ENVIRONMENTAL REPORT

6601 and 6603 BAY STREET

Emeryville, California

For

NEIL MUSSALLEM

THOMAS RICHARDSON

By

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July 31, 1990 PE90.005.02

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Subject: **ENVIRONMENTAL REPORT**
Underground Storage Tank Removals
6601 and 6603 Bay Street
Emeryville, California.

Dear Neil and Tom:

Here is the Environmental Report addressing the petroleum hydrocarbon contamination discovered at the 6601 and 6603 Bay Street underground fuel storage tank removal site.

The Environmental Report characterizes the known extent of free gasoline, diesel and oil product contamination on your properties. The characterization is based on observations and soil and groundwater analysis during the removal of the three underground storage tanks. Subsequent investigation included seven soil borings to groundwater to determine the groundwater gradient. An initial literature review included the 1987 Kaldveer report and a partial (analytical results tables, site plans, and boring logs only) 1989 Engineering Science report for the 1650 65th Street property contiguous to the south.

Based on this initial site characterization, it was determined that the type and extent of petroleum contamination encountered was not consistent with the use, condition or operation of the former fuel dispensing facility. The literature review revealed that in 1987 Kaldveer did not encounter petroleum contamination adjacent to the

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subject underground storage tanks. However, contamination was noted in the Kaldveer report at the southeast corner of the contiguous 1650 65th Street property. The Garrett Freight Lines operation on the south side of 65th Street and an on-site underground fuel storage tank were identified as probable sources of this contamination.

Due to the recent re-development of properties south of 65th Street, it was known that multiple environmental characterization and remediation reports had been prepared during the removal of underground storage tanks, the cleanup of highly contaminated soil and groundwater and the de-watering of trenches and pits during construction or rehabilition of buildings.

William Dubovsky Environmental (WDE) was directed to obtain copies of these reports available as public records from the State Water Quality Control Board. Based on an initial review of these reports, WDE was further instructed to review these reports to further characterize the region and develop an opinion regarding the potential for off-site sources of the contamination discovered during the underground storage tank removals.

Further evaluation of these reports indicated significant disparities or inadequate means and methods for site characterization, sampling, analytical testing, and interpretation of results. It became obvious that a simple correlation of pertinent information from the individual reports was misleading without an understanding of how the information was obtained and its inherent limitations and applicability.

The literature review evolved into an extensive study as individual reports were examined for the sources, methods and procedures used to report analytical results and to develop conclusions and recommendations.

The literature study analysis was documented by reviewing and commenting on applicable excerpts from the individual reports. The excerpts and comments have been segregated by location into Appendices A through D.

It is the opinion of William Dubovsky Environmental that the large quantities of free petroleum product encountered at the 6601 and 6603 Bay Street underground storage tank excavation as diesel and oil originated from the former 68,000 gallons of diesel and 11,000 gallons of oil underground storage at the Garrett Freight Lines located on the south side of 65th Street. It is also our opinion that the gasoline product encountered at the subject site originated from the former 2,000 gallon underground storage tank at the 1650 65th Street fueling facility.

It is further opined that regional contamination of natural and fill soils by the Delta Freight Lines fueling facilities north of 64th Street, the Nielsen Freight Lines fueling facilities and the Parrafin and Pabco petroleum product refinery, storage, and manufacturing operations between 64th and Powell Streets potentially contributed to petroleum hydrocarbon contamination on the subject site.

Should you have any questions or require additional information, please contact our office at your convenience.

Sincerely yours,

WILLIAM DUBOVSKY ENVIRONMENTAL

William F. Dubovsky
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RCE 41033, Exp. 3/31/91

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PRELIMINARY SOIL AND GROUNDWATER CONTAMINATION ASSESSMENT FOR FREE PETROLEUM PRODUCT AND GROUNDWATER FLOW DETERMINATION 6601 & 6603 BAY STREET EMERYVILLE, CALIFORNIA

SCOPE

Our scope of services for the Environmental Report on the subject site consisted of performing the following tasks:

* Review topographic and geologic maps.
* Provide a physical description of the site, including:
  - Unusual soil coloration or odors
  - Fill or other imported materials
  - Physical irregularities at the surface
* Perform cursory observation of adjacent properties, including:
  - Evaluation of present land-use conditions which might adversely affect the subject property.
* Perform preliminary exploratory subsurface evaluation described in accordance with the Unified Soil Classification System (USCS) consisting of seven soil borings into ground water.
* Measure the static water table and perform a level survey to determine the relative water table elevation at each boring.
* Plot the piezometric groundwater data points on the site plan and determine the corresponding groundwater flow gradient.
* Perform an initial literature review of available reports, boring logs, and analytical testing results on the 1650 65th

Street property contiguous to the south boundary of the subject site (Kaldveer, 1987 and Engineering Science, 1989)

* Perform a literature study of available public record reports for properties south of the subject site to Powell Street.

* Prepare a report presenting the findings from the categories listed above and our opinion regarding the occurrence of contamination by motor fuel and oil proximate to the area of the underground storage tank removals at 6601 and 6603 Bay Street, Emeryville.

SITE CONDITIONS

The subject site is comprised of two nearly rectangular lots located on the west side of Bay Street in an industrial section of the City of Emeryville.

The site is situated between existing buildings to the north and south used primarily for warehouse and office. A leaking underground fuel and waste oil storage tank has been removed from the warehouse to the south. Farther south, across 65th Street, leaking underground fuel and oil tanks used by the former Garrett Freight Company have also been removed. An extraction well has been constructed on the Garrett Freight Company site. Monitoring wells have been constructed on the contiguous site to the north. It is unknown if petroleum hydrocarbon groundwater contamination has been reported on this site.

The subject site is bound on the west by the Bayshore Highway (I-80) and the San Francisco Bay. Bay Street and the Southern Pacific Railway define the easterly boundary of the site.

A Site Plan is included in the Appendix. The Plan shows the location of the on-site borings, the location of the former underground storage tanks and dispenser island, and the location of the closest boreholes and monitoring wells mapped on the neighboring 65th Street Warehouse site to the south. The Plan also shows

the direction of groundwater flow based on groundwater piezometric measurements.

A review of the USGS *Oakland West, California* 7.5 Minute Series Quadrangle indicates the site is situated at an elevation of about 10 to 15 feet above MSL. All natural streams or drainageways have been piped and the land area filled between Ashby Avenue to the north and Powell Street to the south. An artificial lagoon is present north of Ashby Avenue between the Bayshore Freeway and the Southern Pacific Railroad.

Two concrete tiltup warehouse buildings currently occupy the site. Three underground storage tanks, (2,000 gallons unleaded gas; 7,500 gallons regular gas; and 6,000 gallons diesel) and a fuel dispenser island were previously removed from the site (Reference Nos. A-1 and A-2).

During the staged removal of the three underground storage tanks, nearly 2,000 gallons of free product (gasoline, diesel and oil), was pumped from the tank removal excavation between August 24 and October 10. Visual observation supported by analytical laboratory test results was used to characterize the source of flow and the relative soil and groundwater petroleum hydrocarbon contamination in the tank removal excavation. The free petroleum product emanated from the eastern 1/2 of the south sidewall and slightly east of the middle of the north sidewall.

HISTORIC SITE CONDITIONS

The KALDVEER report (Reference No. B-1) indicates that back in the late 1800's, the Emeryville shoreline had been extended baywards by artificial fill over the native Bay Muds. A 1916 map indicated that the bay shoreline was formerly designated by the Southern Pacific railroad tracks located along Bay Street to the east of the site.

Sometime prior to the early 1940's, the existing Highway 80, formerly adopted as Route 69, was constructed west of the site and created a levee protecting the inland parcels. From this time

until the late-1950's, the City of Emeryville used the area of the subject site and the area to the south as a municipal disposal site. The fill material was presumed to be a combination of clean fill demolition debris and industrial wastes.

The warehouse to the south was built prior to 1957. Part of the neighboring warehouse activities were conducted on the subject site. The last tenant on the neighboring site was the U.S. Postal Service who occupied the warehouse from 1973. A portion of the subject site was leveled and paved prior to the construction of the existing warehouse.

A layer of portland cement and asphaltic pavement is located about 2.5 feet below existing pavement grade in the area of the underground tanks.

Another definable historic surface is present at a depth of about four feet below existing pavement grade. This surface is characterized by root structures grown in-place within brick, timber and trash debris.

The concrete tilt-up warehouses on the subject site were constructed and occupied during 1958 to 1959. The three underground fuel storage tanks were installed in 1973 and operated by the Leopard Trading Company.

SUBSURFACE EVALUATION

On January 16, 1990, D. Larry Petite, P.E. of **PETITE ENGINEERING** performed a subsurface reconnaissance of the subject site to determine the groundwater piezometric surface. This consisted of observing surface features and logging seven soil borings. The borings were drilled to depths of 13.5 to 15.5 feet below existing grade. The soil borings were positioned along the east, south and west site boundaries.

Soil borings were drilled with an six-inch diameter, continuous flight auger using a CME 55 drill rig operated by Bay Land Drilling located in Foster City (License No. 374152).

The boreholes were left open and water level readings obtained for about a 24 hour period.

The boreholes were then backfilled with drill cuttings and the surface patched with asphalt.

SUBSURFACE CONDITIONS

Samples were described using the Unified Soil Classification System. Subsurface materials observed in the drill cuttings were as follows:

Surface Pavement: 4 to 8-inch thick portland cement reinforced concrete or 2 to 4-inch thick asphaltic concrete pavement over one to two feet of gravel fill.

Soil Lithology: Black sandy CLAY fill with rubble predominated to the bottom of the borings terminated at a depth of 13.5 to 15 feet. At the west end of the 6603 Bay Street property, gray to black SILT or SAND fill with rubble was underlain by black sandy CLAY fill with rubble at a depth of 6 to 7 feet. The most northwesterly Boring (No. 7) encountered a black shiny goo (peat?) at a depth of 11 feet.

nice word

Rubble Materials: Variable quantities of concrete, brick, wood, glass, metal, wire, vinyl floor tile, and other rubble is intermixed with the soils previously described. Two layers of stratigraphically comparable heavily rubbilized discontinuous zones were identified. The first is typically located between the depths of 4 to 9 feet and the second between 11 and 15 feet.

Groundwater: The depth to groundwater varied from 6.6 to 8.6 feet below existing grade. The rate at which the groundwater level stabilized in the boreholes varied significantly (See Page A-4). Perched groundwater was encountered at Boring Nos. 5 and 6 in the south central portion of the 6603 Bay Street property.

NO OVM data

Hydrocarbon Odor: The drill cuttings were continuously checked for hydrocarbon odor during drilling. Only Boring No. 6 located at the southwest corner of 6603 Bay Street exhibited a slight diesel odor at a depth of 13 feet in heavy debris. No indication of free petroleum product was observed in any of the seven borings.

Detailed descriptions of the soil profile encountered in the soil borings are presented in the boring logs. The descriptions were based on auger cuttings only resulting in a generalized representation of soil characteristics. Thin strata of differing materials that may be present are not included on the boring logs.

GROUNDWATER FLOW

The groundwater piezometric surface at each borehole in relation to a common benchmark was determined by a level survey. Depth to groundwater is about 6.6 to 8.6 feet below existing ground surface.

The groundwater levels used to develop the groundwater flow vectors are only representative for the time of the field study on January 16 - 17, 1990. The groundwater levels may vary by several feet due to seasonal precipitation and tidal influence. Temporary construction dewatering activities and remedial groundwater extraction will also locally modify groundwater levels.

No tidal influence shown on curve

Groundwater flow vectors have also been determined on the other study areas where adequate information was available (Page Nos. B-9, C-32, C-40 and D-26).

The *Water Table Elevation Stabilization Curve* included in Appendix A, Page A-4, graphs the changing water levels for each boring from the time of initial drilling to about 24 hours later.

Boring No. 4 exhibited the greatest change in water level, almost 8 feet, during the period of observation. On the other hand, Boring No. 6 did not change from its initial level at the time of drilling. This dramatic difference underscores the highly variable soil and debris conditions encountered in the municipal and

industrial garbage fill material. The water levels did not appear to be affected by tidal influence by more than 0.1 foot during the measurement period. essentially non-existent.

At the time of the field study, the direction of groundwater flow at Bay Street is toward the southwest and west. The groundwater flow curves in a clockwise direction until at the rear of the property, the flow is northwest.

Information obtained on other sites where groundwater level measurements have been made over a period of months indicates a wide variation in groundwater flow direction. When the regional groundwater levels are high in the spring due to average or above average seasonal precipitation and the tides are low, the flow is generally southwest to west. On the other extreme, when the regional groundwater levels are the lowest in the fall after a period of drought and the higher astronomical tides occur, the groundwater flow direction temporarily reverses for the western half of the site and is toward the east to northeast. The farthest extent of the flow reversal is estimated to be at the historic shoreline just west of the Southern Pacific Railroad tracks.

maybe

OBSERVATIONS AND CONCLUSIONS

The following observations and conclusions consider the potential for:

1) petroleum hydrocarbon contamination from the subject underground fuel storage tanks and dispensing facility;

2) the migration of product with the groundwater flow; and,

3) significant offsite sources of contamination located within potential migration paths to the subject site.

POTENTIAL FOR ON-SITE UNDERGROUND STORAGE TANK FUEL RELEASE

The three underground fuel storage tanks on the subject site consisted of one 6,000 gallon tank with a tarred exterior last containing diesel, one 7,500 gallon 1/4 inch thick carbon steel tank with a tarred exterior last containing leaded gasoline and one 2,000 gallon 1/4 inch thick carbon steel tank with a tarred exterior last containing unleaded gasoline. No other tankage or differing tank contents are known by us for this site.

It is known that the gasoline tanks were manufactured by Perkins in 1973 and installed the same year (Ref. No. A-2). It seems likely the diesel tank was installed at the same time. The fuel was delivered by individual dispensers using suction pumps located in a common island.

All three tanks passed tank and product line system pressurization tests conducted on February 4, 1989 or December 28, 1987.

The diesel tank was inspected upon removal on August 23, 1989 and no obvious holes, perforations or corrosion was noted.

The gasoline tanks were inspected upon removal on October 10, 1989 by Gil Wistar, Alameda County Hazardous Materials Inspector and William Dubovsky, Project Manager, for obvious holes. Again, no holes, perforations or corrosion was noted.

During the excavation but prior to removing the diesel tank, black petroleum product flowed from the south wall into the excavation beside the tank. The product was removed by the hazardous waste hauler onsite to remove the diesel tank rinsate. The southeast corner was further excavated to below the bottom of the tank to collect the product that continued to flow from the south wall.

After the tank was removed, the product continued to flow from the south wall into the deepened portion of the pit where it was removed by the hazardous waste hauler. However, no free product was observed under the tank--i.e. the tank was not surrounded with free product and the groundwater table had not been breached.

During August 23 to October 10, when the two gasoline tanks were removed, a hazardous waste hauler vacuumed out product six more times to remove a total estimated 2,000 gallons of petroleum product from the excavation.

The analytical results for soil and groundwater samples obtained from the underground tank removal excavation varied widely. The results are tabulated in Appendix A on Page A-22. The highest soil contamination as diesel was obtained from the south wall near the east end at a depth of 7.5 feet--2,700 ppm TPH as diesel (EPA 3510 or 3550 followed by GCFID). The highest Total Oil and Grease contamination was also from this sample and was 3,400 ppm (Standard Method 503E). No soil samples were analyzed for gasoline adjacent to the diesel tank.

The highest soil contamination as gasoline was 270 ppm TPH as gasoline (GCFID by EPA 5030) sampled from the north wall at a depth of 7.5 feet next to the middle tank.

These results are in agreement with the observed sources of petroleum product flowing into the excavation. It is noted that the highest concentration of petroleum contamination is Oil and Grease. Oil and grease were not used or stored at this site. Only off-site contamination can explain its presence in this quantity of hundreds of gallons.

Groundwater analytical results for gasoline rose from 1,400 ppb on September 12 to 6,300 ppb on October 10. The aromatic volatile organics BTEX also showed a substantial rise with Benzene changing from 8 ppb to 400 ppb. However, on January 25, 1990 with the excavation nearly full from rainfall infiltration, the BTEX results were non-detectable (< 5 ppb) and TPH as diesel was 520 ppb.

The analytical results show an increase in soil and groundwater contamination with time from August 23 until October 10. The highest concentration of any petroleum hydrocarbons was oil and grease of which were not used or stored on this site.

In summary, the potential for the observed hydrocarbon contamination being released from the on-site underground storage tanks is improbable and is not consistent with the presence of the oil and grease contamination, the increase of contamination with time, the tank and fueling systems passing the pressure tests and the condition of the tanks and product lines observed during removal.

POTENTIAL FOR THE MIGRATION OF PETROLEUM PRODUCT WITH THE GROUNDWATER FLOW

REGIONAL HYDROLOGY:

The expected regional near-surface groundwater flow in underlying alluvial material would follow the natural topography and flow from the hills to the east toward the bay to the west.

The near-surface groundwater flow within the study area does not necessarily follow this pattern. The artificial shorelines and levees created by the construction of the Southern Pacific Railroad immediately east of the site and the Bay Shore Freeway immediately west of the site and Ashby Avenue, within several hundred feet to the north of the site, have created barriers that modify the near-surface groundwater flow.

- Dubovsky's argument summarized.

These barriers may prevent groundwater flow (dam effect) or concentrate large flows in permeable areas of sand and gravel affecting groundwater flowing into or out of this enclosed basin area. This induces a complex water flow around less permeable material with the larger flows through the most permeable material.

These barriers may also introduce a significant vertical gradient as groundwater flows down under or up over less permeable fill material existing below the groundwater surface.

The presence of the fill underlying the Bayshore Freeway attenuates daily tidal fluctuations. However, astronomical very high or very low tides significantly affect the groundwater levels and direction of flow along the western two-thirds of the regional study area.

The opposing flows--natural flow towards the bay and high tide inflow--tend to laterally disperse the petroleum products at the point of flow reversal. This occurs approximately along the

historic shoreline generally located west of the Southern Pacific Railroad. It is in this flow reversal area where the underground storage tanks are located on all the reviewed sites.

This groundwater flow regime explains the variable concentrations of the regional presence of hydrocarbon contamination from multiple sources. Low levels of dissolved contamination are present in many samples. However, local hot spots of floating or suspended product not always directly associated with a specific UST leakage site occur over much of the study area.

SMALL-SCALE HYDROLOGY:

The small scale hydrology is often complex within the artificial fill over the bay muds and underlying sedimentary structures. Intermixed and interspread layers of soil, concrete, brick and wood have created chaotic hydrologic paths for the near surface groundwater. This effect varies regionally but extends to a depth of at least 15 to 20 feet below existing grade on the subject site.

The typical placement of municipal fill, demolition debris and industrial waste material consists of cyclical dumping, spreading and leveling operations. This cyclical placement has constructed a multi-layered stratified complex of differing types and permeabilities of fill. The fill generally has a much higher horizontal permeability and continuity then vertical.

Channels of concrete and brick rubble enabling rapid groundwater movement within the predominantly clay fill soils range from a few square feet to several bulldozer blades in width. Most of these channels pinch off to form pockets of rubble. The most extensive rubble structures frequently occur just above the natural bay mud and at the groundwater surface.

Vertical layering limits intermixing of some near-surface groundwater zones. This was observed by the presence of perched water flowing above the static water table into Boring Nos. 5 and 6.

Boring Number No. B-5 exhibited perched water trickling in from the west (up-gradient or opposite to main groundwater flow), 1.2 to 1.7 feet above the static groundwater level. In Boring No. B-6, the perched water flow was only 0.3 feet higher then the static groundwater level but it was flowing in from the east (down-gradient direction).

Potential petroleum product migration paths are, therefore, most likely channelized within rubble and silty sand fill exhibiting limited vertical spreading and mixing in the near surface groundwater. Motor fuels and oil floating and/or suspended in the near surface groundwater may be trapped and collect in pockets of rubble extending above the groundwater surface or as the groundwater flows under obstructions.

This phenomenon occurred to produce the heavy sludge and oil sheen observed in the UST removal excavation at the 1650 65th Street property (Reference No. B-5, Page B-45). At this site, silty sand fill underlies clay fill at about 1.5 feet below the highest groundwater levels. Analytical testing indicated no detectable hydrocarbons in the clay fill from a sample located about 1.5 feet above the silty sand at about the static groundwater level. However, when the excavation was deepened another four feet, the groundwater poured in. Petroleum product contamination suspended in the flowing groundwater, rose to the surface in the excavation. Being lighter then water, the petroleum product was trapped and started collecting in the open excavation.

Alternately, the petroleum products will migrate independent of the groundwater, especially during periods of lower water levels or when trapped in rubble zones. This appears to have occurred at the subject site UST removal excavation (Reference No. A-1). Product flowed into the UST excavation at a depth of 8 to 9 feet after a backhoe excavated into a brick and concrete rubble complex adjacent to an UST. At this time the seasonally low groundwater level was about 13 feet. Petroleum product continued to flow into the excavation for several weeks without the presence of significant groundwater. When the groundwater level rose to a depth of 7.5 to 8 feet in response to winter rains, the flow of product slowed considerably.

A regional elongated area of especially heterogenous rubble and clay fill with associated complicated hydrology is orientated in a north-south direction bayward and parallel to the historic shoreline. This is also the general location tidal induced groundwater surface flow reversal.

On the subject site, it is noted that Soil Boring Nos. 3 and 4 were the slowest to stabilize. These borings are located near the east and west ends of the former underground storage tanks (UST's). Also on the subject site, it is understood that during the drilling for the existing monitoring well, a boring located about 25 feet east of the diesel tank met refusal prior to encountering groundwater.

On the 1650 65th Street property, the Kaldveer (Reference No. B-1) boring EB-6, located about 175 feet south of the UST's on the subject site, did not exhibit groundwater although the boring extended below the known groundwater surface. Also on the 65th Street site the Engineering Science initial boring intended for the installation of a monitoring well and located three feet west of the former UST met refusal with wire wrapped around the drill bit at a depth of 15 feet (Reference No. B-2). This is about 300 feet south of the 6601/6603 UST's. Finally, the Engineering Science boring for a groundwater grab sample, #1 (Reference No. B-9), located 75 feet southwest of the abandoned borehole met refusal above groundwater.

It is also noted that the rainfall and immediately adjacent runoff into the 6601/6603 UST excavation dropped very slowly at a rate of about 1 to 2 inches per week. This is partially due to the siltation of the excavation sidewalls and bottom. However, the average permeability of the ground at this excavation is slow.

SIGNIFICANT OFFSITE SOURCES OF PETROLEUM PRODUCT CONTAMINATION

Several significant offsite sources of petroleum product contamination are located within potential migration paths to the subject site.

The most significant are the adjacent 1650 65th Street former 2,000 gallon UST (Appendix B) used for gasoline and waste oil storage and the Garrett Freightlines Site (Appendix C) located south of 65th Street. The Garrett Freightlines Site former UST's, located 600 to 700 feet south of the 6601/6603 Bay Street former UST's consisted of 68,000 gallons of diesel, 11,000 gallons of motor oil, and 6,000 gallons of gasoline for a maximum total product inventory of 85,000 gallons.

Other potential sources of petroleum product contamination is the 20,000 gallons of diesel tankage at the Delta Freight Lines Facility located on the north side of 64th Street (Appendix C). The Nielsen Freight Lines, located on the south side of 64th Street, operated a 10,000 gallon gasoline tank, a 10,000 gallon diesel tank, a 500 gallon waste oil tank and 500 gallon lube oil tank. Also on this site was antifreeze and motor oil drum storage. (Appendix D, Page D-6)

A final potential source for heavier hydrocarbon contamination is the former industrial activities between 64th Street and Powell Street. Hydrocarbon contamination due to early industrial operations were evidenced as floating black product in one well, a kerosene like product in the shallow soils of another well, tar seeps and tar paper and tar paper materials in the shallow fills (Appendix D, Page D-9).

PRESENCE OF PRODUCT CONTAMINATION:

High diesel (> 1,000 ppm), moderate gasoline (> 100 ppm) and high oil contamination levels have been confirmed by analytical testing of soil and water at various times and locations in the tank excavation during the two-stage removal of the underground tanks (Reference Nos. A-1 and A-2).

Based on passing tank pressure tests, the inspection of the 17 year-old tanks and product lines showing no detectable perforations or signs of leakage (as witnessed by Gilbert M. Wistar, Alameda County, Department of Environmental Health on October 10, 1989), and the preponderance of oil product when no oil was stored or used on-site, it is more likely then not that the black petroleum product flowing into the tank excavation during the removal of the tanks originated off-site.

1650 65th Street

As previously noted, known sources of contamination include the previously removed 2,000 gallon underground tank and leaking product line at the 1650 65th Street Postal Warehouse which was located about 300 feet south of the subject site's UST removals (Reference No. B-1). A May 26, 1988 report by ENGINEERING SCIENCE (Reference No. B-6) indicated analytical results from soil samples obtained from the tank excavation, product line trench or an abandoned borehole about 5 feet to the west of the excavation of 490 (3'), 170 (5'), 200 (9'), 6,600 (10'), No Detection (12'), 4,800 (12.5') and 390 (16.5') ppm gasoline in the soil. It is noted that the groundwater level varies from 12.3 to 13.5 feet below the ground surface so that soil samples obtained above about the 10 - 11 foot depth are representative of contamination originating higher in the soil--in this case the fuel product line. This report also rules out contamination coming from the subject site's (6601 and 6603 Bay Street) underground tanks.

The three soil samples analyzed for gasoline contamination at the 6601 and 6603 Bay Street UST excavation indicated Non-detectable, 2.5 and 270 ppm gasoline at a depth of 7.5 feet (0.5 feet above groundwater). It is the opinion of William Dubovsky Environmental that the gasoline contamination encountered on the subject site originated 300 feet away at the 1650 65th Street former 2,000 gallon UST from a leaking product line. The November 10 groundwater grab sample, GW-8 (Reference No. B-9), encountering free product more likely then not intercepted a trapped pocket of gasoline within the channelized plume originating from the former 1650 65th Street UST site.

Opinion that gas came from P.O. Partners

Garrett Freight Lines

Extensive contamination has been confirmed with ongoing remediation and monitoring on the previous Garrett Freight Company operation, located about 500 feet south of the site. An extraction well is currently in operation at the Garrett Freight Company site. During boring and sampling operations on Exploratory Boring No. 5 (EB-5), PETER KALDVEER AND ASSOCIATES, INC (Reference No. 4) encountered a "brown oil" smeared on the sampler after sampling at a 10 to 12.5 foot depth. Additionally, "the black sands encountered from depths of 7.5 to 12 feet were observed to have a strong gasoline-like odor". Analytical results for Boring EB-5 for a composite soil sample collected at 7.5 and 9' depth indicated a TPH gasoline of 200 mg/L.

The KALDVEER report notes that this contamination could be from an onsite buried tank or the "buried tank located south of the site" (Garrett Freight Company).

The KALDVEER report also included a boring--EB-7--directly adjacent and down-gradient to the subject site's underground tanks. Soil samples from this boring collected at a 6 foot depth on April 13, 1987 indicated a very slight gas contamination of 3.6 mg/kg (ppm).

This is especially significant because an ENGINEERING SCIENCE Groundwater Grab Sample collected from boring GW-8 on November 10, 1989 indicated a groundwater gasoline contamination of 94,000 mg/L.

Boring GW-8 is 35 feet south of the two gasoline tanks located on 6603 Bay Street while Boring EB-7 is only 15 feet south of the tanks (See Site Plan). Also, the highest groundwater gasoline contamination in the tank removal excavation was the 6.3 mg/L for a sample collected October 10, 1989. This is negligible to that obtained from Boring GW-8.

Additionally, the gasoline contamination of groundwater obtained from the tank removal excavation increased from 1.4 mg/L on August 23, 1989 to 6.3 mg/L on October 10, 1989 even after removing 500 gallons of contaminated groundwater on August 25; 400 gallons on August 28; 800 gallons on August 31; 1,600 gallons on September 5; and 1,300 gallons on September 12. Similarly, the benzene contamination of groundwater increased from 8 mg/L to 400 mg/L for the same dates. This indicates that contamination is being drawn into or collected in the excavation as it is being pumped out.

The Garrett Freight Lines site is considered the source of diesel and oil contamination at the subject site for the following reasons.

It is understood that the three underground tanks only contained motor fuel and were not used to store oil or waste oil. However, soil samples collected from the excavation pit sidewalls adjacent to the diesel tank, revealed a Total Oil and Grease analysis of 2,000; 540; and 3,400 mg/kg. The value of 3,400 mg/kg Oil and Grease is higher then the diesel and much higher then the gasoline contamination.

11,000 gallons of oil UST capacity was located at the Garrett Freight Lines Maintenance Building east of the 68,000 gallons of diesel and 6,000 gallons of gasoline underground storage. All of these tanks are located within 600 to 700 feet of the subject site's former UST's. It is also noted that 1/2-inch of product was floating on the groundwater in each pit when the tankage was removed on April 21 to 23, 1986 (Reference No. C-2, Page C-9). It has been calculated that about 1,700 gallons of product was floating in the largest and closest UST excavation.

If one were to draw a line from the Garrett tankage to the subject site's tankage, it would pass through the EB-5 boring and just east of the 1650 65th former UST site. This line is also parallel to the Southern Pacific Railroad tracks and the historic shoreline. Based on the previously discussed mechanisms for lateral product migration within this specific area and the presence of the brown oily contamination found at EB-5, the black to greenish brown sludge and oil sheen on the 1650 65th Street UST excavation groundwater, and the predominance of the black oil and diesel hydrocarbon contamination at the subject site, it is more likely then not that the Garrett Freight Lines Site is the source for the diesel and oil contamination encountered on the subject site.

opinion.

Estimated Extent of Free Product Contamination

The potential for a mechanism and a source for offsite contamination of the subject site in the vicinity of the former UST's has been established.

Based a synthesis of the available information, the following estimate of free undissolved petroleum product (plume) is made. The plume extends from the former subject site UST's approximately 30 feet to the east towards Bay Street. The plume is limited in this direction due to a steeper westerly gradient and infrequent tidal flow reversals extending this far.

conclusions

The northern extent of the plume is unknown. Based on the quantity of product flowing from the northern sidewalls, the contamination is limited and probably extends from about 10 to 20 feet from the subject UST excavation.

The westerly extent of the plume is located at a northwesterly orientated line located through the middle of the excavation.

The southern extent of the plume is discontinuous toward the Garrett Freight Lines former UST installation. Pockets of contamination are still be present but the majority of contamination is diffusing and being flushed out.

A finger of gasoline contamination is indicated at ES Boring No. 8. The contamination is not present in monitoring well MW-5 about 50 feet further west or in Boring No. 4 on the subject site.

Following this portion of the report are Appendices A through D. The excerpts and comments developed in the Appendices include many details not included in this portion of the report.

The literature study was performed in part for the following reasons:

1) Establishes regional historical site development and industrial practices.

2) Similar physical and geohydrological settings allowing comparisons.

3) Similar types and modes of contamination.

4) Establishes extent of regional contamination.

APPENDIX A

6601 AND 6603 BAY STREET

EXCERPTS AND COMMENTS ON STUDY AREA REFERENCES

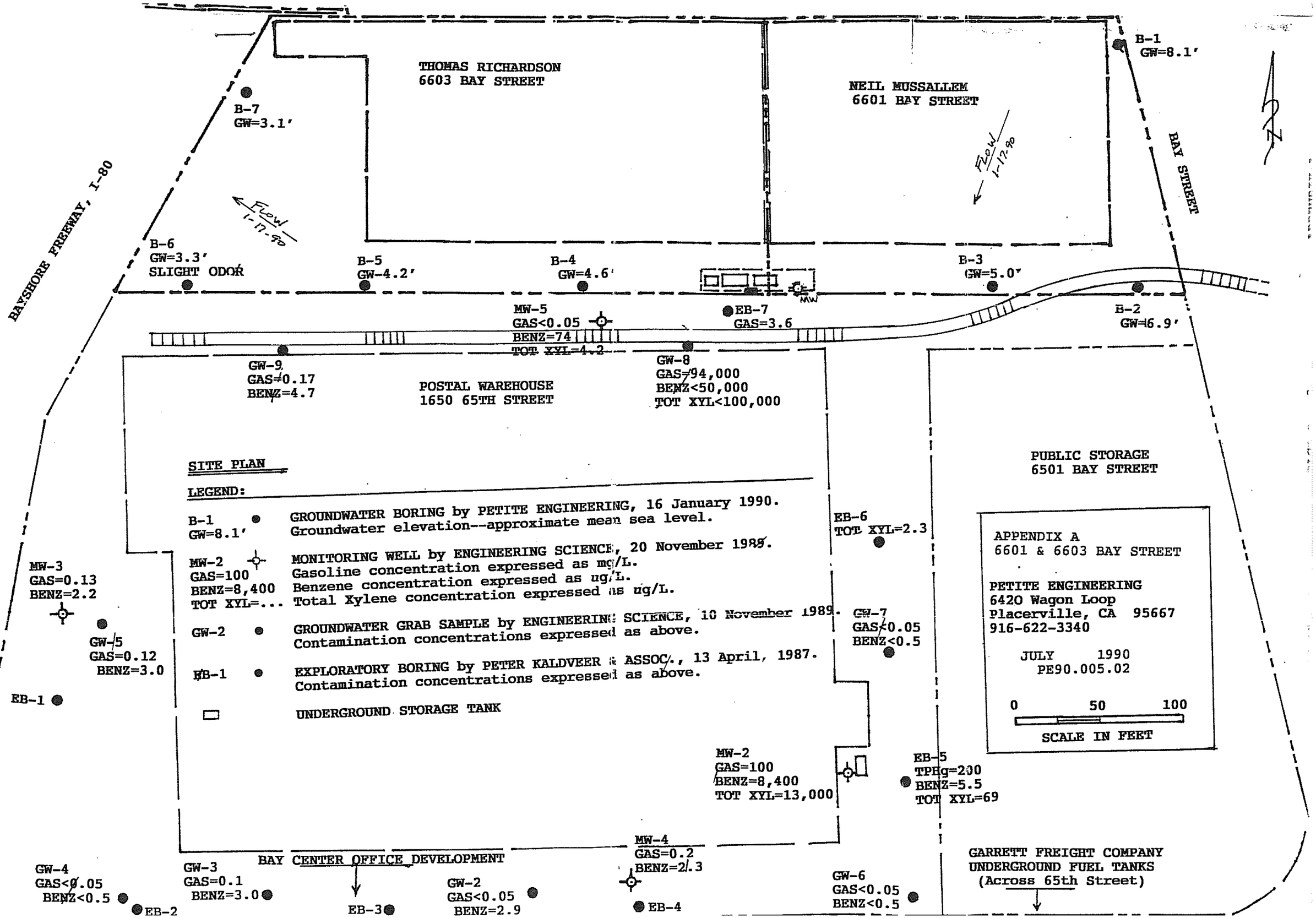
STUDY AREA MAP

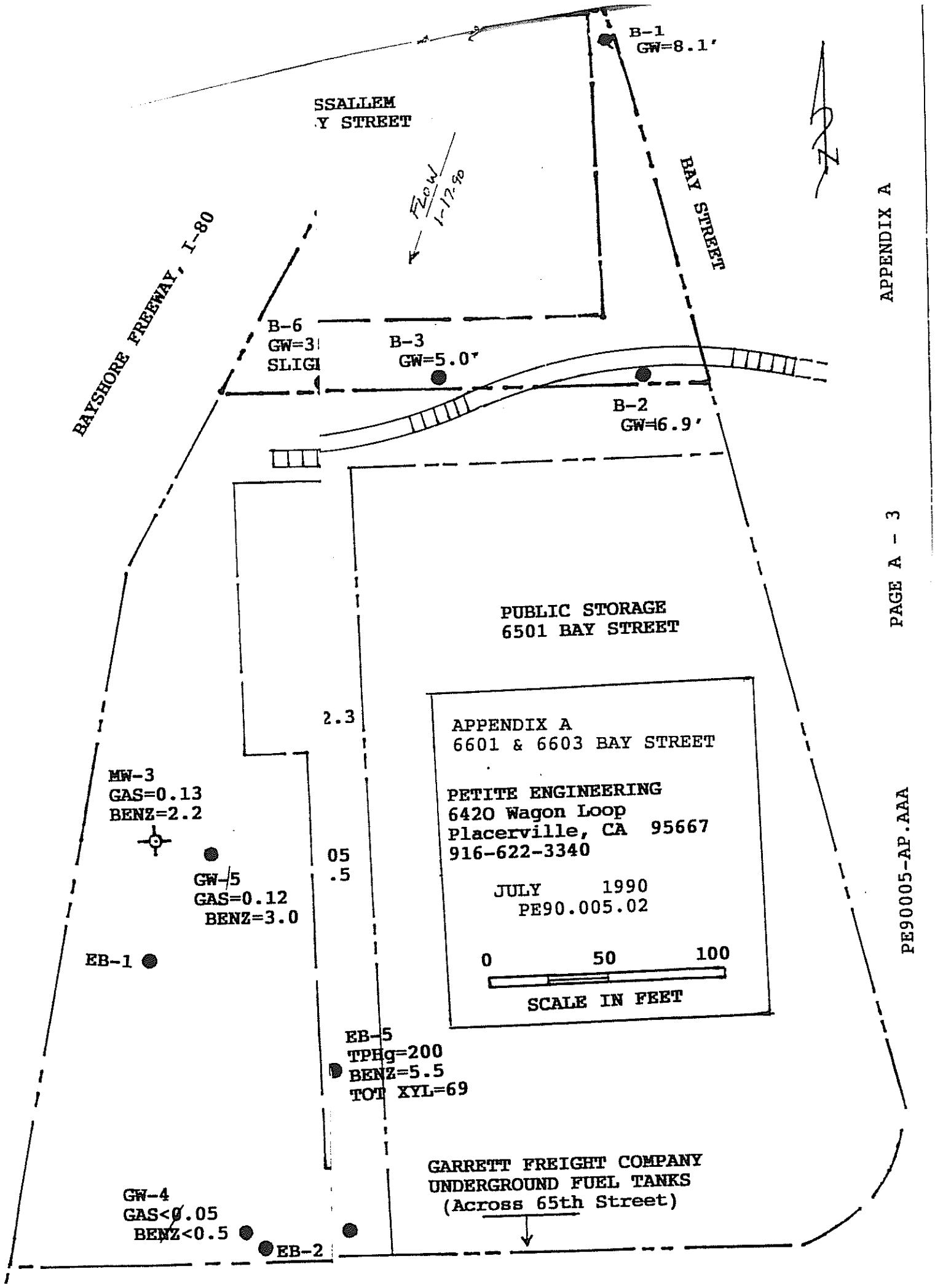
APPENDIX A
6601 & 6603 Bay St.

APPENDIX B
Postal Service
1650 65th St.

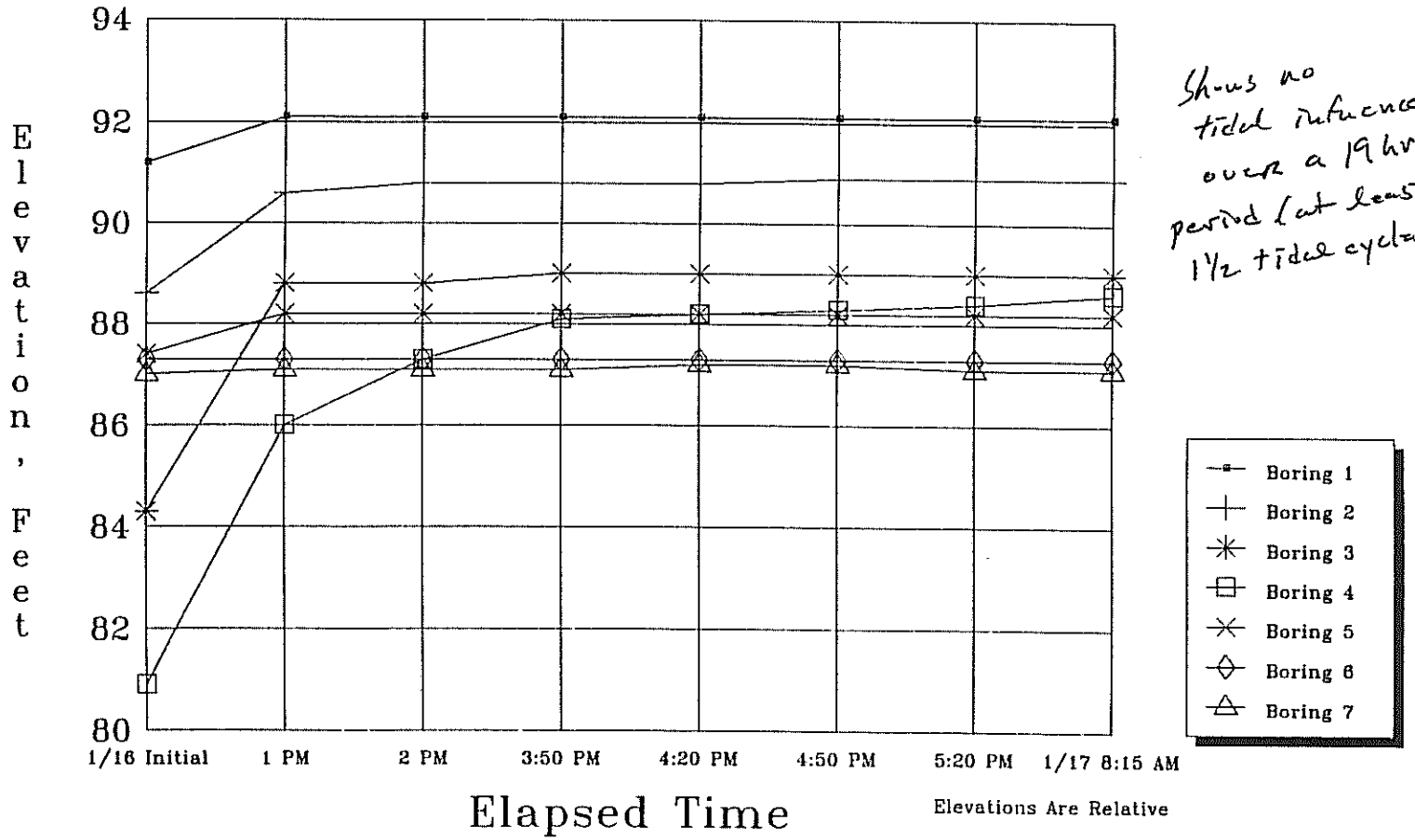
APPENDIX C
Garrett Truck Lines
Bay Center Site

APPENDIX D
Nielsen Freight Lines
Marketplace Site


THOMAS RICHARDSON
6603 BAY STREET
NEIL MUSSALLEM
6601 BAY STREET
BAYSHORE FREEWAY, I-80
BAY STREET
B-1
GW=8.1'
B-7
GW=3.1'
Flow
1-17-90
B-6
GW=3.3'
SLIGHT ODOR
B-5
GW-4.2'
B-4
GW=4.6'
B-3
GW=5.0'
MW
MW-5
GAS<0.05
BENZ=74
TOT XYL=4.2
EB-7
GAS=3.6
B-2
GW=6.9'
GW-9
GAS=0.17
BENZ=4.7
POSTAL WAREHOUSE
1650 65TH STREET
GW-8
GAS=94,000
BENZ<50,000
TOT XYL<100,000
PUBLIC STORAGE
6501 BAY STREET
SITE PLAN
LEGEND:
B-1 GW=8.1' GROUNDWATER BORING by PETITE ENGINEERING, 16 January 1990. Groundwater elevation--approximate mean sea level.
MW-2 GAS=100 BENZ=8,400 TOT XYL=... MONITORING WELL by ENGINEERING SCIENCE, 20 November 1989. Gasoline concentration expressed as mg/L. Benzene concentration expressed as ug/L. Total Xylene concentration expressed as ug/L.
GW-2 GROUNDWATER GRAB SAMPLE by ENGINEERING SCIENCE, 10 November 1989. Contamination concentrations expressed as above.
EB-1 EXPLORATORY BORING by PETER KALDVEER & ASSOC., 13 April, 1987. Contamination concentrations expressed as above.
UNDERGROUND STORAGE TANK
EB-6
TOT XYL=2.3
GW-7
GAS<0.05
BENZ<0.5
APPENDIX A
6601 & 6603 BAY STREET
PETITE ENGINEERING
6420 Wagon Loop
Placerville, CA 95667
916-622-3340
JULY 1990
PE90.005.02
0 50 100
SCALE IN FEET
MW-3
GAS=0.13
BENZ=2.2
GW-5
GAS=0.12
BENZ=3.0
EB-1
MW-2
GAS=100
BENZ=8,400
TOT XYL=13,000
EB-5
TPHg=200
BENZ=5.5
TOT XYL=69
BAY CENTER OFFICE DEVELOPMENT
MW-4
GAS=0.2
BENZ=2.3
GW-4
GAS<0.05
BENZ<0.5
EB-2
GW-3
GAS=0.1
BENZ=3.0
EB-3
GW-2
GAS<0.05
BENZ=2.9
EB-4
GW-6
GAS<0.05
BENZ<0.5
GARRETT FREIGHT COMPANY
UNDERGROUND FUEL TANKS
(Across 65th Street)


B-1
GW=8.1'
SSALLEM
Y STREET
Flow
1-12-90
BAY STREET
BAYSHORE FREEWAY, I-80
B-6
GW=3
SLIGI
B-3
GW=5.0'
B-2
GW=6.9'
PUBLIC STORAGE
6501 BAY STREET
APPENDIX A
6601 & 6603 BAY STREET
PETITE ENGINEERING
6420 Wagon Loop
Placerville, CA 95667
916-622-3340
JULY 1990
PE90.005.02
0 50 100
SCALE IN FEET
2.3
MW-3
GAS=0.13
BENZ=2.2
05
.5
GW-5
GAS=0.12
BENZ=3.0
EB-1
EB-5
TPHg=200
BENZ=5.5
TOT XYL=69
GARRETT FREIGHT COMPANY
UNDERGROUND FUEL TANKS
(Across 65th Street)
GW-4
GAS<0.05
BENZ<0.5
EB-2
APPENDIX A
PAGE A - 3
PE90005-AP.AAA

Water Table Elevation
Stabilization Curve



Shows no tidal influence over a 19 hr. period (at least 1½ tidal cycles)

Elevations Are Relative

January 17 and 18, 1990

LOGGED BY: D. Larry Petite, PE **DATE:** Jan. 16, 1990 **AUGER SIZE:** 6" **BORING NO.** 1

Blows per 1/2 Foot	Sample No.	USCS	Depth, feet	Soil Description
		GM	0	2.5" asphaltic pavement over olive green sandy GRAVEL, wet, dense, fill.
			1	Black (5Y 2.5/1 Munsell), slightly sandy gravelly CLAY, wet, firm with concrete rubble, fill.
		CL	2	
			3	
			4	
			5	Slabs of concrete.
			6	
				Stabilized Water Table at 6.63'.
			7	
				Concrete rubble.
			8	
			9	Wood piling.
			10	
			11	
			12	
			13	
			14	TERMINATE BORING NO. 1 AT 13.5 FEET. No Hydrocarbon Odor.
			15	Note: The soil lithology has been interpreted from drill cuttings.
			16	
			17	
			18	
			19	
			20	

LOGGED BY: D. Larry Petite, PE **DATE:** Jan. 16, 1990 **AUGER SIZE:** 6" **BORING NO.** 2

Blows per 1/2 Foot	Sample No.	USCS	Depth, feet	Soil Description
		GP	0	Yellow brown sandy GRAVEL as aggregate road base, damp, dense, fill.
		o0o0	1	
		CL	2	Black slightly sandy silty CLAY, moist, soft to slightly stiff, fill.
		////	3	
		♦♦♦♦	4	Brick fragments.
		/♦/♦	5	
		////	6	
		▾▾▾▾		Stabilized Water Table at 6.67'.
		////	7	
		////	8	Wet.
		////	9	
		////	10	
		////	11	
		////	12	
		////	13	
			14	TERMINATE BORING NO. 2 AT 13.5 FEET. No Hydrocarbon Odor.
			15	Note: The soil lithology has been interpreted from drill cuttings.
			16	
			17	
			18	
			19	
			20	

LOGGED BY: D. Larry Petite, PE **DATE:** Jan. 16, 1990 **AUGER SIZE:** 6" **BORING NO.** 3

Blows per 1/2 Foot	Sample No.	USCS	Depth, feet	Soil Description
		GP	0	4" concrete slab over yellow brown sandy GRAVEL, damp, dense, fill.
		CL	2	Black slightly sandy CLAY, damp, slightly stiff, fill.
			3	Wood fibers.
			4	
			5	More silty and gravelly.
			6	
			7	Brick fragments. Stabilized Water Table at 7.60'.
			8	
			9	
			10	
			11	Wet.
			12	
			13	
			14	TERMINATE BORING NO. 3 AT 13.5 FEET. No Hydrocarbon Odor.
			15	Note: The soil lithology has been interpreted from drill cuttings.
			16	
			17	
			18	
			19	
			20	

LOGGED BY: D. Larry Petite, PE **DATE:** Jan. 16, 1990 **AUGER SIZE:** 6" **BORING NO.** 4

Blows per 1/2 Foot	Sample No.	USCS	Depth, feet	Soil Description
		GP	0	5" concrete over yellow brown sandy GRAVEL, damp, dense, fill.
		CL	1	Black slightly sandy CLAY, damp, stiff, fill.
			2	
			3	
			4	
			5	
			6	Gravel size Concrete Fragments.
			7	Brick fragments. Wet. Stabilized Water Table at 7.52'.
			8	
			9	
			10	
			11	
			12	Concrete and Brick rubble.
			13	
			14	
			15	
			16	
			17	TERMINATE BORING NO. 4 AT 15.8 FEET. No Hydrocarbon Odor.
			18	Note: The soil lithology has been interpreted from drill cuttings.
			19	
			20	

LOGGED BY: D. Larry Petite, PE **DATE:** Jan. 16, 1990 **AUGER SIZE:** 6" **BORING NO.** 5

Blows per 1/2 Foot	Sample No.	USCS	Depth, feet	Soil Description
		GP	0	5" concrete pavement over yellow brown sandy GRAVEL, damp,
		GP		dense, fill.
		GP	1	
		CL		Black sandy CLAY, damp, stiff, concrete rubble to 6" size,
		CL	2	fill.
		CL		
		CL	3	
		CL		
		CL	4	Brick rubble.
		CL		
		CL	5	
		CL		
		CL	6	Wood, brick, wet, with perched water dribbling into boring
		CL		from west side.
		CL	7	
		CL		Stabilized Water Table at 7.70'.
		CL	8	Less debris.
		CL		
		CL	9	
		CL		
		CL	10	
		CL		
		CL	11	Wood, brick, metal, wire rubble in clay matrix.
		CL		
		CL	12	
		CL		
		CL	13	
			14	TERMINATE BORING NO. 5 AT 13.5 FEET.
			15	Note: The soil lithology has been interpreted from
				drill cuttings.
			16	
			17	
			18	
			19	
			20	

LOGGED BY: D. Larry Petite, PE **DATE:** Jan. 16, 1990 **AUGER SIZE:** 6" **BORING NO.** 6

Blows per 1/2 Foot	Sample No.	USCS	Depth, feet	Soil Description
		GP	0	1" asphalt over yellow brown sandy GRAVEL, moist, dense, fill.
		SP	1	Yellow brown SAND, moist, medium dense, fill.
		ML	2	Black sandy SILT, moist, medium dense, fill with occasional wood and bricks.
		CL	6	Black sandy silty CLAY, wet, soft, fill with wood debris.
			8	Stabilized Water Table at 8.50' with perched water dribbling into boring at about 8.2' depth from the east side.
			13	Metal carriage bolts, bricks, wood, debris. Slight hydrocarbon odor.
			16	TERMINATE BORING NO. 6 AT 15.5 FEET.
			17	Note: The soil lithology is based on interpretation from drill cuttings.

LOGGED BY: D. Larry Petite, PE **DATE:** Jan. 16, 1990 **AUGER SIZE:** 6" **BORING NO.** 6

Blows per 1/2 Foot	Sample No.	USCS	Depth, feet	Soil Description
		GP	0	1" asphalt over yellow brown sandy GRAVEL, moist, dense, fill.
		SP	1	Yellow brown SAND, moist, medium dense, fill.
		ML	2	Black sandy SILT, moist, medium dense, fill with occasional wood and bricks.
		CL	6	Black sandy silty CLAY, wet, soft, fill with wood debris.
			8	Stabilized Water Table at 8.50' with perched water dribbling into boring at about 8.2' depth from the east side.
			12	Metal carriage bolts, bricks, wood, debris. Slight hydrocarbon odor.
			15	TERMINATE BORING NO. 6 AT 15.5 FEET.
			16	Note: The soil lithology is based on interpretation from drill cuttings.

LOGGED BY: D. Larry Petite, PE **DATE:** Jan. 16, 1990 **AUGER SIZE:** 6" **BORING NO.** 7

Blows per 1/2 Foot	Sample No.	USCS	Depth, feet	Soil Description
		GP	0	5" concrete over yellow brown sandy GRAVEL, damp, medium dense, fill.
		SM	3	Gray to Black silty gravelly SAND, damp, medium dense, fill with rubble.
			5	Wire, brick, glass.
		CL	7	Black sandy CLAY, moist, shiny, soft, fill with rubble.
			8	Stabilized Water Table at 8.65'.
			10	Large amounts of glass, wire, brick rubble.
			11	Wet, black shiny goo. No odor.
			13	TERMINATE BORING NO. 7 AT 13.5 FEET. No Hydrocarbon Odor.
			15	Note: Soil lithology based on interpretation from drill cuttings.

Reference No. A-1

UNDERGROUND TANK REMOVAL & 6601 BAY STREET

EMERYVILLE, CA

DATE: September 5, 1989

TO: Dennis Byrne
Division of Hazardous Materials
Dept. of Environmental Health
80 Swan Way, Room 200
Oakland, CA 94621

BY: William Dubovksy
10170 Peninsula Avenue
Cupertino, CA 95014

EXCERPTS AND COMMENTS:

EXCERPT: "Here is the closure report required before beginning the site closure and remediation for the underground tank removal project at 6601 Bay St., Emeryville.

Once the soil samples were taken, they were wrapped in foil and placed in an ice chest (with blue ice) for transportation to Anametrix Inc. Report #8908195--analyzation attached.

After the tank was extracted the presence of fuel was observed, removed and disposed of as hazardous waste. The site was then further excavated on all four sides stockpiling soil pending analyzation.

Over the course of two weeks the site was monitored for floating product and removed by an approved hazardous waste hauler--manifest attached. Due to the placement of the tank (approximately 75% on adjoining property) and lack of information, ownership of the tank is in question.

Further excavation of tank backfill material is not possible due to the placement of the two fuel tanks located at 6603 Bay St., Emeryville.

Over the course of the next few weeks, the site will be closed off by a 6' chain link fence and the ground water will be

monitored for floating product. If floating product is encountered, it will be removed by an approved hazardous waste hauler and disposed of at an approved TSDF "Treatment, Storage and Disposal Facility."

An exemption status has been given by Bay Area Air Quality Management for soil aeration as the contaminant in the soil is diesel which carries an exemption from Article 8 rule 40 and addresses soil aeration.

Once the contaminant levels have been brought down to acceptable levels and floating product has been eliminated, ground and water sampling will be done to determine if we can begin the backfill of the pit and site restoration. Copies of the sampling report, chain of custody and analyzation have been sent to:

Tom Callaghan
Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street Rm. 6040
Oakland, CA 94607

Inspector George Warren
City of Emeryville
6303 Hollis Street
Emeryville, CA 94608

Any available information, guidelines or suggestions your agency might have would be greatly appreciated." (Pages 1 and 2 of cover letter)

COMMENT: *The presence of fuel was observed during the tank pull. Based on Photographic Documentation included in the report and discussions with William Dubovsky, the fuel was pure product. It appeared to be aged oily diesel fuel--black to brown in color but with too low a viscosity for oil. The product was encountered during excavation along the side of the UST near the southeast corner at a depth of about 8 to 9 feet. Excavation continued at this location to a depth of about 12.5 feet. While the excavation was in progress, the hazardous waste truck (H & H Ship Service Company) was completing the removal of rinsate from the UST. Prior to the actual removal of the UST, the hazardous waste truck vacuumed out this pure product from the small pit at the southeast corner of the UST.*

After the UST was removed, a small quantity of product remained in the small pit. However, no product was observed under the tank.

The hazardous waste truck was asked to remain on site while the small pit was deepened to about a 13.0 foot depth. The remaining product was removed at this time. Very little additional product appeared during the deepening of the small pit although a slight seepage of groundwater begin to show. The remainder of the pit was deepened to about a 12.5 foot depth. Soil samples (Tank 1-E and Tank 1-W) were obtained from the bottom of the excavation at this time. Very little product or groundwater flowed into the small pit during the remainder of the day. The groundwater level was not breached during the initial excavation of the pit.

SUMMARY OF ACTIVITIES

6601 BAY STREET, EMERYVILLE

TANK REMOVAL: The 6,000 gallon UST located 25 percent on 6601 and 75 percent 6603 Bay Street last containing diesel was removed on August 23.

INITIAL PRODUCT REMOVAL: About 350 gallons of black oily diesel product was removed during the tank extraction on August 23. The majority of this contamination flowed from the south wall just below brick rubble at a depth of about 7 - 8 feet.

PRODUCT REMOVAL: About 500 gallons of black oily diesel product was removed on August 25. The majority of this contamination flowed from the south wall as noted above and the northwest corner from below a concrete slab and brick rubble in debris near the end of an existing UST at a depth of about 7 - 8 feet.

PRODUCT REMOVAL: About 400 gallons of black oily diesel product was removed on August 28.

PRODUCT REMOVAL and FURTHER SOIL EXCAVATION: About 800 gallons of black oily diesel product and groundwater was removed on August 31. The floating product is thinning. The product is flowing from the west end of the pit. The bottom of the pit was further excavated to reduce potential soil contamination to about a 15 - 16 foot depth into gray-green sand. The ground-water rose to a depth about 13 to 14 feet with at least six inches of floating product. The product flowed from the south wall and the western portion of the north wall.

PRODUCT REMOVAL: About 1,600 gallons of floating product and groundwater was removed on September 5. Flow of product into excavation is slowing down. The groundwater level is rising.

PRODUCT REMOVAL and SOIL/GROUNDWATER SAMPLING: About 1,300 gallons of floating product and groundwater was removed on September 12. Also at this time, soil and groundwater samples were obtained for the analysis: TPH as diesel and BTEX--Aromatic Volatile Hydrocarbons.

RISE IN GROUNDWATER LEVEL: On September 17 and 18, limited rainfall runnoff/infiltration raised the groundwater level in the pit to about 7.5 feet. This is the groundwater level observed in the soil borings located each side (east and west) of the excavation on January 16 and 17, 1990. The level of water in the excavation on January 16, 1990 was about six inches from the top. The level of water in the excavation was about twelve inches from the top on February 7, 1990. The inflow of rainfall runoff and the fluctuating water levels precluded reliable conformational soil testing.

BACKFILL OF EXCAVATION: On February 23, 1990; the excavation was pumped of water prior to backfill. Very little product (less than 0.5 gallons) flowed into the excavation during pumping. The product that did flow in came from the locations noted previously and was either a dark brown (primarily diesel and gasoline) or black and shiny (primarily oil).

PERMITS

COMMENT: *An Underground Tank Closure/Modification Plan was submitted to the Alameda County Health Care Services Agency, Department of Environmental Health, Hazardous Materials Division on August 18, 1989. The assigned Project Number is #U552858.*

Application For Permit to Operate, Maintain or Store (Remove UG diesel tank) was submitted to the Emeryville Fire Department on August 14, 1989.

A Bay Area Air Quality Management District Notification Form for Removal of Tank and Excavation of Contaminated Soil was submitted estimating tank removal on August 21 and Soil Excavation on August 23, 1989.

A Site Safety Plan/Underground Tank Removal @ 6601 Bay St., Emeryville, CA, dated August 15, 1989 was submitted to the County of Alameda, Department of Environmental Health, Hazardous Materials Division.

CONCRETE DEMOLITION

EXCERPT: "Prior to demolition of the fueling station, all electrical power was disconnected; wires pulled and cut.

The concrete slab--8" thick with 1/2" steel rebar and steel mesh warranted specialized equipment necessary for demolition. Once the concrete pad was demolished, the excavators were instructed to expose the plumbing for removal. All plumbing, vent lines and electrical conduit were removed. All plumbing was triple rinsed with water prior to disposal." (Photo-documentation: 9 color prints)

SITE SECURITY & SOIL STORAGE

EXCERPT: "Once demolition began, access to the excavation site was closed off by chain link fence. All soils from the excavation were placed on visqueen and secured by chain link fence--pending laboratory analysis." (Photodocumentation: 5 color prints)

TANK EXCAVATION & INSPECTION

EXCERPT: "The excavator was then instructed to dig to the base of the tank. Once the tank was uncovered, it was inspected for obvious signs of leaks then all risers and pumps were removed and openings plugged." (Photodocumentation: 5 color prints)

COMMENT: *The photodocumentation shows the presence of black shiny oily diesel product at the southeast corner of the tank. The surface of the pure product is covered with globs of sludge. The appearance of this product is identical to that in Reference No. B-4; "Photo 5. Sludge on Top of Water in Pit". This reference may be found in this report in Appendix B, starting on Page B-27.*

TANK EXTRACTION PREPARATION

EXCERPT: "Inspector George Warren, from the City of Emeryville Fire Department, was on site to approve the L.E.L. Once found acceptable, authorization was given to extract the tank for disposal.

Prior to the tank extraction, the tank was rinsed with approximately 650 gallons of water. The solution was then vacuumed by a California Hazardous Waste hauler, manifested and taken to approved "Treatment, Storage and Disposal facility--Manifests Attached.

To displace the oxygen approximately 120 lbs. of dry ice were placed two hours prior to extraction--Receipt Attached." (Photodocumentation: 6 color prints)

COMMENT: *Based on the photographs, product was flowing from the south excavation wall at a depth of about 8 to 9 feet. This product was vacuumed out down to a depth of about 12.5 feet prior to actually pulling the tank. When the tank was removed from the excavation, the product confined to the south wall area and the small pit excavated to about 13 feet in the southeast corner to collect the product for removal. No product was observed immediately after the tank removal directly under the tank. Analytical results of soil samples obtained directly under the tank do indicate 2,400 ppm TPH as diesel contamination but the soil was not saturated with product as observed at this same depth at the south wall.*

These pictures also reveal the presence of stratified fill at the tank excavation. At the south wall, the top eight inches of reinforced concrete pavement is underlain by green to yellow brown sandy silt with brick, cobbles and wood debris.

At a depth of 2.7 feet, a 2 to 4-inch thick continuous layer of concrete or asphalt is present. Underlying this surface is red/gray/black fill material consisting of small sized debris in silty clayey matrix.

Rubble fill

At a depth of four feet, a layer of bricks, timbers and trash are present within a silty matrix exhibiting small to medium root structures that appear to have grown in-place. It is possible that finish grade was at a depth of four feet for a long enough time period that vegetation such as brush had time to establish.

At a depth of five feet a pocket of crushed brick fragments occurs. Also, a massive vertically orientated complex of large concrete slabs extends from a depth of 3 to 7.5 feet east of the dispenser island.

Another horizontal concrete rubble slab(s) appears at a depth of about 8 feet. Most free product appeared from under this concrete rubble.

TANK EXTRACTION

EXCERPT: "Once the tank was extracted, it was inspected further for pitting and holes. After inspection the tank was placed on a California certified hazardous waste hauler vehicle, manifested and sent to an approved "Treatment, Storage and Disposal" facility--Manifest Attached.

All product that found below the tank was removed by a California certified hazardous waste hauler and sent to an

approved "Treatment, Storage and Disposal" facility--Manifest Attached." (Photodocumentation: 6 color prints)

COMMENT: Following the photodocumentation is a tank pressurization test meeting the NFPA Publication #329 requirements. The test was conducted by Petro Tech of Santa Rosa, California using a Horner 'Ezy Chek' leak detection system on February 4, 1989. The tank system and product line passed at -0.0453 gallons per hour which is below the accuracy tolerance of this test of 0.05 gallons per hour. ~~1989. The tank~~ ≈ 350 gal./yr.

Based on the tank pressure test and the lack of corrosion on the tar coated steel tank as documented in the photographs, no tank or product line leakage has occurred. maybe

SOLUTION & TANK DISPOSAL MANIFESTS

DRY ICE RECEIPTS

COMMENT: *A review of the manifests indicates that a total of 1,000 gallons of tank rinsate and product were removed by the vacuum truck from the site. As stated previously in the report, the volume of rinsate was about 650 gallons. This indicates that about 350 gallons of product was removed from the excavation.*

SAMPLING REPORT

CHAIN OF CUSTODY

LABORATORY ANALYSIS

EXCERPT: "Soil sampling was directed by inspector George Warren of the City of Emeryville Fire Department.

Samples were then logged, placed in an ice chest with blue ice, a chain of custody was maintained and soil samples were transported to a California certified hazardous waste laboratory for analyzation for TPHd--EPA Method #3510 or #3550. All testing procedures follow California Department of Health Services approved methods--Chain of custody and analysis attached."

COMMENT: *The sample results for all analytical testing on 6601 and 6603 Bay Street are tabulated in Table A-1. The tanks are numbered 1 through 3 from east to west--i.e. 25 percent of Tank 1 is on the 6601 Bay Street property and Tanks 2 and 3 are located farther west on the 6603 Bay Street property.*

Both soil samples indicated 2,400 ppm TPH as diesel at a depth of 12.5 feet under the east and west ends of the tank. The aromatic volatile organics "BTEX" were non-detect at a reporting limit of 2,000 ppm. This reporting limit is too high to characterize these constituents. Since 2,400 ppm exceeds the maximum allowable regulatory limit of 1,000 ppm for soil to be left in-place, the tank removal pit was further excavated to natural sand at a depth of 15 to 16 feet on August 31, 1989. The excavated soil was stockpiled, spread and aerated on-site in conformance with Regulation 8, Rule 40 of the Bay Area Air Quality Management District.

SITE CLEANUP AND INVESTIGATION

EXCERPT: "On August 25 the site was inspected for the presence of groundwater. Approximately 500 gallons of fuel was found and removed by an approved California hazardous waste hauler, manifested and taken to approved "Treatment, Storage and Disposal" facility--Manifest Attached." (Photodocumentation: 3 color prints)

COMMENT: *Four distinct colors of the silty sand shading around the tank is indicated in the pictures. Clean backfill soil is a light gray or brown--almost white with the glare in the photographs. Diesel and/or gasoline contaminated soil or partially dissolved product is dark brown. Soil with old contamination or previously saturated with product but currently devoid of free product is gray. Oil with diesel and gasoline is shiny black.*

The black oil and aged diesel/gasoline comprises almost all of the free product. It flows from distinct locations from the sides of the excavation on the south wall and walls at the northwest corner of the excavation. The shiny black product is noted as generally flowing from under the concrete rubble slab at a depth of about 8 feet.

The gray colored backfill soil is present below and above the concrete slab level and is the predominant color below a depth of about 6 feet. The light gray or brown color extends from the surface to a depth of 6 feet. The top of the tanks are at a depth of 4 feet.

The dark brown diesel and gasoline product is limited to primarily above the concrete slab ruble and covers the groundwater with a sheen even after the black oil has been suctioned off. Even though the black oil masks the presence of the dark brown color diesel and gasoline, these appear to intermixed and directly associated with the oil as indicated by analytical results.

The black hydrocarbon product is not floating directly on the groundwater during August 1989. Although the ground is moist to saturated, the actual groundwater table was not breached until further excavation deepened the pit to about 15 to 16 feet.

The black hydrocarbon product does seem to be associated with rubble pockets or semi-confining concrete rubble slabs, especially those located near the seasonal high groundwater level of about 7.5 to 8 feet.

EXCERPT: "On August 28 the site was inspected for the presence of more floating product or groundwater, approximately 400 gallons of solution was found and removed by an approved California hazardous waste hauler, manifested and taken to an approved "Treatment, Storage and Disposal" facility--Manifest Attached.

On August 31 the site was inspected for the presence of more floating product or groundwater, approximately 800 gallons were removed by an approved California hazardous waste hauler, manifested and taken to an approved "Treatment, Storage and Disposal" facility--Manifest Attached. Excavation site was further dug and soil stockpiled pending action to be taken at 6603 Bay Street." (Photodocumentation: 3 color prints)

COMMENT: *Between the time of the tank removal on August 23 and the further excavation of the pit on August 31, about 1,200 to 1,600 gallons of pure product was removed. After breaching the groundwater during further excavation on August 31, an additional total of 2,900 gallons of product and groundwater was removed on September 5 and 12. Based on the condition of the tank and product lines and the fuel system pressure test, it is improbable that nearly 2,000 gallons of petroleum product originated from this UST. It is further noted that the highest concentration of petroleum contamination is present as Oil and Grease (3,400 ppm per Standard Method 503E) of which no known historical use or storage has occurred on the 6601 or 6603 Bay Street properties.*

TOG overlaps diesel

It is known that the 1650 65th Street property historically contained waste oil. During further excavation of soil under the tank, black sludge and a green-brown oily sheen was noted on the groundwater.

Also, the Garrett Freight Lines operation on 65th Street had extensive maintenance facilities with three oil and/or waste oil tanks totaling 11,000 gallons. The fuel storage on this site consisted of 68,000 gallons of diesel and 6,000 gallons of

gasoline. During the tank removals, 1/2-inch thick product was found floating on the groundwater at both the fuel and oil UST removal excavations.

Both of these sites exhibited soil contamination levels nearly double that found at the 6601 and 6603 Bay Street UST removal excavation.

Table A-1: Summary of Analytical Results, shows all soil and groundwater analytical testing for the 6601 and 6603 Bay Street UST removal site. This table is found on the following page.

TABLE A-1

SUMMARY OF ANALYTICAL RESULTS

SOIL IN PPM AND WATER IN PPB
6601 AND 6603 BAY STREET, EMERYVILLE

SAMPLE I.D./ DATE	SAMPLE LOCATION	SAMPLE DEPTH, FT	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	TPH as DIESEL	TPH as GASOLINE	OIL & GREASE
#1 8/23/89	Tank 1-E Bottom	12.5 Soil	ND < 2 ppm	ND < 2	ND < 2	ND < 2	2,400 ppm	n/a	n/a
#2 8/23/89	Tank 1-W Bottom	12.5 Soil	ND < 2 ppm	ND < 2	ND < 2	ND < 2	2,400 ppm	n/a	n/a
Tank Pit 9/12/89	Tank 1 Pit	13 Water	8 ppb	ND < 0.5	ND < 0.5	6	n/a	1,400 ppb	n/a
Tank Pit N. 9/12/89	Tank 1 N Wall @ E 1/4	7.5 Soil	ND < 0.02 ppm	ND < 0.02	ND < 0.02	ND < 0.02	1,400 ppm	n/a	na/
Tank Pit S. 9/12/89	Tank 1 E Wall @ Middle	7.5 Soil	ND < 0.02 ppm	ND < 0.02	ND < 0.02	ND < 0.02	1,500 ppm	n/a	n/a
Tank Pit E. 9/12/89	Tank 1 S Wall @ E 1/4	7.5 Soil	ND < 0.02 ppm	ND < 0.02	ND < 0.02	ND < 0.02	300 ppm	n/a	n/a
001 10/10/89	Tank 1 N Wall @ E 1/4	7.5 Soil	n/a	n/a	n/a	n/a	170 ppm	n/a	2,000 ppm
002 10/10/89	Tank 1 E Wall @ Middle	7.5 Soil	n/a	n/a	n/a	n/a	2,300 ppm	n/a	540 ppm
003 10/10/89	Tank 1 S Wall @ E 1/4	7.5 Soil	n/a	n/a	n/a	n/a	2,700 ppm	n/a	3,400 ppm
001 10/10/89	Tank 2 S Wall	7.5 Soil	0.180 ppm	0.007	ND <0.005	0.013	n/a	ND < 1 ppm	n/a
002 10/10/89	Tank 3 W Wall	7.5 Soil	0.640 ppm	ND <0.010	ND <0.010	21	n/a	2.5 ppm	n/a
003 10/10/89	Tank 2 N Wall	7.5 Soil	0.760 ppm	1.200	0.480	1.9	n/a	270 ppm	n/a
004 10/10/89	Tank 3 Pit	8 Water	400 ppb	180	38	290	n/a	6,300 ppb	n/a
#1 01/25/90	Tank 2 Pit	4 Water	ND < 5	ND < 5	ND < 5	ND < 5	520 ppb	n/a	n/a

ANALYTICAL TESTING METHODS:

BTEX: Modified Method 8020
TPH as Diesel: GCFID following either EPA Method 3510 or 3550
TPH as Gasoline: GCFID following EPA Method 3550
Oil and Grease: Standard Method 503E

Reference No. A-2

UNDERGROUND TANK REMOVAL, 6603 BAY STREET

EMERYVILLE, CA

DATE: October 23, 1989

TO: Inspector Dennis Byrne
Alameda County Health Agency
80 Swan Way, Room 200
Oakland, CA 94621

BY: William Dubovsky
10170 Peninsula Avenue
Cupertino, CA 95014

EXCERPTS AND COMMENTS:

EXCERPT: "Here are copies of all information required by Alameda County for excavation and removal of the underground fuel storage tanks located at 6603 Bay Street, Emeryville.

This report has photo documentation, soil and groundwater analyzation, chain of custody, disposal manifests and dry ice receipts from the tank extraction. Assistant Fire Chief, Frank Alhino from the city of Emeryville was on site to approve the L.E.L and oxygen levels prior to extraction. Inspector Gil Wistar from the Alameda County Health Agency was on site directing soil and groundwater sampling, location and depth.

Once the samples were taken; they were wrapped in foil, placed in an ice chest (with blue ice) and a chain of custody was developed for transportation to Anametrix Inc. for analyzation.

Although the level of total gasoline hydrocarbons is below the backfill limits (1000 ppm), **the excavation site remains open due to the presence of floating diesel product believed to have come from an off site source.**

The excavation site and soil storage remains secured by a 6' chain link fence. Until the source of contamination can be located, the clean up phase cannot begin.

Copies of the chain of custody and laboratory analysis have been sent to:

Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6040
Oakland, CA 94607

Assistant Fire Chief Frank Alhino
City of Emeryville
6303 Hollis Street
Emeryville, CA 95608

Should you require further information during your investigation, please do not hesitate to contact me at the address or phone number shown on the previous page." (2-page cover letter)

COMMENT: *The removal of two UST's on 6603 Bay Street follows by seven weeks the removal of the 6,000 gallon UST located on 6601 and 6603 Bay Street. During this period, almost 2,000 gallons of floating oil, diesel and gasoline product has been pumped from the excavation pit.*

At the time of the 6603 Bay Street tank removals, the source of the product had not been determined. During this removal, the tank system and product lines were found to be in good condition. Tank and product line pressure tests performed in February of 1989 and December of 1989 passed. Based on the condition of the tanks, product lines, pressure tests, and the presence of oil contamination when no oil was stored or used onsite, it is improbable that 2,000 gallons of product originated from the tankage, product lines, or dispensers at 6601 and 6603 Bay Street.

SUMMARY OF ACTIVITIES

6603 BAY STREET, EMERYVILLE

TANK REMOVALS: The 7,500 and 2,000 gallon UST's last containing gasoline were removed on October 10, 1989. Floating product flowing from the southeast wall was removed by skimming. Three soil samples and one groundwater sample were taken under the direction of Inspector Gil Wistar from the Alameda County Health Agency.

AGENCY INTERFACE: On October 12, the verbal results of the soil and groundwater samples were discussed with Mr. Dennis Byrne of the Alameda County Health Agency. Mr. Byrne indicated that although

the sampling results were less then 1,000 ppm require additional soil removal, the pit should remain open due to amount of floating product from off site source.

SITE VISIT: On October 16 the groundwater in the pit was covered with floating product. The sidewalls were stained by with oil and grease or diesel hydrocarbons.

BACKFILL OF EXCAVATION: On February 23, 1990; the excavation was pumped of water prior to backfill. Very little product (less than 0.5 gallons) flowed into the excavation during pumping. The product that did flow in came from the locations noted previously and was either a dark brown (primarily diesel and gasoline) or black and shiny (primarily oil).

PERMITS

COMMENT: *An Underground Tank Closure/Modification Plan was submitted to the Alameda County Health Care Services Agency, Department of Environmental Health, Hazardous Materials Division on October 10, 1989. The assigned Project Number is #U552910.*

Application For Permit to Operate, Maintain or Store (Remove UG diesel tank) was submitted to the Emeryville Fire Department on October 3 14, 1989.

A Bay Area Air Quality Management District Notification Form for Removal of Tank and Excavation of Contaminated Soil was submitted estimating tank removal on October 9, 1989.

A Site Safety Plan/Underground Tank Removal @ 6601 Bay St., Emeryville, CA, dated October 2, 1989 was submitted to the County of Alameda, Department of Environmental Health, Hazardous Materials Division.

CONCRETE DEMOLITION

EXCERPT: "Prior to the demolition of the fueling island, all electrical power was disconnected; wires pulled and cut.

The concrete slab; 8" thick with 1/2" steel rebar and steel mesh, warranted specialized equipment necessary for demolition. Once the concrete pad was demolished, the excavator was instructed to expose the plumbing for removal. All plumbing, vent lines and electrical conduit were removed. All plumbing was triple rinsed with water prior to disposal." (Photo-documentation: 6 color prints)

COMMENT: *The surface of the concrete fuel island and concrete pavement over the UST's is clean and free from oil or fuel stains from drippage or spillage. The photo-documentation shows a gray colored soil with dark gray to black discolorations directly under the fuel island. This is in contrast to the light brown soil located directly over the tank. An initial impression would suggest significant contamination under the fuel island. However, upon closure inspection, the light brown soil is imported soil used as shading during the placement of the UST's. This soil is uniform in color and does not darken until a depth of about six to seven feet. On the opposite side of the excavation, the same dark gray to black coloration is noted, although not quite as extensive. Also, the concrete fuel island is underlain by a continuous concrete slab at a depth of about 2.5 feet. No apparent concentration of fuel products are observable at the edge of the old concrete slab and the light brown tank backfill as would be expected if a product leak had occurred.*

Based on the photo-documentation and the tank and manifold system pressure tests, no significant spillage or leakage of fuel occurred from the dispensers or product lines.

SITE SECURITY & SOIL STORAGE

EXCERPT: "Once demolition began, access to the excavation site was closed off by a chain link fence. All soils from the excavation were placed on visqueen and secured by a chain link fence--pending laboratory analysis." (Photo-documentation: 6 color prints)

TANK EXCAVATION & INSPECTION

EXCERPT: "The excavator was then instructed to dig to the base of each tank. Once uncovered, they were inspected for obvious signs of leakage then all risers were removed and openings were plugged.

Although both tanks appeared to be without leakage, seepage of floating product was observed entering the excavation site from the south wall along with groundwater." (Photo-documentation: 14 color prints.

COMMENT: *The photo-documentation reveals that no stains are present on the tanks or in adjacent soil at the location of the fill port riser or product line connections.*

TANK EXTRACTION PREPARATION

EXCERPT: "Prior to the tank extraction, each tank was rinsed with fresh water; approximately 250 gallons for the 2,000 gallon tank and approximately 500 gallons for the 7,500 gallon tank. This solution was then removed by a California hazardous waste hauler, manifested and taken along with the floating product which entered during the extraction process to an approved "Treatment, Storage and Disposal facility"--Manifest Attached.

To displace the oxygen and L.E.L., 75 lbs. of dry ice was placed in the 2,000 gallon tank and 175 lbs. was placed in the 7,500 gallon tank--Receipt Attached. Assistant Fire Chief, Frank Alhino from the City of Emeryville fire department, was on site to approve the L.E.L. and oxygen level of each tank. Once found acceptable, authorization was given to extract the tanks for disposal." (Photo-documentation: 9 color prints)

COMMENT: *Based on the photo-documentation, the surface of the groundwater located in the excavation from the removal of the former UST shows a 10 percent coverage of dark brown product. A moderate sheen covers the remainder of the dirty water. No black oil is observed although a black ring of deposited product is present evenly distributed around the excavation. The groundwater level is at about an eight-foot depth at this time. This is five feet higher then when undiluted product flowed into the excavation during the removal of the former UST.*

TANK EXTRACTION

EXCERPT: "As the tanks were extracted, they were further inspected for pitting and signs of leakage. None was observed. After inspection. both tanks were placed on a California certified hazardous waste hauler vehicle, manifested and sent to an approved "Treatment, Storage and Disposal facility" for disposal--Manifest Attached.

All product found below the tanks was removed by a California certified hazardous waste hauler and taken to an approved "Treatment, Storage and Disposal facility"--Manifest Attached." (Photo-documentation: 6 color prints)

COMMENT: *The photo-documentation shows the tanks in good condition with the tarpaper wrap intact except where scraped with the backhoe bucket.*

SOLUTION & TANK DISPOSAL MANIFESTS

DRY ICE RECEIPTS

COMMENT: *A review of the manifests indicates that a total of 2,400 gallons of tank rinsate and product contaminated groundwater. The quantity of product contaminated groundwater is estimated at 1,650 gallons.*

SAMPLING REPORT, CHAIN OF CUSTODY

LABORATORY ANALYSIS & FIRE INSPECTION REPORTS

EXCERPT: "Soil sampling was directed by inspector Gil Wistar of the Alameda County Health Agency.

All soil samples were logged and a chain of custody was constructed. All samples were placed in an ice chest (with blue ice) for transportation to a California certified laboratory for analyzation for TPH-g -- EPA Method 8015 {*GCFID after extraction by Method 5030*} and for BTX&E EPA Method 8020. All testing procedures followed California Department of Health Services approved methods -- Chain of custody and analysis attached."

COMMENT: *The sample results for all analytical testing on 6601 and 6603 Bay Street are tabulated in Table A-1. Table A-1 is included on the following page. The tanks are numbered 1 through 3 from east to west. The two tanks removed documented by this report are numbered 2 and 3.*

The analytical results for the three soil samples obtained from about six inches above groundwater level indicated non-detectable, 2.5 and 270 ppm of TPH as gasoline at the south wall near the middle of tank 2, the west end of the excavation, and the north wall near the middle of tank 2, respectively. These results are well below the 1,000 ppm limit for Total Petroleum Hydrocarbons (TPH) requiring additional soil removal. However, it is unknown what the diesel and oil contamination concentrations are. This interjects an uncertainty into the actual TPH concentration

The analytical results for the water sample indicate a concentration of 6,300 ppb TPH as gasoline. The water sample is representative of the total excavation for tanks 1 through 3.

TABLE A-1

SUMMARY OF ANALYTICAL RESULTS

SOIL IN PPM AND WATER IN PPB

6601 AND 6603 BAY STREET, EMERYVILLE

SAMPLE I.D./ DATE	SAMPLE LOCATION	SAMPLE DEPTH, FT	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	TPH as DIESEL	TPH as GASOLINE	OIL & GREASE
#1 8/23/89	Tank 1-E Bottom	12.5 Soil	ND < 2 ppm	ND < 2	ND < 2	ND < 2	2,400 ppm	n/a	n/a
#2 8/23/89	Tank 1-W Bottom	12.5 Soil	ND < 2 ppm	ND < 2	ND < 2	ND < 2	2,400 ppm	n/a	n/a
Tank Pit 9/12/89	Tank 1 Pit	13 Water	8 ppb	ND < 0.5	ND < 0.5	6	n/a	1,400 ppb	n/a
Tank Pit N. 9/12/89	Tank 1 N Wall @ E 1/4	7.5 Soil	ND < 0.02 ppm	ND < 0.02	ND < 0.02	ND < 0.02	1,400 ppm	n/a	na/
Tank Pit S. 9/12/89	Tank 1 E Wall @ Middle	7.5 Soil	ND < 0.02 ppm	ND < 0.02	ND < 0.02	ND < 0.02	1,500 ppm	n/a	n/a
Tank Pit E. 9/12/89	Tank 1 S Wall @ E 1/4	7.5 Soil	ND < 0.02 ppm	ND < 0.02	ND < 0.02	ND < 0.02	300 ppm	n/a	n/a
001 10/10/89	Tank 1 N Wall @ E 1/4	7.5 Soil	n/a	n/a	n/a	n/a	170 ppm	n/a	2,000 ppm
002 10/10/89	Tank 1 E Wall @ Middle	7.5 Soil	n/a	n/a	n/a	n/a	2,300 ppm	n/a	540 ppm
003 10/10/89	Tank 1 S Wall @ E 1/4	7.5 Soil	n/a	n/a	n/a	n/a	2,700 ppm	n/a	3,400 ppm
001 10/10/89	Tank 2 S Wall	7.5 Soil	0.180 ppm	0.007	ND <0.005	0.013	n/a	ND < 1 ppm	n/a
002 10/10/89	Tank 3 W Wall	7.5 Soil	0.640 ppm	ND <0.010	ND <0.010	21	n/a	2.5 ppm	n/a
003 10/10/89	Tank 2 N Wall	7.5 Soil	0.760 ppm	1.200	0.480	1.9	n/a	270 ppm	n/a
004 10/10/89	Tank 3 Pit	8 Water	400 ppb	180	38	290	n/a	6,300 ppb	n/a
#1 01/25/90	Tank 2 Pit	4 Water	ND < 5	ND < 5	ND < 5	ND < 5	520 ppb	n/a	n/a

ANALYTICAL TESTING METHODS:

BTEX: Modified Method 8020
TPH as Diesel: GCFID following either EPA Method 3510 or 3550
TPH as Gasoline: GCFID following EPA Method 3550
Oil and Grease: Standard Method 503E

EXCERPT: Alameda County, Department of Environmental Health, Hazardous Materials Inspection Form: Dated 10/10/89 for Leopard Trading at 6603 Bay Street, Emeryville.

"Two gasoline tanks removed from site; pit already open from the removal of a diesel tank at far end of pit (separate operator). Groundwater found at about 8'; **massive contamination present in pit, a brown scum floating on surface.** (A leak report has already been filed for site, according to Bill Dubovsky.)

Tanks are both covered with tar for corrosion protection--**difficult to determine visually if there are any leaks; no obvious holes, however.**

3 soil samples taken from sidewall of pit; 2 from the middle (each side) of large tank and 1 from end of small tank. All samples taken from a depth of 7.5 feet, the water level recorded in on-site monitoring well.

Contaminated water will be pumped into a tank truck then the pit will have a water sample collected.

Diesel pit will have confirmation soil samples taken (sidewalls). Analyzed for TPH-D, TOG." Signed by Gilbert M. Wistar.

COMMENT: *The Alameda County Hazardous Materials Inspector has characterized the contamination in the pit as massive. This is established by observing the presence of a brown scum floating on surface. Based on this characterization, the 1650 65th Street property, the Garrett Freightlines site, the Delta Freightlines site, the Nielsen Freight Company Site and the Marketplace site all exhibited massive contamination as recognized by floating petroleum product. This is pointed out to underscore the widespread nature of significant petroleum hydrocarbon contamination in the semi-confined basin bounded by the Southern Pacific Railroad and historic shoreline to the east and the Bayshore Freeway to the west.*

AVAILABLE TANK TESTING HISTORY

COMMENT: *Records for Underground Tank System Tests for the 2,000 gallon UST containing unleaded gasoline indicate that on December 28, 1987 the system had gain of 0.01 gallons per hour (passing) and on February 4, 1989 a loss of 0.01 gallons per hour (passing). The 7,500 gallon UST containing leaded gasoline indicated a loss of 0.04 gallons per hour (passing) on December 28, 1987.*

As with the diesel tank, the two gasoline tank and product line systems tests indicate leakage less than the testing apparatus accuracy tolerance of 0.05 gallons per hour. Based on these tests, if any leakage is present, it is less than 0.05 gallons per hour.

UNDERGROUND TANK USAGE, PERMIT & LICENSE

COMMENT: *An amended permit indicates that the 2,000 and 7,500 gallon UST's were manufactured by Perkins in 1973 and installed the same year. The tanks are 1/4 inch thick, of single walled construction, and carbon steel material. They are unlined on the interior and covered with tar on the exterior.*

Based on the installation date, the tanks have been underground for 16 years. Based on past experience, properly manufactured and installed tanks younger then 20 years are generally in good condition and leak free.

APPENDIX B

1650 65TH STREET
U. S. POSTAL SERVICE WAREHOUSE
EMERYVILLE, CALIFORNIA

STUDY AREA MAP

LIST OF REFERENCED REPORTS

STUDY AREA REPORTS

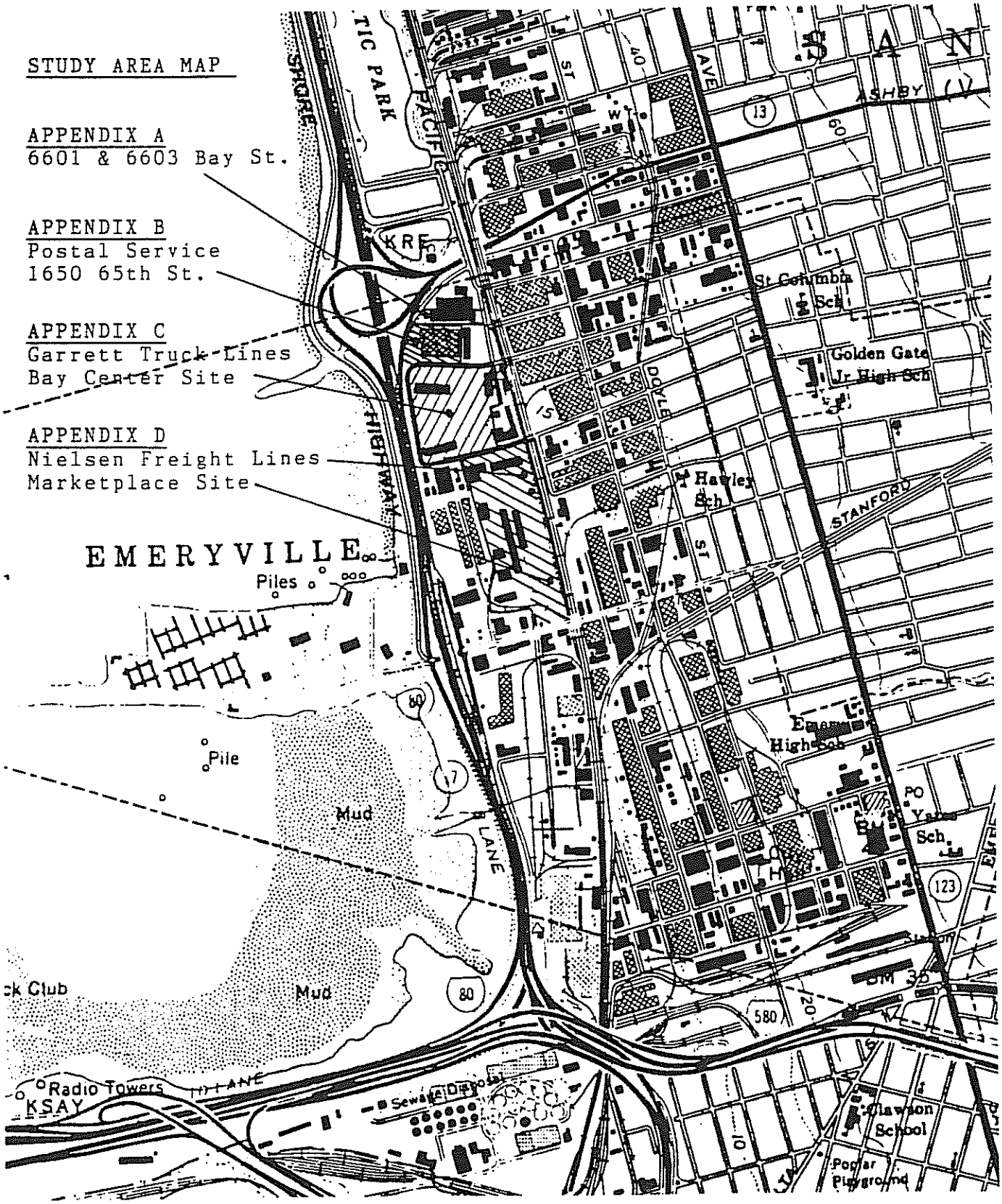
STUDY AREA MAP

APPENDIX A
6601 & 6603 Bay St.

APPENDIX B
Postal Service
1650 65th St.

APPENDIX C
Garrett Truck Lines
Bay Center Site

APPENDIX D
Nielsen Freight Lines
Marketplace Site



APPENDIX B

LIST OF REFERENCES

APPENDIX B

LIST OF REFERENCES

Continued

residual hazardous wastes in the subsurface soils and/or free groundwater." (Page 1)

A. Present Day - Site Description

"The site is roughly rectangular in shape, relatively flat and has maximum plan dimensions of approximately 400 by 600 feet. At the time of drilling, the site was occupied by a one level warehouse building with concrete tilt-up walls and dock-high concrete slab floors. At the northwest corner of the warehouse there was a second story office section covering an area of about 50 by 120 feet. Concrete aprons flanked the west and south sides fo the warehouse. The remaining areas east, south and west of the warehouse were covered with asphaltic concrete pavement. Along the northern end of the warehouse were the Southern Pacific railroad tracks. The remaining area north of the warehouse was covered with concrete slabs.

The neighboring structures around our site include **the Grove Valve and Regulator Company located to the east of our site along Bay Street.** This site contains a one-story concrete block warehouse building and exterior asphaltic concrete pavement. This building was formerly used by Saronia Sugar Company for storage. There were also several connected warehouses located to the north of our site. These warehouses were of similar concrete tilt-up construction type. A fuel pump island was located immediately north of the northern property line of the subject property. This fueling area has three underground fuel tanks. Based on our conversation with the real estate agent for this adjacent property, two of the fuel tanks currently contain unleaded gasoline and one contains diesel fuel. The age of the fuel tanks is unknown. The city block located to the south of the subject property was currently undergoing construction of a large office building complex." (Page 2)

COMMENT: *Regarding possible sources of contamination, the Grove Valve and Regulator Company may have used heat treating processes which may involve significant quanties of quenching oil. Although specific information regarding this site is not known, heat treating companys often have underground oil tanks.*

B. Site History

"Back in the late 1800's, the Emeryville shoreline had been extended baywards by artificial fill over the native Bay Muds. A 1916 map indicated that the bay shoreline was formerly designated by the Southern Pacific railroad tracks located along Bay Street to the east of the site.

Sometime prior to the early-1940's, the existing Highway 80, formerly adopted at Route 69, was constructed west of the site and created a levee protecting the inland parcels. From this time until the late-1950's, the City of Emeryville used the area of the subject site and the area to the south as a municipal disposal site. The fill material was presumed to be a combination of clean fill demolition debris and industrial wastes. Investigations by Earth Metrics Incorporated for the parcel south of 65th Street found no evidence of systematic disposal of potentially hazardous materials on their site.

The existing warehouse was constructed in the mid-1950's in the same configuration as seen today. A previous owner was Holmest Robert and Etal. The warehouse was leased to Louis Stores, a supermarket company, and used as their distribution center under a 20 year contract. The interior western portion of the warehouse contained seven large freezer units. In 1973, the United States Postal Office moved into the warehouse and continues to occupy the building at the time this report was issued. Their operations include a mail bag depository, a mail transport equipment section, and a container repair center. These operations are primarily for storage and distribution of postal service equipment. The Southern Pacific railroad tracks located along the north side of the warehouse were utilized until 1976. Since then, mail has been transported by truck.

The large site located south of the warehouse was formerly occupied by Garrett Freight Lines. Three buildings were present on the Garrett Freight Lines site. In addition, there were two fuel pump islands and eleven known underground fuel tanks located on the northeast quadrant of the city block south of the subject property. These tanks have been removed for the current development. The Garrett Freight Company site was constructed in 1960. This site was also a portion of the municipal fill for the City of Emeryville starting from the 1940's until the late 1950's.

Multiple soil testing programs by Earth Metrics Incorporated for the parcel to the south of our site revealed variable and

widespread concentrations of lead and zinc. In addition, indications of DDT, DDD and DDE pesticides were present at variable concentrations. No quantities of asbestos were encountered in the subsurface soils." (Pages 2 and 3)

SITE INVESTIGATION

A. Subsurface Investigation

"Based on the results of our site characterization, our subsurface investigation consisted of drilling seven exploratory borings. Borings 1 through 6 were drilled at representative locations on the east, west and south sides of the warehouse and Boring 7 was drilled at the north side of the warehouse adjacent to the neighboring fuel pump island. The borings were drilled on April 13, 1987 to a maximum depth of 12 feet using a truck-mounted drill rig equipped with 8-inch diameter, continuous flight hollow stem augers. The hollow stem augers were steamed prior to the drilling of the borings.

The approximate location of the seven borings are shown on the Site Plan, Figure 1. Logs of the borings and details regarding the field investigtion are included in Appendix A." (Page 3)

B. Soil Sampling

"Two to four soil samples were obtained from each boring at various depths above the free groundwater as determined in the field at the time of drilling. The soil samples were collected with a 2 1/2-inch diameter California sampler. The soil samples were contained in 2-inch diameter, 6-inch long brass liners. Both the sampler and the brass liners were decontaminated prior to each sampling with a trisodium phosphate wash, acetone and deionized water. The soil samples were capped with aluminum foil, fitted with rubber caps, taped and stored on ice until delivery to the Thermal Analytical/NorCal Laboratories for testing." (Page 4)

SUBSURFACE CONDITIONS

A. Subsurface

"The subsurface soils encountered at the site consisted of fill materials which extended to the maximum depth explored of 12 feet. These fill materials were comprised of heterogeneous

layers of clayey and gravelly sands and silty and sandy clays. Wood, wire, brick and concrete debris was also encountered. However, in Boring 3 the fills were comprised of sandy gravels. These fill materials were variable in consistence and relative density. We should note that the fill materials had a black coloration beginning at depths of 3 to 7 feet and extended to the bottom of each boring. In addition, in Boring 5, located near the southeast corner of the warehouse, the black sands encountered from depths of 7 1/2 to 12 feet were observed to have a strong gasoline-like odor. A very light odor was also present in the fills from depths of 4 1/2 to 6 1/2 feet and extended to the bottom of Borings 5 and 6." (Page 4)

COMMENT: 1) Note the heterogenous variable composition and relative density of the fill. These physical characteristics of the fill will result in variable dispersion of hydrocarbon contamination in both concentration and location.

2) The location of highest hydrocarbon contamination revealed by the seven borings is in the southeast corner of the near the vicinity of a subsequently removed underground storage tank. This area is also about 300 feet north of one of Garrett Freight Line's underground tank farms consisting of four 12,000 gallon diesel tanks, two 10,000 gallon diesel tanks and one 6,000 gallon gasoline tank.

B. Groundwater

"Free groundwater was encountered in Borings 1, 2, 3, 4, 5, and 7 at depths of 8 to 10 1/2 feet at the time of drilling. The groundwater level was not measured in Boring 6 due to the clayey fill materials which sealed any filtration of groundwater into the boring. Boring 1 was left open for a period of 7 hours at which time the groundwater level was measured at a depth of 8 feet. All other borings may not have been left open for a sufficient period of time to establish equilibrium groundwater conditions. In addition, fluctuations in the groundwater level could occur due to the tides of the adjacent San Francisco Bay, change in seasons, variations in rainfall and other factors." (Page 4)

ANALYTICAL SOIL TESTING RESULTS

"One to two soil samples from each boring were selected for chemical testing. The samples were selected on the basis of color and odor. The selected soil samples from each pair of borings which represent the east, west and south sides fo the site were composited for testing, i.e. Boring 1 and 2, 3 and

4, 5 and 6.

The analytical test methods that were conducted include 1) chlorinated pesticides and PCB's following a modified EPA Method 608, 2) inorganic lead and zinc metal concentrations, using the SW-846 test method, derived from the EPA test methodology, 3) phenole analysis following a modified 8040 and 4) an aromatic analysis following a modified EPA Method 602. In addition, the two samples from Boring 5 at depths of 7 1/2 and 9 feet were analyzed for total hydrocarbons with a gasoline standard and a soil sample from Boring 7 at a depth of 6 feet was analyzed for total hydrocarbons with a diesel fuel standard.

The analytical results indicated that the subsurface fill materials at the site have small concentrations of inorganic lead and zinc. ..... **The analytical result of the total hydrocarbon tests in Borings 5 and 7 indicated concentrations of 200 and 4 mg/Kg (ppm), respectively.** In addition, low levels of Benzene, Toluene and Xylene were detected in Boring 5. The complete chemical laboratory test results are presented in the attached Appendix B as well as a description of the EPA Test Methods performed.

COMMMENT: *Boring 5 is located about 20 east of the onsite Underground Storage Tank (UST) and Boring 7 is located about 10 feet south of the offsite UST's located at 6601/6603 Bay Street. Both onsite and offsite UST's were still in-place at the time the fieldwork was performed for the Kaldveer report.*

BORING 7: It is noted that the plotted location of Boring 7 (EB-7) places it 15 feet south from the UST's at a point 15 feet from the west end of the underground storage tanks at 6601 and 6603 Bay Street. Boring 7 is also located southwest of the dispenser island.

A soil sample obtained at a depth of 6 feet from this boring indicated low total hydrocarbon contamination of 4 mg/Kg as diesel (based on text of report) or a gasoline contamination of 3.6 mg/kg (based on TMA/Norcal analytical report, Table II).

The soil texture was black silty sand encountered at a depth of 4.5 feet that extended to the bottom of the boring at 9.5 feet. Groundwater was logged at a depth of eight feet. A "very light odor" was also noted on the boring log in the silty sand. No indication of free product or stains on the sampler (8 to 9.5 depths) is noted.

The analytical results for this boring is considered representative

of soil located within two feet of the groundwater level in permeable highly sand. Based on the above information, it is inferred that no free product (gasoline, diesel or oil) was present at the location of boring 7 on April 13, 1987. Furthermore, the hydrocarbon contamination level in the soil two feet above the groundwater level at the time of sampling is very low and is consistent with a contamination mechanism of physical or volatile deposition from low levels of hydrocarbon contamination in the groundwater.

The lack of significant contamination at Boring 7 is especially important considering the presence of free floating petroleum product which backflowed into the 6601 and 6603 Bay Street UST excavations during their removal (August and October 1989). To further confuse the issue, two and one-half years after Boring 7 was sampled, a groundwater "grab" sample dated 10 November 1989 taken by Engineering-Science (Reference B-10) indicated free gasoline product of 94,000,000 ppb at Boring GW-8. This boring is located south of the west end of the 6601/6603 Bay Street three former underground fuel tanks and 30 feet southwest of Boring 7. Also at this time and about 50 feet further west of the west end of the 6601/6603 Bay Street former underground fuel tanks, MW-5 (also sampled by ES on 20 November 1989) was ND for gasoline and 74 ppb for benzene. MW-5 is located about 55 feet west of GW-8 and 75 feet west of Boring 7.

"The concentrations are representative values at specific locations and depths where the samples were taken. **To determine the lateral extent and depth of contamination will require additional field exploration and laboratory testing.**

The analytical results for lead and zinc showed concentrations below the Total Threshold Limit Concentrations (TTLC). However, because of the higher lead and zinc concentrations that were found on the site located immediately south of the site and the history of the sites, we recommend that additional testing of the subsurface soils prior to any site grading be conducted to further quantify the presence, if any, of heavy metals. The subsurface soil samples for testing should be obtained from the depths that will require excavation.

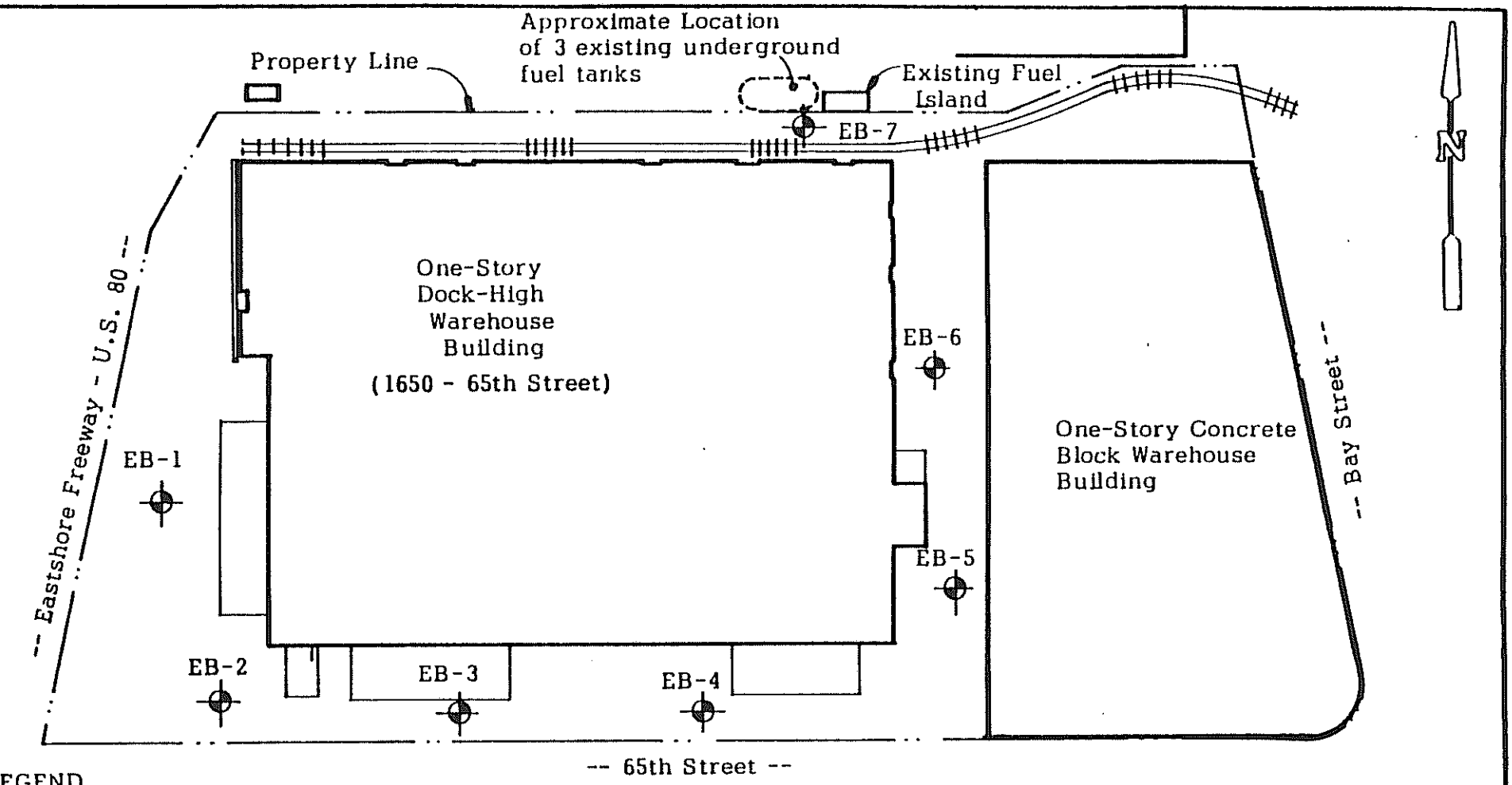
Based on our test results, the major contaminant that has been identified is the petroleum hydrocarbons in Boring 5, located at the southeast corner of the site. A buried tank could be located by Boring 5 as evidenced by the possible filler cap at the southwest corner of the subject warehouse building. However, the source of this excessive concentration of the

hydrocarbon could also be from the buried tank located south of the subject site.

The California Regional Water Quality Control Board, San Francisco Bay Regional Publication, "Guidelines for Addressing Fuel Leaks", the agency which has jurisdiciton over the quality of the surface and groundwaters, requires that a monitoring well be installed on the sites that have soils with hydrocarbon concentrations in excess of 100 mg/kg (ppm)." ... (Pages 5 and 6).

COMMENT: *Note 2 of Exploratory Boring Log No. 5 states "Groundwater level was measured at time of drilling. A brown oil was smeared on the outside of the sampler after obtaining a sample from a depth of 10 1/2 to 12 feet." A year later, as reported by Engineering-Science, a light greenish brown thick gasoline sheen or waste oil sheen was observed on March 9 and March 16, 1988 in the tank removal excavation (Reference No. B-5; Engineering Science, Ref: NC049.10, 6 April 1988).*

Based on the Kaldveer and Engineering Science reports, it is inferred that significant petroleum hydrocarbon contamination, including floating product on the groundwater, was present at the southeast corner of the 1650 65th Street property between April 1987 and March 1988.



LEGEND

EB-6 ⊕ Approximate Location of Exploratory Boring

APPROXIMATE SCALE (Feet)

0 100 200

Base: "Topo Map", by Tronoff Associates, dated February 3, 1983.

Bay Center Office Development

PETER KALDVEER AND ASSOCIATES, INC.

Geotechnical Consultants

SITE PLAN

1650 - 65TH STREET WAREHOUSE
Emeryville, California

PROJECT NO	DATE	Figure 1
K849-3	April 1987	

Reference No. B-2

UNDERGROUND FUEL STORAGE TANK SITE INVESTIGATION

NEAR THE SOUTHEAST CORNER OF THE WAREHOUSE BUILDING

1650 65TH STREET PROPERTY

EMERYVILLE, CALIFORNIA

DATE: 18 September 1987; Ref: NC049.03

TO: Emeryville Bay Front Limited Partnership
c/o Ronald V. Schwartz, President
Benefit Capital Corporation
1330 Broadway, Suite 500
Oakland, California 94612

BY: Engineering-Science
600 Bancroft Way
Berkeley, California 94710

EXCERPTS AND COMMENTS:

INTRODUCTION

"This report describes the implementation of the underground fuel storage tank site characterization plan submitted to Benefit Capital Corporation (BCC) by Engineering-Science (ES) in a letter proposal dated 25 June 1987. The scope of this work included observation of removal of the abandoned Underground Storage Tank (UST) by Cleveland Wrecking Company (CWC), soil sampling beneath the UST, and installation of a groundwater monitoring well if warranted by evidence of soil contamination.

SITE LOCATION AND HISTORY

"The property, approximately 5.5 acres, is located in western Emeryville two blocks south of the Emeryville/Berkeley city boundary. Figure 1 is a site location map. **Originally below sea level, the property was used as a municipal disposal site from the early 1940's to the late 1950's.** Following construction of the existing warehouse in the mid-1950's, the

property was leased to the supermarket company, Louis Stores, which used the warehouse as a distribution center. From 1973 to the present, the United States Post Office has occupied the warehouse, using it for storage and distribution of postal service equipment. Figure 2 is a site plan of the 1650 65th Street property.

The abandoned UST is located near the southeast corner of the warehouse building. It has an estimated 2,000 gallon capacity and was probably installed over 20 years ago. The tank initially contained gasoline and later stored waste oil." ... (Page 1)

COMMENT: *The UST Unauthorized Release (Leak)/Contamination Site Report filed by Richard S Makdisi of Engineering-Science Inc. indicates the substances involved are diesel fuel and gasoline; the tanks age ">30 years"; the source of discharge is from a piping leak caused by corrosion; "Greatest concentration of total petroleum hydrocarbons in soil samples was 6,600 ppm. Groundwater concentrations at 33 mg/l ... BTX levels < detection limits of 1 ppm."*

TANK CLOSURE ACTIVITIES

"CWC excavated the UST on 2 July 1987 and hauled it off-site. Figure 3 shows the excavation boundaries, tank and piping layout and soil sampling locations. **A small volume of residual oily sludge was pumped from the tank prior to tank removal. Excavation began with removal of the vent and product line pipes; strong hydrocarbon odors emanated from soil removed from this area.** A small amount of gasoline spilled from the product line piping during its removal. **Excavation of the tank itself revealed no indication of contamination; the clayey soil and sandy fill excavated from around the tank exhibited no odor.** Following completion of each excavation section, CWC immediately backfilled each excavated area with soil removed from that area. Documentation of the excavation in the form of copies of permits and shipping manifests has already been provided to BCC by Cleveland Wrecking Company. Photographic documentation of the excavation is presented in Appendix A.

The tank, vent pipe, product line and fittings were examined by ES personnel for signs of corrosion and holes. **The tank, vent lines and product lines were in good condition and showed no signs of corrosion. The product line fittings were rusty, however.**

ES personnel collected three soil samples during the tank excavtion: one from beneath the product line (FP-1) and one from beneath both the northern (N-1) and the southern (S-1) end of the tank. The samples, collected in 2-inch brass tubes, were analyzed for total fuel hydrocarbons (EPA Method 8015), aromatic volatile organics (EPA Method 8020) and for lead. **Only sample FP-1, with 490 mg/kg total petroleum hydrocarbons, had a significant level of contamination.** Analytical results are summarized in Table 1. Complete analytical results are presented in Appendix B. Chain of custody records are included in Appendix C." (Page 4)

COMMENT: *Based on a review of this report, including the analytical results, contamination occured from the product lines. Because this tank is small, 2,000 gallons, the product dispenser most likely used suction for product retrieval with a check valve in the tank to prevent drainback. This method minimizes product loss versus a pressurized manifold system.*

GROUNDWATER MONITORING WELL INSTALLATION

"Because the contaminant level in soil sample FP-1 exceeded the 100 ppm limit established by the Regional Water Quality Control Board (RWQCB), a groundwater monitoring well was installed to detrmine the effect of soil contamination on ground water quality. The well site, selected to be downgradient of the UST contaminant source, was located west of the UST excavation and north of the product line trench. This was near the area where Sample FP-1 was collected.

COMMENT: *It appears from the placement of the monitoring well that the groundwater downgradient flow direction is north to northwest. The report has indicated that the probable source of contamination is leaky pipe fittings in the product line. The monitoring well is located north of the product line.*

"Well installation occurred on 27 July and began with drilling of a borehole roughly 3 feet west of the excavation. Metal scraps encountered 15 feet below ground surface caused drilling refusal and required abandonment of the initial borehole. A second borehole was drilled roughly three feet west of the initial borehole. This borehole was completed as the 30-foot deep monitoring well MW-1. Figure 3 shows the locations of the abandoned borehole and Monitoring Well MW-1.

Hydrocarbon odors were detected in both borings. The strongest hydrocarbon odors detected during drilling of Monitoring Well MW-1 were in soil cuttings from 13 to 16 feet below ground surface; a mild gasoline odor was detected in

cuttings from 17 to 23 below ground surface. In the abandoned borehole, a strong gasoline odor was observed in saturated, sandy cuttings originating from 12 to 15 feet below ground surface. Geologic logs for both the abandoned borehole and Monitoring Well MW-1, along with construction details for MW-1, are presented in Appendix D.

During drilling of the initial borehole, two soil samples were collected by California modified split spoon sampler: one at a depth of 5 feet (MW-5) and one at a depth of 10 feet (MW-10). These samples were analyzed for total fuel hydrocarbons by EPA Method 8015. Results are summarized in Table 1. Complete analytical results are presented in Appendix B. Appendix C contains chain of custody records. No additional samples were collected during drilling of the borehole completed as the monitoring well, MW-1.

Monitoring Well MW-1 was sampled on 28 July 1987. The sample, MW-1, was collected with a quartz teflon bailer and analyzed by EPA Method 8015 for total fuel hydrocarbons. No free product was found floating on the groundwater surface on 28 July or on 17 August, when the site was visited again. However, both times the groundwater was yellow and had a strong gasoline odor. Groundwater level, measured on 17 August following a period of equilibration, was 12.27 feet below ground surface. The groundwater sample analytical results are summarized in Table 1 and presented in full in Appendix B. Sampling notes and chain of custondy records are presented in Appendix C." (Page 7)

COMMENT: *The strongest hydrocarbon odor in the abandoned boring (12 - 15 feet) and the monitoring well (13 - 16 feet) corresponds to the first few feet of groundwater. The reported depths to seasonal groundwater level at this location varies from about 12.2 to 14 feet below the ground surface.*

SOIL AND GROUNDWATER SAMPLING RESULTS

"Analytical results of soil and water samples revealed moderate (>100 - <1,000 ppm) to high (>1,000 ppm) soil contamination west of the UST and low level (<100 ppm) contamination of ground water. The highest contamination in the soil, 6,600 ppm total petroleum hydrocarbons, was found 10 feet below ground surface (MW-10) while shallower samples ranged from 170 ppm (MW-5) to 490 (FP-1) ppm total fuel hydrocarbons. Analysis revealed 33 mg/l total fuel hydrocarbons in the groundwater. Conversations with laboratory chemists indicated that, for samples MW-5 and MW-10, gasoline was the major fuel hydrocarbon detected. Some

long chain hydrocarbons, indicative of petroleum hydrocarbons such as oil, were also noted by the laboratory chemists; these were not included in the soil analysis results.

COMMENT: *A comparison of the olfactory sense of gasoline concentration and analytical determination indicate for Soil Sample MW-5, a "mild hydrocarbon odor" was analyzed as 170 ppm total fuel hydrocarbons. The Soil Sample MW-10 olfactory sense indicated a "very mild hydrocarbon odor" or "very slight hydrocarbon odor at 10' (monitoring well)" with a corresponding analysis of 6,600 ppm total fuel hydrocarbons. The correlation of "mild odor" at 170 ppm and "very mild odor" at 6,600 ppm total fuel hydrocarbons is very poor. It is suggested that olfactory desensitization may have occured.*

More importantly, the soil boring logs indicate "strong gas odor" at the abandoned borehole from the 12 to the 13.5 foot depth. No soil samples were obtained from this depth. The borings logs indicate "hydrocarbon odor" at the monitoring well from the 11.5 foot to 17.5 foot depth. As the soil sample at 5 and 10 foot samling depths indicates mild or very mild hydrocarbon odor, that the soil and/or groundwater concentration of total fuel hydrocarbons may be much higher than the 6,600 ppm for Soil Sample MW-10.

It is further noted that these initial samples were received by TMA/Norcal (Richmond, California) on the date sampled, July 2, and then sent by Federal Express to their Southern California (Monrovia) laboratory, TMA/ARLI, where they were received on July 6 and injected (analyzed) on July 7. If proper procedures were not followed (temperature 4 °C or less, etc.) during holding and transportation, a significant loss of volatiles could occur. The laboratory analysis report also indicates that the soil sample under the product line, FP-1, with a concentration of 490 ppm of a C9 - C14 petroleum hydrocarbon, could have actually been contamination by Stoddard's Solvent used for the quantification. However, aromatic volatile hydrocarbons Toluene (at limit of detection) and Xylenes (23 ppm with detection limit of 1.1 ppm) were also detected and confirmed by GC/MS.

"**Because gasoline was the major hydrocarbon detected in the soil samples, contamination probably occured as a result of gasoline leaking from the UST or as a result of gasoline spills.** The lower concentration of MW-5 compared to MW-10 indicates that if spills rather than leaks caused contamination, the spills did not occur in the vicinity of the abandoned borehole where samples MW-5 and MW-10 were collected. If leaks were responsible for the contamination, they probably were in the product line fittings since no

corrosion or holes were observed on the tank itself. It is unlikely that an UST other than the one excavated could be responsible for the hydrocarbon contamination. The closest known UST is north of the site, near EB-7 (Figure 2); this UST is too far away to explain the high levels of contamination in the soil relative to those in the groundwater. If the UST near EB-7 were the origin of contaminants detected in monitoring well MW-1, high contaminant concentrations in the water relative to the soil would be expected. ... (Page 7 and 8)

COMMENT: *Although it is agreed that soil and groundwater contamination occured from the operation of the 2,000 gallon UST at this site, observations of a light greenish brown thick oil sheen was observed on 9 March 1988 and thick sludge and oily sheen on 16 March 1988 in the excavation for contaminated soil removal performed by Riedel Environmental Services (Reference No. B-5) indicate substantial contamination of the groundwater. Because the 2,000 gallon tank and associated piping had been removed 8 months earlier (2 July 1987) and the soil contaminant levels did not indicate substantial amounts of free product, the thick sludge and oily sheen are inferred to be from offsite contamination carried by the groundwater from the Garrett Freight Lines Site.*

"The extent of the soil containing greater than 1000 ppm cannot be determined from contamination characterization done to date. High levels of contamination extend west of the UST at least as far as the abandoned borehole from which the samples were collected. Previous site investigations (Reference No. B-1, Kaldveer) detected total petroleum hydrocarbons at a level of 200 ppm east of the excavation (soil boring EB-5, Figure 2). This suggests that moderate levels of contamination originating from the UST have migrated eastward despite the absence of petroleum hydrocarbons in the samples collected from below the UST or that gasoline spills may have occured east of the excavation.

COMMENT: *The contamination characterization at the date of this report has revealed conflicting visual, olfactory and analytical parameters regarding the cause of hydrocarbon fuel contamination.*

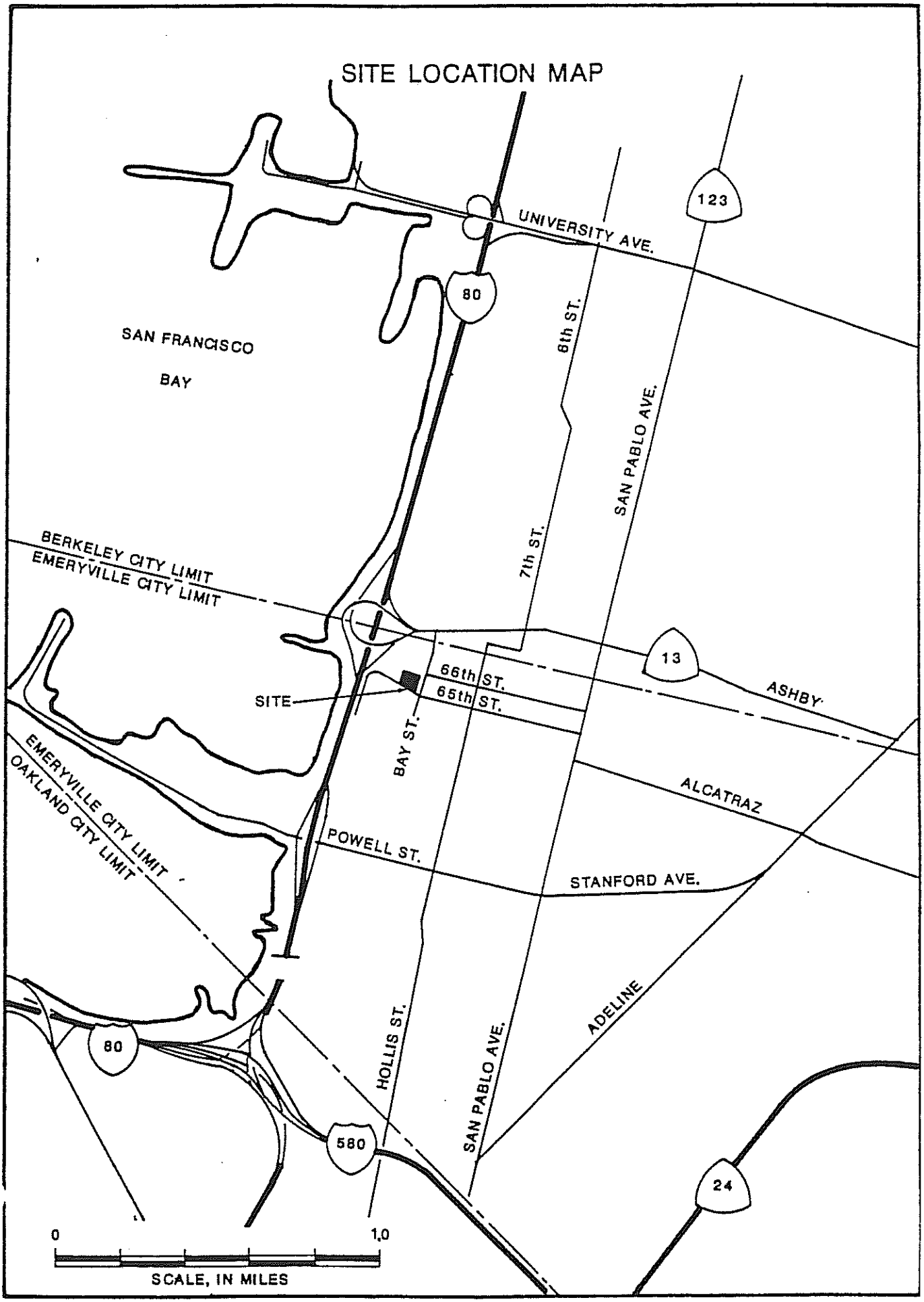
The UST appears to be competent with no visual signs of product leakage from the tank or associated soil stains, odors or analytically detectable contamination directly below the tank at the 12 foot depth. Yet, at 12.5 feet and 17 feet, contamination is present.

The product line exhibits rusty fittings with strong gasoline odors immediately surrounding and below the pipe. Analytical testing

indicates 490 ppm total fuel hydrocarbon contamination at a depth of 3 feet. The soil samples in the abandoned borehole only a few feet away indicates less contamination at a depth of 5 feet (170 ppm TFH) but very high contamination (6,600 ppm TFH) at a depth of 10 feet. If the product line leaked, contamination should generally decrease with depth. However, if the gasoline leak occured several years earlier (with subsequent use for waste oil storage) the soil contamination profile is as expected.

Furthermore, soil testing by Kaldveer (Reference No. B-1) indicates 200 ppm gasoline contamination in a composite from soil samples taken at a 7.5 and 9 foot depth about 20 feet east of the UST. It is inconsistent for the contamination to change from non-detectable under the UST at a 12 foot depth to 200 ppm 20 feet away (the product and vent lines go to the west from the tank).

It is inferred that off-site contamination from the Garrett Freight Lines Site is traveling with the groundwater to the north and northwest under the Post Office Warehouse Building Site. Variations in groundwater flow directions and fluctuating surface levels of several feet have been determined by a review of the referenced reports. The highest concentrations of hydrocarbon fuel contamination on the Post Office Warehouse Site have been recorded within the upper levels of the groundwater and from soil samples in the vadose zone.



ENGINEERING-SCIENCE

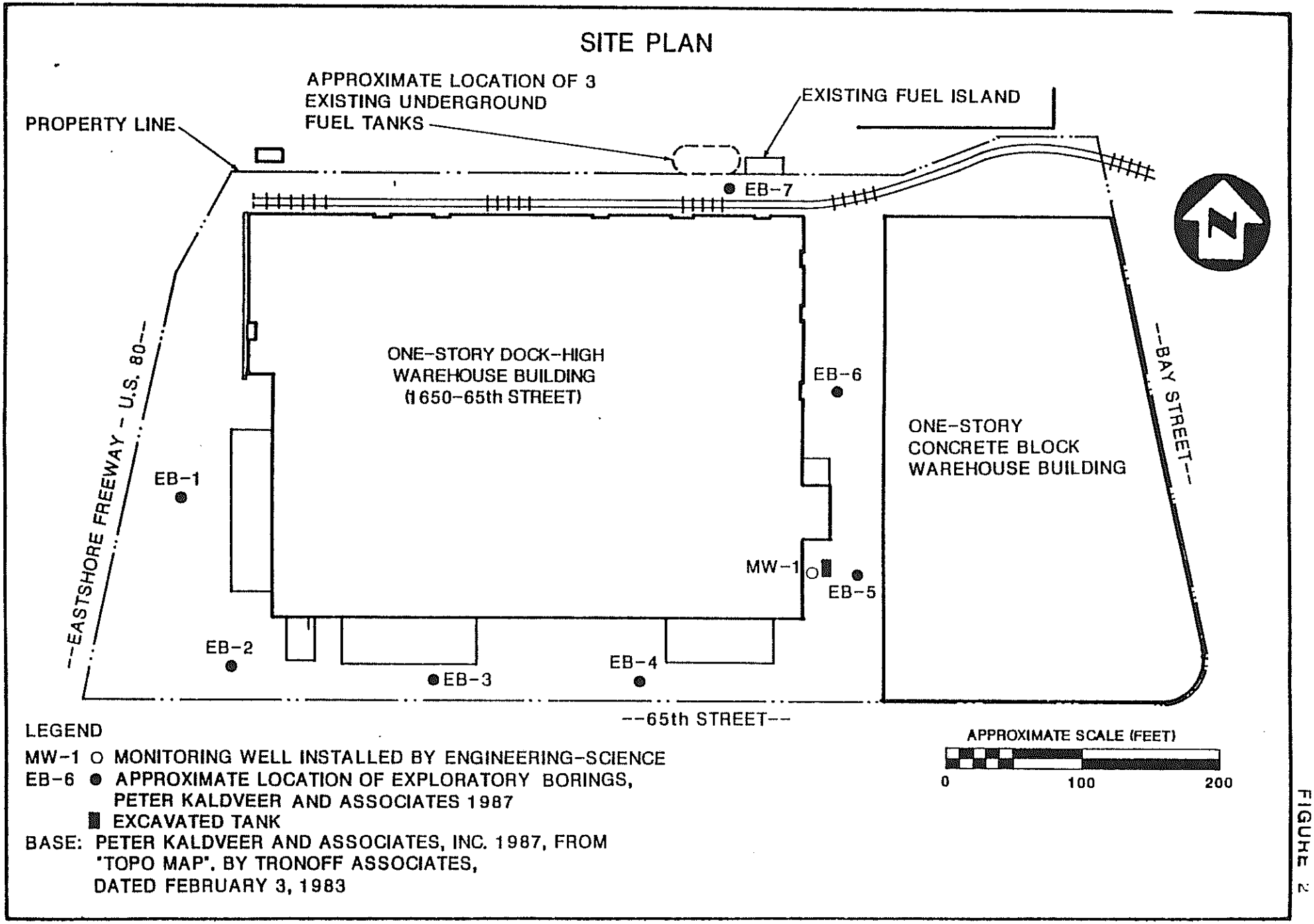
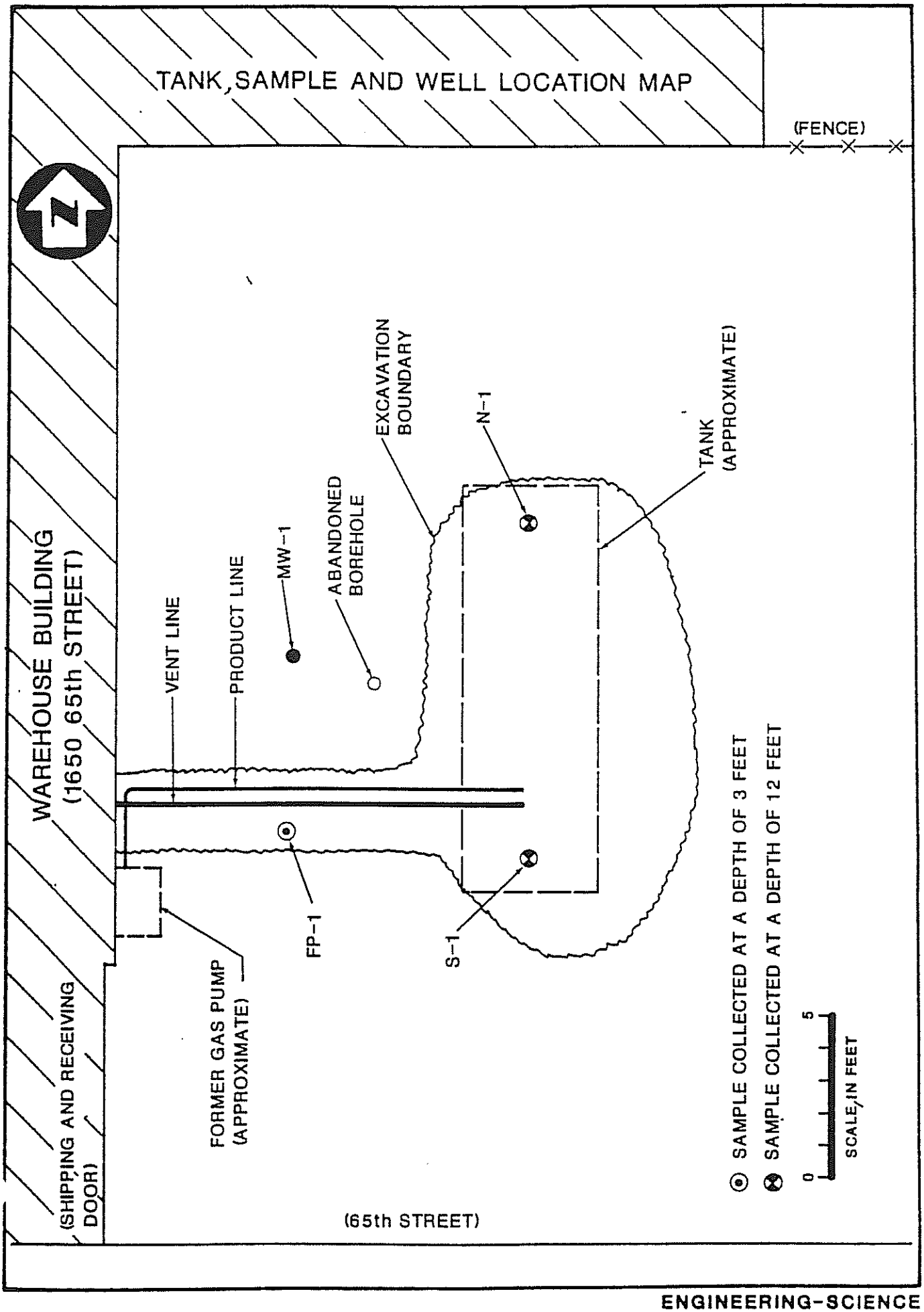

SITE PLAN
APPROXIMATE LOCATION OF 3
EXISTING UNDERGROUND
FUEL TANKS
EXISTING FUEL ISLAND
PROPERTY LINE
EB-7
N
ONE-STORY DOCK-HIGH
WAREHOUSE BUILDING
(1650-65th STREET)
EB-6
ONE-STORY
CONCRETE BLOCK
WAREHOUSE BUILDING
--BAY STREET--
--EASTSHORE FREEWAY - U.S. 80--
EB-1
MW-1
EB-5
EB-2
EB-3
EB-4
--65th STREET--
LEGEND
MW-1 ○ MONITORING WELL INSTALLED BY ENGINEERING-SCIENCE
EB-6 ● APPROXIMATE LOCATION OF EXPLORATORY BORINGS,
PETER KALDVEER AND ASSOCIATES 1987
■ EXCAVATED TANK
BASE: PETER KALDVEER AND ASSOCIATES, INC. 1987, FROM
"TOPO MAP". BY TRONOFF ASSOCIATES,
DATED FEBRUARY 3, 1983
APPROXIMATE SCALE (FEET)
0
100
200

FIGURE 2

FIGURE 3



ENGINEERING-SCIENCE

Reference No. B-3

SOIL REMEDIATION PLAN FOR THE SOUTHEASTERN CORNER OF THE 1650 65TH STREET PROPERTY, EMERYVILLE, CALIFORNIA

DATE: 18 December 1987; Ref.: NC049.05

TO: Alameda County Division of Hazardous Materials
Department of Environmental Health
470 27th Street, Room 322
Oakland, California 94612

ATTENTION: Ms. Elizabeth Rose

BY: Engineering-Science, Inc.
600 Bancroft Way
Berkeley, California

EXCERPTS AND COMMENTS:

INTRODUCTION

"This letter report presents the plan for soil remediation for the 1650 65th Street Property in Emeryville, California. This plan was prepared as part of the ongoing site characterisation and remedial action work being performed by Engineering-Science (ES) for Benefit Capital Corporation (BCC), the former site owner. The plan draws on information presented and developed by Engineering-Science in the Underground Fuel Storage Site Investigation Report dated 18 September 1987 (Refence 1) *{Reference No. B-2}*. The plan includes abandonment of a 30 foot monitoring well and removal of an estimated 60 cubic yards of contaminated soil associated with a former underground storage tank area." (Page 1)

COMMENT: *The report goes on to describe the site location and history and known site contamination to date basically as described in Reference No. B-2.*

REMEDIAL ACTION PLAN

"Soil remediation will be carried out in two phases. The first phase will consist of abandonment of monitoring well MW-1. The second phase will consist of excavtion of the contaminated soil." (Page 4)

Phase 1 - Well Abandonment

"Monitoring well MW-1 will be abandoned by pressure grouting prior to the onset of soil excavation. The well is 30 feet deep, with 21 feet of 2-inch inner diameter 0.010 slotted PVC casing. The grouting system will be set up by inserting a tremie pipe to the bottom of the well. The pip will pass through the well cap, which initially will not be fastened on the well. A thin slurry of neat cement will be pumped through the tremie pipe until all water in the well has been displaced. The well cap will then be fastened onto the well casing. Grouting will continue by forcing grout through the slotted casing into the gravel pack. This will continue until no more grout can be pumped into the well. The grout will be allowed to set for a minimum of 24 hours prior to the start of soil excavation.

Phase 2 - Soil Excavation

Contaminated soil will be excavated and removed according to the specifications presented in Appendix C. **Based on sampling and analytical results completed to date, ES estimates roughly 60 cubic yards of soil will need to be removed from the areas north of the product line and west of the excavated tank. The depth of the excavation is estimated to be a maximum of 12 feet, just above the level of groundwater at 12.2 feet below ground surface.**

Soil will be excavated until all traces of contamination are removed; contaminated soil will be detected in the field by use of a photoionization detector and by visual and olfactory means. Soil samples will then be collected from the sidewalls and base of the excavation for analysis to ascertain if the residual hydrocarbon concentrations are of regulatory and/or health risk concern. Sampling protocol will consist of driving a clean brass sampling tube into soil removed from the excavation by backhoe. The tubes will be capped with non-reactive materials, refrigerated and transported to the analytical laboratory. Samples will be composited as appropriate and analyzed by gas chromatography/flame ionization detection (GC/FID) for total petroleum hydrocarbons (gasoline, diesel and waste oil components), and EPA Method

7421 for lead. A suite of analyses including EPA Method 8240, Standard Methods 503A and E, and EPA Method 8080 for PCBs will be run on one sample when soil has been excavated to below agency limits for total petroleum hydrocarbons and lead. All analyses will be performed on 24-hour turnaround.

Soil excavation will be complete when total petroleum hydrocarbons are below 1,000 ppm, lead is below 5 ppm lead and other contaminant concentrations are below levels acceptable to the Alameda County Health Department and the Regional Water Quality Control Board." (Pages 6 and 7)

COMMENT: *At this time ES recommends soil removal to groundwater (vertical extent) and estimates horizontal contamination to extend west of the UST and north of the product line. The soil contamination has been "interpreted to have been caused by leaks in the product line fittings" (Page 4). Based on analytical results and the location of contaminated soil removal, it is inferred that gasoline product contamination spread to the north toward the 6601/6603 Bay Street Properties from the product line.*

Reference No. B-4

HEALTH AND SAFETY PLAN

FOR

SOIL AND GROUNDWATER REMEDIATION

OF THE

SOUTHEASTERN CORNER OF 1650 65TH STREET

EMERYVILLE, CALIFORNIA

DATE: February 22, 1988; Ref. No.: NC049.08

FOR: Emeryville Bayfront Limited Partnership
Oakland, California

BY: Engineering-Science
600 Bancroft Way
Berkeley, California 94710

EXCERPTS AND COMMENTS:

CHAPTER 1

PURPOSE AND POLICY

"The purpose of this plan is to establish personnel protection standards and mandatory safety practices for remedial activities conducted on the southeastern corner of the 1650 65th Street property in Emeryville. The plan also provides for contingencies that may arise during field investigations and operations.

The provisions of this plan are mandatory for all remedial work. All Engineering-Science (ES) personnel who engage in on-site remedial work shall be familiar with this plan and comply with its requirements. Any supplemental plans used by

subcontractors shall conform to this plan as a minimum.

A site description and scope of work summary for the project is provided in Chapter 2. Chapter 3 presents the project team organization, personnel responsibilities, and lines of authority. Training and medical monitoring requirements are contained in Chapter 4. Chapter 5 presents a safety and health risk analysis. Chapter 6 contains the emergency procedures and list of emergency contacts. Site-specific requirements for levels of protection are included in Chapter 7, and air monitoring procedures are provided in Chapter 8. Site control measures, including designation of site work zones, are contained in Chapter 9, while Chapter 10 provides detailed site-specific decontamination procedures. Chapter 11 contains the health and safety plan acceptance form. Site forms are provided in Appendix A and ES' annual medical monitoring program is described in Appendix B." (Page 1-1)

CHAPTER 2

SITE DESCRIPTION AND SCOPE OF WORK

SITE DESCRIPTION

"The 1650 65th Street property is located in the industrial area of western Emeryville. It comprises 5.5 acres of relatively flat land and hosts a one-storey rectangular concrete warehouse and associated parking areas. At this time, the United States Postal Service leases the warehouse, using it for equipment repair, storage and distribution. The eastern property boundary is abutted by a one-storey concrete block warehouse. The property location is shown in Figure 2-1. Figure 2-2 is a site plan.

The soils of the property are of both natural and artificial origin. The deeper soils, consisting of bay muds, were deposited when the property was beneath the bay. Soils overlying these muds are artificially emplaced fill. The lower fill was deposited around the turn of the century with the extension of the Emeryville shoreline. The upper fill was emplaced from the early 1940s to the mid 1950s when the property was used as a municipal disposal site. The upper fill is presumed to be a combination of clean fill, demolition debris and industrial wastes. No evidence exists that the site was used for the systematic disposal of potentially hazardous materials.

SITE CONTAMINATION

The southeastern corner of the property was contaminated by gasoline and minor amounts of waste oil which leaked from a 2,000 gallon underground storage tank. The tank, excavated on 2 July 1987, was located east of the southeastern warehouse corner. Its former location is shown on Figure 2-2. **Fumes emanating from the soil excavated during tank removal were sufficiently strong to cause irritation to the postal workers inside the warehouse and to require closure of the warehouse roll-up door behind the excavation area. ...** " (Pages 2-1 and 2-4)

COMMENT: *A comprehensive Health and Safety Plan has been prepared by Engineering-Science for the proposed 60 yards of contaminated soil removal. The anticipated level of contaminants resulted in the development of contigencies for use of dermal protection level C (no exposed skin) and respiratory protection levels B (full-face air purifying respirator) and C (Pressure-demand full-face piece, self contained breathing apparatus (SCBA) or pressure-demand supplied air respirator with escape SCBA (NIOSH approved).*

It is undisputed that significant gasoline contamination was present in the soil from a product leak from this UST site.

Reference No. B-5

IMPLEMENTATION OF REMEDIAL ACTION PLAN REPORT

FOR UNITED STATES POSTAL SERVICE SITE

AT 1650 65TH STREET

EMERYVILLE, CALIFORNIA

DATE: 6 APRIL 1988; Ref: NC049.10

FOR: Benefit Capital Corporation
1330 Broadway, Suite 500
Oakland, CA 94612

ATTN: Mr. Ron Schwartz and Mr. Anthony Duckworth

BY: Engineering Science, Inc.
600 Bancroft Way
Berkeley, California

EXCERPTS AND COMMENTS:

INTRODUCTION

"This report describes the implementation of a Remedial Action Plan as described by Engineering-Science (ES) in a proposal dated 7 October 1987 to Benefit Capital Corporation (BCC) for the 1650 65th Street property in Emeryville, California. The Remedial Action Plan (RAP) and associated with the removal of an abandoned underground storage tank (UST), and meetings and discussions with representatives of the Alameda County Department of Environmental Health, Division of Hazardous Materials (ACDEH).

Implementation of the RAP was initiated on 24 February 1988 and was completed on 17 March 1988. Site remediation, consisting of soil excavation and disposal, was conducted by Riedel Environmental Services in accordance with the specifications for the Removal and Disposal of Contaminated Soil and Addendum dated 3 March 1988. These documents are

included with this report as Appendix A.

The scope of this report includes a brief description of the site history, a summary of previous site characterization reports, and a description of remedial action implementation. The health and safety plan for this site was provided in a separate ES report dated February 1988 (Reference 1) {Reference No. B-3}." (Page 1)

SCOPE OF WORK

The scope of work included the following tasks:

1) Preparation of the Remedial Action Plan for the site;
2) Submission of the Remedial Action Plan to the California Regional Water Quality Control Board (RWQCB) and ACDEH;
3) Meeting the regulatory agency personnel to discuss their concerns regarding the Remedial Action Plan;
4) Preparation of a brief bid document for the remedial action work, including brief and concise general specification for the work, a contract form, insurance provisions, etc;
5) Assisting BCC with qualified contractor selection;
6) **Sampling/monitoring during excavation of the contaminated areas and determining the demarcation of contaminated soil;**
7) Volume calculation of the total contaminated soil excavated based on pre- and post-excavation surveys;
8) Assisting the client (BCC) in general contract administration." (Pages 1 and 2)

COMMENT: *The demarcation of contaminated soil includes both the vertical and horizontal extent. Testing to date includes three soil samples from the UST and product line removal excavation, two soil samples from the abandoned soil boring three feet west of the UST, one water sample from MW-1 located six feet west of the UST and a composited soil sample from EB-5 located about 20 feet east of the UST as reported by Kaldveer {Reference No. B-1}. Only one of these samples, a soil sample from the abandoned soil boring from a depth of 10 feet, indicated a Total Petroleum Hydrocarbon contamination of 6,600 ppm exceeding the required removal amount of 1,000 ppm. To properly assess the horizontal extent of contamination by conformational laboratory analysis, soil sampling at this depth from each excavation sidewall should be performed to verify a contamination level less than 1,000 ppm. This apparently was not done. Furthermore, as revealed later in this report, a reported TPH contamination of 4,800 mg/kg (BW-1, ppm) was also obtained from the bottom of the excavation at a depth of 12.5 feet. At a depth of 17 feet, soil samples BW-2 and BE-2 obtained from the*

bottom of the excavation indicated 390 mg/kg and ND TPH, respectively. Therefore, sidewall samples should be taken within the depths of TPH contamination greater then 1,000 ppm or between the depths of 10 to 12.5 feet.

Two sidewall soil samples were obtained. Sidewall soil sample SW-1 was obtained as a field composite at depths of 8 and 9.5 feet from the west wall of the excavation. The Volatile Petroleum Hydrocarbon contamination as gasoline was 6.5 mg/kg. The second sidewall soil sample was a laboratory composite of two samples obtained from the northeast corner and the south wall at a depth of 9.5 feet. The Volatile Petroleum Hydrocarbon contamination as gasoline was 520 mg/Kg (ppm). The value of 520 ppm is significant because if one of the two samples had a value 6.5 ppm contamination the other sample would have a contamination value of 1,033 ppm (greater then the 1,000 ppm requiring excavation). More importantly, no sidewall soil samples were obtained from the depths of 10 to 12.5 feet where bottom samples indicated Total Fuel Hydrocarbons of 6,600 ppm and Volatile Petroleum Hydrocarbons as gasoline of 4,800 ppm. Therefore, horizontal demarcation of the most highly contaminated soil tested is uncertain.

It is also interesting to note that at the 17 foot depth, the analyzation was broken down into VPH, as gasoline (390 ppm); Extractible Petroleum Hydrocarbons (EPH), as diesel (23 ppm); and EPH as motor oil (13 ppm).

SUBSURFACE CONDITIONS

"Based on site history and the soils encountered during ES geological borings, subsurface soil at the site consists of fill materials to depths of approximately 12 to 18 feet. These consist of heterogeneous layers of clayey and gravelly sands and silty and sandy clays, with scattered wood, wires, brick, and concrete debris. These materials are described in monitoring well and borehole logs included in Appendix B.

The upper four (4) feet of soil encountered during soil excavation consist of light brown (tan) sandy silt with some gravel. This layer of soil rests on **dark brown to black silty clay with sand and gravel up to a depth of 13 feet. The bottom layer explored during the excavation consists of dark grey to black, silty, medium to coarse sand with some clay. Goundwater was encountered at a depth of 13.5 feet.** A cross-section of the soil stratigraphy observed in the excavation is shown in Figure 3." (Page 4)

COMMENT: *The dark dark grey to black clay overlying the dark grey to black sand appears to act as a partially confining aquitard for*

the nearsurface groundwater. The groundwater has been previously observed in this area at a depth of 12.2 feet. At the time of the soil removal, the groundwater depth is reported at 13.5 feet. If the confining aquitard varies in depth resulting in portions of the sand being above the highest groundwater levels, floating fuel product will flow through the higher permeable sand even if the groundwater is not necessarily going in the direction of the higher sand permeability.

....

Phase 2 - Soil Excavation

"**Phase 2 operation consisted of excavation and disposal of soil containing greater than 1,000 ppm total petroleum hydrocarbons and backfilling the excavation with clean soil.** Initially the depth of excavation was estimated to be 12 feet (just above the groundwater level). **The depth of excavation was increased to 16.5 feet, as per instructions from ACDEH, since 4,800 mg/kg of Total Petroleum Hydrocarbons (TPH) were detected in soil samples collected at a depth of 12.0 feet.**

The initial phase of excavation, to a depth of 12 feet, was carried out on 2 February 1988 using backhoe model 580E Extendahoe. The excavated soil was stockpiled in the yard area on a 10 mil plastic liner to avoid the contamination of underlying soil. The edges of the plastic liner were elevated at least four inches to contain any precipitation run-on or runoff of contaminated water draining from the excavated soil. At the end of each day, the stockpiled soil was completely covered with plastic. Edges of the plastic cover were weighted to prevent the plastic from shifting or blowing away." (Pages 8 and 9)

COMMENT: *It is interesting to compare the values for TPH contamination found in the soil samples collected at about the 12 foot depth.*

On 2 July 1987 two soil samples, N-1 and S-1, were collected at a depth of 12 feet under the previous tank at the north and south ends (about 13 feet east of the warehouse building). Both were Non-Detectable at the specified limit for C5 to C22 hydrocarbons and BTEX. Samples N-1 and S-1 exhibited 5.0 and 4.8 mg/kg (dry basis) lead at sample percent moistures of 11.0 and 1.7 respectively.

On 24 February 1988, a composited bottom sample, BW-1 at a depth of 12.5 feet (two laboratory composited samples obtained from the east and west sides about 4 and 11 feet east of the warehouse building),

indicated a volatile petroleum hydrocarbon (as gasoline, VPHg) concentration of 4,800 mg/kg; Toluene of 200 and Xylene of 350 ppm; and Lead of 17 mg/Kg (dry basis).

It is very unusual to see the non-detectable TPH results for the initial tank removal testing and then to have low to high TPH results for eight of the next nine soil tests.

Also, based on a ratio of the Lead results to TPH values at the 12 and 12.5 foot depths, the initial samples would exhibit a TPH of about 1,400 ppm.

BS

A review of the percent moisture contents of the samples determined to derive the dry weight basis of Lead concentrations indicate percent moisture contents of 11.0 and 1.7 for samples N-1 and E-1 respectively. The moisture content of 1.7 percent is inconsistent with the soil material described as "moist clay" located within one to two feet of the groundwater. It is most likely that a typographical error occured in the reported data.

It is further noted that these initial samples were received by TMA/Norcal (Richmond, California) on the date sampled, July 2, and then sent by Federal Express to their Southern California (Monrovia) laboratory, TMA/ARLI, where they were received on July 6 and injected (analyzed) on July 7. If proper procedures were not followed (temperature 4 degrees Celsius or less, etc.) during holding and transportation, a significant loss of volatiles could occur. Although unlikely, the moisture content of 1.7 percent for sample E-1 could indicate improper handling procedures resulting in drying out of the sample.

These observations of irregularities interject an uncertainty into validity of the N-1 and S-1 soil sample TPH analytical results.

"A Photovac TIP (photoionization detector) was used in addition to visual and olfactory means as a preliminary aid to determine the extent of contamination at the site. Soil samples were then collected from the sidewalls and the base of the excavation for analysis to ascertain if the residual hydrocarbon concentrations are of regulatory and/or health risk concern.

Sampling protocol consisted of driving a clean brass sampling tube into the soil removed from the excavation by backhoe. The tubes were capped with nonreactive materials, refrigerated, and transported to the analytical laboratory. **Five soil samples were collected at the end of the day along the sides and the bottom of the excavation. The following samples were analyzed by U.S. EPA Method Modified 8015 for**

Total Petroleum Hydrocarbons (gasoline, diesel, and waste oil components) and by U.S. EPA Method 7421 for lead: 1) a composite of two samples (SW-1 and SSO-1 listed as SW-1 in Table 1) collected along the southwest and east side of the excavation at a depth of 9.5 feet from the ground surface, and 2) sample SNE-1 along the side of the excavation. The sampling locations, depths, dates, and analytical results on all the samples collected to date are summarized in Table 1. Analytical results on all the samples collected to date are included in Appendix C.

COMMENT: *The previous description of soil sampling does not agree with the Chain of Custody and Laboratory Sample Descriptor Abbreviations. It appears that SW-1 and SSO-1 were field composited from 8.0 and 9.5 foot sampling depths from the west wall and submitted to the laboratory as SW-1. Reported sample SNE-1 was laboratory composited from samples SNE-1 and SS-1 obtained from the northeast corner and south wall at a depth of 9.5 feet. Reported sample BW-1 was laboratory composited from Samples BW-1 and BE-1 obtained from the west and east bottom portion of the excavation at a depth of 12.5 feet.*

"A concentration of 4,800 mg/kg TPH was detected in the composite sample collected from the bottom of the excavation at a depth of 12 feet. The excavation was deepened to 16.5 feet as instructed by ACDEH for TPH contamination in the soil in excess of 1,000 mg/kg. Two soil samples (BW-2 and BE-2) were collected from the bottom of the excavation at a depth of 17 feet using the same sampling procedures discussed above. Sample BW-2 showed a concentration of 390 mg/kg TPH and a lead concentration below detection limits. Sample BE-2 showed the concentrations of TPH, toluene, xylene, and lead below the detection limits. The locations of these bottom samples are shown on a final survey diagram of the excavation in Figure 4." (Page 9)

COMMENT: *The reported concentration of 4,800 mg/kg sampled TPH at a depth of 12 feet was actually analyzed as volatile petroleum hydrocarbons as gasoline at a tabulated depth of 12.5 feet (Table 1). Diesel and motor oil are present in the groundwater at this location as indicated by the modified EPA Method 8015 analysis for soil sample BW-2 taken on 9 March 1988 at a depth of 17 feet. Therefore, the actual concentration of TPH is probably higher. If the sample depth is actually 12 feet below grade the analytical results are in significant conflict with the initial tests at a 12 foot depth. Because contaminated soil excavated during the removal of the UST was replaced in the excavation, it is likely that some migration and dispersion of contaminants has occured due to mixing*

of soils and rainfall infiltration since the tank removal in 2 July 1987. However, it is unlikely that a concentration of 4,800 mg/kg TPH would occur solely by migration from contaminated soil.

"Approximately 92 cubic yards of soil were excavated from the site by a state certified hazardous waste hauler. The soil was covered with plastic and transported to Casmalia Ranch, a certified Class I hazardous waste site.

Groundwater which had accumulated in the excavation was pumped out, collected, and transported in a tank truck to M & M Ship Service, San Francisco. Copies of all the related Uniform Hazardous Waste Manifests are included in Appendix D." (Pages 9 and 11)

COMMENT: *Later in this report, Appendix F, the Field Inspection Report indicates on March 9, 1988: "A thick oil sheen was observed on the top of the water accumulated in the excavation. It could not be confirmed whether it was gasoline sheen or waste oil sheen as the sheen was light greenish brown in color." On March 16, 1988 "About 2-1/2 to 3 feet of water was observed at the bottom of the pit. The water was dirty, had thick sludge, oily sheen and some wooden and plastic pieces floating on the surface. (Page F-2)" These observations indicate the presence of significant groundwater contamination by petroleum hydrocarbons. This is the first report by ES on the Postal Service Site that independently (Kaldveer first indicated this possiblity) concluded that significant hydrocarbon contamination is present in the fill material that originated elsewhere.*

The vacuum truck was operated by H & H Ship Service, not M & M Ship Service, according to the Uniform Hazardous Waste Manifest. The manifest also described the contamination as gasoline, diesel and motor oil. The additional materials section includes at note that the estimated quantity of 3,800 gallons was about 99 percent water and less than or equal to 1 percent oils (38 gallons of product).

"The entire excavation was performed without any side support to shore the walls of the excavation. Shoring was not considered necessary based on the past experience of ES engineers working in the same area. ES personnel kept a regular surveillance on movement or stress development in the excavation side walls and the adjacent wall of the USPS warehouse. No such signs were observed during the entire operation. Photographs of the excavation and field inspection notes are presented in Appendices E and F.

The validity of analytical results for soil samples collected below the water table in an excavation was discussed with representatives from the ACDEH (Reference 5) and the RWQCB (Reference 6). Since the concentrations of TPH in bottom-of-excavation samples (16.5 feet deep) were below 1,000 mg/kg, the excavation was backfilled on 16-17 March 1988 following ES specifications (Appendix A). Gravel ranging in size from 1/2-inch to 3/4-inch was dumped into the excavation up to groundwater level without using any additional compactive effort. The rest of the excavation was backfilled using eight-inch layers (lifts) of Type E material (as defined in section 19-3.06 of the CalTrans Standard Specifications, July 1984 edition). This material was compacted to 90 percent relative compaction of California Test No. 216. The compaction was carried out using a vibratory plate-type compactor (HOPAC) fitted on the backhoe extension and operated by the backhoe operator. ES personnel supervised the compaction of the backfill. No tests were performed to evaluate the relative compaction of the backfill material." (Page 11)

Type E fill
100% pass 3"
25-70% pass No
5-20% pass No. 5
0-5% pass #200 sieve

COMMENT: *Although the vertical characterization of TPH has been apparently confirmed, the horizontal extent was never confirmed by appropriate analytical tests (refer to previous comments). It is interesting to note that Monitoring Well No. MW-2 installed in November of 1989 to replace the abandoned monitoring well MW-1 encountered significant contamination (OVM = 120) at a depth of 27 feet in natural sand.*

"The top eight inches of the backfill was paved with Class 2 Aggregate Base, conforming to CalTrans Standard Specifications. Aggregate base was placed in a single lift at optimum moisture content (+/- 1.5 percent) and compacted by 10 complete passes of a 10-ton smooth roller. The subgrade was primed wtih an SC liquid asphalt applied at a rate of 0.3 gal/sq yd. It was surfaced with a 2-inch minimum of asphalt and concrete, compacted, and fog sealed." (Page 11)

CONCLUSIONS AND RECOMMENDATIONS

"Conclusions and Recommendations

* **Analytical results from soil samples collected from the sides and bottom of the excavation indicate that the soil containing TPH concentrations greater than 1,000 ppm (mg/kg) has been effectively removed from the site.**

* **The Emeryville bay front area is widely known to have been filled with materials of questionable origin, and contamination from hydrocarbons, heavy metals and pesticides are known to exist in fill materials on an adjacent property (Reference 2). Observed levels of hydrocarbon contamination in materials below the groundwater table elevation in the tank excavation pit may therefore have originated from within the fill materials and are probably not related to leakage from the underground tank.**

* The highest concentration of dissolved TPH observed in groundwater monitoring well MW-1 was 33 mg/l." (Pages 11 and 12)

COMMENT: *The horizontal extent of TPH contamination greater than 1,000 ppm was not characterized by confirmational laboratory analysis at a depth of 10 to 12.5 feet. Vertical characterization indicates TPH of 6,600 ppm at 10 feet and VPH (gasoline only) of 4,800 ppm at 12.5 feet.*

The potential for offsite contamination from the former Garrett Freightline Site has been recognized by ES. The groundwater contamination is "probably not" from the UST. unlikely true

"Recommendations

* The Regional Water Quality Control Board and Alameda County Department of Environmental Health should be contacted to seek a waiver of the requirement for a downgradient monitoring well. **This recommendation is based on the fact that hydrocarbon contamination is known to exist on adjacent parcels, and that groundwater degradation has already occurred throughout the area and could not be safely attributed to leakage from the UST on this site.**

* Should a waiver of the requirement be denied, a downgradient monitoring well should be installed at the site and sampled quarterly for a period of one year." (Page 12)

COMMENT: *It is the opinion of William Dubovsky Environmental that the black oily floating hydrocarbon product contamination observed at 6601/6603 Bay Street originated from other sites, especially the former Garrett Truck Line site. This ES report provides an independent opinion supporting our position of the known offsite contamination that is affecting the subject site.*

TABLE 1

SUMMARY OF SOIL AND GROUNDWATER ANALYTICAL RESULTS

Sample I.D.	Date Sampled	Depth (ft)	Location of sample	Matrix	Total Fuel Hydrocarbons	EPA Method 8020 Toluene (ppm)	EPA Method 8020 Xylene (ppm)	Lead (mg/kg, dry)
N-1	7/2/87	12	Beneath tanks	Soil	ND	ND	ND	5
S-1	7/2/87	12	Beneath tanks	Soil	ND	ND	ND	4.8
FP-1	7/2/87	3	Beneath product line	Soil	490 ppm	0.90	23	36
MW-5*	7/27/87	5	5' west of UST	Soil	170 mg/kg	NA	NA	NA
MW-10**	7/27/87	10	10' below ground surface	Soil	6,600 mg/kg	NA	NA	NA
MW-1	7/28/87		Monitoring Well 1	Water	200 mg/kg 33	NA	NA	NA
EB-5	4/13/87	7.5, 9	Location on Figure 2	Soil	200 mg/kg	NA	NA	NA
BW-1	2/24/88	12.5	Bottom of excavation (12.5')	Soil	4,800 mg/kg	200	350	17
SW-1	2/24/88	8, 9.5	Sides of excavation	Soil	6.5 mg/kg	0.11	0.25	NA
SNE-1	2/24/88	9.5	Sides of excavation	Soil	520 mg/kg	5.6	78	NA
BW-2	3/9/88	17	Bottom of excavation (17')	Soil	390 mg/kg	56	51	ND
BE-2	3/9/88	17	Bottom of excavation (17')	Soil	ND	ND	ND	ND

* All gas
** Gas, diesel, and waste oil

NA = Not Analyzed
ND = Below Detection Limits

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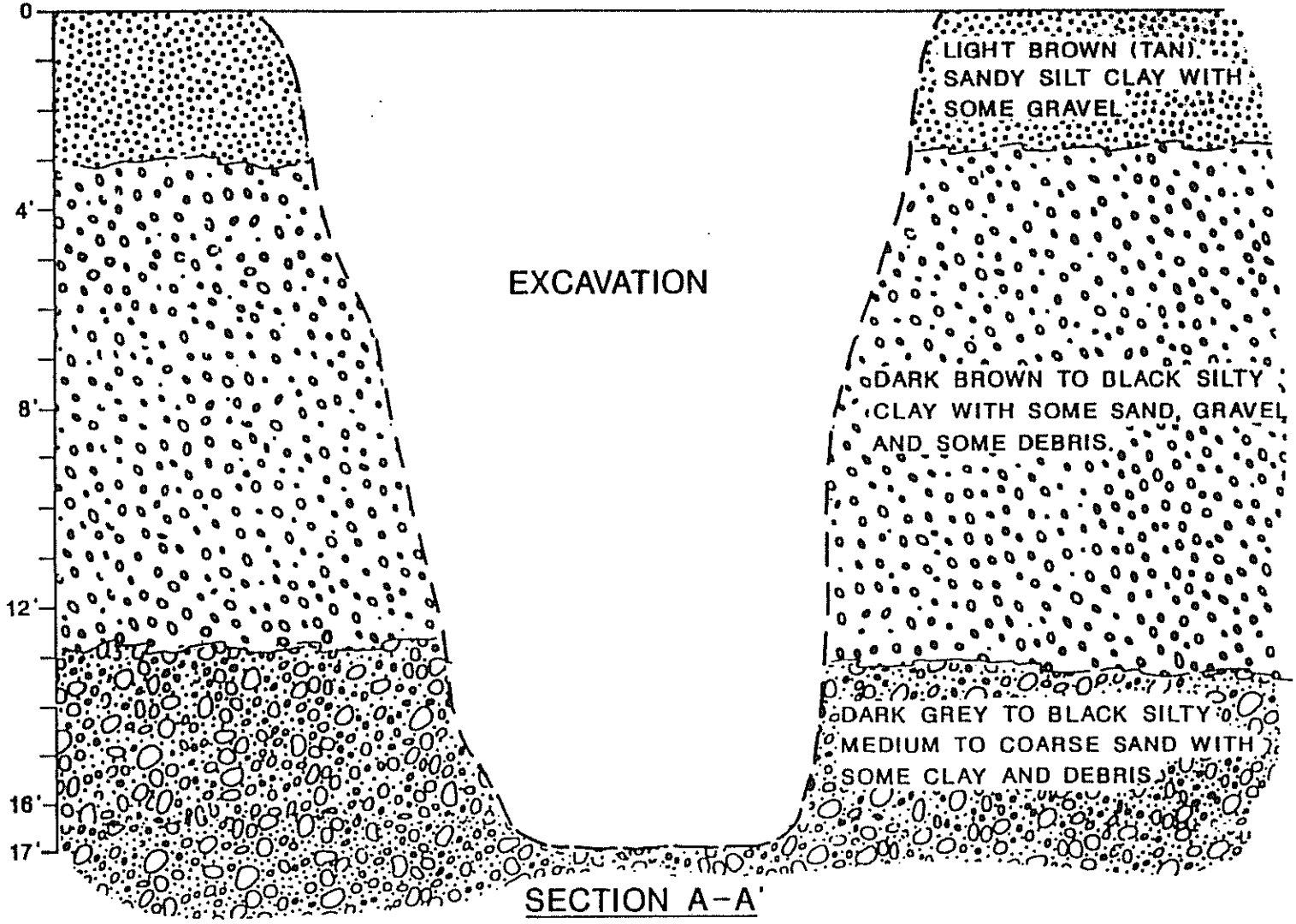
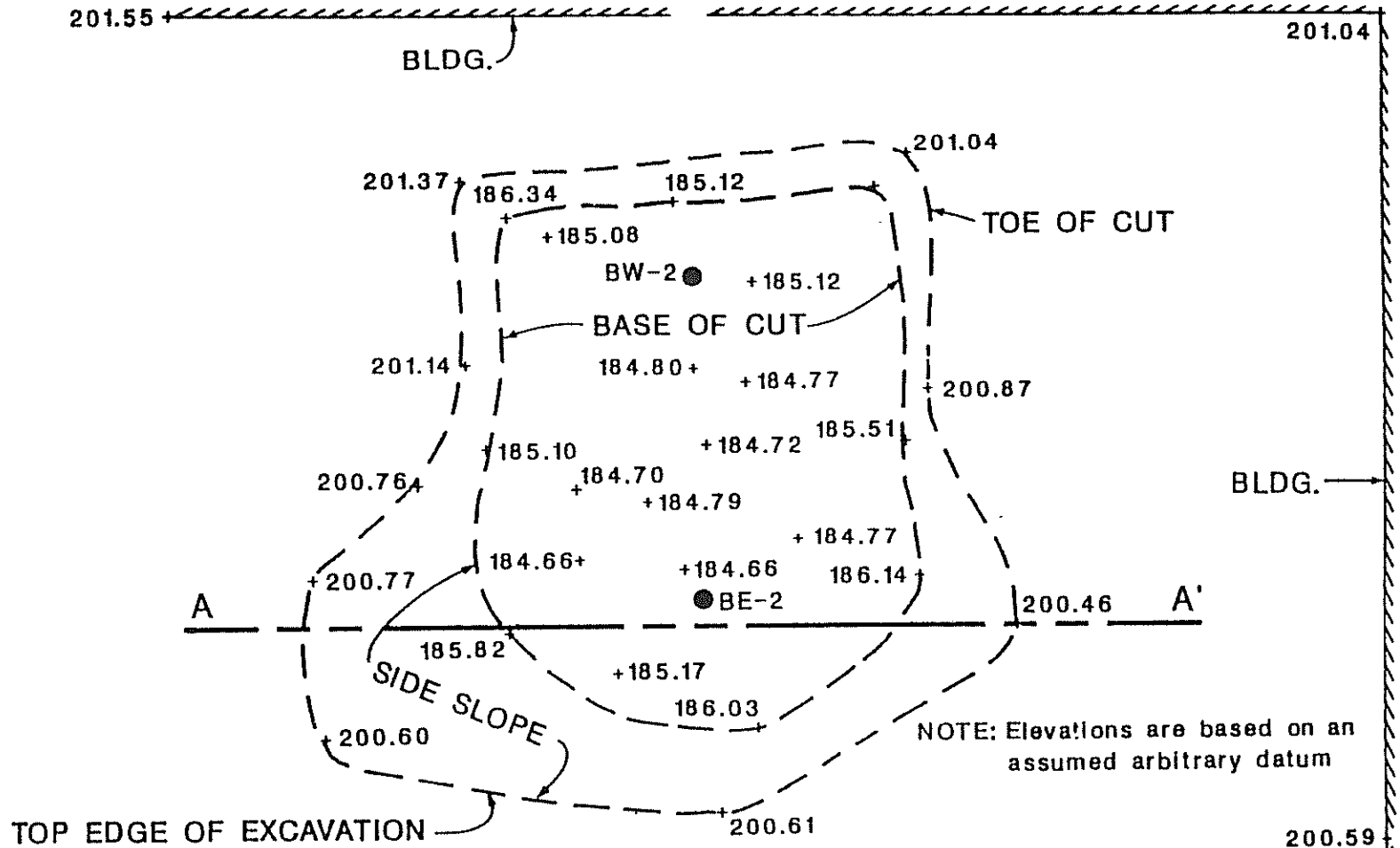
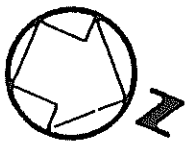


SECTION A-A'

SOIL STRATIGRAPHY ALONG EXCAVATION
1650, 65th Street
EMERYVILLE

FIGURE 3





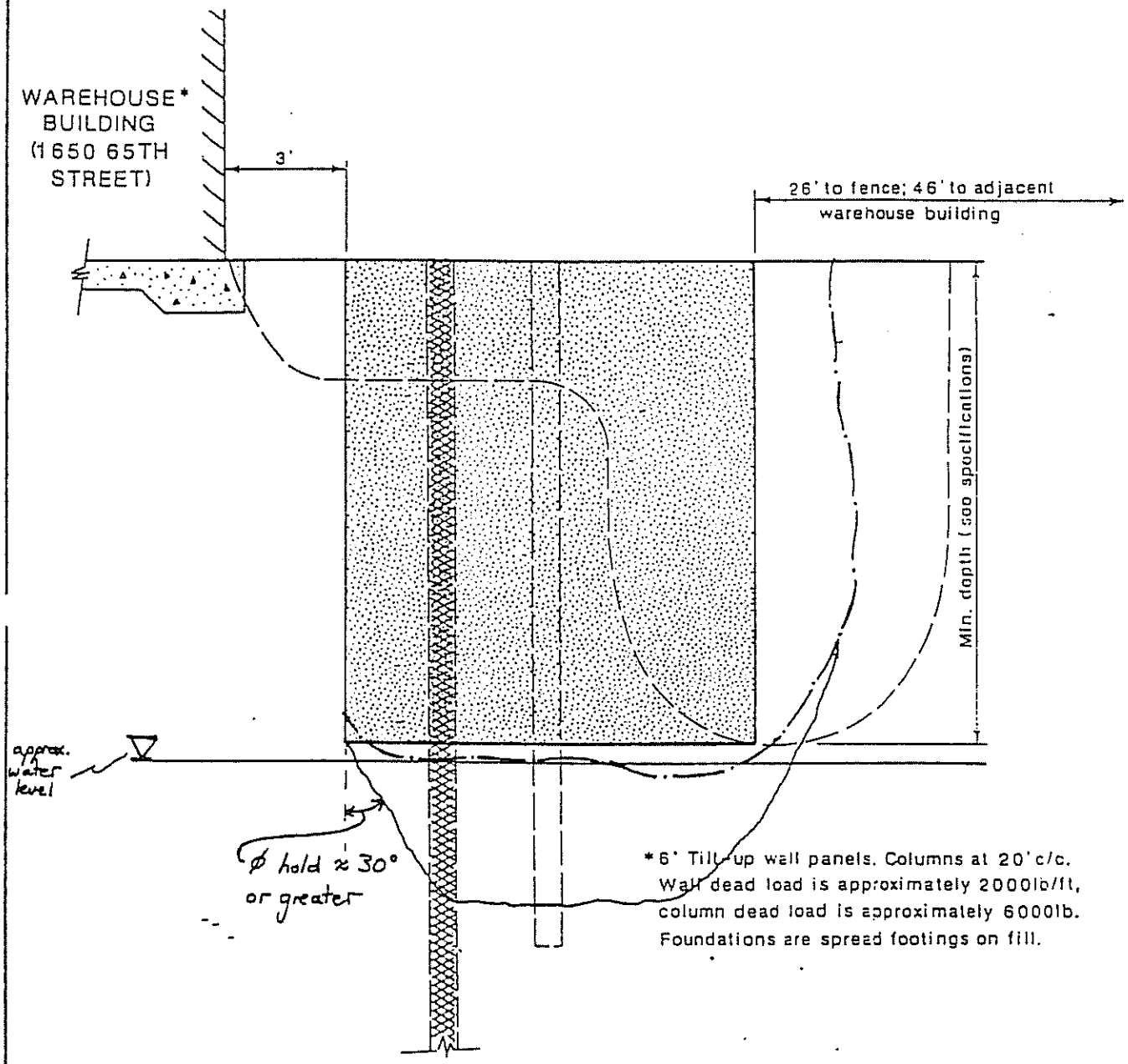
EXCAVATION PLAN AND SAMPLING LOCATIONS 1650, 65th Street EMERYVILLE

LEGEND

- ● SAMPLING LOCATIONS
- \+ ELEVATIONS IN FEET ABOVE AN ARBITRARY DATUM

FIGURE 4

DETAIL OF AREA TO BE EXCAVATED
(CROSS SECTION)



SECTION A
FIG. 2

LEGEND

- AREA OF SOIL TO BE EXCAVATED
- 30' DEEP 8" DIAMETER CEMENT PLUG
- 17' DEEP 8" DIAMETER CEMENTED PLUG
- BOUNDARY OF FORMER TANK EXCAVATION AND UNCOMPACTED SOIL AREA (APPROXIMATE)
- Approximate excavation boundary (3/2/88)
- Final excavation boundary

0 5
SCALE IN FEET

ENGINEERING-SCIENC

APPENDIX F

FIELD INSPECTION NOTES

PROJECT NUMBER: NC049

CLIENT: Benefit Capital Corporation (BCC)
1330 Broadway, Suite 500
Oakland, California 94612

PROJECT LOCATION: 1650 65th Street
Emeryville, California

NATURE OF THE JOB: Monitoring remedial action work associated with fuel hydrocarbon leakage at the southeast corner of the 1650 65th Street property, Emeryville, California

February 24, 1988

"Riedel Environmental Services (RES) used backhoe for excavation. Excavation started at 8:35 a.m. Photovac readings were taken periodically near the excavation, at backhoe operator's level, downwind/upwind from the excavation. Colorimetric tubes were used to determine the concentration of Benzene in the air. These readings were taken to determine if respiratory protection was required at the site. **Excavation was carried out to the depth of 12.5 feet.**

Four truck loads of excavated soil were transported from the site to Casmalia Ranch using the special kind of lined and covered trucks. The manifest numbers used for the trucks are 87611838, 87611839, 87611840 and 87611841. The rest of the excavated soil was stockpiled on 10 ml thick plastic liners. The boundaries of the plastic liners were raised 3 to 4 inches to avoid runoff. These stockpiles were covered with plastic liners at the end of the day.

Groundwater level was found to be 12.5 feet from the surface. At the end of the excavation the contractor (RES) was asked to clean the hole. **Five soil samples were taken at the end of the day. All the samples were collected using sampling**

protocol described in the proposal for the same job. Barricades were placed around the site marking it as a hazardous site." (Page F-1)

COMMENT: *The depth of excavation was 12.5 feet where groundwater was encountered. The soil samples were obtained by inserting a clean liner into soil obtained from the location to be sampled by the backhoe bucket. The soil samples were collected at the end of the day. This procedure and the time of sampling may have allowed the loss of the more volatile hydrocarbons. The results of this sampling should be interpreted as a minimum level of contamination with actual contamination possibly somewhat higher.*

March 9, 1988

"Prior to the excavation, the ground surface and adjacent building walls were checked for any cracks or stress development. No cracks were observed in the wall or the ground surface adjacent to the hole. The excavation walls were standing erect without any shoring. Adjacent wall and ground surface was monitored periodically throughout the day but no cracks were observed in either the ground surface or the wall. The excavation started at 8:20 a.m. **Strong gasoline odor was smelled at the top of the excavation.** Periodic photovac and colormetric tube readings were taken throughout the day.

No water was observed in the excavation at the beginning of the day. Water started pouring in the excavation pit at a depth of 13.5 feet.

COMMENT: *The soil profile described in the report indicates a clay fill to a depth of 13.5 feet underlain with silty sand. It is thought that the clay acts as aquitard that partially confines the groundwater during the higher groundwater levels. The reasoning for this is the location of the groundwater levels generally about 12.5 feet at previous times and the "pouring in" of the groundwater once the clay overburden was removed from over the silty sand. The partially confined aquifer provides a potential channeling or controlling mechanism for the dispersal of floating hydrocarbon product in this area.*

The contractor had brought 20 bags of Solid-A-Sorb (sorbent material) to take care of runoff from the excavated soil. The excavated soil was stockpiled on the plastic membrane spread adjacent to the excavation. The boundaries of this liner were raised to check runoff.

Gasoline odor continued to be strong the whole day. The soil at the bottom of the pit was found to be dark grey to black sany silt to medium sand. A thick oil sheen was observed on the top of the water accumulated in the excavation. It could not be confirmed whether it was gasoline sheen or waste oil sheen as the sheen was light greenish brown in color.

Three truckloads of excavated soil were transported to the Casmalia Ranch site using special bottom-lined and top-covered trucks, each having a capacity of 55 cubic yards or 25 tonnes. The manifest numbers used for the trucks are 87338167, 87338168, 8761190. All the trucks were weighed and extra soil removed before they were transported to Casmalia Ranch.

The depth of excavation was periodically checked. The contractor was asked to stop the excavation at the depth of 16.5 feet all over the site. The hole was cleaned at the end of the day. Backhoe was used to scoop out the soil from the bottom of the hole.

Soil samples were taken in brass liners following all the sampling protocols as described in the proposal.

All the excavated soil was transported from the site and the site area was properly cleaned. Barricades were put again around the excavation marking it a danger zone. The dimensions of the pit were measured at the end of the day. The plan showing the excavation boundaries and the sampling locations have been included." (Pages F-1 and F-2)

COMMENT: *It is noted that a strong gasoline odor was noted at the beginning of the job and throughout the day. As groundwater was not present in the excavation at the beginning of the day and it had been 13 days since the first stage of the excavation, significant gasoline contamination was still present in the soil. Even after excavating the soil from three to four feet below groundwater the smell of gasoline was still strong. It appears that significant contamination was/is present in the sidewalls between the 10 to 12.5 foot depth as previously discussed.*

A thick oil sheen was noted on the groundwater. The groundwater must have been significantly contaminated for this sheen to show up immediately upon excavation.

March 16, 1988

"No cracks were observed in the ground surface and building walls adjacent to the pit. The walls of the pit were standing

erect, with any signs of movement.

About 2-1/2 to 3 feet of water was observed at the bottom of the pit. **The water was dirty, had thick sludge, oily sheen** and some wooden and plastic pieces floating on the surface.

The contractor removed two panels of fence toward the southest corner of the enclosed area to bring in gravel. At 8:16 a.m. two surveyors arrived at the site. They to readings and left the site at 9:19 a.m. Meanwhile the water from the excavation was being pumped into a special truck for transporting dirty water. The pumping activity continued until 11:00 a.m., stopping intermittantly to clean the blockage in the suction pipe. 3,800 gallons of water was pumped from the site and transported under manifest number 87338168. **At the end of pumping there was still a 3- to 4-inch layer of water left at the bottom of the hole. This layer was relatively clean as all the sludge floating on the top had been removed through pumping.**

COMMENT: *No indication of floating product flowing into the hole is noted. However, the thick sludge and oily sheen indicate that some floating product as well as dissolved hydrocarbon contamination was present in this area and was accumulating in the pit due to the partially confined aquifer.*

Appendix E, Photographs of Excavation, contains Picture Nos. 5 "Sludge on Top of Water in Pit" and 6 "Excavation Dewatering." The oily sludge on the groundwater shown by the pictures is similar to that observed in the excavation at 6601/6603 Bay Street.

The Uniform Hazardous Waste Manifest for transportation of the oily sludge and groundwater from the excavation by H and H Ship Service indicates an estimated waste content of 99 percent water and less than or equal to 1 percent oils. 1 percent oil is the same as 10,000 ppm. This actually is not to far off from the 6,600 ppm TPH at a depth of 10 feet in the abandoned borehole.

The contractor started backfilling the hole at 11:00 a.m. gravel ranging in size from 1/2 to 3/4 inches was dumped in the hole up to approximately 13-1/2 feet from the ground surface. This is about the depth of groundwater table measured at this site. Gravel was dumped in one single layer without any kind of compaction. The top surface of this layer was smoothened using a vibratory plate compactor (Hopac) attached to the backhoe arm. Above this level Caltrans-specified Type E material was used as backfill material. No grain size analysis was made to determine if the material conformed to the standards. This material was dumped in the

excavation in approximately 10- to 12-inch layers. The thickness of these layers could not be confirmed as the material was dumped in one place and then smoothed out all over the excavation pit. Moreover, the contractor had no arrangement of takingt out the gravel from the excavation pit. **Each layer was compacted using vibratory compactor until the top of the layers showed a thin film of water.** Relative compaction and the water content of the backfill was not checked. The hole was filled up to a depth of 8 feet from the ground surface. A temporary fence was installed where the contractor had removed the existing permanent fence. The area was barricaded." (Page F-2 and F-3)

March 17, 1988

"Excavation backfilling started at 8:00 a.m. The material used was Caltrans standard Type E. The material was compacted in the layers about 10 to 12 inches thick. Compaction was achieved using a vibratory hammer. No tests were done to determine the relative compaction and water content of the backfill material. **However, it was confirmed that the backfill material was compacted until the water present in the voids showed on the surface.** Excavation was backfilled to the surface at 12:30 p.m. The site was cleaned off after completion of the work. Barricades were removed, and the removed fence was put back in place." (Page F-3)

COMMENT: *The water content in the compacted fill was way over optimum if it showed on the surface. Relative compaction was probably in the range of 80 to 90 percent.*

April 1, 1988

"Asphalt pavement was restored by contractor according to specifications." (Page F-3)

Reference No. B-6

REGULATORY COMPLIANCE AND COMPLETION OF REMEDIAL ACTION FOLLOWING UNDERGROUND STORAGE TANK (UST) REMOVAL AT 1650-65TH STREET IN EMERYVILLE

DATE: 26 May 1988; Ref: NC049.11

TO: Benefit Capital Corporation

ATTN: Mr. Ron Schwartz and Mr. Anthony Duckworth

BY: Engineering Science, Inc.

EXCERPTS AND COMMENTS:

"The underground storage tank (UST) investigation at 1650-65th Street in Emeryville was conducted strictly according to guidelines established by the State of California (Title 23, Chapter 3, Subchapter 16, August 1985) under the authority of the Regional Water Quality Control Board (RWQCB). The regulation are clear as to where soil samples are to be taken to test for UST leakages. If soil contamination is found above a certain concentration, the soil is to be excavated. After excavating, samples of soil are taken to demonstrate that the remaining soil surrounding the tank is clean, and if so, the excavation can be filled. UST closure guidelines from the RWQCB are routinely followed in UST investigations and closures.

The lead agency for this site is the Alameda County Department of Environmental Health, Toxics Division (County). All work plans and reports are submitted to the County for review and approval. Once the work plan is reviewed and approved, subsequent reports are reviewed to see if they have carried out the approved remedial program outlined in the work plan. As unanticipated changes in the proposed work plan occur during its implementation, they are discussed with the county and approved prior to changing the scope of work outlined in the original plan." (Page 1)

REMEDIATION HISTORY

"The tank excavation and removal at the 1650-65th Street site were described in an Engineering-Science (ES) report to the Benefit Capital Corporation (BCC) dated 21 August 1987. Soil samples were collected at the required depths and locations (both the tank pit and product line) and analyzed as required for total fuel hydrocarbons by EPA method 8015 (modified), for aromatic volatile organic compounds by EPA metod 8020, and for lead. Only the sample taken from beneath the product line showed a significant level of contamination (490 ppm) with petroleum hydrocarbons, requiring that installation of a groundwater monitoring well, according to RWQCB guidelines." (Pages 1 and 2)

COMMENT: *It has been noted previously in Reference B-5 that apparent irregularities in soil sample test results and in handling procedures prior to analyzation interjects an uncertainty into the validity of the non-detect TPH values for samples under the UST.*

"During the well installation, soil samples were taken at five foot intervals down to the groundwater level (as per guidelines). The sample taken from a depth of 10 feet contained 6,600 ppm fuel hydrocarbons, well over the 1,000 ppm level at which soil excavation is required. Groundwater sampled from the well tested at 33 ppm fuel hydrocarbons, approximately one third of the saturation level for gasoline in water. Since the water monitoring well was located in the middle of the required excavation area, its closure prior to excavation was required.

A work plan for the monitoring well closure and soil excavation was submitted to the county for review and approval on 18 December 1987. The well was abandoned according to RWQCB specifications in late January and the contaminated soil was excavated by Riedel Environmental Services, Inc. on 24 February 1988. Once the excavation reached a depth of 12.5 feet, samples were taken from the sides and bottom, and analyzed for petroleum hydrocarbons. A composite analysis fo the bottom samples determined a concentration of 4,800 ppm petroleum hydrocarbons (gasoline by modified EPA Analytical Method 8015). After consultation with the RWQCB, further excavation was recommended over the installation and long-term operation of a groundwater extraction and treatment system, because excavation removes the source of contamination." (Page 2)

COMMENT: *Based on soil testing from the abondoned borehole within the soil removal excavation, a TPH of 6,600 ppm was present at a*

depth of 10 feet. As noted above, the soil VPH as gasoline was 4,800 ppm at a depth of 12.5. However, the sidewall soil samples were obtained from a depth of 8 to 9.5 feet--above the vertically defined highly contaminated soil. Therefore, the horizontal extent of the hydrocarbon contamination exceeding 1,000 ppm TPH was not characterized.

> "Excavation continued on 10 March 1988 to a depth of 16.5 feet (approximately 2 feet below the groundwater level). Two soil samples were taken from the bottom of the excavation. Gasoline was not detected in one, and was present in the second at a concentration of 390 ppm, well below the 1,000 ppm which would require further excavation. These results met the County and RWQCB criteria for site remediation, therefore the excavation was backfilled according to engineering specifications. A final report was written and submitted to the County Health Department and BCC on 6 April 1988." (Page 2)

COMMENT: *The Field Inspection Notes (Reference No. B-5) indicate the presence of a "thick oily sheen" on the groundwater flowing into the excavation during the removal of soil. Thirteen days after the initial excavation below groundwater, a "thick sludge, oily sheen" was noted floating on the groundwater surface. No discussion in this letter addresses the presence of this contamination or how it relates the previously removed UST or off-site contamination.*

> LETTER OF COMPLIANCE
>
> "Engineering-Science has carried out the required site remediation for leaky underground storage tanks, and has followed County and RWQCB guidelines in the process. The County has agreed to prepare a letter which states that the work plan as approved by the county for the removal of the UST and remediation of hydrocarbon contamination, has been carried out as proposed." (Pages 2 and 3)

Reference No. B-7

COUNTY ACCEPTANCE LETTER OF THE HEALTH AND SAFETY

PLAN AND IMPLEMENTATION OF REMEDIAL ACTION REPORT PLAN

DATE: June 13, 1988

TO: Mr. Dan B. McCullar
Engineering-Science Inc.
600 Bancroft Way
Berkeley, CA 94710

FROM: Alameda County Health Care Services
Rafat A. Shahid, Chief,
Hazardous Materials Program

EXCERPTS AND COMMENTS:

"Thankyou for your submital of a Health and Safety Plan and an Implementation of Remedial Action Plan Report in regards to the underground tank removal project at 1650 65th Street, Emeryville. **It is the opinion of the Alameda County Environmental Health, Hazardous Materials Unit that the work performed meets the requirements of the California Administrative Code, Titles 22 and 23.**

Please be aware that final approval for the soil mitigation actions conducted at this site is the responsibility of the Regional Water Quality Control Board. It is to this agency that you should direct your request for a waiver concerning the requirement of a downgradient monitoring well.

If you have any questions concerning this matter, please contact Dennis Byrne, Hazardous Materials Specialist, at 271-4320." (One Page)

COMMENT: *The county has accepted the removal of the contaminated soil as adequate. No mention is made of groundwater contamination or of the high levels of TPH soil contamination just above the groundwater. Final approval is reserved for the State Water Quality Control Board.*

Reference No. B-8

IMPLEMENTATION OF REMEDIAL ACTION PLAN REPORT RECOMMENDATIONS

DATE: 24 June 1988; Ref: NCO49.10

TO: Mr. Greg Zentner
Regional Water Quality Control Board
1111 Jackson Street, Room 6040
Oakland, California 94607

BY: Dan B. McCullar, Project Manager
Engineering Science, Inc.
600 Bancroft Way
Berkeley, California 94710

EXCERPTS AND COMMENTS:

"A copy of the Implementation of Remedial Action Plan Report for United States Postal Service Site at 1650-65th Street, Emeryville, California is enclosed for you to review. Please note that under Recommendations on page 12, Engineering-Science has recommended that our client seek a waiver of a downgradient monitoring well following site remediation. **This recommendation is based on the successful excavation of contaminated soil form the underground storage tank area, and because of evidence that groundwater degradation has already occurred throughout the area from hydrocarbon contamination on nearby parcels.**

It would be greatly appreciated if you could review the enclosed document at your earliest convenience and give careful consideration to our clients request for a waiver. Please call if you require any clarifications or additional information with regards to this request." (One Page)

COMMENT: *Again, groundwater degradation from hydrocarbon contamination is noted to have occured throughout the area from nearby parcels.*

Reference No. B-9

GROUNDWATER CONTAMINATION INVESTIGATION

1650 65TH STREET PROPERTY

EMERYVILLE, CALIFORNIA

DATE: 26 December 1989; Ref.: NC222.05

TO: P.O. Partners
Emeryville, California

BY: Engineering-Science, Inc.

NOTE: This report was reviewed in the Alameda County Health Department Offices on March 6, 1990. A new policy regarding obtaining copies of reports was being implemented. A copy of the report could not be obtained without written permission from the property owners or unless a written request based on the "Freedom of Information Act" was processed. Therefore, only selected paraphrased portions of the text of the report are discussed. Copies of the boring logs, site plans and tables summarizing the analytical results were previously obtained and are also reviewed.

REVIEW OF TABLE 2.1

GROUNDWATER "GRAB" SAMPLE ANALYTICAL RESULTS
1650 65th Street Property
10 November 1989

Nine soil borings were drilled to groundwater which was encountered at a depth of 7.5 to 11 feet below grade except for GW-1 which encountered drilling refusal at 9.5 feet.

Of the eight grab samples, four were non-detect (<50 ppb)for gasoline, three indicated low concentrations of 100 to 170 ppb, and one, GW-8, encountered free product with a 94,000,000 ppb concentration. Borehole GW-8 was located adjacent to the north wall of the warehouse building about 30 feet south from the west end of the tank removal excavation at the 6601/6603 Bay Street Properties. Monitoring Well MW-5, which was non-detect for gasoline but relatively high for benzene (74 ppm), is located about

50 feet west of GW-8.

It is unknown what procedure was used in obtaining the grab samples. However, a lower confidence level of obtaining representative results is placed on a borehole sample versus a properly purged and developed monitoring well.

The text of the report basically says that groundwater grab sample GW-8 and well MW-5 suggests that contaminantion associated with the UFST on the adjacent property has migrated onto the 1650 65th street property. The groundwater flow is reported as southwest and south. A further observation in the report indicates that the groundwater in the open pit at 6601/6603 Bay Street looks the same as the groundwater sample obtained from GW-8. The conclusion is drawn that groundwater remediation is likely to be required in the vicinity of the off-site UFST's and sample location GW-8 and that further characterization and remediation of groundwater contamination in this area should be conducted by the adjacent property owners.

COMMENT: *The presence of hydrocarbon contamination of the groundwater is undisputed at the west end of the underground fuel storage tank excavation at the 6601/6603 Bay Street Properties. However, strong evidence against the possibility of a gasoline leak sufficiently large enough to develop 94,000,000 ppb gasoline contamination from the 6601/6603 Bay Street Properties UST's indicates that it is more likely then not that the floating gasoline product originated elsewhere. The analytical methods used for the determination of gasoline contamination do not provide for determining the diesel and oil hydrocarbon contamination which backflowed into the 6601/6603 Bay Street UST excavation.*

Review of Table 3.2

GROUNDWATER SAMPLING ANALYTICAL RESULTS
Groundwater Monitoring Wells MW-2, MW-3, MW-4, and MW-5
1650 65th Street Property
20 and 21 November 1989

Also at this time four monitoring wells were constructed with MW-2 located next to the excavated soil and tank removal site at the southeast corner of the warehouse; MW-3 was located at the westerly end of the site; MW-4 was located on the south side of the warehouse near the east-central portion of the site; and MW-5 was located near the north boundary of the site and about 50 feet west of GW-8.

Of the four monitoring wells, MW-2, located next to the former UST, had the highest concentration of gasoline contamination of 100,000 ppb. MW-3 and MW-4 had low concentrations of gasoline of 130 and 200 ppb respectively. As indicated above, MW-5 was <50 ppb (ND) for gasoline but exhibited a significant concentration of Benzene at 74 ppb.

The carcinogen Benzene was present in all wells above the Maximum Contaminate Level (MCL) of 1 ppb (8400, 2.2, 2.3 and 74 ppb for MW-2 through MW-5).

COMMENT: *The highest level of contamination encountered of 100,000 ppb gasoline in MW-2 is of interest. The monitoring well is installed within the boundaries of the remedial soil excavation where contaminated soil was removed and disposed of at Casmalia Ranch. The excavation pit was then backfilled with compacted clean sandy aggregate fill. The initial monitoring well constructed at this location, MW-1, indicated a groundwater contamination of 33,000 ppb gasoline. Previous soil samples (ppm converted to ppb) indicated 490,000 ppb three feet below surface under the product line; 170,000 and 6,600,000 ppb at 5 and 10 feet below surface at the abandoned borehole; 4,800,000 ppb gasoline at 12.5 feet--the initial bottom of the excavation; and, 390,000 ppb gasoline, 23,000 ppb diesel and 13,000 ppb oil at 17 feet--the final bottom of the excavation. Based on these numbers and even though 90 plus yards of contaminated soil was removed from around the MW-2 location, the groundwater gasoline contamination has increased by a factor of three. This is interpreted as indicating that a plume of contaminated groundwater passes under this site at this location.*

When the 100,000 ppb gasoline contamination at MW-2 is compared to

the gasoline contamination at the GW-8 borehole of 94,000,000 ppb it is apparent why the source of the contamination was inferred to be from the former adjacent UST's at 6601 and 6603 Bay Street.

A short preview of the Garrett Freightliner Site (GFS) further described in Appendix C is appropriate at this point. The maximum soil contamination at the GFS was 5,250,000 ppb as gasoline (EPA 5020/8015) at the north end of the excavation about 300 feet from the 1650 65th Street former UST. The groundwater contamination in the GFS excavation was 240,000 ppb gasoline or 2.4 times that of the 1650 65th Street MW-2. Also on the GFS site, adjacent to the former tanks, MW-A exhibited a groundwater contamination of 460,000 ppb gasoline or 4.6 times that of the 1650 65th Street MW-2. It is pointed out that the analytical tests are limited to revealing the presence of gasoline. The most northerly former GFS tankage consisted of four 12,000 gallon diesel, two 10,000 gallon diesel and one 6,000 gasoline tanks. It is unbelievable that with 68,000 gallons of diesel storage and 6,000 gallons of gasoline storage that analytical tests on the GFS site would only be performed for a gasoline standard. It was also noted in the report for the GFS tank removals that one-half inch of diesel product was floating on the groundwater when the tanks were removed.

Groundwater hydrocarbon contamination is generally widespread for the properties located on the filled in area between the freeway to the west and the railroad tracks to the east.

Monitoring Well Boring Logs

The drilling for Monitoring Well Nos. MW-2 through MW-5 took place on 28 September, 14 November, 15 November and 16 November 1989, respectively. The driller was ASE Drilling, Inc. and a 10.75-Inch O.D. hollow-stem auger was used to drill the holes.

The following table compares several characteristics of the monitoring wells and the closest groundwater grab sample boreholes.

MONITORING WELL CHARACTERISTICS				
CHARACTERISTIC	MW-2	MW-3	MW-4	MW-5
Total Depth, ft.	32.7	22.0	19.0	21.5
Depth to Groundwater, ft.	12.0	8.0	8.5	8.0
Depth of fill below groundwater level, ft.	10.0	5.0	3.0	3.5
Maximum Organic Vapor Meter Reading, OVM	120 at 19 and 27'	67 at 11'	8 at 13.5'	0
Depth of detectable OVM readings	30 @ 10' to 120 @ 27'	67 @ 11' to 3 @ 16'	8 @ 13.5' to 1 @ 15'	0
Soil Classification at higher OVM readings	Black Sand Fill /Brown Sand	Black Silt Fill	Grey-Green Sand	n/a
Gasoline, ug/L	100,000	130	200	ND (<50)
Nearest Grab Sample Borings	GW-6 GW-7	GW-5	GW-2	GW-8
Gasoline, ug/L Grab Samples	ND (<50) ND (<50)	120	ND (<50)	$94x10^6$
Depth of Grab Samples, ft	9 - 10	8 - 9	9 - 11	7.5 - 8.5

TOTAL DEPTH, FT.

The total depth of the monitoring wells varies from 19.0 to 32.7 feet. The depth of the groundwater grab sample boreholes varies from 8.5 to 11 feet.

DEPTH TO GROUNDWATER, FT.

The depth to groundwater in the monitoring wells varies from 8.0 to 12.0 feet. The relative ground surface is about 4 feet higher for MW-2 then the other three wells. The depth to groundwater in the groundwater grab sample boreholes is not indicated but should be similar to the monitoring wells.

DEPTH OF FILL BELOW GROUNDWATER LEVEL, FT.

A significant difference is noted in MW-2 with 10 feet of fill below the groundwater table. The other monitoring wells have 3 to 5 feet of fill located below the groundwater level. This indicates that the natural soil surface at MW-2 is 5 to 8 feet lower then at the surrounding areas. In reports reviewed for properties to the south between 64th and Powell Street, a slough is delineated on the site plans. It is inferred that a slough, tidal pool or small estuary was present at the location of MW-2.

This physical feature may have considerable influence upon local groundwater flow. It is also noted if petroleum product discharges occured prior to the area being filled this is a natural collection feature. Because it has been filled with debri laden sand, silt and clay, it may also collect and channel petroleum products within the more permeable materials. Two distinct levels of high Organic Vapor Meter readings are exhibited in MW-2. One is about five feet below the original natural surface. This zone may have received hydrocarbon contaminants prior to the placement of fill.

MAXIMUM ORGANIC VAPOR METER READING, OVM

The Organic Vapor Meter (OVM) readings give a relative indication of the presence of certain volatile organic hydrocarbons. Without knowing the calibration standard, the actual concentration ranges of volatile organics is unknown. Positive OVM readings were obtained in three of the four monitoring wells. No detectable OVM readings were obtained at MW-5 which is the closest of the four wells to the 6601 and 6603 Bay Street former UST's and about 50 feet west of GW-8 exhibiting floating product analyzed as

94,000,000 ppb gasoline.

Monitoring Well MW-2
Monitoring Well MW-2 with a groundwater gasoline contamination concentration of 100,000 ppb exhibited the first OVM reading of 30 at a depth of 10 feet or 2 feet above the groundwater level. At 12 feet (groundwater level), the OVM reading was 44 and at 19 feet it was 120 in sand fill underlain by clay fill. The underlying clay fill exhibited an OVM reading of 17 at a depth of 21 feet. This was followed by a OVM reading of 4 in natural sandy silt at a depth of 23 feet. The OVM reading in natural brown fine sand peaked at 120 at a depth of 27 feet. The sand was underlain by clay. The last reading for OVM indicated 0 at a depth of 31 feet in sand.

It is noted that OVM readings were detectable in the vadose zone above the groundwater level. Previous soil samples at this depth and location indicated a TPH of 6,600 ppm. The OVM readings were the highest where sandy material was located over clay material. A partially confined aquifer exists with either fill or natural clay material acting as a partial aquiclude. MW-2 is the only well that exhibited detectable OVM readings above or near the groundwater surface.

It is noted in Monitoring Well MW-2 that two distinct levels of hydrocarbon contamination are present as indicated by Organic Vapor Meter Readings of 120 each. The lowest level is within a brown fine sand overlying a mottled brown-orange silty clay. The OVM reading was obtained about five feet below original natural ground surface. The upper level is Black silty very fine sand fill underlain by a mottled tan-brown silty clay fill. The OVM reading was taken about 2 feet below the bottom of the brown fine to coarse sandy gravel compacted fill replacing the previously excavated contaminated soil. This upper level is located about seven feet below the groundwater level.

Monitoring Well No. 3
Monitoring Well No. 3 with a groundwater gasoline contamination of 130 ppb first exhibits an OVM reading (67) at a depth of 11 feet or three feet below the groundwater surface in silt fill. The silt was underlain by natural clay which exhibited an OVM reading of 17 at a depth of 13.5 feet. The clay was underlain by sand with an OVM of 3 at 16 feet. An OVM reading of 0 was present at depths of 18, 20 and 21 feet. Again, positive OVM readings were obtained in silt fill overlying clay and in natural sand material.

Monitoring Well No. 4
Monitoring Well No. 4 with a groundwater gasoline contamination of 200 ppb first exhibits an OVM reading (8) at a depth of 13.5 or

five feet below the groundwater surface in natural sand. The sand is underlain by clay with an OVM of 5 at 14 feet and 1 at 15 feet. Further OVM readings at 17 and 19 feet register 0. This well indicates contamination in the natural sand at a depth of five feet below the groundwater surface but no contamination in the overlying fill materials.

Monitoring Well No. 5

Monitoring Well No. 5 with a non-dectable gasoline contamination of less than 50 ppb was also non-dectable for OVM readings. A stratigraphic correlation can be made between MW-4 and MW-5 which are oriented parallel with the railroad tracks to the east. At MW-4 from a depth of 11.5 to 13.5 feet, grey-green clayey fine sand with abundant shell fragments occurs. At MW-5 from a depth of 15.5 to 17.5 feet, dark gray-green fine sand with abundant shell fragments occurs. The relative difference in elevation is about 4 feet. Because the ground surface at MW-4 is about 2.5 feet higher than MW-5, the actual difference is about 6.5 feet. It is inferred that the natural surface when the sea shells were deposited was about 6.5 feet lower at MW-5 than at MW-4. This correlates with previous information in Appendix D indicating that the depth from top of fill at the northern end of the filled in area between Powell Street and Ashby Avenue was 5 to 10 feet greater then at the southern end.

DEPTH OF DETECTABLE OVM READINGS

Although covered in the previous section, it is noted that except for MW-2 with very high contamination levels, the first positive OVM readings occured 3 and 5 feet below the surface of the groundwater. This is important because the groundwater grab samples obtained from borings GW-2 through GW-9 were taken from the uppermost few feet of the groundwater. It is also interesting to note that the highest level of gasoline contamination also had the greatest vertical extent of OVM levels (MW-2 for 17 feet vertically). MW-3 and MW-4 had vertical OVM readings of 5 and 1.5 feet respectively. This indicates a significant stratification of contamination. If pure product is present in the groundwater as indicated at GW-8 and the floating diesel product in the Garrett Freight Lines tank removal excavations, a significant potential exists for widespread, but locally concentrated, hydrocarbon fuel contamination to occur.

NEAREST GRAB SAMPLE BORINGS

A comparison is made between the grab sample borings and the monitoring wells for gasoline contamination concentration and depth of collection. Only the MW-3 and GW-5 pair, separated by a

distance of 25 feet, give comparable gasoline contamination results--130 and 120 ppb respectively. The other paired Monitoring Wells and Grab Sample Borings, separated by 50 to 80 feet, give opposing results--if one has contamination, the other is non-detect. This occurs even for the highest levels of contamination, GW-8 with 94,000,000 ppb and MW-2 with 100,000 ppb gasoline contamination.

It is noted that the groundwater grab samples are obtained above the level of detectable OVM readings in all the corresponding monitoring wells except MW-2. Therefore, the groundwater grab samples may represent the lower levels of TPH contamination present in the upper one to two feet of groundwater.

Conversely, the use of groundwater grab samples may increase the apparent level of contamination if floating product is present as in GW-8. If gasoline product is present floating on the groundwater surface and the sample depth is only one or two feet, the chance for dilution is very small. However, as in Monitoring Well MW-2, about 28 feet of screened casing extends below the groundwater surface. If the well is properly purged of 3 to 5 well volumes and then allowed to equilibriate prior to sampling, a sample is obtained that represents a much greater depth range of groundwater containg much less product (maxium dissolved gasoline in water is about 100 ppb) with a resulting lower concentration. For example, if 3.0 feet of water with a gasoline concentration of 100 ppb is sampled with 0.001 feet of pure gasoline product, the average concentration is 333,00 ppb contamination. However, if only 1.0 foot of water with a gasoline concentration of 100 ppb is sampled with 0.001 feet of pure gasoline product, the average concentration is 1,000,000 ppm. For illustrative purposes and simply put, the average concentration of the groundwater sample is a ratio of the effective sampled height of the groundwater column in the well if the depth of floating product remains the same.

In conclusion, the 1650 65th Street property exhibits a complex geohydrological regime of heterogeneous fills with widespread hydrocarbon contamination. Analytical laboratory tests indicate the background contamination as measured by a gasoline standard ranges from less than 50 ppb to 200 ppb. At the UST removal site, the most recent results available (MW-2 on 20 November 1989) indicate a concentration of 100,000 ppb gasoline. This approaches the water solubility concentration of gasoline of about 100 mg/L or 100,000 ppb.

Also, a groundwater sample, GW-8, obtained near the former UST's located at 6601/6603 Bay Street revealed the presence of floating product. The analytical results indicated a gasoline concentration of 94,000,000 ppb or 9.4 percent gasoline. As this was a grab

sample from a borehole and not a developed and purged monitoring well, the analytical test simply verifies the presence of floating product. The sampling procedure precludes the analytical determination of the concentration of dissolved gasoline in the groundwater due to the presence of floating product. Due to the inherent limitations of borehole groundwater grab samples, most regulatory agencies do not allow analytical results obtained by this method to be used for conformational testing, only for site screening. OK

Because Engineering-Science, Inc. (ES) indicates in this report that groundwater remediation is likely to be required in the vicinity of the off-site UFST's and sample location GW-8 and that further characterization and remediation of groundwater contamination in this area should be conducted by the adjacent property owners, the following facts should be kept in mind:

1) The presence of floating product in this area has been previously documented as backflowing into the 6601/6603 Bay Street UST removal excavation with groundwater August 23, 1989.

2) The observation by ES that the product contamination in GW-8 was similar in appearance to the product contamination on the groundwater in the 6601/6603 Bay Street UST excavation.

3) The observation by ES during the soil removal remediation at the 1650 65th Street UST removal site of a thick oil sheen March 9, 1988 on groundwater "pouring" into the excavation. Six days later, the groundwater "had a thick sludge, oily sheen." Photographic documentation Pictures Nos. 5 and 6--"Sludge on Top of Water in Pit" and "Excavation Dewatering"--show contamination that is similar in appearence to that at the 6601/6603 Bay Street UST excavation. Contamination at the twelve foot depth under the tank probably was not present in soil until groundwater was encountered in sandy soil at 13.5 feet.

4) The Garrett Freightliner site, south of the 1650 65th Street former UST location, had three groups of underground tankage. The closest group, about 300 feet away, had 68,000 gallons of diesel and 6,000 gallons of gasoline underground storage capacity. Slightly farther away and to the north, 11,000 gallons of waste oil underground storage was located. This is a total amount of 85,000 gallons of petroleum products located in underground storage. At the time of removal of these tanks on April 21 to 23, 1986; "each of the tank pits contained groundwater with floating product residues approximately one-half inch thick" (Aqua Science Engineers, 27 May 1986). This equates to about 1,700 gallons of floating product just in the largest of the three tank groups.

TABLE 2.1

GROUNDWATER "GRAB" SAMPLE ANALYTICAL RESULTS
1650 65th Street Property
10 November 1989

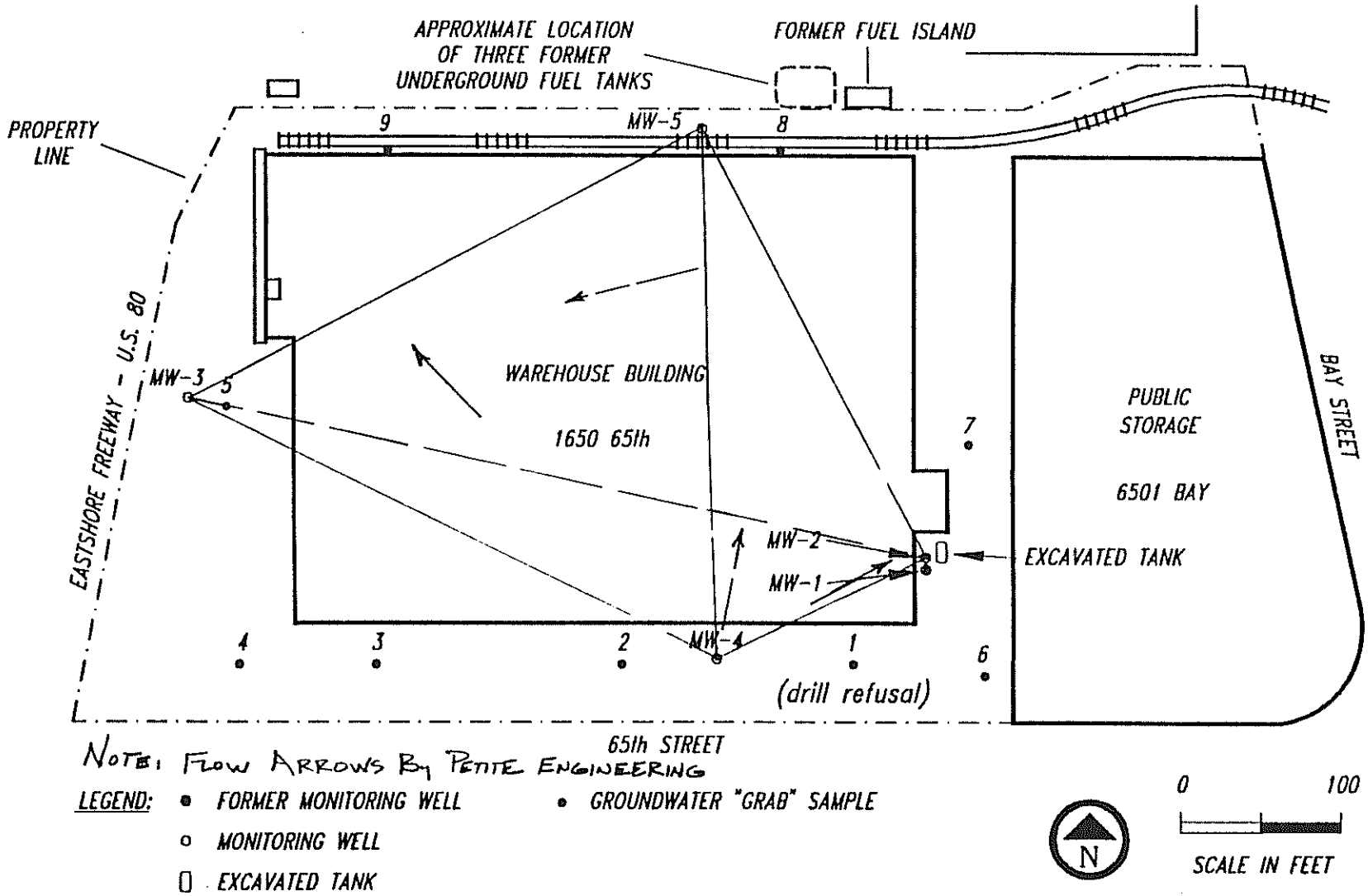
Sample Location	Depth (Feet)	Gasoline (mg/L)	Benzene (µg/L)	Toluene (µg/L)	Total Xylenes (µg/L)	Ethylbenzene (µg/L)
GW-1	Drill Refusal at 9.5'	NS	NS	NS	NS	NS
GW-2	10-11	<0.05	2.9	0.8	<1.0	<0.5
GW-3	10-11	0.1	3.0	0.9	<1.0	2.1
GW-4	9.5 - 10.5	<0.05	<0.5	<0.5	<1.0	<0.5
GW-5	8-9	0.12	3.0	0.8	1.6	2.4
GW-6	9-10	<0.05	<0.5	<0.5	2.3	<0.5
GW-7	9-10	<0.05	<0.5	<0.5	<1.0	<0.5
GW-8[1]	7.5-8.5	94,000	<50,000	<50,000	<100,000	<50,000
GW-9	8-9	0.17	4.7	<0.5	<1.0	5.1

[1] Collected free product sample.
NS = Not Sampled

GROUNDWATER "GRAB" SAMPLE LOCATIONS

1650 65th Street Property

10 NOVEMBER 1989



C107-08.R2 11/20/89

FIGURE 2.1

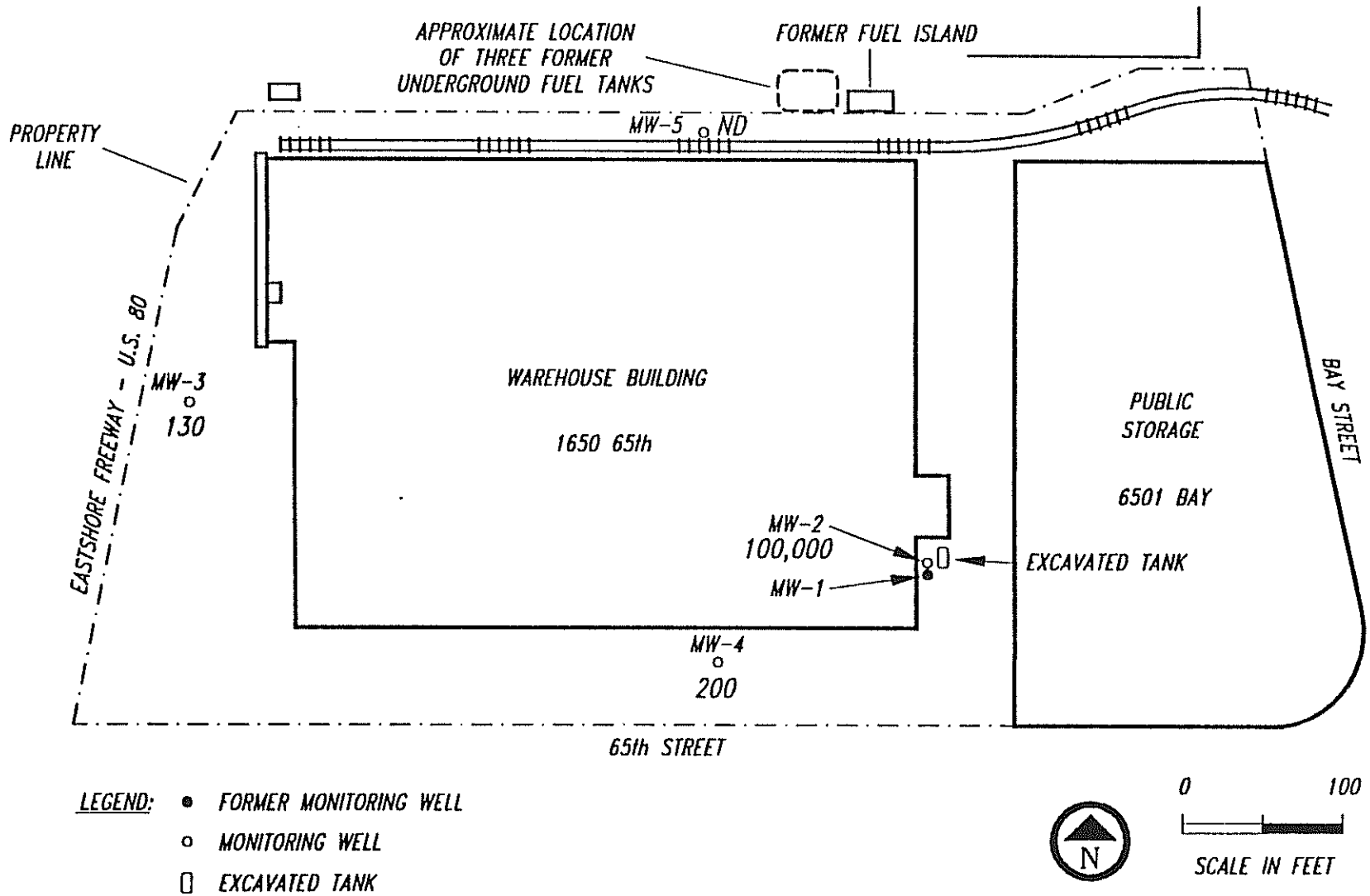
TABLE 3.2

GROUNDWATER SAMPLING ANALYTICAL RESULTS
Groundwater Monitoring Wells MW-2, MW-3, MW-4, and MW-5
1650 65th Street Property
20 and 21 November 1989

Contaminant	MW-2	MW-3	MW-4	MW-5	Drinking Water Regul. Limits	Site Cleanup Regul. Limits
Organics (µg/L)						
Gasoline	100,000	130	200	ND	NA	AD
Benzene	8,400	2.2	2.3	74	1[1]	AD
Toluene	7,400	ND	ND	ND	100[2]	AD
Total Xylenes	13,000	3.0	ND	4.2	1,750[1]	AD
Ethylbenzene	2,400	ND	ND	ND	680[1]	AD
1,2-Dichloroethane	15	ND	ND	ND	0.5[1]	AD
Inorganics (mg/L)						
Lead	0.05	ND	ND	ND	0.05[3]	AD

[1]DHS Maximum Contaminant Level (MCL) in drinking water. California Administrative Code, Title 22, 6/1/89.
[2]DHS Recommended Drinking Water State Action Level (SAL), 6/1/89.
[3]U.S. EPA Maximum Contaminant Level - 40 CFR Parts 141, 142, and 143; National Primary and Secondary Drinking Water Regulations, 4/10/89.
"NA" indicates not applicable.
"ND" indicates nothing detected above the detection limit of analysis.
"AD" = Agency Derived: Determined on a site-by-site basis by the RWQCB and/or ACHD depending on beneficial uses of the affected groundwater and potential sensitive receptors.

GASOLINE CONCENTRATIONS
GROUNDWATER MONITORING WELLS MW-2, MW-3, MW-4 and MW-5
1650 65th Street Property
20 and 21 NOVEMBER 1989(ug/L)



C107-06.R2 11/28/89

FIGURE 3.2

APPENDIX C

FORMER GARRETT/DELTA FREIGHT COMPANIES

BAY CENTER DEVELOPMENT

65TH, 64TH STREETS

BAY, CHRISTIE & LACOSTE STREETS

STUDY AREA MAP

LIST OF REFERENCES

EXCERPTS AND COMMENTS ON
STUDY AREA REFERENCES

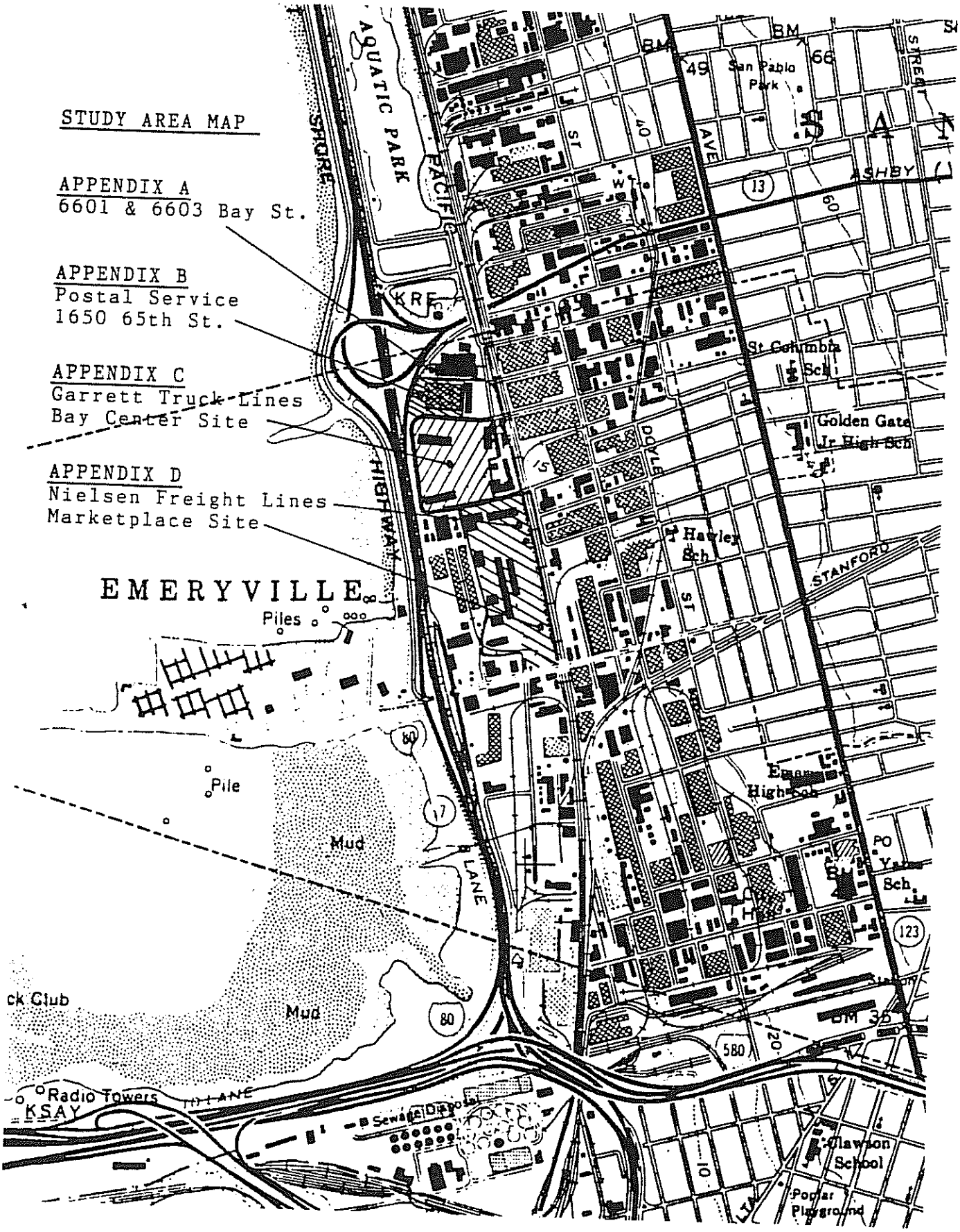
STUDY AREA MAP

APPENDIX A
6601 & 6603 Bay St.

APPENDIX B
Postal Service
1650 65th St.

APPENDIX C
Garrett Truck Lines
Bay Center Site

APPENDIX D
Nielsen Freight Lines
Marketplace Site



APPENDIX C

LIST OF REFERENCES

Reference No. C-1

DRAFT ENVIRONMENTAL IMPACT REPORT

FOR THE PROPOSED

BAY CENTER DEVELOPMENT

IN THE REDEVELOPMENT PROJECT AREA

OF THE CITY OF EMERYVILLE

DATE: July 1985

BY: Earth Metrics Incorporated
859 Cowan Road
Burlingame, CA 94010
(415) 697-7103

EXCERPTS AND COMMENTS:

I. PROJECT DESCRIPTION

A. "Project Location. The proposed Bay Center Development office complex site is located in Emeryville, California, near the eastern shoreline of San Francisco Bay (Figures 1-1 and 1-2). The roughly rectangular site is adjacent to Interstate Route 80 (Figure 1-3) and is bounded by Bay Street and the Southern Pacific Railroad right of way on the east, 64th Street on the south, La Coste Street on the west (between the project area and I-80), and 65th street on the north. Figure 1-4, an aerial photograph of the site, depicts the parcel's appearance and surrounding uses." (Page 1-1)

B. "... Approximately 1000 parking spaces will be developed on the eastern half of the 17+/- acre parcel in order to respond to the city's requirement for three spaces per 1000 square feet of floor area. An additional 290 spaces will be available between the office buildings and the western property line (adjacent to Interstate 80).

The large parcel east of the planned office structures, currently proposed as a parking area, will be developed as a future second phase of the overall property. Generalized plans for this area include the development of up to 450,000 square feet of residential usage and

approximately 50,000 square feet of service/commercial space. This potential site addition will be subject to an indepth analysis at the time of application; the current study concerns only the 325,000 square foot office complex and parking areas proposed. ...

The project area is currently utilized for large scale trucking operations (Delta-Garrett truck lines), with numerous tractors and trailers parked on site, loading docks and storage buildings, fueling and maintenance areas, and administrative offices. These uses will be removed and replaced by commercial offices and parking upon the implementation of the project plans." (Page 1-1)

COMMENT: *It is emphasized that the trucking operations are of a large scale. In the traffic analysis portion of this report, the estimated vehicle trip generation in p.m. peak hour by project for the Delta-Garrett truck terminals is 64 inbound and 96 outbound. It is reasonable to assume that over one-hundred trucks used these facilities each day. This volume of use creates a high potential for fuel spillage and drippings. It also indicates a large quantity of fuel usage with increasing chances of spillage or overfills during UST filling. Finally, an extensive pressurized manifold would be used to supply the individual fuel dispensers. Because the site is on uncompacted fill overlying soft clays or loose silts and sands, differential settlement may have occured which potentially causes leakage at the manifold fittings. Seismic shaking can also be attributed to initiating leakage.*

II. SUMMARY OF IMPACTS AND MITIGATION MEASURES

A. "HAZARDOUS WASTE POTENTIAL. EXISTING SETTING. Four preliminary test borings were conducted on the subject property to ascertain if certain heavy metals had been deposited in the sub-surface due to prior land uses (unverified report of a former paint factory on site). State of California threshold limits for lead were exceeded in three borings and zinc in one boring and the limit for zinc approached in another boring. None of the borings contained concentrations of chromium in excess of the state limits. Three of the borings contained a strong hydrocarbon smell (possibly the result of truck fueling operations on the project site)." (Page 2-2)

B. "HAZARDOUS WASTES POTENTIAL. EXISTING SETTING. Prior and existing site uses have distributed potentially unsafe materials into the soils of the project area. Truck fueling overflows and/or potential leakage from

underground fuel tanks and lines, and the unconfirmed former on site use for a paint factory/distribution center could have contributed to the subsurface waste materials. ...

In May 1985, four exploratory borings were drilled at random locations on the subject property (Figure 3.5-1). Laboratory tests performed on samples obtained from the borings indicated the following:

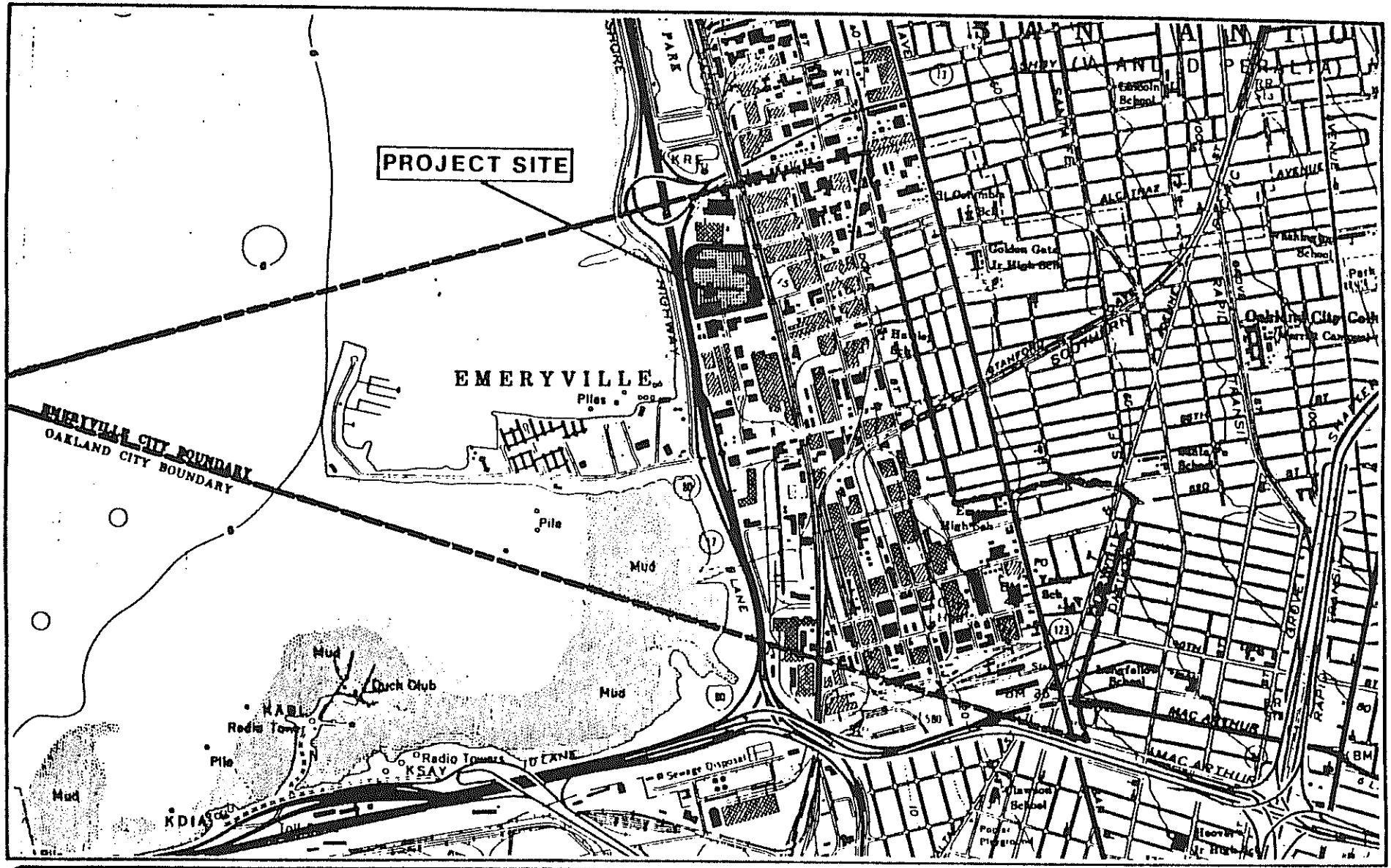
- Threshold values for lead {1000 mg/kg} were exceeded in Borings 2, 3 and 4.
- Threshold limits for zinc {5000 mg/kg} were exceeded in Boring 4 and are close to allowable values in Boring 2.
- Chromium concentrations {2500 mg/kg} are below the State threshold limits in all borings.
- **A strong hydrocarbon smell was apparent in Borings 1, 2 and 4."** (Page 3.5-1)

COMMENT: *Boring Nos. 1, 2 and 4 are oriented from north to south about midway between Christie Street and the freeway. Boring No. 1 is located adjacent to 65th Street. This indicates hydrocarbon contamination was present at this location in July of 1985. Although no differentiation is made between soil and/or groundwater hydrocarbon smell, based on other studies, hydrocarbon groundwater contamination was present in this area. Based on groundwater flow directions for this site, the contamination plume may be traveling at different times within the arc from slightly south of west to due north. The 6603 property is directly north and therefore down gradient at least part of the time from the underground fuel tankage and this area of observed hydrocarbon contaminated groundwater.*

C. "IMPACTS. Development of the proposed office project will not require grading on site which may expose **deposits of the heavy metals and/or hydrocarbon materials.** Fill material will be imported to provide a level building site.

The fill material placed on the site will further seal the waste materials, encountered in the testing, from surface disturbance potential." (Page 3.5-1)

COMMENT: *Earth Metrics Incorporated states unequivocally that the site contains waste materials including hydrocarbon materials.*



earth metrics

N

SCALE
1" = 2000'

FIGURE 1-3 LOCAL PROJECT SITE LOCATION

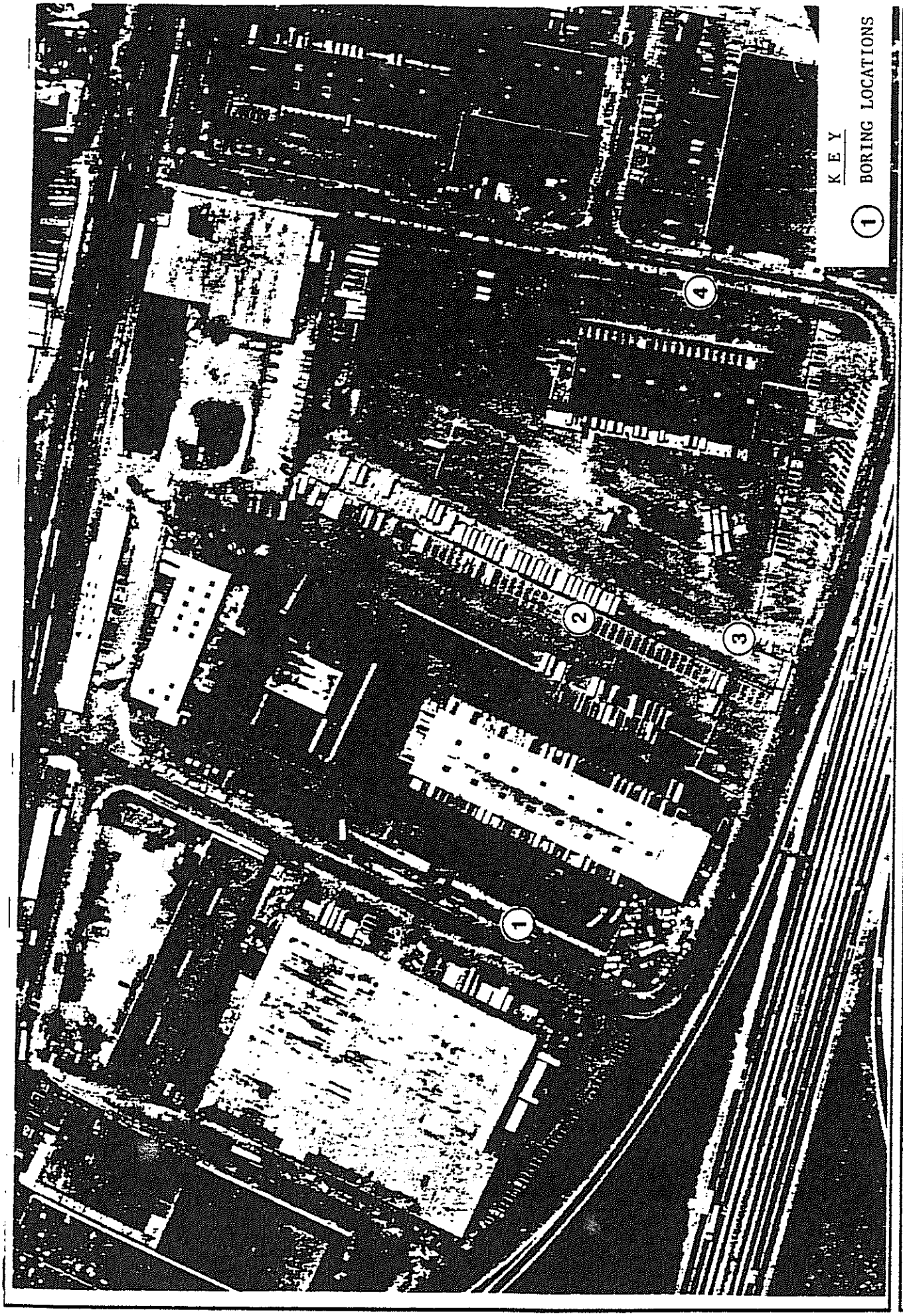


FIGURE 3.5-1 EXPLORATORY BORING LOCATIONS

Reference No. C-2

REPORT - SOIL SAMPLING AND DETERMINATION OF HYDROCARBON CONTAMINATION FROM TANK REMOVAL AT THE BAY PORT DEVELOPMENT, 64TH AND LACOSTE STREET, EMERYVILLE, CA.

DATE: May 27, 1986

TO: Mike Heim
Heim Brothers
375 Arthur Road
Martinez, CA 94553

BY: Aqua Science Engineers
1280 C Newell Avenue Suite 144
Walnut Creek, CA 94596

EXCERPTS AND COMMENTS:

"During the period 1960 to 1985 Garrett Freightlines operated a truck terminal at 64th and Lacoste Streets in Emeryville, CA. The site was used as a municipal dump for nonspecific solid waste between 1940 and 1960. The site is currently under demolition by the Martin Co. with the intention of constructing an office complex and parking facility upon it. Part of the pre-construction work was to remove the 12 underground fuel tanks. A total of 12 tanks of various capacities (8 diesel, 1 gasoline and 3 waste oil) were removed from three tank pits located on the northeastern and eastern portions of the property, Figure 1. This work was performed from April 21 to 23, 1986, by Tom Daniels Excavation, Inc. under subcontract to the Heim Construction Co. Aqua Science Engineers, Inc. was subcontracted to collect soil and water samples during the tank removal process."

"The tank pits were approximately 12 feet below grade. The water table is at a depth of approximately 9 feet. Following tank excavation each tank was inspected for cracks and holes by the Emeryville Fire Department and Aqua Science Engineers. None were found. Each of the tank pits contained groundwater with floating product residues approximately one-half inch thick. The product was skimmed and disposed of by H & H Services of San Francisco."

COMMENT: *If each of the tank pits contained groundwater with floating product residues approximately one-half inch thick, then*

Tank Pit TC-1 (6 diesel and 1 gasoline tanks) would most likely be diesel product; Tank Pits WO-1 (1 waste oil tank) and WO-2 (2 waste oil tanks) would most likely be waste oil product; and, Tank Pits A and B (1 diesel tank each) would most likely be diesel product. Therefore the most likely contamination on or from this site would be diesel and oil. If the Tank Pit TC-1 excavation is drawn to scale (Reference No. C-5), approximately 1,700 gallons of floating product were present in this excavation alone.

It is noted that analytical testing of soil or groundwater was never performed for oil and only by headspace for diesel. The headspace method is no longer approved for diesel analysis as it only quantifies the lower boiling point constituents of diesel and will not detect any oil or grease contamination. The reported hydrocarbon contamination values should be considered as minimum values that may be lower than actual values.

The report does not indicate the degree of tank corrosion or the integrity of the fillport product lines or the dispenser manifold product lines. Based on the Nielsen Freight Lines site and the 1650 65th Street property, the primary source of contamination originated from the product manifold pipeline (fittings and fuel delivery ports). The product manifold was undoutedly pressurized (versus suction). A clear statement regarding the integrity of the tankage and fuel dispensing system cannot be made based on the reported information. Based on the quantity of floating product it appears significant leakage was occuring beyond that of spillage, drippings or UST overfilling.

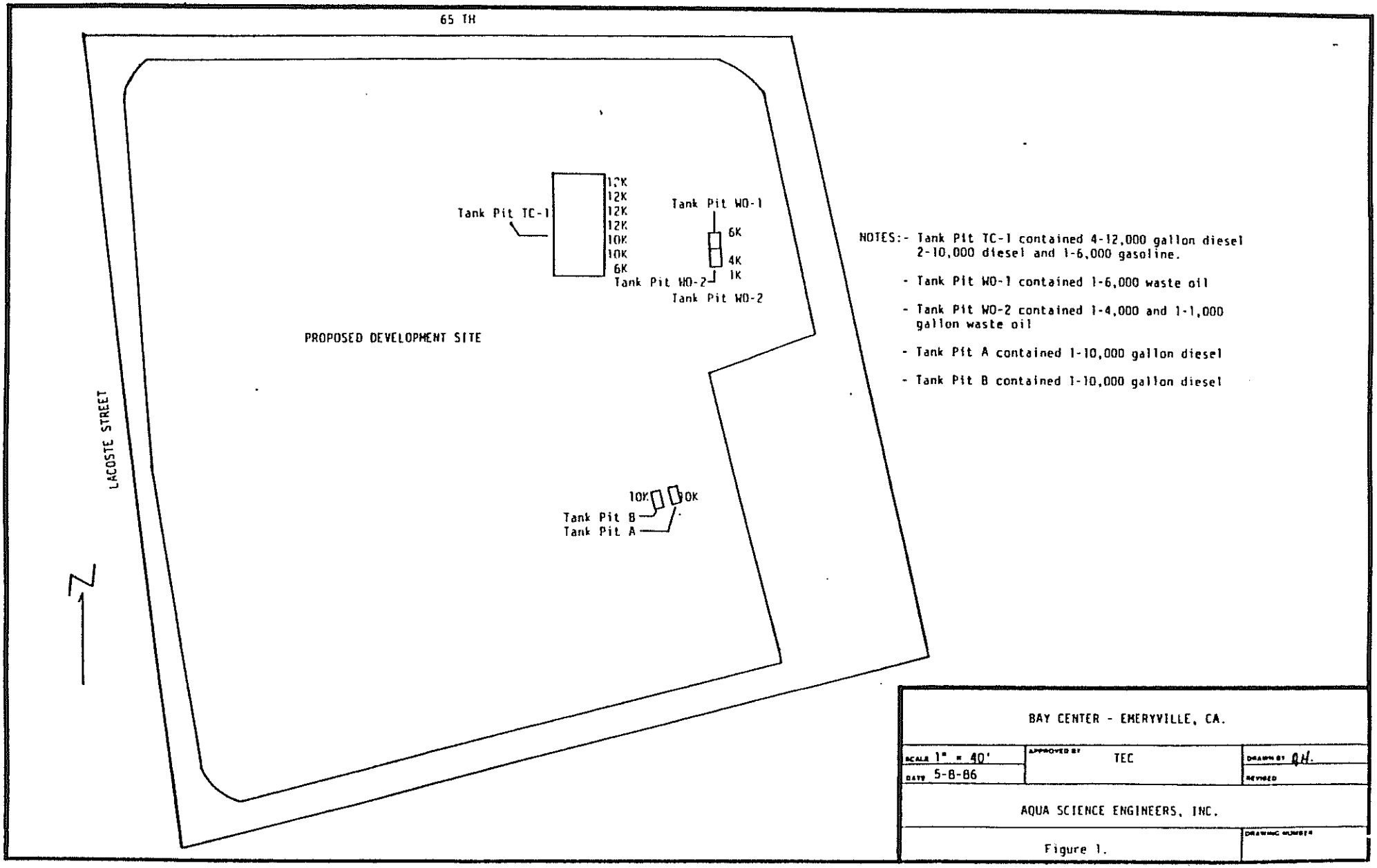
"**Once the floating product was removed, water samples were sampled** using a teflon bailer, washed with TSP, rinsed with tap water and then distilled water. The sample vials and bottles will be filled to overflowing in such a manner: (1) that precluded air bubbles passing through the sample during filling, and (2) sealed so that no air was entrapped in the vial. Once filled, samples were inverted and tapped to test for air bubbles. Samples will be placed on ice and delivered to the lab as soon as possible."

"**Soil samples were collected one foot above water surface elevation from the tank pit wall, one from each tank end. Each sample was collected by inserting a 4-inch long by 2-inch wide brass tube into the tank pit wall, the length of the tube.** The tube was pulled from the soil with the compacted sample inside, capped with aluminum {aluminum} foil and plastic caps, wrapped with light-tight tape, labeled, and immediately {immediately} placed in an ice chest containing cube ice. A total of 24 soil samples were collected from the

12 tanks excavated."

"Figure 2 presents the results of the soil and groundwater analysis for motor fule {fuel} hydrocarbons. The results indicate that motor fuel contamination in the soil and groundwater is above acceptable limits set by the Regional Water Quality Control Board and that a program of decontamination is necessary."

COMMENT: *Figure Nos. 1 and 2 are included. The highest value of soil contamination is 5,250 ppm Total Hydrocarbons (northeast corner of TC-1). This sample location is located the closest to the 6601 and 6603 Bay Street properties. Note that the groundwater contamination is 240 ppm Total Hydrocarbons. The validity of these values for expressing the actual values of the most likely contamination of diesel, oil and grease are suspect because a headspace (EPA 5020) method was used that will not detect the middle and higher boiling point diesel constituents unless special procedures are used. Also, the headspace method is prone to interference from other mechanisms that effectively bind the hydrocarbons resulting in lower reported concentrations. This method will not detect oil or grease.*



NOTES:- Tank Pit TC-1 contained 4-12,000 gallon diesel 2-10,000 diesel and 1-6,000 gasoline.

- Tank Pit WO-1 contained 1-6,000 waste oil
- Tank Pit WO-2 contained 1-4,000 and 1-1,000 gallon waste oil
- Tank Pit A contained 1-10,000 gallon diesel
- Tank Pit B contained 1-10,000 gallon diesel

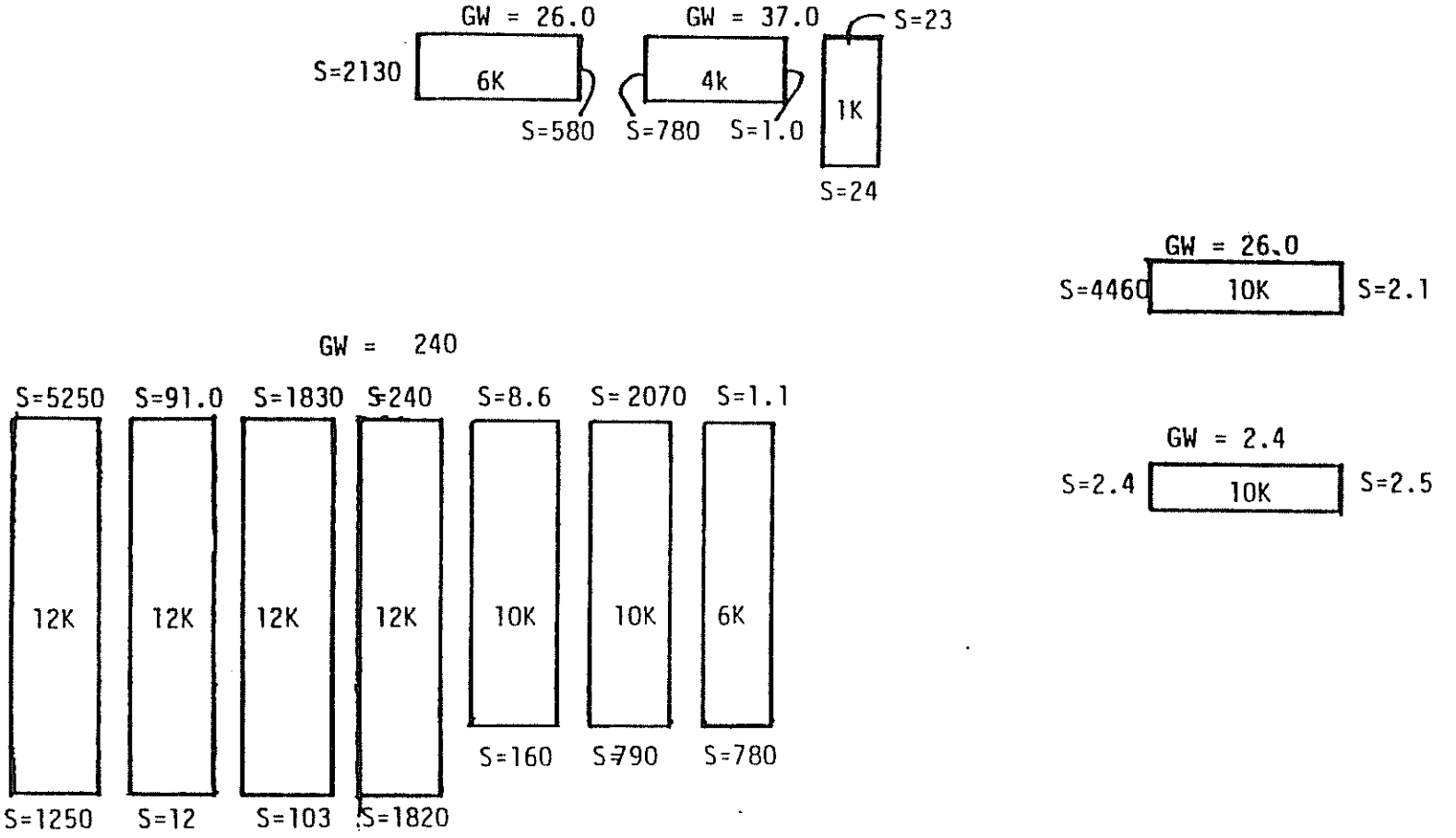
BAY CENTER - EMERYVILLE, CA.

SCALE 1" = 40'	APPROVED BY TEC	DRAWN BY QH.
DATE 5-8-86		REVISED

AQUA SCIENCE ENGINEERS, INC.

Figure 1.

DRAWING NUMBER



K = Tank capacity in 1000 U. S. gallons
S = Soil sample results
GW = Groundwater sample results

Note: Sample results are total hydrocarbons (EPA5020/8015) in ppm.

BAY CENTER _ EMERYVILLE, CA.

SCALE:	APPROVED BY:	DRAWN BY D.H.
DATE: 5-6-86		REVISED

AQUA SCIENCE ENGINEERS, INC.

DRAWING NUMBER
Figure 2.

Reference No. C-3

PHASE II - EXTENT OF GROUNDWATER CONTAMINATION INVESTIGATION,

BAY CENTER

DATE: August 27, 1986

FOR: THE MARTIN COMPANY
4256 Hacienda Drive Suite 101
Pleasanton, CA 94566

BY: AQUA SCIENCE ENGINEERS
P.O. Box 535
San Ramon, CA 94583

EXCERPTS AND COMMENTS:

I. OVERVIEW

A. "The extent of groundwater contamination at the Bay Center development was conducted in July and August, 1986. The purpose of the investigation was to: (1) determine the extent of contamination on-site, and (2) determine the location and levels of contaminants.

A total of 37 groundwater samples were collected. **A total of 34 samples were analyzed for total hydrocarbons expressed as motor fuels, benzene, toluene, and xylene. These samples were analyzed according to EPA 5020/8015.** Groundwater analysis for pesticides, CAM metals, organochlorines, and acid/base organics was conducted on three samples from wells located close to a former motor fuel tank pit, directly to the west of the tank pit, near Lacoste Street, and one sample between the wells, on Christie Street.

The results indicate that the: (1) highest groundwater contaminates, ranging in concentrations from 460 ppm to 100 ppm, are located east of Christie Street and close to the former motor fuel tank pit; (2) motor fuel contaminates are contained on site; and (3) concentrations of contaminates found can be treated using air stripping and carbon filtration." (Page 1)

COMMENT: *The EPA 5020/8015 analysis method is not appropriate for diesel, oil and grease contamination. Refer to Reference No. C-6 for Board comments on this. Due to laboratory analysis procedures utilizing headspace extraction (EPA 8020/8015), only gasoline, including some low boiling point diesel constituents, contamination is reported. The report indicates the samples were analyzed for total hydrocarbons expressed as motor fuels. The diesel contamination has been only partially characterized. Oil and grease contamination has not been characterized. Unfortunately, the Martin Group and other parties relying on this report may have been misled regarding the actual levels and extent of high boiling point hydrocarbon groundwater contamination.*

COMMENT: *Soil sample results for total hydrocarbons (EPA 5020/8015) in ppm range from 5,250 to 1.1 (GW = 240) for the largest pit containing six diesel tanks and one gasoline tank. The other pits also showed very high (greater than 1,000 ppm hydrocarbons) soil values (see Figure 2.)*

B. "Overall, beneficial uses of concern to the Board are (1) acute and chronic toxicity of the contaminants to aquatic life; (2) recreation, which would include water contact; and (3) groundwater recharge for drinking water. Certain assumptions must be made regarding the impact to beneficial uses of motor fuel contamination detected at Bay Center and the subsequent treatment and discharge of the treated groundwater to surface water. Levels of protection range from no discharge to strict discharge where groundwater recharge is a beneficial use, to groundwater not being used for recharge. Bay Center clearly falls into the category of groundwater not being used for recharge. In general, the Board indicates that concentrations of constituents of 0.100 ppm (0.01 ppm for toluene) will in general not impact aquatic life and recreation. These concentrations are readily achievable with air stripping and carbon filtration." (Pages 1 and 2)

II. BACKGROUND

A. "**During the period 1960 to 1985 Garrett Freightlines operated a truck terminal at 64th and Lacoste Street in Emeryville, CA. The site was used as a municipal dump for nonspecific solid waste between 1940 and 1960.** The site is currently under development by the Martin Co.

with the intention of constructing an office complex upon it. Part of the construction plans called for removing all underground motor fuel tanks used by the previous owners. **A total of 12 tanks (8 diesel, 1 gasoline and 3 waste oil) were removed from three tank pits located on the northeastern and eastern portions of the property.**

Soil and groundwater contamination was discovered during tank removal. In response to the contamination present, the Martin Co. directed Aqua Science Engineers, Inc. (ASE) to determine the extent of fuels contamination both on-site and beyond the property boundaries. **A horizontal and verticle definition of motor fuel groundwater contamination began July 15, 1986 and was completed August 7, 1986. The Phase II involved placing 37 borings located over the site.** Groundwater samples were analyzed for hydrocarbons expressed as motor fuels, benzene, toluene, and xylene.

A characterization to determine the extent of site-wide soils contamination was conducted by Earth Metrics. Ancillary to the soils investigation by Earth Metrics, two groundwater monitoring wells were installed and water samples taken and analyzed.

COMMENT: *No site plan or boring logs were included in the report on file at the RWQCB. An internal RWQCB memo indicated that the site plan was missing at the time of their review.*

Based on a review of monitoring well logs indicating visual and olfactory observation of hydrocarbon contamination as well as some logs with Organic Volatile Meter (OVM) readings on the adjoining Nielsen/Marketplace sites and 1650 65th Street property indicate moderate groundwater contamination (greater than 100 ppm petroleum hydrocarbons) is not encountered at some locations until three to five feet below the groundwater surface and may extend nearly 20 feet below the groundwater surface. It is unfortunate that information regarding the depths of groundwater sampled and the lack of boring logs indicating the observable presence of hydrocarbon contamination and soil lithology is not available for such an extensive study of 37 borings. The level of confidence placed in the results of this study to characterize the horizontal and vertical extent of hydrocarbon groundwater contamination is low without this information.

Four monitoring wells were constructed as part of this study. The EPA Methods 8020/8015 petroleum hydrocarbon results from these wells is not clearly defined.

Three of the four monitoring wells were used for a groundwater elevation study.

III. GEOLOGY

A. "The following sections, was excerpted from a report by Earth Metrics, Soil and Groundwater Contamination Characterization of Bay Center Site, August 20, 1986.

The hills above Emeryville consist of Tertiary sediments and volcanics overlying Jurassic-Cretaceous bedrock of the Franciscan Assemblage. The hills are part of the California Coast Range, and result from repeated episodes of deformation by folding and faulting over the last three million years. This uplift contributed to rapid erosion and deposition of a thick sequence of poorly consolidated alluvial fan deposits. Fluctuation is sea level, as a result of continental glaciation, accelerated this process. As much as 540 feet of this late Tertiary early Quaternary sediment is believed to overlie bedrock in the Emeryville area.

The oldest alluvial fan deposits consist of poorly consolidated interbedded silts, sands and gravels know as the Alameda Formation (QA). These in turn are overlain by 10 to 15 feet of alluvium and stream deposited sands and silts of the Temescal formation. North of Powell Street in the area of the project site, the Temescal sands and silts are overlain by 30 feet of Merritt sand, a generally fine grained and well sorted beach and windblown sand deposit. Overlying these sands in this area are 10 to 20 feet of Bay Mud.

Since the late 1800s the Emeryville shoreline has been progressively extended baywards by imported fill. Approximately one third of the land area of the City of Emeryville presently consists of fill placed over bay mud. **The composition of the fill is highly variable,and in general it appears to consist of imported clayey and/or sandy soils combined with construction and industrial waste materials** (City of Emeryville, Emeryville Redevelopment Project Draft EIR, 1977).

Bore holes north of the project site indicate that thicknesses of the artificial fill material in this area range form approximately 15 to 25 feet (City of Emeryville, 1975). Boring logs from the project site suggest that artificial fill materials is probably not

much greater than 15 feet overlying bay mud (Geomatrix, 1986). Analysis of these logs suggests stratification of the fill material. The upper 1.5 to 4.0 feet of fill on the subject site consists of asphalt, aggregate base, and imported select fill. The underlying three to five feet of fill consists of a heterogeneous mixture of clay and sand with assorted miscellaneous debris including metal, glass, brick, and burnt wood. Maximum concentrations of these materials appear at approximately six feet below grade.

COMMENT: *1) If the depth of artificial fill at the 6601/6603 Bay Street properties is 15 to 25 feet versus about 15 feet at the Market Place property the following may occur, a) because the surface elevations of the two sites are within a few feet of each other, this implies that the elevation of the natural ground at the 6601/6603 Bay Street properties may be 5 to 10 feet lower then at the Market Place property. This could allow for higher flows into this area during lower water table levels--the swirl of groundwater flow changing from southwest to west along the easterly boundary to a northwest to north direction along the westerly boundary of the site (see Flow arrow 2 on piezometric map). This also could allow for a previous historic inflow of contaminants into this "basin area" as the majority of the area to the south of the 6601/6603 Bay Street properties was filled and developed at an earlier date. Additionally, the deeper fills may tend to collect and trap floating petroleum products more than the shallow fills. This can occur due to slower flow through the relatively thicker layer of permeable material with the result of less wash-through or flushing. It may also occur due to a significant depth of construction debris below the water table that trap floating petroleum products with open rubble pockets.*

2) The depth to first groundwater is between eight and ten feet below ground surface on the Bay Center site. The depth of fill with the majority of rubble is 4.5 to 9.0 feet below ground surface. Because of the extremes of permeability of the rubble and the irregular depth (extending below the groundwater surface in some places and not in others) very complex flow of the near-surface groundwater component may occur. This is especially true of petroleum fuels floating on the groundwater surface. It is noted that a 1/2 inch thick layer of diesel product was floating on top of the groundwater in the pit where 6 diesel and 1 gasoline tanks were removed. This floating product plume will be complex and cannot be simply defined as following the general groundwater flow.

Logs of the soils borings reveal materials that are part

of the historic municipal use of the subject site for land disposal. Metal and slag could have originated from early industrial used {uses} located in Emeryville /Oakland, such as Judson Steel and scrap yard. Brick, glass, and wood could have been transported from building demolition sites in Emeryville. Burnt materials could have been disposed on the subject site from fire damaged buildings.

Historic municipal disposal of scrap metal, spent welding rods, and other ferrous materials is probable {probable}. Iron was tested in twelve (12) samples and determined to be in the range of 6,700 mg/kg to 140,000 mg/kg. Metal was visually confirmed in the boring logs. Owing to the shallowness of the fill overlying the Bay Mud, rain and moisture had been oxidizing solid metal and leaching metallic ions for a period of several years, prior to encapsulation of the subject site with asphaltic pavement by Garrett Freight Lines.

At depths greater than six feet below grade, clay content of the fill material is seen in the bore logs to increase substantially. **At approximately ten to 12 feet, a layer of oil slag and organic material is seen in numerous bore hole locations throughout the site. Petroleum odors are also reported from numerous samples taken at this depth."** (Pages 3 and 4)

COMMENT: *The presence of petroleum odors in numerous samples at this depth is consistent with a regional distribution of petroleum products in the near-surface groundwater. This depth is generally consistent with the original natural soil surface. A slough is noted south of 64th Street at the former Nielsen Freight Lines site. It is possible that this area developed a significant depth of decayed organic material (peat) as a tidal slough. In addition, after the freeway was constructed, this area was a shallow inland lagoon. As the lagoon was filled in and used for industry, petroleum products released from spills or discharges would be trapped in the remaining unfilled portions of the lagoon. It has been determined that the lagoon was filled generally from south to north. This would provide for a maximum amount of time for accumulation of waste products.*

Seasonal groundwater level fluctuations of at least one to two feet occur within the filled lagoon area and tend to deposit petroleum products within the soil matrix at the groundwater surface. The contamination of soil from fluctating groundwater levels is likely on the site. Petroleum odors in the soil more then several feet above the groundwater are more normally associated with tankage and

product line manifold leaks or spillage/drippings from dispenser and parking areas.

IV. GROUNDWATER ELEVATION AND FLOW DIRECTION

A. "The direction of groundwater flow (Figure 1) was determined using a Stevens Continuous Chart Recorder (Model 68 Type F) over a six day period. These data are presented in Table 1. The depth to groundwater ranges from about 6.5 to 8.0 feet. **The data indicate that the direction of groundwater flow in the vicinity of the Bay Center office complex development is generally toward the south and southwest.** The calculated horizonal {horizontal} hydraulic gradient is approximately 0.003 ft./ft.

The current data is sufficient to adequately evaluate short-term variations in groundwater elevation of {and} flow direction. However, periodic measurements of groundwater elevations should be planned to monitor longer-term local or regional trends and seasonal fluctuations in groundwater elevation and flow.

COMMENT: *The title for Table 1 is "Groundwater Elevation over a Six Day Period, Groundwater Elevation (feet MSL)." However, based on the text of the report and comparison with Groundwater Technology, Inc.'s March 17, 1987 Subsurface Hydrocarbon Investigation, Bay Center Project, Table 1 -- GROUNDWATER MONITORING, the tabulation is most likely for the depth to groundwater.*

Figure 1 was missing from this report. An analysis of the groundwater level data has been superimposed on a plan in a later Groundwater Technology, Inc. report. Monitoring Well E was substituted for the location of MW-A which was reportedly buried by excavated material from the tank removal pits. An analysis of this data indicates that the flow is complex. Levels in three monitoring wells measured in August 1986 indicates a southwesterly flow at the south central portion of the site. Four wells measured on 30 December 1986 indicate the groundwater flow is westerly at Christie Street and then turns northerly at Lacoste Street. This is a similar swirl identified on the 6601 and 6603 Bay Street properties. Four wells measured on 5 January 1987 indicate a westerly flow (no swirl) at Christie and Lacoste Streets. Four wells measured on 21 January 1987 indicate a complex flow with a slight southwesterly flow at Christie Street, and nearly opposite northeasterly flow at Lacoste Street and, in between these oposing flows, the converging groundwater flowing to the southeast at the

south end and to the northwest at the north end. An explanation for this could be a high tide surge modifying the groundwater gradients. Alternately, a typographical error could have occured in tabulating MW-D (in the six days of continuous readings the water level in this well only changed the last day and by only 0.03 feet). If this is the case, then the flow shows a swirl as the gradient changes from southwesterly at Christie Street to northwesterly at Lacoste Street.

The exact date of measurement for the August 1986 water level data is not indicated in the report.

V. GROUNDWATER QUALITY

A. "A site-wide determination of groundwater quality was conducted in July, 1986. A total of 37 borings to groundwater were placed throughout {throughout} the site to determine: (1) the extent of motor fuel contamination and; (2) the possibility of contaminants travelling off-site. Groundwater samples were sent to WESCO Laboratories (Novato, CA.) for analysis.

Samples were analyzed for total hydrocarbons, expressed as motor fuels, benzene, toluene, and xylene. Analytical results from the groundwater samples are presented in Table 2; laboratory data are presented in Appendix A. Results of each groundwater sample is shown in Figure 1. Due to the motor fuel contamination {contamination} found during the tank removal in May 1986, our primary focus was a determination of concentrations of motor fuels present in groundwater throughout the site. During this investigation, no other constituents in the water were addressed by ASE. However, it recently came to our attention that water quality samples collected from wells MWA, MWB and boring W9 installed for Earth Metrics yield contaminants not previously addressed. As part of the soil investigation conducted by Earth Metrics, groundwater samples taken from MWA, MWB, W9, and W15 were analyzed for CAM metals, GC/MS and pesticides. The results are shown in Table 3.

COMMENT: *W9 is referenced in the Groundwater Technology, Inc. report (Reference No. C-4) as Monitoring Well MW-C.*

B. MOTOR FUEL CONTAMINATION: **The water quality analzses {analysis} confirmed that groundwater east of Christie**

Street and in the vicinity of the three tank pits contains elevated concentrations of motor fuel hydrocarbons (Figure 1 {missing from report}). **Additionally, groundwater away from the tank pits, on A Pad, and contiguous to Christie Street contain slightly elevated concentrations of motor fuels. Examination of the data set for motor fuel hydrocarbons suggests that the extent of contamination is contained on-site.**

COMMENT: *The contamination of hydrocarbons is highest at MWA located near the largest group of tanks which had the 0.5 inch of diesel floating on the groundwater. The next highest level of hydrocarbons occurs at 65th and Christie Streets. This indicates probable movement of contamination in a west to northwest direction during August 1986.*

COMMENT: *It is unclear whether or not the contamination is contained on-site based solely on this report. Without Figure 1 to identify the location of the borings, it is unclear whether or not borings adjacent to property boundaries exhibit motor fuel hydrocarbons. However, based on Groundwater Technology, Inc. SITE PLAN, Figure 1 showing the locations of Monitoring Wells B, C, D and E, two wells (MW C is immediately adjacent to 64th Street and MW B is about 60 feet east of Lacoste Street) show Total Hydrocarbons as Motor Fuels of 110 and 150 ppb. Also, "Table 2, Results of groundwater samples -- Bay Center" identifies one sample as "65th - Lacoste" with Total Hydrocarbons as Motor Fuels of 1,500 ppb. Clearly, contamination most likely extends off-site in significant concentrations. Additionally, the EPA 8020/8015 analytical test used for the Total Hydrocarbon analysis will not detect all diesel components or any oil or grease contaminants, the most likely to occur on this site due to the presence of 9 diesel tanks and 3 waste oil tanks but only one gasoline tank.*

The amount of diesel detected in the headspace method is based on the temperature used and the calibration of the GC equipment. A higher temperature will release more of the higher boiling point diesel constituents into the headspace tested by GC. Wesco Laboratories was contacted regarding their protocol used during the July 1986 date of analysis. However, they no longer perform this type of laboratory analysis. The diesel analysis in this report is believed to generally indicate the presence of diesel contamination but not accurately quantify the concentration of contamination. The presence of oil or grease contamination is undetectable by the analytical methods used. The presence of this contamination may be indicated by the footnotes on the laboratory analysis report:

"* Closest available matching standard is diesel fuel.
** Sample contained oily surface sheen."

The oily surface sheen in combination with a diesel standard indicates free diesel product and/or the presence of oil or grease.

Perimeter borings along the fence line (which would indicate off-site travel of contaminants) of the property indicate that the motor fuel contaminants found in the groundwater are below levels of concern.

COMMENT: *No definition of a "level of concern" is provided.*

Total hydrocarbons expressed as motor fuels ranged from < 0.05 ppm to 460 ppm in MWA, close to Tank Pit 1. *{Normally groundwater contamination is expressed in ppb. The above values would be 50 to 460,000 ppb}.* Concentrations of motor fuels found on A Pad were 20 ppm *{20,000 ppb}* and 1.5 ppm *{1,500 ppb}* in borings close to Lacoste Street and 65th. Slightly elevated concentrations of motor fuels were found along Christie Street, boring # W9 {MW-C} and # ASE-F.

Concentrations of benzene in most cases were below the level of detection (0.001 ppm). A review of the benzene concentrations detected ranged from 0.002 ppm in ASE-B to 41.0 ppm in MWA. Benzene detected in MWA approaches the level of saturation (5.0 %) associated with contaminated water arising from motor fuels. Concentrations above the detection level except for MWA ranged from 0.002 ppm to 0.101 ppm and are well below the concentrations found to cause acute and chronic toxitity {toxicity} to fresh water fish and impact recreation use. These concentrations would be considered within acceptable levels in the site area.

Toluene was detected at concentrations of 0.002 pm to 0.077 ppm. In general, concentrations were below the level of detection of 0.001 ppm. Toluene concentrations above the level found to be acute to fresh water fish (0.020 ppm) are found in boring # 20 (0.029 ppm), # 16 (0.077 ppm), # 2.5 (0.025).

COMMENT: *Boring # 2.5 is located near Lacosta and 65 Streets.*

Xylene was detected at concentrations ranging from 0.002

ppm to 5.1 ppm. As with benzene and toluene, most groundwater concentrations were below the level of detection (0.001 ppm). Boring # 2.5 and MWA had detectable levles {levels} above 1.0 ppm, at 2.5 ppm and 5.1 ppm respectively.

Xylene concentrations above 0.050 ppm were detected in boring # 27 (0.058 ppm), # 1.5 (0.215 ppm), and # 8.5 (0.092 ppm). With the exception of MWA, xylene concentrations are below levels found to be acutely toxic to fresh water fish (3.8 ppm)." (Pages 4 - 6)

C. OTHER GROUNDWATER CONTAMINATES:

"Samples were collected by Earth Metrics in July, 1986. Laboratory results, received by ASE August 11, 1986 indicate constituents detected in groundwater that are of concern. Most noteworthy is the presence of pesticides, particurally {particullarly} DDT, DDD, and DDE, and the organochlorine PCB. An summary of selected organic compounds detected in groundwater is shown in Figure 1." ... (Page 6)

Reference No. C-4

REPORT

SUBSURFACE HYDROCARBON INVESTIGATION

BAY CENTER PROJECT

EMERYVILLE, CALIFORNIA

DATE: March 17, 1987

FOR: Walt Kaczmarek
The Martin Company
4256 Hacienda Drive
Suite 101
Pleasanton, CA 94566

BY: GROUNDWATER TECHNOLOGY, INC.
4080 Pike Lane, Suite D
Concord, CA 94520

EXCERPTS AND COMMENTS:

INTRODUCTION

"This report presents the results of the additional Phase I work performed by Groundwater Technology, Inc. at the Bay Center Project located in Emeryville, California (See Figure 1, Site Location Map). **The additional work performed in preparation for the installation of a hydrocarbon recovery system, and included the installation of one new monitoring well, the collection and analysis of water samples from both the new and existing wells, and the approximation of the aquifer characteristics.**" (Page 1)

WORK STEPS

MONITORING WELL INSTALLATION

"**The purpose of the boring was to explore the site for the presence of subsurface contamination, and to obtain an approximation of the aquifer characteristics. Groundwater Technology located the boring (MW-E) in the assumed down gradient direction from the excavated tank pit, in the vicinity of the proposed recovery well** (See Figure 2 - Site Plan)." .... (Page 1)

SOIL SAMPLING

"Soil samples were obtained during drilling using a 2.5 inch O.D. split spoon sampler lined with three, 2 x 6 inch brass sample tubes. The sampler was driven eighteen inches at each sampling point. Samples were collected at 5 foot intervals beginning at 13.5 feet below ground surface to the bottom of the boring. The collected samples were sealed and capped for subsequent delivery to the laboratory for sieve analyses. Each sample was labeled with the boring number, sample designation number, and depth. All samples remained in the possession of the project geologist until delivery to the laboratory." (Page 4)

"Sieve analyses were performed at the Johnson Division laboratory on three of the collected soil samples for grain size determination to be used in the design of the recovery well (See Appendix II - Sieve Analysis)." (Page 5)

COMMENT: *All soil samples were obtained below the groundwater level. Laboratory testing was limited to physical testing--no volatile organic or TPH testing was performed.*

WATER SAMPLING

"Monitoring wells B through E were developed by hand bailing and sampled with an EPA approved Teflon sampler. Access was not available to monitoring well A due to the presence of construction generated soil piles. The groundwater samples were collected in glass vials with Teflon caps in a manner such that no air was trapped inside and then labeled immediately with the job I.D., sample number, date, time and type of analysis requested. The samples were then stored on ice in a thermally insulated cooler until delivery to the laboratory. Analyses for organochlorine pesticides, PCB/s, volatile organics and base/neutral acids were conducted by EPA Methods 608, 624 and 625." (Page 5)

COMMENT: *No analysis was made for Total Petroleum Hydrocarbons as gas or diesel. No analysis was made for Total Oil and Grease. It is therefore impossible to evaluate the actual impact or changes of gasoline, diesel, oil and grease contamination at the site. There is no reference whether or not HCL preservative was used in the glass vials. The maximum time between sampling and analysis for EPA Method 624 is 7 days without a preservative and 14 days with a preservative. Based on the SEQUUOIA Analytical Laboratory analysis reports included as Appendix IV, samples from Monitoring Wells C, D and E were held for three days prior to being received by the lab and then were extracted (and analyzed ?) eight days later. This*

means there was at least eleven days from sampling date to analysis date for these samples. If preservative was not used in the glass vials, the EPA Method 624 (Volatile Organics by GC/MS) analytical results for these samples should be considered a minimum value with actual values potentially higher.

The eleven day hold prior to analysis by EPA Methods 608 (Organochlorine Pesticides, PCB) and 625 (Base Neutral & Acids by GC/MS) exceeds the 7 day maximum hold time for these analyses. Therefore, these analysis for Monitoring Wells C, D and E are, again, considered minimum values.

SITE CONDITIONS

HYDROGEOLOGY

"The local groundwater gradient was determined after surveying the elevations at the top of the monitoring well casings and subtracting the measured depth to groundwater levels to obtain water elevations (See Table I). The measurements indicate that the gradient is fairly flat (<1%) under the site, and appears to be flowing to the southwest toward the San Francisco Bay. All of the monitoring information obtained from monitoring well B shows a decrease in the groundwater elevation which appears as a groundwater depression." (Page 6)

COMMENT: *Monitoring well D, not B, shows a consistent decrease in the groundwater elevation in Table I. However, the January 21, 1987 depth to water tabulated value of 8.61 for MW-D is most likely in error and should be 9.61. This is consistent with the August 1986 6-day set of readings which indicated a water level change in only one day out of the six. Therefore, the conclusion of a groundwater depression at MW-B is most likely unfounded.*

Why?

The direction of flow has been calculated for the four monitoring wells based on measurements obtained in August 1986, 30 December 1986, 5 January 1987 and 21 January 1987. The four possible flow direction solutions for the four monitoring wells are shown as flow arrows superimposed on GTI's Site Plan, Figure 1. A curvalinear groundwater flow is indicated. At Christie Street the flow varies from southwest to west. Between Christie Street and Lacosta Street the flow varies from west to north. <u>The direction of this curvalinear swirl is identical to that observed on the 6601 and 6603 Bay Street properties.</u>

AQUIFER CHARACTERISTICS

"As previously discussed, two methods were used to approximate the hydrogeologic characteristics of the aquifer underlying the site. The Bower and Rice, (1976), method was developed for use in unconfined aquifers with partially penetrating wells such as the Emeryville site conditions. Cooper et. al., (1967), method was designed for fully penetrating wells in confined aquifers of rather low transmissivity. This last method was used only to verify that **the approximate values obtained by Bower and Rice were consistent with aquifers of low transmissivity.** The following table presents the results of the aquifer characteristic calculations from both methods performed on the data obtained from the December 30, 1986 bail down test of monitoring well E (See Appendix III - Calculations). The calculated values obtained as a result of the bail down test are typical for silty sands and clays similar to the subsurface materials encountered beneath the site.

AQUIFER CHARACTERISTICS

	HYDRAULIC CONDUCTIVITY (gpd/ft^2)	TRANSMISSIVITY (gpd/ft)	PUMPING RATE (gpm)
MW-E Bouwer Method	0.98	38.22	0.81
MW-E Couper Method	1.20	46.75	1.22" (Page 8)

COMMENT: *An argument has been made by William Dubovsky Environmental that petroleum products have been selectively transmitted through rubble zones or stratified layers creating pockets and "streams" of concentrated hydrocarbon product. This argument would be moot if the regional soils allowed rapid unrestricted flow of groundwater.*

GROUNDWATER CONTAMINATION

"The results of laboratory analyses performed on groundwater samples from the site indicate that although hydrocarbon

contamination and some acid extractable organics and base/neutral organics are present in the wells sampled, the levels are significantly lower, if detectable, than previously reported in the report prepared by Aqua Science Engineering titled, "Phase II - Extent of Groundwater Contamination Investigation, Bay Center". (See Tables III and IV and Appendix IV - Water Analysis)." (Page 9)

COMMENT: *As noted previously, the hold time from sample collection to analysis of eleven days for Monitoring Well Nos. C, D and E exceeds the seven day allowable hold for EPA Methods 608 (Organochlorine Pesticides, PCB) and 625 (Base Neutral & Acids by GC/MS). Therefore, these analysis for Monitoring Wells C, D and E are not considered valid for expressing the maximum contamination concentration. Similarly, the analysis for hydrocarbon contamination as expressed by EPA Method 624 (Volatile Organics by GC/MS) would only be valid if the glass vials were acidified prior to sampling allowing for a 14-day hold. Acidification of the glass vials is not mentioned in the report.*

CONCLUSIONS & RECOMMENDATIONS

"Because the latest groundwater analysis data indicates that the contaminants present are volatile organics, Groundwater Technology believes that groundwater extraction combined with air stripping treatment is the best recovery approach for this site. The latest laboratory analyses indicate that additional treatment for pesticides, PCB's and most acid and base/neutral organic compounds will not be necessary. Therefore, the groundwater extraction system would include a pumping well, PW-1, equipped with a 1/2 hp water table depression pump with Teflon seals and one probe scavenger (See Figure 3, Typical Recovery System). The recovery well would likely be located near monitoring well E and the excavated tank pit. Well construction would consist of 10-inch diameter stainless steel 0.030 slotted well screen and blank casing placed within a 24 inch borehole. The well would be packed in the same manner as the monitoring wells with sand placed in the annulus from the bottom of the boring to 2 feet above the top of the screen and sealed with 1 foot of bentonite and concrete. A traffic rated vault box would be installed such that the recovery well and the associated pump control panels are located below grade." (Pages 13 and 14)

COMMENT: *It is again noted that the laboratory results for monitoring wells C, D and E pesticides, PCB/s and acid and base/neutral organic compounds are not considered to be maximum values if the maximum sample holding time was exceeded.*

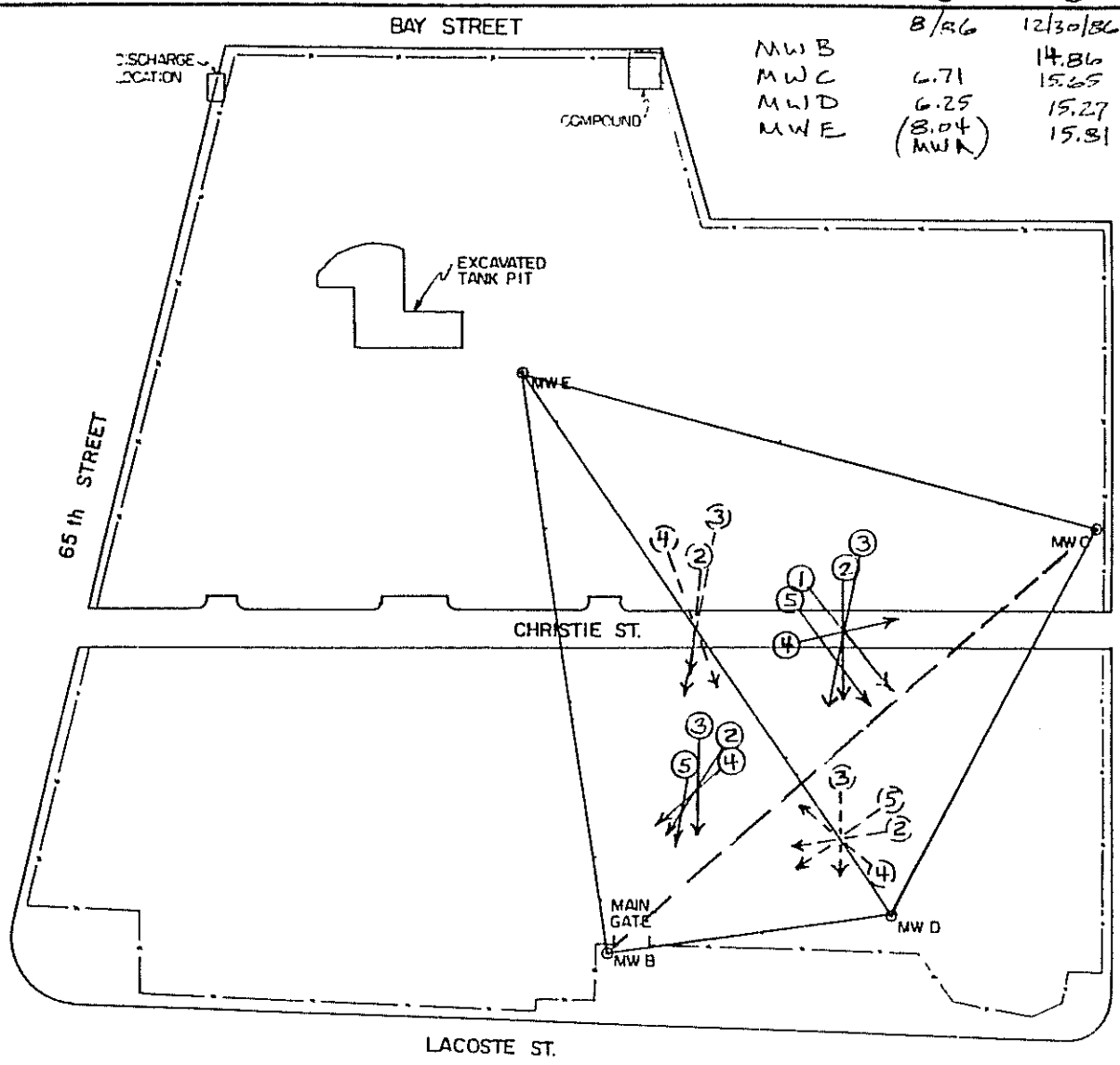
"Air stripping is proposed as the preferred treatment system for removal of the dissolved organics. Air stripping achieves high removal efficiencies and is more cost effective than liquid-phase activated carbon. The Bay Area Air Quality Management District may place limitations of up to 15 pounds per day or 200 ppm total hydrocarbons (THC) on air emissions and may limit other air stream constituents such as benzene. These limitations may require the use of an additional vapor phase carbon or catalytic conversion system for treatment of air emissions.

Because we are anticipating the presence of free floating hydrocarbons on the water table, Groundwater Technology will be installing a double-pump system within the recovery well. One pump will depress the water table, forming a "cone of depression". The second pump will recover any free floating product which collects within the recovery well. Recovered product will be stored on-site in a 630 gallon cylindrical polypropylene tank. The product recovery pump will operate automatically whenever free product is present in the recovery well. It is impossible to predict recovery rates prior to operation; therefore, Groundwater Technology will install a tank full sensor which would automatically shut-off the product pump to prevent overfilling. A totalizer would also be installed to quantify recovery rates. .... " (Page 15 and 16)

COMMENT: *"Free floating hydrocarbons on the water table" indicates that the contamination is free product and will travel in the direction of groundwater flow unless controlled by differing permeabilities in the heterogeneous fill material and construction debris. This site is also noted as a confirmed source of free floating product.*

"Based upon field inspection, laboratory analyses and preliminary calculations, Groundwater Technology believes one operating recovery well, pumping between 1 and 3 gpm, has the ability to draw the contaminated water from around the old tank pit, capture the water up to 70 feet down gradient and have some influence on groundwater movement as far away as the corner of Lacoste and 64th Street. Therefore, it is Groundwater Technology's opinion that the Martin Company should proceed with the recovery system operating with one pumping well, as presented in the proposal titled, "Bay Center Project Emeryville, California, dated October 1986 and as described within this report." (Page 17)

COMMENT: *The groundwater table is very flat in this area and will respond to relatively small water extraction or infiltration rates. Due to the natural seasonal fluctuations in the groundwater level, differing flow directions will occur as noted in Figure 1. This situation allows for a very complex flow of the floating hydrocarbon product that may be significantly directed by variable permeabilities in the heterogenous fill and construction debris.*



	① 8/86	② 12/30/86	③ 1/5/87	④ 1/21/87	⑤
MW B		14.86	15.18	15.00	
MW C	6.71	15.65	16.80	15.71	TYPO?
MW D	6.25	15.27	15.34	16.29 ⇒ 15.29	
MW E	(8.04 MW A)	15.81	16.95	16.76	

ANALYSIS BY D. L. PETITE, P.E. FROM EARTH METRICS DATA MARCH 17, 1987 - TABLE 1

LEGEND

① GW FLOW DIRECTION FOR NW AND SE TRIADS (3-POINT SOLUTION)

① GW FLOW DIRECTION FOR NE AND SW TRIADS (DASHED COMMON LINE)

FIGURE 1
SITE PLAN

0 FEET 200

MARTIN COMPANY
EMERYVILLE, CALIFORNIA

GROUNDWATER TECHNOLOGY

Reference No. C-5

REPORT OF

FURTHER SUBSURFACE HYDROCARBON INVESTIGATION

EMERYVILLE, CALIFORNIA

BAY CENTER PROJECT

DATE: September 8, 1987

FOR: Mr. Walt Kaczmarek
The Martin Company
4256 Hacienda Drive
Suite 101
Pleasanton, CA 94566

BY: Groundwater Technology, Inc.
4080 Pike Lane, Suite D
Concord, CA 94520

Kelly A. Kline
Project Geologist

EXCERPTS AND COMMENTS:

INTRODUCTION

"This report presents the results of the additional Phase I work performed by Groundwater Technology, Inc. (GTI) as requested by EMCON Associates at the Bay Center Project located in Emeryville, California (See Figure 1, Site Location Map).

SCOPE OF WORK

The purpose of the investigation conducted by GTI was to provide a general assessment of the hydrocarbon contamination underlying the site. Specifically, the scope of services was as follows:

1) Assess subsurface conditions at the site by drilling seven soil borings.

2) Continuously obtain undisturbed soil samples from each boring at approximately the 21 through 25-foot depth.

3) Install monitoring wells in each of the seven soil borings.

4) Survey all new monitoring wells.

5) Monitor each well to determine the depth to water for preparation of a groundwater gradient map.

6) **Conduct analyses of water samples from each monitoring well by U.S. Environmental Protection Agency (EPA) Methods 418.1, 602, 3020/7421, and 3005/6010.**

7) Prepare a report presenting the results of the further site investigation." (Pages 1 and 3)

COMMENT: *The analyses of water samples are for:*
Method 418.1 -- Total Recoverable Petroleum Hydrocarbons
Method 602 -- Aromatic Volatile Organics (includes BTEX)
Method 3020/7421 -- Total Lead
Method 3005/6010 -- Arsenic

Regarding the EPA Method 418.1 analysis, footnote 2 on page A-19 of the LUFT Field Manual, December 1987, State of California Water Resources Control Board: "This relatively quick analytical procedure measures recoverable petroleum hydrocarbons, including oil and grease. It is applicable for measuring light fuel fractions, but loses approximately half of any gasoline present (ref.4). The method costs less than the recommended procedure and is useful primarily as a survey tool."

EPA Method 602 is applicable to the volatile aromatic hydrocarbons Benzene, Toluene, Ethylbenzene and the Xylene Isomers and gasoline. This method analyzes hydrocarbon chains in the range of C4 to C12.

SOIL BORINGS

"The purpose of the soil borings was to further explore the site for the presence of subsurface hydrocarbon contamination, and to obtain a definition of the vertical and area extent of the contamination, if encountered. Five of the borings were drilled to an approximate depth of 25 feet, as per EMCON Associates recommendations. These five borings MW-F, through MW-J, were continuously sampled from approximately the 21 through 25 foot depth (See Appendix I - Drill Logs). Two additional borings were requested by the Martin Company. These two borings, MW-K and MW-L were drilled to approximately 15 feet and placed beside MW-G and MW-I respectively (See Site Plan - Figure 2).

All of the soil borings were drilled with a truck-mounted drill rig using 7.5-inch outside-diameter (O.D.) hollow-stem augers. The drilling was performed under the direction of a GTI field geologist who also maintained a continuous log of the materials encountered in accordance with the Unified Soil Classification System (See Appendix I - Drill Logs)." (Pages 4 and 5)

SOIL SAMPLING

"Soil samples were obtained during drilling using a 2.5-inch O.D. split-spoon sampler lined with three, 2-inch by 6-inch brass sample tubes. The sampler was driven 18 inches at each point. **Samples were collected at 5 foot intervals beginning at a depth of 13.5 feet below the ground surface to approximately 20 feet. Between 21 feet through approximately 25 to 26 feet continuous samples were taken to more accurately log the soils encountered.** The collected samples were taken to more accurately log the soils encountered. The collected samples were sealed, capped and packed on ice in an insulated cooler for possible delivery to the laboratory for analysis. Each sample was labeled with the boring identification, time of day and depth collected. A Chain-of-Custody Manifest was included with the samples at all times (See Appendix II, Standard Operating Procedures)." (Page 5)

COMMENT: *The first 13.5 feet of each boring was logged based on drill cuttings. The soil samples do not appear to have been analyzed.*

MONITORING WELL INSTALLATION

"**Groundwater monitoring wells were installed in all of the borings immediately after drilling.** The wells were constructed with 0.020 inch machine slotted, PVC well screen and 2-inch blank casing. **In monitoring wells MW-F through MW-J, 5 feet of well screen was installed in the bottom of each of the borings with blank casing installed to approximately 3 to 4 feet above ground as per EMCON Associates recommendations. The construction of MW-K and MW-L, consisted of well screen from the bottom of each boring to 5-feet below the ground surface. Blank casing was then installed to approximately 3 to 4 feet above ground surface.** A gravel pack consisting of Lonestar No. 2 sand was placed in the annulus from the bottom of each boring to approximately one foot above the well screen interval. The wells were completed with a bentonite seal and cement grout to the surface (See Appendix I - Drilling Logs). **4-inch steel pipes were installed to protect the well heads. After installation, well heads for**

> **all the wells were surveyed to a common datum for elevation control, and subsequent gradient determination."** (Pages 5 and 6)

COMMENT: *A review of the well logs (see following table) indicates that the gravel pack extends above the groundwater level in Monitoring Wells E, F, K and L. The gravel pack starts at 7, 7, 7 and 8.5 feet below the groundwater level for monitoring Wells G, H, I, and J respectively. The analytical results for groundwater sampled from these wells is representative of groundwater located between about 19 to 25 feet below ground surface. This is below the depth of about 12 to 18.5 feet below ground surface where "slight hydrocarbon odor" was noted on the boring logs of Monitoring Wells H, I and J. Analytical results for BTEX and Total Volatile Hydrocarbons revealed contamination between about 19 to 25 feet below ground surface for MW-H but was non-detect for MW-I and MW-J. Note that the distance between the bottom of the black organic ooze is about 0.2, 0.5 and 1.0 feet above the gravel pack for Monitoring Wells H, I and J respectively.*

Monitoring Wells K and L, located adjacent to Monitoring Wells G and I respectively, sampled the groundwater from 11 to 12 feet below ground surface to about 14.5 feet (top three feet). No product odor was noted on the boring logs and both wells were non-detect for BTEX and Total Volatile Hydrocarbons (C4 to C12).

Based on a review of the seven monitoring wells constructed, 5 wells sample groundwater below the black organic ooze in which product odor was noted and 2 wells sample groundwater above and only about six inches into the black organic ooze which is about 6 feet in thickness. This interjects an uncertainty into actual levels of product contamination within the black organic ooze.

The appropriateness of the laboratory analysis used has also been reviewed. Based on the Garrett Freight Lines underground tanks, diesel, waste oil and gasoline may be present on the site. The BTEX and Total Volatile Hydrocarbons (C4 to C12) analysis determined by Modified EPA Method 602 is appropriate for gasoline contamination but not for diesel, oil or grease contamination. As indicated in the LUFT Field Manual, Page 7:

> *"Diesel fuel consists primarily of straight-chain hydrocarbons (alkenes and alkanes) ranging in length from C10 to C23 (see Appendix J). Carbon chain lengths of C16 to C17 predominate in the mixture, whose composition approximates a bell-shaped curve with C16 and C17 as the mean. Diesel fuel may also contain some aromatic constituents (depending on the source and refining process), including benzene. But these are minor components usually accounting for less than 0.1 percent of the*

total product."

The diesel, oil and grease contamination was analyzed by EPA Method 418.1. This method was previously discussed under the heading Scope of Work.

COMPARISON OF RELATIVE DEPTHS TO GROUNDWATER, BLACK ORGANIC OOZE, GRAVEL PACK AND HYDROCARBON ODOR

MONITORING WELL	GROUND WATER	BLACK OOZE		GRAVEL PACK		PRODUCT ODOR	
		Top	Bottom	Top	Bottom	Top	Bottom
MW E	8.5	12	18	5.5	50	No odor	
MW F	10	7	14	9	25	No odor	
MW G	12	15	20	19	25	No odor	
MW H	12	14	18.8	19	25.5	13.5	18.8
MW I	12	12	18.5	19	25.5	12	18.5
MW J	10.5	11	18	19	25.5	11	18
MW K	12	14.5	?	4	15	No odor	
MW L	11	14.5	?	4	15	No odor	

COMMENT: *MW K and MW L are adjacent to MW G and MW I respectively. MW I exhibited product odor, however MW L did not.*

Monitoring Well H is the only well testing positive--71.9 ppm Total Volatile Hydrocarbons--of the seven wells sampled on August 30, 1987. This well is located west of two former underground diesel storage tanks located near 64th Street.

WATER SAMPLING ANALYSES

"**On August 30, 1987 Wells MW-F through MW-L were developed, purged and sampled.** The monitoring wells were developed and purged by hand bailing and sampled with an EPA approved

Teflon[R] sampler. The samples were labeled immediately with job identification number, the sample number, date, time and type of analysis requested. The samples were then stored on ice in a thermally insulated cooler until delivery to GT Environmental Laboratories where they were then **analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), lead, arsenic, total petroleum hydrocarbons, and total volatile hydrocarbons.** Chain-of-Custody Manifests were completed and enclosed as required. Analyses were performed by EPA Methods 3020/7421, 3005/6010, 418.1 and a Modified 602. (See Laboratory Results - Appendix III).

On September 2, 1987, the recovery well was also sampled and all of the monitoring wells were monitored for depth to water. The recovery well water sampled was analyzed using the same previously mentioned EPA Methods. (See Laboratory Results - Appendix III). The depth to water measurements were used to generate a groundwater gradient map (See Groundwater Gradient Map - Figure 3)." (Pages 6 and 7)

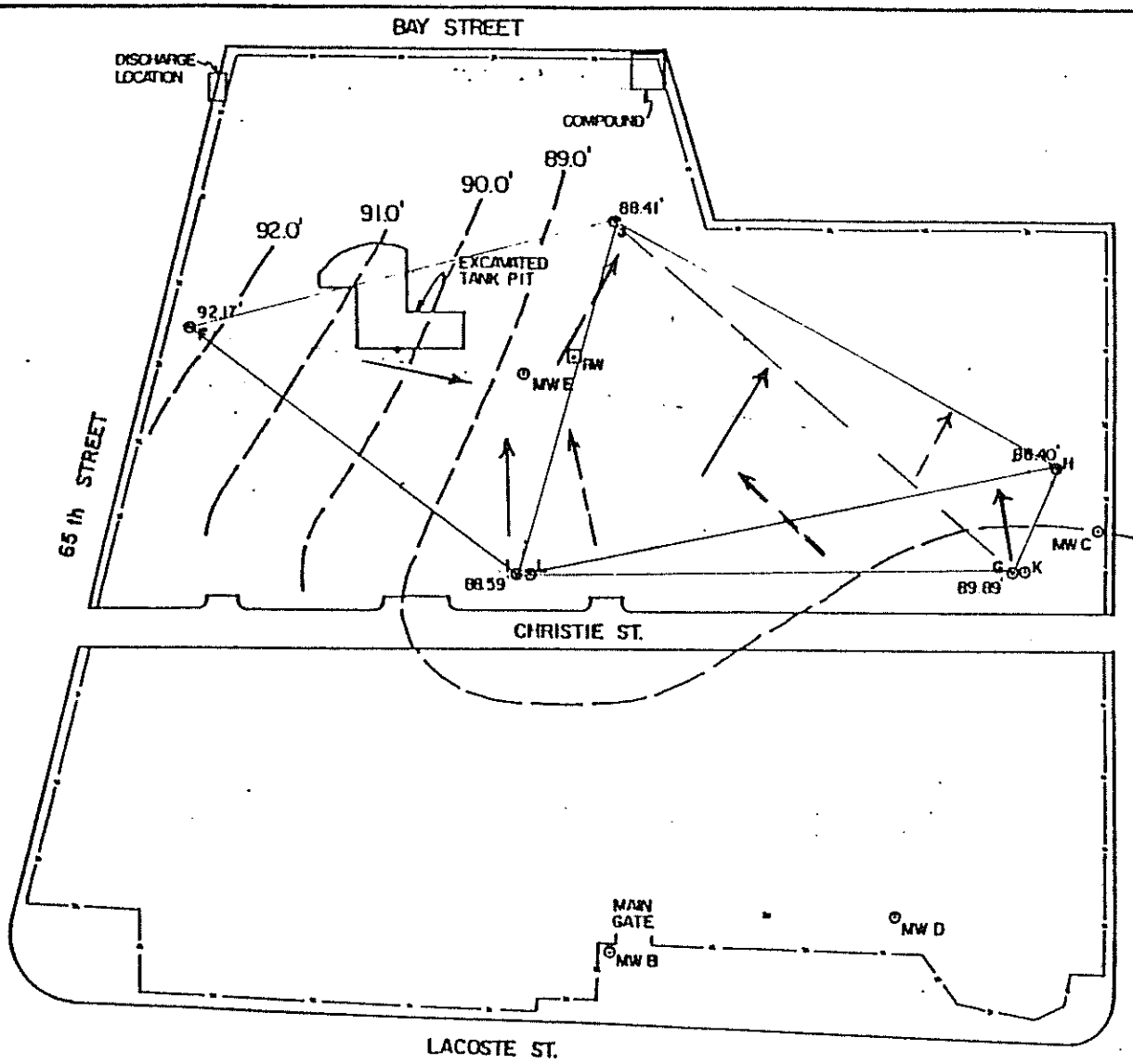
COMMENT: *The Groundwater Gradient Map - Figure 3, is based on water level measurements that have stabilized for three days after drilling. The five monitoring well water levels have been used to calculate eight flow arrows using the three-point solution. The groundwater flow is complex. With only one monitoring well (F) located at the north end of the site next to 65th street, only one solution for groundwater flow of south-southwest is available in the northeastern quadrant. At the southeastern quadrant of the site, the flow direction is curvelinear from northeast at Christie street to southeast toward Bay Street. This is almost opposite to flow gradients calculated for the southwest quadrant site area between Christie and Lacoste Streets on 30 August 1986, 30 December 1986, 5 January 1987 and 21 January 1987 (Monitoring Wells B, C, D and E). It is postulated that the groundwater flow direction at Christie Street has basically reversed between the four readings between August 1986 and January 1987 and the September 2, 1987 reading in this report due to unseasonably high tides.*

Other explanations may be construction activities including de-watering operations, unusually high tides, groundwater extraction from the recovery well, or a combination of the above.

The apparent direction of groundwater flow may also explain why the groundwater contamination concentrations are substantially lower then at other times--i.e. the groundwater flow is generally east so that Monitoring Well J (no detection of contaminants) is the only well down gradient from a tank removal location.

The EPA Methods 602 and 418.1 indicate free product present at the

recovery well. Total Volatile Hydrocarbons (primarily gasoline hydrocarbons) of 93,724 ppb were sampled on September 2, 1987. The Total Petroleum Hydrocarbons concentration including the heavier gasoline fractions and the diesel, oil and grease for this sample was 355,000 ppb.



40 WELL
WELL

COMPANY
LE, CALIFORNIA

GROUNDWATER GRADIENT MAP
SEPTEMBER 2, 1987

0 FEET 200

GROUNDWATER TECHNOLOGY

Reference No. C-6

REGIONAL WATER QUALITY CONTROL BOARD

SAN FRANCISCO BAY REGION

INTERNAL MEMO

BAY CENTER PROJECT NPDES

DATE: November 2, 1987

EXCERPTS AND COMMENTS:

"Background
This site was a municipal dump from 1940 to 1960, and a trucking terminal from 1960 -1985. During development, 12 underground tanks were removed (8 diesel, 1 gasoline and 3 waste oil;) in April of 1986. Soil and water samples taken from beneath the tanks were incorrectly analyzed (head space, not an appropriate extraction technique for diesel analysis). However, the lab results show soil contamination up to 4460 ppm TPH, and water contamination of 26 ppm TPH in the vicinity of tank pits A and B (See Figures I - III).

A subsequent groundwater investigation by Aqua Science (July-August, 1986) consisted of analyzing water samples taken from 37 borings on site. Four of the borings were converted to monitoring wells, and we have results for two of the wells that were sampled that year, although these wells apparently were not sampled for TPH (Figure IV shows all presently existing wells, the former positions of the tanks, and recently plotted gradients). MW-A showed high levels of volatile (EPA 624) and base/neutral extractable (EPA 625) organics and PCB's (EPA 606; See Table I). These levels are indicative of free product, either gasoline or diesel. Also attached are the results of the analysis of the groundwater taken from the 37 borings (Table II). All of these samples, except one, were subjected to head space analysis, and compared to standards of gasoline or aged gasoline. Sample No. 30 was compared to a diesel standard. Locations of the borings are not noted on any site map that we have. Similarly, the location of MW-A is unknown to us, though it is reportedly in the area of MW-E.

In 1987, a fifth monitoring well (MW-E) was drilled, and all wells except MW-A, were sampled and analyzed using EPA methods 624, 625 and 608 (Table III). MW-A was reportedly covered by excavated soil and could not be sampled this year. Levels of

contamination in MW-B decreased dramatically to non-detectable levels. However, the concentration of the total hydrocarbon matrix is not reported, which would give an indication of the level of the dissolved diesel or gasoline contamination present, if any.

In March of this year, GTI proposed a cleanup system that consists of a double-pump system; any floating product pumped from the groundwater will be stored in a tank on site prior to disposal. Groundwater will be treated using an air stripper. GTI has performed a slug test, calculated transmissivity, and estimates a 70 foot radius of influence (Figure V). Contamination in MW-C, the origin of which was probably the two tanks formerly located south of the larger excavation, is not addressed in the cleanup proposal. Their air stripper is based upon the physical properties of benzene, and my own calculations show that its size is sufficient to remove the elevated concentrations of benzene originally reported in MW-A. However, the cleanup system has not been analyzed for its abilities to remove the less volatile compounds found in the groundwater.

In September of this year, GTI submitted the results from the drilling and sampling of seven additional wells. The water was analyzed by EPA Method 602, and TPH using EPA Method 418.1, and IR method (only the new wells were sampled; TPH =ND for these wells. See Figure V. Most new wells are ND for 602. MW-H shows 72 ppb TPH in HC Matrix by 502 and 10.9 ppb Benzene.

In summary:

A) Only once (one soil sample) has a soil or water sample been analyzed for TPH as diesel.
B) The radius of influence of the proposed recovery system is inadequate if the goal is to cleanup all on-site pollution.
C) Soil contamination, if any, and its potential for the continuing impact on groundwater quality, has not been addressed.

The NPDES Permit application is incomplete in that it does not contain or address the following: ...." (Pages 1 and 2)

COMMENT: *The RWQCB, San Francisco Bay Region, indicates that in their opinion soil and groundwater TPH contamination as diesel has not been adequately characterized or addressed for cleaned up. This implies that the RWQCB believes that there is significant site contamination that will not be cleaned up by the proposed recovery system. This interjects an uncertainty into when TPH contamination from this site ceases to disperse throughout the surrounding areas.*

APPENDIX D

NIELSEN FREIGHT LINES

NORTH MARKETPLACE & MARKETPLACE SITES

64TH, SHELLMOUND, & POWELL STREETS

LACOSTE & CHRISTIE STREETS

STUDY AREA MAP

LIST OF REFERENCES

EXCERPTS AND COMMENTS ON STUDY AREA REFERENCES

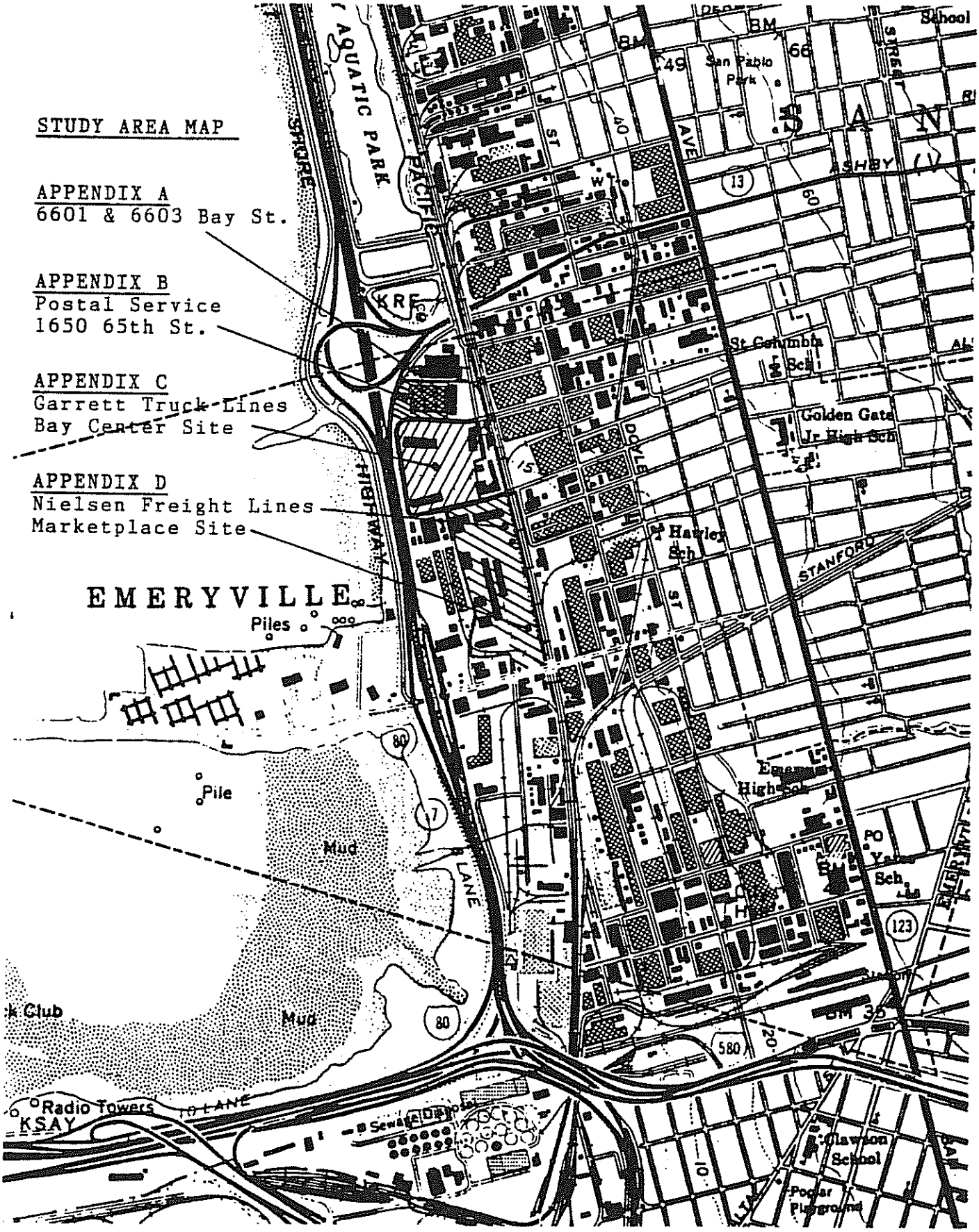
STUDY AREA MAP

APPENDIX A
6601 & 6603 Bay St.

APPENDIX B
Postal Service
1650 65th St.

APPENDIX C
Garrett Truck Lines
Bay Center Site

APPENDIX D
Nielsen Freight Lines
Marketplace Site



APPENDIX D

LIST OF REFERENCES

APPENDIX D

LIST OF REFERENCES,

CONTINUED

Reference No. D-1

ENVIRONMENTAL ASSESSMENT

Former Nielsen Freight Lines Site and Adjacent Parcel

Emeryville, California

Letter of Transmittal and 37 Page Report

DATE: August 12, 1987

TO: Mr. Greg Zentner
Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street
Oakland, CA 94607

FOR: The Martin Company
4265 Hacienda Drive, Suite 101
Pleasanton, California 94566

FROM: Woodward-Clyde Consultants
100 Pringle Avenue, Suite 300
Walnut Creek, California 94596
John C. McMillan, P.E.
Project Engineer

EXCERPTS AND COMMENTS:

I. EXECUTIVE SUMMARY

A. "INTRODUCTION--The Martin Company proposes to develop a retail structure and attendant parking in Emeryville, California. Woodward-Clyde Consultants (WCC) has been retained by The Martin Company to perform an environmental assessment of the proposed project site consisting of the following elements: review of site history; performance of field investigations including drilling and sampling, and well installation and sampling; chemical testing of selected soil and groundwater samples; and assessment and presentation of the study results in a report. WCC was also retained to observe the removal of underground tanks and fueling manifolds and to submit the required tank removal and closure documentation to the appropriate regulatory agencies. This tank closure work is reported under separate cover (WCC, 1987). A summary of the major

findings and remedial recommendations of that report are presented in the attached document in the section entitled "Summary of Fuel Tank and Manifold Closure Report" and are not presented in this Executive Summary." (Page E-1)

B. "SITE DESCRIPTION--The proposed development site consists of two adjacent parcels of land near the intersection of Christie and 64th Streets in Emeryville, California. The first is a 5.2-acre parcel currently occupied by a cross-dock trucking terminal and formerly operated by the Nielsen Freight Lines Company (see Figure 2). The second parcel is 1.7 acres and is the northern portion of the Marketplace development which borders the Nielsen site on the south. The two parcels are referred to in this report as the Nielsen and the North Marketplace parcels. The North Marketplace parcel is currently a parking lot." (Page E-1)

C. "SITE HISTORY--Both the Marketplace and Nielsen parcels are former tidal flats which have been filled. By 1930 most of the current Marketplace site had been filled and populated with buildings. Between 1935 and 1937, the portion of the Nielsen site north of 63rd Street was filled. Industrial activities pursued on the northern portion of the Marketplace site consisted principally of the manufacture of bituminous roofing products (tar paper), and the blending and packaging of oil-based paints and enamels. Included was a small distillation plant for referring crude asphalt into tar and other light hydrocarbon fractions. Early industrial development of the Nielsen site included four large above-ground storage tanks, an industrial building, and organized outdoor storage areas. In the 1960's, the site was redeveloped as a trucking facility. The exact nature of the industrial parcel is not known. However, aerial photos indicate that this facility was part of the same industrial complex which occupies the Marketplace parcel."

Existing features of environmental concern on Nielsen parcel include: a 10,000-gallon gasoline and a 10,000-gallon diesel tank, a 500-gallon waste oil and a 500-gallon lube oil tank, an antifreeze and motor oil drum storage area, a tar seep in the area of the former tankage, solvent use in the Nielsen repair garage, and an oil/water separator sump also adjacent to the repair garage.

There are no toxic waste sites north of Powell Street and within the City of Emeryville currently under examination by California Department of Health Services. **A Westinghouse plant known to have PCB soil and groundwater contamination lies to the southeast and across the railroad tracks from the Nielsen parcel. Fuel pumps and thus underground fuel tanks exist at industrial facilities east and northeast of the Nielsen parcel."** (Pages E-1 and E-2)

D. "SUMMARY OF ENVIRONMENTAL CONCERN--**Based on the previous discussion, the following environmental concerns for the subject parcels have been identified:**

- Early Industrial Operations - presence of tar paper materials, paint components, crude asphalt, and asphalt distillation products in shallow fill and groundwater.

- Trucking Facility Operations - presence of oil and fuel residues in the shallow soil and groundwater due to surface dripping or spillage; presence of antifreeze in shallow soil and groundwater beneath the drum storage area; and the presence of gasoline or diesel in subsurface soil and shallow groundwater due to underground tank, piping, or manifold leakage.

- Regional Concerns - presence of trace levels of PCB's or heavy metals in shallow fill due to landfilling." (Pages E-2 and E-3)

E. "Site Soil and Groundwater Conditions ... It appears that the native soil underlying the fill is generally a stiff to very stiff sandy or silty clay or silt. Based on WCC's local experience, a thick laterally continuous layer of "old Bay Mud" is anticipated to exist beneath the Nielsen and North Marketplace parcels.

Groundwater level data taken in the area in 1982 and 1985 showed the regional shallow groundwater gradient to be towards the west-southwest. Groundwater level measurements taken from the new Nielsen wells showed a groundwater flow direction at the north end of the Nielsen property toward the west. **A piezometric highpoint was seen near the southwest area of the site and is thought to be due to the presence of low permeability tar materials in the fill at the well location."** (Page E-3)

COMMENT: *The WCC Piezometric Surface Map, 6 May 1987, Figure 4 has been analyzed by determining the flow direction within each triad of wells (three-point problem). For the six triads within 100 feet of the railroad right of way (easterly boundary) the flow components vary between west to northwest. This is in slight conflict with the reported regional direction of west to west-southwest.*

For the four possible triads in the south-central portion of the site (Well Nos. 2, 6A, 7--the piezometric highpoint, and 8) the groundwater flow is north-east. This is in direct conflict with the reported regional flow.

For the triad defined by Well Nos. 2, 4 and 6A, the flow direction is nearly southerly. This is in conflict with all contiguous triads and reported flow directions.

As in the 6601 and 6603 Bay Street properties, the near surface groundwater flow does not flow uniformly toward the San Francisco Bay to the west. Instead, due to the heterogenous composition of fill material with resultant differing permeabilities, the groundwater flow is locally contorted with significant changes of direction both vertically and horizontally. As noted in a comment near the end of this report, the discrepancy in flow may be to a tidal surge modifying the groundwater surface.

F. "MAJOR FINDINGS, Trace Metals. Metals were generally undetected in the groundwater and, where detected, were generally well below the federal drinking water standards. Exceptions are lead in wells W-6A and W-7 and chromium in wells W-4 and W-7. The elevated metals levels at W-4, W-6A, and W-7 are thought to be due to the presence of tar paper and tar paper products in the fill. The possible wide distribution of tar paper materials in the fill of the region suggests that similar localized groundwater contamination may exist at many points in the region." (Page E-4)

G. "MAJOR FINDINGS, Oil and Fuel. **In the current investigation, the test results for oil and fuel residue in the shallow fill soil for the Nielsen property indicate that some such accumulation has occurred and in a pattern consistent with the locations of likely surface deposition or collection.** The affected fill soils do not appear to contain any substantial concentrations of volatile or extractable priority pollutants.

Black fluid observed in the shallow soil of Boring B-1

starting at a depth of 2 feet is believed to be leakage of oily materials from the oil/water separator sump located immediately north of the boring. The absence of the black fluid in boring B-4 located 14 feet south of the sump indicates that the shallow soil contamination condition is very localized.

The TFH, fuel, and EPA Methods 624 and 625 analyses results for shallow groundwater samples from the Nielsen parcel indicate that no substantial fuel or oil contamination is present in the groundwater. Fuel hydrocarbon test results for groundwater from the diesel tank excavation varied from <1 to 630 mg/l. Further investigation of the groundwater in this excavation appears warranted. Toluene was detected in monitoring well W-2 at a concentration less than the State's Action Level. Because no fuel hydrocarbons, benzene, or xylene were detected in that groundwater sample, it appears that the source is localized and is not associated with motor fuels. The source of the Freon 113 in the well W-2 groundwater sample is not know. The unidentified compounds detected in well W-7 groundwater sample are thought to be from the tar paper material fill which constitutes much of the profile screened by that monitoring well." (Page E-5)

COMMENT: *The "Major Findings" for "Oil and Fuel" represent that "no substantial fuel or oil contamination is present in the groundwater." Based on the analysis of local groundwater flow in the vicinity of the gasoline underground storage tank and manifold line, the nearest wells (5 and 6A) are located cross gradient from the tank and manifold line. This interjects an uncertainty into possible gasoline groundwater contamination. The same situation also occurs at the diesel tank and northerly manifold.*

H. "MAJOR FINDINGS, <u>Tar Paper and Paint Components (Solvents).</u> **Hydrocarbon contamination due to early industrial operations were evidenced as a floating black fluid at well 5M; a kerosene-like contaminant in the shallow soils of well W-8; tar seeps in the area of B-3; and tar paper and tar paper materials in the shallow fill at wells W-6, W-6A, W-7, and B-4.** The black fluid removed from well 5M is believed to be crude asphalt and was found to contain a number of PNA's (polynuclear aromatic compound). Low concentrations of PNA's were also found in the groundwater beneath the floating layer. Fuel-weight hydrocarbons are present in the shallow fill

at well W-8. The groundwater from well W-8 also showed low concentrations of PNA's. PNA's were also detected in the soil sample taken from beneath a shallow wood slab at boring B-3. The presence of the PNA's together with the lack of purgeable priority pollutants indicates the asphaltic nature of these contaminants. A strong pungent odor was noted at B-3 when a buried wood slab was penetrated at a depth of about 4 feet. The odor is thought to be from volatile petroleum distillates and could pose an off-gassing hazard should the wood slab be removed during site development. The extent of the wood slab is unknown.

Tar paper in organized layers was found in monitoring wells W-4 and W-6A. Tar materials were also found at the base of shallow boring B-4. Substantial thicknesses of fibrous paper, tar paper, and similar debris were found in monitoring wells W-6 and W-7. Extensive testing of the W-7 groundwater sample suggests that these materials contribute substantial amounts of unidentified non-priority pollutant compounds to the groundwater. Degradation of these buried materials is also believed to be the source of the elevated ammonia nitrogen concentration observed in the well W-7 groundwater sample. **As was the case in the discussion of trace metals in groundwater, the contribution of these organic contaminants and nitrogen ammonia to the groundwater may be localized at each fill pocket but regional in scope, due to the wide distribution of tar paper materials in the regional fill."** (Page E-6)

II. SITE DESCRIPTION (previously described above)

III. SITE HISTORY

A. "Site Filling. **Both the Nielsen and the Marketplace properties are former tidal flats of San Francisco Bay which have been filled. The northeast corner of the Marketplace property was first occupied by the Paraffin Company in 1884.** Little is known about the early operations of the Paraffin Company. However, it appears that these early operations may have been directed primarily towards research and development of bituminous and petroleum based products, and possible some small scale asphalt and kerosene refining. It appears that only limited landfilling, if any, would have been done at the Marketplace property during the period 1884 to about 1900. Beginning in 1902, the Paraffin Company began making preparation for manufacture of roofing felt,

roofing paper, roofing shingles and refined asphalt for use in linoleum and asphalt based paints. **Much or most of the land within the historic Bay shoreline as shown on Figure 2A had been filled by approximately 1910.** Manufacture of at least some of the products named above was being done at the site by 1910. In 1920, the Paraffin Company became Pabco. By about 1930, most of the current Marketplace site had been filled and populated with buildings. **The property between 64th Street to the north, 63rd to the south, the railroad right-of-way to the east, and the Bayshore freeway to the west were filled between 1935 and 1937.** This parcel includes most of what is now the Nielsen site. In 1957, Pabco was purchased by the Fibreboard Corporation.

COMMENT: *The historic Bay Shoreline is important in understanding the groundwater near-surface hydrology and the dispersion routes of petroleum product contamination. Based on a review of the history of development, boring logs and soil stratigraphy, much of the fill located along the shoreline is comprised of wood, concrete, brick, wire, glass and other debris and rubble. As indicated above in the report, much of the inland area from the shoreline was filled in by 1910. Most this material is surmised to be debris and rubble from the 1906 earthquake. Until the Bayshore Freeway was constructed, most filling activities in the study area appear to be restricted to dumping along the shoreline except for the Marketplace site which was generally filled by 1930. From the 1940's to late 1950's the area north of 64th Street to Ashby Avenue was used as municipal disposal site.*

The presence of the coarser rubble along the former shoreline has created an area of very complex hydrology in the heterogeneous rubble placed generally parallel to the shoreline. It is noted that the Marketplace, Nielsen Freightlines, Delta Freightlines, Garrett Freightlines, U.S. Postal Warehouse, and 6601/6603 Bay Street property underground storage tanks are located within this zone exhibiting extensive quantities of rubble along the former shoreline. It is further noted that tidal influence most likely extends to this area creating groundwater flow reversals that tend to slow baywards flow, mix and spread laterally (north-south) hydrocarbon contamination.

In a 1947 aerial photo, the eastern part of the present Nielsen parcel is seen to be under development. The construction activities include the construction of four large above ground tanks (Figure 2A). A small black area just south of the four large tanks is evident in the photo, but its cause is not known with certainty. By 1949, a single large building and outdoor storage areas

are evident. The building tanks and storage area are shown on Figure 2A. The remaining portion of the area between this development and the current Eastshore freeway had not yet been developed.

By 1953, the single structure on the Nielsen site area had been added to and a parking lot built at the intersection of what is now 64th and Christie Streets. In the 1960's, the Nielsen Freight Lines building and main parking area had been constructed. In a 1969 aerial photo, the two low-rise commercial buildings to the west of the Nielsen building were also present. Nielsen operations appear to have been extended to include the "panhandle" area bordering Christie Street some time between 1971 and 1973." (Pages 2 and 3)

B. "Site Industrial Activities. Early industrial activities pursued in the Marketplace site buildings are shown in Figure 2A. The area which is now the northern portion of the Marketplace parking lot was occupied by buildings dedicated to the manufacture of roofing products. The two existing Marketplace buildings were used for paint manufacture and storage, and for warehousing. The northeast corner of the Marketplace property and the southern portion of the current Nielsen parcel were occupied by an asphalt refining plant. This plant distilled crude asphalt into refined asphalt for roofing manufacture by removing the light hydrocarbon fractions. The light fractions were sent to the powerhouse for use as fuel.

Paint manufacture at the site consisted of the blending and packaging of oil based paints and enamels form ingredients produced elsewhere. Pain mediums included mainly linseed oil and some synthetic resin varnishes for enamel. The primary medium solvent was apparently mineral spirits, although lesser amounts of other solvents including ethyl alcohol, xylene and toluene were also used.

A variety of pain pigments were used. A former operations manager for paint manufacturing at the site recalled during an interview that commonly used pigments included titanium oxide, red and white lead, zinc oxide, zinc chromate, magnesium silicate, barium sulfate and others.

The exact nature of the industrial activities used in the building and tankage on what is now the Nielsen parcel is

not known." (Pages 3 and 4)

C. "Pertinent Existing Features on the Nielsen Parcel. **The Nielsen parcel was developed by System 99 sometime between 1959 and 1969.** This facility was purchased by Nielsen Freight Lines approximately nine years ago.

During an initial site visit in July 1986, a number of features pertaining to this study were noted. These were as follows:

1. A 10,000-gallon gasoline storage tank and fueling manifold;
2. A 10,000-gallon diesel tank and fueling manifold;
3. A 500-gallon waste oil tank;
4. A 500-gallon lube oil tank;
5. An antifreeze and motor oil drum storage area;
6. Tar seeps through the pavement; and
7. Solvent use in the facilities' repair garage.

During later field activities, an oil/water separator sump was also noted just south of the repair facility. As the sump stores oily sludge between clean outs, it too poses an environmental concern." (Pages 4 and 5)

D. "Potential Regional Concerns. In addition to the historic Pabco operations on the two subject parcels, other historical and current industrial activities in the region may have a bearing on the environmental conditions at the Nielsen and North Marketplace parcels. An inquiry was made to the California Department of Health Services regarding the existence of any active toxic waste sites north of Powell Street and within the City of Emeryville. There are currently no such active cases. A Westinghouse Company plant is located to the south of Nielsen parcel and just east of the Southern pacific Railroad tracks. The plant site has PCB soil and groundwater contamination. Trace levels of PCB's were found at several sampling locations on the Marketplace property in the 1982 environmental study (WCC, 1982). DHS indicated that a site visit to the ITT/Grinnell parcel just north of the Westinghouse property has also been made concerning PCB's. Access to the records from that site visit could not be obtained in a timely manner.

The industrial site immediately to the east of the Nielsen building is a rendering plant which, based on an

aerial photo, has been present since before 1947. The plant appears to pose no significant imminent environmental concerns. During a cursory inspection of the neighborhood east of the Nielsen property, the rendering plant and the warehousing facility immediately to the north were observed to have gasoline pumps and, therefore, underground fuel tanks." (Page 5)

IV. PREVIOUS MARKETPLACE STUDY

"**The soil borings for the North Marketplace parcel show that site to be covered with mixed fine and coarse-grained fill about 5 feet thick. The fill contained assorted construction debris including brick chips and metal scraps.** Several significant features within the North Marketplace parcel were also noted. These included **a tar seep in the area of boring 11M and four groups of underground tanks labelled A, B, C, and D on Figure 3.** Boring 11M was drilled through a tar seep and a 2-foot-thick layer of tar was encountered. The Group A tanks were reported to have contained crude asphalt, while the Group B, C, and D tanks were to have contained solvents for paint manufacture (WCC, 1982). Backhoe studies of the Group A, B, and C tank areas showed that these tanks are no longer present. A borehole study of the Group D area indicated that these tanks are not likely to be present. **The shallow fill at the site was frequently noted to have a petroleum odor.**" (Page 7)

V. SUMMARY OF UNDERGROUND STORAGE TANK REPORT (WWC, 1987)

"No corrosion or perforations were observed in the diesel tank, product line, or manifold. **Free product of less than 1/16-inch thickness was observed to be floating on the groundwater in the tank excavation immediately following tank removal. Soil stains were observed at the bottom of the product line trench and also beneath the former location of most of the manifold withdrawal ports.** This staining indicates that some diesel fuel spillage occurred during the trucking facility operation. As there is little value in testing soils in which concentrations of fuel is visually evidenced, an additional 2.5 feet of soil was removed from the entire length of the manifold trench. Soil samples were then taken at 50-foot intervals along the manifold excavation to confirm the continued presence of diesel fuel. Also, a water sample was taken form the diesel tank excavation, a soil sample from the product line trench, and a number

of samples from the piles of excavated soil were also obtained. **Chemical test results for total fuel hydrocarbons in these samples were obtained indicating that moderate soil contamination remains in the product line and manifold trenches. Only two trench samples were observed to have greater than 1000 ppm of TFH. Three samples taken from the stockpiled soil of the diesel tank and manifold excavations were found to have greater than 1000 ppm of diesel present.** Mixed results were obtained for the groundwater samples from the tank excavation, as will be discussed later in this report.

The remedial action program presented for the diesel tank and manifold excavations calls for treatment of the soil already removed and stockpiled by bio-degradation techniques. The additional soil containing greater than 100 ppm of diesel fuel and above the groundwater table will be removed from the manifold trench and similarly treated. The excavations will be backfillled with the bio-degraded soil, if feasible. Monitoring wells would be installed down-gradient of the diesel manifold if levels of fuel at the water table exceed 100 ppm.

No corrosion or perforations were observed in the gasoline tank, product line, or manifold. No substantial free product was observed on the groundwater in the excavation at the time of tank removal. Minor soil stains were found in the manifold trench immediately beneath the former locations of most of the product withdrawal ports. The stains indicate that some gasoline spillage occurred during the trucking facility operation. An additional 1.5 feet of soil was removed at 20-foot intervals along the gasoline manifold. Samples were taken from each point and screened using an organic vapor meter. A description of this field screening technique is given later in this report. This technique provides a means of assessing the relative fuel hydrocarbon concentrations in soil samples. Samples from the locations giving the higher head space readings were analyzed for fuel hydrocarbon content. **The test results indicate only minor contamination remains along the gasoline manifold. A soil sample taken from the wall of the gasoline tank excavation showed no detectable fuel hydrocarbons or BTX.**

COMMENT: *The gasoline manifold is extremely long, about 250 feet in length. Staining was noted beneath the former locations of most of the product withdrawal ports. In addition to the potential*

spillage at these locations, leakage could have occurred at the manifold withdrawal port fittings. As this manifold was almost certainly pressurized (versus suction for a single dispenser) slow leaks were probably present at these locations in the manifold line for a long time. Because the manifold was placed in uncompacted fill, differential settlement of the fills and earthquake shaking could likely start the small leaks. This contamination mechanism is common to all of the sites reviewed in the study area.

Key elements of the remedial plan for the gasoline tank and manifold systems include excavation of the remaining soil along the manifold trench which contains concentrations of greater than 10 ppm of gasoline and is above the groundwater table. This soil, along with that already excavated, will be aerated on-site in accordance with Bay Area Air Quality Management District guidelines. The treated soil will be used to backfill the tank and manifold excavations, if feasible.

COMMENT: *In Reference No. D-5; supplementary soil analysis from a composite of 6 soil samples obtained at a five-foot depth, 4 from the gasoline manifold trench and 2 from the tank removal excavation, indicated a gasoline contamination of 9,500 ppm. To put this in perspective, the ignitability level of gasoline in sand is about 1,000 ppm and the maximum solubility concentration in water is about 100 ppm (higher values indicate free product). It is also noted that no monitoring wells were constructed downgradient of the gasoline manifold. Therefore no representative groundwater samples were analyzed for probable contamination even though the above soil samples were obtained between six and eighteen inches above the groundwater level.*

No corrosion or perforations of the waste oil tank or product line were observed. The product line was left in place. No groundwater was observed in the tank excavation at the time of tank removal. Two soil samples were taken from the bottom of the excavation. No fuel hydrocarbons were detected. No remedial steps are necessary for this tank, and the tank excavation will be backfilled with the same soil which was removed. Similar observations were made and sample results were obtained for the lube oil tank. This tank excavation will also be backfilled with the soil initially removed. If additional backfill is needed for the two oil tanks, clean fine-grained import fill will be used.

Observation of an existing oil/water (O/W) separator removal was not included in the original scope of work. This O/W separator is located south and adjacent to the former truck repair shop. The concrete sump should be cleaned of all residue waste oil and sludge and closed in accordance with the state, county, and local underground storage tank regulations. The sanitary sewer line should be capped and sealed." (Pages 8 - 11)

VI. FIELD PROGRAM

A. "Monitoring Well Development and Sampling. .... On 6 May 1987, the elevations of the tops of the monitoring well casings were surveyed. Also on this date, the depth to groundwater in each of the wells was measured, and the groundwater surface was checked for any floating contaminants using a teflon bailer." .... (Page 14)

VII. SITE SOIL CONDITIONS

A. "Fill Materials. As discussed above under "Site History," the Nielsen and Marketplace sites are former tidal flats of San Francisco Bay which have been filled. The shallow soil conditions on the North Marketplace parcel was discussed in the Previous Marketplace Study section. As most of the field exploration undertaken during the current study was on the Nielsen property, the discussion of shallow soil conditions which follows is restricted to that parcel.

The shallow fill at the site consists predominantly of silty and gravelly clays. Some coarse-grained materials are also present including fine grained, poorly graded sand as well as silty and gravelly sand. **The depth of the fill appears to be about 9 to 15 feet at the east end of the Nielsen parcel and 14 to 17 feet at the west end.** The variation in the fill depth may be due to the presence of a slough seen in early topographic maps of the area. The approximate position of this slough per these early maps is shown in Figure 2a.

COMMENT: *The soil lithology is similar at the Nielsen/Marketplace site to the 6601 and 6603 Bay Street properties. The presence of a slough on this site is significant. A similar depression of natural soil was indicated at the east side of the 1650 65th Street property (Appendix B). This depression was further correlated by the depth of fill materials as logged in boreholes for monitoring*

wells.

Immediately below the site pavement are several inches of silty gravel base material underlain by a sandy gravel or gravelly sand containing varying amounts of silt and clay. This coarse-grained layer was present in nearly all the borings done on the Nielsen property and extends to a depth of 1.5 to 2.5 feet. It is believed that this gravel material was imported for the finish grading of the large pavement areas of the trucking facility." (Page 15)

B. "Native Soil. Several borings have been done on the Nielsen site by Geomatrix Consultants as part of the geotechnical study for the foundation of the proposed commercial building (Geomatrix, 1987). Several of these borings extend to a depth of approximately 30 to 32 feet. Based on these borings and WCC's drilling results, it appears that the underlying native soils to this depth are generally a stiff to very stiff sandy or silty clays or silts. There is an absence of the soft, compressible "recent Bay Mud" noted in prior explorations of the adjoining properties (WCC 1982, 1985). These fine-grained soils predominate to the depth of exploration of the Geomatrix study, although some sand was found in Geomatrix boring 3 (Figure 3) at a depth of 29 to 31.5 feet.

A typical geologic cross section extending from the adjacent Westinghouse site through the Watergate Peninsula in Emeryville is shown in Figure 5. **This figure, presented in WCC's 1985 Westinghouse study, shows a thick and laterally continuous layer of "Old Bay Mud," a substantially regional clay aquitard, to be present from at least the Southern Pacific Railroad right-of-way to San Francisco Bay. It is expected that this layer exists beneath the Nielsen parcel and the North Marketplace parcel.** The top of the layer was found in Geomatrix boring 1." (Pages 15 and 16)

COMMENT: *If this substantially regional clay aquitard extends northward under the 6601 and 6603 Bay Street properties, the petroleum hydrocarbon contamination should be confined above this layer. The deepest extent of hydrocarbon contamination detected at the 1650 65th Street site (Appendix B, Reference No. B-9) is at a depth of 27 feet in brown sand (MW-2).*

C. "Subsurface Debris In Fill. Some debris, specifically wood and brick chips, were commonly found in the shallow fill of the Nielsen parcel. Also in this fill, pieces of fibrous paper believed to be roofing fill and bits of tar were located. Tar paper in organized layers was found in monitoring wells W-6A and W-4. Also tar materials were found at the base of shallow boring B-4. Substantial thicknesses of fibrous paper, tar paper, and similar debris were found in monitoring wells W-6 and W-7. The presence of the fibrous paper and tar materials is consistent with the site history, which includes the previous roofing paper production industry on the Marketplace property prior to the filling of the Nielsen parcel. **The fibrous paper and tar fills seem more predominant in the central and western portions of this site. The lateral extent of these heterogeneous, non-soil fills is not known.**

A number of subsurface obstacles were encountered during drilling. An 8-inch-thick concrete slab was found in boring B-4. Also, a large wooden slab or block was encountered in the drilling of boring B-3. A timber was seen in the side of the gasoline tank excavation just north of B-3 at a similar depth. It is possible that there exists an extensive wood mat in the area of boring B-3 and the repair garage, as this area was occupied by four large above ground tanks before construction of the freight lines facility." (Pages 16 and 17)

VIII. SITE GROUNDWATER CONDITIONS

A. "**In March of 1985, groundwater level measurements were taken concurrently at the Marketplace property and the adjacent Westinghouse site to the east. The resulting piezometric surface map showed the shallow groundwater gradient and flow direction in the area to be towards the west-southwest.** The groundwater level drop from east to west across the Marketplace site, a distance of about 450 feet, was approximately 3 feet (WCC, 1985). Piezometric data taken in 1982 at the Marketplace property alone showed a similar groundwater flow direction. The groundwater elevation drop across the Marketplace site for these measurements was also on the order of a couple of feet (WCC, 1982). Based on these results, monitoring wells selected for placement down-gradient of a specific site feature of interest on the Nielsen parcel were placed to the west-southwest of that feature.

Groundwater elevation measurements data were taken at the

Nielsen parcel as part of the current study, and the results are shown in Figure 4. **The groundwater flow direction at the north end of the Nielsen property is toward the west. A piezometric high point is seen in well No. 7. This high point may be due to the presence of low permeability tar paper fill materials at this location."** (Page 17)

COMMENT: *The piezometric high point at well No. 7 may actually be a tidal surge modifying the groundwater level. The flow resultant for the four triads defined by the four most southwesterly wells (W-6A, W2, W-8 and W-7) reveals an excellent correlation for a northeast flow. The gradient for the northeastern flow located in the southwesterly portion of the site is about 0.3 percent. Another excellent correlation of flow gradient is observed at the southeasterly portion of the site. The resultant flow direction using five wells is westerly at 0.3 percent.*

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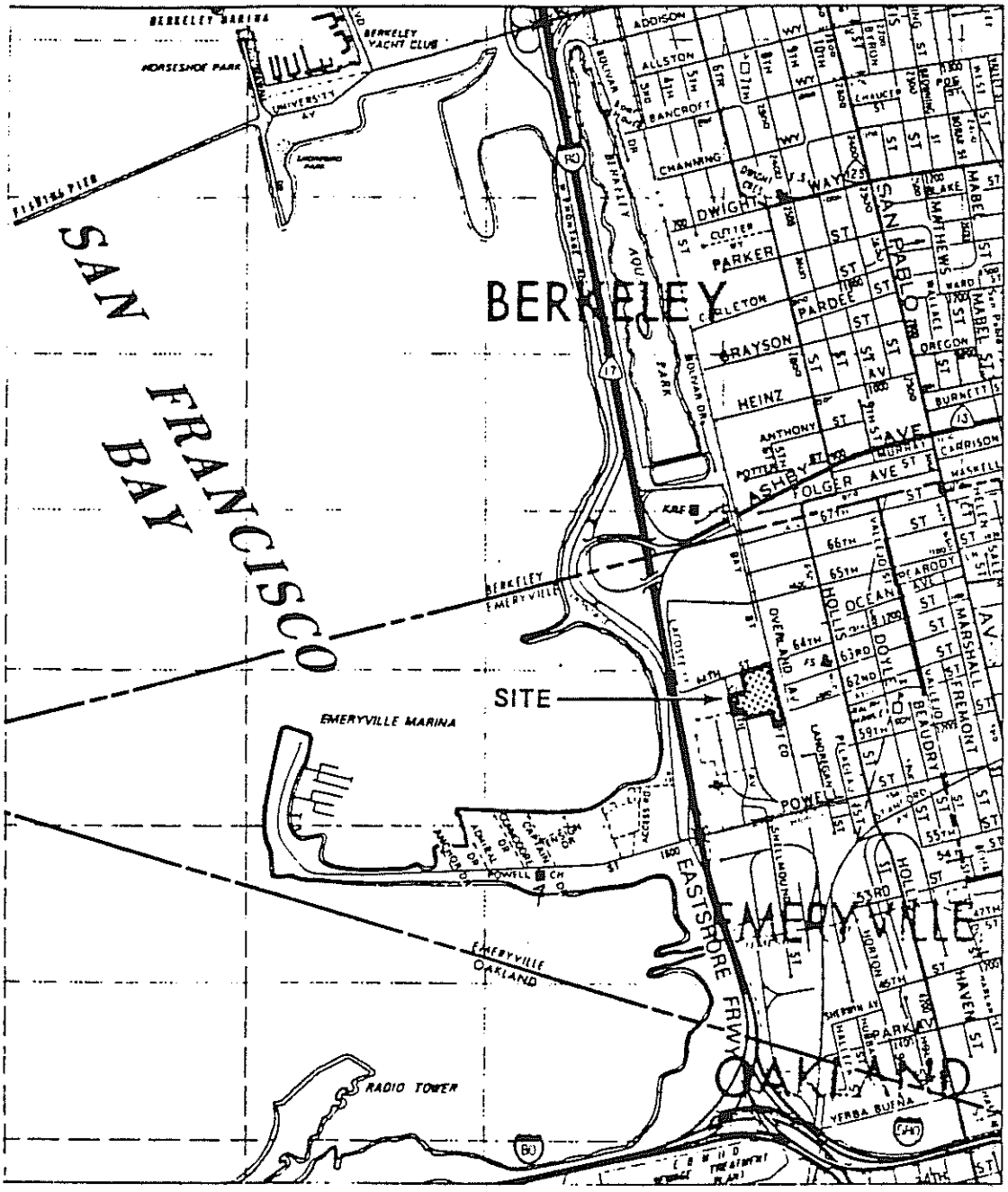
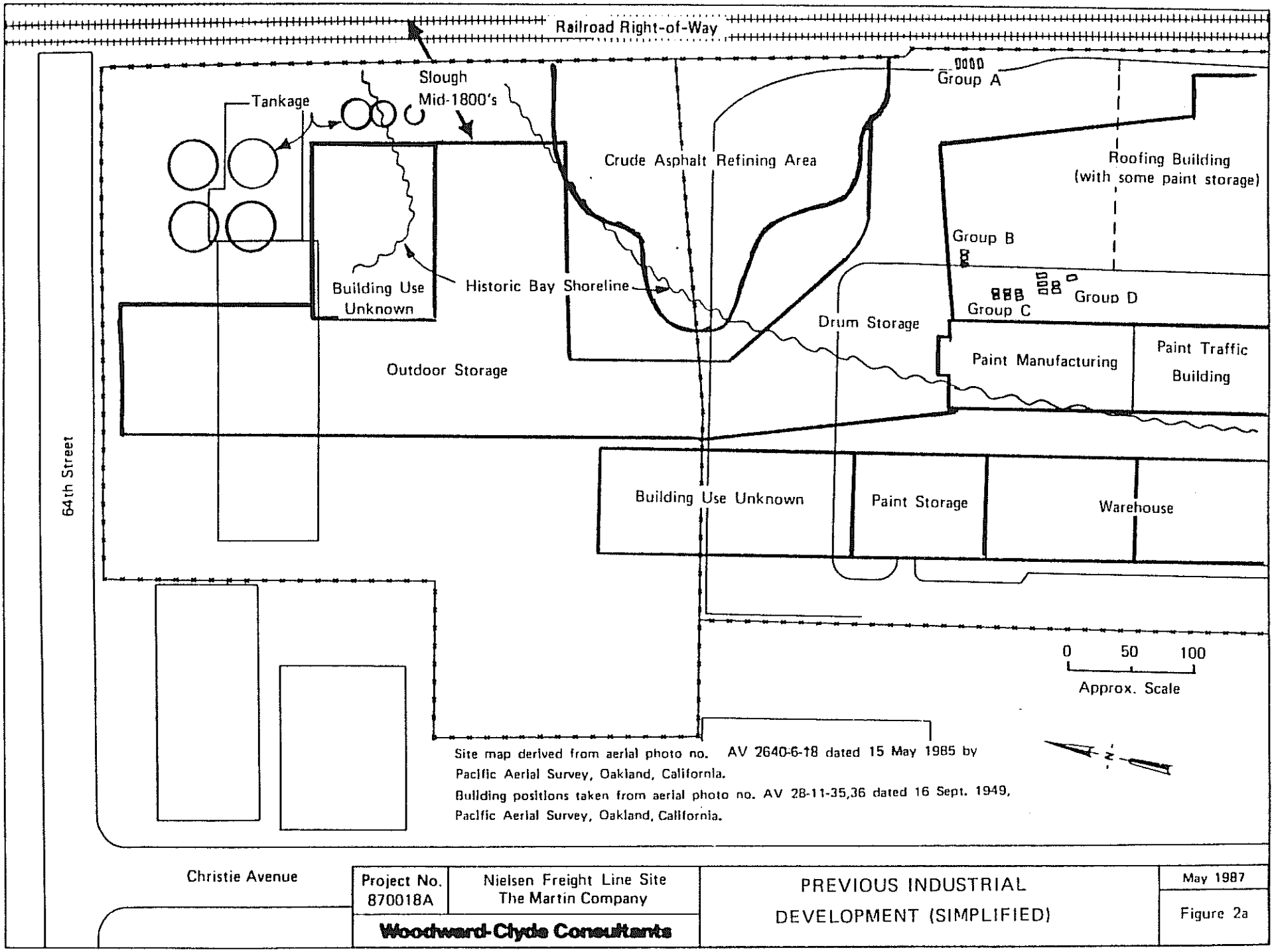
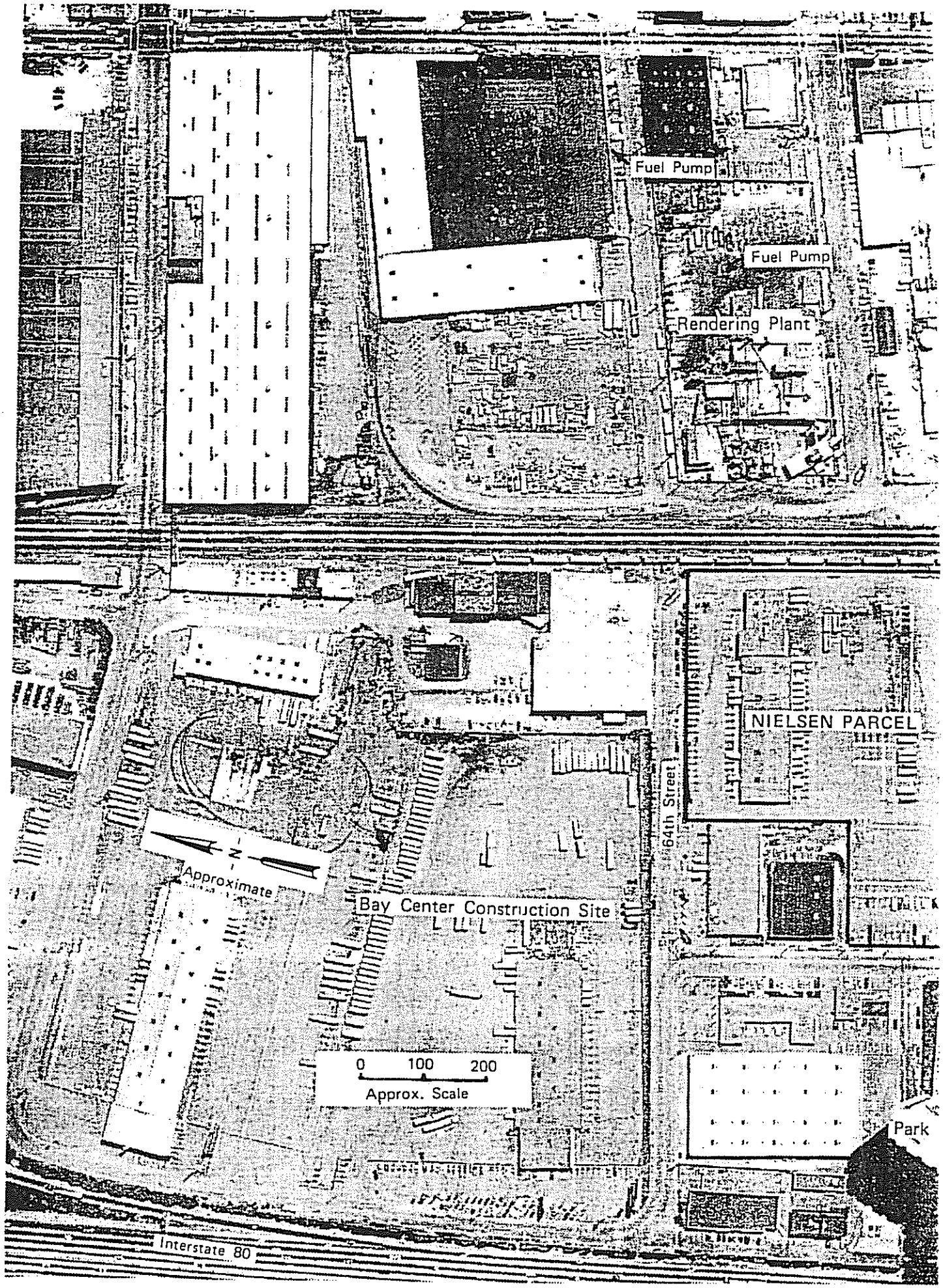


Project No. 8710018A	Nielsen Freight Line Site The Martin Company	SITE LOCATION	May 1987
Woodward-Clyde Consultants			Figure 1


Railroad Right-of-Way
Slough
Mid-1800's
Tankage
Crude Asphalt Refining Area
Group A
Roofing Building
(with some paint storage)
Group B
Group C
Group D
Building Use
Unknown
Historic Bay Shoreline
Drum Storage
Outdoor Storage
Paint Manufacturing
Paint Traffic
Building
Building Use Unknown
Paint Storage
Warehouse
64th Street
0 50 100
Approx. Scale
Site map derived from aerial photo no. AV 2640-6-18 dated 15 May 1985 by
Pacific Aerial Survey, Oakland, California.
Building positions taken from aerial photo no. AV 28-11-35,36 dated 16 Sept. 1949,
Pacific Aerial Survey, Oakland, California.
Christie Avenue
Project No.
870018A
Nielsen Freight Line Site
The Martin Company
Woodward-Clyde Consultants
PREVIOUS INDUSTRIAL
DEVELOPMENT (SIMPLIFIED)
May 1987
Figure 2a


Fuel Pump
Fuel Pump
Rendering Plant
NIELSEN PARCEL
64th Street
Approximate
Bay Center Construction Site
0 100 200
Approx. Scale
Park
Interstate 80

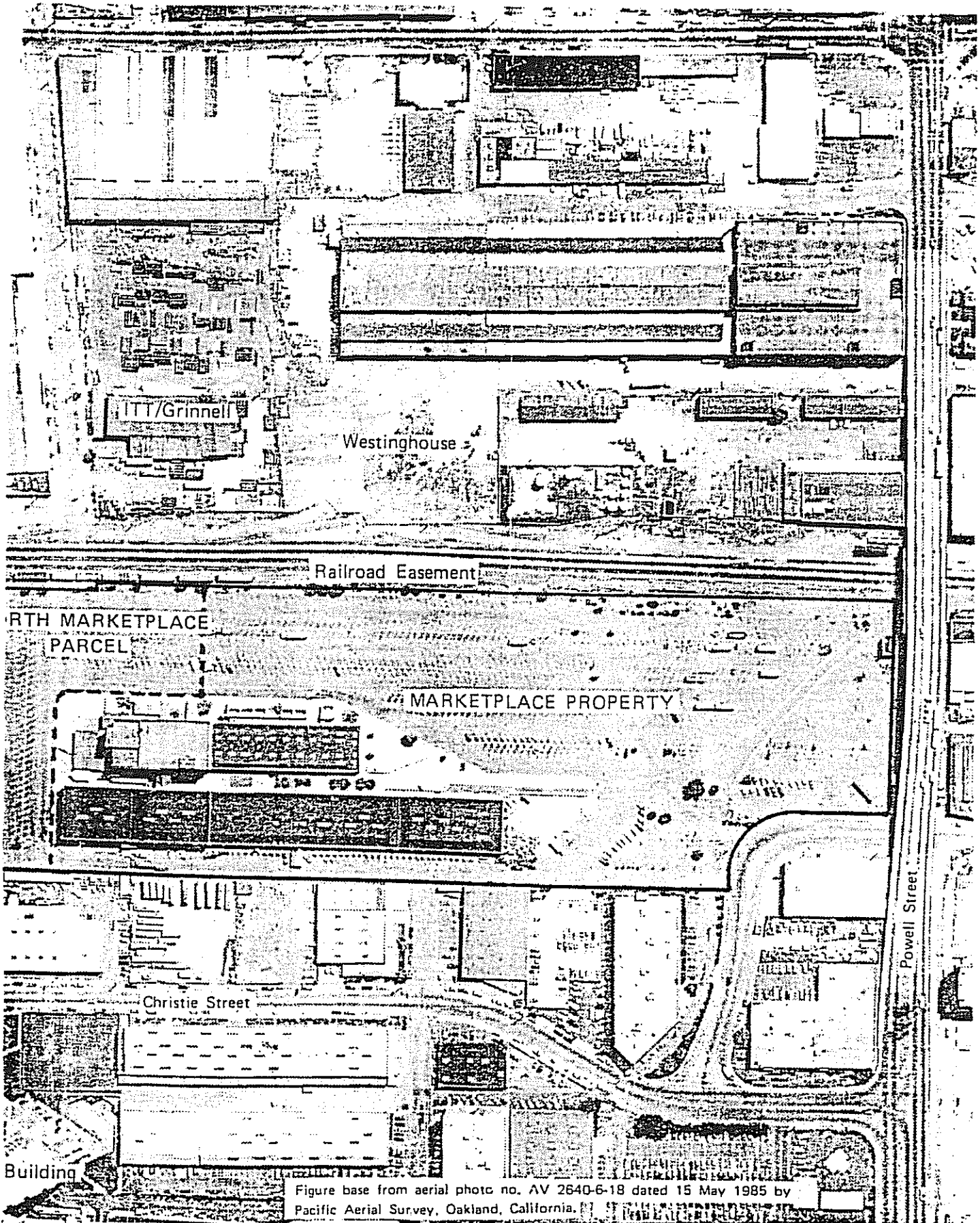
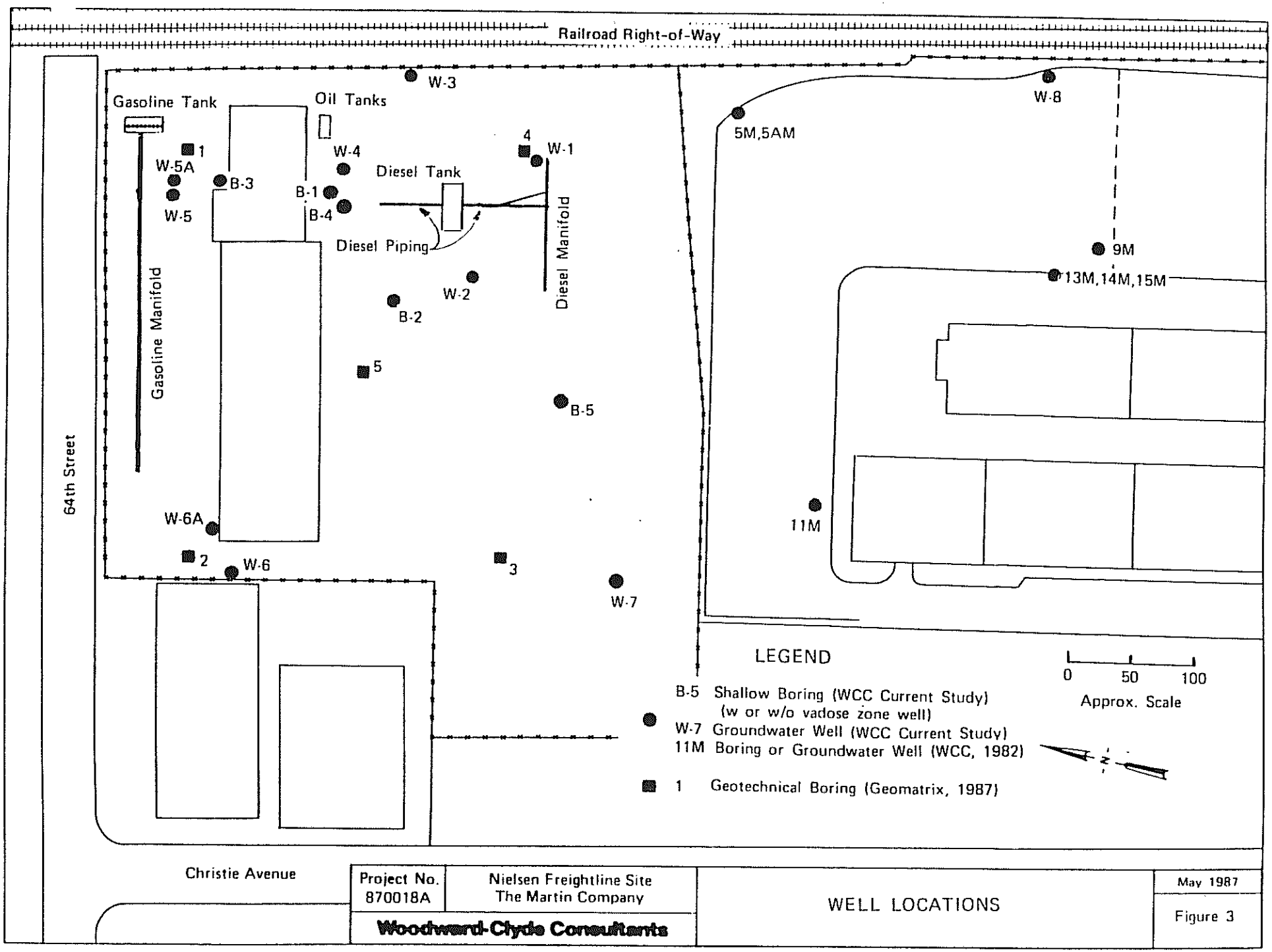
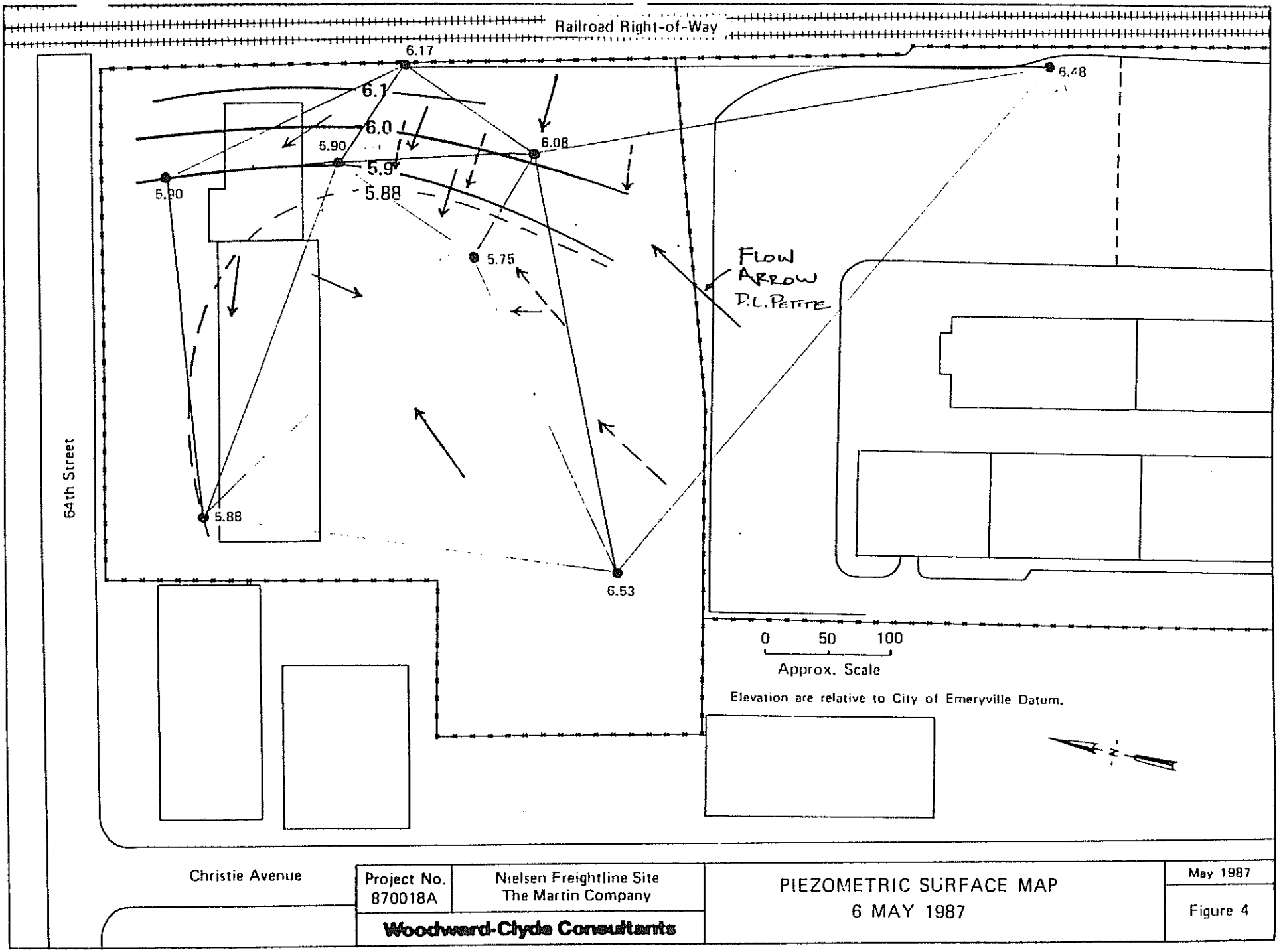


Figure base from aerial photo no. AV 2640-6-18 dated 15 May 1985 by Pacific Aerial Survey, Oakland, California.

Project No. 8710018A	Nielsen Freight Line Site The Martin Company	SITE REGION MAP	May 87
Woodward-Clyde Consultants			Figure 2b



Project No. 870018A	Nielsen Freightline Site The Martin Company	WELL LOCATIONS	May 1987
Woodward-Clyde Consultants			Figure 3


Railroad Right-of-Way
6.17
6.48
6.1
6.0
5.90
6.08
5.9
5.88
5.90
5.75
FLOW ARROW P.L. PETTE
64th Street
5.88
6.53
0 50 100
Approx. Scale
Elevation are relative to City of Emeryville Datum.
N
Christie Avenue
Project No. 870018A
Nielsen Freightline Site
The Martin Company
Woodward-Clyde Consultants
PIEZOMETRIC SURFACE MAP
6 MAY 1987
May 1987
Figure 4

Reference No. D-2

DRAFT WORKPLAN FOR SOILS CONTAMINATION CHARACTERIZATION OF MARKETPLACE SITE IN EMERYVILLE, CALIFORNIA (64th Street, Christie Avenue and Powell Street)

DATE: November 10, 1987 and revised January 28, 1988

TO: County of Alameda

FROM: Earth Metrics Inc. (9569.A1)
859 Cowan Road
Burlingame, CA 94010

EXCERPTS:

I. HISTORY

A. "This site historically contained paint and asphaltic roof products manufacturing facilities. A current issue to be resolved concerns the disposition of oil and grease ladened soil in the northern and central sectors of the site. Oil and grease originated from crude petroleum which was refined to tar at the former roof products manufacturing facility." (Page 1-1)

B. "Paint manufacturing, which commenced on site in the 1920's,..." (Page 2-1)

II. CONTAMINATION

A. "This report also recommends encapsulation of the tar which is mixed into soil in the northern and central sectors." (Page 1-1)

B. "Four or five groups of subsurface storage tanks have been identified, which were subjects of the previous study and again are subjects of the current study. Group A tanks, located on the northeast property line (refer to Figure 2) contained crude asphalt. Group B, C and D tanks (refer to Figure 2) contained solvents used in paint manufacture. A fifth tank group was located in the

southeast corner of the site. **All tanks were subsurface, concrete tanks.**" (Page 2-1)

C. "Previous Soil Test Results. Lead, copper, and zinc did not exceed the current California TTLC in any of the 26 solids samples. Soil samples from Boring No. 8 and 10 contained 74 percent to 88 percent of the TTLC for lead. Polychlorinated biphenyls (PCBs) were detected in four borings (No. 4, 5, 7, and 8). PCBs concentrations ranged from 0.12 ppm (Arochlor 1260) in Boring No. 5 (7.0 to 8.0 foot depth) to 33 ppm (Arochlor 1242 and 1260) in Boring No. 8 (2.0 to 3.0 foot depth). Minor chlordane (pesticide) was detected in Boring No. 2, at the concentration of 0.5 to 1.0 ppm. Other results were insignificant (no contaminant detected or, if detected, not at a concentration of concern). (Page 2-1)

D. "Previous Water Test Results. Two purgeable organics (EPA Method 624), tetranydrofuron and methyletheyl ketone, were detected at 0.34 ppm and 0.23 ppm, respectively. These were not considered to constitute a hazard. Metals concentrations were below the U.S. EPA Safe Drinking Water Standards. Other results were insignificant.

Groundwater from Well No. 8 contained trace amounts (in the parts per billion range) of priority organics as follows:

Priority Organics	ug/liter (PPB)
Acenaphthene	4
Benzo (a) antracene	2
Chrysene	2
Fluorene	9
Fluoranthene	4
Napthalene	30
Phenanthrene	5
Pyrene	5

Some of the above priority organics also were detected on the adjacent Nielsen site (in Boring No. 5)." (Page 2-4)

E. "**Oil and grease concentrations in the soil samples from borings EM1 and EM2 exceeded 4,000 ppm (refer to Table 3). Borings EM1 and EM2 are located adjacent to a former use labeled as a "refinery." Oil and grease in Boring EM4 exceeded 1,000 ppm.** Boring EM4 is located approximately in the path of the former pipeline used to convey refined asphalt to the former factory building.

(Page 3-1)

F. "Current Water Test Results. Groundwater monitor Well Nos. 4, 5 and 12 were sampled and tested for metals and for total halogenated organics by EPA 9020. Groundwater monitoring Well Nos. 4 and 12 were purged using a hand held pump. Total volume excavated was approximately three times the well hole volume. Wells were then resampled using a Teflon bailer. Groundwater monitoring Well No. 5 was not purged due to the presence of a black tarry liquid that essentially filled the well. A sample of the tarry fluid was collected with a Teflon bailer and submitted for analysis.

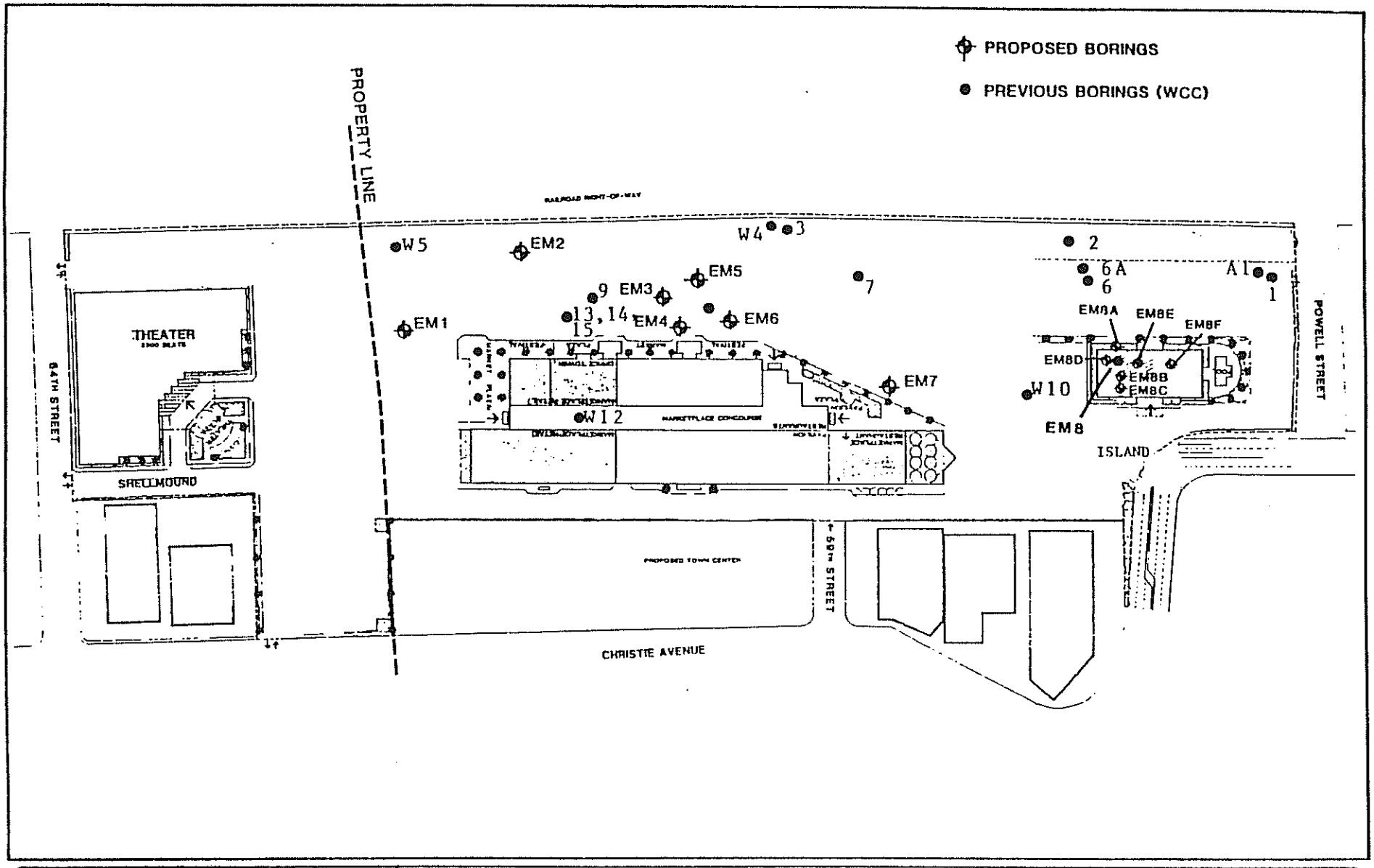
The groundwater results indicate presence of copper, iron, arsenic, chromium, manganese, lead, tin, vanadium, and zinc (refer to Table 5). Copper and lead levels were particularly elevated in Well Nos. 5 and 12. Well No. 5 is the well which contained the black tarry fluid. **Although EPA Safe Drinking Water Standards are reported in Table 5, the subject groundwater is shallow, brackish groundwater and is not a drinking water source.**

The groundwater and black tarry fluid were also tested for total halogenated organics by EPA 9020 (refer to Table 6). The groundwater did not contain detectable halogenated organics (less than 10 mg/l). The black tarry fluid contained 433 mg/l; and therefore, additional testing for PCBs was performed. Sample analysis did not detect the presence of PCBs." (Page 3-10)

G. "Because the tar is not localized, but extends into the Marketplace site (to the north), excavation and removal would be difficult and costly." (Page 5-1)

H. "Well No. 5 is filled with a waste petroleum product. It contains halogenated organics at the 433 ppm concentration. Sample analysis did not reveal detectable concentrations of PCBs.

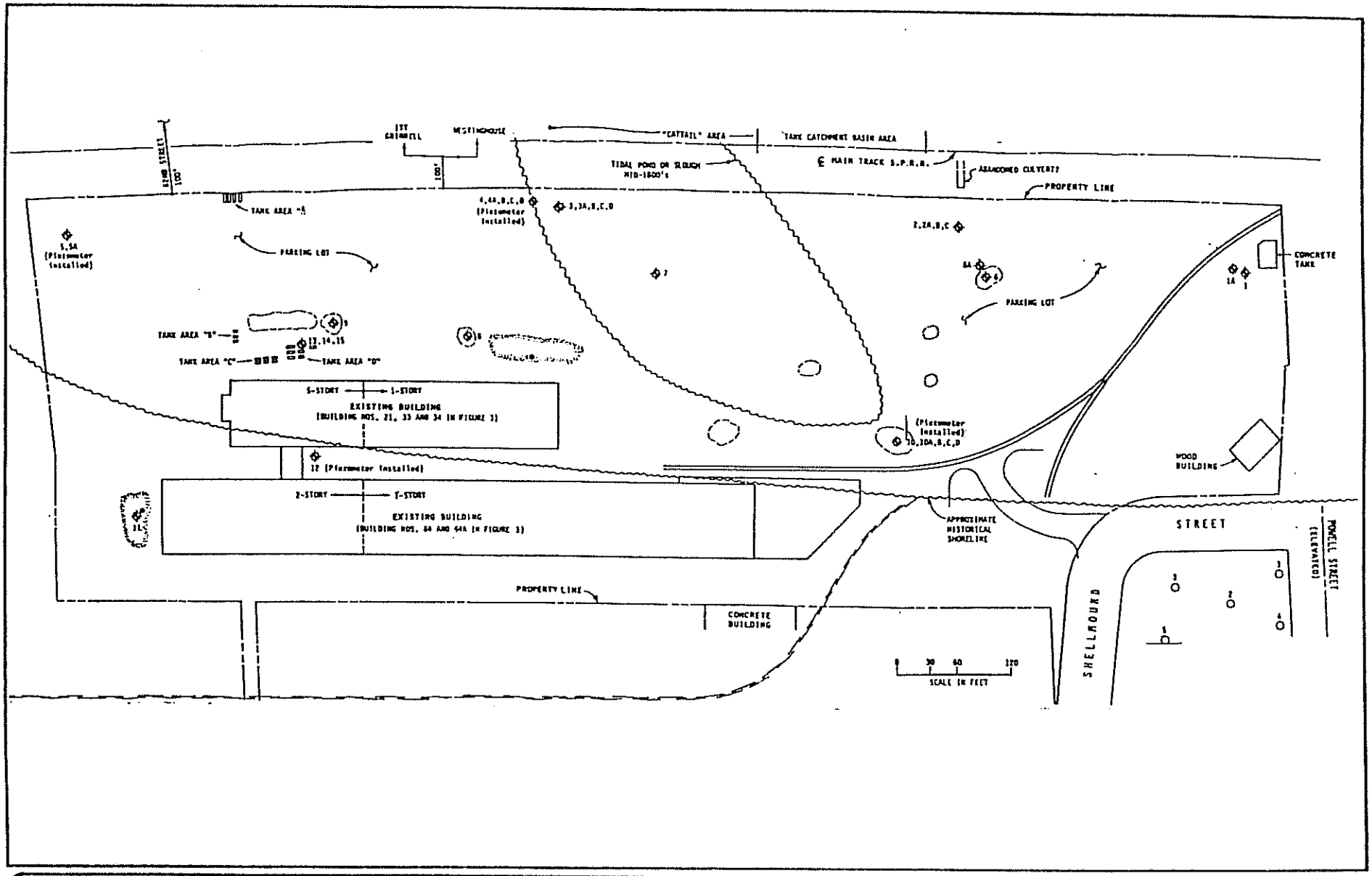
Liquid waste should probably be pumped out of this Well No. 5 and containerized. Details of the pumping, testing, and clean up procedure should be drafted for Alameda County's approval prior to commencement of clean up activity." (Page 5-1)



earth metrics

SCALE
1" = 160'

FIGURE 1. MARKETPLACE PROJECT SITE DETAILING BORING LOCATIONS



earth metrics

SCALE
1" = 140'

FIGURE 2. FORMER TANK LOCATIONS AND PREVIOUS BORING LOCATIONS

Reference No. D-3

NIELSON AND MARKETPLACE SITES,

EMERYVILLE, CA

DATE: May 4, 1988; Two page letter.

TO: Mr. Lowell Miller
County of Alameda
Department of Health Services
470 27th Street
Room 322
Oakland, CA 94612

BY: Mr. Walter T. Kaczmarek
General Partner
Christie Avenue Partners

The Martin Company
6425 Christie Avenue, Suite 406
Emeryville, California 94608

EXCERPTS AND COMMENTS:

"In response to your requests at our meeting on May 2 regarding the subject sites, please be assured we will cooperate in every possible way to address and mitigate your concerns. Specifically, we will do the following:

1. **Mitigate the potential hydrocarbon contamination at the manifold area and potential diesel pit contamination using either an aeration or biodegradation process.** Our intent is to use Groundwater Technology as the contractor to perform such work. A copy of its proposed clean up plan is included.

2. Complete further research and/or testing on the "so-called" asphalt substance in the underground soil which is of concern to you. This is being done now. Upon completion of this, we will present to you the results, a risk analysis and mitigation plan for your approval.

3. Other than in the area of the asphalt substance of concern (in #2 above), the entire site will be covered by concrete, asphalt or 18" of clean soil (in landscaped areas) to eliminate the accessibility of individuals to any metal contaminated soil. Naturally, the action to be taken on the

asphalt substance will be subject to the outcome in #2 above.

4. No contaminated soil will be removed from the site without your approval." (Page 1) ...

COMMENT: *The hydrocarbon contamination exceeds 1,000 ppm in the in-place soil at the dispenser manifold area and in stockpiled soil from the tank and manifold removal excavations.*

Reference No. D-4

CONSTRUCTION SCHEDULE FOR

MARKETPLACE AND NIELSON SITES

DATE: May 4, 1988; 1 Page Letter with attached Schedule

TO: Mr. Lowell Miller
County of Alameda
Department of Health Services
470 27th Street
Room 322
Oakland, CA 94612

FROM: Mr. Walter T. Kaczmarek
General Partner
Christie Avenue Partners

Martin Devcon Properties
660 East Calaveras Boulevard
Milpitas, California 95035

EXCERPT AND COMMENT:

> "Included is the estimated underground construction schedule for the office tower, the marketplace building rehab and the site work for the property. It does not include the work schedule for the movie theater (northern most building on site) or the hotel (at southern end of site). Those will be forwarded as soon as we have them. Please note, we do not own the property for the hotel but will provide help in coordinating any work to be done since our contamination report covers the entire site (including the hotel). (Page 1)
> ...

COMMENT: *The significant underground work that may require special precautions and de-watering is scheduled for May 4 to about the first of August. Groundwater Piezometric Studies conducted during this time may reflect the influence of the construction work--especially if de-watering of excavations occurs.*

Reference No. D-5

FINAL PROPOSAL TO REMEDIATE

THE MARKETPLACE AND NIELSEN SITES

IN EMERYVILLE, CALIFORNIA

DATED: May 5, 1988 and Revised May 16, 1988

FOR: Alameda County Hazardous Materials Unit

BY: Earth Metrics Incorporated
859 Cowan Road
Burlingame, CA 94010

EXCERPTS AND COMMENTS:

PROPOSED PLAN TO REMEDIATE THE MARKETPLACE AND NIELSEN SITES

"This final remediation proposal was prepared at the direction and request of the Alameda County Hazardous Materials Unit. The final proposal contains six elements: i) remediation proposals and alternatives, ii) conditions of underground construction approval, iii) underground construction schedule, iv) worker safety and hygiene plan, v) well closure plan, and a vi) directory of responsible personnel and their roles.

1. BACKGROUND

The Marketplace and Nielsen Truck sites are contiguous sites in Emeryville, and subjects of this comprehensive document. The Marketplace site is a site of historic industrial use sine the 1800s. Potential contamination conditions left from the historic use by a floor and roof covering manufacturer (The Parrafine Companies/PABCO) is well documented in two previous reports on file with the County. The Woodward-Clyde report on the Marketplace contamination investigation was filed in 1982. The Earth Metrics subsequent report on the same subject site was filed in 1987 and updated again in 1988.

The Nielsen Truck Terminal is also a subject of previous documents on file with the County. All historic underground fuel and waste oil tanks have been removed, as of 1987. A report was filed by Woodward-Clyde at the time of the tank closure. A subsequent report by Earth Metrics and Final Tank Closure Permit Application were filed in 1988, these latter to

address residual gasoline and diesel fuel left in the gasoline and diesel manifold trenches.

All reports address three separable issues. These issues are: gasoline in site soil, diesel fuel in site soil, and an asphaltic material in site soil." (Page 1-1)

COMMENT: *Significant concentrations of TPH in groundwater have been found or would be expected. 7.7 ppm Petroleum Hydrocarbons as Diesel was located the groundwater sample from the Diesel Tank Pit at a depth of about 6 feet. A composite of six soil samples from the gasoline manifold and pit at a depth of five feet indicated 9,500 ppm gasoline. The water table in this area ranges from 5.5 to 6.5 feet. However, no monitoring wells are located in the vicinity of the gasoline manifold to determine groundwater contamination concentrations.*

"The State of California action levels for gasoline and diesel in soil are the same, the action criteria being 100 parts per million (ppm) in both cases. Fuels have been identified above the action level in a portion of the former gasoline manifold, in a portion of the former diesel manifold, and in four discrete stockpiles.

As far as we know, there is no action level for the asphaltic material. The asphaltic material has been identified in two deposits, the larger of which is located in the northeast corner of the Marketplace site. All contamination investigation reports on file with the County, from 1982 onward, have acknowledged the presence of this asphaltic material. Recently, on May 2, 1988, the Alameda County Hazardous Materials Unit declared this asphaltic material a potential hazard." (Page 1-1)

2. REMEDIATION PROPOSALS

2.1 Gasoline and Diesel Manifolds and Tank Pits

"Soil stockpiled or to be excavated from the diesel and gasoline manifold trenches will be stored on site for active aeration vie venting and landfarming by modified enhanced natural degradation. This remediation will be performed by a qualified biodegradation treatment firm, Groundwater Technology Incorporated. This same firm performed site remediation and monitoring on Emeryville's Bay Center and P.I.E. Truck Terminal. This work was performed by Ms. Jan Jacobsen and Mr. Greg Hoehn under agency supervision by RWQCB's Ms. Beth Levine. ...

The gasoline and diesel tank pits themselves will be backfilled. They can be backfilled because test of the bottom soils indicate gasoline and diesel concentrations less than 100 ppm. ..." (Page 2-1)

Reference No. D-6

NPDES PERMIT APPLICATION

EMERYVILLE MARKET PLACE PROPERTY

DATED: June 6, 1988

TO: Mr. Greg Zentner
California Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6040
Oakland, CA 94607

FROM: Groundwater Technology, Inc.
Michael J. Wray
SFB Territory Manager/Hydrogeologist

SUBJECT: NPDES Permit Application
Emeryville Market Place Property

EXCERPTS AND COMMENTS:

I. GROUNDWATER

A. Regarding the dewatering of utility trenches "due to a **suspected perched water table** at the site" with a contractor's estimate of 525,000 gallon discharge..."However, this quantity will most likely be much less due to the suspected **limited volume of the perched water.**"

II. CONTAMINATION

A. "Water samples collected and analyzed for the site to date have detected only low levels of priority pollutants (EPA 625). **Total oil and grease levels of 38 parts per million** (ppm) were detected however."

Reference No. D-7

REQUEST FOR ISSUANCE OF INTERIM LETTER OF APPROVAL FOR GROUNDWATER DISCHARGE

DATED: June 7, 1988 NO. OF PAGES: 2

TO: Mr. Roger James
California Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6040
Oakland, CA 94607

FROM: Groundwater Technology Inc.
Michael J. Wray
San Francisco Bay Territory Manager/Hydrogeologist

RE: Request for Issuance of Interim Letter of Approval for Groundwater Discharge

SUMMARY:

I. GROUNDWATER

Regarding the dewatering of utility trenches "due to a **suspected perched water table** at the site" with a contractor's estimate of 525,000 gallon discharge..."However, this quantity will most likely be much less due to the suspected **limited volume of the perched water.**"

II. CONTAMINATION

"Water samples collected and analyzed for the site to date have detected only low levels of priority pollutants (EPA 625). **Total oil and grease levels of 38 parts per million** (ppm) were detected however."

III. BASIS FOR REQUEST

"On behalf of the Christie Avenue Partners, GTI requests that a interim letter of approval for discharge of groundwater to the storm drain system be granted for the Emeryville site. Construction cannot continue until the underground utilities are installed. Delays will cost our client up to $50,000 per day. Therefore, a prompt reply on this matter would be greatly appreciated."

Reference No. D-8

REPORT OF WASTE DISCHARGE (ROWD) WAIVER

EMERYVILLE MARKET PLACE DEVELOPMENT

DATED: June 20, 1988 PAGES: 2

TO: Mr. Lynn E. Pera, P.E.
Groundwater Technology, Inc.
4080 Pike Lane, Suite D
Concord, CA 94520

FROM: California Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street, Room 6040
Oakland, CA 94607

File No. 1216.00(SAH)

EXCERPTS AND COMMENTS:

"This letter concerns an application by Christie Avenue Partners to discharge construction de-watering water from the Emeryville Market Place development, located near the intersection of Christie and 64th Streets in Emeryville, Alameda County. As explained below, I hereby waive the report of waste discharge (ROWD) for this temporary discharge. This waiver is subject to two conditions also noted below." ...

"Your proposed discharge properly falls under category 16 of the resolution attachment: construction activities (e.g. dewatering). The resolution allow waivers for this type of discharge if we expect little or no impact on surface waters or groundwater and if Best Management Practices (BMPs) are used."

"In this case, your discharge will be treated to remove volatile organic compounds. Heavy metals will not be removed, but are already at very low concentrations. The temporary discharge will not adversely affect any beneficial uses of surface waters or groundwaters. The discharge will not be against the public interest. Conversely, to prohibit this type of temporary discharge would impose a potentially large burden on new development projects, unrelated to the Board's ongoing

program to clean-up contaminated groundwater."

"My ROWD waiver is subject to two conditions. First, the applicant (Christie Avenue Partners) or its agents must follow BMPs. Resolution 83-3 defines BMPs as those specific schedules of activities, prohibitions, maintenance procedures, and other management practices needed to prevent or reduce the pollution of waters of the State. In this case, **Best Management Practices include (1) installing and operating the activated-carbon filtration unit and (2) installing and operating an oil-water separator, should oil and grease concentrations interfere with the effectiveness of the carbon unit. All water stored in tanks from prior dewatering must be treated prior to discharge, in addition to any further dewatering.**"

"Second, the applicant (or it agents) must conduct a limited self-monitoring program. **Grab samples of effluent from the treatment unit (as discharged to the storm drain) will be taken daily for the first five days and weekly thereafter until the discharge is discontinued.** Samples will be analyzed using EPA Methods 624 and 625 (volatile organics and extractable organics, respectively). The applicant (or its agents) will submit results of the first five analyses to the Regional Board no more than 30 days after the discharge starts. The report will include necessary background information,m such as the date and time of sampling and the discharge rate. The cover letter will be signed by a responsible official of Christie Avenue Partners and will certify under penalty of perjury that the information in the report is accurate to the best of signator's knowledge. Subsequent results will be submitted on the 15th day of the month following the sampling. Self-monitoring reports should be sent to the attention of Lisa McCann at the Regional Board."

Reference No. D-9

TEMPORARY DEWATERING WATER TREATMENT SYSTEM

WEEKLY EFFLUENT WATER ANALYSIS RESULTS

JULY 11 THROUGH AUGUST 4, 1988

EMERYVILLE MARKET PLACE

5800 Shellmound Street, Emeryville

DATE: August 26, 1988; Two page letter with analytical results.

TO: Mr. Michael A. Covarrubias
Sr. Vice President
The Martin Company
6425 Christie Avenue #406
Emeryville, CA 94608

FROM: Groundwater Technology Inc.
4080-D Pike Lane
Concord, CA 94520
Kelly A. Kline, Geologist
Steven A Fischbein, Industrial Group Manager/Hydrogeologist
Lynn E. Pera, Registered Engineer: #33431
Job No. 203 799 5080.01

SUMMARY: The temporary dewatering watering treatment system operated on an intermittent basis during July and August, 1988. Analytical results indicate "No Detection" of EPA Testing Methods 624 and 625 for samples obtained on July 11, 21 and August 4, 1988.

NOTE: *1) Carbon stripping worked at this site.*

2) Piezometric water level studies or depth to groundwater determinations in wells and borings performed within the general study area during this time period of artificial drawdown of the local water table may not be representative of normal conditions.

Reference No. D-10

SUMMARY OF ACTIVITIES AT THE EMERYVILLE MARKETPLACE SITE

EMERYVILLE, CALIFORNIA

(64th and Lacoste)

DATE: November 2, 1988 No. of Pages: 2

FROM: Rafat A Shahid, Chief of Hazardous Material Division of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, CA 94621

TO: Mr. Jim McCammon,
Toxics Substances Control Division
California Department of Health Services
5850 Shellmound, Suite 390
Emeryville, CA 94608

SUBJECT: Summary of Activities at the Emeryville Marketplace Site, Emeryville, California 94608

EXCERPTS AND COMMENTS:

I. SITE CONDITIONS.

A. Site operated by Pabco, a tarring and asphalt manufacturer.

B. Deposits of asphaltic materials close to the surface.

C. A kerosene like material in areas of the subsurface near the groundwater.

D. Some asbestos impregnated tarpaper like material in the underlying debris.

E. **Several underground tanks have been removed that showed some hydrocarbon contamination originating from leaks.**

F. **A portion of the site is being used for aeration of hydrocarbon contaminated soils resulting from previous tank leaks.**

II. COUNTY REQUIREMENTS.

A. Received and reviewed several site assessment plans, construction plans, and a site safety plan in connection with this project.

B. Developer to provide an on-site industrial hygienist to monitor construction activities.

C. All hazardous materials that are to be removed from the site are being manifested and otherwise managed according to California hazardous waste laws.

COMMENT: Hydrocarbon contamination has occurred in the soil. However, groundwater contamination is not indicated as a concern.