5	NA	NA	NA	NA	NA	NA	ND
1B-1 4.0-4.5	NA	NA	NA	NA	NA	NA	NA
2B-1 1.0-1.5	NA	NA	NA	NA	NA	NA	30
2B-1 4.0-4.5	NA	ND	NA	NA	NA	NA	ND
3B-1 1.0-1.5	NA	ND	NA	NA	NA	NA	ND
3B-1 4.0-4.5	NA	ND	NA	NA	NA	NA	ND
4B-1 1.0-1.5	NA	ND	NA	NA	NA	NA	180
4B-1 4.0-4.5	NA	ND	NA	NA	NA	NA	50
5B-1 1.0-1.5	NA	ND	NA	NA	NA	NA	100
5B-1	NA	ND	NA	NA	NA	NA	ND
4.0-4.5	NA	ND	NA	NA	NA	NA	ND

TABLE 1 (Continued)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

SOILS - METALS

PARAMETERS	T-1	T-2	T-3	T-4	T-5
Beryllium	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	0.5
Chromium	26	22	21	32	21
Copper	11	4.6	62	73	100
Lead	21	8.9	840	140	190
Nickel	23	16	26	53	51
Silver	1.3	ND	ND	ND	ND
Thallium	ND	ND	ND	5.4	ND
Zinc	27	12	310	270	330
Antimony	21	20	ND	ND	ND
Arsenic	2.6	1.6	4.7	38	0.4
Selenium	ND	ND	ND	ND	ND
Mercury	0.07	0.03	0.13	0.26	0.17

TABLE 1 (Concluded)
HISTORIC SOIL AND GROUNDWATER ANALYTICAL RESULTS
Subsurface Investigation
2099 Grand Street
Alameda, California

WATER SAMPLES - HYDROCARBONS

SAMPLE	DATE	TPHg	TPHd	BENZENE	TOLUENE	ETHYLBENZENE	XYLENES	TOG	FREE PRODUCT
MW-1	5/4/92	ND	ND	ND	0.8	ND	1.3	ND	None
MW-2	5/4/92	29,000	1,200	4,000	11,000	500	2,900	ND	None
MW-3	5/4/92	ND	120	ND	1.0	ND	ND	ND	None
MW-4	5/4/92	ND	150	ND	ND	ND	ND	ND	None
W-1(7)	6/12/87	36*	NA	0.0066	ND	0.013	ND	NA	0.25-0.50
W-2(7)	6/12/87	1.3*	NA	0.350	ND	0.023	0.018	NA	Sheen
W-3(7)	6/12/87	ND	NA	0.0041	ND	ND	ND	NA	None
W-4	6/12/87	ND	NA	ND	ND	ND	ND	NA	None
W-5	6/12/87	ND	NA	ND	ND	ND	ND	NA	Sheen
B-7	6/12/87	ND	NA	ND	ND	ND	ND	NA	None

WATER SAMPLES - METALS

SAMPLE	LEAD	ZINC
WELL B-7	0.14	NA
T-3	NA	2.7

NOTES: 1 - Soil analytical results in mg/kg unless otherwise noted.
2 - Groundwater analytical results in $\mu g/\ell$, except TOG which is reported in mg/ℓ.
3 - NA indicates not analyzed.
4 - ND indicates not detected above laboratory reporting limit.
5 - NR indicates results not reported.
6 - Reported by laboratory as TPHd* but possibly represents heavier hydrocarbon product. Those reported as TPHg* may possibly represent diesel or kerosene.
7 - Results in mg/ℓ.

TABLE 2
SOIL BORING CHEMICAL ANALYTICAL DATA[1]
Subsurface Investigation
2099 Grand Street
Alameda, California

Sample[2] Depth	TPHd	TPHg	Benzene	Toulene	Ethyl Benzene	Xylenes
TP1-3.5	29	NA	NA	NA	NA	NA
TP2-4	300	NA	NA	NA	NA	NA
TP2A-4	<5.0	NA	NA	NA	NA	NA
TP2B-4	<5.0	NA	NA	NA	NA	NA
TP3-4	~~800~~	13	<0.005	<0.005	0.070	0.059
TP4-4	<5.0 (<5.0)	<1.0 (NA)	<0.005 (NA)	<0.005 (NA)	<0.005 (NA)	<0.005 (NA)
TP5-4	<5.0	<1.0	<0.005	<0.005	<0.005	<0.005
TP5A-4	<5.0	<1.0	<0.005	<0.005	<0.005	<0.005
HD1-5	15	NA	NA	NA	NA	NA
HD2-4	<5.0	NA	NA	NA	NA	NA
HD3-5	<5.0	NA	NA	NA	NA	NA
HD3A-4	<5.0	NA	NA	NA	NA	NA
HD4-3.5	<5.0	<1.0	<0.005	<0.005	<0.005	<0.005
PL1A-6.5	<5.0	NA	NA	NA	NA	NA
PL2-4	<5.0	NA	NA	NA	NA	NA
PL3-4	5.0	NA	NA	NA	NA	NA
PL4-4	<5.0	NA	NA	NA	NA	NA

(1) - Measured in milligrams per kilograms (mg/kg).
(2) - Boring number and depth to top of analyzed sample.
NA - Not Analyzed.
< - Analyte not detected above the noted reporting limit.
Duplicate results in parenthesis.
Note PL1A-6.5 is duplicate of PL1-3.5 - Primary sample not analyzed.

TABLE 3
GROUNDWATER CHEMICAL ANALYTICAL DATA
Subsurface Investigation
2099 Grand Street
Alameda, California

Borehole	TPHd(1)	TPHg(1)	Benzene(2)	Toulene(2)	Ethyl-Benzene(2)	Xylenes(2)
TP1	<50	NA	NA	NA	NA	NA
TP2	31,000 (15,000)	NA (NA)	NA (NA)	NA (NA)	NA (NA)	NA (NA)
TP2A	450,000	NA	NA	NA	NA	NA
TP2B	<50	NA	NA	NA	NA	NA
TP3	<50	<50	<0.5	<0.5	<0.5	<0.5
TP4	<50	<50	<0.5	<0.5	<0.5	<0.5
TP5	<50	<50	<0.5	<0.5	<0.5	<0.5
TP5A	<50	<50	<0.5	<0.5	<0.5	<0.5
HD3A	<50	NA	NA	NA	NA	NA
HD4	<50	<50	<0.5	1.6	5.3	4.5
PL1	<50	<50	<0.5	<0.5	<0.5	<0.5
PL2	630	NA	NA	NA	NA	NA
PL3	<50	NA	NA	NA	NA	NA
PL4	1,200	NA	NA	NA	NA	NA
Trip Blank	NA	<50	<0.5	<0.5	<0.5	<0.5

(1) - Measured in micrograms per liter ($\mu g/\ell$).
NA - Not Analyzed.
< - Analyte not reported above noted detection limit.
* - No sample obtained.
Duplicate results in parenthesis.
No samples collected from borings HD1 and HD3.

TABLE 4
GROUNDWATER ELEVATION DATA
Subsurface Investigation
2099 Grand Street
Alameda, California

Well	Date	Time	DTW[1]	Groundwater[2] Elevation (msl)
MW-1	10/28/93	0613	3.54	1.45
	11/09/93	*	*	*
MW-2	10/28/93	0640	6.24	-3.20
	11/09/93	1148	2.61	0.43
MW-3	10/28/93	0603	4.70	0.81
	11/09/93	1145	4.70	0.81
MW-4	10/28/93	0629	2.85	0.54
	11/09/93	1136	2.32	1.07
W-1	10/28/93	0616	4.46	-0.43
	11/09/93	1140	4.46	-0.43
W-2	10/28/93	0620	1.76	1.51
	11/09/93	1133	1.09	2.18

Notes:

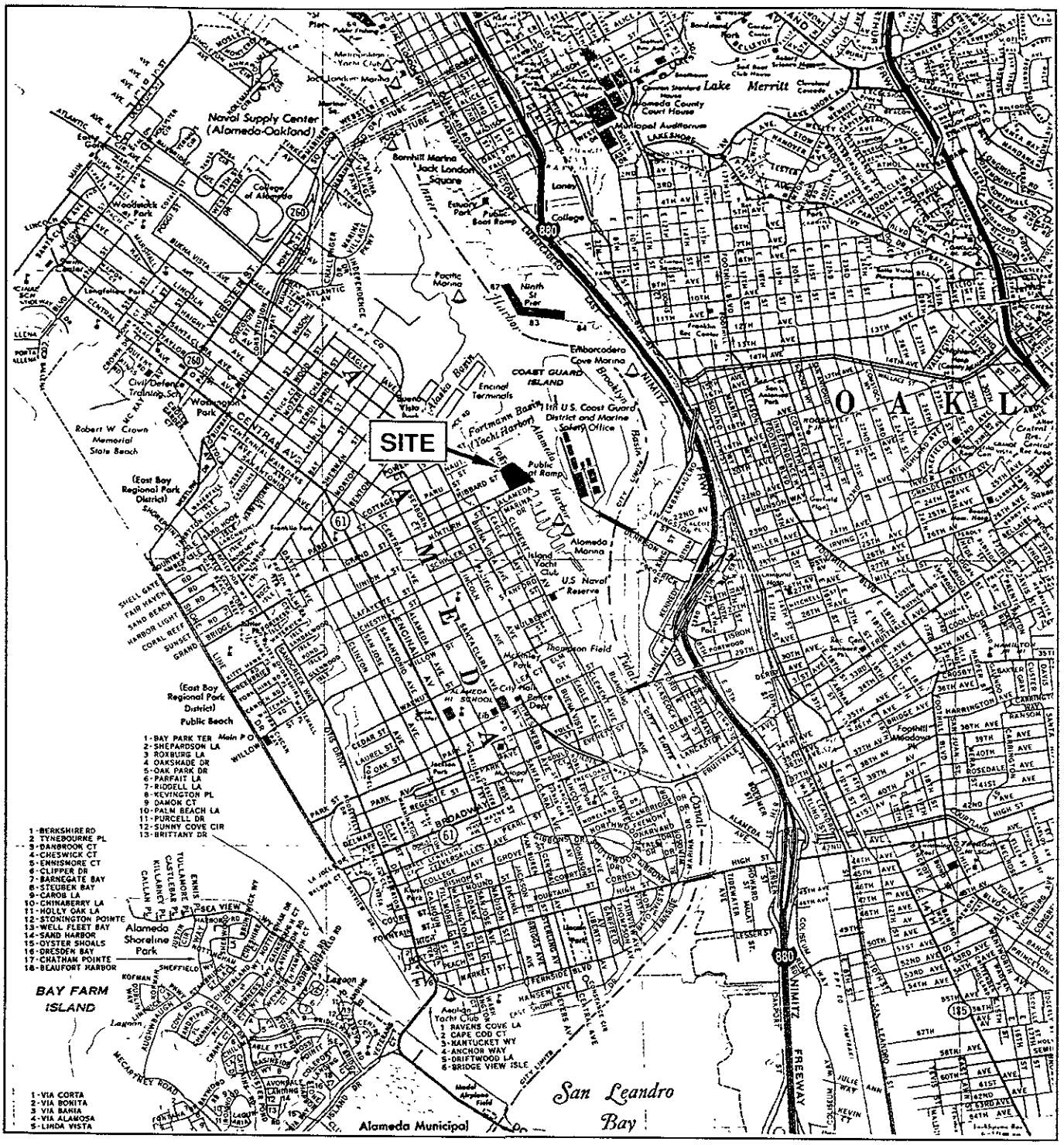
(1) Depth To Water measured from top of well casing.
(2) Groundwater elevation measured with respect to mean sea level (msl) using Zaccor 1992 elevation data.
* Well box inaccessible.
Unable to locate wells W-3, W-4, W-5, and B-7.

TABLE 5
DEPTH TO WATER IN BORINGS
Subsurface Investigation
2099 Grand Street
Alameda, California

Boring	DTW[1]	Groundsurface Elevation[2] Feet (msl)	Groundwater[2] Elevation (msl)
TP1	6	5.33	-0.67
TP2	6	4.91	-1.09
P2A	5	4.51	-0.49
TP2B	6	5.93	-0.07
TP3	5.5	3.34	-2.16
TP4	5	3.35	-1.65
TP5	5	3.36	-1.64
TP5A	7	5.39	-1.62
HD1	**	**	**
HD2	9	5.39	-3.61
HD3	6	6.59	0.59
HD3A	4.5	6.82	2.32
HD4	5	3.44	-1.56
PL1	9.5	4.79	-4.71
PL2	7	6.64	-0.36
PL3	7.5	6.04	-1.46
PL4	10	6.32	-3.68

Notes:

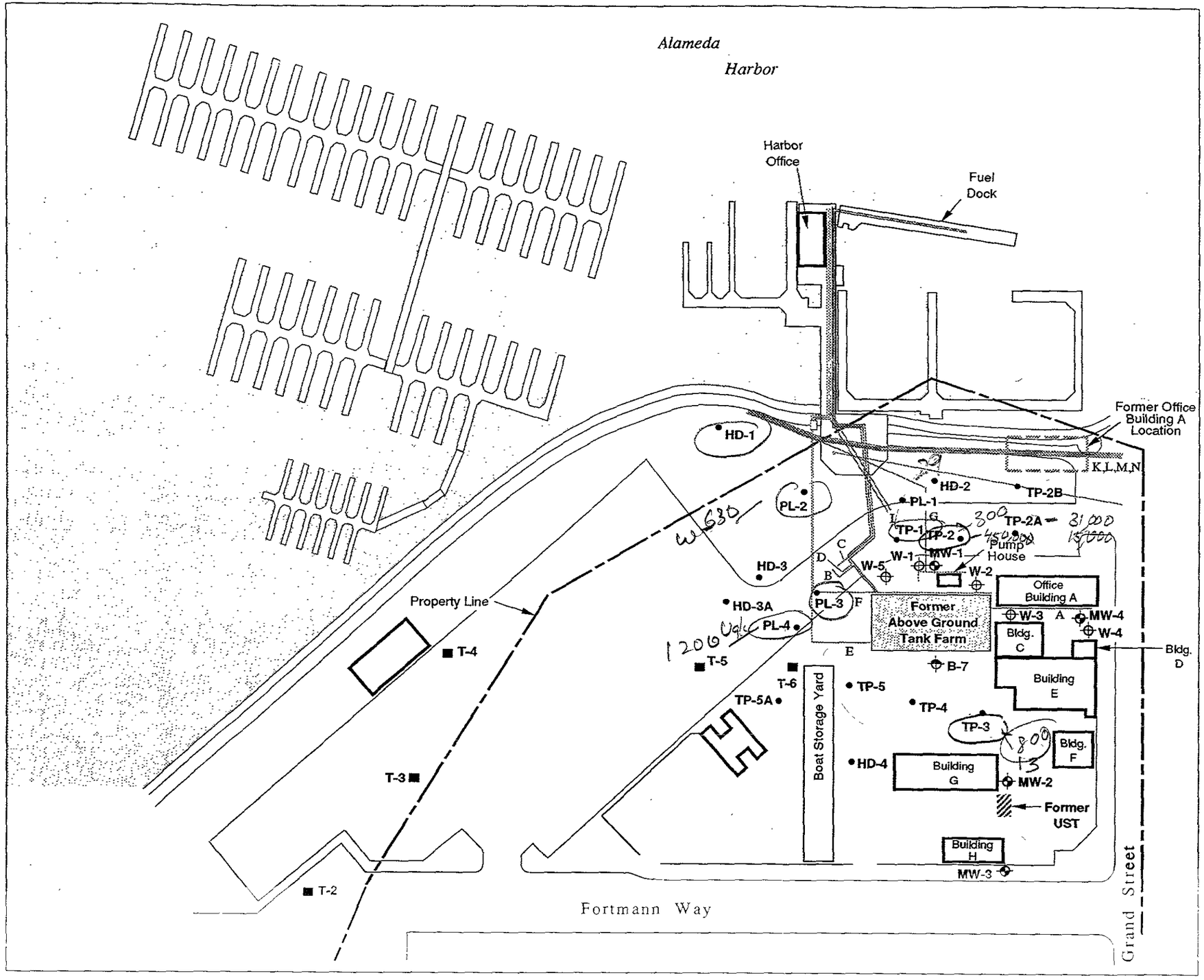
(1) Depth to Water measured in feet below groundsurface.
(2) Mean Sea Level measured using wellhead elevations for MW-2, MW-3, and MW-4 from Zaccor, 1992 as benchmarks.
** Groundwater not encountered.



SOURCE:
H. M. Gousha, 1988, Oakland and East Bay Cities

SITE LOCATION MAP
Additional Site Investigation
Grand Marina Facility
Alameda, California
FIGURE 1

SEACOR
SJN 50085-001-01



LEGEND

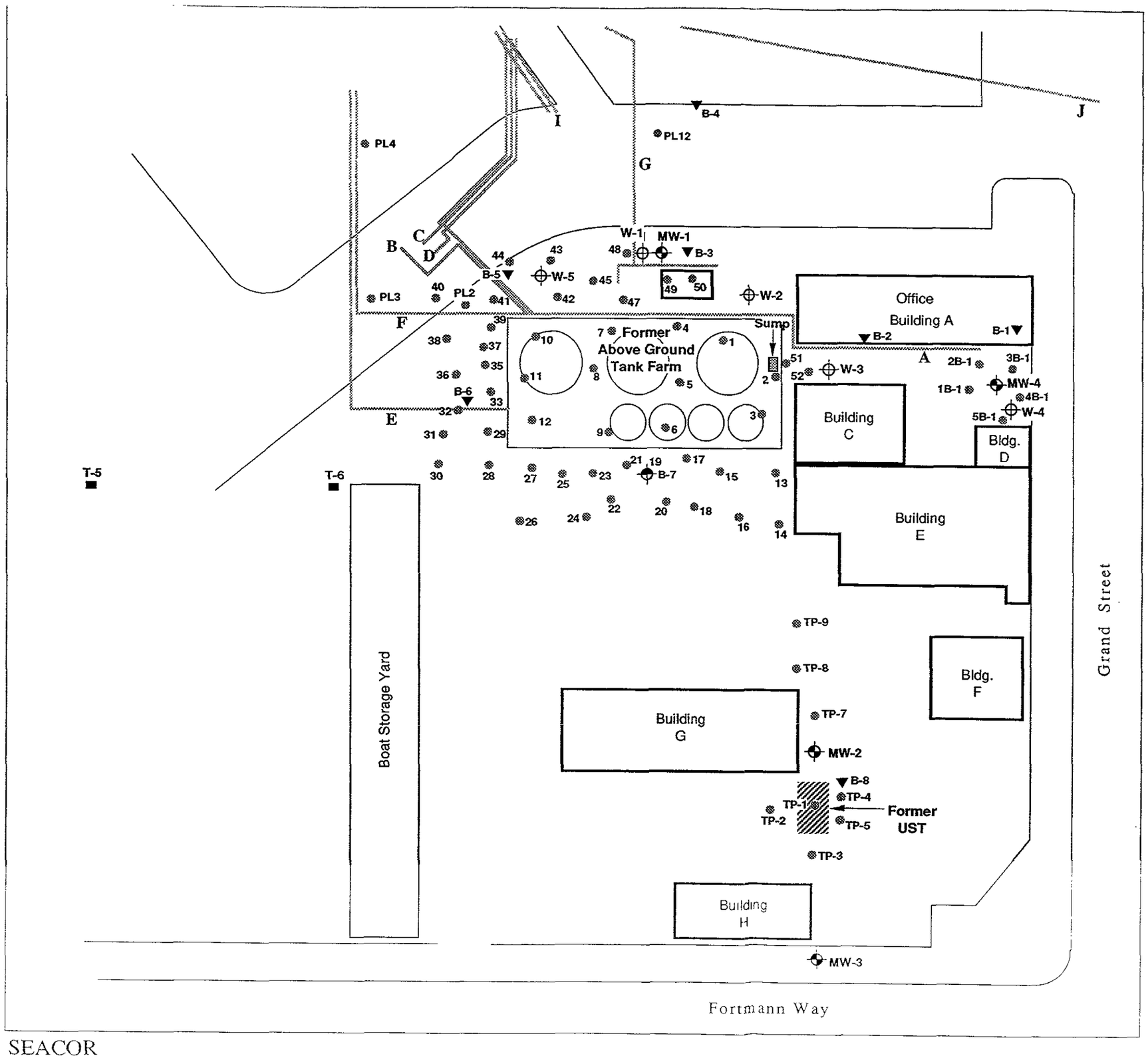
- Borings (SEACOR, 10/93)
- Monitoring Well (Zacoor, 5/92)
- Monitoring Well (Harding-Lawson, 6/87)
- Monitoring Well (Crowley Environmental Services, 4/87)
- Test Trench (Harding-Lawson, 6/87)

KEY FOR UTILITIES

A	3" Commercial Diesel Line	
B	Diesel Vent Line	
C	Gasoline Line	
D	Diesel Line	
E	Abandoned Bilge/Sludge Line (4")	Proposed Secondary Pipe Enclosure Chase for Future Use
F	Abandoned Diesel Line (4")	
G	Abandoned Lube Oil (3")	
H	8" Concrete Storm Drain	
I	3" Copper Pump-up Fire Hydrants	
J	6" Sewer V.C.P.	
K	2 x 3" High Voltage Electrical	
L	4" Electrical Secondary	
M	2 x 3" Telephone	
N	2 x 2" Cable T.V.	

SEACOR
SJN 50085-001-01

SITE PLAN AND SAMPLE LOCATIONS
Additional Site Investigation
Grand Marina Facility
Alameda, California
FIGURE 2



LEGEND

- Monitoring Well (Zaccor, 5/92)
- Soil Boring (Zaccor, 5/92)
- Monitoring Well (Harding-Lawson, 6/87)
- Soil Boring (Harding-Lawson, 6/87)
- Test Trench (Harding-Lawson, 6/87)
- Monitoring Well (Crowley Environmental Services, 4/87)

NOTE:
Locations are approximate and based on previous site plans.

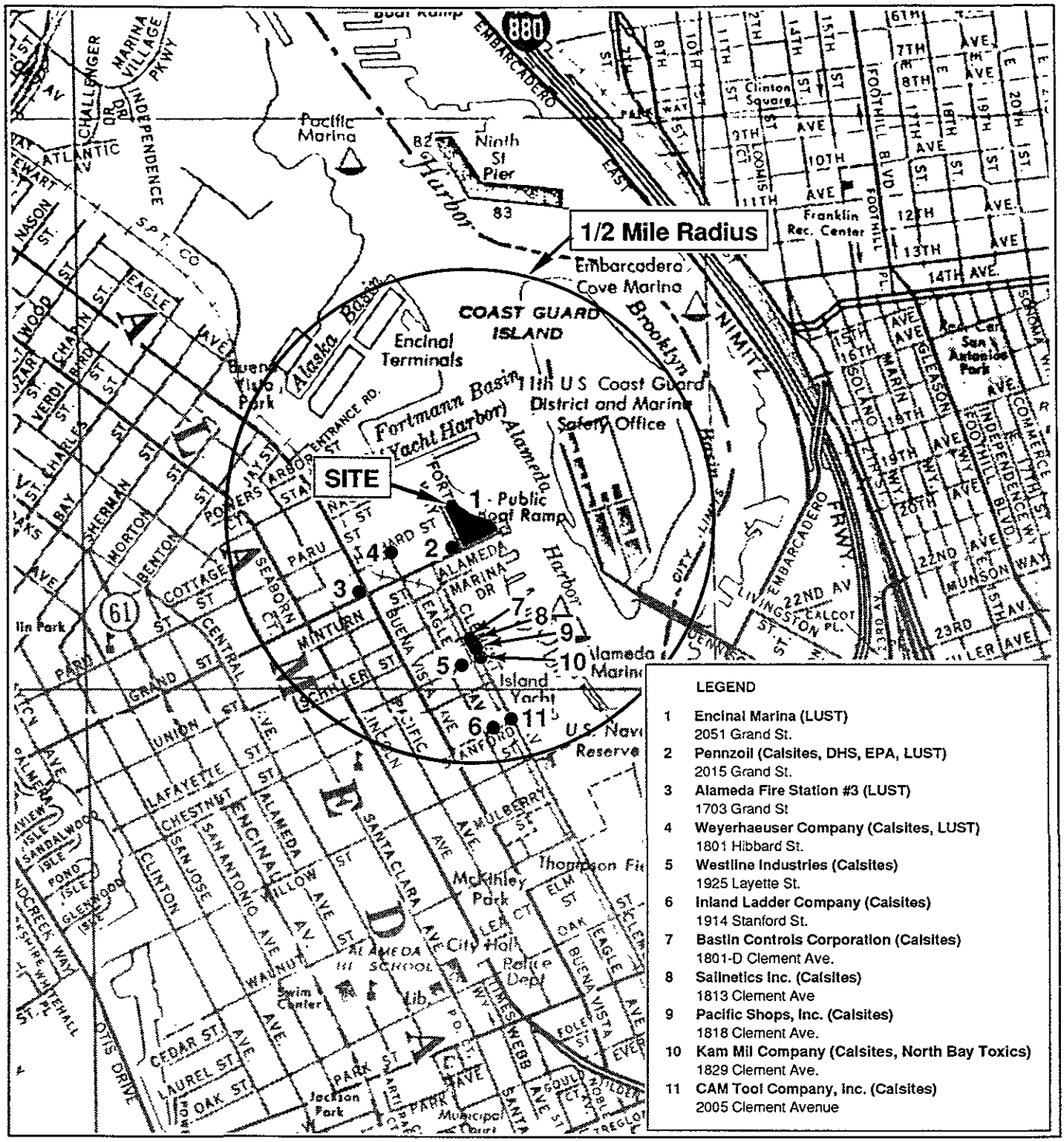
KEY FOR UTILITIES

A	3" Commercial Diesel Line	
B	Diesel Vent Line	
C	Gasoline Line	
D	Diesel Line	
E	Abandoned Bilge/Sludge Line (4")	Proposed Secondary Pipe Enclosure Chase for Future Use
F	Abandoned Diesel Line (4")	
G	Abandoned Lube Oil (3")	
H	8" Concrete Storm Drain	
I	3" Copper Pump-up Fire Hydrants	
J	6" Sewer V.C.P.	
K	2 x 3" High Voltage Electrical	
L	4" Electrical Secondary	
M	2 x 3" Telephone	
N	2 x 2" Cable T.V.	

0 100 Feet

SEACOR
SJN 50085-001-01

PREVIOUS SAMPLE LOCATIONS
Additional Site Investigation
Grand Marina Facility
Alameda, California
FIGURE 3

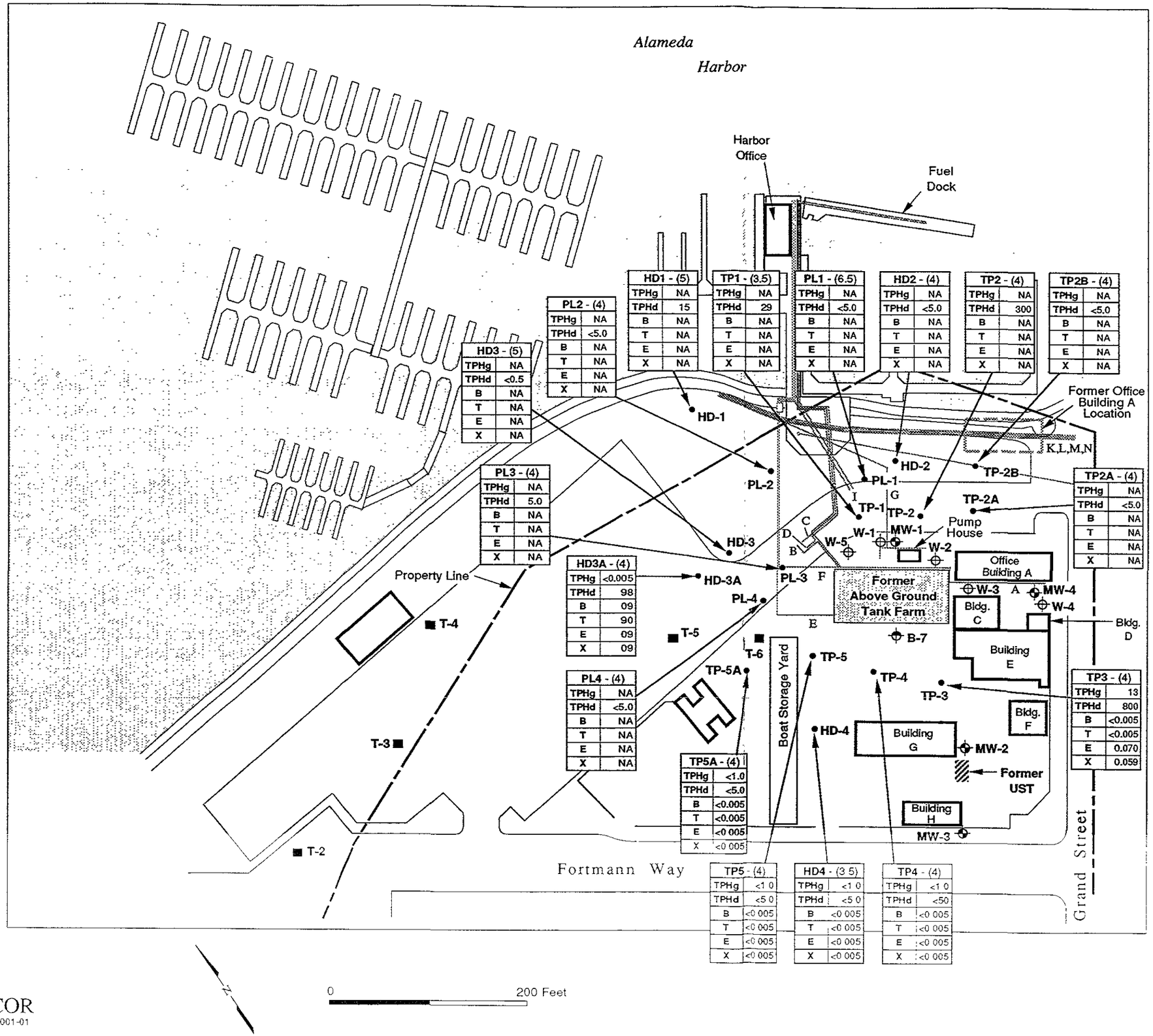


SOURCE:
H. M. Gousha, 1988, Oakland and East Bay Cities

0 1/2 Mile

SITE VICINITY AND/OR CHEMICAL RELEASE LOCATIONS
Additional Site Investigation
Grand Marina Facility
Alameda, California
FIGURE 4

SEACOR
SJN 50085-001-01



SEACOR
SJN 50085-001-01

LEGEND

- Borings (SEACOR, 10/93)
- Monitoring Well (Zacoor, 5/92)
- Monitoring Well (Harding-Lawson, 6/87)
- Monitoring Well (Crowley Environmental Services, 4/87)
- Test Trench (Harding-Lawson, 6/87)

KEY FOR UTILITIES

A	3" Commercial Diesel Line	
B	Diesel Vent Line	
C	Gasoline Line	
D	Diesel Line	
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F	Abandoned Diesel Line (4")	
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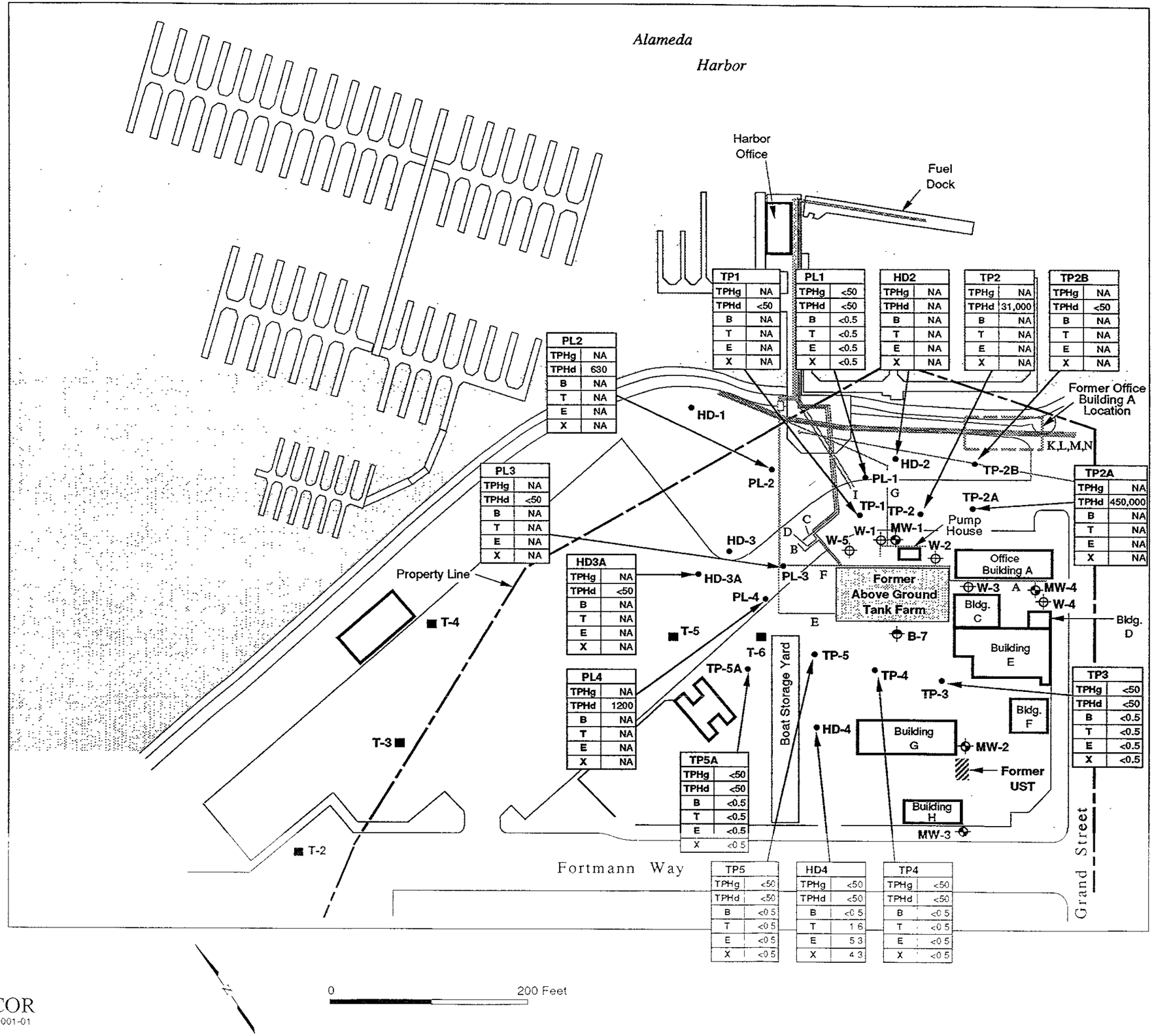
H	8" Concrete Storm Drain	
I	3" Copper Pump-up Fire Hydrants	
J	6" Sewer V.C.P.	
K	2 x 3" High Voltage Electrical	
L	4" Electrical Secondary	
M	2 x 3" Telephone	
N	2 x 2" Cable T.V.	

Chemical Analytical Results

	TP3 - (4)		
Total Petroleum Hydrocarbons as Gasoline	TPHg	NA	Not Analyzed
Total Petroleum Hydrocarbons as Diesel	TPHd	800	Analytical Results in mg/Kg
Benzene	B	<0.005	
Toluene	T	<0.005	
Ethylbenzene	E	<0.005	Not Detected above Laboratory Reporting Limit
Xylenes	X	<0 005	

Soil Boring and Sample Depth

SOIL CHEMICAL ANALYTICAL RESULTS
October 27 and 28, 1993
Additional Site Investigation
Grand Marina Facility
Alameda, California
FIGURE 5



TP1	
TPHg	NA
TPHd	<50
B	NA
T	NA
E	NA
X	NA

PL1	
TPHg	<50
TPHd	<50
B	<0.5
T	<0.5
E	<0.5
X	<0.5

HD2	
TPHg	NA
TPHd	NA
B	NA
T	NA
E	NA
X	NA

TP2	
TPHg	NA
TPHd	31,000
B	NA
T	NA
E	NA
X	NA

TP2B	
TPHg	NA
TPHd	<50
B	NA
T	NA
E	NA
X	NA

PL2	
TPHg	NA
TPHd	630
B	NA
T	NA
E	NA
X	NA

TP2A	
TPHg	NA
TPHd	450,000
B	NA
T	NA
E	NA
X	NA

PL3	
TPHg	NA
TPHd	<50
B	NA
T	NA
E	NA
X	NA

HD3A	
TPHg	NA
TPHd	<50
B	NA
T	NA
E	NA
X	NA

PL4	
TPHg	NA
TPHd	1200
B	NA
T	NA
E	NA
X	NA

TP3	
TPHg	<50
TPHd	<50
B	<0.5
T	<0.5
E	<0.5
X	<0.5

TP5A	
TPHg	<50
TPHd	<50
B	<0.5
T	<0.5
E	<0.5
X	<0.5

TP5	
TPHg	<50
TPHd	<50
B	<0.5
T	<0.5
E	<0.5
X	<0.5

HD4	
TPHg	<50
TPHd	<50
B	<0.5
T	1.6
E	5.3
X	4.3

TP4	
TPHg	<50
TPHd	<50
B	<0.5
T	<0.5
E	<0.5
X	<0.5

LEGEND

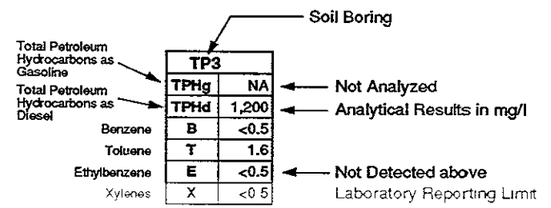
- Borings (SEACOR, 10/93)
- Monitoring Well (Zacoor, 5/92)
- Monitoring Well (Harding-Lawson, 6/87)
- Monitoring Well (Crowley Environmental Services, 4/87)
- Test Trench (Harding-Lawson, 6/87)

KEY FOR UTILITIES

A	3" Commercial Diesel Line
B	Diesel Vent Line
C	Gasoline Line
D	Diesel Line
E	Abandoned Bilge/Sludge Line (4")
F	Abandoned Diesel Line (4")
G	Abandoned Lube Oil (3")
H	8" Concrete Storm Drain
I	3" Copper Pump-up Fire Hydrants
J	6" Sewer V.C.P.
K	2 x 3" High Voltage Electrical
L	4" Electrical Secondary
M	2 x 3" Telephone
N	2 x 2" Cable T.V.

E, F, G: Proposed Secondary Pipe Enclosure Chase for Future Use

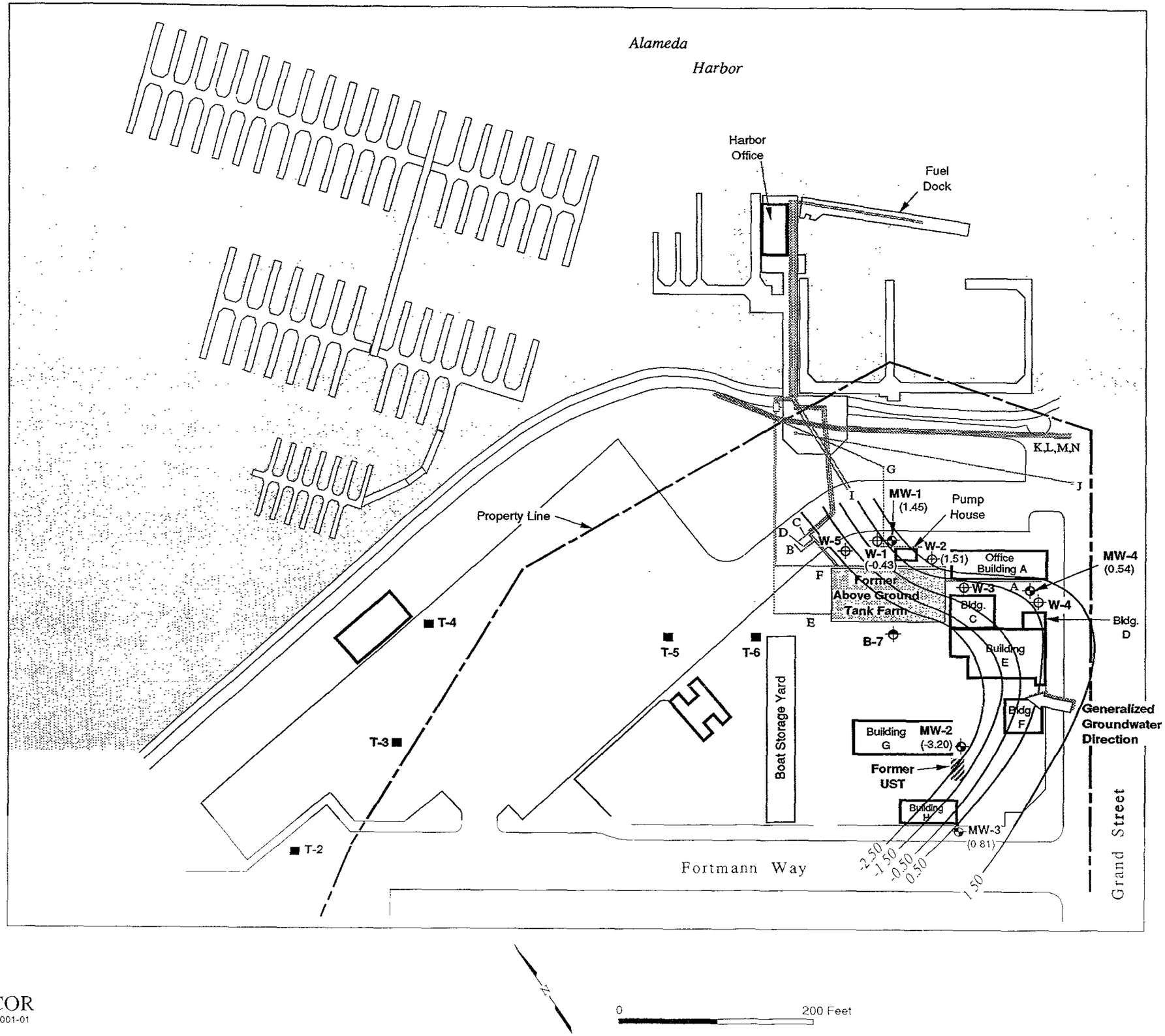
Chemical Analytical Results



NOTE:
Analytical Results for BTEX in µg/l

GROUNDWATER CHEMICAL ANALYTICAL RESULTS
October 27 and 28, 1993
Additional Site Investigation
Grand Marina Facility
Alameda, California
FIGURE 6

SEACOR
SJN 50085-001-01



LEGEND

- Monitoring Well (Zaccor, 5/92)
- Monitoring Well (Harding-Lawson, 6/87)
- Monitoring Well (Crowley Environmental Services, 4/87)
- Test Trench (Harding-Lawson, 6/87)
- (-0.43) Groundwater Elevation in Feet MSL
- 0.50 Groundwater Elevation Contour

NOTE:
Locations are approximate and based on previous site plans.

KEY FOR UTILITIES

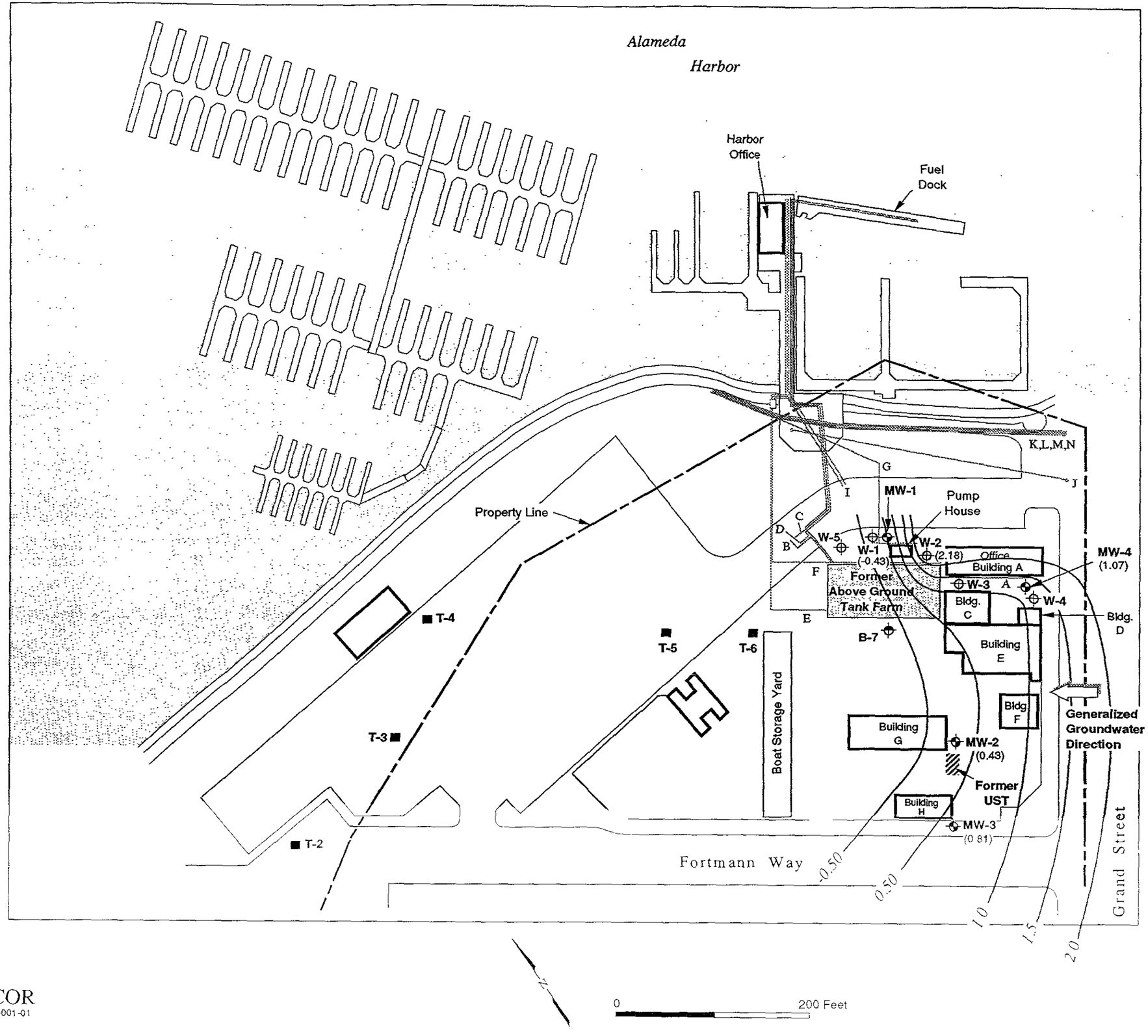
- **A** 3" Commercial Diesel Line
- **B** Diesel Vent Line
- **C** Gasoline Line
- **D** Diesel Line
- **E** Abandoned Bilge/Sludge Line (4")
- **F** Abandoned Diesel Line (4")
- **G** Abandoned Lube Oil (3")

Proposed Secondary Pipe Enclosure Chase for Future Use

- **H** 8" Concrete Storm Drain
- **I** 3" Copper Pump-up Fire Hydrants
- **J** 6" Sewer V.C.P.
- **K** 2 x 3" High Voltage Electrical
- **L** 4" Electrical Secondary
- **M** 2 x 3" Telephone
- **N** 2 x 2" Cable T.V.

SEACOR
SJN 50085-001-01

GROUNDWATER ELEVATION CONTOURS
October 28, 1993
Additional Site Investigation
Grand Marina Facility
Alameda, California
FIGURE 7



SEACOR
SJN 50085-001-01

LEGEND

- Monitoring Well (Zaccor, 5/92)
- Monitoring Well (Harding-Lawson, 6/87)
- Monitoring Well (Crowley Environmental Services, 4/87)
- Test Trench (Harding-Lawson, 6/87)
- (-0.43) Groundwater Elevation in Feet MSL
- 1.0 Groundwater Elevation Contour

NOTE:
Locations are approximate and based on previous site plans.

KEY FOR UTILITIES

- **A** 3" Commercial Diesel Line
- **B** Diesel Vent Line
- **C** Gasoline Line
- **D** Diesel Line
- **E** Abandoned Bilge/Sludge Line (4")
- **F** Abandoned Diesel Line (4")
- **G** Abandoned Lube Oil (3")

Proposed Secondary Pipe Enclosure Chase for Future Use

- **H** 8" Concrete Storm Drain
- **I** 3" Copper Pump-up Fire Hydrants
- **J** 6" Sewer V.C.P.
- **K** 2 x 3" High Voltage Electrical
- **L** 4" Electrical Secondary
- **M** 2 x 3" Telephone
- **N** 2 x 2" Cable T.V.

GROUNDWATER ELEVATION CONTOURS
November 9, 1993
Additional Site Investigation
Grand Marina Facility
Alameda, California
FIGURE 8

APPENDIX A

SUBTRONIC CORP. PIPELINE INTEGRITY TEST REPORT

subtronic corp.

Electronic Sub-Surface Surveys & Instruments
For Locating Buried Pipes, Cables and Drains

4070 Nelson Avenue • Suite E
Concord, California 94520
Telephone (510) 686-3747
FAX No. (510) 686-5281

November 9, 1993

SEACOR
90 New Montgomery St. Ste. 620
San Francisco CA 94105

Attn: Donald Moore
FAX: (415) 882-4406

TEST REPORT

Location of Test Site:
Grand Marina, Grand Avenue, Alameda CA.

Length of Test Pipe(s):
1 X 3" approximately 150'
2 X 4" approximately 150' (see sketch)

Description of Pipes:
Visible in valve chamber and under pier;
Condition: good
Material: steel
Joints: Victaulic couplings

One X 4" pipe in use as bilge waste transporter to A.S.T.
One X 4" and 1 X 3" not in use.

Test Pressure:
Static head pressure at lowest test point in bilge line approximately 4.0 P.S.I.

Desired test pressure for test of pipe lines: 5.0 P.S.I.

Test Material:
Nitrogen gas.

Test Results & Date(s) of Tests:
Southern 4" dia. (bilge line): 5.0 P.S.I. sustained over 49 minutes. Tested 10/27/93.

Middle 4" dia. (not in use): 5.0 P.S.I. sustained over 53 minutes. Tested 10/27/93.

Northern 3" dia. (not in use):
FIRST TEST: 5.0 P.S.I. drop to 3.5 P.S.I. after 20 minutes.
Tested 10/29/93.

Detected minor leak at screw plug. Removed, cleaned and sealed.

SECOND TEST: 5.2 P.S.I. sustained over 63 minutes.
Tested 10/29/93.

Conclusion:
All three pipes were found free of leaks at an applied pressure of 5 P.S.I.

Report prepared and approved by:

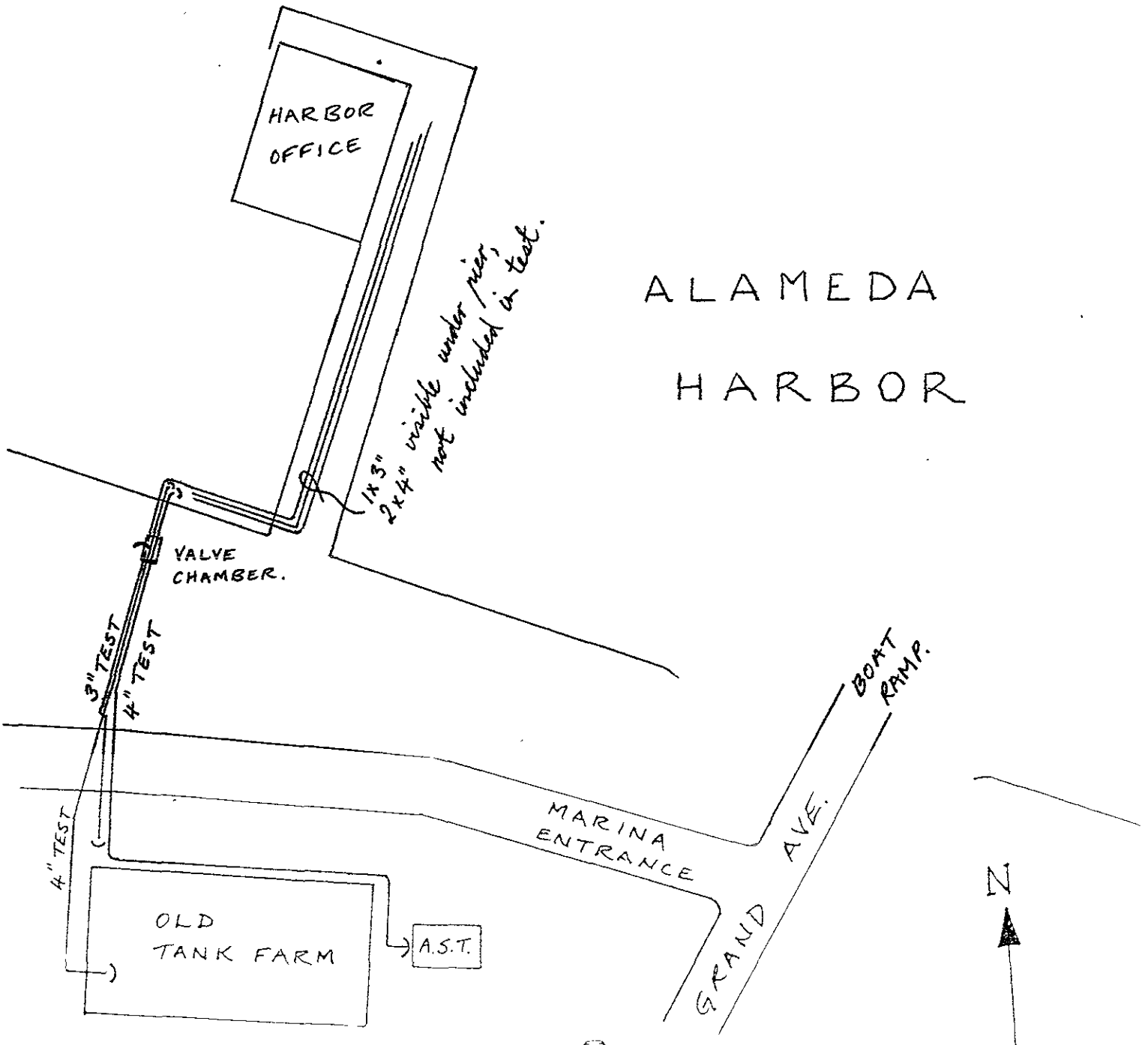
J. C. Taylor, Vice President

subtronic corp.

Electronic Sub-Surface Surveys & Instruments
For Locating Buried Pipes, Cables and Drains

4070 Nelson Avenue • Suite E
Concord, California 94520
Telephone (510) 686-3747
FAX No. (510) 686-5281

PIPE TESTS AT GRAND MARINA, ALAMEDA



AWWA Members APWA Members

APPENDIX B

BORING LOGS

Project:	SUBSURFACE INVESTIGATION		Log of Boring/Monitoring Well: **HD-1**
Boring Location:	2099 GRAND STREET, ALAMEDA	Project No.: 50085-001-01	
Subcontractor and Equipment:	PRECISION SAMPLING	Logged By: TJPK	
Sampling Method:	CONTINUOUS CORE	Monitoring Device: OVM 580B	Comments: Boring relocated twice, each of three attempts met refusal @ 5'
Start Date/Time:	10-28-93//1010	Finish Date/Time: 10-28-93//1130	
First Water (bgs):	NA	Stabilized Water Level (bgs): NA	

Surface Elevation: 5.33 Casing Top Elevation: NA

Sample Interval/ Recovery (inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
12/24		298/24	0–2			DARK BROWN, SANDY SILT (ML) with angular gravel, stiff, moist, no odor (Fill)
12/24	HD1-4	177/>1000	2–4			BLACK SILTY AND SANDY CLAY (CL) with gravel, firm, wet to moist, moderate odor grades with strong odor
10/12		71	4–5			grades with increasing sand

Boring Abandonment/ Well Construction Details

GROUND SURFACE

BACKFILLED WITH GROUT

BOTTOM OF BORING 5.0'

C:\SUB\HD-1.DWG
DATE 12NOV93

SEACOR

Reviewed By James D. Peterson Date: 4-6-94

Revised By _____ Date _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **HD-2**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments: Boring relocated–first attempt met refusal @ ~2'
Start Date/Time: 10-28-93//1010	Finish Date/Time: 10-28-93//1130		
First Water (bgs): 9 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 5.33 Casing Top Elevation: NA

Sample Interval/ Recovery (inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
24/24		45	0–3	SW		DARK YELLOWISH BROWN TO MEDIUM BROWN FINE SAND (SW) well graded, occasional gravel, dense, moist, no odor (Fill)
12/24	HD2 -4	>1000	3–7	CL		GREENISH BROWN SANDY CLAY (CL) with gravel, wood, brick, shells, firm, moist, slight odor (Fill)
						poor recovery
5/36		249				one inch of decomposed shells
						poor recovery
3/36		127	9–10	CL	▽	BLACK SILTY AND SANDY CLAY (CL) with green mottling, soft, wet, slight odor

Boring Abandonment/ Well Construction Details

GROUND SURFACE

BACKFILLED WITH GROUT

BOTTOM OF BORING 10.0'

C:\SUB\HD-2.DWG
DATE 12NOV93

SEACOR

Reviewed By [signature] Date 4-6-94

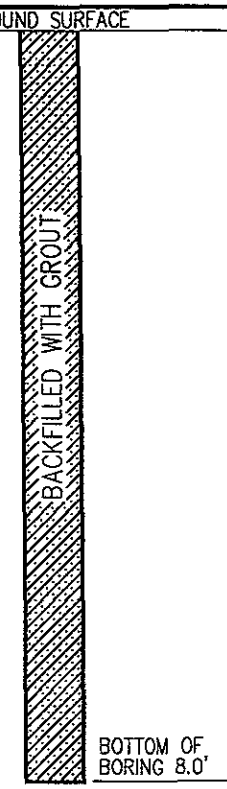
Revised By _____ Date _____

Project:	SUBSURFACE INVESTIGATION		Log of Boring/Monitoring Well: **HD-3**
Boring Location:	2099 GRAND STREET, ALAMEDA	Project No.: 50085-001-01	
Subcontractor and Equipment:	PRECISION SAMPLING	Logged By: TJPK	
Sampling Method:	CONTINUOUS CORE	Monitoring Device: OVM 580B	Comments: Boring relocated–first attempt met refusal @ ~3'
Start Date/Time:	10-27-93//1430	Finish Date/Time: 10-27-93//1530	
First Water (bgs):	6 FEET	Stabilized Water Level (bgs): NA	

Surface Elevation: 6.59 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
20/24		>1000	0–2			DARK BROWN GRAVELLY SAND (SP) with brick, angular to subangular gravel, dense, moist, moderate odor (Fill)
24/36	HD3 -3.5	>1000	3–6			DARK BLACK SILTY AND SANDY CLAY (CL) with gravel, firm, very moist, moderate odor
24/36		NR	6–8		▽	BROWNISH GREEN MEDIUM TO FINE SAND (SW) well graded, loose to dense, wet, moderate odor

Boring Abandonment/ Well Construction Details



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DATE 12NOV93

SEACOR

Reviewed By James D Ritchie Date 9-8-94

Revised By _____ Date _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **HD-3A**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments: Boring relocated–first attempt met refusal @ ~2'
Start Date/Time: 10-28-93//1320	Finish Date/Time: 10-28-93//1415		
First Water (bgs): 4.5 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 6:82 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)	Boring Abandonment/ Well Construction Details
			0				GROUND SURFACE
18/24		>1000	1			DARK YELLOWISH BROWN SANDY CLAY (CL) with yellowish brown sand and angular to subangular gravel, firm moist, no odor (Fill)	BACKFILLED WITH GROUT
			2				
			3			BLACKISH GRAY SILTY AND SANDY CLAY (CL) very soft, moist, no odor	
15/24		>1000					
	HD3A -4		4				
8/12			5			grades wet with blue-green mottling	BOTTOM OF BORING 5.0'
			6				
			7				
			8				
			9				
			10				
			11				
			12				
			13				
			14				
			15				

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DATE 17NOV93

SEACOR

Reviewed By: [signature] Date: 4-6-94

Revised By: _____ Date: _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **HD-4**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments:
Start Date/Time: 10-27-93//0910	Finish Date/Time: 10-27-93//0930		
First Water (bgs): 5 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 3.44 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
			0			BLACKISH GRAY SILTY FINE SAND (SM) with gravel, dense to loose, moist, no odor (Fill)
12/18		>1000	1			MEDIUM TO DARK BROWN GRAVELLY FINE SAND (SP) angular to subangular, unconsolidated, slightly moist, no odor (Fill)
			2			
			3			DARK GREENISH BLACK FINE SAND (SW) dense, moist, strong odor
9/30	HD4 -3.5	>1000	4			
			5		▽	grades wet
30/36		>1000	6			BROWNISH BLACK SILTY AND SANDY CLAY (CL) with blackish-green mottling, soft, moist to wet, strong to moderate odor, rootlets
			7			
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			

Boring Abandonment/ Well Construction Details

GROUND SURFACE

BACKFILLED WITH GROUT

BOTTOM OF BORING 7.0'

C:\SUB\HD-4.DWG
DATE 12NOV93

SEACOR

Reviewed By: [signature] Date: 4-6-94

Revised By: _____ Date: _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **TP-1**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments: Boring relocated–first three attempts met refusal ~3'
Start Date/Time: 10-28-93//1010	Finish Date/Time: 10-28-93//1130		
First Water (bgs): 6 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 5.33 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
			0			DARK YELLOWISH BROWN GRAVELLY SANDY CLAY (CL) angular to subangular gravel, slightly moist, no odor (Fill)
12/24		>1000	1			
			2			BROWNISH BLACK FINE SANDY CLAY (CL) with green sandy clay lenses, firm, moist, slight odor
18/24	TP1 -3.5	>1000	3			
			4			GREENISH DARK BROWN SILTY AND FINE SANDY CLAY (CL) occasional gravel, firm, moist, slight to moderate odor, poor recovery
24/36		>1000	5			
			6		▽	grades black and wet
			7			grades with brown sandy clay lenses and slight to moderate odor
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			

Boring Abandonment/ Well Construction Details

GROUND SURFACE

BACKFILLED WITH GROUT

BOTTOM OF BORING 7.0'

C:\SUB\TP-1.DWG
DATE 12NOV93

SEACOR

Reviewed By [signature] Date 4-6-94

Revised By _____ Date _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **TP-2**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments:
Start Date/Time: 10-27-93//1150	Finish Date/Time: 10-27-93//1200		
First Water (bgs): 6 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 4.91 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
15/30		>1000	0–2			MEDIUM BROWN GRAVELLY CLAY (CL) AND BROWNISH YELLOW FINE SAND (SW)(Fill) with gravel, angular, dense, sightly moist grades to brownish black clayey sand, very stiff, with odor
12/18	TP2-4	>1000	2–4			BLACK FINE SAND (SW) with brick fragments and large gravel, medium dense, moist, strong odor (Fill)
18/36		400	4–6		▽	grades wet
			6–7			BLACK SILTY CLAY (CL) very soft, wet, moderate odor

Boring Abandonment/ Well Construction Details

GROUND SURFACE

BACKFILLED WITH GROUT

BOTTOM OF BORING 7.0'

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DATE 12NOV93

SEACOR

Reviewed By: [signature] Date: 4-6-94

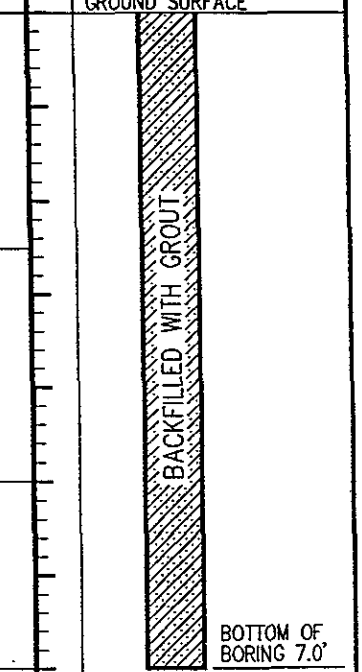
Revised By: [signature] Date: _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **TP-2A**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments:
Start Date/Time: 10-28-93//1200	Finish Date/Time: 10-28-93//1300		
First Water (bgs): 5 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 4.51 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
12/18		>1000	0–2			DARK YELLOWISH BROWN SANDY CLAY (CL) with yellowish brown medium-grained sand and angular to subangular, firm, slightly moist, no odor (Fill)
4/36	TP2A-4	>1000	2–5			BROWNISH BLACK SILTY AND FINE SANDY CLAY (CL) with rootlets, green sandy clay lenses, firm to stiff, moist, slight odor, poor recovery
24/36		>1000	5–7		▽	GREENISH DARK BROWN CLAYEY SAND (SC) with angular to subangular gravel, dense, wet, moderate odor, green and dark yellowish brown mottling, oily residue

Boring Abandonment/ Well Construction Details



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DATE 17NOV93

SEACOR

Reviewed By: [signature] Date: 4-6-94

Revised By: _____ Date: _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **TP-2B**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments: Boring relocated–first attempt met refusal @ ~5'
Start Date/Time: 10-28-93//1540	Finish Date/Time: 10-28-93//1600		
First Water (bgs): 6 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 5.93 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
24/24		247	0–3.7	DARK YELLOWISH BROWN FINE SAND (SW) well graded, dense, moist, no odor (Fill)
	TP2B -3.5	>1000	3	grades with strong odor
12/24		186	3.7–4.4	BLACK FINE SAND (SW) well graded, dense, moist, slight odor
			4.4–7	BROWNISH BLACK SILTY AND SANDY CLAY (CL) trace sand, stiff, moist to wet, slight odor, rootlets, black mottling, poor recovery
2/36		>1000	6	grades wet

Boring Abandonment/ Well Construction Details

GROUND SURFACE

BACKFILLED WITH GROUT

BOTTOM OF BORING 7.0'

C:\SUB\TP-2B.DWG
DATE 12NOV93

SEACOR

Reviewed By [signature] Date 4-6-94

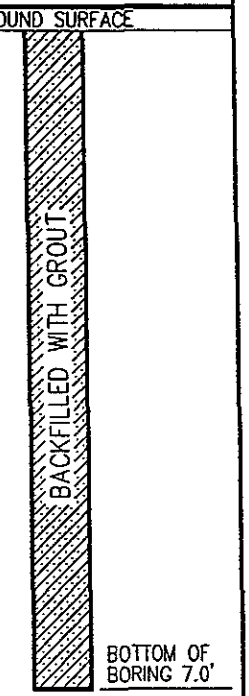
Revised By Date.

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **TP-3**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments:
Start Date/Time: 10-27-93//1030	Finish Date/Time: 10-27-93//1145		
First Water (bgs): 5.5 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 3.34 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
18/24		494	0–1	SW		BLACK GRAY FINE SAND (SW) with gravel, medium dense, moist, no odor (Fill)
14/24	TP3-4	>1000	1–5	SP		MEDIUM TO DARK BROWN GRAVELLY FINE SAND (SP) angular to subangular, dense, slightly moist, slight odor
24/36		949	5–7	CL	▽	DARK GREENISH BLACK SILTY CLAY (CL). very soft, wet, moderate to strong odor

Boring Abandonment/ Well Construction Details



C:\SUB\TP-3.DWG
DATE: 12NOV93

SEACOR

Reviewed By: [signature] Date: 4-6-94

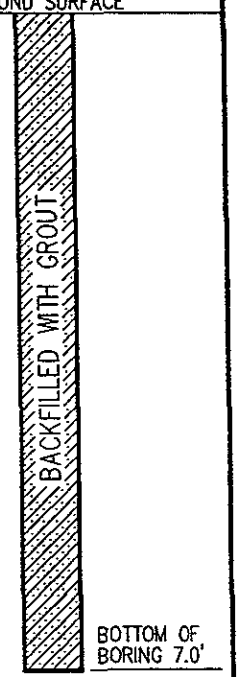
Revised By: _____ Date: _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **TP-4**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments: Boring relocated–first attempt met refusal @ ~3'
Start Date/Time: 10-27-93//1005	Finish Date/Time: 10-27-93//1020		
First Water (bgs): 5 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 3.35 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
12/18		>1000	0–1			BLACK GRAY FINE SAND (SW) with gravel, medium dense, moist, no odor (Fill)
			1–2			MEDIUM TO DARK BROWN GRAVELLY FINE SAND (SP) angular to subangular, dense, slightly moist slight odor, poor recovery
6/36	TP4 –4	>1000	3–4			grades with strong odor
			5		▽	
18/36		465	5–7			DARK GREENISH BLACK SILTY CLAY (CL) very soft, wet, moderate to strong odor
			8–15			

Boring Abandonment/ Well Construction Details



C:\SUB\TP-4.DWG
DATE 12NOV93

SEACOR

Reviewed By Jane D Ritchie Date 4-6-94

Revised By _____ Date _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **TP-5**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments:
Start Date/Time: 10-27-93//0945	Finish Date/Time: 10-27-93//1000		
First Water (bgs): 5 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 3.36 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
12/18		14	0–1			BLACK GRAY FINE SAND (SP) with gravel, medium dense, moist, no odor (Fill)
			1–2			DARK GREENISH BLACK FINE SAND (SW) dense, moist, moderate odor, poor recovery
12/30	TP5-4	40.7	3–4			grades with strong odor
			4–5		▽	grades wet
18/36		375	6–7			BROWNISH BLACK SILTY AND SANDY CLAY (CL) with green mottling, rootlets, soft, wet, strong odor

Boring Abandonment/ Well Construction Details

GROUND SURFACE

BACKFILLED WITH GROUT

BOTTOM OF BORING 7.0'

C:\SUB\TP-5.DWG
DATE 12NOV93

SEACOR

Reviewed By: Jane D Ritchie Date 4-6-94

Revised By: _____ Date _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **TP-5A**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments: Boring relocated– first attempt met refusal @ ~3'
Start Date/Time: 10-28-93//1010	Finish Date/Time: 10-28-93//1130		
First Water (bgs): 6 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 5.33 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
12/24		>1000	0–2	CL		DARK BROWN SANDY CLAY (CL) with shells and gravel, angular to subangular, stiff, moist, no odor (Fill)
12/24	TP5A-4	>1000	3–5	CL		grades with less gravel and shells, strong odor
18/36		>1000	6–7	SC	▽	DARK YELLOWISH BROWN CLAYEY, GRAVELLY COARSE SAND (SC) with shells, angular to subangular, dense, moist, no odor
			8	SW		GREENISH BROWN FINE SAND (SW) loose, wet, moderate odor
24/36		529	9–10	CL		BLACKISH GREEN CLAY (CL) with black mottling, soft, wet, moderate odor

Boring Abandonment/ Well Construction Details

GROUND SURFACE

BACKFILLED WITH GROUT

BOTTOM OF BORING 10.0'

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DATE 12NOV93

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Reviewed By: [signature] Date: 4-6-94

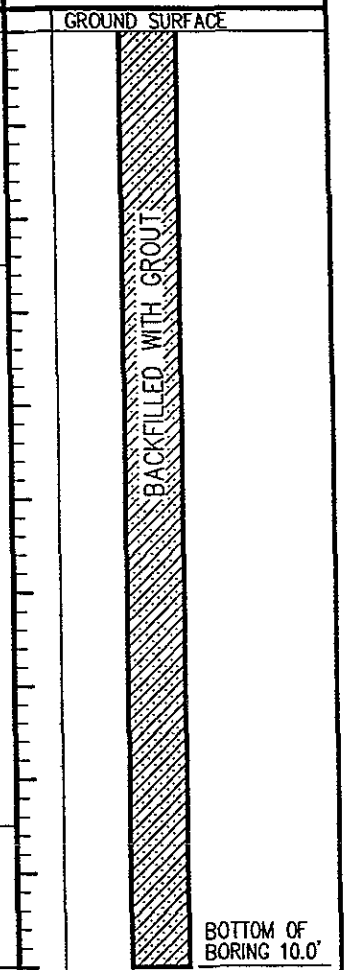
Revised By: _____ Date: _____

Project:	SUBSURFACE INVESTIGATION		Log of Boring/Monitoring Well: **PL-1**
Boring Location:	2099 GRAND STREET, ALAMEDA	Project No.: 50085-001-01	
Subcontractor and Equipment:	PRECISION SAMPLING	Logged By: TJPK	
Sampling Method:	CONTINUOUS CORE	Monitoring Device: OVM 580B	Comments:
Start Date/Time:	10-28-93//1600	Finish Date/Time: 10-28-93//1645	
First Water (bgs):	9.5 FEET	Stabilized Water Level (bgs): NA	

Surface Elevation: 4.79 Casing Top Elevation: NA

Sample Interval/ Recovery (inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
18/24		>1000	0–2			DARK YELLOWISH BROWN FINE SAND (SW) well graded, loose to dense, moist, no odor (Fill)
12/24	PL1 -3.5 PL1A -6.5	>1000	3–8			BLACK GRAVELLY CLAYEY SAND (SC) sand coarse, angular to subangular gravel, dense, moist, moderate to slight odor
24/36		>1000	6–7			
18/36		282	9–10		▽	GREENISH BLACK SILTY CLAY (CL) with black mottling, very soft, wet, moderate odor

Boring Abandonment/ Well Construction Details



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DATE: 12NOV93

SEACOR

Reviewed By [signature] Date 4-6-94

Revised By _____ Date _____

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **PL-2**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments: Boring relocated–first attempt met refusal @ ~3'
Start Date/Time: 10-28-93//0920	Finish Date/Time: 10-28-93//1000		
First Water (bgs): 7 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 6.64 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
12/24		>1000	0–2			DARK YELLOWISH BROWN SANDY CLAY (CL) with yellowish brown sand and angular to subangular gravel, firm to stiff, slightly moist, no odor (Fill)
8/24	PL2-4	539	2–7			BROWNISH BLACK FINE SILTY AND SANDY CLAY (CL) with rootlets, green sandy clay lenses, firm to stiff, moist, slight odor
24/36		>1000	6–7			
			7		▽	
24/36		>1000	7–10			GREENISH DARK BROWN CLAYEY SAND (SC) with angular to subangular gravel, green and dark yellowish brown mottling, soft, wet, moderate odor

Boring Abandonment/ Well Construction Details

GROUND SURFACE

BACKFILLED WITH GROUT

BOTTOM OF BORING 10.0'

C:\SUB\PL-2.DWG
DATE 12NOV93

SEACOR

Reviewed By James D Ritchie Date 4-6-94

Revised By _____ Date _____

Project: SUBSURFACE INVESTIGATION		Log of Boring/Monitoring Well:
Boring Location: 2099 GRAND STREET, ALAMEDA	Project No.: 50085-001-01	**PL-3**
Subcontractor and Equipment: PRECISION SAMPLING	Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B	Comments:
Start Date/Time: 10-28-93//0730	Finish Date/Time: 10-28-93//0800	Boring relocated–first attempt met refusal @ ~3'
First Water (bgs): 7.5 FEET	Stabilized Water Level (bgs): NA	

Surface Elevation: 6.04 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)	Boring Abandonment/ Well Construction Details
18/24		0	0–2	ML		DARK YELLOWISH BROWN GRAVELLY SILT (ML) angular to subangular, stiff, slightly moist, no odor (Fill)	GROUND SURFACE; BACKFILLED WITH GROUT
12/24	PL3 -4	0	2–5.5	CL		GRAYISH BLACK SANDY CLAY (CL) with shells, wood, very stiff, moist, slight odor (Fill) grades with increasing sand	
18/36		0	5.5–7.5	SC		GRAY BLACK FINE CLAYEY SAND (SC) dense, moist, slight odor	
24/36		0	7.5–10	CL	▽	GRAY BLACK SILTY CLAY (CL) with black mottling, very soft, wet, moderate odor	BOTTOM OF BORING 10.0'

C:\SUB\PL-3.DWG DATE 12/10/93

SEACOR

Reviewed By [signature] Date 4-6-94

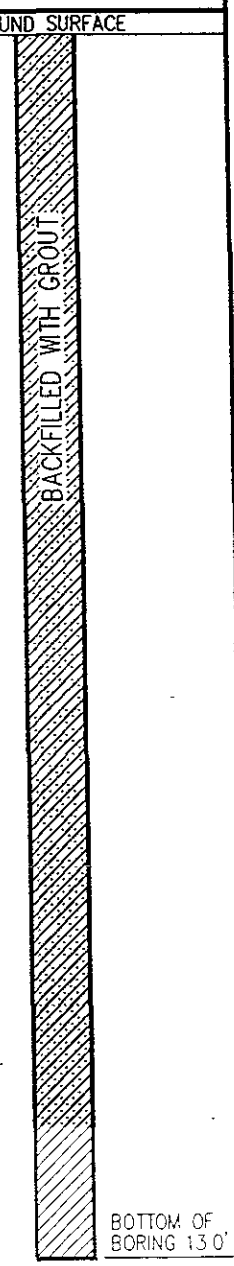
Revised By Date

Project: SUBSURFACE INVESTIGATION			Log of Boring/Monitoring Well: **PL-4**
Boring Location: 2099 GRAND STREET, ALAMEDA		Project No.: 50085-001-01	
Subcontractor and Equipment: PRECISION SAMPLING		Logged By: TJPK	
Sampling Method: CONTINUOUS CORE	Monitoring Device: OVM 580B		Comments: Boring relocated–first attempt met refusal @ ~2'
Start Date/Time: 10-28-93//0800	Finish Date/Time: 10-28-93//0930		
First Water (bgs): 10 FEET	Stabilized Water Level (bgs): NA		

Surface Elevation: 6.32 Casing Top Elevation: NA

Sample Interval/ Recovery (Inches)	Sample Number	PID (ppm)	Depth (Feet)	USCS Symbol	Water Level	LITHOLOGIC DESCRIPTION (color, grain size, consistency, moisture, other)
15/18		0	0–2			DARK YELLOWISH BROWN SANDY GRAVELLY CLAY (CL) angular to subangular, with shells, stiff, moist, no odor (Fill)
10/30	PL4-4	0	2–5			BLACKISH BROWN SANDY CLAY (CL) with gravel, brick, wood, stiff, moist, no odor (Fill)
24/36		0	5–10			DARK YELLOWISH BROWN SANDY GRAVELLY CLAY (CL) angular to subangular, stiff, slightly moist, no odor
24/36		69	9			grades with odor
30/36		>1000	10–12		▽	GRAYISH BLACK SILTY CLAY (CL) with black mottling, wood, very soft, wet, strong odor
			12–13			GRAY BLACK LOAMY CLAY (OH) with wood and pulp, very soft, wet, strong odor

Boring Abandonment/ Well Construction Details



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DATE 12NOV93

SEACOR

Reviewed By: [signature] Date: 4-6-94

Revised By: Date:

Unified Soil Classification System

MAJOR DIVISIONS			SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS MORE THAN HALF IS LARGER THAN NO 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO 4 SIEVE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL–SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL–SAND MIXTURES
		GRAVELS WITH OVER 12 % FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL–SAND–SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL–SAND–CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO 4 SIEVE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12 % FINES	SM	SILTY SANDS, POORLY GRADED SAND–CLAY MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND–CLAY MIXTURES
FINE GRAINED SOILS MORE THAN HALF IS SMALLER THAN NO 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAY
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE, SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOIL			Pt	PEAT AND OTHER HIGHLY ORGANIC SOIL

Grain Size Chart

Classification	Range of Grain Sizes	
	U.S. Standard Sieve Size	Grain Size in Millimeters
Boulders	Above 12"	Above 305
Cobbles	12" to 3"	305 to 76.2
Gravel	3" to No. 4	76.2 to 7.76
coarse	3" to 3/4"	7.62 to 4.76
fine	3/4" to No. 4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
coarse	No. 4 to No 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.074
Silt and Clay	Below No. 200	Below 0.074

Sample Designation

- Drive Sample Interval
- Continuous Core Sample Interval
- First Encountered Water (during drilling)
- Stabilized Water Elevation

SEACOR

APPENDIX C

ANALYTICAL RESULTS
AND
CHAIN-OF-CUSTODY RECORDS

MOBILE CHEM LABS INC.

5011 Blum Road, Suite 1 • Martinez, CA 94553
Phone (510) 372-3700 • Fax (510) 372-6955

November 17, 1993

SEACOR Corporation
90 New Montgomery, #620
San Francisco, CA 94105
Attn: Jim Ritchie

RE: Crowley Grand Marina
Grand & Fortnam
Alameda, California

Dear Mr. Ritchie:

On October 28, 1993, Mobile Chem Labs, Inc. (MCL) performed total petroleum hydrocarbons (TPH) as diesel and TPH as gasoline analyses on soil samples from the above referenced site. As per your request, we have made a qualitative interpretation of the chromatography from three samples. The following is our findings for samples HD4-3.5, TP3-4 and TP2-4.

1.) **Sample HD4-3.5 (MCL# F103015)**
The sample is below reporting limits for both gasoline and diesel. The diesel chromatograph shows the possible presence of diesel. To confirm this a second sample needs to be taken and run for lower detection limits than requested in the initial analysis. The gasoline chromatograph did not indicate the presence of gasoline.

2.) **Sample TP3-4 (MCL# F103017)**
This sample has high levels of diesel (800 ppm) and follows the expected profile for diesel. The diesel chromatograph does not indicate lighter hydrocarbons ($<C_{12}$) at higher than expected levels. The gasoline chromatograph does not show the presences of benzene or toluene that would be seen a recent spill of gasoline. The presence of xylene and ethylbenzene could be caused by either aged gasoline or a lighter fraction in diesel.

3.) **Sample TP2-4 (MCL# F103016)**
This sample has high levels of diesel (approx. 300 ppm). The chromatograph shows lighter hydrocarbons whose presence changed the profile from the characteristic diesel shape. The gasoline chromatograph had reportable levels of benzene, ethylbenzene and xylene. Thus the change in the diesel profile may be caused by gasoline.

Should you have any further questions, please do not hesitate to call.

Sincerely,

MOBILE CHEM LABS, INC.

Fred Choske
Senior Chemist

MOBILE CHEM LABS INC.

5011 Blum Road, Suite 1 • Martinez, CA 94553
Phone (510) 372-3700 • Fax (510) 372-6955

50085-001-01\1342\013072

SEACOR Corporation
90 New Montgomery St., $620
San Francisco, CA 94109
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27-93
Date Received: 10-28-93
Date Analyzed: 10-28-93

Sample Number	Sample Description
F103015	Project # 50085-001-01 Crowley Grand Marina Grand & Fortnam, Alameda HP4-3.5 SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

QA/QC: Spike Recovery is 64%

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

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50085-001-01\1342\013072

SEACOR Corporation
90 New Montgomery St., $620
San Francisco, CA 94109
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27-93
Date Received: 10-28-93
Date Analyzed: 10-28-93

Sample Number	Sample Description
F103017	Project # 50085-001-01 Crowley Grand Marina Grand & Fortnam, Alameda TP3-4 SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	13
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	0.070
Ethylbenzene	0.005	0.059

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.
(ppm) = (mg/kg)

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Ronald G. Evans
Lab Director

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90 New Montgomery St., $620
San Francisco, CA 94109
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27-93
Date Received: 10-28-93
Date Analyzed: 10-28-93

Sample Number	Sample Description
F103018	Project # 50085-001-01 Crowley Grand Marina Grand & Fortnam, Alameda TP5-4 SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

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50085-001-01\1342\013072

SEACOR Corporation
90 New Montgomery St., $620
San Francisco, CA 94109
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-28-93
Date Received: 10-28-93
Date Analyzed: 10-28-93

Sample Number	Sample Description
F103021	Project # 50085-001-01 Crowley Grand Marina Grand & Fortnam, Alameda TP4-4 SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

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50085-001-01\1342\013072

SEACOR Corporation
90 New Montgomery St., $620
San Francisco, CA 94109
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-28-93
Date Received: 10-28-93
Date Analyzed: 10-28-93

Sample Number	Sample Description
F103027	Project # 50085-001-01 Crowley Grand Marina Grand & Fortnam, Alameda TP5A-4 SOIL

ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1.0	<1.0
Benzene	0.005	<0.005
Toluene	0.005	<0.005
Xylenes	0.005	<0.005
Ethylbenzene	0.005	<0.005

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 8020 used for BTX distinction.
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

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50085-001-01\1342\013072

Seacor Corporation
90 New Montgomery, Suite 620
San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27/28-93
Date Received: 10-28-93
Date Analyzed: 10-28-93

Sample Number	Sample Description	Detection Limit ppm	SOIL Total Petroleum Hydrocarbons as Diesel ppm
	Crowley Grand Marina Grand & Fortnam, Alameda Proj. No.: 50085-001-01		
F103012	PL3-4	5.0	5.0
F103013	HD3-5	5.0	<5.0
F103014	HD2-4	5.0	<5.0
F103015	HD4-3.5	5.0	<5.0
F103016	TP2-4	5.0	300
F103017	TP3-4	5.0	800
F103018	TP5-4	5.0	<5.0
F103019	HD1-5	5.0	15
F103021	PL2-4	5.0	<5.0

QA/QC: Duplicate Deviation on F103016 is 4.0%

Note: Analysis was performed using EPA method 3550 and TPH LUFT.
(ppm) = (mg/kg)

MOBILE CHEM LABS
Fred Choate
for

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

5011 Blum Road, Suite 1 • Martinez, CA 94553
Phone (510) 372-3700 • Fax (510) 372-6955

50085-001-01\1342\013072

Seacor Corporation
90 New Montgomery, Suite 620
San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27/28-93
Date Received: 10-28-93
Date Analyzed: 10-28-93

Sample Number	Sample Description	Detection Limit ppm	SOIL Total Petroleum Hydrocarbons as Diesel ppm
	Crowley Grand Marina Grand & Fortnam, Alameda Proj. No.: 50085-001-01		
F103022	TP1-3.5	5.0	29
F103023	PL4-4	5.0	<5.0
F103024	TP4-4	5.0	<5.0
F103025	TP2-A	5.0	<5.0
F103026	HD3A-4	5.0	<5.0
F103027	TP5A-4	5.0	<5.0
F103028	TP2B-4	5.0	<5.0
F103029	TP6-4	5.0	<5.0
F103030	PL1A-6.5	5.0	<5.0

Note: Analysis was performed using EPA method 3550 and TPH LUFT.
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

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500085-001.01\1428\013104

SEACOR Corporation
90 New Montgomery St., #620
San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27-93
Date Received: 10-28-93
Date Analyzed: 11-08-93

Sample Number	Sample Description
103559	Project # 500085-001.01 Crowley Grand Marina Grand & Fortnam TP-3 WATER

ANALYSIS

	Detection Limit	Sample Results
	ppb	ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

QA/QC: Spike Recovery is 112%

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.
(ppb) = (µg/L)

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

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500085-001.01\1428\013104

SEACOR Corporation
90 New Montgomery St., #620
San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27-93
Date Received: 10-28-93
Date Analyzed: 11-08-93

Sample Number	Sample Description
103560	Project # 500085-001.01 Crowley Grand Marina Grand & Fortnam TP-4 WATER

ANALYSIS

	Detection Limit	Sample Results
	ppb	ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.
(ppb) = (µg/L)

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

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500085-001.01\1428\013104

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90 New Montgomery St., #620
San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27-93
Date Received: 10-28-93
Date Analyzed: 11-08-93

Sample Number	Sample Description
103561	Project # 500085-001.01 Crowley Grand Marina Grand & Fortnam TP-5 WATER

ANALYSIS

	Detection Limit	Sample Results
	ppb	ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.
(ppb) = (µg/L)

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

MOBILE CHEM LABS INC.

5011 Blum Road, Suite 1 • Martinez, CA 94553
Phone (510) 372-3700 • Fax (510) 372-6955

500085-001.01\1428\013104

SEACOR Corporation
90 New Montgomery St., #620
San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27-93
Date Received: 10-28-93
Date Analyzed: 11-08-93

Sample Number	Sample Description
103562	Project # 500085-001.01 Crowley Grand Marina Grand & Fortnam HD-4 WATER

ANALYSIS

	Detection Limit	Sample Results
	ppb	ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	1.6
Xylenes	0.5	5.3
Ethylbenzene	0.5	4.5

QA/QC: Duplicate Deviation is 4.7%

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.
(ppb) = (µg/L)

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SEACOR Corporation
90 New Montgomery St., #620
San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27-93
Date Received: 10-28-93
Date Analyzed: 11-08-93

Sample Number	Sample Description
103563	Project # 500085-001.01 Crowley Grand Marina Grand & Fortnam Trip Blank WATER

ANALYSIS

	Detection Limit	Sample Results
	ppb	ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.
(ppb) = (µg/L)

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Lab Director

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San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-28-93
Date Received: 10-28-93
Date Analyzed: 11-10-93

Sample Number	Sample Description
113118	Project # 500085-001.01 Crowley Grand Marina Grand & Fortnam PL1 WATER

ANALYSIS

	Detection Limit	Sample Results
	ppb	ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.
(ppb) = (µg/L)

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500085-001.01\1428\013104

SEACOR Corporation
90 New Montgomery St., #620
San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-28-93
Date Received: 10-28-93
Date Analyzed: 11-10-93

Sample Number	Sample Description
113119	Project # 500085-001.01 Crowley Grand Marina Grand & Fortnam TP5A WATER

ANALYSIS

	Detection Limit	Sample Results
	ppb	ppb
Total Petroleum Hydrocarbons as Gasoline	50	<50
Benzene	0.5	<0.5
Toluene	0.5	<0.5
Xylenes	0.5	<0.5
Ethylbenzene	0.5	<0.5

Note: Analysis was performed using EPA methods 5030 and TPH LUFT with method 602 used for BTX distinction.
(ppb) = (µg/L)

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

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500085-001.01\1428\013104

Seacor Corporation
90 New Montgomery, Suite 620
San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-27/28-93
Date Received: 10-28-93
Date Analyzed: 11-08-93

Sample Number	Sample Description	Detection Limit ppb	WATER Total Petroleum Hydrocarbons as Diesel ppb
	Crowley Grand Marina Grand & Fortnam Proj. No.: 500085-001.01		
103558	TP-2	50	31,000
103559	TP-3	50	<50
103560	TP-4	50	<50
103561	TP-5	50	<50
103562	HD-4	50	<50
103564	PL-2	50	630
103565	PL-3	50	<50
103566	PL-4	50	1,200
103567	TP1	50	<50
103568	TP2A	50	450,000

QA/QC: Spike Recovery on 103567 is 115%
Duplicate Deviation on 103564 is 2.1%

Note: Analysis was performed using EPA method 3550 and TPH LUFT.
(ppm) = (mg/kg)

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500085-001.01\1428\013104

Seacor Corporation
90 New Montgomery, Suite 620
San Francisco, CA 94105
Attn: Jim Ritchie
Project Manager

Date Sampled: 10-28-93
Date Received: 10-28-93
Date Analyzed: 11-10-93

Sample Number	Sample Description	Detection Limit ppb	WATER Total Petroleum Hydrocarbons as Diesel ppb
	Crowley Grand Marina Grand & Fortnam Proj. No.: 500085-001.01		
113118	PL-1	50	<50
113119	TP5A	50	<50
113120	HD3A	50	<50
113121	TP2B	50	<50
113122	TP2C	50	15,000

QA/QC: Spike Recovery on 113121 is 99%
Duplicate Deviation on 113121 is 4.2%

Note: Analysis was performed using EPA method 3550 and TPH LUFT.
(ppm) = (mg/kg)

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

Chain-of-Custody Number 1527

SEACOR Chain-of-Custody Record

Address: 90 New Montgomery St Ste 1620
San Francisco, CA. 94105
415-882-1548

Project # 1085.001.01 Task # GM04
Project Manager Lisa Bithell
Laboratory
Turn-around time:
Sampler's Name: Tari Pinkett-Kahey
Sampler's Signature: Tari Pinkett-Kahey

Analysis Request

Sample ID	Date	Time	Matrix	TPHg/BTEX 8015 (modified)/8020	TPHd 8015 (modified)	TPH 418.1	Aromatic Volatiles 602/8020	Volatile Organics 624/8240 (GC/MS)	Halogenated Volatiles 601/8010	Semi-volatile Organics 625/8270 (GC/MS)	Pesticides/PCB's 608/8080	Total Lead 7421	Priority Pollutant Metals (13)	TCLP Metals				Comments/ Instructions	Number of Containers
PL 2-4	10/28/93	935	soil		X														
TP1-3.5	"	1020	"		X														
PL 4-4	"	930	"		X														
TP 4 - 4	"	1120	"	X	X														
TP 2 - A		1300			X														
HD3A - 4		1340			X														
TP5A - 4		1505		X	X														
TP2B - 4		1555			X														
TP6 - 4		1635			X														
PL 1 - A 6.5		1645			X														

Special Instructions/Comments:

Relinquished by:
Sign Tari Pinkett-Kahey
Print Tari Pinkett-Kahey
Company SEACOR
Time 1700 Date 10/28/93

Received by:
Sign Fred Chaske
Print FRED CHASKE
Company MCL
Time 1700 Date 10/28/93

Relinquished by:
Sign
Print
Company
Time Date

Received by:
Sign
Print
Company
Time Date

Sample Receipt

Total no. of containers
Chain of custody seals:
Rec'd good condition/cold:
Conforms to record:

Client:
Client Contact:
Client Phone Number:

Date / / Page of

Chain-of-Custody Number 1526

SEACOR Chain-of-Custody Record

Address: 90 New Montgomery St Suite 620
San Francisco CA. 94109
415- 882-1578

Project # 50085.001.01 Task # 6M04
Project Manager Jim Ritchie
Laboratory
Turn-around time:

Sampler's Name: Teri Plunkett-Kahney
Sampler's Signature: Teri Plunkett-Kahney

Analysis Request

Sample ID	Date	Time	Matrix	TPHg/BTEX 8015 (modified)/8020	TPHd 8015 (modified)	TPH 418.1	Aromatic Volatiles 602/8020	Volatile Organics 624/8240 (GC/MS)	Halogenated Volatiles 601/8010	Semi-volatile Organics 625/8270 (GC/MS)	Pesticides/PCB's 608/8080	Total Lead 7421	Priority Pollutant Metals (13)	TCLP Metals				Comments/ Instructions	Number of Containers
PH3-4	10/26/93	710	Soil	X	X														
HD3-5	10/27/93	300		X	X														
HD2-4				X	X														
* HD4-3.5				X	X														
TP2-4				X	X														
TP3-4				X	X														
TP5-4				X	X														
HD1-5				X	X														
* TP4-6				X	X														

Special Instructions/Comments:

Relinquished by:
Sign Jim Ritchie Kahney
Print Teri J. Plunkett Kahney
Company SEACOR
Time 800 Date 10/28/93

Received by:
Sign Fred Choske
Print FRED CHOSKE
Company MCL
Time 0800 Date 10/28/93

Relinquished by:
Sign
Print
Company
Time Date

Received by:
Sign
Print
Company
Time Date

Sample Receipt

Total no. of containers
Chain of custody seals:
Rec'd good condition/cold:
Conforms to record:

Client:
Client Contact:
Client Phone Number:

Date / / Page of

SEACOR Chain-of-Custody Record

Address: 90 New Montgomery St. Suite 620
San Francisco CA. 94105
(415) 882-1548

Project # 510085.00.01 Task # 6M04
Project Manager Jim Ritchie
Laboratory
Turn-around time:

Sampler's Name: Terri J. Plunkett-Kalmes
Sampler's Signature: Terri J. Plunkett-Kalmes

Analysis Request

Sample ID	Date	Time	Matrix	TPHg/BTEX 8015 (modified)/8020	TPHd 8015 (modified)	TPH 418.1	Aromatic Volatiles 602/8020	Volatile Organics 624/8240 (GC/MS)	Halogenated Volatiles 601/8010	Semi-volatile Organics 625/8270 (GC/MS)	Pesticides/PCB's 608/8080	Total Lead 7421	Priority Pollutant Metals (13)	TCLP Metals				Comments/ Instructions	Number of Containers
PL1	10/29/93		H2O	*	*														
PL2					X														
PL3					X														
PL4					X														
TPSA				*	*														
HD3A					*														
TP1					X														
TP2A					X														
TP2B					*														
TP2C					*														

Special Instructions/Comments:

X = 5 Day TAT Requested by J Ritchie 11-3-93

* = 24 hr TAT Requested by T Plunkett 11-9-93

Relinquished by:
Sign Terri J. Plunkett-Kalmes
Print Terri J. Plunkett-Kalmes
Company SEACOR
Time _____ Date 10/29/93

Relinquished by:
Sign _____
Print _____
Company _____
Time _____ Date _____

Received by:
Sign _____
Print _____
Company _____
Time _____ Date _____

Received by:
Sign Dave Levine
Print Dave Levine
Company Woodward Clyde
Time 11:15 Date 10-29-93

Sample Receipt

Total no. of containers
Chain of custody seals:
Rec'd good condition/cold:
Conforms to record:

Client:
Client Contact:
Client Phone Number:

Date ___ / ___ / ___ Page ___ of ___

Chain-of-Custody Number: 744

SEACOR Chain-of-Custody Record

Address: 90 New Montgomery St Suite 620
San Francisco, CA, 94105

Project # 520085-001-01 Task # 6M04
Project Manager J. Ritchie
Laboratory
Turn-around time:
Sampler's Name: Terry J. Plunkett-Kalmes
Sampler's Signature: Terry Plunkett-Kalmes

Analysis Request

Sample ID	Date	Time	Matrix	TPHg/BTEX 8015 (modified)/8020	TPHd 8015 (modified)	TPH 418.1	Aromatic Volatiles 602/8020	Volatile Organics 624/8240 (GC/MS)	Halogenated Volatiles 601/8010	Semi-volatile Organics 625/8270 (GC/MS)	Pesticides/PCB's 608/8080	Total Lead 7421	Priority Pollutant Metals (13)	TCLP Metals				Comments/ Instructions	Number of Containers
TP-2	10/27	6:00	H2O		X														
TP 3				X	X														
TP-4				X	X														
TP-5				X	X														
HD-2																			
HD-4				X	X														
Trip blank				X															

Special Instructions/Comments:
X = 5 Day TAT Requested by J Ritchie 11-3-93

Relinquished by:
Sign Terry Plunkett-Kalmes
Print Terry J. Plunkett-Kalmes
Company SEACOR
Time ______ Date 10/28

Received by:
Sign Dave Levine
Print Dave Levine
Company Mobile Chem
Time 11:15 Date 10-27-93

Relinquished by:
Sign
Print
Company
Time ______ Date ______

Received by:
Sign
Print
Company
Time ______ Date ______

Sample Receipt
Total no. of containers
Chain of custody seals:
Rec'd good condition/cold:
Conforms to record:

Client:
Client Contact:
Client Phone Number:

Date ___/___/___ Page ___ of ___