PRELIMINARY SITE ASSESSMENT REPORT

CREDIT WORLD AUTO SALES
11/4/93
2345 E. 14TH STREET
OAKLAND, CA 94601
11.4.93

Prepared For:
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Submitted By:
TANK PROTECT ENGINEERING
Of Northern California, Inc.
November 4, 1993

Project Number 267

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This Preliminary Site Assessment Report has been prepared by the staff of **Tank Protect Engineering of Northern California, Inc.** under direction of an Engineer and/or Geologist whose seal(s) and/or signature(s) appear hereon.

The findings, recommendations, specifications or professional opinions are presented, within the limits prescribed by the client, after being prepared in accordance with generally accepted professional engineering and geologic practice. We make no other warranty, either expressed or implied.

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1.0 INTRODUCTION

The subject site is located at 2345 E. 14th Street in the city of Oakland in Alameda County, California (see Figure 1) and is owned by Messrs. Aaron and Stanley Wong [(Wong), telephone number (510) 532-1672]. The site is occupied by a used car dealership known as Credit World Auto Sales. The only on-site structure is a building which includes an office and automotive service bay. Previous work by others, that included soil borings and installation of 3 groundwater monitoring wells, has documented soil and groundwater contamination apparently due to leaks or spills associated with a former underground gasoline tank complex.

In response to additional work approved by the Alameda County Health Care Services Agency (ACHCSA) in their letter of October 30, 1992 (see Appendix A), Tank Protect Engineering of Northern California, Inc. (TPE) prepared a June 18, 1993 <u>Workplan for Construction of Groundwater Monitoring Wells</u> (WP) for installation of 2 additional groundwater monitoring wells and up to 2 free product removal systems if free product was present in any of the wells. The WP was submitted to Wong for their approval and delivery to the ACHCSA and the California Regional Water Quality Control Board-San Francisco Bay Region (CRWQCB). The WP was subsequently approved by the ACHCSA in their June 25, 1993 letter (see Appendix A).

This <u>Preliminary Site Assessment Report</u> (PSAR) summarizes TPE's understanding of site history and documents work conducted by TPE under the above WP. This PSAR also presents TPE's findings, interpretations, and recommendations.

2.0 SITE HISTORY

The following background is summarized from documents provided to TPE by Wong.

2.1 Tank Removal

On August 5, 1988, one 8,000-gallon underground gasoline storage tank, two 6,000-gallon underground gasoline storage tanks, one 1,000-gallon underground waste oil storage tank, 2 dispenser islands, and associated piping were removed from the site by West Coast Tank Company of Campbell, California. Subsequent soil sampling was conducted by SCS Engineers (SCS) of Dublin, California.

2.2 Tank Removal Soil Sampling

On August 25, 1988, two soil samples were collected from beneath each gasoline tank and analyzed for total petroleum hydrocarbons as gasoline (TPHG) by United States Environmental Protection Agency (EPA) Method 8015; for benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Method 8020; and for lead by EPA Method 7420. Samples collected from beneath the waste oil storage tank were analyzed for total petroleum hydrocarbons as diesel (TPHD) by EPA Method 8015, for total oil & grease (TOG) by Standard Method 503E, and for volatile organics by EPA Method 624.

2.2.1 Results of Chemical Analyses

All samples analyzed for TPHG, BTEX, and lead contained concentrations of all constituents. TPHG ranged in concentration from 130 parts per million (ppm) to 1,500 ppm. BTEX chemicals ranged in concentration from a low of .17 ppm for benzene to a high of 160 ppm for xylenes. Lead ranged in concentration from 4.6 ppm to 316 ppm.

TOG and TPHD were detected in both soil samples collected beneath the waste oil tank. TOG was detected at concentrations of 570 ppm and 780 ppm. TPHD was detected at concentrations of 65 ppm and 110 ppm.

EPA Method 624 detected only ethylbenzene and total xylenes in soil beneath the waste oil tank. no other VOCs

The reader is referred to SCS's September 19, 1988 letter report to Mr. Dino Gonis for documentation of the above work and analytical results.

2.3 Soil Boring and Groundwater Investigation-October 3, 1988

On October 3, 1988, California Environmental Consultants (CEC) drilled 3 soil borings, B-1 through B-3 (see Figure 2), to characterize the soil in the vicinity of the tanks. Borings B-1 and B-2 were drilled in the area of the former underground gasoline tanks and boring B-3 was drilled in the area of the former waste oil tank. One soil and 1 "grab" groundwater sample was collected from each boring. Soil samples were collected at depths of about 15 feet.

2.3.1 Results of Chemical Analyses

2.3.1.1 Soil Samples

Soil samples from borings B-1 and B-2 were analyzed for TPHG and BTEX by EPA Method 5030 or 3810/8015/8020; TPHG was detected at concentrations of 3.4 ppm and 83 ppm, respectively. Low concentrations of some or all BTEX chemicals were detected in both samples.

The soil sample from boring B-3 was analyzed for BTEX, TOG, and halogenated volatile organics by EPA Methods 5030/8020, 3550, and 5030/8010, respectively. All BTEX chemicals were detected and ranged in concentration from a low of .360 ppm for benzene to a high of .850 ppm for xylenes. TOG was detected at a concentration of 88 ppm and no chemicals were detected by EPA Method 5030/8010.

2.3.1.2 "Grab" Groundwater Samples

One "grab" groundwater sample was collected from each boring and analyzed as discussed above under section 2.3.1.1 Soil Samples.

TPHG was detected in water samples from borings B-1 and B-2 at concentrations of 67,000 parts per billion (ppb) and 110,000 ppb, respectively; all BTEX chemicals were detected in both samples with concentrations ranging from a low of 2,400 ppb for toluene to a high of 17,000 ppb for benzene.

The water sample from boring B-3 detected all BTEX chemicals ranging in concentration from a low of 160 ppb for toluene to a high of 1,300 ppb for xylenes. TOG was detected at a concentration of 290,000 ppb and no chemicals were detected by EPA Method 5030/8010.

The reader is referred to CEC's November 21, 1988 letter report to Mr. Dino Gonis for documentation of the above scope of work and analytical results.

2.4 Soil Boring and Groundwater Investigation-August 21 and 22, 1991

On May 22, 1991, Earth Systems Environmental, Inc. (ESE), under subcontract to Mobile Labs, installed 1 groundwater monitoring well, MW-1, and on August 21 and 22, 1991, drilled 5 soil borings, TH-1 through TH-5, and installed 2 groundwater monitoring wells, MW-1 and MW-2, (see Figure 2) as a further characterization of soil and groundwater contamination.

The soil borings were located, generally, along an east-west treading line that runs through the center of the location of the former gasoline tank complex and generally in the direction of the anticipated groundwater gradient. Boring TH-2 is located at the easterly end of the line; boring TH-1 is located in the center of the former complex; boring TH-3 is located at the westerly end of the line near the waste oil tank; and boring TH-4 is located about a third the distance from TH-3 to TH-1. Boring TH-5 was not located in line with the other borings, but was located in the southerly corner of the site (see Figure 2).

Monitoring well MW-1 is located south of the former tank complex; wells MW-2 and MW-3 are located near the northerly and westerly corners of the site, respectively (see Figure 2).

Two soil samples were analyzed from each boring and monitoring well with the exception of boring TH-1 in which only 1 sample was analyzed. All samples were collected at depths of about 10 or 18 feet, with the exception of the deeper sample in boring TH-2 which was collected at a depth of 30.0 feet.

2.4.1 Results of Chemical Analyses

2.4.1.1 Soil Samples

All soil samples from borings and monitoring wells located in the area of the former gasoline tank complex were analyzed for TPHG by EPA Method 8015 Modified and BTEX by EPA Method 8020. All soil samples from borings and monitoring wells located in the area of the former waste oil tank were analyzed for total recoverable hydrocarbons (TRH) by EPA Method 418.1, TPHG, and BTEX. Soil samples from boring TH-5, located furthest from either former tank area, were analyzed for TPHG and BTEX.

All soil samples in all borings, with the exception of 1 sample in boring TH-5, detected TPHG with concentrations ranging from 10 ppm to 4,320 ppm. Chemical analyses of the deeper sample in boring TH-5 were nondetectable. All soil samples analyzed for TRH detected concentrations ranging from 20 ppm to 1,600 ppm. BTEX chemicals were detected almost exclusively in samples collected only in the area of the former gasoline tank complex.

2.4.1.2 Groundwater Samples

Groundwater samples were collected from the monitoring wells on August 23, 1991, one day after their construction and development, and analyzed for TPHG by EPA Method 8015 Modified and BTEX by EPA Method 602. No TPHG or BTEX were detected in well MW-3. TPHG was detected in wells MW-1 and MW-2 at concentrations of 2,090,000 ppb and 10,000 ppb, respectively. BTEX chemicals were detected only in well MW-1 and ranged in concentration from 2,145 ppb for ethylbenzene to 23,150 ppb for xylenes.

The reader is referred to ESE's December 23, 1991 Phase I Soil and Ground Water Assessment report for documentation of the above scope of work and analytical results.

2.4.1.3 ESE's Recommendations

Based on the above work and analytical results, ESE recommended additional site characterization by installing 2 additional groundwater monitoring wells and drilling 1 additional soil boring.

2.5 Groundwater Monitoring - April 16, 1992

On April 16, 1992, NKJ Environmental Monitoring (NKJ) measured depth-to-groundwater in each well and found floating product present in all 3 wells. The thickness of product ranged from 0.16 feet to 5.12 feet.

The reader is referred to NKJ's May 1, 1992 letter report to Mobile Labs, Inc. for documentation of the above scope of work.

2.6 ACHCSA Letters Dated October 19 and 30, 1992

On October 19, 1992, the ACHCSA sent a letter to Wong titled Request for Report of Subsurface Investigation and Workplan Addendum for Former Taxi Taxi, Inc. at 2345 E. 14th St., Oakland, CA 94601. This letter requested additional information about the tank closure, disposition of stockpiled soil, and requested an additional workplan to further characterize soil and groundwater contamination.

On October 30, 1992, the ACHCSA sent a letter to Wong titled Subsurface Investigation at Former Taxi Taxi at 2345 E. 14th St., Oakland, CA 94601. This letter approved ESE's recommendations for installation of 2 additional groundwater monitoring wells and recommends a product removal system.

3.0 PRELIMINARY SITE ASSESSMENT

TPE's objectives in this preliminary site assessment were to: (1) further investigate the horizontal extent of groundwater contamination by constructing 2 groundwater monitoring wells (TMW-4 and TMW-5) at locations proposed by TPE in their WP and approved by the ACHCSA in their June 25, 1993 letter, (2) further investigate the horizontal and vertical extent of vadose zone soil contamination while drilling soil borings for construction of the above groundwater monitoring wells, (3) install free product removal systems in up to 2 wells, if free product is present.

To meet the above objectives, TPE performed the following work:

- Conducted a subsurface utility survey to minimize the potential of encountering unexpected utilities, and to assist in selecting locations for 2 soil borings.
- Drilled 2 soil borings to investigate the horizontal and vertical extent of vadose zone soil contamination.
- Collected soil samples from the above soil borings at approximately 5-foot depth intervals for construction of boring logs and for potential chemical analyses.
- Analyzed vadose zone soil samples from the above borings for TPHG and BTEX.
- Converted the above borings into groundwater monitoring wells.
- Developed the newly installed groundwater monitoring wells.
- Purged and sampled all on-site monitoring wells.
- Analyzed the above groundwater samples and 1 trip blank sample for TPHG and BTEX.
- Surveyed top-of-casings (TOC) of all 5 on-site wells to the nearest .01 foot relative to Mean Sea Level (MSL).

- Measured depth to stabilized groundwater in each well and interpreted direction and gradient of groundwater flow.
- Prepared this PSAR to document work performed and analytical results and present TPE's findings and recommendations.

Details of the above work are presented below.

3.1 Predrilling Activities

3.1.1 June 11, 1993 Site Visit

Prior to installing 2 additional wells, a representative of TPE visited the site on June 11, 1993 to measure depth-to-groundwater in each well (for evaluation of groundwater gradient and flow direction) and free product thickness, if any. The purpose of determining groundwater flow direction was to assist TPE in optimally locating the 2 new wells. Depth-to-groundwater and top of free product were measured by using a KECK Model KIR-89 interface meter. Gradient was .0357 feet per foot in a northwesterly direction and no significant product thickness was measured. Details of the site visit are documented in TPE's WP.

3.1.2 Rationale for Well Locations

The locations of the 2 monitoring wells were chosen based on the groundwater gradient determination made by TPE on June 11, 1993. Well TMW-4 was installed near the eastern corner of the site; this location is upgradient of the former on-site underground gasoline tank complex and is expected to evaluate if off-site contaminant sources are impacting the site. Well TMW-5 was installed downgradient and within 10 feet of the former location of the underground gasoline tank complex according to recommendations in the CRWQCB's "Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites", dated August 10, 1990.

3.1.3 Subsurface Survey

On July 15, 1993, prior to installing the 2 wells, subsurface locators conducted an underground utility survey and contacted Underground Service Alert to minimize the potential for encountering unexpected underground utilities or objects during drilling operations.

3.1.4 Permits

On July 14, 1993, TPE filed notices of intent with the California Department of Water Resources to install the 2 subject wells and on July 15, 1993, TPE obtained a well installation permit from the Alameda County Flood Control and Water Conservation District, Water Resources Management Zone 7 (see Appendix A).

3.2 Soil Boring and Sampling Procedures

The following discusses soil boring and soil sampling procedures and results of chemical analyses. Appendices B, C, and D document TPE's protocols relative to sample handling procedures, hollow-stem auger drilling and soil sampling procedures, and waste handling and decontamination procedures.

On July 22 and 23, 1993, TPE drilled exploratory borings for construction of 2 groundwater monitoring wells (TMW-4 and TMW-5) at the locations shown in Figure 2. The exploratory borings were drilled using 8-inch diameter, hollow-stem, auger, drilling equipment. The augers and sampling equipment were steam-cleaned before drilling each boring to prevent cross contamination between borings or the introduction of off-site contamination for the initial boring.

Representative soil samples were collected from each boring for construction of the geological profile, for field screening for hydrocarbon contamination by headspace analysis, and for potential chemical analysis. Headspace analysis was conducted by sealing soil samples in quart size plastic bags and warming the bagged samples in the sun to promote volatilization of any hydrocarbons that may be present in the soil.

The headspace in the plastic bags was tested by inserting the probe of a Gastech Inc. Trace-Techtor Hydrocarbon Vapor Tester into the bag (while minimizing the entry of new air into the bag) and recording the response in ppm.

Soil samples were collected by advancing either a California split-spoon sampler, equipped with three 6-inch long by 2-inch diameter brass tubes, or a standard penetration sampler into the undisturbed soil beyond the tip of the augers. The standard penetration sampler was used only in the saturated zone to obtain soil samples for physical characterization of the aquifer. The sampling equipment was cleaned before each sampling event by washing in a trisodium phosphate (TSP) solution and rinsing in tap water. Soil samples selected for chemical analysis were collected and preserved in the brass tubes by quickly covering the open ends with Teflon tape and capping the tube ends with plastic end-caps. Each tube was labeled to show site address, project number, sample number, sample depth, date, time, and sampler and individually stored in a plastic bag in an iced cooler. The samples were delivered for analysis to California Department of Health Services (DHS) certified Trace Analysis Laboratory, Inc. (TAL) located in Hayward, California, accompanied by chain-of-custody documentation.

Representative soil samples were collected from each boring at about 5-foot intervals from ground surface until groundwater was encountered. After encountering groundwater, continuous sampling was conducted with either a California split spoon sampler or standard penetration sampler to evaluate aquifer character and thickness for well design purposes. Due to time constraints, continuous sampling was halted in well TMW-4 after reaching a depth of 30.5 feet and the next and final sample was collected at a depth of 34.5 to 36.0 feet.

Three discrete vadose zone soil samples were collected for chemical analysis from each boring at depths of about 5.5 to 6.0 feet, 10.5 to 11.0 feet, and 15.5 to 16.0 feet.

Soil samples and cuttings from both borings were described in detail using the Unified Soil Classification System and were logged under the direction of a California registered geologist (see Appendix E).

Drill cuttings were stored in 55-gallon steel drums labeled to show contents, date stored, suspected contaminant, expected date of removal, contact person, and client telephone number.

3.2.1 Results of Chemical Analyses

All samples were analyzed for TPHG and BTEX by the DHS Method and Modified EPA Method 8020, respectively.

3.2.1.1 Boring for Well TMW-4

Chemical analyses of soil samples collected from the boring for well TMW-4 detected only TPHG at a concentration of .940 ppm in the soil sample collected at a depth of about 15.5 to 16.0 feet.

3.2.1.2 Boring for Well TMW-5

Chemical analyses of soil samples collected from the boring for well TMW-5 detected TPHG and benzene in all samples. TPHG and benzene were detected at depths of about 5.5 to 6.0 feet, 10.5 to 11.0 feet, and 15.5 to 16.0 feet at concentrations of 2.4 ppm, 14 ppm, and 16 ppm; and .026 ppm, .900 ppm, and .840 ppm, respectively. Ethylbenzene was detected in the soil samples collected at depths of about 10.5 to 11.0 feet and 15.5 to 16.0 feet, at concentrations of 1.6 ppm and .690 ppm, respectively. Xylenes were detected in the samples collected at depths of about 5.5 to 6.0 feet and 15.5 to 16.0 feet at concentrations of .053 ppm and 1.3 ppm, respectively. Toluene was nondetectable in all the soil samples.

Analytical results are summarized in Table 1 and documented with a certified analytical report and chain-of-custody in Appendix F.

3.3 Groundwater Monitoring Well Construction, Development, and Sampling

The following discusses groundwater monitoring well construction, development, and sampling procedures; and results of chemical analyses. Appendices G, H, I and J document TPE's protocols relative to groundwater monitoring well construction, development, and sampling procedures; and quality assurance and quality control procedures.

3.3.1 Groundwater Monitoring Well Construction

The borings for monitoring wells TMW-4 and TMW-5 were auger-drilled to depths of 34.5 feet and 24 feet, respectively; each boring was further advanced with either a split spoon sampler or standard penetration sampler to depths of 36.0 feet and 27.0 feet, respectively. Prior to constructing wells in each boring, the sampler holes were backfilled with bentonite pellets to the depth of the augered hole. The borings were converted into monitoring wells by installing 2-inch diameter, flush-threaded, schedule 40, polyvinyl chloride (PVC) casing and .010-inch, machine-slotted screen. The depth of each boring and screen length were determined by the geologic profile and the depth of occurrence of groundwater in the boring at each location. In well TMW-4, the boring encountered a water-bearing, brown, poorly graded, sand beneath an overlying confining clay at a depth of 30.5 feet to 32.5 feet. In well TMW-5, the boring encountered a water-bearing green to grey, clayey, silty, very dense, poorly graded sand beneath an overlying confining clay at a depth of 18 to 23.0 feet.

Well TMW-4 was screened from 14 feet to 34 feet below ground surface. Well TMW-5 was screened from 17 feet to 24 feet below ground surface. The lengths of screen and blank PVC well casing were threaded together above ground and lowered inside the hollow-stem augers. After each well was set at the predetermined depth, the annular space between the well screen and borehole was backfilled to about 2 feet above the top of the well screens with Lone Star #2/12 filter sand. The sand was slowly tremied down the inside of the hollow-stem augers while the augers were slowly withdrawn. This method minimized the possibility of bridging and helped assure that the filter sand would surround the well casing before the native material could collapse into the borehole. After the screened portion of the annular space of the borehole was backfilled with filter sand, the hole was sealed with about 2-feet of bentonite and then filled with a sand cement grout to within .50 feet of the ground surface. The monitoring wells were protected with water tight, traffic-rated vault boxes with locking steel covers. The vault boxes were set in concrete about an inch above the existing ground surface to help divert surface water away from the well.

All wells were constructed under the direction of a California registered geologist. See Appendix E for soil boring logs and well construction details.

The TOC of all 5 wells was surveyed relative to MSL by a professional civil engineer on August 10, 1993. MSL is based on Oakland Bench Mark 3505 located at the intersection of E. 14th Street and 22nd Avenue.

3.3.2 Groundwater Monitoring Well Development

On July 26, 1993, wells TMW-4 and TMW-5 were developed by TPE. Prior to development, each well was checked for floating product using a dedicated polyethylene bailer; no floating product, sheen or odor was detected in the well TMW-4. In well TMW-5, a skim of floating product and odor were apparent in the purge water.

Each well was developed by surging with a surge block and using a 1.7-inch, positive displacement, PVC hand pump until no noticeable improvement in the purged water could be seen. After development, the water from each well was turbid.

All well development tools and equipment were steam-cleaned immediately before starting each well development. Development water was stored on site in 55-gallon drums. The drums were labeled to show contents, suspected contaminant, date filled, expected removal date, company name, contact person, and client telephone number.

3.3.3 Groundwater Monitoring Well Sampling

Groundwater samples were collected from all 5 wells on August 17, 1993. Depth-to-groundwater and top of free product, if present, were measured with a KECK Model KIR-89 interface meter. Depth-to-groundwater and top of free product, was measured in each well from the TOC to the nearest 0.01 foot (see Table 2). A minimum of 3 repetitive measurements were made for each level determination to ensure accuracy. The elevation of the groundwater level in each well was calculated by subtracting depth-to-groundwater from each well's respective TOC and correcting for thickness of floating product, if present. Next, each well was visually checked for floating product using a dedicated polyethylene bailer.

Immediately prior to sampling, the wells were purged a minimum of 3 wetted well volumes with dedicated polyethylene bailers and until temperature, pH, and electrical conductivity of the purged water stabilized and all floating product was removed. Since dedicated bailers were used for each well sampled, no decontamination was necessary between sampling events. After purging was completed, the water samples were collected in sterilized glass vials/bottles having Teflon-lined screw caps, immediately sealed, and labeled to show: date, time, sample location, project number, and sampler. The samples were immediately stored in an iced cooler for transport to DHS certified Priority Environmental Labs (PRIORITY) located in Milpitas, California accompanied by chain-of-custody documentation.

Purge water was stored on site in 55-gallon drums. The drums were labeled to show contents, suspected contaminant, date filled, expected removal date, company name, contact person, and client telephone number.

3.3.3.1 Floating Product

Floating product was observed and measured in wells MW-1, MW-2, and TMW-5 at thickness of .77 feet, .01 feet, and .03 feet, respectively. Odor was noticed in well MW-3 while no floating product or odor were detected in well TMW-4. Table 3 summarizes the thickness of floating product measured in each well. The floating product was easily removed by bailing at the time of sampling.

3.3.3.2 Results of Chemical Analyses

All groundwater samples and 1 trip blank sample were analyzed for TPHG and BTEX by EPA Methods 5030/8015 and 602, respectively.

Chemical analyses detected TPHG and BTEX chemicals in all 5 wells. TPHG was detected in wells MW-1, MW-2, MW-3, TMW-4, and TMW-5 at concentrations of 110,000 ppb, 49,000 ppb, 9,600 ppb, 150 ppb, and 120,000 ppb, respectively. All BTEX chemicals were detected in all wells with the exception of no benzene detected in well TMW-4.

Well TMW-4, the furthest upgradient well, detected the lowest concentrations of TPHG and BTEX. Toluene, ethylbenzene, and xylenes were detected at concentrations of .8 ppb, 1.4 ppb, and 3.7 ppb, respectively. Benzene was not detected.

The reader is referred to Table 4 for a summary of BTEX concentrations detected in all wells.

Analytical results are summarized in Table 5 and documented with an analytical report and chain-of-custody in Appendix F.

3.4 Regional Hydrogeology

The site is located in the East Bay Plain of the Coast Range physiographic province. The surface of the Bay Plain in the general area of the site is gently sloping to the southwest and the site is at an elevation of about 27 feet above MSL. The East Bay Plain is an area comprised of flat alluvial lowlands and bay and tidal marshes lying between the bedrock hills of the Diablo Range to the east and San Francisco Bay to the west. Geologic materials underlying the plain are classified as consolidated and unconsolidated. The consolidated materials beneath the East Bay Plain are estimated to be present at a depth of about 1,000 feet below the ground surface and are not considered to be aquifers. The unconsolidated materials, occurring from ground surface to a depth of about 1,000 feet, contain the groundwater aquifers of the East Bay Plain. These materials consist of a heterogeneous mixture of clay, silt, sand, and gravel mainly derived by erosion of the Diablo Range. According to USGS Professional Paper 943, the subject site is located on Quaternary age alluvial deposits consisting of medium-grained, unconsolidated, moderately sorted, permeable fine sand, silt, and clayey silt with a few thin beds of coarse sand.

Major groundwater-bearing materials beneath the East Bay Plain occur at depths ranging from 50 feet to 1,000 feet below ground surface. Groundwater from these aquifers is presently used mostly for irrigation and industrial purposes. Groundwater flow is generally in a direction from the Diablo Range toward San Francisco Bay.

The nearest body of surface water to the site is Brooklyn Basin Tidal Canal located about .50 miles west of the site.

3.5 Site Hydrogeology

The site hydrogeology has been interpreted from soil boring logs constructed by TPE and others and the stabilized groundwater elevations in the 5 on-site groundwater monitoring wells. Boring logs and well construction details for wells TMW-4 and TMW-5 are presented in Appendix E. The reader is referred to CEC's November 21, 1988 letter report and ESE's December 23, 1991 Report for soil boring logs and well construction details of soil borings and monitoring wells constructed by others.

Geologic cross sections A-A' and B-B' (Figures 3 and 4) have been constructed from boring logs and stabilized groundwater elevations to illustrate the site's stratigraphy and hydrogeologic characteristics. The locations of the cross sections are shown in Figure 5.

Geologic cross sections A-A' and B-B' illustrate that the stratigraphy, in general, consists of the following sequence from ground surface to depth: (1) a dry, brown, aggregate base material that underlies the asphalt surface to a depth of about 1.0 foot; (2) an underlying dry, grey to black clay (sometimes brown) ranging to depths of about 7.5 to 12.0 feet; (3) an underlying damp light grey to green clay to a depth of about 17.0 feet; (4) an underlying water bearing light green to grey clayey sand ranging to depths of about 23.0 to 27.0 (this sand thickens and thins across the site and pinches-out to the east and west; a probable, moist, upper member of this sand is present in the borings of TH-2 and TH-4); (5) an underlying, dry to moist, brown, gravelly clay ranging to depths of about 27.0 to 30.5 feet; (6) an underlying, light brown, wet sand to a depth of about 32.5 feet (in well MW-1 this sand is underlain by an apparent lenticular gravel facies whose vertical and lateral extent is undetermined); and (7) an underlying damp, brown, gravelly clay ranging to the total depth explored.

All sands illustrated in the 2 cross sections are interpreted by TPE to be channel sands, in origin, and are probably hydraulically connected, beyond the area of investigation, to comprise the shallow groundwater system beneath the site. As an example, 2 apparent separate sands in the boring of TH-4, at depths of about 8 feet and 19 feet in cross section A-A', are believed to be merged into 1 thick sand seen in the boring of well MW-2 in cross section B-B'.

Groundwater occurs in the sands beneath the site as both confined and unconfined. Confined groundwater was observed in wells MW-1, TMW-4, and TMW-5 while unconfined groundwater was observed in wells MW-2 and MW-3.

3.5.1 Upper Water-Bearing Sand Member

Geologic cross section A-A' (see Figure 3) illustrates the upper water-bearing sand member, at about 18 feet deep in well TMW-5, as a lens that pinches out towards the east and west. This sand lens was not present in well TMW-4 and ESE's boring TH-3. The groundwater in this sand, in well TMW-5, is confined as interpreted from the stratigraphic sequence and the observation that stabilized groundwater in the well was above the upper surface of the sand.

Geologic cross section B-B' (see Figure 4) shows the upper sand member extending the length of the site in a north-south direction and varying in thickness. In well MW-2, the sand becomes about 14-feet thick and the groundwater in the sand is unconfined. As mapped in Figure 6, the sand exhibits the characteristics of an ancient stream channel trending north-south across the site.

3.5.2 Lower Water-Bearing Sand Member

Geologic cross sections A-A' and B-B' illustrate a lower water-bearing sand member at approximately 30.0 feet deep. This sand was present in wells TMW-4, MW-1, MW-3, and ESE's boring TH-3 and absent in ESE's boring TH-2 and well MW-2. This sand member appears to exhibit characteristics similar to the upper sand member though information about this sand member is sparse since many previous borings were not drilled deep enough.

Monitoring wells MW-2 and TMW-5 monitor the upper sand member while MW-1, MW-3, and TMW-4 monitor both the upper and lower sand members. While the upper sand member was not present in well TMW-4, it appeared to be replaced by a brown, wet, clay suggesting that the boring was located near the pinched-out edge of the sand; this wet clay is expected to yield some water to the well.

3.5.3 Groundwater Gradient

Depth-to-groundwater was measured in each well from the TOC, to the nearest 0.01 foot, and subtracted from the TOC elevation (MSL) to calculate groundwater elevation (see Table 2). When floating product was present (see Table 3), the groundwater elevation was corrected by multiplying floating product thickness times a density of .75 and adding the resultant value to the groundwater elevation. This corrected groundwater elevation (see Table 2) was used to map groundwater gradients and flow directions by triangulation between wells.

Groundwater gradient on June 11, 1993 was reevaluated based on TOC measurements relative to MSL (a previous gradient was calculated by TPE based on a site datum established by ESE and presented in TPE's WP). The calculated gradient was .026 feet per foot (see Figure 7) as compared to .0357 feet per foot as presented in TPE's WP. The recalculated flow direction is slightly more northerly than in TPE's WP.

Groundwater gradient was next evaluated using all 5 wells on August 17, 1993. Groundwater flow direction on August 17, 1993 ranges from north-northeast to west-southwest with an average gradient of about .029 feet per foot (see Figure 8).

Groundwater gradient to the south and southeast of the site cannot be determined because of the absence of groundwater monitoring wells in that area.

The probable source for contamination to groundwater, the former underground fuel tanks, were up and cross-gradient and within about 10 feet of groundwater monitoring well TMW-5 on August 17, 1993; wells TMW-4 and MW-1 were up and cross-gradient and wells MW-2 and MW-3 were down and cross-gradient.

Depth-to-groundwater measurements and elevation calculations are documented in Table 2.

On August 17, 1993, the average groundwater elevation decreased .79 feet as compared to the average elevation for June 11, 1993 (see Table 4).

4.0 CONTAMINATION MAPS

4.1 TPHG Dissolved Plume Map

A TPHG dissolved plume map was constructed for the August 17, 1993 sampling event (see Figure 9). The map suggests that groundwater contamination by TPHG may extend beneath the entire site with higher concentrations in the area of the former underground fuel tank complex.

The source of groundwater contamination in well TMW-4, the most upgradient well, is uncertain at this time and may be due to an off-site upgradient source.

4.2 TPHG Soil Plume Maps

Two maps (see Figures 10 and 11) were constructed from soil analytical results obtained by TPE and others for the time period May 22, 1991 through July 23, 1993. The concentrations of TPHG have probably changed for the earlier samples analyzed by others due to natural degradation processes, volatilization, and chemical transport; however, the maps are presented here as a guide to conducting future work.

Figure 10 is a TPHG isoconcentration map of soil contamination at the 10 to 11-foot depth range. The pattern of contours reflects the former underground tank complex as a source of contamination, but more strongly suggests a source area at the location of well MW-2 where TPHG was detected at a concentration of 4,320 ppm at a depth of 10 feet by ESE. The client knows of no surface spills nor other underground tanks that may be a source of contamination in the area of well MW-2. A possible source of contamination may be floating and/or dissolved product that potentially migrated from the former underground tank complex at a time when top of groundwater and/or floating product were 10 feet or less below ground surface. Cross section B-B' illustrates that the upper surface of the upper sand member is only 8 feet below ground surface in well MW-2 and would constitute a conduit for potential soil contamination to that depth.

Figure 11 is a TPHG isoconcentration map of soil contamination at the 15 to 18-foot depth. The pattern of contours reflects the former underground tank complex as a source of contamination to the soil. A significant source of contamination to the soil at this depth may be contamination from floating product and/or dissolved product associated with the groundwater.

Because of the spatial distribution of analytical data used in constructing Figures 10 and 11, the interpolated isoconcentration contours are believed to represent the maximum potential areas of their respective concentrations and, in reality, the area of contamination may be significantly less.

5.0 CONCLUSIONS

Results of groundwater analyses indicate a groundwater contaminant plume exists beneath most of the site. The plume is not well defined on the southeast and southwest sides of the property. Groundwater contamination in well TMW-4 suggests the possible influence of an upgradient off-site source. Additional groundwater monitoring wells would be needed to evaluate groundwater quality on the southeast and southwest sides of the property.

The groundwater flow direction has been documented to range from, at least, north-northeast to west-southwest. Additional groundwater monitoring wells would be needed to evaluate groundwater gradient and flow direction on the southeast and southwest sides of the property.

On August 17, 1993, floating product was measured in wells MW-1, MW-2, and TMW-5 at thicknesses of .77 feet, .01 feet, and .03 feet, respectively. No product recovery system has been installed to date because product was quickly bailed to a sheen, indicating a limited volume. TPE believes a greater thickness of floating product may be found in an upgradient direction since gasoline has a lesser density than water. Additional groundwater monitoring wells would be needed on the southeast and southwest sides of the property to further evaluate the horizontal and vertical distribution of floating product. To evaluate the presence of floating and dissolved product in well MW-2, an additional well(s) may be required in the northwesterly area of the site.

Vadose zone soil contamination exceeding 1,000 ppm is apparently present in the area of boring TH-1 and well MW-2. The source of contamination in the area of TH-1 is probably the former underground tank complex and the source of contamination in the area of well MW-2 is probably groundwater containing floating product and/or dissolved product.

6.0 RECOMMENDATIONS

TPE recommends remediation of contaminated vadose zone soil by excavation, specifically in the areas of boring TH-1 and well MW-2. During excavation activities, TPE expects to encounter contaminated groundwater that may have floating product. Some groundwater contamination can be remediated by pumping the pit(s) at the time of excavation activities.

TPE recommends additional characterization of groundwater gradient, floating product, and the dissolved TPHG plume by installation of 3 additional groundwater monitoring wells: 1 on the southeast, 1 on the southwest, and 1 on the northwest sides of the property.

The northwesterly well will, additionally: (1) provide gradient data along the apparent prominent, northwesterly groundwater flow axis, (2) evaluate the potential for groundwater contamination to flow off site, and (3) provide soil sample analyses to further evaluate vadose zone soil contamination in the vicinity of well MW-2.

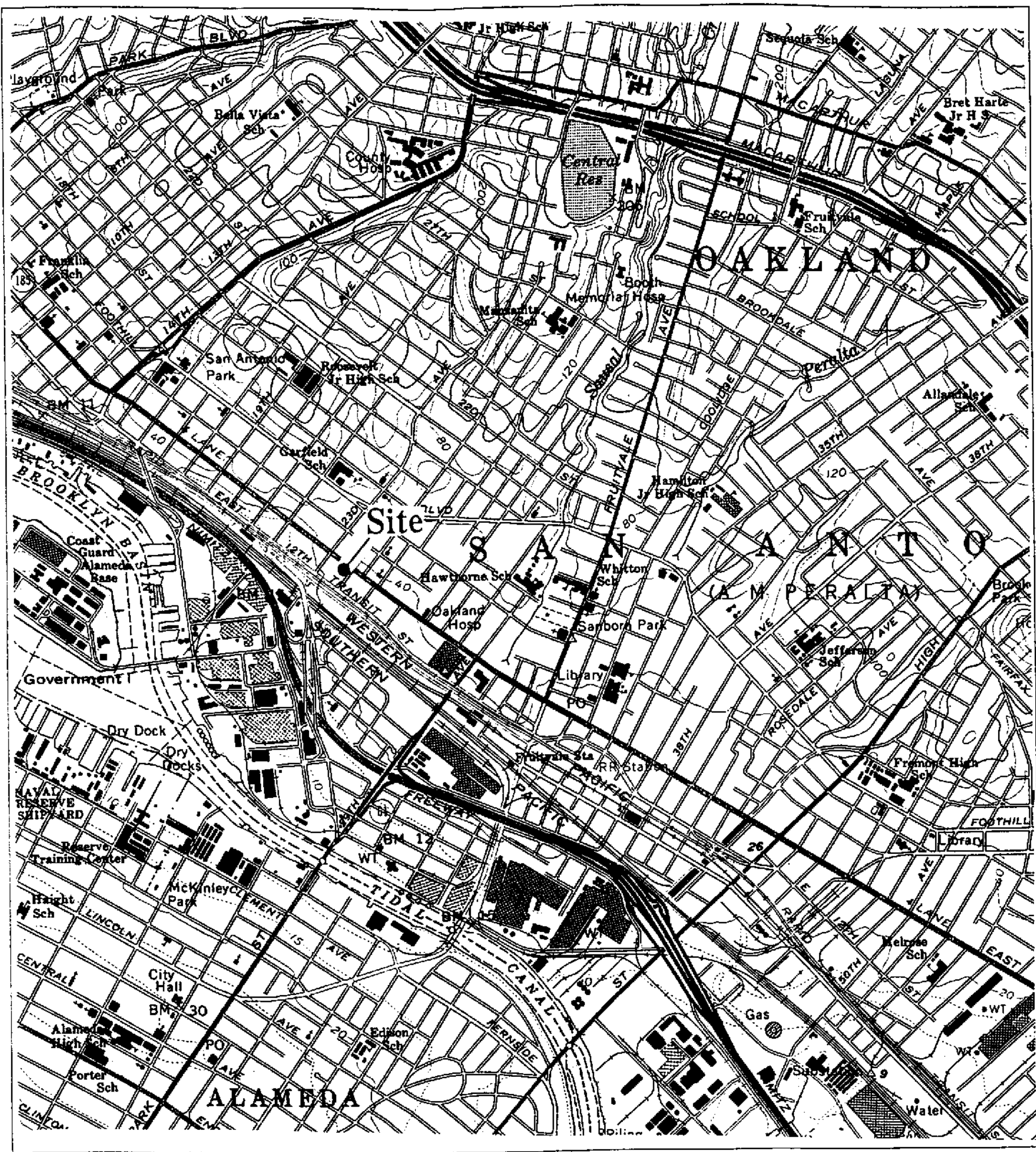
Installation of the above wells are recommended prior to beginning excavation activities to better define the extent of vadose zone soil contamination.

TPE recommends quarterly groundwater sampling and quarterly gradient determination of the 5 groundwater monitoring wells, and any future wells that may be installed, for a period of 1 year to establish a trend of groundwater quality and flow direction beneath the site. TPE recommends that groundwater samples from MW-1 through TMW-5 be analyzed for TPHG and BTEX and that bailing of free product be continued until additional characterization has been conducted.

7.0 STUDY LIMITATIONS

This PSAR is based on results of work conducted by others, information provided by Wong, subsurface exploration, laboratory analyses of soil and groundwater samples, and subsurface geologic correlations. The chemical analytical results for the samples are considered applicable to that borehole and depth or location from which they were collected. The soil encountered in the borings is believed to be representative of the site; however, the soil may vary in character between observation points. The conclusions contained herein are based on field observations, analytical data, and professional judgement which is in accordance with current standards of professional practice. No other warranty is expressed or implied.

The findings and conclusions of this report are valid as of the present time; however, the passing of time could change the conditions of the subsurface due to natural processes or the influence of man. Accordingly, the findings of this report may be invalidated, wholly or partly, by changes beyond TPE's control. Therefore, this report should not be relied upon after an extended period of time without being reviewed by a Civil Engineer or Registered Geologist.



LEGEND

REFERENCE: USGS 7.5 MINUTE SERIES
QUADRANGLE MAP OAKLAND EAST,
CALIFORNIA, PHOTOREVISED 1980

N

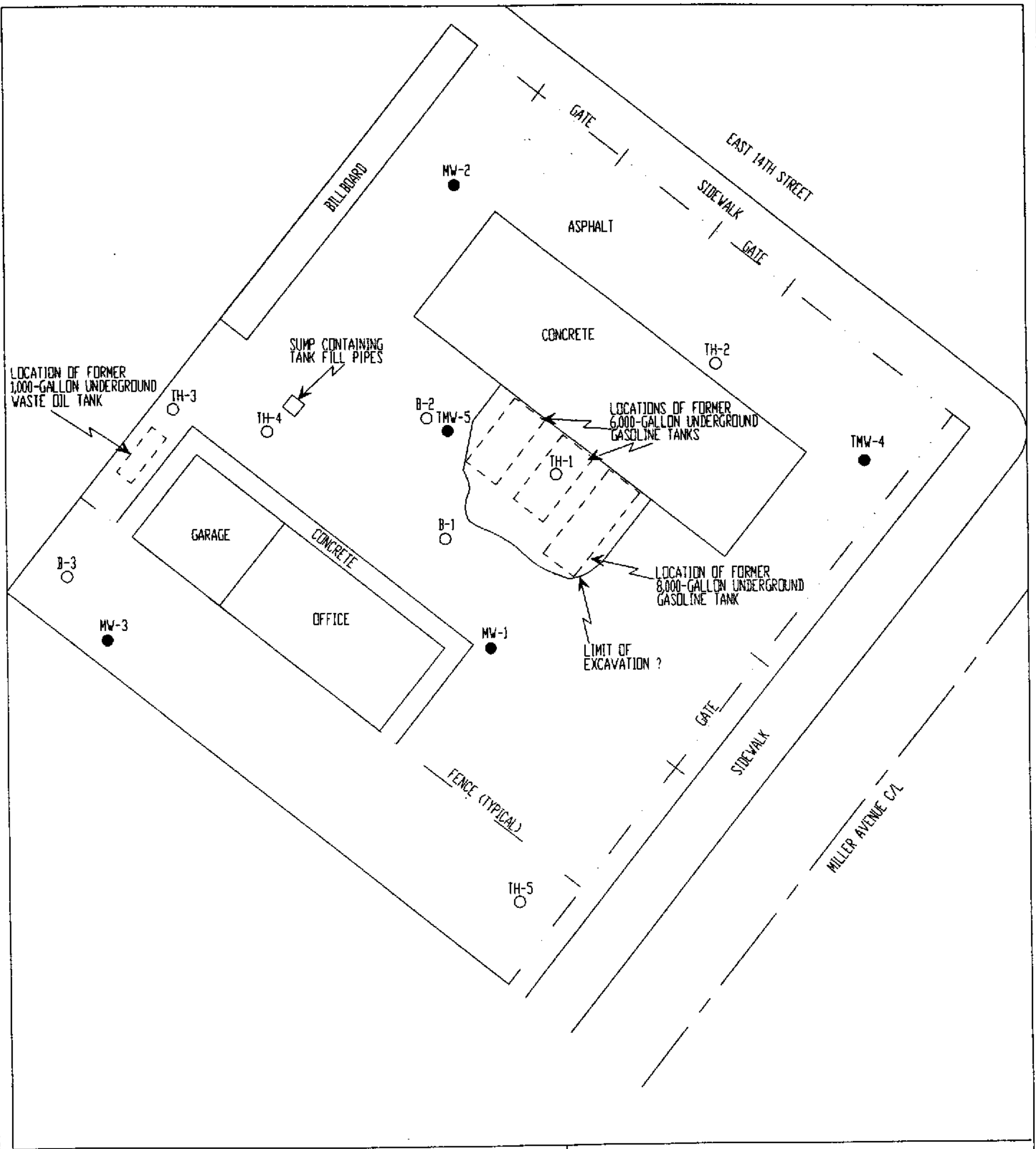
0 2,000
SCALE IN FEET

TANK PROTECT ENGINEERING

SITE VICINITY MAP

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	6/14/93
FIGURE	1
FILE #	267-1
DRAWN BY	AK
CHECKED BY	JVN



LEGEND

TMW-4 ● NAME AND LOCATION OF MONITORING WELL INSTALLED BY TPE

MW-1 ● NAME AND LOCATION OF MONITORING WELL INSTALLED BY OTHERS

B-1 ○ NAME AND APPROXIMATE LOCATION OF SOIL BORING DRILLED BY OTHERS

N

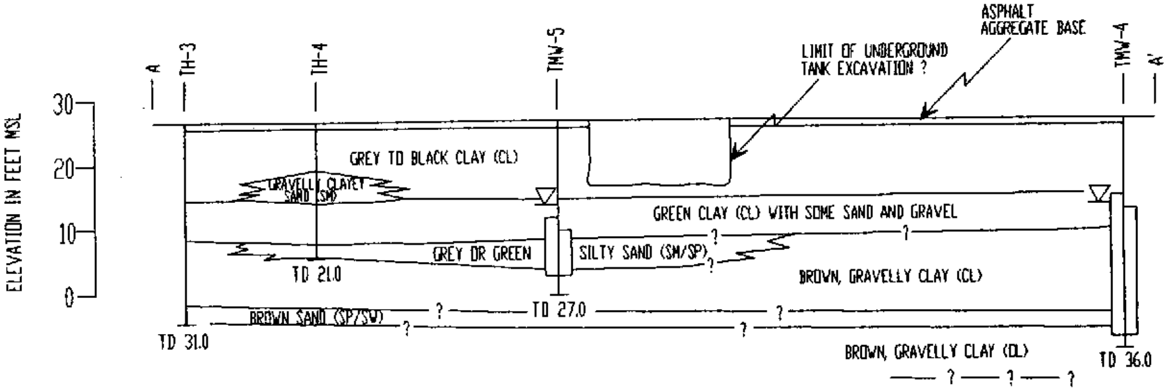
0 30
SCALE IN FEET

TANK PROTECT ENGINEERING

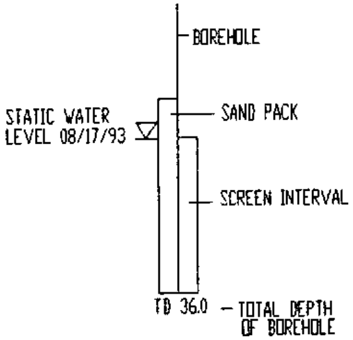
SITE PLAN

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	10/4/93
FIGURE	2
FILE #	267-2
DRAWN BY	AK
CHECKED BY	JVM



LEGEND



NO VERTICAL EXAGGERATION

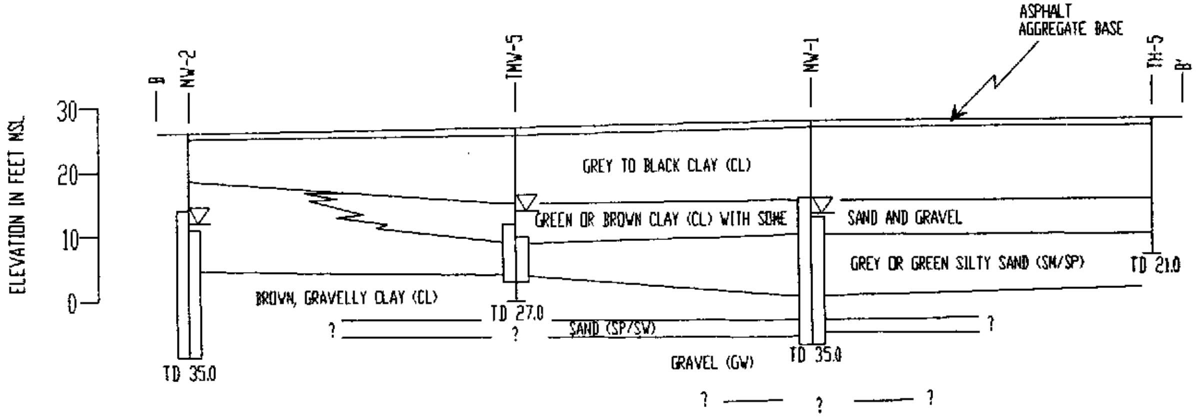
NOTE: SEE FIGURE 5 FOR LOCATION OF CROSS SECTION

TANK PROTECT ENGINEERING

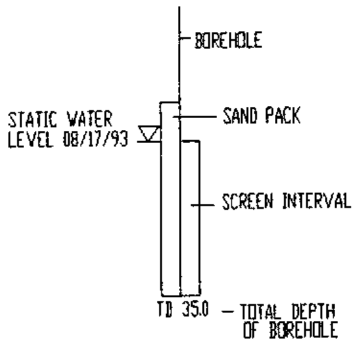
GEOLOGIC CROSS SECTION A-A'

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	9/13/93
FIGURE	3
FILE #	267-8
DRAWN BY	LNH
CHECKED BY	JVM



LEGEND



NO VERTICAL EXAGGERATION

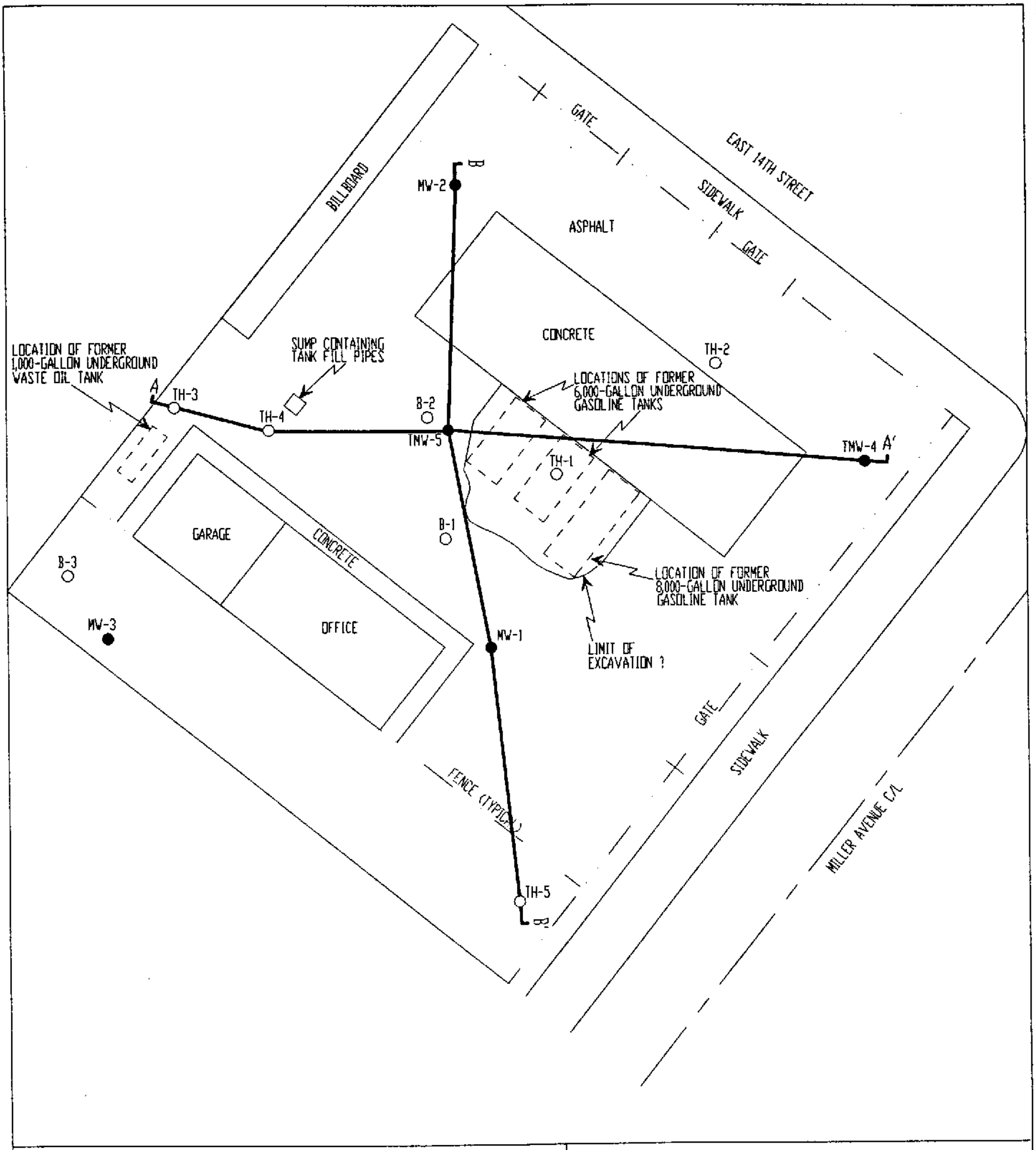
NOTE: SEE FIGURE 5 FOR LOCATION OF CROSS SECTION

TANK PROTECT ENGINEERING

GEOLOGIC CROSS SECTION B-B'

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	10/4/93
FIGURE	4
FILE #	267-7
DRAWN BY	LNH
CHECKED BY	JVM



LEGEND

TMW-4 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY TPE
MW-1 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY OTHERS
B-1 ○	NAME AND APPROXIMATE LOCATION OF SOIL BORING DRILLED BY OTHERS
A A'	LOCATION OF GEOLOGIC CROSS SECTION

-N-

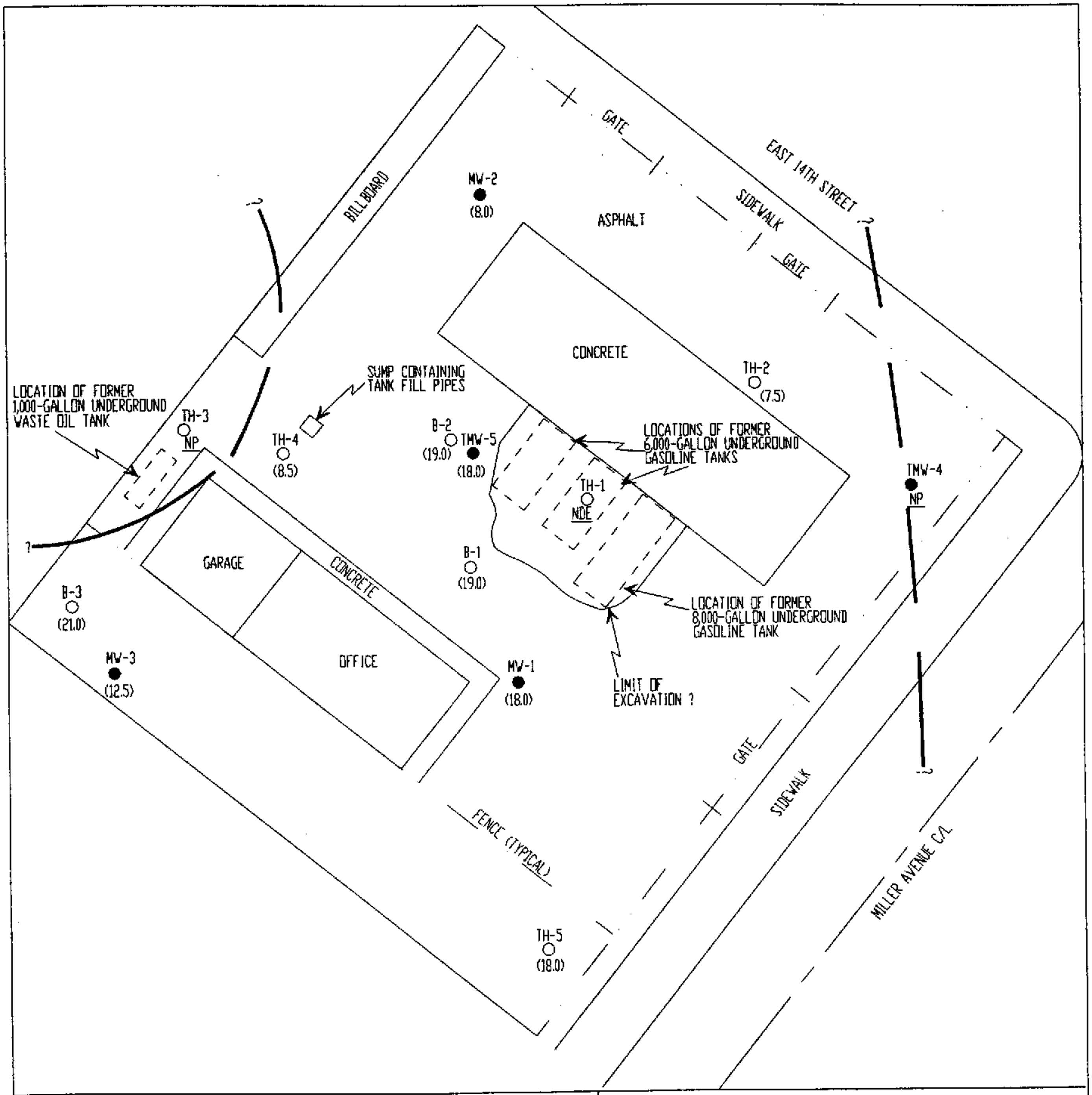
0 30
SCALE IN FEET

TANK PROTECT ENGINEERING

SITE PLAN
LOCATION OF GEOLOGIC CROSS SECTIONS A-A' AND B-B'

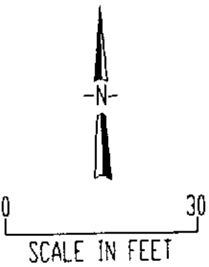
CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	9/13/93
FIGURE	5
FILE #	267-6
DRAWN BY	LNH
CHECKED BY	JVM



LEGEND

TMW-4 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY TPE
(12.5)	DEPTH TO UPPER SAND MEMBER
NP	UPPER SAND MEMBER NOT PRESENT
NDE	BORING NOT DEEP ENOUGH
MW-1 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY OTHERS
B-1 ○	NAME AND APPROXIMATE LOCATION OF SOIL BORING DRILLED BY OTHERS
/	UPPER SAND MEMBER BOUNDARY



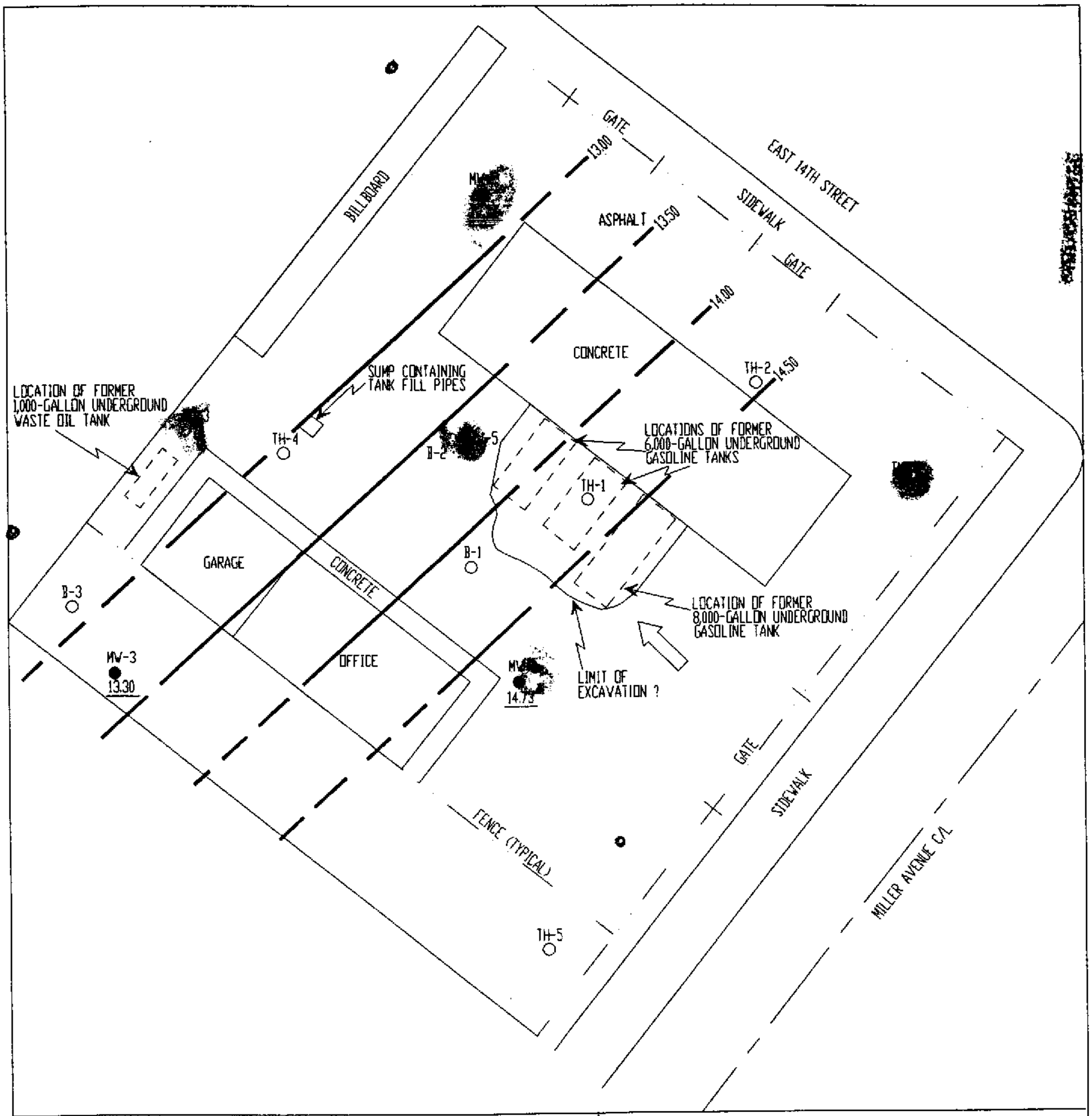
TANK PROTECT ENGINEERING

SITE PLAN

HORIZONTAL LIMITS OF UPPER SAND MEMBER

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	10/4/93
FIGURE	6
FILE #	267-9
DRAWN BY	LNH
CHECKED BY	JVN



LEGEND

TMW-4 ⊕	NAME AND LOCATION OF MONITORING WELL PROPOSED BY TPE
MW-1 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY OTHERS
B-1 ○	NAME AND APPROXIMATE LOCATION OF SOIL BORING DRILLED BY OTHERS
12.74	POTENTIOMETRIC ELEVATION (6/11/93)
*	WATER LEVEL ADJUSTED FOR FLOATING PRODUCT
13.00	POTENTIOMETRIC CONTOUR
⇦	GROUNDWATER FLOW DIRECTION

-N-

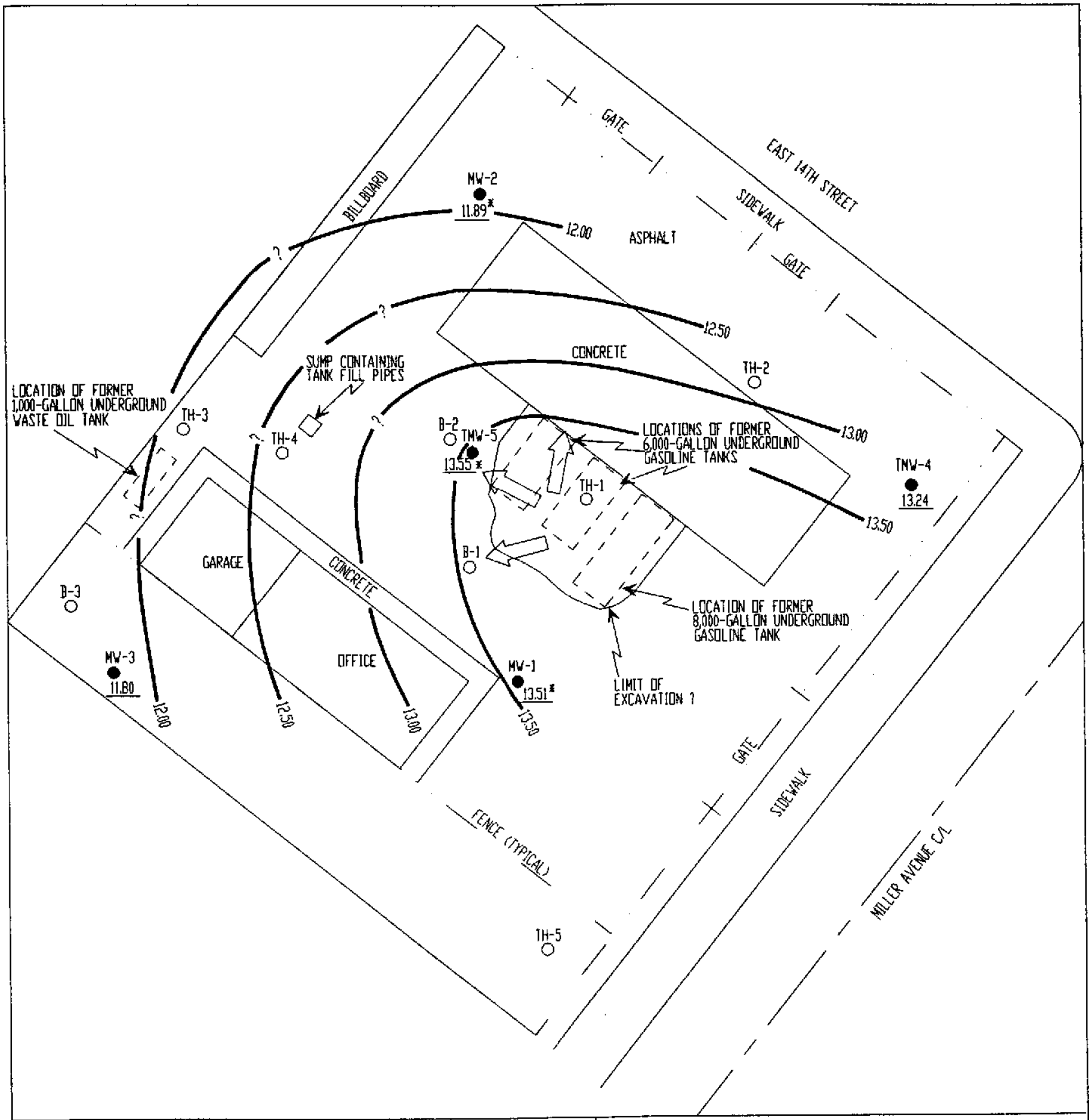
0 30
SCALE IN FEET

TANK PROTECT ENGINEERING

SITE PLAN
GROUNDWATER GRADIENT MAP (6/11/93)

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	9/13/93
FIGURE	7
FILE #	267-5
DRAWN BY	LNH
CHECKED BY	JVM



LEGEND

TMW-4 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY TPE
MW-1 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY OTHERS
B-1 ○	NAME AND APPROXIMATE LOCATION OF SOIL BORING DRILLED BY OTHERS
13.24	POTENTIOMETRIC ELEVATION (8/17/93)
*	WATER LEVEL ADJUSTED FOR FLOATING PRODUCT
— 12.00	POTENTIOMETRIC CONTOUR
⇦	GROUNDWATER FLOW DIRECTION

N

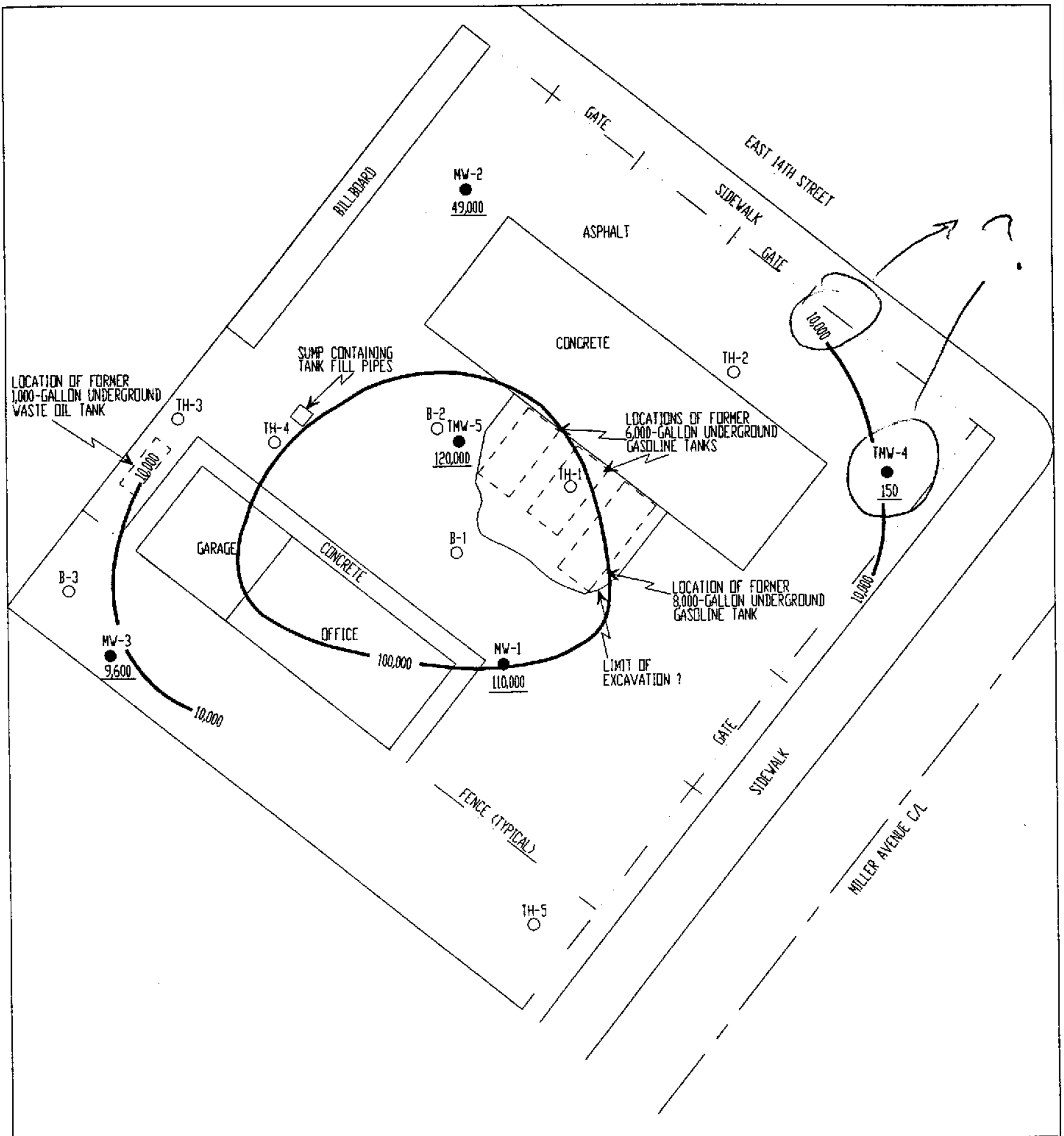
0 30
SCALE IN FEET

TANK PROTECT ENGINEERING

SITE PLAN
GROUNDWATER GRADIENT MAP (8/17/93)

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	10/4/93
FIGURE	8
FILE #	267-4
DRAWN BY	LNH
CHECKED BY	JVN



L E G E N D

TMW-4 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY TPE
MW-1 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY OTHERS
B-1 ○	NAME AND APPROXIMATE LOCATION OF SOIL BORING DRILLED BY OTHERS
9,600	TPHG CONCENTRATION (ppb)
10,000	ISOCONCENTRATION CONTOUR (ppb)

-N-

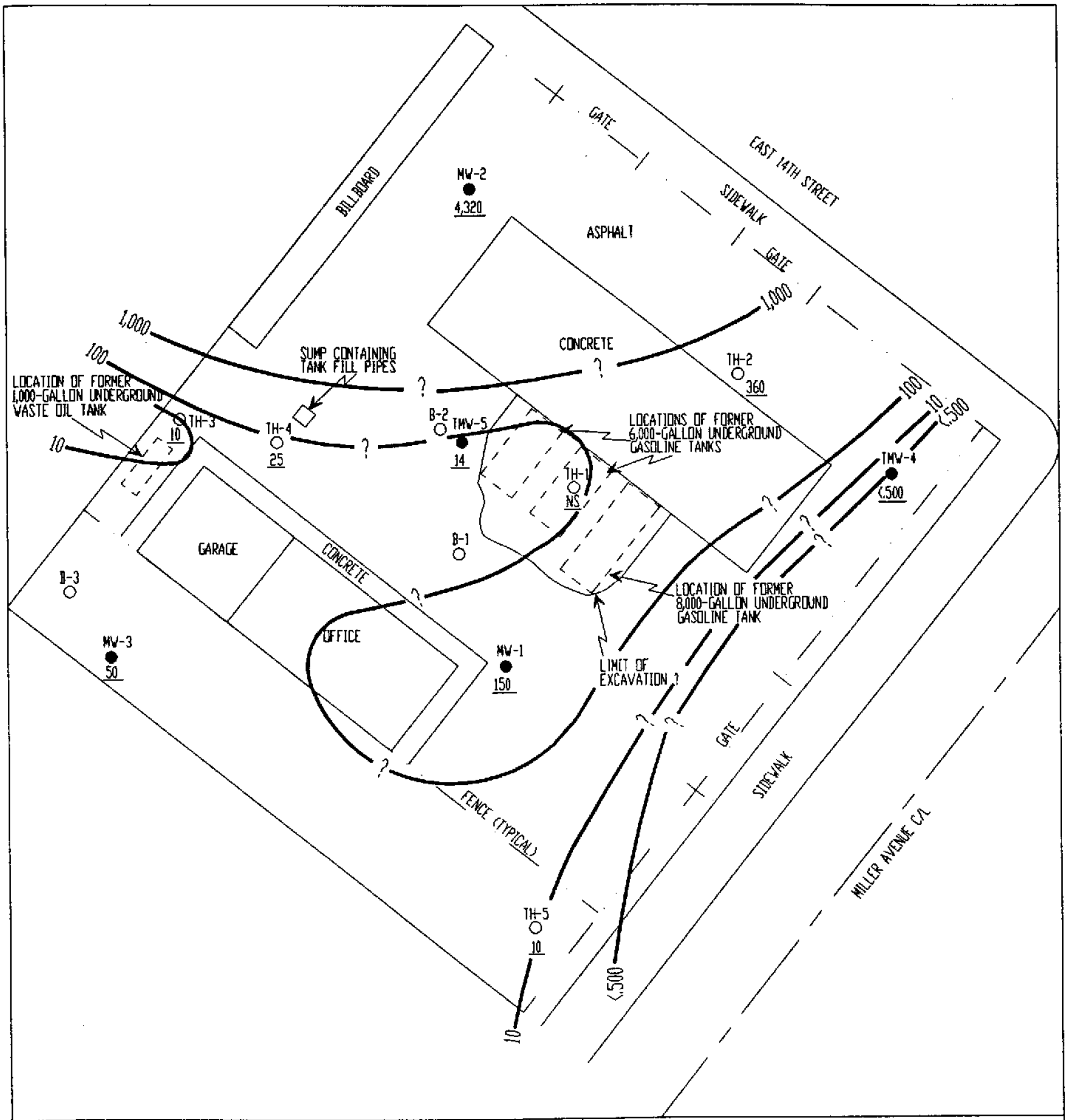
0 30
SCALE IN FEET

TANK PROTECT ENGINEERING

SITE PLAN
TPHG GROUNDWATER ISOCONCENTRATION MAP (8/17/93)

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	10/4/93
FIGURE	9
FILE #	267-13
DRAWN BY	AK
CHECKED BY	JVM



LEGEND

TMW-4 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY TPE
MW-1 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY OTHERS
B-1 ○	NAME AND APPROXIMATE LOCATION OF SOIL BORING DRILLED BY OTHERS
NS	NO SAMPLE
10	TPHG CONCENTRATION (ppm)
100	ISOCONCENTRATION CONTOUR (ppm)

-N-

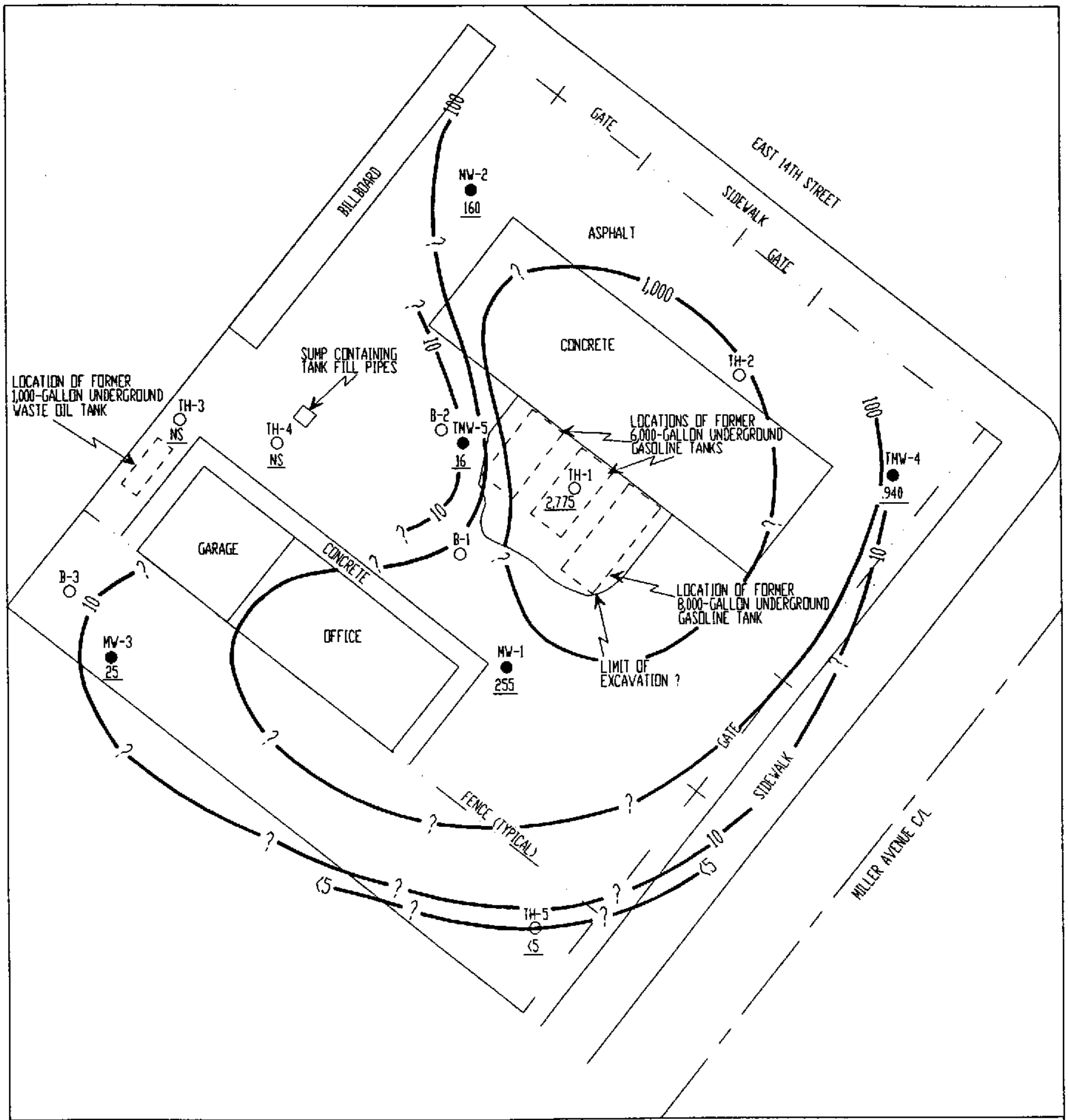
0 30
SCALE IN FEET

TANK PROTECT ENGINEERING

SITE PLAN
TPHG SOIL ISOCONCENTRATION MAP (5/22/91-7/23/93)
10 TO 11-FOOT DEPTH

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	10/18/93
FIGURE	10
FILE #	267-12
DRAWN BY	AK
CHECKED BY	JVM



L E G E N D

TMW-4 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY TPE
MW-1 ●	NAME AND LOCATION OF MONITORING WELL INSTALLED BY OTHERS
B-1 ○	NAME AND APPROXIMATE LOCATION OF SOIL BORING DRILLED BY OTHERS
NS	NO SAMPLE
25	TPHG CONCENTRATION (ppm)
100	ISOCONCENTRATION CONTOUR (ppm)

-N-

0 30
SCALE IN FEET

TANK PROTECT ENGINEERING

SITE PLAN
TPHG SOIL ISOCONCENTRATION MAP (5/22/91-7/23/93)
15 TO 18-FOOT DEPTH

CREDIT WORLD AUTO SALES
2345 E. 14TH STREET
OAKLAND, CA 94601

DATE	10/18/93
FIGURE	11
FILE #	267-11
DRAWN BY	AK
CHECKED BY	JVM

TABLE 1
SUMMARY OF SOIL SAMPLE ANALYTICAL RESULTS
(ppm[1])

Sample ID Name	Date	Depth (Feet)	TPHG	Benzene	Toluene	Ethyl-Benzene	Xylenes
B-1	10/03/88	15.0	3.4	0.31	<0.1	<0.1	0.14
B-2	10/03/88	15.0	83	1.6	1.1	1.8	9.6
B-3	10/03/88	15.0	NA	.360	.650	.470	.850
MW-1	05/22/91	10.0	150	0.460	0.365	0.305	0.960
MW-1	05/22/91	15.0	255	1.505	4.255	4.015	4.270
TH-1	08/21/91	15.0	2,775	1.235	1.060	1.625	5.280
TH-2	08/21/91	10.0	360	<.005	<.005	<.005	0.770
TH-2	08/21/91	30.0	50	<.005	<.005	<.005	<.005
MW-2	08/21/91	10.0	4,320	7.275	6.620	3.470	13.815
MW-2	08/21/91	15.0	160	<.005	<.005	<.005	<.005
TH-3[2]	08/22/91	10.0	10	<.005	<.005	<.005	<.005
TH-3[2]	08/22/91	19.0	10	<.005	<.005	<.005	<.005
TH-4[2]	08/22/91	10.0	25	<.005	<.005	<.005	0.175
TH-4[2]	08/22/91	20.0	450	<.005	<.005	<.005	<.005
MW-3[2]	08/22/91	10.0	50	<.005	<.005	<.005	<.005
MW-3[2]	08/22/91	15.0	25	<.005	<.005	<.005	<.005
TH-5	08/22/91	10.0	10	<.005	<.005	<.005	<.005
TH-5	08/22/91	18.0	<5	<.005	<.005	<.005	<.005
TMW-4	07/22/93	5.5-6.0	<.500	<.0050	<.0050	<.0050	<.015
TMW-4	07/22/93	10.5-11.0	<.500	<.0050	<.0050	<.0050	<.015
TMW-4	07/22/93	15.5-16.0	.940	<.0050	<.0050	<.0050	<.015
TMW-5	07/23/93	5.5-6.0	2.4	.026	<.0050	<.0050	.053
TMW-5	07/23/93	10.5-11.0	14	.900	<.050	1.6	<.140
TMW-5	07/23/93	15.5-16.0	16	.840	<.050	.690	1.3

[1] PARTS PER MILLION.

[2] ALSO ANALYZED FOR TOTAL RECOVERABLE HYDROCARBONS BY ESE; SEE ESE 12/23/91 REPORT FOR ANALYTICAL RESULTS.

TABLE 2
GROUNDWATER ELEVATION

Well Name	Date	TOC[1] Elevation (Feet SD[2])	Depth-to-Water From TOC (Feet)	Depth to Product From TOC (Feet)	Corrected[3] Groundwater Elevation (Feet MSL[4])
MW-1	08/23/91[5]	100.00	15.42	NA[9]	84.58
	04/16/92[6]	27.33[7]	16.66	11.54	14.51[8]
	06/11/93		12.61	12.60	14.73
	08/17/93		14.40	13.63	13.57[7]
MW-2	08/23/91[5]	98.585	13.77	NA	84.815
	04/16/92[6]	25.92[7]	15.38	12.57	12.65[8]
	06/11/93		13.185	ND[10]	12.74
	08/17/93		14.04	14.03	11.89
MW-3	08/23/91[5]	99.25	15.07	NA	84.18
	04/16/92[6]	27.57[7]	14.14	13.98	13.55[8]
	06/11/93		14.275	ND	13.30
	08/17/93		15.77	ND	11.80
TMW-4	08/17/93	26.50[7]	13.26	ND	13.24
TMW-5	08/17/93	26.51[7]	12.98	12.95	13.55

[1] TOP-OF-CASING.

[2] SITE DATUM ESTABLISHED BY ESE.

[3] ELEVATION CORRECTED FOR FLOATING PRODUCT USING .75 DENSITY OF GASOLINE.

[4] MEAN SEA LEVEL.

[5] WATER LEVEL MEASUREMENTS BY ESE.

[6] WATER LEVEL MEASUREMENTS BY NKJ.

[7] TOC SURVEYED 8/10/93 BY PROFESSIONAL ENGINEER.

[8] CORRECTED GROUNDWATER ELEVATION BY TANK PROTECT ENGINEERING.

[9] NOT AVAILABLE.

[10] NOT DETECTED.

TABLE 3
SUMMARY OF FLOATING PRODUCT THICKNESS

Well Name	Date	Depth-to-Water From TOC[1] (Feet)	Depth-to-Product From TOC[1] (Feet)	Product Thickness (Feet)
MW-1	04/16/92[2]	16.66	11.54	5.12
	06/11/93	12.61	12.60	.01
	08/17/93	14.40	13.63	.77
MW-2	04/16/92[2]	15.38	12.57	2.81
	06/11/93	13.185	ND[3]	---
	08/17/93	14.04	14.03	.01
MW-3	04/16/92[2]	14.14	13.98	0.16
	06/11/93	14.275	ND	---
	08/17/93	15.77	ND	---
TMW-4	08/17/93	13.26	ND	---
TMW-5	08/17/93	12.98	12.95	.03

[1] TOP-OF-CASING.

[2] WATER AND PRODUCT LEVELS MEASURED BY NKJ.

[3] NOT DETECTED.

TABLE 5
SUMMARY OF GROUNDWATER SAMPLE ANALYTICAL RESULTS
(ppb[1])

Sample ID Name	Date	TPHG	Benzene	Toluene	Ethyl-Benzene	Xylenes
MW-1	08/17/93	110,000	270	690	730	3,100
MW-2	08/17/93	49,000	94	240	250	980
MW-3	08/17/93	9,600	4.1	17	28	54
TMW-4	08/17/93	150	<0.5	0.8	1.4	3.7
TMW-5	08/17/93	120,000	340	730	790	3,600
TMW-6[2]	08/17/93	<50	<0.5	<0.5	<0.5	<0.5

[1] PARTS PER BILLION.

[2] TRIP BLANK.

APPENDIX A

- ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY, LETTER DATED OCTOBER 19, 1992
- ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY, LETTER DATED OCTOBER 30, 1992
- ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY, LETTER DATED JUNE 25, 1993
- ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT, WATER RESOURCES MANAGEMENT ZONE 7, DRILLING PERMIT APPLICATION

ALAMEDA COUNTY
**HEALTH CARE SERVICES
AGENCY**
DAVID J. KEARS, Agency Director

RAFAT A. SHAHID, ASST. AGENCY DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
State Water Resources Control Board
Division of Clean Water Programs
UST Local Oversight Program
80 Swan Way, Rm 200
Oakland, CA 94621
(510) 271-4530

October 19, 1992
STID # 2116

Mssrs. Aaron and Stanley Wong c/o
2200 E. 12th St.
Oakland CA 94606

Re: Request for Report of Subsurface Investigation and Workplan Addendum for former Taxi Taxi, Inc. at 2345 E. 14th St., Oakland CA, 94601.

Dear Mssrs. Wong:

Please be advised that the oversight of the remediation of the above site has been transferred to the Local Oversight Program (LOP) section of the Alameda County Hazardous Materials Division. You have been notified of this through a "Notice of Requirement to Reimburse" letter recently sent to you. The new case handler is the undersigned Hazardous Materials Specialist.

Upon review of the files, it appears that additional work will be required to further delineate the soil and groundwater contamination.

As you may recall, upon the removal of the four underground tanks at this site on 8/25/88, results of soil samples indicated high gasoline (up to 1500 parts per million, ppm) and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) around the gasoline tanks and elevated total oil and grease (TOG) in soil samples at the ends of the former waste oil tank. An initial investigation was performed by California Environmental Consultants, CEC, through the request of Mr. Dino Gonis. This investigation consisted of sampling of stockpiled soils and drilling three borings along with analyzing three grab groundwater samples from these borings. The results of this investigation indicated high dissolved gasoline and BTEX in the groundwater samples taken in the assumed downgradient direction to the gasoline tanks and elevated dissolved oil and grease in the grab water sample downgradient to the former waste oil tank pit.

Following this, Earth Systems Environmental, Inc. prepared a workplan dated May 28, 1991. This workplan called for seven additional borings and converting two of the borings into groundwater monitoring wells. Apparently, monitoring well 1, MW-1, was installed on May 22, 1991 when a drilling rig was conveniently available in this area.

I have recently spoken with Mr. Mark Magargee of Earth Systems Environmental and he informed that the work outlined in this workplan has been performed and that a report has been issued detailing the results. Be aware that our office has not received a copy of this report. Please send our office a copy within **10 days** of receipt of this letter. In the same conversation with Mr. Margargee, he stated that MW-1 had free product in it. An immediate interim measure must be performed to remove all free product from this well on a regular basis. Bailing is not an acceptable means. Your workplan addendum should state what measure will be done to comply with this request.

In the initial request for a workplan, sent to you by Mr. Ariu Levi in his 8/2/89 letter, he included a general guideline for your workplan. Upon review of the status of this site, you should provide comment to the following County concerns:

1. Please provide copies of manifests for all hazardous waste including tanks, piping, rinsate and sludge which was offhauled from the site.

2. Please document the disposal or reuse of all non-hazardous stockpiled soils generated from the tank removals.

3. No information was given concerning piping associated with the tanks. Please detail the fate of all piping existing at the site.

4. No information was given regarding any remedial activities performed at the time of the tank removals. Because of this, contamination in excess of 1000 ppm likely still exists in the soils. Please describe your method for determining the lateral and vertical extent of soil and groundwater contamination. This may include soil borings, soil gas survey, etc. Describe the rationale for the location of all borings and monitoring wells. Given the assumed westerly groundwater gradient and the existence of free product in MW-1, an additional well(s) will be needed to delineate the extent of the groundwater contaminant plume. Please keep in mind that priority should be given to prevent off-site migration of contamination.

5. You should commence groundwater elevation readings, sampling and analysis immediately and continue on a quarterly basis until this site is recommended for site closure to the Regional Water Quality Control Board (RWQCB).

Please provide a written response to the above comments along with your workplan addendum to our office within **45 days** of receipt of this letter.

Please submit copies of all reports, analytical results and workplans to our office and to that of the RWQCB to the attention of Mr. Rich Hiett. Their address is 2101 Webster St., Suite 550, Oakland CA 94612. You should consider this a formal request for technical reports pursuant to the California Water Code Section 13267 (b). Failure to submit the requested document may subject you to civil liabilities.

Please also be aware that failure to submit the requested document may also be considered the improper closure of an underground tank. Section 25299 of the California Health and Safety Code (CH&SC) allows for the civil penalty of not less than $500 or more than $5000 for each underground tank for each day which that operator or owner fails to properly close an underground tank as required by Section 25298. Thus failure to submit the requested documents may subject you to both civil liabilities as well as referral of this case to the District Attorney Office for enforcement.

You may contact me at (510) 271-4350 should you have any questions regarding this letter.

Sincerely,

Barney M Chan

Barney M. Chan
Hazardous Materials Specialist

cc: G. Jensen, Alameda County District Attorney Office
R. Hiett, RWQCB
E. Howell, files

Add-2345

BH

EBH File

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

RAFAT A. SHAHID. ASST. AGENCY DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
State Water Resources Control Board
Division of Clean Water Programs
UST Local Oversight Program
80 Swan Way, Rm 200
Oakland, CA 94621
(510) 271-4530

October 30, 1992
STID # 2116

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 2

To J. Mrakovich	From B Chan
Co. TPE	Co. AlaCty LOP
Dept.	Phone # 271-4530
Fax # 429-8089	Fax #

Mr. Stanley Wong
2200 E. 12th St.
Oakland CA 94606

Re: Subsurface Investigation at Former Taxi Taxi at 2345
E. 14th St., Oakland CA 94601

Dear Mr. Wong:

Thank you for the submission of the two reports regarding the above site which you delivered to our office on October 28th. These reports include the **Phase I Soil and Ground Water Assessment** by Earth Systems Environmental, Inc. and the **Groundwater Monitoring Report** dated May 1, 1992 performed by NKJ Environmental Monitoring in behalf of Mr. Jeff Johnson. Our office has completed the review of these reports. As you are aware through our office meeting, more work will be required to determine the extent of and remediate the soil and groundwater contamination.

After reviewing the reports, the first observation reached is that the groundwater contamination appears to be severe. When the wells were initially installed in August 1991 there was high concentrations of Total Petroleum Hydrocarbons as gasoline (TPHg) and high concentrations of Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) in MW-1 only. The next monitoring event in April of 1992 showed floating product on all three wells and as much as 5.12 feet in MW1. Our office agrees with what is recommended in this report. Some type of product removal is necessary immediately. Manual removal may be done only as an interim measure while the extent of the groundwater contamination is being determined and while a remediation system is being developed.

Earth Systems Environmental recommends the installation of two additional monitoring wells, one up-gradient and one down-gradient to help define the extent of the groundwater plume. These locations are acceptable but it will be necessary to perform additional site assessment to identify all additional location(s) requiring monitoring wells.

Be aware that the items 1-5 requested in my October 19, 1992 letter must still be provided by **December 3, 1992**. Your consultant will be able to provide the requested information and adequately reply to my questions.

Because of the results of the recent reports provided, your response should also identify the method by which free product in the wells will be removed and provide a workplan which will define the extent of soil and groundwater contamination. Please also provide a description of the groundwater remediation systems which you are considering for treating the contaminated groundwater. You should also provide a time schedule for the design, permitting and construction of the proposed remedial system.

Your subsequent quarterly monitoring reports should include the following information:

* detail the work which has been performed the preceding quarter and that which is proposed for the next quarter
* a site map delineating contamination contours for soil and groundwater based on the most recent data
* historical records of groundwater elevations in all wells
* a tabulation of the analytical results from all previous monitoring events

You may contact me at (510) 271-4350 should you have any questions regarding this letter.

Sincerely,

Barney M Chan

Barney M. Chan
Hazardous Materials Specialist

cc: G. Jensen, Alameda County District Attorney Office
R. Hiett, RWQCB
EH E. Howell, files

2add2345

ALAMEDA COUNTY
HEALTH CARE SERVICES
AGENCY
DAVID J. KEARS, Agency Director

RAFAT A. SHAHID, ASST. AGENCY DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
State Water Resources Control Board
Division of Clean Water Programs
UST Local Oversight Program
80 Swan Way, Rm 200
Oakland, CA 94621
(510) 271-4530

June 25, 1993
StID # 2116

Mr. Stanley Wong
2200 E. 12th St.
Oakland CA 94606

Re: Comment on June 18, 1993 Workplan for Construction of Groundwater Monitoring Wells at 2345 E. 14th St., Oakland CA 94601, formerly Taxi Taxi

Dear Mr. Wong:

Our office has received and reviewed the above referenced report as prepared by your consultant, Tank Protect Engineering, TPE. Recall, this workplan calls for the installation of two monitoring wells, one upgradient to the site and the other downgradient to and close to the former fuel tank pit. The workplan also calls for the installation of up to two automatic free product removal systems within chosen monitoring wells. This workplan is acceptable as work should proceed on the condition that:

1. Our office is contacted 48 working hours prior to monitoring well installation so we may witness this activity.

2. Please provide the data sheets describing the free product removal system to be installed in the wells.

Please be aware that our office has yet to receive the information requested information requested in my October 19 and October 30, 1993 letters. Recall, the October 19th letter requested information regarding the manifests and disposal records for the tank, piping and stockpiled soils, plus any information regarding sampling beneath the piping run. The October 30th letter gave a reporting format for all future reports. In particular, it requested a site map delineating contamination contours for soil and groundwater based on the most recent information, historical records of groundwater gradient and a tabulation of all previous monitoring event results.

You should also be aware that the installation of the two wells described in the workplan does not constitute the full characterization of the extent of soil and groundwater contamination nor does the installation of free product recovery systems represent adequate remediation of the site. The Site Assessment Report (SAR), to be prepared by TPE, should give your next steps intended to fully characterize the site and investigate your remedial options. This might include additional borings, a soil-gas survey, pump tests etc.

Please provide the requested information of the October 19th letter **within 30 days or by July 26, 1993.** In addition, your future monitoring reports should include the information requested in my October 30th letter.

You should consider this a formal request for technical reports pursuant to the California Water Code Section 13267 (b). Failure to submit the reports may subject you to civil liabilities.

You may contact me at (510) 271-4530 if you have any questions.

Sincerely,

Barney M Chan

Barney M. Chan
Hazardous Materials Specialist

cc: G. Jensen, Alameda County District Attorney Office
J. Mrakovich, Tank Protect Engineering, 2821 Whipple Rd., Union City, CA 94587-1233
E. Howell, files

3-2345E14

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600
FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

OCATION OF PROJECT
2345 E. 14TH STREET
OAKLAND, CA 94601

IENT
ime AARON & STANLEY WONG
ddress 2200 E. 12TH STREET Voice (510) 535-1672
y OAKLAND, CA Zip 94606

PPLICANT
ame TANK PROTECT ENGINEERING
Fax (510) 429-8089
dress 2821 WHIPPLE ROAD Voice (510) 429-8088
ty UNION CITY, CA Zip 94587

PE OF PROJECT
ell Construction
Cathodic Protection ___
Water Supply
Monitoring X
Geotechnical Investigation
General ___
Contamination ___
Well Destruction ___

OPOSED WATER SUPPLY WELL USE
mestic ___ Industrial ___ Other ___
unicipal ___ Irrigation ___

ILLING METHOD:
ud Rotary ___ Air Rotary ___ Auger X
bia ___ Other ___

RILLER'S LICENSE NO. C57 484288

ELL PROJECTS
Drill Hole Diameter 8 in.
Casing Diameter 2 in.
Surface Seal Depth 2 ft.
Maximum Depth 30 ft.
Number 2

EOTECHNICAL PROJECTS
Number of Borings ___
Hole Diameter ___ in.
Maximum Depth ___ ft.

STIMATED STARTING DATE 7/22/93
STIMATED COMPLETION DATE 7/22/93

hereby agree to comply with all requirements of this permit and Alameda ounty Ordinance No. 73-68.

PPLICANT'S IGNATURE John V. Medaniel Date 7/14/92

FOR OFFICE USE

PERMIT NUMBER 93377
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

[✓ A.] GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well Projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

[✓ B.] WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION See attached.

Approved Wyman Hong Date 15 Jul 93
Wyman Hong

91992

APPENDIX B

SAMPLE HANDLING PROCEDURES

APPENDIX B

SAMPLE HANDLING PROCEDURES

Soil and groundwater samples will be packaged carefully to avoid breakage or contamination, and will be delivered to the laboratory in an iced-cooler. The following sample packaging requirements will be followed.

- Sample bottle/sleeve lids will not be mixed. All sample lids will stay with the original containers and have custody seals affixed to them.
- Samples will be secured in coolers to maintain custody, control temperature, and prevent breakage during transportation to the laboratory.
- A chain-of-custody form will be completed for all samples and accompany the sample cooler to the laboratory.
- Ice, blue ice, or dry ice (dry ice will be used for preserving soil samples collected for the Alameda County Water District) will be used to cool samples during transport to the laboratory.
- Each sample will be identified by affixing a pressure sensitive, gummed label, or standardized tag on the container(s). This label will contain the site identification, sample identification number, date and time of sample collection, and the collector's initials.
- Soil samples collected in brass tubes will be preserved by covering the ends with Teflon tape and capped with plastic end-caps. The tubes will be labeled, sealed in quart size bags, and placed in an iced-cooler for transport to the laboratory.

All groundwater sample containers will be precleaned and will be obtained from a State Department of Health Services certified analytical laboratory.

Sample Control/Chain-of-Custody: All field personnel will refer to this workplan to verify the methods to be employed during sample collection. All sample gathering activities will be recorded in the site file; all sample transfers will be documented in the chain-of-custody; samples are to be identified with labels and all sample bottles are to be custody-sealed. All information is to be recorded in waterproof ink. All TPE field personnel are personally responsible for sample collection and the care and custody of collected samples until the samples are transferred or properly dispatched.

The custody record will be completed by the field technician or professional who has been designated by the TPE project manager as being responsible for sample shipment to the appropriate laboratory. The custody record will include, among other things, the following information: site identification, name of person collecting the samples, date and time samples were collected, type of sampling conducted (composite/grab), location of sampling station, number and type of containers used, and signature of the TPE person relinquishing samples to a non-TPE person with the date and time of transfer noted. The relinquishing individual will also put all the specific shipping data on the custody record.

Records will be maintained by a designated TPE field employee for each sample, site identification, sampling locations, station numbers, dates, times, sampler's name, designation of the samples as a grab or composite, notation of the type of sample (e.g. groundwater, soil boring, etc.), preservatives used, on-site measurement data, and other observations or remarks.

APPENDIX C

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING PROCEDURES

APPENDIX C

HOLLOW-STEM AUGER DRILLING AND SOIL SAMPLING PROCEDURES

Undisturbed soil samples will be recovered from soil without introducing liquids into the borings. Soil samples as core will be taken at 5-foot depth intervals and changes in lithology from ground surface to termination depth, or through the aquifer zone of interest for lithologic logging.

Borings will be drilled with a hollow-stem auger and sampled with a California or modified California-type split-spoon sampler. Soil samples will be of sufficient volume to perform the analyses which may be required, including replicate analyses.

Soil from all borings will be described in detail using the Unified Soil Classification System and will be logged by a geologist, civil engineer, or engineering geologist who is registered or certified by the State of California and is experienced in the use of the Unified Soil Classification System.

All wet zones above the free water zone will be noted and accurately logged.

Soil samples will be collected in clean brass or stainless steel sampling tubes in the split-spoon. Sediment traps will be used when unconsolidated sands and gravels fall from the sampler during retrieval. The brass tubes will be cut apart using a clean knife. The ends of the tubes will be covered with a thin sheet of Teflon tape or aluminum foil beneath plastic end caps and sealed with electrical or duct tape and properly labeled. The samples will be stored on ice at a temperature of 4 degrees Celsius.

Drill cuttings will be stored on site in 55-gallon drums or covered with plastic sheeting. Analytical results will be submitted immediately to the site owner for determination of appropriate disposal procedures. The soil borings not completed as wells will be backfilled with a cement grout.

APPENDIX D

WASTE HANDLING AND DECONTAMINATION PROCEDURES

APPENDIX D

WASTE HANDLING AND DECONTAMINATION PROCEDURES

Decontamination: Any drilling, sampling or field measurement equipment that comes into contact with soil or groundwater will be properly decontaminated prior to its use at the site and after each incident of contact with the soils or groundwater being investigated. Proper decontamination is essential to obtain samples that are representative of environmental conditions and to accurately characterize the extent of soil and groundwater contamination. Hollow-stem auger flights and the drill bit will be steam-cleaned between the drilling of each well.

All sample equipment, including the split-tube sampler and brass tubes, will be cleaned by washing with tri-sodium phosphate detergent, followed by rinsing with potable water.

Waste Handling: Waste materials generated during site characterization activities will be handled and stored as hazardous waste and will be stored on site in appropriately labeled containers. Waste materials anticipated include excavated soil, drill cuttings, development and purge water, water generated during aquifer testing, water generated during decontamination, and used personnel protection equipment such as gloves and Tyvek. The site owner will be responsible for providing the storage containers and will be responsible for the disposal of the waste materials. Drill cuttings from individual borings will be stored separately in drums or covered by plastic sheeting and the appropriate disposal procedure will be determined by the site owner or TPE following receipt of the soil sample analytical results. Drums will be labeled to show material stored, known or suggested contaminant, date stored, expected removal date, company name, contact, and telephone number.

APPENDIX E

LOGS OF EXPLORATORY BORINGS AND WELL COMPLETION DETAILS

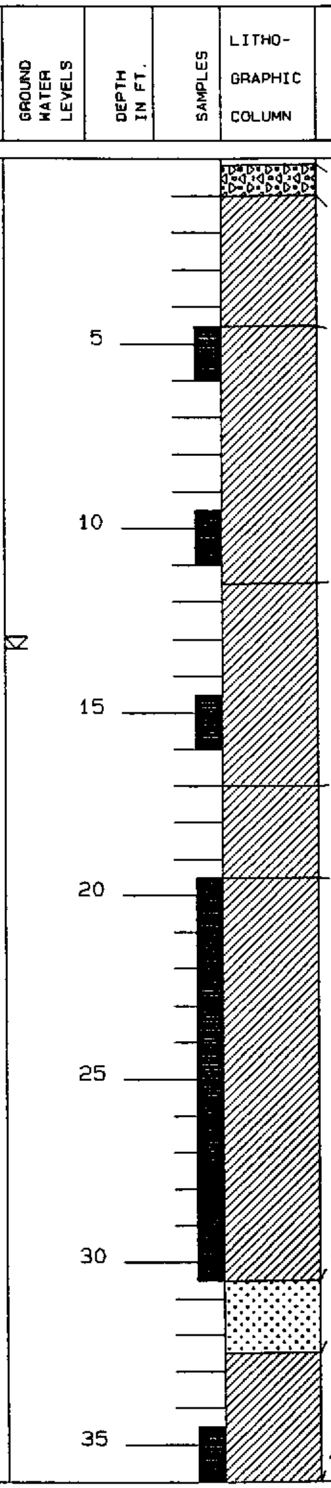
LOG OF EXPLORATORY BORING

PROJECT NUMBER 267 BORING NO. TMW-4

PROJECT NAME 2345 EAST 14TH STREET, OAKLAND CA.

BY LNH DATE 7/22/93 SURFACE ELEV. 27 FT

RECOVERY (FT/FT)	OVA (PPM)	PENETRATION (BLOWS/FT)
.75/1.5		9
.75/1.5		20
1.5/1.5		26
1.5/1.5		36
1.5/1.5		46
1.5/1.5		43
1.5/1.5		33
1.5/1.5		44
1.0/1.5		28
1.0/1.5		22
1.5/1.5		29



DESCRIPTION

ASPHALT

AGGREGATE BASE (GW): brown, dry, no odor.

CLAY (CL): black, scattered sand, dry, no odor.

CLAY (CL): brown, scattered sand, stiff to very stiff, dry, no odor.

CLAY (CL): mottled green/blue, scattered sand, gravelly at 14.5', very stiff, dry, slight odor.

CLAY (CL): brown, very stiff, moist to wet, no odor.

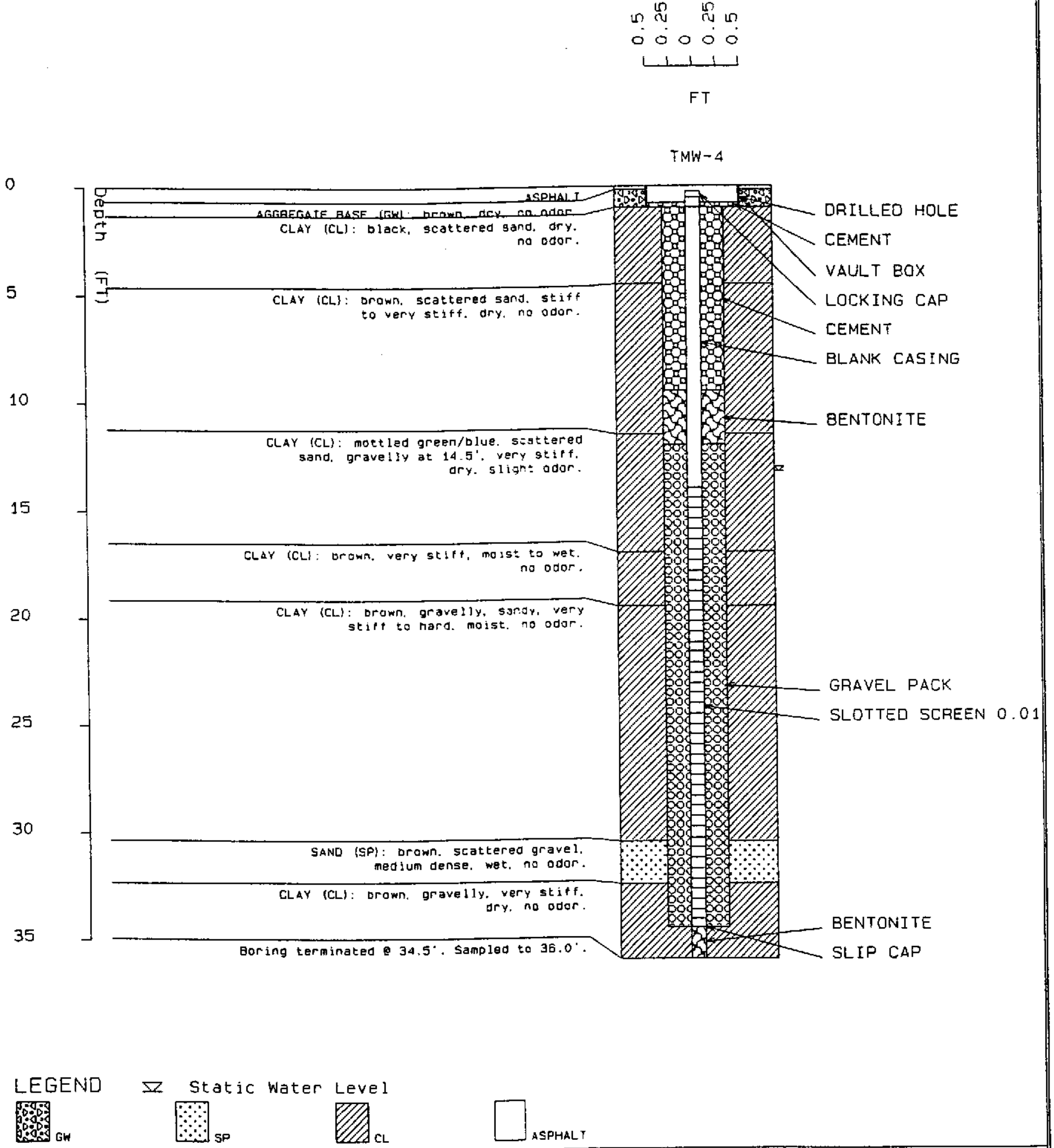
CLAY (CL): brown, gravelly, sandy, very stiff to hard, moist, no odor.

SAND (SP): brown, scattered gravel, medium dense, wet, no odor.

CLAY (CL): brown, gravelly, very stiff, dry, no odor.

Boring terminated @ 34.5'. Sampled to 36.0'.

REMARKS: Boring drilled with continuous-flight, hollow-stem, 8-inch O.D. augers. Samples collected in a 2.0-inch I.D. California and standard penetration sampler.



WELL ID : TMW-4

2345 EAST 14TH STREET, OAKLAND, CA

TANK PROTECT ENGINEERING

Figure :

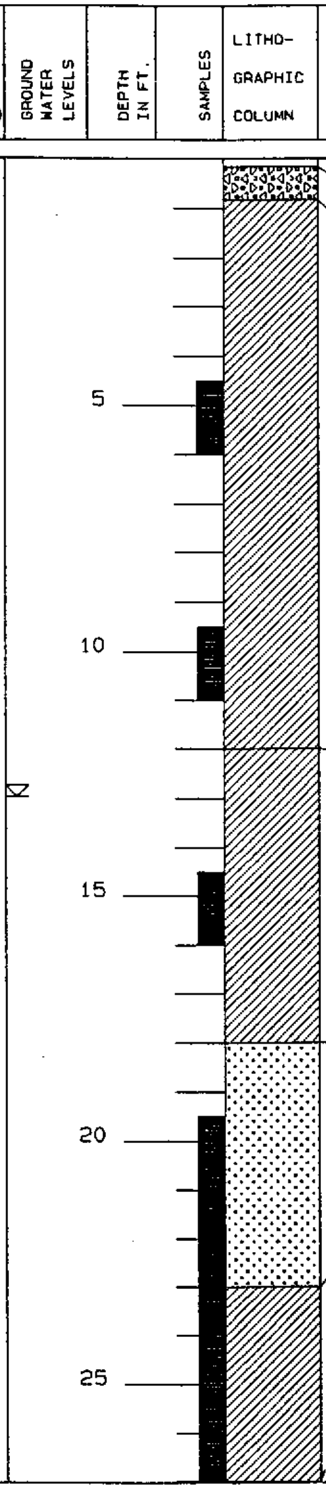
LOG OF EXPLORATORY BORING

PROJECT NUMBER 267 BORING NO. TMW-5

PROJECT NAME 2345 EAST 14TH STREET. OAKLAND CA.

BY LNH DATE 7/23/93 SURFACE ELEV. 27 FT

RECOVERY (FT/FT)	OVA (PPM)	PENETRATION (BLOWS/FT)
.75/1.5	0	7
1.5/1.5	>1000	20
1.2/1.5	>1000	>50
-	750	-
1.5/1.5		>50
1.5/1.5		>50
1.2/1.5		39
1.5/1.5		>50
1.5/1.5		49



DESCRIPTION

ASPHALT

AGGREGATE BASE (GW): brown, dry, no odor.

CLAY (CL): grey to black, scattered sand, firm to very stiff, dry, slight odor.

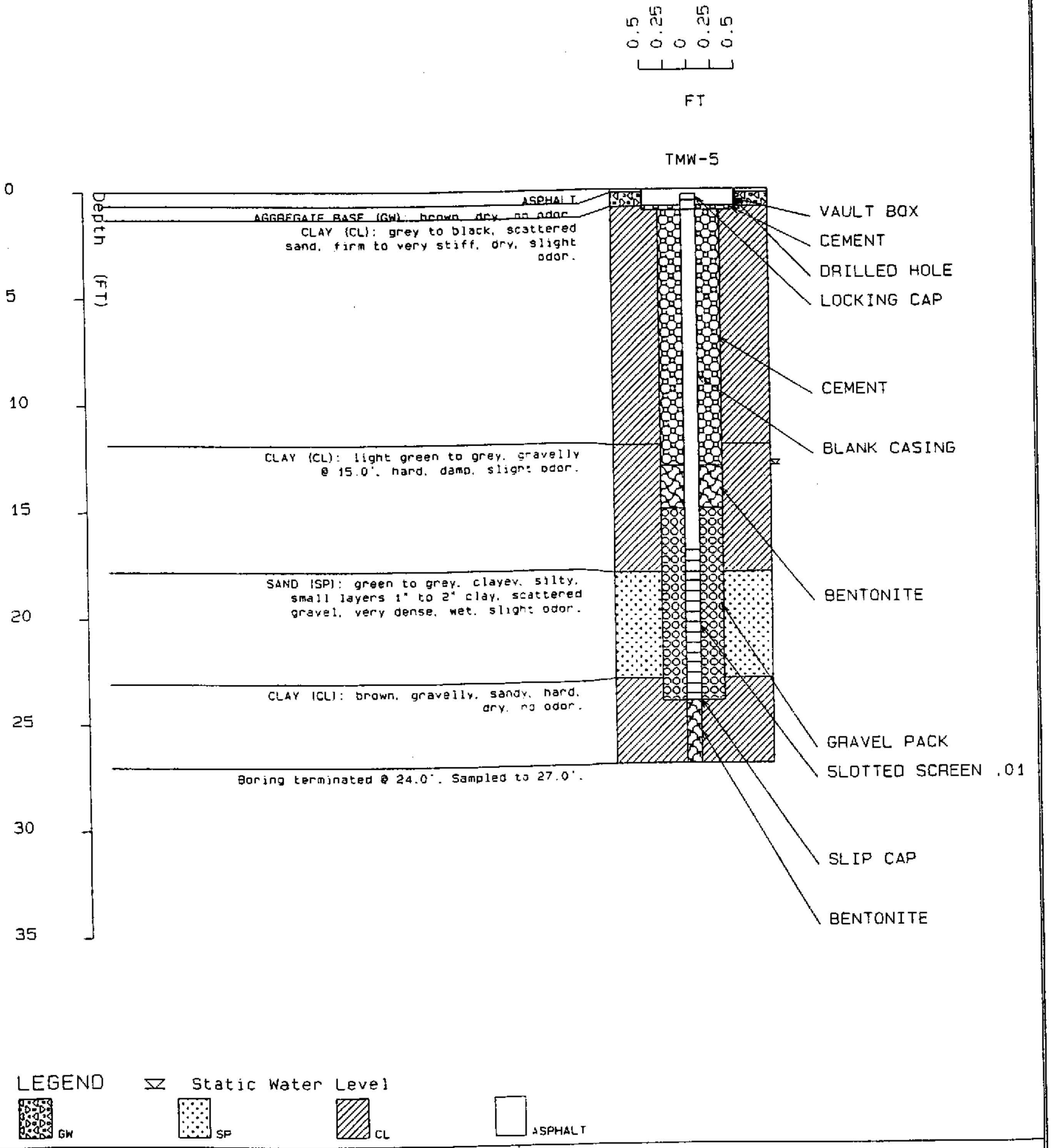
CLAY (CL): light green to grey, gravelly @ 15.0', hard, damp, slight odor.

SAND (SP): green to grey, clayey, silty, small layers 1" to 2" clay, scattered gravel, very dense, wet, slight odor.

CLAY (CL): brown, gravelly, sandy, hard, dry, no odor.

Boring terminated @ 24.0'. Sampled to 27.0'.

REMARKS: Boring drilled with continuous-flight, hollow-stem, 8-inch O.D. augers. Samples collected in a 2.0-inch I.D. California and standard penetration sampler.



AGGREGATE BASE (GW), brown, dry, no odor.

CLAY (CL): grey to black, scattered sand, firm to very stiff, dry, slight odor.

CLAY (CL): light green to grey, gravelly @ 15.0', hard, damp, slight odor.

SAND (SP): green to grey, clayey, silty, small layers 1" to 2" clay, scattered gravel, very dense, wet, slight odor.

CLAY (CL): brown, gravelly, sandy, hard, dry, no odor.

Boring terminated @ 24.0'. Sampled to 27.0'.

WELL ID : TMW-5

2345 EAST 14TH STREET, OAKLAND, CA

TANK PROTECT ENGINEERING

Figure :

APPENDIX F

CERTIFIED ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY DOCUMENTATION

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545

Telephone (510) 783-6960
Facsimile (510) 783-1512

TAL

August 2, 1993

Mr. Marc Zomorodi
Tank Protect Engineering
2821 Whipple Road
Union City, California 94587

Dear Mr. Zomorodi:

Trace Analysis Laboratory received six soil samples on July 26, 1993 for your Project No. 267C072393, Credit Auto World (our custody log number 3465).

These samples were analyzed for Total Petroleum Hydrocarbons as Gasoline and Benzene, Toluene, Ethylbenzene, and Xylenes. Our analytical report and the completed chain of custody form are enclosed for your review.

Trace Analysis Laboratory is certified under the California Environmental Laboratory Accreditation Program. Our certification number is 1199.

If you should have any questions or require additional information, please call me.

Sincerely yours,

Scott T. Ferriman

Scott T. Ferriman
Project Specialist

Enclosures

LOG NUMBER: 3465
DATE SAMPLED: 07/23/93
DATE RECEIVED: 07/26/93
DATE EXTRACTED: 07/26/93
DATE ANALYZED: 07/27/93
DATE REPORTED: 08/02/93
PAGE: Two

Sample Type: Soil

Method and Constituent:	Units	TMW-5, 4.5		TMW-5, 9.5		TMW-5, 14.5	
		Concentration	Reporting Limit	Concentration	Reporting Limit	Concentration	Reporting Limit
DHS Method:							
Total Petroleum Hydrocarbons as Gasoline	ug/kg	2,400	500	14,000	1,000	16,000	1,000
Modified EPA Method 8020 for:							
Benzene	ug/kg	26	5.0	900	48	840	48
Toluene	ug/kg	ND	5.0	ND	50	ND	50
Ethylbenzene	ug/kg	ND	5.0	1,600	53	690	53
Xylenes	ug/kg	53	15	ND	140	1,300	140

Method and Constituent:	Units	Method Blank	
		Concentration	Reporting Limit
DHS Method:			
Total Petroleum Hydrocarbons as Gasoline	ug/kg	ND	500
Modified EPA Method 8020 for:			
Benzene	ug/kg	ND	5.0
Toluene	ug/kg	ND	5.0
Ethylbenzene	ug/kg	ND	5.0
Xylenes	ug/kg	ND	15

QC Summary:

% Recovery: 126
% RPD: 8.2

Concentrations reported as ND were not detected at or above the reporting limit.

Louis W. DuPuis
Quality Assurance/Quality Control Manager

Trace Analysis Laboratory, Inc.
3423 Investment Boulevard, #8 • Hayward, California 94545
Telephone (510) 783-6960
Facsimile (510) 783-1512

LOG NUMBER: 3465
DATE SAMPLED: 07/22/93
DATE RECEIVED: 07/26/93
DATE EXTRACTED: 07/26/93
DATE ANALYZED: 07/27/93
DATE REPORTED: 08/02/93

CUSTOMER: Tank Protect Engineering

REQUESTER: Marc Zomorodi

PROJECT: No. 267C072393, Credit Auto World, 2345 E. 14th Street

Sample Type: Soil

		TMW-4, 4.5		TMW-4, 9.5		TMW-4, 14.5	
Method and Constituent:	Units	Concentration	Reporting Limit	Concentration	Reporting Limit	Concentration	Reporting Limit
DHS Method:							
Total Petroleum Hydrocarbons as Gasoline	ug/kg	ND	500	ND	500	940	500
Modified EPA Method 8020 for:							
Benzene	ug/kg	ND	5.0	ND	5.0	ND	5.0
Toluene	ug/kg	ND	5.0	ND	5.0	ND	5.0
Ethylbenzene	ug/kg	ND	5.0	ND	5.0	ND	5.0
Xylenes	ug/kg	ND	15	ND	15	ND	15

Concentrations reported as ND were not detected at or above the reporting limit.

TANK PROTECT ENGINEERING
Of Northern California
Environmental Management

TANK PROTECT ENGINEERING
2021 WHIPPLE ROAD
UNION CITY, CA 94587
(415)429-8088
(800)523-8088
FAX(415)429-8089

LAB: TAL
TURNAROUND: Normal
P.O. #: 659

CHAIN OF CUSTODY

PAGE 1 OF 1

PROJECT NO.: 267C072393

SITE NAME & ADDRESS: Credit Auto World
2345 E. 14th Street

SAMPLER NAME, ADDRESS AND TELEPHONE NUMBER: Lee Huckins
2821 WHIPPLE ROAD, UNION CITY, CA 94587 (415) 429-8088

ID NO.	DATE	TIME	SOIL	WATER	SAMPLING LOCATION	(1) TYPE OF CONTAINER	ANALYTES REQUESTED: TOTAL LIGHT HC	AROMATIC HC (BTX)	TOTAL HEAVY HC	OIL & GREASE	VOC SCAN (624's)	OTHER	REMARKS
TMW-4	7/22		x		4.5	Brass	x	x					
TMW-4	7/22		x		9.5	Brass	x	x					
TMW-4	7/22		x		14.5	Brass	x	x					
TMW-5	7/23		x		4.5	Brass	x	x					
TMW-5	7/23		x		9.5	Brass	x	x					
TMW-5	7/23		x		14.5	Brass	x	x					

Relinquished by : (Signature) Lee Huckins	Date / Time 7/26/93 / 10:16	Received by : (Signature) Teri Meller	Relinquished by : (Signature) Teri Meller	Date / Time 7/26/93 10:35	Received by : (Signature)
Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Relinquished by : (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time 7/26/93 / 10:35	Remarks P/u, Soil, 6-BT, SF, Y-1, 5-Day TAT	

DATE: 7/22/93

PRIORITY ENVIRONMENTAL LABS

Precision Environmental Analytical Laboratory

August 23, 1993 PEL # 9308082

TANK PROTECT ENGINEERING, INC.

Attn: Jeff
Re: Six water samples for Gasoline/BTEX analysis.

Project name: Credit World Auto Sales
Project location: 2345 E. 14th St.
Project number: 267081793

Date sampled: Aug 17, 1993
Date extracted: Aug 20-21, 1993
Date submitted: Aug 20, 1993
Date analyzed: Aug 20-21, 1993

RESULTS:

SAMPLE I.D.	Gasoline (ug/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
MW-1	110000	270	690	730	3100
MW-2	49000	94	240	250	980
MW-3	9600	4.1	17	28	54
TMW-4	150	N.D.	0.8	1.4	3.7
TMW-5	120000	340	730	790	3600
TMW-6	N.D.	N.D.	N.D.	N.D.	N.D.
Blank	N.D.	N.D.	N.D.	N.D.	N.D.
Spiked Recovery	93.1%	84.2%	89.5%	92.0%	94.1%
Duplicate Spiked Recovery	87.8%	80.2%	81.6%	88.5%	93.0%
Detection limit	50	0.5	0.5	0.5	0.5
Method of Analysis	5030 / 8015	602	602	602	602

David Duong
Laboratory Director

TANK PROTECT ENGINEERING

2821 WHIPPLE ROAD
UNION CITY, CA 94587
(415)429-8088
(800)523-8088
FAX(415)429-8089

PEL # 9308082

INV # 23922

LAB: Priority Env.

TURNAROUND: Normal

P.O. #: 684

PAGE 1 OF 1

CHAIN OF CUSTODY

PROJECT NO.: 267081793

SITE NAME & ADDRESS: Credit ~~Auto~~ World Auto Sales
2345 E 14th St

SAMPLER NAME, ADDRESS AND TELEPHONE NUMBER: Lee Huckins
2821 WHIPPLE ROAD, UNION CITY, CA 94587 (415) 429-8088

ID NO.	DATE	TIME	SOIL	WATER	SAMPLING LOCATION	(1) TYPE OF CONTAINER	ANALYTES REQUESTED: TOTAL LIGHT HC	AROMATIC HC (BTX)	TOTAL HEAVY HC	OIL & GREASE	VOC SCAN (624's)	OTHER		REMARKS
MW-1	8/17	1530		X		2 40ml vials	X	X						
MW-2	8/17	1230		X		2 40ml vials	X	X						
MW-3	8/17	1640		X		2 40ml vials	X	X						
TMW-4	8/17	1120		X		2 40ml vial	X	X						
TMW-5	8/17	1410		X		2 40ml vials	X	X						
MW-6	8/17	1645		X		2 40ml vials	X	X						

Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Lee Huckins	8/20/93 9:00	Teri Mello	Teri Mello	8/20/93 9:20	
Relinquished by : (Signature)	Date / Time	Received by : (Signature)	Relinquished by : (Signature)	Date / Time	Received by : (Signature)
Relinquished by : (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
	8/20/93 9:20	PEL			

DATE: 8-20-93

APPENDIX G

GROUNDWATER MONITORING WELL CONSTRUCTION PROCEDURES

APPENDIX G

GROUNDWATER MONITORING WELL CONSTRUCTION PROCEDURES

BOREHOLE DESIGN

Casing Diameter: The minimum diameter of well casings will be 2 inches (nominal).

Borehole Diameter: The diameter of the borehole will be a minimum of 4 inches and a maximum of 12 inches greater than the diameter of the well casing. The minimum annular space will be 2.5 inches as measured from the outside diameter of the casing to the drill hole wall.

Shallow (Unconfined Zone) Wells: When unconfined groundwater is encountered the borehole will be advanced through the aquifer to an underlying clay layer or aquitard. The screened interval will begin a minimum of 5 feet above the saturated zone or above the anticipated seasonal high level of groundwater. The screen will extend the full thickness of the aquifer or no more than 15 feet into the saturated zone, whichever is reached first. The well screen will not extend into the aquitard, nor will the screened interval exceed 20 feet in length.

Deep (Confined Zone) Wells: Any monitoring well to be screened below the upper aquifer will be installed as a double-cased well. A steel conductor casing will be placed through the upper water-bearing zone to prevent aquifer cross-contamination.

The conductor casing will be installed in the following manner: a large diameter borehole (typically 18 inches) will be drilled until it is determined that the first competent aquitard has been reached. A low carbon steel conductor casing will be placed in the borehole to the depth drilled. Centralizers will be used to center the casing in the borehole. The annular space between the conductor casing and the formation will be cement-grouted from bottom to top by tremie pipe method. The grout will be allowed to set for a minimum of 72 hours.

Drilling will continue inside the conductor casing, with a drill bit of smaller diameter than the conductor casing. If additional known aquifers are to be fully penetrated, the procedure will be repeated with successively smaller diameter conductor casings.

The bottom of the well screen in a confined aquifer will be determined by presence or lack of a clay layer or aquitard as described above. The screened interval in a confined zone shall extend across the entire saturated zone of the aquifer or up to a length of 20 feet, which ever is less. The screened zone and filter pack will not cross-connect to another aquifer.

CONSTRUCTION MATERIALS

Casing and Screen Materials: Well casing and screen will be constructed of clean materials that have the least potential for affecting the quality of the sample. The most suitable material for a particular installation will depend upon the parameters to be monitored. Acceptable materials include PVC, stainless steel, or low carbon steel.

Casing Joints: Joints will be connected by flush threaded couplers. Organic bonding compounds and solvents will not be used on joints.

Well Screen Slots: Well screen will be factory slotted. The size of the slots will be selected to allow sufficient groundwater flow to the well for sampling, minimize the passage of formation materials into the well, and ensure sufficient structural integrity to prevent the collapse of the intake structure.

Casing Bottom Plug: The bottom of the well casing will be permanently plugged, either by flush threaded screw-on or friction cap. Friction caps will be secured with stainless steel set screws. No organic solvents or cements will be applied.

Filter Pack Material: Filter envelope materials will be durable, water worn, and washed clean of silt, dirt, and foreign matter. Sand size particles will be screened silica sand. Particles will be well rounded and graded to an appropriate size for retention of aquifer materials.

Bentonite Seal Material: Bentonite will be pure and free of additives that may affect groundwater quality. Bentonite will be hydrated with clean water.

Grout Seal Material: Cement grout will consist of a proper mixture of Type 1/11 Portland cement, hydrated with clean water. Up to 3% bentonite may be added to the mixture to control shrinkage.

CONSTRUCTION PROCEDURES

Decontamination: All downhole tools, well casings, casing fittings, screens, and all other components that are installed in the well shall be thoroughly cleaned immediately before starting each well installation. When available, each component shall be cleaned with a high temperature, high pressure washer for a minimum of 5 minutes. When a washer is not available, components shall be cleaned with water and detergent or trisodium phosphate, rinsed in clean water, then rinsed in distilled water.

Soil and water sampling equipment and material used to construct the wells shall not donate to, capture, mask, nor alter the chemical composition of the soil and groundwater.

Drilling Methods: Acceptable drilling methods include solid and hollow-stem auger, percussion, direct circulation mud and air rotary, and reverse rotary. The best alternative is that which minimizes the introduction of foreign materials or fluids. If drilling fluid is employed, drilling fluid additives shall be limited to inorganic and non-hazardous compounds. Compressed air introduced into the borehole shall be adequately filtered to remove oil and particulates.

Casing Installation: The casing will be set under tension, when necessary, to ensure straightness. Centralizers will be used where necessary to prevent curvature or stress to the casing.

Sand Pack Installation: The sand pack will be installed so as to avoid bridging and the creation of void spaces. The tremie pipe method will be used where installation conditions or local regulations require. Drilling mud, when used, will be thinned prior to packplacement. The sand pack shall cover the entire screened interval and rise a minimum of 2 feet above the highest perforation.

Bentonite Seal Placement: A bentonite seal will be placed above the sand pack by a method that prevents bridging. Bentonite pellets can be placed by free fall if proper sinking through annular water can be assured. Bentonite slurry will be placed by the tremie pipe method from the bottom upward. The bentonite seal will not be less than 1 foot in thickness.

Grout Seal Placement: The cement grout mixture will be hydrated with clean water and thoroughly mixed prior to placement. If substantial groundwater exists in the bore hole, the grout shall be placed by tremie pipe method from the bottom upward. In a dry borehole, the grout may be surface poured to a depth of 30 feet. Below a depth of 30 feet grout will be placed by tremie pipe. Grout will be placed in 1 continuous lift and will extend to the surface or to the well vault if the well head is completed below grade. A minimum of 5 feet of grout seal will be installed, unless impractical due to the shallow nature of the well.

Surface Completion: The well head will be protected from fluid entry, accidental damage, unauthorized access, and vandalism. A watertight, locking cap will be installed on the well casing. Access to the casing will be controlled by a keyed lock.

Well heads completed below grade will be completed in a concrete and/or steel vault, installed to drain surface runoff away from the vault.

Well Identification: Each well will be labeled to show well number, depth, hole and casing diameter, and screened interval.

APPENDIX H

GROUNDWATER MONITORING WELL DEVELOPMENT PROCEDURES

APPENDIX H

GROUNDWATER MONITORING WELL DEVELOPMENT PROCEDURES

INTRODUCTION

Newly installed groundwater monitoring wells will be developed to restore natural hydraulic conductivity of the formation, remove sediments from well casing and filter pack, stabilize the filter pack and aquifer material, and promote turbidity-free groundwater samples.

Wells may be developed by bailing, hand pumping, mechanical pumping, air lift pumping, surging, swabbing, or an effective combination of methods. Wells will be developed until the water is free of sand, silt, and minimum turbidity has stabilized.

In some cases where low permeability formations are involved or the drilling mud used fails to respond to cleanup, initial development pumping may immediately dewater the well casing and thereby inhibit development. When this occurs, clean, potable grade water may be introduced into the well, followed by surging of the introduced waters with a surge block. This operation will be followed by pumping. The procedure may be repeated as required to establish full development.

METHODOLOGY

Seal Stabilization: Cement and bentonite annular seals shall set and cure not less then 72 hours prior to well development.

Decontamination: All well development tools and equipment shall be thoroughly cleaned immediately before starting each well installation. When available, each component shall be cleaned with a high temperature, high pressure washer for a minimum of 5 minutes. When a washer is not available, components shall be cleaned with clean water, then rinsed with distilled water.

Development equipment shall not donate to, capture, mask, nor alter the chemical composition of the soils and groundwater.

Introduction of Water: Initial development of wells in low permeability formations may dewater the casing and filter pack. When this occurs, clean, potable water will be introduced into the well to enhance development.

Bailing: Development will begin by bailing to remove heavy sediments from the well casing. Care will be taken to not damage the well bottom cap during lowering of the bailer.

Surging: Care will be exercised when using a surge block to avoid damaging the well screen and casing. When surging wells screened in coarse (sand/gravelly) aquifers, the rate of surge block lifting shall be slow and constant. When surging wells screened in fine (silty) aquifers, more vigorous lifting may be required. Between surging episodes, wells will be bailed to remove accumulated sediments.

Pumping: Development pumping rates shall be less than the recharge rate of the well in order to avoid dewatering.

Discharged Water Containment and Disposal: All water and sediment generated by well development shall be collected in 55-gallon steel drums. Development water will be temporarily contained on site, pending sampling and laboratory analysis. No hazardous development water will be released to the environment. Disposal of development water will be the responsibility of the client

APPENDIX I

GROUNDWATER MONITORING WELL SAMPLING PROCEDURES

APPENDIX I

GROUNDWATER MONITORING WELL SAMPLING PROCEDURES

Groundwater monitoring wells will not be sampled until at least 72 hours after well development. Groundwater samples will be obtained using either a bladder pump, clear Teflon bailer, or dedicated polyethylene bailer. Prior to collecting samples, the sampling equipment will be thoroughly decontaminated to prevent introduction of contaminants into the well and to avoid cross-contamination. Monitoring wells will be sampled after 3 to 10 wetted casing volumes of groundwater have been evacuated and pH, electrical conductivity, and temperature have stabilized as measured with a Hydac Digital Tester. If the well is emptied before 3 to 10 well volumes are removed, the sample will be taken when the water level in the well recovers to 80% of its initial water level or more.

When a water sample is collected, turbidity of the water will be measured and recorded with a digital turbidimeter. Degree of turbidity will be measured and recorded in nephelometric turbidity units (NTU).

TPE will also measure the thickness of any floating product in the monitoring wells using a probe, clear Teflon, or polyethylene bailer. The floating product will be measured after well development but prior to the collection of groundwater samples. If floating product is present in the well, TPE will recommend to the client that product removal be commenced immediately and reported to the appropriate regulatory agency.

Unless specifically waived or changed by the local, prevailing regulatory agency, water samples shall be handled and preserved according to the latest EPA methods as described in the Federal Register (Volume 44, No.233, Page 69544, Table ll) for the type of analysis to be performed.

Development and/or purge water will be stored on site in labeled containers. The disposal of the containers and development and/or purge water is the responsibility of the client.

MEASUREMENTS

Purged Water Parameter: During purging, discharged water will be measured for the following parameters.

Parameter	Units of Measurement
pH	None
Electrical Conductivity	Micromhos
Temperature	Degrees F or C
Depth to Water	Feet/Tenths
Volume of Water Discharged	Gallons
Turbidity	NTU

Documentation: All parameter measurements shall be documented in writing on TPE development logs.

APPENDIX J

QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

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QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

The overall objectives of the field sampling program include generation of reliable data that will support development of a remedial action plan. Sample quality will be checked by the use of proper sampling, handling, and testing methods. Additional sample quality control methods may include the use of background samples, equipment rinsate samples, and trip and field blanks. Chain-of-custody forms, use of a qualified laboratory, acceptable detection limits, and proper sample preservation and holding times also provide assurance of accurate analytical data.

TPE will follow a QA/QC program in the field to ensure that all samples collected and field measurements taken are representative of actual field and environmental conditions and that data obtained are accurate and reproducible. These activities and laboratory QA/QC procedures are described below.

Field Samples: Additional samples may be taken in the field to evaluate both sampling and analytical methods. Three basic categories of QA/QC samples that may be collected are trip samples, field blanks, and duplicate samples.

Trip blanks are a check for cross-contamination during sample collection, shipment, and in the laboratory. Analytically confirmed organic-free water shall be used for organic parameters and deionized water for metal parameters. Blanks will be prepared by the laboratory supplying the sample containers. The blank shall be numbered, packaged, and sealed in the same manner as the other samples. One trip blank will be used for each sample set of less than 20 samples. At least 5% blanks will be used for sets greater than 20 samples. The trip blank is a water sample that remains with the collected samples during transportation and is analyzed along with the field samples to check for residual contamination. The trip blank is not to be opened by either the sample collectors or the handlers.

The field blank is a water sample that is taken into the field and is opened and exposed at the sampling point to detect contamination from air exposure. The water sample is poured into appropriate containers to simulate actual sampling conditions. Contamination for air exposure can vary considerably from site to site.

The laboratory will not be informed about the presence of field and trip blanks and a false identifying number will be put on the label. Full documentation of these collection and decoy procedure will be made in the site log book.

Duplicate samples are identical sample pairs (collected in the same place and at the same time), placed in identical containers. For soils, adjacent sample liners will be analyzed. For the purpose of data reporting, one is arbitrarily designated the sample, and the other is designated as a duplicate sample. Both sets of results are reported to give an indication of the precision of sampling and analytical methods.

The laboratory's precision will be assessed without the laboratory's knowledge by labeling one of the duplicates with false identifying information. Data quality will be evaluated on the basis of the duplicate results.

Laboratory QA/QC: Execution of a strict QA/QC program is an essential ingredient in high-quality analytical results. By using accredited laboratory techniques and analytical procedures, estimates of the experimental values can be very close to the actual value of the environmental sample. The experimental value is monitored for its precision and accuracy by performing QC test designed to measure the amount of random and systematic errors and to signal when correction of these errors is needed.

The QA/QC program describes methods for performing QC tests. These methods involve analyzing method blanks, calibration standards, check standards (both independent and EPA-certified standards), duplicates, replicates, and sample spikes. Internal QC also requires adherence to written methods, procedural documentation, and record keeping, and the observance of good laboratory practices.