THE SAN JOAQUIN COMPANY INC.
1120 HOLLYWOOD AVENUE, SUITE 3, OAKLAND, CALIFORNIA 94602

Alameda County Health Care Services Agency
Environmental Protection Division
1131 Harbor Way Parkway, Suite 250
Alameda, California 94502-6577

Date: September 20, 2000

Our Reference: 9401.114

Attn. Mr. Larry Seto

SUBJECT: **Closure Report: 208 Jackson Street, Oakland, California**

Dear Mr. Seto:

At the request of the property owner, SNK Development Inc., we transmit herewith three (3) copies of our: *Closure Report: 208 Jackson Street, Oakland, California.*

When you have had an opportunity to review the report, we believe you will agree that no further remedial or monitoring action is required at the 208 Jackson Street property. Accordingly, we respectfully request that your agency apply to the California Regional Water Quality Control Board – San Francisco Bay Region to obtain formal closure as the site of an unauthorized release of fuel hydrocarbons to the subsurface.

If you have any questions, please call me at (510) 336-1772.

Sincerely,

D. J. Watkins, Phd, P.E.
President
The San Joaquin Company Inc.

cc. Ms. Marilyn Ponte, SNK Development Inc.

Enc: Closure Report: 208 Jackson Street, Oakland, California (3)

TELEPHONE OAKLAND CALIFORNIA (510) 336-9118 TRACY CALIFORNIA (209) 832 2910

THE SAN JOAQUIN COMPANY INC.
1120 HOLLYWOOD AVENUE, NO. 3, OAKLAND, CALIFORNIA 94602

MEMORANDUM

TO: **Larry Seto, Alameda County PHS**

FROM: **Dai Watkins**

DATE: **September 19, 2000**

SUBJECT: **208 Jackson Street, Oakland, California**

Larry:

The enclosed document is our formal Closure Report for the 208 Jackson Street site.

It includes a complete site history from 1878, a complete description of all tank removal, remediation and groundwater-quality monitoring that has been performed at the site, together with Tables documenting all of the test data from the various consultants who worked on the project over the years.

The draft Case Closure Summary that we prepared for you is a condensed summary of our Closure Report.

The site owners, SNK Development Inc., are completely refinancing their project and the lender needs to have a formally "closed" site before providing that financing, so if you concur with our findings, we would appreciate your making the necessary application to the RWQCB as soon as you can.

As you requested, if I have not heard from you within the next couple of weeks, I will call you again. In the meantime, if you have any questions, please don't hesitate to call me at (510) 336-1772.

Dai

THE SAN JOAQUIN COMPANY INC.
1120 HOLLYWOOD AVENUE, SUITE 3, OAKLAND, CALIFORNIA 94602

CLOSURE REPORT

208 JACKSON STREET, OAKLAND, CALIFORNIA

for

SNK DEVELOPMENT INC

September 2000

Project No.: 9401.114

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PROFESSIONAL CERTIFICATION AND LIMITATIONS

The professional engineering work reported herein was performed under the direction of the engineer whose seal and signature appear below. The work was performed in accordance with generally accepted standards of engineering practice, based on information available to us at the time of its preparation and within the limits of the scope of work directed by the client. No other representation, expressed or implied, and no warranty or guarantee is included or intended as to professional opinions, recommendations, or field or laboratory data provided.

REGISTERED PROFESSIONAL ENGINEER
D. J. WATKINS
No. 882
Exp. 3/31/02
GEOTECHNICAL
STATE OF CALIFORNIA

D. J. Watkins

D. J. Watkins, Ph.D., PE.
Geotechnical Engineer
The San Joaquin Company Inc.

1.0 INTRODUCTION

This document has been prepared to support closure of the property at 208 Jackson Street, Oakland, California as the site of an unauthorized release of fuel hydrocarbons. It describes and records the history of the fuel tanks that leaked and the site characterization performed at the site to evaluate the lateral and vertical extent to which the subsurface was affected by the leakage and the results of a program of environmental remediation performed under the direction of The San Joaquin Company Inc. (**SJC**) on that property, including the results of post-remedial groundwater-quality monitoring. The location of that property is shown on Figures 1 and 2. Figure 3 is a site plan prepared prior to implementation of the remediation program.

2.0 BACKGROUND

From circa 1878, when the area was first subdivided, to circa 1946, the whole of the city block surrounded by Jackson, Second, Madison and Third Streets was the site of residential lots. In 1946, individuals and corporations began to purchase and consolidate the residential lots, and the city block was rapidly converted to industrial and commercial use. This development included the construction, between 1946 and 1947, of a steel-framed building, approximately 2,450 square feet (**sq ft**) in plan area, at the corner of Second and Madison Streets for the Marine Steel Company (**Marine Steel**). (See Figure 3 for location.) Associated with that building was a storage yard that extended northeast along Madison Street. At that time, the Marine Steel address was 205 Madison Street. For identification purposes, this building will be referred to in this report as the 205 Madison Street Building

In 1947, the John Morell Company (**Morell**) began to purchase and consolidate the remainder of the property on the city block and subsequently built a meatpacking facility at 208 Jackson Street.

Subsequent to its initial occupancy by Marine Steel, the site at 205 Madison Street was occupied by a variety of businesses that included used machinery and scrap metal dealers. At some time prior to 1963, the 205 Madison Street Building and property at that address were used by a truck-rental business. In January 1963, ownership of that site passed to Morell, which incorporated the 205 Madison Street property, including the metal building, into its meatpacking facility. In 1970, J. Morell sold all of its holdings on the city block, but the property continued in use as a meatpacking facility with a succession of owners, the last of which was the East Bay Packing Company (**East Bay Packing**).

A second metal building, approximately 3,250 sq ft in plan area, located at the approximate mid-point of the Madison Street frontage of the property was built in the early 1970s. (See Figure 3 for location.)

At some time after the site formerly known as 205 Madison Street was developed for Marine Steel, presumably during the period when it served as a truck-rental facility, a total of four underground storage tanks were installed on that property. These included 10,000-gallon and 8,000-gallon gasoline tanks, together with 10,000-gallon and 2,000-gallon diesel tanks. The locations of the four tanks are shown on Figure 4.

On March 20, 1990, all four tanks were removed from the property by Geo-Environmental Technology of Campbell, California. Testing at the bottom of the tank pits showed that soil and groundwater beneath the tanks were affected by components of fuel hydrocarbons (Geo-Environmental Technology, 1990). Affected soil excavated during the tank removal, including spoil from over-excavation of Tank Pit 1, was spread on the site for aeration.

Following the removal of the tanks from the property, groundwater-quality monitoring wells were installed on the site and an excavation was opened in the tank field in an attempt to remediate soil affected by fuel hydrocarbons. The spoil from that excavation was stockpiled in the eastern corner of the property near the intersection of Third and Madison Streets. The location of that excavation, which remained open until 1998, is shown on Figure 3, as is the stockpile of soil that was excavated from it.

In November 1990, the 208 Jackson Street property, including all of the land and facilities on the city block, was purchased by Mr. Tzu Ming Chen and Mrs. Chih Chin Lin Chen (**the Chens**), the owners of Wo Lee Food. That company subsequently used the property for production, packaging and distribution of Asian specialty foods. The Chens assumed responsibility for the portion of the property that was affected by the underground discharge of fuel hydrocarbons. In the period between 1990 and 1998, under the direction and oversight of the California Regional Water Quality Control Board – San Francisco Bay Region (**RWQCB**) and the Alameda County Health Care Services Agency (**ACHCSA**), the Chen's retained a series of consultants to characterize the site and monitor groundwater quality in the affected area.

On October 22 1998, SNK Development Inc. (**SNK**) of San Francisco, California purchased the 208 Jackson Street property from the Chens. (Note: Following purchase of the property, SNK Development Inc. transferred ownership of the site to SNK Peabody JLS, LLC. To simplify the presentation, in this report the acronym "SNK" will be use to designate either of these entities.)

Prior to the close of the real estate transaction, SNK retained SJC to develop a remediation plan that would permit timely redevelopment of the property as the site of a multi-story residential development.

3.0 SITE CHARACTERISTICS

The urban setting of the 208 Jackson Street Property is shown on Figures 1 and 2.

3.1 Topography

In 1998, the principal building of the 208 Jackson Site (Wo Lee Food) faced onto Jackson Street, and, as described previously, there were two smaller metal buildings on the property along Madison Street. Across Third Street from the site on the other side of which was a parking lot that occupied an entire city block. Today, a multistory residential development is being constructed on the site. Across Third Street in 1998 there was parking lot that occupied an entire city block. At present (September 2000), the half of that block facing onto Jackson and Third Streets features a multi-story parking structure, which is also under construction.

Directly across Madison Street, which runs along the southeast side of the property with which this report is concerned, are mixed commercial warehouses, packing and distribution facilities. In 1998, to the east of the 208 Jackson Street property, diagonally across from the intersection of Third and Madison Streets, there was a distribution warehouse formerly operated by Dreyer's Ice Cream. However, that structure has since been demolished and that property is currently being redeveloped.

Second Street passes along the southwest side of the subject property. Across Second Street is the Monahan Paper Company, occupying a city block on the southeastern side of that street. Across Jackson Street from the subject property are Miller's Quality Meats and a multi-story residential and workspace building, the Brick House Lofts.

Approximately 0.2 miles southwest of Second Street is the channel of the Oakland Inner Harbor, also known as the Oakland Estuary. That waterway separates Oakland from the island of Alameda. The tidal Lake Merritt is approximately 0.6 miles to the northeast. The lake is connected to the Oakland Estuary via a tidal channel that flows some 0.7 miles to the southeast of the subject property.

The grade level of the subject property lies between 6 ft and 8 ft MSL (above mean sea level). The general slope of the ground in the area is to the south at a gradient of approximately 0.01 ft/ft. However, with the exception of streets that run northeast to southwest, much of the ground is relatively flat because it has been graded for building pads and other infrastructure.

3.2 Geology

The subject property is situated on the eastern side of San Francisco Bay in the California Coast Ranges section of the Pacific Border physiographic province.

Prior to removal of the fuel storage tanks from the subsurface in 1990, the entire area of the property was either paved or beneath structures. The first several feet, varying in thickness between two and four feet beneath the ground surface, was composed of bituminous macadam paving, imported road-base material, and the concrete that formed foundations or paving. These surficial materials have since been removed

Beneath the man-made surfacing and fill is the Pleistocene-age Merritt Sand, which has an estimated thickness of approximately 50 feet at the 208 Jackson Street site. The Merritt Sand lies unconformably over earlier Quaternary continental and marine sands, clays and gravels of the Alameda Formation, the maximum thickness of which is unknown, but exceeds 1,050 feet.

The Merritt Sand formation was laid down as a bay-front beach deposit at some time during the late Pleistocene geologic period (*i e.* some 2 million years ago). It is composed of fine-grained, silty, clayey sand with lenses of sandy clay and clay. These deposits are yellowish-brown to dark yellowish-orange in color. They originated from wind- and water-deposited beach and near-shore deposits. The average dry density is 111 lb/ft^3 (within a range of 103-122 lb/ft^3) and the moisture content is in the range 7% to 21%. Sand grains in the Merritt formation are well sorted, rounded to sub-rounded and frosted. Small fragments of roots, twigs and grass may be present. Where the surficial material has been removed during construction and land development, the upper two feet may be loose and contain humus.

Down-gradient from the site is the previously noted Oakland Estuary. That waterway cuts through the Merritt sands on the Oakland side of the waterway (*i.e.,* the bank closest to the subject property). Artificial fill covers the original shoreline. However, it is notable that beneath that fill in this area of the waterfront, the soft Bay Mud - usually found ubiquitously around the shores of San Francisco Bay - is quite thin and extends only a short distance inland from the present-day banks of the estuary. It is not present beneath the 208 Jackson Street site.

3.3 Hydrogeology

The water table is encountered beneath the 208 Jackson Street site at a depth of approximately 3.5 ft. to 5.5 ft., which is generally below the top of the Merritt Sands. The direction of groundwater flow beneath the site is to the south, toward the Oakland Estuary.

Soils with the grain size and gradational properties of the fine Merritt sands commonly have hydraulic conductivities in the range of 10^{-4} - 10^{-6} cm/sec, with the conductivities falling to the bottom of this range with increasing silt and clay content (Terzaghi and Peck, 1948).

4.0 REMOVAL OF FUEL STORAGE TANKS

When the underground storage tanks were removed from the property on March 20, 1990, soil samples were recovered from beneath each end of each of the four tanks. These samples were analyzed for Total Petroleum Hydrocarbons quantified as Diesel (**TPHd**), Total Petroleum Hydrocarbons quantified as Gasoline (**TPHg**), Benzene, Toluene, Ethyl benzene and Total Xylene Isomers (**Xylene**) (Geo-Environmental Technology, 1990). The sampling locations in the bottoms of the tank pits are shown on Figure 4. The results of the analyses performed on the samples are presented in Table 1.

The distribution of components of hydrocarbons detected in the samples recovered from the floors of the tank pits suggests that Tank 1 had leaked diesel. However, based on the presence of other components of hydrocarbon fuels in the soil beneath that tank, it appears likely that it may have, at some time, contained gasoline or that components of gasoline had migrated into the soil beneath it from a leak in one of the other tanks. Given the low concentrations of components of hydrocarbons detected in soil from beneath Tanks Pits 2, 3 and 4, it appears that those tanks did not leak, but that the soil in their vicinities was affected by tank overfilling and local spills.

5.0 LATERAL AND VERTICAL EXTENT OF HYDROCARBON-AFFECTED ZONE

To initiate exploration of the lateral and vertical extent to which soil and groundwater beneath the site were affected by components hydrocarbon fuels, on May 5, 1990, Geo-Environmental Technology installed three groundwater-quality monitoring wells. Those wells, designated MW-1, MW-2 and MW-3, were installed in the area from which the underground tanks on the 208 Jackson Street site had been removed. The total depths of the borings for the wells varied from 8 ft. to 10 ft. The locations of those wells are shown on Figure 4, and the logs of the well borings are presented in Appendix I.

Monitoring well MW-3 was located so as to permit groundwater-quality monitoring up gradient from the area in which the underground fuel storage tanks had previously been located. Monitoring well MW-2 was located cogradient from the pit that had formerly contained Tank 3. Monitoring well MW-1 was situated close to the approximate center of the southwestern edge of the pit from which Tank 1, which had contained diesel, had been removed.

Soil samples were recovered when the borings for monitoring wells MW-1, MW-2 and MW-3 were drilled. These samples were analyzed for TPHd, and TPHg. The results of the analyses are presented in Table 2. Those analyses detected no fuel hydrocarbons in the samples, except for 6.9 mg/Kg in the sample recovered from monitoring well MW-1, at a depth of 3 ft. below the ground surface (**BGS**).

Monitoring well MW-1 was later destroyed when an area around the pit from which Tank #1 had been removed was further over-excavated to remove additional hydrocarbon-affected soil. The spoil from that excavation work amounted to some 75 cubic yards and was stockpiled on-site, near the intersection of Third and Madison Streets, at the location shown on Figure 3. When the soil in that stockpile was tested at the request of the ACHCSA in March 1997, it was found to contain diesel at concentrations up to 39 mg/Kg, but no gasoline or Benzene, Toluene, Ethyl Benzene or Total Xylene Isomers (the **BTEX** compounds) (ACC Environmental Consultants [**ACC**] 1997c).

On May 26, 1994 Subsurface Consultants, Inc. installed two additional groundwater-quality monitoring wells, MW-4 and MW-5, on the site. (See Figure 4 for locations.) Monitoring well MW-4 was located inside the then extant metal building at 205 Madison Street to permit monitoring of groundwater-quality on the east side of the area where the underground tanks had been located and MW-5 was located-in the western portion of that area (Subsurface Consultants, Inc., 1994). Copies of the logs of these wells are also included in Appendix I. Soil samples recovered from the subsurface when these wells were installed were not analyzed for the presence of components of fuel hydrocarbons.

A series of consultants periodically recovered and analyzed samples from groundwater-quality monitoring wells MW-1 through MW-5 to assess groundwater quality beneath the site. Because these monitoring wells were installed in groups at different times and because regular monitoring was not carried out on a consistent basis, a complete chronological record of groundwater quality is unavailable. However, data is available from at least some of the wells over a period that extended from May 1990 to October 1997 (Geo-Environmental Technology 1990, Subsurface Consultants, Inc. 1994, ACC Environmental Consultants,1997c).

Depth to groundwater in the monitoring wells was measured on each occasion that groundwater samples were recovered. The results, compiled in Table 3, indicate that the water table was located at varying depths between 4 and 6 ft BGS. ACC used the groundwater depth data to compute the direction of groundwater flow and its average gradient. As shown in Table 4, in the period from September 1995 to October 1997, the direction of groundwater flow was to the south, or south-southeast, at a gradient that varied between 0.003 and 0.007 ft/ft. (ACC Environmental Consultants, Inc. 1997c).

5.1 Groundwater Affected by Fuel Hydrocarbons

The results of the analyses of the samples of groundwater recovered from monitoring wells MW-1 through MW-5 are presented in Table 5. The data show that the highest concentrations of fuel hydrocarbons in groundwater were present beneath the metal 205 Madison Street Building, where, on June 3, 1994, a sample of groundwater recovered from monitoring well MW-4 was affected by diesel at 9.8 mg/L, gasoline at 210 mg/L, Benzene at 7.6 mg/L, Toluene at 28.0 mg/L, Ethyl benzene at 3.7 mg/L, and Total Xylene Isomers at 24.0 mg/L. The sample recovered on the same date from monitoring well MW-5, located to the northwest of the 205 Madison Street Building, close to the former site of Tank 4, was affected by diesel at 4.6 mg/L, gasoline at 7.8 mg/L, and trace concentrations of the BTEX compounds.

A sample from monitoring well MW-1 was recovered on May 21, 1990, prior to the destruction of that well when soil was over-excavated around the former site of Tank 1. It contained 5.5 mg/L of diesel, 25.0 mg/L of gasoline, and moderate concentrations of the BTEX compounds.

None of the groundwater samples recovered from monitoring wells MW-2 and MW-3 between May 1990 and March 1997 contained any detectable concentrations of diesel, gasoline, or the BTEX compounds. These findings are compatible with the location of monitoring well MW-3, upgradient from the affected plume of groundwater, and confirm that monitoring well MW-2 is located co-gradient to the plume.

Beginning with the round of groundwater-quality monitoring conducted on September 4, 1996, samples recovered from monitoring wells MW-2 through MW-5 were also analyzed for methyl tertiary butyl ether (**MTBE**). No detectable concentrations of this gasoline additive were detected in those wells.

5.2 Lateral Extent of Subsurface Affected by Fuel Hydrocarbons

In March 1995, ACC opened a total of 16 small-diameter borings to explore further the distribution of fuel hydrocarbons on and in the vicinity of the site (ACC Environmental Consultants 1995). Some of these borings were located across Madison Street and Second Street from the 208 Jackson Street property to investigate the limits of down-gradient and co-gradient migration of fuel hydrocarbons in groundwater. The locations of the borings are shown on Figure 5. Soil samples were recovered from the borings at a depth just above or closely below the depth of the water table and analyzed for TPHd, TPHg and the BTEX compounds. The results of the soil analyses are presented in Table 7. Grab samples of groundwater were also recovered from the probe holes and these were also analyzed for TPHd, TPHg and the BTEX compounds. The results are presented in Table 8.

Taken together with the data obtained from the groundwater-quality monitoring wells, the data from the small-diameter borings drilled by ACC showed that the highest concentration of fuel hydrocarbons in soil and groundwater was present beneath the 205 Madison Street Building. Traces of fuel hydrocarbons were also detected off-site at the locations of borings drilled across Second and Madison Streets. However, as can be see by inspection of the data for borings B1 through B6 (see Figure 5 for locations) in Tables 7 and 8, the concentrations of fuel hydrocarbons detected in samples from those locations were very low and the traces that were detected varied from point to point without apparent spatial continuity. In fact, the distribution of the data is such that it is possible that the detected traces across Second and Madison Streets may have had sources other than the release of fuel hydrocarbons that occurred on the 208 Jackson Street property. Such an interpretation is consistent with the industrial history of the neighborhood.

Figure 5 shows a conservative interpretation of the area of the plume of affected groundwater when the fuel hydrocarbons were at their highest concentrations, prior to removal of the underground storage tanks. The areas where the concentrations of total petroleum hydrocarbons, without regard to type, exceeded 50 mg/L are seen on the figure to be concentrated beneath the metal building formerly located at 205 Madison Street. Beyond the footprint of that building, hydrocarbon concentrations declined rapidly; concentrations less than 50 mg/L but greater than 10 mg/L in groundwater were limited to a small annulus around the central zone of the plume. Beyond that zone, only traces of hydrocarbons were present. They are consistent with up-gradient and co-gradient dispersion from the source of leakage of fuels into the subsurface. Down-gradient dispersion was to the south from the location of the underground storage tanks, which is consistent with the direction of groundwater flow as determined from measurements of the depth to the water table in the groundwater-quality monitoring wells. These interpretations imply that there was a significant loss of fuels from the underground storage tanks in the southern corner of the 208 Jackson Street property, but that the down-gradient migration of the leaked fuels was relatively limited.

5.3 Vertical Extent of Subsurface Affected by Fuel Hydrocarbons

When the borings were drilled to install monitoring wells MW-1 through MW-3, samples were recovered and analyzed for components of fuel hydrocarbons from depths slightly above the groundwater table, but no samples were recovered from deeper locations in the borings. Also, based on the records available to SJC, it appears that no soil recovered from the borings drilled for monitoring wells MW-4 and MW-5 was analyzed. Thus, little information was available regarding the vertical extent to which the subsurface was affected by components of fuel hydrocarbons until the remediation work reported herein was undertaken.

As will be discussed in the following section of this report, two additional groundwater-quality monitoring wells, MW-6 and MW-7, were later installed by SJC. Soil samples were recovered from selected depths to the total depth of the borings and analyzed so that the relationship of hydrocarbon concentration to depth could be evaluated. The results of the analyses are shown in Table 2. Additional information was obtained when the affected soil was excavated and removed from the subsurface for treatment. Taken together, these data showed that 1) the upper boundary of the zone of affected soil was typically one foot above the water table (*i.e.*, at depths between 3 and 5 ft. BGS); 2) at its deepest (near the northern corner of the intersection of Second and Madison Streets), the maximum depth of the zone of affected soil extended some 12 ft. BGS; and 3) over much of the affected area, the depth to the bottom of the zone of affected soil was considerably less – typically between 5 and 9 ft. BGS.

5.4 Natural Attenuation of Fuel Hydrocarbons in Groundwater

Inspection of Table 5 shows that the concentration of components of fuel hydrocarbons in the affected groundwater had declined steadily since the underground storage tanks had been removed under the action of natural attenuation and bio-remediation. By the time of the sampling round conducted on October 1997, the concentrations of fuel hydrocarbons in monitoring well MW-4 had fallen from 210 mg/L to 48 mg/L of gasoline and from 9.8 mg/L to a less than detectable concentration of diesel. Similarly, the concentration of gasoline in samples from monitoring well MW-5 had fallen from 7.8 mg/L to 1.1 mg/L over the same period, while the concentration of diesel fell from 4.6 mg/L to 1.8 mg/L.

6.0 REMEDIATION PLAN

By 1996, sufficient characterization work had been completed at 208 Jackson Street for the Chen's consultants to develop and evaluate alternate remediation programs for the property. (ACC Environmental Consultants, Inc. 1996) Several remediation plans were discussed with the ACHCSA and, by early 1998, that agency approved a plan for implementation of remediation. That plan was based on extended groundwater-quality monitoring and natural attenuation of the concentrations of fuel hydrocarbons in the groundwater by natural bioremediation, accelerated by placing oxygen-releasing materials into a trench excavated along the northeastern side of the 205 Madison Street Building. This plan called for no demolition or excavation that would permit direct removal of the affected soil from the subsurface (ACC Environmental Consultants, Inc. 1997b).

The remediation plan described above was not implemented by the Chen's prior to the purchase of the property by SNK. Because SNK proposed to redevelop the site, it was apparent that the new construction would involve excavation for foundations and subsurface utilities and would require an aggressive approach for remediation of the hydrocarbon-affected soil present in the southern corner of the site, at the intersection of Second and Madison Streets.

In May 1998, SNK retained The San Joaquin Company Inc. to develop a remediation plan that would provide for remediation of affected subsurface soil according to an aggressive schedule so that the site could be rendered safe for construction and for the proposed future use of the property.

In June 1998, SJC submitted a remediation plan to the ACHCSA that called for remediation of the affected soil by excavation followed by on-site treatment by aeration and, as necessary, bioremediation, with the treated soil being returned to the excavation as engineered fill. (The San Joaquin Company Inc. 1998) On August 3, 1998, the ACHCSA approved the plan with minor modifications (Alameda County Health Care Services Agency 1998a). The ACHCSA's requested modifications were incorporated into a revised edition of the work plan, which was approved by that agency (Alameda County Health Care Services Agency 1998c).

6.1 Cleanup Criteria

The approved Remediation Plan, as amended by the ACHCSA, established the following cleanup standards:

For soil remaining in situ following completion of remedial excavation:

Total Petroleum hydrocarbons quantified as diesel (TPHd):	100 mg/Kg
Total Petroleum hydrocarbons quantified as gasoline (TPHg):	100 mg/Kg
Benzene:	0.016 mg/Kg
Toluene:	0.1 mg/Kg
Ethyl benzene:	0.1 mg/Kg
Total Xylene Isomers:	0.1 mg/Kg

For treated soil returned to remedial excavation:

Total Petroleum hydrocarbons quantified as diesel (TPHd):	1,000 mg/Kg
Polynuclear Aromatic Compounds (PNAs):	ND
Total Petroleum hydrocarbons quantified as gasoline (TPHg):	100 mg/Kg
Benzene:	ND
Toluene:	ND
Ethyl benzene:	ND
Total Xylene Isomers:	ND

Note: ND = Not detectable at the method detection limit (MDL) of the analytical procedure used to measure the concentration of the applicable analyte.

7.0 PREPARATION FOR REMEDIATION

To provide for safe demolition of some of the structures on the property that would be necessary for complete remediation of hydrocarbon-affected soil and in anticipation of the clearance of all structures on the site preparatory to redevelopment, a pre-demolition asbestos survey was conducted for SJC by the M.F. Lundeen Company (M.F. Lundeen Company 1998). No asbestos-containing material (ACM) was found in the metal building at 205 Madison Street or in the other metal building located near the center of the Madison Street frontage of the subject property.

SNK contracted with Dietz Irrigation of Tracy, California (**Dietz**) to implement the approved remediation plan. Dietz is an experienced remediation contractor, holding a Class A General Engineering Contractor's license, with Hazardous Waste endorsement issued by the California Contractors State License Board (**CSCLB**).

Dietz mobilized to the site in July 1998 and notified the ACHCSA that remedial work was set to begin. To prepare the site for remediation, Dietz removed all accumulated debris and inert waste material from the site.

To allow for excavation of the affected soil, the 205 Madison Street Building was demolished under a permit issued by the City of Oakland and after notifying the San Francisco Bay Area Air Quality Management District (**SFBAAQMD**). Safe demolition of that building required temporary backfilling of the excavation at the former site of underground storage Tank 1, which had been left open for a number of years, located on the northeastern side of that building. This was accomplished by removing the stockpile of excavated soil that had originally been removed from the pit from its on-site location near the intersection of Third and Madison Streets (see Figure 3) and placing it into the pit to provide level standing for the demolition equipment. This material was later re-excavated and treated as hydrocarbon-affected soil by the processes described later in this report.

Note: During the progress of the remediation work, it was found necessary to demolish the second metal building on the site, which was located at the approximate mid-point of the Madison Street frontage of the subject property (see Figure 3). This demolition was also undertaken following City of Oakland and SFBAAQMD permit and notification procedures.

A brine storage tank containing some 15 cubic yards of salt was also removed from the property. The salt was disposed as a special waste at Browning Ferris Industries' Vasco Road facility in Livermore, California.

To permit excavation of the soil affected by fuel hydrocarbons, concrete paving over an area of approximately 100 feet by 75 feet in the southern end of the property was broken up and loaded for transport to a concrete-recycling facility. Some 850 cubic yards, as measured in situ, of clean overburden soil from the area to be excavated was then removed and transported to the Vasco

Road landfill for use as daily cover. That work was performed using a Komatsu PC200-LC-5 excavator equipped with a 1-1/2 cu. yd. bucket and a Case 821 front loader with a 4-cu. yd. bucket that were supported by a Case 580 K backhoe. The area of the excavation is shown on Figure 6.

8.0 EXCAVATION OF HYDROCARBON-AFFECTED SOIL

After the clean overburden was removed, excavation of the hydrocarbon-affected soil was initiated. The soils at the depth of the groundwater table, down to the depth of excavation required to remove all of the affected material, was a loose, flowing sand with the consistency of wet mortar. This material flowed into any excavation below the water table so that it was not possible to use conventional excavation methods for this phase of the work.

To perform the excavation in the flowing sands, a technique developed by SJC for remediating sites under similar conditions was applied. This technique involves use of large sieve-size, gap-graded, no-fines rock to stabilize the walls and floor of small excavations. These cells are left open for only the minimum time necessary for spoil to be removed from them and a sample, which penetrates beneath the zone of affected soil, to be recovered from the bottom of the cell. These small excavations are overlapped to achieve complete excavation over the whole of the hydrocarbon-affected area.

A primary concern during the excavation of the contaminated soil was for the safety of the excavation and the stability of the public streets and sidewalks and the underground utilities that run beneath them. These conditions required careful control of the size of the excavation cells and the time that they were permitted to be open, so as to avoid sand flowing into the excavation before it was backfilled and thus threatening to destabilize adjacent ground.

To ensure that unstable conditions did not develop, the Observational Method (Peck 1969) for management and control of geotechnical construction was employed. At the 208 Jackson Street property, application of the method was initiated, under the direction of an experienced, California-licensed geotechnical engineer, by excavation of a number of test cells at the northwestern end of the excavation where it was known that the depth to the bottom of the zone of soil affected by hydrocarbons was relatively shallow. Those test cells were excavated to the depth required to remove hydrocarbon-affected soil. When soil excavated from the bottom floor of a cell was free of visual or olfactory indicators of contamination by gasoline, or the safe limits of excavation had been reached, the floor of the cell in that area was sampled and the samples preserved for laboratory analysis in the manner described in the next section of this report.

After samples were recovered from the bottom, the cells were immediately backfilled with 6-in. to 1-1/2 in. sieve-size, river-run surge rock containing no fines. The excavator was used to distribute the rock over the area of the cell until the surface of the rock was a few inches above the water table. Each excavated and backfilled cell could then be used as dry, hard standing for the heavy equipment. The test excavations showed that the rock backfilling technique could be applied at the site and provided useful information regarding the maximum size of a cell that could be safely excavated and the time available for sampling the soil at the bottom of the cell before the rock backfill had to be placed to prevent flowing sand from filling the excavation. The maximum extent of the excavation cell and the time over which it would remain temporarily stable were both found to be small, so that, in general, it was necessary to limit the plan dimensions of the cell to some 10 ft by 10 ft or smaller and to recover a soil sample rapidly from the bottom so that the rock backfill could be placed with minimum delay.

Following its placement in the excavation, the clean, 6-in. to 1-1/2 in. sieve-size, no-fines rock was thoroughly compacted using a heavy, vibratory compactor. Due to the large voids between the rocks, this material, when so compacted, can serve as support for heavy foundations and, because it has a very high permeability, it is not susceptible to liquefaction during a seismic event.

In addition to controlling the flow of sand into the excavation, the rock backfill also served to provide a stable access to the areas of the excavation distant from the edges of the pit. By progressively overlapping excavation cells - from the northwest end of the excavation area towards the center - it was possible to construct a submerged rock berm, the top of which was just above the water table. This permitted the excavator to advance into the central area of the remedial excavation, followed by the front-end loader, which was used to transport the excavated soil to a temporary stockpile on the concrete-paved area of the property. Without this trafficable berm, the excavator and loader would have sunk over their axles into the wet, flowing sand.

As shown on Figure 6, the total depth of the remedial excavation varied from some 5 ft. on its northwestern side to 10 ft. on its southeastern side. A total of approximately 1,260 cu. yd. of hydrocarbon-affected soil, as measured in situ, was removed from the subsurface and placed in a temporary stockpile preparatory to its on-site treatment. The total quantity of the 6-in. to 1-1/2-in., sieve-size rock placed in the excavation from the water table to the bottom of the excavation amounted to some 900 tons.

9.0 SOIL SAMPLING IN REMEDIAL EXCAVATION

As noted above, when the remedial excavation reached a depth beneath which there were no visual or olfactory indications of the presence of fuel hydrocarbons, soil samples to quantify the success of the remediation were recovered from the floor of the pit.

To obtain samples for analysis, intact blocks of soil were excavated from the target locations and raised to the surface in the excavator bucket. A face of the block of soil in the bucket was cut with a knife to expose an undisturbed surface, and a clean, 2-in. diameter by 6-in. long, brass sampling tube was driven into the cut soil face until the tube was completely filled with soil.

Following sample recovery, each sample tube was cleaned externally, its ends covered with aluminum foil and it was closed with tightly fitting plastic caps. The caps were secured with adhesiveless tape. Each sample tube was then labeled for identification, entered into chain-of-custody control and packed on chemical ice for transport to Chromalab Inc.'s laboratory in Pleasanton, California.

Each soil sample submitted to the laboratory was analyzed for the following suite of analytes.

Analyte	**Method of Analysis**
Total Petroleum Hydrocarbons (quantified as Diesel)	EPA Method 5030/8015
Total Petroleum Hydrocarbons (quantified as Gasoline)	EPA Method 5030/8015
Benzene	EPA Method 8020
Toluene	EPA Method 8020
Ethyl Benzene	EPA Method 8020
Total Xylene Isomers	EPA Method 8020

Chromalab's laboratory is licensed by the California Department of Health Services to perform the listed analyses.

10.0 HYDROCARBONS IN SOIL SAMPLES FROM REMEDIAL EXCAVATION

Twenty-three soil samples were recovered from the bottom of the remedial excavation. The sampling locations are shown on Figure 6. The depths from which they were recovered are also noted on that Figure.

Table 9 lists the concentrations of Total Petroleum Hydrocarbons quantified as diesel, Total Petroleum Hydrocarbons quantified as gasoline, and Benzene, Toluene, Ethyl benzene and Total Xylene Isomers (the BTEX compounds) detected in the samples.

Note: The laboratory certificates of analysis for all of the analyses reported herein have been provided to the ACHCSA in relevant reports that were submitted to that agency during the progress of the remediation work.

The data in Table 9 show that the remedial excavation was successful in removing essentially all hydrocarbon-affected soil from beneath the 208 Jackson Street property, except for trace concentrations of hydrocarbons at a few isolated locations where the flowing sand caused the local remediation cell to collapse before the desired depth of the excavation could be achieved.

10.1 Testing of Stockpiled Soil Prior to Treatment

As previously noted, hydrocarbon-affected soil removed from the subsurface in the affected area of the site was stockpiled on the concrete-paved area of the property.

On September 9, 1998, the soil stockpile was quartered and sampled to determine the mean concentration of hydrocarbons it contained. A total of four samples were taken - one from each quarter of the stockpile. The samples were recovered by driving a clean, 2-in. diameter by 4-in. long, brass sampling tube into the bottom of a pit dug into the stockpile at each of the four designated sampling locations until the tube was completely filled with soil.

Following sample recovery, each sample tube was cleaned externally, its ends covered with aluminum foil and it was closed with tightly-fitting plastic caps. The caps were secured with adhesiveless tape. Each sample tube was then labeled for identification, entered into chain-of-custody control and packed on chemical ice for transport to Chromalab Inc.'s laboratory in Pleasanton, California.

At the laboratory, the samples were composited and the composite sample was analyzed for the following suite of analytes.

Analyte	**Method of Analysis**
Total Petroleum Hydrocarbons (quantified as Diesel)	EPA Method 5030/8015
Total Petroleum Hydrocarbons (quantified as Gasoline)	EPA Method 5030/8015
Benzene	EPA Method 8020
Toluene	EPA Method 8020
Ethyl Benzene	EPA Method 8020
Total Xylene Isomers	EPA Method 8020

The sub-samples used to create that first composite sample from the stockpile of hydrocarbon-affected soil were designated sample numbers SP-2A, SP-2B, SP-2C, and SP-2D. The results of the analysis of the composite sample are presented in Table 10.

Only TPHd was detected in the composite sample at a concentration of 37 mg/Kg. This result was unexpected because data from groundwater-quality monitoring at the site indicated the presence of components of gasoline as well as diesel in the subsurface. The detected concentration of diesel was also lower than had been expected. To check that the results of the analyses from that sampling of the stockpile were valid, on September 16, 1998, the stockpile was quartered and sampled for a second time. The four individual specimens obtained from that procedure were designated as sample numbers SP-3A, SP-3B, SP-3C, and SP-3D. A composite of those samples was made and it was also analyzed for TPHd, TPHg and the BTEX compounds. The composite sample contained 280 mg/Kg of TPHd, but no detectable concentrations of components of gasoline, except for a trace concentration of Ethyl benzene at 7 µg/Kg. In addition, as a conservative check for the presence of gasoline, each of the sub-specimens (*i.e.* samples SP-3A –

SP-3D) was also analyzed for total petroleum hydrocarbons quantified as gasoline. As is shown in Table 10, none were detected in any of the sub-specimens.

The results of the analyses of the samples taken from the stockpile of hydrocarbon-affected soil were communicated to the SFBAAQMD. Based on that data, that agency determined that the concentrations of volatile fuel hydrocarbons in the stockpile of soil were lower than the threshold with which its regulations for treatment of soil by aeration are concerned. Accordingly, treatment of the stockpiled soil was authorized without necessity for oversight of the process by that agency.

11.0 TREATMENT OF HYDROCARBON-AFFECTED SOIL

After the stockpiled soil was sampled and analyzed and the SFBAAQMD confirmed that it could be treated by aeration without obtaining a permit from that agency, a Case 821 loader with a 4-cubic-yard bucket was used to remove soil from the stockpile sufficient to cover, to a thickness of approximately 12 in., an area of some 120 ft. by 90 ft. of the concrete paving that was then present on the site. The arrangement of the spread soil as it was laid down in the treatment area is shown on Figure 7.

To treat the hydrocarbon-affected soil that had been spread at the treatment site, it was thoroughly rototilled throughout its thickness by a heavy-duty, agricultural rototiller powered by a Landini GE 85 tractor immediately after it was laid down. It was then left to aerate and was periodically inspected for visual or olfactory signs of remaining traces of components of gasoline. As judged necessary from time to time, the rototilling operation was repeated to accelerate volatization of components of fuel hydrocarbons.

11.1 Sampling of Treated Soil

When treatment of the first spread of hydrocarbon-affected soil (*i.e.*, LDS 1, as shown on Figure 7) was judged to be complete, a protocol was developed for sampling the spread soil to determine whether any remaining traces of fuel hydrocarbons were at concentrations lower than those established in the approved remediation plan for material that would be recycled in beneficial use on the site.

11.1.1 Selection of Sampling Locations

The 120-ft. by 90-ft. LDS 1 soil spread was subdivided into a grid of 25 equally-sized cells, each individual cell being identified by the row and column which contained it. This arrangement is diagrammed on Figure 7, which shows the lettering and numbering scheme used to identify the individual cells.

To select cells from within which samples of the treated soil were to be recovered, dice were repeatedly tossed to yield randomly paired sets of column letters and row numbers until a total of 5 cells were uniquely identified for sampling. Within each selected cell, a discrete sampling point was arbitrarily selected by tossing a sampling tube into it without consideration for the appearance, olfactory properties or any other characteristic of the soil therein. The five cells in which sampling locations were randomly situated are identified on Figure 7.

11.1.2 Sampling and Analysis Procedures

At each randomly selected sampling location, a small pit was excavated so that the floor of the pit was at least 3 in. below the surface of the spread soil. A clean, 2-in. diameter by 4-in. long, brass sampling tube was then driven into the wall of the small pit near the bottom until the tube was completely filled with treated soil.

Following sample recovery, each sample tube was cleaned externally and its ends covered with aluminum foil and closed with tightly fitting plastic caps. The caps were secured with adhesiveless tape. Each sample tube was identified by the row and column number of the grid cell from which the sample that it contained had been recovered. The tubes were then labeled accordingly for identification, entered into chain-of-custody control and packed on chemical ice for transport to Chromalab's laboratory in Pleasanton, California.

Each sample of aerated soil submitted to the laboratory was analyzed for the following suite of analytes.

Analyte	Method of Analysis
Total Petroleum Hydrocarbons (quantified as Diesel)	EPA Method 5030/8015
Total Petroleum Hydrocarbons (quantified as Gasoline)	EPA Method 5030/8015
Benzene	EPA Method 8020
Toluene	EPA Method 8020
Ethyl Benzene	EPA Method 8020
Total Xylene Isomers	EPA Method 8020

In addition, the five samples recovered from LDS 1 were composited and the composite sample was analyzed for the presence of any of the polynuclear aromatic hydrocarbons (**PNA**) that are included in the USEPA Method 8270A procedure.

11.2 Results of Analyses of Treated Soil

The results of the analyses of the samples recovered from the spread of the treated soil designated LDS 1 are presented in Table 11. None of the samples contained any detectable concentrations of TPHg or any of the BTEX compounds, nor were any PNA's detected in the composite sample from that soil spread. However, all of the individual samples contained some low concentration of TPHd, ranging from 31 mg/Kg to 270 mg/Kg. These concentrations are all very much lower than

SJC

the clean-up criterion of 1,000 mg/Kg established by the approved remediation plan for treated soil that would be recycled in beneficial use on the site.

11.3 Statistical Evaluation of Results of Analyses of Treated Soil

Although the samples of soil recovered from treatment spread LDS 1 contained no detectable concentrations of TPHg or its BTEX components, nor any PNA's, and the detected concentrations of TPHd were very much lower than the established clean up criterion, the validity of those findings was tested statistically in accordance with the procedures documented in *Methods of Evaluating the Attainment of Cleanup Standards. Vol. 1. Soils and Solid Media* published by the USEPA (United States Environmental Protection Agency 1989).

The results of the analyses for TPHd that are included in Table 11 have the following statistical properties:

Spread LDS 1

No of Samples: 5
Degrees of Freedom: 4
Mean Concentration of TPHd: 119.80 mg/Kg
Standard Deviation: 96.88 mg/Kg

The formula for an upper one-sided percent confidence limit around the mean of the result from the samples can be computed from

$$\mu_{\upsilon\alpha} = \bar{x} + t_{1-\alpha,df} \cdot s / n^{½} \qquad \text{Equation (1)}$$

where:

$\mu_{\upsilon\alpha}$ = the one-sided confidence limit for a given degree of confidence α.

n = the number of samples recovered from the soil spread
x = the mean concentration of the analyte of concern in the samples recovered from the soil spread

s = the standard deviation of the concentrations of the analyte of concern detected in the samples recovered from the soil spread

α = the false positive rate for the analyses of the soil samples

df = the number of degrees of freedom of the statistical data set (df = n-1)

$t_{1-\alpha,df}$ = statistical parameter, the value of which depends upon the percent confidence limit and the degrees of freedom of the statistical data set

To confirm with a confidence level of α that nowhere in the soil spread is there any soil containing diesel at a concentration greater than the established clean up criterion C_s, it is necessary that the value of $\mu_{\upsilon\alpha}$ is $< C_s$.

The appropriate value of $t_{1-\alpha,df}$ can be obtained from Table A.1 in Appendix A of the above-cited USEPA guidance document. By inspection of the table, the value of α at 0.001 (*i.e.*, for a confidence level of 99.9%) and for 4 degrees of freedom (*i.e.*, the number of samples recovered from soil spread LDS 1 minus 1) is 7.173. Using that value with the previously-computed statistical data from the results of analyses of the samples recovered from soil spread LDS 1, Equation (1) yields:

$$\mu_{\upsilon\alpha} = 430.58 \text{ mg/Kg}$$

Thus, because that value (430.58 mg/Kg) is less than the clean up criterion of 1,000 mg/Kg, it can be stated with 99.9% confidence that, after treatment, none of the treated soil in spread LDS 1 exceeds the clean up criterion. In fact, it can be stated with the same high level of confidence that none of the treated soil in spread LDS 1 exceeded even a concentration of 500 mg/Kg, one-half of the established clean up criterion.

When treatment of soil spread LDS 1 was completed, the results of the analyses of the soil samples recovered from the spread were transmitted to the ACHCSA, which cleared the soil for use as backfill on the site (Alameda County Health Care Services Agency 1998b). Following receipt of that authorization to terminate treatment of LDS 1, the front loader was used to place the soil in a temporary stockpile so that the concrete pavement could be used to treat additional soil affected by fuel hydrocarbons.

To treat all of the stockpile of soil that had been removed from the remedial excavation required creation and treatment of two additional soil spreads, LDS 2 and LDS 3. Each of these spreads was treated and tested using the same procedures as are described above for soil spread LDS 1. The configurations of soil spreads LDS 2 and LDS 3 and the random points from which samples were recovered following their treatment are shown on Figures 8 and 9, respectively. The results of the laboratory analyses of the samples therefrom are presented on Tables 12 and 13.

The statistical analysis applicable to the results obtained from soil spreads LDS 2 and LDS 3 after each had been treated is as follows:

Spread LDS 2

No of Samples:	6
Degrees of Freedom:	5
Mean Concentration of TPHd:	157.50 mg/Kg
Standard Deviation:	178.29 mg/Kg

For that set of data, the value of $t_{1-\alpha,df}$ is 5.893. Accordingly, using Equation (1),

$$\mu_{\upsilon\alpha} = 332.61 \text{ mg/Kg.,}$$

a result well below the clean up criterion of 1,000 mg/Kg for diesel.

Spread LDS 3

No of Samples:	6
Degrees of Freedom:	5
Mean Concentration of TPHd:	43.48 mg/Kg
Standard Deviation:	111.52 mg/Kg

For that set of data, the value of $t_{1-\alpha,df}$ is 5.893. Accordingly, using Equation (1),

$$\mu_{\upsilon\alpha} = 700.67 \text{ mg/Kg.,}$$

which is, again, a result well below the clean up criterion of 1,000 mg/Kg for diesel.

In each case, the results of the analyses of the treated soil from these two spreads were also submitted to the ACHCSA, which approved the beneficial use of the treated soil on the property (Alameda County Health Care Services Agency 1998d, 1998e).

12.0 BACKFILLING OF REMEDIAL EXCAVATION

Material from the temporary stockpile of treated soil was used to backfill the remedial excavation. As noted previously, to permit safe excavation, clean rock backfill had been placed in the excavation from the bottom of the excavation to the depth of the water table at the time soil affected by fuel hydrocarbons was removed from that zone of the subsurface. To prepare the rock already placed in the excavation for placement of this additional backfill, the front-end loader and excavator were used to carefully level its surface. It was then thoroughly compacted using a 66-in., pad-footed, vibratory compactor.

To assess its properties for use as engineered fill, a representative 5-gal. sample was recovered from the stockpile of treated soil and submitted to Inspection Consultants, Inc. of Oakland, California (**Inspection Consultants**). Inspection Consultants developed a compaction curve according to procedure D1557 published by the American Society for Testing and Materials (**ASTM**) for the material, from which it computed a maximum dry density of 125 lb./ft.^{3} and an optimum moisture content of 10.5 %. A copy of the compaction curve is presented in Appendix II.

The front loader was then used to place the treated soil over the rock in the remedial excavation and spread in uniform, 6- to 8-in. high layers, each of which was compacted using the vibratory compactor to achieve a minimum relative density of 90%, as specified in the remediation plan. A nuclear density gauge, calibrated against the compaction test, was used to measure the relative density of the compacted backfill according to the procedure specified by ASTM Standard D2922. The results of the density testing are also presented in Appendix II. (Note: Due to the presence of the underlying rock fill, a meaningful result could not be obtained from the nuclear gauge testing procedure until a minimum depth of 12 in. of compacted soil had been placed over it.)

Placement and compaction of the treated soil in the remedial excavation continued until its surface was at a level 2 ft. below the original ground surface on the site. This grade level was established at the request of SNK to comport with future grading for redevelopment of the site. Figure 10 shows a section through the restored remedial excavation.

The volume of treated soil required to restore the remedial excavation to the grade specified by SNK was less than the total volume of treated soil available. The balance was stockpiled on the excavation area and was used beneficially as engineered fill when the 208 Jackson Street site was graded for redevelopment.

13.0 CLOSURE OF MONITORING WELLS

As described previously, a total of five groundwater-quality monitoring wells had been installed on the 208 Jackson Street site prior to the implementation of the remediation work. All of these, except for monitoring well MW-1, were closed as part of the approved remediation work plan. Monitoring well MW-1 had been removed by excavation in 1990 when the tank pit close to which it was located was over-excavated.

Monitoring wells MW-4 and MW-5 were removed on August 9, 1998, when the remedial excavation was opened. The well closures were performed under the permit of the Alameda County Public Works Agency (**ACPWA**).

In compliance with the approved remediation plan, monitoring wells MW-2 and MW-3 were closed by pressure grouting with Portland cement grout on November 23, 1998. These closings were performed by Gregg Drilling and Testing Inc. (**Gregg**), which holds the requisite C57 license issued by the CSCLB, under the terms of a permit issued by the ACPWA. The well heads and the upper section of the casings of these grouted wells were later cut off when concrete paving that had covered the site was removed and the site graded.

Records of the closure of monitoring wells MW-2 through MW-5 that were closed under the direction of SJC, were submitted to ACPWA and the California Department of Water Resources (**DWR**), in compliance with Sections 13700 through 13806 of the California Water Code.

14.0 AUTHORIZATION TO REDEVELOP THE PROPERTY

Backfilling of the remedial excavation was completed by October 26, 1998, and on November 30, 1998, the remediation contractor submitted a report documenting the excavation and treatment of the hydrocarbon-affected soil to the ACHCSA (Dietz Irrigation 1998). The report included the results of the analyses of samples recovered from the floor of the remedial excavation and from the spreads of treated soil.

After reviewing that report, the ACHCSA authorized the site to be released for redevelopment on

December 3, 1998 (Alameda County Health Care Services Agency 1998f). SNK then retained a demolition contractor to demolish the remaining structures on the 208 Jackson Street property. This work was completed under the permit of the City of Oakland.

Note: Prior to demolition of the structures, ACM that had been found in the concrete structure at 208 Jackson Street when it was surveyed prior to initiation of the remediation program (M.F. Lundeen Company 1998) was removed by Bluewater Environmental Services, Inc. (**Bluewater**), a licensed asbestos-removal contractor, working under sub-contract to Dietz Irrigation.

By early November 1999, the City of Oakland had issued a building permit for construction of a residential and commercial complex on the 208 Jackson Street property. At the time of writing this report (September 2000) construction is in progress. Figure 11 shows the site and its surrounding area as it was in August 2000.

15.0 POST-REMEDIAL GROUNDWATER-QUALITY MONITORING

Following completion of the excavation and treatment of the hydrocarbon-affected soil, the remediation plan called for two groundwater-quality monitoring wells to be installed in the streets adjacent to the site. Those wells were to be used to monitor groundwater quality at quarterly intervals for a period of one year.

Subsequently, at a meeting with SJC held in January 2000, the ACHCSA directed that additional groundwater-quality monitoring be performed on a semi-annual schedule.

15.1 Installation of Groundwater-quality Monitoring Wells

On December 30, 1998, two groundwater-quality monitoring wells were installed, one down-gradient from and one co-gradient to the area of the site where the subsurface had been affected by fuel hydrocarbons. These wells were designated monitoring wells MW-6 and MW-7. They are located as shown on Figure 6.

The City of Oakland granted a minor encroachment permit for installation of the wells in the public streets. The City also issued a building permit for construction of the wells and a City representative oversaw the completion of the well heads. The well installation was also permitted by the ACPWA in compliance with the regulations covering installation of wells in Alameda County. Boring and well construction operations were performed by Gregg. Gregg used a rubber-crawler mounted drilling rig equipped with 8-in diameter hollow stem augers to make the well borings, each of which was continuously logged by a California-licensed geotechnical engineer. Each well has a total depth of 15.5 ft. Both wells are formed from machine-slotted, 2-in. diameter, Schedule 40 casing assemblies with No. 2-16 Monterey sand filter packs and 2-ft bentonite seals. Copies of the boring logs and the well construction details are included in Appendix A. The wells were developed by false bailing and pumping.

Each well was equipped with a dedicated, 1.5-in diameter, Schedule 40, PBC bailer, which was suspended in the well by a nylon cord.

The disposition of groundwater-quality monitoring wells installed on the 208 Jackson Street property is shown on the following chart.

Well	**Date**	**Action**
MW-1	circa 1990	Destroyed by excavation
MW-2	11/23/98	Closed by Pressure Grouting
MW-3	11/23/98	Closed by Pressure Grouting
WW-4	07/30/98	Destroyed by Excavation
MW-5	08/09/98	Destroyed by Excavation
MW-6	12/30/98	Installed
MW-7	12/30/98	Installed

15.2 Soil Sampling

While the borings for the monitoring wells were being drilled, the drilling equipment was used to recover a soil sample in clean, 1.875-in diameter, brass tubes from a depth approximately 5 ft beneath the ground surface and at approximate 5-ft intervals thereafter to the bottom of each hole.

After each use, the sampling tools were thoroughly cleaned and rinsed in a five-percent solution of trisodium phosphate before being reused. Separate sets of clean augers were used in the separate borings to avoid the possibility of cross-contamination.

Following sample recovery, each sample tube was cleaned externally, its ends covered with aluminum foil and closed with tightly-fitting plastic caps. The caps were secured with adhesiveless tape. Each sample tube was then labeled for identification, entered into chain-of-custody control and packed on chemical ice for transport within 24 hours to Chromalab's laboratory in Pleasanton, California.

Each of soil samples submitted to the laboratory was analyzed for the following suite of analytes.

Analyte	**Method of Analysis**
Total Petroleum Hydrocarbons (quantified as Diesel)	EPA Method 3500/8015
Total Petroleum Hydrocarbons (quantified as Gasoline)	EPA Method 5030/8015
Benzene	EPA Method 8020
Toluene	EPA Method 8020
Ethyl Benzene	EPA Method 8020
Total Xylene Polymers	EPA Method 8020

15.3 Disposal of Drill Cuttings and Development Water

The drill cuttings generated from the borings were retained in a wheelbarrow at each well head before being transported to a concrete-paved area of the site. There, the cuttings, which amounted to no more than twelve cubic feet, were spread and left to aerate.

The development water generated by the well construction operations was temporarily contained in a 50-gallon drum at the drilling site and disposed by decanting it to a non-draining, concrete-paved area of the site, from which it evaporated.

On January 9, 1999, a sample of the aerated cutting was obtained by quartering the material, removing a 0.5 cubic foot sample from each quarter, compositing the quarter, and driving a brass tube into the composite until it was completely full of soil. The tube was then closed, labeled and placed under chain-of-custody control in the manner previously described. It was delivered to Chromalab's laboratory where it was analyzed for TPHd, TPHg and BTEX compounds. The analytical results showed that, of the foregoing suite of analytes, the sample contained only TPHd at a concentration of 12 mg/Kg. This is an order of magnitude below the clean-up criterion set by the remediation plan for diesel in soil. Accordingly, the treated drill cuttings were combined with other treated soil stockpiled on the site to be incorporated into the site's engineered backfill.

15.4 Groundwater-quality Monitoring Protocol

The first round of groundwater-quality sampling employing monitoring wells MW-6 and MW-7 was conducted on January 9, 1999 (The San Joaquin Company Inc 1999a). Second, third and fourth rounds followed on April 25, 1999 (The San Joaquin Company Inc 1999b), July 24, 1999 (The San Joaquin Company Inc 1999c), and October 24, 1999 (The San Joaquin Company Inc 1999d), respectively.

A fifth round of sampling from MW-6 and MW-7 was conducted on April 20, 2000.

15.4.1 Sample Recovery

The following protocol was used in each of the four 1999 sampling rounds. The depth to groundwater in each of the monitoring wells (MW-6 and MW-7) was measured using a conductivity probe. The water table elevations were computed relative to mean sea level (MSL). These measurements and the computed groundwater-table elevations are recorded in Table 3.

After the depth to groundwater in each well had been measured, they were purged by pumping a minimum of five well volumes of water from each of them. The purge water was decanted into 5-gallon pails, which, when full, were emptied onto a non-draining, paved area of the site, from which it evaporated.

After both wells had been purged, the depth to groundwater in each was measured again prior to sampling, to ensure that a representative sample would be obtained. In all cases, the water levels in the wells had fully recovered between the time of purging and the time of sampling.

Groundwater samples were then recovered from the wells using the dedicated PVC bailers with which they had been equipped when they were constructed. Water was decanted from the bailers using a valved decanting spigot to fill completely clean, laboratory-supplied glassware. The sample vials, jars and bottles were then tightly closed, labeled for identification, entered into chain-of-custody control, and packed on chemical ice for transport to Chromalab's laboratory in Pleasanton, California for analysis.

15.4.2 Sample Analyses

Following receipt at the laboratory, each groundwater water sample was analyzed for the following suite of analytes.

Analyte	**Method of Analysis**
Total Petroleum Hydrocarbons (quantified as Diesel)	EPA Method 8015
Total Petroleum Hydrocarbons (quantified as Gasoline)	EPA Method 8015
Benzene	EPA Method 602
Toluene	EPA Method 602
Ethyl Benzene	EPA Method 602
Total Xylene Polymers	EPA Method 602
*Methyl-tertiary Butyl Ether (MTBE)	EPA Method 8260A

* **Note:** Analyses for MTBE were not included in the standard suite of analytes for the post-remedial groundwater monitoring as specified in the approved Remediation Plan. However, in response to a request made by the ACHCSA on June 30, 1999 (Alameda County Health Care Services Agency 1999), that testing was initiated with the July 24, 1999 sampling round.

15.4.3 Results of Groundwater Analyses

The results of the analyses of the samples of groundwater recovered from monitoring wells MW-6 and MW-7 over the period January 9-April 20, 2000 are presented in Table 5, which also includes the results from earlier rounds of groundwater sampling that utilized monitoring wells MW-1 through MW5.

As can be seen in Table 5, and as was reported in the Quarterly Status and Groundwater-Quality Monitoring Report issued for the period March 1, 1999 to May 31, 1999 (The San Joaquin Company Inc. 1999b), diesel, gasoline and all of the BTEX compounds were detected in the sample recovered from well MW-6 on April 26, 1999. That result was unexpected because none - with the exception of a trace of xylene polymers - had been detected in water previously recovered from that well. In response to those unexpected results, the engineer in responsible charge of the remediation program directed that a second set of samples, in addition to those routinely submitted for analysis to Chromalab, be recovered from both monitoring wells MW-6 and MW-7 during the next sampling round that was conducted on July 25, 1999. The additional samples were submitted to Curtis & Tompkins' laboratory in Berkeley, California where they were independently analyzed as a quality-assurance measure. The results of Curtis & Tompkins analyses are shown in Table 6.

When differences in the reporting protocols for analytical results that do not exactly match the laboratories' standards for fuel hydrocarbons such as gasoline and diesel are taken into account, the analytical results obtained by Curtis & Tompkins from the samples recovered from monitoring wells MW-6 and MW-7 are in substantial agreement with those obtained by Chromalab. Thus, as was discussed in the quarterly report for June 1 to August 31, 1999 (The San Joaquin Company Inc. 1999c), the quality assurance analyses performed by Curtis & Tompkins demonstrates the substantial validity of the primary analyses performed by Chromalab.

The sample of groundwater recovered from monitoring well MW-6 on July 24 contained no detectable concentrations of the BTEX compounds. This result is compatible with the result obtained for that well on January 9, showing that the elevated concentrations of BTEX compounds that were detected in the sample recovered on April 25 had been eliminated. Similarly, although not entirely eliminated, the concentrations of diesel and gasoline in the sample recovered on July 25 had fallen markedly from the concentrations present on April 25, which had unexpectedly appeared following the January 9 sampling round, when there had been no detectable concentrations of either diesel or gasoline in the sample recovered from MW-6.

On October 24, 1999, analyses of the sample of groundwater recovered from MW-6, as shown in Table 5, detected the presence of 140 μg/L of TPHd, 370 μg/L of TPHg, and benzene at 0.73 μg/L. There were no detectable concentrations of the other BTEX compounds. MTBE was detected at 950 μg/L.

Concentrations of analytes of concern in samples from monitoring well MW-7 had fallen significantly between the sampling round conducted on January 9 and that conducted on April 25. As can be seen by inspection of Table 5, however, by July 25, although the concentration of diesel was again lower, there was a large increase in the concentration of gasoline and the BTEX compounds in the sample recovered from that well. That increase in concentrations was also unexpected, but the results obtained from the quality assurance sample recovered from that well on the same date and analyzed by Curtis & Tompkins (see Table 6) verified the results of the analyses obtained by Chromalab.

Analyses of the sample of groundwater recovered from monitoring well MW-7 on October 24 detected the presence of 1,300 μg/L of TPHd, 660 μg/L of TPHg, benzene at 220 μg/L, toluene at 8.8 μg/L, ethyl benzene at 24 μg/L and total xylene polymers at 65 μg/L. No MTBE was detected in the sample recovered from this well, as was the case for the previous sampling round.

SJC sampled the two wells again on April 20, 2000. In MW-6, concentrations of TPHd had further reduced to 120 µg/L (as shown in Table 5). No TPHg or BTEX compounds were detected in this well at that time. There was further significant reduction to 350 µg/L of the MTBE in MW-6, which indicates that the effects of the materials introduced into the well during the early 1999 street paving operations have almost fully dissipated.

During the April 20, 2000 sampling round, MW-7 contained TPHd at 3,400 µg/L and TPHg at 8,300 µg/L, with commensurate concentrations of the BTEX compounds. As has always been the case for this down-gradient well, no MTBE was detected.

15.4.4 Evaluation of Groundwater Analyses

There are several data trends that can be observed in the results obtained from analyses of samples recovered from monitoring wells MW-6 and MW-7 in the period from January 9, 1999 to April 20, 2000.

No MTBE was detected in the samples recovered from monitoring well MW-7 on July 25 (the first sampling round where analysis for this oxygenate was performed) nor on October 24, while 1,500 µg/L and 950 µg/L were detected, respectively, in the samples recovered on the same date from MW-6. This indicates that groundwater in MW-6 is affected by a different mixture of petroleum hydrocarbons from the groundwater in MW-7. It is also significant that, although analyses for MTBE had been performed on samples from the other monitoring wells located on the 208 Jackson Street property in prior years, none had ever been detected in any of those wells.

In addition to the difference related to the presence and absence of MTBE, there are other notable differences in the matrix of data obtained from monitoring wells MW-6 and MW-7. Water from MW-6, which had been essentially free of petroleum hydrocarbons on January 9, was unexpectedly found to be affected by significant concentrations of several of those compounds on April 25. However, by July 25, there had been major declines in the concentration of diesel and gasoline in that well and none of the BTEX compounds were present. By the October 24 sampling round, there had been a minor upward fluctuation in the concentration of diesel in the sample from MW-6, but there was a further, large decrease in the concentration of gasoline. Also, the concentrations of the BTEX compounds, except for a very minor trace of benzene, continued to be undetectable. This data trend strongly suggests that some new mixture of analytes had been introduced into MW-6 between January 9 and April 25, but, since the latter date, had been dissipating from the groundwater at that location by natural processes such as dispersion or dilution, and by the purging of the well at each sampling round.

Data from MW-7 show an unexpected increase in the concentrations of gasoline and the BTEX compounds in the period between April 25 and July 24, although, earlier in the year, the trend of the data was declining toward lower concentrations of all analytes of concern. By October 24, although there was an inconsequential increase in the concentration of diesel detected in the sample from MW-7, there was a very large decrease in the concentration of gasoline and the BTEX compounds, so that the previously-prevailing pattern of substantial decrease in the concentrations of all analytes of concern with time in samples from this well was restored. This data trend suggests that some foreign material had been introduced into the well in the period between April 25 and July 25, 1999.

Second Street was re-paved in April 1999. It is interesting to set the data trends described above in the context of that activity. Following is a chronological listing of conditions observed in and around the wells during the period January through July 1999:

Sampling Date	**Conditions Observed**
January 9, 1999	No unusual conditions are observed; paving was undisturbed.
April 25, 1999	Second Street has been scarified and the surficial bituminous macadam surfacing removed. Some stained areas are seen in the vicinity of MW-6. MW-7 well cover is buried under pile of sand- to gravel-sized bituminous macadam debris, but it is otherwise apparently undisturbed.
July 25, 1999	Re-paving is complete around MW-6. Debris has been cleared from the MW-7 well cover, but that cover is found broken and loose in the paving of Madison Street, which has not been re-paved. On removal of the dedicated bailer hung in the well casing, it was found that the upper 6 inches of the casing above the top of the bailer was blocked by bituminous macadam debris and there was evidence that some of that material had fallen further down the well to the groundwater table.

Bituminous macadam contains a large number of petroleum hydrocarbon compounds, particularly long carbon-chain compounds. During re-paving operations, other, lighter petroleum compounds are used as solvents and for treatment of existing pavement prior to laying new surfacing. If any of those materials (which are applied in liquid or semi-liquid form), spilled equipment fuels, or pavement debris from street planing operations were introduced into the groundwater-quality monitoring wells, they would cause the type of increase in concentrations of petroleum hydrocarbons that had been observed at the 208 Jackson Street site.

The data trends and field conditions described above strongly support the interpretation that re-paving work performed in that area of the site was the cause of the sudden appearance of components of fuel hydrocarbons in monitoring well MW-6 on April 25 and the notable increase in the concentrations of components of fuel hydrocarbons in monitoring well MW-7 on July 25.

When monitoring wells MW-6 and MW-7 were first sampled on January 9, the pavement around the site was in its original condition. By the sampling round conducted on April 25, the wearing course of the Second Street pavement had been planed away in preparation for re-paving that street. It is evident that some material related to the re-paving work was introduced into MW-6, resulting in the unexpected presence of petroleum hydrocarbons in that well.

By April 25, the paving contractor had stored paving debris directly on top of the MW-7 casing closure, but the bolted casing cover and well cap had prevented introduction of any of this material into the well. Thus, concentrations of analytes of concern in MW-7 declined compared to those detected in samples recovered previously from this well, as would be expected, due to the beneficial effects of the remediation work that had been performed on the site by that time on the ongoing processes of natural bioremediation and dispersion.

By the July 25 sampling round, the re-paving of Second Street had been completed and the petroleum compounds introduced into MW-6 by that activity had declined in concentration due to natural dispersion, dilution and the purging of the well during the April and July sampling rounds. This trend continued through the October 24 sampling round and the concentrations of the analytes of concern declined further toward the non-detectable concentrations that had prevailed on January 9, 1999.

At some time between April 25 and July 25, the MW-7 well cover was damaged and displaced by the bucket of heavy equipment used to load the paving debris that had been temporarily stored over it. This activity caused debris to fall into the well casing before the paving contractor reset the cover over the well. The material introduced into the well at that time caused the concentration of petroleum hydrocarbons in the groundwater in the gasoline range to rise significantly, thus accounting for the results obtained by the analysis of the sample recovered from MW-7 on July 25. By October 24, the effect of this perturbation had passed, so that the results of the analyses of the sample recovered on that date showed that the trend of steadily decreasing concentrations of analytes of concern with time had resumed.

The moderate increase in concentrations of components of fuel hydrocarbons in MW-7 that was observed in the results from the April 2000 sampling round compared to the results from the October 1999 sampling round can be attributed to the rise in the groundwater table to within 3.52 ft. of the ground surface. This was the highest level recorded during the post-remedial monitoring program and would have caused groundwater to come into contact with relatively heavily-affected soil in the small pocket of unexcavated subsurface area beneath the street immediately down-gradient of the site, compared to soil at greater depths which was in contact with the groundwater when the water table was at lower elevations.

In SJC's opinion, the explanations for the variations and perturbations in the concentrations of analytes of concern observed during the groundwater-quality monitoring program are well supported by the site characteristics history and analytical results. We expect, assuming that there are no future man-made perturbations that might adversely affect the groundwater quality, that concentrations of analytes of concern in the small pocket of affected groundwater that remains under the streets adjacent to the site will continue to fall under the action of continuing natural bioremediation and dispersion.

16.0 CONCLUSIONS

The approved corrective action plan for remediation of the property at 208 Jackson Street in Oakland, California has been successfully completed and:

- The total mass of hydrocarbon-affected soil within the site boundaries, amounting to some 1,300 cubic yards, that had served as a source of components of fuel hydrocarbons affecting the groundwater has been fully remediated by excavation and on-site treatment. The bottom of the remedial excavation was free of detectable concentrations of TPHd, TPHg and BTEX compounds, except for a few small isolated pockets of material containing very low residual concentrations of some components of fuel hydrocarbons. Any floating product that may have been present has been eliminated.

- Off-site soil and groundwater affected by the remnant of the plume of hydrocarbons that originated on the property are located beneath concrete-paved public streets.

- The leading edge of the affected groundwater plume does not extend across those streets.

- The tanks previously located on the site did not store fuel containing fuel oxygenates. No MTBE has been detected in any on-site groundwater monitoring well.

- Except for fluctuations due to groundwater reaching maximum and minimum elevations and an incident where components of petroleum hydrocarbon were introduced into two off-site wells during city of Oakland street re-paving operations, the results of groundwater monitoring show a steadily declining trend in the concentrations of analytes of concern in the small un-remediated area beneath the streets immediately adjacent to the subject property.

17.0 RECOMMENDATIONS

It is recommended that a request be made via the Alameda County Health Care Services Agency to the California Regional Water Quality Control Board – San Francisco Bay Region for closure of the property at 208 Jackson Street, Oakland, California as the site of an unauthorized release of fuel hydrocarbons to the subsurface.

18.0 REFERENCES

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TABLE 1

RESULTS OF ANALYSES OF SOIL SAMPLES FROM BOTTOMS OF TANK PITS

Tank No.	Capacity Gal.	Fuel Type	Sample No.	Date Sampled	Sampling Depth ft.	TPH(d) mg/Kg	TPH(g) mg/Kg	Benzene mg/Kg	Toluene mg/Kg	Ethyl-benzene mg/Kg	Total Xylenes mg/Kg
1	2000	Diesel	1N	3/20/1990	7	2500	n/a	4.5	3.8	25	42
			1S	3/20/1990	7	82	n/a	61	195	130	240
2	10000	Gasoline	2N	3/20/1990	7	n/a	ND	ND	ND	ND	ND
			2S	3/20/1990	7	n/a	ND	0.015	ND	0.067	0.018
3	10000	Diesel	3N	3/20/1990	7	140	ND	ND	ND	ND	ND
			3S	3/20/1990	7	5	ND	ND	ND	ND	ND
4	8000	Gasoline	4E	3/20/1990	7	n/a	ND	ND	ND	ND	ND
			4W	3/20/1990	7	n/a	11	0.017	ND	0.012	0.0056

Notes: (1) ND = Not Detected above the Method Detection Limit (MDL).
(2) n/a = Sample not analyzed for this analyte.

TABLE 2

RESULTS OF ANALYSES OF SOIL SAMPLES RECOVERED FROM GROUNDWATER-QUALITY MONITORING WELL BORINGS

Well No.	Sample No.	Date Sampled	Depth BGS ft.	TPHd (diesel) mg/Kg	TPHg (gasoline) mg/Kg	Benzene mg/Kg	Toluene mg/Kg	Ethyl-benzene mg/Kg	Total Xylenes mg/Kg
MW-1	MW1-1	5/5/1990	3	6.9	n/a	n/a	n/a	n/a	n/a
	MW1-2	5/5/1990	5	ND	n/a	n/a	n/a	n/a	n/a
MW-2	MW2-1	5/5/1990	4	ND	n/a	n/a	n/a	n/a	n/a
MW-3	MW3-1	5/5/1990	3	ND	n/a	n/a	n/a	n/a	n/a
	MW3-2	5/5/1990	7	ND	n/a	n/a	n/a	n/a	n/a
MW-4	No soil samples were recovered when the boring for well MW-4 was drilled.								
MW-5	No soil samples were recovered when the boring for well MW-5 was drilled.								
MW-6	MW6-4.5	12/30/1998	4.5	3.5	ND	ND	ND	ND	ND
	MW6-10.0	12/30/1998	10.0	ND	ND	ND	ND	ND	ND
	MW6-15.0	12/30/1998	15.0	ND	ND	ND	ND	ND	ND
MW-7	MW7-5.0	12/30/1998	5	ND	3300	ND	130	110	590
	MW7-10.0	12/30/1998	10	1900	ND	0.015	0.033	0.019	0.13
	MW7-15.5	12/30/1998	15.5	ND	ND	ND	0.024	0.017	0.098

Notes: (1) ND = Not Detected above the Method Detection Limit (MDL).
(2) n/a = not analyzed

TABLE 3

DEPTHS TO GROUNDWATER

Well No.	Date Measured	Casing Elevation ft. MSL	Groundwater Depth ft.	Groundwater Elevation ft. MSL
MW-1				
	(Destroyed)			
MW-2		6.64		
	09/26/95		5.20	1.44
	10/27/95		5.11	1.53
	11/30/95		5.19	1.45
	09/04/96		5.05	1.59
	03/21/97		4.31	2.33
	10/01/97		5.18	1.46
	(Well destroyed 11/23/98)			
MW-3		7.71		
	09/26/95		5.71	2.00
	10/27/95		5.81	1.90
	11/30/95		5.90	1.81
	09/04/96		5.64	2.07
	03/21/97		5.03	2.68
	10/01/97		5.84	1.87
	(Well destroyed 11/23/98)			
MW-4		6.74		
	09/26/95		5.39	1.35
	10/27/95		5.43	1.31
	11/30/95		5.51	1.23
	09/04/96		5.28	1.46
	03/21/97		4.67	2.07
	10/01/97		5.46	1.28
	(Well destroyed 08/09/98)			
MW-5		6.73		
	09/26/95		5.14	1.59
	10/27/95		5.17	1.56
	11/30/95		5.26	1.47
	09/04/96		5.11	1.62
	03/21/97		4.32	2.41
	10/01/97		5.23	1.50
	(Well destroyed 08/09/98)			
MW-6	01/09/99	5.63	4.57	1.06
	04/25/99		4.00	1.63
	07/24/99		4.23	1.40
	10/24/99		5.12	0.51
	04/20/00		3.61	2.02
MW-7	01/09/99	5.15	4 58	0 57
	04/25/99		4.10	1.05
	07/24/99		4 04	1.11
	10/24/99		4.90	0 25
	04/20/00		3.52	1 63

TABLE 4

GROUNDWATER GRADIENTS

Date Monitored	**Average Gradient** (foot/foot)	**Direction**
09/09/95	0.004	south-southeast
10/27/95	0.003	south
11/30/95	0.003	south
09/04/96	0.003	south
03/21/97	0.007	south
10/01/97	0.003	south

TABLE 5

RESULTS OF ANALYSES OF SAMPLES OF GROUNDWATER RECOVERED FROM MONITORING WELLS

Well No.	Date Sampled	TPHd µg/L	TPHg µg/L	Benzene µg/L	Toluene µg/L	Ethyl-benzene µg/L	Total Xylenes µg/L	MTBE µg/L
MW-I	05/21/90	5,500	25000	400	440	330	650	n/a
	(Well destroyed *circa* 1990)							
MW-2	05/21/90	ND	ND	ND	ND	ND	ND	n/a
	01/06/94	ND	ND	ND	ND	ND	ND	n/a
	09/04/96	ND	ND	ND	ND	ND	ND	ND
	03/21/97	ND	ND	ND	ND	ND	ND	ND
	(Well destroyed 11/23/98)							
MW-3	05/21/90	ND	ND	ND	ND	ND	ND	n/a
	01/06/94	ND	ND	ND	ND	ND	ND	n/a
	06/03/94	230 (3)	ND	ND	ND	ND	ND	n/a
	09/04/96	ND	ND	ND	ND	ND	ND	ND
	03/21/97	ND	ND	ND	ND	ND	ND	ND
	(Well destroyed 11/23/98)							
MW-4	06/03/94	9,800	210,000	7,600	28,000	3,700	24,000	n/a
	09/04/96	ND	45,000	5,100	4,600	4,100	14,000	ND
	03/21/97	ND	58,000	5,000	6,300	4,600	14,000	ND
	10/01/97	ND	48,000	5,000	3,800	3,900	12,000	ND
	(Well destroyed 08/09/98)							
MW-5	06/03/94	4,600	7,800	3.8	6.2	10.0	16.0	n/a
	09/04/96	ND	1,600	14.0	3.6	9.7	13.0	ND
	03/21/97	690	430	4.2	ND	1.4	0.62	ND
	10/01/97	1,800	1,100	0.7	1.1	1.2	1.9	ND
	(Well destroyed 08/09/98)							
MW-6	01/09/99	ND	ND	ND	ND	ND	1.70	n.a.
	04/25/99	140	4500	26	160	9.8	140	n.a.
	07/25/99	89	1400	ND	ND	ND	ND	1500
	10/24/99	140	370	0.73	ND	ND	ND	950
	04/20/00	120	ND	ND	ND	ND	ND	350
MW-7	01/09/99	1900	7200	410	550	120	1200	n.a.
	04/25/99	1800	4500	960	47	ND	730	n.a.
	07/25/99	1200	9100	2000	830	610	2000	ND
	10/24/99	1300	660	220	8.8	24	65	ND
	04/20/00	3400	8300	1400	380	310	1100	ND

Notes:
(1) n/a = Not analyzed.
(2) ND = Not Detected above the Method Detection Limit (MDL).
(3) Reported to be an anomolous result from one chromatogram peak

TABLE 6

RESULTS OF QUALITY ASSURANCE ANALYSES OF SAMPLES OF GROUDWATER FROM MONITORING WELLS MW-6 AND MW-7

Well No.	**Date Sampled**	**TPHd** µg/L	**TPHg** µg/L	**Benzene** µg/L	**Toluene** µg/L	**Ethyl-benzene** µg/L	**Total Xylenes** µg/L	**MTBE** µg/L
MW-6	07/25/99	190	ND	ND	ND	ND	0.64	2700
MW-7	07/25/99	1100	7200	1900	790	560	1940	ND

Notes: (1) ND = Not detected above the Method Detection Limit (MDL)

TABLE 7

RESULTS OF ANALYSES OF SAMPLES OF SOIL FROM SMALL-DIAMETER BORINGS

Sample Number	**Depth** in Feet	**Date Collected**	**TPHd** mg/Kg	**TPHg** mg/Kg	**Benzene** mg/Kg	**Toluene** mg/Kg	**Ethyl-benzene** mg/Kg	**Xylenes** mg/Kg
B1	4.0	3/21/1995	1.3	N.D.	N.D.	N.D.	N.D.	N.D.
B2	4.0	3/21/1995	5.4	N.D.	N.D.	N.D.	N.D.	N.D.
B3	4.0	3/21/1995	N.D.	N.D.	N.D.	N.D.	N.D.	0.013
B4	4.0	3/21/1995	N.D.	N.D.	N.D.	N.D.	N.D.	0.014
B5	4.0	3/21/1995	N.D.	N.D.	N.D.	N.D.	N.D.	0.019
B6	4.0	3/21/1995	N.D.	N.D.	N.D.	N.D.	N.D.	0.013
B7	4.0	3/21/1995	N.D.	1.7	0.04	0.011	0.0074	0.029
B8	4.0	3/21/1995	94	2.9	0.026	0.012	0.030	0.091
B9	3.5	3/21/1995	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
B10	3.5	3/21/1995	71	2,300	5.3	26	40	200
B11	3.5	3/22/1995	1.4	N.D.	N.D.	N.D.	N.D.	N.D.
B12	3.5	3/22/1995	1,100	22	0.023	0.43	0.21	3.6
B13	3.5	3/22/1995	66	2,700	1.9	3.9	34	210
B14	3.5	3/22/1995	N.D.	4.2	N.D.	0.044	0.024	0.25
B15	3.5	3/22/1995	5.6	710	1.5	0.4	1.3	7.6
B16	3.5	3/22/1995	1,200	270	2.2	25	9.6	59

Notes: (1) N.D. = Not Detected above the Method Detection Limit (MDL).

TABLE 8

RESULTS OF ANALYSES OF GROUNDWATER GRAB SAMPLES FROM SMALL-DIAMETER BORINGS

Sample No.	**Boring No.**	**TPHd (Diesel)** µg/L	**TPHg (Gasoline)** µg/L	**Benzene** µg/L	**Toluene** µg/L	**Ethyl-benzene** µg/L	**Total Xylenes** µg/L
W1	B1	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
W2	B2	170	53	0.56	N.D.	N.D.	1.4
W3	B3	140	N.D.	N.D.	N.D.	N.D.	N.D.
W4	B4	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
W5	B5	170	N.D.	N.D.	N.D.	N.D.	N.D.
W6	B6	160	N.D.	N.D.	N.D.	N.D.	N.D.
W7	B7	N.D.	N.D.	1.0	0.52	N.D.	1.2
W8	B8	320	N.D.	N.D.	N.D.	N.D.	N.D.
W9	B9	n/a	78	2.1	N.D.	N.D.	5.3
WI0	B10	n/a	140,000	2,100	7,700	4,600	27,000
W11	B11	33,000	46,000	55	36	570	3,500
W12	B12	100,000	330,000	1,200	27,000	9,700	61,000
W13	B13	38,000	150,000	1,100	5,500	6,200	37,000
W14	B14	84,000	200,000	2,700	61,000	5,900	37,000
W15	B15	5,500	72,000	2,300	3,600	5,200	27,000
W16	B16	6,200	200,000	22,000	69,000	6,300	39,000

Notes: (1) N.D. = Not Detected above the Method Detection Limit (MDL).
(2) n/a = Sample not analyzed for this analyte.

TABLE 9

RESULTS OF ANALYSES OF SOIL SAMPLES RECOVERED FROM THE BOTTOM OF THE REMEDIAL EXCAVATION

Location Number (on Figure 6)	**Sample Number**	**Sample Depth** ft	**Date Sampled**	**TPHd (Diesel)** mg/Kg	**TPHg (Gasoline)** mg/Kg	**Benzene** mg/Kg	**Toluene** mg/Kg	**Ethyl-benzene** mg/Kg	**Total Xylenes** mg/Kg
1	CON 00	8	8-Sep-98	N.D.	2.5	0.015	0.0067	0.19	0.98
2	CON W25	12	8-Sep-98	N.D.	N.D.	N.D.	N.D.	0.0087	N.D.
3	CON S25	10	8-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
4	CON S25-W25	7	8-Sep-98	4.4	1.8	0.17	N.D.	0.46	0.023
5	CON S50	10	8-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
6	CON S60	7	8-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
7	CON W50	9	10-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
8	CON W50-S25	10	10-Sep-98	N.D.	N.D.	N.D.	N.D.	0.023	0.029
9	CON W50-S50	12	10-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
10	CON W75(10)	10	10-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
11	CON S75 W25	10	14-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
12	CON S75 W50	9	14-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
13	CON W75-S25	9	14-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
14	CON W75-S50	8	14-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
15	CON W75-S75	7	14-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
16	CON S75-W100	7	14-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
17	CON W100	5	15-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
18	CON W100-S25	5	15-Sep-98	2.3	N.D.	N.D.	N.D.	N.D.	N.D.
19	CON S50-W100	6	15-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
20	CON S70-W100	5	15-Sep-98	N.D.	29	N.D.	N.D.	N.D.	1.2
21	CON E25-S80	7	18-Sep-98	360	N.D.	N.D.	N.D.	0.0074	0.072
22	CON E45-S80	8	18-Sep-98	4.3	N.D.	N.D.	N.D.	N.D.	N.D.
23	CON E60-S80	7	18-Sep-98	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.

Note: (1) N.D. = Not Detected above the Method Detection Limit (MDL).

TABLE 10

RESULTS OF ANALYSES OF SAMPLES FROM STOCKPILE OF UNTREATED SOIL

Sample No.	**Date Sampled**	**TPHd** mg/Kg	**TPHg** mg/Kg	**Benzene** mg/Kg	**Toluene** mg/Kg	**Ethyl-benzene** mg/Kg	**Total Xylenes** mg/Kg
Composite of Sample Nos. SP-2A, 2B, 2C, 2D	09/09/98	37	N.D.	N.D.	N.D.	N.D.	N.D.
Composite of Sample Nos. SP-3A, 3B, 3C, 3D	09/16/98	280	N.D.	N.D.	N.D.	0.0070	N.D.
SP-3A	09/16/98	n/a	N.D.	n/a	n/a	n/a	n/a
SP-3B	09/16/98	n/a	N.D.	n/a	n/a	n/a	n/a
SP-3C	09/16/98	n/a	N.D.	n/a	n/a	n/a	n/a
SP-3D	09/16/98	n/a	N.D.	n/a	n/a	n/a	n/a

Notes:
(1) n/a = not analyzed for this analyte
(2) N.D. = Not Detected above the Method Detection Limit (MDL).

SJC

TABLE 11

RESULTS OF ANALYSES OF SAMPLES FROM TREATED SOIL SPREAD LDS 1

Sample No.	**Date Sampled**	**TPHd** mg/Kg	**TPHg** mg/Kg	**Benzene** mg/Kg	**Toluene** mg/Kg	**Ethyl-benzene** mg/Kg	**Total Xylenes** mg/Kg
A4	09/29/98	38	ND	ND	ND	ND	ND
B2	09/29/98	120	ND	ND	ND	ND	ND
D3	09/29/98	140	ND	ND	ND	ND	ND
E1	09/29/98	270	ND	ND	ND	ND	ND
E4	09/29/98	31	ND	ND	ND	ND	ND

Notes:
(1) A composite of all 5 soil samples listed above was tested for Polynuclear Aromatic Hydrocarbons (PNAs). None were detected
(2) ND = Not Detected above the Method Detection Limit (MDL).

TABLE 12

RESULTS OF ANALYSES OF SAMPLES FROM TREATED SOIL SPREAD LDS 2

Sample No.	**Date Sampled**	**TPHd** mg/Kg	**TPHg** mg/Kg	**Benzene** mg/Kg	**Toluene** mg/Kg	**Ethyl-benzene** mg/Kg	**Total Xylenes** mg/Kg
A-2	10/15/98	220	ND	ND	ND	ND	ND
C-1	10/15/98	260	ND	ND	ND	ND	ND
C-2	10/15/98	110	ND	ND	ND	ND	ND
C-3	10/15/98	190	ND	ND	ND	ND	ND
E-4	10/15/98	120	ND	ND	ND	ND	ND
E-5	10/15/98	45	ND	ND	ND	ND	0.0057

Notes: (1) A composite of all 6 soil samples listed above was tested for Polynuclear Aromatic Hydrocarbons (PNAs). None were detected.

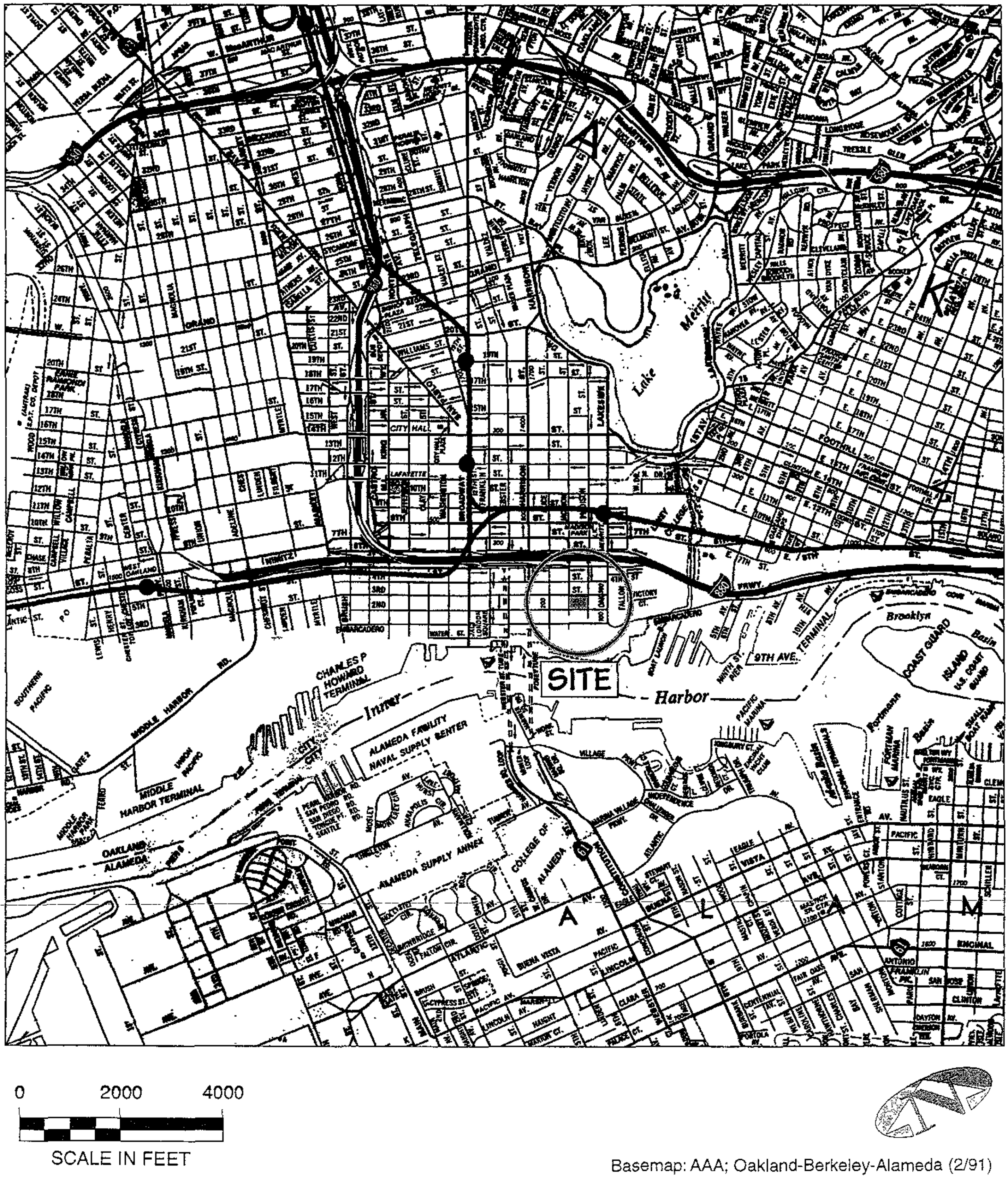
(2) ND = Not Detected above the Method Detection Limit (MDL).

TABLE 13

RESULTS OF ANALYSES OF SAMPLES FROM TREATED SOIL SPREAD LDS 3

Sample No.	**Date Sampled**	**TPHd** mg/Kg	**TPHg** mg/Kg	**Benzene** mg/Kg	**Toluene** mg/Kg	**Ethyl-benzene** mg/Kg	**Total Xylenes** mg/Kg
A-4	11/10/98	8.8	N.D.	N.D.	N.D.	N.D.	N.D.
B-1	11/10/98	9.1	N.D.	N.D.	N.D.	N.D.	N.D.
C-2	11/10/98	140	N.D.	N.D.	N.D.	N.D.	N.D.
D-3	11/10/98	36	N.D.	N.D.	N.D.	N.D.	N.D.
G-8	11/10/98	18	N.D.	N.D.	N.D.	N.D.	N.D.
G-5	11/10/98	49	N.D.	N.D.	N.D.	N.D.	N.D.

Notes:
(1) ND = Not Detected above the Method Detection Limit (MDL).
(2) A composite of all 6 soil samples listed above was tested for Polynuclear Aromatic Hydrocarbons (PNAs). None were detected.

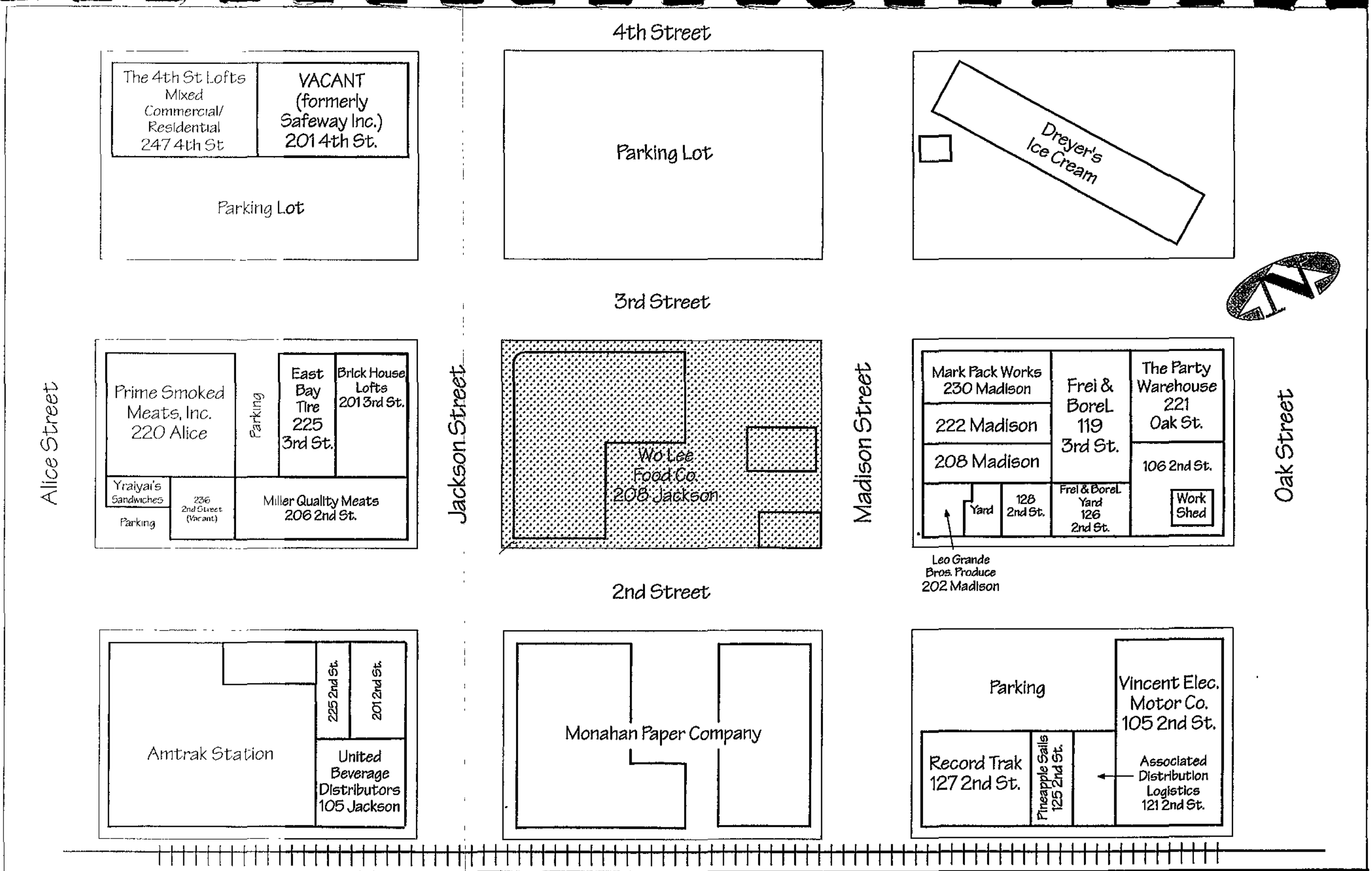


Basemap: AAA; Oakland-Berkeley-Alameda (2/91)

SITE LOCATION

208 Jackson Street, Oakland, California

FIG 1	**The San Joaquin Company, Inc.**	Project Number: 9401.114
		Drawn by: GNM · Date: 06/09/98



EXPLANATION

▨ Subject Property

0 80

SCALE IN FEET
(Approx.)

ADJOINING PROPERTIES

208 Jackson Street, Oakland, California

FIG 2

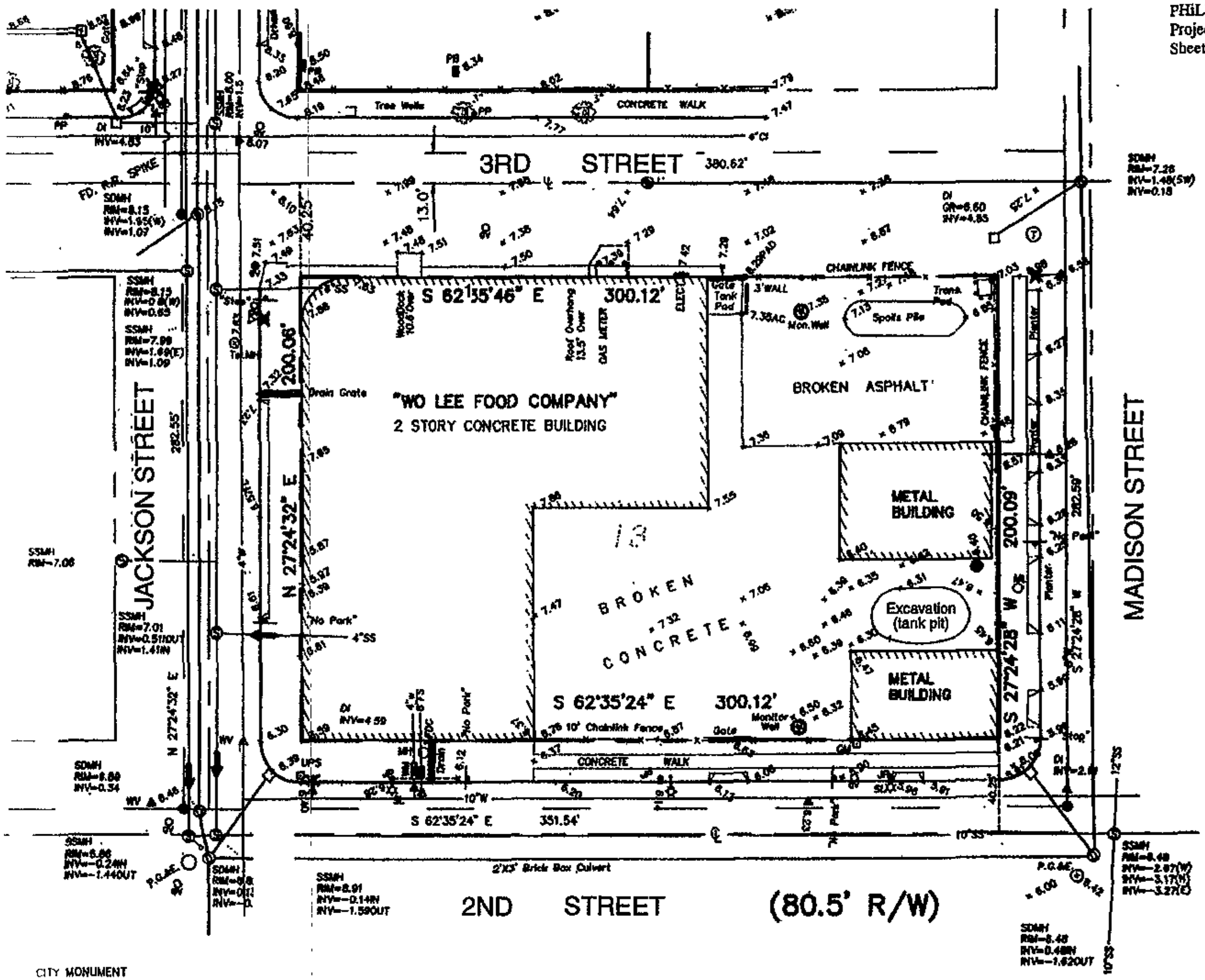
The San Joaquin Company Inc.

Project Number: 9401.114

Drawn by: GNM

Date: 11/15/99

Source:
PHILLIPPI ENGINEERING (04/11/98)
Project: A.L.T.A. Survey Block 13 & Portions of 35 & 36
Sheet Title: S.N.K. Realty Group



LEGEND

AC	ASBESTOS CEMENT
CONC	CONCRETE
BLDG	BUILDING
DI	DRAIN INLET
EB	ELECTRIC BOX
FDC	FIRE DEPT CONNECTION
FS	FIRE SERVICE WATER
GR	GRATE
H/C	HANDICAP
INV	INVERT
JP	JOINT POLE
PB	PULLBOX
PP	POWER POLE
SDMH	STORMDRAIN MANHOLE
SSMH	SANITARY SEWER MANHOLE
SL	STREETLIGHT
TRANS	TRANSFORMER

◉	CITY MONUMENT
✱	FIRE HYDRANT
— — —	MONUMENT LINE
— - —	CENTER LINE

0 50 100
SCALE IN FEET

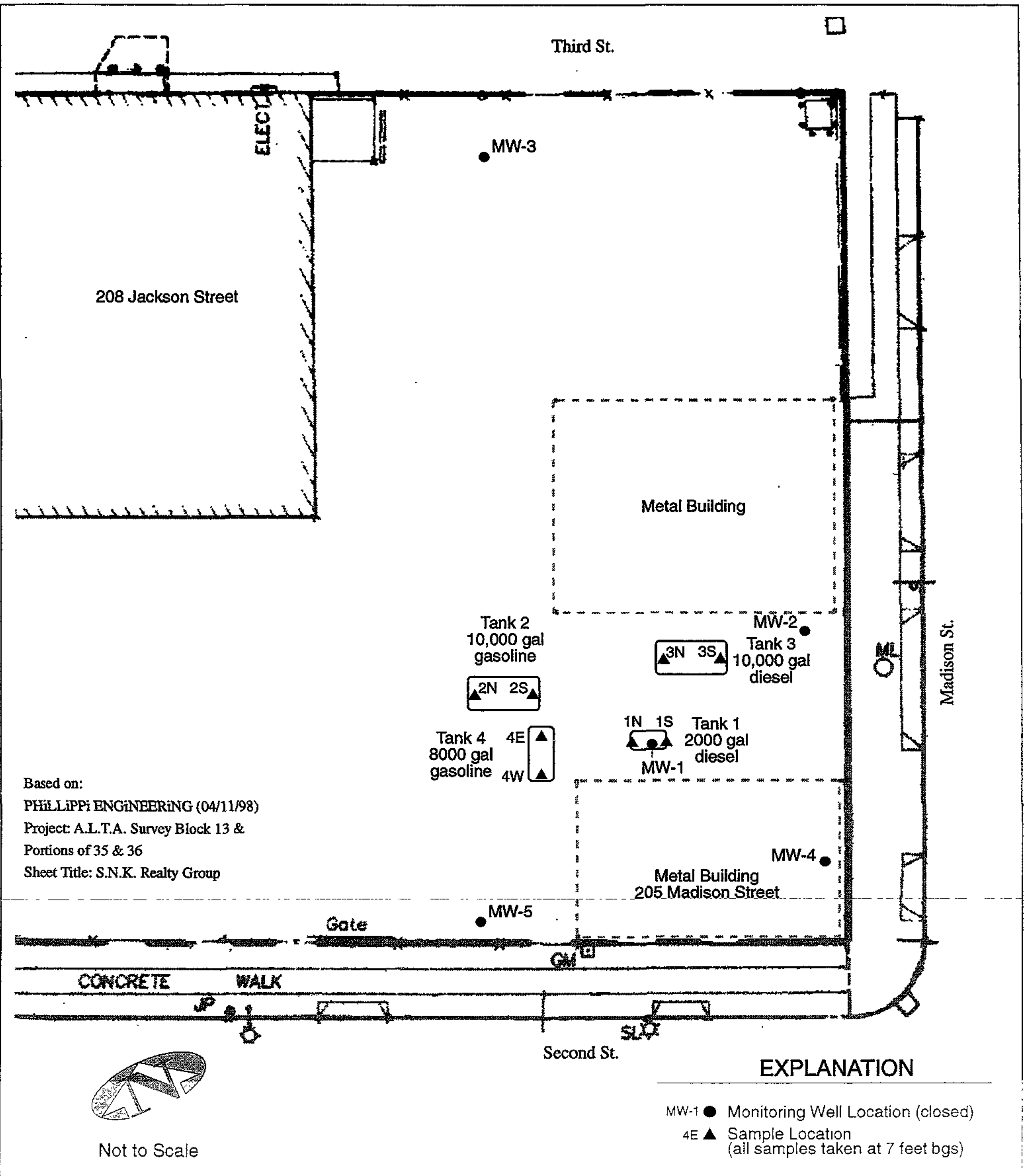
SITE PLAN

208 Jackson Street, Oakland, California

FIG. 3

The San Joaquin Company Inc.

Project Number: 9401.114
Drawn by: GNM
Date: 11/15/99



Based on:
PHiLLiPPi ENGiNEERiNG (04/11/98)
Project: A.L.T.A. Survey Block 13 &
Portions of 35 & 36
Sheet Title: S.N.K. Realty Group

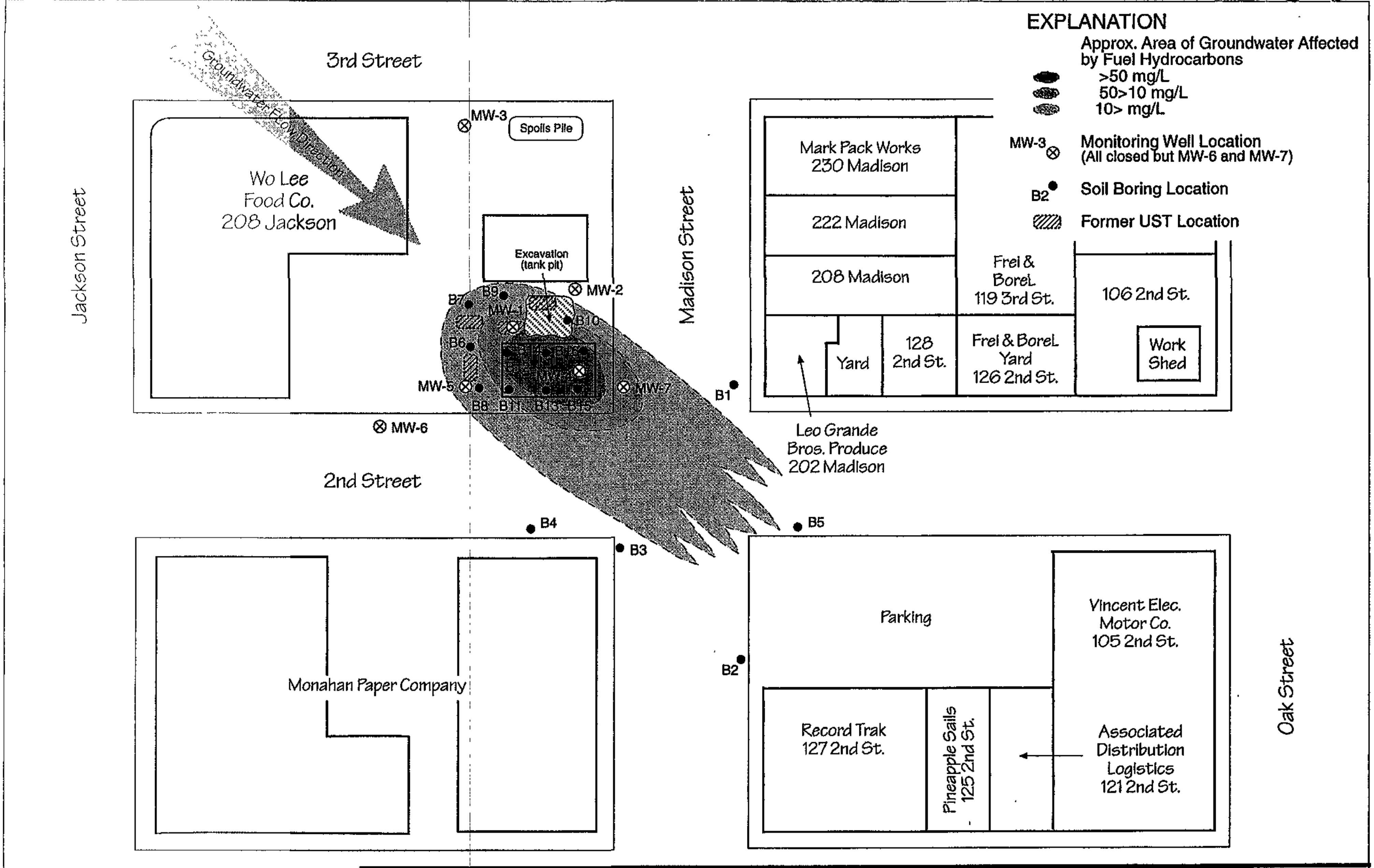
FORMER LOCATIONS OF UNDERGROUND STORAGE TANKS

208 Jackson Street, Oakland, California

FIG 4

The San Joaquin Company Inc.

Project Number: 9401.114
Drawn by: GNM
Date: 11/16/99



FUEL HYDROCARBON PLUME PRIOR TO REMEDIATION

208 Jackson Street, Oakland, California

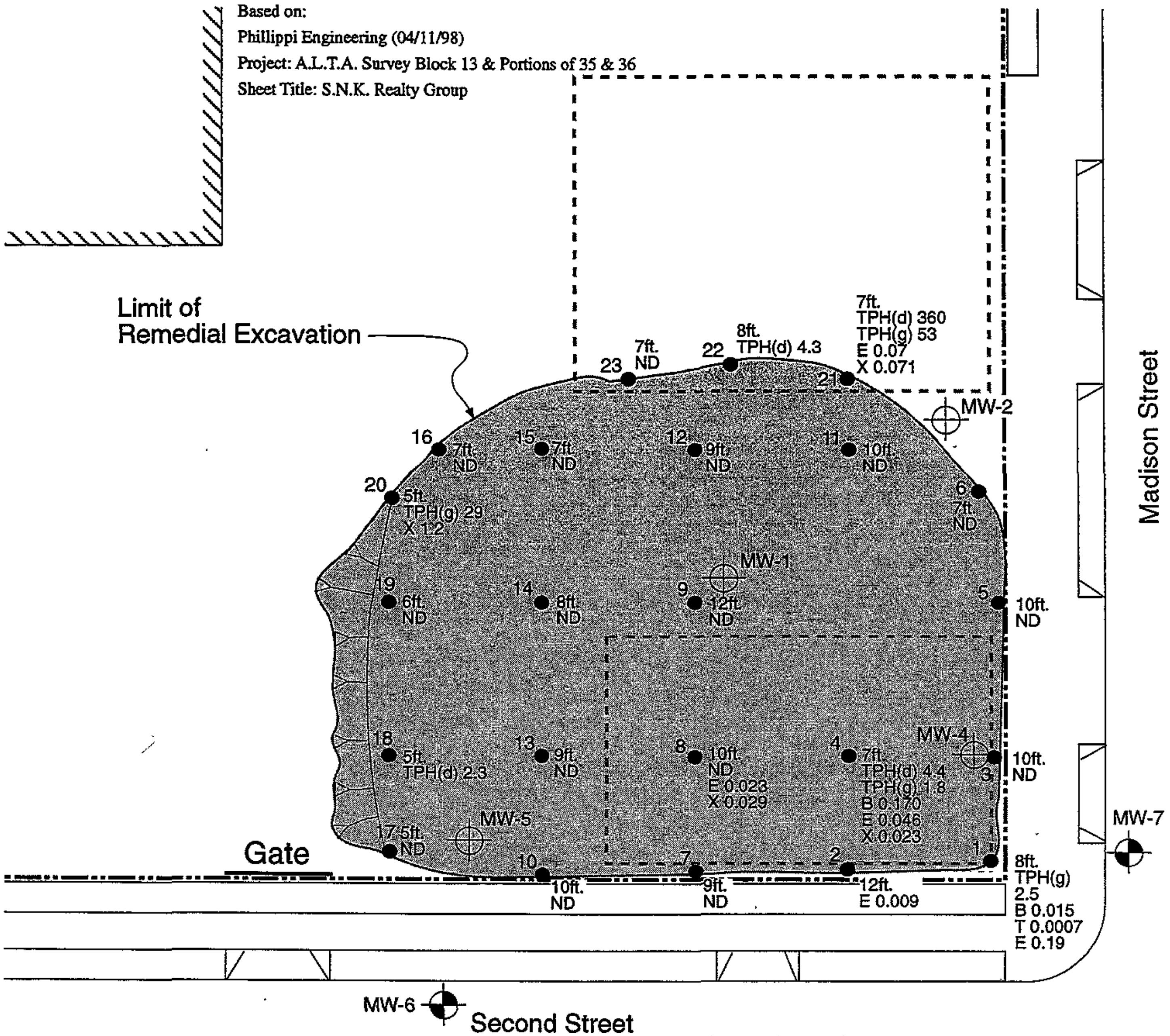
FIG 5

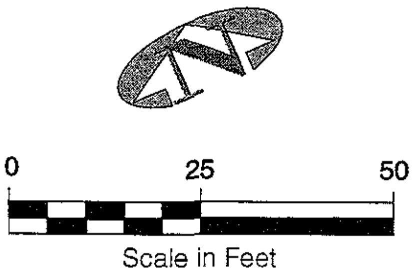
The San Joaquin Company Inc.

Project Number: 9401.114

Drawn by: GNM

Date: 11/16/99





EXPLANATION

MW-6 ● Monitoring Well Location
MW-2 ○ Monitoring Well Location (closed)
13 ● Sample Location
ND No analytes of concern detected above the applicable MDL except as noted
10ft. Depth in feet to bottom of remedial excavation
-·-·— Property Boundary

Analytes of concern
(All concentrations in mg/kg)
TPH(d) - diesel
TPH(g) - gasoline
B - Benzene
T - Toluene
E - Ethylbenzene
X - Xylenes

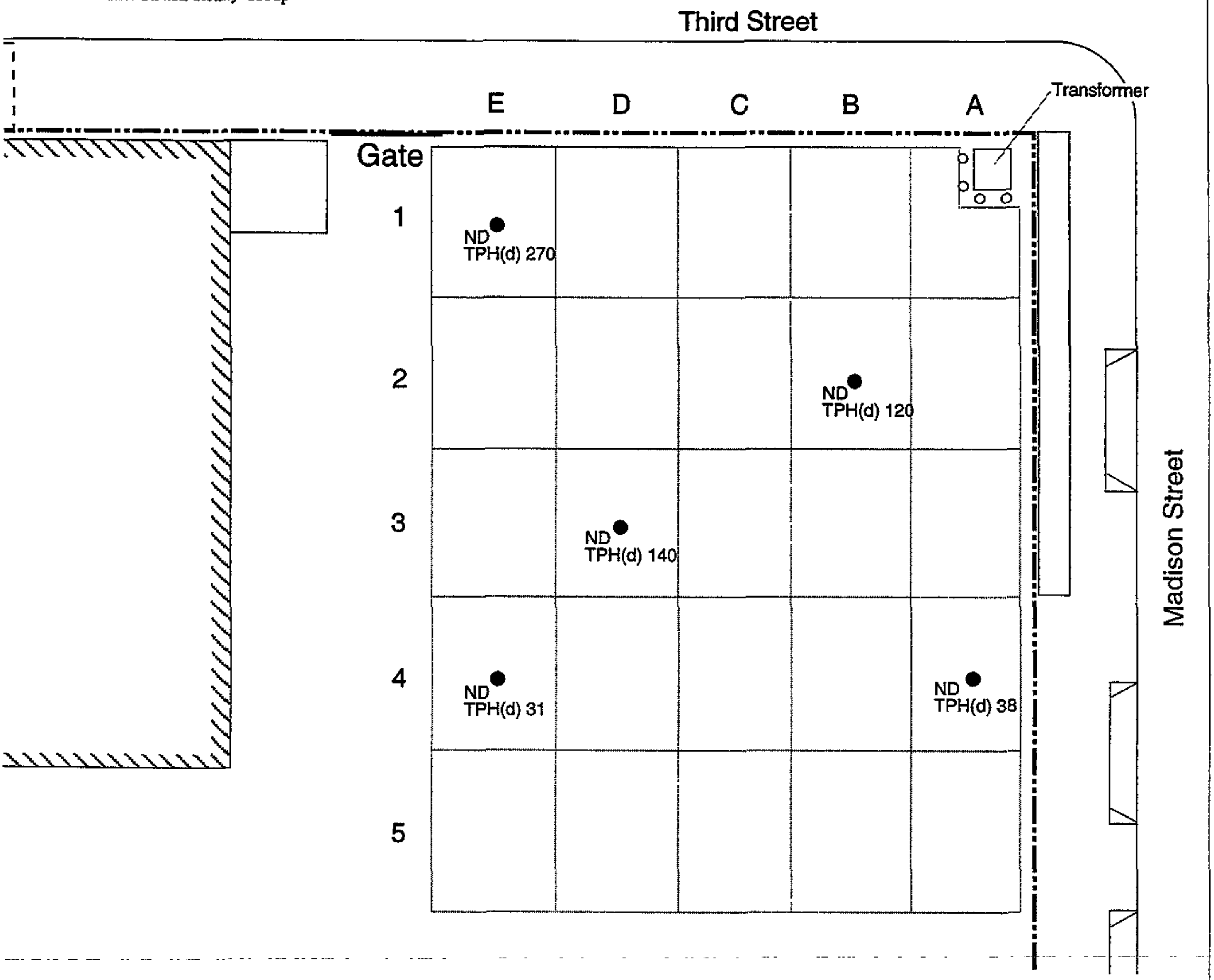
NOTE: Refer to Table 9 for complete data results

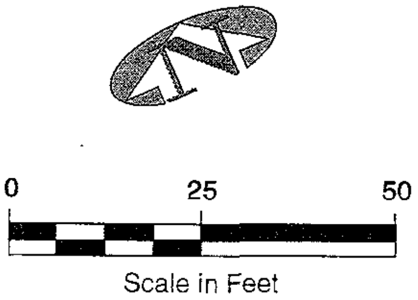
SAMPLING LOCATIONS IN REMEDIAL EXCAVATION

208 Jackson Street, Oakland, California

FIG 6	**The San Joaquin Company Inc.**	Project Number: 9401.114
		Drawn by: GNM Date: 11/16/99

Based on:
Phillippi Engineering (04/11/98)
Project: A.L.T.A. Survey Block 13 & Portions of 35 & 36
Sheet Title: S.N.K. Realty Group





EXPLANATION

● Sampling Location

N.D. No analytes of concern detected above the applicable MDL except as noted

-·-·-·— Property Boundary

NOTE: Refer to Table 11 for complete data results

Analytes of concern
(all concentrations in mg/kg)
TPH(d) - diesel
TPH(g) - gasoline
B - Benzene
T - Toluene
E - Ethylbenzene
X - Xylenes
PNA - Polynuclear Aeromatics

SAMPLE LOCATIONS IN TREATED SOIL SPREAD LDS 1

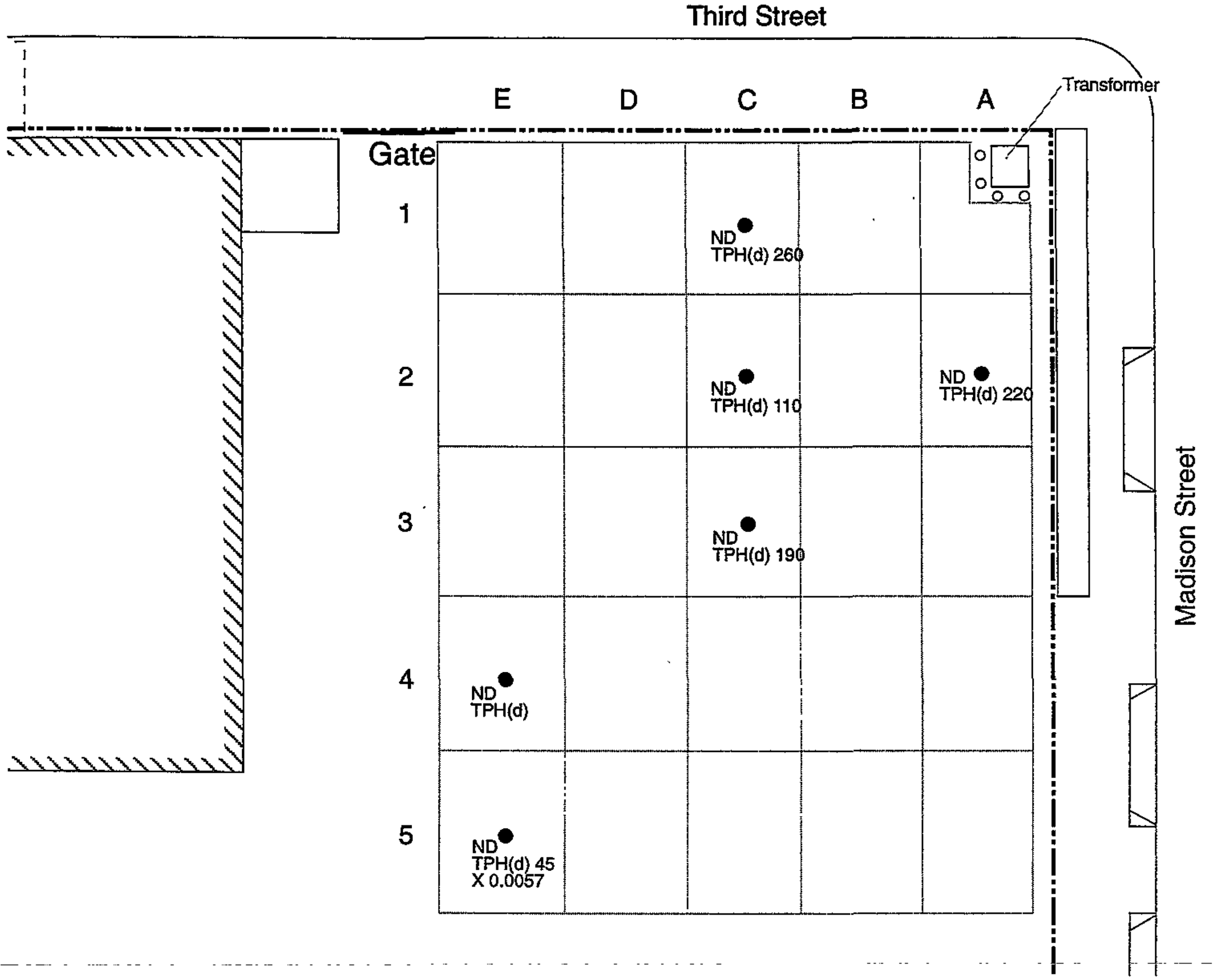
208 Jackson Street, Oakland, California

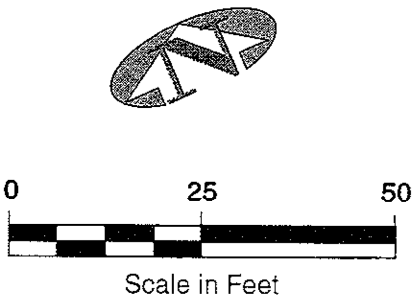
FIG 7

The San Joaquin Company Inc.

Project Number: 9401.114
Drawn by: GNM
Date: 11/16/99

Based on:
Phillippi Engineering (04/11/98)
Project: A.L.T.A. Survey Block 13 & Portions of 35 & 36
Sheet Title: S.N.K. Realty Group





EXPLANATION

● Sampling Location
N.D. No analytes of concern detected above the applicable MDL except as noted
-·-·— Property Boundary

NOTE: Refer to Table 12 for complete data results

Analytes of concern
(all concentrations in mg/kg)
TPH(d) - diesel
TPH(g) - gasoline
B - Benzene
T - Tolulene
E - Ethylbenzene
X - Xylenes
PNA - Polynuclear Aeromatics

SAMPLE LOCATIONS IN TREATED SOIL SPREAD LDS 2

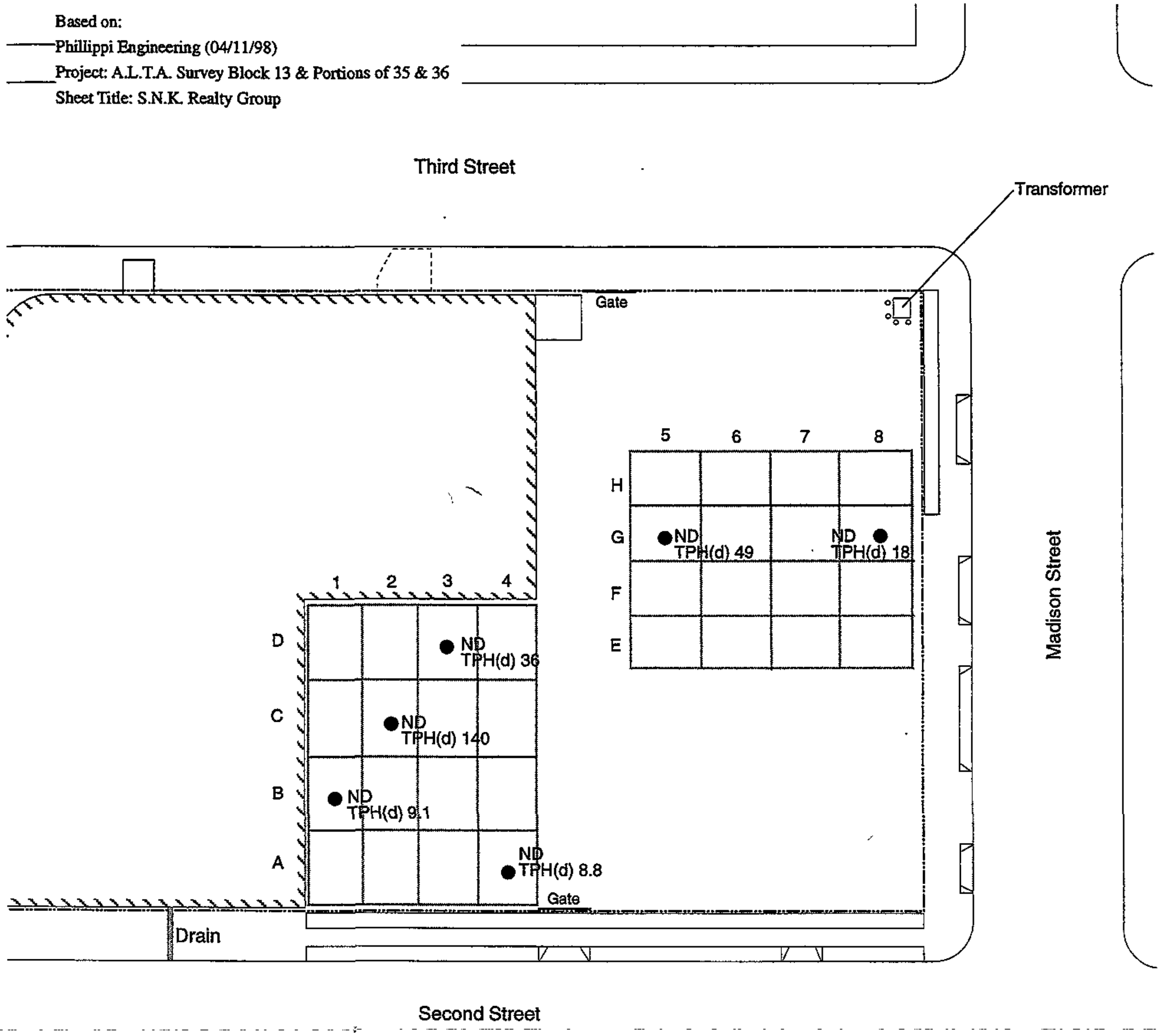
208 Jackson Street, Oakland, California

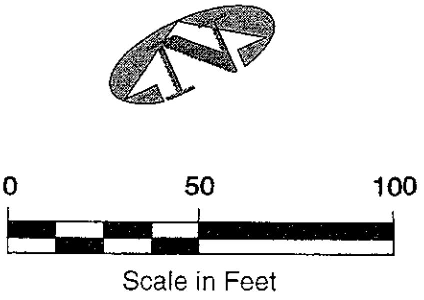
FIG 8

The San Joaquin Company Inc.

Project Number: 9401.114
Drawn by: GNM
Date: 11/16/99

Based on:
Phillippi Engineering (04/11/98)
Project: A.L.T.A. Survey Block 13 & Portions of 35 & 36
Sheet Title: S.N.K. Realty Group





EXPLANATION

● Sampling Location
N.D. No analytes of concern detected above the applicable MDL except as noted
---·--- Property Boundary

NOTE: Refer to Table 13 for complete data results

Analytes of concern
(all concentrations in mg/kg)
TPH(d) - diesel
TPH(g) - gasoline
B - Benzene
T - Toluene
E - Ethylbenzene
X - Xylenes
PNA - Polynuclear Aeromatics

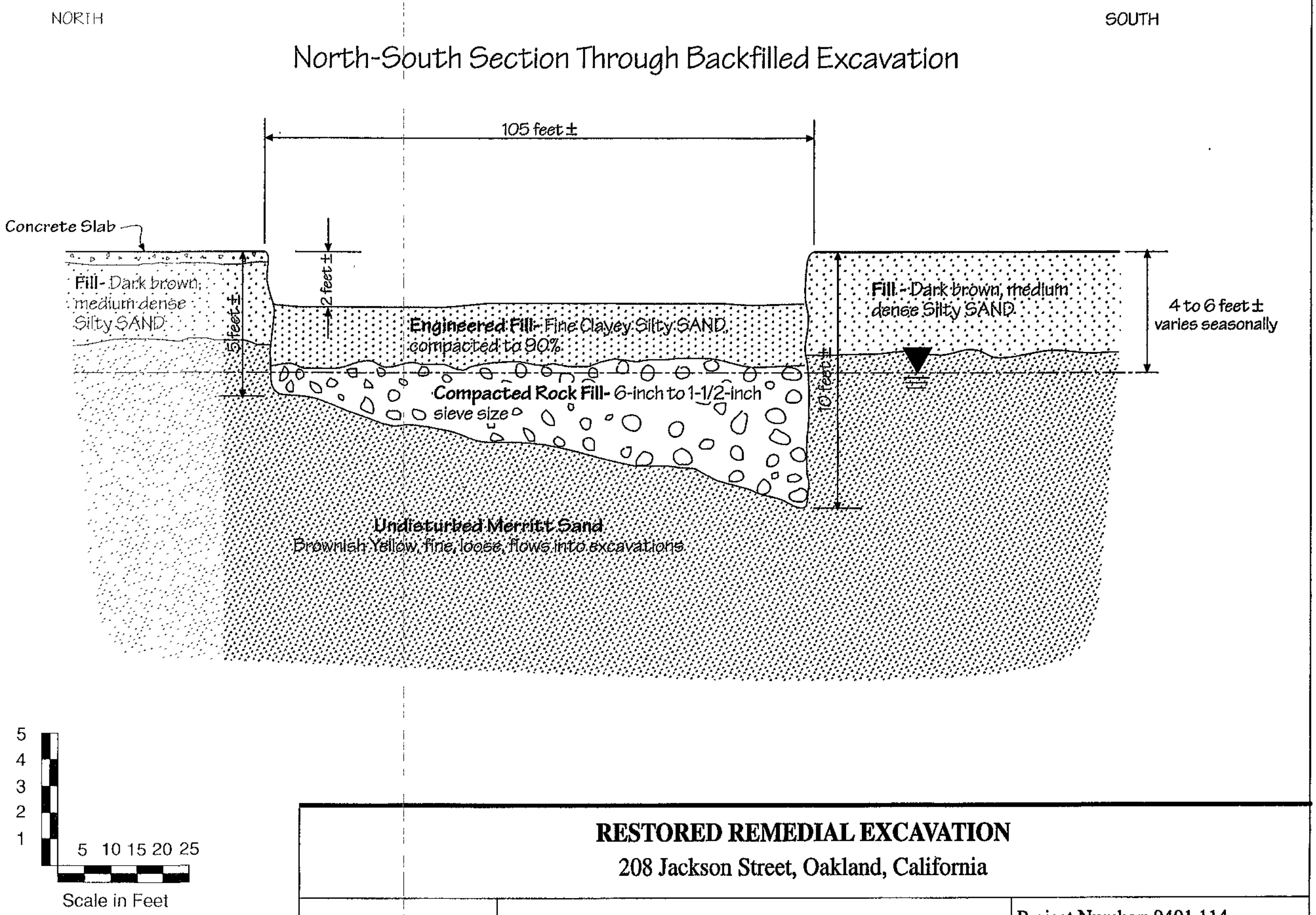
SAMPLE LOCATIONS IN TREATED SOIL SPREAD LDS 3

208 Jackson Street, Oakland, California

FIG 9

The San Joaquin Company Inc.

Project Number: 9401.114
Drawn by: GNM
Date: 11/16/99



RESTORED REMEDIAL EXCAVATION

208 Jackson Street, Oakland, California

FIG 10

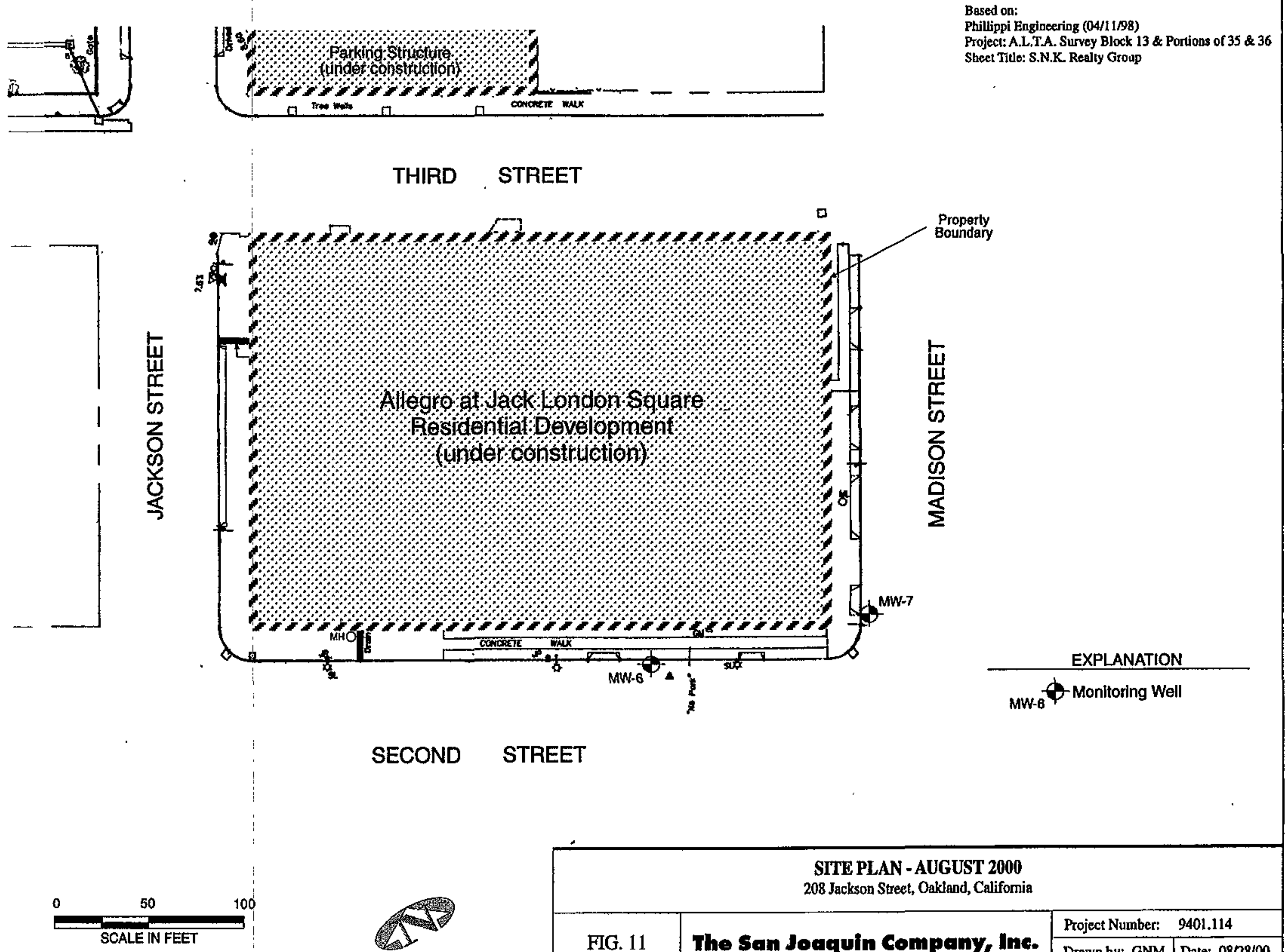
The San Joaquin Company Inc.

Project Number: 9401.114

Drawn by: GNM

Date: 11/17/99

Based on:
Phillippi Engineering (04/11/98)
Project: A.L.T.A. Survey Block 13 & Portions of 35 & 36
Sheet Title: S.N.K. Realty Group



SITE PLAN - AUGUST 2000
208 Jackson Street, Oakland, California

FIG. 11

The San Joaquin Company, Inc.

Project Number:	9401.114
Drawn by: GNM	Date: 08/28/00

APPENDIX I

WELL LOGS

SJC

The San Joaquin Company, Inc.

Monitoring Well Log

WELL No.: MW-7

Project: Allegro @ Jack London Square

Project No.: 9401.114

Owner: SNK Development, Inc.

Location: 208 Jackson Street, Oakland, CA

Top of Casing Elevation: 5.15 ft.

Surface Elevation: 5.73 ft.

Depth to Water: 4.58 ft.

Date Installed: 12/30/98

Total depth of Boring: 15.5 ft.

Boring Diameter: 8 in.

Well Casing Diameter: 2 in.

Total depth of Well: 15.0 ft.

Casing Material: PVC

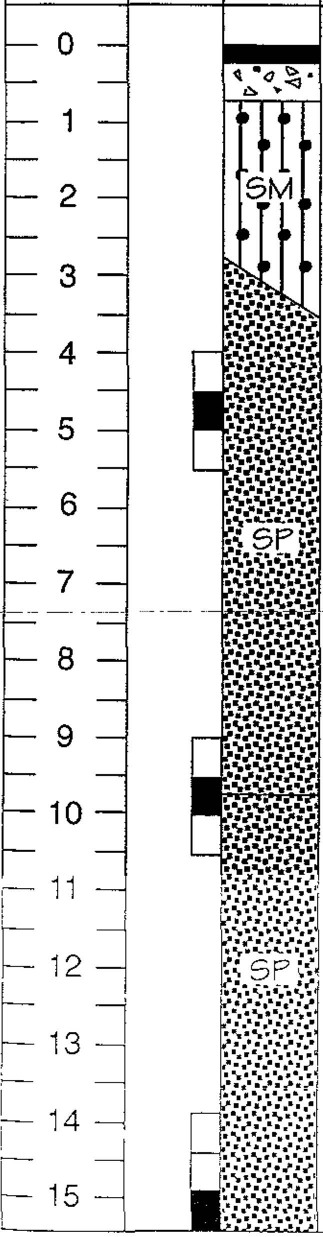
Drilling Company: Gregg Drilling & Testing, Inc.

Drilling Method: 8-inch Hollow Stem Auger

Driller: Trevor Joyner

Logged By: Dai Watkins

Depth (Feet) | **Sample** | **Graphic Log**



Description

3 inches Bituminous Macadam
6 inches Concrete

Brown, moist, medium dense, SILTY SAND (FILL)

Odor of gasoline

▼ Static Water (01/09/99)

Odor of gasoline

Moderate odor of gasoline

Dark brown, wet, loose, fine SAND, occasional gravel, little fines, fine grained, subrounded

Moderate odor of gasoline

Slight odor of gasoline

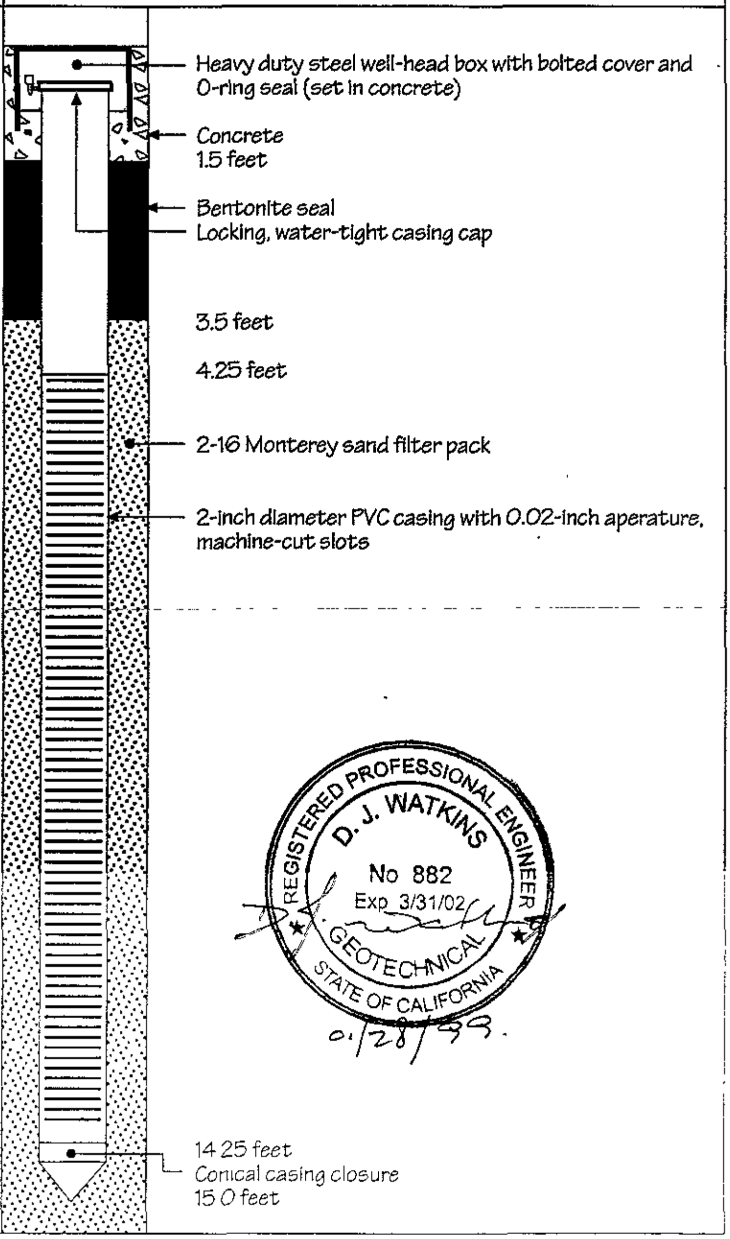
No odor

Brownish yellow, wet, loose, fine SAND, occasional gravel, little fines, fine grained, subrounded

No odor

Bottom of Boring @ 15.5 feet

Well Construction



REGISTERED PROFESSIONAL ENGINEER
D. J. WATKINS
No 882
Exp 3/31/02
GEOTECHNICAL
STATE OF CALIFORNIA

01/28/99

The San Joaquin Company, Inc.

Monitoring Well Log

WELL No.: MW-6

Project: Allegro @ Jack London Square

Project No.: 9401.114

Owner: SNK Development, Inc.

Location: 208 Jackson Street, Oakland, CA

Top of Casing Elevation: 5.63 ft.

Surface Elevation: 5.92 ft.

Depth to Water: 4.57 ft.

Date Installed: 12/30/98

Total depth of Boring: 15.5 ft.

Boring Diameter: 8 in.

Well Casing Diameter: 2 in.

Total depth of Well: 15.0 ft.

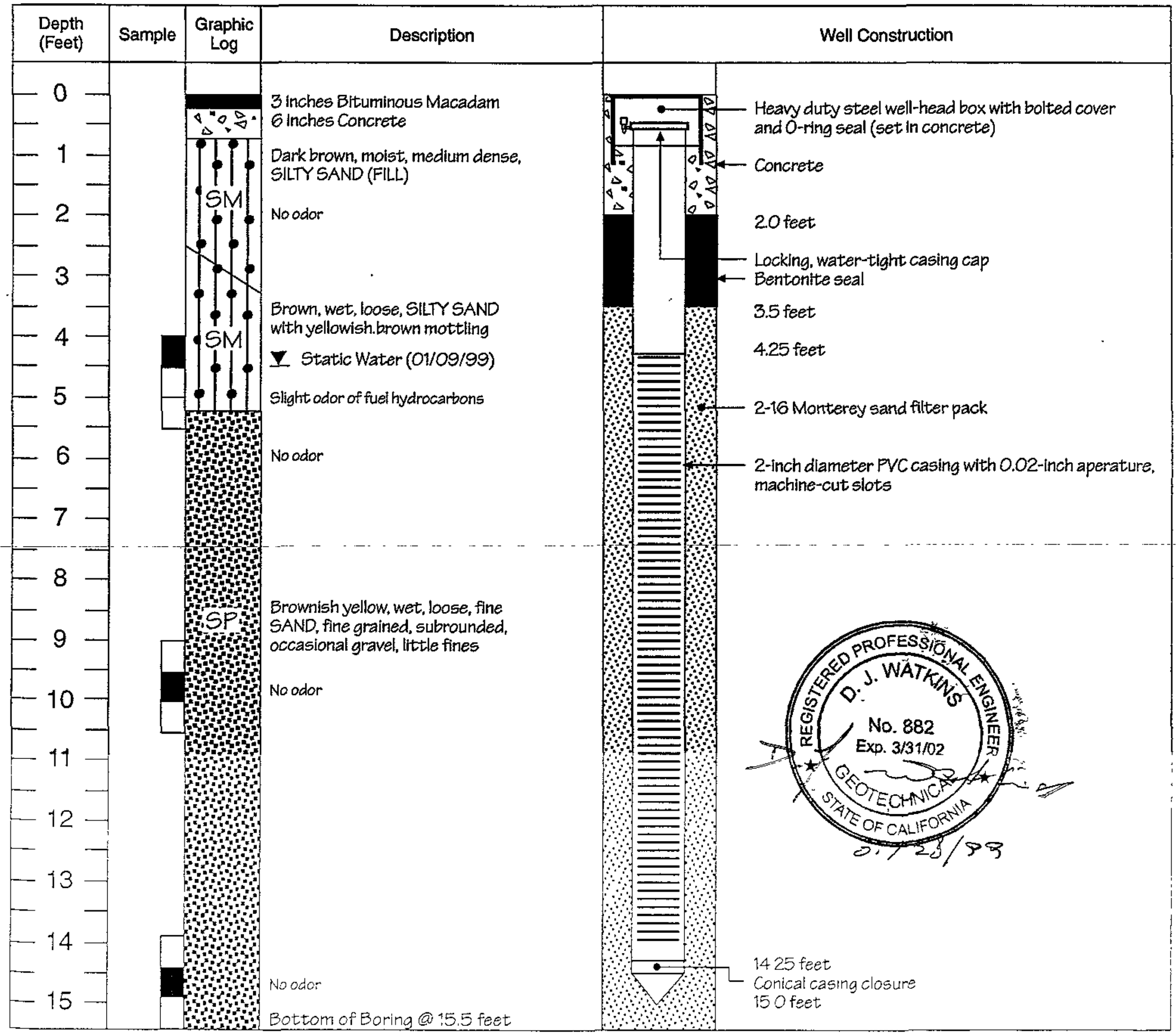
Casing Material: PVC

Drilling Company: Gregg Drilling & Testing, Inc.

Drilling Method: 8-inch Hollow Stem Auger

Driller: Trevor Joyner

Logged By: Dai Watkins



3 inches Bituminous Macadam
6 inches Concrete

Dark brown, moist, medium dense, SILTY SAND (FILL)

No odor

Brown, wet, loose, SILTY SAND with yellowish.brown mottling

▼ Static Water (01/09/99)

Slight odor of fuel hydrocarbons

No odor

Brownish yellow, wet, loose, fine SAND, fine grained, subrounded, occasional gravel, little fines

No odor

No odor

Bottom of Boring @ 15.5 feet

Heavy duty steel well-head box with bolted cover and O-ring seal (set in concrete)

Concrete

2.0 feet

Locking, water-tight casing cap

Bentonite seal

3.5 feet

4.25 feet

2-16 Monterey sand filter pack

2-inch diameter PVC casing with 0.02-inch aperature, machine-cut slots

14.25 feet

Conical casing closure

15.0 feet

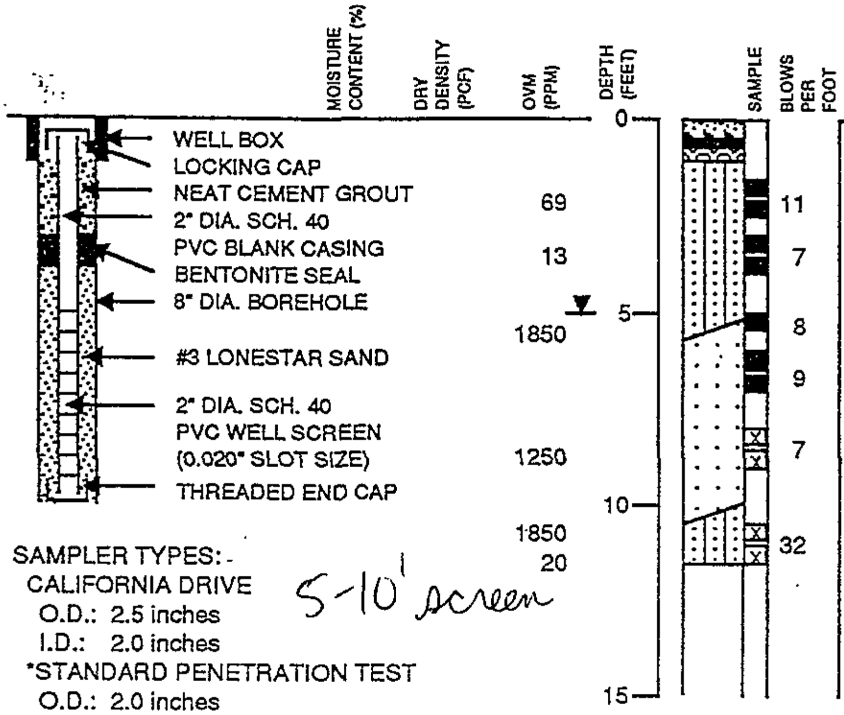
Registered Professional Engineer
D. J. Watkins
No. 882
Exp. 3/31/02
Geotechnical
State of California

01/28/99

From Groundwater Contamination Assessment 208 Jackson St Oakland Ca June 94.

LOG OF TEST BORING MW-4

EQUIPMENT 8" Hollow Stem Auger
DATE DRILLED 5/26/94
ELEVATION 6.74 feet *



CONCRETE SLAB - 6" thick
ASPHALTIC CONCRETE - 2" thick
AGGREGATE BASE - 3" thick
BLACK SILTY SAND (SM)
medium dense, moist, occasional fine gravel (fill)
GROUNDWATER LEVEL DURING DRILLING
gasoline odor at 5 feet
OLIVE GRAY SAND (SP)
medium dense, wet, fine grained

LIGHT BROWN AND GRAY MOTTLED SILTY SAND (SM)
dense, moist

5-10' screen

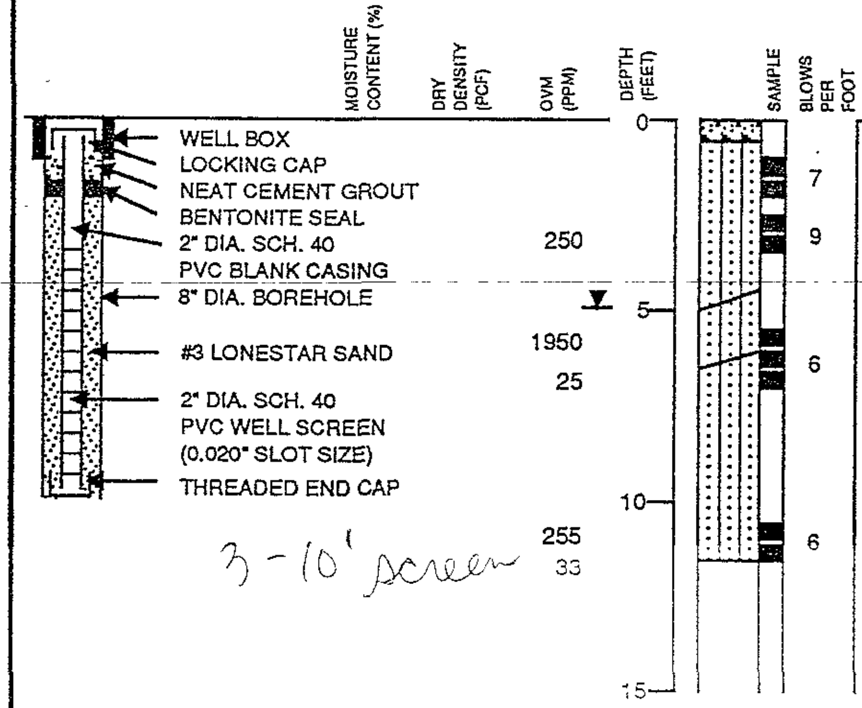
SAMPLER TYPES:
CALIFORNIA DRIVE
O.D.: 2.5 inches
I.D.: 2.0 inches
*STANDARD PENETRATION TEST
O.D.: 2.0 inches
I.D.: 1.4 inches

HAMMER WEIGHT: 140 pounds
HAMMER DROP: 30 inches

* City of Oakland Datum

LOG OF TEST BORING MW-5

EQUIPMENT 8" Hollow Stem Auger
DATE DRILLED 5/26/94
ELEVATION 6.73 feet *



CONCRETE SLAB - 7" thick
BROWN SILTY CLAYEY SAND (SM/SC)
medium dense, moist (fill)
strong gasoline odor
some wood fragments
gravelly at 3.5 feet
GROUNDWATER LEVEL DURING DRILLING
OLIVE GRAY SILTY SAND (SM)
loose, wet, fine grained
BROWN AND GRAY MOTTLED SILTY SAND (SM)
loose, wet, fine grained

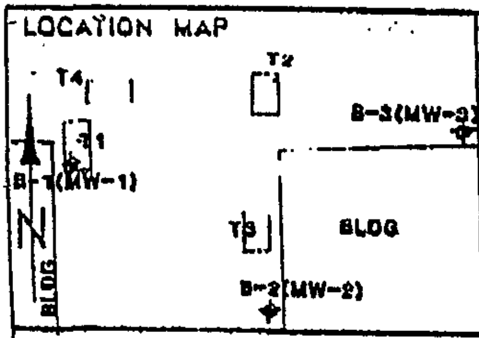
3-10' screen

Subsurface Consultants

208 JACKSON STREET - OAKLAND, CA

JOB NUMBER	DATE	APPROVED	PLATE
886.001	5/31/94	SL	2

LOCATION MAP

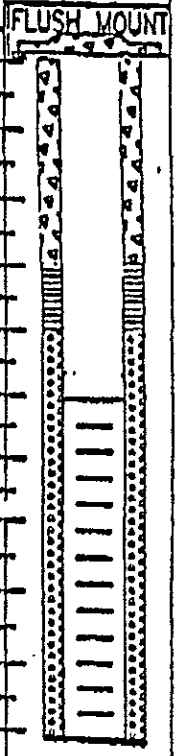


Geo-Environmental Technology **BORING LOG** PAGE 1 OF 1

WELL NUMBER ▶ B-3 (MW-3)		LOCATION ▶ 208 JACKSON ST. OAKLAND,CA	
DATE ▶ 5/5/90		WEATHER ▶ SUNNY, 60's	
LOGGED BY ▶ TOM SMITH		DRILLED BY ▶ AQUA_SCIENCE	
DRILLING METHOD ▶ 8 5/8-INCH HOLLOW_STEM AUGER		SAMPLING METHOD ▶ 18-INCH CALIF. SPLIT-SPOON	
GRAVEL PACK ▶ SAND 10 FEET TO 4 FEET		SEAL ▶ BENTONITE 4 FT TO 3 FT GROUT 3 FT TO 0 FT	
CASING ▶ TYPE SCHEDULE 40	DIAMETER TWO-INCH	LENGTH 5 FT	HOLE DIA. 10-INCH
SCREEN ▶ TYPE PVC SLOT 0,01 INCH	DIAMETER TWO-INCH	LENGTH 5 FT	TOTAL DEPTH 10 FT

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	USCS	LITHOLOGY/REMARKS
						0				
						1				
						2				
damp mst	poor fair	mst sft		1	NA	3	1.3'	3 4 5	ML SC	0.00'-0.50' SILT, brown, clayey. 0.50'-1.30' SAND, brown, mottled, light brown, very fine-grained, clayey.
						4				
						5				
						▽				Water at 5.5 feet.
sat	fair	lse		2	NA	6	1.5'	2 3 7	SC	0.00'-1.50' SAND, yellowish-brown, fine-grained, very clayey.
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

WELL COMPLETION



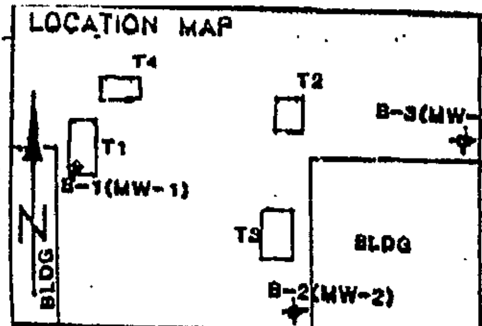
REGISTERED PROFESSIONAL ENGINEER
MATTHEW JAMES WALKER
mjw
No. C 037369
6-30-92
CIVIL
STATE OF CALIFORNIA

PERMIT # 90266

EXPLANATION ▨ GROUT ▤ BENTONITE ○ SAND ▭ CASING ☰ SCREEN ▽ WATER LEVEL

AGENCY Alameda Co.Flood Cntrl. & Wtr Conserv.Destrict

LOCATION MAP

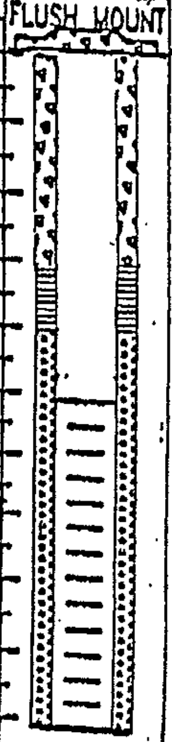


Geo-Environmental Technology **BORING LOG** PAGE __ OF __

WELL NUMBER ▶ B-2(MW-2)
LOCATION ▶ 208 JACKSON ST. OAKLAND,CA
DATE ▶ 5/5/90
WEATHER ▶ SUNNY, 60's
LOGGED BY ▶ TOM SMITH
DRILLED BY ▶ AQUA_SCIENCE
DRILLING METHOD ▶ 8 5/8-INCH HOLLOW_STEM AUGER
SAMPLING METHOD ▶ 18-INCH CALIF. SPLIT-SPOON
GRAVEL PACK ▶ SAND 10 FEET TO 4 FEET
SEAL ▶ BENTONITE 4 FT TO 3 FT GROUT 3 FT TO 0 FT
CASING ▶ TYPE SCHEDULE 40 DIAMETER TWO-INCH LENGTH 5 FT
HOLE DIA. 10-INCH
SCREEN ▶ TYPE PVC SLOT 0.01 INCH DIAMETER TWO-INCH LENGTH 5 FT
TOTAL DEPTH 10 FT

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	USCS	LITHOLOGY/REMARKS
						0				
						1				
						2				
damp mst	poor fair	mst sft		1	NA	3	1.1'	3	ML	0.00'-0.50' SILT, brown, clayey.
						4		1 4	SC	0.50'-1.30' SAND, brown, mottled, light brown, very fine-grained, clayey.
						5				Water at 5.5 feet.
sat	fair	lse		2	NA	6	0.10	2 3 7	SC	0.00'-0.10' SAND, yellowish-brown, fine-grained, very clayey. Very little sample recovery.
						7				
						8				
						9				
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

WELL COMPLETION



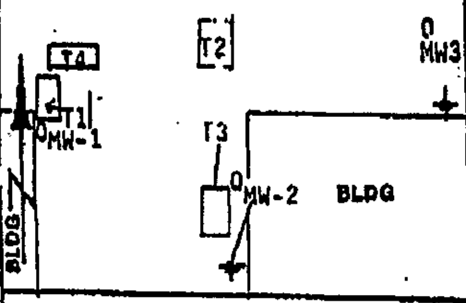
REGISTERED PROFESSIONAL ENGINEER
MATTHEW JAMES WALKER
No. C 037369
6-30-92
CIVIL
STATE OF CALIFORNIA

PERMIT # 90266

EXPLANATION ▨ GROUT ▤ BENTONITE ▨ SAND ☐ CASING ▭ SCREEN ▽ WATER LEVEL

AGENCY: Alameda Co.Flood Cntrl. & Wtr Conserv.Destrict

LOCATION MAP



Geo-Environmental Technology **BORING LOG** PAGE 1 OF 1

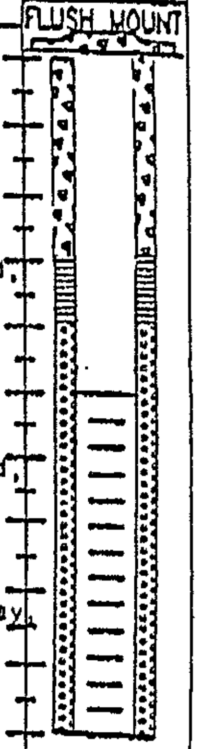
WELL NUMBER	B-1 (MW-1)	LOCATION	208 JACKSON STREET OAKLAND, CALIF.
DATE	5/5/90	WEATHER	SUNNY 60's
LOGGED BY	TOM SMITH	DRILLED BY	AQUA-SCIENCE
DRILLING METHOD	8 5/8-inch HOLLOW-STEM AUGER	SAMPLING METHOD	18-INCH CALIF. SPLIT SPOON
GRAVEL PACK	SAND 10 FEET TO 4 FEET	SEAL	BENTONITE 4 FT TO 3 FT GROUT 3 FT TO 0 FT.

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER TWO-INCH LENGTH 5 FT. HOLE DIA. TEN INCH

SCREEN ▶ TYPE PVC SLOT 0.01 INCH DIAMETER TWO-INCH LENGTH 5 FT TOTAL DEPTH TEN FT

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	USCS	LITHOLOGY/REMARKS
						0				
						1				
						2				
MST	FR	LSE				3		2 2		0,00'-1,50' SAND, grayish-brown, fine-grained, sub-rounded.
				1	NA	4	1,5'	2	SM	
SAT	WELL	LSE				5		2 4		
				2	NA	▼6	0,45	1	SC	0,00'-0,45' SAND, grayish-brown, fine-grained, sub-rounded. Water at 6,0 FT.
						7				
SAT	FR	MDNS				8	1,5'	6		0,00'-1,50' SAND, brown, mottled, greenish-gray, slightly clayey.
				3	NA	9		11 21	SC	
						10				
						11				
						12				
						13				
						14				
						15				
						16				
						17				
						18				
						19				
						20				

WELL COMPLETION



MATTHEW JAMES WALKER
No. C 037369
6-2-92

PERMIT # 90266

EXPLANATION
▨ GROUT
▤ BENTONITE
○ SAND
▭ CASING
☰ SCREEN
▼ WATER LEVEL

AGENCY: Alameda Co. Flood Cntl & Wtr.Conserv.District

APPENDIX II

COMPACTION DATA

SOIL AGGREGATE – MOISTURE DENSITY RELATIONS

PROJECT NAME: 208 Jackson St.

PROJECT NO.: 982-114

SAMPLE DESCRIPTION: Grey Gravelly Sand

LOCATION:

SAMPLE NO.: 0/362

A. Wt. mold+soil	6158	6248	6362	6341	
B. Wt. mold	4295	—	—	—	
C. Wt. wet soil (A–B)	1863	1953	2067	2046	
D. Factor: 4" mold–0.06614 6" mold–0.02939	.06614	—	—	—	
E. Wet Density (CxD)	123.2	129.2	136.7	135.3	
F. Water added	+0	+50	+100	+150	
G. Pan+wet soil	454	452	450	450	
H. Pan+dry soil	434	426	414	406	
I. Pan Tare	48	—	—	—	
J. Dry soil (H–I)	386	378	366	358	
K. Moisture loss (G–H)	20	26	36	44	
L. % Moisture (K/J x 100)	5.2	6.9	9.8	12.3	
M. Dry Density $\left(\frac{E}{1+\frac{L}{100}}\right)$	117.1	120.9	124.5	120.4	

112 3

105.2 106.9 109.8

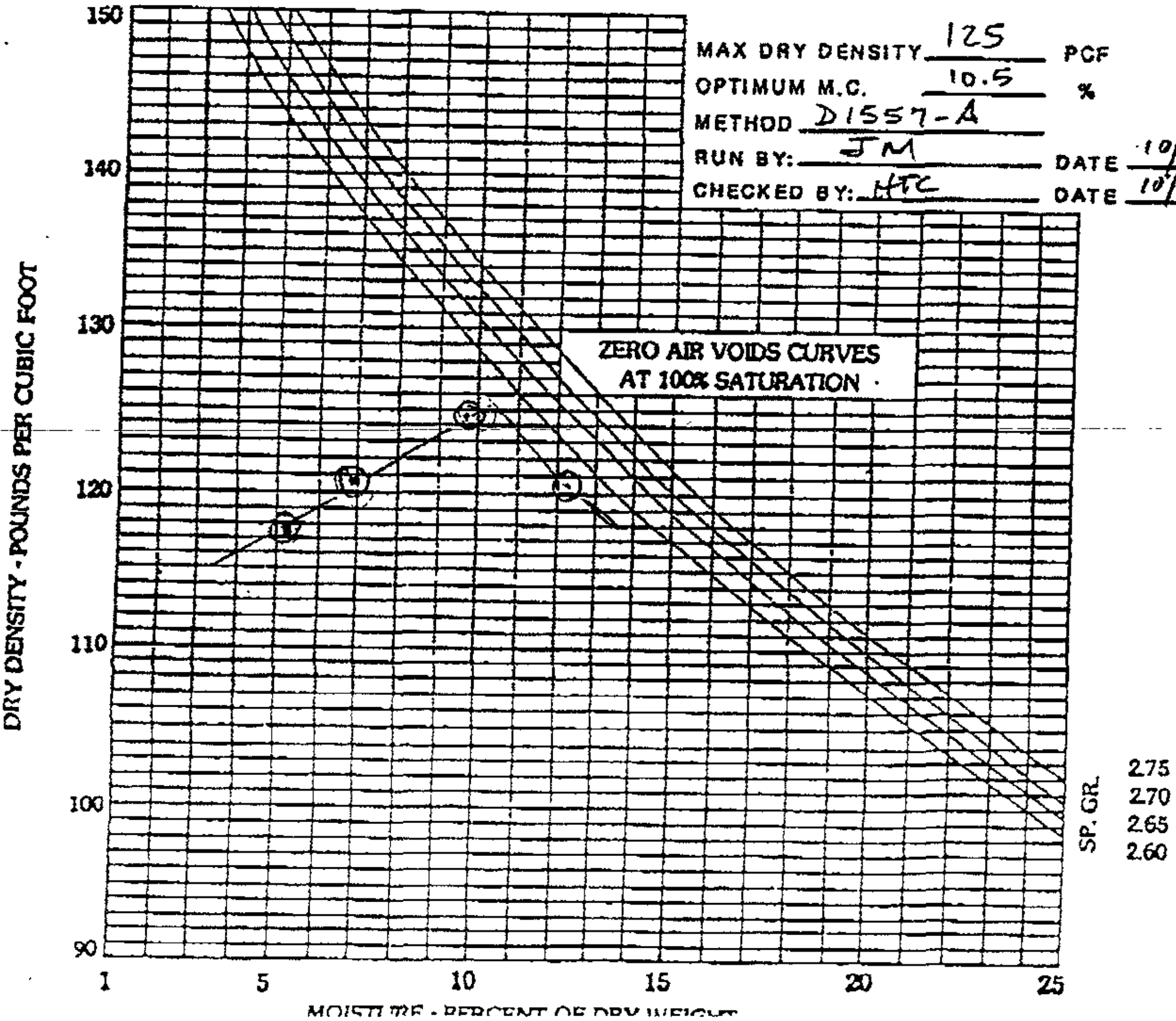
MAX DRY DENSITY 125 PCF

OPTIMUM M.C. 10.5 %

METHOD D1557-A

RUN BY: JM DATE 10/14/98

CHECKED BY: HTC DATE 10/14/98



INSPECTION CONSULTANTS, LP

Job Name 208 JACKSON

Date 10/21/98

ICI Job No. 982-114

Job Address SAME

City OAKLAND

Permit No.

Issued by

Contractor

Subcontractor DIETZ IRRIGATION

Material Description (type, grade, source)

Technician/Inspector

Page 1 of 1

Dept of Building & Safety / City Of

Building Inspector

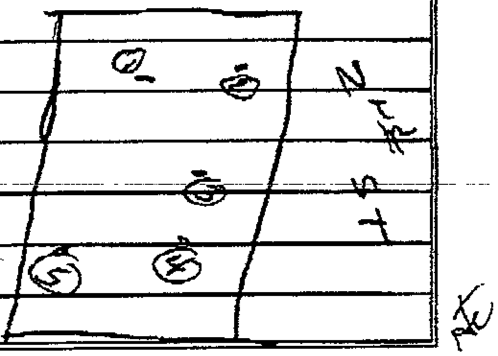
Type of Inspection Required

☐ Reinforced Concrete
☐ Post Tensioned Concrete
☐ Reinforced Masonry
☐ Structural Steel Assembly
☐ Fire Proofing
☐ Epoxy Anchors
☑ Earthwork
☐ Quality Control
☐ Other

Inspection Summary Locations of work inspected, test samples taken, work rejected, job problems, progress, remarks, etc. Includes information about - amounts of material placed or work performed, number, type & identification numbers of test samples taken: Structural connections (welds H.S. Bolts inspected) checked, etc.

Comments: upon site arrival crew had placed and compacted material for building Pad. several Nuclear soil Test were performed at various locations of the ⑤ test performed ② passed, ③ failed will Recompact & test at later date

1	86.0%	12.0	107.5
2	95.0%	9.7	118.4
3	90.7	9.0	113.4
4	95.0	8.1	118.7
5	88.7	9.0	110.9



CERTIFICATION OF COMPLIANCE

I hereby certify that I have inspected to the best of my knowledge all of the above reported work unless other noted. I have found this work to comply with the approved plans, specifications, and applicable sections of the governing building codes. Non-Compliance conditions noted were brought to the attention of

Inspector

Compliance ☑ Yes ☐ No

Time In	Time Out	Total Reg. Hrs	Total O.T. Hrs
Billing Code	Billing Code	Billing Code	Billing Code

All inspections based on a minimum of 4 hours and over 4 hours - 8 hour min. In addition, any inspection extending past noon hour will be an 8 hour min.

Client Authorization

EXPRESS PRINTING CENTER (916) 638-0322

White - Office Copy ◆ Canary - Client Copy

INSPECTION CONSULTANTS, LP

Project Name 208 JACKSON ST	Client or Owner	Job No. 982-114
General Location of Work OAKLAND	Owner or Clients Representative	Date-Day of Week 10/26/98 MON
General Contractor DIETZ IRRIGATION	Subcontractor	Project Engineer
Type of Work Nuclear Soil TEST	Subcontractor's Superintendent or Foreman	Permit No.
Assignment Cancelled By:	Page 1 of 2 · Weather SUNNY	Technician C. Hills

Daily Field Report upon site arrival crew had compacted and backfill pad. Nuclear soil TEST were performed at various locations and depths. All recorded test were within job guidelines and specifications.

	Density	M.C.	%. Compact.	Depth.	
1	117.1	8.4	94%	-1	ReTEST
2	116.9	8.4	94	-1	ReTest
3	121.3	7.6	97	-1	
4	122.5	7.7	98	-1	ReTest
5	117.0	8.5	94	.2	
6	121.1	7.9	97	.2	
7	122.3	7.5	98	GD	
8	120.5	8.1	96	GD	
9	121.7	7.9	98	GD	

{"SEE DRAWING for TEST LOCATIONS"}

Conformance

Non-compliance conditions noted were brought to the attention of ____________________ for corrective action. Work observed was to the best of my knowledge, in conformance with the (approved) project plans specification, and applicable standards of workmanship; with the exception of items noted above.

☐ Comments Attached

Inspector Carl Hills

INSPECTION CONSULTANTS, LP

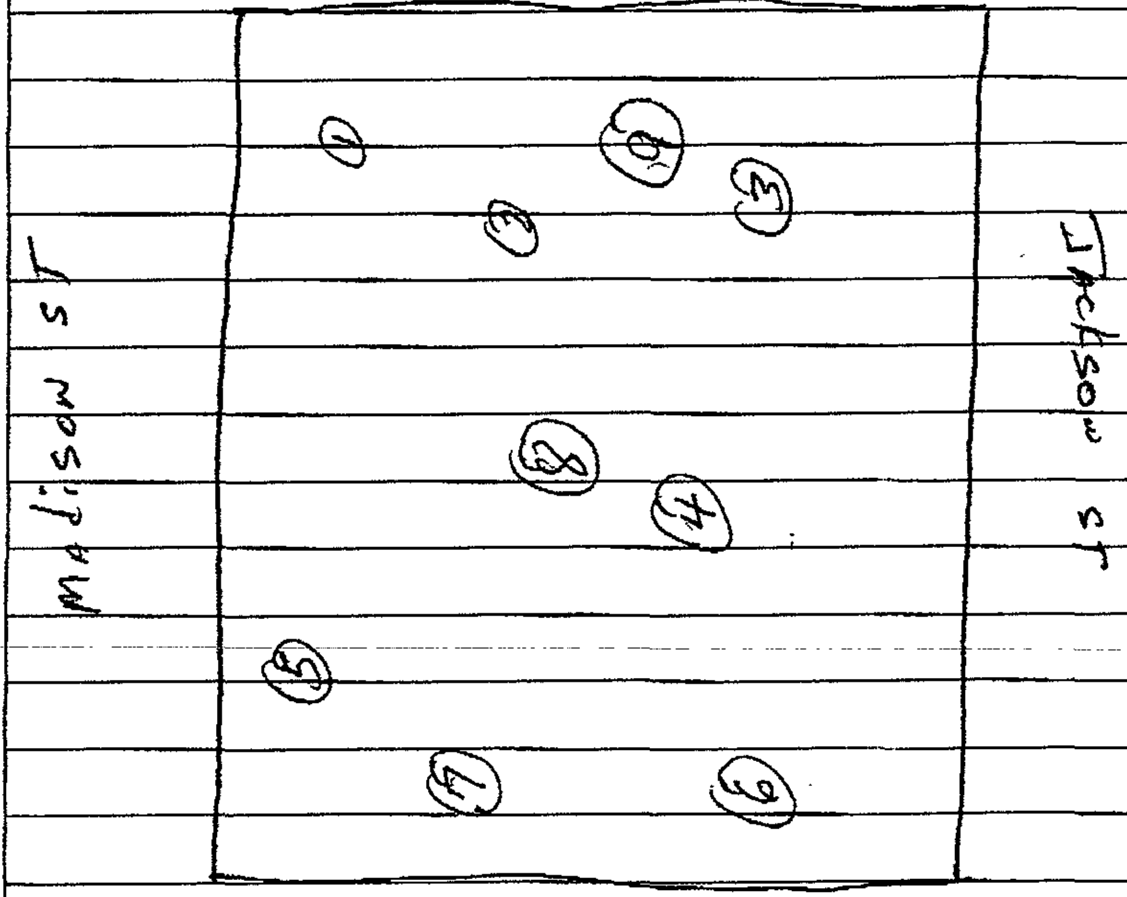
Project Name 208 JACKSON ST	Client or Owner	Job No. 982-114
General Location of Work Oakland	Owner or Clients Representative	Date-Day of Week 10/26/98
General Contractor DIETZ IRRIGATIONS	Subcontractor	Project Engineer

Type of Work Nuclear Soil Test	Subcontractor's Superintendent or Foreman	Permit No.

Assignment Cancelled By:	Page 2 of 2	Weather Sunny	Technician C. Hills

Daily Field Report

2nd ST.



Conformance

Non-compliance conditions noted were brought to the attention of ______________________ for corrective action. Work observed was to the best of my knowledge, in conformance with the (approved) project plans specification, and applicable standards of workmanship; with the exception of items noted above.

☐ Comments Attached

Inspector Carl