LRO 232

SITE CONCEPTUAL MODEL

FOR

FORMER USA STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Prepared for

USA GASOLINE CORPORATION

May 6, 2005

Prepared by

STRATUS
ENVIRONMENTAL, INC.

3330 Cameron Park Drive, Suite 550
Cameron Park, California 95682

Project No. 2007-0057-01

STRATUS ENVIRONMENTAL, INC.

3330 Cameron Park Drive, Ste 550
Cameron Park, California 95682
(530) 676-6004 ~ Fax: (530) 676-6005

May 6, 2005

Mr. Amir Gholami
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502

Re: Site Conceptual Model
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Dear Mr. Gholami:

This Site Conceptual Model was prepared under the supervision of the undersigned.

STRATUS ENVIRONMENTAL, INC.

Stephen J. Carter, P.G.
Senior Project Supervisor

PROFESSIONAL GEOLOGIST
Stephen S. Carter
No. 5577
STATE OF CALIFORNIA

Gowri S. Kowtha, P.E.
Project Manager

REGISTERED PROFESSIONAL ENGINEER
GOWRI SHANKAR KOWTHA
No. C 63413
Exp. 9/30/06
CIVIL
STATE OF CALIFORNIA

cc: Mr. Chuck Miller, USA Gasoline Corporation
Mr. Ken Phares, Jay-Phares Corporation
Mr. Peter McIntyre, AEI Consultants

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1 EXECUTIVE SUMMARY

Stratus Environmental, Inc. (Stratus), on behalf of USA Gasoline Corporation (USA), has prepared the following Site Conceptual Model (SCM) for former USA Station No. 57, located at 10700 MacArthur Boulevard, Oakland, California (Figure 1). This SCM contains tables and figures that have been generated as part of assessment activities previously conducted at the site. The SCM also includes a brief description of the site, summarizes the extent of petroleum hydrocarbon impact to soil and groundwater, and identifies transport and exposure pathways. A summary of this SCM is provided in Table 1.

A total of twenty soil borings have been installed at the site, eight of which were completed as groundwater monitoring wells. Site assessment studies conducted to date have explored to a maximum depth of 44 feet below ground surface (bgs). Lithologic conditions encountered during drilling consisted of at least 10 to more than 44 feet bgs of interbedded fine-grained (silt and clay) and coarse-grained sediments (silty and clayey sand, gravelly sand, clayey gravel). A laterally continuous stratum of sandy and clayey gravel is encountered at approximately 11 to 25 feet bgs. These interbedded strata overlay deeply weathered, highly fractured, silty sandstone, siltstone, claystone, and chert (bedrock). The contact between the sediments and the underlying bedrock appears to dip toward the north at approximately 25° from horizontal.

Depth to groundwater in the monitoring wells at the site has fluctuated between approximately 7 and 21 feet bgs since the monitoring program was initiated in 1995. Groundwater fluctuations do not appear seasonally related. Since monitoring was initiated, groundwater elevations appear to generally decrease in wells S-1, S-2, and MW-5, and to generally increase in wells MW-3 and MW-7. Historically, groundwater flow has been towards the north, south, southwest, southeast and southeast, radial around wells S-1, S-2, and MW-7, and radial away from well MW-3. Groundwater flow gradients have ranged from 0.001 to 0.086.

In the vadose zone, petroleum hydrocarbon impact appears to be limited to the vicinity of the former underground storage tanks (UST's) and the former dispenser islands. Petroleum hydrocarbon impact extends vertically to groundwater. Based on available soil analytical data, and assuming no degradation, Stratus estimates that approximately 141 kilograms (311 pounds [lbs]) of total petroleum hydrocarbons as gasoline (TPHG) remain in the vadose zone.

Except in the vicinity of the southwest corner of the former UST pit (borings B-1, B-2, B-3, and MW-3), the extent of vadose zone impact appears to be adequately characterized. Impact is limited laterally to the vicinity of the former UST pit, dispensers, and product piping trench. Impact extends vertically to groundwater. At the furthest extent of excavation, impact in the former UST pit appears limited to the walls and base in the southern corner of the pit. Over-excavation was not performed beneath the former dispenser islands, but based on data from the adjacent product piping trench, impact beneath the islands is likely limited to 10 feet bgs.

Petroleum hydrocarbon impact to groundwater appears to be restricted to the vicinity of wells S-1, S-2, MW-3, and MW-7. Historical analytical data suggest a generally decreasing trend in dissolved concentrations. The highest concentrations of dissolved hydrocarbons are consistently reported in well S-2. Historical analytical data suggest that the plume configuration is stable. The estimated mass of TPHG, benzene, and methyl tertiary butyl ether (MTBE) in groundwater (based on first quarter 2005 data) is 5.5 lbs, 0.4 lbs, and 0.3 lbs, respectively.

Excavation at the time of UST removal (July and October, 1994) appears to have removed approximately 148.40 pounds of TPHG, 0.07 pounds of benzene, and 18.72 of total petroleum hydrocarbons as diesel (TPHD). Dual phase extraction (DPE) feasibility testing performed in 2004 attained groundwater extraction rates between 0.07 and 2.80 gallons per minute (gpm), achieving TPHG extraction rates up to 0.001 pounds per day (lbs/day). Soil vapor extraction rates of 86 to 87 cubic feet per minute (cfm) achieved TPHG extraction rates up to 5.16 lbs/day. These data indicated that DPE was a technically viable remedial option to address both residual hydrocarbon impact in the vadose zone and dissolved impact in the groundwater.

There do not appear to be any complete pathways at the site for exposure to hydrocarbon compounds. Redevelopment plans for the site may lead to complete exposure pathways for inhalation exposure in indoor air, and for dermal contact with impacted groundwater. The nearest identified water supply well appears to be located approximately 1,000 feet to the southwest (irrigation well). This well does not appear threatened by hydrocarbon impact for the USA site.

Based on available soil analytical data, concentrations of TPHG, TPHD, and benzene, toluene, ethylbenzene, and total xylenes (BTEX) compounds remain in the soil in the vicinity of the former UST pit and former dispensers at concentrations above current Regional Water Quality Control Board (RWQCB) Environmental Screening Levels (ESL's). It is our understanding, based on discussions with Jay-Phares Corporation, that current redevelopment plans for the site call for removal of up to 15 feet of soil in the area of the former UST pit and former dispensers, which would remove most of the soil impact. A limited area near the southern corner of the former UST pit will likely still contain residual hydrocarbons above ESL's, but over-excavation in this area could remove impacted soil above ESL's.

Based on the current groundwater monitoring analytical data, groundwater is impacted with TPHG, BTEX compounds, MTBE, tertiary butyl alcohol (TBA), and 1,2-dichloroethane (1,2-DCA) at concentrations above ESL's. Additional DPE mass removal events (approximately 30 days duration), prior to redevelopment, has been proposed for this site, which should reduce hydrocarbon concentrations significantly in both soil (vadose zone) and groundwater prior to implementation of the proposed redevelopment plans.

2 SITE DESCRIPTION

2.1 Site Description

Former USA Station 57 is situated in eastern Oakland, California, near the Oakland-San Leandro boundary. The site is currently an undeveloped, partially paved parcel situated on the western corner of the intersection of 108th Avenue and Foothills Boulevard, adjacent to Interstate 580 (Figure 1). This parcel comprises the eastern corner of the Foothills Square Shopping Center. The site is bounded to the northeast by Foothill Boulevard, and to the southeast by 108th Avenue. The southwest and northwest edges of the site are bounded by parking area associated with the adjacent shopping center (Figure 2). Photographs of the current site conditions are included in Appendix A.

The subject site previously operated as USA Gasoline Station No. 57. The former service station configuration included three 12,000-gallon gasoline and one 8,000-gallon diesel UST's and three dispenser islands. The station was closed, and the UST's, dispensers, and associated product piping were removed in July 1994. The approximate former locations of the UST's and dispenser islands are shown on Figure 3

2.2 Topography and Surface Conditions

From the subject site, topography slopes moderately toward the southwest, down the East Bay Plain toward San Francisco Bay. Immediately northeast of the site, the San Leandro Hills rise sharply out of the plain (Figure 1).

The site itself is generally flat. The ground surface remains partially paved with asphalt and concrete, except for the former UST pit and former dispenser islands. The eastern corner of the site is covered with a large stockpile (reported to be approximately 3,000 cubic yards [yd^3]) of soil excavated from another area of the shopping center as part of a separate environmental investigation.

2.2.1 Drainage

The surface run-off from the site appears to flow into storm drains located in the parking area of the shopping center (Figure 2). Run-off from Foothill Boulevard and 108th Avenue is directed to storm drain catch basins by concrete roadside gutters. The nearest surface water appears to be San Leandro Creek, situated approximately 4,000 feet to the south, and Seneca Reservoir, approximately 5,000 feet to the north-northeast (Figure 1).

2.2.2 Zoning and Land Use

All properties in the immediate vicinity of the site have been developed. Single- and multiple-family dwellings are situated to the southeast (across 108th Avenue). Interstate Highway 580 is located to the northeast (across Foothill Boulevard). A retail shopping center is situated immediately to the southwest and northwest. Knowland State Arboretum and Park and Lake Chabot Municipal Golf Course are located in the San

Leandro hills northeast and east of the site, respectively. Several small urban parks are situated to the south-southeast and southeast of the site. The closest of these parks is over 3,000 feet from the site. (Figure 1). Based on the City of Oakland Planning and Zoning Department (http://www.oaklandnet.com/maproom/), the subject site and adjacent shopping center are zoned for commercial use. Properties in the vicinity of the site are zoned for commercial and residential use.

2.2.3 Meteorology Data

The climate in the vicinity of the site generally consists of mild to hot summers with infrequent precipitation, and mild winters with intermittent rainfall events and foggy conditions. A California Irrigation Management Information System (CIMIS) weather station in Union City, California (Station No 171) reported an average air temperature of 57.4 degrees Fahrenheit (°F), an average maximum temperature of 67.7 °F, an average minimum temperature of 48.0 °F, an average wind speed of 3.5 miles per hour, and an average total precipitation of 26.81 inches between May 1, 2004, and April 11, 2005 (http://wwwcimis.water.ca.gov/cimis/). Meteorological conditions at the subject site should be generally similar to the data collected at the Union City weather station.

3 SUMMARY OF SITE ASSESSMENT ACTIVITIES

Assessment of petroleum hydrocarbon impact at the site was initiated in 1987. Several consultants have been involved in site characterization activities at this site. The following is a brief summary of assessment activities conducted to date. Locations of all soil borings and wells are included on Figure 3.

- Pacific Environmental Group installed two groundwater monitoring wells (S-1 and S-2) and four soil borings (A through D) in February 1987. This investigation was performed as part of a potential real estate transaction, not in response to a reported release.

- Three 12,000-gallon USTs and one 8,000-gallon UST were removed in July 1994. Soil sampling and over-excavation activities were overseen by Western Geo-Engineers. Additional excavation in the southern corner of the former UST pit was performed in October 1994 under the direction of Alton Geosciences.

- Alton Geoscience installed one groundwater monitoring well (MW-3) and six soil borings (B-1 through B-6) in February and March 1995.

- Alton Geoscience installed five groundwater monitoring wells (MW-4 through MW-8) in November 1995.

- Groundwater monitoring and sampling was initiated in 1995.

Boring logs and well construction details are presented in Appendix B, and are summarized on Table 2. Historical soil analytical data are summarized in Appendix C. Historical groundwater monitoring and chemical analytical data are included in Appendix D.

4 SUBSURFACE CONDITIONS

4.1 Geologic Conditions

4.1.1 Regional Setting

The subject site is situated on the eastern edge of the East Bay Plain, a broad, gently sloping area of sedimentary deposits on the eastern shore of San Francisco Bay. In the site vicinity, these sediments are mapped as Late Pleistocene alluvium, consisting of weakly consolidated, slightly weathered, poorly sorted, irregularly interbedded clay, silt, sand, and gravel, interpreted to be alluvial fan and fluvial deposits of the Holocene age. These alluvial fan deposits extend westward over the Alameda formation, the major basin filling unit in the area. In the immediate site vicinity, the Hayward Fault separates the sediments of the East Bay Plain from the igneous rocks (gabbros, keratophyres, and quartz keratophyres) that comprise the western portion of the adjacent San Leandro Hills (Helley and others, 1979; Figuers, 1998; Graymer, 2000).

4.1.2 Subsurface Geologic Conditions

Site assessment studies conducted to date have explored to a maximum depth of 44 feet bgs. A total of twenty soil borings were advanced, eight of which were completed as groundwater monitoring wells (S-1, S-2, and MW-3 through MW-8). Interpreted geologic relationships are illustrated on geologic cross section A-A' (Figure 4). Additional geologic cross sections constructed during previous investigations, and site plans illustrating the surface traces of those cross sections, are presented in Appendix E.

Based on boring logs from subsurface investigations, the subject site is underlain by interbedded strata consisting predominantly of unconsolidated fine-grained sediments (silt and clay) and coarse-grained sediments (silty and clayey sand, gravelly sand, and clayey gravel). These interbedded strata extend from at least 10 feet to more than 44 feet bgs. Within this unit of unconsolidated sediments, a stratum of sandy and clayey gravel is encountered at approximately 25 feet below ground surface (bgs) beneath the northern portion of the site, and at approximately 11 feet bgs beneath the southern end of site.

These interbedded strata of clay, silt, sand, and gravel overlay deeply weathered, highly fractured silty sandstone, siltstone, claystone, and chert. This sandstone, siltstone, claystone, and chert unit has been interpreted by others as bedrock, although it should be noted that the borings into this material were advanced using hollow-stem augers, and samples of the material were collected using a modified California split-spoon sampling device. Gravel-sized clasts were reported within the bedrock unit in some of the borings. Field notes from Western Geo-Engineers (1994) suggest chert is also present. The contact between the sediments and the underlying sandstone/siltstone appears to dip toward the north at an apparent angle of approximately 25° from horizontal.

4.2 Hydrogeology

Historical groundwater depth-to-water data indicate that groundwater has fluctuated between approximately 7 and 21 feet bgs in the monitoring well network since monitoring and sampling was initiated in 1995 (the initial depth-to-water reading for well MW-8 of 33.33 on November 22, 1995, appears anomalous and was not included in discussions or graphical representations of historical groundwater conditions). The greatest amount of fluctuation (12.18 feet, from 7.38 to 19.56 feet bgs) is observed in well MW-5, and the smallest amount of fluctuation (10.20 feet, from 5.88 to 16.08 feet bgs) is observed in well MW-4, indicating a smear zone approximately 10 to 12 feet thick.

Based on the historical depth-to-water data (Appendix D), the well screens in wells S-1, S-2, and MW-3 through MW-7 appear to have been submerged during some or all of the life of the wells (well construction details summarized in Table 2). Wells MW-4 and MW-5 are the only wells not constructed with some or all of the screened intervals placed within the sandstone/siltstone/claystone bedrock (lithologic logs and well construction details are included in Appendix B, and are summarized on Figure 4). While these wells may not be ideally constructed, they none the less appear to adequately monitor subsurface hydrogeologic conditions beneath the site.

As shown on the hydrographs in Appendix F, the fluctuations observed in the monitoring well network do not appear to be seasonally related. The hydrographs suggest that groundwater elevations are generally decreasing in wells S-1, S-2, and MW-5, increasing in wells MW-3 and MW-7, and are not increasing or decreasing in wells MW4 and MW-8 (there is not enough data for well MW-6 to evaluate the groundwater elevation trend in this well).

Historically, groundwater flow has been toward the north, south, southwest, southeast, radial toward wells S-1, S-2, and MW-7, and radial away from well MW-3. Groundwater gradients have ranged from 0.001 to 0.089 feet/feet. During the most recent monitoring event (January 9, 2005), groundwater was measured between 10.34 and 20.33 feet bgs, with groundwater flow radial toward wells S-1, S-2, and MW-7, and radial away from well MW-3 (Figure 5). Available historical groundwater elevation contour maps for the site are included in Appendix G.

4.3 Utilities

A utility survey performed by California Underground Utilities on April 22, 2005, identified the presence of water, sewer, and electrical lines beneath the subject site. The approximate locations of these utilities are shown on Figure 3. Burial depths of these utility lines were not identified during the survey. However, based on our experience at similar service station sites, we expect the utilities to be buried approximately 2 to 3 feet bgs. The assumed burial depths are shown on Figure 4. Based on the locations identified during the April 22, 2005, survey and the assumed burial depths, these utilities do not appear situated to act as preferential pathways for hydrocarbon plume migration.

Work performed by others has identified the presence of water, electrical, natural gas, storm drain, and telephone lines beneath the adjacent shopping center parking lot (Figure 2). The burial depths of these utilities were not identified. These utilities appear situated outside the area of soil or groundwater impact associated with the USA facility.

4.4 Extent of Petroleum Hydrocarbon Impact

4.4.1 Extent of Residual Petroleum Hydrocarbon Impact

TPHG and benzene concentrations in soil are summarized in Figures 6 and 7. Iso-concentration maps of TPHG concentrations in soil at various depths beneath the site are included in Appendix H.

Former UST Pit

Petroleum hydrocarbons have impacted soil in the vicinity of the former UST pit, and impact appears to extend to the saturated zone. Based on analytical data from soil samples collected at the furthest extent of excavation, impact remains in the western and southwestern walls of the pit (Figure 6). Samples collected at 12 to 13 feet bgs from the pit walls in this area reported up to 9.6 milligrams/kilogram (mg/Kg) of benzene and 2,400 mg/Kg of TPHG (this TPHG concentration is not shown on Figure 6; it was from a sample collected by Alton Geosciences and the sample location was not indicated in the material reviewed). As inferred from the cross-section (Figure 4), soil in this area consists of silty and clayey gravel. The base of the UST pit was excavated to depths between 15.5 and 20 feet bgs. TPHG and benzene were also reported in samples collected from the base of the UST pit (up to approximately 20 feet bgs) at concentrations up to 620 and 1.1 mg/Kg, respectively. The highest concentrations were reported in the sample collected from 20 feet bgs in the southern corner of the pit. Field notes indicate the material at this location was bedrock, described as indurated, fractured chert with claystone (Western Geo-Engineers, 1994).

Former Product Dispensers

TPHG and benzene were reported in five of the six soil samples collected beneath the former dispenser islands. These samples were collected between 3 and 3.5 feet bgs in what is inferred from the cross-section (Figure 4) as silt and clay grading into silty and clayey sand. As shown on Figure 6, the highest concentration of TPHG (1,800 mg/Kg) and benzene (0.72 mg/Kg) reported from the dispenser island samples were in sample DI-6, collected from the eastern end of the northern island. The vertical extent of impact beneath the former dispenser islands is not completely characterized.

Former Piping Trench

Hydrocarbons were reported in only one of the five soil samples collected from the former product piping trench. This sample (PI-2, between the middle and northern islands, Figure 6), collected from 3.5 feet bgs, reported TPHG at a concentration of 4,500 mg/Kg. Limited excavation in the area of this sample deepened the pit to

approximately 9 feet bgs. A confirmation sample collected at the base of this pit (PI2-0, Figure 6) reported TPHG at 15 mg/Kg and benzene at 0.02 mg/Kg. Soil conditions beneath the former piping trench are inferred to be similar to those under the former dispensers.

Soil and Well Borings

Near the former UST pit, soil samples collected from borings B-1 and MW-3 (west of the former UST pit) at depths between 9.5 and 35 feet bgs were reported to contain TPHG at concentrations up to 540 mg/Kg and benzene concentrations up to 2.6 mg/Kg. East of the former UST pit TPHG was reported in soil samples collected in boring B-2 between 16 and 26 feet bgs at concentrations of 16 to 240 mg/Kg. Benzene concentrations in these samples ranged from 0.057 to 0.96 mg/Kg. Soil analytical data from exploratory soil borings drilled adjacent to the former dispenser islands, former product line trench, and former UST pit suggest that the lateral extent of impact near the former dispenser islands and former product line trench has been adequately characterized. Soil impact south and southeast of borings B-2 and B-3 is not completely characterized. Soil impact west of borings B-1 and MW-3 is also not completely characterized. With these exceptions, impacted soil remaining in the UST pit and beneath the dispenser islands at the furthest extent of excavation appears to be adequately characterized.

The highest residual concentrations are reported in samples collected within the interbedded sedimentary strata. Near the southern corner of the UST pit, low concentrations of residual hydrocarbons have also been reported in samples collected from the claystone/siltstone, at depths up to 8 feet below the inferred contact between the sedimentary unit and the bedrock. Based on the iso-concentration maps, approximately 141 Kg of TPHG remains in the vadose zone soil (311 lbs). Mass calculations are included in Appendix H.

4.4.2 Extent of Dissolved Hydrocarbons

Free product has not been observed at this site, but a sheen has been observed in well S-2 on a sporadic basis, most recently in July 2004, at the conclusion of the DPE feasibility testing.

TPHG, BTEX compounds, MTBE, TBA, and 1,2-DCA are consistently reported in wells S-1, S-2, and MW-3. MTBE is also consistently reported in well MW-7. The highest concentrations of TPHG, benzene, MTBE, TBA, and 1,2-DCA are consistently reported in well S-2. Very low concentrations of TPHG, benzene, and MTBE have also been reported on a sporadic basis in wells MW-4, MW-5, MW-6, and MW-8. TPHG, benzene, and MTBE concentrations for the first quarter 2005 are summarized in Figure 8. Based on these data, benzene, MTBE, and 1,2-DCA are present at concentrations above their current Maximum Contaminant Levels (MCL's) of 1.0 micrograms per liter (µg/L), 13 µg/L (primary MCL), and 0.5 µg/L, respectively.

Based on plots of historical TPHG, benzene, and MTBE concentrations (Appendix F), there does appear to be a general decrease of dissolved petroleum hydrocarbons in wells

S-1, S-2, MW-3, and MW-7. TPHG and benzene concentrations in wells S-1, S-2, and MW-3 appear to show this decreasing trend. The dissolved MTBE concentrations in wells S-1 and MW-7 also appear to have a downward trend, while the MTBE concentration trend in well S-2 appears flat, and the MTBE concentration trend in well MW-3 appears to be increasing. Concentrations of 1,2-DCA in wells S-1, S-2, and MW-3 appear to be decreasing, while the TBA concentrations in these wells appears flat. Historical groundwater chemical analytical data are summarized in Appendix D. These data suggest the extent of dissolved hydrocarbon impact has been adequately characterized, and the dissolved hydrocarbon plume configuration appears relatively stable. However, the available data are not adequate to evaluate if the dissolved hydrocarbons penetrate the soil/bedrock interface to any great extent, or the extent to which fracture flow might influence dissolved hydrocarbon distribution beneath the site.

Iso-concentration contours for TPHG, benzene, and MTBE concentrations reported during the first quarter 2005 sampling event are included in Appendix I. Based on these iso-concentration contours, approximately 2,490 grams of TPHG (5.5 lbs), 169 grams of benzene, (0.4 lbs), and 158 grams of MTBE (0.3 lbs) remain in the groundwater beneath the site. While the limited number of data points makes construction of viable iso-concentration maps problematic, the overall decreasing trends in dissolved concentrations of TPHG, benzene, and MTBE suggest that the mass of dissolved hydrocarbons in the groundwater beneath the site have likely decreased since removal of the UST's and dispensers, while the lateral extent of dissolved impact appears relatively unchanged.

5 REMEDIAL ACTIONS

- Approximately 775 cubic yards of soil were reported excavated under the direction of Western Geo-Engineers after removal of UST's in 1994. Based on an arithmetic mean of concentrations reported for samples from the soil stockpile, approximately 148.40 Kg (327.17 lbs) of TPHG, 0.07 Kg (0.15 lbs) of benzene, and 18.72 Kg (41.27 lbs) of TPHD were removed with the stockpiles. Tabulated stockpile analytical data are included in Appendix C. Calculations of mass removed are included in Appendix H.

- Stratus Environmental Inc. performed a DPE test in 2004. Soil vapors and groundwater were extracted from wells S-1, S-2, MW-3, and a combination of all wells simultaneously. The test was able to achieve groundwater extraction rates between 0.07 and 2.80 gpm, and soil vapor extraction rates between 86 to 87 cfm. The induced groundwater radius of influence during the test was limited. In groundwater, hydrocarbon mass was extracted at estimated rates up to 0.001 lbs/day of TPHG, 0.00001 lbs/day of benzene, and 0.001 lbs/day of MTBE. In soil vapor, hydrocarbon mass was extracted at estimated rates up to 5.16 lbs/day of TPHG, 0.01 lbs/day of benzene, and 0.01 lbs/day of MTBE. These test data indicated that DPE was a technically viable technology to address the impact beneath the site.

- The report recommended additional DPE to further reduce hydrocarbon mass, especially in the vadose zone. Tables summarizing analytical data and field measurements from the DPE test are included in Appendix J.

6 POTENTIAL EXPOSURE PATHWAYS AND SENSITIVE RECEPTORS

An exposure pathway model for the site is presented in Figure 9. The primary potential source of exposure (leaking UST's, piping, and dispensers) were removed from the site in 1994. Potential secondary sources for exposure include residual hydrocarbons in subsurface soil and dissolved petroleum hydrocarbons in groundwater.

6.1 Potential On-site Exposure Pathways

The primary sources for exposure to gasoline and related compounds (leaking UST's, piping, and dispensers) have been removed. Secondary sources of potential exposure at this site include residual hydrocarbons in the vadose zone soil, and dissolved hydrocarbons in the groundwater. While TPHD has been reported in soil and groundwater samples, the primary compounds of concern at this site appear to be TPHG, BTEX, MTBE, TBA, and 1,2-DCA.

Exposure to the secondary sources of petroleum hydrocarbons at the site (impacted soil and groundwater beneath the site) appears limited. Potential transport mechanisms associated with these secondary sources include exposure of impacted soil to human contact (dermal contact and ingestion), volatilization of residual hydrocarbons in the vadose zone and in groundwater (inhalation), and exposure to impacted groundwater through pumping (dermal contact and ingestion).

6.1.1 Potential for Human Contact

Surface soil at the site is not impacted. There is no surface water at the site or in the immediate vicinity. Exposure of construction workers to impacted soil (or groundwater, depending on the depth of excavation and the depth to water) may be possible during planned redevelopment activities. If construction workers are properly trained for this type of work (e.g. taking precautions to properly check, and if necessary, ventilate excavations in the impacted areas; taking proper measures to monitor air quality and utilize breathing respirators where appropriate; wearing the proper clothing while working at the site; and washing prior to eating or drinking), and proper care and attention is given to safety precautions and hygiene, the risk of exposure to construction workers through dermal contact, accidental ingestion, or inhalation of volatilized hydrocarbons appears minimal. Excavation activities in the vicinity of the former USA station should be performed and supervised by HAZWOPER-trained personnel.

Dissolved hydrocarbons are present in groundwater beneath the site. However, because there are no structures at the site to restrict natural airflow, it appears unlikely that vapors from the dissolved plume will accumulate in concentrations that will become an exposure threat. As there are currently no water supply wells at the site or in the immediate vicinity, exposure to impacted groundwater appears unlikely (except as discussed above for construction workers).

6.1.2 Potential for Environmental Impact

Given the current site conditions, it appears unlikely that impact at this site could compromise other environmentally sensitive receptors (e.g. adjacent surface soil or surface water).

6.1.3 Potential Future Land Use

The site is currently zoned for commercial use (C-30). Potential redevelopment plans call for construction of a shopping center building over the area of the former UST's and dispensers. Volatilization of hydrocarbons into the building may be possible, but with proper engineering controls incorporated into the building design (e.g. vapor barrier), exposure of the customers or employees in the building is unlikely.

6.2 Off-site Receptors

6.2.1 Water Supply Wells

Well search data were included in GHH's Risk Assessment and Closure Request Report (1998). Copies of the table and figure from the GHH report are included in Appendix K. The locations and operational status of these wells has not been verified.

When radial groundwater flow is not observed at the site, groundwater flow appears to be toward the southeast. Based on the data included in Appendix K, there does not appear to be any water supply wells situated southeast of the subject site. The nearest water supply well is an irrigation well at 2455 109^{th} Avenue, approximately 1,000 feet to the southwest. The data summarized in Appendix K suggests there are no off-site groundwater receptors likely to be impacted by dissolved hydrocarbons from the site.

6.3 Previous Risk Assessment

GHH submitted a Risk Assessment and Closure Request (1998) that included a Dominico Fate and Transport modeling of impact to the nearest groundwater receptor. This model indicated that under steady state conditions, the benzene concentration at the nearest receptor would be approximately 1.5×10^{-8} µg/L (Appendix L).

GHH's Closure Information/Proposal (2002) included a Tier 1 Risk Based Corrective Action analysis that concluded benzene concentrations in soil exceeded the limits for volatilization to indoor air, and the benzene concentrations in well S-2 exceeded the limits for groundwater ingestion.

6.4 Environmental Screening Levels

The San Francisco Bay RWQCB has developed Environmental Screening Levels (ESL's) for TPHG, BTEX compounds, MTBE, TBA, and 1,2-DCA (summarized in Appendix M). Residual concentrations of TPHG and BTEX compounds in soil beneath the site that exceed the ESL concentrations are illustrated on Figure 10. ESL tables are included in Appendix M. ESL values for shallow soil (<3 meters) were utilized for this

comparison. Soil and groundwater concentrations of TPHG, benzene, toluene, ethylbenzene, xylenes, MTBE, TBA, and 1,2-DCA were compared to ESL concentrations for both commercial and residential property usage (there are no differences in the soil ESL's for commercial and residential usage for the compounds of concern at this site).

6.4.1 Soil Impact

Based on discussions with Jay-Phares Corporation, current redevelopment plans may require the area of the former service station to be excavated to an elevation of 64 to 66 feet MSL. This might require the removal of up to 15 feet of soil. These excavation activities should remove virtually all impacted soil in the vicinity of the former dispenser island and former UST pit. As depicted in the figures included in Appendix M, small areas of residual impact will remain near the southern end of the former UST pit. If sampling performed after completion of the redevelopment grading activities confirm the presence of residual TPHG, BTEX compounds, MTBE, TBA, and 1,2-DCA in this area at concentrations above ESL's, additional limited excavation should be able to reduce these concentrations to acceptable levels.

6.4.2 Groundwater impact

Based on the most recent groundwater monitoring and sampling data, dissolved concentrations of TPHG, MTBE, TBA, and 1,2-DCA were reported above ESL values in well S-1; concentrations of TPHG, BTEX compounds, MTBE, TBA, and 1,2-DCA were reported above ESL values in well S-2; and concentrations of benzene, MTBE, TBA, and 1,2-DCA were reported above ESL values in well MW-3. None of the compounds of concern were reported in well MW-7 at concentrations above ESL values.

7 SUMMARY

- The former USA Station No. 57 was closed and the UST's, dispenser islands, and associated product piping were removed in July 1994. Approximately 775 yd^3 of soil were excavated as part of the UST and dispenser removal activities. The site was not redeveloped subsequent to station closure. The site is currently zone for commercial usage.

- Site assessment activities were initiated in 1987. To date a total of twenty soil borings have been drilled at the site. Eight of the borings were converted to groundwater monitoring wells.

- Geology beneath the site consists of approximately 10 to more than 40 feet bgs of interbedded fine-grained (silt and clay) and coarse-grained sediments (silty and clayey sand, gravelly sand, and clayey gravel). A stratum of sandy and clayey gravel is encountered at approximately 11 to 25 feet bgs. This interbedded unit overlies deeply weathered, highly fractured bedrock comprised of silty sandstone, siltstone, claystone, and chert. The contact between the sediments and the underlying sandstone/siltstone appears to dip toward the north at approximately 25° from horizontal.

- Based on the depth to groundwater in the monitoring wells, the smear zone due to groundwater fluctuation is approximately 10 to 12 feet thick. Groundwater flow has been and towards the north, south, southwest, southeast, radial toward wells S-1, S-2, and MW-7, and radial away from well MW-3.

- Petroleum hydrocarbons have impacted soil in the immediate vicinity of the former UST complex and former dispenser islands. Impact extends to the saturated zone. In general, the vertical and lateral extent of the impact appears to be adequately characterized. Approximately 141 Kg (311 lbs) of TPHG remain in the vadose zone soil.

- Dissolved hydrocarbons of concern include TPHG, BTEX compounds, MTBE, TBA, and 1,2-DCA. Groundwater impact appears limited to the vicinity of wells S-1, S-2, MW-3, and MW-7, with the highest concentrations reported in well S-2.

- TPHG and benzene concentrations appear to be decreasing in wells S-1, S-2, and MW-3. MTBE concentrations appear to be decreasing in wells S-1 and MW-7, and increasing in well MW-3. Groundwater concentrations and plume configuration appear relatively stable. Approximately 2,490 grams of TPHG (5.5 lbs), 169 grams of benzene, (0.4 lbs), and 158 grams of MTBE (0.3 lbs) remain in the groundwater beneath the site.

- Approximately 775 yd^3 of soil were excavated and removed from the site. Approximately 148.40 Kg (327.17 lbs) of TPHG, 0.07 Kg (0.15 lbs), and 18.72 Kg (41.27 lbs) of TPHD were removed in this stockpiled material.

- The DPE test was successful in removing TPHG, benzene, and MTBE in both soil vapor and groundwater. The test data suggest DPE is a viable remedial alternative to remove residual hydrocarbons from the soil and groundwater beneath the site.

- There does not appear to be any complete pathway for human exposure to residual or dissolved hydrocarbons beneath the site. There does not appear to be any downgradient water supply wells.

- A very limited area of soil impacted by concentrations above ESL values will remain after proposed redevelopment grading. Dissolved concentrations of some or all of the compounds of concern are reported in wells S-1, S-2, and MW-3 at concentrations above ESL values.

8 DISCUSSION & RECOMMENDATIONS

Petroleum hydrocarbon impact has been identified in the vadose zone as well as in the groundwater. In the vadose zone, petroleum hydrocarbon impact appears to be limited to the immediate vicinity of the former UST's and the former dispenser islands. The lateral and vertical extent of vadose zone impact has been adequately characterized. Approximately 141 Kg (310 lbs) pounds of residual hydrocarbon as TPHG appears to remain in the unsaturated zone. Additional characterization of the vadose zone impact does not appear warranted at this time.

Petroleum hydrocarbon impact has also been identified in wells S-1, S-2, MW-3, and MW-7. The extent of the dissolved hydrocarbon impact appears to be adequately characterized. The dissolved concentrations and plume configuration appear stable. The estimated mass of TPHG, benzene, and MTBE in groundwater (based on first quarter 2005 data) is 5.5 lbs, 0.4 lbs, and 0.3 lbs, respectively. Additional characterization of the dissolved hydrocarbon plume does not appear warranted at this time.

Soil and groundwater impact are present beneath the site at concentrations that exceed current RWQCB ESL values. Remedial activities proposed below should reduce these concentrations.

Based on our discussions with Jay-Phares Corporation, redevelopment plans for the site may require excavation of up to 15 feet of soil to lower the grade to 64 to 66 feet MSL. These excavation activities should remove most of the residual soil impact. Soil generated during these grading activities will be screened in the field, and impacted soil will be segregated and properly disposed of off-site. The proposed excavation activities appear likely to leave a small pocket of impact above ESL values in the vicinity of the southern corner of the former UST pit. Stratus recommends this area of impact also be excavated, and soil samples collected and analyzed to confirm removal of impact to concentrations below ESL values.

Stratus has recommended a program of 30-day dual phase extraction to reduce the mass of dissolved hydrocarbons in the groundwater beneath the site (Stratus, 2004b). This program will be implemented upon approval of the proposed work by Alameda County Department of Environmental Health.

9 REFERENCES

The following documents were consulted, in whole or in part, during preparation of this report:

Alton Geoscience, 1995, Supplementary Site Assessment Report (dated April 24, 1995).

--, 1996, Supplementary Site Assessment Report (dated February 26, 1995).

Figuers, S., 1998, Groundwater study and water supply history of the East Bay Plain, Alameda and Contra Costa Counties, CA: Norfleet Consultants, Livermore, California (prepared for the Friends of the San Francisco Bay Estuary, Oakland, California).

GHH Engineering Inc., 1998, Risk Assessment and Closure Request Report (dated September 1998).

--, 2002, Closure Information Proposal (dated April 2002).

Graymer, M.W., 2000, Geologic map and map database of the Oakland metropolitan area, Alameda, Contra Costa, and San Francisco Counties, California: U.S. Geological Survey Miscellaneous Field Studies MF-2342, version 1, scale 1:50,000 (digital map, http://geopubs.wr.usgs.gov/map-mf/mf2342/mf2342f.pdf).

Helley, E.J., K.R. Lajoie, W.E. Spangle, and M.L. Blair, 1979, Flatland deposits of the San Francisco Bay Region, California–their geology and engineering properties, and their importance to comprehensive planning: U.S. Geological Survey Professional Paper 943.

Pacific Environmental Group, 1987, Preliminary Site Assessment Investigation (dated March 13, 1987).

Stratus Environmental, Inc., 2004, Work Plan for Monitoring Well Replacement (dated January 14, 2004).

--, 2004a, Feasibility Test Work Plan (dated March 15, 2004).

--, 2004b, Dual Phase Extraction Test Report (dated October 15, 2004).

--, 2005, Quarterly Groundwater Monitoring Report, First Quarter 2005 (dated April 13, 2005).

Western Geo-Engineers, 1994, UST's Removal Soil Sampling and OverExcavation (dated October 6, 1994).

10 LIMITATIONS

This report was prepared in general accordance with accepted standards of care which existed at the time this work was performed. No other warranty, expressed or implied, is made. Conclusions and recommendations are based on field observations and data obtained from this work and previous investigations. It should be recognized that definition and evaluation of geologic conditions is a difficult and inexact art. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present. More extensive studies may be performed to reduce uncertainties, such as additional subsurface assessment, risk-based corrective action analysis, or fate and transport modeling. This report is solely for the use and information of our client unless otherwise noted.

TABLE 1

Site Conceptual Model Summary

Former USA Service Station No. 57
10700 MacArthur Boulevard
Oakland, California

Item	Comment
Source of Contamination	Former UST's, dispensers, and product piping.
Chemicals of Concern	Petroleum hydrocarbons (TPHG, BTEX compounds, MTBE, TBA, and 1,2-DCA). TPHD has been reported; not a chemical of concern.
Site Vicinity	Situated on shopping center property. Surrounding land developed for residential use, commercial use, and freeway.
Summary of Investigations	Compliance soil samples were collected when the UST's, dispensers, and product pipe were removed in 1994. A total of twenty soil borings have been drilled. Eight of the borings were converted to groundwater monitoring wells.
Subsurface Geology	The site is underlain by interbedded fine-grained (silt and clay) and sandy sediments (silty and clayey sand), from approximately 10 to more than 40 feet bgs. A laterally continuous stratum of sandy and clayey gravel is encountered at approximately 11 to 25 feet bgs. This interbedded unit overlies deeply weathered, highly fractured, silty sandstone and siltstone bedrock. The contact between the sediments and the underlying bedrock appears to dip toward the north at approximately 25° from horizontal.
Groundwater flow direction and gradient	Depth to groundwater measurements have fluctuated approximately 10 to 12 feet since monitoring was initiated in 1995. Groundwater flow direction has been and towards the north, south, southwest, southeast, radial toward wells S-1, S-2, and MW-7, and radial away from MW-3. During the most recent monitoring event (January 19, 2005), groundwater was measured between 10.34 and 20.33 feet bgs. Gradients have fluctuated from 0.001 to 0.086 ft/ft.
Maximum Concentrations in Soil	TPHG = 2,400 mg.Kg (UST pit, 10/94) TPHD = 330 mg.Kg (UST pit, 10/94) Benzene = 9.6 mg.Kg (UST pit, 9/94) Toluene = 21 mg.Kg (UST pit, 9/94) Ethylbenzene = 40 mg.Kg (UST pit, 9/94) Xylenes = 260 mg.Kg (UST pit, 9/94)
Maximum Concentrations in Groundwater	TPHG = 160,000 µg/L (Well S-2, 7/31/98) TPHD = 7,300 µg/L (Well S-1, 4/28/98) Benzene = 5,700 µg/L (Well MW-3, 11/22/95) Toluene = 3,800 µg/L (Well S-2, 2/12/87) Ethylbenzene = 1,300 µg/L (Well S-2, 2/12/87) Xylenes = 11,000 µg/L (Well S-2, 2/12/87) MTBE = 750 µg/L (Well S-2, 11/19/02) TBA = 2,000 µg/L (Well MW-3, 8/10/04) 1,2-DCA = 270 µg/L (Well MW-3, 8/10/04)

TABLE 1

Site Conceptual Model Summary

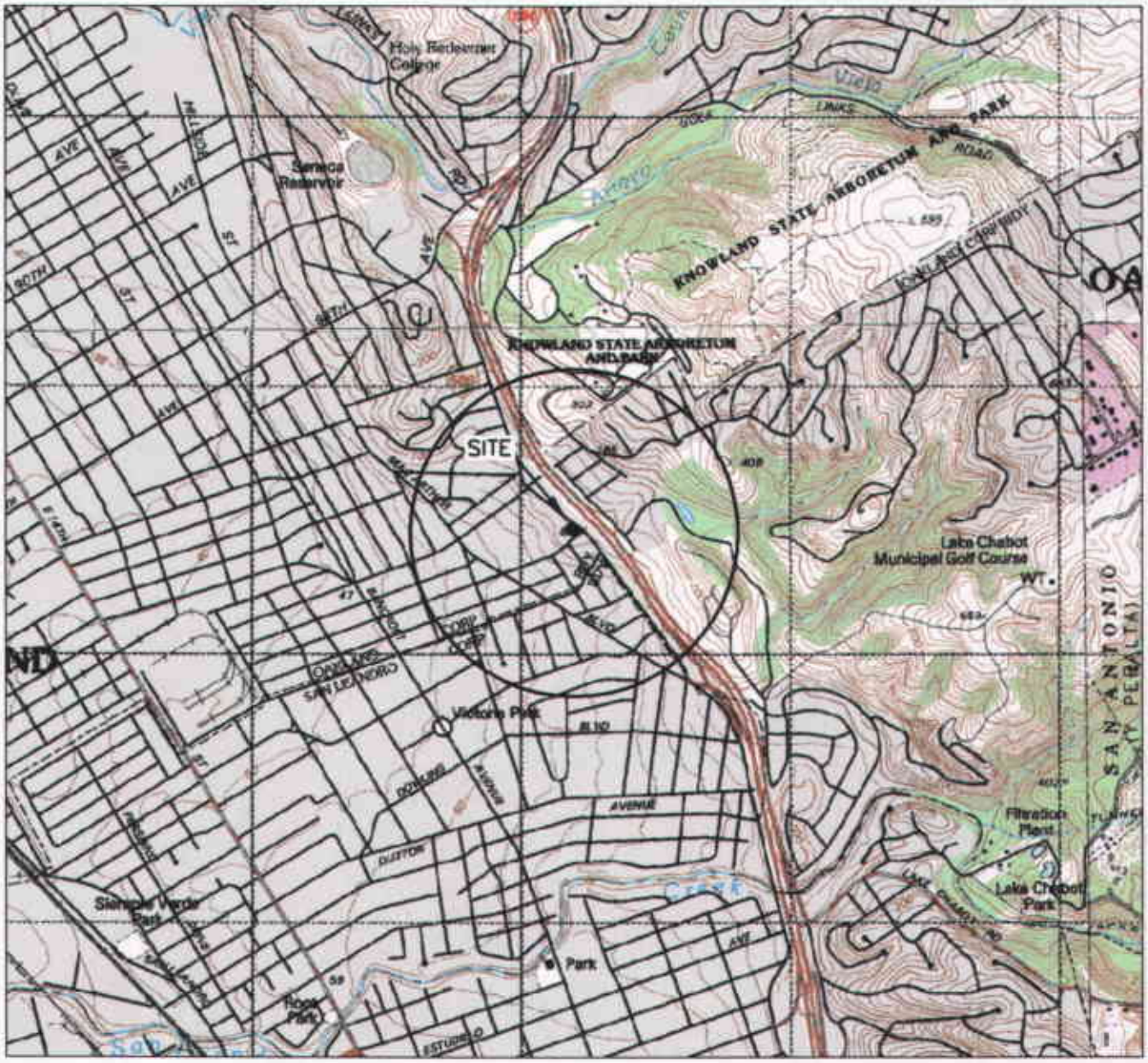
Former USA Service Station No. 57
10700 MacArthur Boulevard
Oakland, California

Extent of Impact in Soil	Extent of vadose zone impact appears to be adequately characterized. Impact is limited laterally to the vicinity of the former UST pit, dispensers, and product piping trench. Impact extends vertically to groundwater (Groundwater has fluctuated between 7 and 21 feet bgs).
Extent of Impact to Groundwater	Extent of groundwater impact appears to be adequately characterized, and limited to the vicinity of wells S-1, S-2, MW-3, and MW-7.
Potential Sensitive Receptors	There are no water supply wells at the site. The nearest supply well is an irrigation well approximately 1,000 feet to the southwest.
Potential Exposure Pathways	There do not appear to be any complete exposure pathways at the site at this time. Proposed redevelopment plans have the potential to create exposure pathways via volatilization to indoor air and dermal contact with impacted groundwater.
Feasibility Studies	Testing performed in July 2004 indicated that DPE was a viable remedial alternative to remove hydrocarbon mass.
Remedial Efforts	Approximately 775 cubic yards of soil were reported excavated from the former UST pit in 1994. During the DPE feasibility test, approximately 13.34 pounds of TPHG were removed via soil vapor extraction, and approximately 0.015 pounds of TPHG was removed via extraction of impacted groundwater.
Next Phase of Activity	Perform additional DPE events to further reduce the TPHG mass in the groundwater and vadose zone.

Table 2 - DRILLING AND WELL CONSTRUCTION SUMMARY

Former USA Station #57
10700 MacArthur Boulevard
Oakland, California

ID	Date	Boring Dia. (inches)	Boring Depth (feet bgs)	Casing Diameter (inches)	Casing Depth (feet bgs)	Slot Size (inches)	Screen Interval (feet bgs)
Monitoring Wells							
S-1	2/12/87	8	40	3	40	0.02	20 - 40
S-2	2/12/87	8	40	3	40	0.02	20 - 40
MW-3	2/28/95	10	44	4	44	0.02	24 -44
MW-4	11/20/95	10	40.5	4	40.5	0.02	10 - 40.5
MW-5	11/20/95	10	41	4	40	0.02	10 - 40
MW-6	11/20/95	10	40.5	4	40.5	0.02	10 - 40.5
MW-7	11/21/95	10	41	4	40	0.02	10 - 40
MW-8	11/21/95	10	35.5	4	35	0.02	10 - 35
Soil Borings							
A	2/12/87	8	20				
B	2/12/87	6	20				
C	2/12/87	6	20				
D	2/12/87	6	20				
B-1	2/28/95	8	46				
B-2	3/1/95	8	31				
B-3	3/1/95	8	21				
B-4	3/2/95	8	12				
B-5	3/2/95	8	12				
B-6	3/2/95	8	12				
B-7	3/2/95	8	12				
B-8	3/2/95	8	12				



GENERAL NOTES:
BASE MAP FROM U.S.G.S.
OAKLAND, CA
7.5 MINUTE TOPOGRAPHIC
PHOTOREVISED 1980

North

QUADRANGLE LOCATION

0 2000 FT

SCALE 1:24,000

USA 573\e Location Map.dwg Apr 27, 2005 JMP USA57\Quarterly

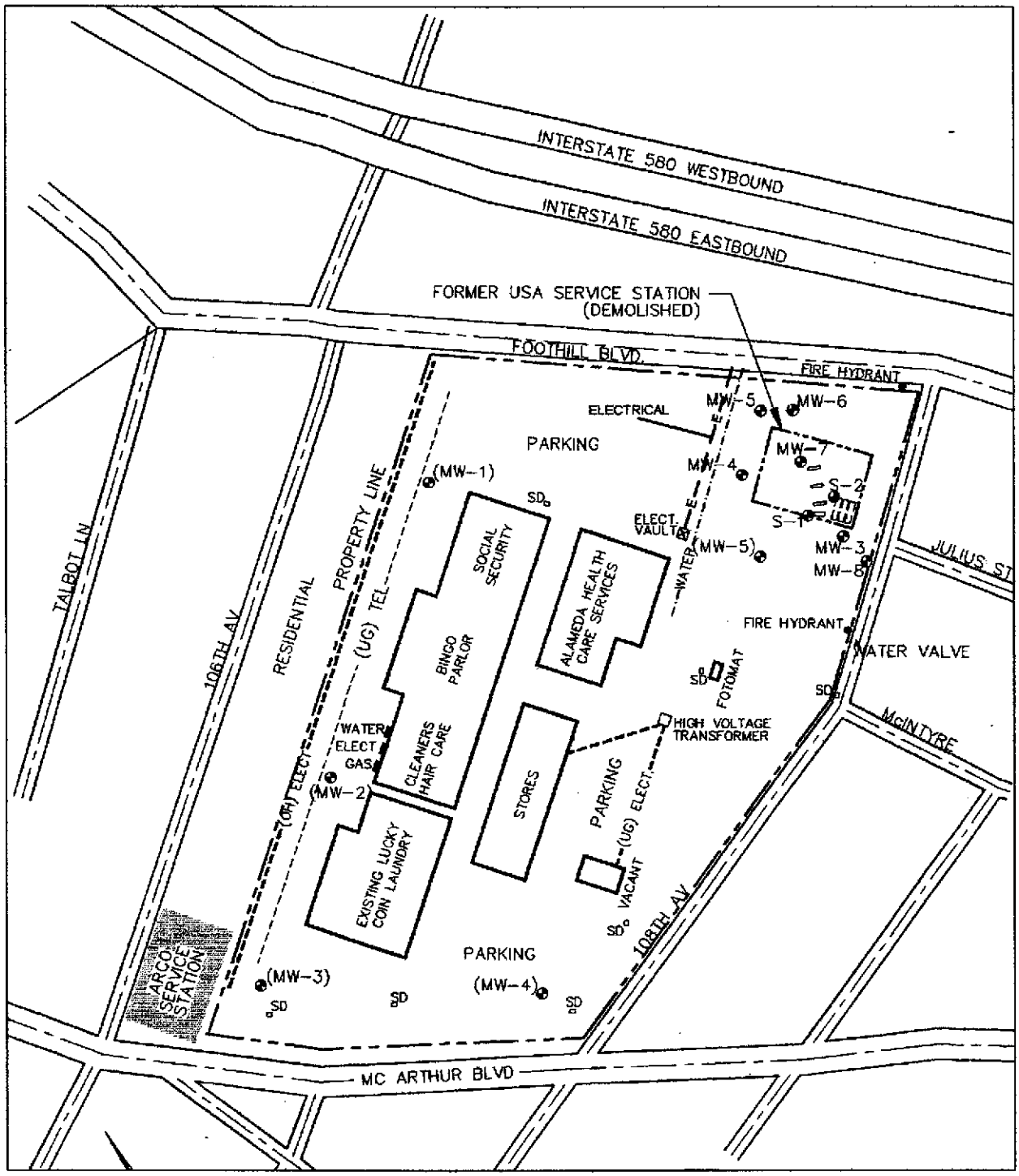
STRATUS ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SITE LOCATION MAP

FIGURE
1

PROJECT NO.
2007-0057-01



NOTES:
1. LOCATIONS OF UTILITIES BASED ON SURVEY PERFORMED BY OTHERS
2. BUILDING LOCATIONS AND PROPERTY BOUNDARIES APPROXIMATE

0 200 FT

APPROXIMATE SCALE

BASED ON DRAWING FROM GHH ENGINEERING, INC. DATED 1/19/01

STRATUS ENVIRONMENTAL, INC.

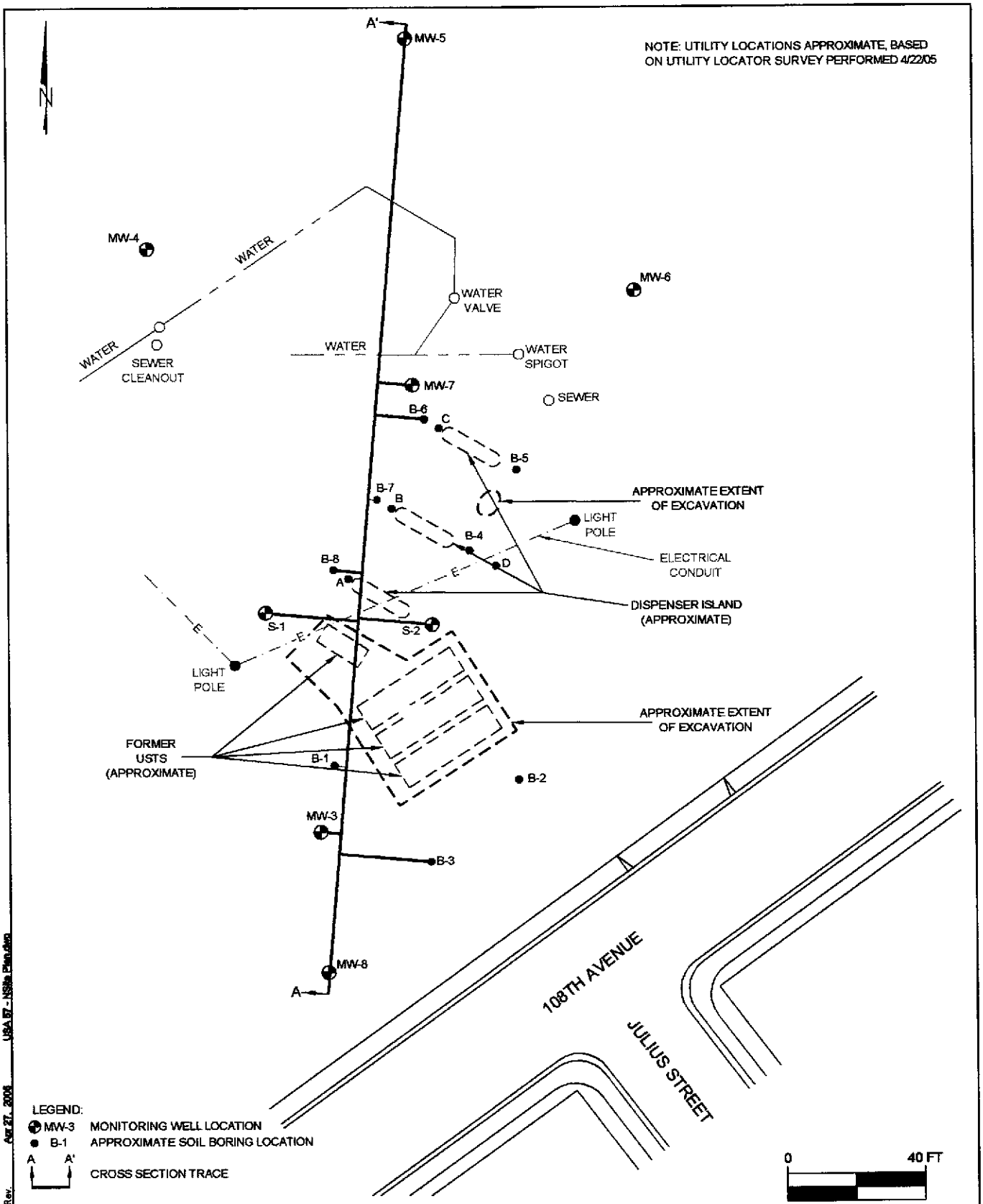
FORMER USA SERVICE STATION NO. 57
10700 MacARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SITE VICINITY MAP

FIGURE 2

PROJECT NO. 2007-0057-01

USA57SCM JMP REV Apr 29, 2008 USA 57 Site Vicinity.dwg



NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, AND GHH ENGINEERING.

STRATUS ENVIRONMENTAL, INC.

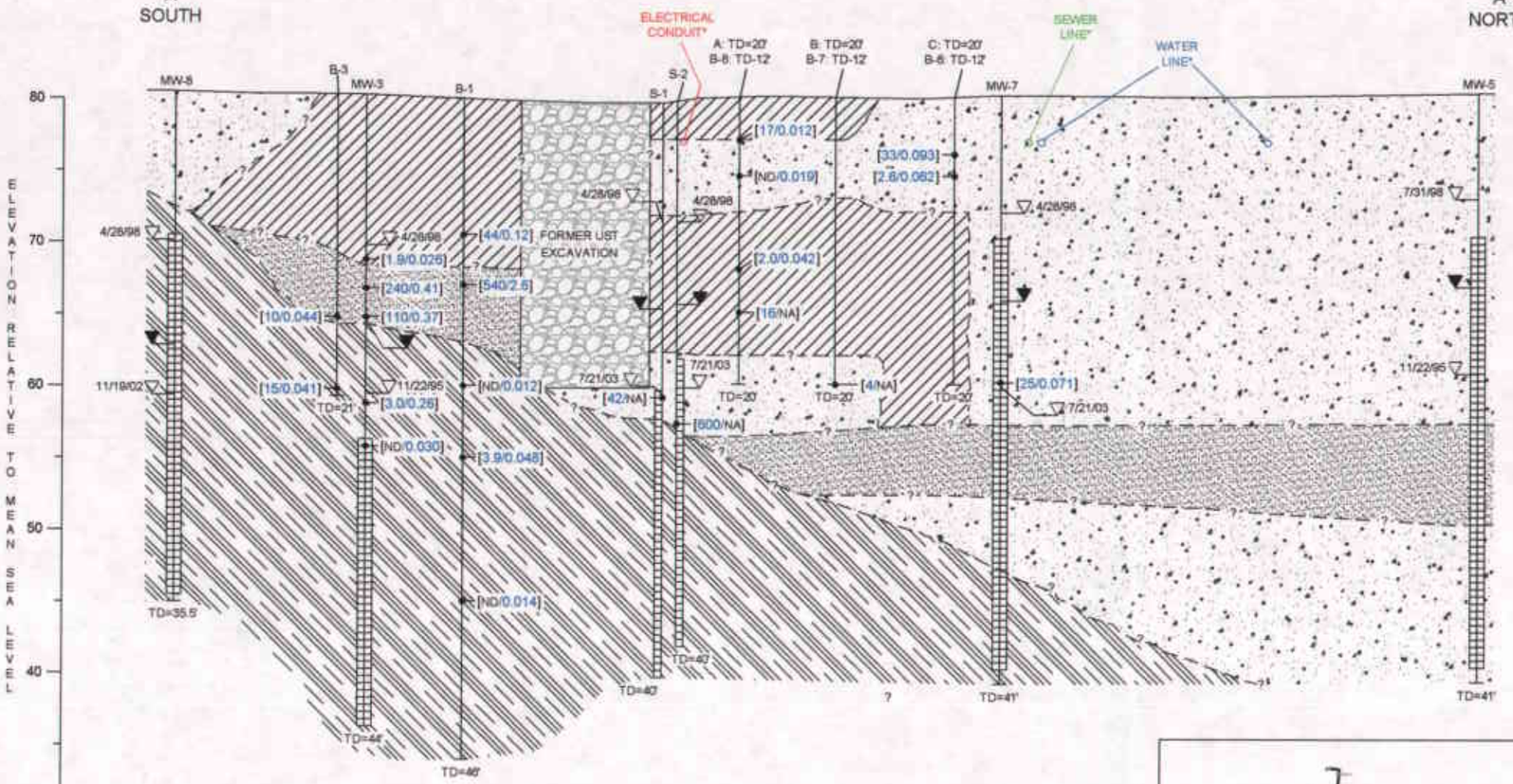
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SITE PLAN

FIGURE
3

PROJECT NO.
2007-0057-01

USA57SCM JMP Rev. Apr 27, 2008 USA 57 - Site Plan.dwg



LEGEND:

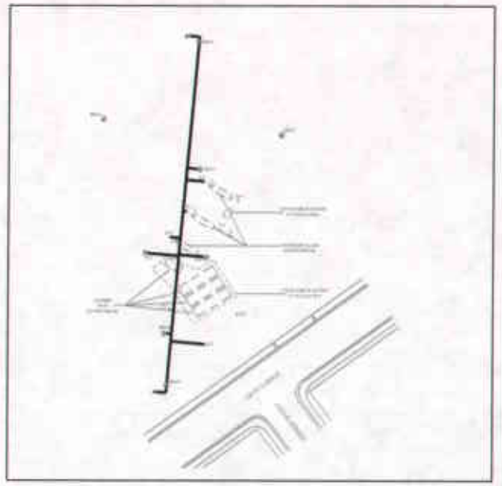
- APPROXIMATE CONTACT BETWEEN SOIL TYPES
- SOIL SAMPLE LOCATION
- [44/0.12] TOTAL PETROLEUM HYDROCARBONS AS GASOLINE, BENZENE, CONCENTRATION IN MILLIGRAMS PER KILOGRAM (mg/Kg)
- LIMIT OF GROUNDWATER FLUCUATION RANGE WITH DATE OF MEASUREMENT
- AVERAGE DEPTH TO GROUNDWATER
- SCREENED INTERVAL OF WELL
- TD=40' TOTAL DEPTH OF BORING IN FEET BELOW SURFACE GRADE
- CLAY, SILT (CL, ML)
- SILTY SAND, CLAYEY SAND (SM, SC)
- SILTY GRAVEL, CLAYEY GRAVEL (GM, GC)
- BACKFILL
- BEDROCK

ND = NOT DETECTED (LABORATORY REPORTING LIMITS NOT AVAILABLE)

NA = NOT ANALYZED FOR THIS CONSTITUENT

* UTILITY DEPTHS & LOCATIONS APPROXIMATE

NOTE: SOIL ANALYTICAL RESULTS ONLY SHOWN IF TPHG OR BENZENE WERE REPORTED PRENSENT IN THE SAMPLE BY THE LABORATORY.



SITE PLAN

VERT. SCALE 0 – 10 FT

HORZ. SCALE 0 – 30 FT

STRATUS ENVIRONMENTAL, INC.

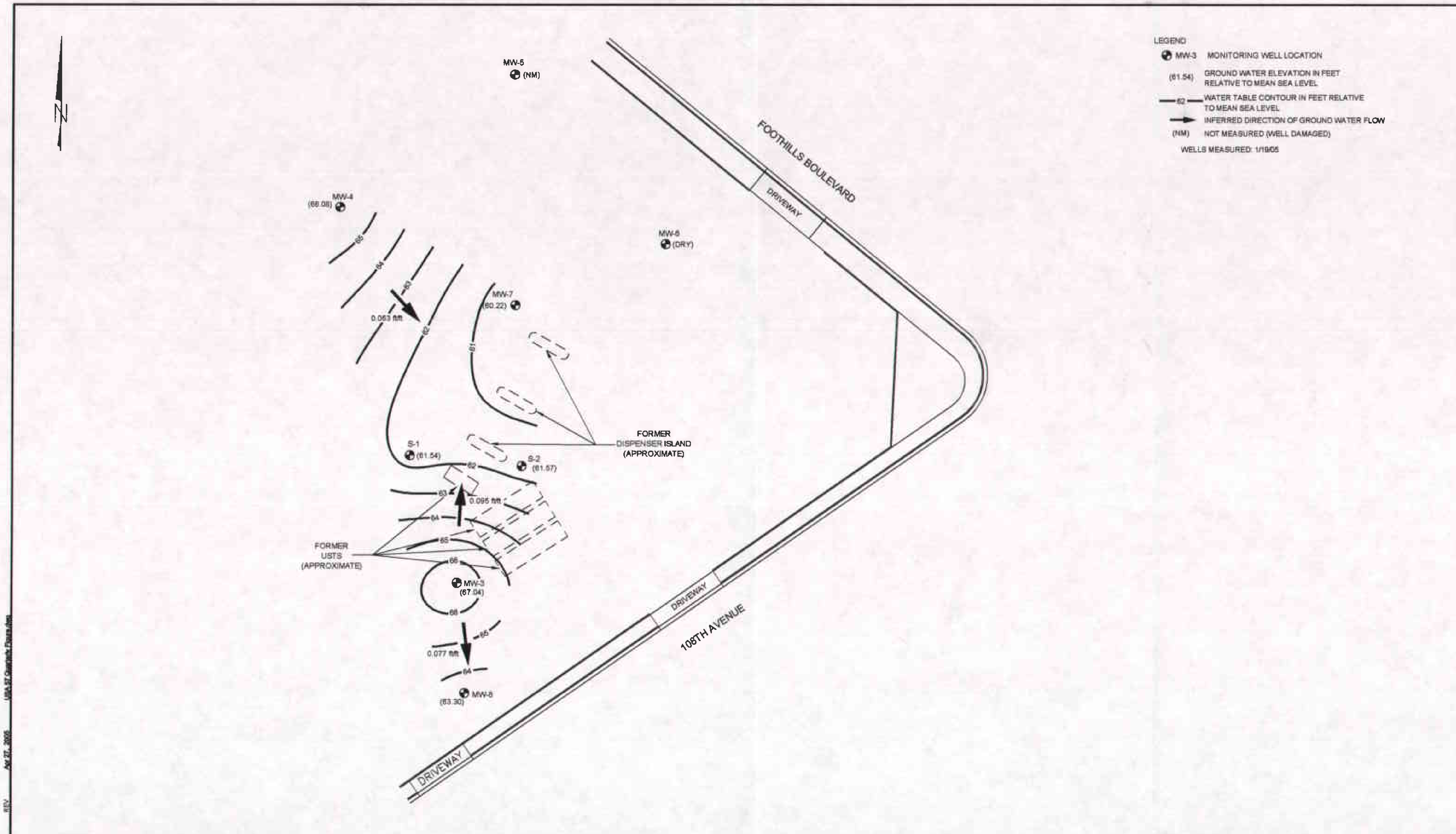
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GEOLOGIC CROSS SECTION A-A'

FIGURE
4

PROJECT NO.
2007-0057-01

USA 57 Cross Section AA.dwg May 05, 2009 RTV JMP LITHOSECTION



STRATUS ENVIRONMENTAL, INC.

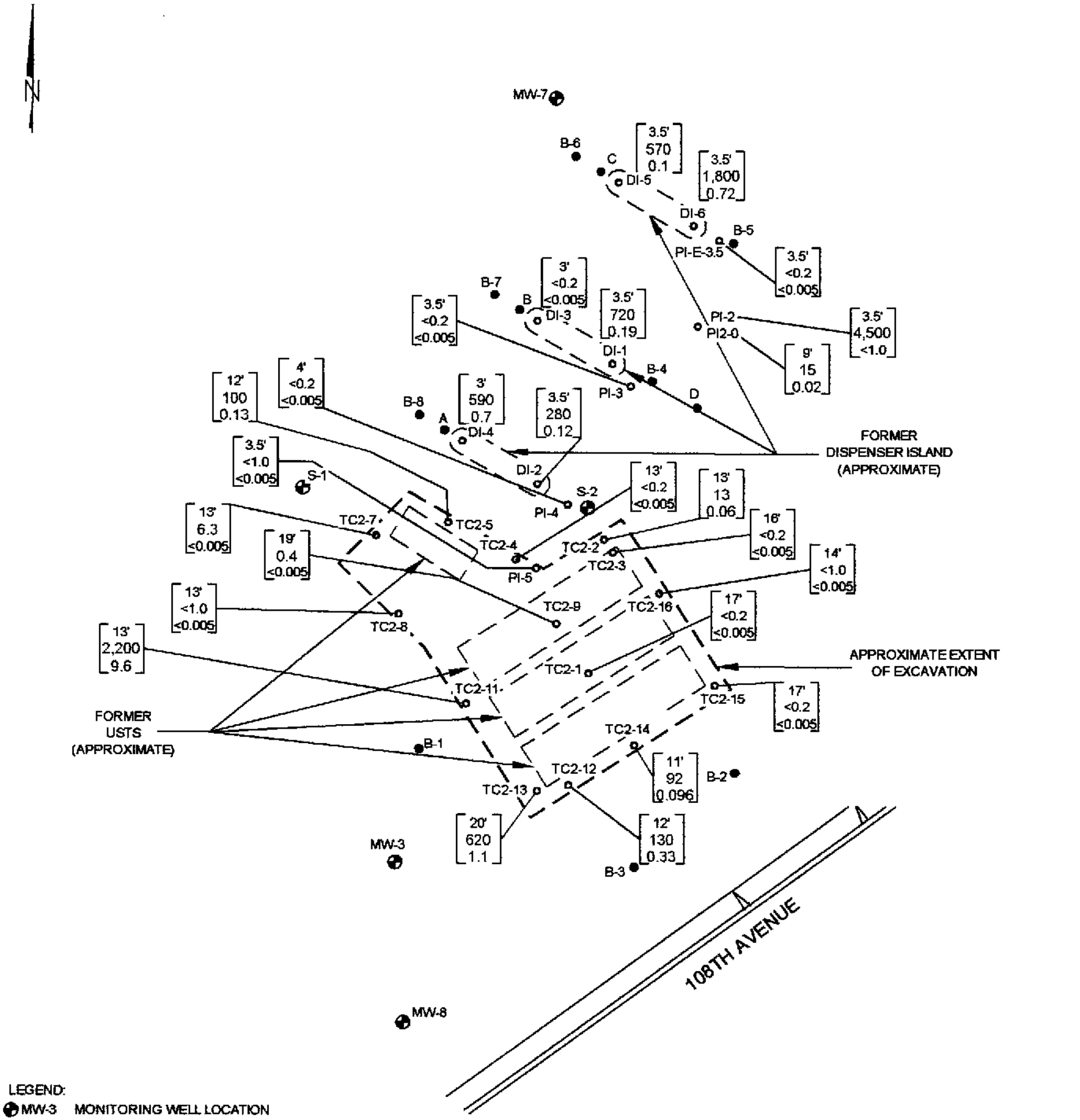
0 40 FT
HORZ. SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP
1st QUARTER 2005

FIGURE
5

PROJECT NO.
2007-0057-01



LEGEND:

- MW-3 MONITORING WELL LOCATION
- B-1 APPROXIMATE SOIL BORING LOCATION
- D1-4 APPROXIMATE SOIL SAMPLE LOCATION

17'	DEPTH OF SAMPLE IN FEET bgs
<0.2	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN mg/Kg
≤0.005	BENZENE CONCENTRATION IN mg/Kg

SOIL SAMPLES COLLECTED BETWEEN 7/94 AND 9/94.
NOT ALL SAMPLE LOCATIONS SHOWN; ONLY THOSE SAMPLES COLLECTED AT THE FURTHEST EXTENT OF EXCAVATION
MAP DOES NOT REFLECT OVER EXCAVATION AND SAMPLING PERFORMED BY ALTON GEOSCIENCE IN 10/94.

0 60 FT
SCALE

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, & GHH ENGINEERING.

STRATUS ENVIRONMENTAL, INC.

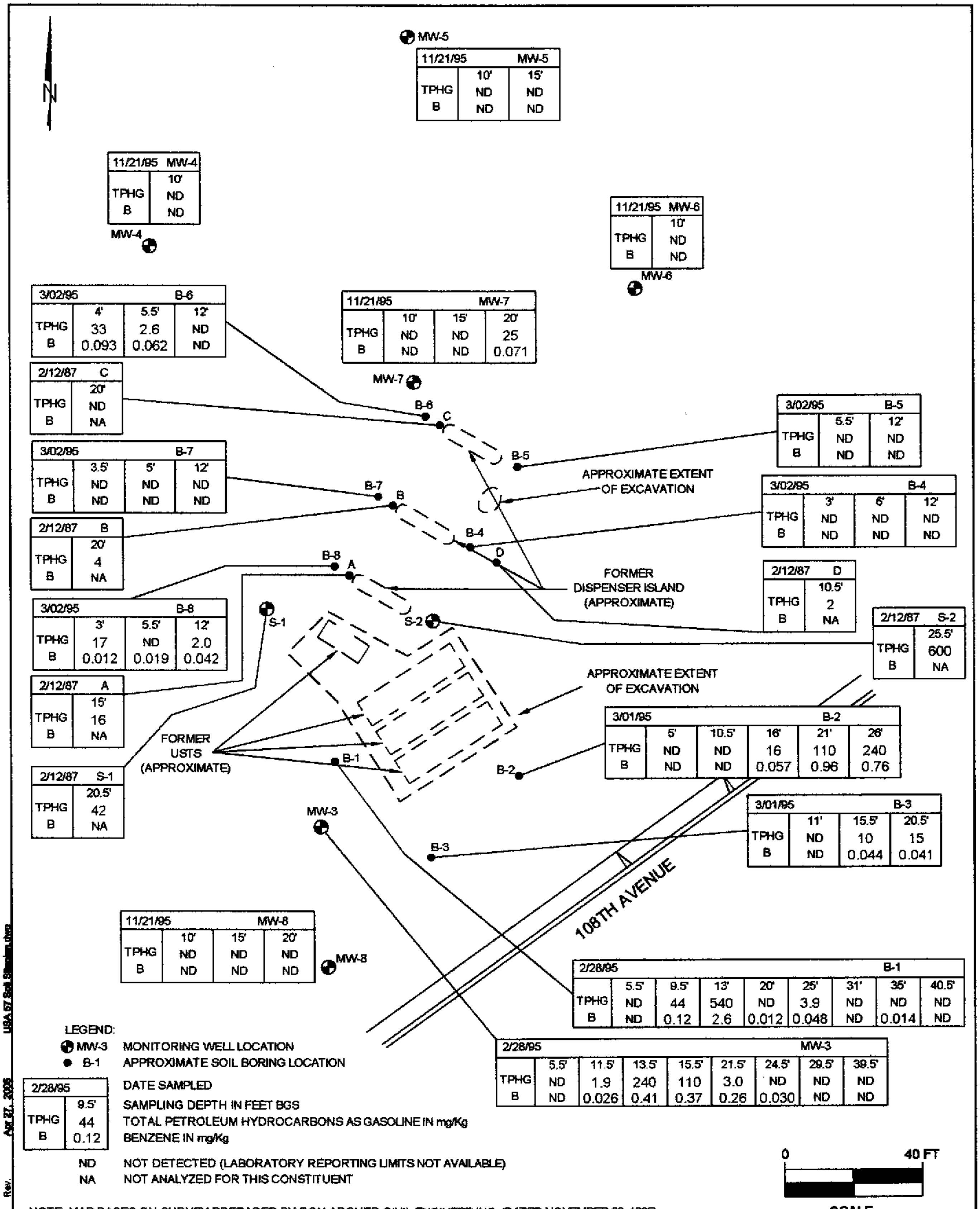
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SOIL CONCENTRATION MAP
UST PIT AND DISPENSERS

FIGURE 6

PROJECT NO. 2007-0057-01

USA\57\SCMeeting JMP Rev. Apr 27, 2005 USA 57 Soil Analytical.dwg



NOTE: MAP BASES ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, AND GHH ENGINEERING.

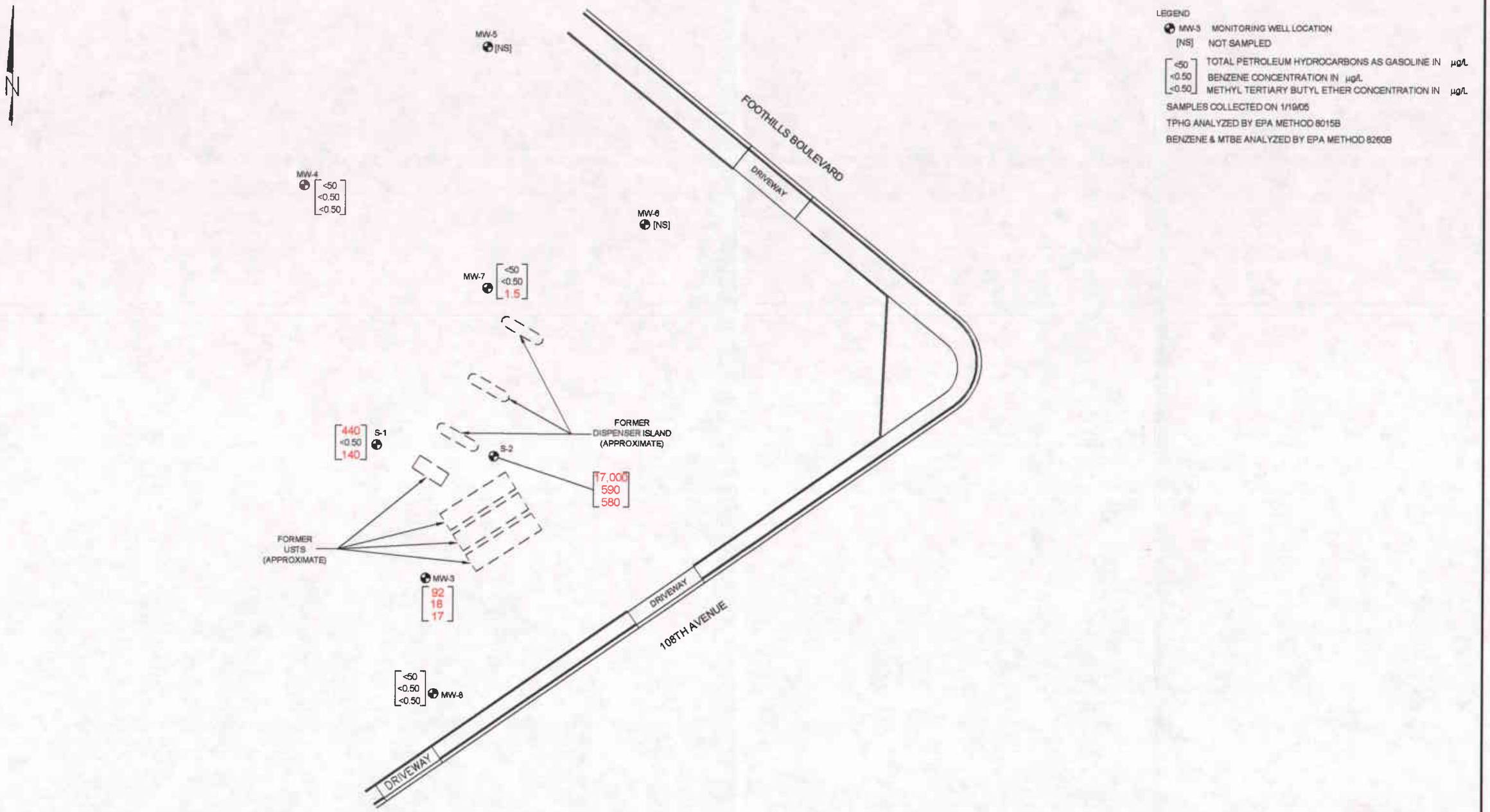
STRATUS ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SOIL CONCENTRATION MAP
SOIL BORINGS

FIGURE 7

PROJECT NO. 2007-0057-01



LEGEND

MW-3 MONITORING WELL LOCATION

[NS] NOT SAMPLED

[<50 / <0.50 / <0.50] TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN µg/L; BENZENE CONCENTRATION IN µg/L; METHYL TERTIARY BUTYL ETHER CONCENTRATION IN µg/L

SAMPLES COLLECTED ON 1/19/05

TPHG ANALYZED BY EPA METHOD 8015B

BENZENE & MTBE ANALYZED BY EPA METHOD 8260B

STRATUS ENVIRONMENTAL, INC.

0 40 FT

HORZ. SCALE

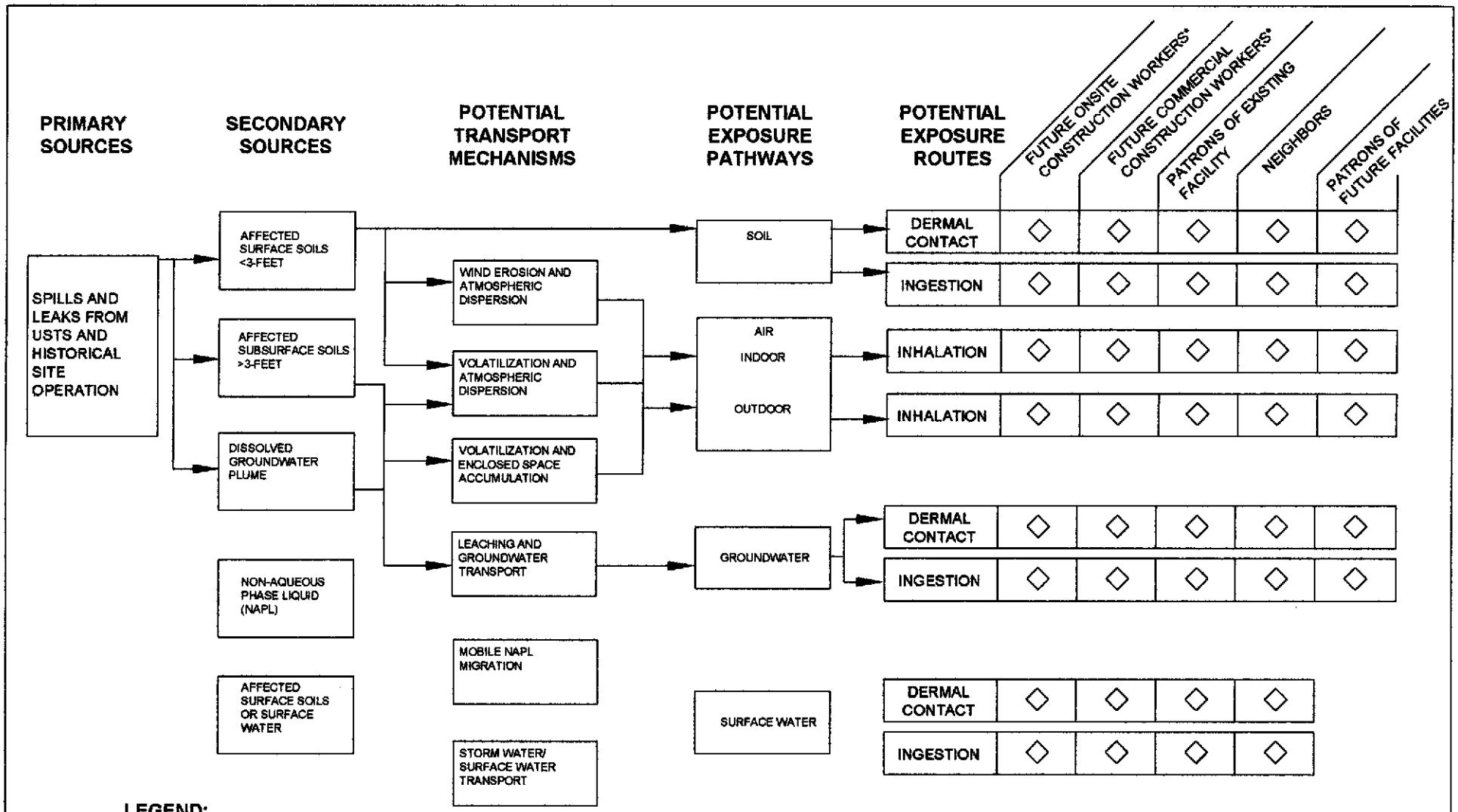
FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER ANALYTICAL SUMMARY
1st QUARTER 2005

FIGURE
8

PROJECT NO.
2007-0057-01

USA ST Quarterly Event.dwg Apr 27, 2005 REV AMP USA#57SCM



LEGEND:

◆ COMPLETE PATHWAY

◇ INCOMPLETE PATHWAY

* ASSUMES WORKERS ARE APPRISED OF THE POTENTIAL HAZARDS. CONSTRUCTION WORKERS AT SITE ASSUMED TO BE PROPERLY TRAINED IN WORKING WITH AND HANDLING GASOLINE IMPACTED SOIL. ASSUMES BUILDINGS PROPERLY DESIGNED TO PROHIBIT VAPOR INTRUSION.

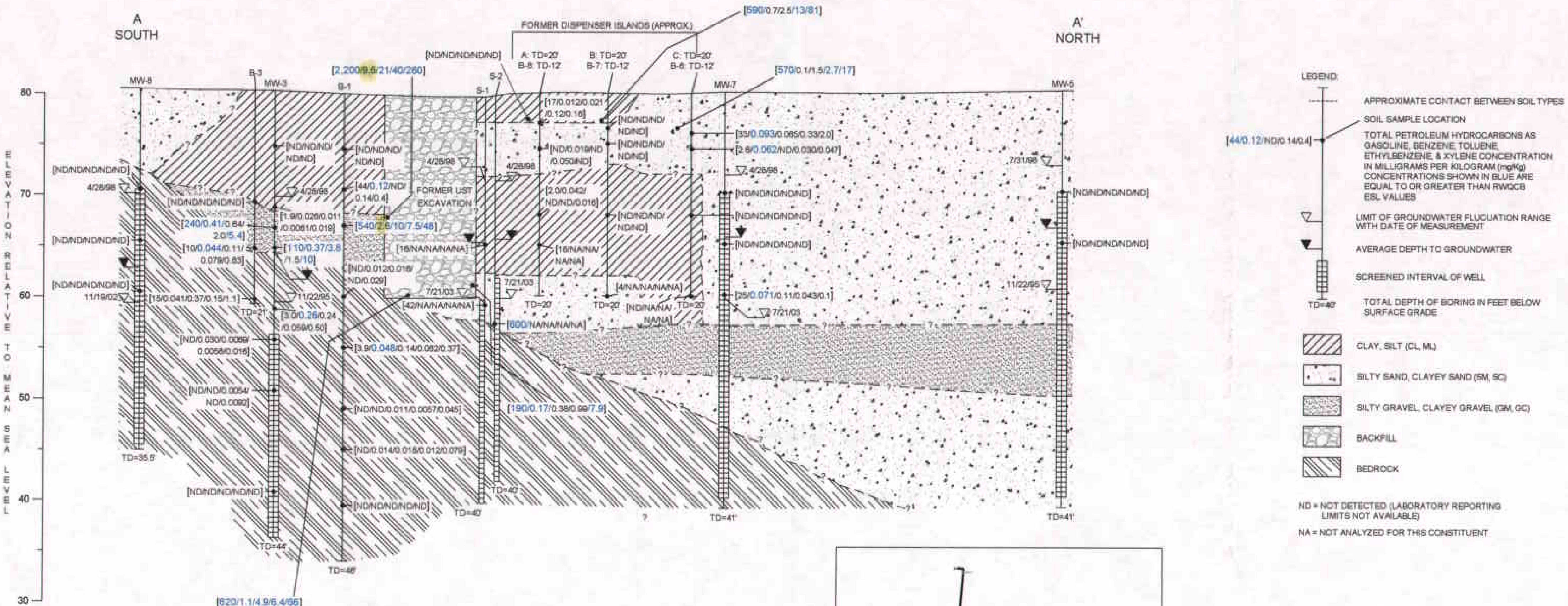
FIGURE 9

POTENTIAL EXPOSURE PATHWAY MODEL

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

PROJECT NO. 2007-0057-01	DRAWN BY JMP 4/2005
FILE NO. USA 57	PREPARED BY S.S.
REVISION NO.	REVIEWED BY

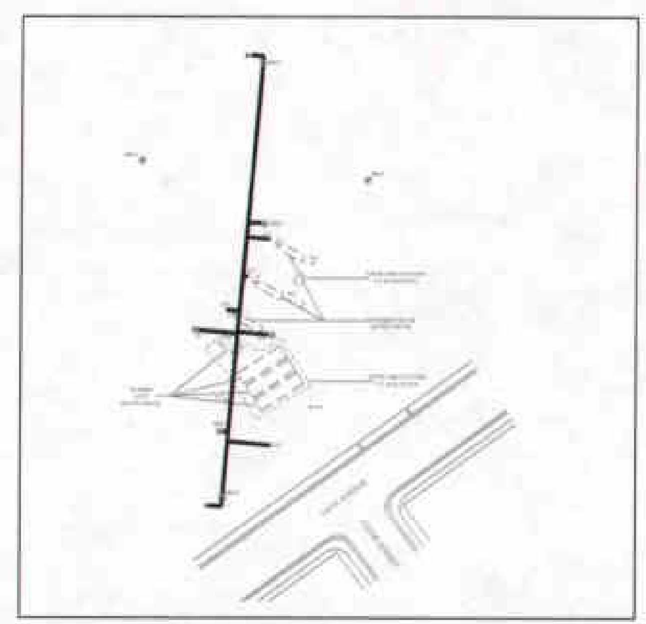
STRATUS ENVIRONMENTAL, INC.



RWQCB ESL CONCENTRATIONS (2/05)

SHALLOW SOIL (< 3 m bgs)

	COMMERCIAL (mg/Kg)	RESIDENTIAL (mg/Kg)
TPHG	100	100
BENZENE	0.044	0.044
TOLUENE	2.9	2.9
ETHYLBENZENE	3.3	3.3
ZYLENE	2.3	2.3



SITE PLAN

STRATUS ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

SOIL ANALYTICAL RESULTS ABOVE ESL'S

FIGURE 10

PROJECT NO. 2007-0057-01

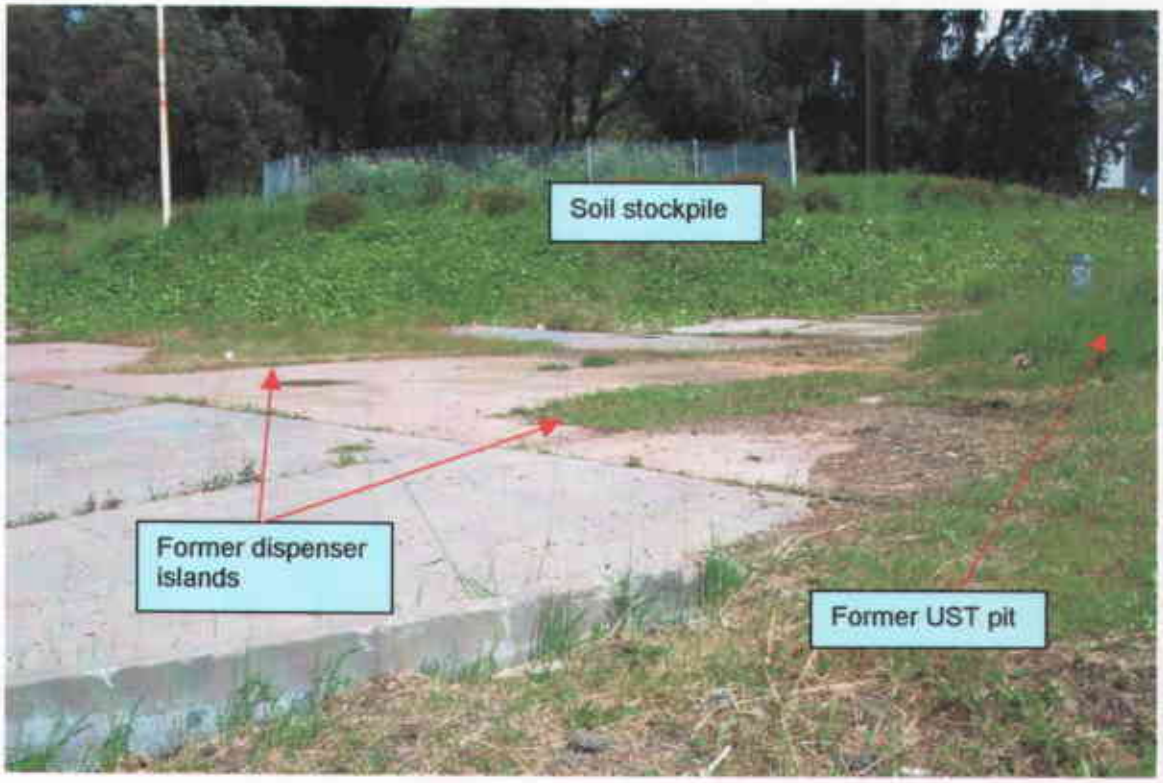
APPENDIX A

PHOTOGRAPHS OF CURRENT SITE CONDITIONS

Subject site, viewed from Foothill Square parking lot (facing east).

Former UST pit, viewed from 108th Avenue (facing northwest).

Subject site, viewed from Foothill Square parking lot (facing south).



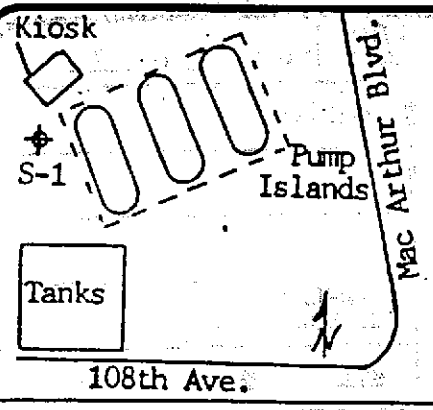
Former Dispenser islands, viewed east from parking lot

APPENDIX B

BORING LOGS AND WELL CONSTRUCTION DETAILS

PACIFIC ENVIRONMENTAL GROUP, INC.

JOB NO. 100-22.01

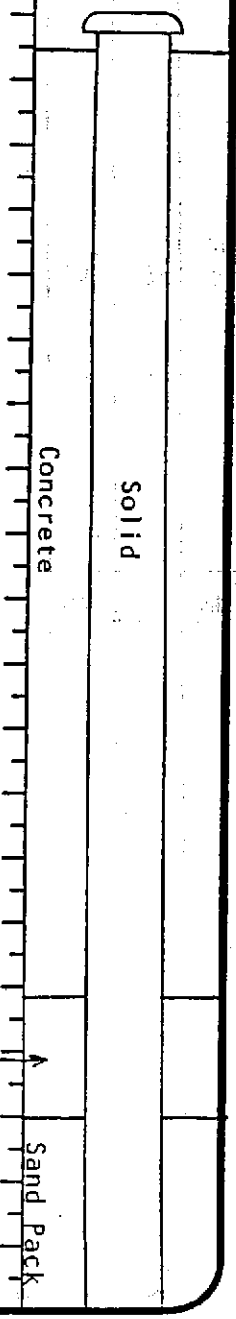


SHELL OIL COMPANY -- WELL LOG

PAGE 1 OF 2

WELL NUMBER ▶ S-1	LOCATION ▶ Oakland		
DATE ▶ 2/12/87	WEATHER ▶ Cool, rain		
LOGGED BY ▶ DM	DRILLED BY ▶ Bayland: Ed, Curt		
DRILLING METHOD ▶ HSA	SAMPLING METHOD ▶ Cal. Mod.		
GRAVEL PACK ▶ CA	SEAL ▶ Bentonite & concrete		
CASING ▶ TYPE Schedule 40 PVC	DIAMETER 3"	LENGTH 20'	HOLE DIA 8"
SCREEN ▶ TYPE Schedule 40 PVC SLOT .020"	DIAMETER 3"	LENGTH 20'	TOTAL DEPTH 40'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0			Concrete
						1			(CL) olive-brown silty clay
						2			
						3			
Dp			M		ND	4		P	(minor sand; no odor)
						5			(gravelly at 5')
						6			
						7			
						8			
Dp	MS	VD				9		8	(SC) dark yellowish-brown clayey sand; trace find gravel; no odor
					ND	10		25	
						1		45	
						2			
						3			
						4		15	
Dp	MS	VD			38	5		30	(very silty, slight odor)
						6		50	
						7			
						8			
						9		6	
Dp	MS	VD			102			15	(very fine grained; moderate to strong odor)



WELL COMPLETION

PACIFIC ENVIRONMENTAL GROUP, INC.

JOB NO. 100-22.01

LOCATION MAP

See page 1 for details.

SHELL OIL COMPANY -- WELL LOG

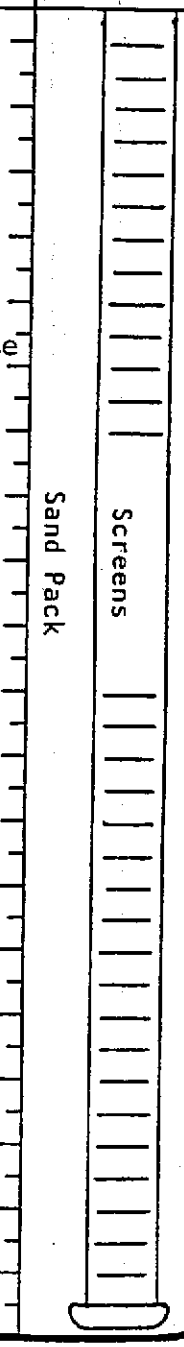
WELL NUMBER ▶ S-1	LOCATION ▶ Oakland
DATE ▶	WEATHER ▶
LOGGED BY ▶	DRILLED BY ▶
DRILLING METHOD ▶	SAMPLING METHOD ▶
ELEVATION ▶	GRAVEL PACK ▶ / SEAL ▶

CASING ▶ TYPE | DIAMETER | LENGTH | HOLE DIA

SCREEN ▶ TYPE | SLOT | DIAMETER | LENGTH | TOTAL DEPTH

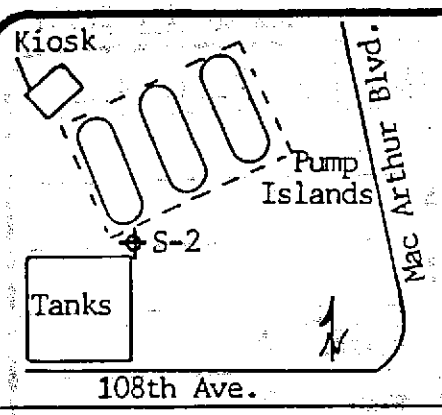
MOISTURE CONTENT	SORTING	POROSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						20		15	(SC) continued
								25	
						1			
						2			(harder drilling)
						3			
Dr-Dp	PS	VD			ND	4		50	yellowish-brown silty sandstone; deeply weathered; fractured; trace clay; no odor
						5			
						6			
						7			
						8			
Dp		Hd			1	9		30	yellowish-brown claystone; no odor
								50	
						30			
						1			
						2			
						3			
						4		30	(very closely fractured; deeply weathered; no odor to very slight odor)
Dp		Hd			ND	5		50	
						6			
						7			
						8			dark grayish-brown silty sandstone; fractured
						9		50	
Wt	PS	VD							Total Depth = 40'

WELL COMPLETION



PACIFIC ENVIRONMENTAL GROUP, INC.

JOB NO. 100-22.01



SHELL OIL COMPANY -- WELL LOG

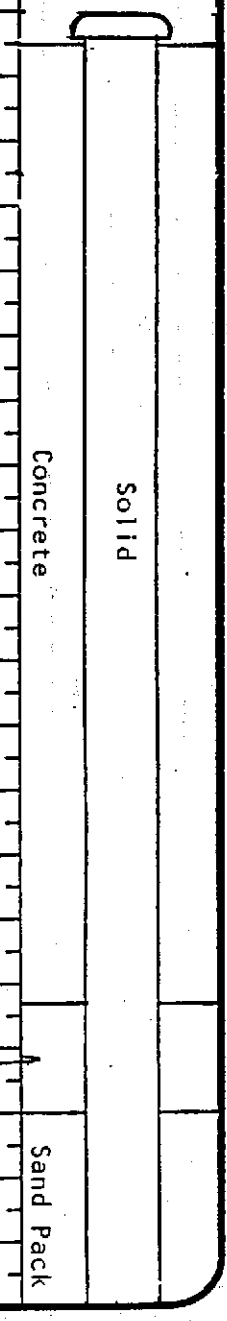
WELL NUMBER	S-2	LOCATION	Oakland
DATE	2/12/87	WEATHER	cool, rainy
LOGGED BY	DM	DRILLED BY	Bayland: Ed, Curt
DRILLING METHOD	HSA	SAMPLING METHOD	Cal. Mod.
GRAVEL PACK	CA	SEAL	bentonite & concrete

CASING ▶ TYPE Schedule 40 PVC DIAMETER 3" LENGTH 20' HOLE DIA 8"

SCREEN ▶ TYPE Schedule 40 PVC SLOT .020" DIAMETER 3" LENGTH 20' TOTAL DEPTH 40'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0			concrete
						1			(CL) gray silty clay; no odor
						2			
						3			
						4		P	(SM) dark yellowish-brown silty sand;
Dp	WS				ND	5			very fine-grained; no odor
						6			
						7			
						8			
						9		11	(CL) dark yellowish-brown sandy clay;
Dp		Hd	L		4.4	10		22 30	very silty; moderate odor
						1			
						2			
						3			
						4		P	(CL-ML) dark grayish-brown silty clay to
Dp		VSt	L		127	5			clayey silt; no odor
						6			
						7			
						8			(SC) dark yellowish-brown clayey sand;
Dp	PS					9			some gravel; silty; very fine-grained; no odor

WELL COMPLETION



PACIFIC ENVIRONMENTAL GROUP, INC. JOB NO. 100-22.01

LOCATION MAP

See page 1 for details.

SHELL OIL COMPANY -- WELL LOG

WELL NUMBER ▶ S-2	LOCATION ▶ Oakland
DATE ▶	WEATHER ▶
LOGGED BY ▶	DRILLED BY ▶
DRILLING METHOD ▶	SAMPLING METHOD ▶
GRAVEL PACK ▶	SEAL ▶

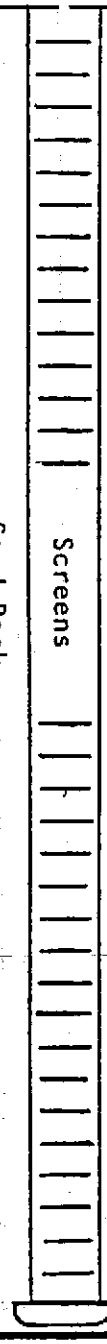
ELEVATION ▶

CASING ▶ TYPE DIAMETER LENGTH HOLE DIA

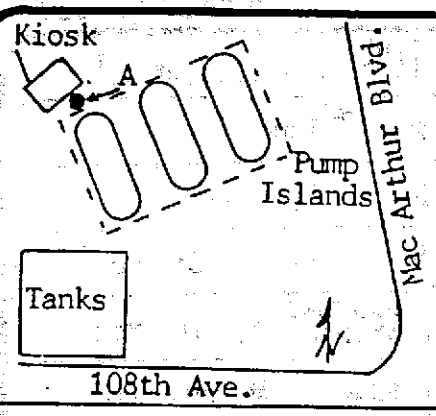
SCREEN ▶ TYPE SLOT DIAMETER LENGTH TOTAL DEPTH

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						20			(SC) continued
						1			
						2			
						3			
						4		P	
Dp	P				152	5			dark yellowish brown to dark grayish-brown sandstone; fractured; weathered; no odor
						6			
						7			
						8			
						9			
Dp	P	VD				30		P	(very closely fractured; very strong odor)
						1	▽		
						2			
						3			
Wt		VD				4		P	(fractured; moderate odor)
						5			
						6			
						7			
						8			
Wt		VD				9		P	(fractured; weathered; no odor) total depth = 40'

WELL COMPLETION



JOB NO. 100-22.01



SHELL OIL COMPANY -- WELL LOG

PAGE 1 OF 1

WELL NUMBER ▶ Boring A		LOCATION ▶ Oakland	
DATE ▶ 2/12/87		WEATHER ▶ cool, rainy	
LOGGED BY ▶ DM		DRILLED BY ▶ Bayland: Ed, Curt	
DRILLING METHOD ▶ HSA		SAMPLING METHOD ▶ Cal. Mod.	
GRAVEL PACK ▶ n/a		SEAL ▶ concrete	

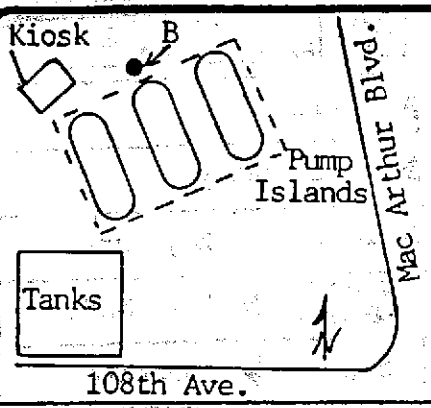
CASING ▶ TYPE n/a DIAMETER n/a LENGTH — HOLE DIA 8"

SCREEN ▶ TYPE n/a SLOT n/a DIAMETER n/a LENGTH — TOTAL DEPTH 20'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	WELL COMPLETION
						0			concrete	
						1			asphalt	
									(CL) olive silty clay; brown mottling	
						2				
						3				
Dp	PS				ND	4		P	(SC) olive-gray clayey sand; little gravel; no odor	
						5				
						6				
						7				
						8				
Dp		Hd	L		ND	9		8	(CL) dark yellowish-brown sandy clay; some silt; trace fine gravel; no odor	
								18		
						10		20		
						1				
						2				
						3				
Dp		Hd	L		8.3	4		12	(increasing sand and fine gravel; slight odor)	
								20		
						5		30		
						6				
						7				
						8				
						9			(SC) dark yellowish-brown clayey sand; some gravel; no odor	
Dp					4.6				total depth = 20'; no water encountered	

concrete

PACIFIC ENVIRONMENTAL GROUP, INC. JOB NO. 100-22.01



SHELL OIL COMPANY -- WELL LOG

PAGE 1 OF 1

WELL NUMBER ▶ Boring B		LOCATION ▶ Oakland	
DATE ▶ 2/12/87		WEATHER ▶ cool, cloudy	
LOGGED BY ▶ DM		DRILLED BY ▶ Bayland: Ed, Curt	
DRILLING METHOD ▶ CFA		SAMPLING METHOD ▶ Cal. Mod.	
GRAVEL PACK ▶ n/a		SEAL ▶ concrete	

CASING ▶ TYPE n/a DIAMETER n/a LENGTH HOLE DIA 6"

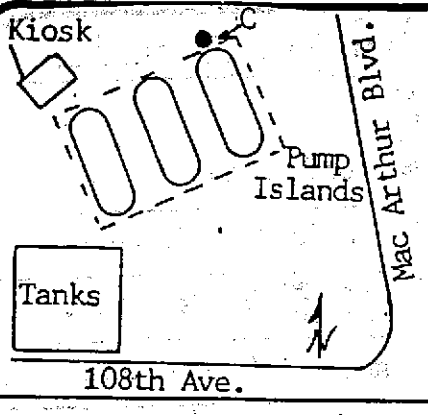
SCREEN ▶ TYPE n/a SLOT n/a DIAMETER n/a LENGTH TOTAL DEPTH 20'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0			concrete; odor in base rock
Dp-Mst						1			(CL) yellowish-brown silty clay; trace fine sand; no odor
						2			
						3			
Dp	MS				ND	4		P	(SM) dark yellowish-brown silty sand; fine to medium grained; no odor (gravelly at 5')
						5			
						6			
						7			
						8			(CL) dark yellowish-brown sandy clay; some silt; no odor
Dp		Hd	L		ND	9		8 20 20	
						10			
						1			
						2			
						3			
Dp		Hd	L		ND	4		10 20 25	(very silty; no odor)
						5			
						6			
						7			
						8			(SC) dark yellowish-brown clayey sand; some grave; silty; no odor
						9		10 25 30	
Dp	PS	VD			<1				total depth = 20'; no water encountered

WELL COMPLETION: concrete

PACIFIC ENVIRONMENTAL GROUP, INC.

JOB NO. 100-22.01



SHELL OIL COMPANY -- WELL LOG

PAGE 1 OF 1

WELL NUMBER ▶ Boring C		LOCATION ▶ Oakland	
DATE ▶ 2/12/87		WEATHER ▶ cool, rainy	
LOGGED BY ▶ DM		DRILLED BY ▶ Bayland: Ed, Curt	
DRILLING METHOD ▶ CFA		SAMPLING METHOD ▶ Cal. Mod.	
GRAVEL PACK ▶ n/a		SEAL ▶ concrete	

CASING ▶ TYPE n/a DIAMETER n/a LENGTH HOLE DIA 6"

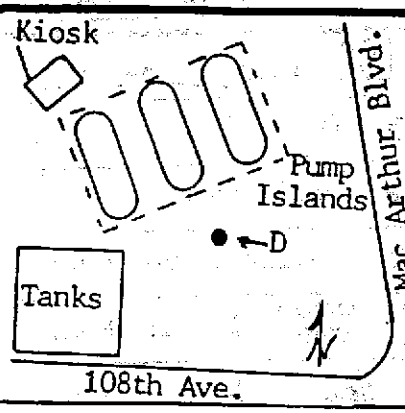
SCREEN ▶ TYPE n/a SLOT n/a DIAMETER n/a LENGTH TOTAL DEPTH 20'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	H-NU (ppm)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS
						0			concrete
Dp						1			(SM-ML) dark yellowish-brown silty sand to sandy silt
						2			
						3			
Dp	MS				ND	4		P	(fine to medium grained; no odor)
						5			
						6			
						7			
						8			(CL) dark yellowish-brown sandy clay; some silt; trace gravel; no odor
Dp		Hd			ND	9		10	
						10		18	
								23	
						1			
						2			
						3			
Dp		Hd			<1	4		10	(very silty; no odor)
								18	
						5		25	
						6			
						7			
						8			
						9		10	
Dp		Hd			14.2			18	(dark grayish-brown; slight odor)
								20	total depth = 20'; no water encountered

WELL COMPLETION: concrete

PACIFIC ENVIRONMENTAL GROUP, INC.

JOB NO. 100-22.01



SHELL OIL COMPANY -- WELL LOG

PAGE 1 OF 1

WELL NUMBER ▶ Boring D		LOCATION ▶ Oakland	
DATE ▶ 2/12/87		WEATHER ▶ cold, rainy	
LOGGED BY ▶ DM		DRILLED BY ▶ Bayland: Ed, Curt	
DRILLING METHOD ▶ CFA		SAMPLING METHOD ▶ Cal. Mod.	
GRAVEL PACK ▶ n/a		SEAL ▶ concrete	

CASING ▶ TYPE n/a DIAMETER LENGTH HOLE DIA 6"

SCREEN ▶ TYPE SLOT DIAMETER LENGTH TOTAL DEPTH 20'

MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NO.	(PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY / REMARKS	WELL COMPLETION
						0			concrete	
Dp-Mst						1			(CL) yellowish-brown silty clay; trace sand	
						2				
						3			?	
						4		P	(SW) dark grayish-brown sand	
						5				
						6				
						7				
						8				
Wt	PS				18.2	9		P		
Dp		Stf	L						(no odor)	
						10			(GC-SC) dark grayish-brown clayey gravel to sand; very silty; no odor	
						1				
						2				
						3				
						4				
Dp		Stf	L		ND			P	(CL) yellowish-brown silty clay; very silty; some very fine sand	
						5				
						6				
						7				
						8				
		VSt				9		P		
									total depth = 20'; no water encountered	

concrete

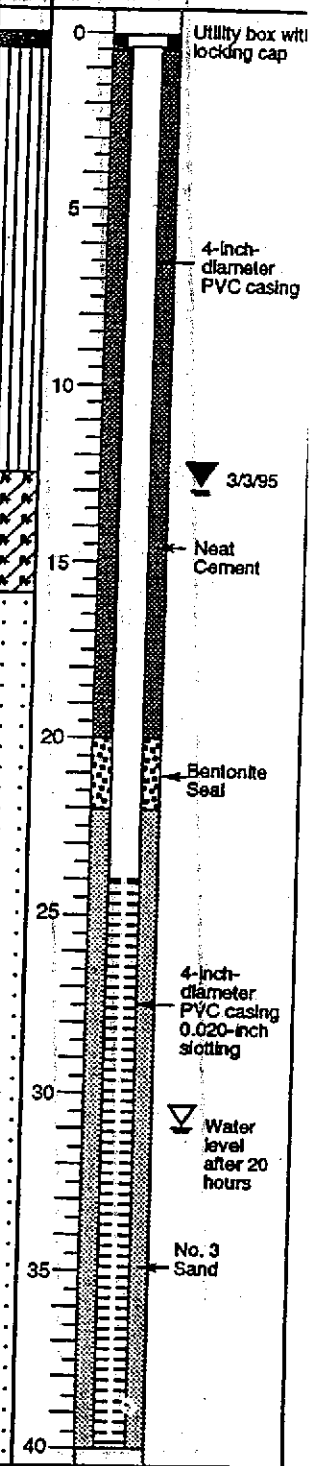
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 2/28/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 44.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Hand-augered to 5 feet. 4 inches of Asphalt.		
7,8,10	115	ND		5	CLAYEY SILT: yellowish brown, soft, damp, very fine-grained.	ML	
5,7,8	20	1.9		10	Olive, moist.		
—	10% LEL	240			GRAVELLY SAND: yellowish brown, damp, well graded, with clay.	GC	
13,24,50 for 4"	2% LEL	110		15			
5 for 5"	500				SANDSTONE: brownish yellow, very friable, dry, fine-grained with silt.		
—	50				SILTSTONE: dark yellowish brown, very friable, dry, with sand.		
11,22,50 for 4"	100	3.0		20			
50 for 6"	10	ND			Soft, interbedded with fractured, very hard, damp sandstone.		
50 for 6"	25			25			
—	20				Dry.		
15,17,19	50	ND		30			
—	0				Damp.		
—	15						
—	15			35			
	0				With increased clay content in siltstone, mottled dark green and yellowish brown. Moist.		
50 for 6"	100	ND		40			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

MW-3

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 2/28/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 44.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY	WELL CONSTRUCTION DETAIL
				40				40
				45				45
				50				50
				55				55
				60				60
				65				65
				70				70
				75				75
				80				80

End cap

ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

MW-3
PAGE 2 OF 2

41-0034/MW-3 03/17/95

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 2/28/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 46.0 feet DEPTH TO WATER: 44.0 feet

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 4 feet. 6 Inches of Concrete.	
7,11,8	0	ND		5	SILTY CLAY: dark gray brown, soft, damp.	CL
6,7,11	75	44		10	CLAYEY SILT: dark yellowish brown, soft, damp, few small pebbles.	ML
6,11,15	70% LEL	540		15	GRAVELLY SAND: mottled dark yellow brown and green, loose, damp, with clay.	GC
					From approximately 17 feet to bottom of hole: Interbedded sandstone and siltstone.	
21,37,42	350	ND		20	SANDSTONE: light olive brown, very fractured and friable with calcium carbonate infill in fractures.	
					SILTY CLAY (weathered bedrock): dark grayish brown, soft, damp at 10 feet.	
		3.9			Light olive brown, wet, with gravel.	
47 for 12"	5% LEL			25	SANDSTONE: light olive brown, very fractured and friable with calcium carbonate infill in fractures.	
15,29,26	5% LEL	ND		30	SILTY CLAY (weathered bedrock): light olive brown, soft, wet, with gravel.	
					GRAVELLY SAND (weathered bedrock): dark yellowish brown, loose, moist.	
12,15,19	175	ND		35	Interbedded with silty clay.	
41,27,35	175	ND		40		

WELL CONSTRUCTION DETAIL

ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

B-1
PAGE 1 OF 2

PROJECT NO.: 41-0034	DATE DRILLED: 2/28/95
LOCATION: USA Gas #57	LOGGED BY: A. Le May
10700 MacArthur Boulevard	APPROVED BY: M. Katen, RG
Oakland, California	DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 46.0 feet DEPTH TO WATER: 44.0 feet

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY	WELL CONSTRUCTION DETAIL
27,30 41 for 4"	40	4		40				
				45	GRAVELLY CLAY (weathered bedrock): dark yellowish brown, saturated, well graded, with sand and pebbles to 1/4 inch.			
				50		ML		
				55				
				60				
				65				
				70				
				75				
				80				

ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

B-1
PAGE 2 OF 2

41-0034/B-1 03/17/95

PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

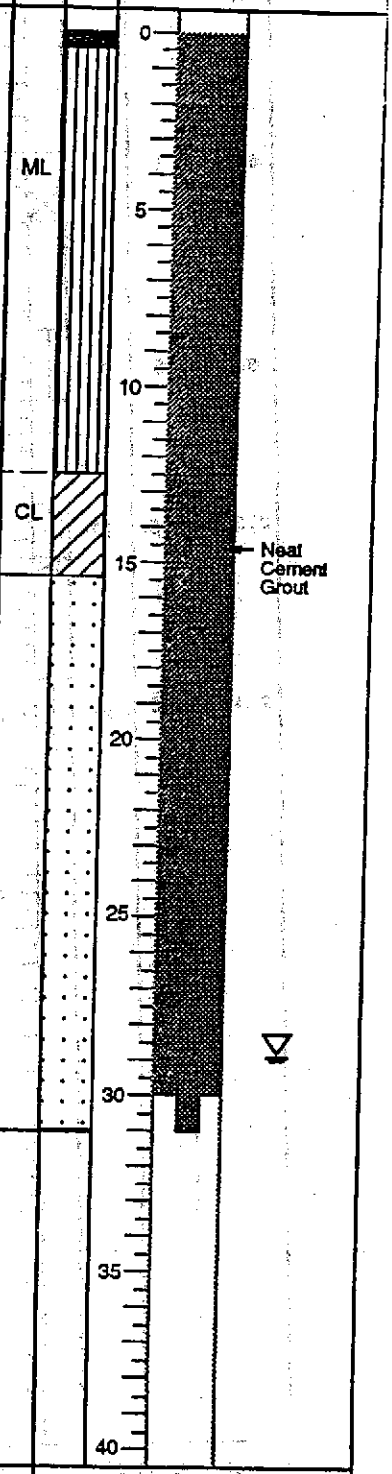
DATE DRILLED: 3/1/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 31.0 feet DEPTH TO WATER: 29.0 feet

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 5 feet. 4 inches of Asphalt.	
11,12,17	60	ND		5	CLAYEY SILT: dark yellowish brown, soft, damp, fine-grained, low plasticity.	ML
11,16,21	80	ND		10	At approximately 10 feet depth includes small pebbles and mottled dark brown and green.	
21,27,31	5% LEL	16		15	SANDY CLAY: dark yellowish brown, damp, fine-grained.	CL
					SANDSTONE: brownish yellow, fractured, damp, fine-grained, with clay.	
8,10,16	325	110		20	SANDY CLAY (weathered bedrock): dark yellowish brown, damp, fine-grained. SANDSTONE: brownish yellow, fractured, fine-grained, with green staining.	
8,11,17	60 150% LEL	240		25	Interbedded with sandy clay. SANDY CLAY (weathered bedrock) to 25 feet, then fractured sandstone.	
6,11,13	LEL off scale			30	GRAVELLY SAND (weathered bedrock): very dark grayish brown, loose, saturated, well graded.	
				35		
				40		

LITHOLOGY

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

B-2
PAGE 1 OF 1

41-0034/B-1 03/17/95

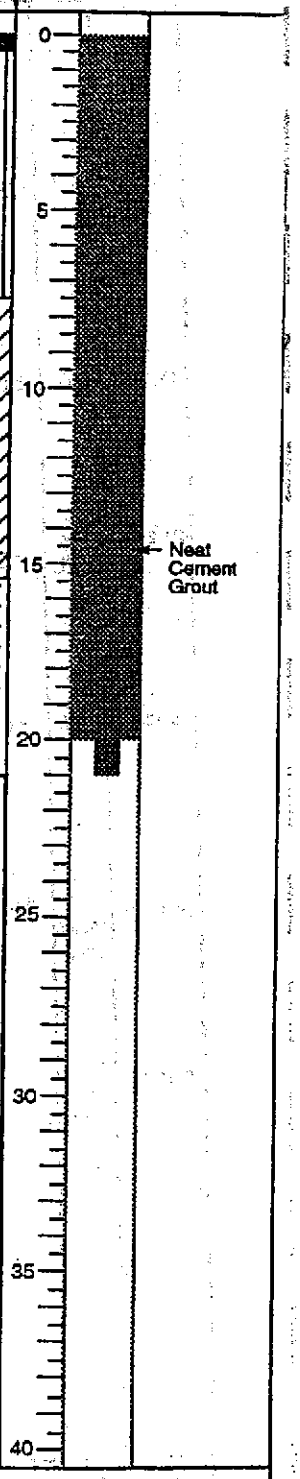
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 3/1/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 21.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Hand-augered to 5 feet. 4 inches Asphalt.		
5,7,10	0			5	CLAYEY SILT: brown, soft, damp, fine-grained, with sand and occasional pebbles.	ML	
8,10,8	5	ND		10	SANDY CLAY: very dark grayish brown, soft, damp, with small pebbles and a moderate amount of silt.	SC	
28,39,43	15	10		15	SANDSTONE: light yellowish brown, friable, very fractured, contains 3-inch thick layer of sandy clay at 15 feet.		
27,46,23	30	15		20	Interbedded with gravelly clay. GRAVELLY CLAY (weathered bedrock): dark olive brown, moderately soft, with large pebbles to 0.5-inch diameter.		
				25			
				30			
				35			
				40			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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41-0034/B-3 03/21/95

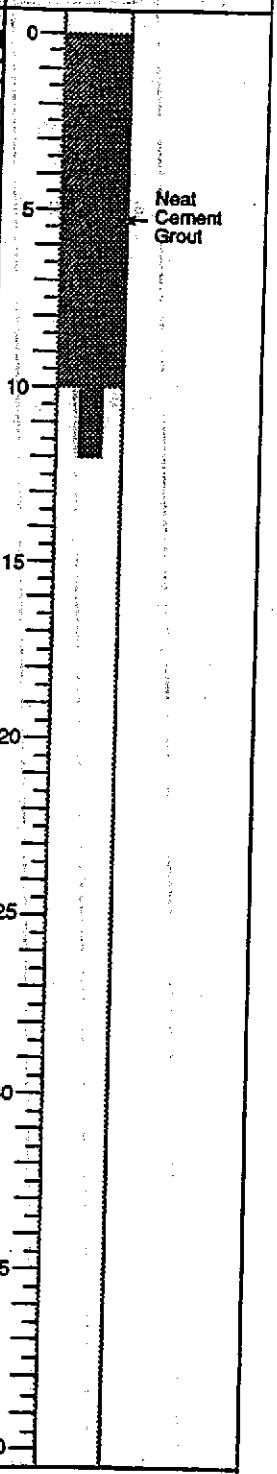
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 3/2/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-Inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 12.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Hand-augered to 4 feet. 6 inches Concrete		
5,7,13	5	ND			SANDY CLAY: olive brown, soft, saturated from surface, with small amount of pebbles.	CL	
7,7,8	15	ND		5	SAND: dark yellowish brown, loose, saturated, medium- to coarse-grained sand, poorly graded.	SP	
6,15,15	15	ND		10	SANDY CLAY: olive brown, medium soft, moist, with small amount of pebbles.	CL	
				15			
				20			
				25			
				30			
				35			
				40			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

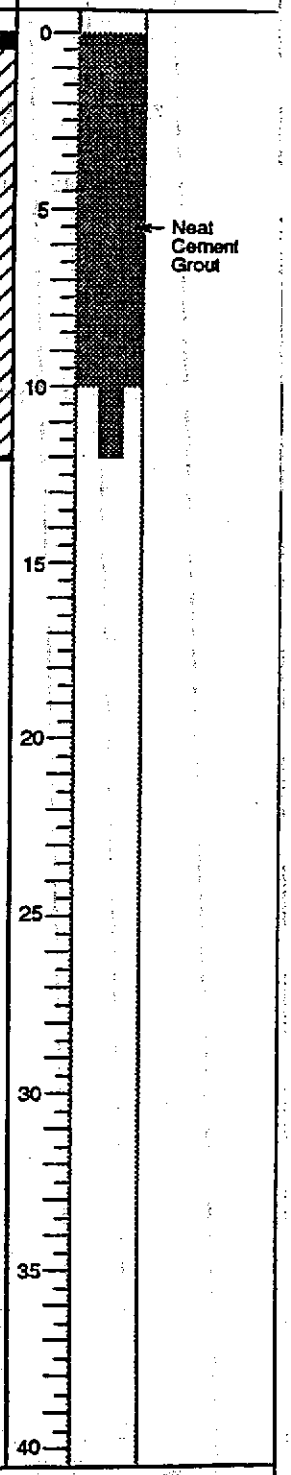
41-0034/B-4 03/21/95

PROJECT NO.: 41-0034	DATE DRILLED: 3/2/95
LOCATION: USA Gas #57	LOGGED BY: A. Le May
10700 MacArthur Boulevard	APPROVED BY: M. Katen, RG
Oakland, California	DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-Inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 12.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
	0			0	Hand-augered to 4 feet. 6 inches Concrete.		
5,7,14	10	ND		5	SANDY CLAY: olive brown, very soft, damp, with small pebbles.	CL	
15,16,21	15	ND		10	Moist, with silt.		
				15			
				20			
				25			
				30			
				35			
				40			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

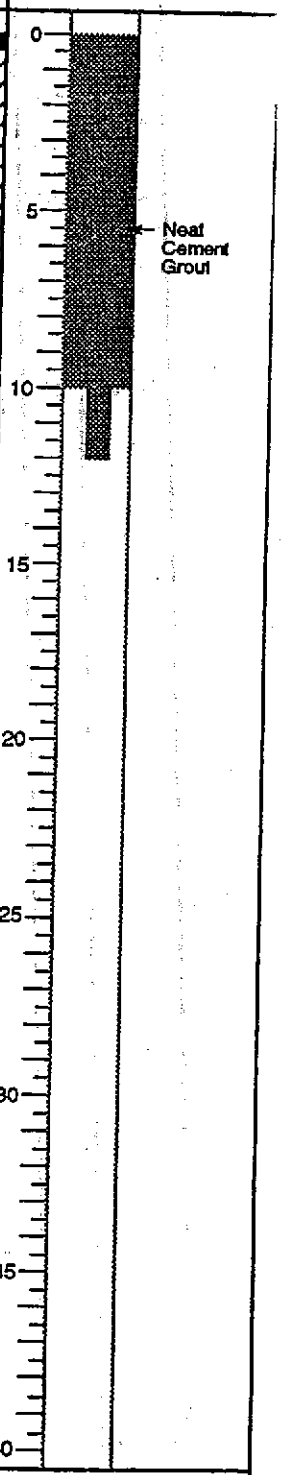
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 3/2/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-Inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 12.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Hand-augered to 4 feet. 6 Inches of Concrete.		
2,2,5	130	33			SANDY CLAY: green olive gray, very soft, damp, with silt and occasional pebbles.	CL	
	60						
2,7,11	10	2.6		5	Olive gray.		
2,13,21	10	ND		10	SILTY CLAY: dark brown, soft, with occasional larger pebbles.		
				15			
				20			
				25			
				30			
				35			
				40			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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41-0034/B-6 03/21/95

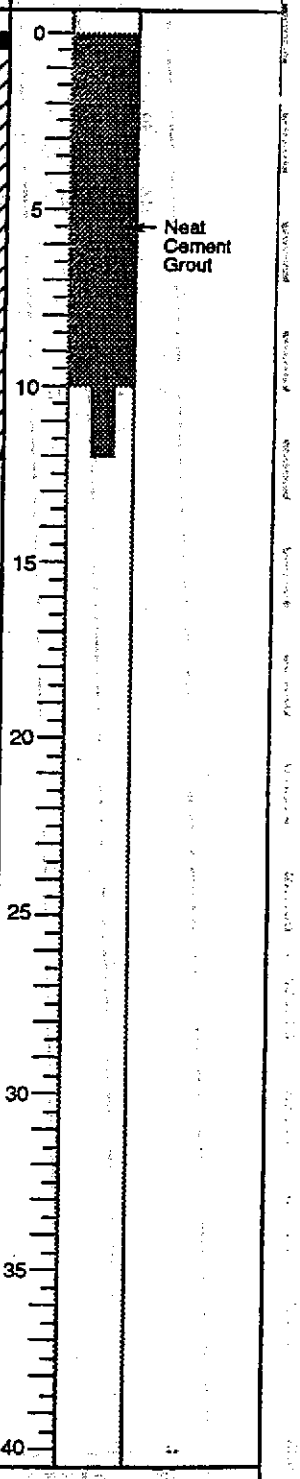
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 3/2/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 12.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Hand-augered to 5 feet. 6 inches Concrete.		
2,2,5	130 60	ND			SANDY CLAY: dark olive gray, very soft, damp, with silt and occasional pebbles.	CL	
2,7,11	10	ND		5	At 4.5 feet depth, dark brown, harder, increased silt content.		
2,13,21	10	ND		10	Dark olive gray, medium hard, damp, with silt. At 11.5 feet depth, dark brown, hard.		
				15			
				20			
				25			
				30			
				35			
				40			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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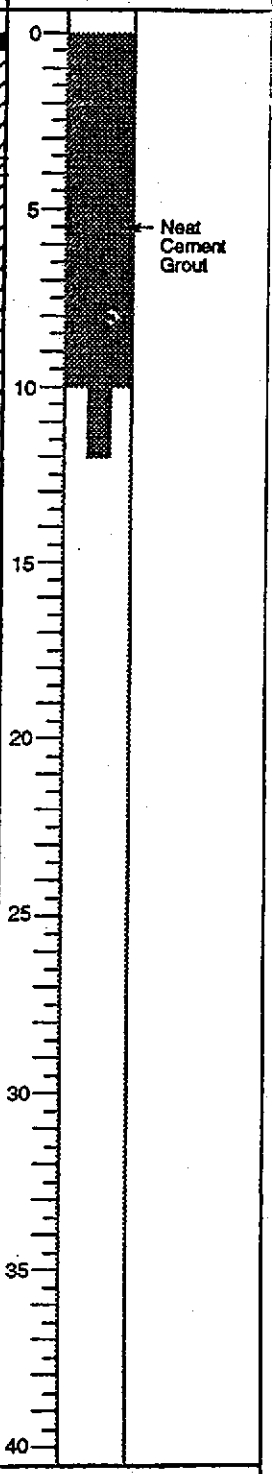
41-0034/B-7 03/21/95

PROJECT NO.: 41-0034	DATE DRILLED: 3/2/95
LOCATION: USA Gas #57	LOGGED BY: A. Le May
10700 MacArthur Boulevard	APPROVED BY: M. Katen, RG
Oakland, California	DRILLING CO.: Bayland Drilling

DRILLING METHOD: 8-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 12.0 feet DEPTH TO WATER:

BLOWS PER 6 INCHES	CGI (ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Hand-augered to 4 feet. 6 inches Concrete.		
4,4,7	90	17			SANDY CLAY: dark olive gray, very soft, damp.	CL	
					CLAYEY SAND: dark olive gray, very soft, damp, with some small gravel pebbles.	SC	
2,3,5	95	ND		5	GRAVELLY CLAY: dark olive gray, very soft, saturated.	CL	
17,23,22	25	2.0		10	SILTY CLAY: dark yellowish brown, hard, damp, with rare small pebbles, with sand.		
				15			
				20			
				25			
				30			
				35			
				40			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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41-0034/B-8 03/21/95

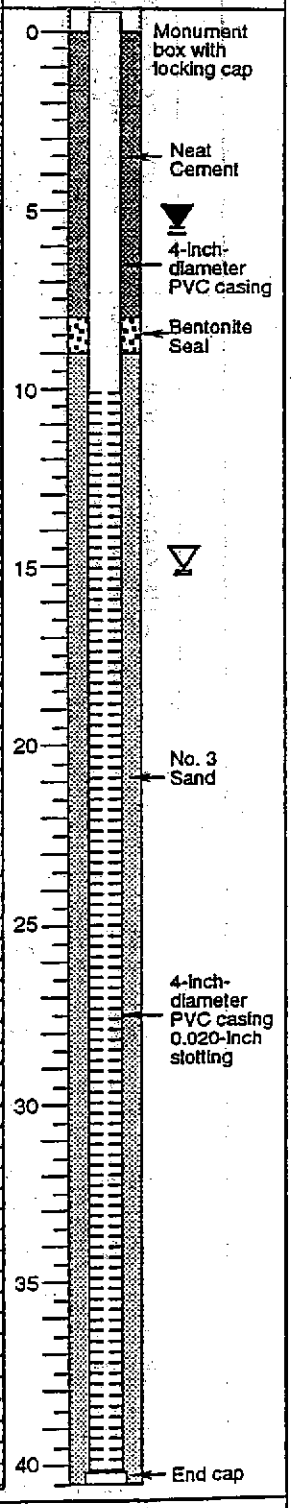
PROJECT NO.: 41-0034	DATE DRILLED: 11/20/95
LOCATION: USA Gas #57	LOGGED BY: A. Le May
10700 MacArthur Boulevard	APPROVED BY: M. Katen, RG
Oakland, California	DRILLING CO.: V & W Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 40.5 feet DEPTH TO WATER: 15.0 feet

BLOWS PER 6 INCHES	PID(ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 5 feet.	
9,14,15	—			5	SILTY SAND: dark yellowish brown, medium dense, damp, poorly graded.	SM
8,11,14	0	ND		10	SANDY SILT: dark yellowish brown, stiff, damp, with clay.	ML
18,21,34	5			15	SILTY SAND: dark yellowish brown, medium dense, moist, with clay, contains carbonate pebbles up to 0.13-inch diameter.	SM
18,31,34	0			20	SILTY SAND and GRAVEL Mixture: dark yellowish brown, medium dense, wet,with clay.	GC
14,24,36	0			25	SILTY CLAYEY SAND and GRAVEL Mixture: strong brown, dense, damp, with pebbles to 0.5-inch diameter.	
12,18,23	0			30		
9,22,31	0			35	Medium dense.	
30,50	0			40	Increased silt content.	

LITHOLOGY

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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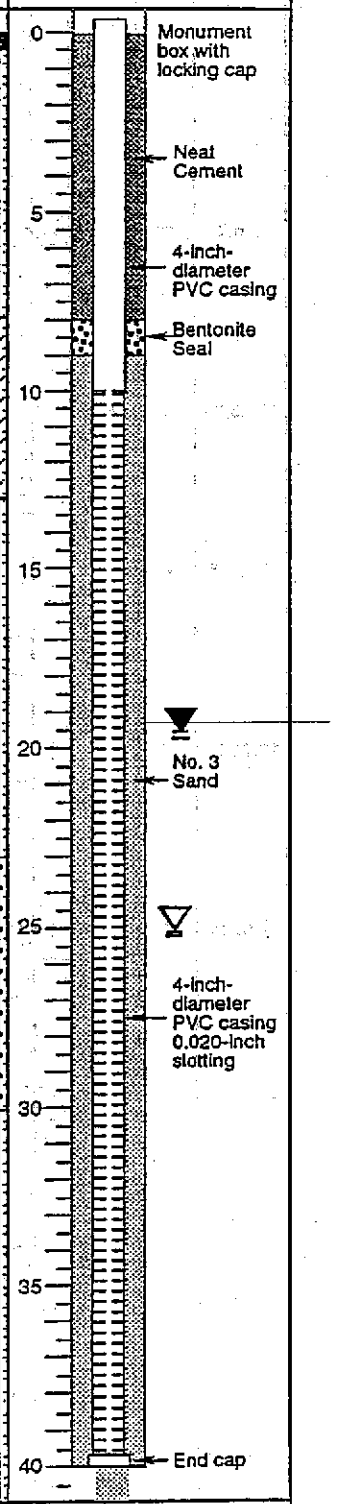
PROJECT NO.: 41-0034	DATE DRILLED: 11/20/95
LOCATION: USA Gas #57	LOGGED BY: A. Le May
10700 MacArthur Boulevard	APPROVED BY: M. Katen, RG
Oakland, California	DRILLING CO.: V & W Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 41.0 feet DEPTH TO WATER: 25.0 feet

BLOWS PER 6 INCHES	PID(ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Hand-augered to 5 feet. 4 inches Asphalt.		
7,18,21	0			5	SILTY SAND: yellowish brown, medium dense, damp, fine-grained, poorly graded.	SM	
10,14,19	0	ND		10	CLAYEY SAND: dark yellowish brown, medium dense, damp, poorly graded, with occasional pebbles to 0.5-inch diameter.	SC	
16,23,24	0	ND		15	SILTY SAND: dark yellowish brown, medium dense, damp, with gravel and some clay.	SM	
12,18,24	0			20			
6,9,16	—			25	No recovery, sampler saturated, gravel lense?	GM	
					SILTY CLAYEY SANDY GRAVEL: dark yellowish brown, loose, saturated, poorly graded.		
10,15,24	0			30	SILTY SAND: dark yellowish brown, medium dense, damp, with gravel and some clay.	SM	
5,12,21	0			35	With lenses up to 4 inches of more gravel-rich, saturated.		
10,21,32				40			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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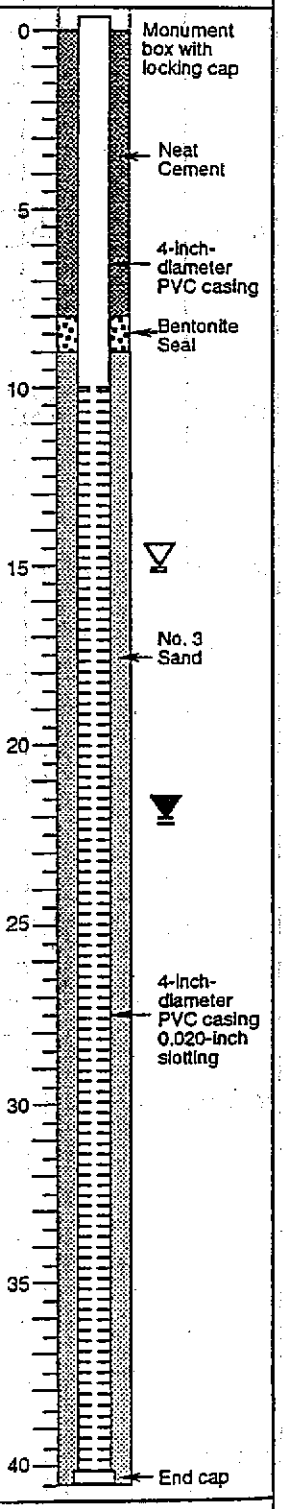
PROJECT NO.: 41-0034
LOCATION: USA Gas #57
10700 MacArthur Boulevard
Oakland, California

DATE DRILLED: 11/20/95
LOGGED BY: A. Le May
APPROVED BY: M. Katen, RG
DRILLING CO.: V & W Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 40.5 feet DEPTH TO WATER: 15.0 feet

BLOWS PER 6 INCHES	PID(ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Hand-augered to 5 feet.		
10,16,21	—			5	SILTY SAND for 2 inches: brown, dry, then SILTY SAND: dark yellowish brown, medium dense, damp with some clay.	SM	
13,25,30	0	ND		10	With gravel.		
9,18,28	0			15	SILTY SAND and GRAVEL Mixture: moist, with clay.		
18,21,24	0			20	Wet.		
9,14,19	0			25	Gravel-rich lenses up to 4-inch thick.	GC	
6,11,16	—			30	Saturated, poor recovery.		
				35	As above for 6 inches, damp.		
12,50 for 4"					SILTY SANDSTONE BEDROCK: dark yellowish brown, dry, fractured and friable.		
12,17,17	0			40	CLAYEY GRAVEL BEDROCK Interbedded: brown, loose, saturated, includes fractured bedrock pebbles.		

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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PAGE 1 OF 1

41-0034/MW-6 01/05/96

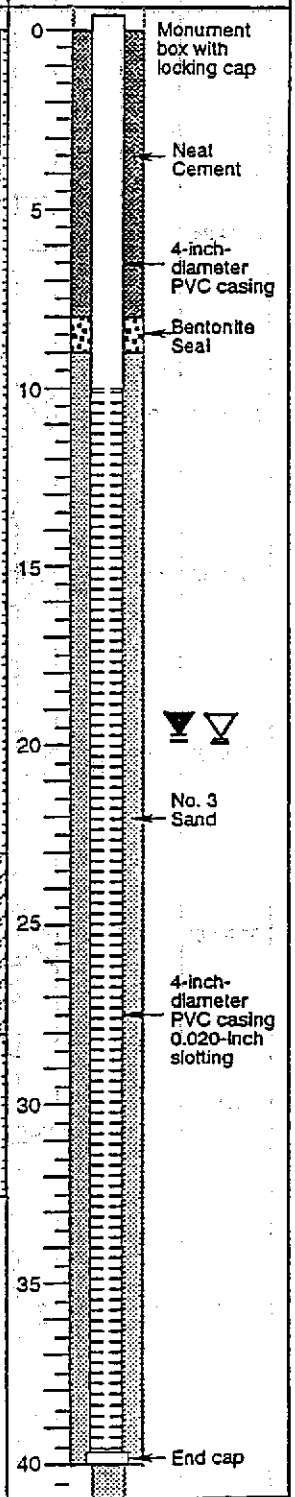
PROJECT NO.: 41-0034	DATE DRILLED: 11/21/95
LOCATION: USA Gas #57	LOGGED BY: A. Le May
10700 MacArthur Boulevard	APPROVED BY: M. Katen, RG
Oakland, California	DRILLING CO.: V & W Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 41.0 feet DEPTH TO WATER: 20.0 feet

BLOWS PER 6 INCHES	PID(ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS
				0	Hand-augered to 5 feet.	
6,11,19	0			5	SILTY SAND: dark yellowish brown, medium dense, damp, fine-grained, poorly graded.	
9,15,22	0	ND		10	With clay and carbonate pebbles to 0.5-inch diameter.	SM
8,15,23	0	ND		15		
10,13,20	>2,500	25		20	Slight greenish color.	
14,19,22	>2,500			25	CLAYEY SANDY and GRAVEL Mixture: yellowish brown, medium dense, damp, pebbles to 0.13-inch diameter.	GC
17,31,32	0			30	SILTY SAND: dark yellowish brown, dense, damp, with gravel and clay.	SM
23,50	0			35	SILTY SANDSTONE BEDROCK; light olive brown, very fractured, moist, very friable, with clay.	
13,2232	0			40	With claystone interbeds, saturated.	

LITHOLOGY

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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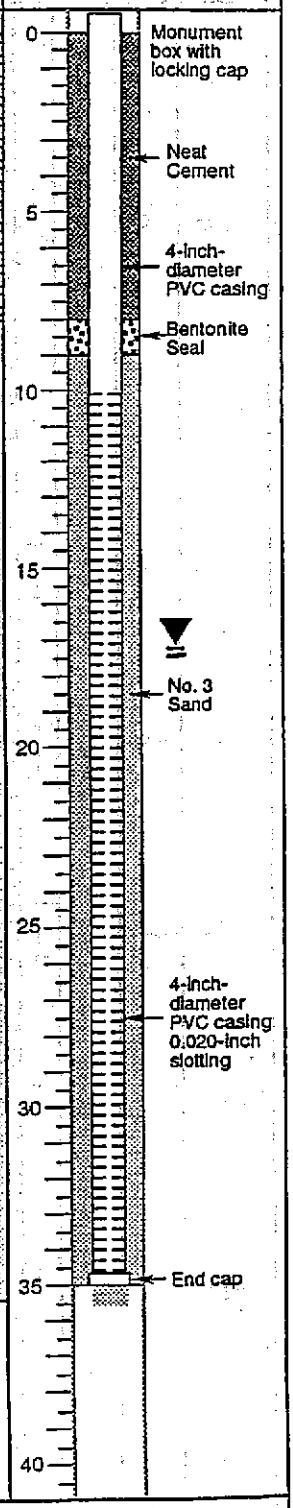
PAGE 1 OF 1

PROJECT NO.: 41-0034	DATE DRILLED: 11/21/95
LOCATION: USA Gas #57	LOGGED BY: A. Le May
10700 MacArthur Boulevard	APPROVED BY: M. Katen, RG
Oakland, California	DRILLING CO.: V & W Drilling

DRILLING METHOD: 10-inch diameter Hollow-Stem Auger
SAMPLER TYPE: California Modified Split-Spoon
TOTAL DEPTH: 35.5 feet DEPTH TO WATER: N/A

BLOWS PER 6 INCHES	PID(ppm)	TPH-G (ppm)	SAMPLE	DEPTH (feet below grade)	DESCRIPTION	USCS	LITHOLOGY
				0	Hand-augered to 5 feet.		
10,14,24	—			5	SILTY SAND: dark yellowish brown, medium dense, damp, with gravel and clay.	SM	
					SILTY SANDSTONE BEDROCK: yellowish brown, friable, fractured, dry, very dense		
50 for 3"	0	ND		10			
50 for 5"	—	ND		15			
50 for 5"	—	ND		20			
50 for 6"	—			25			
25,32,50	0			30	As above including 6 inches of strong brown claystone and sand.		
28,50 for 6"	0			35			
				40			

WELL CONSTRUCTION DETAIL



ALTON GEOSCIENCE
Livermore, California

LOG OF EXPLORATORY BORING

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APPENDIX C

HISTORICAL SOIL ANALYTICAL DATA

ITAS/Santa Clara to Pacific Environmental Group, Inc.
ATTN: Susan Willhite

February 28, 1987

TABLE OF RESULTS

ND = None Detected

Laboratory Number	Sample Identification		Date Received	Total Hydrocarbons (Parts per Million, dry soil basis)
	Project 100-22.01, Oakland			
S7-02-076-01	A	13.5-15'	2/17/87	16.
S7-02-076-02	B	18.5-20'	2/17/87	4.
S7-02-076-03	C	18.5-20'	2/17/87	ND.
S7-02-076-04	D	9-10.5'	2/17/87	2.
S7-02-076-05	S-1	19-20.5'	2/17/87	42.
S7-02-076-06	S-1	19-20.5'	2/17/87	16.
S7-02-076-07	S-2	24-25.5'	2/17/87	600.
S7-02-076-09	Fill Box		2/17/87	410.
			Detection Limit	2.

TABLE 4

SOIL ANALYTICAL DATA
FORMER USA STATION #57
10700 MacARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Well ID	Date	Depth (feet)	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Total Xylene (ppm)
S-1	02/12/87	20.5 20.5	42 16	- -	- -	- -	- -	- -
S-2	02/12/87	24.5	600	-	-	-	-	-
B-1	02/28/95	5.5 9.5 13.0 20.0 25.0 31.0 35.0 40.5	ND 44 540 ND 3.9 ND ND ND	- - 55 - - - - ND	ND 0.12 2.6 0.012 0.048 ND 0.014 ND	ND ND 10 0.016 0.14 0.011 0.018 ND	ND 0.14 7.5 ND 0.062 0.0057 0.012 ND	ND 0.4 48 0.029 0.37 0.045 0.079 ND
B-2	03/01/95	5.0 10.5 16.0 21.0 26.0	ND ND 16 110 240	- - - - 22	ND ND 0.057 0.96 0.76	ND ND 0.028 0.41 1.4	ND ND 0.029 0.33 0.85	ND ND 1.2 1.5 1.9
B-3	03/01/95	11.0 15.5 20.5	ND 10 15	- - 1.3	ND 0.044 0.041	ND 0.11 0.37	ND 0.079 0.15	ND 0.63 1.1
B-4	03/02/95	3.0 6.0 12.0	ND ND ND	- - ND	ND ND ND	ND ND ND	ND ND ND	ND ND ND
B-5	03/02/95	5.5 12.0	ND ND	- ND	ND ND	ND ND	ND ND	ND ND
B-6	03/02/95	4.0 5.5 12.0	33 2.6 ND	5.3 - -	0.093 0.062 ND	0.065 ND ND	0.33 0.030 ND	2.0 0.047 0.022

TABLE 4 (Continued)

SOIL ANALYTICAL DATA
FORMER USA STATION #57
10700 MacARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Well ID	Date	Depth (feet)	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Total Xylene (ppm)
B-7	03/02/95	3.5	ND	ND	ND	ND	ND	ND
		5.0	ND	-	ND	ND	ND	ND
		12.0	ND	-	ND	ND	ND	ND
B-8	03/02/95	3.0	17	-	0.012	0.021	0.12	0.16
		5.5	ND	ND	0.019	ND	0.050	ND
		12.0	2.0	-	0.042	ND	ND	0.016
MW-3	02/28/95	5.5	ND	-	ND	ND	ND	ND
		11.5	1.9	-	0.026	0.011	0.0061	0.019
		13.5	240	12	0.41	0.64	2.0	5.4
		15.5	110	-	0.37	3.8	1.5	10
		21.5	3.0	-	0.26	0.24	0.059	0.50
		24.5	ND	-	0.030	0.0069	0.0056	0.016
		29.5	ND	-	ND	0.0054	ND	0.0092
		39.5	ND	-	ND	ND	ND	ND
MW-4	11/21/95	10.0	ND	5.0	ND	ND	ND	ND
MW-5	11/21/95	10.0	ND	5.2	ND	ND	ND	ND
		15.0	ND	4.2	ND	ND	ND	ND
MW-6	11/21/95	10.0	ND	4.4	ND	ND	ND	ND
MW-7	11/21/95	10.0	ND	4.7	ND	ND	ND	ND
		15.0	ND	4.3	ND	ND	ND	ND
		20.0	25	8.7	0.071	0.11	0.043	0.1
MW-8	11/21/95	10.0	ND	5.5	ND	ND	ND	ND
		15.0	ND	5.1	ND	ND	ND	ND
		20.0	ND	4.5	ND	ND	ND	ND

TPH G — Total petroleum hydrocarbons in the gasoline range
TPH D — Total petroleum hydrocarbons in the diesel range
ppm — Parts per million
ND — Not detected at the method detection limit
\- — Not measured/not analyzed
Boring locations are presented in Alton Geo Sciences' "Supplementary Site Assessment Report " which are included in Appendix C.

TABLE 5

SOIL ANALYTICAL DATA - TANK REMOVAL
FORMER USA STATION #57
10700 MacARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Sample Location	Sample ID	Date	Depth (feet)	TPH G (ppm)	TPH D (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl-benzene (ppm)	Total Xylene (ppm)	TTLC Lead (ppm)
Product Trench	PI-E-3.5	07/19/94	3.5	ND(0.2)	ND(1.0)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	7
	PI-2	07/19/94	3.5	4,500	ND(50)	ND(1.0)	6	60	440	4
	PI-3	07/19/94	3.5	ND(0.2)	ND(1.0)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	5
	PI-4	07/19/94	4	ND(0.2)	ND(1.0)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	6
	PI-5	07/19/94	3.5	ND(1.0)	ND(1.0)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	7
	PI2-0	09/19/94	9	15	-	0.02	0.04	0.07	0.19	-
Tank Field	TP1	07/19/94	12.5	-	60	ND(0.005)	0.015	0.007	0.008	-
	TP2	07/19/94	12.5	-	230	ND(1.0)	0.79	2.2	0.7	-
	TP3	07/19/94	13	94	-	0.18	0.25	1	5.9	3
	TP4	07/19/94	13	1400	-	1.9	3.5	12	150	4
	TP5	07/19/94	13	300	-	ND(0.5)	0.74	4.8	20	3
	TP6	07/19/94	13	0.7	-	ND(0.005)	ND(0.005)	0.006	ND(0.005)	3
	TP7	07/19/94	13	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	3
Tank Cavity	TC-1	08/19/94	16	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC-2	08/19/94	16	93	-	ND(1.0)	0.28	0.63	3.1	-
	TC-3	08/19/94	17.5	2.4	1	0.008	0.02	0.02	0.11	-
	TC-4	08/19/94	15.5	0.7	2	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC-5	08/19/94	17	190	-	0.17	0.38	0.99	7.9	-
	TC-6	08/19/94	18	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	SM-1	08/19/94	19.5	0.4	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-1	09/27/94	417 17	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-2	09/27/94	13	13	-	0.06	0.019	0.026	ND(0.005)	-
	TC2-3	09/27/94	16	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-4	09/27/94	13	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-5	09/27/94	12	100	200	0.13	0.12	0.1	0.26	-
	TC2-7	09/27/94	13	6.3	37	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-8	09/27/94	13	ND(1.0)	16	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-9	09/27/94	19	0.4	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-11	09/27/94	13	2200	-	9.6	21	40	260	-
	TC2-12	09/27/94	12	130	-	0.33	0.29	0.66	7.9	-
	TC2-13	09/27/94	20	620	-	1.1	4.9	6.4	66	-
	TC2-14	09/27/94	11	92	-	0.096	0.1	0.17	1.7	-
	TC2-15	09/27/94	17	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	TC2-16	09/27/94	14	ND(1.0)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
(Alton)	TC3-3	10/94	12-13	300	330	-	-	-	-	-
(Alton)	TC3-4	10/94	12-13	510	ND	-	-	-	-	-
(Alton)	TCE-5	10/94	12-13	2400	ND	-	-	-	-	-
(Alton)	TC3-6	10/94	12-13	940	ND	-	-	-	-	-
Dispenser Island	DI-1	09/27/94	3.5	720	-	0.19	2	9	53	-
	DI-2	09/27/94	3.5	280	-	0.12	0.8	4.6	33	-
	DI-3	09/27/94	3	ND(0.2)	-	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	-
	DI-4	09/27/94	3	590	-	0.7	2.5	13	81	-
	DI-5	09/27/94	3.5	570	-	0.1	1.5	2.7	17	-
	DI-6	09/27/94	3.5	1800	-	0.72	5.2	31	180	-

SOIL SAMPLES BY WESTERN GEO-ENGINEERS UNLESS OTHERWISE NOTED

TPH G	Total petroleum hydrocarbons in the gasoline range
TPH D	Total petroleum hydrocarbons in the diesel range
ppm	Parts per million
ND	Not detected at the method detection limit
-	Not measured/not analyzed

WEGE: TABLE 1

USA PETROLEUM CORPORATION

10700 MACARTHUR BLVD.,

OAKLAND, CALIFORNIA

SOIL SAMPLE LABORATORY RESULTS

SAMPLE LOCATION	SAMPLE ID	DATE SAMPLED	DEPTH SAMPLED IN FEET	SAMPLING COMPANY	LAB	TPH,G ppm	TPH,D ppm	BENZENE ppm	TOLUENE ppm	ETHYL BENZENE ppm	XYLENE ppm	TTLC LEAD ppm	STLC LEAD PPM	PNA's by M8270 ppm	VOL.ORGAN by 8240 ** ppm
P_L TRNCH	PI-E 3.5	07/19/94	3.5	WEGE	AEN	<0.2	<1.0	<.005	<.005	<.005	<.005	7			
P_L TRNCH	PI-2	07/19/94	3.5	WEGE	AEN	4500	<50	<1.0	6	60	440	4			
P_L TRNCH	PI-3	07/19/94	3.5	WEGE	AEN	<0.2	<1.0	<.005	<.005	<.005	<.005	5			
P_L TRNCH	PI-4	07/19/94	4	WEGE	AEN	<0.2	<1.0	<.005	<.005	<.005	<.005	6			
P_L TRNCH	PI-5	07/19/94	3.5	WEGE	AEN	<1.0	<1.0	<.005	<.005	<.005	<.005	7			
TNK FIELD	TP1	07/19/94	12.5	WEGE	AEN		60	<.005	0.015	0.007	0.008			<0.2	
TNK FIELD	TP2	07/19/94	12.5	WEGE	AEN		230	<1.0	0.79	2.2	0.7			* 0.77	ND
TNK FIELD	TP3	07/19/94	13	WEGE	AEN	94		0.18	0.25	1	5.9	3			
TNK FIELD	TP4	07/19/94	13	WEGE	AEN	1400		1.9	3.5	12	250	4			
TNK FIELD	TP5	07/19/94	13	WEGE	AEN	300		<.5	0.74	4.8	20	3			ND
TNK FIELD	TP6	07/19/94	13	WEGE	AEN	0.7		<.005	<.005	0.006	<.005	3			
TNK FIELD	TP7	07/19/94	13	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005	3			
TNK CAVTY	TC-1	08/19/94	16	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	TC-2	08/19/94	16	WEGE	AEN	93		<0.01	0.28	0.63	3.1				
TNK CAVTY	TC-3	08/19/94	17.5	WEGE	AEN	2.4	1	0.008	0.02	0.02	0.11				
TNK CAVTY	TC-4	08/19/94	15.5	WEGE	AEN	0.7	2	<.005	<.005	<.005	<.005				
TNK CAVTY	TC-5	08/19/94	17	WEGE	AEN	190		0.17	0.38	0.99	7.9				
TNK CAVTY	TC-6	08/19/94	18	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	SM-1	08/18/94	19.5	WEGE	AEN	0.4		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-1	09/27/94	17	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-2	09/27/94	13	WEGE	AEN	13		0.06	0.019	0.026	<.005				
TNK CAVTY	TC2-3	09/27/94	16	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-4	09/27/94	13	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-5	09/27/94	12	WEGE	AEN	100	200	0.13	0.12	0.1	0.25				
TNK CAVTY	TC2-7	09/27/94	13	WEGE	AEN	6.3	37	<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-8	09/27/94	13	WEGE	AEN	<1.0	16	<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-9	09/27/94	19	WEGE	AEN	0.4		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-11	09/27/94	13	WEGE	AEN	2200		9.6	21	40	260				
TNK CAVTY	TC2-12	09/27/94	12	WEGE	AEN	130		0.33	0.29	0.66	7.9				
TNK CAVTY	TC2-13	09/27/94	20	WEGE	AEN	620		1.1	4.9	6.4	66				
TNK CAVTY	TC2-14	09/27/94	11	WEGE	AEN	92		0.096	0.1	0.17	1.7				
TNK CAVTY	TC2-15	09/27/94	17	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				
TNK CAVTY	TC2-16	09/27/94	14	WEGE	AEN	<1.0		<.005	<.005	<.005	<.005				
ISP ISL	DI-1	08/19/94	3.5	WEGE	AEN	720		0.19	2	9	53				
ISP ISL	DI-2	08/19/94	3.5	WEGE	AEN	280		0.12	0.8	4.6	33				
ISP ISL	DI-3	08/19/94	3	WEGE	AEN	<0.2		<.005	<.005	<.005	<.005				

APPENDIX D

HISTORICAL GROUNDWATER ELEVATION AND ANALYTICAL DATA

TABLE 1

GROUNDWATER ELEVATION AND ANALYTICAL SUMMARY

Former USA Service Station No. 57

10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	TPHG (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
S-1	02/12/87						630	4.4	3.5	37	NA
	03/03/95	13.10	74.74	61.64	910	5,900	260	7.6	16	14	NA
	07/24/95	12.35		62.39	NA	NA	NA	NA	NA	NA	NA
	11/22/95	19.30	78.68	59.38	460	6,100	13	0.69	0.99	1.1	460*
	12/06/95	19.59		59.09	NA	NA	NA	NA	NA	NA	NA
	01/04/96	19.52		59.16	NA	NA	NA	NA	NA	NA	NA
	01/31/97	15.07		63.61	1,100	200	11	6	3	6	200*
	10/10/97	18.90		59.78	530	2,000	<0.5	2.1	<0.5	<2	230*
	01/20/98	16.79		61.89	1,800	200	<0.5	<0.5	1.5	10	87*
	04/28/98	8.37		70.31	130	7,300	1.9	3.2	<0.5	<0.5	310*
	07/31/98	11.61		67.07	310	2,000	0.54	4.6	3.8	0.82	280*
	06/10/99	14.35		64.33	660	150	0.99	<0.5	<0.5	2.4	80*[1]
	10/18/00	17.56		61.12	<50	330	<0.5	0.93	<0.5	<0.5	44
	03/12/02	16.29		62.39	500	<50	2.8	4.8	0.79	4.4	63
	11/19/02	19.53		59.15	190	NA	<0.50	<0.50	<0.50	<0.50	190
	01/09/03	18.14		60.54	510	NA	1.1	<0.50	0.52	<0.50	11
	04/14/03	18.04		60.64	300	NA	<1.0[2]	<1.0[2]	<1.0[2]	<1.0[2]	27
	07/21/03	20.31		58.37	300	NA	<0.50	<0.50	<0.50	<0.50	11
	10/09/03	19.46		59.22	390	NA	<0.50	<0.50	<0.50	<0.50	8.8
	01/15/04	18.21	79.66	61.45	200	NA	<0.50	<0.50	<0.50	<0.50	6.0
	04/08/04	19.29		60.37	140	NA	<0.50	<0.50	<0.50	<0.50	12
	08/10/04	18.86		60.80	110	NA	4.6	<0.50	<0.50	0.51	73
	11/11/04	19.81		59.85	160	NA	<0.50	<0.50	<0.50	<0.50	150
	01/19/05	18.12		61.54	440	NA	<0.50	<0.50	1.4	<0.50	140

TABLE 1

GROUNDWATER ELEVATION AND ANALYTICAL SUMMARY

Former USA Service Station No. 57

10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	TPHG (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-3	03/03/95	13.99	76.30	62.31	2,500	1,600	540	92	36	200	NA
	07/24/95	13.33		62.97	NA	NA	NA	NA	NA	NA	NA
	11/22/95	20.94	80.32	59.38	14,000	5,400	5,700	230	430	650	820*
	12/06/95	17.48		62.84	NA	NA	NA	NA	NA	NA	NA
	01/04/96	20.01		60.31	NA	NA	NA	NA	NA	NA	NA
	01/31/97	16.63		63.69	1,100	<50	130	8	5	5	NA
	10/10/97	20.62		59.70	3,400	1,100	830	4	100	<10	160*
	01/20/98	15.40		64.92	3,900	550	7.9	4.1	<0.5	3.7	<5.0*
	04/28/98	10.51		69.81	800	1,000	82	5.2	5.7	5.4	240*
	07/31/98	13.46		66.86	2,200	610	510	7.6	16	5.27	310*
	11/02/98	17.11		63.21	4,900	1,600	220	16	13	13.7	180*
	06/10/99	15.24		65.08	1,000	120	<0.5	<0.5	<0.5	1.1	120*[1]
	10/18/00	15.41		64.91	<50	<50	<0.5	<0.5	<0.5	<0.5	12
	04/08/04	13.70		66.62	<50	NA	<0.50	<0.50	<0.50	<0.50	19
	08/10/04	16.96		63.36	580	NA	19	<1.0[3]	<1.0[3]	3.3	300
	11/11/04	17.40		62.92	3,000	NA	810	<5.0[3]	43	<5.0[3]	690
	01/19/05	13.28		67.04	92	NA	18	<0.50	0.77	<0.50	17

TABLE 1

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Former USA Service Station No. 57

10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	TPHG (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-4	11/22/95	14.99	76.42	61.43	<50	200	<0.5	1.5	<0.5	1.7	6.4*
	12/06/95	11.21		65.21	NA	NA	NA	NA	NA	NA	NA
	01/04/96	14.62		61.80	NA	NA	NA	NA	NA	NA	NA
	01/31/97	8.18		68.24	<50	<50	<0.5	2	<0.5	2	11*
	10/10/97	14.14		62.28	<50	<50	<0.5	<0.5	<0.5	<2	<5.0*
	01/20/98	7.05		69.37	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	04/28/98	5.88		70.54	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	07/31/98	8.40		68.02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/02/98	16.08		60.34	NA	NA	NA	NA	NA	NA	NA
	06/10/99	14.81		61.61	NA	NA	NA	NA	NA	NA	NA
	10/18/00	12.71		63.71	<50	<50	<0.5	0.59	0.82	0.53	<5.0*
	03/12/02	8.92		67.50	<50	<50	<0.5	0.61	0.72	2.5	1.8
	11/19/02	13.24		-13.24	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/03	11.00		-11.00	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/14/03	11.03		-11.03	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/21/03	13.10		-13.10	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/09/03	13.33		-13.33	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/04	12.14		-12.14	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/08/04	10.76		65.66	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	08/10/04	12.62		63.80	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	11/11/04	11.93		64.49	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/19/05	10.34		66.08	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50

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Former USA Service Station No. 57

10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	TPHG (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-5	11/22/95	19.56	80.52	60.96	<50	280	<0.5	1.8	<0.5	3	2.2*
	12/06/95	15.84		64.68	NA	NA	NA	NA	NA	NA	NA
	01/04/96	19.36		61.16	NA	NA	NA	NA	NA	NA	NA
	01/31/97	13.31		67.21	80	<50	<0.5	0.6	<0.5	2	6*
	10/10/97	17.80		62.72	<50	<50	<0.5	<0.5	<0.5	<2	<5*
	01/20/98	12.58		67.94	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	04/28/98	9.45		71.07	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	07/31/98	7.38		73.14	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/02/98	15.98		64.54	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0*
	06/10/99	14.60		65.92	NA	NA	NA	NA	NA	NA	NA
	10/18/00	17.77		62.75	<50	<50	<0.5	0.75	<0.5	0.79	28
	03/12/02	15.72		64.80	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/19/02	NM		NM				Well Damaged			
	01/09/03	NM		NM				Well Damaged			
	04/14/03	NM		NM				Well Damaged			
	07/21/03	NM		NM				Well Damaged			
	10/09/03	NM		NM				Well Damaged			
	01/15/04	NM		NM				Well Damaged			
	04/08/04	16.80		63.72	<100	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	08/10/04	18.58		61.94	89	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	11/11/04	NM		NM				Well Damaged			
	01/19/05	NM		NM				Well Damaged			

TABLE 1

GROUNDWATER ELEVATION AND ANALYTICAL SUMMARY

Former USA Service Station No. 57

10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	TPHG (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-6	11/22/95	21.73	81.64	59.91	<50	140	<0.5	1.2	<0.5	1.5	5.3*
	12/06/95	18.03		63.61	NA	NA	NA	NA	NA	NA	NA
	01/04/96	21.67		59.97	NA	NA	NA	NA	NA	NA	NA
	01/31/97	16.01		65.63	70	<50	<0.5	2	<0.5	<1	5*
	10/10/97	20.55		61.09	80	<50	<0.5	<0.5	<0.5	<2	<5*
	01/20/98	15.74		65.90	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	04/28/98	10.78		70.86	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	07/31/98	13.97		67.67	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/02/98	17.97		63.67	NA	NA	NA	NA	NA	NA	NA
	06/10/99	16.92		64.72	NA	NA	NA	NA	NA	NA	NA
	10/18/00	NM		NM	Unable to Locate						
	03/12/02	NM		NM	Unable to Locate						
	11/19/02	NM		NM	Unable to Locate						
	01/09/03	NM		NM	Unable to Locate						
	04/14/03	NM		NM	Unable to Locate						
	07/21/03	NM		NM	Unable to Locate						
	10/19/03	NM		NM	Unable to Locate						
	01/15/04	NM		NM	Unable to Locate						
	04/08/04	NM		NM	Well Obstructed - Not Sampled						
	08/10/04	NM		NM	Dry - Not Sampled						
	11/11/04	17.20		64.44	Dry - Not Sampled						
	01/19/05	NM		NM	Dry - Not Sampled						

TABLE 1

GROUNDWATER ELEVATION AND ANALYTICAL SUMMARY

Former USA Service Station No. 57

10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	TPHG (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-7	11/22/95	19.38	78.86	59.48	<50	180	<0.5	0.57	<0.5	0.62	0.73*
	12/06/95	19.72		59.14	NA	NA	NA	NA	NA	NA	NA
	01/04/96	19.76		59.10	NA	NA	NA	NA	NA	NA	NA
	01/31/97	15.25		63.61	70	<50	0.7	1	<0.5	<1	8*
	10/10/97	19.03		59.83	<50	<50	<0.5	<0.5	<0.5	<2	15*
	01/20/98	17.11		61.75	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	04/28/98	8.22		70.64	<50	<50	<0.5	<0.5	<0.5	<0.5	9.3*
	07/31/98	11.53		67.33	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/02/98	15.15		63.71	NA	NA	NA	NA	NA	NA	NA
	06/10/99	14.23		64.63	NA	NA	NA	NA	NA	NA	NA
	10/18/00	17.59		61.27	NA	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	03/12/02	16.54		62.32	<50	<50	<0.5	<0.5	<0.5	<0.5	2.9
	11/19/02	19.59		-19.59	<50	NA	<0.50	<0.50	<0.50	<0.50	3.8
	01/09/03	18.38		-18.38	<50	NA	<0.50	<0.50	<0.50	<0.50	2.7
	04/14/03	18.17		-18.17	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/21/03	20.29		-20.29	<50	NA	<0.50	<0.50	<0.50	<0.50	1.8
	10/09/03	19.48		-19.48	<50	NA	<0.50	<0.50	<0.50	<0.50	2.9
	01/15/04	18.45	79.81	61.36	<50	NA	<0.50	<0.50	<0.50	<0.50	2.6
	04/08/04	17.28		62.53	<50	NA	<0.50	<0.50	<0.50	<0.50	0.81
	08/10/04	18.85		60.96	<50	NA	<0.50	<0.50	<0.50	<0.50	2.1
	11/11/04	19.85		59.96	<50	NA	<0.50	<0.50	<0.50	<0.50	1.0
	01/19/05	19.59		60.22	<50	NA	<0.50	<0.50	<0.50	<0.50	1.5

TABLE 1

GROUNDWATER ELEVATION AND ANALYTICAL SUMMARY

Former USA Service Station No. 57

10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	TPHG (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
MW-8	11/22/95	33.33	79.55	46.22	<50	360	<0.5	1.3	<0.5	2.1	2.1*
	12/06/95	17.57		61.98	NA	NA	NA	NA	NA	NA	NA
	01/04/96	20.08		59.47	NA	NA	NA	NA	NA	NA	NA
	01/31/97	18.72		60.83	80	<50	0.6	1	<0.5	1	8*
	10/10/97	20.26		59.29	50	<50	<0.5	<0.5	<0.5	<2	<5*
	01/20/98	15.91		63.64	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	04/28/98	10.39		69.16	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	07/31/98	12.93		66.62	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0*
	11/02/98	16.90		62.65	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0*
	06/10/99	14.98		64.57	NA	NA	NA	NA	NA	NA	NA
	10/18/00	16.27		63.28	<50	<50	<0.5	<0.5	1.1	6.3	8.6*
	03/12/02	14.56		64.99	<50	<50	<0.5	0.63	0.55	1.7	0.94
	11/19/02	21.14		-21.14	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/09/03	17.90		-17.90	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/14/03	17.84		-17.84	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	07/21/03	19.79		-19.79	<100[2]	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	10/09/03	21.02		-21.02	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/15/04	18.10	80.50	62.40	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	04/08/04	17.51		62.99	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	08/10/04	20.76		59.74	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	11/11/04	21.38		59.12	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50
	01/19/05	17.20		63.30	<50	NA	<0.50	<0.50	<0.50	<0.50	<0.50

TABLE 1

GROUNDWATER ELEVATION AND ANALYTICAL SUMMARY

Former USA Service Station No. 57

10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	Depth to Water (feet)	Well Elevation (ft msl)	Groundwater Elevation (ft msl)	TPHG (µg/L)	TPHD (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)

Note:

* = MTBE analyzed using EPA Method 8020/8021B

MTBE = Methyl tert-butyl ether

TPHD = Total petroleum hydrocarbons as diesel

TPHG = Total petroleum hydrocarbons as gasoline

TPHG analyzed using EPA Method 8015B and the remaining analytes using EPA Method 8260B

msl = Mean sea level

µg/L = micrograms per liter

NA = Not analyzed

NM = Not measured

[1] Laboratory indicates the chromatogram does not match the diesel hydrocarbon range pattern.

[2] Reporting limits were increased due to sample foaming.

[3] Reporting limits were increased due to high concentrations of target analytes.

Monitoring wells surveyed by Morrow Surveying on February 10, 2004.

Data prior to November 19, 2002 provided by GHH Engineering.

TABLE 2

GROUNDWATER ANALYTICAL RESULTS
FOR OXYGENATES AND ADDITIONAL COMPOUNDS

Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
S-1	11/19/02	190	<10	<1.0	<1.0	<1.0	NA	NA	NA	NA
	01/09/03	11	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	04/14/03	27	<20[2]	<2.0[2]	<2.0[2]	<2.0[2]	NA	NA	NA	NA
	07/21/03	11	<10[2]	<1.0	<1.0	<1.0	NA	NA	NA	NA
	10/09/03	8.8	6.4	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	01/15/04	6.0	10	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	04/08/04	12	8.5	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	08/10/04	73	28	<1.0	<1.0	<1.0	16	<2.0	<5,000	<5,000
	11/11/04	150	14	<1.0	<1.0	<1.0	7.3	<2.0	<5,000	<5,000
	01/19/05	140	14	<1.0	<1.0	<1.0	3.8	<2.0	<5,000	<5,000
S-2	11/19/02	750	<200[1]	<20[1]	<20[1]	<20[1]	NA	NA	NA	NA
	01/09/03	270	<100[1]	<10[1]	<10[1]	<10[1]	NA	NA	NA	NA
	04/14/03	400	95	<5.0[1]	<5.0[1]	<5.0[1]	NA	NA	NA	NA
	07/21/03	410	110	<5.0[1]	<5.0[1]	<5.0[1]	NA	NA	NA	NA
	10/09/03	180	57	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	<20[1]	NA	NA
	01/15/04	130	48	<4.0[1]	<4.0[1]	<4.0[1]	<4.0[1]	<16[1]	NA	NA
	04/08/04	430	130	<5.0[1]	<5.0[1]	<5.0[1]	<5.0[1]	<20[1]	<5,000	<5,000
	08/10/04	92	<100[1]	<10[1]	<10[1]	<10[1]	74	<40[1]	<5,000	<5,000
	11/11/04	420	<200[1]	<20[1]	<20[1]	<20[1]	<20[1]	<80[1]	<5,000	<5,000
	01/19/05	580	200	<5.0[1]	<5.0[1]	<5.0[1]	8.2	<20[1]	<5,000	<5,000
MW-3	04/08/04	19	7.6	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	08/10/04	300	2,000	2.2	<2.0[1]	<2.0[1]	270	<8.0[1]	<5,000	<5,000
	11/11/04	690	1,400	<10[1]	<10[1]	<10[1]	140	<40[1]	<5,000	<5,000
	01/19/05	17	19	<1.0	<1.0	<1.0	1.4	<2.0	<5,000	<5,000

TABLE 2

GROUNDWATER ANALYTICAL RESULTS
FOR OXYGENATES AND ADDITIONAL COMPOUNDS

Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
MW-4	11/19/02	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	01/09/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	04/14/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	07/21/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	10/09/03	<0.50	<5.0	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	01/15/04	<0.50	7.8	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	04/08/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	08/10/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	11/11/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	01/19/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
MW-5	11/19/02					Well Damaged				
	01/09/03					Well Damaged				
	04/14/03					Well Damaged				
	07/21/03					Well Damaged				
	10/09/03					Well Damaged				
	01/15/04					Well Damaged				
	04/08/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<4.0[2]	<5,000	<5,000
	08/10/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	11/11/04					Well Damaged				
	01/19/05					Well Damaged				

TABLE 2

GROUNDWATER ANALYTICAL RESULTS
FOR OXYGENATES AND ADDITIONAL COMPOUNDS

Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
MW-6	11/19/02	Unable to Locate								
	01/09/03	Unable to Locate								
	04/14/03	Unable to Locate								
	07/21/03	Unable to Locate								
	10/19/03	Unable to Locate								
	01/15/04	Unable to Locate								
	04/08/04	Well Obstructed - Not Sampled								
	08/10/04	Well Obstructed - Not Sampled								
	11/11/04	Well Obstructed - Not Sampled								
	01/19/05	Well Obstructed - Not Sampled								
MW-7	11/19/02	3.8	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	01/09/03	2.7	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	04/14/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	07/21/03	1.8	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	10/09/03	2.9	<5.0	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	01/15/04	2.6	7.9	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	04/08/04	0.81	9.0	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	08/10/04	2.1	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	11/11/04	1.0	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	01/19/05	1.5	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000

TABLE 2

GROUNDWATER ANALYTICAL RESULTS
FOR OXYGENATES AND ADDITIONAL COMPOUNDS

Former USA Service Station No. 57
10700 MacArthur Blvd., Oakland, California

Well Number	Date Collected	MTBE (µg/L)	TBA (µg/L)	DIPE (µg/L)	ETBE (µg/L)	TAME (µg/L)	1,2-DCA (µg/L)	EDB (µg/L)	Methanol (µg/L)	Ethanol (µg/L)
MW-8	11/19/02	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	01/09/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	04/14/03	<0.50	<5.0	<1.0	<1.0	<1.0	NA	NA	NA	NA
	07/21/03	<0.50	<10[2]	<1.0	<1.0	<1.0	NA	NA	NA	NA
	10/09/03	<0.50	<5.0	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	01/15/04	<0.50	9.9	<1.0	<1.0	<1.0	<1.0	<2.0	NA	NA
	04/08/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	08/10/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	11/11/04	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000
	01/19/05	<0.50	<10	<1.0	<1.0	<1.0	<1.0	<2.0	<5,000	<5,000

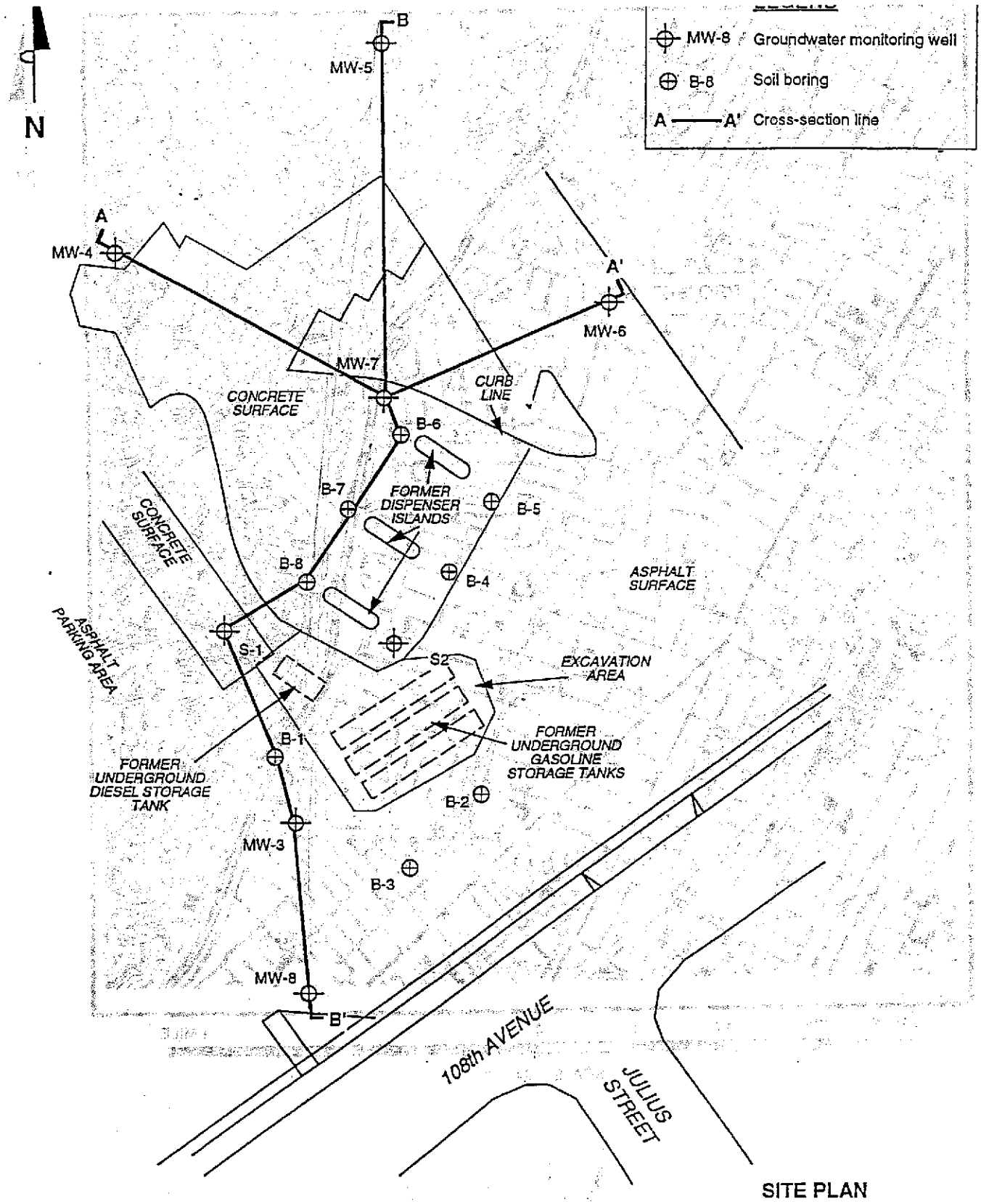
Note:
Oxygenates analyzed using EPA Method 8260B
µg/L = micrograms per liter
NA = Not analyzed

[1] Reporting limits were increased due to high concentrations of target analytes
[2] Reporting limits were increased due to sample foaming

MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
1,2-DCA = 1,2-Dichloroethane
EDB = 1,2-Dibromoethane

APPENDIX E

ADDITIONAL GEOLOGIC CROSS SECTIONS



SITE PLAN

SCALE (feet)

0 20 40

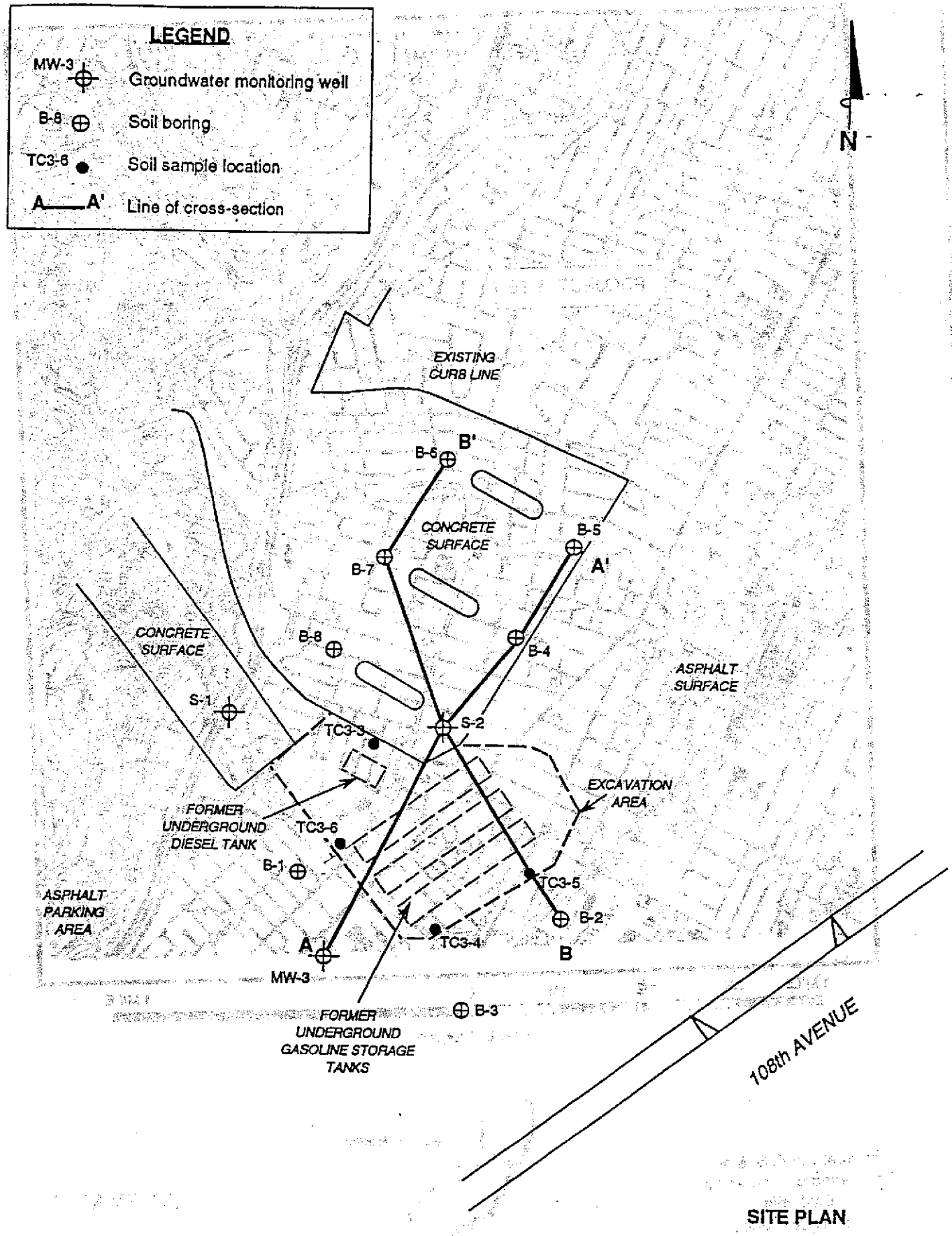
USA Gas # 57
10700 MacArthur Boulevard
Oakland, California

ALTON GEOSCIENCE
Livermore, California

Source: Ron Archer, Civil Engineer, Inc.

FIGURE 2

41-0034/Site 12/95 12/15/95



SITE PLAN

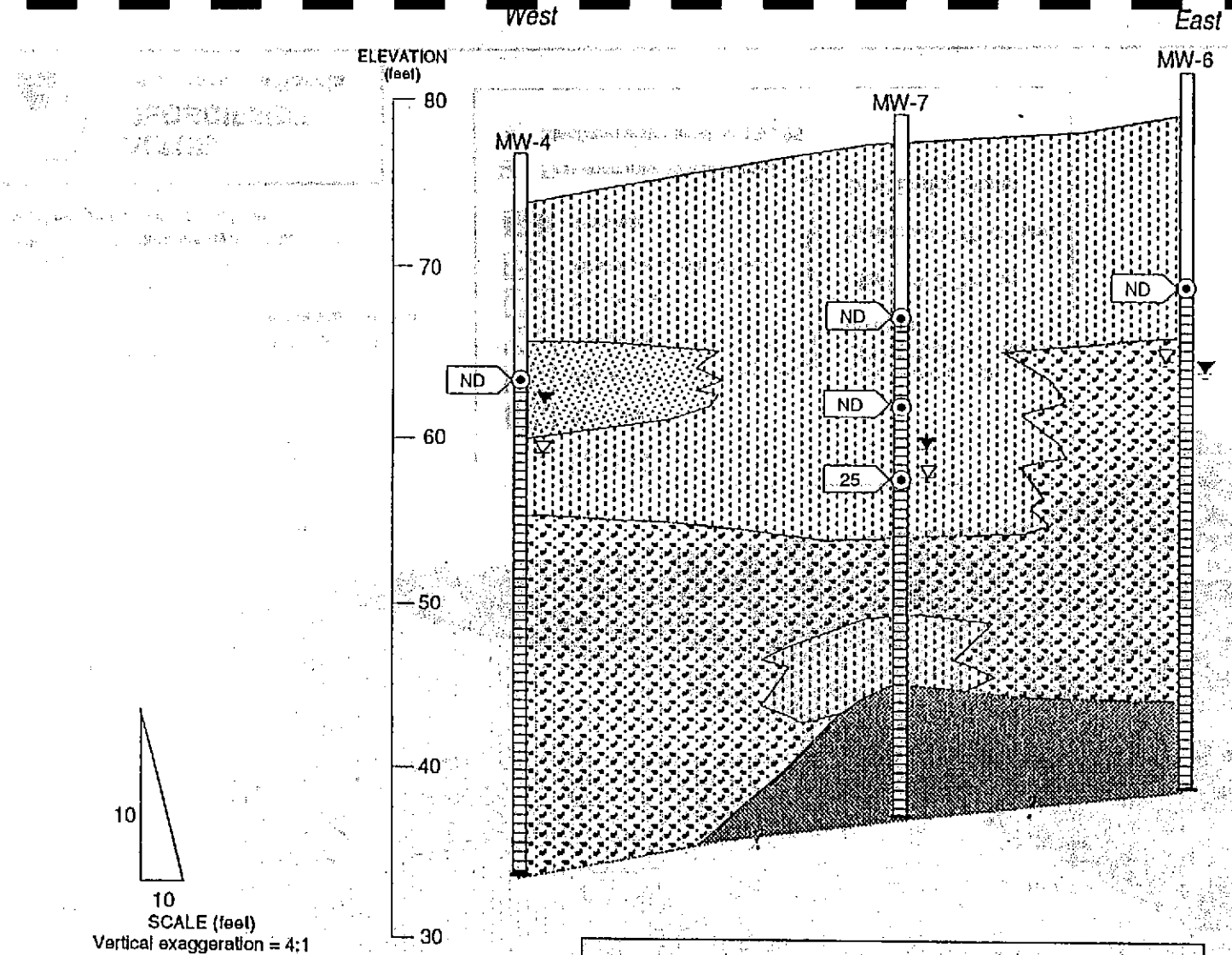
Former USA Gas #57
10700 MacArthur Boulevard
Oakland, California

SCALE (feet)
0 15 30

ALTON GEOSCIENCE
Livermore, California

FIGURE 2

41-0034/New Plan 04/11/95



LEGEND

- Silty sand
- Sandy silt
- Gravel-sand-clay mixture
- Bedrock
- First encountered water level
- Stabilized water level on 12/6/95
- ND — Soil Sample with TPH-G Concentration (in ppm)
- Blank PVC Casing
- Screened PVC Casing
- Total Boring Depth

NOTES:
TPH-G = total petroleum hydrocarbons as gasoline; ppm = parts per million.

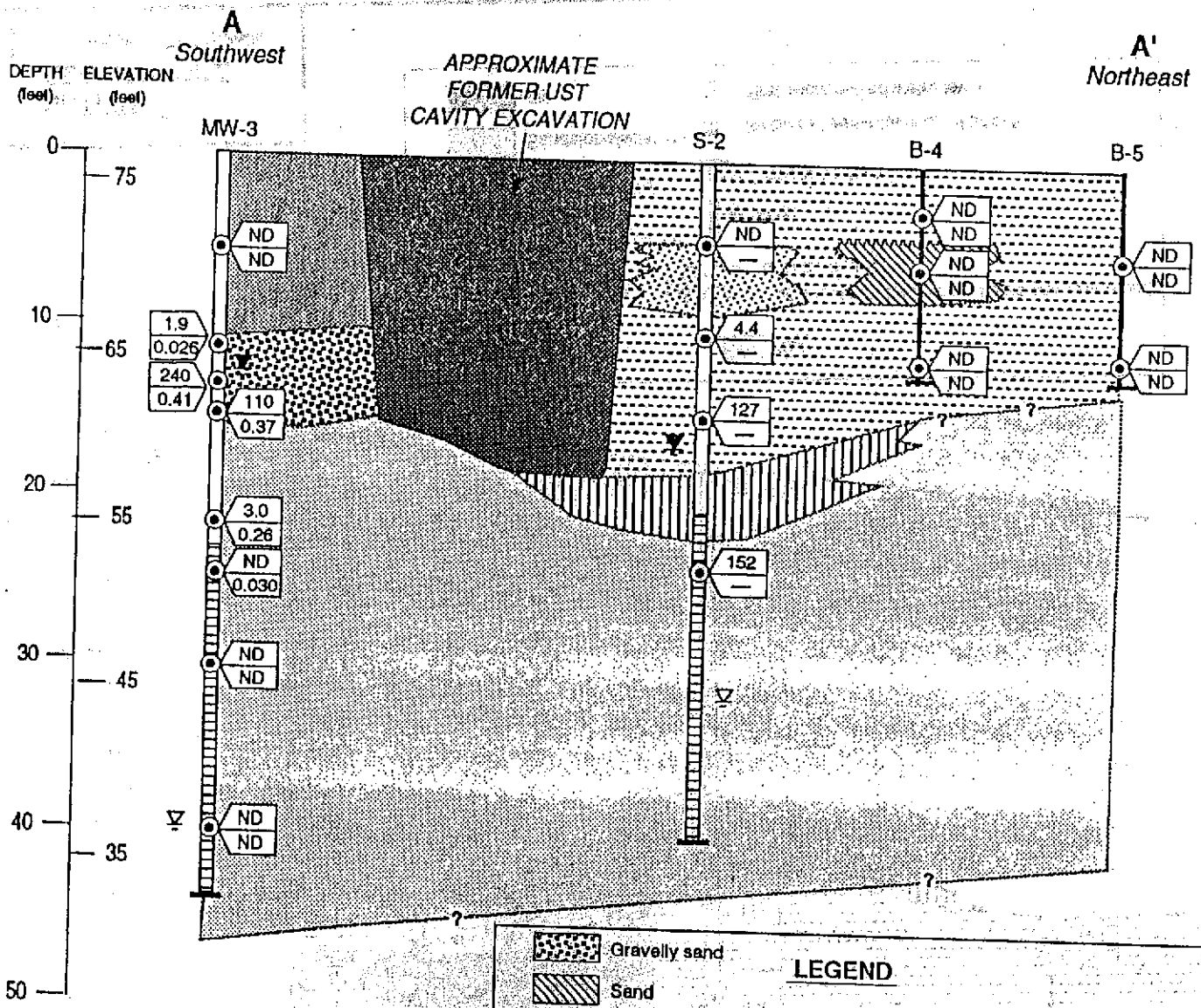
ALTON GEOSCIENCE
Livermore, California

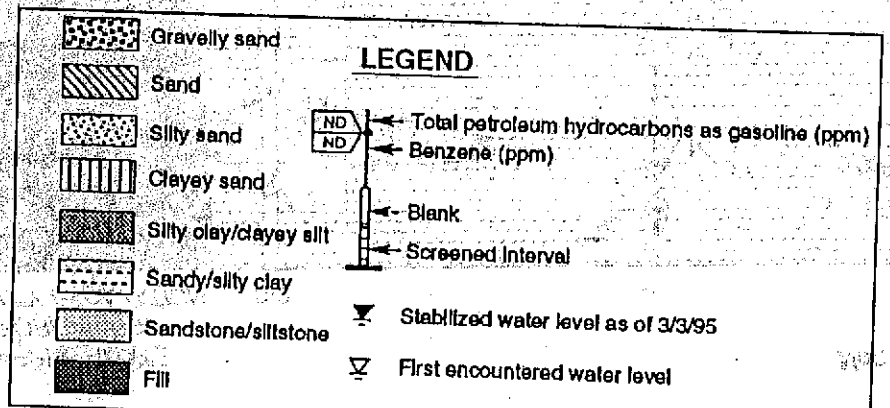
CROSS-SECTION A-A'

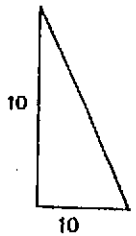
Former USA Gas #57
10700 MacArthur Boulevard
Oakland, California

FIGURE 3

41-0034/2X-section A-A' 01/12/96







SCALE (feet)
Vertical exaggeration = 2:1

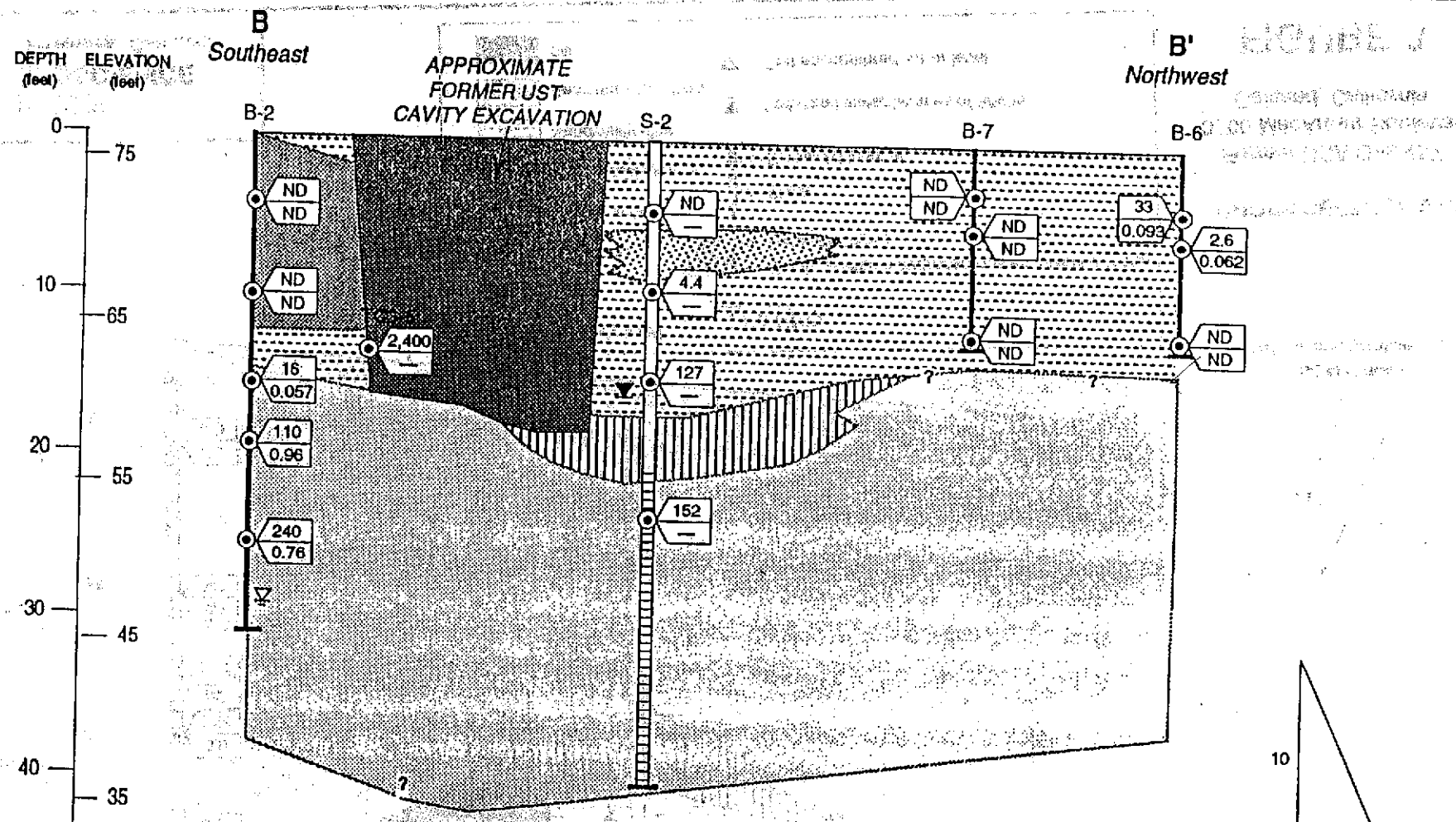
ALTON GEOSCIENCE
Livermore, California

CROSS SECTION A-A'

Former USA Gas #57
10700 MacArthur Boulevard
Oakland, California

FIGURE 3

41-0031

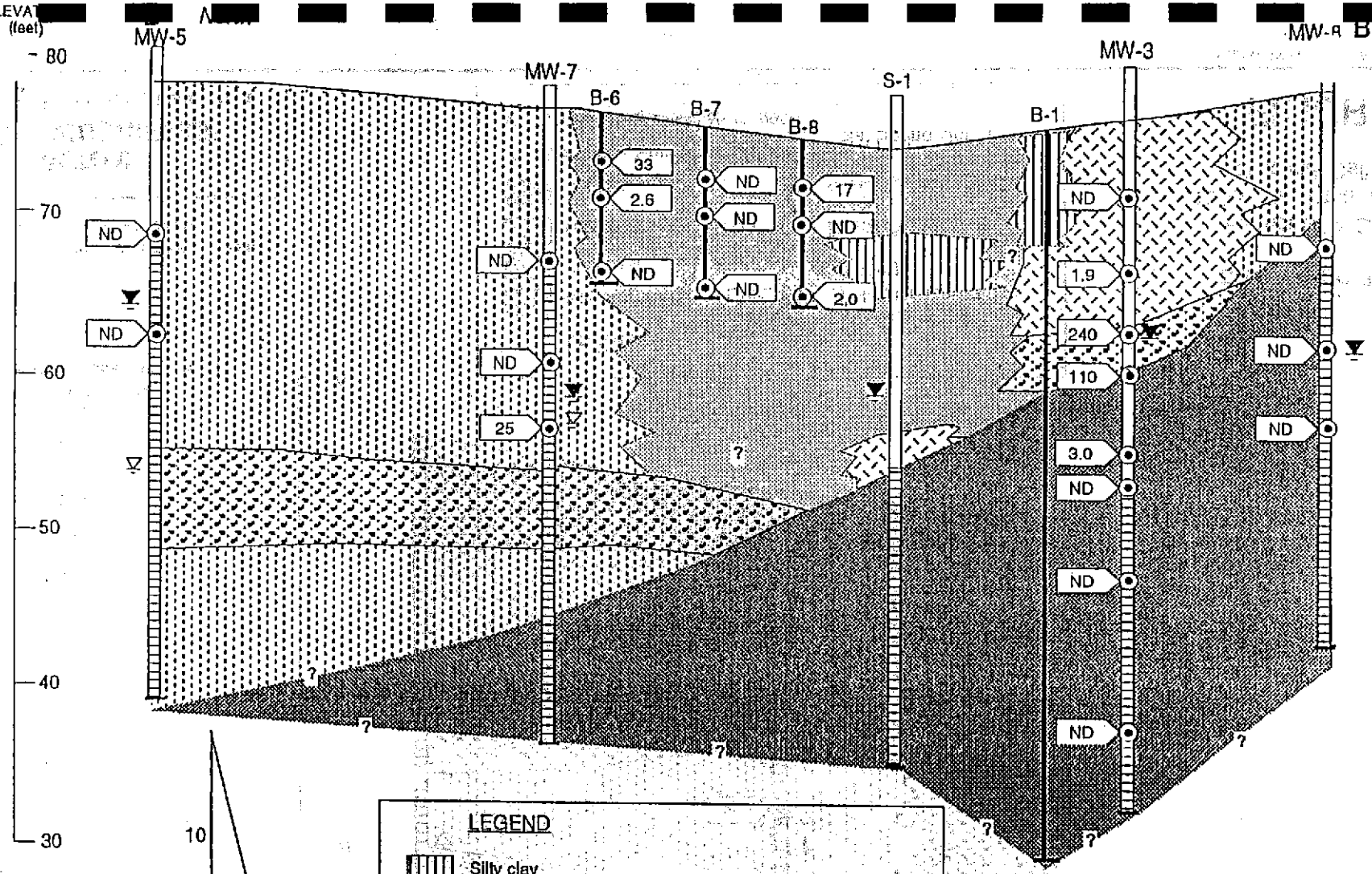


ALTON GEOSCIENCE
Livermore, California

CROSS SECTION B-B'

Former USA Gas #57
10700 MacArthur Boulevard
Oakland, California

FIGURE 4



NOTES:
TPH-G = total petroleum hydrocarbons as gasoline; ppm = parts per million.

ALTON GEOSCIENCE
Livermore, California

CROSS-SECTION B-B'

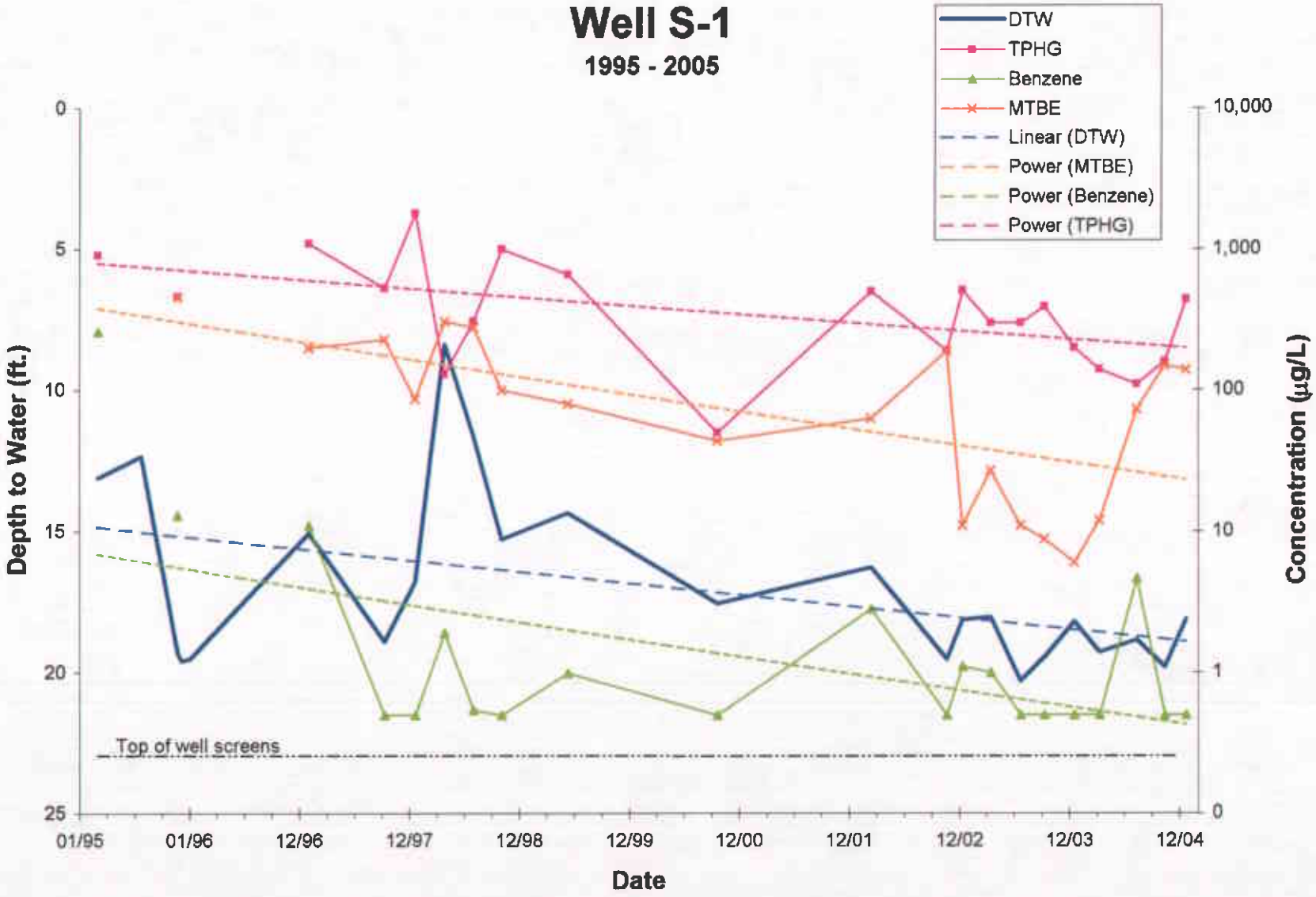
Former USA Gas #57
10700 MacArthur Boulevard
Oakland, California

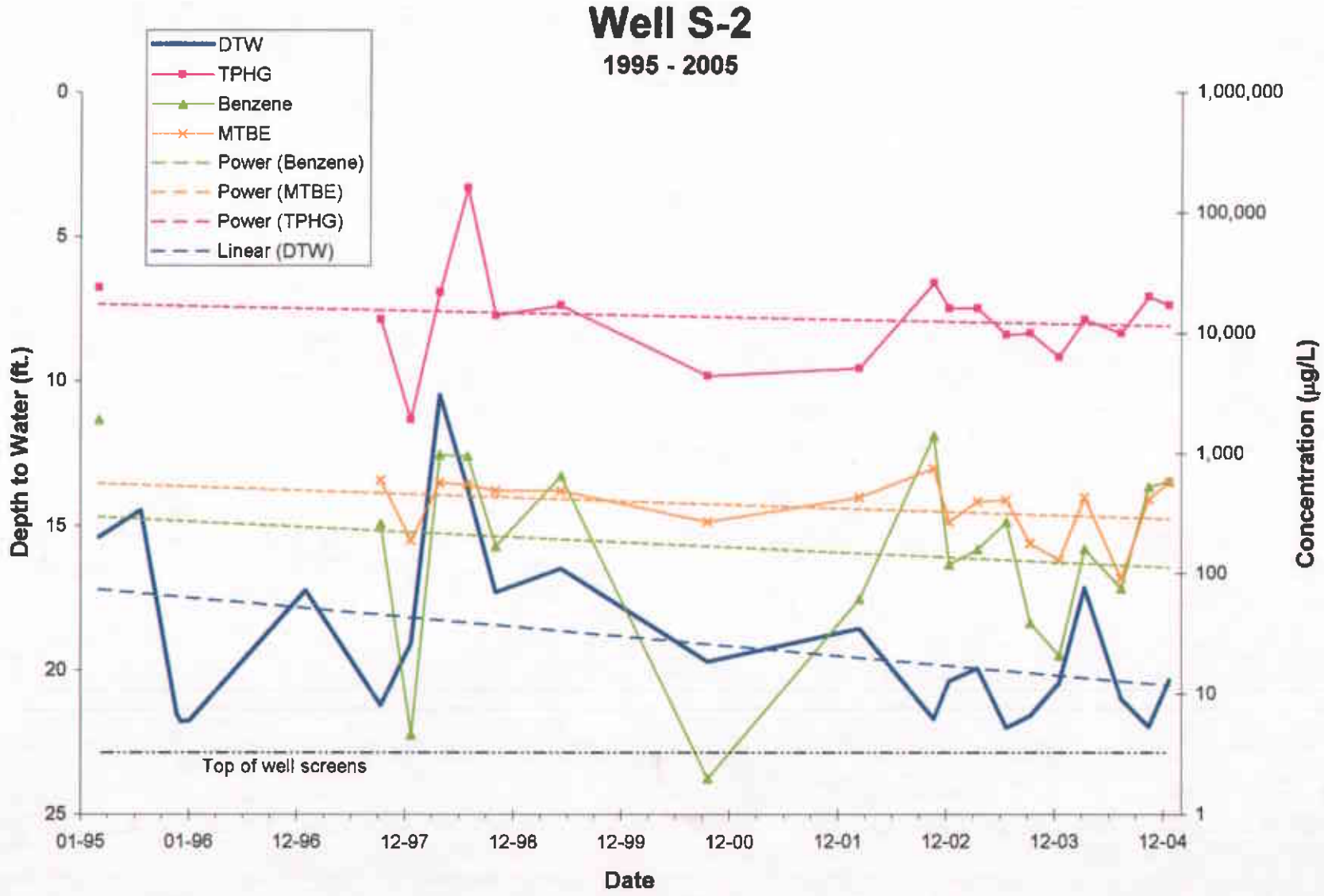
FIGURE 4

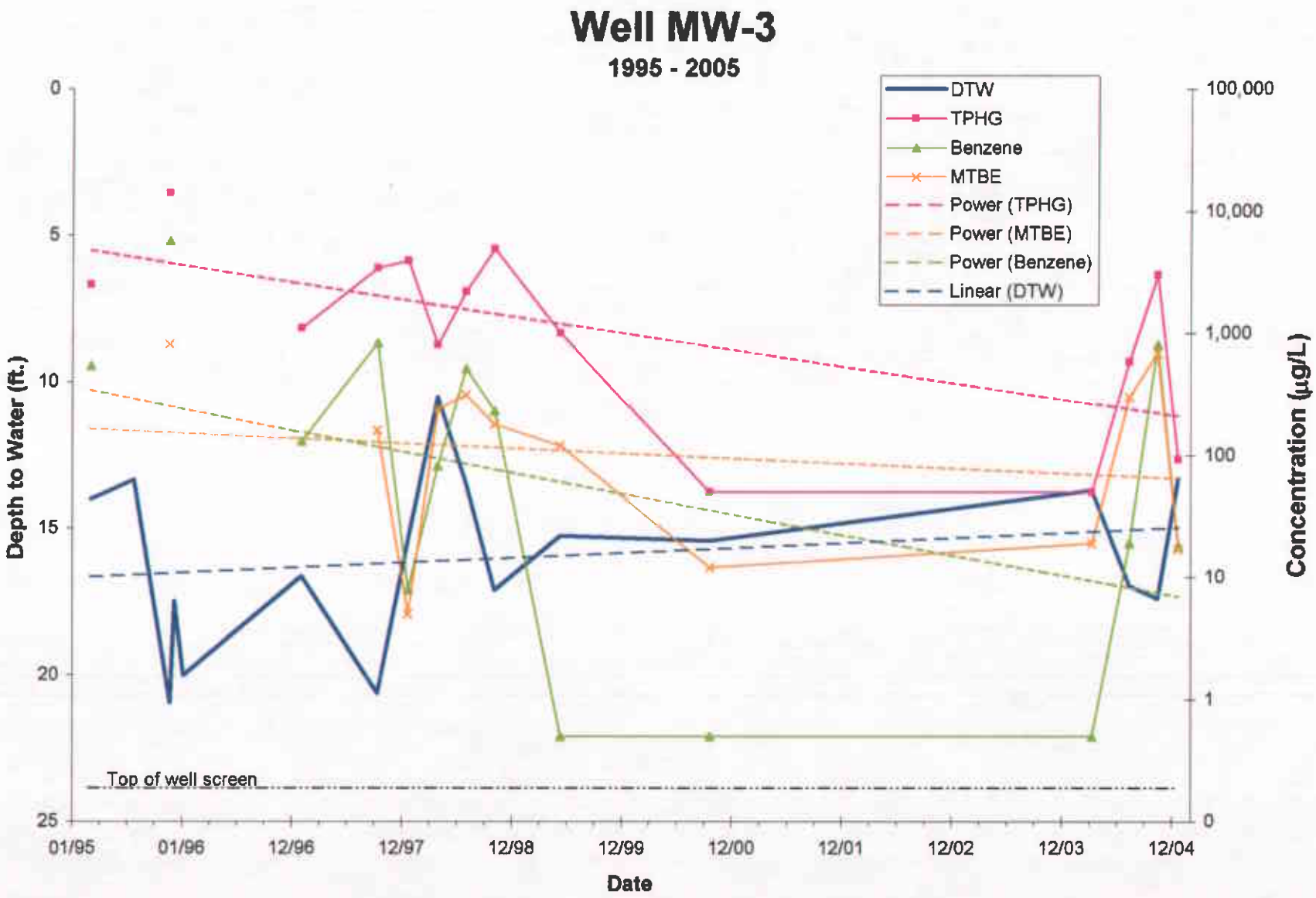
41-0034/2X-section B-B' 01/16/96

APPENDIX F

HYDROGRAPHS AND DISSOLVED CONCENTRATION PLOTS

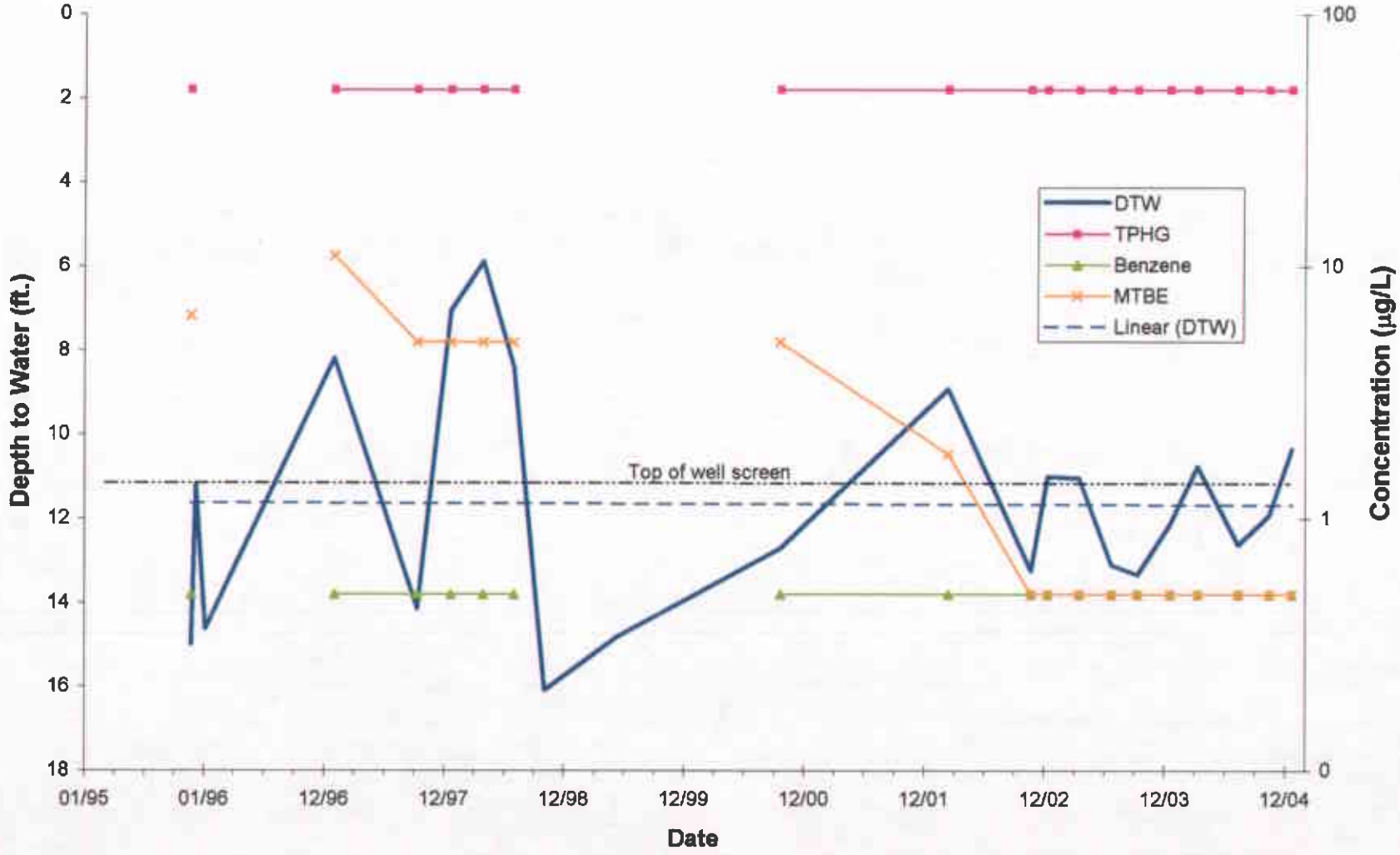

Well S-1
1995 - 2005
DTW
TPHG
Benzene
MTBE
Linear (DTW)
Power (MTBE)
Power (Benzene)
Power (TPHG)
Depth to Water (ft.)
0
5
10
15
20
25
Concentration (µg/L)
10,000
1,000
100
10
1
0
Top of well screens
01/95
01/96
12/96
12/97
12/98
12/99
12/00
12/01
12/02
12/03
12/04
Date

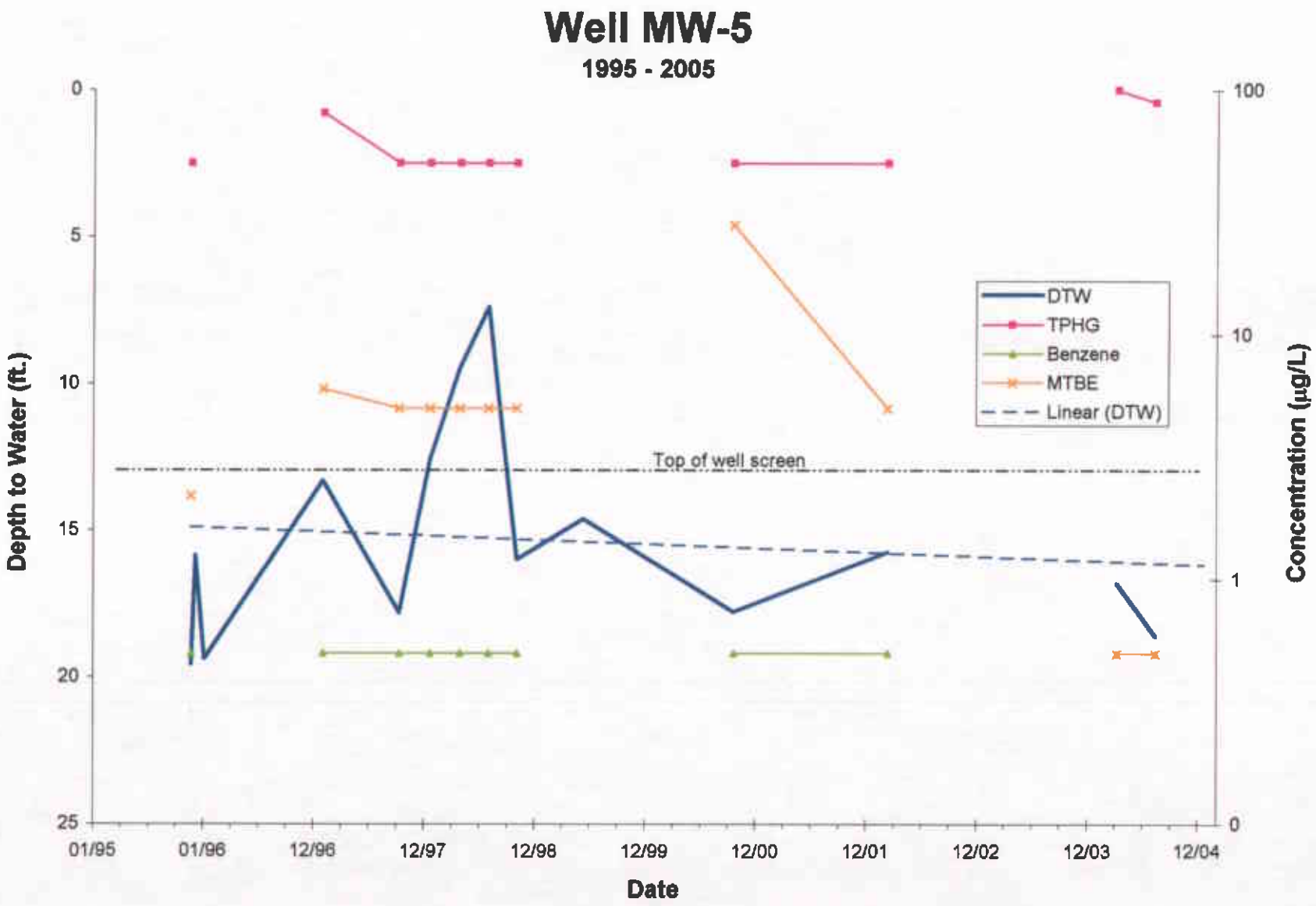

Well S-2
1995 - 2005
DTW
TPHG
Benzene
MTBE
Power (Benzene)
Power (MTBE)
Power (TPHG)
Linear (DTW)
Depth to Water (ft.)
0
5
10
15
20
25
Top of well screens
1,000,000
100,000
10,000
1,000
100
10
1
Concentration (µg/L)
01-95
01-96
12-96
12-97
12-98
12-99
12-00
12-01
12-02
12-03
12-04
Date


Well MW-3
1995 - 2005
DTW
TPHG
Benzene
MTBE
Power (TPHG)
Power (MTBE)
Power (Benzene)
Linear (DTW)
Depth to Water (ft.)
0
5
10
15
20
25
Top of well screen
Concentration (µg/L)
100,000
10,000
1,000
100
10
1
0
01/95
01/96
12/96
12/97
12/98
12/99
12/00
12/01
12/02
12/03
12/04
Date

Well MW-4

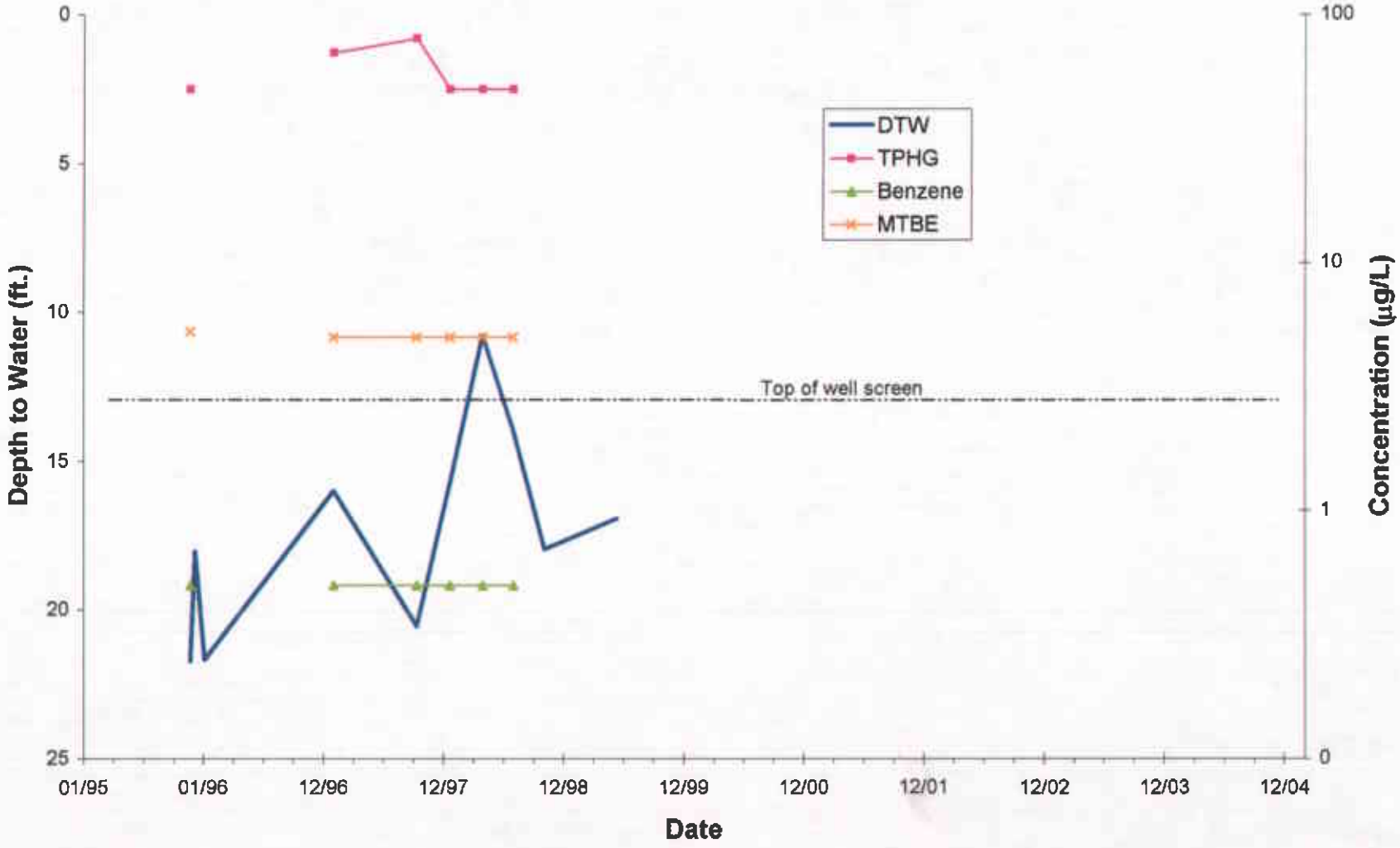
1995 - 2005




Well MW-5
1995 - 2005
Depth to Water (ft.)
Concentration (µg/L)
Date
Top of well screen
DTW
TPHG
Benzene
MTBE
Linear (DTW)
0
5
10
15
20
25
100
10
1
0
01/95
01/96
12/96
12/97
12/98
12/99
12/00
12/01
12/02
12/03
12/04

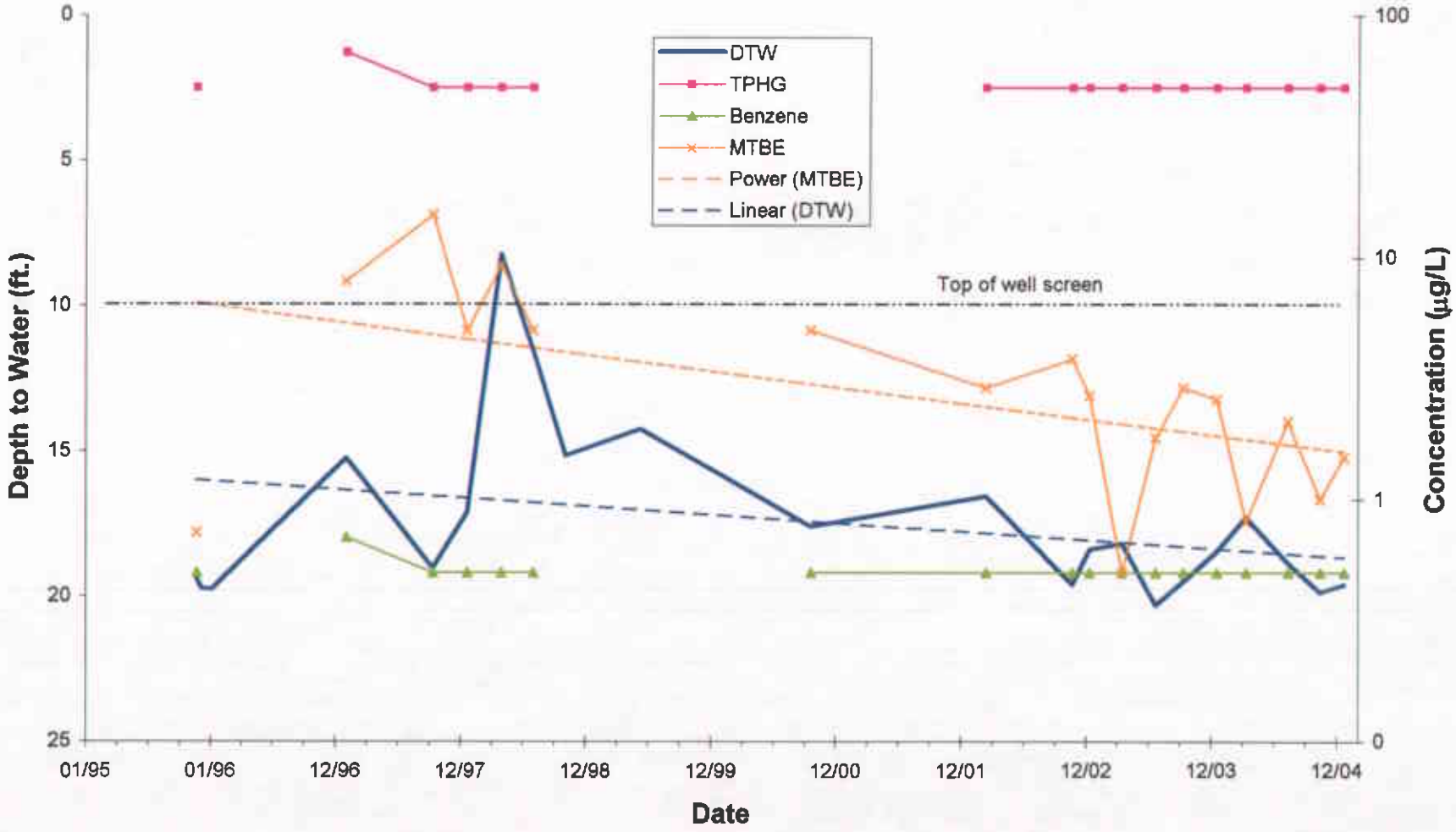
Well MW-6

1995 - 2005



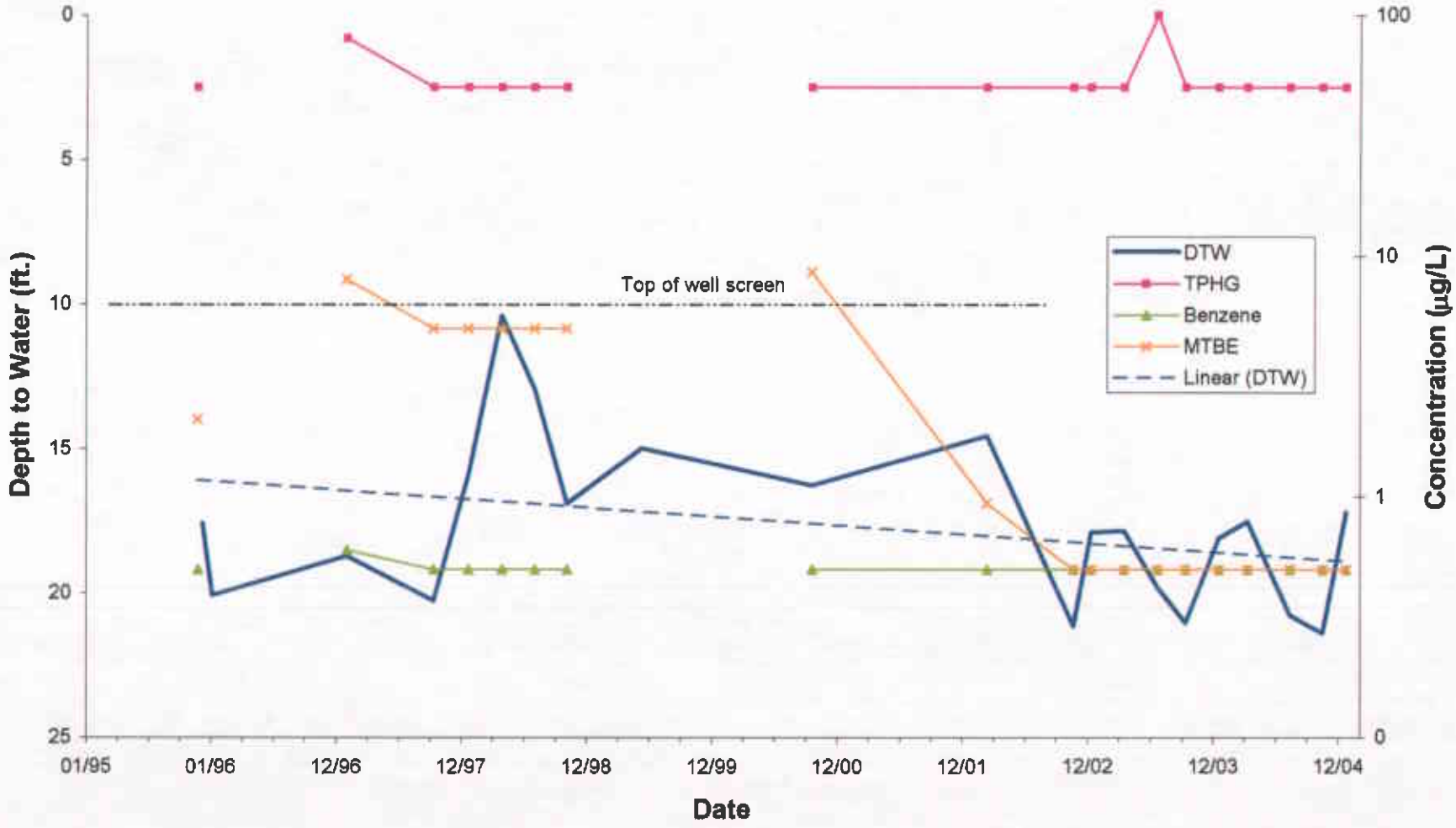
Well MW-7

1995 - 2005



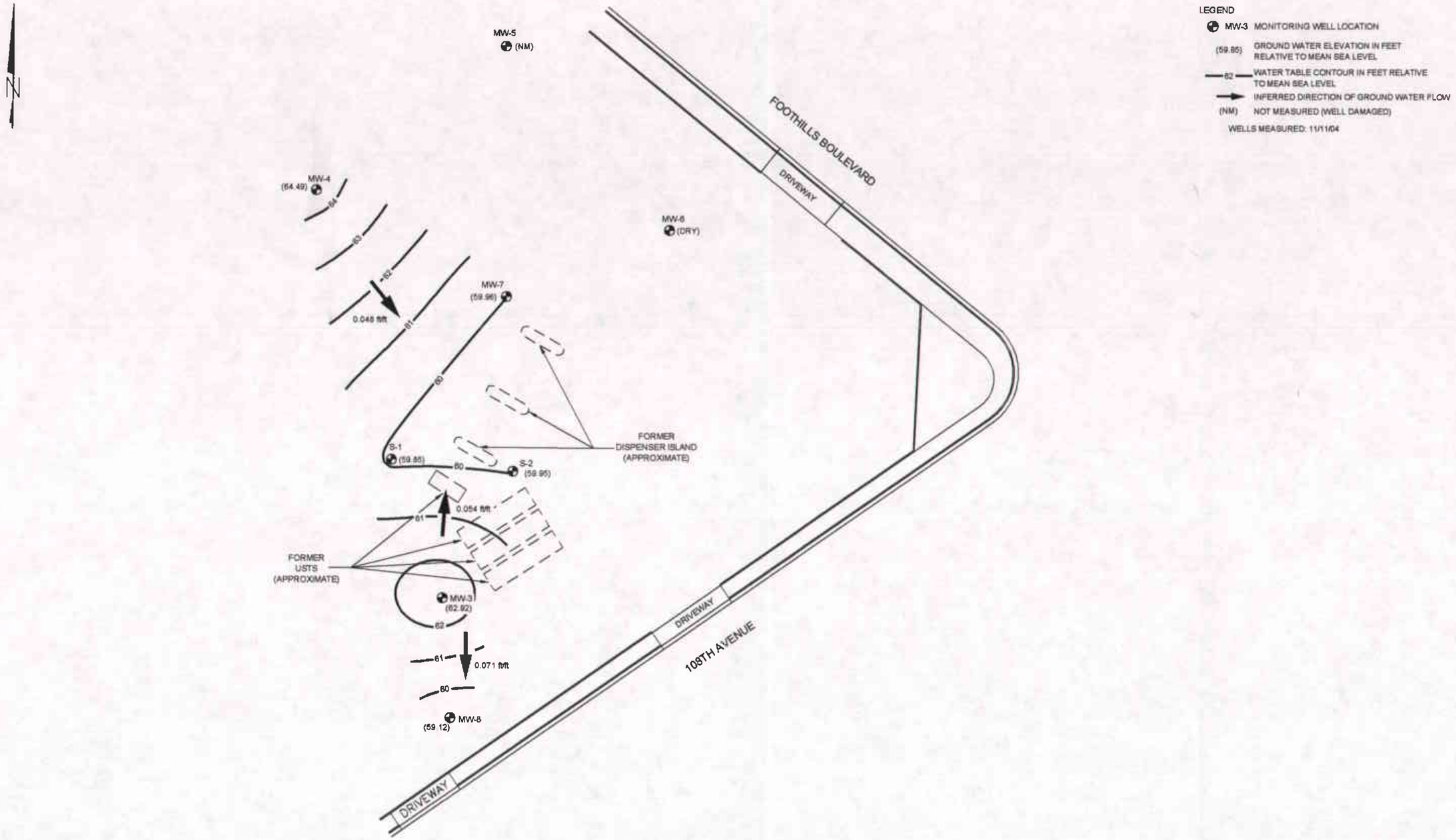
Well MW-8

1995 - 2005



APPENDIX G

HISTORICAL GROUNDWATER ELEVATION CONTOUR MAPS



STRATUS ENVIRONMENTAL, INC.

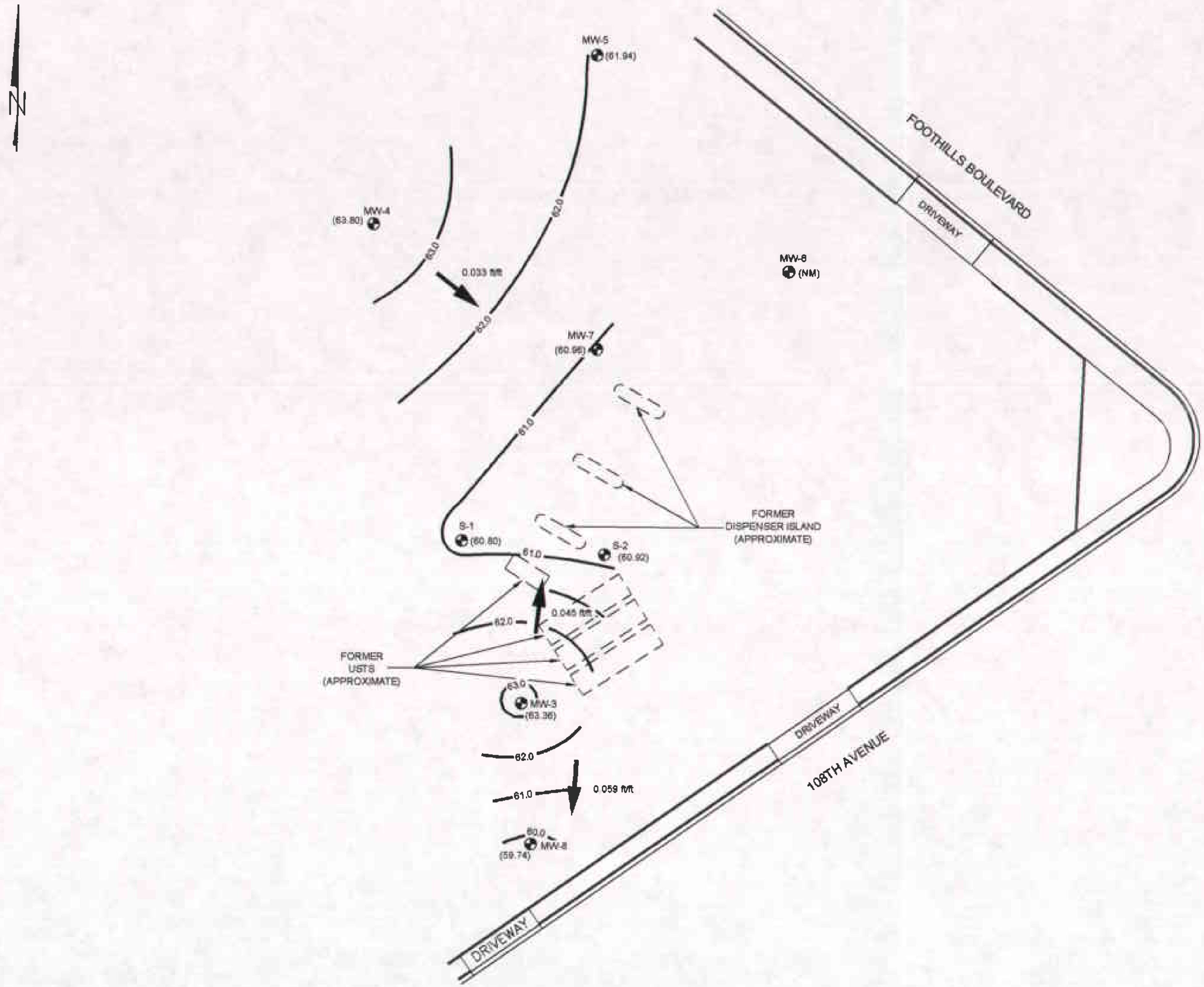
0 40 FT
HORZ. SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP
4th QUARTER 2004

FIGURE
2

PROJECT NO.
2007-0057-01



LEGEND

- MW-3 MONITORING WELL LOCATION
- (60.80) GROUND WATER ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL
- 62.0 WATER TABLE CONTOUR IN FEET RELATIVE TO MEAN SEA LEVEL
- INFERRED DIRECTION OF GROUND WATER FLOW
- (NM) NOT MEASURED (DRY)

WELLS MEASURED: 8/10/04

0 40 FT

HORZ. SCALE

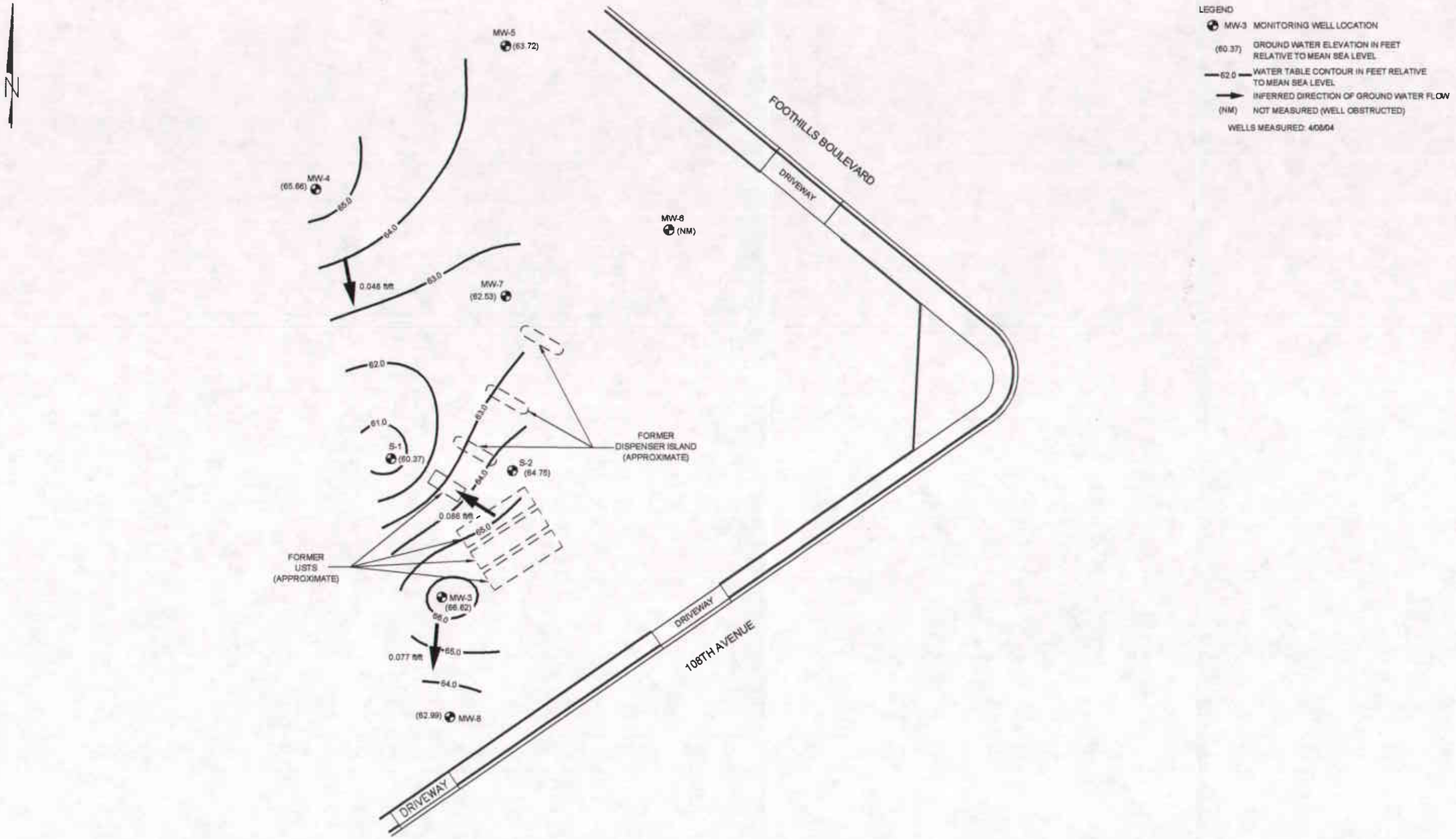
STRATUS ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP
3rd QUARTER 2004

FIGURE 2

PROJECT NO. 2007-0057-01



STRATUS
ENVIRONMENTAL, INC.

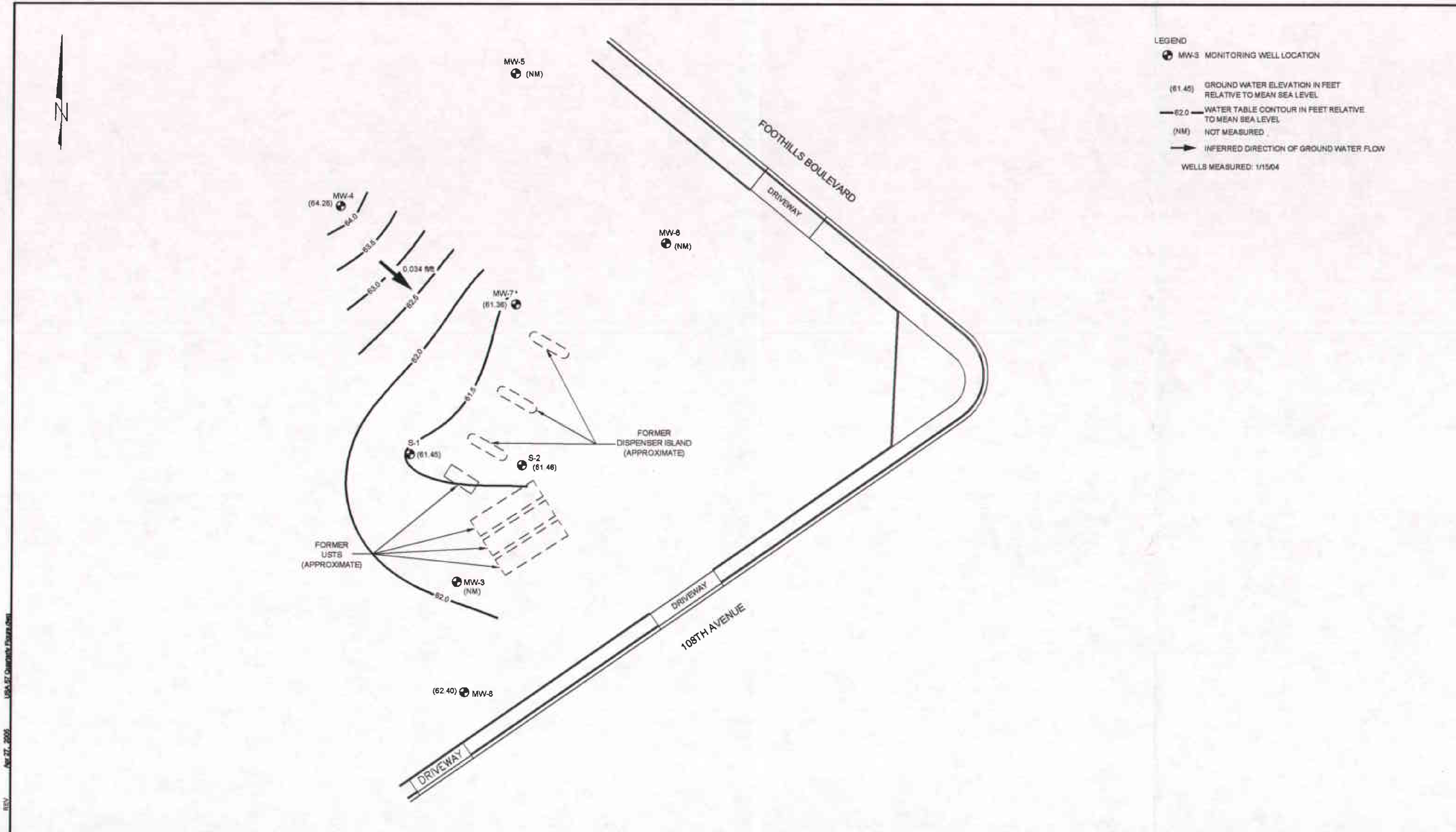
0 40 FT
HORZ. SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP
2nd QUARTER 2004

FIGURE
2

PROJECT NO.
2007-0057-01



STRATUS
ENVIRONMENTAL, INC.

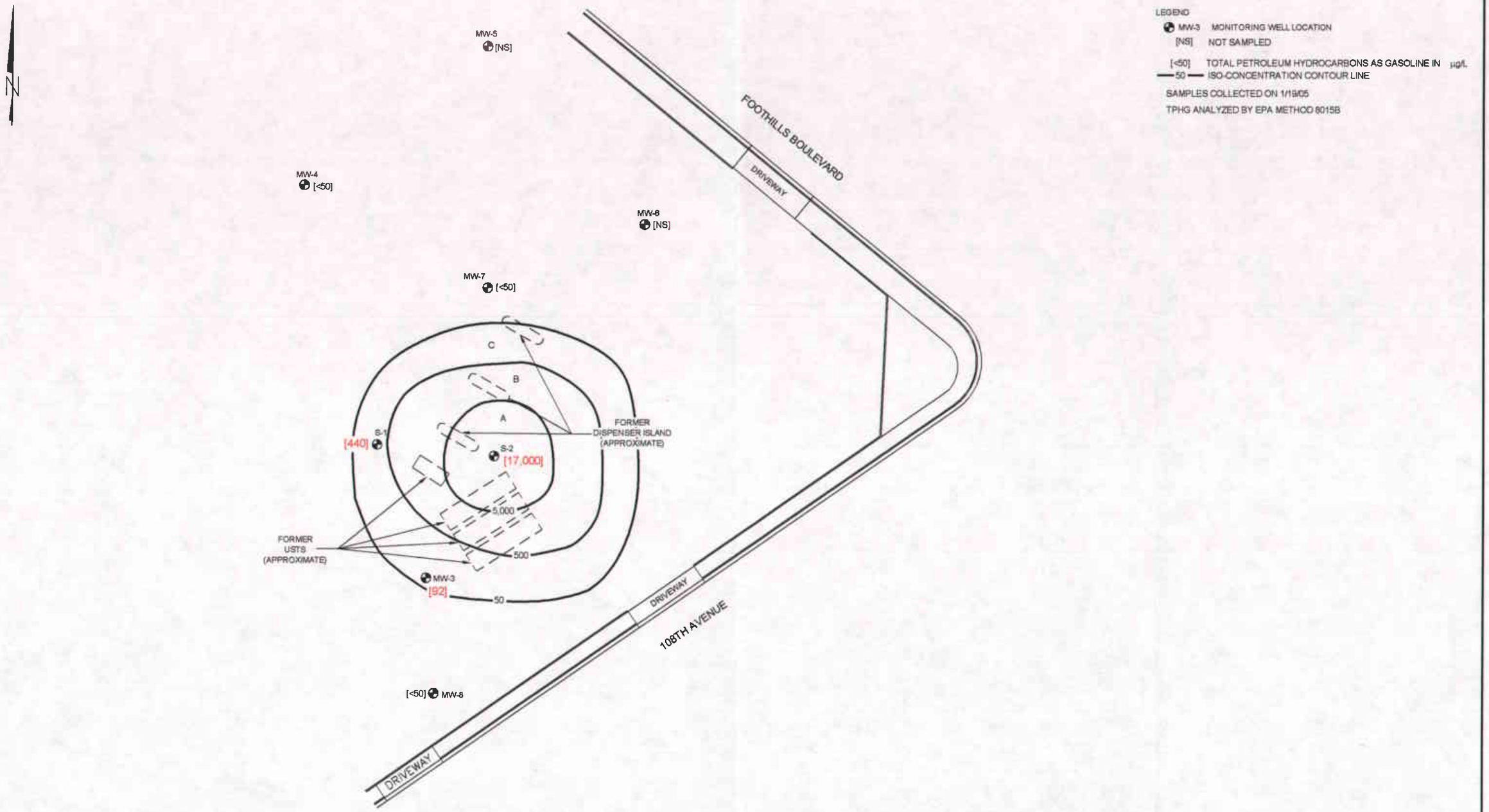
0 40 FT
HORZ. SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION CONTOUR MAP
1st QUARTER 2004

FIGURE
2

PROJECT NO.
2007-0057-01



STRATUS ENVIRONMENTAL, INC.

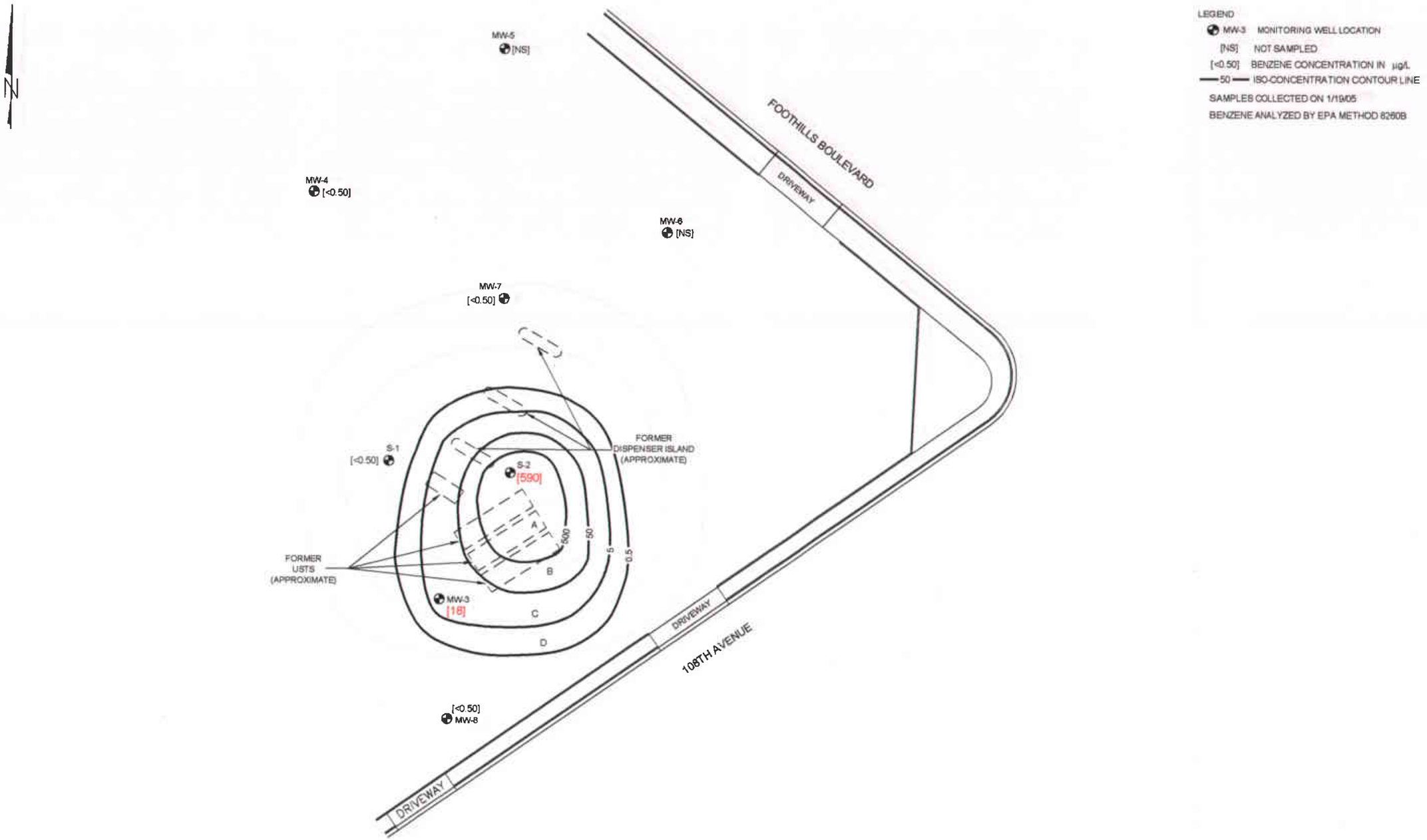
0 40 FT
HORZ. SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

TPHG ISO-CONCENTRATION CONTOUR MAP
1st QUARTER 2005

FIGURE
I-1

PROJECT NO.
2007-0057-01



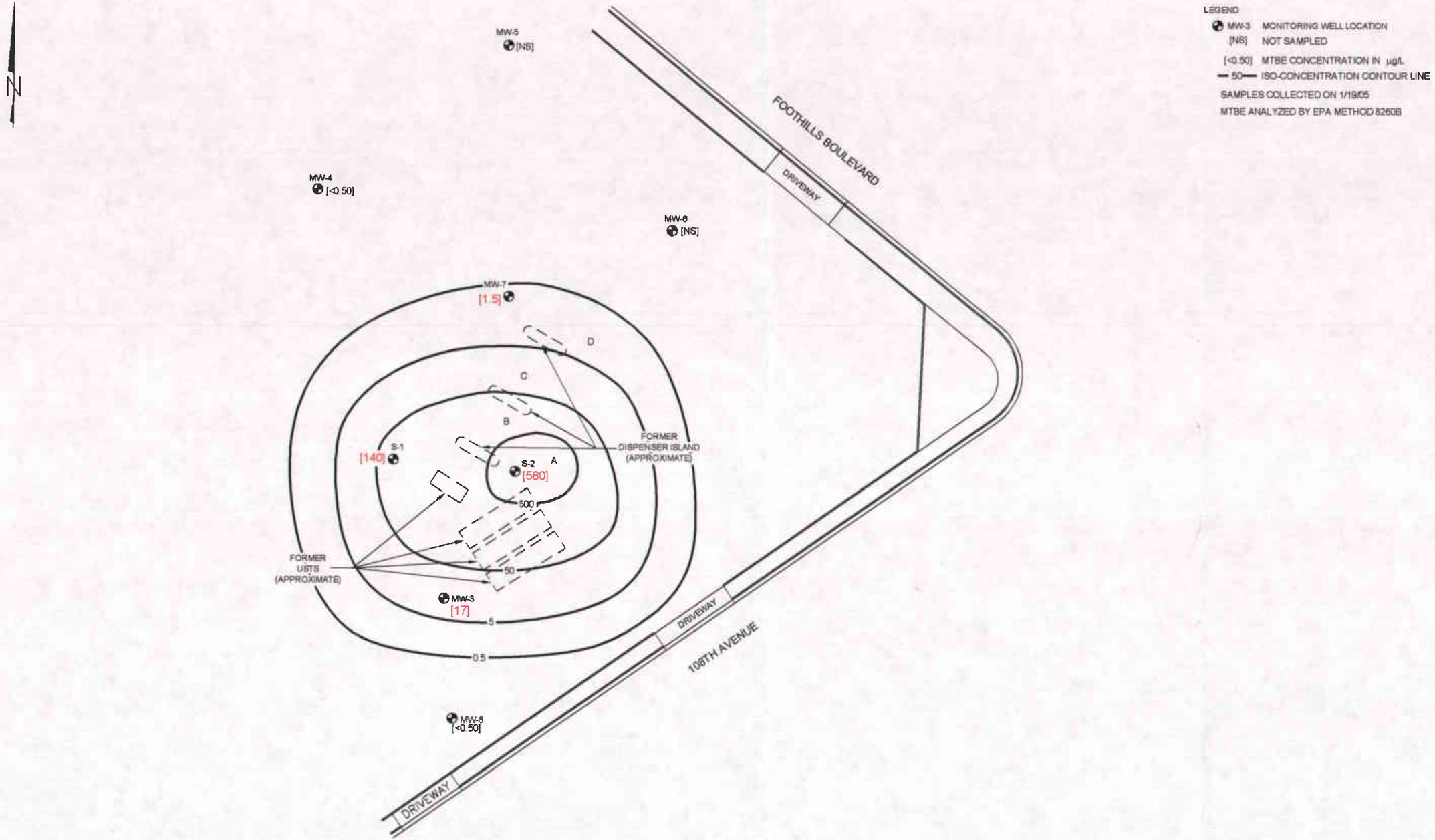
STRATUS
ENVIRONMENTAL, INC.

0 40 FT
HORZ. SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

BENZENE ISO-CONCENTRATION CONTOUR
MAP 1st QUARTER 2005

FIGURE
I-2
PROJECT NO.
2007-0057-01



STRATUS ENVIRONMENTAL, INC.

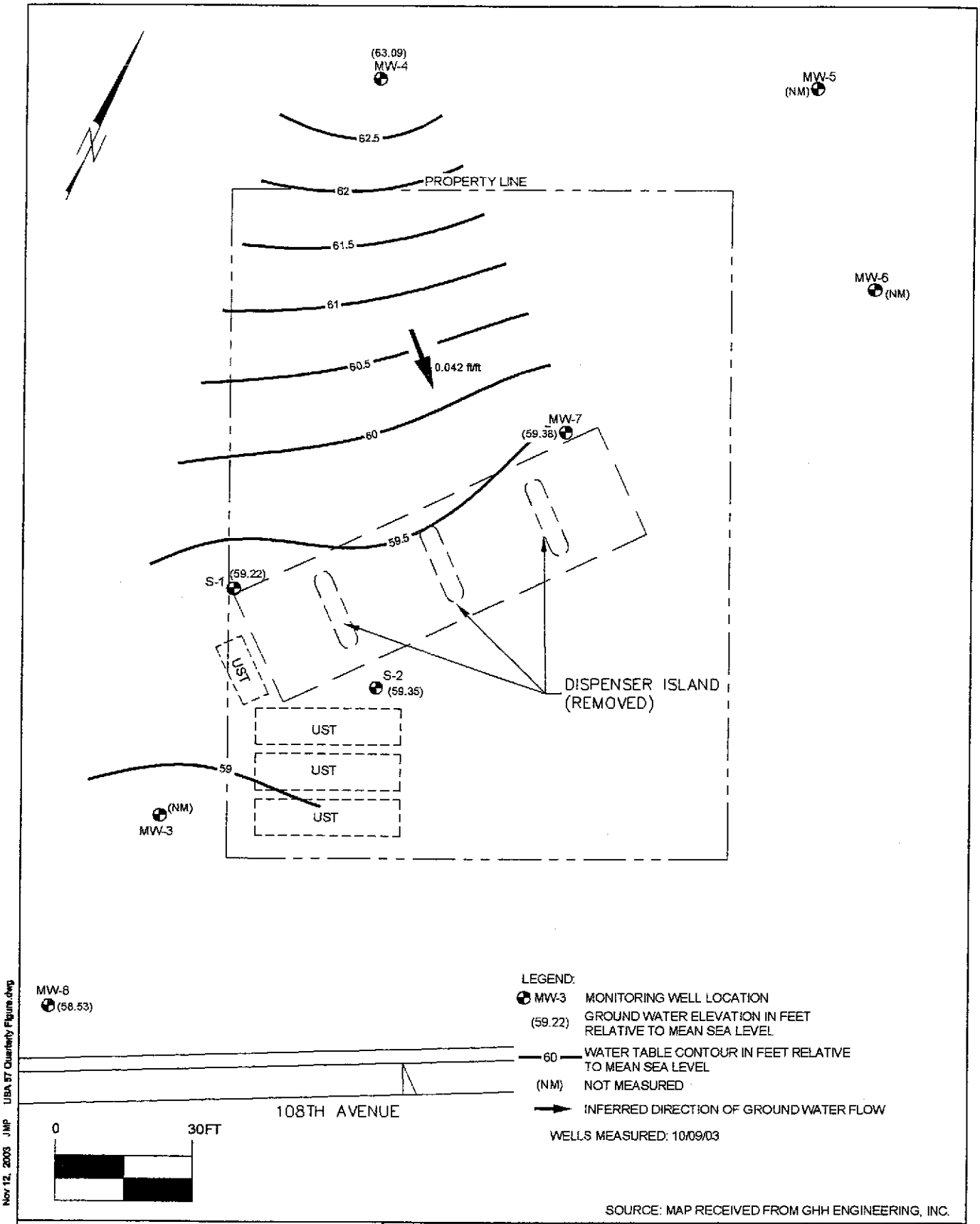
0 40 FT
HORZ. SCALE

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

MTBE ISO-CONCENTRATION CONTOUR MAP
1st QUARTER 2005

FIGURE
I-3

PROJECT NO.
2007-0057-01



SOURCE: MAP RECEIVED FROM GHH ENGINEERING, INC.

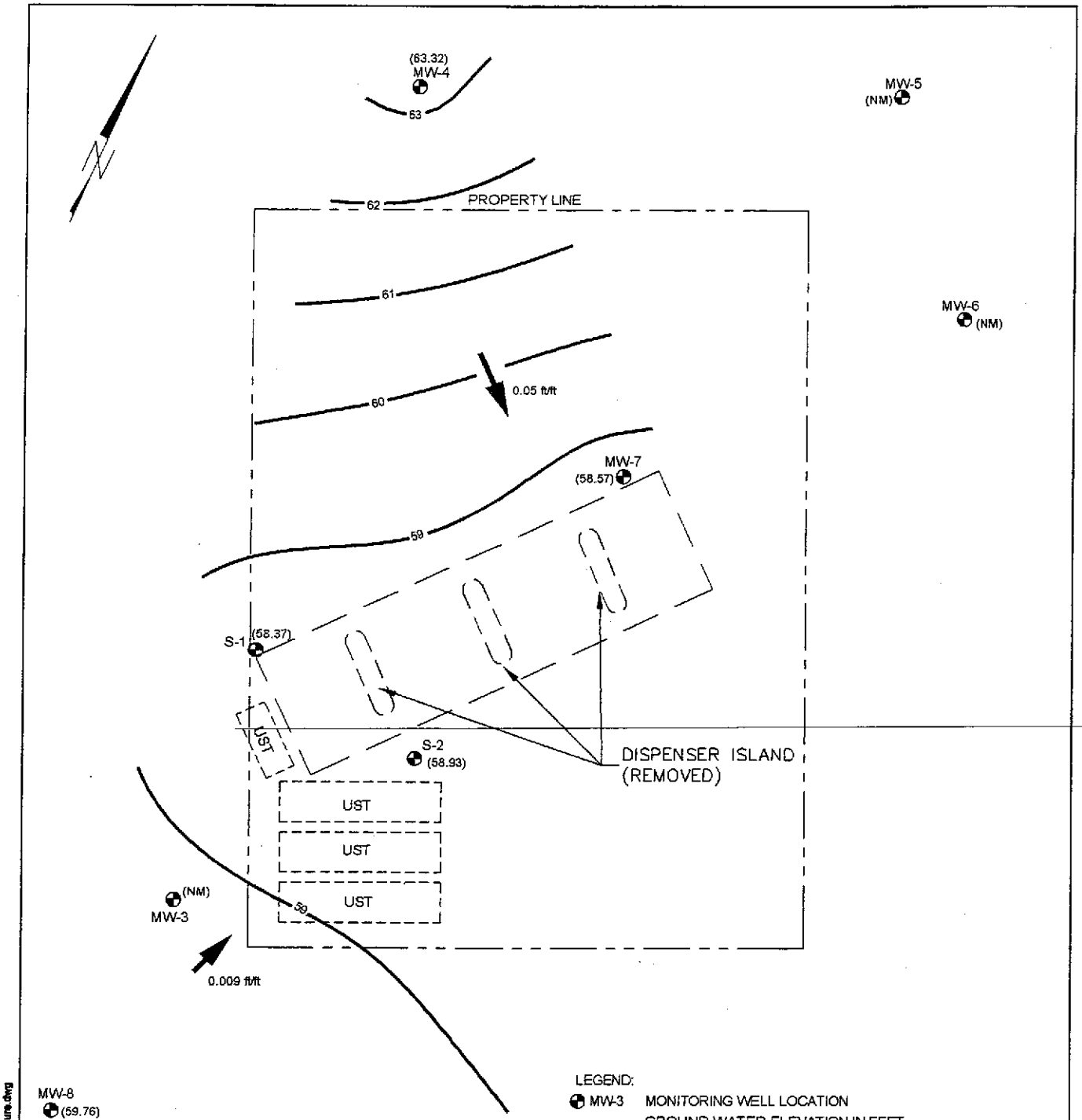
Nov 12, 2003 JMP LIBA 57 Quarterly Figure.dwg

USA\57\Quarterly Figures

STRATUS ENVIRONMENTAL, INC.

USA GASOLINE STATION #57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOUR MAP
4th QUARTER 2003

FIGURE
2
PROJECT NO.
2007-0057-01



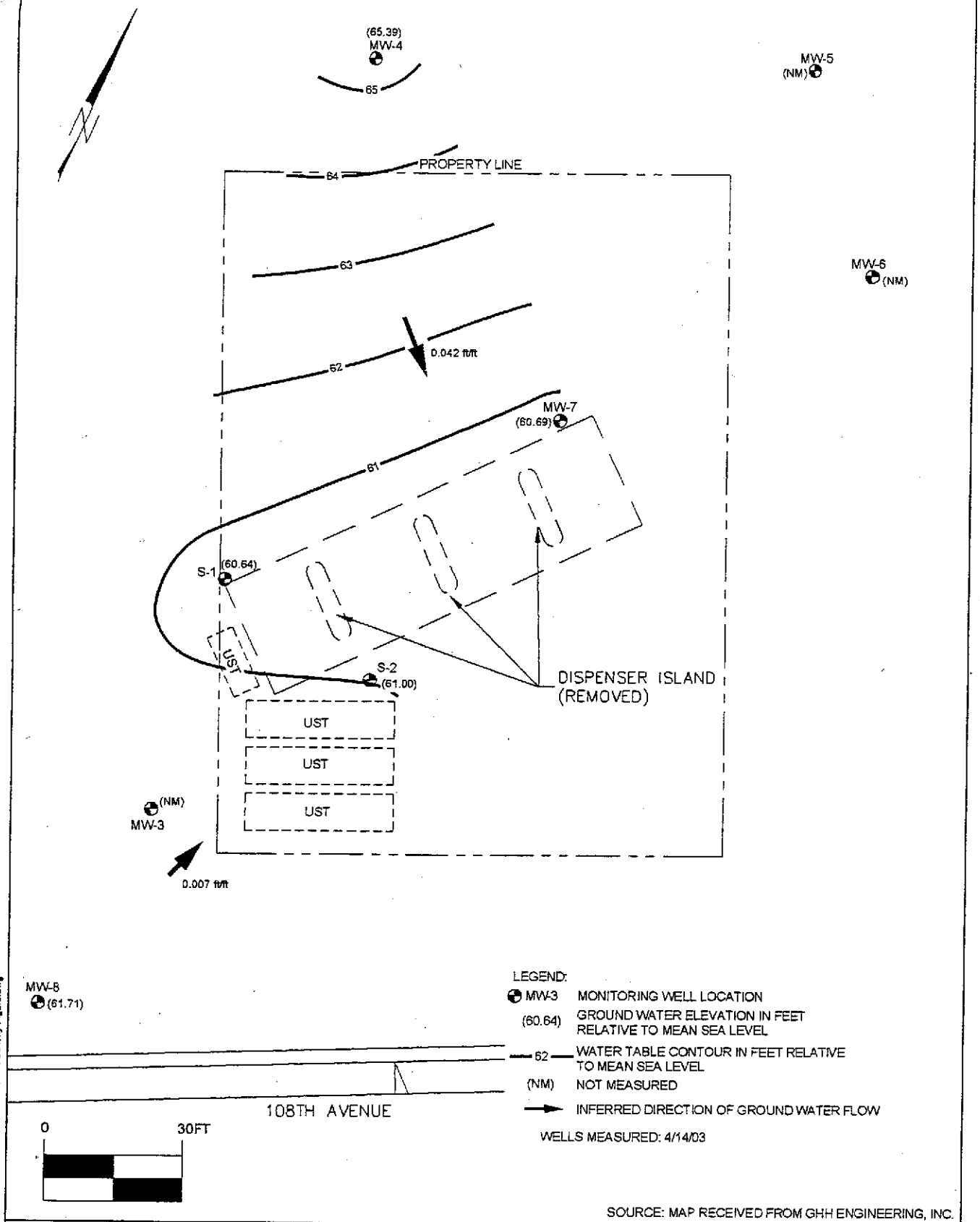
SOURCE: MAP RECEIVED FROM GHH ENGINEERING, INC.

STRATUS ENVIRONMENTAL, INC.

USA GASOLINE STATION #57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOUR MAP
3rd QUARTER 2003

FIGURE
2
PROJECT NO.
2007-0057-01

Aug 08, 2003 JMP USA 57 Quarterly Figure.dwg
USA\57\Quarterly Figures



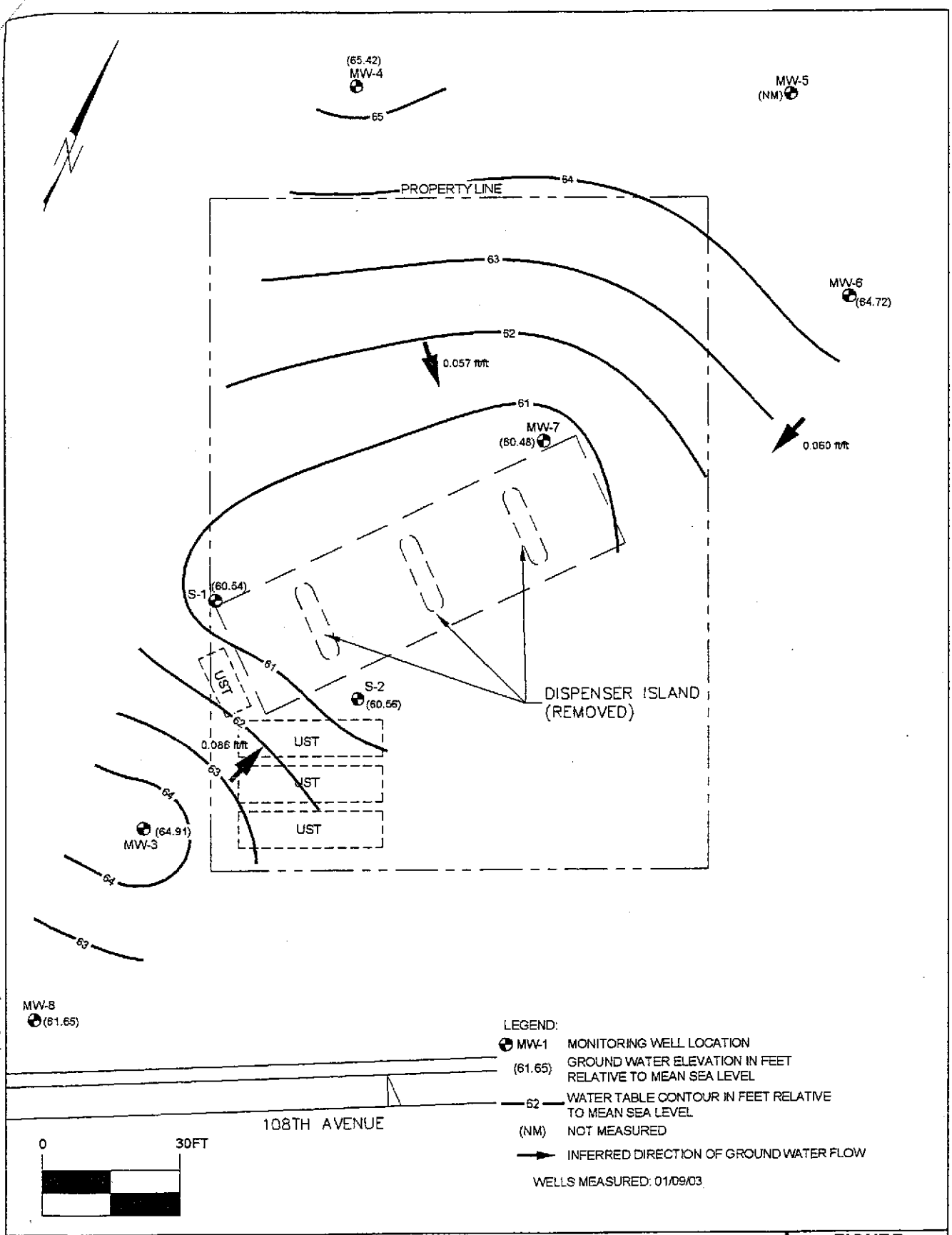
SOURCE: MAP RECEIVED FROM GHH ENGINEERING, INC.

STRATUS ENVIRONMENTAL, INC.

USA GASOLINE STATION #57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOUR MAP
2nd QUARTER 2003

FIGURE
2
PROJECT NO.
2007-0057-01

Jul 21, 2003 JMP USA 57 Quarterly Figure.dwg
USA\57\Quarterly Figures



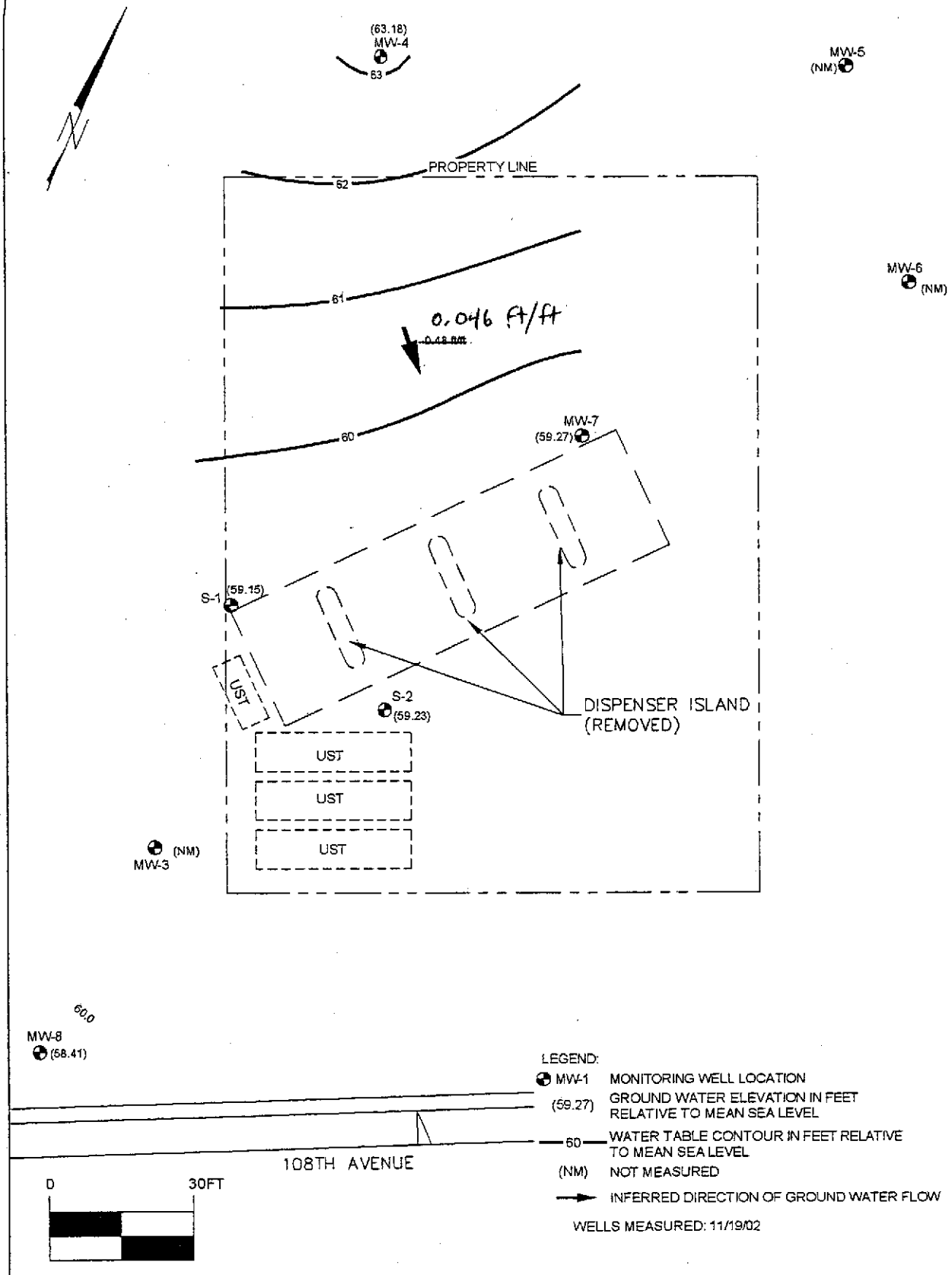
Mar 13, 2003 JMP USA 57 Quarterly Figure.dwg

USA\57\Quarterly Figures

STRATUS ENVIRONMENTAL, INC.

USA GASOLINE STATION #57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOUR MAP
1st QUARTER 2003

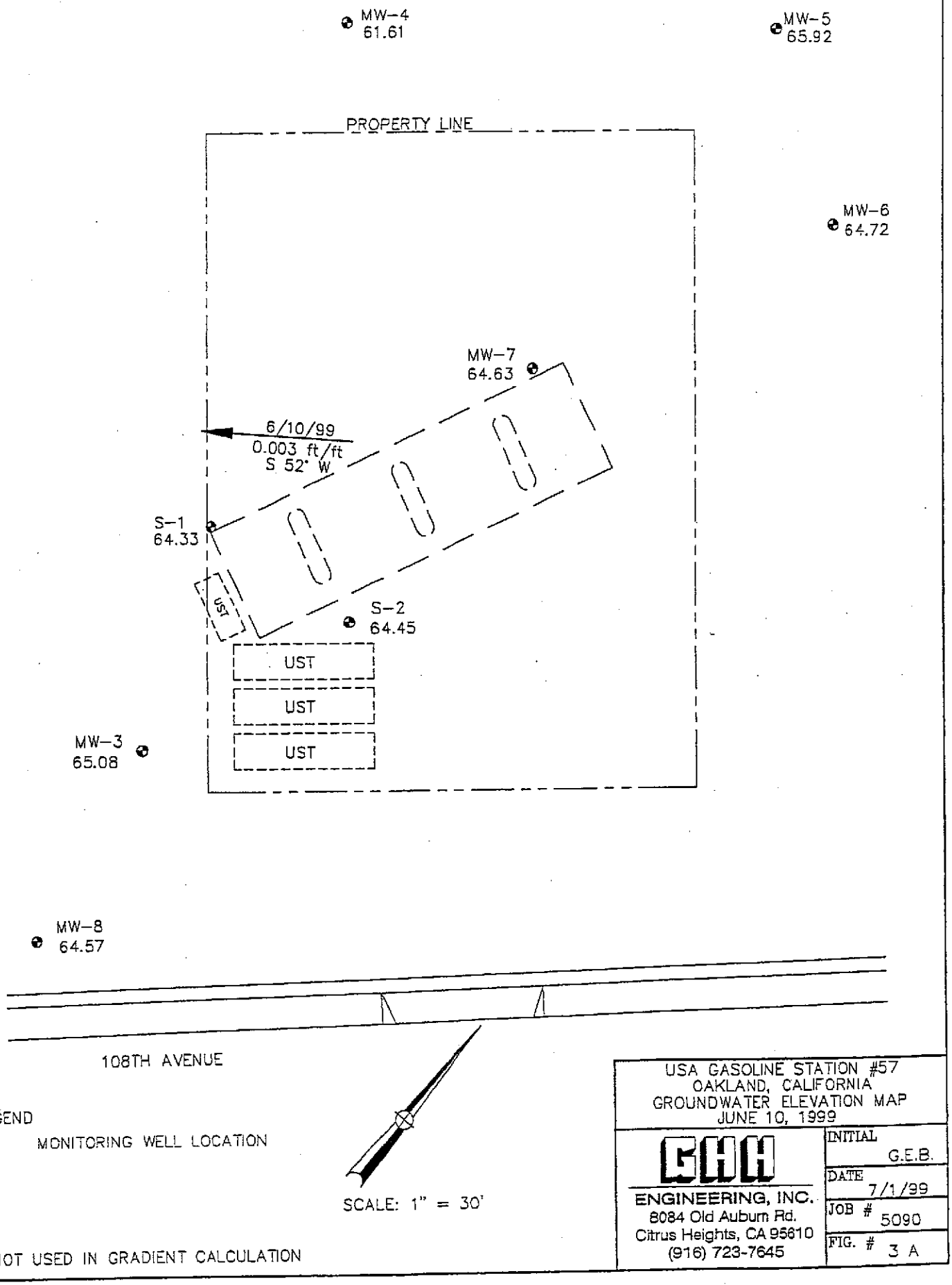
FIGURE
2
PROJECT NO.
2007-0057-01



STRATUS ENVIRONMENTAL, INC.

USA GASOLINE STATION #57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION CONTOUR MAP
4th QUARTER 2002

FIGURE
2
PROJECT NO.
2007-0057-01

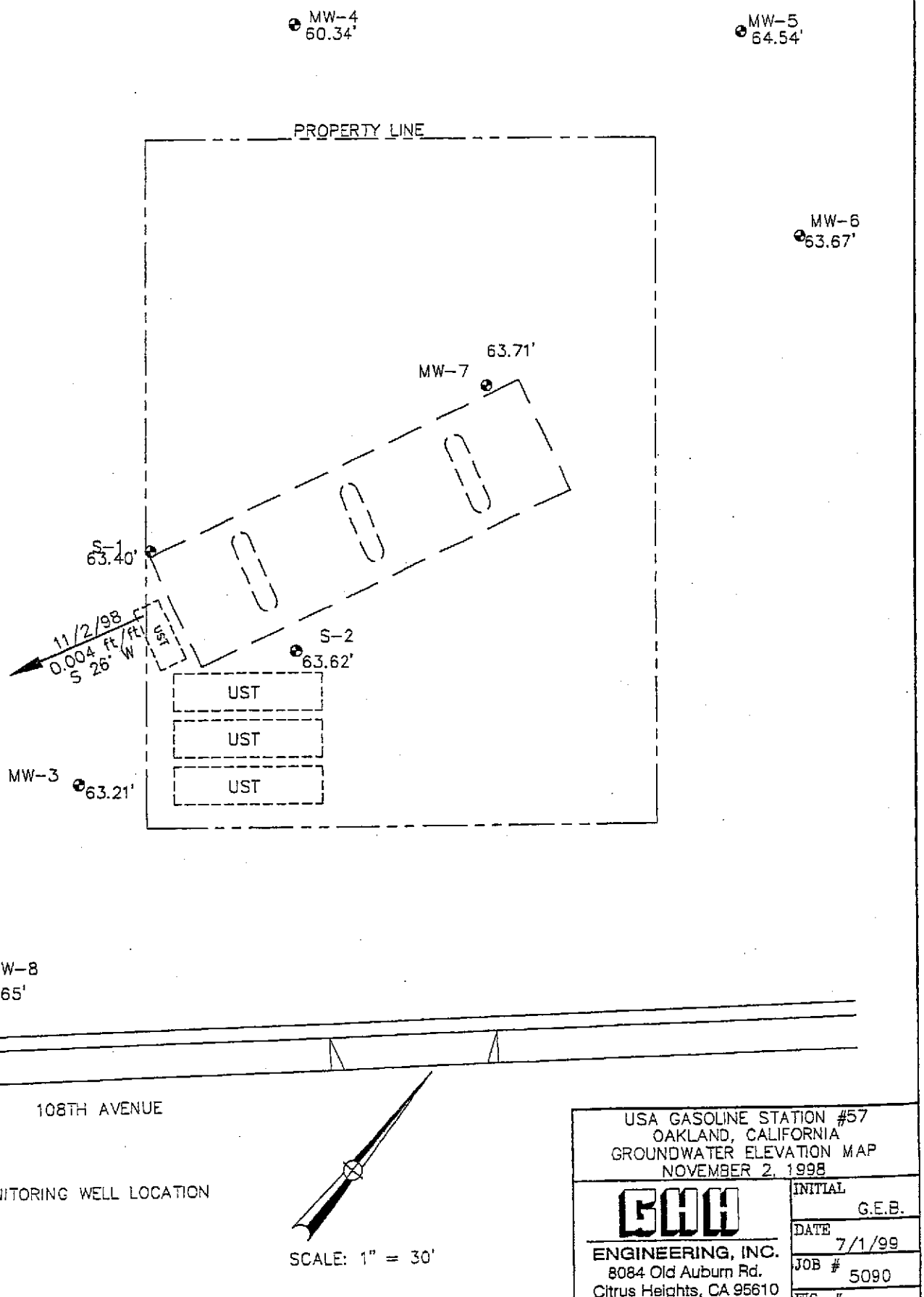


* NOT USED IN GRADIENT CALCULATION

USA GASOLINE STATION #57
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION MAP
JUNE 10, 1999

GAH
ENGINEERING, INC.
8084 Old Auburn Rd.
Citrus Heights, CA 95610
(916) 723-7645

INITIAL	G.E.B.
DATE	7/1/99
JOB #	5090
FIG. #	3 A

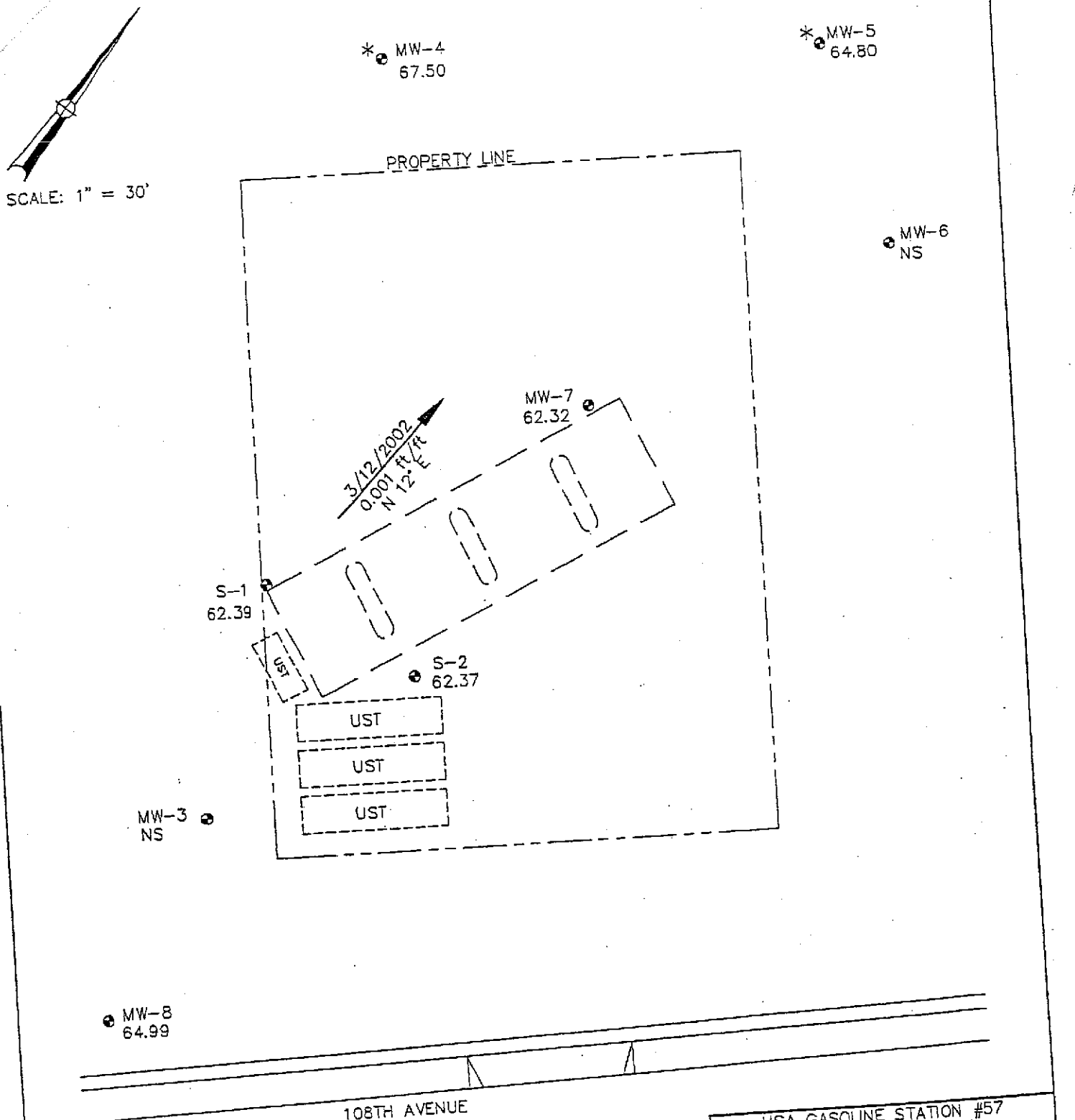


* NOT USED IN GRADIENT CALCULATION

USA GASOLINE STATION #57
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION MAP
NOVEMBER 2, 1998

GHA
ENGINEERING, INC.
8084 Old Auburn Rd.
Citrus Heights, CA 95610
(916) 723-7645

INITIAL	G.E.B.
DATE	7/1/99
JOB #	5090
FIG. #	3



LEGEND

● MONITORING WELL LOCATION

GROUNDWATER LEGEND

79.10 GROUNDWATER ELEVATION

FLOW DIRECTION (MARCH 12, 2002)

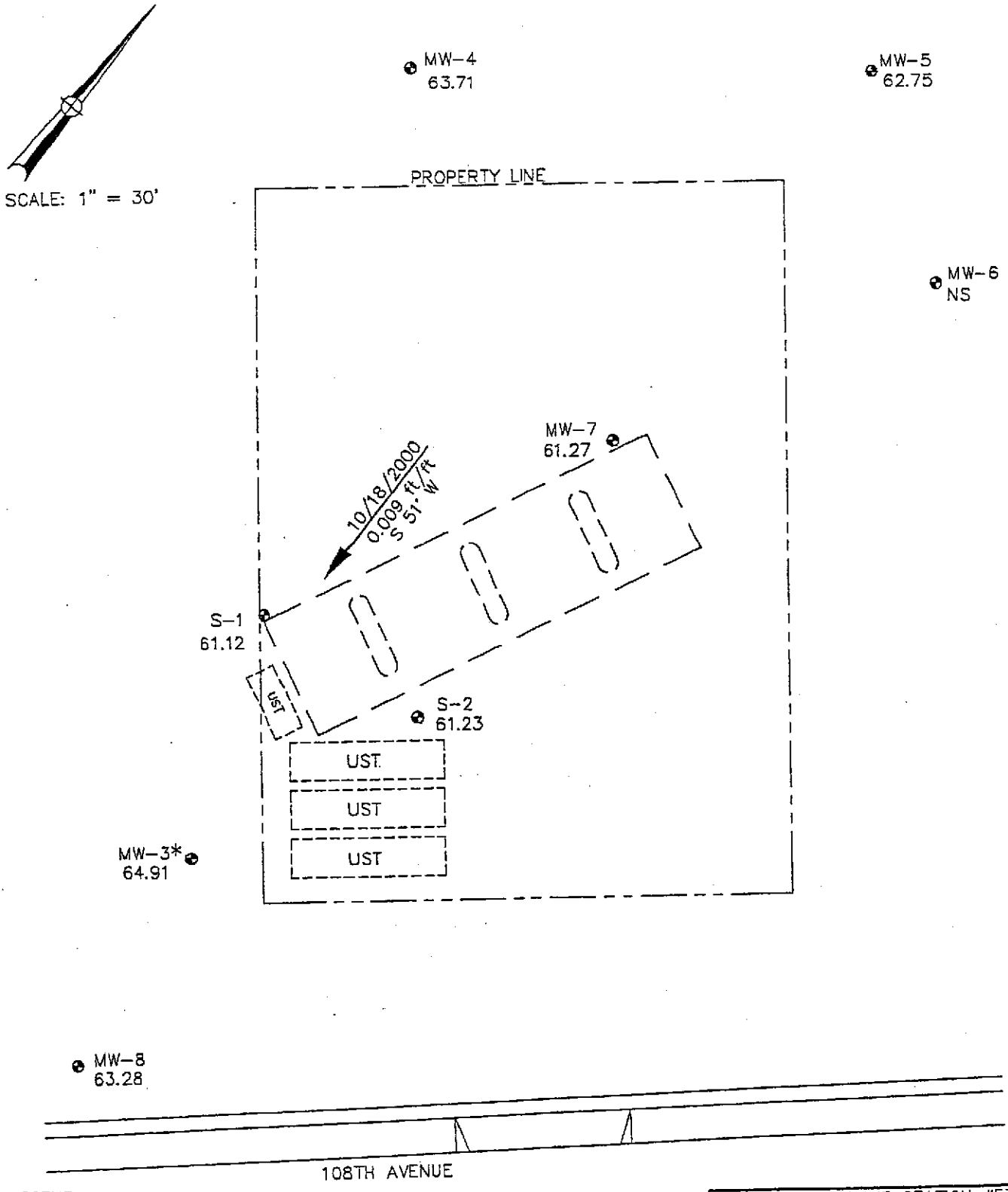
NS NOT SURVEYED

* NOT USED IN GRADIENT CALCULATION

USA GASOLINE STATION #57
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION MAP

GHH
ENGINEERING, INC.
11960 Heritage Oak Place
Auburn, CA 95603
(530) 996-3100

INITIAL	C.O.
DATE	4/9/2002
JOB #	5090
FIG. #	4



LEGEND

● MONITORING WELL LOCATION

GROUNDWATER LEGEND

79.10 GROUNDWATER ELEVATION

FLOW DIRECTION (OCTOBER 18, 2000)

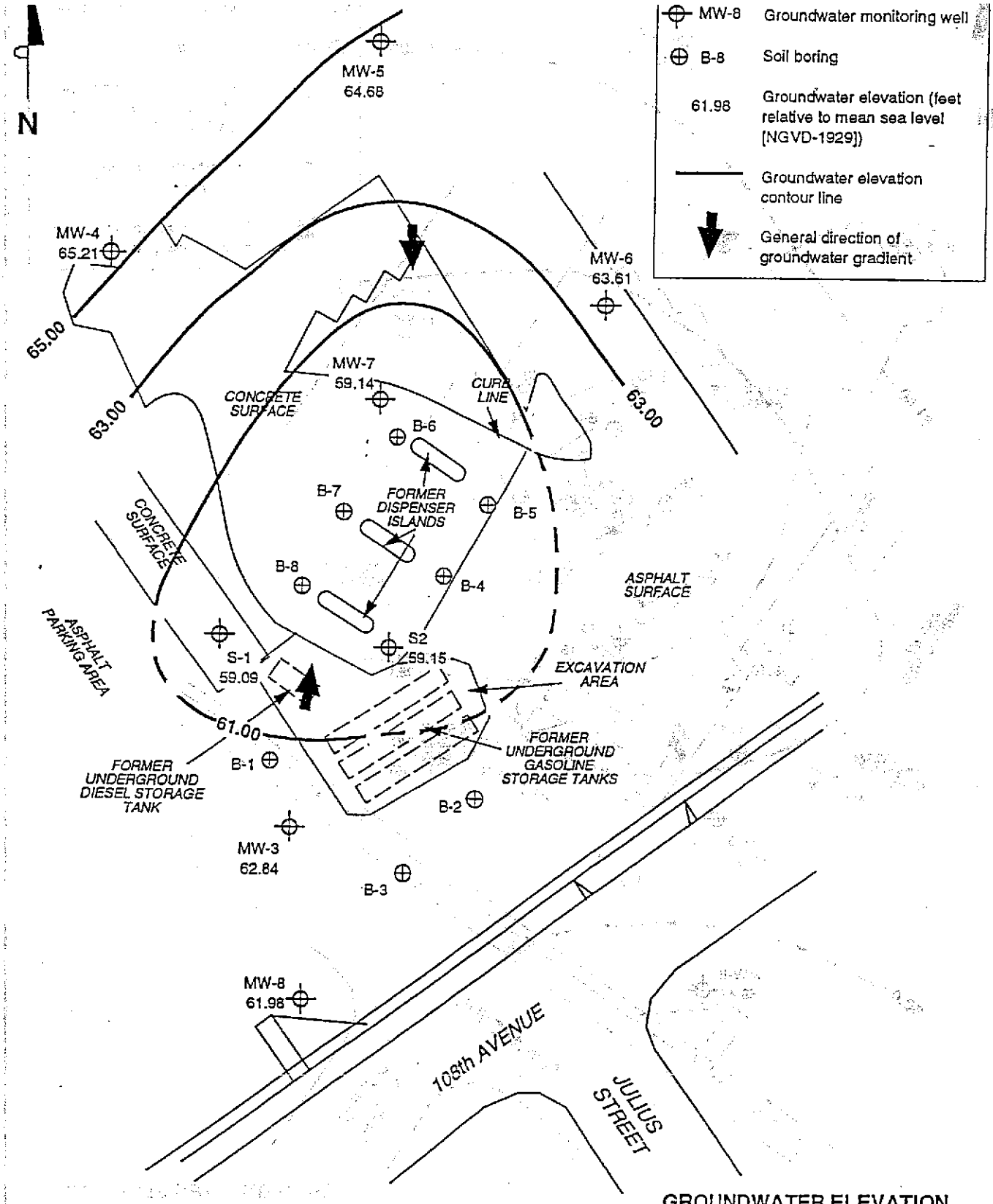
NS NOT SURVEYED

* NOT USED IN GRADIENT CALCULATION

USA GASOLINE STATION #57
OAKLAND, CALIFORNIA
GROUNDWATER ELEVATION MAP

GHA
ENGINEERING, INC.
11960 Heritage Oak Place
Auburn, CA 95603
(530) 996-3100

INITIAL	C.O.
DATE	1/19/2001
JOB #	5090
FIG. #	4



NOTES:
Contour lines are interpretive based on fluid level measurements collected December 6, 1995.
Contour interval = 2.0 feet.

SCALE (feet)
0 20 40

Source: Ron Archer, Civil Engineer, Inc.

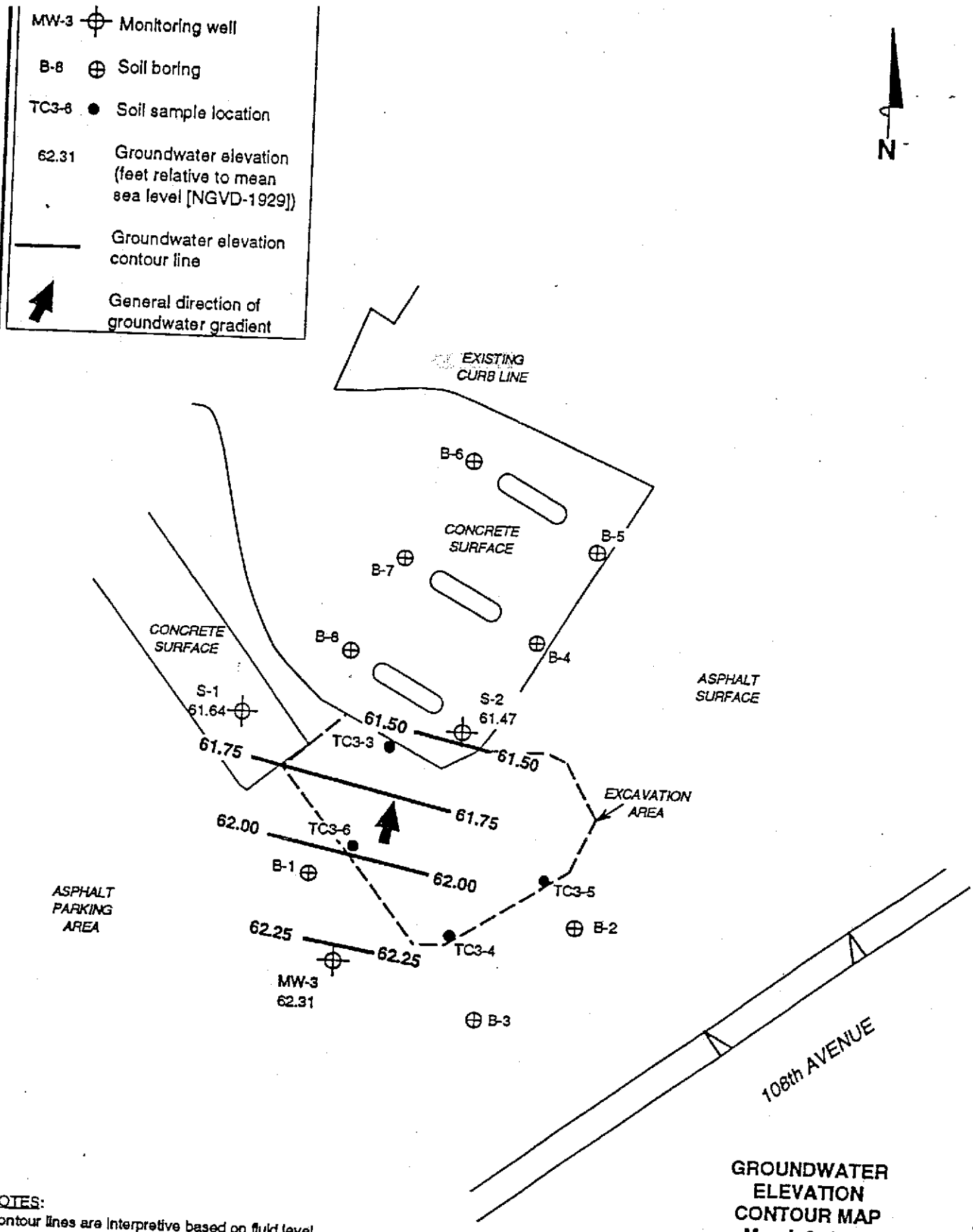
GROUNDWATER ELEVATION CONTOUR MAP
December 6, 1995

USA Gas # 57
10700 MacArthur Boulevard
Oakland, California

ALTON GEOSCIENCE
Livermore, California

FIGURE 7

41-0034/Site 12/95 12/15/95



NOTES:
Contour lines are interpretive based on fluid level measurements collected March 3, 1995. Contour interval = 0.25 foot.

ALTON GEOSCIENCE
Livermore, California

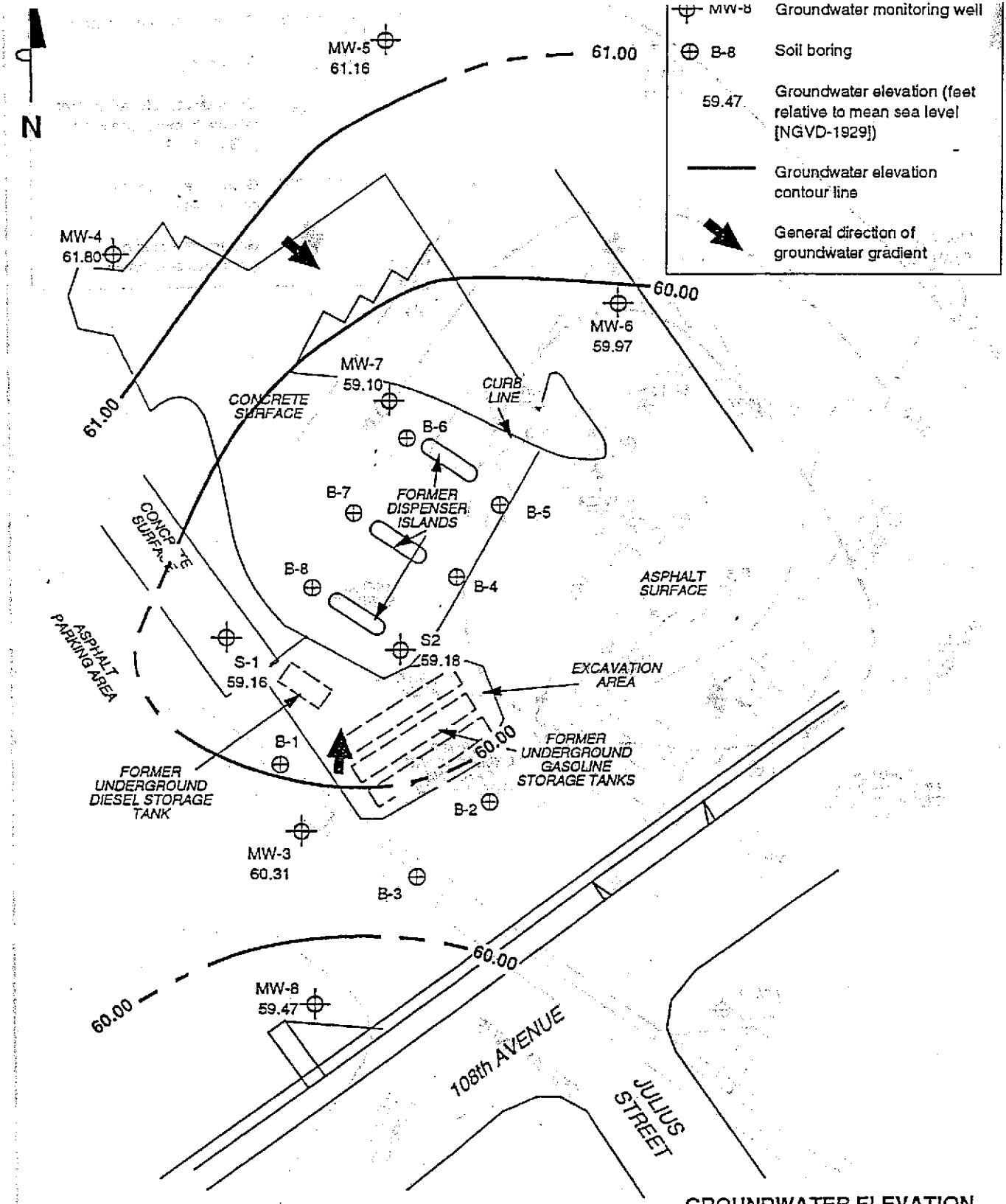
SCALE (feet)
0 15 30

GROUNDWATER ELEVATION CONTOUR MAP
March 3, 1995

Former USA Gas #57
10700 MacArthur Boulevard
Oakland, California

FIGURE 7

41-0034/New Plan 04/11/95



NOTES:
Contour lines are interpretive based on fluid level measurements collected January 4, 1996.
Contour Interval = 1.0 foot.

SCALE (feet)
0 20 40

GROUNDWATER ELEVATION CONTOUR MAP
January 4, 1996

USA Gas # 57
10700 MacArthur Boulevard
Oakland, California

ALTON GEOSCIENCE
Livermore, California

Source: Ron Archer, Civil Engineer, Inc.

FIGURE 8

41-0034/Site 12/95 12/15/95

APPENDIX H

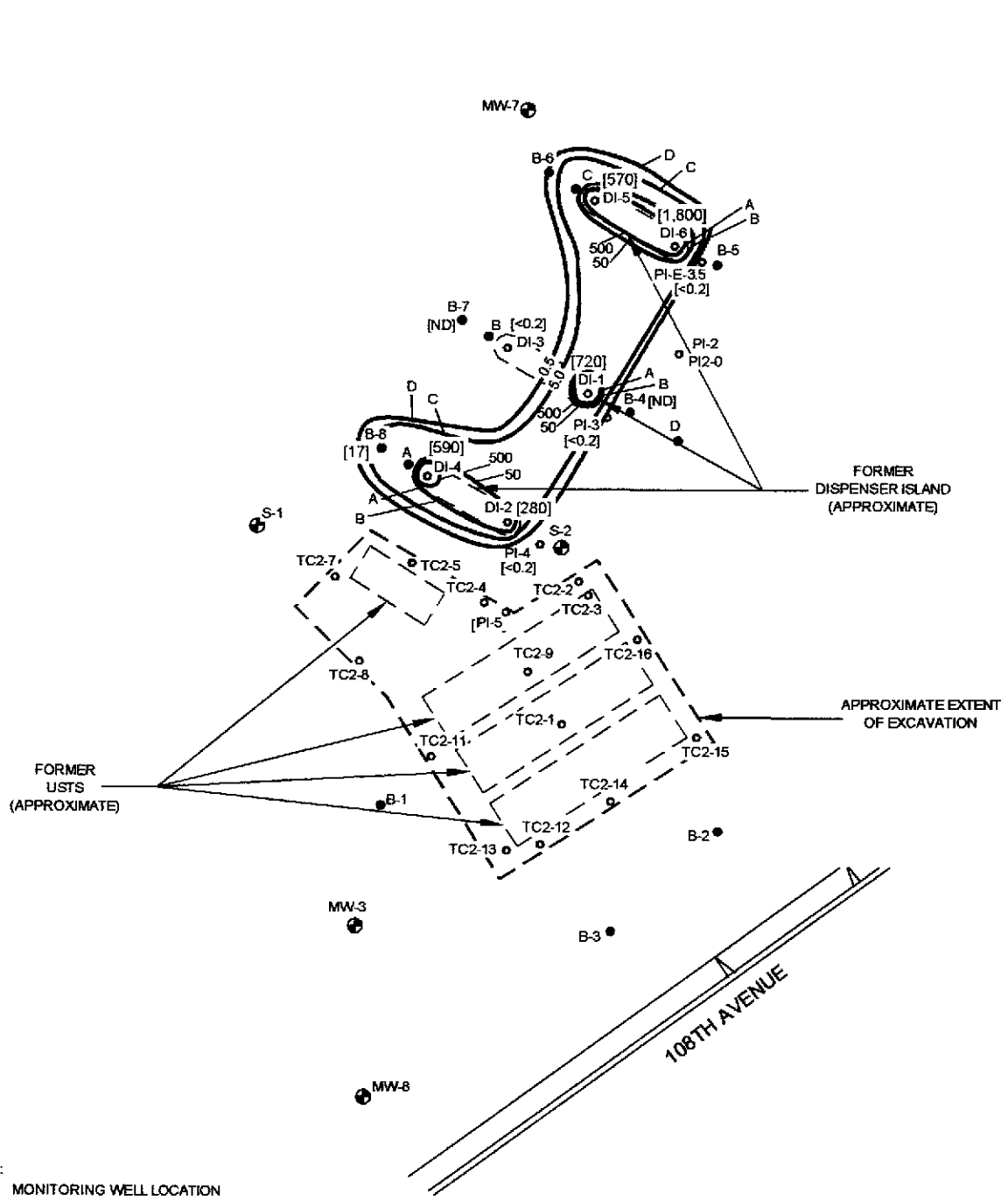
DEPTH DISCRETE ISO-CONCENTRATION CONTOUR MAPS FOR TPHG AND PETROLEUM HYDROCARBON MASS ESTIMATES

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California
Mass of TPHG Remaining in the Vadose Zone

Basis	Area ID	Area sq.ft	Depth ft	Avg Conc mg/kg	Soil Volume cu.ft	Soil Density Kg/cu.ft	Soil Mass Kg	TPHG Mass Kg
H-1 Figure 6C (0 to 7 feet bgs)	A	224.13	7	500	1,568.91	36.85	57,814.33	**28.91**
	B	311.95	7	50	2,183.65	36.85	80,467.50	**4.02**
	C	1790.43	7	5	12,533.01	36.85	461,841.42	**2.31**
	D	634.46	7	0.5	4,441.22	36.85	163,658.96	**0.08**
						Mass of TPHG from 0 - 7 feet bgs =		**35.32**
H-2 Figure 6D (7 to 12 feet bgs)	A	228.83	5	50	1,144.15	36.85	42,161.93	**2.11**
	B	4374.89	5	5	21,874.45	36.85	806,073.48	**4.03**
	C	5670.22	5	0.5	28,351.10	36.85	1,044,738.04	**0.52**
						Mass of TPHG from 7 - 12 feet bgs =		**6.66**
H-3 Figure 6E (12 to 17 feet bgs)	A	397	5	500	1,983.80	36.85	73,103.03	**36.55**
	B	2681.09	5	50	13,405.45	36.85	493,990.83	**24.70**
	C	10360.94	5	5	51,804.70	36.85	1,909,003.20	**9.55**
						Mass of TPHG from 12 - 17 feet bgs =		**70.80**
H-4 Figure 6F (17 to 22 feet bgs)	A	285.34	5	500	1,426.70	36.85	52,573.90	**26.29**
	B	1250.00	5	5	6,250.00	36.85	230,312.50	**1.15**
	C	4565.62	5	0.5	22,828.10	36.85	841,215.49	**0.42**
						Mass of TPHG from 17 - 22 feet bgs =		**27.86**
Estimated Total Mass of Petroleum Hydrocarbons in the Subsurface =								**141**

Notes:

1. Concentrations are assumed from the outer contour. Assumed to be uniform across area.
2. The average concentration is assumed to be uniform across the chosen depth of soil profile
3. Soil density is assumed be to 36.85 kilograms per cubic feet (Kg/cu.ft)
4. Soil Mass = Soil Density * Soil Volume
5. TPHG Mass(Kilograms) = Soil Mass (Kilograms) * Average Concentration (Avg Conc) (milligrams*10^{-6}/Kilogram)



LEGEND:

- MW-3 MONITORING WELL LOCATION
- B-1 APPROXIMATE SOIL BORING LOCATION
- D1-4 APPROXIMATE SOIL SAMPLE LOCATION

[<0.2] TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN mg/Kg

ND NOT DETECTED (LABORATORY REPORTING LIMITS NOT AVAILABLE)

NA NOT ANALYZED FOR THIS CONSTITUENT

SOIL SAMPLES COLLECTED BETWEEN 7/94 AND 3/95
NOT ALL SAMPLE LOCATIONS SHOWN; ONLY THOSE SAMPLES COLLECTED AT THE FURTHEST EXTENT OF EXCAVATION

0 60 FT

SCALE

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, & GHH ENGINEERING.

STRATUS ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

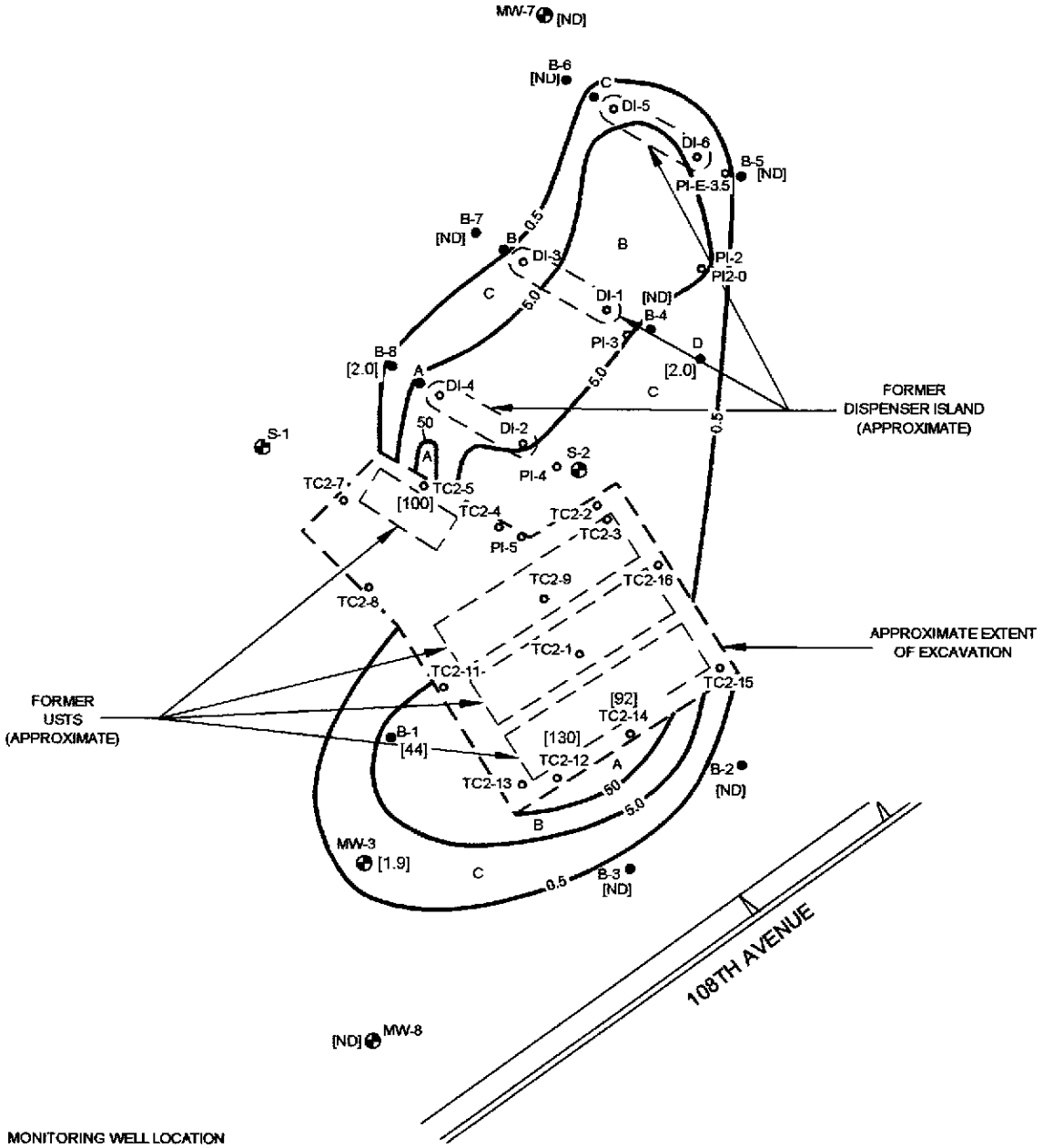
TPHG ISO-CONCETRATION
CONTOUR MAP (0 - 7' bgs)

FIGURE

H-1

PROJECT NO.
2007-0057-01

USA57SCN JMP Rev. Mar 09, 2009 USA 57 Soil Analytical.dwg



LEGEND:

- MW-3 MONITORING WELL LOCATION
- B-1 APPROXIMATE SOIL BORING LOCATION
- D1-4 APPROXIMATE SOIL SAMPLE LOCATION

[44] TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN mg/Kg

ND NOT DETECTED (LABORATORY REPORTING LIMITS NOT AVAILABLE) - ASSUMED <0.50

NA NOT ANALYZED FOR THIS CONSTITUENT

SOIL SAMPLES COLLECTED BETWEEN 7/94 AND 11/95
NOT ALL SAMPLE LOCATIONS SHOWN; ONLY THOSE SAMPLES COLLECTED AT THE FURTHEST EXTENT OF EXCAVATION

0 60 FT
SCALE

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995) AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, & GHH ENGINEERING.

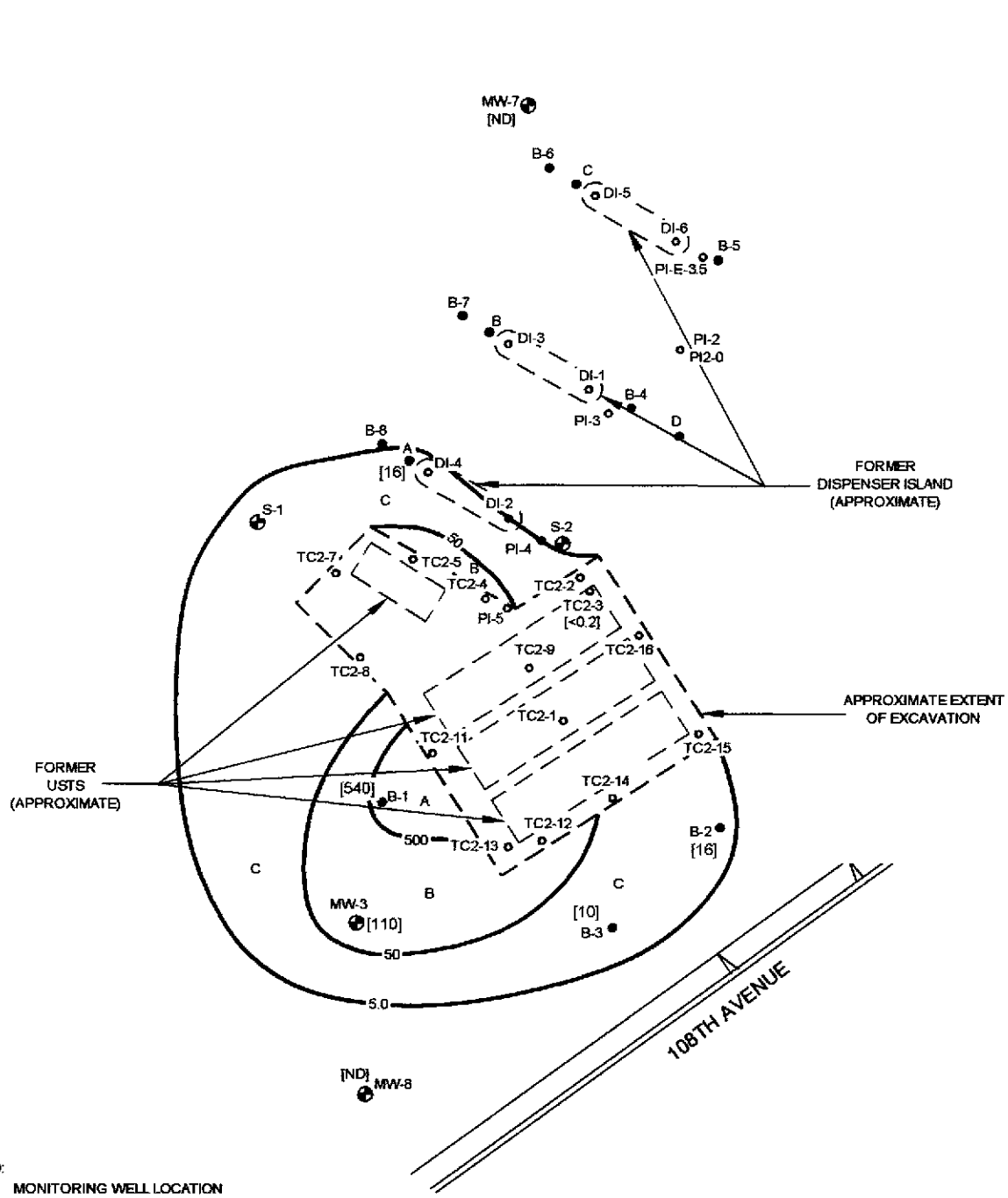
STRATUS ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

TPHG ISO-CONCETRATION CONTOUR MAP (7' - 12' bgs)

FIGURE
H-2
PROJECT NO. 2007-0057-01

USA57\SCM May 09, 2008 USA 57 Soil Analytical.dwg Rev. JMP



LEGEND:

MW-3	MONITORING WELL LOCATION
B-1	APPROXIMATE SOIL BORING LOCATION
D1-4	APPROXIMATE SOIL SAMPLE LOCATION
[<0.2]	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN mg/Kg
ND	NOT DETECTED (LABORATORY REPORTING LIMITS NOT AVAILABLE)
NA	NOT ANALYZED FOR THIS CONSTITUENT

SOIL SAMPLES COLLECTED BETWEEN 7/94 AND 11/95
NOT ALL SAMPLE LOCATIONS SHOWN; ONLY THOSE SAMPLES
COLLECTED AT THE FURTHEST EXTENT OF EXCAVATION

0 60FT
SCALE

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995)
AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, & GHH ENGINEERING.

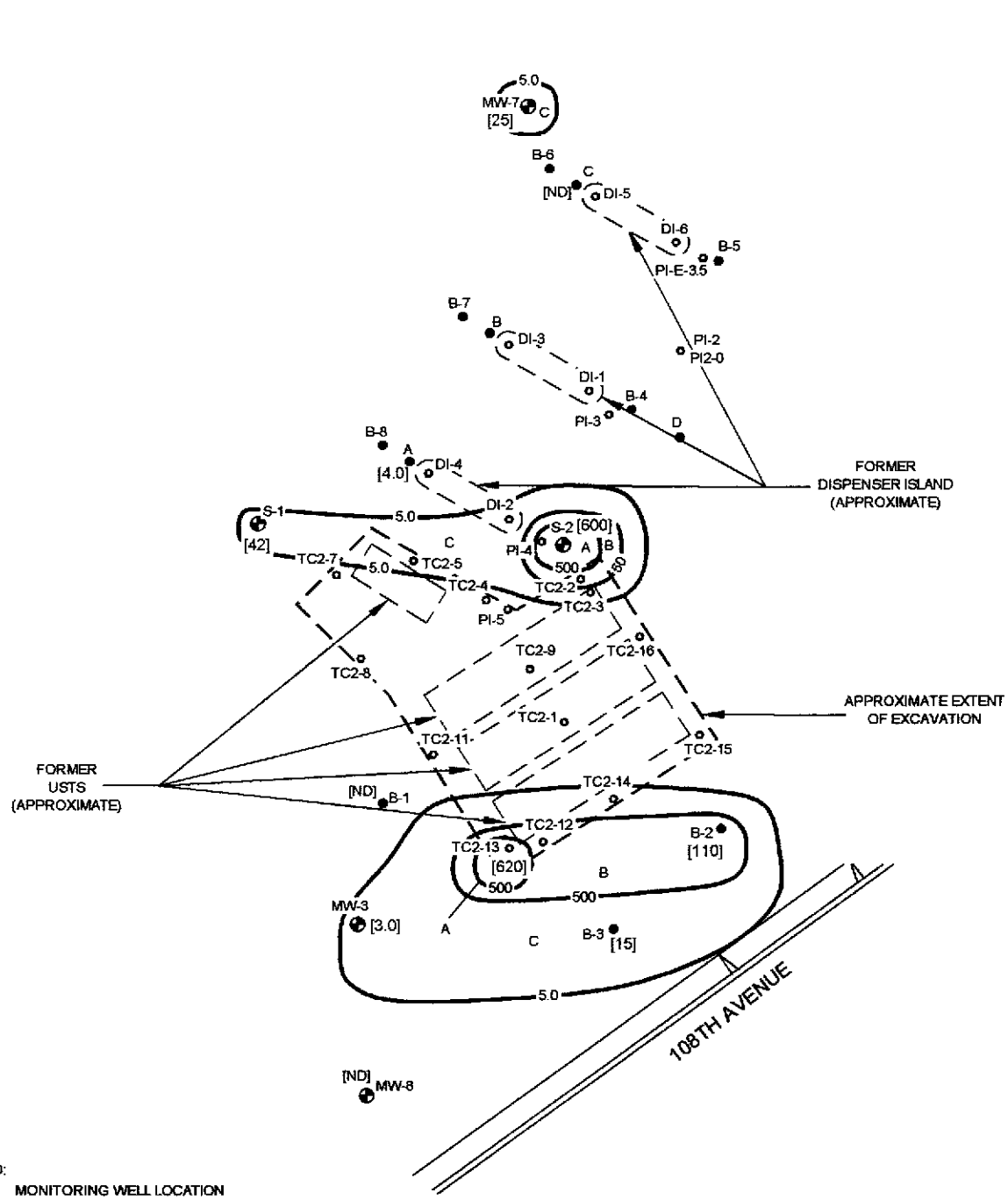
STRATUS
ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

TPHG ISO-CONCETRATION
CONTOUR MAP (12' - 17' bgs)

FIGURE
H-3
PROJECT NO.
2007-0057-01

USA\57\SCM JMP Rev. May 09, 2008 USA 57 Soil Analytical.dwg



LEGEND:

MW-3	MONITORING WELL LOCATION
B-1	APPROXIMATE SOIL BORING LOCATION
D1-4	APPROXIMATE SOIL SAMPLE LOCATION
[3.0]	TOTAL PETROLEUM HYDROCARBONS AS GASOLINE IN mg/Kg
ND	NOT DETECTED (LABORATORY REPORTING LIMITS NOT AVAILABLE)
NA	NOT ANALYZED FOR THIS CONSTITUENT

SOIL SAMPLES COLLECTED BETWEEN 7/94 AND 11/95
NOT ALL SAMPLE LOCATIONS SHOWN; ONLY THOSE SAMPLES
COLLECTED AT THE FURTHEST EXTENT OF EXCAVATION

0 60 FT

SCALE

NOTE: MAP BASED ON SURVEY PREPARED BY RON ARCHER CIVIL ENGINEER INC. (DATED NOVEMBER 22, 1995)
AND DRAWINGS PREPARED BY ALTON GEOSCIENCE, WESTERN GEO-ENGINEERS, & GHH ENGINEERING.

STRATUS
ENVIRONMENTAL, INC.

FORMER USA SERVICE STATION NO. 57
10700 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

TPHG ISO-CONCETRATION
CONTOUR MAP (17' - 22' bgs)

FIGURE
H-4
PROJECT NO.
2007-0057-01

USA\STRSCM JMP Rev. May 09, 2005 USA 57 Soil Analytical.dwg

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California
Mass of TPHG, Benzene, and TPHD in Stockpiled Soil

Basis	Avg Conc mg/kg	Soil Volume cu.ft	Soil Density Kg/cu.ft	Soil Mass Kg	Mass Kg
TPHG	192.46	20,925.00	36.85	771,086.25	**148.40**
Benzene	0.09	20,925.00	36.85	771,086.25	**0.07**
TPHD	376.40	1,350.00	36.85	49,747.50	**18.72**

Notes:

1. Average concentrations based on data from Western Geo-Sciences (1994).
2. Stockpile for TPHG and benzene assumed to be 775 cubic yards.
3. Stockpile for TPHD assumed to be 50 cubic yards.

APPENDIX I

DISSOLVED ISO-CONCENTRATION CONTOUR MAPS AND DISSOLVED HYDROCARBON MASS ESTIMATES 1ST QUARTER 2005

Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California
Dissolved Hydrocarbon Mass Remaining

Basis	Area ID	Area sq.ft	Depth ft	Avg Conc µg/L	Water Volume liters	TPHG Mass grams
TPHG Figure I-1	A	1670.58	27.5	5,000	390,271.17	**1,951.36**
	B	4053.93	27.5	500	947,055.52	**473.53**
	C	5564.06	27.5	50	1,299,843.30	**64.99**
					Estimated Mass of TPHG in groundwater =	**2,489.88**
Be Figure I-2	A	1271.78	27.5	500	297,105.84	**148.55**
	B	1454.28	27.5	50	339,740.43	**16.99**
	C	2717.27	27.5	5	634,792.80	**3.17**
	D	2722.87	27.5	0.5	636,101.04	**0.32**
					Estimated Mass of Benzene in groundwater =	**169.03**
MTBE Figure I-3	A	812	27.5	500	189,694.71	**94.85**
	B	4682.65	27.5	50	1,093,933.43	**54.70**
	C	6074.20	27.5	5	1,419,019.24	**7.10**
	D	8141.09	27.5	0.5	1,901,874.04	**0.95**
					Estimated Mass of MTBE in groundwater =	**157.59**

Notes:

1. Based on groundwater data from 1st quarter 2005.
2. Average concentration for area assumed equal to outer contour value.
3. The average concentration is assumed to be uniform vertically.
4. Water column = TD deepest well (44 ft bgs) - average DTW (16.5 ft bgs).
5. Based on soil drilling observations, average porosity assumed to be 30%.
6. Mass (grams) = volume (ft^3) * porosity * 29.31687 (L/ft^3) * concentration (µg/L) * 10-6 (g/mg).

APPENDIX J

DPE TEST DATA

TABLE 1
DPE TEST USING WELL S-2
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date & Time	TE	Appl Vac	Air Flow	Totalizer Reading	GW Ext Rate	Inf PID	Oper Temp	Induced Vacuum ("WC) &/or DTW (feet bgs) Data in Observation Wells															
								S-1			MW-3			MW-4		MW-5		MW-7			MW-8		
	hh:mm	"Hg	cfm	gallons	gpm	ppmv	deg F	Vac	DTW	DD	Vac	DTW	DD	DTW	DD	DTW	DD	Vac	DTW	DD	DTW	DD	
7/6/2004 7:00				42,120					18.13			15.70		12.26		18.07			18.19		19.55		
7/6/2004 8:30		Start Up Test using well S-2, DTW =20.26 feet bgs and DPE unit hour meter reading = 839.6																					
7/6/2004 9:00	00:30	25.50	87	42,120	--	2.9	1,450	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
7/6/2004 10:00	01:30	NM	NM	42,120	--	23.0	NM	0.35	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
7/6/2004 11:00	02:30	26.25	88	42,130	0.07	29.0	1,466	1.30	18.38	0.25	0.0	15.70	0.00	12.27	0.01	18.08	0.01	0.0	18.30	0.11	19.58	0.03	
7/6/2004 12:00	03:30	26.50	87	42,200	0.33	24.0	1,444	0.50	18.58	0.45	0.0	15.69	-0.01	12.25	-0.01	18.05	-0.02	0.0	18.35	0.16	19.51	-0.04	
7/7/2004 6:30	22:00	23.50	86	42,820	0.47	7.1	1,456	0.20	18.65	0.52	0.0	15.70	0.00	12.26	0.00	18.04	-0.03	0.0	18.38	0.19	19.55	0.00	
7/7/2004 6:50	22:20	Discontinue Test on S-2																					
Distance to Extraction Well S-2								**50**			**60**			**135**		**170**		**70**			**100**		
Screening Interval	**20 - 40 (S-2)**							**20 - 40**			**24 - 44**			**10 - 40.5**		**10 - 40**		**10 - 40.5**			**10 - 35**		

Notes:
TE - Time Elapsed, hours: minutes
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
ppmv - parts per million by volume
Temp - Temperature
deg F - degree Farenheit
Ext. - Extraction
cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
GW Ext - Groundwater Extraction
PID - Photo Ionization Detector
All induced vacuum measured in observation wells were in "WC
gpm - gallons per minute
"Hg - Inches Mercury
bgs - below ground surface
NM - Not measured

TABLE 2
DPE TEST USING WELL S-1
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date & Time	TE	Appl Vac	Air Flow	Totalizer Reading	GW Ext Rate	Inf PID	Oper Temp.	Induced Vacuum ("WC) &/or DTW (feet bgs) Data in Observation Wells															
								S-2			MW-3			MW-4		MW-5		MW-7			MW-8		
	hh:mm	"Hg	cfm	gallons	gpm	ppmv	deg F	Vac	DTW	DD	Vac	DTW	DD	DTW	DD	DTW	DD	Vac	DTW	DD	DTW	DD
7/7/2004 7:05	Start Up Test using Well S-1																						
7/7/2004 7:05	0.00	NM	NM	42,820	NM	NM	NM	NM	NM		NM	15.70		12.26		18.07			18.38		19.55	
7/7/2004 7:30	00:25	24.00	86	42,890	2.80	1.5	1,459	+7.4	30.08		NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
7/7/2004 8:00	00:55	24.00	87	42,890	--	0.6	1,456	+4.4	25.35	-4.73	0.0	15.70	0.00	12.25	-0.01	18.06	-0.01	0.0	18.38	0.00	19.55	0.00
7/7/2004 9:00	01:55	24.00	87	42,960	0.61	0.0	1,457	+0.2	22.16	-7.92	0.0	15.70	0.00	12.25	-0.01	18.07	0.00	0.0	18.38	0.00	19.55	0.00
7/7/2004 9:05	02:00	Discontinue Test on S-1																					
Distance to Extraction Well S-1								50			60			110		170		80			105		
Screening Interval 20 - 40 (S-1)								20 - 40			24 - 44			10 - 40.5		10 - 40		10 - 40.5			10 - 35		

Notes:
TE - Time Elapsed, hours: minutes
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
ppmv - parts per million by volume
Temp - Temperature
deg F - degree Farenheit
Ext. - Extraction
cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
GW Ext - Groundwater Extraction
PID - Photo Ionization Detector
All induced vacuum measured in observation wells were in "WC
gpm - gallons per minute
"Hg - Inches Mercury
bgs - below ground surface
NM - Not measured

TABLE 3
DPE TEST USING WELL MW-3
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date & Time	TE	Appl Vac	Air Flow	Totalizer Reading	GW Ext Rate	Inf PID	Oper Temp	Induced Vacuum ("WC) &/or DTW (feet bgs) Data in Observation Wells														
								S-1			S-2			MW-4		MW-5		MW-7			MW-8	
	hh:mm	"Hg	cfm	gallons	gpm	ppmv	deg F	Vac	DTW	DD	Vac	DTW	DD	DTW	DD	DTW	DD	Vac	DTW	DD	DTW	DD
7/7/2004 9:25	Start Up Test using Well MW-3																					
7/7/2004 9:25	0.00	NM	NM	42,960	--	NM	NM	NM	NM	--	NM	22.16	--	12.26	--	18.07	--	NM	18.38	--	19.55	NM
7/7/2004 10:00	00:35	24.50	87	42,960	--	0.0	1,450	0.0	NM	--	NM	NM	--	NM	--	NM	--	NM	NM	--	NM	NM
7/7/2004 10:30	01:05	25.50	87	42,960	--	0.0	1,447	0.0	19.38	--	+0.6	21.00	-1.16	12.25	0.00	18.06	-0.01	0.0	18.36	-0.02	19.53	-0.02
7/7/2004 11:30	02:05	26.00	87	42,960	--	0.0	1,456	0.0	19.11	-0.27	+0.2	20.91	-1.25	12.25	0.00	18.06	-0.01	0.0	18.35	-0.03	19.53	-0.02
7/7/2004 11:35	02:10	Discontinue test on MW-3																				
Distance to Extraction Well MW-3								60			60			170		220		120			50	
Screening Interval	24-44 (MW-3)							20 - 40			20 - 40			10 - 40.5		10 - 40		10 - 40.5			10 - 35	

Notes:

TE - Time Elapsed, hours: minutes
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
ppmv - parts per million by volume
Temp - Temperature
deg F - degree Farenheit
Ext. - Extraction

cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
GW Ext - Groundwater Extraction
PID - Photo Ionization Detector
All induced vacuum measured in observation wells were in "WC
gpm - gallons per minute
"Hg - Inches Mercury
bgs - below ground surface
NM - Not measured

TABLE 4
COMBINED DPE TEST USING WELLS S-1, S-2, AND MW-3
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date & Time	TE	Appl Vac	Air Flow	Totalizer Reading	GW Ext Rate	Inf PID	Oper Temp	MW-4		MW-5		MW-6		MW-7			MW-8		
	hh:mm	"Hg	cfm	gallons	gpm	ppmv	deg F	DTW	DD	DTW	DD	Vac	DTW	Vac	DTW	DD	Vac	DTW	DD
7/7/2004 11:35	Start Test on S-1, S-2 and MW-3																		
7/7/2004 11:35	0.00	NM	NM	42,960	NM	NM	NM	12.25	--	18.06	--	NM	DRY	NM	18.35	--	NM	19.53	--
7/8/2004 6:15	18:40	22.25	87	44,610	1.47	4.0	1,460	12.25	0.00	18.11	0.05	0.0	DRY	0.0	18.63	0.28	0.0	19.70	0.17
7/9/2004 6:00	42:25	23.00	86	46,960	0.92	2.3	1,440	12.33	0.08	18.18	0.12	0.0	DRY	0.0	18.72	0.37	0.0	20.02	0.49
7/10/2004 6:00	66:25	23.00	86	48,690	0.43	3.5	1,460	12.41	0.16	18.26	0.2	0.0	DRY	0.0	18.78	0.43	0.0	20.32	0.79
7/11/2004 6:00	90:25	21.00	86	50,760	0.38	3.2	1,456	12.41	0.16	18.27	0.21	0.0	DRY	0.0	18.81	0.46	0.0	20.58	1.05
7/12/2004 6:30	114:55	22.50	86	52,780	0.29	3.0	1,453	12.42	0.17	18.32	0.26	0.0	DRY	0.0	18.84	0.49	0.0	20.75	1.22
7/15/2004 6:00	186:25	22.50	86	58,760	0.53	4.0	1,446	12.27	0.02	18.36	0.3	0.0	DRY	0.0	18.90	0.55	0.0	21.17	1.64
7/19/2004 5:45	282:10	23.25	86	66,320	0.45	3.2	1,459	11.67	-0.58	18.23	0.17	0.0	DRY	0.0	18.98	0.63	0.0	21.50	1.97
7/22/2004 5:45	354:10	23.25	86	71,870	0.26	3.0	1,458	12.05	-0.20	18.33	0.27	0.0	DRY	0.0	19.03	0.68	0.0	21.65	2.12
7/25/2004 10:36	431:01			77,720	0.23	Discontinue DPE Test. DPE unit hour meter reading = 1,297.7													
Distance to Nearest Extraction Well								110		170		110		70			50		
Screening Interval								10 - 40.5		10 - 40		10 - 40.5		10 - 40.5			10 - 35		

Notes:
TE - Time Elapsed, hours: minutes
Appl - Applied
Oper - Operating
Vac - Vacuum
DTW - depth to groundwater
" WC - Inches water column
ppmv - parts per million by volume
Temp - Temperature
deg F - degree Farenheit
Ext. - Extraction
cfm - cubic feet per minute
Inf - Influent
DD - Drawdown
GW Ext - Groundwater Extraction
PID - Photo Ionization Detector
All induced vacuum measured in observation wells were in "WC
gpm - gallons per minute
"Hg - Inches Mercury
bgs - below ground surface
NM - Not measured

TABLE 5
SOIL VAPOR ANALYTICAL RESULTS
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	Sample Type	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
07/06/04	1030	Eff Air	Air	<12	<0.12	<0.12	<0.12	<0.12	<0.12
07/06/04	1032	Inf Cat Air	Air	**660**	**2.1**	**0.38**	**1.2**	**1.1**	**1.0**
07/07/04	0904	Inf Cat Air S-1	Air	<12	<0.12	<0.12	<0.12	<0.12	**0.29**
07/07/04	1126	Inf Cat Air MW-3	Air	<12	<0.12	<0.12	<0.12	<0.12	**0.13**
07/19/04	0641	Eff Air	Air	<12	<0.12	<0.12	<0.12	<0.12	<0.12
07/19/04	0644	Inf Cat Air	Air	**88**	**0.26**	<0.12	<0.12	**0.19**	**0.25**

All air sample values reported in milligrams per cubic meter (mg/m^3)

TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether

Analytical Laboratory
Alpha Analytical, Inc. (ELAP #2019)

Analytical Methods
TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX and MTBE analyzed by EPA Method SW8260B

STRATUS

TABLE 6
GROUNDWATER ANALYTICAL RESULTS
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Sample Date	Sample Time	Sample ID	Sample Type	TPHG	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE	TBA	DIPE	ETBE	TAME	Methanol	Ethanol
07/06/04	1050	S-2	Water	2200	13	1.8	10	26.9	66	170	<1.0	<1.0	<1.0	<5,000	<5,000
07/08/04	0854	Influent	Water	<100[1]	<0.50	<0.50	0.66	4.4	16	NA	NA	NA	NA	NA	NA
07/08/04	0905	GAC Influent	Water	110	<0.50	<0.50	<0.50	1.89	17	NA	NA	NA	NA	NA	NA
07/08/04	1030	Effluent	Water	<50	<0.50	<0.50	<0.50	<0.50	<0.50	NA	NA	NA	NA	NA	NA
07/19/04	0623	Effluent	Water	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0	NA	NA
07/19/04	0630	Influent	Water	<50	<0.50	<0.50	<0.50	0.52	3.7	56	<1.0	<1.0	<1.0	NA	NA
07/27/04	1118	Effluent	Water	<50	<0.50	<0.50	<0.50	<0.50	<0.50	<10	<1.0	<1.0	<1.0	NA	NA

All water sample values reported in micrograms per liter (µg/L)
TPHG = Total petroleum hydrocarbons as gasoline
BTEX = Benzene, toluene, ethylbenzene, and total xylenes
MTBE = Methyl tertiary butyl ether
TBA = Tertiary butyl alcohol
DIPE = Di-isopropyl ether
ETBE = Ethyl tertiary butyl ether
TAME = Tertiary amyl methyl ether
NA = Not analyzed
[1] Reporting limits were increased due to sample foaming

Analytical Laboratory
Alpha Analytical , Inc. (ELAP #2019)

Analytical Methods
TPHG analyzed by EPA Method SW8015B/DHS LUFT Manual
BTEX, MTBE, TBA, DIPE, ETBE, & TAME analyzed by EPA Method SW8260B
Methanol & Ethanol analyzed by EPA Method SW8260B-DI

TABLE 7
PETROLEUM HYDROCARBON MASS EXTRACTION RATES SUMMARY
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

Date	Test Well ID	Flowrate (cfm)	Influent Concentration (mg/m^3)			Soil Vapor Extraction Rate from Wells (lbs/day)			Cumulative Mass (TPHG) Removed	
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	Period[1]	Total
									lbs	lbs
07/06/04	S-2	87.0	660	2.1	1.0	5.16	0.01	0.01	5.16	5.16
07/07/04	S-1	87.0	<12	<0.12	0.29	<0.09	<0.001	0.002	0.01	5.17
07/07/04	MW-3	87.0	<12	<0.12	0.13	<0.09	<0.001	0.001	0.01	5.18
07/19/04	S-1, S-2, MW-3	86.0	88	0.26	0.25	0.68	0.002	0.002	8.16	13.34

Date	Test Well ID	Volume of groundwater extracted[2], gallons	Influent Concentration (µg/L)			Mass Extracted from groundwater (lbs)			Cumulative Mass (TPHG) Removed	
			TPHG	Benzene	MTBE	TPHG	Benzene	MTBE	Period	Total
									lbs	lbs
07/06/04	S-2	80	2,200	13	66	0.001	0.00001	0.00004	0.001	0.001
07/08/04	S-1, S-2, MW-3	2,490	<100	<0.50	16	<0.002	<0.00001	0.0003	0.012	0.014
07/19/04	S-1, S-2, MW-3	21,710	<50	<0.50	4	<0.01	<0.0001	0.001	0.008	0.015

Sample Calculations

Ext. Rate from Wells (vapor) = $\frac{40 \text{ cu ft}}{\text{min}} \times \frac{8{,}400 \text{ mg}}{\text{cu meter}} \times \frac{\text{lb}}{453593 \text{ mg}} \times \frac{1{,}440 \text{ min}}{\text{day}} \times \frac{\text{cu meter}}{35.314 \text{ cu ft}}$

= 30.21 lbs/day

Mass removed from groundwater = concentration (µg/L) x gallons extracted x (2.2046×10^{-9})(lb/mg) / 0.26418 (gal/L)

[1] For mass estimates between the sampling dates, average mass extraction rate and time elapsed (operational uptime) between the sampling events were used

[2] Volume estimated based on flow totalizer measurements taken on the sampling days

Based on average groundwater extraction rate of 0.63 gpm and the average concentrations, the mass extraction rate for is calculated using:

Mass removed from groundwater (lbs/day) = concentration (µg/L) x average flowrate (gpm) x (2.2046×10^{-9})(lb/mg) / 0.26418 (gal/L) * 60 (mins/hr)*24 (hr/day)

TPHG	=	0.017	lbs/day
Benzene	=	0.0001	lbs/day
MTBE	=	0.0002	lbs/day

Figure 3
Depth to Water Variation with Time in Observation Wells - DPE Test at S-2
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, California

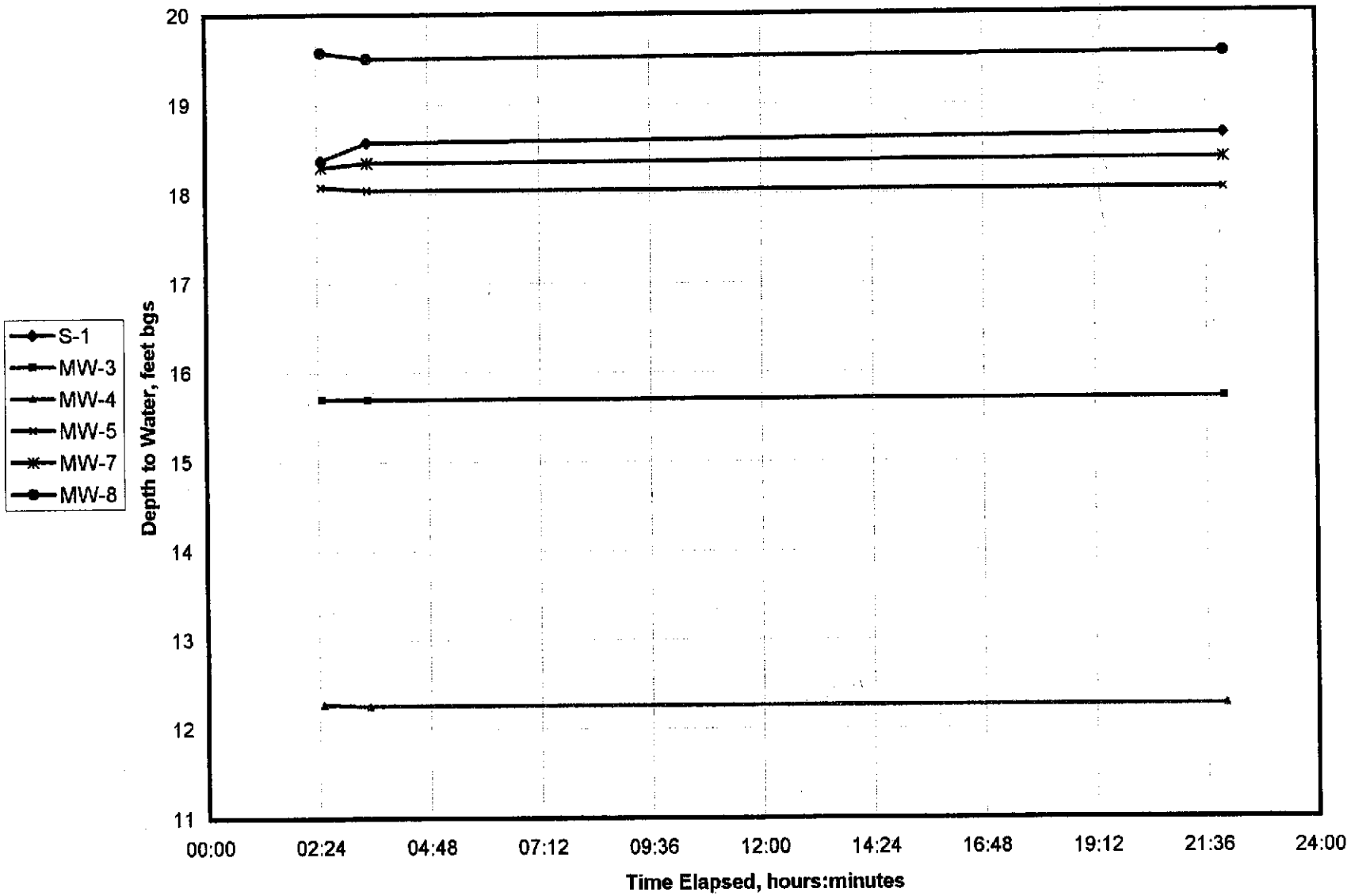
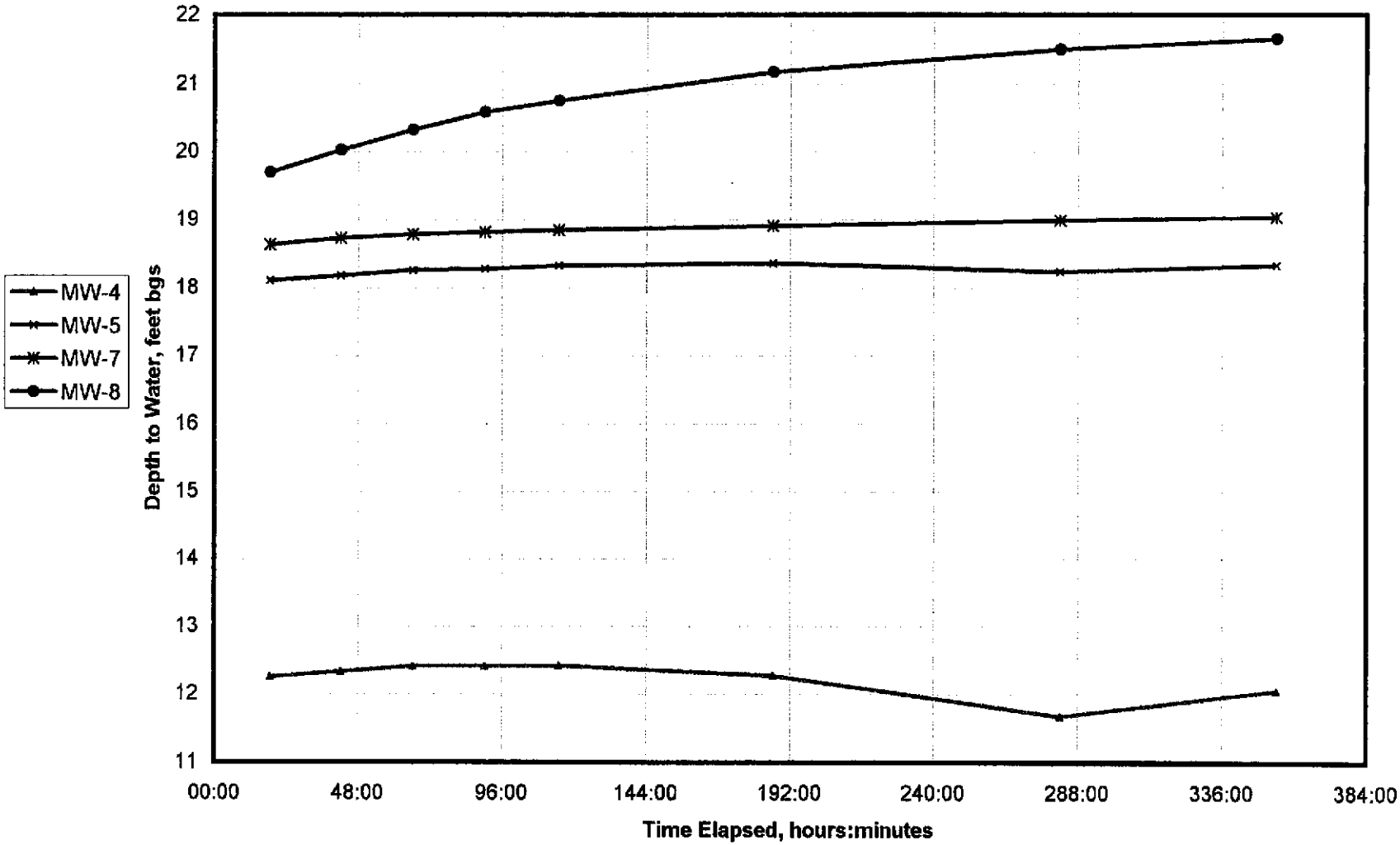


Figure 4
Depth to Water Variation with Time in Observation Wells - Combined DPE Test
Former USA Station No. 57
10700 MacArthur Boulevard
Oakland, CA



APPENDIX K

WELL SURVEY DATA

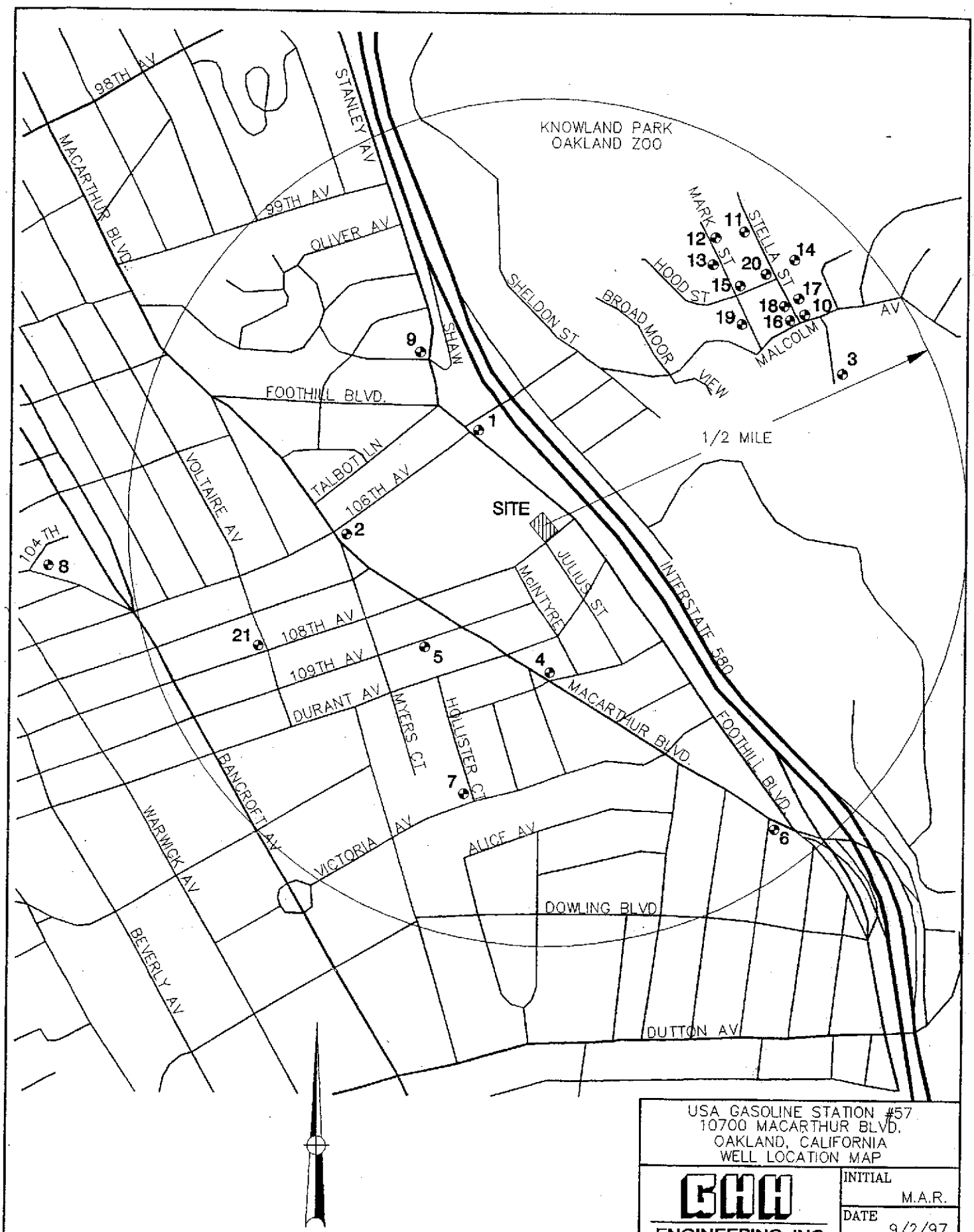
TABLE 1

WELLS WITHIN 1/2-MILE RADIUS
USA STATION #57
OAKLAND, CALIFORNIA

Map ID	Well Use	Owner	Well Address	DWR	Year	Perforated Intervals (feet)
1	MW	Southland	10501 Foothills	2 S 3 W 24 E (3-5)	1987	
2	MW	Arco	10600 MacArthur	2 S 3 W 24 E 11	1992	
3	MW	Sam Kai Kee	106th	2 S 3 W 24 G 1	1951	28-85'
4	MW	Shell		2 S 3 W 24 M		
5	IW	Ms. Kitchen	2544 109th	2 S 3 W 24 M 1		38-55'
6	MW	Unocal	96 MacArthur			Unknown
7	IW	Mr. Brahmse	377 Hollister	2 S 3 W 24 N 1	1971	35-75'
8	CPW	PG&E	Sunnyside 75' SW of 104th	2 S 3 W 23 K 1	1974	120'
9	CPW	PG&E	Shaw & Stanley	2 S 3 W 24 E 2	1976	120'
10	DW	Mr. Freitas	Stella & Malcolm	2 S 3 W 24 B 5	1955	55-123'
11	DW	G. Hower	10700 Stella	2 S 3 W 24 B 2	1951	55'
12	DW	Johnson	10731 Mark	2 S 3 W 24 B 1	1951	102'
13	DW	Sam Kai Kee	Mark	2 S 3 W 24 B 3		100'
14	DW	H. Mathews	10544 Stella	2 S 3 W 24 C 3		42-92'
15	DW	A. Bassigian	Mark & Hood	2 S 3 W 24 B	1958	56-107'
16	DW	C. Bach	Malcolm & Stella	2 S W W 24		100'
17	DW	J. Prentiss	10521 Stella	S 2 3 W 24 C	1951	Unknown
18	DW	R. Trimble	10520 Stella	2 S 3 W 24 C	1951	190'
19	DW	C. Armtront	10550 Stella	2 S 3 W 24 C	1951	Unknown
20	DW	H. Brenneman	10600 Stella	2 S 3 W 24 B 4	1951	98'
21	CPW	PG&E	Voltaire & 108th	2 S S W 23 J 1		105'

MW Monitoring well
DW Domestic well
CW Cathodic protection well
IW Irrigation well

G:\data\5090\Search.wb1



APPROX. SCALE: 1" = 800'
● WELL LOCATION

USA GASOLINE STATION #57
10700 MACARTHUR BLVD.
OAKLAND, CALIFORNIA
WELL LOCATION MAP

GHH
ENGINEERING, INC.
8084 Old Auburn Rd.
Citrus Heights, CA 95610
(916) 723-7645

INITIAL	M.A.R.
DATE	9/2/97
JOB #	5090
FIG. #	5

FIGURE 8

APPENDIX L

DOMINICO GROUNDWATER MODEL OUTPUT

DOMINICO MODEL FOR CALCULATING CONCENTRATIONS OF IMPACTED GROUNDWATER AT STEADY STATE

Directions: input all data requested in unshaded areas

Benzene Concentration (ug/l)	Distance to Nearest Receptor (feet)	Decay Rate (/days)	Groundwater Velocity (feet/year)	Width of impacted soil (feet)	Depth of impacted soil (feet)	Dispersion in the Y Direction erf ( )	Dispersion in the Z Direction erf ( )	Error Function of dispersion in the Y Direction	Error Function of dispersion in the Y Direction
5,700	1,800	0.0009	10	20	40	0.015	0.056	0.0172	0.0626

alpha X (feet)	180
alpha Y (feet)	60.00
alpha Z (feet)	18
Groundwater Velocity (feet/day)	0.0274

*At steady state the concentration of benzene at the nearest receptor will be approximately 1.50E-08 ug/l

*If the decay is assumed to be first order reaction then the approx. time to reach steady state will be 81 years

ASSUMPTIONS
- one-dimensional flow and 3-dimensional dispersion
- first-order decay rate based on dissolved and adsorbed phases decaying at the same rate
- medium is isotropic and homogeneous
- source concentration is constant
- aerial source perpendicular to the direction of flow

Source: GHH Engineering, Inc., Closure Information Proposal (dated April, 2002)

APPENDIX M

RWQCB ESL TABLES

TABLE A. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS Current or Potential Source of Drinking Water

CHEMICAL PARAMETER	[1]Shallow Soil		[3]Groundwater (ug/L)
	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	
ACENAPHTHENE	1.6E+01	1.6E+01	2.0E+01
ACENAPHTHYLENE	1.3E+01	1.3E+01	3.0E+01
ACETONE	5.0E-01	5.0E-01	1.5E+03
ALDRIN	3.2E-02	1.3E-01	2.0E-03
ANTHRACENE	2.8E+00	2.8E+00	7.3E-01
ANTIMONY	6.1E+00	4.0E+01	6.0E+00
ARSENIC	5.5E+00	5.5E+00	3.6E+01
BARIUM	7.5E+02	1.5E+03	1.0E+03
BENZENE	4.4E-02	4.4E-02	1.0E+00
BENZO(a)ANTHRACENE	3.8E-01	1.3E+00	2.7E-02
BENZO(b)FLUORANTHENE	3.8E-01	1.3E+00	2.9E-02
BENZO(k)FLUORANTHENE	3.8E-01	1.3E+00	2.9E-02
BENZO(g,h,i)PERYLENE	2.7E+01	2.7E+01	1.0E-01
BENZO(a)PYRENE	3.8E-02	1.3E-01	1.4E-02
BERYLLIUM	4.0E+00	8.0E+00	2.7E+00
BIPHENYL, 1,1-	6.5E-01	6.5E-01	5.0E-01
BIS(2-CHLOROETHYL)ETHER	1.8E-04	1.8E-04	1.4E-02
BIS(2-CHLOROISOPROPYL)ETHER	5.4E-03	5.4E-03	5.0E-01
BIS(2-ETHYLHEXYL)PHTHALATE	6.6E+01	6.6E+01	4.0E+00
BORON	1.6E+00	2.0E+00	1.6E+00
BROMODICHLOROMETHANE	1.4E-02	3.9E-02	1.0E+02
BROMOFORM	2.2E+00	2.2E+00	1.0E+02
BROMOMETHANE	2.2E-01	3.9E-01	9.8E+00
CADMIUM	1.7E+00	7.4E+00	1.1E+00
CARBON TETRACHLORIDE	1.2E-02	3.4E-02	5.0E-01
CHLORDANE	4.4E-01	1.7E+00	4.0E-03
CHLOROANILINE, p-	5.3E-02	5.3E-02	5.0E+00
CHLOROBENZENE	1.5E+00	1.5E+00	2.5E+01
CHLOROETHANE	6.3E-01	8.5E-01	1.2E+01
CHLOROFORM	8.8E-01	1.9E+00	7.0E+01
CHLOROMETHANE	7.0E-02	2.0E-01	1.3E+00
CHLOROPHENOL, 2-	1.2E-02	1.2E-02	1.8E-01
CHROMIUM (Total)	5.8E+01	5.8E+01	5.0E+01
CHROMIUM III	7.5E+02	7.5E+02	1.8E+02
CHROMIUM VI	1.8E+00	1.8E+00	1.1E+01
CHRYSENE	3.8E+00	1.3E+01	2.9E-01
COBALT	1.0E+01	1.0E+01	3.0E+00
COPPER	2.3E+02	2.3E+02	3.1E+00
CYANIDE (Free)	3.6E-03	3.6E-03	1.0E+00
DIBENZO(a,h)ANTHTRACENE	1.1E-01	3.8E-01	8.5E-03
DIBROMOCHLOROMETHANE	1.9E-02	5.4E-02	1.0E+02
1,2-DIBROMO-3-CHLOROPROPANE	4.5E-03	4.5E-03	2.0E-01
DIBROMOETHANE, 1,2-	3.3E-04	3.3E-04	5.0E-02
DICHLOROBENZENE, 1,2-	1.1E+00	1.1E+00	1.0E+01

TABLE A. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS Current or Potential Source of Drinking Water

	[1]Shallow Soil		
CHEMICAL PARAMETER	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	[3]Groundwater (ug/L)
DICHLOROBENZENE, 1,3-	7.4E+00	7.4E+00	6.5E+01
DICHLOROBENZENE, 1,4-	4.6E-02	1.3E-01	5.0E+00
DICHLOROBENZIDINE, 3,3-	7.7E-03	7.7E-03	2.9E-02
DICHLORODIPHENYLDICHLOROETHANE (DDD)	2.3E+00	9.0E+00	1.0E-03
DICHLORODIPHENYLDICHLOROETHYLENE (DDE)	1.6E+00	4.0E+00	1.0E-03
DICHLORODIPHENYLTRICHLOROETHANE (DDT)	1.6E+00	4.0E+00	1.0E-03
DICHLOROETHANE, 1,1-	2.0E-01	2.0E-01	5.0E+00
DICHLOROETHANE, 1,2-	4.5E-03	4.5E-03	5.0E-01
DICHLOROETHYLENE, 1,1-	1.0E+00	1.0E+00	6.0E+00
DICHLOROETHYLENE, Cis 1,2-	1.9E-01	1.9E-01	6.0E+00
DICHLOROETHYLENE, Trans 1,2-	6.7E-01	6.7E-01	1.0E+01
DICHLOROPHENOL, 2,4-	3.0E-01	3.0E-01	3.0E-01
DICHLOROPROPANE, 1,2-	5.1E-02	1.2E-01	5.0E+00
DICHLOROPROPENE, 1,3-	3.3E-02	5.9E-02	5.0E-01
DIELDRIN	2.3E-03	2.3E-03	1.9E-03
DIETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHTHALATE	3.5E-02	3.5E-02	1.5E+00
DIMETHYLPHENOL, 2,4-	6.7E-01	6.7E-01	1.0E+02
DINITROPHENOL, 2,4-	4.0E-02	4.0E-02	1.4E+01
DINITROTOLUENE, 2,4-	8.5E-04	8.5E-04	1.1E-01
1,4 DIOXANE	1.8E-03	1.8E-03	3.0E+00
DIOXIN (2,3,7,8-TCDD)	4.6E-06	1.9E-05	5.0E-06
ENDOSULFAN	4.6E-03	4.6E-03	8.7E-03
ENDRIN	6.5E-04	6.5E-04	2.3E-03
ETHANOL	4.5E+01	4.5E+01	5.0E+04
ETHYLBENZENE	3.3E+00	3.3E+00	3.0E+01
FLUORANTHENE	4.0E+01	4.0E+01	8.0E+00
FLUORENE	8.9E+00	8.9E+00	3.9E+00
HEPTACHLOR	1.4E-02	1.4E-02	3.8E-03
HEPTACHLOR EPOXIDE	1.5E-02	1.5E-02	3.8E-03
HEXACHLOROBENZENE	2.7E-01	9.6E-01	1.0E+00
HEXACHLOROBUTADIENE	1.0E+00	1.0E+00	2.1E-01
HEXACHLOROCYCLOHEXANE (gamma) LINDANE	4.9E-02	4.9E-02	8.0E-02
HEXACHLOROETHANE	2.4E+00	2.4E+00	7.0E-01
INDENO(1,2,3-cd)PYRENE	3.8E-01	1.3E+00	2.9E-02
LEAD	1.5E+02	7.5E+02	2.5E+00
MERCURY	3.7E+00	1.0E+01	1.2E-02
METHOXYCHLOR	1.9E+01	1.9E+01	1.9E-02
METHYLENE CHLORIDE	7.7E-02	7.7E-02	5.0E+00
METHYL ETHYL KETONE	3.9E+00	3.9E+00	4.2E+03
METHYL ISOBUTYL KETONE	2.8E+00	2.8E+00	1.2E+02
METHYL MERCURY	1.2E+00	1.0E+01	3.0E-03
METHYLNAPHTHALENE (total 1- & 2-)	2.5E-01	2.5E-01	2.1E+00
METHYL TERT BUTYL ETHER	2.3E-02	2.3E-02	5.0E+00

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CHEMICAL PARAMETER	[1]Shallow Soil		[3]Groundwater (ug/L)
	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	
MOLYBDENUM	4.0E+01	4.0E+01	3.5E+01
NAPHTHALENE	4.6E-01	1.5E+00	1.7E+01
NICKEL	1.5E+02	1.5E+02	8.2E+00
PENTACHLOROPHENOL	4.4E+00	5.0E+00	1.0E+00
PERCHLORATE	1.0E-02	1.0E-02	6.0E+00
PHENANTHRENE	1.1E+01	1.1E+01	4.6E+00
PHENOL	7.6E-02	7.6E-02	5.0E+00
POLYCHLORINATED BIPHENYLS (PCBs)	2.2E-01	7.4E-01	1.4E-02
PYRENE	8.5E+01	8.5E+01	2.0E+00
SELENIUM	1.0E+01	1.0E+01	5.0E+00
SILVER	2.0E+01	4.0E+01	1.9E-01
STYRENE	1.5E+00	1.5E+00	1.0E+01
tert-BUTYL ALCOHOL	7.3E-02	7.3E-02	1.2E+01
TETRACHLOROETHANE, 1,1,1,2-	2.4E-02	2.4E-02	1.3E+00
TETRACHLOROETHANE, 1,1,2,2-	9.1E-03	1.8E-02	1.0E+00
TETRACHLOROETHYLENE	8.7E-02	2.4E-01	5.0E+00
THALLIUM	1.0E+00	1.3E+01	2.0E+00
TOLUENE	2.9E+00	2.9E+00	4.0E+01
TOXAPHENE	4.2E-04	4.2E-04	2.0E-04
TPH (gasolines)	1.0E+02	1.0E+02	1.0E+02
TPH (middle distillates)	1.0E+02	1.0E+02	1.0E+02
TPH (residual fuels)	5.0E+02	1.0E+03	1.0E+02
TRICHLOROBENZENE, 1,2,4-	3.8E-01	1.0E+00	2.5E+01
TRICHLOROETHANE, 1,1,1-	7.8E+00	7.8E+00	6.2E+01
TRICHLOROETHANE, 1,1,2-	3.2E-02	7.0E-02	5.0E+00
TRICHLOROETHYLENE	2.6E-01	4.6E-01	5.0E+00
TRICHLOROPHENOL, 2,4,5-	1.8E-01	1.8E-01	1.1E+01
TRICHLOROPHENOL, 2,4,6-	1.7E-01	1.7E-01	5.0E-01
VANADIUM	1.1E+02	2.0E+02	1.5E+01
VINYL CHLORIDE	6.7E-03	1.9E-02	5.0E-01
XYLENES	2.3E+00	2.3E+00	2.0E+01
ZINC	6.0E+02	6.0E+02	8.1E+01

TABLE A. ENVIRONMENTAL SCREENING LEVELS (ESLs)
Shallow Soils (≤3m bgs)
Groundwater IS Current or Potential Source of Drinking Water

CHEMICAL PARAMETER	[1]Shallow Soil		[3]Groundwater (ug/L)
	[2]Residential Land Use (mg/kg)	Commercial/ Industrial Land Use Only (mg/kg)	
Electrical Conductivity (mS/cm, USEPA Method 120.1 MOD)	2.0	4.0	not applicable
Sodium Adsorption Ratio	5.0	12	not applicable

Red: Updated with respect to ESLs presented in July 2003 document.

Notes:

1. Shallow soils defined as soils less than or equal to 3 meters (approximately 10 feet) below ground surface.
2. Category "Residential Land Use" generally considered adequate for other sensitive uses (e.g., day-care centers, hospitals, etc.)
3. Assumes potential discharge of groundwater into a freshwater, marine or estuary surface water system.

Source of soil ESLs: Refer to Appendix 1, Tables A-1 and A-2.

Source of groundwater ESLs: Refer to Appendix 1, Table F-1a.

Soil data should be reported on dry-weight basis (see Appendix 1, Section 6.2).

Soil ESLs intended to address direct-exposure, groundwater protection, ecologic (urban areas) and nuisance concerns under noted land-use scenarios. **Soil gas data should be collected for additional evaluation of potential indoor-air impacts at sites with significant areas of VOC-impacted soil. See Section 2.6 and Table E.**

Groundwater ESLs intended to be address drinking water, surface water, indoor-air and nuisance concerns. **Use in conjunction with soil gas screening levels to more closely evaluate potential impacts to indoor-air if groundwater screening levels for this concern approached or exceeded (refer to Section 2.6 and Appendix 1, Table F-1a).**

Aquatic habitat goals for bioaccumulation concerns not considered in selection of groundwater goals (refer to Section 2.7).

Refer to appendices for summary of ESL components.

Soil and water ESLs for ethanol based on gross contamination concerns (see Appendix 1, Chapter 5 and related tables).

TPH -Total Petroleum Hydrocarbons. TPH ESLs must be used in conjunction with ESLs for related chemicals (e.g., BTEX, PAHs, oxidizers, etc.). See Volume 1, Section 2.2 and Appendix 1, Chapter 5.