GETTLER-RYAN INC.

ENVIRONMENTAL PROTECTION

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TRANSMITTAL

TO: Mr. Thomas Bauhs
Chevron Products Company
P.O. Box 6004
San Ramon, CA 94583

DATE: June 30, 2000
PROJECT #: 346499.02

SUBJECT: Site Conceptual Model and RBCA Evaluation for Former Chevron Service Station #9-0020.

FROM:
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WE ARE SENDING YOU:

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1	06/27/00	Site Conceptual Model and Risk-Based Corrective Action Evaluation for Former Chevron Service Station #9-0020, 1633 Harrison Street, Oaklnad, California.

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cc: Mr. Don Hwang, Alameda County Health Care Services Agency (certified mail)
Ms. Betty Owen, Chevron Products Company
Mr. James Brownell, Delta Environmental Consultants, Inc.
GR File

COMMENTS: Attached is a copy of the final report for your use. Copies of this report have been submitted to the above listed parties. Please call if you have questions.

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SITE CONCEPTUAL MODEL
AND RISK-BASED CORRECTIVE ACTION EVALUATION

for
Former Chevron Service Station #9-0020
1633 Harrison Street
Oakland, California

Report No. 346499.02

Prepared for:

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June 27, 2000

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1.0 INTRODUCTION

At the request of Chevron Products Company (Chevron), Delta Environmental Consultants, Inc. and Gettler-Ryan Inc. (GR) are submitting this report presenting the site conceptual model (SCM), and documenting the results of the implementation of the Risk-Based Corrective Action (RBCA) planning process based on the City of Oakland requirements, for former Chevron Service Station #9-0020 located at 1633 Harrison Street in Oakland, California. The purpose of this work was to evaluate whether the implementation of further environmental investigation and/or remediation related to soil and groundwater is warranted at the site. This report was prepared based on information supplied by Chevron, and describes site hydrogeological conditions and distribution of contaminants in space and time, identifies potential current and future receptors, presents the RBCA model results for the site, and recommends the most appropriate action plan for the site.

2.0 SITE DESCRIPTION

2.1 General

The subject site is situated on the western corner of Harrison and 17th Streets in Oakland, California (Figure 1). The subject site was used as a service station until 1972. The service station facilities included a station building, service islands, fuel and waste oil underground storage tanks (USTs), and product lines. All aboveground and underground station facilities were removed at the time of station closure. Since December 1975, the site has been utilized as a parking lot. Locations of the site features are shown on Figure 2.

The site vicinity is used for transportation, commercial, and residential purposes. The subject site is bounded by Harrison Street to the southeast, 17th Street to the northeast, and commercial properties to the southwest and northwest. An apartment building is located approximately 80 feet of the southeastern boundary of the subject site, across Harrison Street. This building appear to be the only residential building in the immediate vicinity of the subject site. Other buildings situated across Harrison Street or 17th Street are used for commercial purposes. A former transmission repair shop building located south of the subject site, currently is used by various offices and a discount fabrics wholesale outlet. The site vicinity is shown on the maps included in Appendix A.

2.2 Previous Environmental Work

Soil Vapor Survey

In January 1988, EA Engineering, Science, and Technology, Inc (EA) performed a soil vapor survey at the site. Total volatile hydrocarbons were detected in 22 vapor samples collected from 11 locations at concentrations ranging from 1 to 140 parts per million by volume (ppmv). The highest hydrocarbon concentrations were present near the former waste oil UST. Laboratory analysis indicated that the compounds detected in the vapor samples were primarily low-boiling compounds (peaks eluting prior to benzene), most probably methanol, which is a common product of bacterial metabolism. EA Figure 4 showing sample locations and Table 1 summarizing soil vapor data are included in Appendix B.

Soil Boring and Groundwater Monitoring Well Installation

In October 1993, Western Geologic Resources, Inc.(WGR) drilled three on-site soil borings (B-1 through B-3) and installed groundwater monitoring wells MW-1 through MW-3 in these borings, respectively. The borings were drilled to depths between 33 and 35.5 feet below ground surface (bgs). Groundwater was encountered in the borings at depths ranging from 23.5 to 25 feet bgs. A total of seventeen soil samples (ten unsaturated and seven saturated soil samples) collected from borings B-1 through B-3 at depths between 5 and 30 feet bgs were analyzed for petroleum hydrocarbons. Benzene, ethylbenzene, toluene, xylenes (BTEX) were not detected in any of these samples. Total fuel hydrocarbons (12 parts per million [ppm]) were detected only in the sample collected from well boring B-2/MW-2 at a depth of 19 feet bgs (capillary fringe zone). Results for soil samples collected from well borings B-1/MW-1 through B-3/MW-3 are summarized in WGR Table1 included in Appendix C. BTEX or total fuel hydrocarbons were not detected in the groundwater samples collected from wells MW-1 through MW-3, however, halogenated volatile organics (HVOs) including carbon tetrachloride (up to 18 parts per billion [ppb]), tetrachloroethylene (PCE, up to 84 ppb), trichloroethylene (TCE, up to 3 ppb), and trans-1-2-Dichloroethylene (1,2-DCE, up to 10 ppb) were detected in these samples. The groundwater results are included in Blain Tech Services, Inc. (Blaine Tech) *Cumulative Table of Well Data and Analytical Results, Additional Analyses* included in Appendix D.

In April 1989, WGR drilled nine soil borings (B-4 through B-12) and installed groundwater monitoring wells MW-4 through MW-8 in borings B-8 through B-12, respectively, to further evaluate the extent of petroleum hydrocarbons and HVOs beneath the subject site. The borings were drilled to depths ranging from 22.5 to 36.5 feet bgs. Groundwater was encountered in the borings at depths ranging from 20 to 22 feet bgs. A total of forty soil samples (twenty-four unsaturated and sixteen saturated soil samples) collected from the borings at depths between 4.2 and 34.5 feet bgs were analyzed for petroleum hydrocarbons and HVOs. Total petroleum hydrocarbons as diesel (TPHd) were detected in the unsaturated samples collected from boring B-8/MW-4 at depths of 4.5 feet bgs (450 ppm) and 9.6 feet bgs (600 ppm) located near the former waste oil UST. TPHg were detected in the samples collected from boring B-11/MW-7 at 19.5 feet bgs (capillary fringe sample) and at 23.5 feet bgs (saturated sample) at concentrations of 680 ppm and 50,000 ppm, respectively. 1,1,1-Trichloroethane (TCA) was detected at low concentrations (up to 0.2 ppm) in samples from borings B8/MW-4 and B-11/MW-7. Oil and grease was detected in the saturated soil

sample collected from boring B-9/MW-5 at the low concentration (80 ppm). Hydrocarbons were not detected in any other soil samples collected from borings B-4 through B-12. The sample collected from boring B-9/MW-5 at 21 feet bgs did not contain cadmium or lead, and contained chromium and zinc at low concentrations of 27 ppm and 17 ppm, respectively. TPHg (8,400 ppb) and benzene (100 ppb) were detected in the groundwater sample collected from well MW-7, and were not detected in the samples collected from other site wells. O&G (3,000 ppb) was detected only in the groundwater sample collected from well MW-8. HVOs (up to 35 ppb of carbon tetrachloride and 11 ppb of chloroform) were detected in groundwater samples from wells MW-4 through MW-8. PCE (up to 6 ppb) and 1,2-DCE (up to 4 ppb) were detected in the groundwater samples collected from wells MW-5 and MW-8. Boring/well locations are shown on Figure 3, and the soil analytical data for samples from borings B-4 through B-12 are summarized in WGR Table 2 included in Appendix C.

In June 1990, WGR installed four off-site groundwater monitoring wells (MW-9 through MW-12) to delineate the lateral extent of hydrocarbon plume downgradient and crossgradient of the subject site. Well borings B-13/MW-11, B-14/MW-12, B-15/MW-10, and B-16/MW-9 were drilled to the depths between 27 and 29.5 feet bgs. Groundwater was encountered in these boring at depths between 19.7 and 21 feet bgs. A total of fourteen soil samples (nine unsaturated and five saturated samples) collected from the well borings at depths between 6.2 and 29.5 feet bgs were analyzed for TPHg and BTEX. TPHg or BTEX were not detected in any of these soil samples. The groundwater sample collected from well MW-9 contained TPHg (5,700 ppb) and benzene (47 ppb). The groundwater samples collected from wells MW-10 through MW-12 contained HVOs including carbon tetrachloride, chloroform, PCE, TCE, and 1,2-DCE. The highest HVOs concentration (73 ppb of PCE) was detected in the sample collected from well MW-11, located crossgradient of the subject site. The soil analytical data for borings B-13 through B-16 are summarized in WGR Table 4 included in Appendix C.

In October 1991, Pacific Environmental Group, Inc. (PEG) installed downgradient groundwater monitoring well MW-13 to further evaluate the extent of dissolved hydrocarbon plume, and upgradient monitoring well MW-14 to investigate suspected off-site origination of HVOs. In addition, four soil borings (B-A through B-D) were drilled to assess the extent of hydrocarbons in subsurface in the vicinity of well MW-7. The borings were drilled to depths ranging from 28 to 31.5 feet bgs. Groundwater was encountered at depths ranging from 20.5 to 21.5 feet bgs. A total of twenty-five soil samples (fifteen unsaturated and ten saturated samples) collected from borings MW-13, MW-14, and B-A through B-D at depths between 10 and 28.5 feet bgs were analyzed for TPHg and BTEX. TPHg or BTEX were not detected in these soil samples with the exception of the saturated sample collected from boring B-D at 25 feet bgs, which contained TPHg (120 ppm), and BTEX (up to 1.8 ppm). HVOs were not detected in the soil samples collected from well boring MW-14 at depths between 10 and 25 feet bgs. The groundwater sample collected from well MW-13 contained TPHg (3,100 ppb) and benzene (68 ppb), but did not contain HVOs. The groundwater sample collected from well MW-14 did not contain TPHg or BTEX, but contained chloroform (5.5 ppb) and PCE (33 ppb). Soil analytical data for borings MW-13, MW-14, and B-A through B-D are summarized in PEG Table 1 included in Appendix C.

In November/December 1992, Groundwater Technology, Inc. (GTI) installed off-site wells MW-15 and MW-16 to further delineate the dissolved hydrocarbon plume. Well borings MW-15 and MW-16 were

drilled to the depths of 30 and 31.5 feet bgs, respectively. Groundwater was encountered in these borings at the depth of 20 feet bgs. The soil samples collected from boring MW-15 at 20 and 30 feet bgs, and from boring MW-16 at 10 and 20 feet bgs were analyzed for TPHg and BTEX. Soil samples collected from the borings at 20 feet bgs were also analyzed for total organic carbon. The soil samples did not contain TPHg or BTEX. Total organic carbon was detected at concentrations of 120 ppm (MW-15) and 60 ppm (MW-16). Initial groundwater samples collected from wells MW-15 and MW-16 did not contain TPHg or BTEX. Soil analytical data for borings MW-15 and MW-16 are summarized in GTI Table 1 included in Appendix C.

Soil Vapor Extraction Test

In December 1991, PEG conducted a soil vapor extraction (SVE) test for the purpose of determining the feasibility of using SVE for the remediation of hydrocarbons present in subsurface in the vicinity of wells MW-4 and MW-7. Vacuums of 40 and 55 inches of water column (in.w.c.) were applied to well MW-7, while monitoring vacuum response in wells MW-6 and MW-8. No measurable response was observed. The volumetric air flow was less than 10 standard cubic feet per minute (scfm). Concentrations of TPHg in vapor samples from well MW-7 ranged from 8,400 to 18,000 ppmv. The second test was conducted on well MW-4 while monitoring the vacuum response in wells MW-2 and MW-5. A vacuum of 40 in.w.c. was applied to well MW-4. No response was noted in wells MW-2 and MW-5. A single air sample collected from well MW-4 indicated TPHg concentration of 32 ppmv. The volumetric air flow was less than 10 scfm. The third test was conducted on well MW-4 by applying a positive pressure of approximately 80 in.w.c. A positive pressure of 0.02 in.w.c. was observed in well MW-2. Based on the test results, PEG concluded that vacuum of 137 in.w.c. would be necessary to extract approximately 20 scfm from wells, and estimated a radius of influence of 18 feet.

Dewatering and SVE Remediation System Installation

In June 1993, G&M installed a dewatering system and a SVE remediation system in wells MW-4 and MW-7 to mitigate impacted soils. The system begun operation in July 1993. During the initial system startup, it was determined that the catalytic unit would not pass the initial startup criteria stated in the Bay Area Air Quality Management District (BAAQMD) air permit. The very low flow rate of less than 4 cubic feet per minute (cfm) and the rapid drop in concentrations caused an apparent destruction efficiency of less than 90%, the minimum efficiency required by the air permit. The dewatering system could also only extract low groundwater yields: between system startup on July 1, 1993, and closure on December 12, 1993, only 462 gallons of hydrocarbon impacted groundwater were removed at pumping rates ranging from 0.004 to 0.02 gallons per minute (gpm). Monthly groundwater influent sampling data indicated that TPHg concentrations decreased from 4,400 ppb on July 15, 1993, to 220 ppb on September 9, 1993. Although the pump was shut down for a month and half between the first and second sampling events, there was no significant increase in hydrocarbon concentration. System operation data are summarized in tables included in Appendix G.

The effectiveness of augmenting the existing SVE system with additional wells was evaluated, and it was determined that the low permeability sediments encountered at the site would still limit the effectiveness of the extraction system. The system was shut off in December 1993, and all system equipment removed in December 1996.

Soil Excavation

In January 1992, PEG oversaw removal of hydrocarbon impacted soil from the vicinity of well MW-4 and excavating a 30-foot long and 5-foot deep trench across the area of the former USTs to confirm that the USTs had been removed from the site. No USTs were observed although construction debris, including piping and concrete slabs were found beneath the surface in the area of the former USTs. Approximately 150 cubic yards of soil , including 27 cubic yards of discolored soil were excavated and properly disposed off-site. The excavation was backfilled with clean imported material. A total of thirteen confirmation soil samples were collected at the bottom and lateral limits of the excavation and analyzed for TPHg, TPHd and BTEX. Three of these samples were analyzed for HVOs. HVOs were not detected in these samples. Only one sample (collected from the southern excavation sidewall at 8 feet bgs) contained detectable petroleum hydrocarbons (310 ppm of TPHg and 270 ppm of TPHd). Benzene was not detected in this sample. Laboratory analysis report indicated that the diesel chromatogram was of a non-standard diesel pattern, and may indicate the presence of weathered gasoline. Diesel was never marketed at the subject site. Further excavation to the south was precluded by the foundation of the adjacent building that paralleled the excavation sidewall to a depth of approximately 10 feet bgs. However, with the exception of the small area near the 8-foot sample from the southern excavation sidewall, the source area soils have been removed. The sample locations and analytical results are shown on PEG's diagram and Table 1 included in Appendix C.

Well Search

A search of registered wells within ½-mile of the site was conducted in 1990 by the County of Alameda Public Works Agency using their computer database. Ninety-six wells were located within a ½-mile radius of the subject site. Most of these wells are monitoring or test wells. No drinking water wells, and only one irrigation well were identified. The irrigation well is located more than ¼ mile southeast (crossgradient) of the subject site. The well locations are shown on Figure 9 and well data are summarized in Table 5 included in Appendix E.

Upgradient Source Investigation

In October 1991, PEG performed a reconnaissance of possible upgradient off-site sources of HVOs detected in groundwater at the subject site. Hallmark Cleaners, a dry cleaning business located approximately 60 feet upgradient of the subject site, was identified as a possible source of carbon tetrachloride and other HVOs. However, the Oakland Fire Marshall' Office records did not contain permits for aboveground storage tanks (ASTs) or USTs at Hallmark Cleaners (permits are required only for the storage of flammable substances, and carbon tetrachloride is not a flammable substance). Based on the field inspection, in 1991 there were

no ASTs at the Hallmark site, and the dry cleaning did not occur at the site, but the clothes were sent to another location for cleaning. PEG identified numerous other businesses which may use or store HVOs (including printers, dry cleaners, machine shops and manufacturers), and a large number of automobile repair facilities in the upgradient vicinity of the subject site, which may be the potential sources of HVOs or secondary sources of petroleum hydrocarbons.

In October 1992, Geraghty & Miller Inc. (G&M) conducted an evaluation of the possible off-site origination of HVOs detected in groundwater at the subject site. Based on the presence of numerous potential sources of HVOs in the upgradient vicinity of the subject site, and observations that the highest HVOs concentrations were detected in wells located along the upgradient boundary of the subject site, and HVOs were not detected in soil at the subject site, G&M concluded that the source of HVOs is probably located upgradient of the former Chevron facility. The Alameda County Department of Environmental Health accepted this conclusion in their letter to Chevron dated November 4, 1992, and granted an approval to discontinue sampling of site wells for HVOs.

The 1992 database file review by Environmental Risk Information and Imaging Services (ERIIS) reported 67 leaking underground storage tanks (LUSTs) within 1-mile radius of the subject site. Five of these LUST sites were within two blocks of the subject site. The nearest LUST site is Harrison Street Garage located at 1432 Harrison Street, south (upgradient) of the subject site.

Groundwater Monitoring and Sampling

Quarterly monitoring and sampling of site wells has begun in November 1988. During the period of November 1988 to September 1999, a depth to shallow groundwater beneath the site fluctuated between 16 and 22 feet bgs. The groundwater flow direction fluctuated between east and northeast, and the gradient was 0.01 to 0.03. Groundwater monitoring and sampling data are summarized in Blaine Tech *Cumulative Table of Well Data and Analytical Results*, included in Appendix D. Historic potentiometric maps are included in Appendix F.

On-site well MW-7 has contained petroleum hydrocarbons at concentrations up to 11,000 ppb of TPHg and 810 ppb of benzene. Hydrocarbon concentrations in this well have decreased significantly (to current levels of 276 ppb TPHg and 35.1 ppb benzene) since groundwater monitoring begun, and especially upon addition of the oxygen release compound (ORC) in March 1997. Hydrocarbons were not detected in the other on-site wells (MW-1 through MW-6 and MW-8) with the exception of few occasions (low concentrations). Downgradient off-site wells MW-9 and MW-13 have contained hydrocarbons at concentrations up 87,000 ppb of TPHg and 1,400 ppb of benzene. Hydrocarbon concentrations have decreased to nondetectable levels in well MW-13 by March 1999. Hydrocarbon concentrations in well MW-9 decreased significantly (to 217 ppb of TPHg and 1.36 ppb of benzene) upon addition of the ORC in July 1999. Off-site wells MW-10 through MW-12, MW-14 and MW-15 contained hydrocarbons only on few occasions and at low concentrations. Initially (between December 1992 and March 1994), off-site well MW-16 did not contain petroleum hydrocarbons. In the second half of 1994, a very precipitous increase in hydrocarbon concentrations occurred in well MW-16. Since that time, concentrations of hydrocarbons have been

increasing in well MW-16, and currently, this well contains 5,480 ppb of TPHg and 717 ppb of benzene. The ORC was installed in well MW-16 in July 1998, however, no decrease in hydrocarbon concentrations had occurred. The absence of hydrocarbons in MW-16 until 1994, then the very precipitous increase in hydrocarbon concentrations (not the gradual increase which would be expected if the Chevron plume had migrated to well MW-16), and inconsistent trends in hydrocarbon concentrations in this well versus wells MW-7, MW-9, and MW-13 suggest that hydrocarbons present in well MW-16 originated from a separate off-site source.

TOG was detected in the groundwater sample collected from well MW-8 in April 1989 at low concentration of 3,000 ppb, but TOG concentration in this well decreased to nondetectable by June 1989. TOG has not been detected in any other site well. HVOs have been detected in the site wells, however, these HVOs appear to originate from the off-site source (see above).

MtBE (up to 280 ppb by EPA Method 8020) was reported to be present in wells MW-7, MW-9, MW-13, MW-15, and MW-16 with the highest concentration reported for off-site well MW-16. However, the MtBE presence was not confirmed by EPA 8260 analysis which is more accurate in regards to MtBE detection. The reported MtBE concentrations appear to be false detections due to interference on the EPA 8020 analysis from other gasoline compounds (most likely 2-methyl pentane and 3-methyl pentane). The lack of MtBE is consistent with the subject site history, as the service station closed in 1972, and MtBE was not added to Chevron gasoline in northern California until 1991.

Monitoring and sampling of several site wells was discontinued in 1993 (MW-5, MW-6, MW-8, MW-12, and MW-14), 1994 (MW-11), or 1995 (MW-1 through MW-4 and MW-10), because the wells did not contain petroleum hydrocarbons. These wells were destroyed in January 1998.

Evaluation of Intrinsic Bioremediation

Evaluation of intrinsic bioremediation was performed for the subject site in June 1999 by Chevron CRTC group. The observed trends for indicator parameters of alkalinity, dissolved iron (ferrous), and dissolved oxygen versus total BTEX in the site wells suggested that intrinsic bioremediation is occurring at the subject site. Sulfates and nitrates levels were considerably lower near the source area, which is consistent with the expected consumption of nitrates and sulfates during the biodegradation of the BTEX compounds.

2.3 Geology and Hydrogeology

The subject site is located on the East Bay Plane, approximately 3 miles east of the Outer Harbor on the eastern shore of San Francisco Bay, and approximately ¼ mile west of Lake Merritt. The site is a relatively flat lot at an elevation of approximately 30 feet above mean sea level. As mapped by Helley and others (1979, *Flatland Deposits of the San Francisco Bay Region, California: U.S. Geological Survey Professional Paper 943)*, soil in the site vicinity consists of Pleistocene beach and dune sand deposits (Merritt Sand) consisting of loose, well sorted fine to medium sand. The nearest surface water is Lake

Merritt. Based on historical monitoring data, the groundwater flow direction in the vicinity of the site fluctuates between east and northeast.

The boring logs indicate that the subject site is underlain by silty to gravelly sands interbedded with clays and silts to the total depth explored of 36.5 feet bgs. Groundwater was encountered beneath the site at a depth of approximately 20 feet bgs. Boring logs, and WGR's geologic cross section are included in Appendix H.

3.0 SITE CONCEPTUAL MODEL

The site conceptual model was prepared based on the site assessment and quarterly monitoring and sampling data collected at the site to date. A pictorial representation of the site conceptual model is presented on Figure 3.

3.1 Release Scenario and Plume Characterization

A service station operated at the subject site until 1972. Fuel and waste oil USTs (potential on-site primary sources of release) were present at the site at that time. All underground and aboverground station facilities were removed at the time of station closure. Since 1975, the site has been used as a parking lot. There are several environmental problem sites (potential secondary off-site sources of contamination) in the vicinity of the subject site.

Environmental investigations conducted at the site indicated that soil and shallow groundwater beneath the subject site have been impacted by petroleum hydrocarbons and HVOs. A distribution of HVOs in the subsurface at the subject site indicates that HVOs have originated from the upgradient off-site source. Groundwater beneath the subject site has not been impacted by MtBE as indicated by the EPA Method 8260 confirmation results.

Hydrocarbon impacted soil (up to 600 ppm of TPHg) was present in the vicinity of well MW-4. A source removal was conducted at the subject site in 1992, and the hydrocarbon impacted soil was excavated and removed from the site, with the exception of the very small area at the southern wall of the excavation.

Groundwater beneath the subject site has been monitored and sampled since November 1988 through the network of sixteen groundwater monitoring wells. During this period of time a groundwater depth ranged from 16 to 22 feet bgs, and a groundwater flow direction was consistently to the east or northeast. Hydrocarbon impacted groundwater (up to 11,000 ppb of TPHg, up to 810 ppb benzene) has been present beneath the eastern corner of the subject site (well MW-7) and east (downgradient) of the site, beneath Harrison and 17th Streets (wells MW-9, MW-13 and MW-16). Hydrocarbon concentrations have decreased to nondetectable levels in well MW-13 and to low levels in wells MW-7 and MW-9. Hydrocarbon concentrations have been increasing in well MW-16 since June 1994. The ORC was installed in well MW-16 in July 1998, however, no decrease in hydrocarbon concentrations had occurred. Trends in TPHg and benzene concentrations in groundwater from wells MW-7, MW-9, MW-13 and MW-16 are depicted on

Figures 5 and 6. The trends in gasoline hydrocarbon concentrations in off-site well MW-16 versus wells MW-7, MW-9, and MW-13 are inconsistent with the common source. The dissolved hydrocarbon plume is depicted on Figure 4. The lateral extent of the subject site plume has been generally delineated except to the northeast (vicinity of well MW-16), where a separate off-site plume appears to be present. The plume migration appears to be slow and limited by natural processes.

3.2 Potential Receptors

The hydrocarbon plume extends beneath eastern portion of the subject site (parking lot), beneath the intersection of Harrison and 17th Streets, and possibly beneath the commercial buildings on the eastern side of Harrison Street. Most of this area is paved with asphalt or concrete. The nearest residential building is located upgradient and outside of the plume. The potential exposure receptors are current and future workers of the parking lot and possibly in the commercial buildings along the eastern side of Harrison Street, and current and future site visitors (clients, motorists, pedestrians). Vadose zone soils at the site are not impacted (affected soil has been removed), therefore, hydrocarbon volatilization from soil or direct dermal contact is not a valid pathway. No water producing wells are located at the site or in the immediate site vicinity, therefore groundwater ingestion is not a valid pathway. Potential exposure mediums are ambient air, and indoor air in commercial buildings. The major exposure pathway is hydrocarbon volatilization from groundwater to ambient and indoor air. Based on the groundwater depth (16 to 22 feet bgs) and an absence of hydrocarbons in the vadose zone, a dermal contact with hydrocarbon impacted soil and groundwater is not a valid pathway for the utility maintenance worker.

3.3 Other Environmental Issues

The lateral extent of hydrocarbon impacted groundwater has not been delineated in the downgradient direction of the subject site. However, a secondary source of hydrocarbons appears to be present in the downgradient vicinity of the subject site. The location and magnitude of influence of this off-site source is unknown.

An underground utility survey has not been conducted at the site. The dissolved hydrocarbon plume at the subject site extends beneath the public streets (Harrison and 17th Streets), in the area where underground utilities are likely to be present. However, based on the groundwater depth (16 to 22 feet bgs), underground utility trenches do not appear to be a likely factor in plume migration in the subject site vicinity.

4.0 RISK-BASED CORRECTIVE ACTION (RBCA)

Tier 1 of the RBCA process involves comparison of the site constituent concentrations to generic Risk-Based Screening Levels (RBSL) to evaluate whether further evaluation and/or active remediation is required. RBSL values are derived from standard exposure equations and reasonable maximum exposure (RME) estimates per U.S. EPA guidelines. RBSL concentrations limits are designed to be protective of human health even if exposure occurs directly within the on-site area of affective soil or groundwater and inherently provide conservative estimates of potential threats to human health and the environment. According to the

RBCA process, if Tier 1 limits are not exceeded, the user may proceed directly to compliance monitoring and/or no further action. However, if these generic screening levels are exceeded, the affected media may be addressed by 1) remediating to the generic Tier 1 limits, if practicable, 2) conducting Tier 2 evaluation to develop site-specific remediation goals, or 3) implement an interim action to abate risk "hot spots".

The City of Oakland has set the specific RBSLs for the sites located in Oakland and meeting the special eligibility criteria. The Oakland RBCA Eligibility Checklist and Oakland Tier 1 RBSLs are included in Appendix I.

4.1 Site Parameters

The complete exposure pathways are those that could pose a reasonable potential for contaminant contact with a human or environmental receptor. Under Tier 1 RBCA, only on-site receptors apply. Based on the land usage within a plume (commercial buildings, parking lots, public streets), commercial types of exposure scenarios were evaluated for the site. There are no water supply wells within the plume. Therefore, groundwater ingestion or subsurface soil leaching to groundwater exposure pathways were not considered the complete pathways. The surface soil (<3 feet bgs) is not impacted. There is no significant impact to vadose zone soils at the site. The area within the plume is used for parking, transportation, and commercial purposes. The downgradient edge of the plume may extend beneath the commercial buildings. Therefore, the only complete exposure pathways identified are volatilization to outdoor and indoor air from groundwater (commercial and construction worker receptor). These exposure pathways were evaluated during this RBCA analysis.

Based on the Oakland eligibility checklist, the subject site can be evaluated using the Oakland RBCA levels (see Appendix I). Therefore, the maximum contaminant concentrations ever detected in groundwater beneath the subject site were compared to the specific Oakland Tier 1 RBSLs. This represents the conservative approach, as it is unlikely that the concentrations of contaminants at the distant edge of the hydrocarbon plume would exceed the source initial concentrations.

4.2 Results of RBCA Analysis

Based on the RBCA analysis, site conditions are below the Oakland Tier 1 RBSLs and, according to the RBCA decision making process and the City of Oakland guidelines, no further work is necessary at the subject site. Pertinent data used in the analysis are presented in Table 1 included in Appendix I.

5.0 DISCUSSION AND CLOSURE PLAN

The subject site has been impacted by petroleum hydrocarbons, but has not been impacted by MtBE. Hydrocarbon impacted soil has been removed from the site. Hydrocarbon impacted groundwater has been present in the eastern portion of the site and in the downgradient (eastern and northeastern) vicinity of the subject site. The lateral extent of dissolved hydrocarbon plume has been delineated except to the northeast.

Concentrations of hydrocarbons in groundwater beneath the eastern portion of the subject site (MW-7) and in the immediate downgradient vicinity of the subject site (MW-9 and MW13) decreased to low or nondetectable levels. Concentrations of hydrocarbons at the northeastern edge of the dissolved hydrocarbon plume (near MW-16) have been increasing since June 1994, despite installation of the ORC in the well. The trends in gasoline hydrocarbon concentrations in the downgradient vicinity of the subject site (well MW-16 versus wells MW-9 and MW-13) are inconsistent with a common source. Hydrocarbons present in well MW-16 appear to originate from a separate off-site source.

HVOs have been detected in groundwater beneath the subject site and its vicinity, even though the HVOs have never been stored at the subject site suggesting that an upgradient off-site hydrocarbon source contributes to groundwater contamination at the subject site. Location and magnitude of influence of this off-site source is unknown.

There are numerous former and current businesses in the immediate upgradient vicinity of the subject site which may be the potential sources of HVOs or secondary sources of gasoline hydrocarbons present in the subject site vicinity. Due to plume commingling, it appears that the additional environmental investigation in the northeastern vicinity of the subject site would not provide significant additional information specific to the subject site plume delineation.

The RBCA analysis indicates that modeled concentrations of hydrocarbons volatilizing to outdoor air from subsurface soil and groundwater do not exceed the Oakland RBSLs for commercial use of the properties within the plume. Based on the site environmental condition, and RBCA analysis it appears that risk mitigation or additional environmental investigation is not required at the subject site. There are no potential threats to human health and the environment based on the current usage of the site and its vicinity. Therefore, GR recommends to initiate closure proceedings. Groundwater monitoring and sampling of site wells shall be continued to verify groundwater flow direction and confirm that the dissolved groundwater plume remains stable until a closure status is granted.

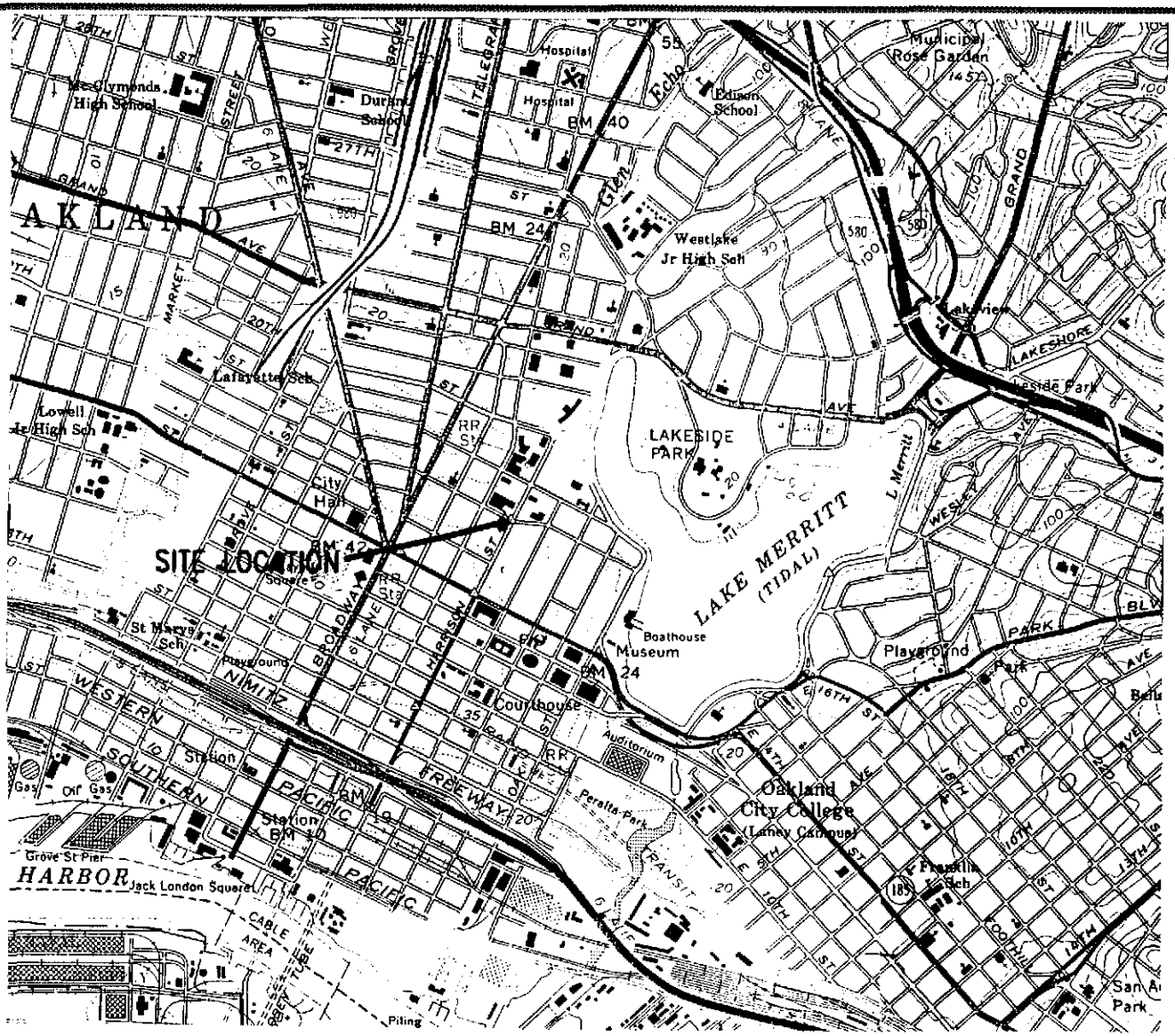
Table 1. Comparison of Site Representative Contaminant Concentrations to Oakland RBSLs - Former Chevron Service Station #9-0020, 1633 Harrison Street, Oakland, California.

Description	Benzene	Toluene	Ethylbenzene	Xylenes	MTBE
	<----------ppm---------->				
Representative Site Concentrations (maximum concentration in well MW-7)	0.810	0.430	0.320	1.300	0.130*
Oakland Tier 1 RBSL (inhalation of vapors volatilizing from groundwater for commercial/industrial receptor)					
Indoor air:					
Carcinogenic risk:	1.8	—	—	—	—
Hazard:	110	>SOL	>SOL	>SOL	>SOL
Outdoor air:					
Carcinogenic risk:	21	—	—	—	—
Hazard:	1,300	>SOL	>SOL	>SOL	>SOL
RBSLs Exceeded?	No	No	No	No	No

EXPLANATION:
RBSL = Risk Based Screening Level
MTBE = Methyl t-Butyl Ether
ppm = Parts per million
--- = Not provided/not applicable
>SOL = RBSL exceeds solubility of chemical in water
* = MtBE concentration by EPA Method 8020 in sample collected on September 13, 1993, appears to be false detection (sample was not analyzed by EPA Method 8260). Confirmation analysis by EPA 8260 performed on sample from well MW-7 collected on September 29,1999, indicated not detected MtBE.

RBSLs SOURCE:
Oakland RBCA look-up tables revised January 1, 2000, provided by Mark Gomez of Oakland Urban Land *Redevelopment Program*

346499.02



Base Map: USGS Topographic Map

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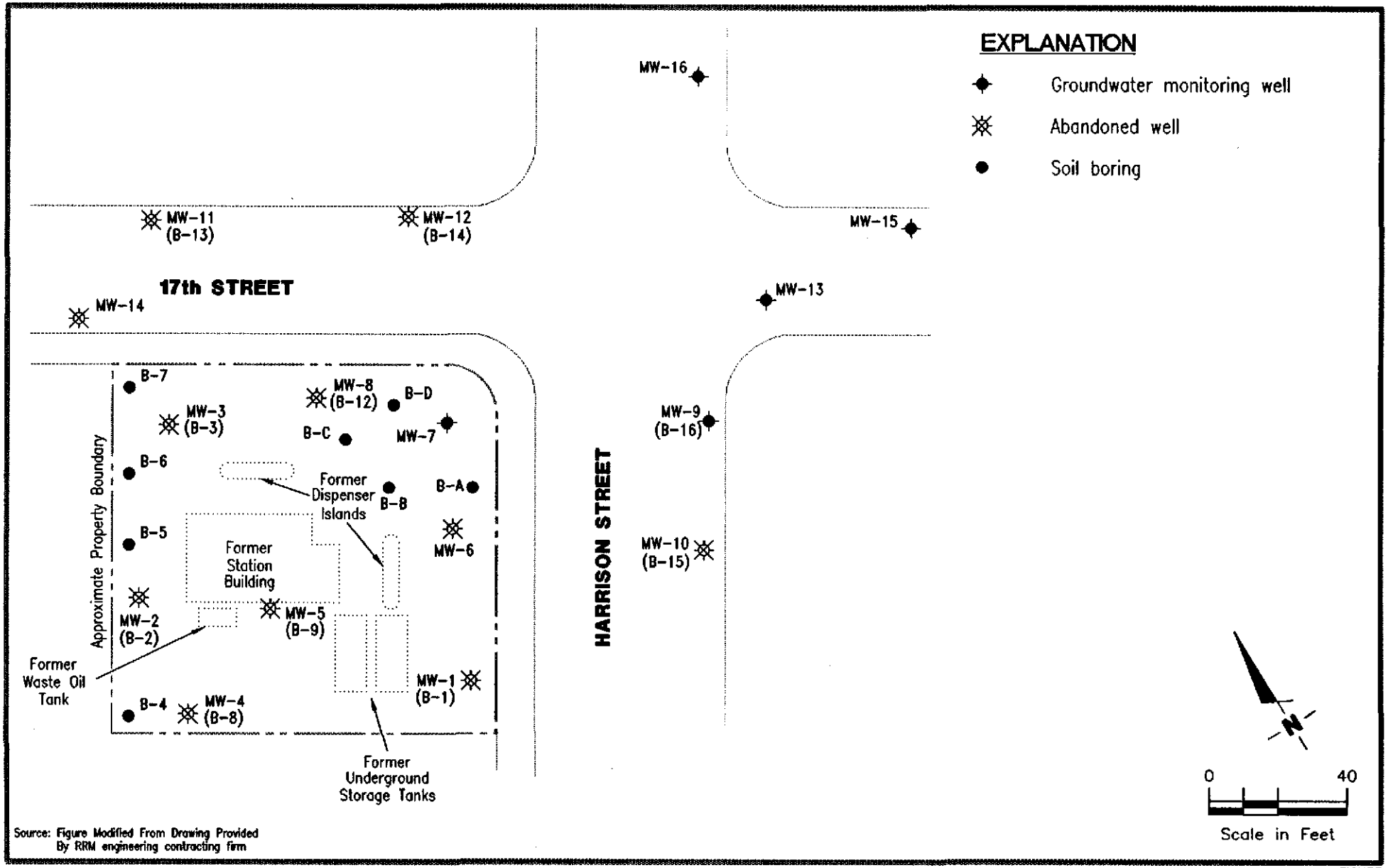
Dublin, CA 94568

VICINITY MAP
Former Chevron Service Station No. 9-0020
1633 Harrison Street
Oakland, California

FIGURE
1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
346499		5/00	



Source: Figure Modified From Drawing Provided By RRM engineering contracting firm

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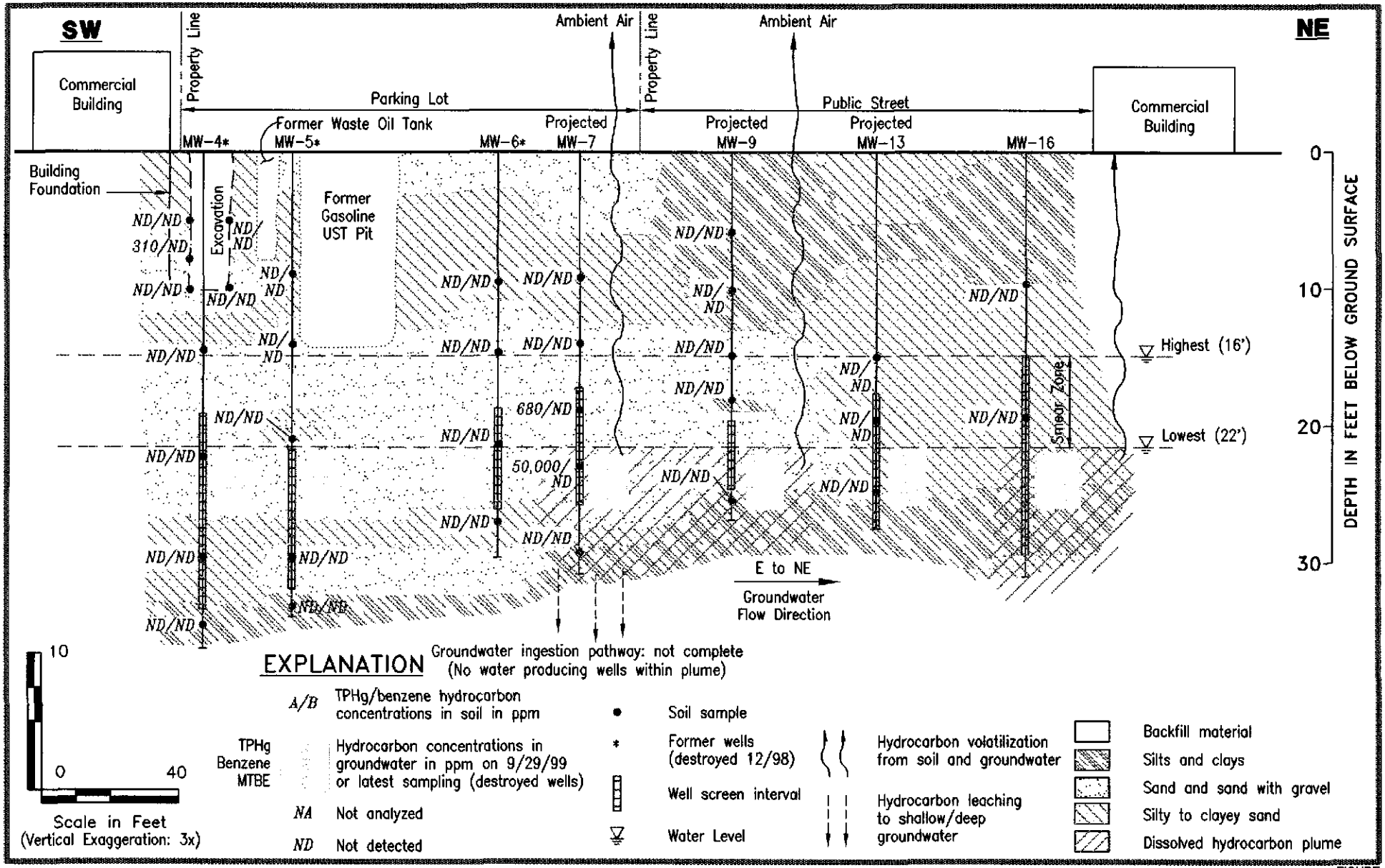
Dublin, CA 94568

SITE PLAN
Former Chevron Service Station No. 9-0020
1633 Harrison Street
Oakland, California

FIGURE
2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
346499.02		5/00	



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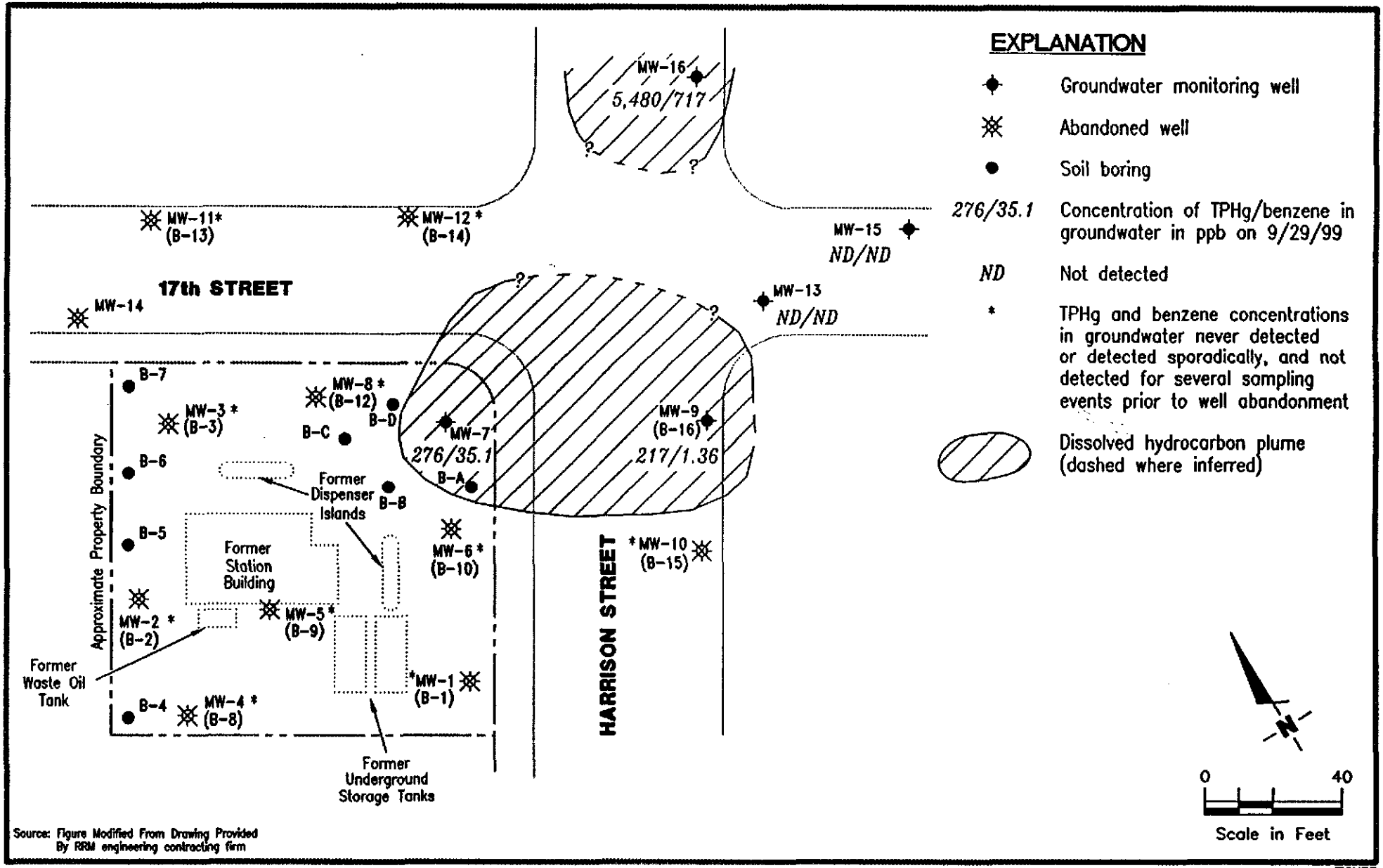
SITE CONCEPTUAL MODEL
Former Chevron Service Station No. 9-0020
1633 Harrison Street
Oakland, California

FIGURE
3

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
346499.02		5/00	



Source: Figure Modified From Drawing Provided By RRM engineering contracting firm

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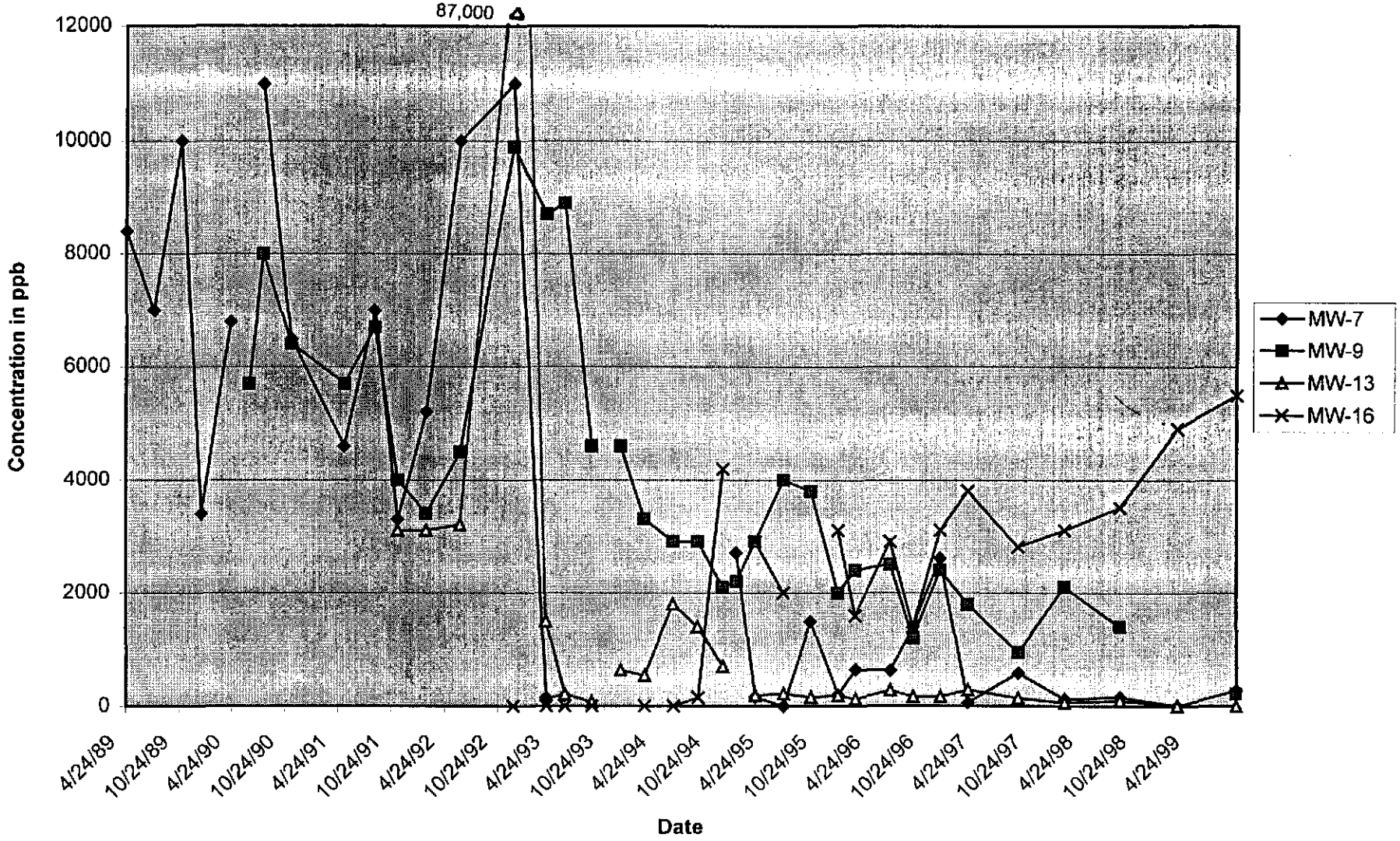
HYDROCARBON PLUME MAP
Former Chevron Service Station No. 9-0020
1633 Harrison Street
Oakland, California

FIGURE
4

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
346499.02		5/00	



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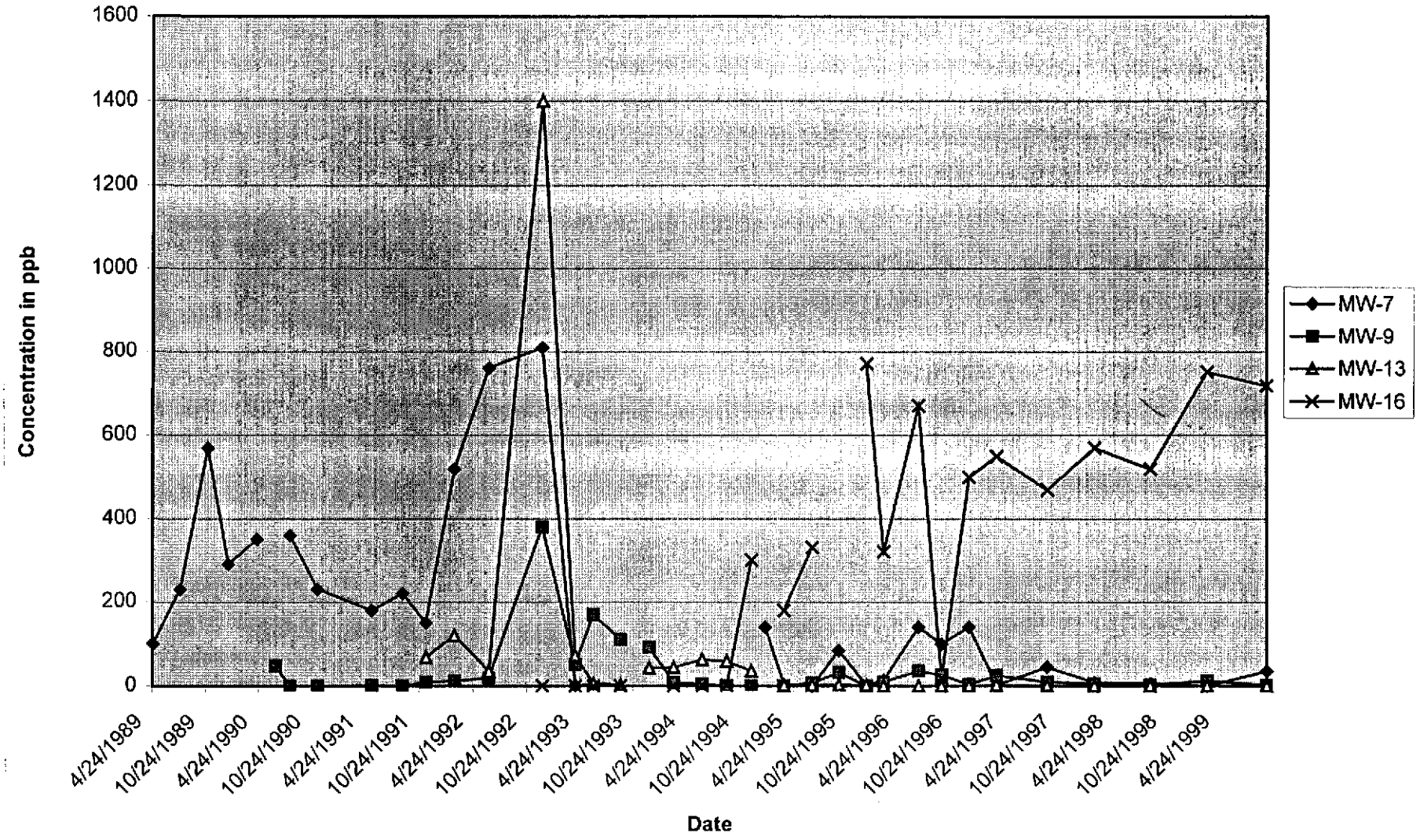
TPHg CONCENTRATION IN WELLS
Former Chevron Service Station No. 9-0020
1633 Harrison Street
Oakland, California

FIGURE
5

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
346499.02		5/00	



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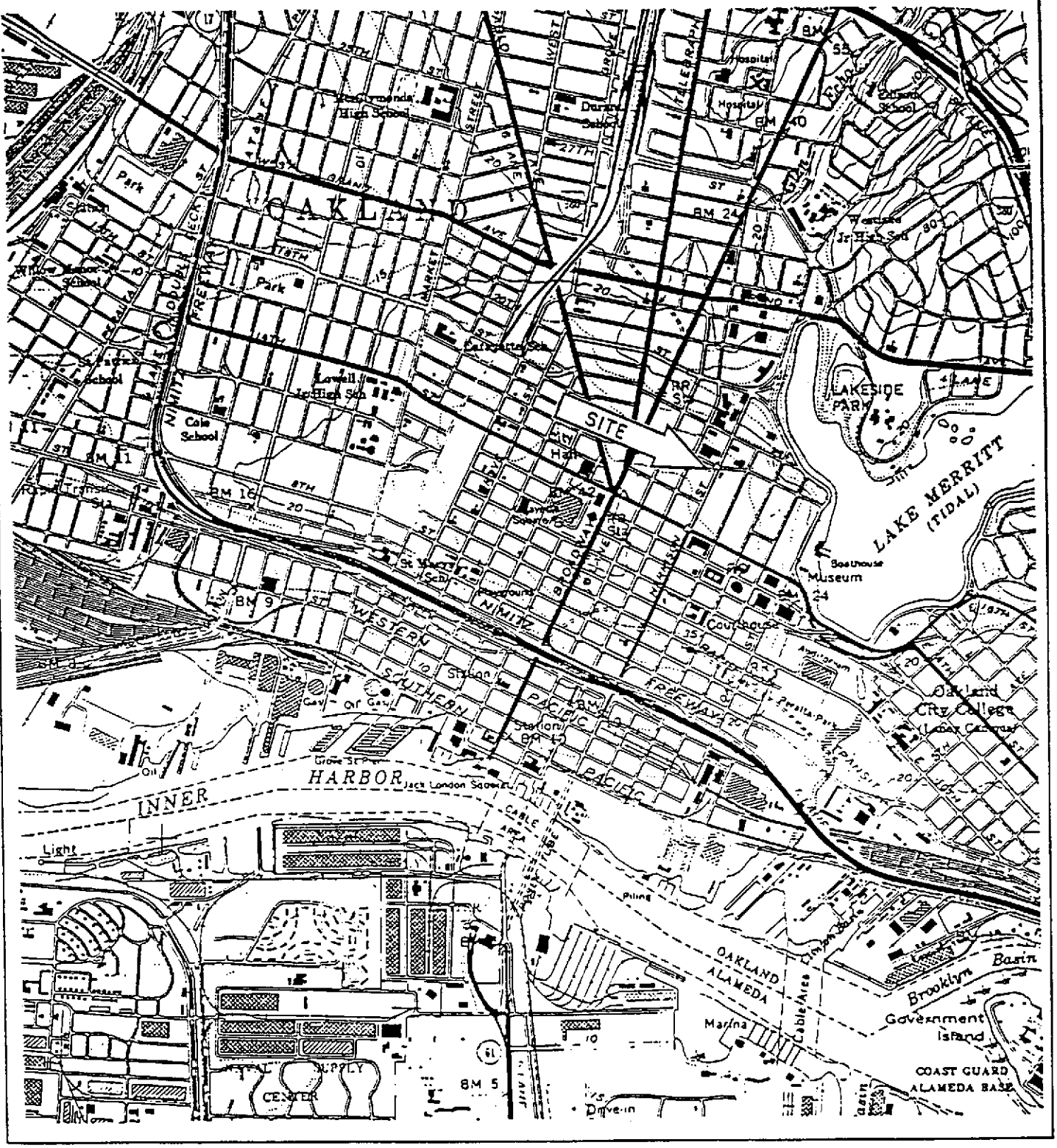
BENZENE CONCENTRATION IN WELLS
Former Chevron Service Station No. 9-0020
1633 Harrison Street
Oakland, California

FIGURE
6

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
346499.02		5/00	

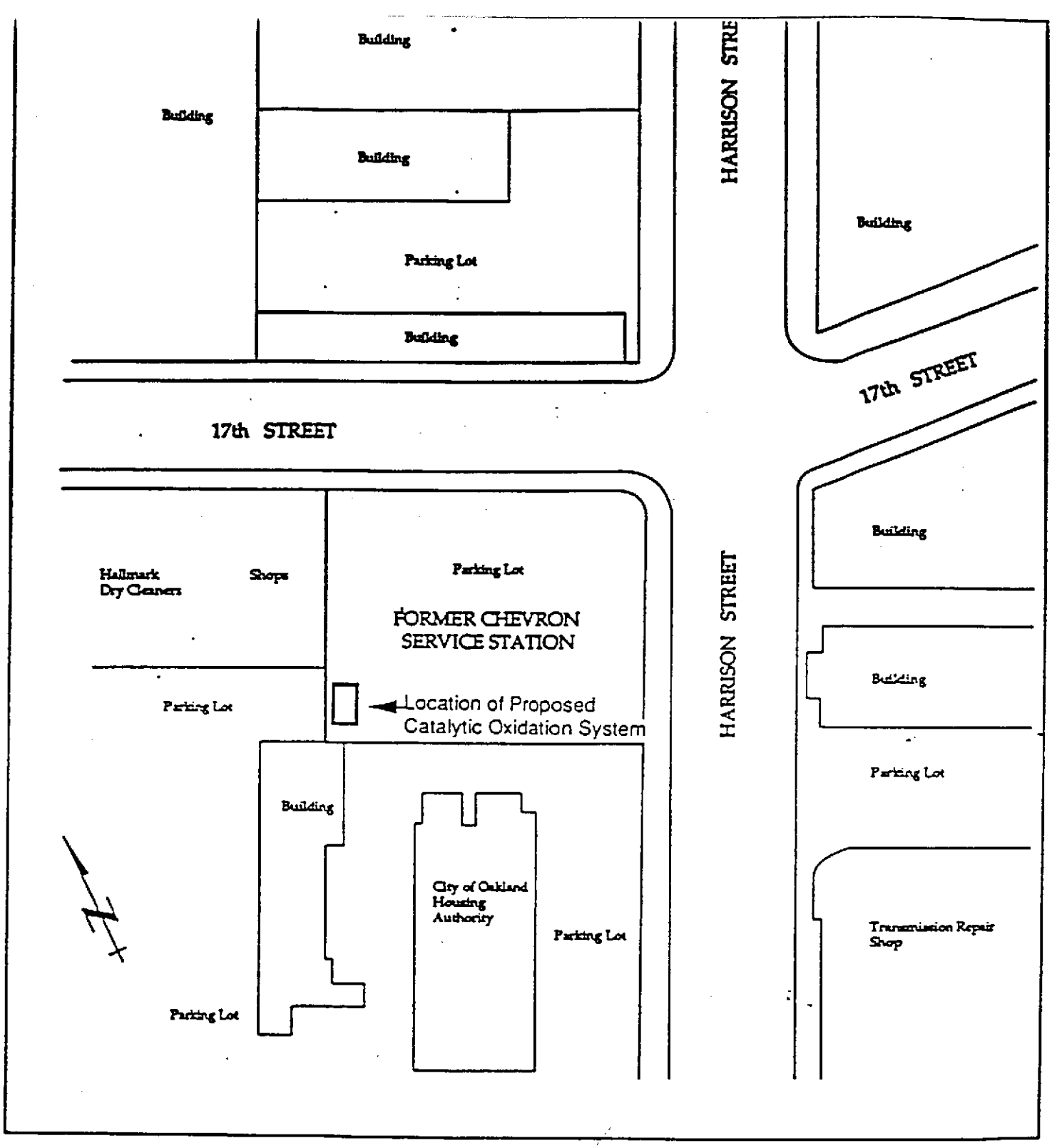


GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC13600

SITE LOCATION MAP
Former Chevron Service Station #9-0020
1633 Harrison Street
Oakland, California

FIGURE
1



GERAGHTY & MILLER, INC.
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Project No. RC13600

SITE VICINITY MAP

Former Chevron Service Station #9-0020
1633 Harrison Street
Oakland, California

FIGURE
2

APPENDIX B

SOIL VAPOR DATA

1990 SOIL VAPOR SURVEY

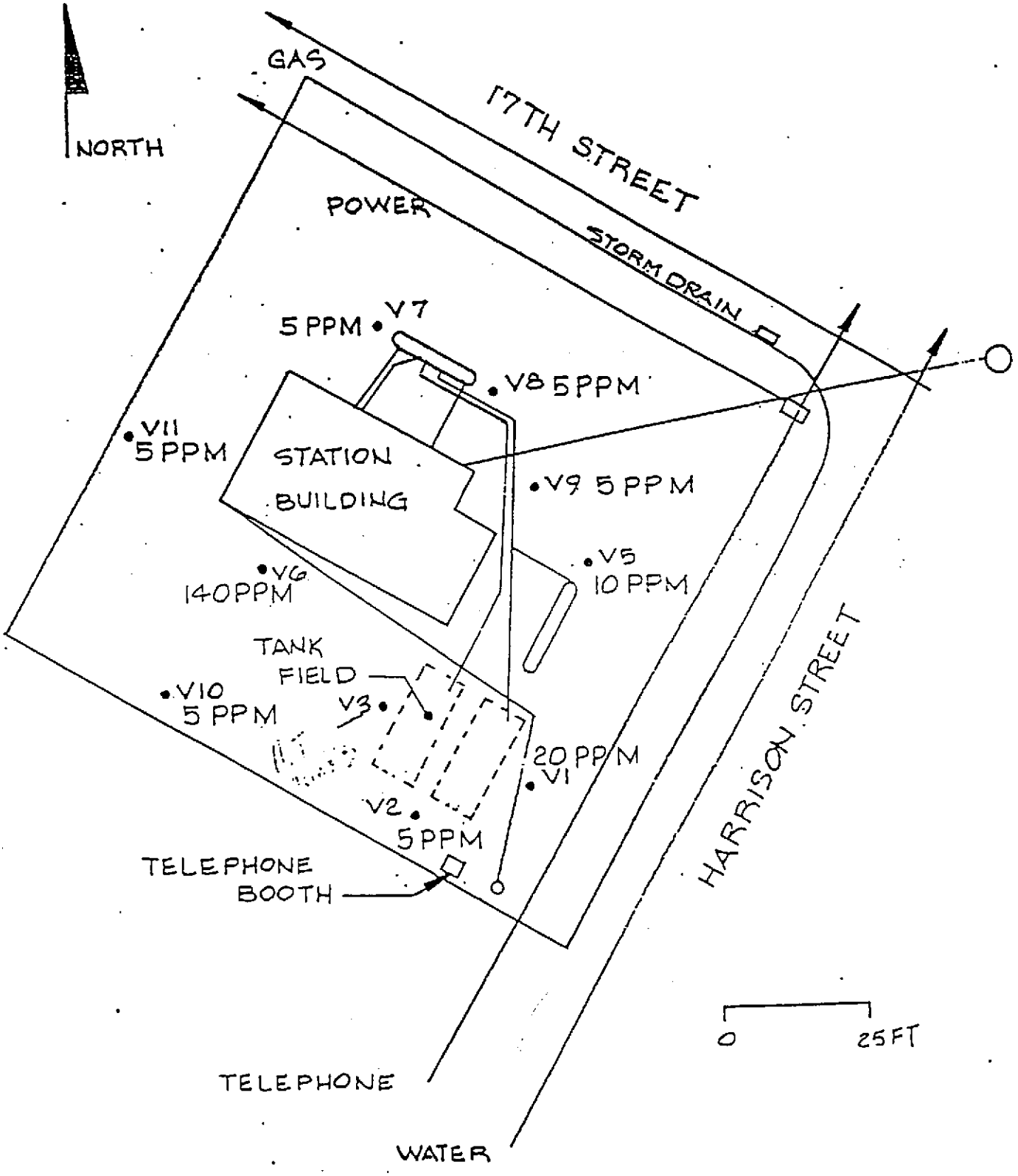


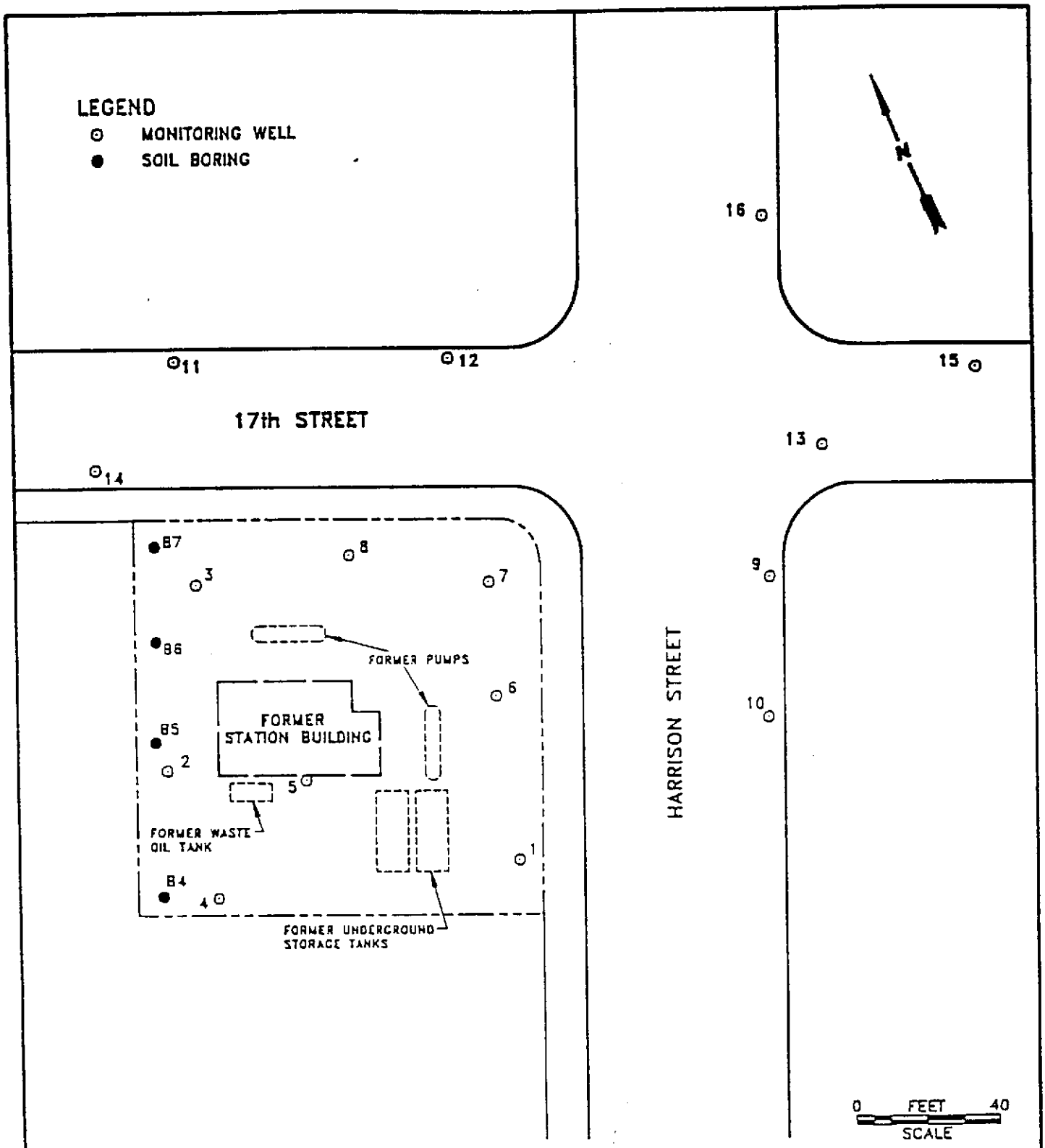
Figure 4. Concentrations of total detected hydrocarbons at each sample point at Chevron Service Station 9-0020, Oakland, California.

TABLE 1 CONCENTRATIONS OF HYDROCARBON CONSTITUENTS IN SOIL VAPOR AT CHEVRON SS 9-0020, 17TH AND HARRISON, OAKLAND, CALIFORNIA, 17 DECEMBER 1987

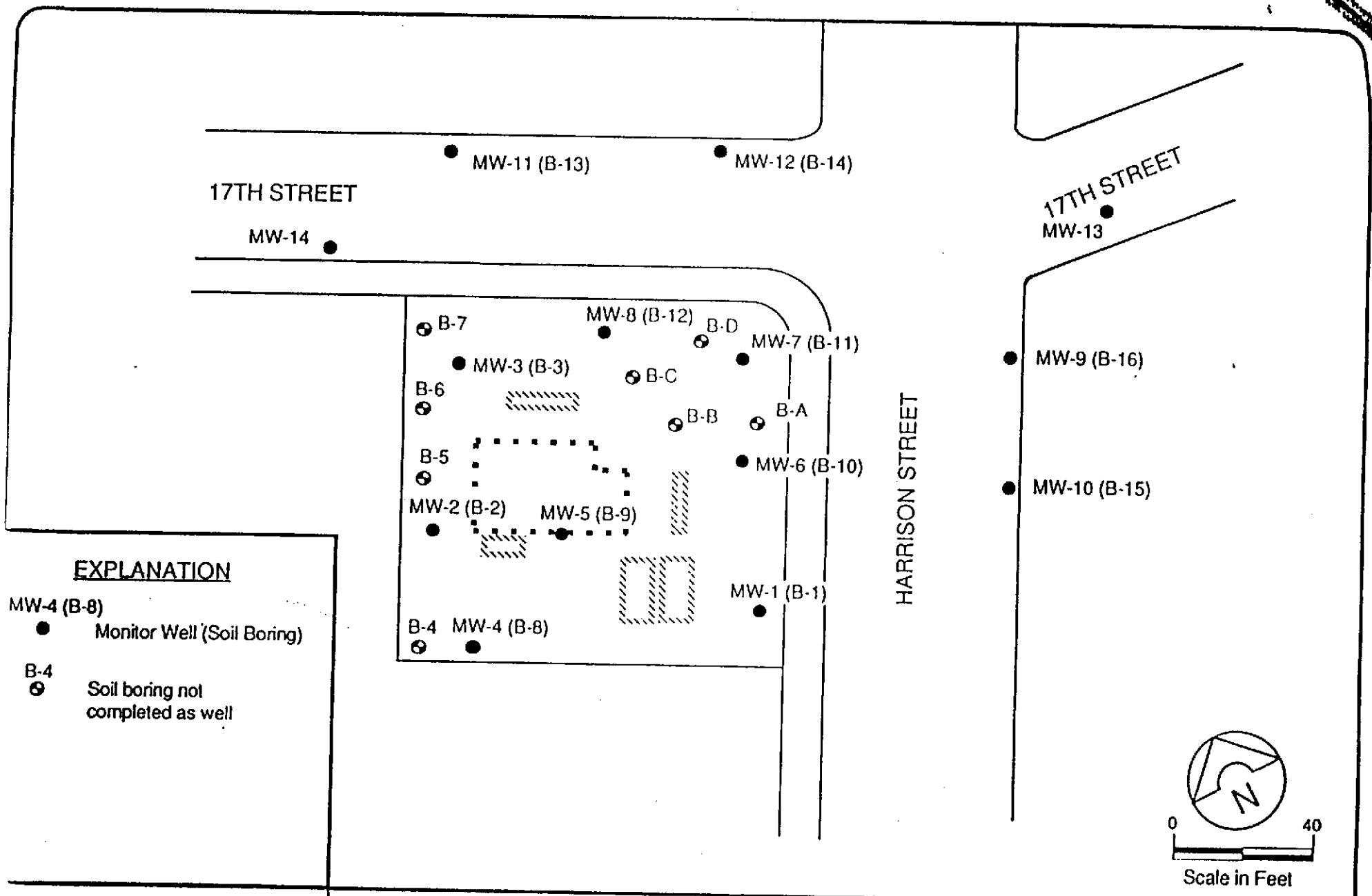
Sample Location	Depth (ft)	Peaks Prior to Benzene[a] (ppm)[b]	Benzene (ppm)	Toluene (ppm)	o-Xylene (ppm)	m,p-Xylene (ppm)	Ethyl-benzene (ppm)	Peaks Not Otherwise Identified (ppm)[b]	Total Volatile Hydro-carbons (ppm)[b]
V1/A	3.0	1-5	<1	<1	<1	<1	<1	<1	1-5
V1/B	5.5	5	<1	<1	<1	<1	<1	<1	5
V1/C	8.0	5	<1	1-5	<1	1-5	<1	1-5	10
V1/D	10.5	1-5	<1	<1	<1	<1	<1	<1	1-5
V1/E	13.0	5	<1	<1	<1	<1	<1	<1	5
V2/A	3.0	1-5	<1	<1	<1	<1	<1	<1	1-5
V2/B	8.0	1-5	<1	<1	<1	<1	<1	<1	1-5
V3/A	3.0	10	<1	<1	<1	<1	<1	<1	10
V3/B	5.5	10	<1	<1	<1	<1	<1	<1	10
V3/C	8.0	5	<1	<1	<1	<1	<1	<1	5
V3/D	10.5	1-5	<1	<1	<1	<1	<1	<1	1-5
V4	3.0	15	<1	<1	<1	<1	<1	<1	15
V5	3.0	10	<1	<1	<1	<1	<1	<1	10
V6/A	3.0	20	<1	<1	<1	<1	<1	<1	20
V6/B	8.0	140	<1	<1	<1	<1	<1	<1	140
V6/C	13.0	1-5	<1	<1	<1	<1	<1	<1	1-5
V7	3.0	1-5	<1	<1	<1	<1	<1	1	5
V8	3.0	1-5	<1	<1	<1	<1	<1	<1	1-5
V9/A	3.0	1-5	<1	<1	<1	<1	<1	<1	1-5
V9/B	8.0	1-5	<1	<1	<1	<1	<1	1	5
V10	8.0	1-5	<1	<1	<1	<1	<1	<1	1-5
V11	8.0	5	<1	<1	<1	<1	<1	<1	5

a. Early peaks from blank data subtracted from total peaks prior to benzene.
b. Quantified on the basis of the V-sec:ppm response ratio for benzene (see text).

CHV21:82X



GROUNDWATER TECHNOLOGY 4057 PORT CHICAGO HWY. CONCORD, CA 94520 (510) 671-2387				SITE PLAN		
CLIENT: CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0020				LOCATION: 1633 HARRISON STREET OAKLAND, CALIFORNIA	REV. NO.: 0	DATE: 1/15/93
PM: JBW	PE/RG: DRK	DESIGNED: TW	DETAILED: ML	ACAD FILE: SP193	PROJECT NO.: 020302499	FIGURE: 2



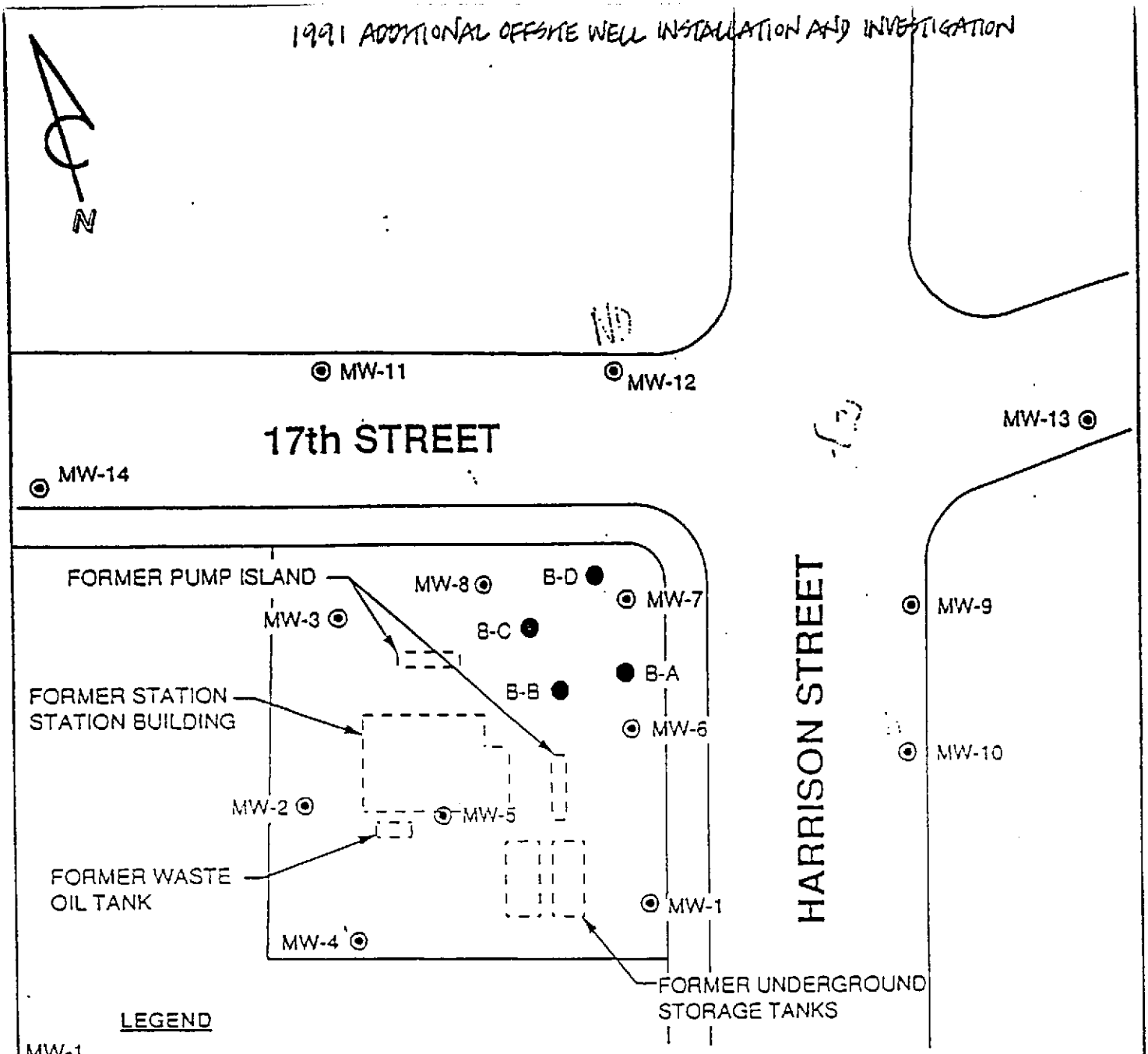
GERAGHTY & MILLER, INC.
Environmental Services

Project No. RC13600

BORING AND MONITOR WELL LOCATIONS
Former Chevron Service Station #9-0020
1633 Harrison Street
Oakland, California

FIGURE
3

1991 ADDITIONAL OFFSITE WELL INSTALLATION AND INVESTIGATION



SCALE

0 40 80 FEET

PACIFIC ENVIRONMENTAL GROUP, INC.	FORMER CHEVRON USA STATION 9-0020 1633 Harrison Street at 17th Street Oakland, California	FIGURE: 2
	SITE MAP	PROJECT: 320-90.01

TABLE 1. Analytic Results for Soil Samples
Former Chevron Service Station 90020, Oakland, CA

Sample ID	Date	FC	THF	Benzene	Toluene	Xylenes	E-Benzene
			<----------ppm---------->				
B-1- 5.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-1-10.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-1-15.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-1-20.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-1-29.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-1-34.0	26 Oct 88				NA		
B-2- 5.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-2-10.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-2-15.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-2-19.0	26 Oct 88	OIL	12	<0.3	<0.3	<0.3	<0.3
B-2-20.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-2-25.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-2-30.0	26 Oct 88				NA		
B-3- 5.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-10.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-15.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-20.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-25.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-30.0	26 Oct 88	---	<10	<0.3	<0.3	<0.3	<0.3
B-3-34.0	26 Oct 88				NA		

Notes:
FC - Fuel characterization
THF - Total fuel hydrocarbons
E-Benzene - Ethyl benzene
NA - Not Analyzed

4/89

Table 2. ANALYTIC RESULTS FOR SOIL SAMPLES
Former Chevron SS #90020
Oakland, California
WGR Project # 1-012.01

SAMPLE ID	DEPTH (ft)	TPPH	BENZENE	TOLUENE	XYLENES	E-BENZENE	CT	PCE	TCE	TCA
		<----------PPM---------->								
B-4	6.0	<5.0	<0.005	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005
B-4	16.0	<2.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-4	23.2	<2.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-5	9.5	<2.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-5	14.5	<2.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-5	22.0	<2.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-6	9.5	<2.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-6	14.5	<1.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-6	22.0	<1.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-7	4.2	<1.0	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
B-7	9.2	<1.0	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
B-7	14.0	<0.5	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
B-7	21.6	<0.5	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
B-8	4.5	600	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
B-8	9.6	600	<0.01	<0.01	<0.020	<0.01	<0.01	<0.01	<0.01	0.1
B-8	9.6	450	<0.02	<0.02	<0.040	<0.02	<0.02	<0.02	<0.02	0.090
B-8	14.5	<1.0	<0.02	<0.02	<0.004	<0.02	<0.02	<0.02	<0.02	<0.002
B-8	22.5	<1.0	<0.02	<0.02	<0.004	<0.02	<0.02	<0.02	<0.02	<0.002
B-8	29.5	<1.0	<0.02	<0.02	<0.004	<0.02	<0.02	<0.02	<0.02	<0.002
B-8	34.5	<1.0	<0.02	<0.02	<0.004	<0.02	<0.02	<0.02	<0.02	<0.002
B-9	9.0	<0.5	<0.005	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005
B-9	14.0	<0.5	<0.005	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005
B-9	21.0	<0.1	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-9	29.5	<0.5	<0.005	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005
B-9	33.5	<5.0	<0.005	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005

Table 2 (continued)

SAMPLE ID	DEPTH (ft)	TPPH	BENZENE	TOLUENE	XYLENES	E-BENZENE	CT	PCE	TCE	TCA
		<----------PPM---------->								
B-10	9.5	<1.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-10	14.5	<1.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-10	21.5	<1.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-10	27.0	<1.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-11	9.5	<0.1	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-11	14.25	<2.0	<0.0002	<0.0002	<0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
B-11	19.25	680	<0.01	<0.01	0.950	0.140	<0.010	<0.010	<0.010	<0.010 *
B-11	23.50	45,000	<0.1	4.0	12	3.500	<0.1	<0.1	<0.1	0.2
B-11	23.50	50,000.	<0.2	4.1	20	5.0	<0.2	<0.2	<0.2	<0.2
B-11	29.50	<1.0	<0.001	<0.001	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001
B-12	9.50	<1.0	<0.002	0.003	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-12	14.50	<2.0	<0.005	<0.005	<0.010	<0.005	<0.005	<0.005	<0.005	<0.005
B-12	21.00	<1.0	<0.002	0.003	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-12	24.25	<1.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002
B-12	27.50	<1.0	<0.002	<0.002	<0.004	<0.002	<0.002	<0.002	<0.002	<0.002

SAMPLE ID	DEPTH (ft)	O & G	Cd	Cr	Pb	Zn
		<----------PPM---------->				
B-9	21.0	80	<10	27	<1	17

NOTES

E-Benzene = Ethylbenzene

TPPH = Total purgeable petroleum hydrocarbons analyzed by Central Coast

PPB = Parts per billion

PPM = Parts per million

CT = Carbon Tetrachloride

PCE = Tetrachloroethene

TCE = Trichloroethene

TCA = 1,1,1-Trichloroethane

O&G = Oil and gas

Cd = Cadmium

Cr = Chromuim

Pb = Lead

Zn = Zinc

* = Chlorobenzene at 0.07 ppm

012T2JN9

TABLE 4. Analytic Results: Soil Samples
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

Boring ID #	Date	EPA Method	Depth (ft)	FC	TPPH	Benzene	Toluene	E-Benzene	Xylenes
				<----------	ppm	----------			>
B-13-16.0	18 Jun 90	8015/8020	16.0	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-13-21.0	18 Jun 90	8015/8020/8010	21.0	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-13-28.0	18 Jun 90	8015/8020	28.0	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-14-16.0	19 Jun 90	8015/8020	16.0	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-14-21.5	19 Jun 90	8015/8020/8010	21.5	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-14-29.5	19 Jun 90	8015/8020	29.5	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-15-16.0	20 Jun 90	8015/8020	16.0	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-15-19.5	20 Jun 90	8015/8020/8010	19.5	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-15-25.2	20 Jun 90	8015/8020	25.2	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-16-6.2	21 Jun 90	8015/8020	6.2	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-16-10.6	21 Jun 90	8015/8020	10.6	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-16-15.6	21 Jun 90	8015/8020	15.6	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-16-18.8	21 Jun 90	8015/8020/8010	18.8	---	<1.0	<0.005	<0.005	<0.005	<0.005
B-16-25.6	21 Jun 90	8015/8020	25.6	---	<1.0	<0.005	<0.005	<0.005	<0.005

NOTES:

FC = Fuel Characterization
TPPH = Total Purgeable Petroleum Hydrocarbons
E-Benzene = Ethylbenzene
Xylenes = Total Xylenes
ft = feet
ppm = parts-per-million
< = Less than listed detection limit
--- = Not characterized
All samples analyzed by Pace, Inc., Novato, California

Table 1
Soil Analytical Results - Petroleum Hydrocarbons

Former Chevron Service Station 9-0020
1633 Harrison Street at 17th Street
Oakland, California

Boring Number	Sample Depth (feet)	Sample Date	TPH-Gasoline (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)
MW-13	15 - 16.5	10/03/91	ND	ND	ND	ND	ND
	20 - 21.5	10/03/91	ND	ND	ND	ND	ND
	25 - 26.5	10/03/91	ND	ND	ND	ND	ND
MW-14	10 - 11.5	10/03/91	ND	ND	ND	ND	ND
	20 - 21.5	10/03/91	ND	ND	ND	ND	ND
	25 - 26.5	10/03/91	ND	ND	ND	ND	ND
B-A	10 - 11.5	10/05/91	ND	ND	ND	ND	ND
	15 - 16.5	10/05/91	ND	ND	ND	ND	ND
	20 - 21.5	10/05/91	ND	ND	ND	ND	ND
	25 - 26.5	10/05/91	ND	ND	ND	ND	ND
	30 - 31.5	10/05/91	ND	ND	ND	ND	ND
B-B	10 - 11.5	10/05/91	ND	ND	ND	ND	ND
	15 - 16.5	10/05/91	ND	ND	ND	ND	ND
	20 - 21.5	10/05/91	ND	ND	ND	ND	ND
	25 - 26.5	10/05/91	ND	ND	ND	ND	ND
B-C	10 - 11.5	10/05/91	ND	ND	ND	ND	ND
	15 - 16.5	10/05/91	ND	ND	ND	ND	ND
	20 - 21.5	10/05/91	ND	ND	ND	ND	ND
	25 - 26.5	10/05/91	ND	ND	ND	ND	ND
	28.5 - 30	10/05/91	ND	ND	ND	ND	ND
B-D	10 - 11.5	10/05/91	ND	ND	ND	ND	ND
	15 - 16.5	10/05/91	ND	ND	ND	ND	ND
	20 - 21.5	10/05/91	ND	ND	ND	ND	ND
	25 - 26.5	10/05/91	120	ND	0.16	0.14	1.8
	28.5 - 30	10/05/91	ND	ND	ND	ND	ND

TPH = total petroleum hydrocarbons
ppm = parts per million
ND = not detected

Table 2
Soil Analytical Results - Halogenated Volatile Organics

Former Chevron Service Station 9-0020
1633 Harrison Street at 17th Street
Oakland, California

Well Number	Sample Depth (feet)	Sample Date	Halogenated Volatile Organics (ppb)
MW-14	10 - 11.5	10/03/91	All ND
	20 - 21.5	10/03/91	All ND
	25 - 26.5	10/03/91	All ND

ND = Not detected

TABLE 1
ANALYTICAL RESULTS OF SOIL SAMPLES
COLLECTED ON NOVEMBER 11 AND DECEMBER 8, 1992
(Concentrations in parts per million)

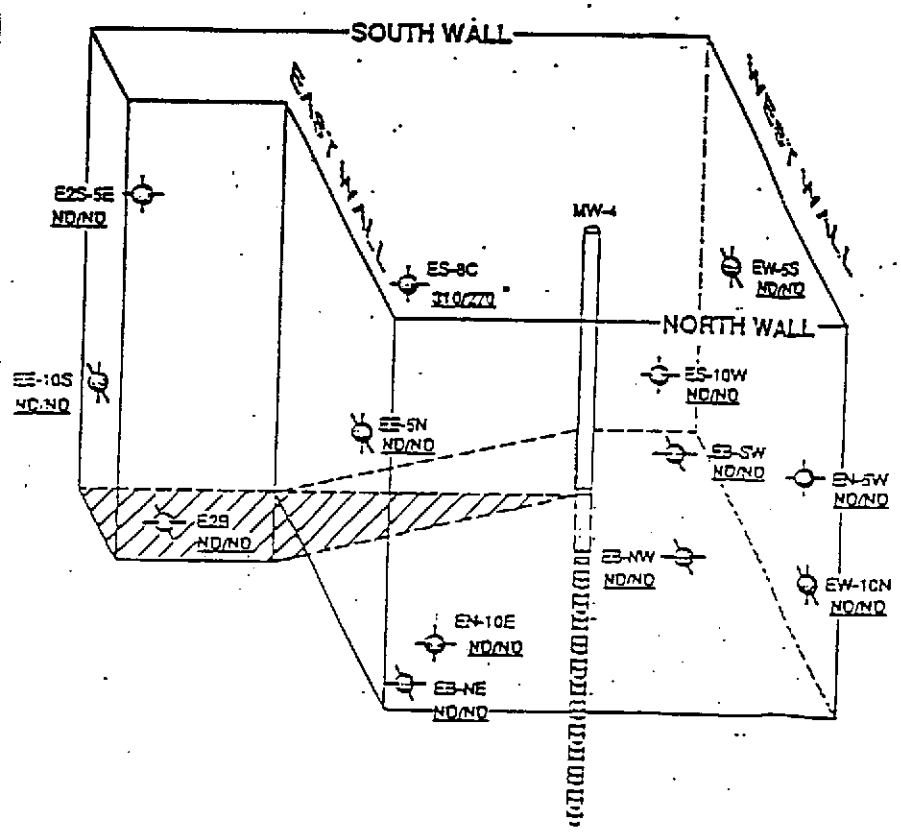
DATE	SAMPLE ID	SAMPLE DEPTH (feet)	BENZENE	TOLUENE	ETHYL-BENZENE	XYLENES	TPH-AS-GASOLINE	TOTAL ORGANIC CARBON
11/11/92	MW-15	20	<0.005	<0.005	<0.005	<0.005	<1	120
		30	<0.005	<0.005	<0.005	<0.005	<1	–
12/08/92	MW-16	10	<0.005	<0.005	<0.005	<0.005	<1	–
		20	<0.005	<0.005	<0.005	<0.005	<1	60

TPH = Total petroleum hydrocarbons

R2779A1.TW

GROUNDWATER TECHNOLOGY

1992 EXCAVATION SAMPLING LOCATIONS



LEGEND

MW-4 GROUNDWATER MONITORING WELL LOC AND DESIGNATION

EN-10E SOIL SAMPLE LOCATION AND DESIGNATI

North Wall	South Wall	East Wall
EN-5W	E2S-SE	EE-5N
EN-10E	ES-8C	EE-10S
--	ES-10W	

West Wall	Bottom of Excavation
EW-5S	EB-NE
EW-10N	EB-NW
	EB-SW
	E29

210/270 GASOLINE/DIESEL CONCENTRATION IN S. PARTS PER MILLION, 1-3-92

ND NON-DETECTABLE LEVELS

* NON-TYPICAL DIESEL CHROMATOGRAPH PATTERN WAS OBSERVED

PACIFIC
RONMENTAL
OUP, INC.

SCALE
0 4 8 FEET

FORMER CHEVRON USA STATION 9-0020
1633 Harrison Street at 17th Street
Oakland, California

GASOLINE/DIESEL CONCENTRATION MAP

1992 EXCAVATION SAMPLING RESULTS

Table 1
Soil Analytical Results
Low Boiling Hydrocarbons

Former Chevron Service Station 9-0020
1633 Harrison Street at 17th Street
Oakland, California

Sample Date: January 9, 1992

Sample ID	TPH-gasoline (ppm)	TPH-diesel (ppm)	Benzene (ppm)	Toluene (ppm)	Ethylbenzene (ppm)	Xylenes (ppm)
ES-10W	ND	ND	ND	ND	ND	ND
ES-8C	310	270*	ND	ND	0.88	2.8
EE-5N	ND	ND	ND	ND	ND	ND
EE-10S	ND	ND	ND	ND	ND	ND
EN-5W	ND	ND	ND	ND	ND	ND
EN-10E	ND	ND	ND	ND	ND	ND
EW-5S	ND	ND	ND	ND	ND	ND
EW-10N	ND	ND	ND	ND	ND	ND
EB-NE	ND	ND	ND	ND	ND	ND
EB-NW	ND	ND	ND	ND	ND	ND
EB-SW	ND	ND	ND	ND	ND	ND
E2S-5E	ND	ND	ND	ND	ND	ND
E2B	ND	ND	ND	ND	ND	ND
SP1	14**	ND	ND	ND	ND	0.09
SP2	14**	ND	ND	ND	ND	0.07
SP3	5***	ND	ND	0.014	0.025	71

* = Diesel range concentration reported. A non-standard diesel pattern was observed in chromatogram.
** = Gasoline range concentration reported. A non-standard gasoline pattern was observed in the chromatogram.
*** = Gasoline range concentration reported. The majority of peaks were observed in the diesel range of the chromatogram.
ppm = parts per million
SP1, SP2 and SP3 are composite soil samples from the spoils pile (SP3 sampled on January 22, 1992).

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-1											
11/03/88	29.82	9.42	20.40	--	<1000	<1.0	<1.0	<1.0	<1.0	--	--
02/02/89	29.82	9.11	20.71	--	--	--	--	--	--	--	--
02/10/89	29.82	--	--	--	<100	<0.2	<0.2	<0.2	<0.4	--	--
04/23/89	29.82	9.48	20.34	--	--	--	--	--	--	--	--
04/24/89	29.82	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	--	<3000
07/28/89	29.82	9.24	20.58	--	<50	<0.1	<0.5	<0.2	<0.5	--	<3000
10/30/89	29.82	9.30	20.52	--	<500	<0.3	<0.3	<0.3	<0.6	--	--
01/09/90	29.82	9.05	20.77	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
04/18/90	29.82	8.87	20.95	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
06/22/90	29.82	8.82	21.00	--	--	--	--	--	--	--	--
08/09/90	29.82	8.88	20.94	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	29.82	8.84	20.98	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
05/15/91	29.82	9.18	20.64	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	29.82	9.03	20.79	--	110	<0.5	<0.5	<0.5	<0.5	--	--
11/15/91	29.82	9.07	20.75	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
02/20/92	29.82	8.92	20.90	--	<50	0.5	0.6	<0.5	0.9	--	--
06/15/92	29.82	9.18	20.64	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/92	29.82	8.98	20.84	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	29.82	9.91	19.91	--	<50	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	29.82	9.97	19.85	--	--	--	--	--	--	--	--
09/10/93	29.82	--	--	--	--	--	--	--	--	--	--
09/27/93	29.82	9.47	20.35	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/17/93	29.82	9.14	20.68	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/10/94	29.82	9.25	20.57	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/16/94	29.82	9.27	20.55	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/07/94	29.82	9.13	20.69	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
11/30/94	29.82	9.59	20.23	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/22/95	29.82	10.37	19.45	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-2											
11/03/88	30.59	9.70	20.89	--	<1000	<1.0	<1.0	<1.0	<1.0	--	--
02/02/89	30.59	9.38	21.21	--	--	--	--	--	--	--	--
02/10/89	30.59	--	--	--	<100	<0.2	<0.2	<0.2	<0.4	--	--
04/23/89	30.59	9.77	20.82	--	--	--	--	--	--	--	--
04/24/89	30.59	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	--	<3000
07/28/89	30.59	9.57	21.02	--	<100	<0.2	<1.0	<0.2	<0.5	--	<3000
10/30/89	30.59	9.63	20.96	--	<500	<0.3	<0.3	<0.3	<0.6	--	--
01/09/90	30.59	9.34	21.25	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
04/18/90	30.59	9.06	21.53	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
06/22/90	30.59	9.02	21.57	--	--	--	--	--	--	--	--
08/09/90	30.59	9.04	21.55	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	30.59	9.05	21.54	--	<50	<0.5	0.8	<0.5	0.9	--	--
05/15/91	30.59	9.44	21.15	--	83	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	30.59	9.32	21.27	--	97	<0.5	<0.5	<0.5	<0.5	--	--
11/15/91	30.59	9.29	21.30	--	<50	0.5	1.5	0.8	3.6	--	--
02/20/92	30.59	9.13	21.43	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/15/92	30.59	9.41	21.18	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/92	30.56	9.09	21.47	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	30.56	10.03	20.53	--	66	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	30.56	10.11	20.45	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/10/93	30.56	--	--	--	--	--	--	--	--	--	--
09/27/93	30.56	9.59	20.97	--	--	--	--	--	--	--	--
12/17/93	30.56	9.25	21.31	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/10/94	30.56	9.33	21.23	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/16/94	30.56	9.35	21.21	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/07/94	30.56	9.22	21.34	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
11/30/94	30.56	9.66	20.90	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/22/95	30.56	10.22	20.34	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-3											
11/03/88	30.09	9.55	20.54	--	<1000	<1.0	<1.0	<1.0	<1.0	--	--
02/02/89	30.09	9.24	20.85	--	--	--	--	--	--	--	--
02/10/89	30.09	--	--	--	<100	<0.2	<0.2	<0.2	<0.4	--	--
04/23/89	30.09	9.66	20.43	--	--	--	--	--	--	--	--
04/24/89	30.09	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	--	<3000
07/28/89	30.09	9.45	20.64	--	<100	<0.2	<1.0	<0.2	<0.4	--	<3000
10/30/89	30.09	9.48	20.61	--	<500	<0.3	<0.3	<0.3	<0.6	--	--
01/09/90	30.09	9.21	20.88	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
04/18/90	30.09	8.94	21.15	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
06/22/90	30.09	8.89	21.20	--	--	--	--	--	--	--	--
08/09/90	30.09	8.91	21.18	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	30.09	8.94	21.15	--	51	<0.5	<0.5	<0.5	<0.5	--	--
05/15/91	30.09	9.18	20.91	--	85	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	30.09	9.20	20.89	*	91	<0.5	<0.5	<0.5	<0.5	--	--
11/15/91	30.09	9.07	21.02	--	<50	<0.5	0.7	<0.5	1.3	--	--
02/20/92	30.09	9.02	21.07	--	<50	<0.5	<0.5	<0.5	0.9	--	--
06/15/92	30.09	9.27	20.82	--	50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/92	30.08	9.07	21.07	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	30.08	9.95	20.13	--	<50	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	30.08	10.03	20.05	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/10/93	30.08	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/27/93	30.08	9.50	20.58	--	--	--	--	--	--	--	--
12/17/93	30.08	9.07	21.01	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/10/94	30.08	9.22	20.86	--	<50	<0.5	<0.5	<0.5	1.1	--	--
06/16/94	30.08	9.21	20.87	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/07/94	30.08	9.11	20.97	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
11/30/94	30.08	10.45	19.63	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/22/95	30.08	10.27	19.81	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

* See Table 2 of Additonal Analyses.

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-4											
04/23/89	31.17	9.84	21.33	--	--	--	--	--	--	--	--
04/24/89	31.17	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	--	<3000
07/28/89	31.17	9.59	21.58	--	<50	<0.1	<0.5	<0.1	<0.2	--	<3000
10/30/89	31.17	9.63	21.54	--	<500	<0.3	<0.3	<0.3	<0.6	--	--
01/09/90	31.17	9.35	21.82	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
04/18/90	31.17	9.08	22.09	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
06/22/90	31.17	9.05	22.12	--	--	--	--	--	--	--	--
08/09/90	31.17	9.06	22.11	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	31.17	9.07	22.10	--	<50	<0.5	1.0	0.5	1.0	--	--
05/15/91	31.17	9.46	21.71	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	31.17	9.30	21.87	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
11/15/91	31.17	9.37	21.80	--	97	<0.5	0.9	<0.5	1.9	--	--
02/20/92	31.17	9.18	21.99	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/15/92	31.17	9.43	21.74	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/92	31.17	9.12	22.05	--	<50	0.7	0.5	0.5	1.3	--	--
04/07/93	31.17	10.06	21.11	--	<50	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	31.17	--	--	--	--	--	--	--	--	--	--
09/10/93	31.17	--	--	--	--	--	--	--	--	--	--
09/27/93	31.17	9.63	21.54	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/17/93	31.17	9.28	21.89	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/10/94	31.17	--	--	--	--	--	--	--	--	--	--
06/16/94	31.17	10.63	20.54	--	--	--	--	--	--	--	--
09/07/94	31.17	9.27	21.90	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
11/30/94	31.17	9.83	21.34	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/21/95	31.17	10.55	20.62	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-5											
04/23/89	30.28	9.66	20.62	--	--	--	--	--	--	--	--
04/24/89	30.28	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	--	<3000
07/28/89	30.28	9.42	20.86	--	<100	<0.2	<1.0	<0.2	<0.4	--	<3000
10/30/89	30.28	9.46	20.82	--	<500	<0.3	<0.3	<0.3	<0.6	--	--
01/09/90	30.28	9.21	21.07	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
04/18/90	30.28	8.93	21.35	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
06/22/90	30.28	8.90	21.38	--	--	--	--	--	--	--	--
08/09/90	30.28	8.92	21.36	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	30.28	8.93	21.35	--	<50	<0.5	1.0	<0.5	1.0	--	--
05/15/91	30.28	8.99	21.29	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	30.28	9.17	21.11	--	94	3.0	5.0	1.5	5.5	--	--
11/15/91	30.28	9.10	21.18	--	<50	0.9	1.7	<0.5	2.2	--	--
02/20/92	30.28	9.03	21.25	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/15/92	30.28	9.28	21.00	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/92	30.28	9.05	21.23	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	30.28	9.97	20.31	--	<50	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	30.28	--	--	--	--	--	--	--	--	--	--
09/10/93	30.28	--	--	--	--	--	--	--	--	--	--
09/27/93	30.28	9.52	20.76	--	--	--	--	--	--	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-6											
04/23/89	29.46	9.41	20.05	--	--	--	--	--	--	--	--
04/24/89	29.46	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	--	<3.0
07/28/89	29.46	9.16	20.30	--	<100	<0.2	<1.0	<0.2	<0.4	--	<3.0
10/30/89	29.46	9.14	20.32	--	<500	<0.3	<0.3	<0.3	<0.6	--	--
01/09/90	29.46	8.95	20.51	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
04/18/90	29.46	8.74	20.72	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
06/22/90	29.46	8.69	20.77	--	--	--	--	--	--	--	--
08/09/90	29.46	8.72	20.74	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	29.46	8.71	20.75	--	<50	3.0	5.0	0.5	2.0	--	--
05/15/91	29.46	8.85	20.61	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	29.46	8.93	20.53	--	180	6.1	12	3.8	14	--	--
11/15/91	29.46	8.93	20.53	--	<50	<0.5	0.6	<0.5	<0.5	--	--
02/20/92	29.46	8.77	20.69	--	<50	0.9	1.1	<0.5	1.4	--	--
06/15/92	29.46	9.08	20.38	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/92	29.45	8.88	20.57	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	29.45	9.86	19.59	--	<50	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	29.45	9.95	19.50	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/10/93	29.45	--	--	--	--	--	--	--	--	--	--
09/27/93	29.45	9.38	20.07	--	--	--	--	--	--	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-7											
04/23/89	29.01	10.02	18.99	--	--	--	--	--	--	--	--
04/24/89	29.01	--	--	See Table 2	8400	100	260	160	1300	--	<3.0
07/28/89	29.01	9.07	19.94	--	7000	230	90	70	440	--	<3000
07/28/89	29.01	--	--	Duplicate	6000	280	180	58	430	--	--
10/30/89	29.01	9.04	19.97	--	10,000	570	55	160	400	--	--
10/30/89	29.01	--	--	Duplicate	9900	520	82	180	410	--	--
01/09/90	29.01	8.86	20.15	--	3400	290	72	9.0	200	--	--
04/18/90	29.01	8.64	20.37	--	6800	350	140	110	400	--	--
06/22/90	29.01	8.61	20.40	--	--	--	--	--	--	--	--
08/09/90	29.01	8.63	20.38	--	11,000	360	130	14	660	--	--
11/13/90	29.01	8.60	20.41	--	6500	230	110	97	460	--	--
05/15/91	29.01	8.54	20.47	--	4600	180	55	46	300	--	--
08/27/91	29.01	8.87	20.14	--	7000	220	53	63	340	--	--
11/15/91	29.01	8.79	20.22	--	3300	150	19	4.9	200	--	--
02/20/92	29.01	8.69	20.32	--	5200	520	150	100	380	--	--
06/15/92	29.01	9.03	19.98	--	10,000	760	430	320	1100	--	--
12/16/92	29.01	8.87	20.14	--	11,000	810	350	280	1100	--	--
04/07/93	29.01	9.87	19.14	--	150	1.4	0.9	0.9	4.5	--	--
06/09/93	29.01	9.96	19.05	--	180	4.0	1.0	1.0	3.0	--	--
09/10/93	29.01	--	--	--	--	--	--	--	--	--	--
09/27/93	29.01	--	--	--	--	--	--	--	--	--	--
12/17/93	29.01	--	--	--	--	--	--	--	--	--	--
03/10/94	29.01	--	--	--	--	--	--	--	--	--	--
06/16/94	29.01	--	--	--	--	--	--	--	--	--	--
09/07/94	29.01	--	--	--	--	--	--	--	--	--	--
11/30/94	29.01	--	--	Inaccessible	--	--	--	--	--	--	--
01/17/95	29.01	17.39	11.62	--	2700	140	65	44	200	--	--
03/22/95	29.01	11.33	17.68	--	160	3.4	<0.5	1.1	0.77	--	--
06/27/95	29.01	9.75	19.26	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/28/95	29.01	9.67	19.34	--	1500	84	24	26	130	--	--
12/30/95	29.01	9.85	19.16	--	200	1.6	<0.5	1.3	5.9	5.5	--
02/28/96	29.01	10.57	18.44	--	650	14	1.3	4.2	16	34	--
06/27/96	29.01	10.29	18.72	--	640	140	10	9.8	14	55	--
09/13/96	29.01	9.61	19.40	--	1400	100	30	24	66	130	--
12/16/96	29.01	8.91	20.10	--	2600	140	72	51	180	<50	--

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Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-7 (CONT'D)											
03/20/97	29.01	10.06	18.95	--	64	1.7	2.4	<0.5	0.67	<2.5	--
09/08/97	29.01	9.34	19.67	--	590	45	<1.0	7.7	<1.0	46	--
02/16/98	29.01	10.41	18.60	--	120	8.7	7.5	1.9	11	4.4	--
08/25/98	29.01	9.61	19.40	--	160	6.2	33	0.84	2.0	<2.5	--
03/09/99	29.01	13.01	16.00	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
09/29/99	29.01	12.12	16.89	--	276	35.1	2.54	2.17	5.43	<5.0	--
09/29/99	29.01	12.12	16.89	Confirmation run	--	--	--	--	--	<2.0	--
MW-8											
04/23/89	29.57	9.43	20.14	--	--	--	--	--	--	--	--
04/24/89	29.57	--	--	--	<50	<0.5	<1.0	<1.0	<1.0	--	3000
04/24/89	29.57	--	--	Duplicate	<50	<0.5	<1.0	<1.0	<1.0	--	--
07/28/89	29.57	9.20	20.37	--	<100	<0.2	<1.0	<0.2	<0.4	--	<3000
10/30/89	29.57	9.25	20.32	--	<500	<0.3	<0.3	<0.3	<0.6	--	--
01/09/90	29.57	8.97	20.60	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
04/18/90	29.57	8.70	20.87	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
06/22/90	29.57	9.23	20.34	--	--	--	--	--	--	--	--
08/09/90	29.57	8.68	20.89	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	29.57	8.71	20.86	--	<50	<0.5	0.8	<0.5	2.0	--	--
05/15/91	29.57	9.08	20.49	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	29.57	8.97	20.60	--	73	<0.5	<0.5	<0.5	<0.5	--	--
11/15/91	29.57	8.95	20.62	--	<50	<0.5	0.7	<0.5	2.1	--	--
02/20/92	29.57	8.77	20.80	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/15/92	29.57	9.09	20.48	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/92	29.57	8.89	20.68	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	29.57	9.87	19.70	--	<50	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	29.57	9.97	19.60	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/10/93	29.57	--	--	--	--	--	--	--	--	--	--
09/27/93	29.57	9.35	20.22	--	--	--	--	--	--	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-9											
06/22/90	28.67	7.87	20.80	--	5700	47	31	280	530	--	<1000
08/09/90	28.67	7.93	20.74	--	8000	<0.3	17	210	480	--	--
11/13/90	28.67	7.89	20.78	--	6400	<3.0	20	240	450	--	--
05/15/91	28.67	8.19	20.48	--	5700	2.0	16	190	390	--	--
08/27/91	28.67	8.12	20.55	--	6700	<3.0	31	180	350	--	--
11/15/91	28.67	8.10	20.57	--	4000	8.8	26	150	280	--	--
02/20/92	28.67	6.90	21.77	--	3400	13	30	230	460	--	--
06/15/92	28.67	8.30	20.37	--	4500	19	72	280	560	--	--
12/16/92	28.68	8.39	20.29	--	9900	380	220	380	1300	--	--
04/07/93	28.68	9.36	19.32	--	8700	51	150	360	1000	--	--
06/09/93	28.68	9.52	19.16	--	8900	170	160	350	1100	--	--
09/10/93	28.68	--	--	--	4600	110	63	190	350	--	--
09/27/93	28.68	8.74	19.94	--	--	--	--	--	--	--	--
12/17/93	28.68	8.37	20.31	--	4600	92	85	180	300	--	--
03/10/94	28.68	8.38	20.30	--	3300	8.0	29	120	170	--	--
06/16/94	28.68	8.42	20.26	--	2900	4.8	16	85	64	--	--
09/07/94	28.68	8.27	20.41	--	2900	<0.5	9.9	70	75	--	--
11/30/94	28.68	8.70	19.98	--	2100	<5.0	<5.0	53	51	--	--
03/22/95	28.68	9.27	19.41	--	2200	<5.0	5.3	26	69	--	--
06/27/95	28.68	9.28	19.40	--	2900	7.4	10	68	99	--	--
09/28/95	28.68	9.13	19.55	--	4000	32	<10	36	44	--	--
12/30/95	28.68	8.88	19.80	--	3800	<5.0	13	<5.0	120	120	--
02/28/96	28.68	8.93	19.75	--	2000	9.9	<5.0	46	30	<25	--
06/27/96	28.68	9.13	19.55	--	2400	36	7.1	65	72	<50	--
09/13/96	28.68	8.86	19.82	--	2500	26	8.4	53	39	36	--
12/16/96	28.68	7.91	20.77	--	1200	3.5	2.4	12	14	<10	--
03/20/97	28.68	9.28	19.40	--	2400	25	5.8	26	22	<25	--
09/08/97	28.68	8.59	20.09	--	1800	9.5	8.1	22	21	12	--
02/16/98	28.68	9.45	19.23	--	950	5.6	3.1	13	13	18	--
08/25/98	28.68	9.18	19.50	--	2100	2.5	6.4	35	51	8.9	--
03/09/99	28.68	8.87	19.81	--	1400	12	7.8	8.8	16	8.8	--
07/19/99	28.68	--	--	*	--	--	--	--	--	--	--
09/29/99	28.68	8.27	20.41	--	217	1.36	1.14	1.56	1.49	<5.0	--
09/29/99	28.68	8.27	20.41	Confirmation run	--	--	--	--	--	<2.0	--

* ORC's installed.

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-10											
06/22/90	28.60	8.12	20.48	--	<50	<0.5	<0.5	<0.5	<0.5	--	<1000
08/09/90	28.60	8.15	20.45	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	28.60	8.13	20.47	--	<50	<0.5	2.0	0.5	2.0	--	--
05/15/91	28.60	8.45	20.15	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	28.60	8.33	20.27	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
11/15/91	28.60	8.27	20.33	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
02/20/92	28.60	7.15	21.45	--	<50	2.0	2.2	<0.5	2.1	--	--
06/15/92	28.60	7.30	21.30	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/92	28.62	8.45	20.17	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	28.62	9.41	19.26	--	<50	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	28.62	9.55	19.07	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/10/93	28.62	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/24/93	28.62	8.90	19.72	--	--	--	--	--	--	--	--
12/17/93	28.62	8.55	20.07	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/10/94	28.62	8.65	19.97	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/16/94	28.62	8.64	19.98	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/07/94	28.62	8.50	20.12	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
11/30/94	28.62	8.92	19.70	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/22/95	28.62	9.70	18.92	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-11											
06/22/90	29.37	8.34	21.03	--	<50	<0.5	<0.5	<0.5	<0.5	-- --	<1000
08/09/90	29.37	8.35	21.02	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	29.37	8.44	20.93	--	76	0.6	1.0	0.9	4.0	--	--
05/15/91	29.37	8.76	20.61	--	78	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	29.37	8.67	20.70	--	110	<0.5	<0.5	<0.5	<0.5	--	--
11/15/91	29.37	8.69	20.68	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
02/20/92	29.37	7.46	21.91	--	<50	1.9	2.1	1.0	4.4	--	--
06/15/92	29.37	8.81	20.56	--	--	--	--	--	--	--	--
12/16/92	29.39	8.64	20.75	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	29.39	9.56	19.83	--	<50	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	29.39	9.72	19.67	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/10/93	29.39	--	--	--	--	--	--	--	--	--	--
09/27/93	29.39	9.06	20.33	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/17/93	29.39	8.66	20.73	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/10/94	29.39	8.70	20.69	--	--	--	--	--	--	--	--
06/16/94	29.39	8.83	20.56	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--
MW-12											
06/22/90	28.43	7.98	20.45	--	<50	<0.5	<0.5	<0.5	<0.5	--	<1000
08/09/90	28.43	8.00	20.43	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	28.43	7.98	20.45	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
05/15/91	28.43	8.36	20.07	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	28.43	8.28	20.15	--	56	<0.5	<0.5	<0.5	<0.5	--	--
11/15/91	28.43	8.18	20.25	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
02/20/92	28.43	7.06	21.37	--	<50	2.5	3.1	0.7	3.0	--	--
06/15/92	28.43	8.53	19.90	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/92	28.43	8.63	19.80	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	28.43	9.68	18.75	--	<50	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	28.43	--	--	--	--	--	--	--	--	--	--
09/10/93	28.43	--	--	--	--	--	--	--	--	--	--
09/27/93	28.43	8.80	19.63	--	--	--	--	--	--	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-13											
11/15/91	28.63	7.56	21.07	*	3100	68	40	110	270	--	--
02/20/92	28.63	6.46	22.17	--	3100	120	50	240	400	--	--
06/15/92	28.63	7.96	20.67	--	3200	35	33	210	300	--	--
12/16/92	28.62	8.28	20.34	--	87,000	1400	540	2400	11,000	--	--
04/07/93	28.62	9.21	19.41	--	1500	72	12	70	160	--	--
06/09/93	28.62	9.42	19.20	--	210	6.0	2.0	7.0	16	--	--
09/10/93	28.62	--	--	--	73	3.0	<0.5	2.0	3.0	--	--
09/27/93	28.62	8.27	20.35	--	--	--	--	--	--	--	--
12/17/93	28.62	7.86	20.76	--	640	43	12	12	37	--	--
03/10/94	28.62	7.93	20.69	--	540	44	22	10	69	--	--
06/16/94	28.62	7.95	20.67	--	1800	63	12	18	64	--	--
09/07/94	28.62	7.79	20.83	--	1400	59	12	22	50	--	--
11/30/94	28.62	8.21	20.41	--	700	36	4.4	18	31	--	--
03/22/95	28.62	8.80	19.82	--	190	1.4	1.4	<0.5	<0.5	--	--
06/27/95	28.62	8.86	19.76	--	220	1.8	<0.5	<0.5	0.84	--	--
09/28/95	28.62	8.58	20.04	--	160	3.2	<0.5	0.97	2.2	--	--
12/30/95	28.62	8.32	20.30	--	190	0.94	<0.5	0.74	1.1	<2.5	--
02/28/96	28.62	8.73	19.89	--	130	<0.5	<0.5	<0.5	<0.5	<2.5	--
06/27/96	28.62	8.64	19.98	--	280	<0.5	1.4	<0.5	3.8	9.4	--
09/13/96	28.62	8.34	20.28	--	170	<0.5	<0.5	<0.5	0.89	2.7	--
12/16/96	28.62	8.15	20.47	--	170	<0.5	0.51	0.6	3.0	<2.5	--
03/20/97	28.62	8.72	19.90	--	290	1.6	0.78	1.1	1.5	3.4	--
09/08/97	28.62	8.13	20.49	--	140	0.52	1.5	<0.5	1.2	<2.5	--
02/16/98	28.62	8.87	19.75	--	64	<0.5	<0.5	<0.5	<0.5	<2.5	--
08/25/98	28.62	8.60	20.02	--	99	<0.5	<0.5	<0.5	1.7	<2.5	--
03/09/99	28.62	8.62	20.00	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
09/29/99	28.62	8.13	20.49	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--
09/29/99	28.62	8.13	20.49	Confirmation run	--	--	--	--	--	<2.0	--

*See Table 2 of Additional Analysis.

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-14											
11/15/91	29.46	9.13	20.33	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
02/20/92	29.46	8.05	21.41	--	<50	1.3	1.8	1.1	5.2	--	--
06/15/92	29.46	--	--	--	--	--	--	--	--	--	--
12/16/92	29.45	8.79	20.66	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	29.45	--	--	--	--	--	--	--	--	--	--
06/09/93	29.45	--	--	--	--	--	--	--	--	--	--
09/10/93	29.45	--	--	--	--	--	--	--	--	--	--
09/27/93	29.45	9.19	20.26	--	--	--	--	--	--	--	--
01/17/98	--	--	--	Abandoned	--	--	--	--	--	--	--
MW-15											
12/16/92	28.04	8.30	19.74	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	28.04	9.24	18.80	--	<50	1.3	<0.5	<0.5	<1.5	--	--
06/09/93	28.04	9.44	18.60	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/10/93	28.04	--	--	--	--	--	--	--	--	--	--
09/27/93	28.04	8.11	19.93	--	<50	2.0	<0.5	<0.5	<0.5	--	--
12/17/93	28.04	7.72	20.32	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/10/94	28.04	7.75	20.29	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/16/94	28.04	7.73	20.31	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/07/94	28.04	7.61	20.43	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
11/30/94	28.04	8.03	20.01	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/22/95	28.04	8.57	19.47	--	69	4.9	<0.5	<0.5	<0.5	--	--
06/27/95	28.04	8.70	19.34	--	<50	3.9	<0.5	1.4	<0.5	--	--
09/28/95	28.04	8.38	19.66	--	<50	0.82	<0.5	<0.5	<0.5	--	--
12/30/95	28.04	8.10	19.94	--	160	7.0	1.4	<0.5	1.8	14	--
02/28/96	28.04	8.41	19.63	--	81	1.7	<0.5	<0.5	<0.5	<2.5	--
06/27/96	28.04	8.44	19.60	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--
09/13/96	28.04	8.14	19.90	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
12/16/96	28.04	7.81	20.23	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
03/20/97	28.04	8.52	19.52	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
09/08/97	28.04	7.86	20.18	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
02/16/98	28.04	8.67	19.37	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
08/25/98	28.04	8.34	19.70	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
03/09/99	28.04	8.35	19.69	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
09/29/99	28.04	7.92	20.12	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
MW-16											
12/16/92	28.32	8.74	19.58	--	--	--	--	--	--	--	--
12/21/92	28.32	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	28.32	9.91	18.41	--	<50	<0.5	6.8	<0.5	<0.5	--	--
06/09/93	28.32	10.07	18.25	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/10/93	28.32	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/27/93	28.32	8.16	20.16	--	--	--	--	--	--	--	--
12/17/93	28.32	--	--	--	--	--	--	--	--	--	--
03/10/94	28.32	7.77	20.55	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/16/94	28.32	7.67	20.65	--	<50	0.9	0.7	<0.5	<0.5	--	--
09/07/94	28.32	7.59	20.73	--	150	1.3	0.8	1.2	3.6	--	--
11/30/94	28.32	8.04	20.28	--	4200	300	<5.0	34	350	--	--
03/22/95	28.32	8.65	19.67	--	2900	180	5.7	21	91	--	--
06/27/95	28.32	8.72	19.60	--	2000	330	10	27	48	--	--
09/28/95	28.32	--	--	Inaccessible	--	--	--	--	--	--	--
12/30/95	28.32	8.06	20.26	--	3100	770	39	30	80	<12	--
02/28/96	28.32	8.48	19.84	--	1600	320	15	11	21	<25	--
06/27/96	28.32	8.45	19.87	--	2900	670	48	54	86	280	--
09/13/96	28.32	8.17	20.15	--	1400	18	4.0	8.6	16	<10	--
12/16/96	28.32	7.53	20.79	--	3100	500	25	23	52	<25	--
03/20/97	28.32	8.52	19.80	--	3800	550	23	14	8.4	140	--
09/08/97	28.32	7.97	20.35	--	2800	470	28	24	41	<10	--
02/16/98	28.32	8.40	19.92	--	3100	570	35	27	54	<25	--
08/25/98	28.32	8.12	20.20	--	3500	520	43	57	75	<12	--
03/09/99	28.32	8.15	20.17	--	4900	750	55	40	120	<50	--
09/29/99	28.32	7.77	20.55	--	5480	717	45.3	44	100	<125	--
09/29/99	28.32	7.77	20.55	Confirmation run	--	--	--	--	--	<10	--

Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
TRIP BLANK											
11/03/88	--	--	--	--	--	<1.0	<1.0	<1.0	<1.0	--	--
02/10/89	--	--	--	--	<50	<0.1	<0.1	<0.1	<0.2	--	--
04/24/89	--	--	--	--	<50	<0.5	<0.5	<1.0	<1.0	--	--
07/28/89	--	--	--	--	<50	<0.1	<0.1	<0.1	<0.2	--	--
10/30/89	--	--	--	--	<500	<0.3	<0.3	<0.3	<0.6	--	--
01/09/90	--	--	--	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
04/18/90	--	--	--	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
06/22/90	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
08/09/90	--	--	--	--	<50	<0.3	<0.3	<0.3	<0.6	--	--
11/13/90	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
05/15/91	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
08/27/91	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
11/15/91	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
02/20/92	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/15/92	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/92	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
04/07/93	--	--	--	--	<50	<0.5	<0.5	<0.5	<1.5	--	--
06/09/93	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/10/93	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/27/93	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/17/93	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/10/94	--	--	--	--	<50	<0.5	0.6	<0.5	0.6	--	--
06/16/94	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/07/94	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
11/30/94	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
01/17/95	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
03/22/95	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
06/27/95	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
09/28/95	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/30/95	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
02/28/96	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
06/27/96	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--
09/13/96	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	--	--
12/16/96	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--

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Cumulative Table of Well Data and Analytical Results

Vertical Measurements are in feet. Analytical results are in parts per billion (ppb)

DATE	Well Head Elev.	Ground Water Elev.	Depth To Water	Notes	TPH-Gasoline	Benzene	Toluene	Ethyl-Benzene	Xylene	MTBE	TOG
TRIP BLANK (CONT'D)											
03/20/97	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
09/08/97	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
02/16/98	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
08/25/98	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
03/09/99	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5	--
09/29/99	--	--	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0	--

ADDITIONAL ANALYSES

Vertical Measurements are in feet. Analytical values are in parts per billion (ppb)

DATE	Carbon Tet	Chloro-form	PCE	TCE	1, 2,-DCE	t-1, 2-DCE	c-1, 2-DCE	1, 1, 1-TCA	1,2-DCA	1, 2-DCP	1, 2-DCP
MW-1											
11/03/88	18	7.0	<1.0	<1.0	--	<1.0	--	<1.0	<1.0	--	--
02/10/89	17	6.0	<0.2	<0.2	--	<0.2	<0.2	<0.2	<0.2	--	--
04/24/89	16	6.0	<1.0	<1.0	<1.0	--	--	<1.0	<1.0	--	--
07/28/89	20	6.4	<0.1	<0.1	--	<0.1	<0.1	0.3	<0.1	--	--
10/30/89	11	4.9	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	--	--
01/09/90	24	7.2	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	--	--
04/18/90	23	5.5	<0.5	<0.5	<0.5	--	--	1.4	<0.5	<0.5	<0.5
08/09/90	32	11	0.7	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	24	7.0	60.7	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
05/15/91	15	5.0	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
08/27/91	18	4.2	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5	<0.5
11/15/91	21	7.9	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
02/20/92	24	7.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
06/15/92	10	3.2	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

ADDITIONAL ANALYSES

Vertical Measurements are in feet. Analytical values are in parts per billion (ppb)

DATE	Carbon Tet	Chloro-form	PCE	TCE	1, 2,-DCE	t-1, 2-DCE	c-1, 2-DCE	1, 1, 1-TCA	1,2-DCA	1, 2-DCP	1, 2-DCP
MW-2											
11/03/88	3.0	2.0	34	3.0	--	10	--	<1.0	<1.0	--	--
02/10/89	1.4	1.0	17.2	<0.2	--	<0.2	6.3	<0.2	<0.2	--	--
04/24/89	2.0	2.0	38	3.0	9.0	--	--	<1.0	<1.0	--	--
07/28/89	3.7	2.0	46	2.6	--	<0.2	<0.2	<0.2	<0.2	--	--
10/30/89	1.4	2.6	53	1.1	14	--	--	<0.5	<0.5	--	--
01/09/90	3.6	3.9	78	5.3	16	--	--	<0.5	<0.5	--	--
04/18/90	1.5	2.7	130	3.9	19	--	--	<0.5	<0.5	<0.5	<0.5
08/09/90	2.1	2.1	74	6.1	15	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	<0.5	2.0	40	4.0	--	<0.5	10	<0.5	<0.5	<0.5	<0.5
05/15/91	2.0	2.0	56	6.0	--	<0.5	15	<0.5	<0.5	<0.5	<0.5
08/27/91	1.1	0.9	46	3.9	--	--	8.0	<0.5	<0.5	<0.5	<0.5
11/15/91	0.6	1.1	58	3.1	--	<0.5	6.3	<0.5	<0.5	<0.5	<0.5
02/20/92	11	<2.5	62	3.1	--	<2.5	4.3	<2.5	<2.5	<2.5	<2.5
06/15/92	<0.5	1.2	45	3.1	--	<0.5	4.8	<0.5	<0.5	<0.5	<0.5
MW-3											
11/03/88	8.0	6.0	84	3.0	--	5.0	--	<1.0	<1.0	--	--
02/10/89	5.8	4.0	53	1.9	--	<0.2	9.0	<0.2	<0.2	--	--
04/24/89	7.0	6.0	110	3.0	11	--	--	<1.0	<1.0	--	--
07/28/89	8.6	5.0	49	2.1	--	<0.2	11	<0.2	<0.1	--	--
10/30/89	5.6	5.3	62	0.7	8.2	--	--	<0.5	<0.5	--	--
01/09/90	8.6	6.1	81	73.8	8.7	--	--	<0.5	<0.5	--	--
04/18/90	7.6	5.8	120	2.4	11	--	--	<0.5	<0.5	<0.5	<0.5
08/09/90	11	6.7	81	5.1	11	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	7.0	5.0	43	4.0	--	<0.5	9.0	<0.5	<0.5	<0.5	<0.5
05/15/91	6.0	4.0	46	3.0	--	<0.5	8.0	<0.5	<0.5	<0.5	<0.5
08/27/91	5.5	3.8	43	2.6	--	--	8.1	<0.5	<0.5	<0.5	<0.5
11/15/91	6.3	5.0	67	3.4	--	0.8	7.4	0.9	<0.5	<0.5	<0.5
02/20/92	2.8	4.0	96	3.0	--	<2.5	6.1	<2.5	<2.5	<2.5	<2.5
06/15/92	5.0	3.9	86	2.9	--	<0.5	7.5	<0.5	<0.5	<0.5	<0.5

ADDITIONAL ANALYSES

Vertical Measurements are in feet. Analytical values are in parts per billion (ppb)

DATE	Carbon Tet	Chloro-form	PCE	TCE	1, 2,-DCE	t-1, 2-DCE	c-1, 2-DCE	1, 1, 1-TCA	1,2-DCA	1, 2-DCP	1, 2-DCP
MW-4											
04/24/89	35	11	<1.0	<1.0	<1.0	--	--	<1.0	<1.0	--	--
07/28/89	32	9.3	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--
10/30/89	32	8.5	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	--	--
01/09/90	36	9.8	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	--	--
04/18/90	41	9.5	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5
08/09/90	38	11	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	40	11	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
05/15/91	35	10	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
08/27/91	28	6.1	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5	<0.5
11/15/91	23	9.1	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
02/20/92	400	140	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
06/15/92	38	11	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-5											
04/24/89	4.0	5.0	4.0	<1.0	2.0	--	--	<1.0	<1.0	--	--
07/28/89	5.6	4.0	5.3	0.3	--	<0.2	2.3	0.5	<0.2	--	--
10/30/89	2.9	2.0	2.7	<0.5	0.86	--	--	<0.5	<0.5	--	--
01/09/90	8.2	4.6	7.8	0.6	3.1	--	--	<0.5	<0.5	--	--
04/18/90	6.3	2.8	2.6	<0.5	1.7	--	--	<0.5	<0.5	<0.5	<0.5
08/09/90	11	4.8	6.0	<0.5	2.3	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	7.0	3.0	5.0	<0.5	--	<0.5	1	<0.5	<0.5	<0.5	<0.5
05/15/91	4.0	2.0	3.0	<0.5	--	<0.5	0.8	<0.5	<0.5	<0.5	<0.5
08/27/91	3.3	1.1	2.3	<0.5	--	--	<0.5	<0.5	<0.5	<0.5	<0.5
11/15/91	5.7	2.8	5.5	<0.5	--	<0.5	1.7	<0.5	<0.5	<0.5	<0.5
02/20/92	4.0	2.0	3.9	<0.5	--	<0.5	0.7	<0.5	<0.5	<0.5	<0.5
06/15/92	4.0	2.0	5.0	<0.5	--	<0.5	1.4	<0.5	<0.5	<0.5	<0.5

ADDITIONAL ANALYSES

Vertical Measurements are in feet. Analytical values are in parts per billion (ppb)

DATE	Carbon Tet	Chloro-form	PCE	TCE	1, 2,-DCE	t-1, 2-DCE	c-1, 2-DCE	1, 1, 1-TCA	1,2-DCA	1, 2-DCP	1, 2-DCP
MW-6											
04/24/89	13	7.0	<1.0	<1.0	<1.0	--	--	<1.0	<1.0	--	--
07/28/89	9.6	4.0	<0.2	<0.2	--	<0.2	<0.2	0.5	0.6	--	--
10/30/89	8.2	3.6	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	--	--
01/09/90	10	4.2	<0.5	<0.5	<0.5	--	--	<0.5	1.8	--	--
04/18/90	11	3.8	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5
08/09/90	20	6.6	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	15	5.0	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
05/15/91	11	4.0	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
08/27/91	8.0	2.2	2.4	<0.5	--	--	<0.5	<0.5	<0.5	<0.5	<0.5
11/15/91	13	5.4	<0.5	<0.5	--	<0.5	<0.5	<0.5	0.8	<0.5	<0.5
02/20/92	11	4.0	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
06/15/92	9.6	4.2	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

ADDITIONAL ANALYSES

Vertical Measurements are in feet. Analytical values are in parts per billion (ppb)

DATE	Carbon Tet	Chloro-form	PCE	TCE	1, 2,-DCE	t-1, 2-DCE	c-1, 2-DCE	1, 1, 1-TCA	1,2-DCA	1, 2-DCP	1, 2-DCP
MW-7											
04/24/89	3.0	9.0	<1.0	<1.0	<1.0	--	--	<1.0	<1.0	--	--
07/28/89	<2.0	<10	<2.0	<2.0	--	<2.0	<2.0	<10	6.0	--	--
07/28/89	<5.0	<20	<5.0	<5.0	--	<5.0	<0.5	<5.0	<5.0	--	--
10/30/89	<1.0	3.9	<1.0	<1.0	<1.0	--	--	<1.0	6.4	--	--
10/30/89	<1.0	3.1	<1.0	<1.0	<1.0	--	--	<1.0	6.2	--	--
01/09/90	<0.5	3.0	<0.5	<0.5	<0.5	--	--	<0.5	8.4	--	--
04/18/90	<0.5	3.2	<0.5	<0.5	<0.5	--	--	<0.5	7.7	0.6	0.6
08/09/90	3.3	7.7	<0.5	<0.5	<0.5	--	--	<0.5	8.4	<0.5	<0.5
11/13/90	0.6	3.0	<0.5	<0.5	--	<0.5	<0.5	<0.5	4.0	<0.5	<0.5
05/15/91	2.0	2.0	<0.5	<0.5	--	<0.5	<0.5	<0.5	3.0	<0.5	<0.5
08/27/91	0.7	2.8	<0.5	<0.5	--	--	<0.5	<0.5	2.7	<0.5	<0.5
11/15/91	0.8	2.7	<0.5	<0.5	--	<0.5	<0.5	<0.5	3.1	<0.5	<0.5
02/20/92	2.2	1.9	<0.5	<0.5	--	<0.5	<0.5	<0.5	3.3	<0.5	<0.5
06/15/92	1.1	1.8	<0.5	<0.5	--	<0.5	<0.5	<0.5	4.5	<0.5	<0.5
MW-8											
04/24/89	2.0	3.0	6.0	<1.0	4.0	--	--	<1.0	<1.0	--	--
04/24/89	2.0	2.0	6.0	<1.0	3.0	--	--	<1.0	<1.0	--	--
07/28/89	2.3	2.0	5.6	<0.2	--	<0.2	3.8	<0.2	<0.2	--	--
10/30/89	2.5	2.6	8.0	<0.5	5.5	--	--	<0.5	<0.5	--	--
01/09/90	4.9	3.9	19	0.9	6.6	--	--	<0.5	<0.5	--	--
04/18/90	3.8	2.8	17	0.6	5.7	--	--	<0.5	<0.5	<0.5	<0.5
08/09/90	5.3	4.4	27	1.2	9.2	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	3.0	2.0	21	0.7	--	<0.5	6.0	<0.5	<0.5	<0.5	<0.5
05/15/91	2.0	2.0	30	0.9	--	<0.5	6.0	<0.5	<0.5	<0.5	<0.5
08/27/91	1.4	1.1	32	1.0	--	--	4.7	<0.5	<0.5	<0.5	<0.5
11/15/91	1.5	1.9	50	<0.5	--	<0.5	5.8	<0.5	<0.5	2.0	2.0
02/20/92	1.3	2.3	68	2.4	--	<0.5	7.6	<0.5	<0.5	<0.5	<0.5
06/15/92	0.7	1.9	46	1.6	--	<0.5	5.6	<0.5	--	<0.5	<0.5

ADDITIONAL ANALYSES

Vertical Measurements are in feet. Analytical values are in parts per billion (ppb)

DATE	Carbon Tet	Chloro-form	PCE	TCE	1, 2,-DCE	t-1, 2-DCE	c-1, 2-DCE	1, 1, 1-TCA	1,2-DCA	1, 2-DCP	1, 2-DCP
MW-9											
06/22/90	<0.5	<0.5	<0.5	<0.5	--	<0.5	--	<0.5	<0.5	<0.5	<0.5
08/09/90	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	<0.5	0.71	<0.5	<0.5
11/13/90	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	1.0	<0.5	<0.5
05/15/91	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	0.5	<0.5	<0.5
08/27/91	<0.5	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5	<0.5
11/15/91	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
02/20/92	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
06/15/92	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-10											
06/22/90	9.6	8.9	<0.5	<0.5	--	<0.5	--	<0.5	<0.5	<0.5	<0.5
08/09/90	11	7.8	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	5.0	4.0	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
05/15/91	5.0	4.0	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
08/27/91	6.9	3.4	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5	<0.5
11/15/91	2.7	3.3	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
02/20/92	3.3	3.4	3.0	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
06/15/92	4.5	2.9	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-11											
06/22/90	4.6	6.5	73	1.3	--	<0.5	8.9	<0.5	<0.5	<0.5	<0.5
08/09/90	8.1	6.8	84	2.0	4.6	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	<0.5	<0.5	39	<0.5	--	<0.5	2.0	5	<0.5	<0.5	<0.5
05/15/91	1.0	3.0	7	0.5	--	<0.5	2.0	<0.5	<0.5	<0.5	<0.5
08/27/91	4.1	3.3	73	1.0	--	--	2.4	<0.5	<0.5	<0.5	<0.5
11/15/91	3.3	3.6	64	0.9	--	<0.5	2.3	<0.5	<0.5	<0.5	<0.5
02/20/92	<2.5	<2.5	62	<2.5	--	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
06/15/92	--	--	--	--	--	--	--	--	--	--	--

ADDITIONAL ANALYSES

Vertical Measurements are in feet. Analytical values are in parts per billion (ppb)

DATE	Carbon Tet	Chloro-form	PCE	TCE	1, 2,-DCE	t-1, 2-DCE	c-1, 2-DCE	1, 1, 1-TCA	1,2-DCA	1, 2-DCP	1, 2-DCP
MW-12											
06/22/90	6.0	7.3	7.4	<0.5	--	<0.5	13	<0.5	<0.5	<0.5	<0.5
08/09/90	8.0	7.0	6.7	<0.5	5.8	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	<0.5	<0.5	9.0	<0.5	--	<0.5	3.0	3.0	<0.5	<0.5	<0.5
05/15/91	4.0	4.0	10	<0.5	--	<0.5	3.0	<0.5	<0.5	<0.5	<0.5
08/27/91	3.1	2.6	10	<0.5	--	--	2.3	<0.5	<0.5	<0.5	<0.5
11/15/91	1.9	3.5	8.9	<0.5	--	<0.5	5.9	<0.5	<0.5	<0.5	<0.5
02/20/92	3.3	3.4	3.7	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
06/15/92	2.2	3.7	13	<0.5	--	<0.5	4.5	<0.5	<0.5	<0.5	<0.5
MW-13											
11/15/91	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
02/20/92	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
06/15/92	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-14											
11/15/91	<0.5	5.5	33	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
02/20/92	<0.5	4.3	38	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
06/15/92	--	--	--	--	--	--	--	--	--	--	--

ADDITIONAL ANALYSES

Vertical Measurements are in feet. Analytical values are in parts per billion (ppb)

DATE	Carbon Tet	Chloro-form	PCE	TCE	1, 2,-DCE	t-1, 2-DCE	c-1, 2-DCE	1, 1, 1-TCA	1,2-DCA	1, 2-DCP	1, 2-DCP
TRIP BLANK											
11/03/88	<1.0	<1.0	<1.0	<1.0	--	<1.0	--	<1.0	<1.0	--	--
02/10/89	<0.1	<0.5	<0.1	<0.1	--	<0.1	<0.1	<0.1	<0.1	--	--
04/24/89	<1.0	<1.0	<1.0	<1.0	<1.0	--	--	<1.0	<1.0	--	--
07/28/89	<0.1	<0.5	<0.1	<0.5	<0.1	--	<0.1	<0.1	<0.1	--	--
10/30/89	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	--	--
01/09/90	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	--	--
04/18/90	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5
06/22/90	<0.5	<0.5	<0.5	<0.5	--	<0.5	--	<0.5	<0.5	<0.5	<0.5
08/09/90	<0.5	<0.5	<0.5	<0.5	<0.5	--	--	<0.5	<0.5	<0.5	<0.5
11/13/90	<0.5	0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
05/15/91	--	--	--	--	--	--	--	--	--	--	--
08/27/91	--	--	--	--	--	--	--	--	--	--	--
11/15/91	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
02/20/92	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
06/15/92	<0.5	<0.5	<0.5	<0.5	--	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

TABLE 2 OF ADDITIONAL ANALYSES

Vertical Measurements are in feet. Analytical values are in parts per billion (ppb)

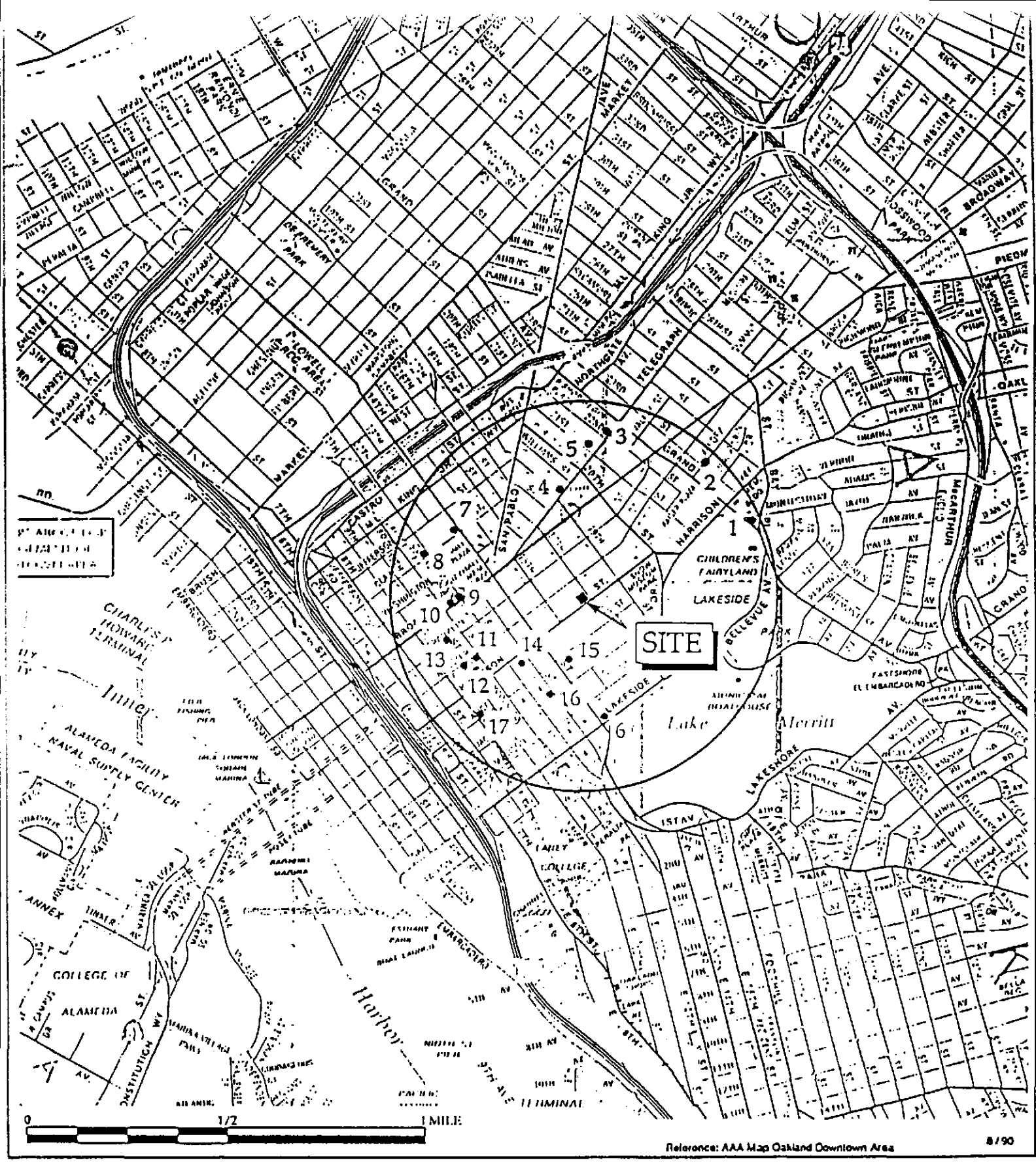
DATE	2-butanone	Acetone	1, 1-DCE	1, 1-DCA	Chloro-benzene	Chloro-benzene
MW-3						
08/27/91	--	--	1.3	0.5	0.7	0.7
MW-7						
04/24/89	160	5.0	--	--	--	--
MW-13						
11/15/91	--	--	--	0.6	--	--

Note: Blaine Tech Services, Inc. began routine monitoring of the groundwater wells at this site on November 1, 1994.
Earlier field data and analytical results are drawn from the September 27, 1994 Groundwater Technology, Inc. report.

ABBREVIATIONS:
TPH = Total Petroleum Hydrocarbons
TOG = Total Oil and Grease
Carbon Tet = Carbon Tetrachloride
PCE = Tetrachloroethene
TCE = Trichloroethene
1,2-DCE = 1,2-Dichloroethene
t-1,2-DCE = trans-1,2-Dichloroethene
c-1,2-DCE = cis-1,2-Dichloroethene
1,1,1-TCA = 1,1,1-Trichloroethane
1,2-DCA = 1,2-Dichloroethane
1,2-DCP = 1,2-Dichloropropane
1,1-DCE = 1,1-Dichloroethene
MC = Methylene chloride

APPENDIX E

WELL SURVEY DATA



Reference: AAA Map Oakland Downtown Area

8/90

LEGEND

- 1 Map Location Number keyed to Table 5

Wells Located Within One-Half Mile Radius of
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

DRAFT

FIGURE 9

TABLE 5. Wells Located Within One-Half Mile Radius Of
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California
(See Figure 9 for Well Locations)

Map Location No.	Owner	Well Location	Number of Wells	Year Drilled	Use
1	Chevron USA	210 Grand Ave. Oakland	9	1989-90	Monitor
2	Morrison & Forester	2302 Valdez St. Oakland	4	1989	Monitor
3	Texaco	2225 Telegraph Ave. Oakland	9	1989	Monitor
4	Carter-Hawley-Hale	1911 Telegraph Ave. Oakland	1	1988	Test
5	Bank of America	21st & Broadway Oakland	1	1988	Monitor
6	Lakeside Corp. (Bechtel)	244 Lakeside Dr. Oakland	1	1977	Irrigation
7	Five City Center, City of Oakland	14th & Clay Sts. Oakland	3	1988	Destroyed
8	General Services Administration	12th & Clay Sts. Oakland	3	1989	Monitor
9	APC Building	12th & Broadway Oakland	3	1988	Monitor
10	Bramalea-APC	1111 Broadway Oakland	3	1988	Monitor
11	City of Oakland	11th & Webster Sts. Oakland	5	1987-88	Monitor, Test

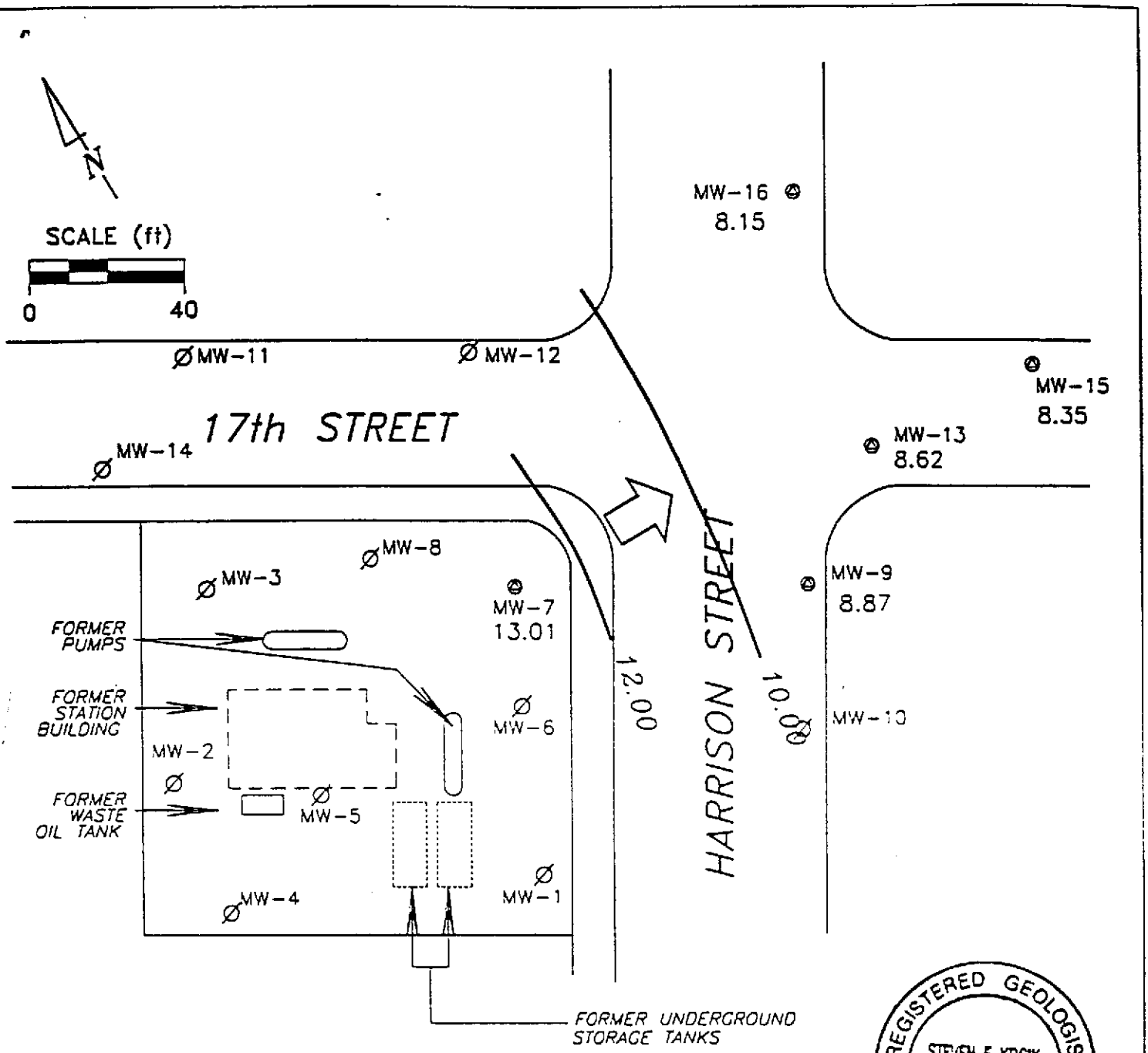
TABLE 5. Wells Located Within One-Half Mile Radius Of
Former Chevron Service Station #90020 (continued)
1633 Harrison Street
Oakland, California

Map Location No.	Owner	Well Location	Number of Wells	Year Drilled	Use
12	City of Oakland, Oakland Redevelopment Agency	10th & Webster Sts. Oakland	7	1987-88	Monitor, Test
13	City of Oakland	10th & Franklin Sts. Oakland	2	1988	Test
14	City of Oakland, Frank Mar Comm. Housing	Pacific Renaissance Plaza 13th & Harrison Sts. Oakland	39	1989	Monitor, Injection, Extraction
15	Moose Club	14th & Alice Sts. Oakland	1	1927	Abandoned 1984
16	Alameda County Services	165 13th St. Oakland	4	1989	Monitor
17	Fire Station #12	9th & Alice Sts. Oakland	1	1989	Monitor

NOTES:

Total Number of Wells = 96

APPENDIX F
POTENTIOMETRIC MAPS



REGISTERED GEOLOGIST
STEVEN E. KRCIK
No. 4976
9/00
STATE OF CALIFORNIA

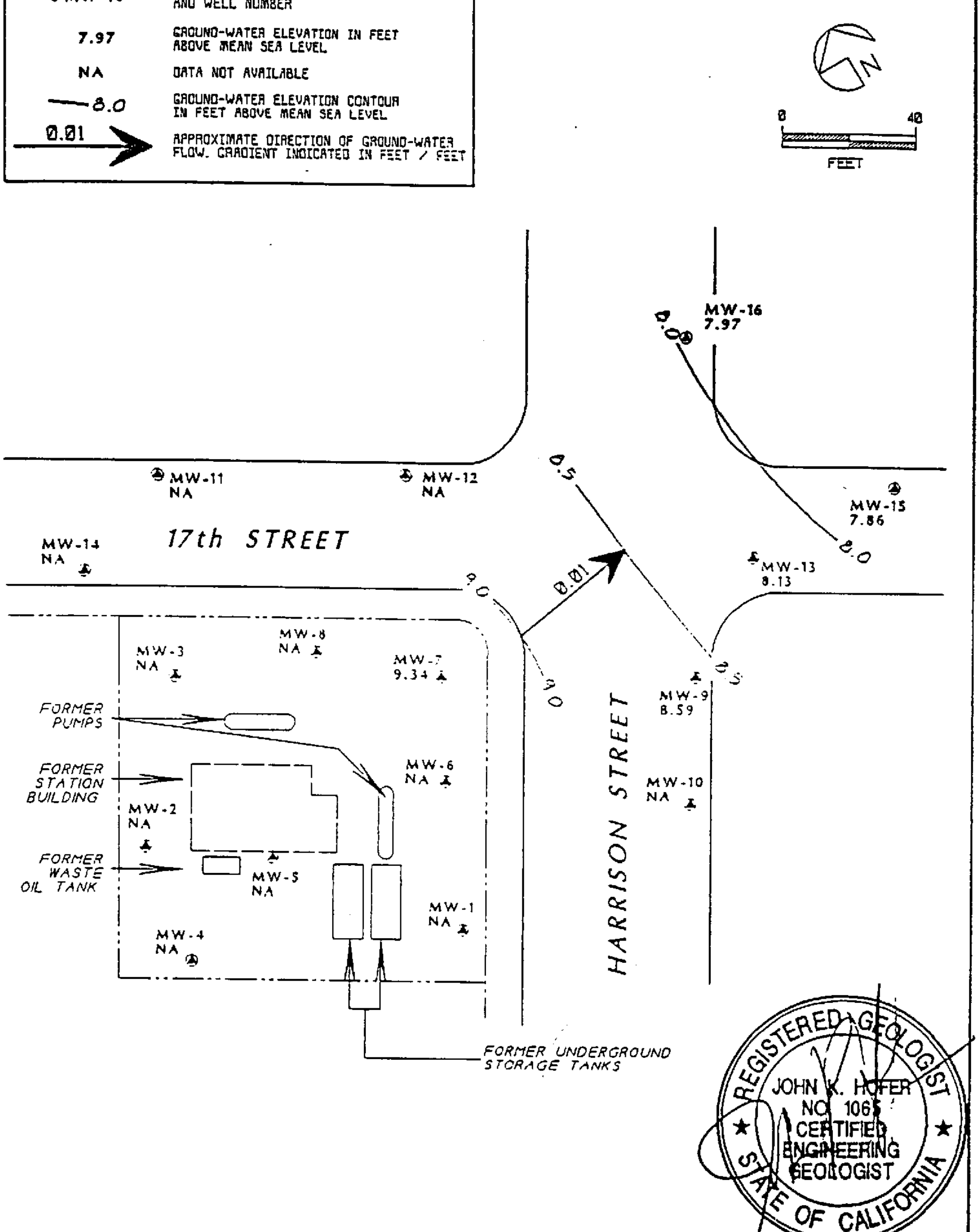
EXPLANATION

- MONITORING WELL
- ABANDONED WELL
- 8.35 GROUNDWATER ELEVATION (FT. MSL)
- 10.00 — GROUNDWATER ELEVATION CONTOUR (FT. MSL)
- APPROXIMATE GROUNDWATER FLOW DIRECTION; APPROXIMATE GRADIENT = 0.03

Basemap from Geoconsultants, Inc.

PREPARED BY RRM engineering contracting firm	Former Chevron Station 9-0020 1633 Harrison Street Oakland, California GROUNDWATER ELEVATION CONTOUR MAP, MARCH 9, 1999	FIGURE: 1 PROJECT: DAC04

MW-16	MONITORING WELL LOCATION AND WELL NUMBER
7.97	GROUND-WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
NA	DATA NOT AVAILABLE
8.0	GROUND-WATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL
0.01	APPROXIMATE DIRECTION OF GROUND-WATER FLOW. GRADIENT INDICATED IN FEET / FEET



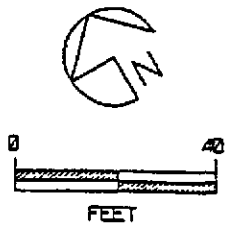
TITLE : GROUND-WATER ELEVATION CONTOUR MAP - SEPTEMBER 8, 1997

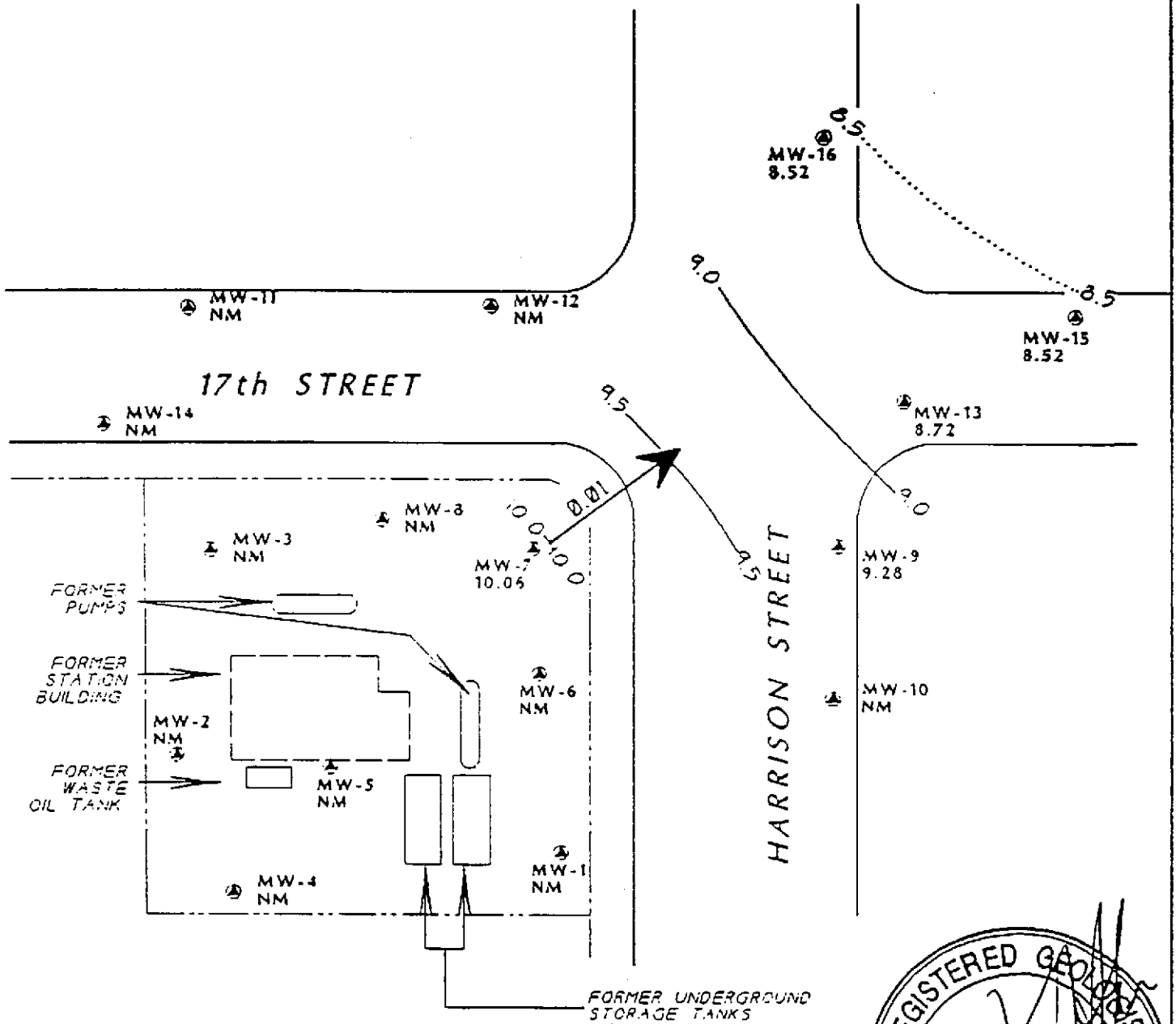
LOCATION : FORMER CHEVRON SERVICE STATION 9-0020
1633 HARRISON STREET, OAKLAND, CALIFORNIA

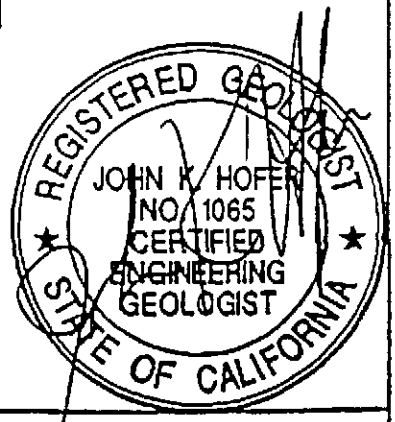
SOURCE : CAMBRIA ENVIROMENTAL TECHNOLOGY, INC

GEOCONSULTANTS, INC
SAN JOSE, CALIFORNIA
Project No. G758-09

MW-16	MONITORING WELL LOCATION AND WELL NUMBER
8.52	GROUND-WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
NM	NOT MEASURED
9.0	GROUND-WATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL
0.01	APPROXIMATE DIRECTION OF GROUND-WATER FLOW. GRADIENT INDICATED IN FEET / FEET







TITLE : GROUND-WATER ELEVATION CONTOUR MAP - MARCH 20, 1997

LOCATION : CHEVRON SERVICE STATION 9-0020
1633 HARRISON STREET, OAKLAND, CALIFORNIA

SOURCE :CAMBRIA ENVIROMENTAL TECHNOLOGY, INC

GEOCONSULTANTS, INC
SAN JOSE, CALIFORNIA
Project No. G756-09

MW-16	MONITORING WELL LOCATION AND WELL NUMBER
8.17	GROUND-WATER ELEVATION IN FEET ABOVE MEAN SEAL LEVEL
NM	NOT MEASURED
9.0	GROUND-WATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL
0.01	APPROXIMATE DIRECTION OF GROUND-WATER FLOW. GRADIENT INDICATED IN FEET / FEET

N

0 40

FEET

MW-16 8.17

MW-11 NM

MW-12 NM

MW-15 8.14

17th STREET

MW-14 NM

MW-13 8.34

9.0

8.5

0.01

MW-8 NM

MW-3 NM

9.5

MW-7 9.61

9.5

MW-9 8.86

HARRISON STREET

FORMER STATION

FORMER STATION BUILDING

MW-6 NM

MW-2 NM

MW-10 NM

FORMER WASTE OIL TANK

MW-5 NM

MW-1 NM

MW-4 NM

EXISTING WALL

REGISTERED GEOLOGIST
JOHN K. HOFER
NO. 1065
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

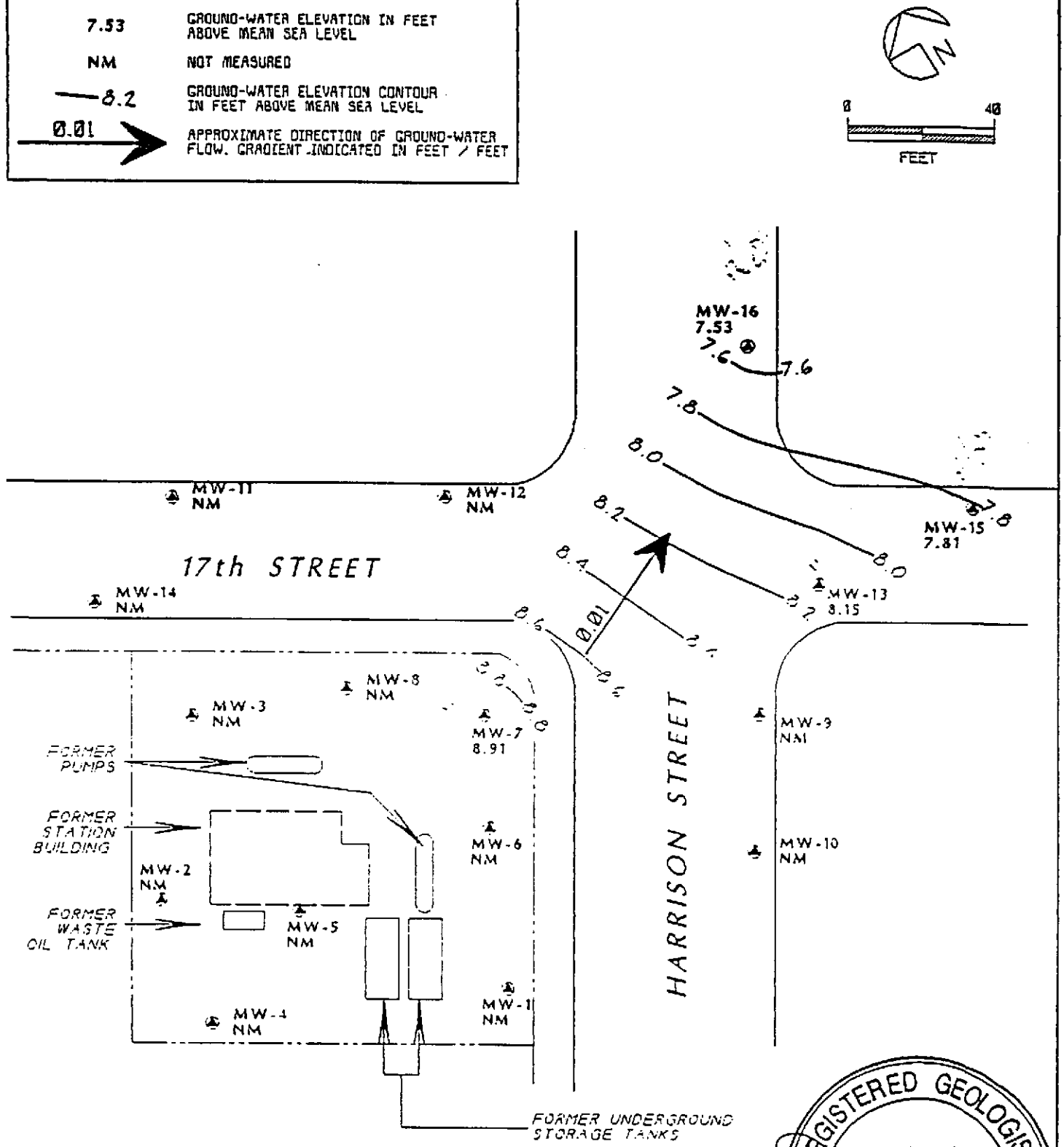
TITLE : GROUND-WATER ELEVATION CONTOUR MAP - SEPTEMBER 13, 1996

LOCATION : CHEVRON SERVICE STATION 9-0020
1633 HARRISON STREET, OAKLAND, CALIFORNIA

SOURCE :CAMBRIA ENVIROMENTAL TECHNOLOGY INC.

GEOCONSULTANTS, INC
SAN JOSE, CALIFORNIA
Project No. G758-09
CHEVRON\ALAMEDA\W0020S

MW-16	MONITORING WELL LOCATION AND WELL NUMBER
7.53	GROUND-WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
NM	NOT MEASURED
8.2	GROUND-WATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL
0.01	APPROXIMATE DIRECTION OF GROUND-WATER FLOW. GRADIENT INDICATED IN FEET / FEET



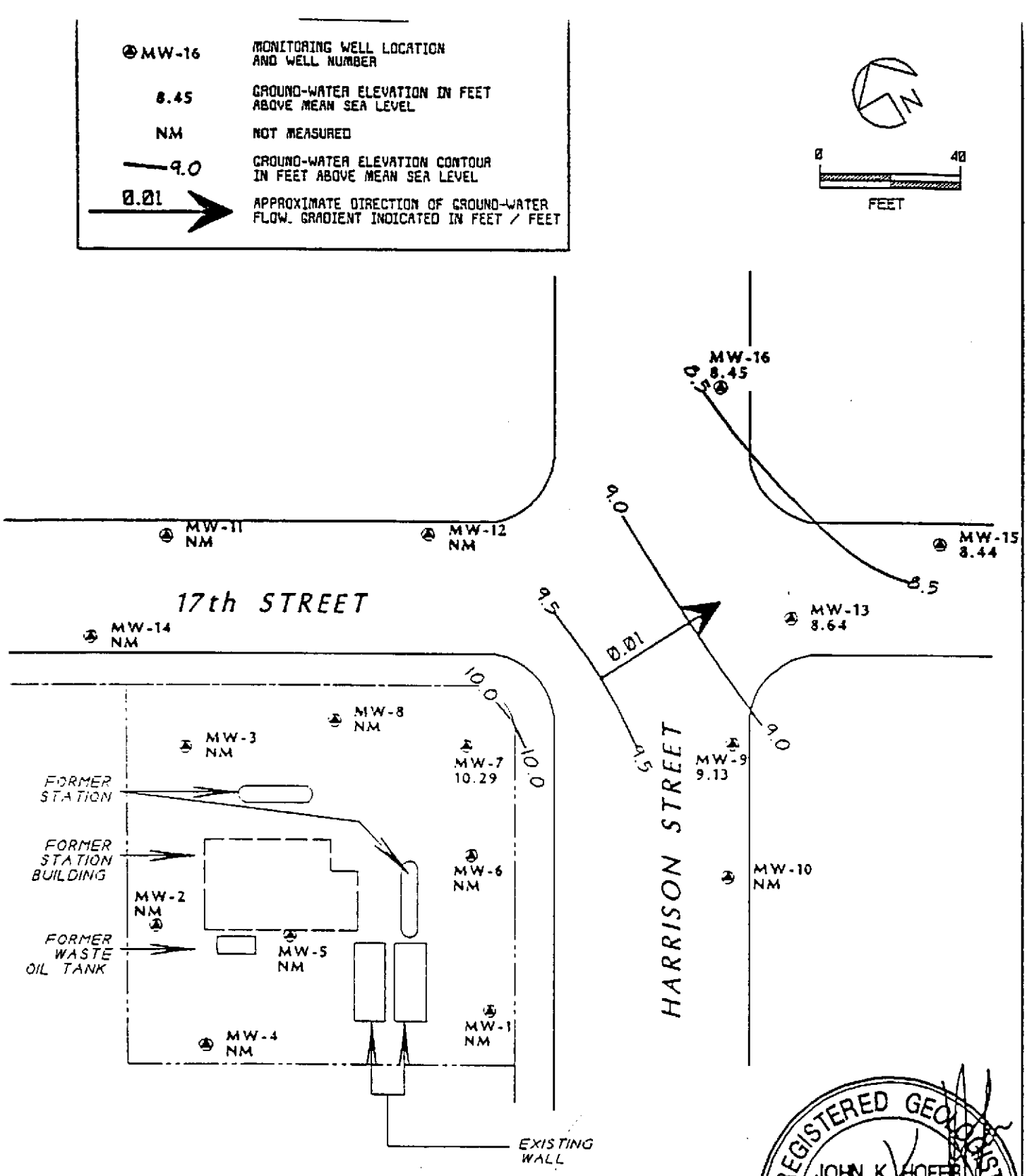
REGISTERED GEOLOGIST
JEREMY C. WIRE
NO. 93
Certified Hydrogeologist
STATE OF CALIFORNIA

TITLE : GROUND-WATER ELEVATION CONTOUR MAP - DECEMBER 16, 1996

LOCATION : CHEVRON SERVICE STATION 9-0020
1633 HARRISON STREET, OAKLAND, CALIFORNIA

SOURCE : CAMBRIA ENVIROMENTAL TECHNOLOGY, INC

GEOCONSULTANTS, INC
SAN JOSE, CALIFORNIA
Project No. G758-09

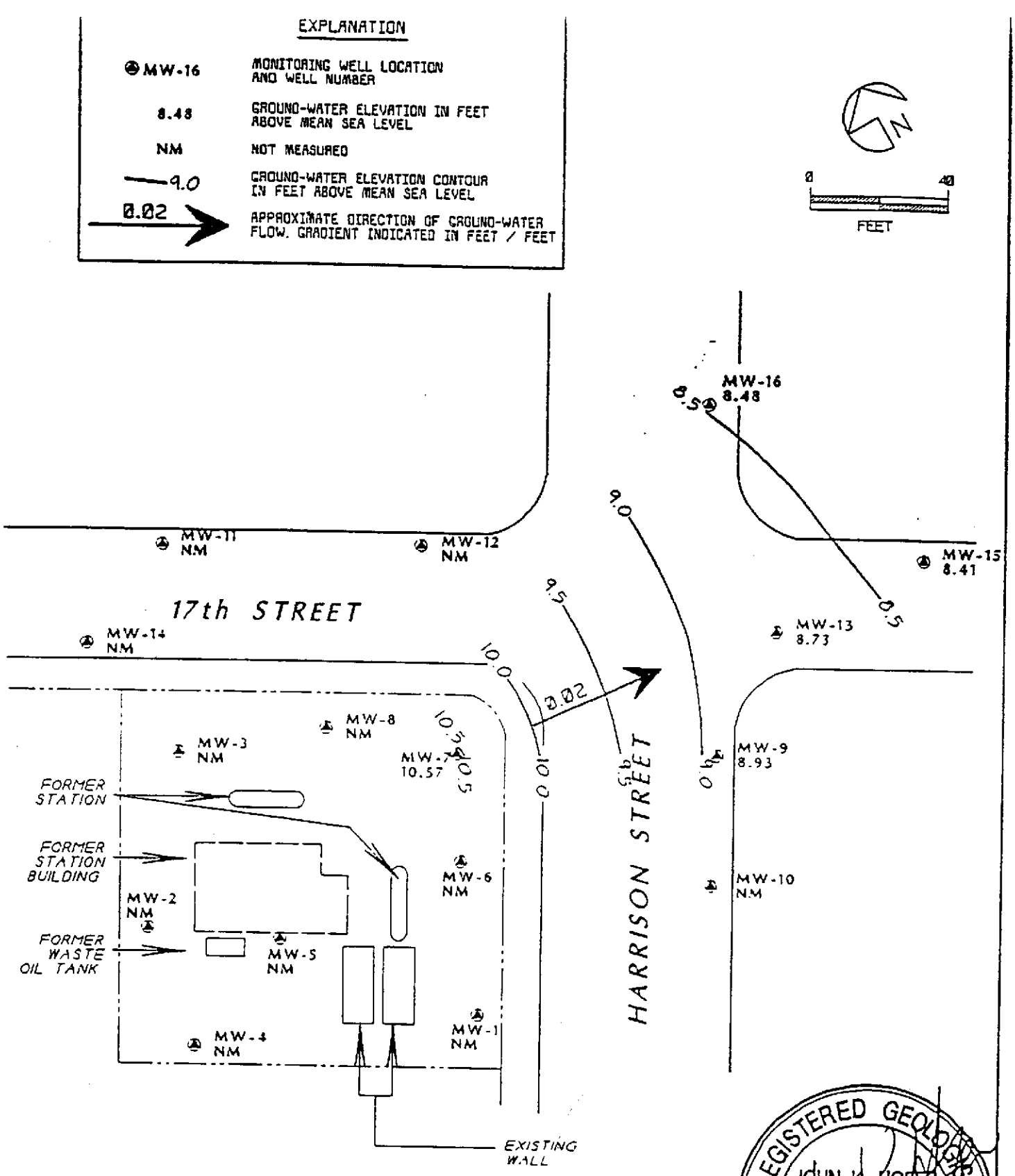


TITLE : GROUND-WATER ELEVATION CONTOUR MAP - JUNE 27, 1996

LOCATION : CHEVRON SERVICE STATION 9-0020
1633 HARRISON STREET, OAKLAND, CALIFORNIA

SOURCE :CAMBRIA ENVIROMENTAL TECHNOLOGY, INC.

GEOCONSULTANTS, INC
SAN JOSE, CALIFORNIA
Project No. G758-09
CHEVRON\ALAMEDA\BASE



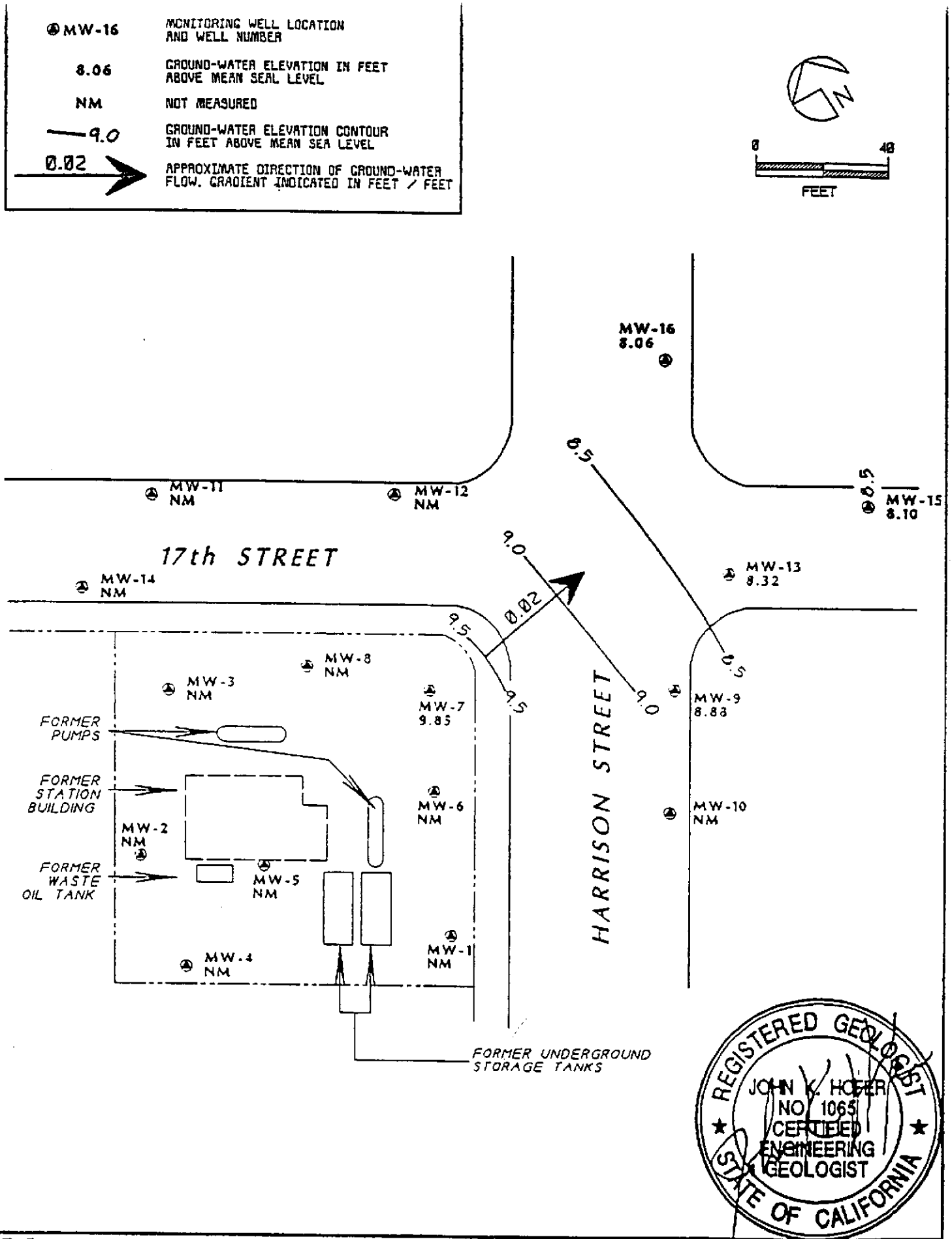
REGISTERED GEOLOGIST
JOHN K. HOPER
NO. 1065
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

TITLE : GROUND-WATER ELEVATION CONTOUR MAP - FEBRUARY 28, 1996

LOCATION : CHEVRON SERVICE STATION 9-0020
1633 HARRISON STREET, OAKLAND, CALIFORNIA

SOURCE : CAMBRIA ENVIROMENTAL TECHNOLOGY, INC

GEOCONSULTANTS, INC
SAN JOSE, CALIFORNIA
Project No. G758-09



REGISTERED GEOLOGIST
JOHN K. HOEER
NO. 1065
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

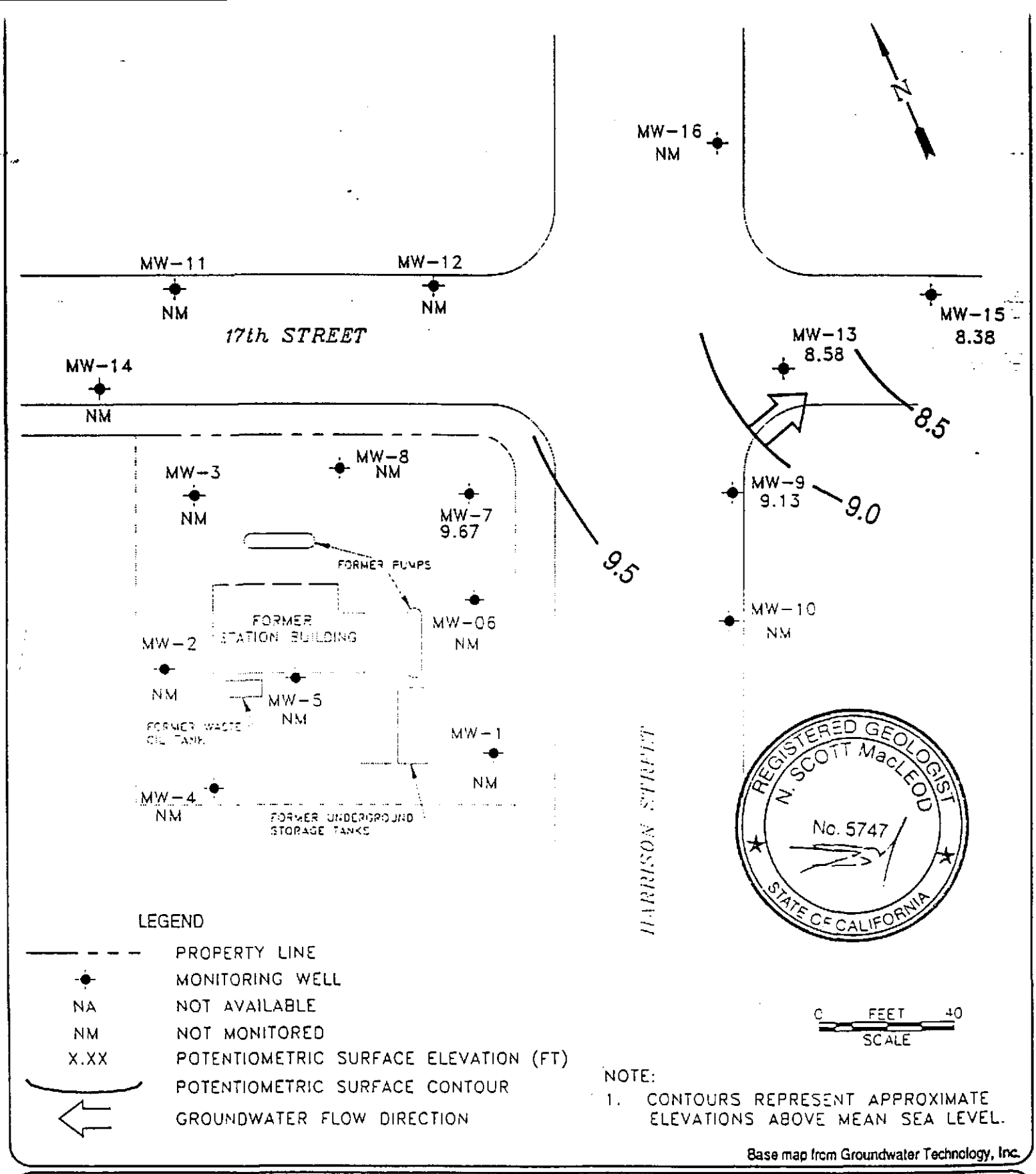
TITLE : GROUND-WATER ELEVATION CONTOUR MAP - DECEMBER 30, 1995

LOCATION : CHEVRON SERVICE STATION 9-0020
1633 HARRISON STREET, OAKLAND, CALIFORNIA

SOURCE :CAMBRIA ENVIROMENTAL TECHNOLOGY, INC.

GEOCONSULTANTS, INC
SAN JOSE, CALIFORNIA
Project No. G758-09

CHEVRON\ALAMEDA\BASE



NOTE:

1. CONTOURS REPRESENT APPROXIMATE ELEVATIONS ABOVE MEAN SEA LEVEL.

Base map from Groundwater Technology, Inc.

CAMBRIA
Environmental Technology, Inc.

Chevron Station 9-0020
1633 Harrison Street
Oakland, California

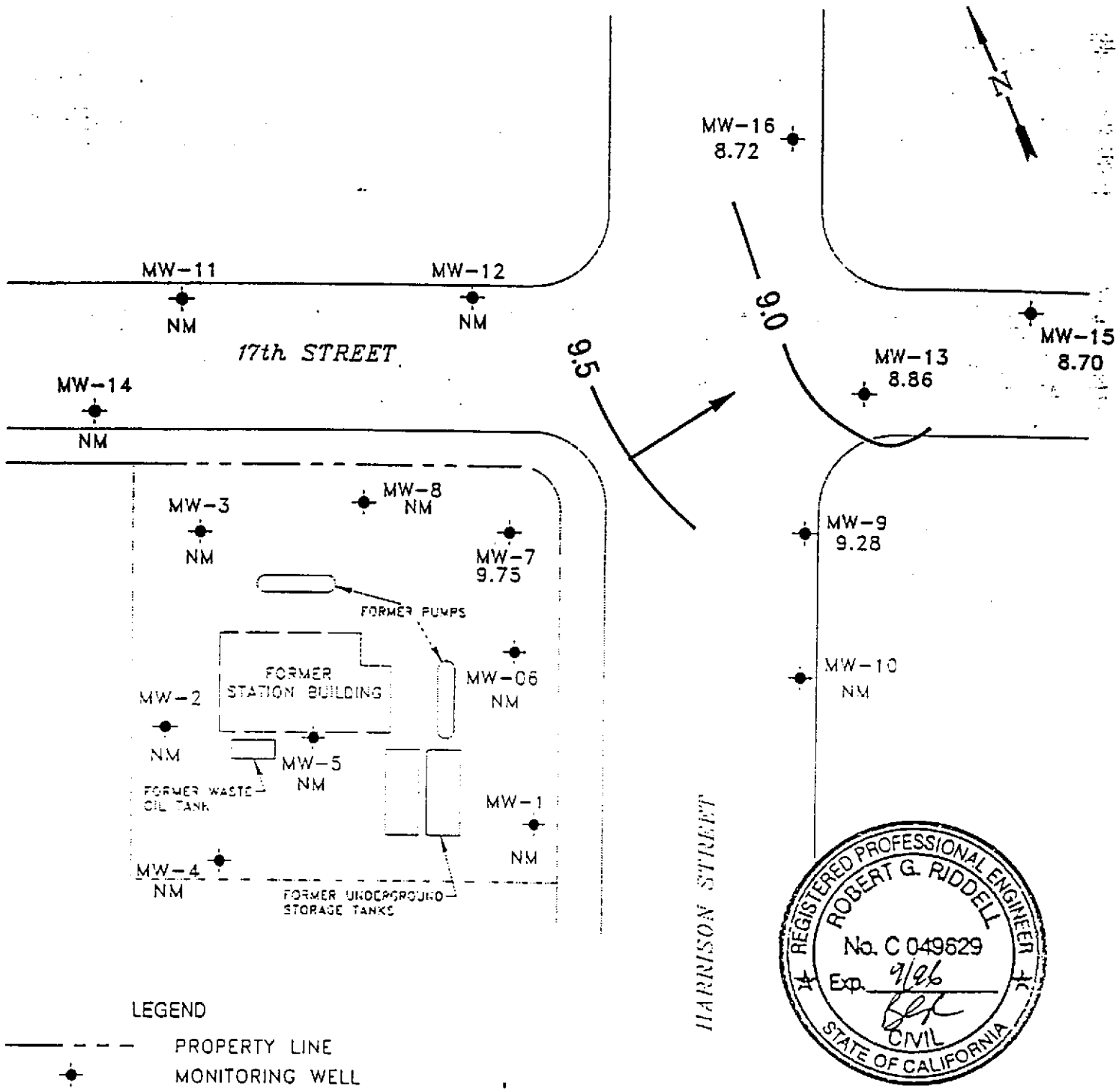
\CHEVRON\9-0020\0020-GM.DWG

Ground Water Elevation

September 28, 1995

FIGURE

1



LEGEND

——— - - -	PROPERTY LINE
✦	MONITORING WELL
NA	NOT AVAILABLE
NM	NOT MONITORED
X.XX	POTENTIOMETRIC SURFACE ELEVATION (FT)
⌒	POTENTIOMETRIC SURFACE CONTOUR
←	GROUNDWATER FLOW DIRECTION
*	ANOMALOUS DATA, NOT CONTOURED

NOTE:
1. CONTOURS REPRESENT APPROXIMATE ELEVATIONS ABOVE MEAN SEA LEVEL.

Base map from Groundwater Technology, Inc.

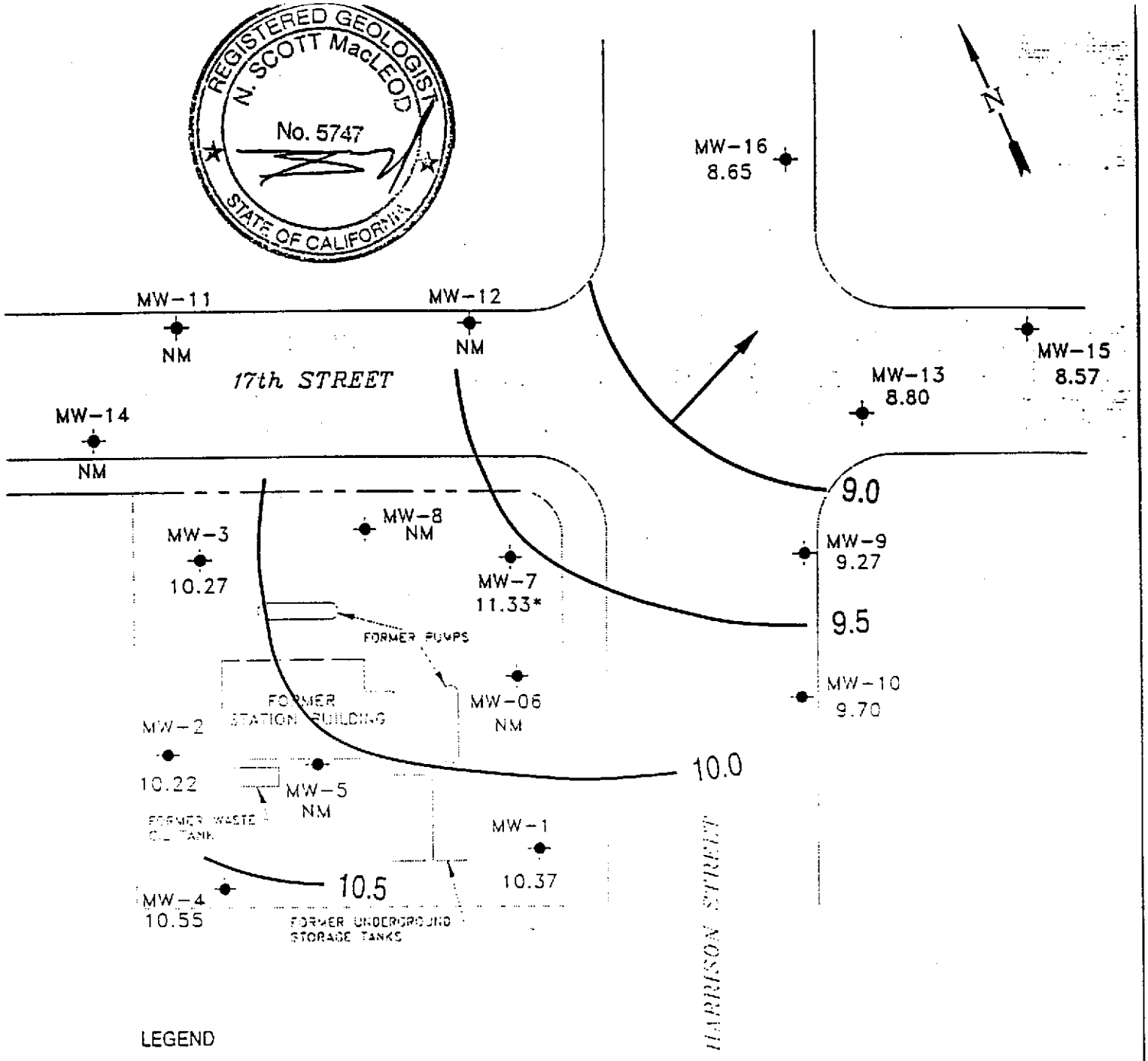
CAMBRIA
Environmental Technology, Inc.

Chevron Station 9-0020
1633 Harrison Street
Oakland, California

\CHEVRON\9-0020\0020-QM.DWG

Ground Water Elevation
June 27, 1995

FIGURE
1



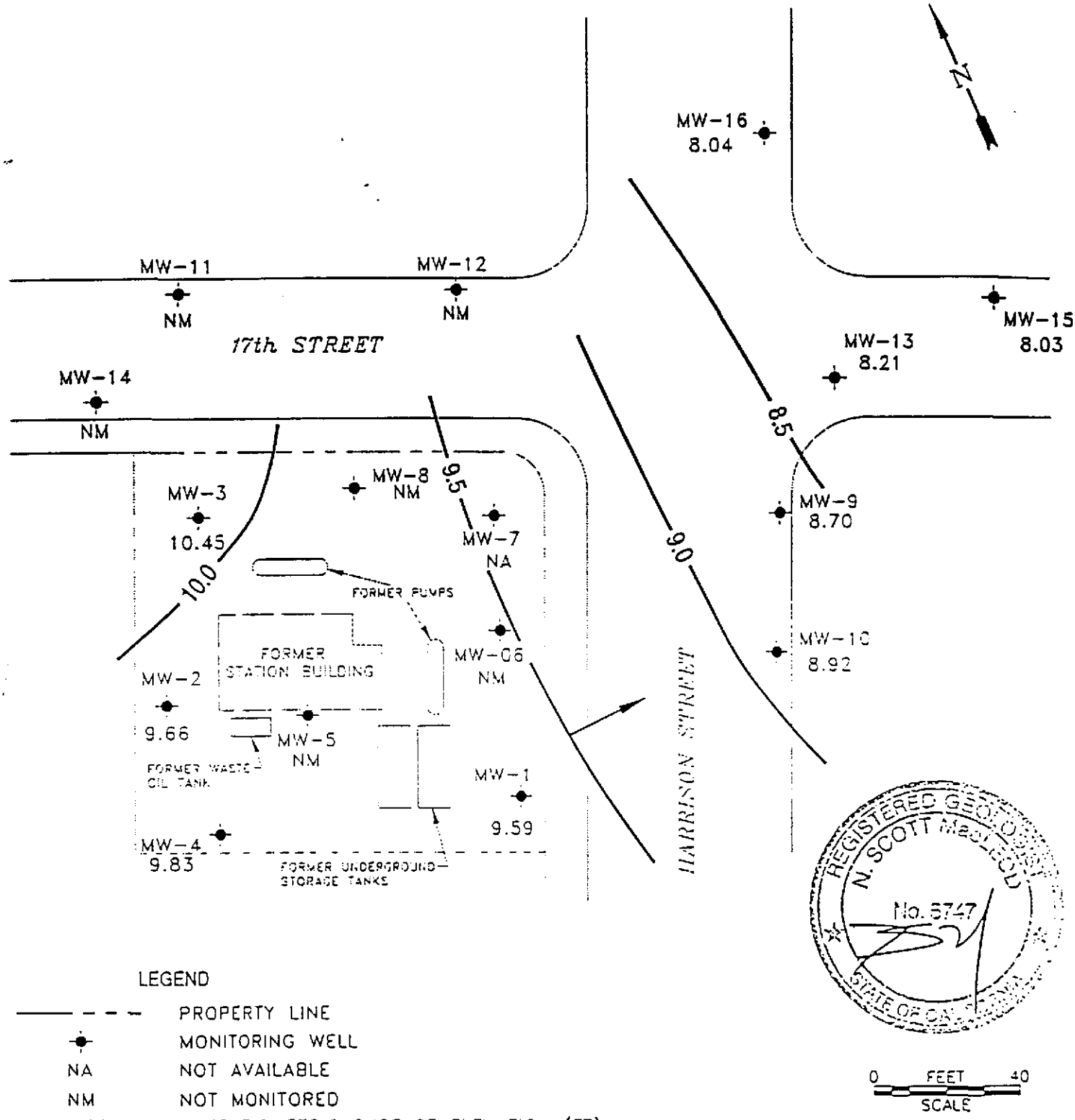
CAMBRIA
Environmental Technology, Inc.

Chevron Station 9-0020
1633 Harrison Street
Oakland, California

\CHEVRON\9-00200020-QM.DWG

Ground Water Elevation
March 22,1995

FIGURE
1



LEGEND

——— - - -	PROPERTY LINE
⌖	MONITORING WELL
NA	NOT AVAILABLE
NM	NOT MONITORED
X.XX	POTENTIOMETRIC SURFACE ELEVATION (FT)
⌒	POTENTIOMETRIC SURFACE CONTOUR
←	GROUNDWATER FLOW DIRECTION

NOTE:

1. CONTOURS REPRESENT APPROXIMATE ELEVATIONS ABOVE MEAN SEA LEVEL.

Base map from Groundwater Technology, Inc.

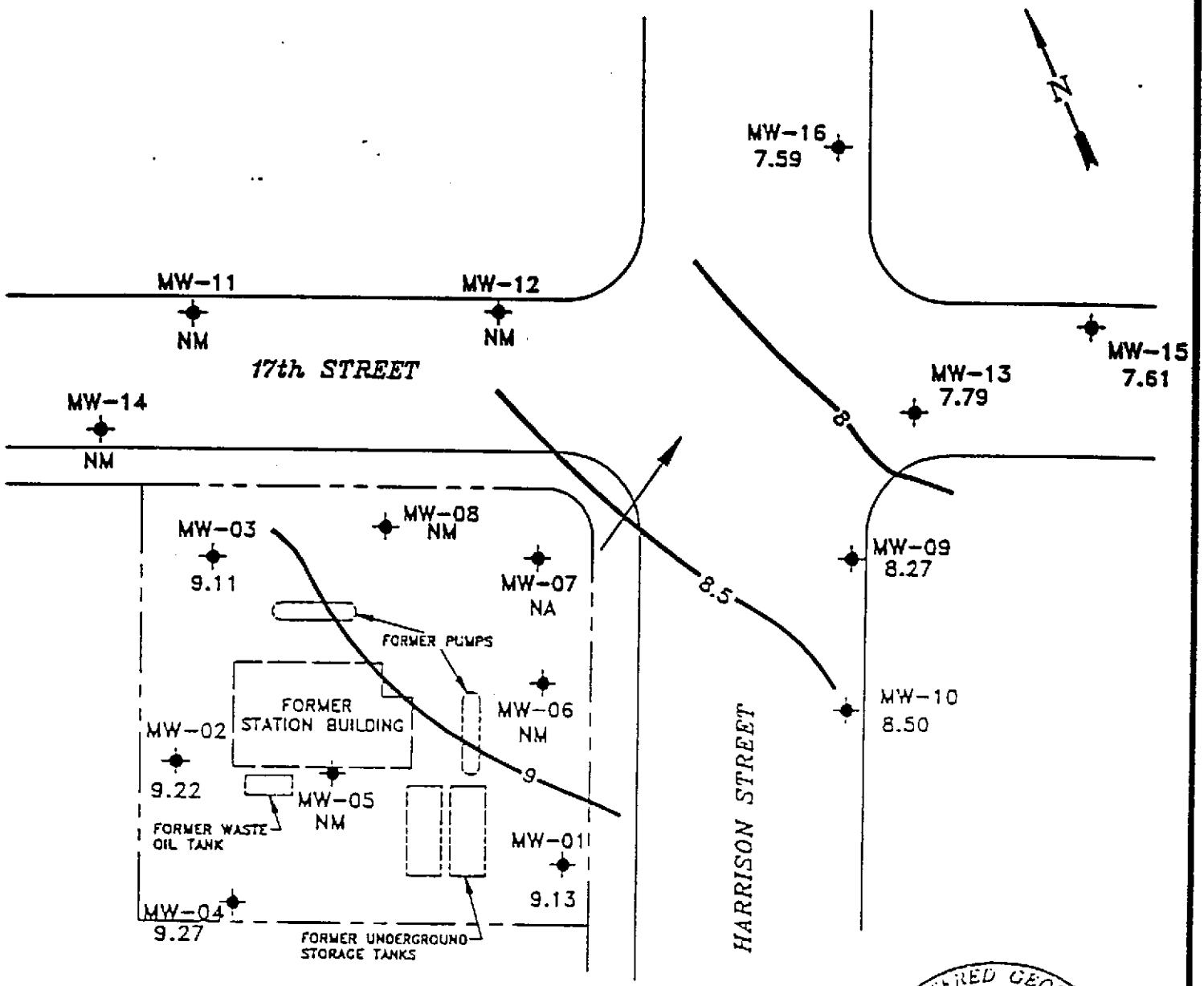
CAMBRIA
Environmental Technology, Inc.

Chevron Station 9-0020
1633 Harrison Street
Oakland, California

\CHEVRON\9-0020\0020-QM(4Q94).DWG

Ground Water Elevation
November 30, 1994

FIGURE
1



REGISTERED GEOLOGIST
EDVARDAS (ED) K. SIMONIS
No. 4422
STATE OF CALIFORNIA

LEGEND

———	PROPERTY LINE
✦	MONITORING WELL
NA	NOT AVAILABLE
NM	NOT MONITORED PER CLIENT REQUEST
X.XX	POTENTIOMETRIC SURFACE ELEVATION (FT)
⌒	POTENTIOMETRIC SURFACE CONTOUR
←—	GROUNDWATER FLOW DIRECTION

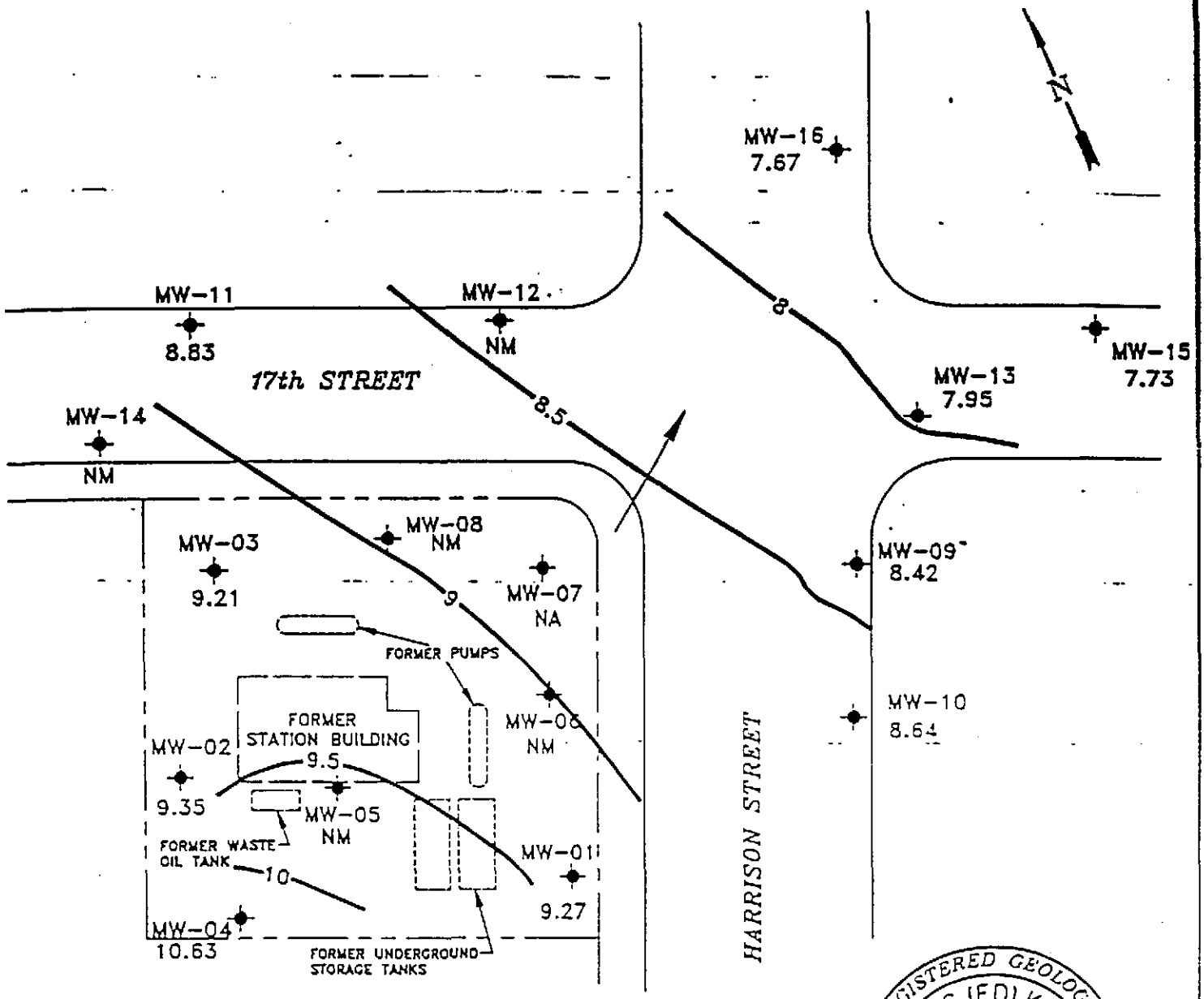
NOTE:
1. CONTOURS REPRESENT APPROXIMATE ELEVATIONS ABOVE MEAN SEA LEVEL

GROUNDWATER TECHNOLOGY

0 FEET 40
SCALE

POTENTIOMETRIC SURFACE MAP (9/7/94)

CLIENT: CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0020	FILE: 4081PSM, (1:40)	PROJECT NO.: 02010-4081	PM: KS	PE/RG: SLS
LOCATION: 1633 HARRISON STREET OAKLAND, CALIFORNIA	REV.			FIGURE: 1
	DES.: SS	DET.: SS	DATE: 9/8/94	



REGISTERED GEOLOGIST
EDVARDAS (ED) K. SIMONIS
No. 4422
STATE OF CALIFORNIA

LEGEND

— — —	PROPERTY LINE
✦	MONITORING WELL
NA	NOT AVAILABLE
NM	NOT MONITORED PER CLIENT REQUEST
X.XX	POTENTIOMETRIC SURFACE ELEVATION (FT)
⌒	POTENTIOMETRIC SURFACE CONTOUR
←	GROUNDWATER FLOW DIRECTION

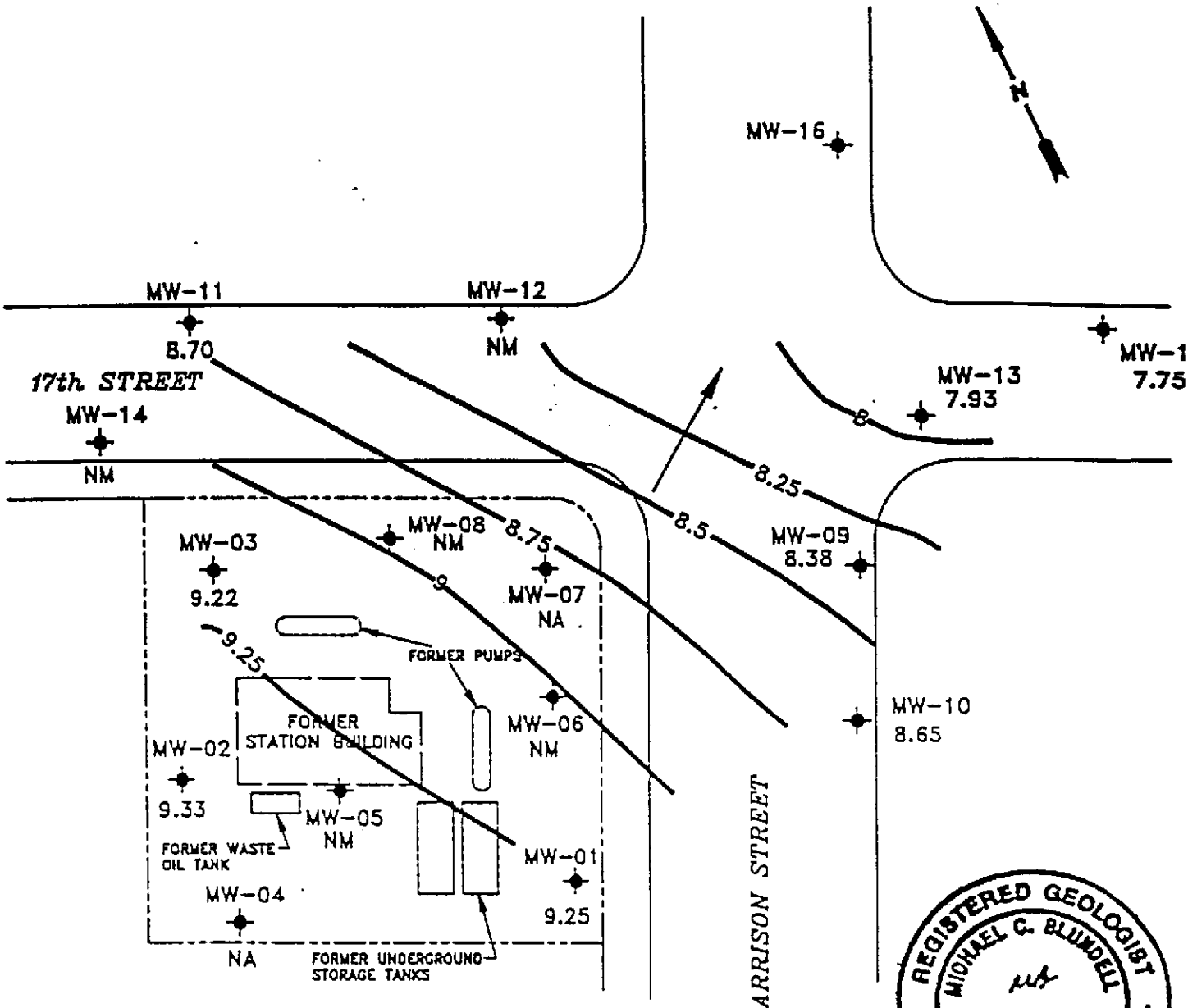
NOTE:
1. CONTOURS REPRESENT APPROXIMATE ELEVATIONS ABOVE MEAN SEA LEVEL.

GROUNDWATER TECHNOLOGY

0 FEET 40
SCALE

POTENTIOMETRIC SURFACE MAP (6/16/94)

CLIENT: CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0020	FILE: 4081PSM, (1:40)	PROJECT NO.: 02010-4081	PM: KJ	PE/RG: EKS	
LOCATION: 1633 HARRISON STREET OAKLAND, CALIFORNIA	REV.	DES.: SS	DET.: SS	DATE: 6/24/94	FIGURE: 1



REGISTERED GEOLOGIST
MICHAEL C. BLUMDELL
No. 5148
STATE OF CALIFORNIA

LEGEND

———	PROPERTY LINE
✦	MONITORING WELL
NA	NOT AVAILABLE
NM	NOT MONITORED PER CLIENT REQUEST
X.XX	POTENTIOMETRIC SURFACE ELEVATION (FT)
⌒	POTENTIOMETRIC SURFACE CONTOUR
←	GROUNDWATER FLOW DIRECTION

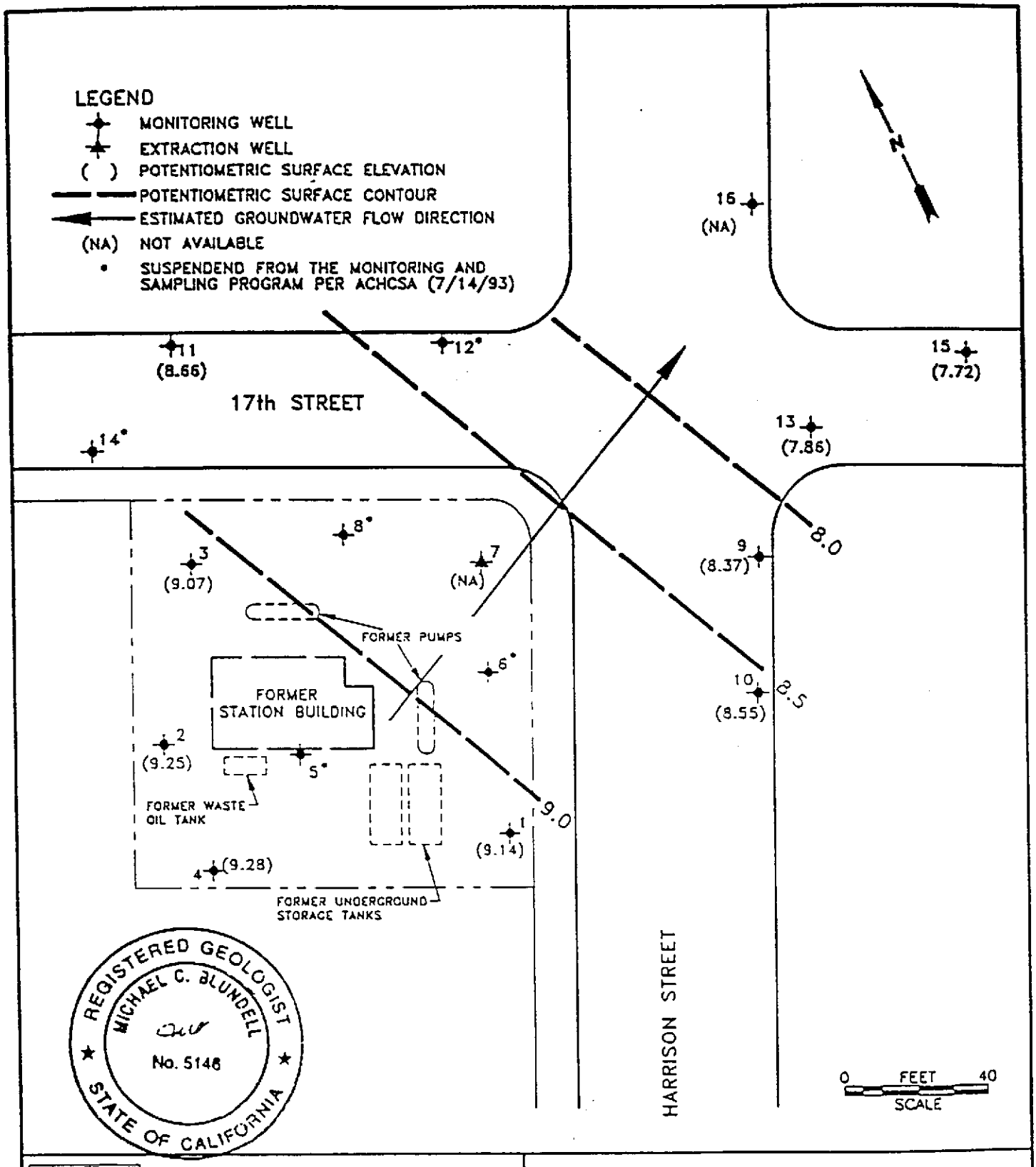
NOTE:
1. CONTOURS REPRESENT APPROXIMATE ELEVATIONS ABOVE MEAN SEA LEVEL.

GROUNDWATER TECHNOLOGY

0 FEET 40
SCALE

POTENTIOMETRIC SURFACE MAP (3/10/94)

CLIENT: CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0020	FILE: 4081PSM, (1:40)	PROJECT NO.: 02010-4081	PM	PE/RG	
	REV.			FIGURE: 1	
LOCATION: 1633 HARRISON STREET OAKLAND, CALIFORNIA	DES. TW	DET. SS	DATE: 4/5/94		

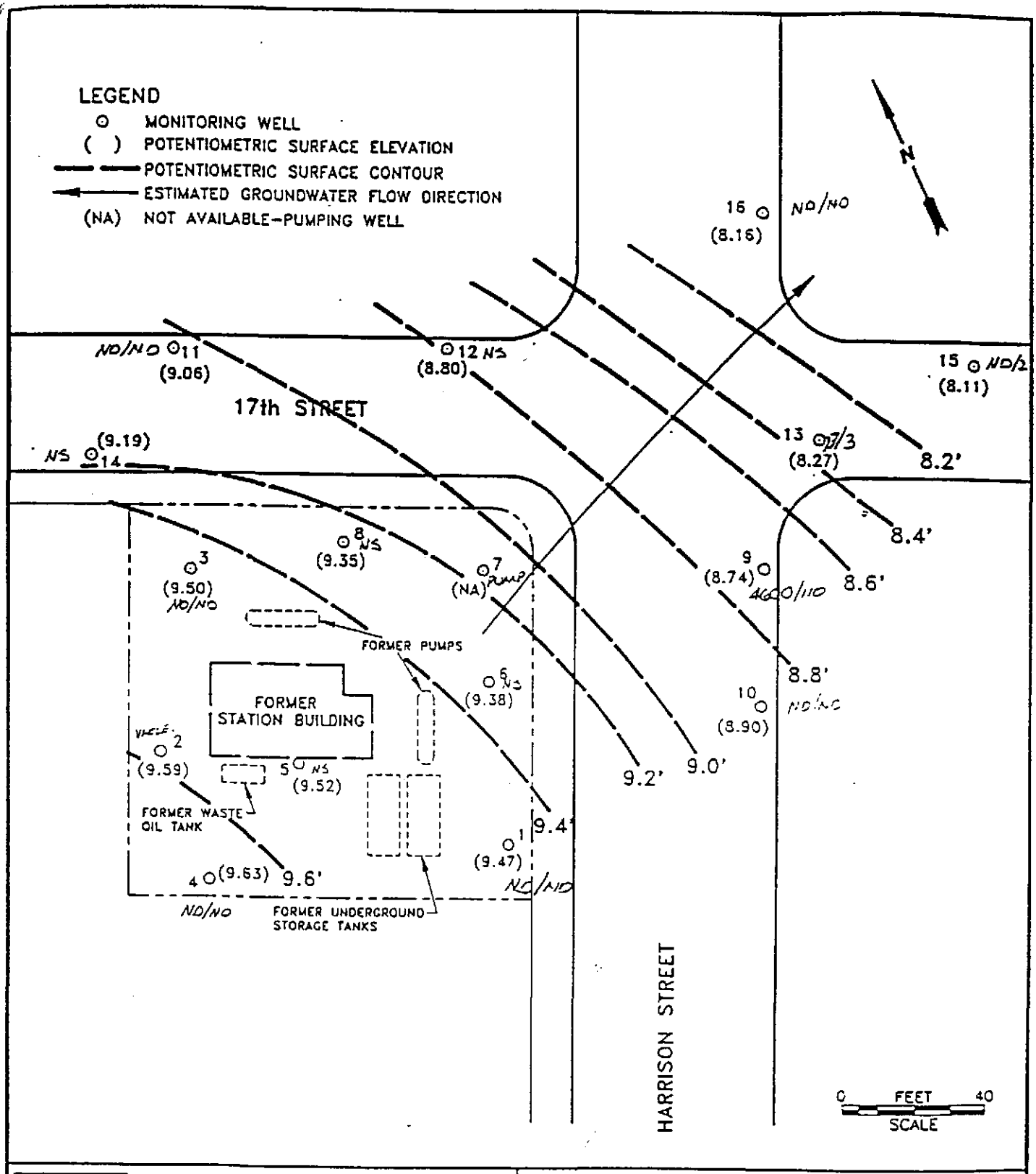


GROUNDWATER TECHNOLOGY
4057 PORT CHICAGO HWY.
CONCORD, CA 94520
(510) 671-2387

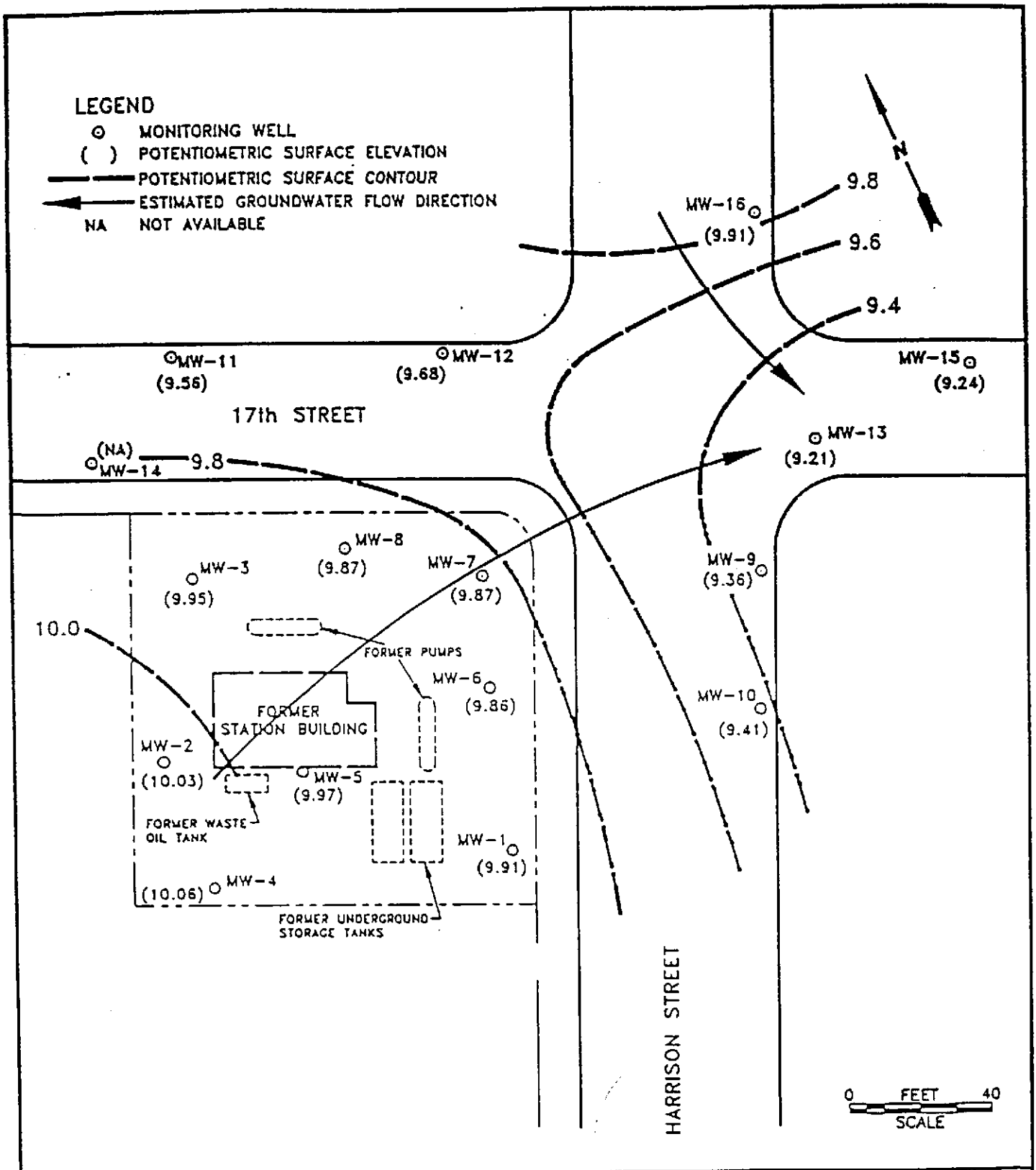
POTENTIOMETRIC SURFACE MAP (12/17/93)

CLIENT:	LOCATION:	REV. NO.:	DATE:
CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0020	1633 HARRISON STREET OAKLAND, CALIFORNIA	0	1/19/94

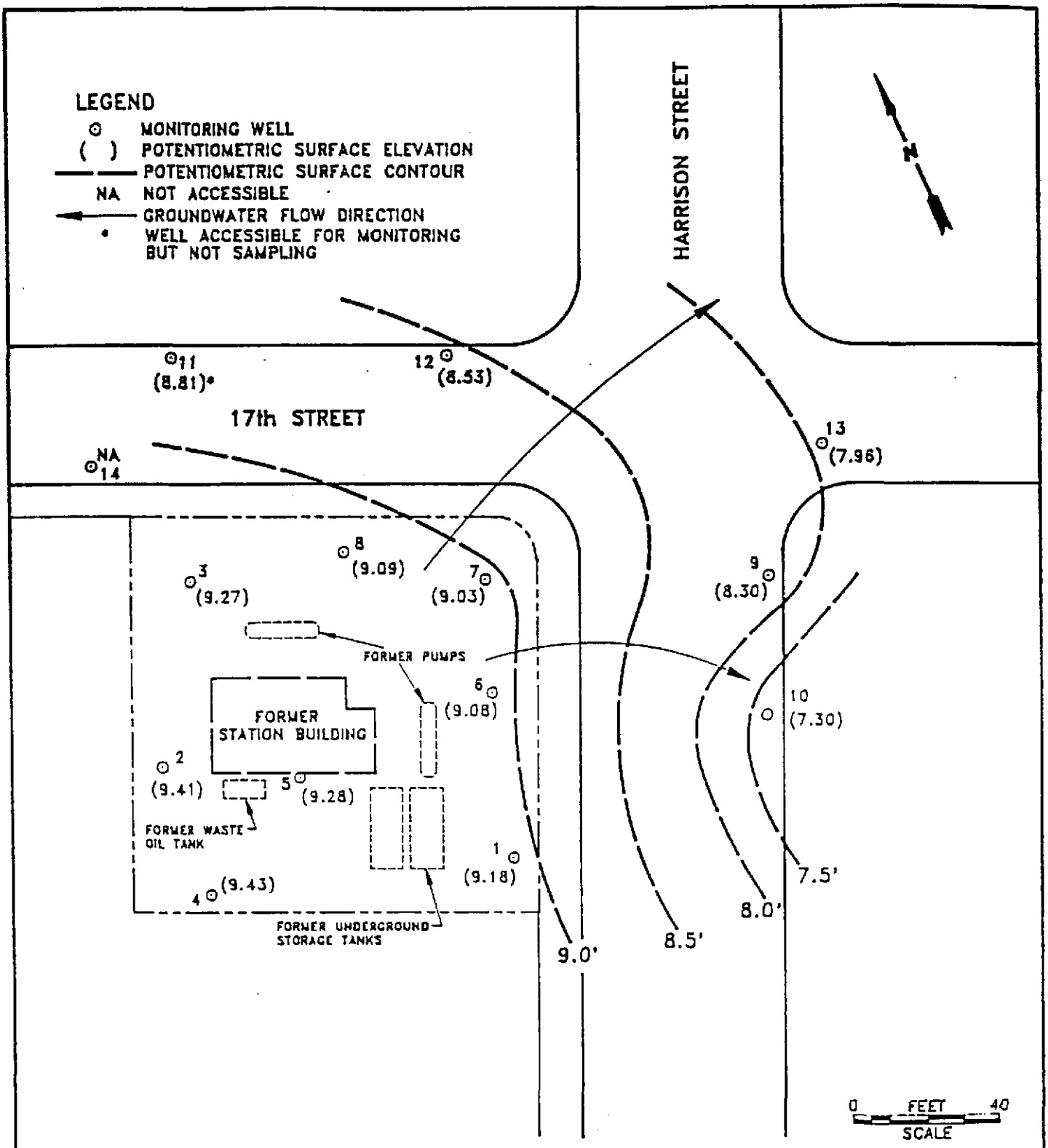
PM	PE/RG	DESIGNED	DETAILED	ACAD FILE:	PROJECT NO.:	FIGURE:
		TW	CY	PSM194	020204084	1



GROUNDWATER TECHNOLOGY 4057 PORT CHICAGO HWY. CONCORO, CA 94520 (510) 671-2387				POTENTIOMETRIC SURFACE MAP (9/27/93)		
CLIENT: CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0020				LOCATION: 1633 HARRISON STREET OAKLAND, CALIFORNIA	REV. NO.: 0	DATE: 10/6/93
PM	PE/RG	DESIGNED	DETAILED	ACAD FILE:	PROJECT NO.:	FIGURE:
	PRK	TW	ML	PSM02793/SP193	020204084	1



GROUNDWATER TECHNOLOGY	4057 PORT CHICAGO HWY. CONCORD, CA 94520 (510) 671-2387	POTENTIOMETRIC SURFACE MAP (4/7/93)	
CLIENT: CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0020	LOCATION: 1633 HARRISON STREET OAKLAND, CALIFORNIA	REV. NO.: 0	DATE: 5/12/93
PM: LWS	PE/RG: ORK	DESIGNED: TW	DETAILED: CY
ACAD FILE: PSM593/SP193	PROJECT NO.: 020302499	FIGURE: 1	



GROUNDWATER TECHNOLOGY
4057 PORT CHICAGO HWY.
CONCORD, CA 94520
(510) 671-2387

POTENTIOMETRIC SURFACE MAP (6/15/92)

CLIENT:	LOCATION:	REV. NO.:	DATE:
CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION No. 9-0020	1633 HARRISON STREET OAKLAND, CALIFORNIA	0	7/22/92

PM	PE/RG	DESIGNED	DETAILED	ACAD FILE:	PROJECT NO.:	FIGURE:
SAM	DIRK	GM	ML	PSM61592/SP592	020302499	1

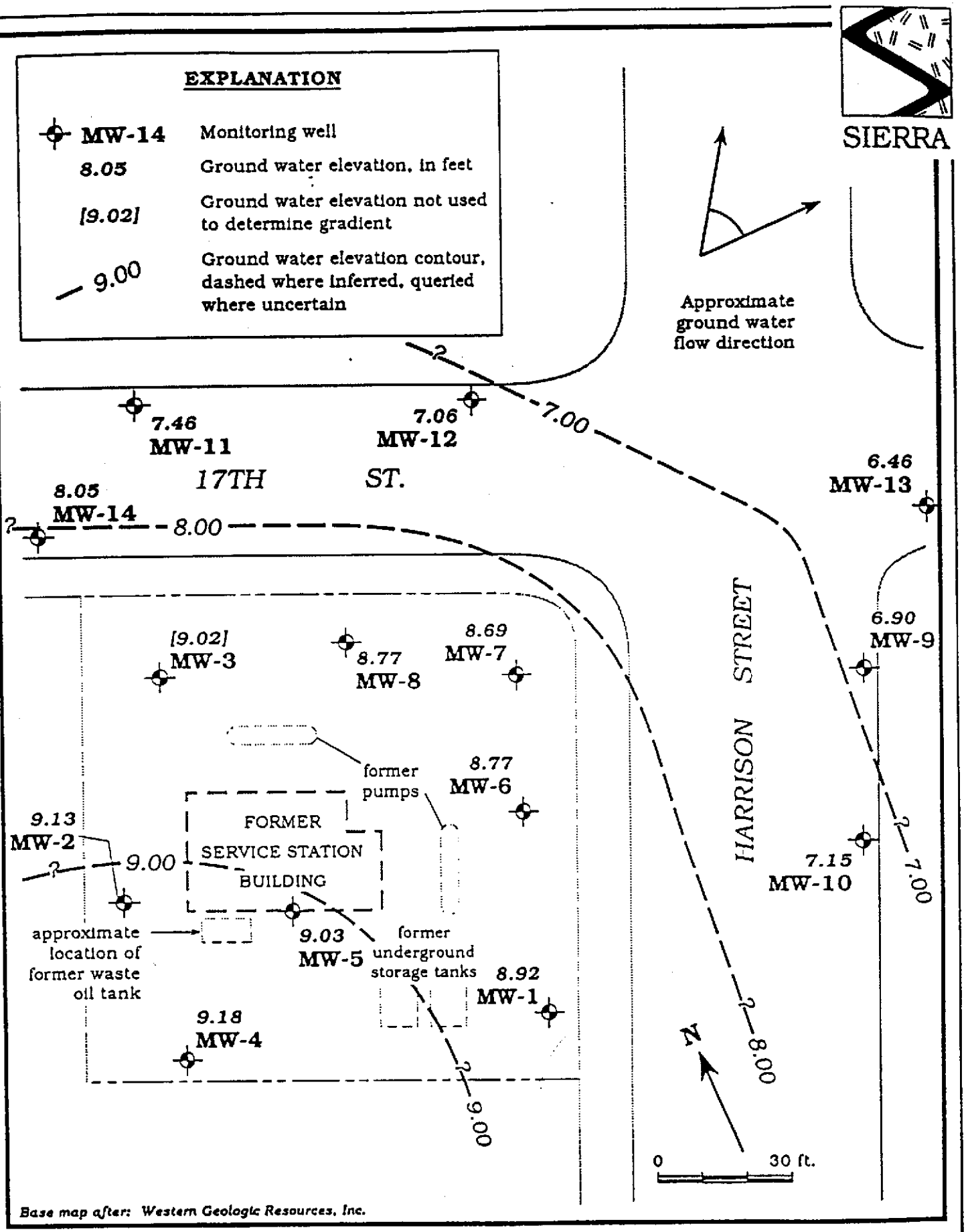


Figure 2. Monitoring Well Locations and Ground Water Elevation Contour Map – February 20, 1992 – Chevron Service Station #9-0020, 17th Street and Harrison Street, Oakland, California

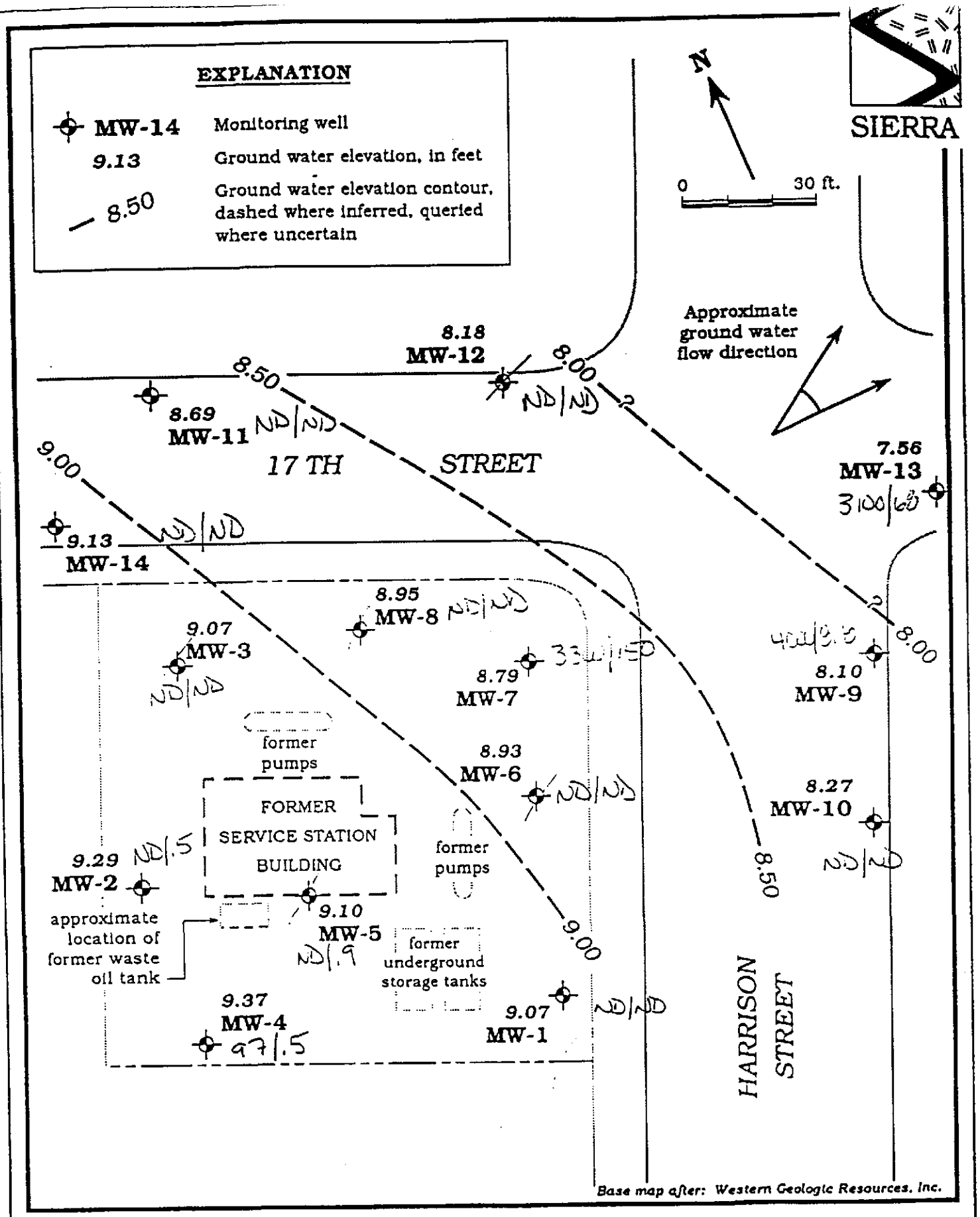


Figure 2. Monitoring Well Location and Ground Water Elevation Contour Map – November 15, 1991 – Chevron Service Station #9-0020, 17th Street and Harrison Street, Oakland, California

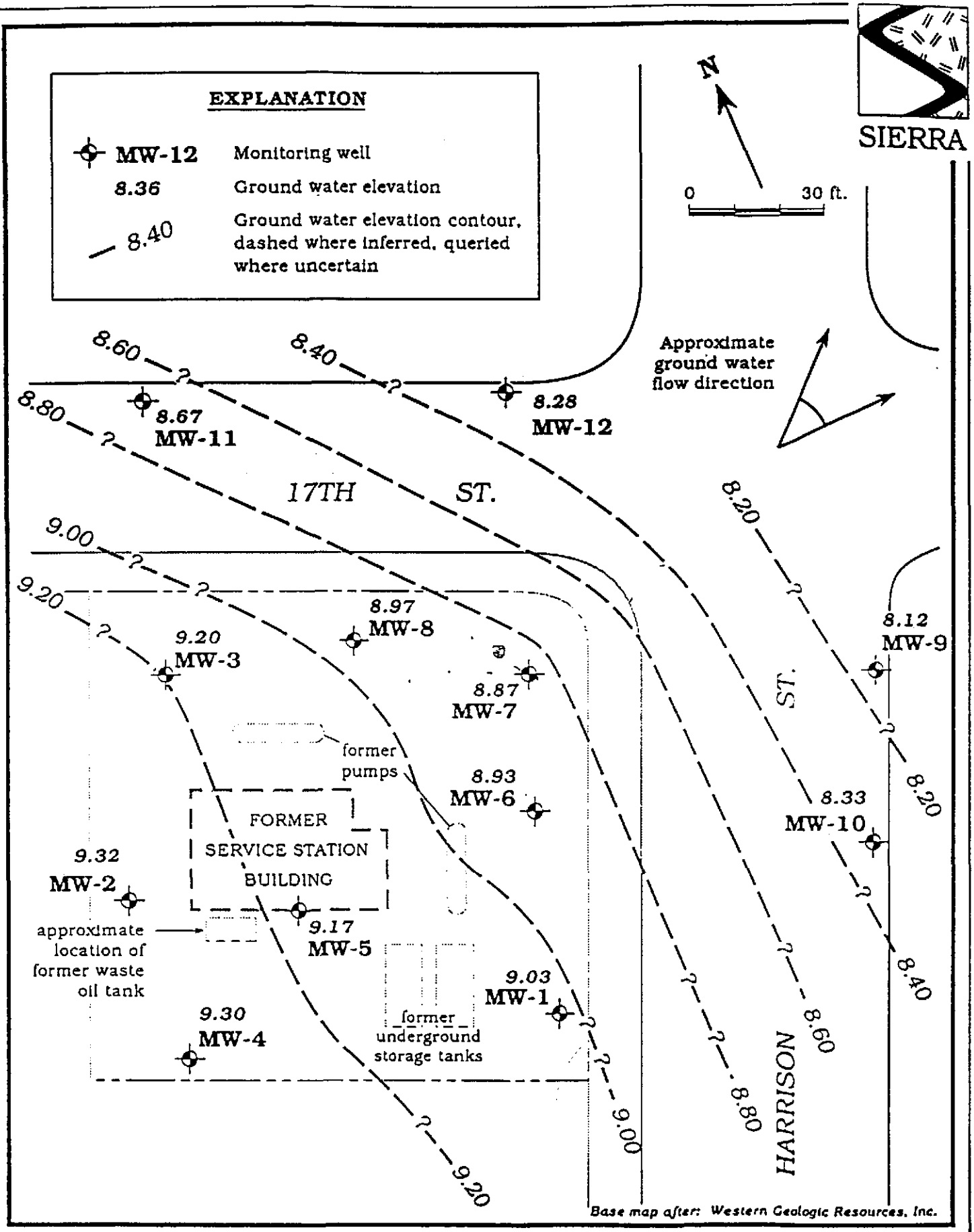


Figure 2. Monitoring Well Locations and Ground Water Elevation Contour Map - August 27, 1991 - Chevron Service Station #9-0020, 17th Street and Harrison Street, Oakland, California

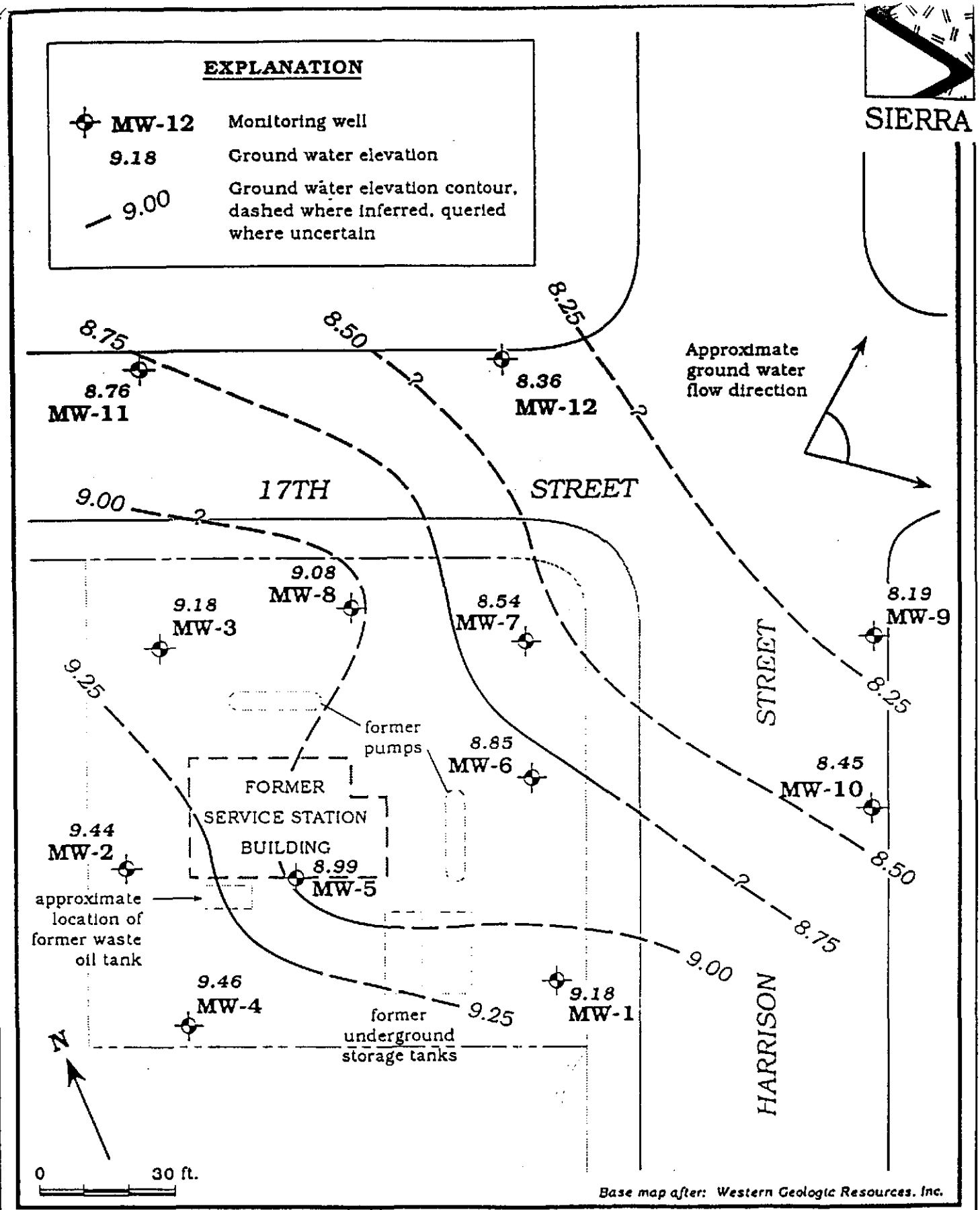
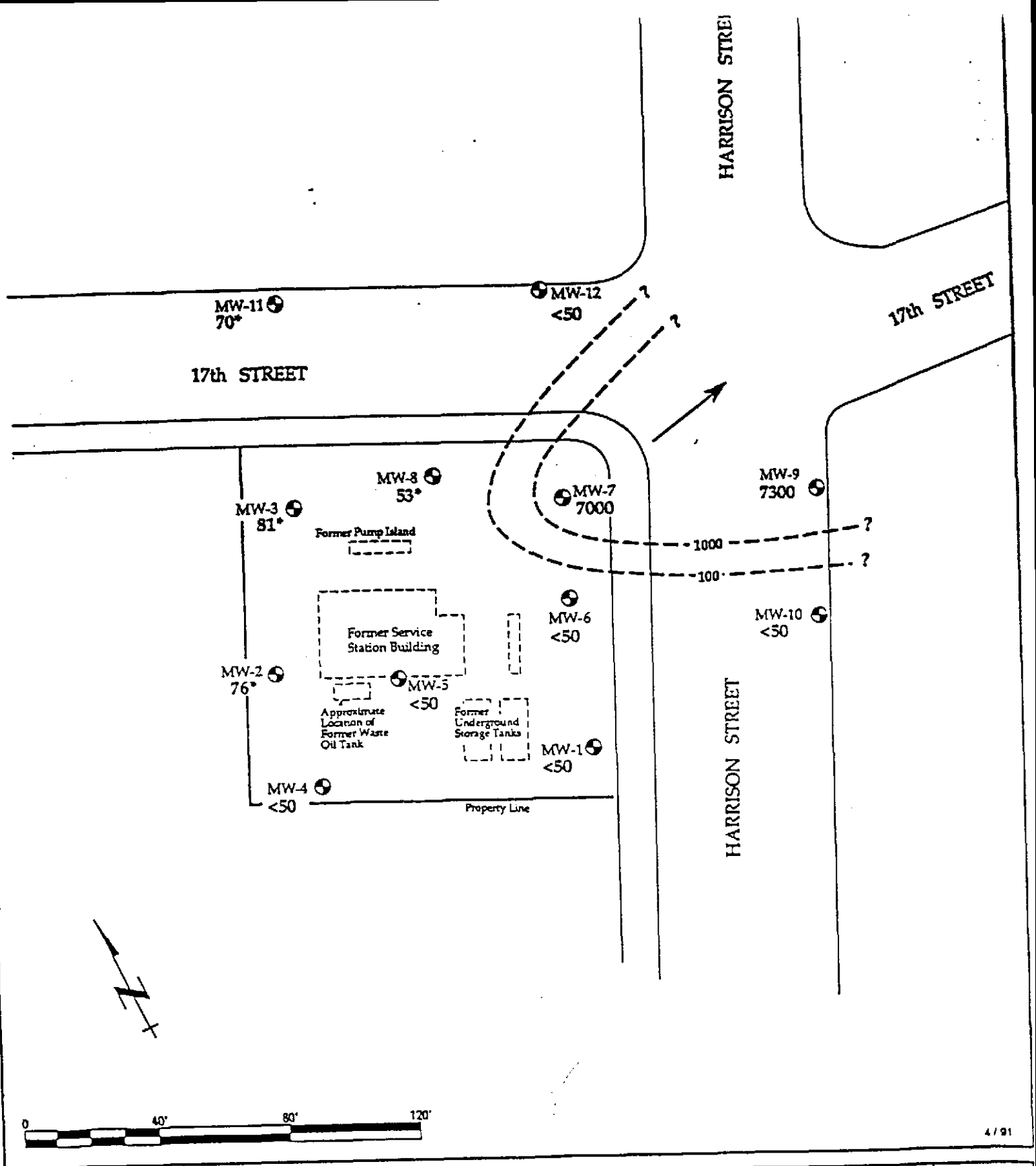


Figure 2. Monitoring Well Locations and Ground Water Elevation Contour Map – May 15, 1991 – Chevron Service Station #9-0020, 17th Street and Harrison Street, Oakland, California



EXPLANATION

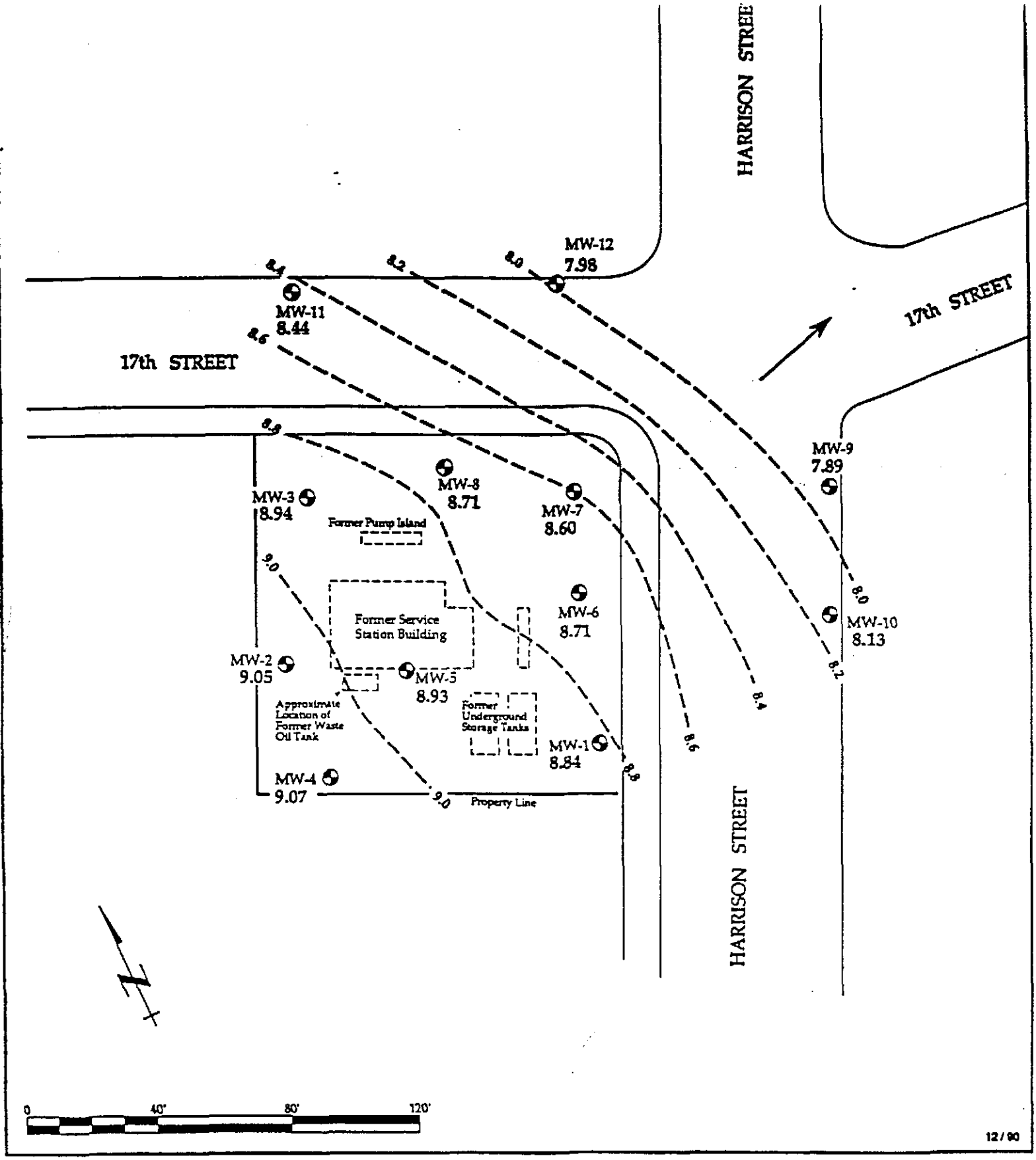
- MW-1 <50 — Monitor Well location and TPPH concentration in parts-per-billion (ppb) EPA method 8015
- * — Does not match gasoline pattern, single peak in gasoline range can be identified from EPA method 8010 results
- 100 — ? — Isoconcentration contour for TPPH in ppb, dashed where inferred, queried where uncertain
- 5 ← — Estimated direction of groundwater flow

Distribution of Total Purgeable Petroleum Hydrocarbons (TPPH) in Shallow Groundwater
7 March 1991
Former Chevron Service Station #90020
1633 Harrison Street,
Oakland, California

FIGURE 3

WESTERN GEOLOGIC RESOURCES, INC.

1-012.05



EXPLANATION

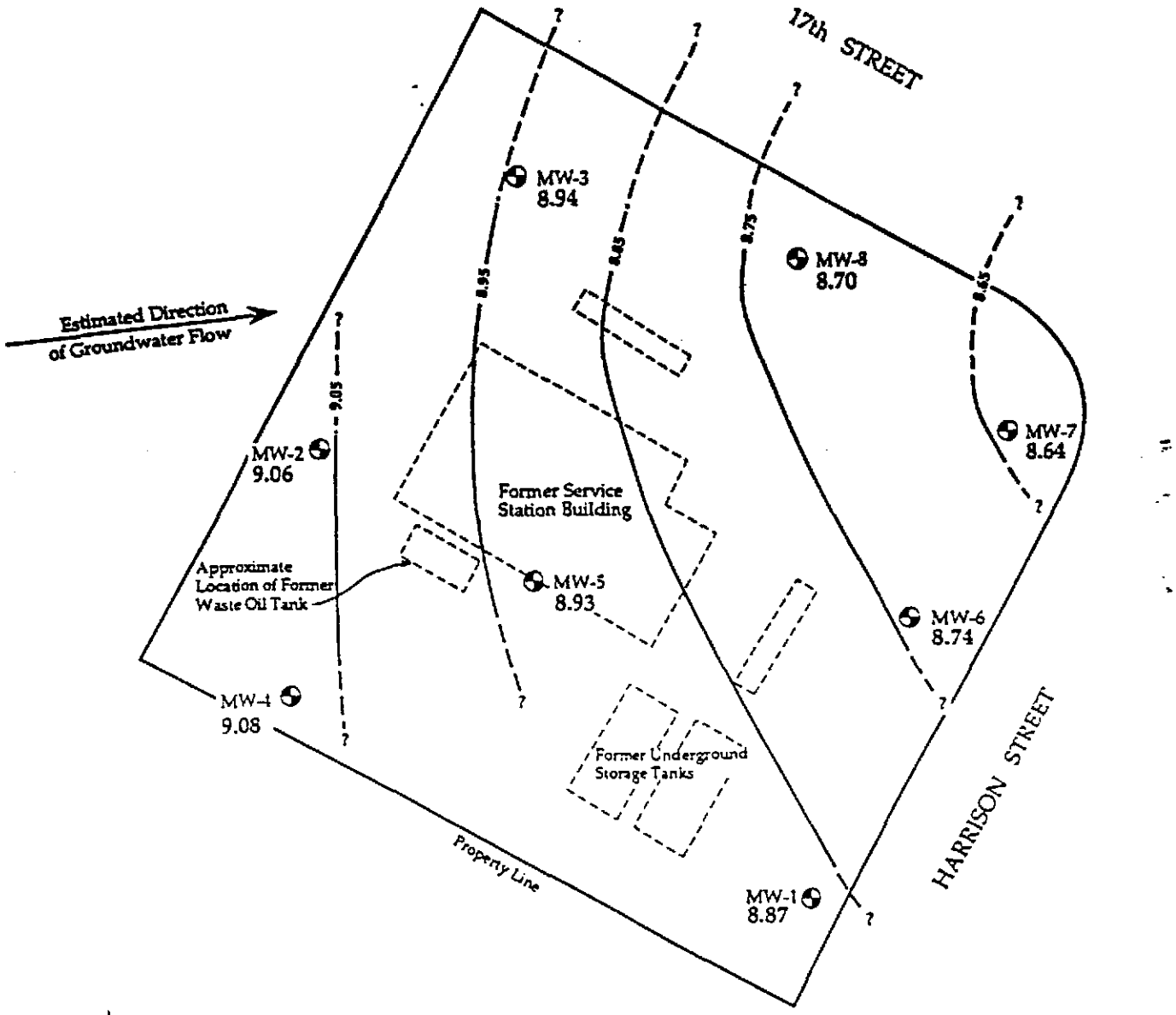
MW-1 8.84 — Monitor Well location and groundwater elevation, feet above mean sea level (MSL)

8.0 — — — ? — Potentiometric surface contour, feet above MSL, dashed where inferred

← — Estimated direction of groundwater flow

Potentiometric Surface of Shallow Groundwater
13 November 1990
Former Chevron Service Station #90020
1633 Harrison Street, Oakland, California

FIGURE
3



LEGEND

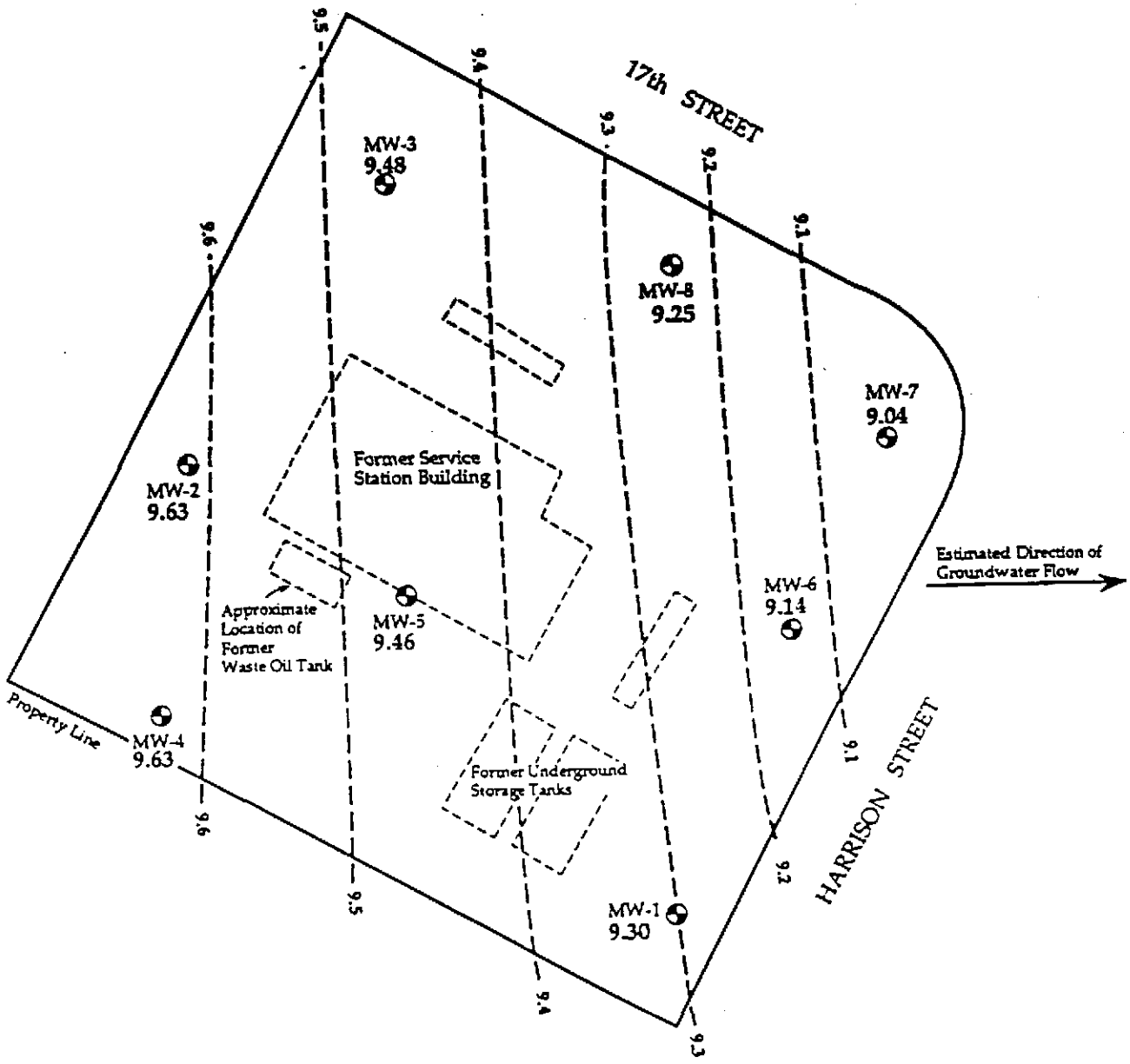
MW-8 8.70	Monitor Well Location and groundwater elevation, feet above mean sea level
8.85 — — —?	Groundwater elevation contour, feet above mean sea level, dashed where inferred, queried where uncertain

Potentiometric Surface of Shallow Groundwater, 18 April 1990
Chevron Service Station #90020
17th and Harrison Streets, Oakland, California

FIGURE 3

WESTERN GEOLOGIC RESOURCES, INC.

1-012.03



LEGEND

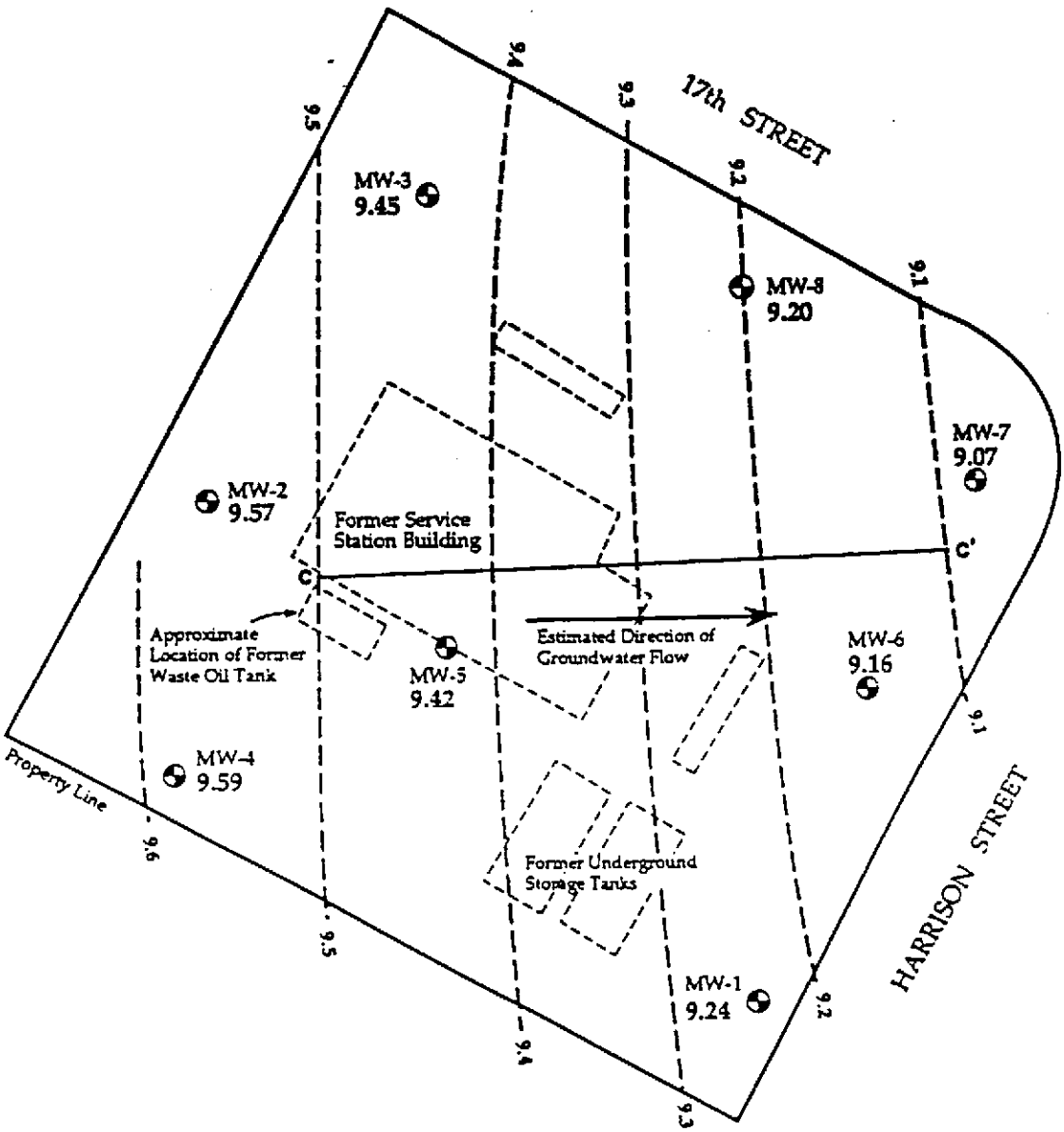
- MW-4 9.63 — Monitor Well Location and groundwater elevation, feet above mean sea level
- 9.6 — — ? — Groundwater elevation contour, feet above mean sea level, dashed where inferred, queried where uncertain

Potentiometric Surface of Shallow Groundwater,
30 October 1989
Former Chevron Service Station #90020
Oakland, California

FIGURE
5

WESTERN GEOLOGIC RESOURCES, INC.

1-012.03



12/89

LEGEND

- MW-4 9.59 — Monitor Well Location and groundwater elevation, feet above mean sea level
- 9.5 — Groundwater elevation contour, feet above mean sea level, dashed where inferred
- C——C' — Reference Line for gradient calculation

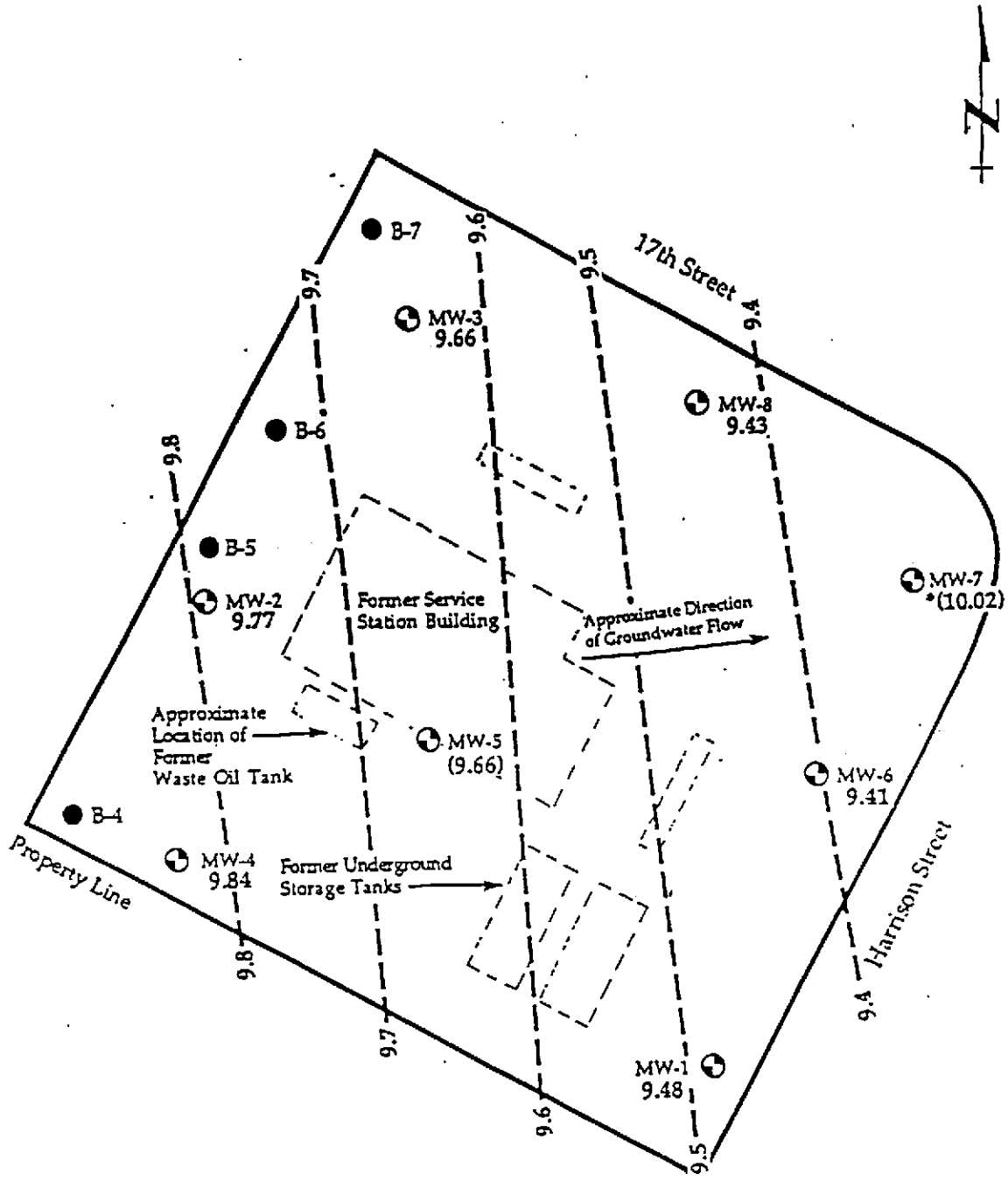
Potentiometric Surface of Shallow Groundwater
28 July 1989
Former Chevron Service Station #90020
Oakland, California

FIGURE 4

WESTERN GEOLOGIC RESOURCES, INC.

1-012.03

1989 GROUNDWATER INVESTIGATION



SCALE: 1"=25'

LEGEND

MW-1 9.48	Monitoring Well Location Static Water Level Elevation (MSL) 23 April 1989
B-4	Boring Location
9.4	Groundwater Elevation Contour, Feet Above Mean Sea Level, Dashed Where Inferred
*	Anomalous Elevation Not Used

Potentiometric Surface of the Shallow Water-Bearing Zone
23 April 1989, Chevron SS #90020, Oakland, California

FIGURE
4

WESTERN GEOLOGIC RESOURCES, INC.

1-012.02

APPENDIX G

SYSTEM OPERATION DATA

Table 1: Flow Totalizer Readings
Former Chevron Service Station #9-0020
1633 Harrison Street, Oakland, California.

Date	Totalizer Reading (Gallons)		Gallons Discharged This Period	Cumulative Gallons	Days Since Previous Reading	Average Discharge Rate (GPM)	Notes
1-Jul-93	0		0	0		0	System nonoperational
14-Jul-93	2,059	(a)	0	0		0	System startup
19-Jul-93	2,218		159	159	5	0.02	O&M, collect air samples
22-Jul-93	2,218		0	159	3	0.00	Shut off system; sump pump failure
9-Sep-93	2,466		248	407	49	0.004	Restart system; collect GW system samples
14-Oct-93	2,492		26	433	35	0.001	Collect GW system samples
17-Nov-93	2,501		9	442	34	0.000	Collect GW system samples
12-Dec-93	2,521		20	462	25	0.001	System off on arrival; no samples collected
							55 gal. discharged this reporting period

(a) Meter not zeroed when system began operation.

GPM = Gallons per minute

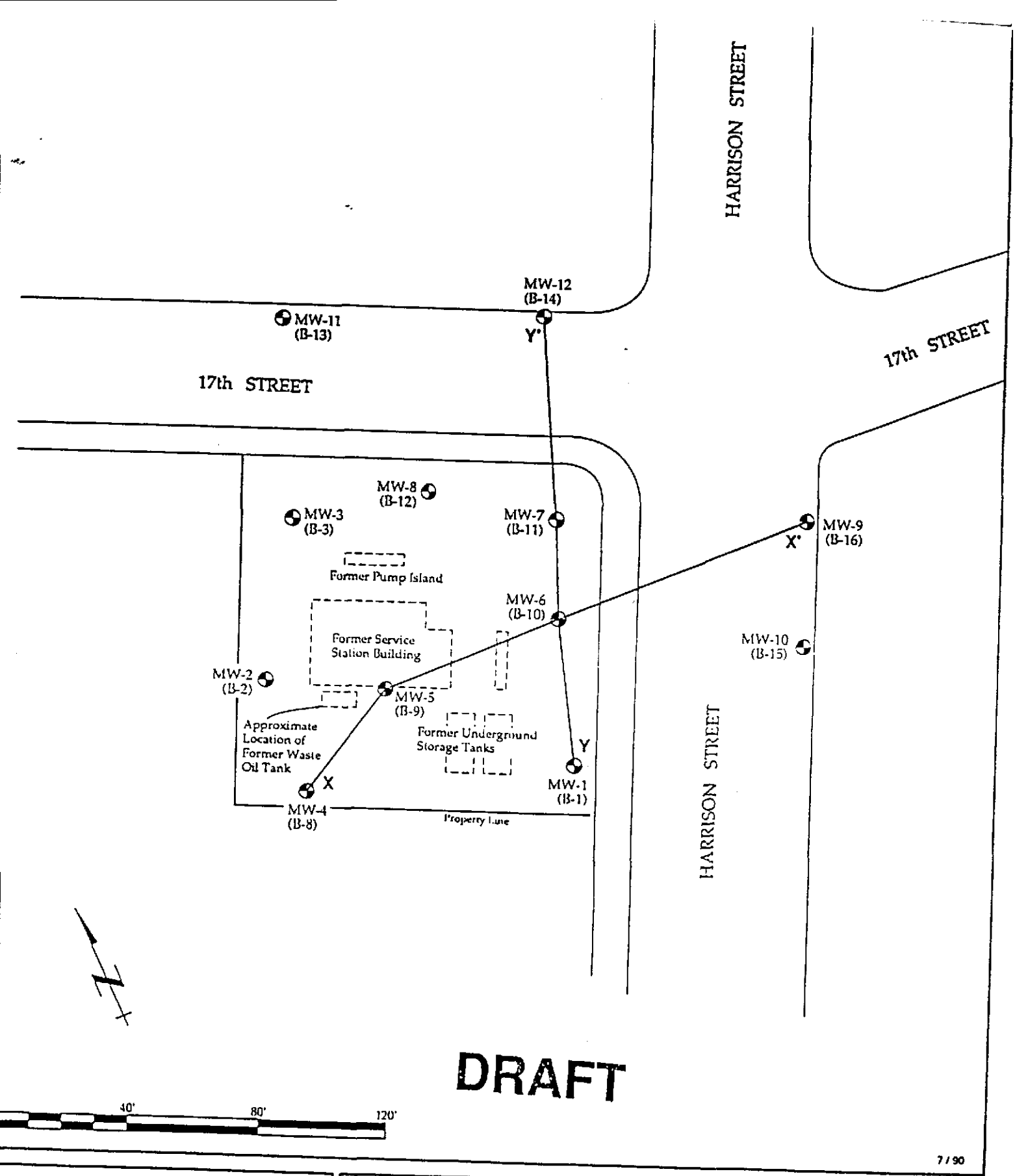
Table 2: **Groundwater Analytical Results**
Former Chevron Service Station #9-0020
1633 Harrison Street, Oakland, California.

Sample	Date	TPH as Gasoline (µg/L) (a)	Benzene (µg/L) (b)	Toluene (µg/L) (b)	Ethylbenzene (µg/L) (b)	Xylenes (µg/L) (b)
Influent	15-Jul-93	4,400	330	260	170	900
	9-Sep-93	220	6	11	9	56
	14-Oct-93	100	7	4	2	15
	17-Nov-93	390	12	8	5	40
Intermediate	15-Jul-93	NS	NS	NS	NS	NS
	9-Sep-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
	14-Oct-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
	17-Nov-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
Effluent	15-Jul-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
	9-Sep-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
	14-Oct-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
	17-Nov-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
Trip Blank	15-Jul-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
	9-Sep-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
	14-Oct-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)
	17-Nov-93	ND(<50)	ND(<0.5)	ND(<0.5)	ND(<0.5)	ND(<0.5)

(a) Analyzed by USEPA Method 8015, modified.
(b) Analyzed by USEPA Method 8020.

TPH Total petroleum hydrocarbons
µg/L Micrograms per liter
ND( ) Laboratory method detection limit; limit in parentheses
NS Not sampled

No samples were collected in December 1993; the groundwater treatment system was off.



EXPLANATION

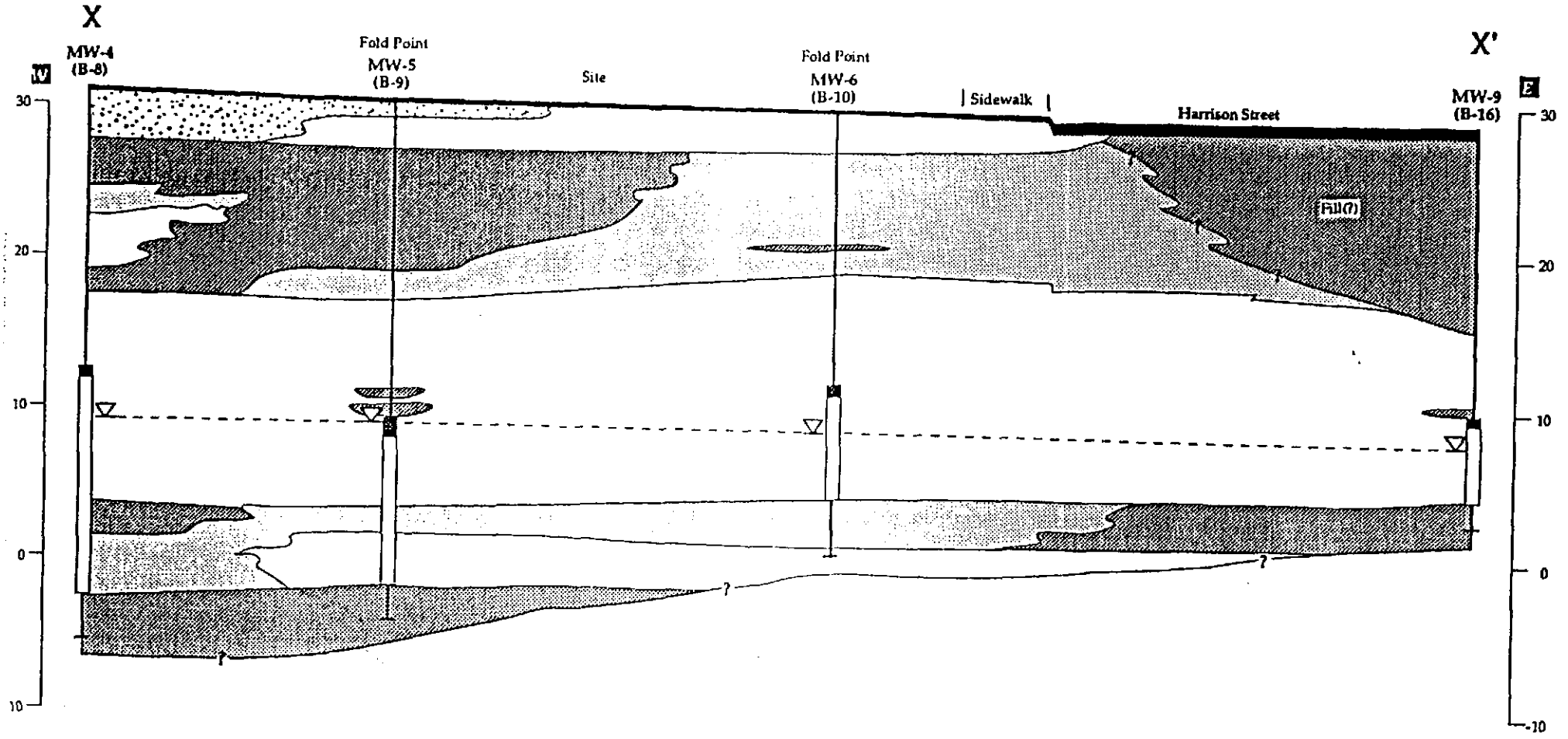
MW-1 (B-1) Monitor Well (Boring) location

X — X' Generalized hydrogeologic cross-section location

Site Map with Monitor Well and Generalized Hydrogeologic Cross-Section X-X' and Y-Y' Locations
Former Chevron Service Station #90020
1633 Harrison Street,
Oakland, California

FIGURE

3



DRAFT

EXPLANATION

- Low permeability soils; sandy and silty clays
- Low to moderate permeability soils; silty and clayey sands
- Moderate to high permeability soils; gravelly sands
- Fill
- Asphalt/Concrete

MW-4 (B-8) Monitor Well Location (Boring Location)

Sand pack
Screen interval
Boring

Static water level, 22 June 1990

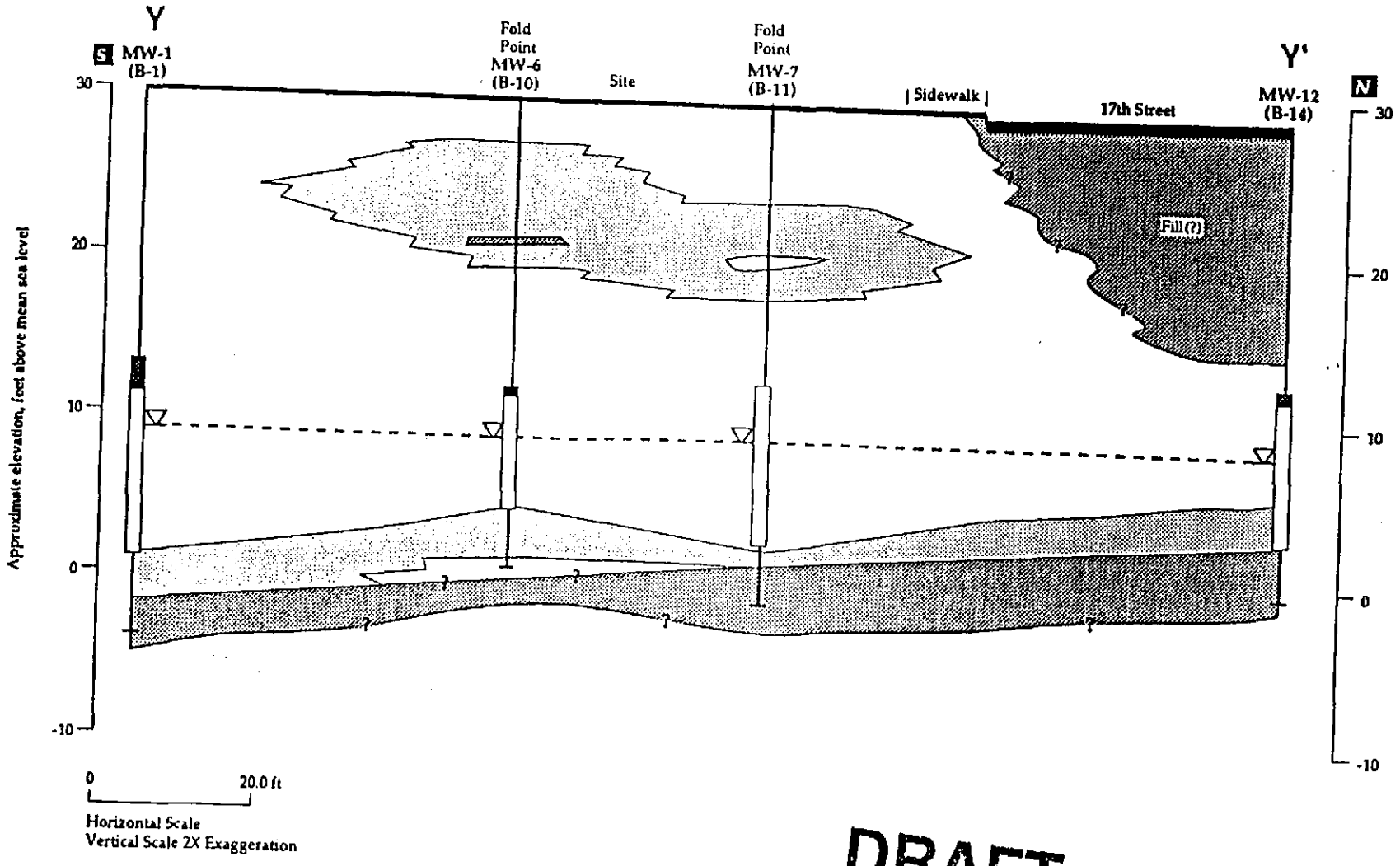
Potentiometric Surface

Generalized Hydrogeologic Cross-Section X-X'
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

FIGURE
4

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



DRAFT

EXPLANATION

- Low permeability soils; sandy and silty clays; clayey silts
- Low to moderate permeability soils; silty and clayey sands
- Moderate to high permeability soils; sands; gravelly sands
- Asphalt/Concrete

MW-1 (B-1) Monitor Well Location (Boring Location)

Sand pack
Screen interval
Boring

Static water level, 22 June 1990

Potentiometric Surface

Generalized Hydrogeologic Cross-Section Y-Y'
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

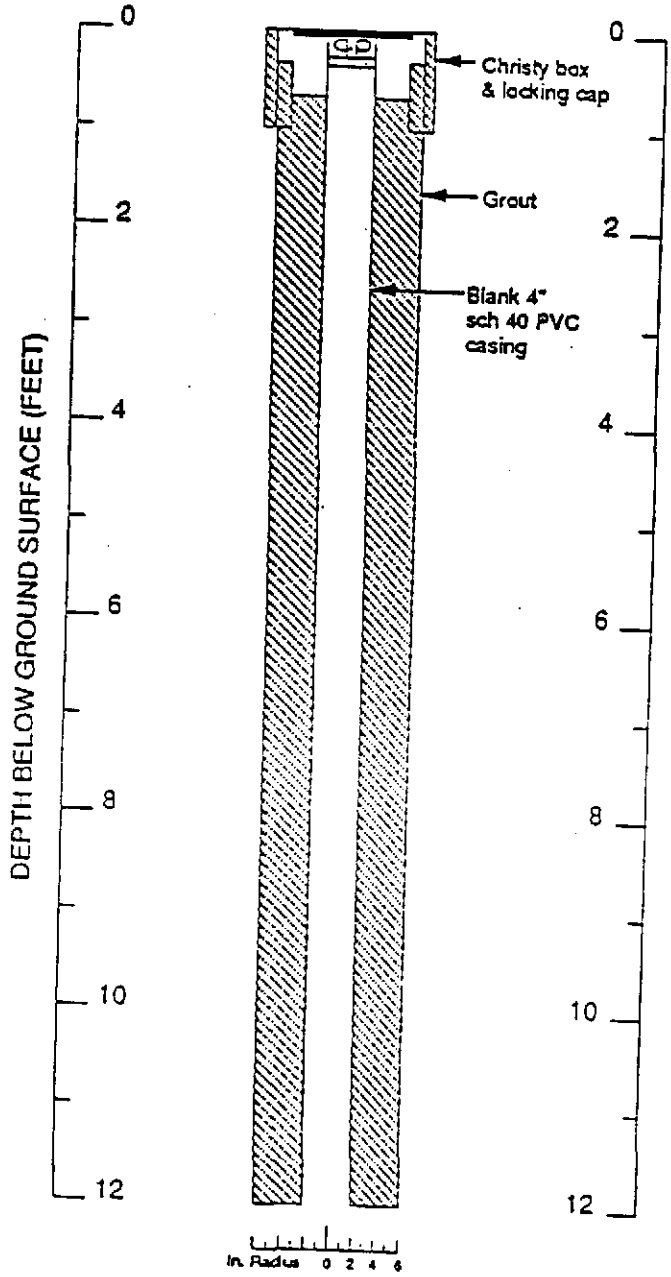
FIGURE 5

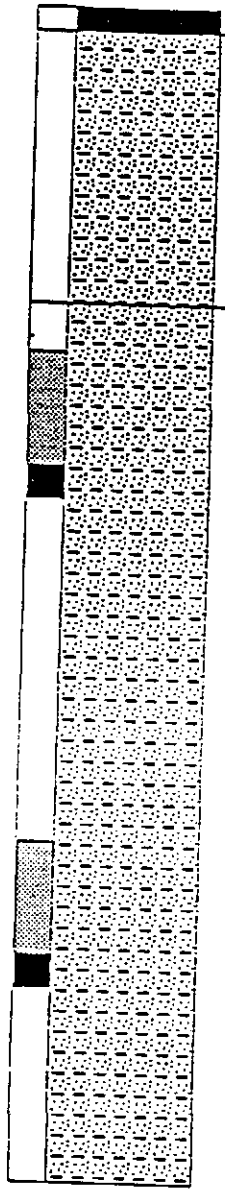
WESTERN GEOLOGIC RESOURCES, INC.

1-012.04

WGR

MONITOR WELL MW-1





DESCRIPTION

Asphalt

Silty SAND (SM) light brown; medium dense to loose: damp; 20% fine to medium sand; moderate est K

Silty SAND (SM) light brown with orange mottling; medium dense to loose; damp; 20% fine to medium sand; moderate est K

Continues

EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Gradational (hachured), uncertain (dashed) contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Grab sample

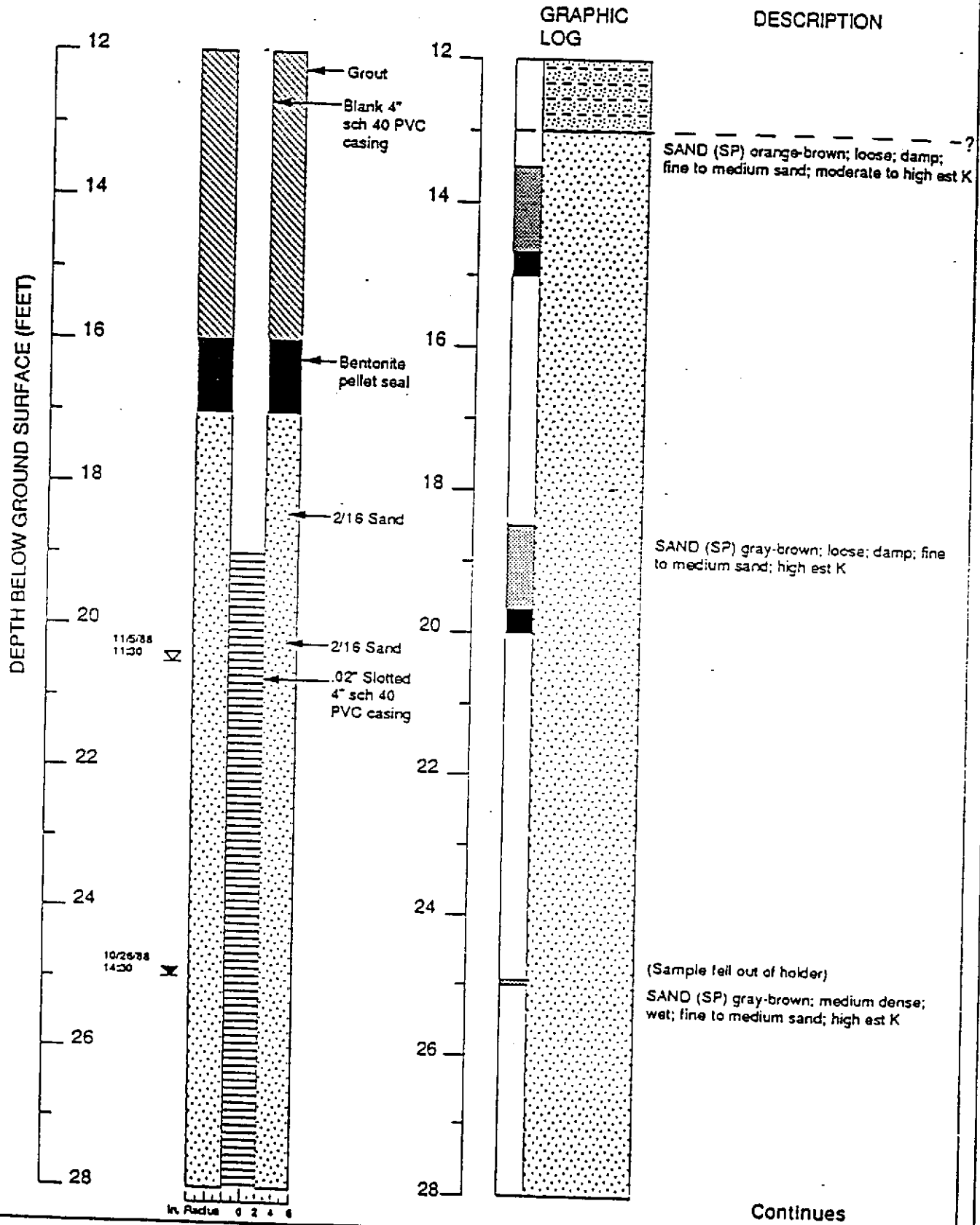
est K = Estimated permeability (hydraulic conductivity)

Logged by: Gail Jones
Supervisor: Tom Howard
Drilling Company: All Terrain
Driller: Wes
Drilling Method: Hollow stem auger
Dates Drilled: 10/26/88
Well Head Completion: Christy box & locking cap
Type of Sampler: 2" split barrel
TD: Drill depth

Boring Log and Well Completion Details MW-1
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

MONITOR WELL MW-1 (cont.)

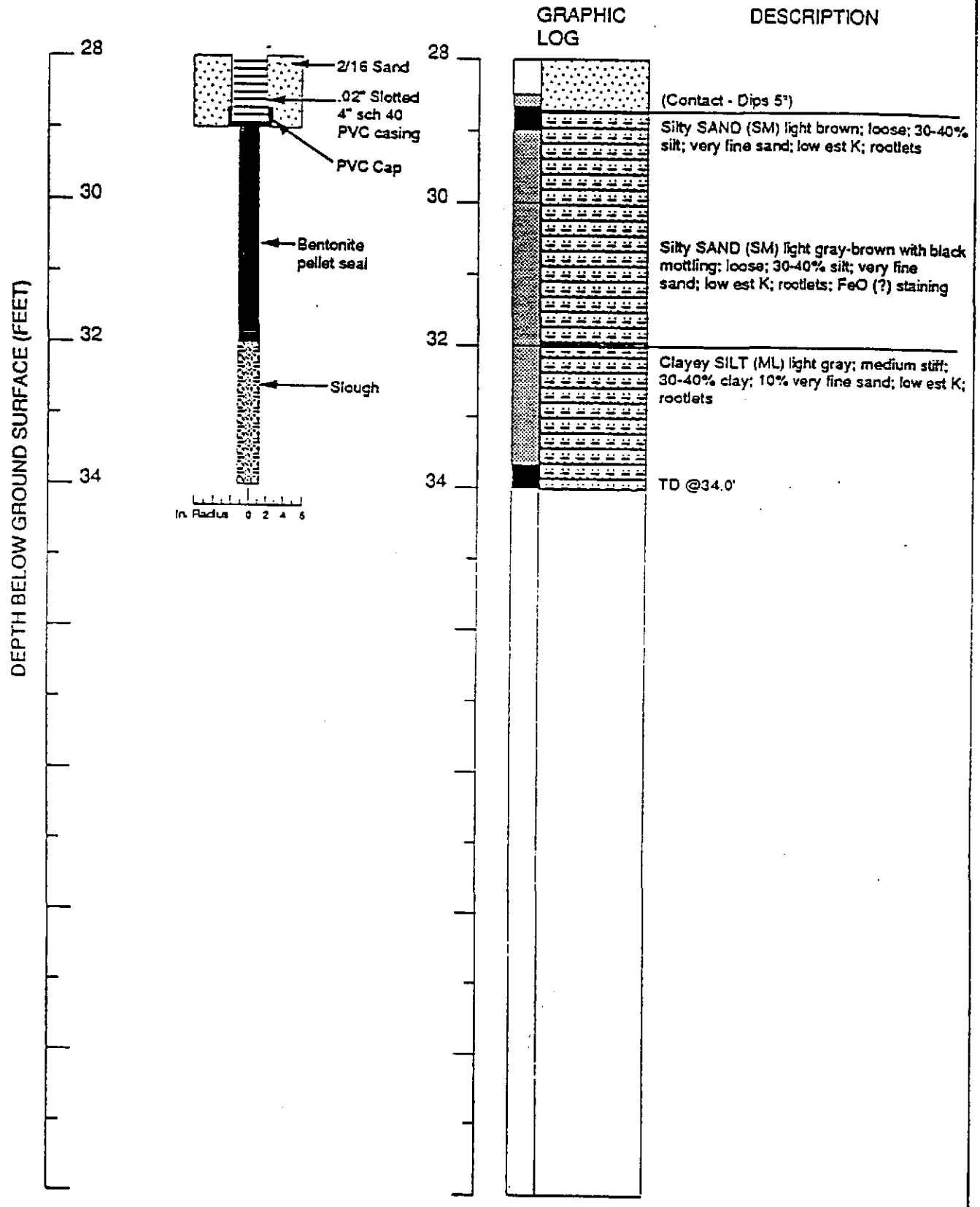


Continues

Boring Log and Well Completion Details MW-1 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

MONITOR WELL MW-1 (cont.)

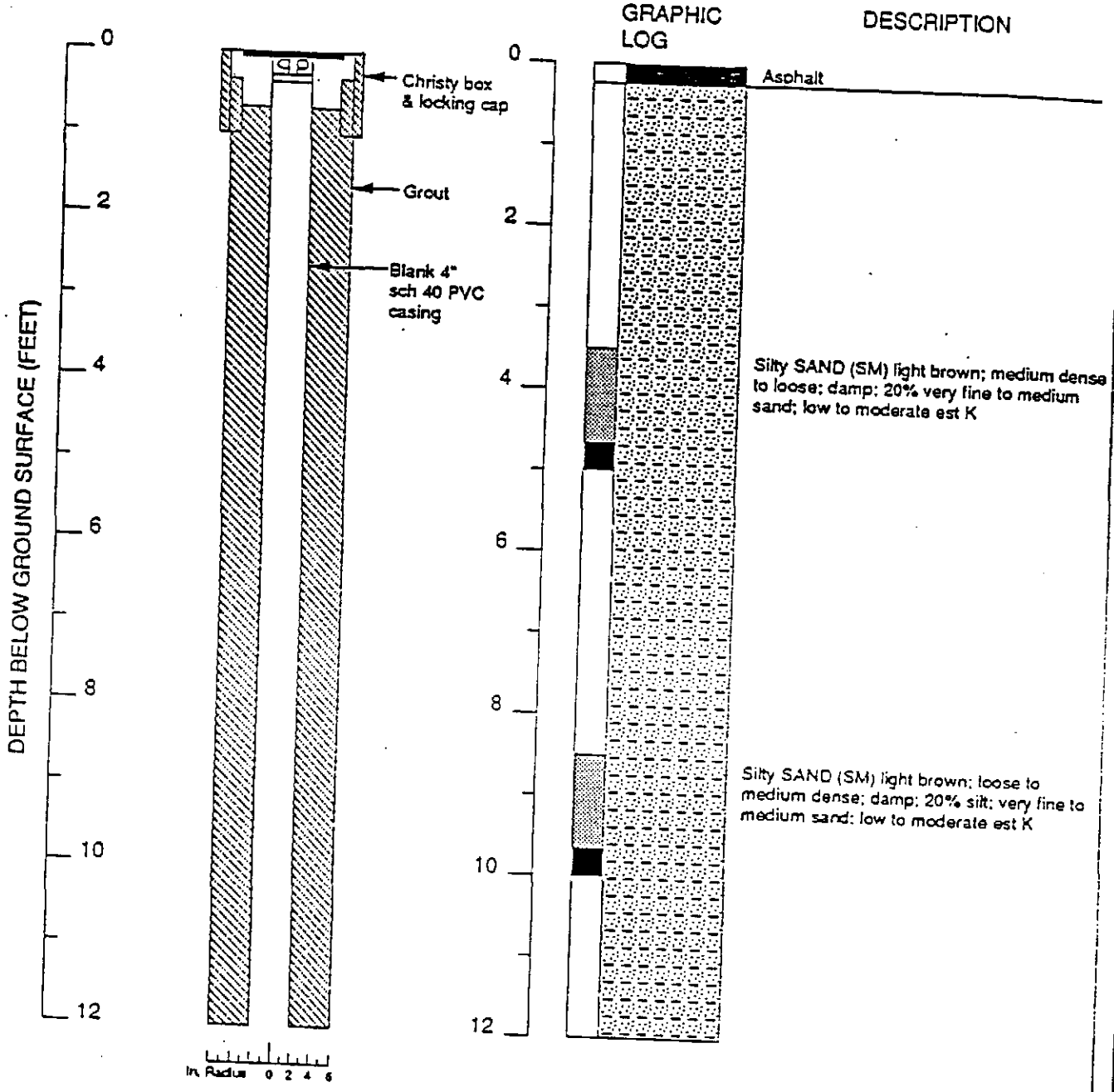


Boring Log and Well Completion Details MW-1 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

WGR

MONITOR WELL MW-2



EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Gradational (hachured), uncertain (dashed) contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Grab sample

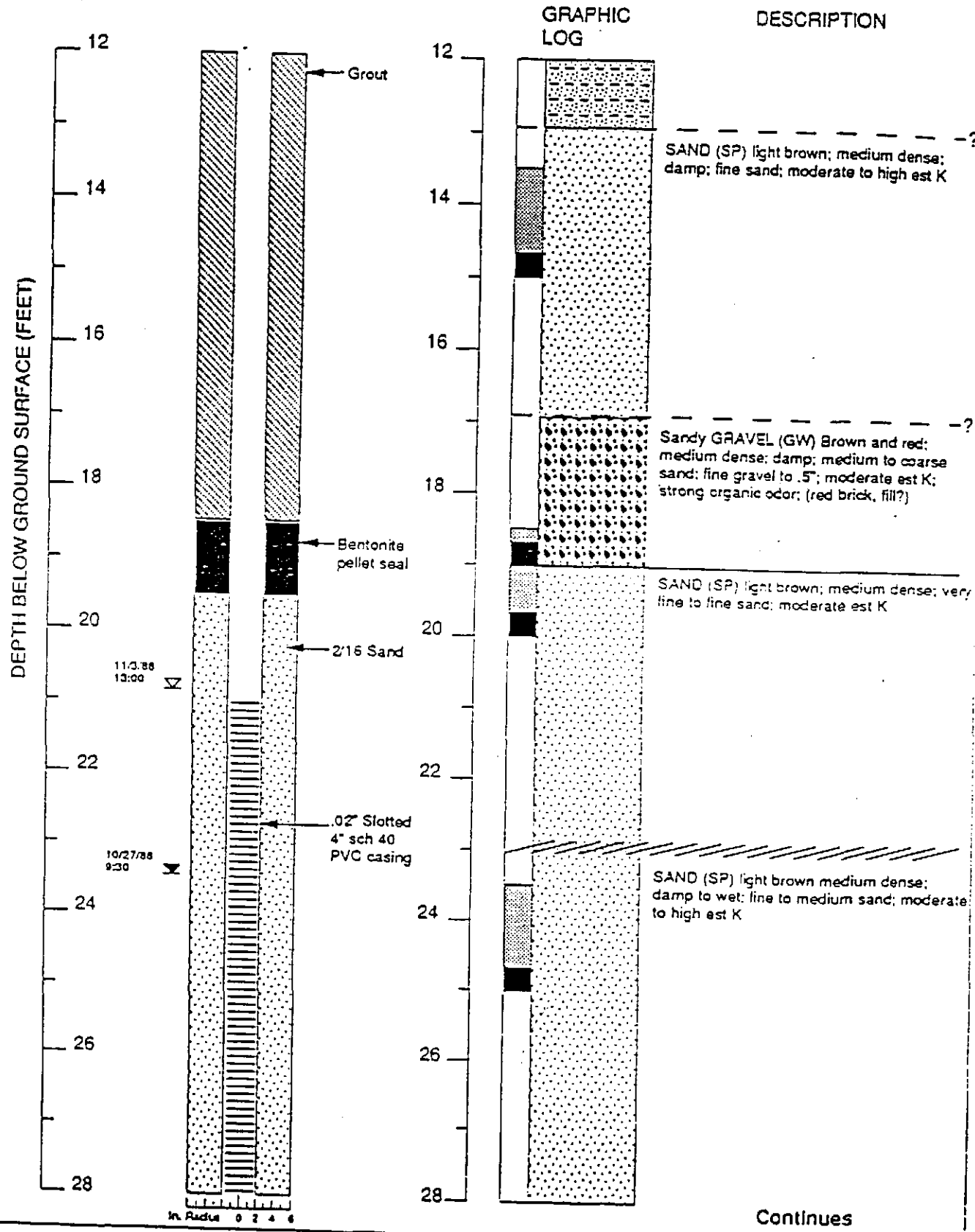
est K = Estimated permeability (hydraulic conductivity)

Logged by: Gail Jones
Supervisor: Tom Howard
Drilling Company: All Terrain
Driller: Wes
Drilling Method: Hollow stem auger
Dates Drilled: 10/27/88
Well Head Completion: Christy box & locking cap
Type of Sampler: 2" split barrel
TD: Drill depth = 33.0 ft

Boring Log and Well Completion Details MW-2
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

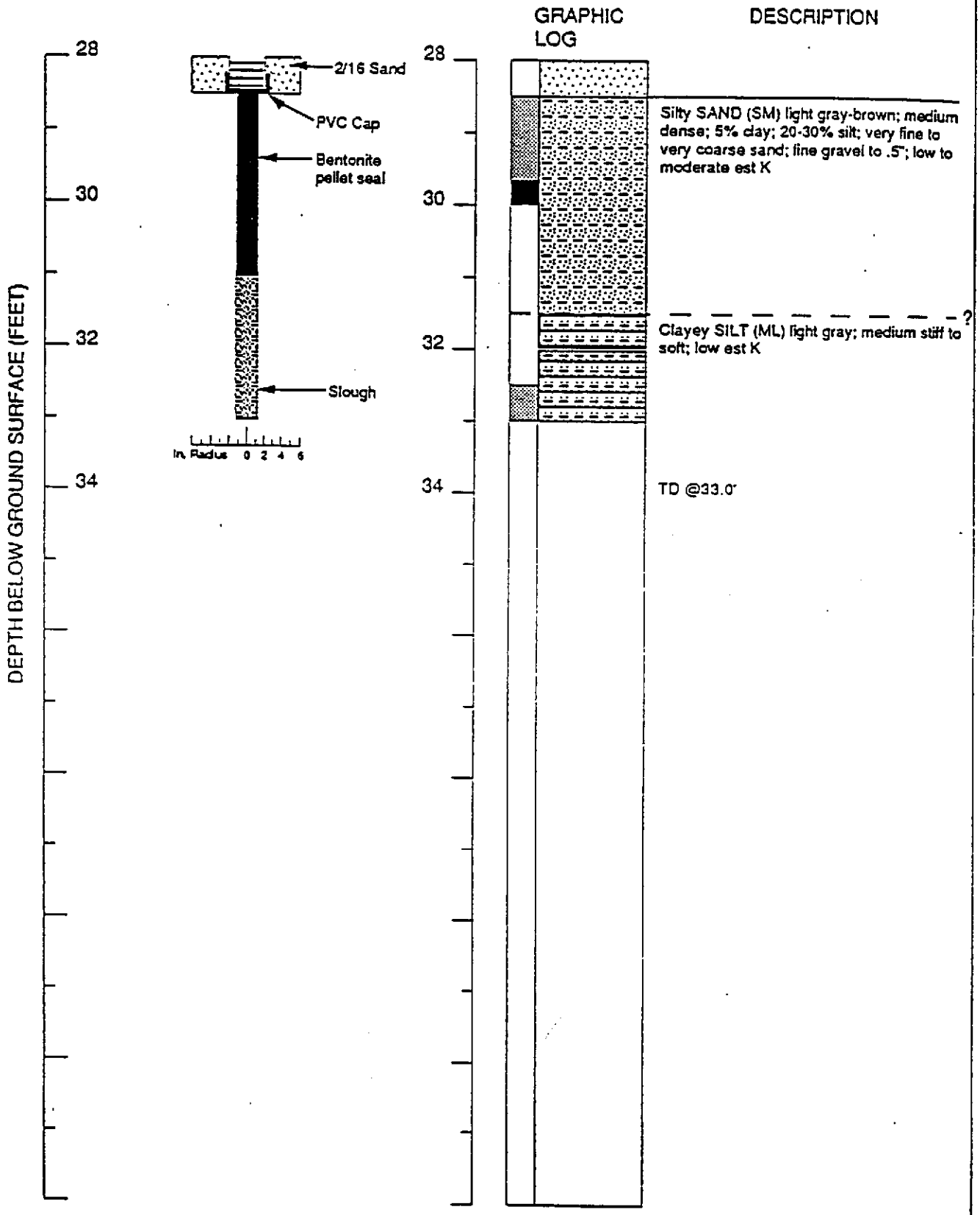
MONITOR WELL MW-2 (cont.)



Boring Log and Well Completion Details MW-2 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

MONITOR WELL MW-2 (cont.)

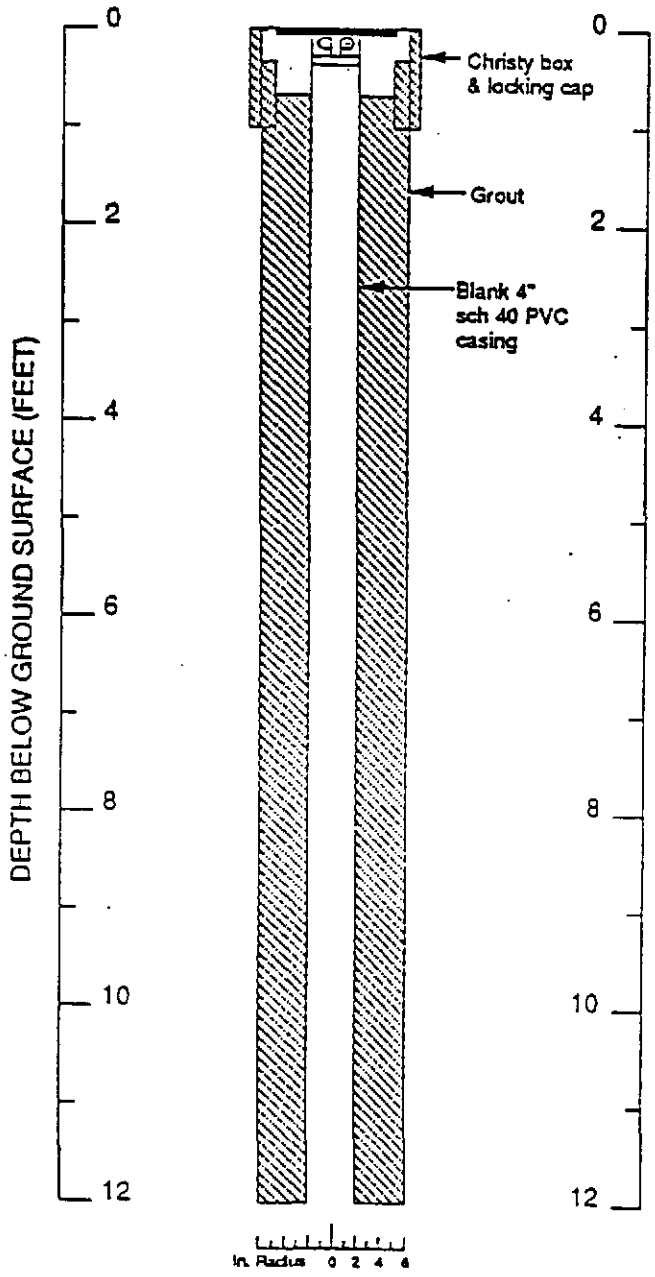


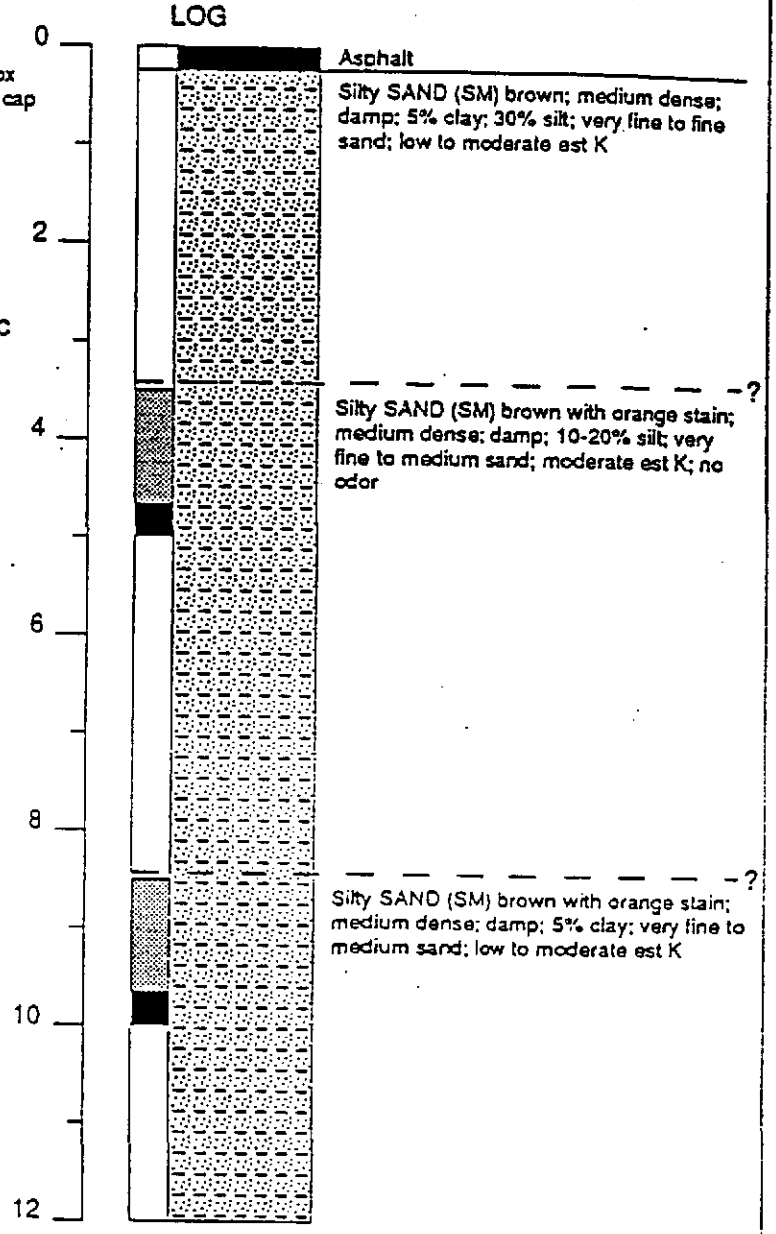
Boring Log and Well Completion Details MW-2 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

WGR

MONITOR WELL MW-3





Continues

EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Gradational (hachured), uncertain (dashed) contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Grab sample

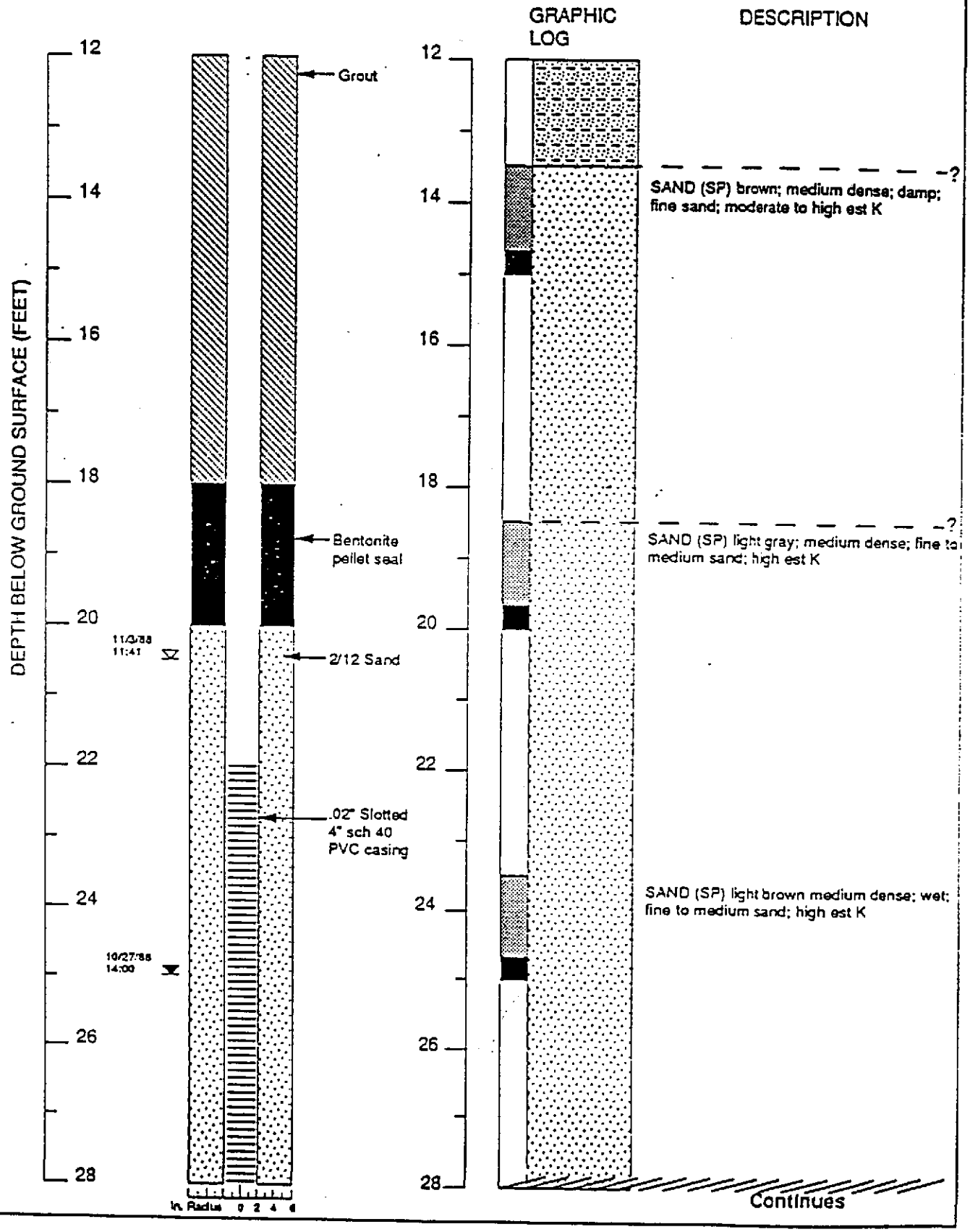
est K = Estimated permeability (hydraulic conductivity)

Logged by: Gail Jones
Supervisor: Tom Howard
Drilling Company: All Terrain
Driller: Wes
Drilling Method: Hollow stem auger
Dates Drilled: 10/27/88
Well Head Completion: Christy box & locking cap
Type of Sampler: 2" split barrel
TD: Drill depth = 35.5 ft

Boring Log and Well Completion Details MW-3
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA

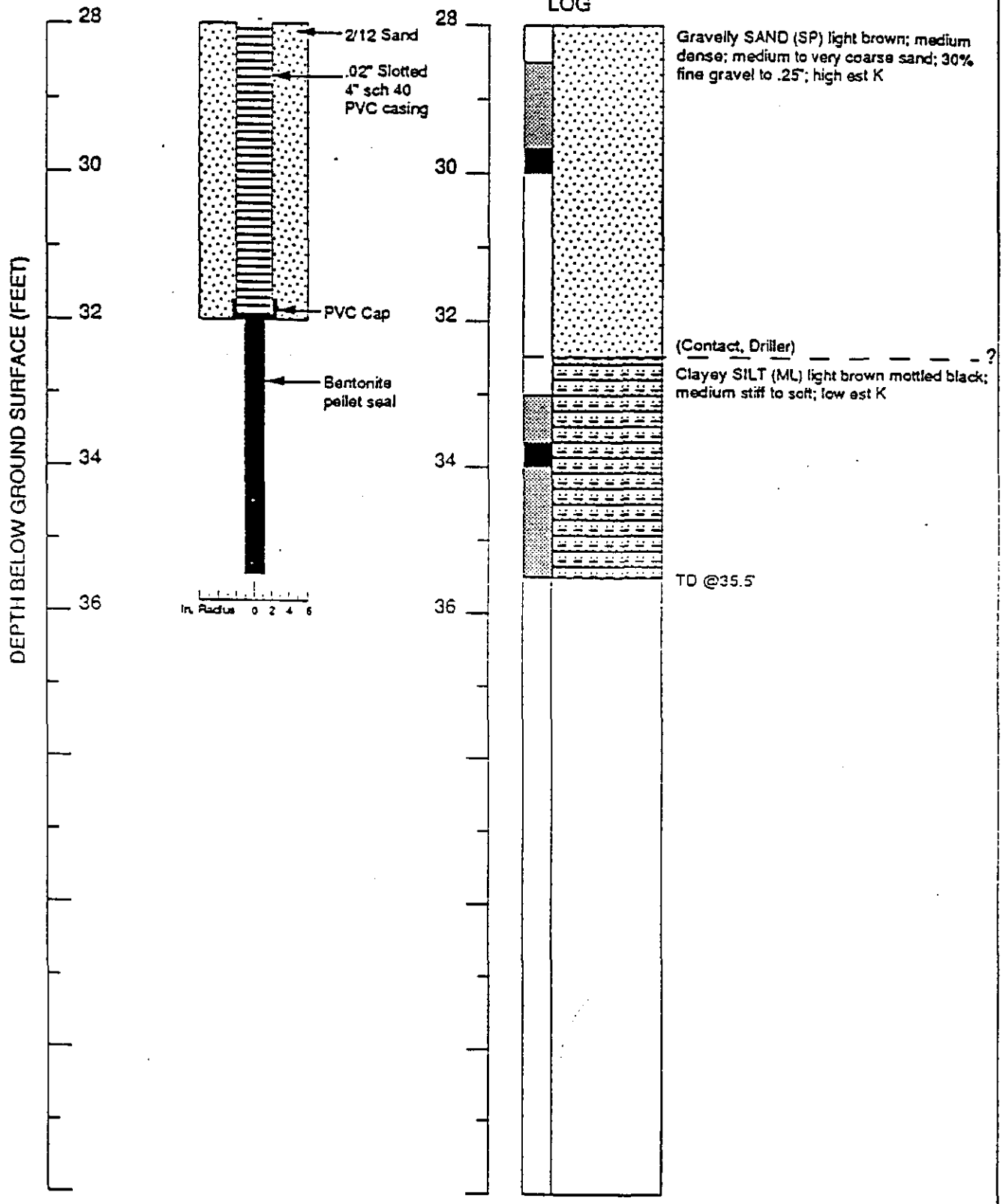
MONITOR WELL MW-3 (cont.)



Boring Log and Well Completion Details MW-3 (cont.)
WGR Project No.: 1-012.01

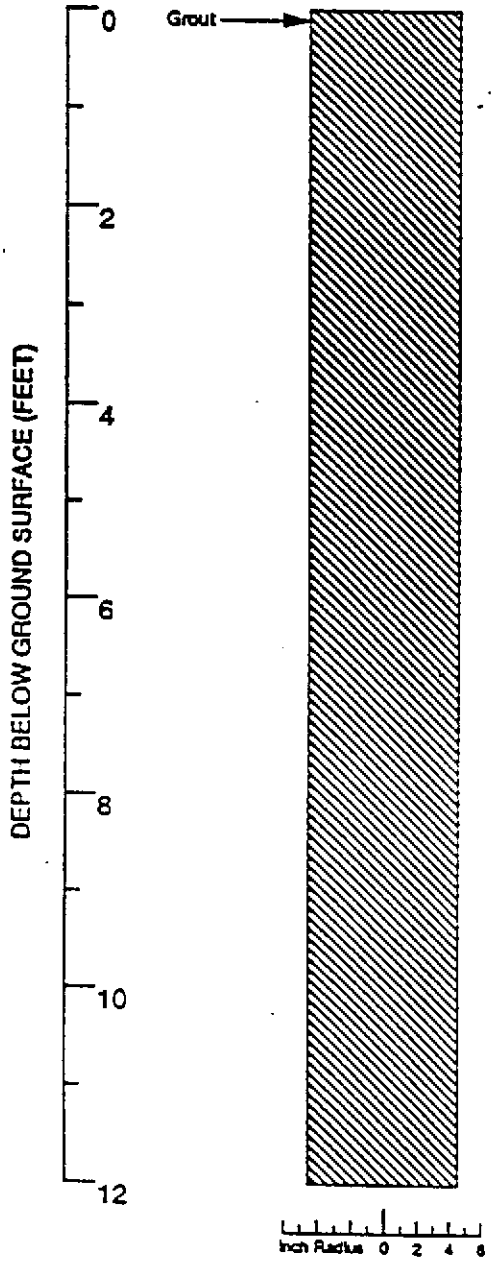
Chevron Facility #90020
Oakland, CA

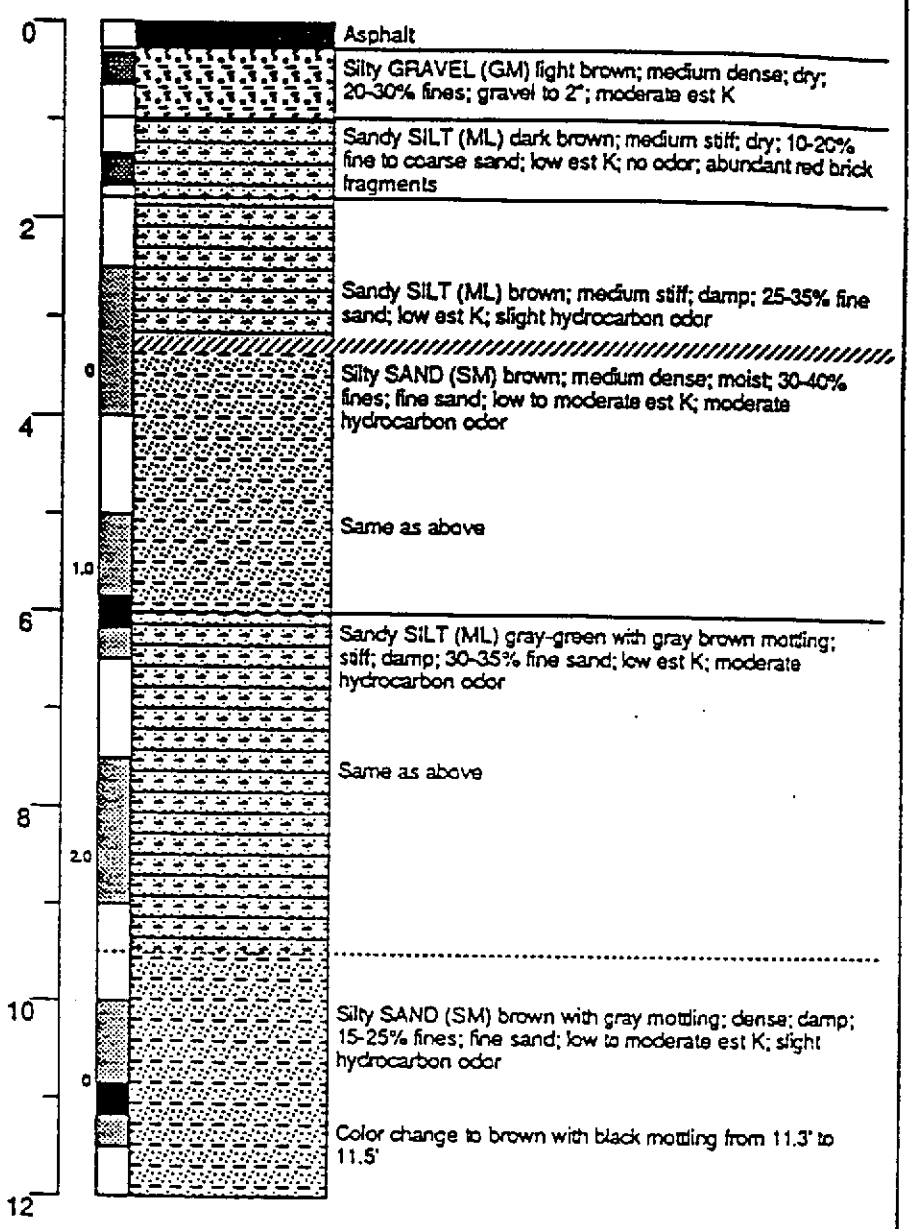
MONITOR WELL MW-3 (cont.)



Boring Log and Well Completion Details MW-3 (cont.)
WGR Project No.: 1-012.01

Chevron Facility #90020
Oakland, CA





Continues

Logged by:	Mike Edmonson	Drilling Company:	Exploration Geoservices	Well Head Completion:	None
Supervisor:	Tom Howard	Drilling Method:	9" Hollow stem auger	Type of Samplers:	2" & 1.4" split barrel
Date Drilled:	4/11/89	Driller:	Dave Yeager	TD (Total Depth):	24.0 ft.

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR — No recovery
- Grab sample
- ——— Contacts
- ..... Dotted where approximate
- – – – Dashed where uncertain
- ////// Hachured where gradational
- est K — Estimated permeability (hydraulic conductivity)

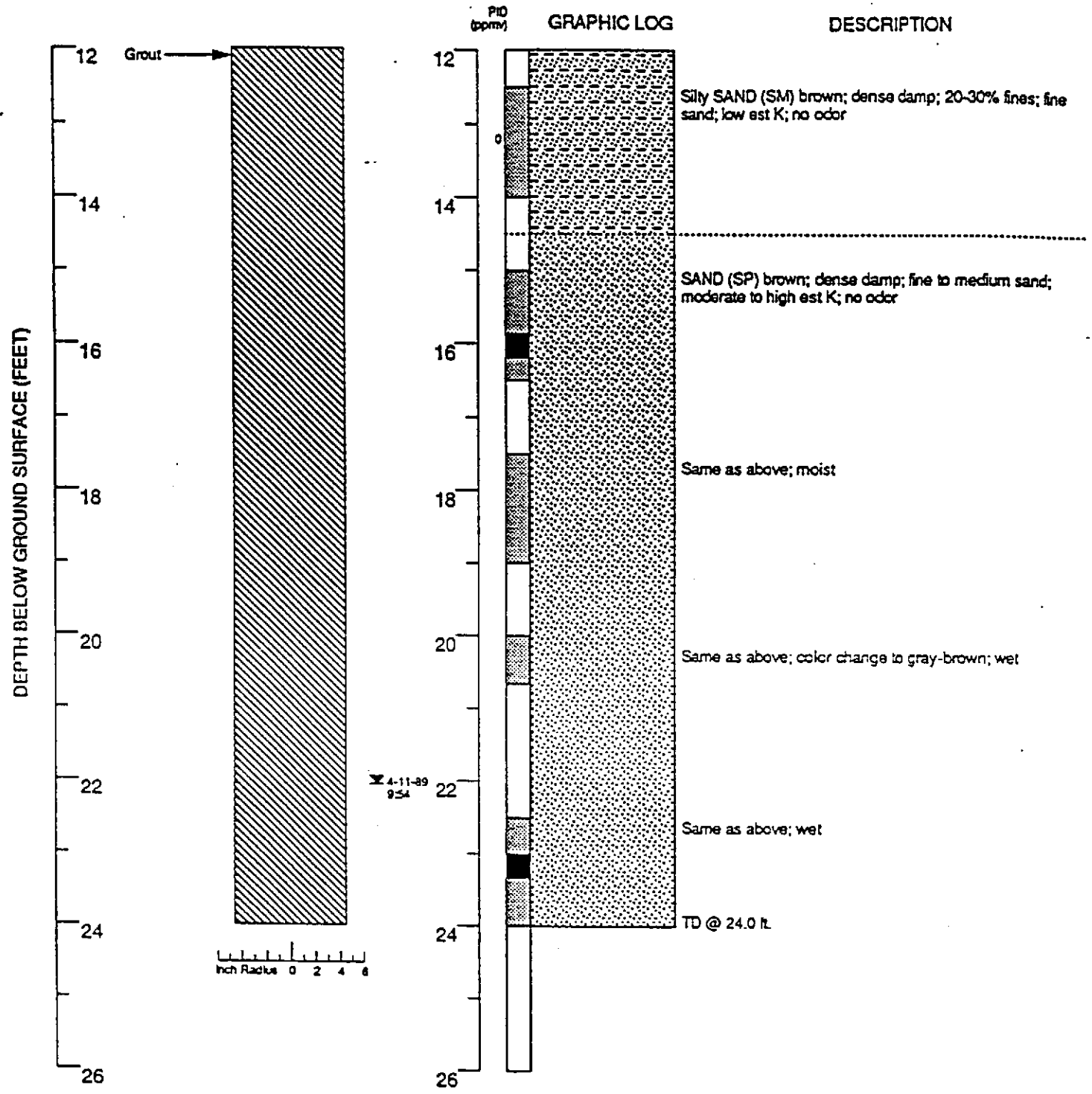
Boring Log B-4
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

BORING

4

WESTERN GEOLOGIC RESOURCES, INC.



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

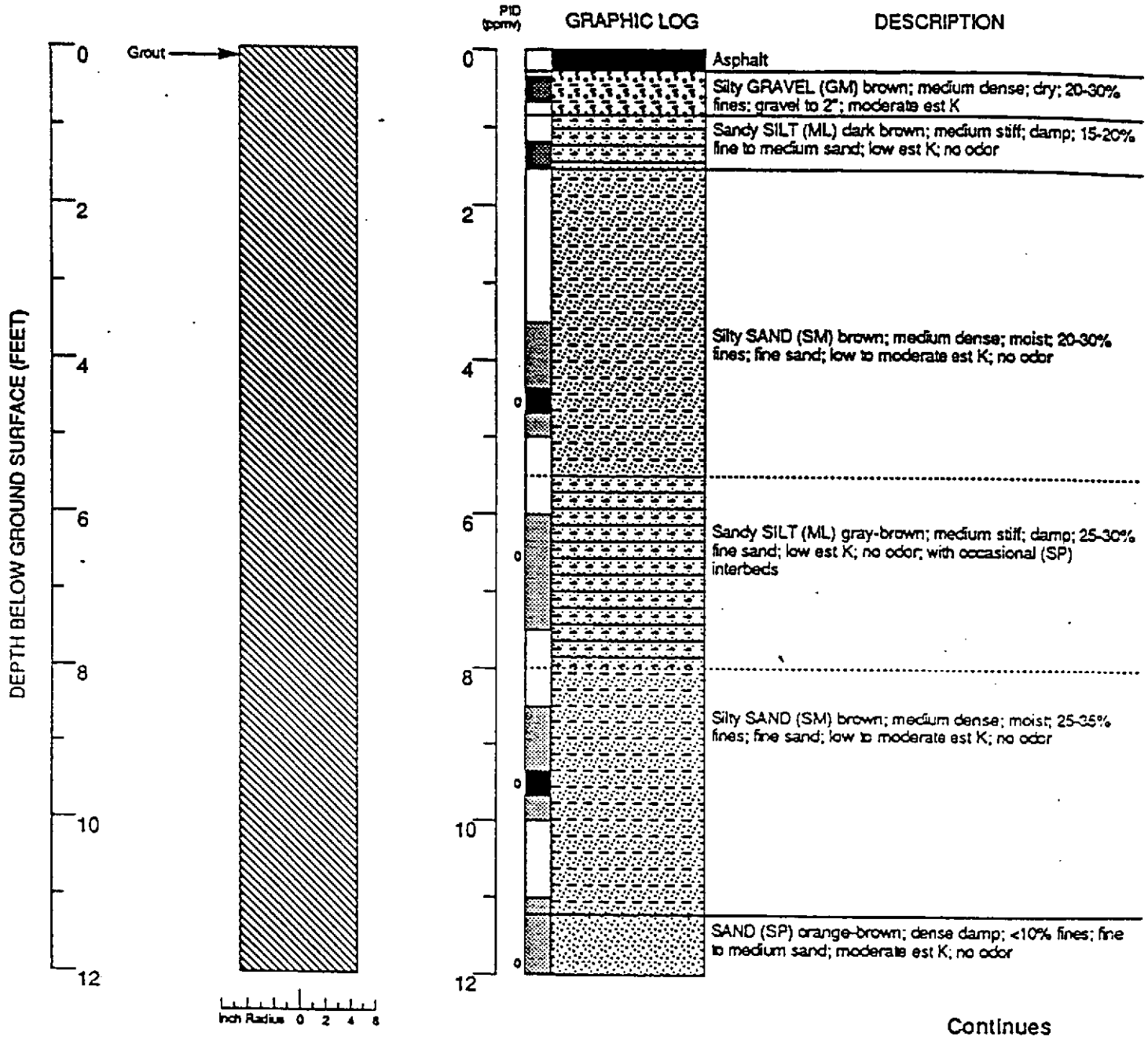
Boring Log B-4 (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

BORING

4

WESTERN GEOLOGIC RESOURCES, INC.



Continues

Logged by:	Mike Edmonson	Drilling Company:	Exploration Geoservices	Well Head Completion:	None
Supervisor:	Tom Howard	Drilling Method:	9" Hollow stem auger	Type of Samplers:	2" & 1.4" split barrel
Dates Drilled:	4/11/89	Driller:	Dave Yeager	TD (Total Depth):	22.5 ft.

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR — No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K — Estimated permeability (hydraulic conductivity)

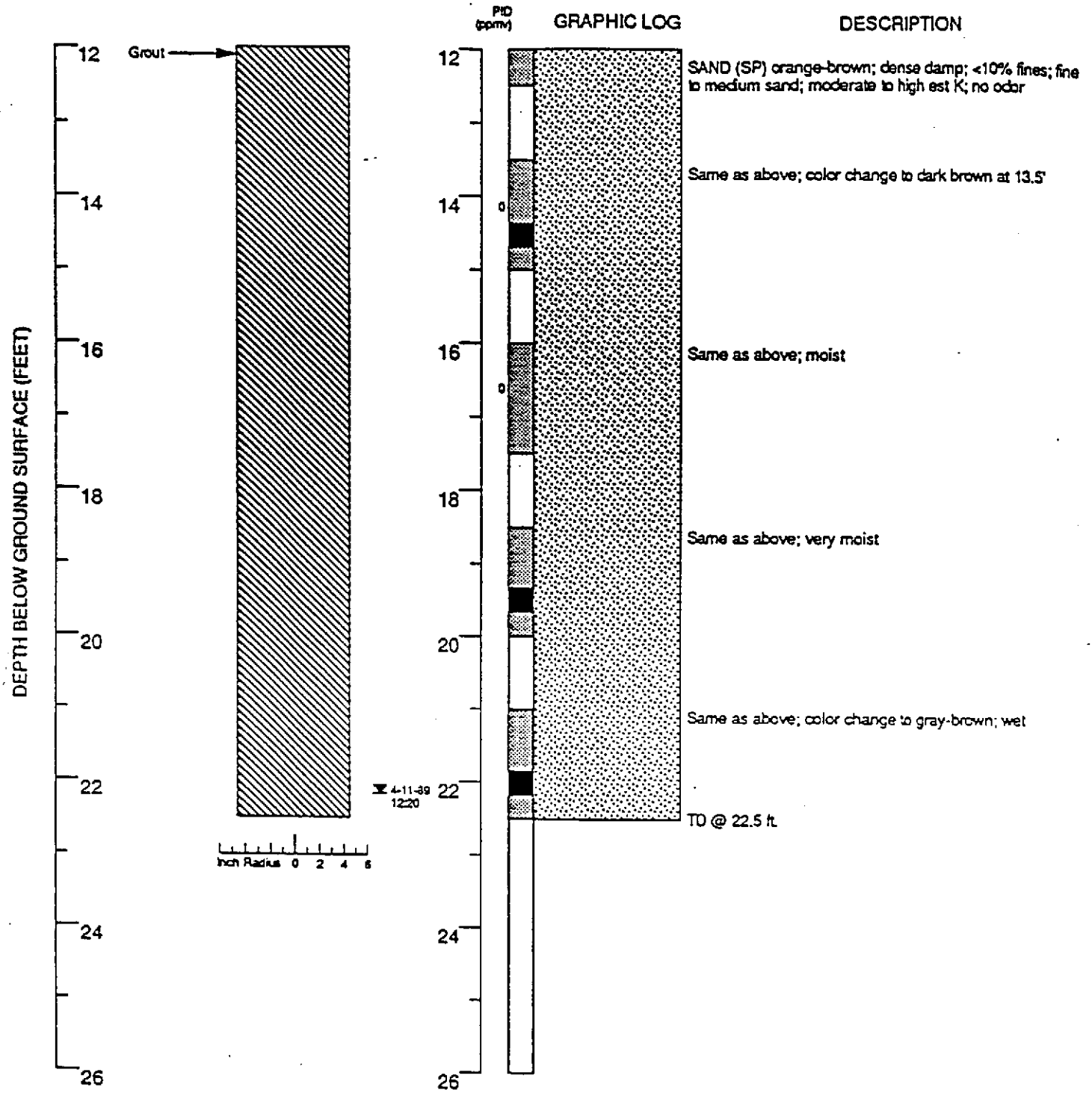
Boring Log B-5
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

BORING

5

WESTERN GEOLOGIC RESOURCES, INC.



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery.
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

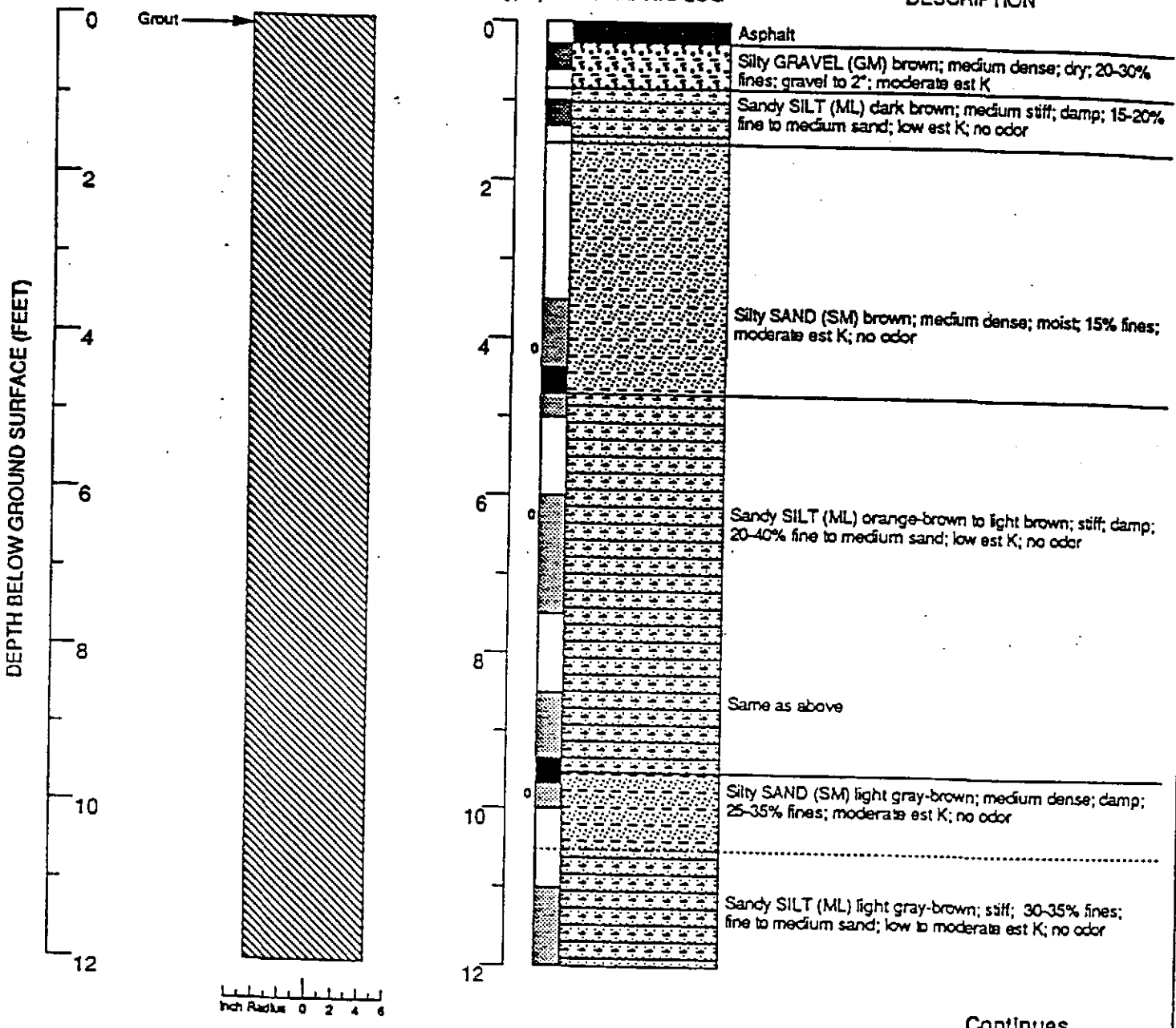
Boring Log B-5 (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

BORING

5

WESTERN GEOLOGIC RESOURCES, INC.



Continues

Logged by:	Dave Reichard	Drilling Company:	Exploration Geoservices	Well Head Completion:	None
Supervisor:	Tom Howard	Drilling Method:	9" Hollow stem auger	Type of Samplers:	2" & 1.4" split barrel
Dates Drilled:	4/11/89	Driller:	Dave Yeager	TD (Total Depth):	22.7 ft.

EXPLANATION

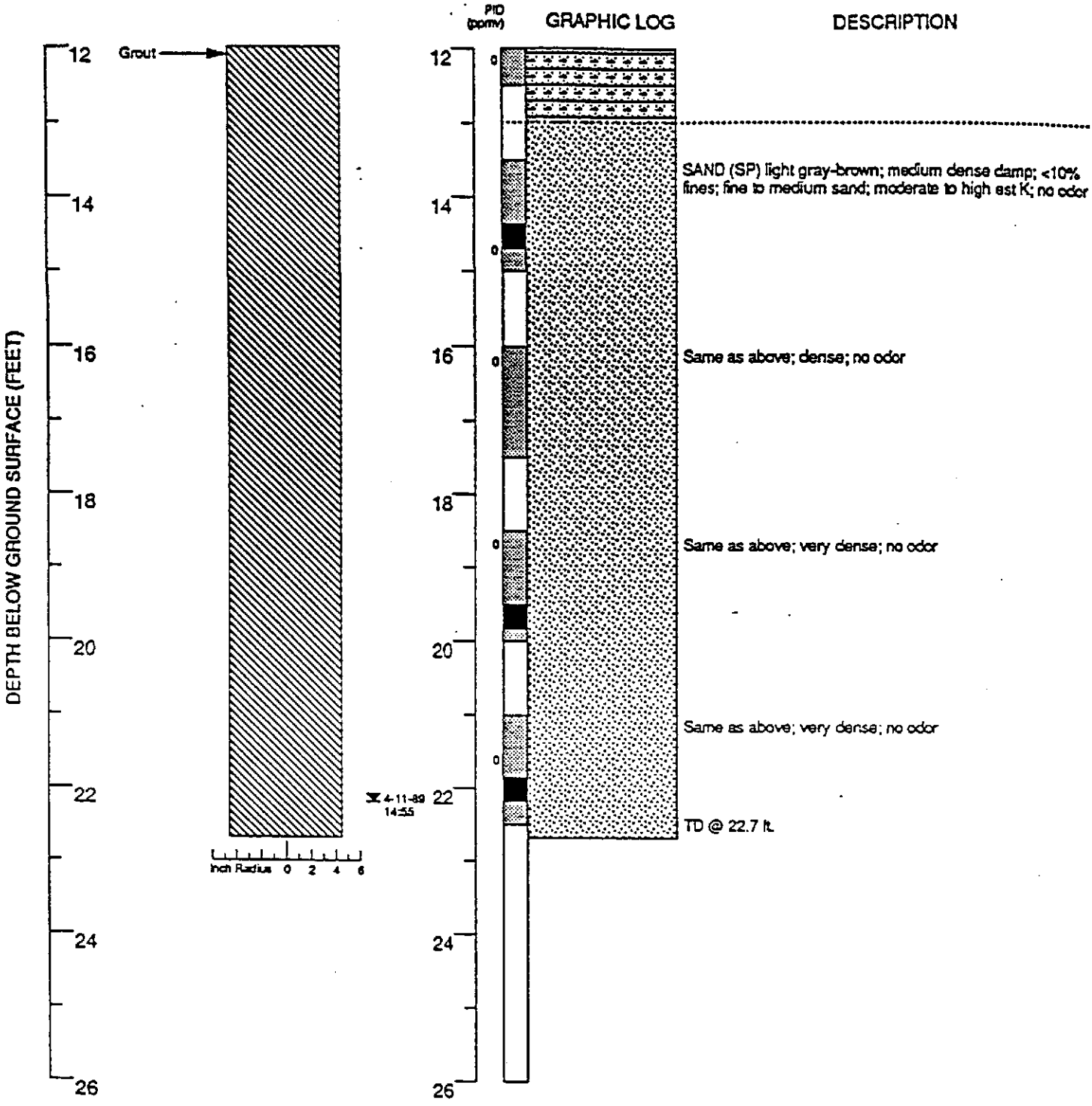
- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery
- Grab sample
- Contacts
- ..... Dotted where approximate
- – – – Dashed where uncertain
- ////// Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

Boring Log B-6
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

BORING 6

WESTERN GEOLOGIC RESOURCES, INC.



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

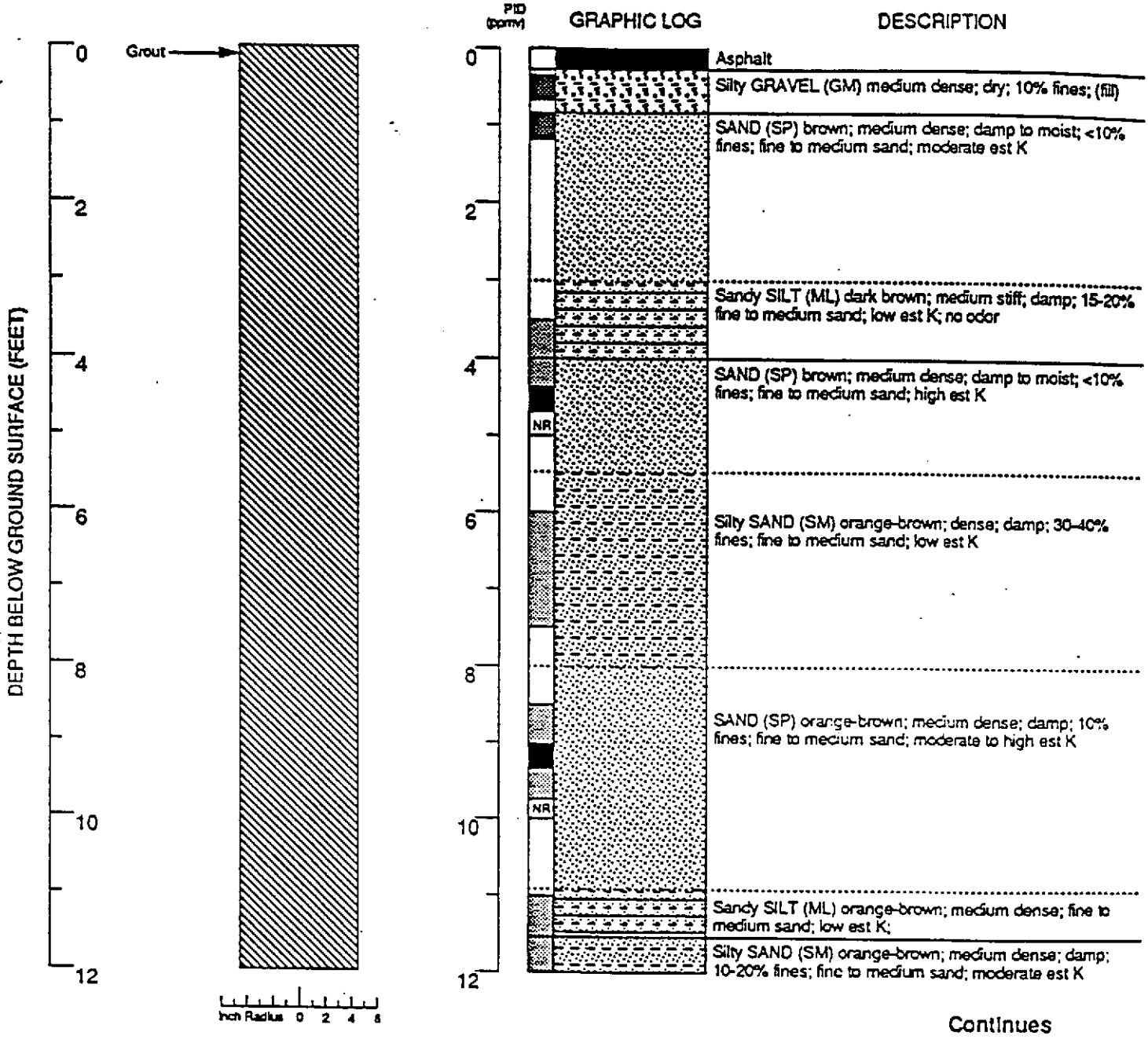
Boring Log B-6 (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

BORING

6



Logged by:	Dave Reichard	Drilling Company:	Exploration Geoservices	Well Head Completion:	None
Supervisor:	Tom Howard	Drilling Method:	9" Hollow stem auger	Type of Sampler:	2" split barrel
Dates Drilled:	4/12/89	Driller:	Dave Yeager	TD (Total Depth):	22.7 ft.

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR: No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity)

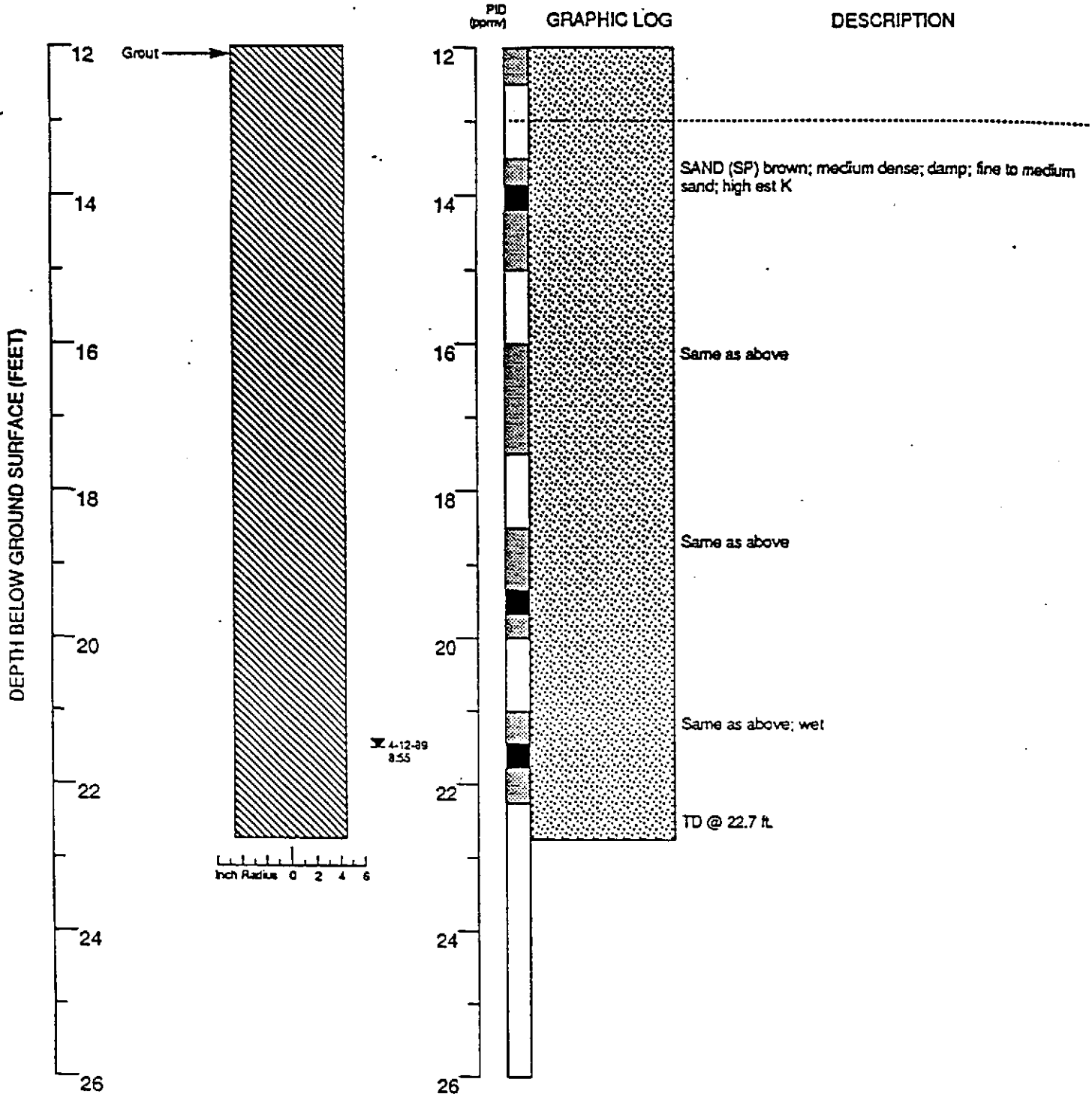
Boring Log B-7
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

BORING

7

WESTERN GEOLOGIC RESOURCES, INC.



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

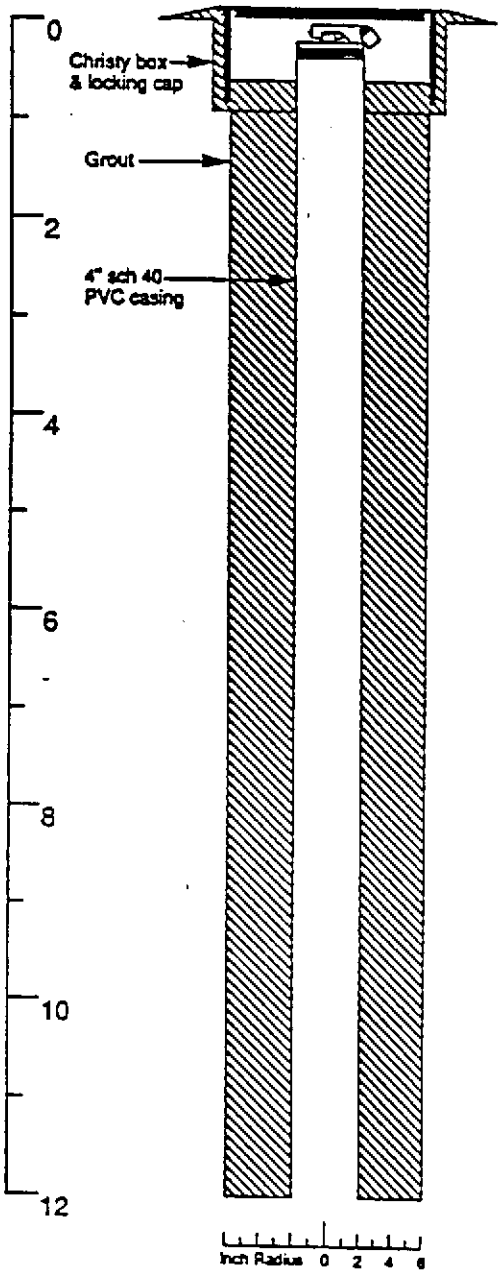
Boring Log B-7 (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

BORING

7

WESTERN GEOLOGIC RESOURCES, INC.



PID (ppmv)	GRAPHIC LOG	DESCRIPTION
0		Asphalt
		Silty SAND (SM) brown; medium dense; damp; 20% fines; fine to coarse sand; 20% fine to coarse gravel; moderate est K; (fill)
		(contact, driller)
		Clayey SAND (SC) light green with orange mottling; dense; damp; 30-40% fines; low est K; strong hydrocarbon odor
		Silty SAND (SM) brown with orange and light gray mottling; medium dense; damp; 15-20% fines; low to moderate est K; slight hydrocarbon odor
		SAND (SP) light gray with brown mottling; dense; moist; <10% fines; fine to medium sand; moderate est K; slight hydrocarbon odor
		SAND (SP) blue gray with brown mottling; dense; moist; <10% fines; fine to medium sand; moderate est K; strong hydrocarbon odor

Continues

Logged by:	Dave Reichard	Drilling Company:	Exploration Geoservices	Well Head Completion:	Christy box & locking cap
Supervisor:	Tom Howard	Drilling Method:	12" Hollow stem auger	Type of Samplers:	2" & 1.4" split barrel
Dates Drilled:	4/12/89	Driller:	Dave Yeager	TD (Total Depth):	36.5 ft.

EXPLANATION

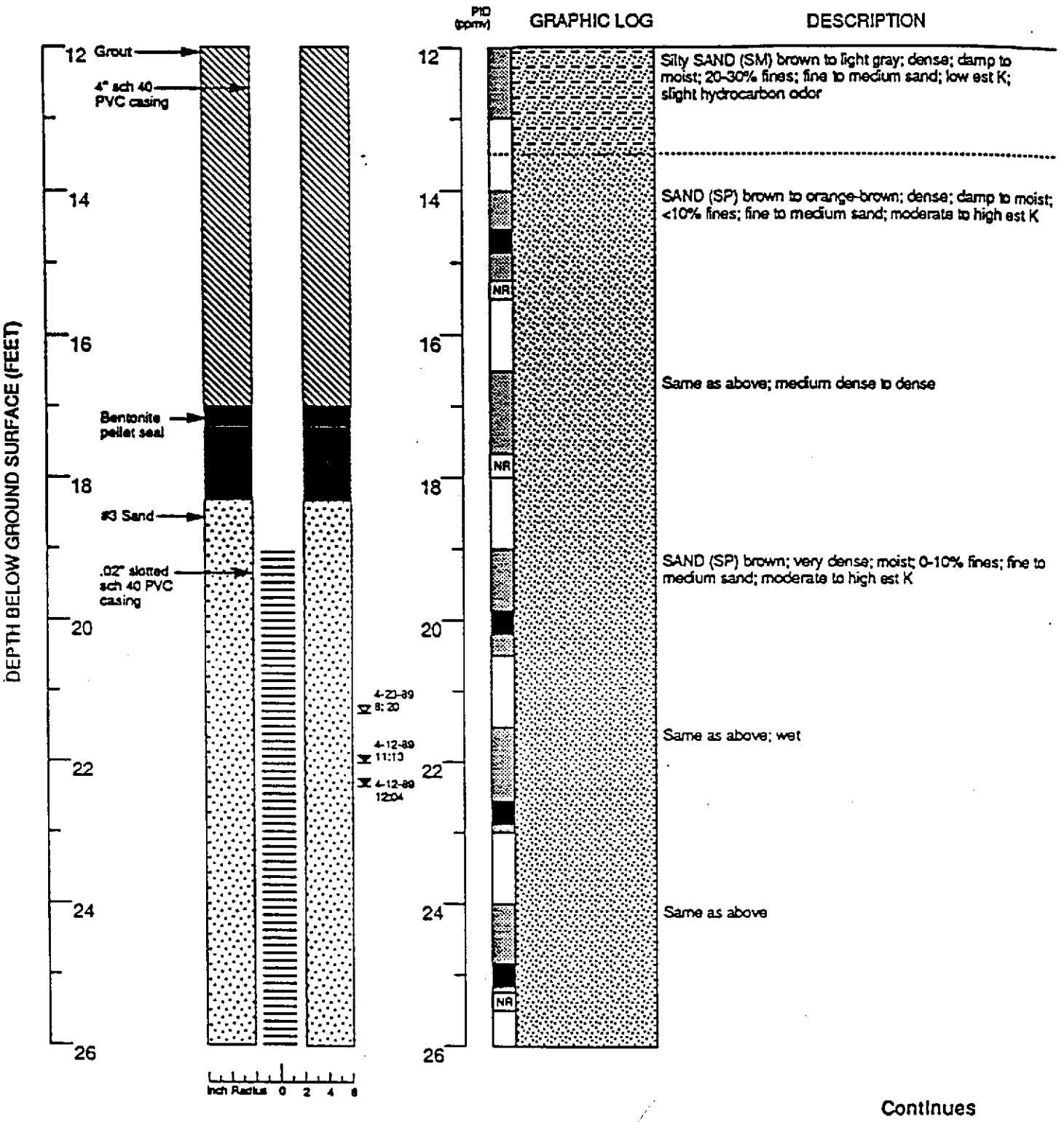
- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

Boring Log and Well Completion Details
MW-4 (Boring B-8)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

MONITOR WELL
4

WESTERN GEOLOGIC RESOURCES, INC.



Continues

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

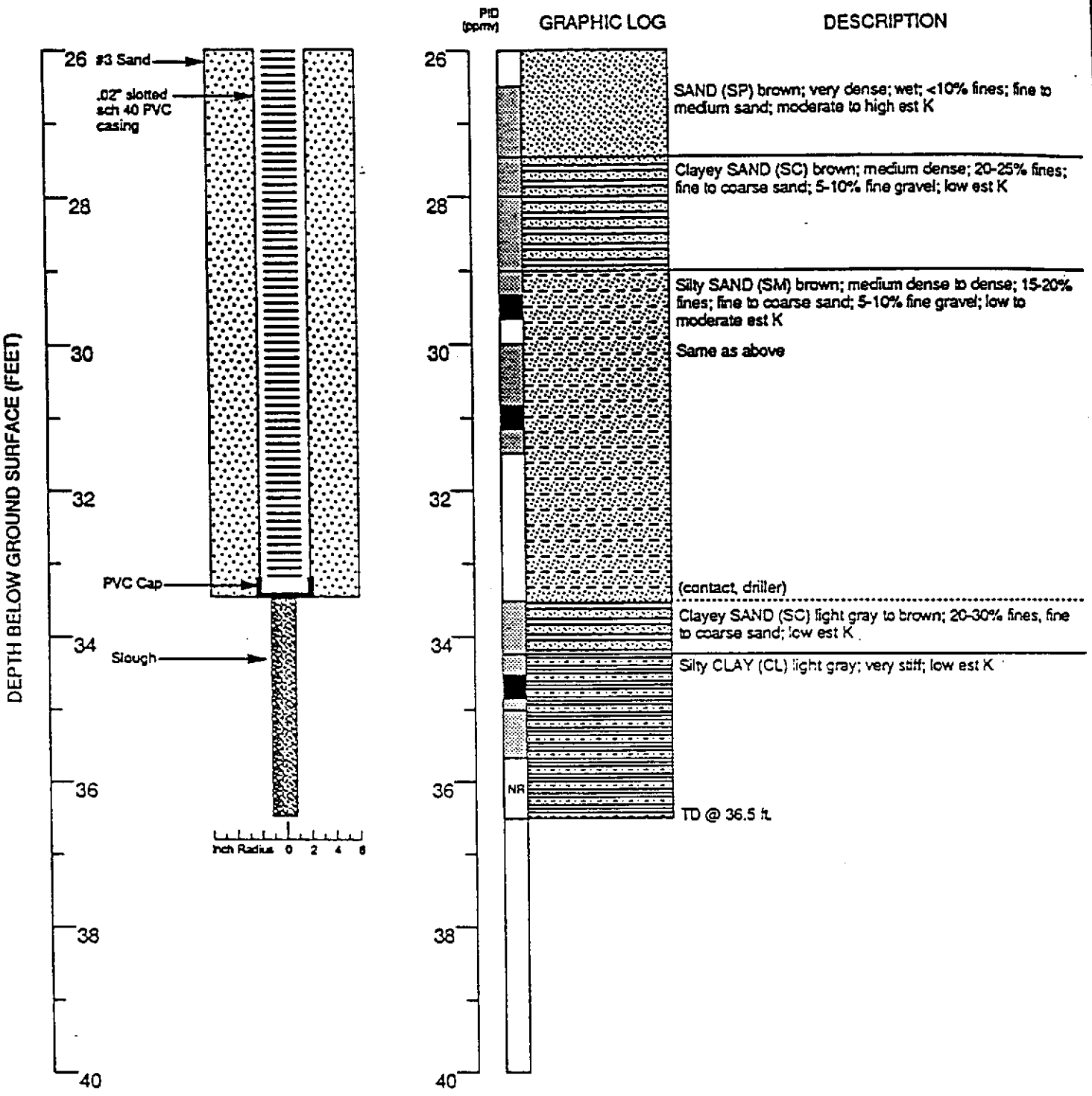
Boring Log and Well Completion Details
MW-4 (Boring B-8) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

MONITOR WELL

4

WESTERN GEOLOGIC RESOURCES, INC.



EXPLANATION

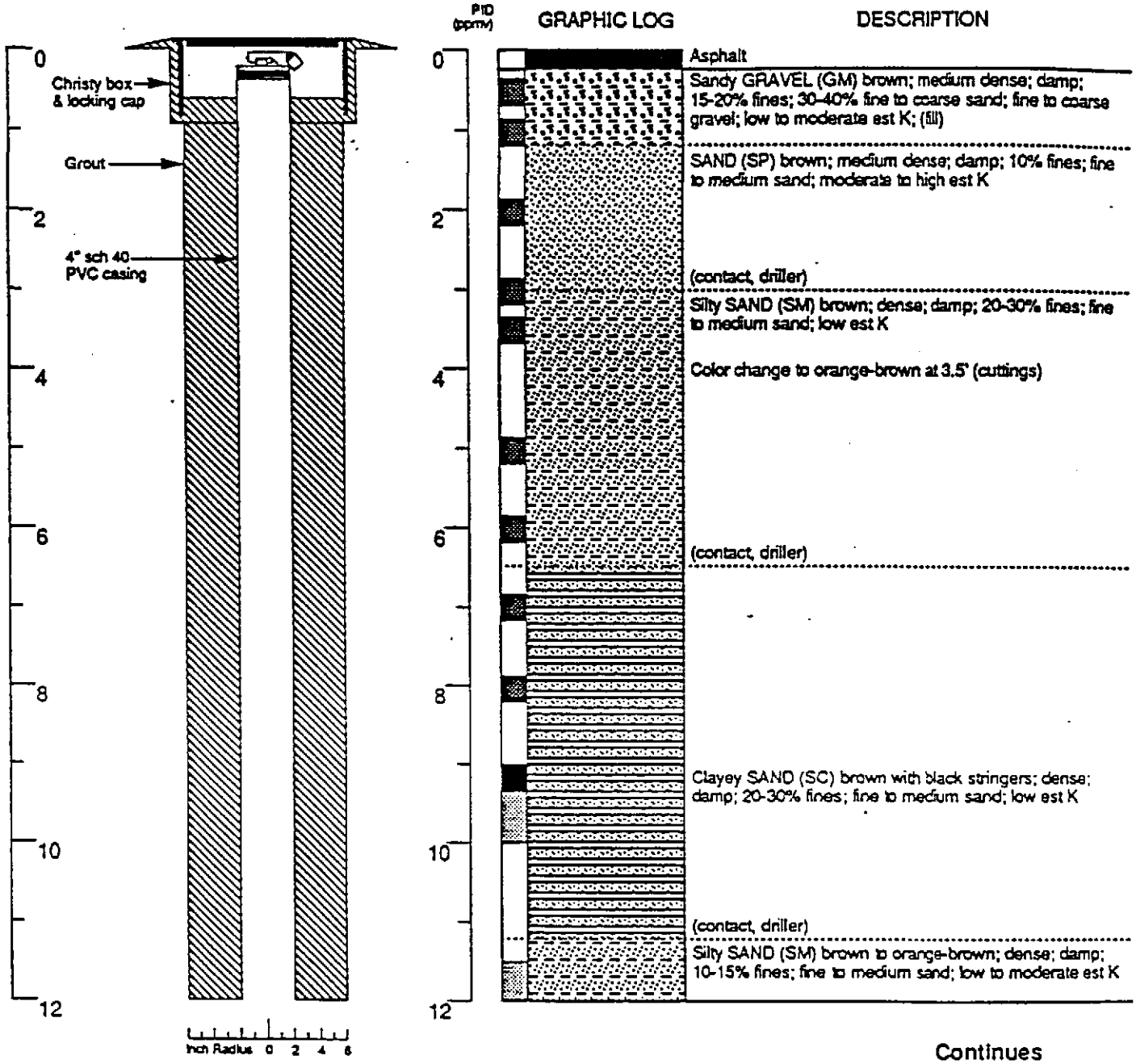
- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- No recovery
- rb sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K — Estimated permeability (hydraulic conductivity)

Boring Log and Well Completion Details
MW-4 (Boring B-8) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

MONITOR WELL
4

WESTERN GEOLOGIC RESOURCES, INC.



Continues

Logged by:	Richard Baldwin	Drilling Company:	Exploration Geoservices	Well Head Completion:	Christy box & locking cap
Supervisor:	Tom Howard	Drilling Method:	12" Hollow stem auger	Type of Samplers:	2" & 1.4" split barrel
Dates Drilled:	4/14/89	Driller:	Dave Yeager/Troy Foster	TD (Total Depth):	34.0 ft.

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

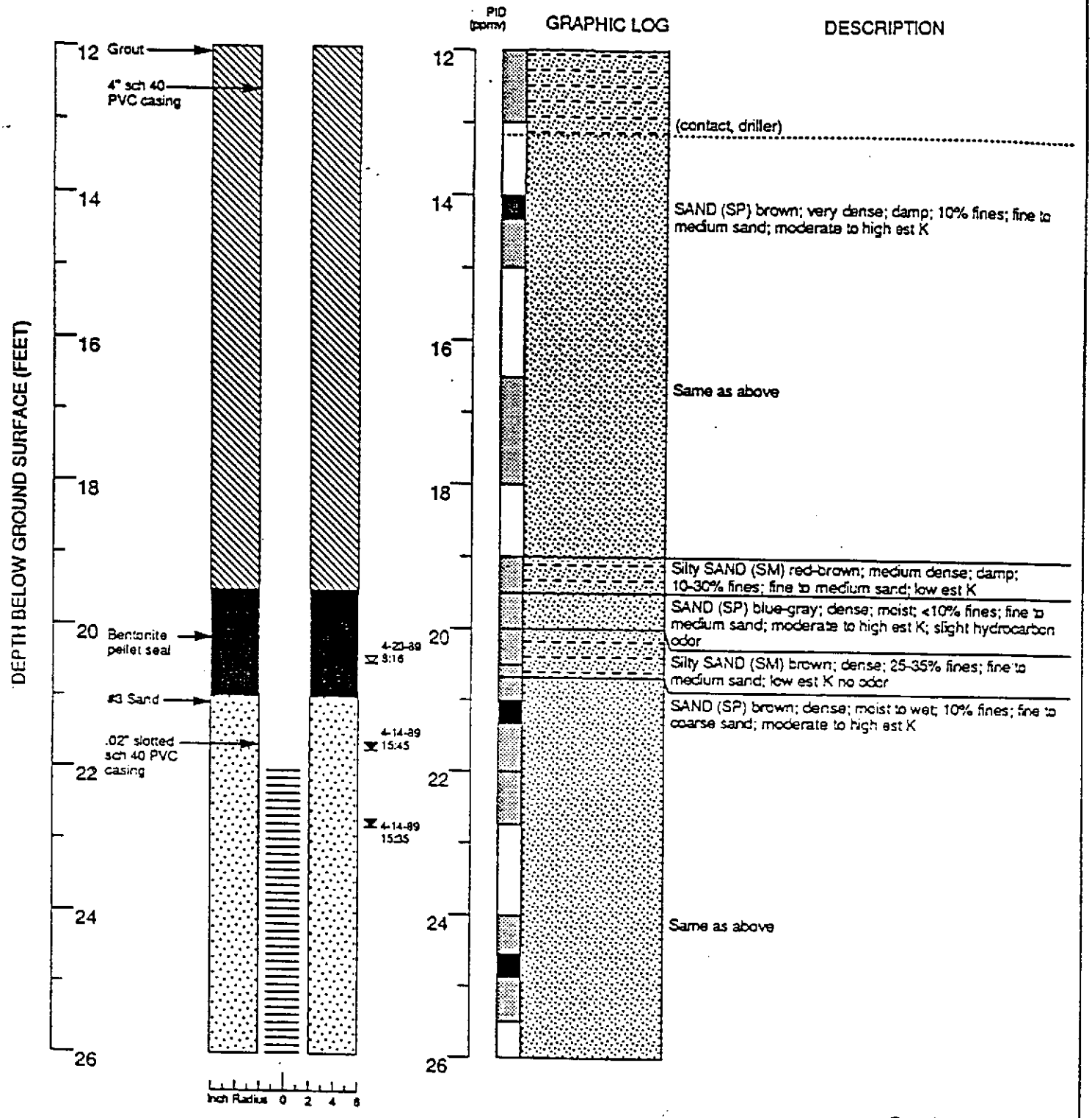
Boring Log and Well Completion Details
MW-5 (Boring B-9)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

MONITOR WELL

5



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K — Estimated permeability (hydraulic conductivity)

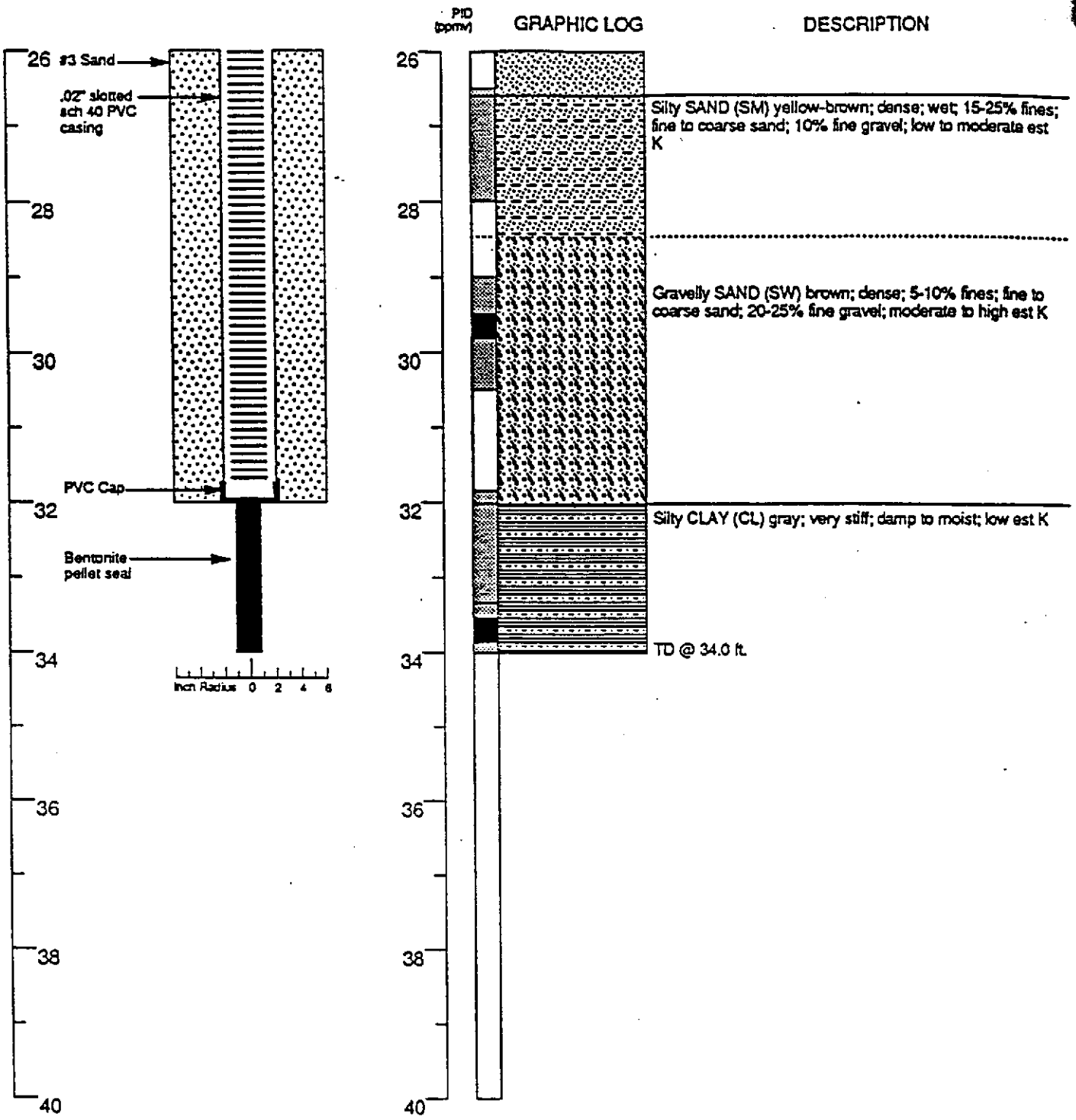
Boring Log and Well Completion Details
MW-5 (Boring B-9) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

MONITOR WELL

5



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR: No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity)

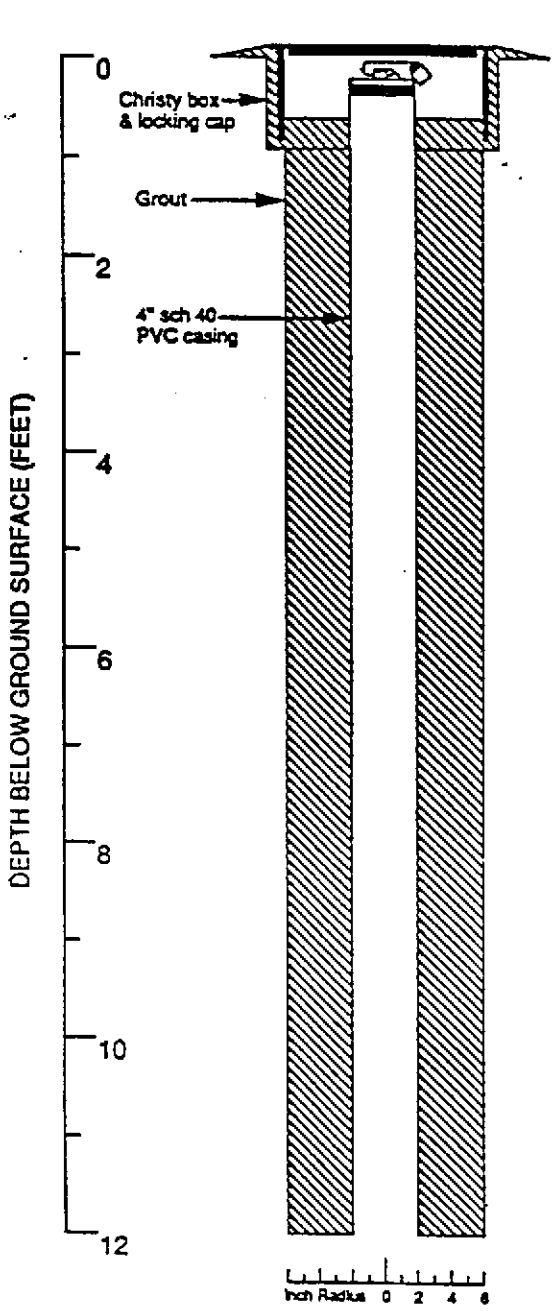
Boring Log and Well Completion Details
MW-5 (Boring B-9) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

MONITOR WELL

5



PID (ppmv)	GRAPHIC LOG	DESCRIPTION
0		Asphalt
		Gravelly SAND (SW) orange-brown; damp; 10-15% fines; fine to medium sand; 20-30% fine to coarse gravel; moderate est K; (fill)
2		SAND (SP) brown; medium dense; damp; fine to medium sand; high est K
		(contact, driller)
		Silty SAND (SM) brown; dense; damp; 30-40% fines; fine to medium sand; low est K (contact, driller)
4		Silty SAND (SM) orange-brown with gray mottling; medium dense; damp; 15-20% fines; fine to medium sand; low to moderate est K
6		Same as above
8		Clayey SAND (SC) thin bed; low est K
10		Silty SAND (SM) orange-brown with gray mottling; medium dense; damp; 15-20% fines; fine to medium sand; low to moderate est K
12		SAND (SP) orange-brown to blue-gray; dense; 10% fines; fine to medium sand; moderate to high est K; slight hydrocarbon odor

Continues

Logged by:	Richard Baldwin	Drilling Company:	Exploration Geoservices	Well Head Completion:	Christy box & locking cap
Supervisor:	Tom Howard	Drilling Method:	12" Hollow stem auger	Type of Samplers:	2" & 1.4" split barrel
Dates Drilled:	4/13/89	Driller:	Dave Yeager/Troy Foster	TD (Total Depth):	29.5 ft.

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery.
- Grab sample
- ——— Contacts
- ..... Dotted where approximate
- – – – Dashed where uncertain
- ////// Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

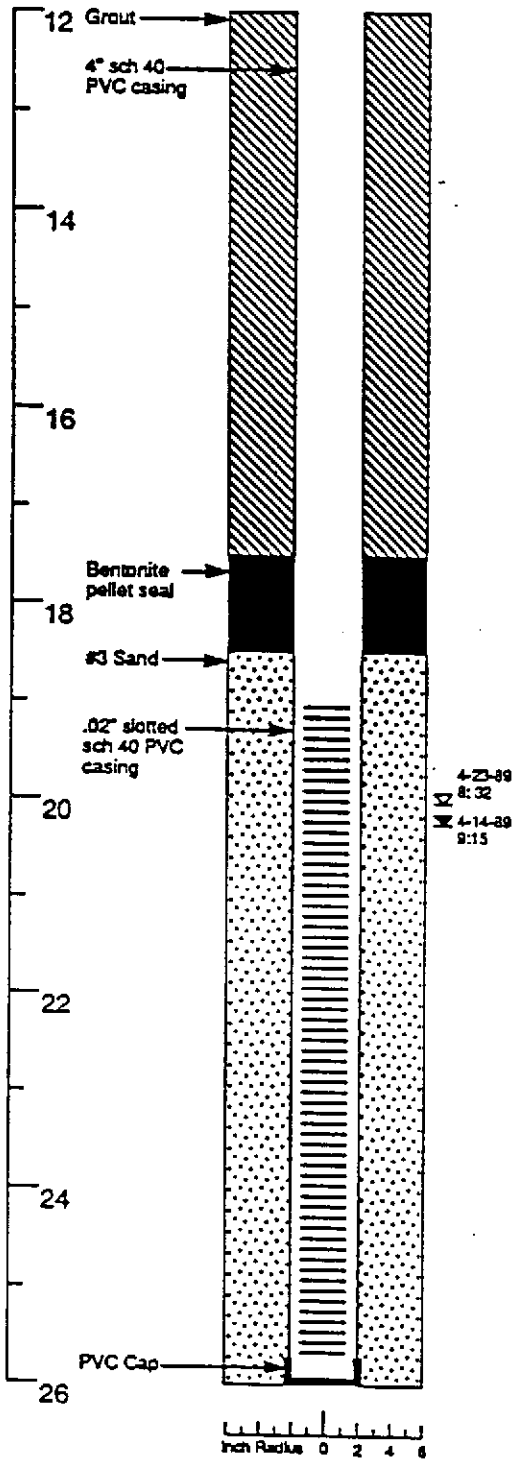
Boring Log and Well Completion Details
MW-6 (Boring B-10)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

MONITOR WELL

6



DEPTH BELOW GROUND SURFACE (FEET)

PID (ppm)	GRAPHIC LOG	DESCRIPTION
12		SAND (SP) orange-brown to blue-gray; dense; 10% fines; fine to medium sand; moderate to high est K; slight hydrocarbon odor
NR		
14		Same as above; blue-gray; slight to moderate hydrocarbon odor
NR		
16		Same as above; moist; slight hydrocarbon odor
18		Same as above; moist; moderate hydrocarbon odor
NR		
20		Same as above; wet; slight to moderate hydrocarbon odor
22		
24		SAND (SP) orange-brown; slight to moderate hydrocarbon odor
26		

Continues

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

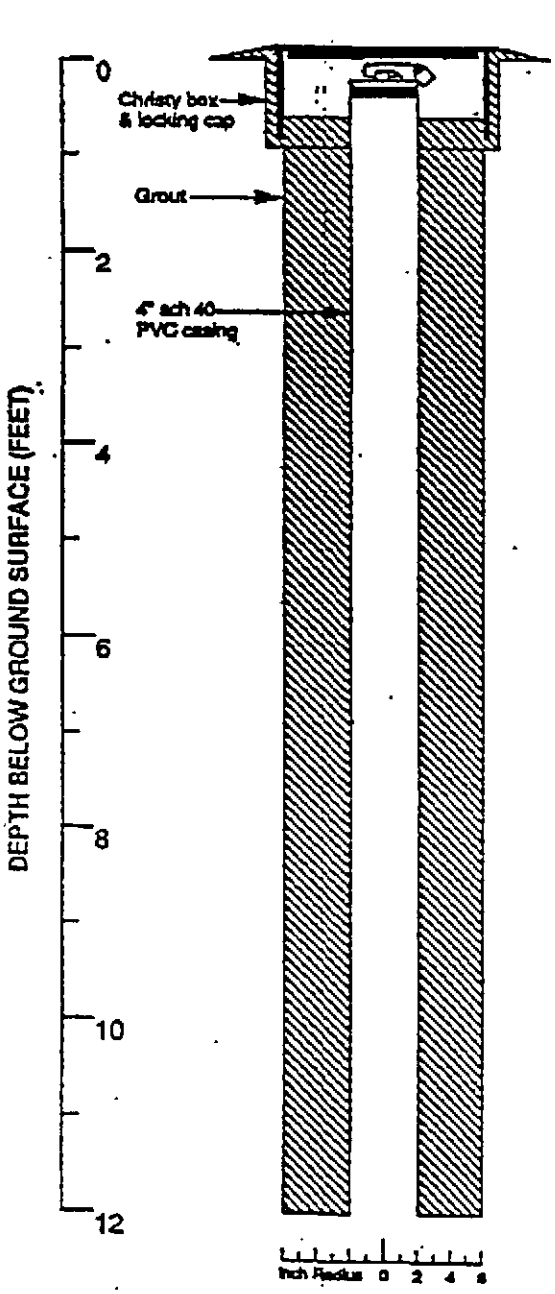
Boring Log and Well Completion Details
MW-6 (Boring B-10) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

MONITOR WELL

6



PID (ppm)	GRAPHIC LOG	DESCRIPTION
0		Asphalt
		SAND (SP) light brown; medium dense; damp; fine to coarse sand; high est K
2		(contact, driller)
4		Silty SAND (SM) orange-brown; medium dense; damp; 10-15% fines; fine to medium sand; moderate est K
6		Silty SAND (SM) orange-brown; medium dense; damp; 20-30% fines; fine to medium sand; low to moderate est K
8		SAND (SP) brown; dense; damp; <10% fines; fine to medium sand; moderate est K
10		Silty SAND (SM) orange-brown; medium dense; damp; 20-30% fines; fine to medium sand; low est K Color change to blue-gray at 10.5'
12		Same as above

Continues

Logged by:	Richard Baldwin	Drilling Company:	Exploration Geoservices	Well Head Completion:	Christy box & locking cap
Supervisor:	Tom Howard	Drilling Method:	12" Hollow stem auger	Type of Samplers:	2" & 1.4" split barrel
Dates Drilled:	4/13/89	Driller:	Dave Yeager/Troy Foster	TD (Total Depth):	31.0 ft.

EXPLANATION

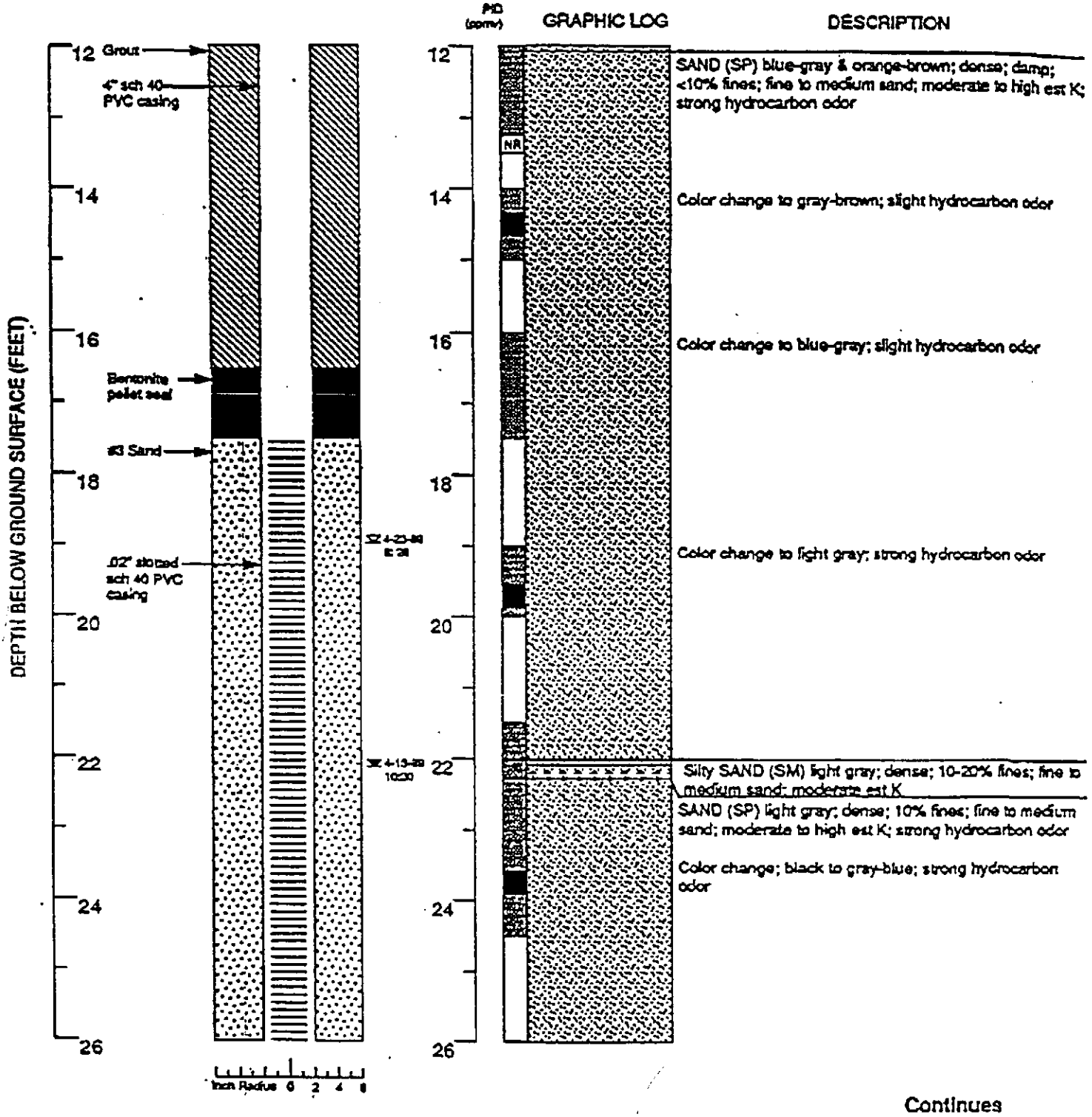
- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- No recovery
- Grab sample
- Contacts
- 'Dashed where approximate'
- Dashed where uncertain
- Hachured where gradational
- est K - Estimated permeability (hydraulic conductivity)

Boring Log and Well Completion Details
MW-7 (Boring B-11)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

MONITOR WELL

7



Continues

EXPLANATION

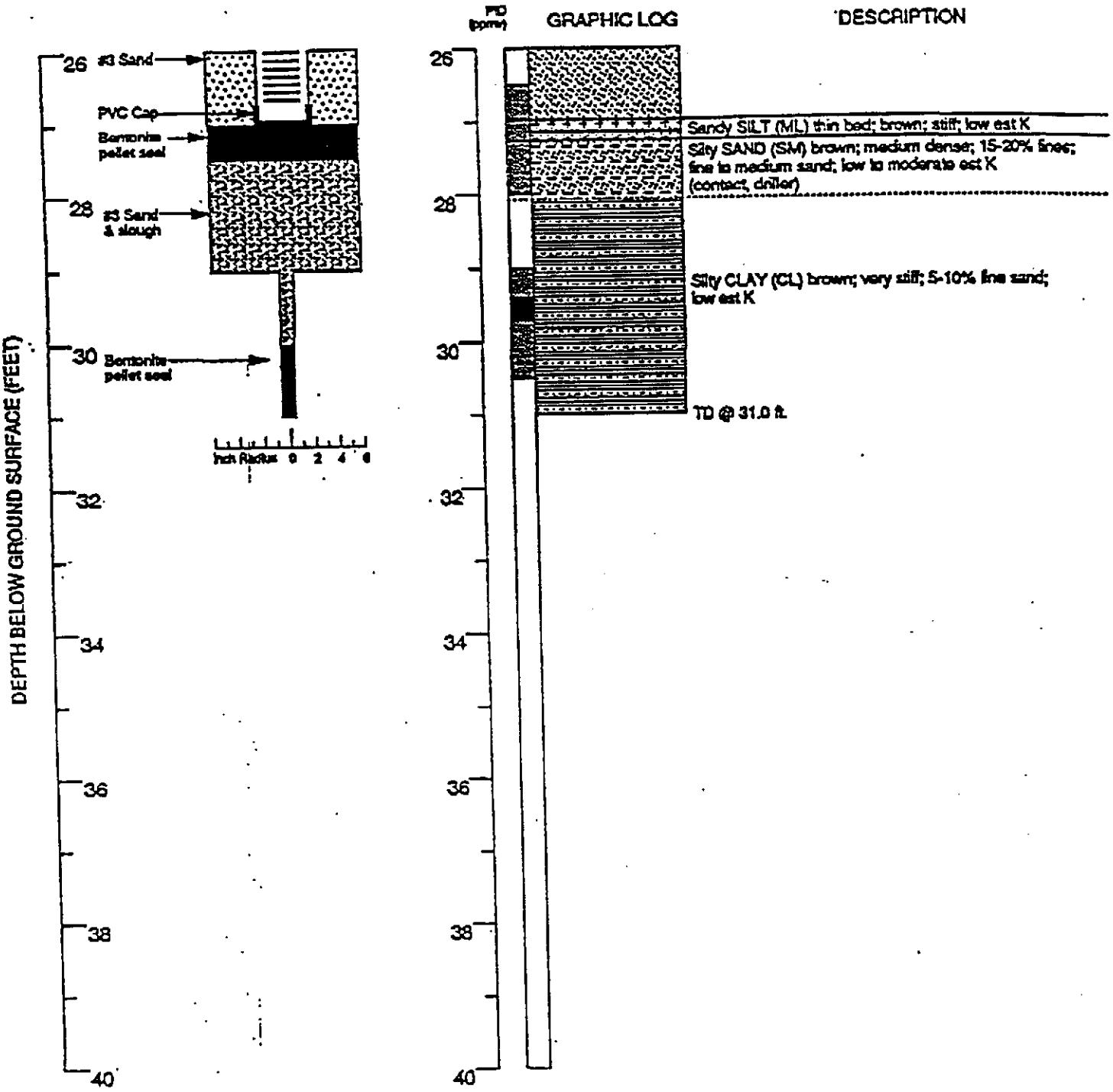
- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR: No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity)

Boring Log and Well Completion Details
MW-7 (Boring B-11) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

MONITOR WELL

7



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample submitted for chemical analysis
- NR No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

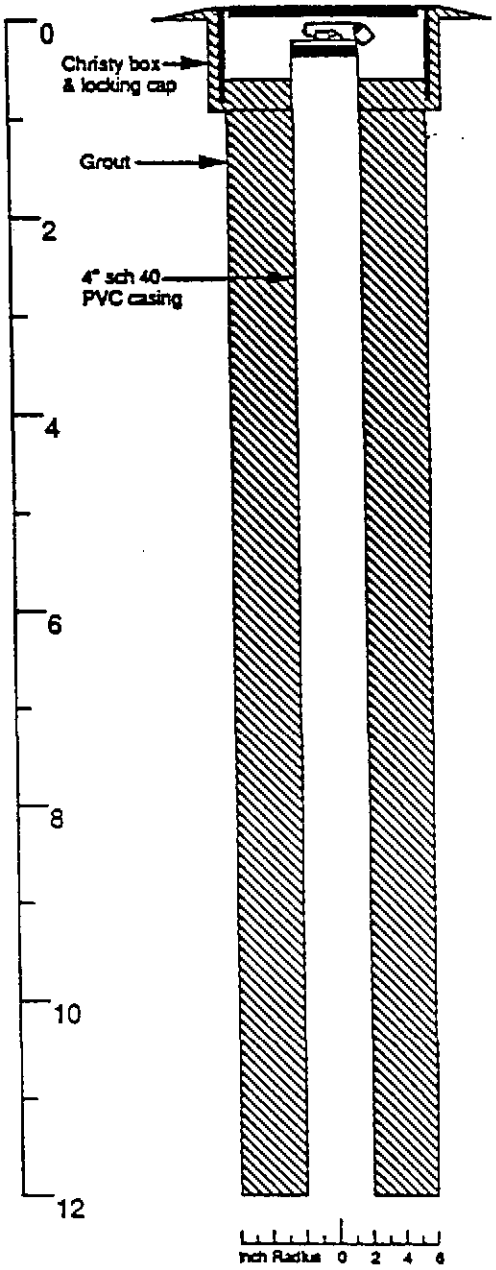
Boring Log and Well Completion Details
MW-7 (Boring B-11) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

MONITOR WELL

7



PID (ppmv)	GRAPHIC LOG	DESCRIPTION
0		Asphalt
		SAND (SP) light brown; medium dense; damp; fine to coarse sand; high est K
2		(contact, driller)
4		Silty SAND (SM) orange-brown; medium dense; damp; 10-15% fines; fine to medium sand; moderate est K
6		Silty SAND (SM) orange-brown; medium dense; damp; 20-30% fines; fine to medium sand; low to moderate est K
8		SAND (SP) brown; dense; damp; <10% fines; fine to medium sand; moderate est K
10		Silty SAND (SM) orange-brown; medium dense; damp; 20-30% fines; fine to medium sand; low est K Color change to blue-gray at 10.5'
12		Same as above

Continues

Logged by:	Richard Baldwin	Drilling Company:	Exploration Geoservices	Well Head Completion:	Christy box & locking cap
Supervisor:	Tom Howard	Drilling Method:	12" Hollow stem auger	Type of Samplers:	2" & 1.4" split barrel
Dates Drilled:	4/13/89	Driller:	Dave Yeager/Troy Foster	TD (Total Depth):	31.0 ft

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K Estimated permeability (hydraulic conductivity)

Boring Log and Well Completion Details
MW-7 (Boring B-11)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

MONITOR WELL

7

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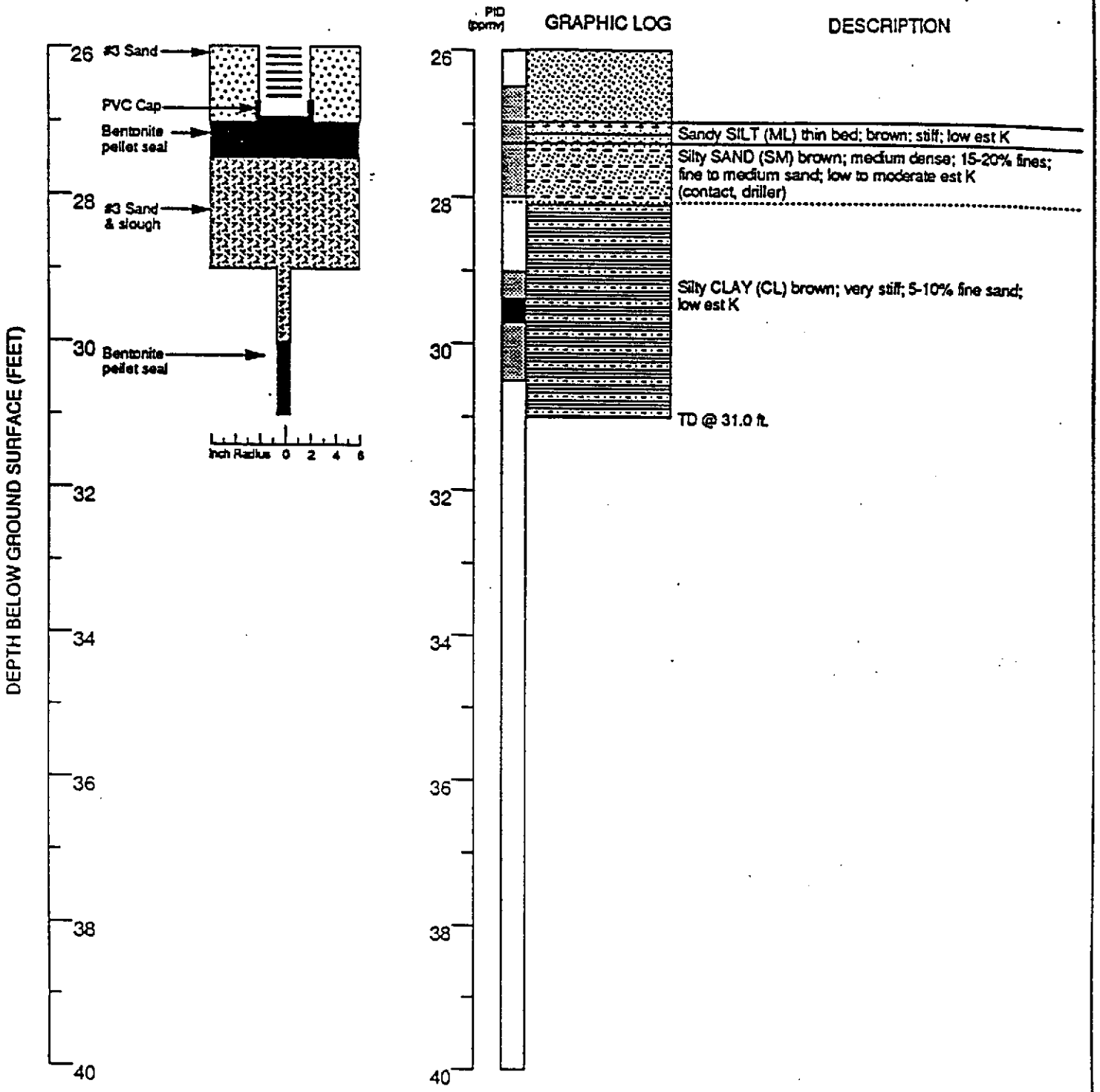


EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR: No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity)

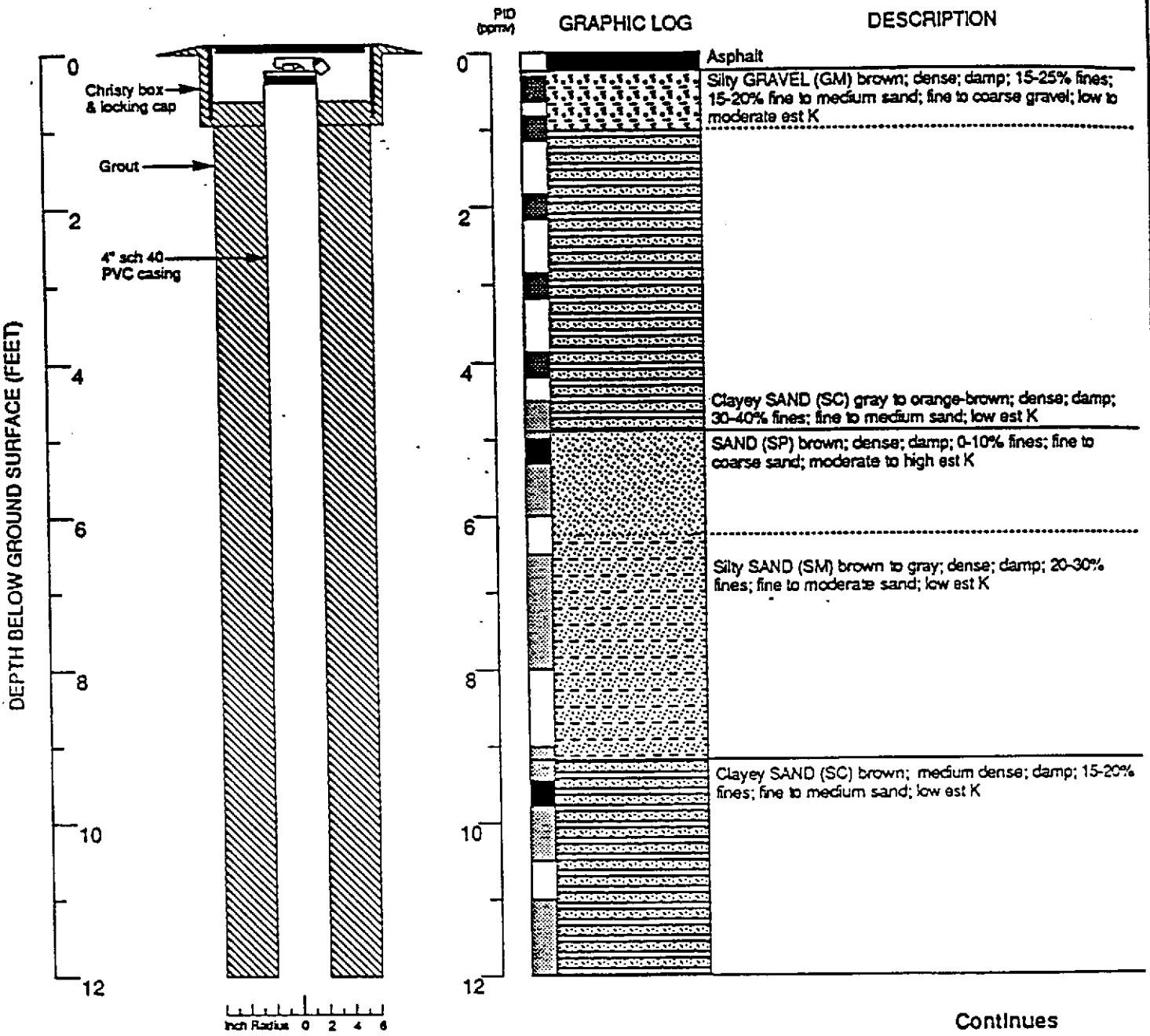
Boring Log and Well Completion Details
MW-7 (Boring B-11) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

MONITOR WELL

7



Logged by:	Richard Baldwin	Drilling Company:	Exploration Geoservices	Well Head Completion:	Christy box & locking cap
Supervisor:	Tom Howard	Drilling Method:	12" Hollow stem auger	Type of Samplers:	2" & 1.4" split barrel
Dates Drilled:	4/19/89	Driller:	Dave Yeager/Troy Foster	TD (Total Depth):	28.0 ft.

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR: No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity)

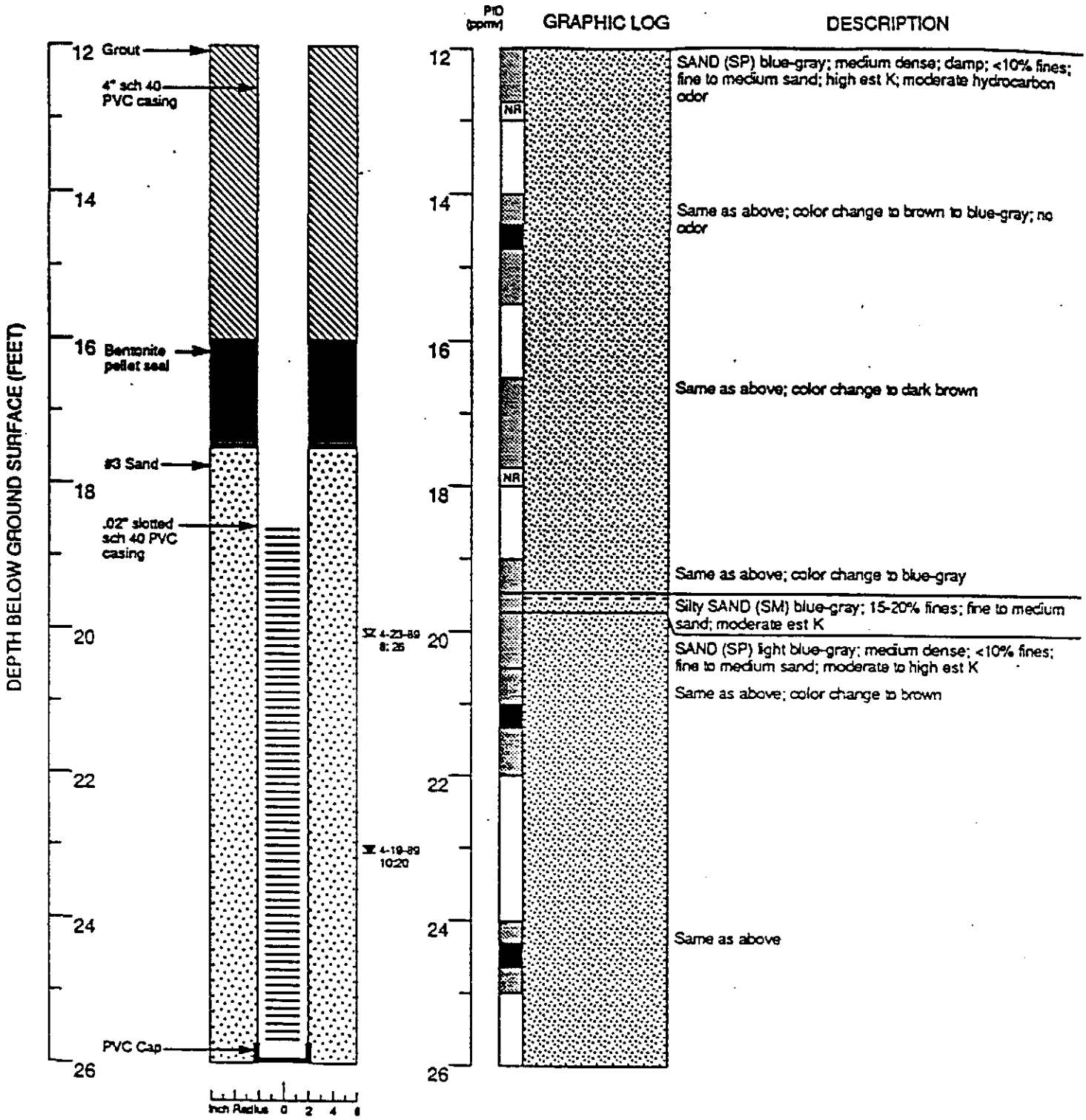
Boring Log and Well Completion Details
MW-8 (Boring B-12)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

MONITOR WELL

8



EXPLANATION

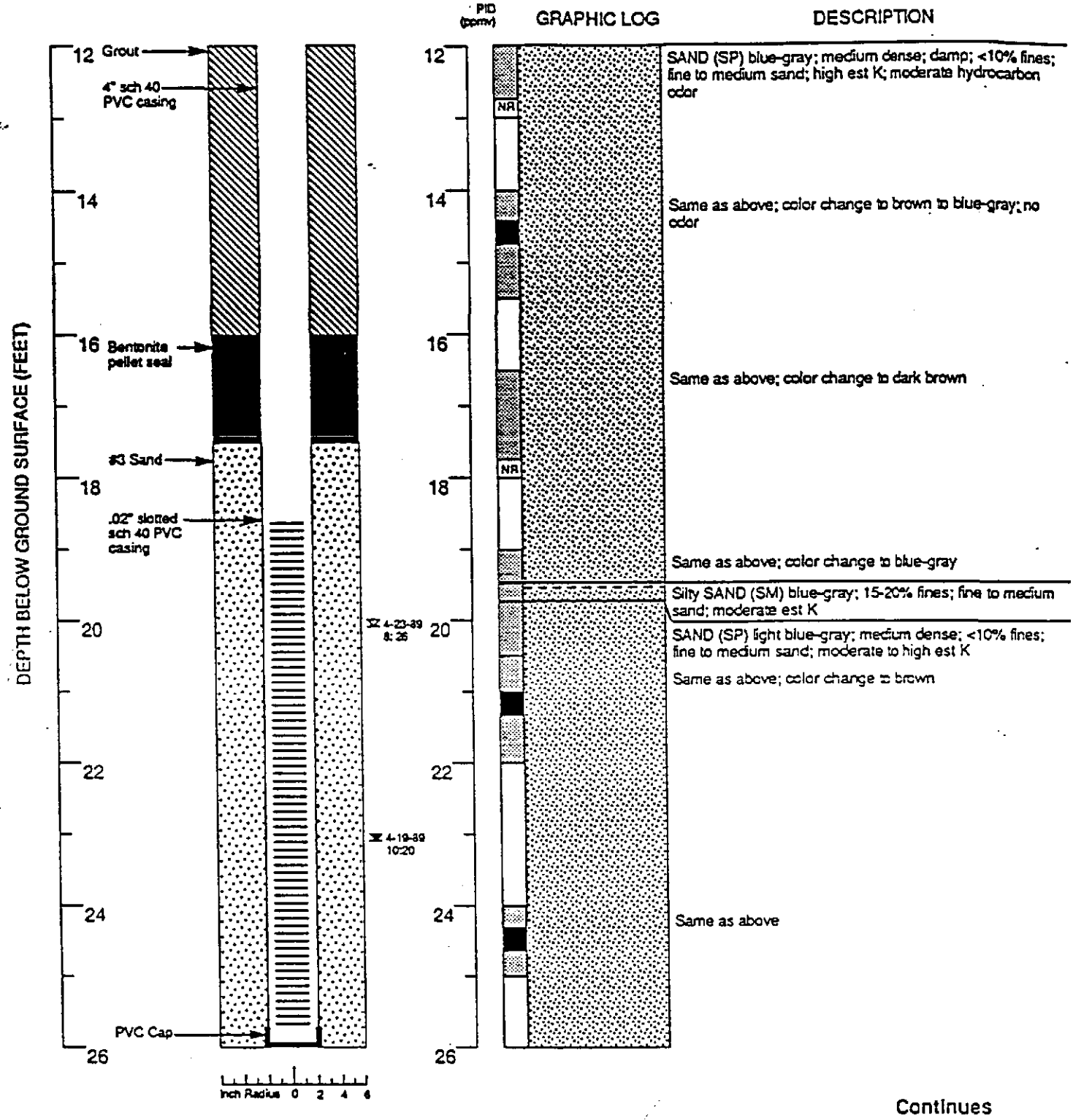
- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR: No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity)

Boring Log and Well Completion Details
MW-8 (Boring B-12) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

MONITOR WELL
8

WESTERN GEOLOGIC RESOURCES, INC.



Continues

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR: No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity)

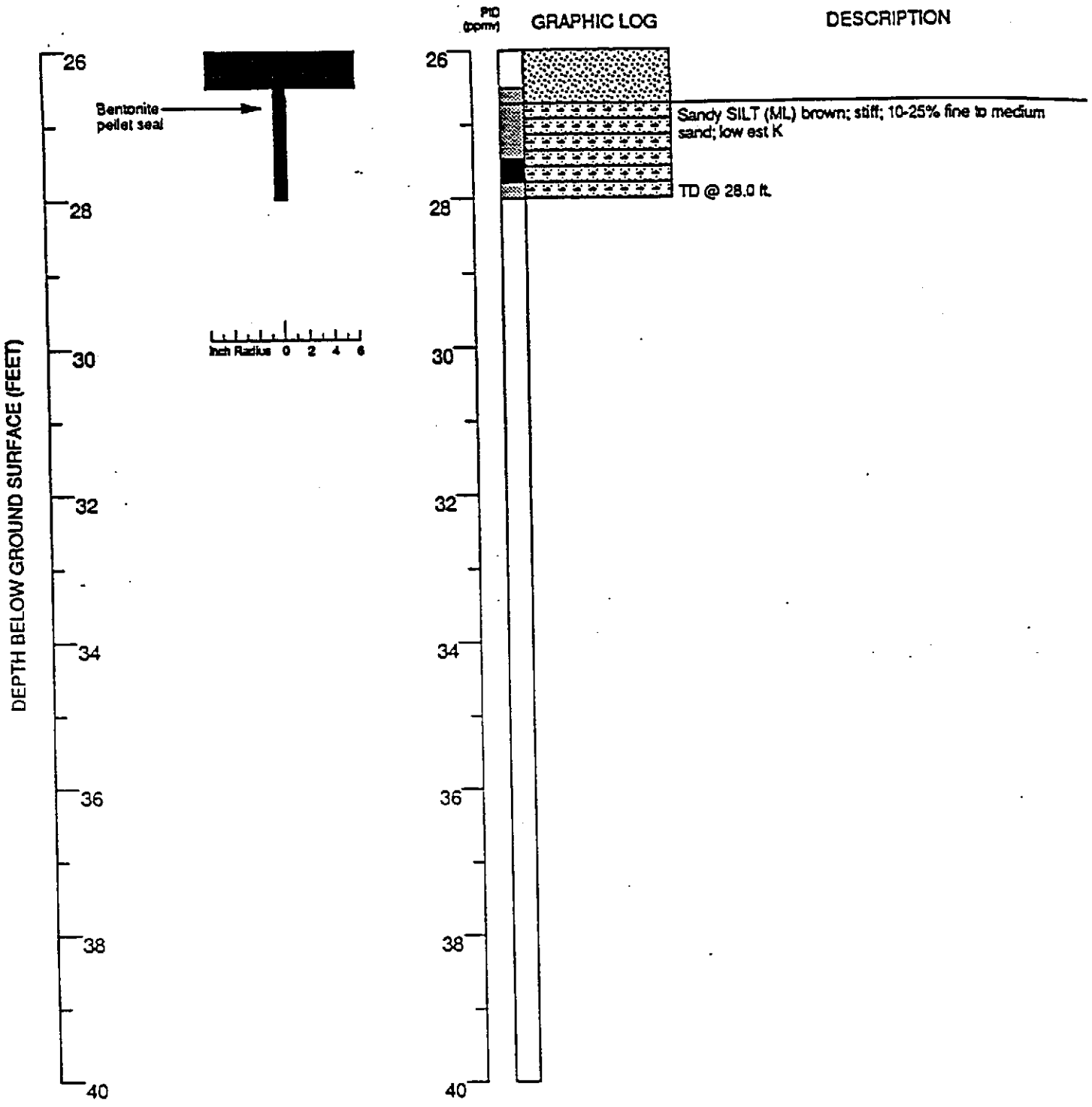
Boring Log and Well Completion Details
MW-8 (Boring B-12) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

MONITOR WELL

8



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- NR — No recovery
- Grab sample
- Contacts
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K — Estimated permeability (hydraulic conductivity)

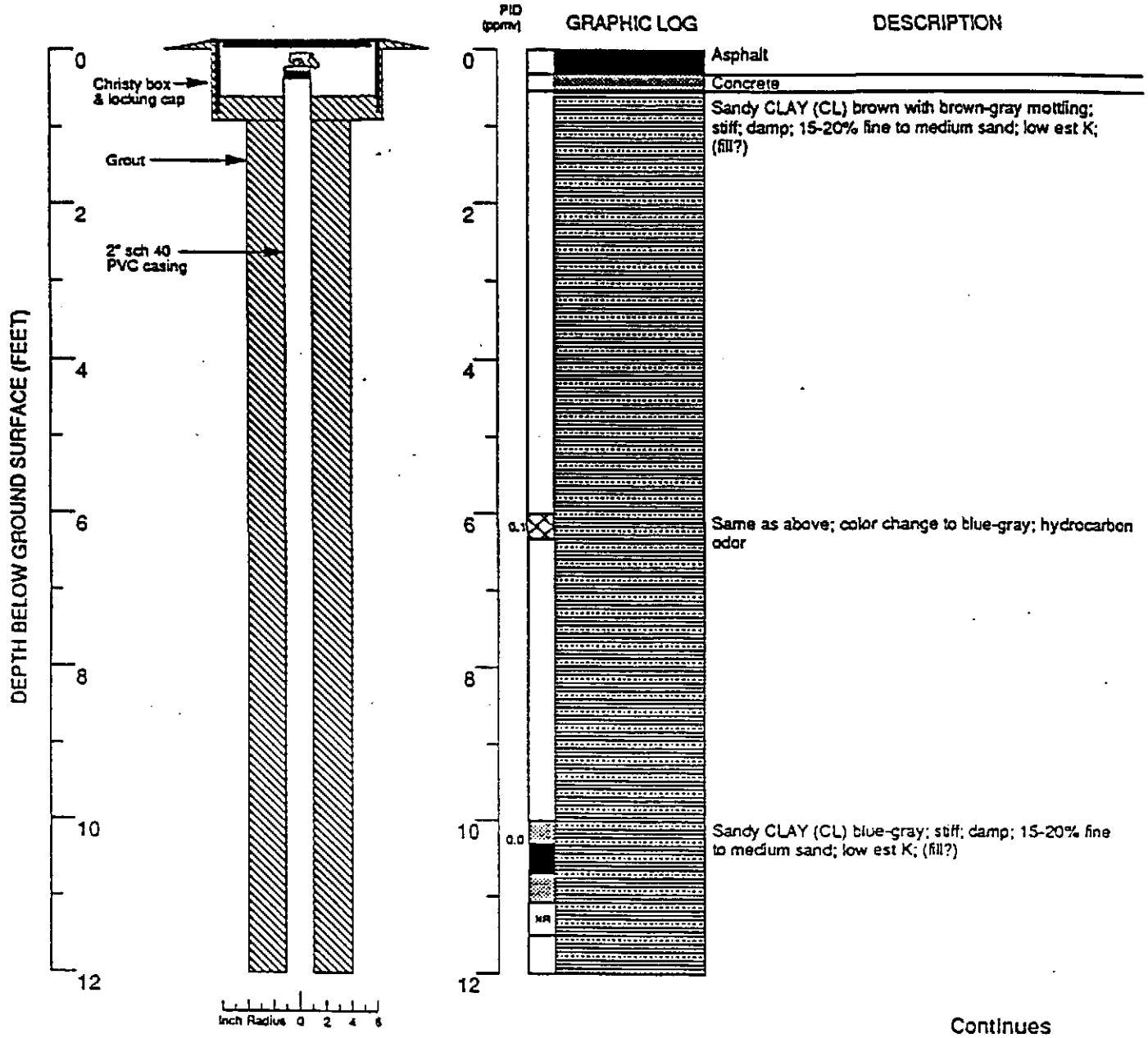
Boring Log and Well Completion Details
MW-8 (Boring B-12) (cont.)
WGR Project No.: 1-012.02

Chevron Facility #90020
Oakland, CA

WESTERN GEOLOGIC RESOURCES, INC.

MONITOR WELL

8



Logged by:	Julie Noffke	Drilling Company:	B & F Drilling Co., Inc.	Well Head Completion:	Christy box & locking cap
Project Mgr:	Len Niles	Drilling Method:	8" Hollow stem auger	Type of Sampler:	2" split barrel
Dates Drilled:	6/20/90	Driller:	Bruce Cox	TD (Total Depth):	27.5 ft.

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sleve sample
- Grab sample
- Contacts: Solid where certain; Dotted where approximate; Dashed where uncertain; Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

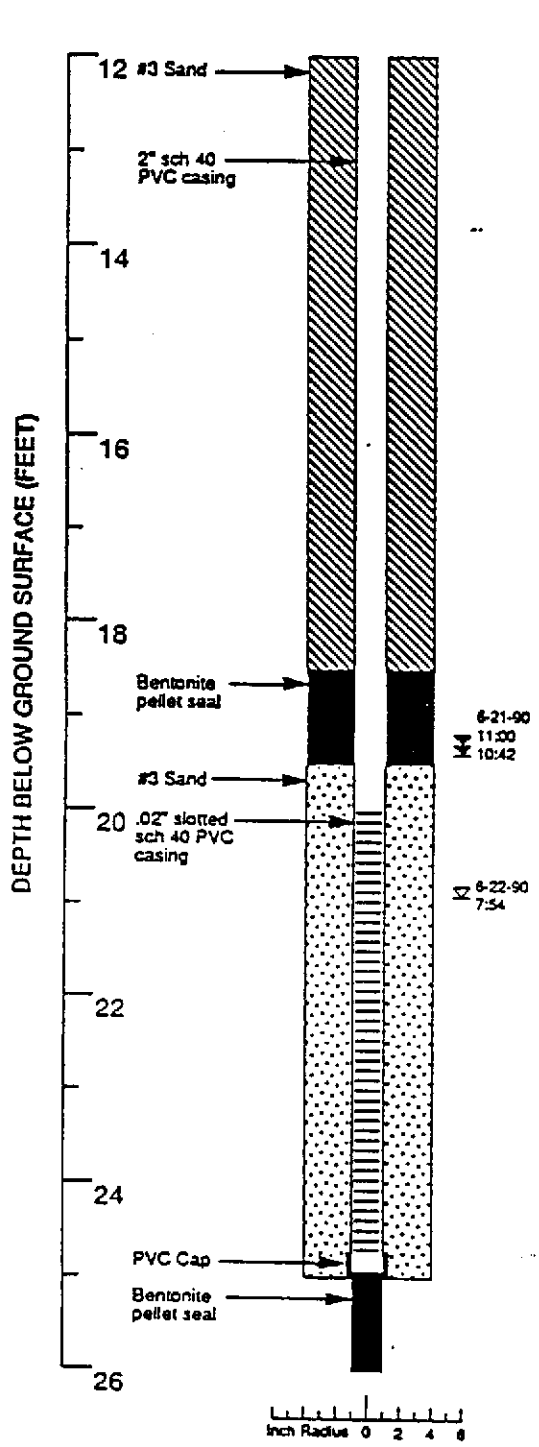
Boring Log and Well Completion Details
MW-9 (Boring B-16)

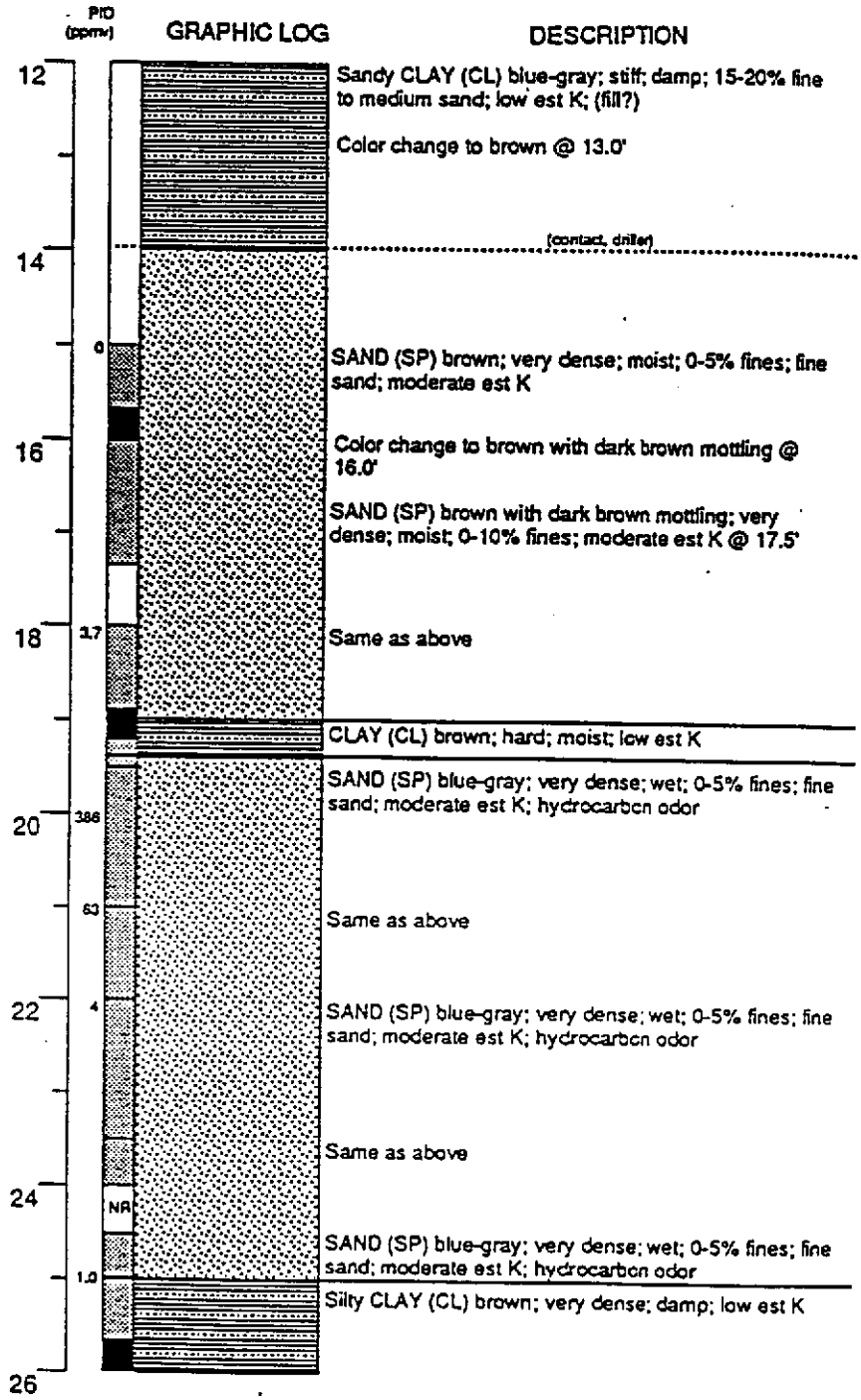
Chevron Service Station #90020
Oakland, California

MONITOR WELL 9

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04





Continues

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

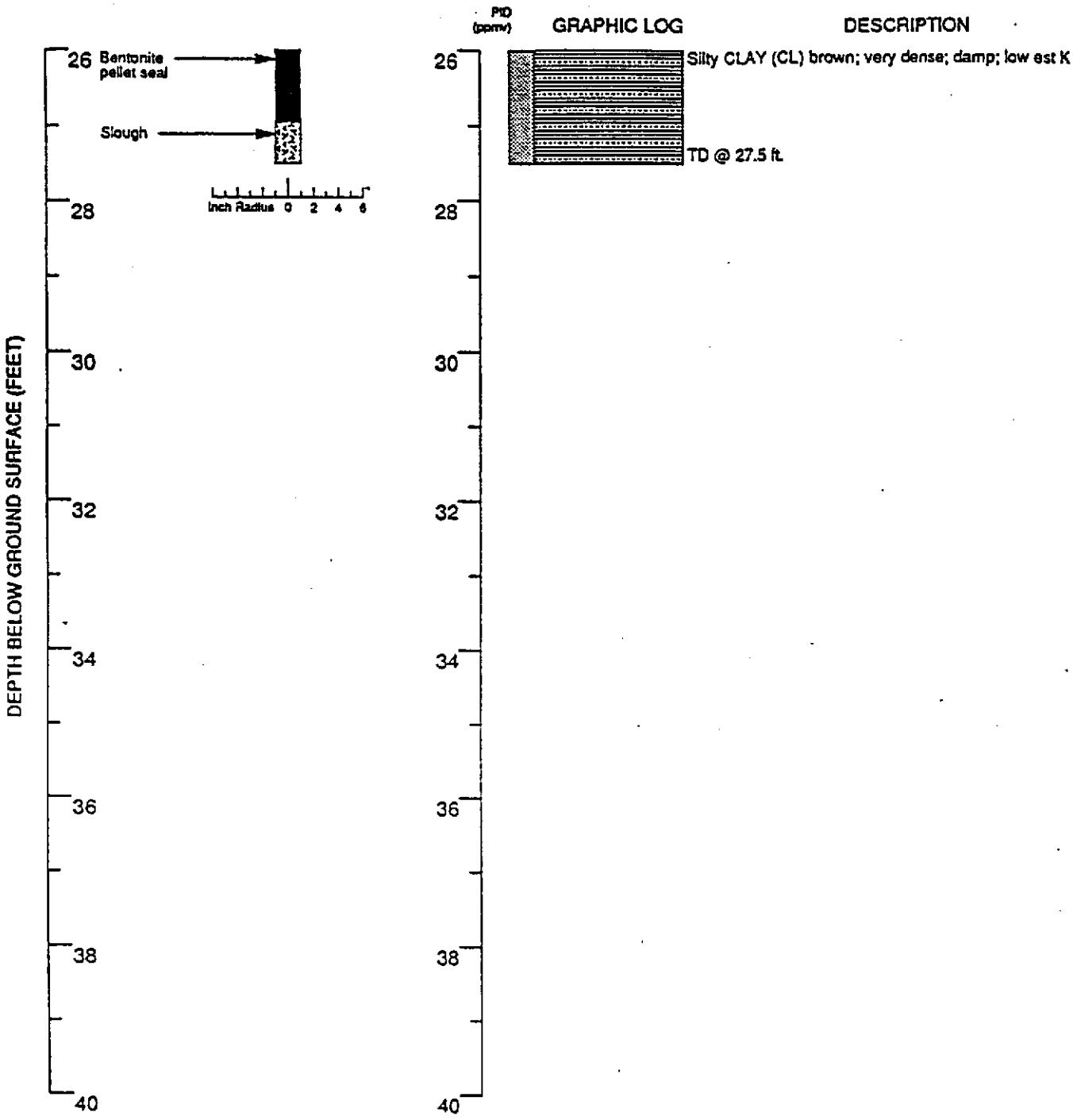
Boring Log and Well Completion Details
MW-9 (Boring B-16)

Chevron Service Station #90020
Oakland, California

MONITOR WELL
9

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

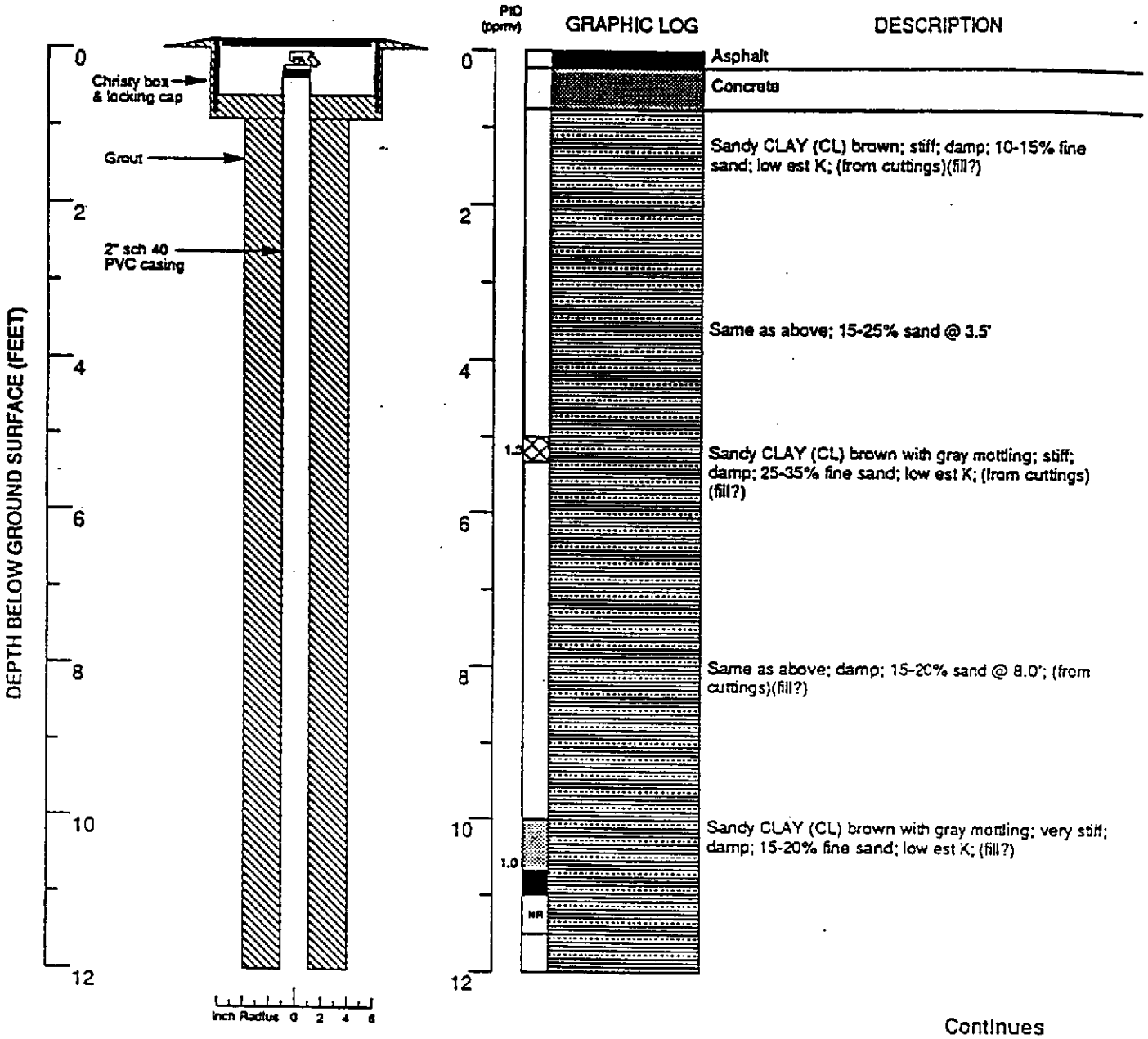
Boring Log and Well Completion Details
MW-9 (Boring B-16)

Chevron Service Station #90020
Oakland, California

MONITOR WELL
9

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



Logged by:	Justin Power	Drilling Company:	B & F Drilling Co., Inc.	Well Head Completion:	Christy box & locking cap
Project Mgr:	Len Niles	Drilling Method:	8" Hollow stem auger	Type of Sampler:	2" split barrel
Dates Drilled:	6/20/90	Driller:	Bruce Cox	TD (Total Depth):	27.0 ft.

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

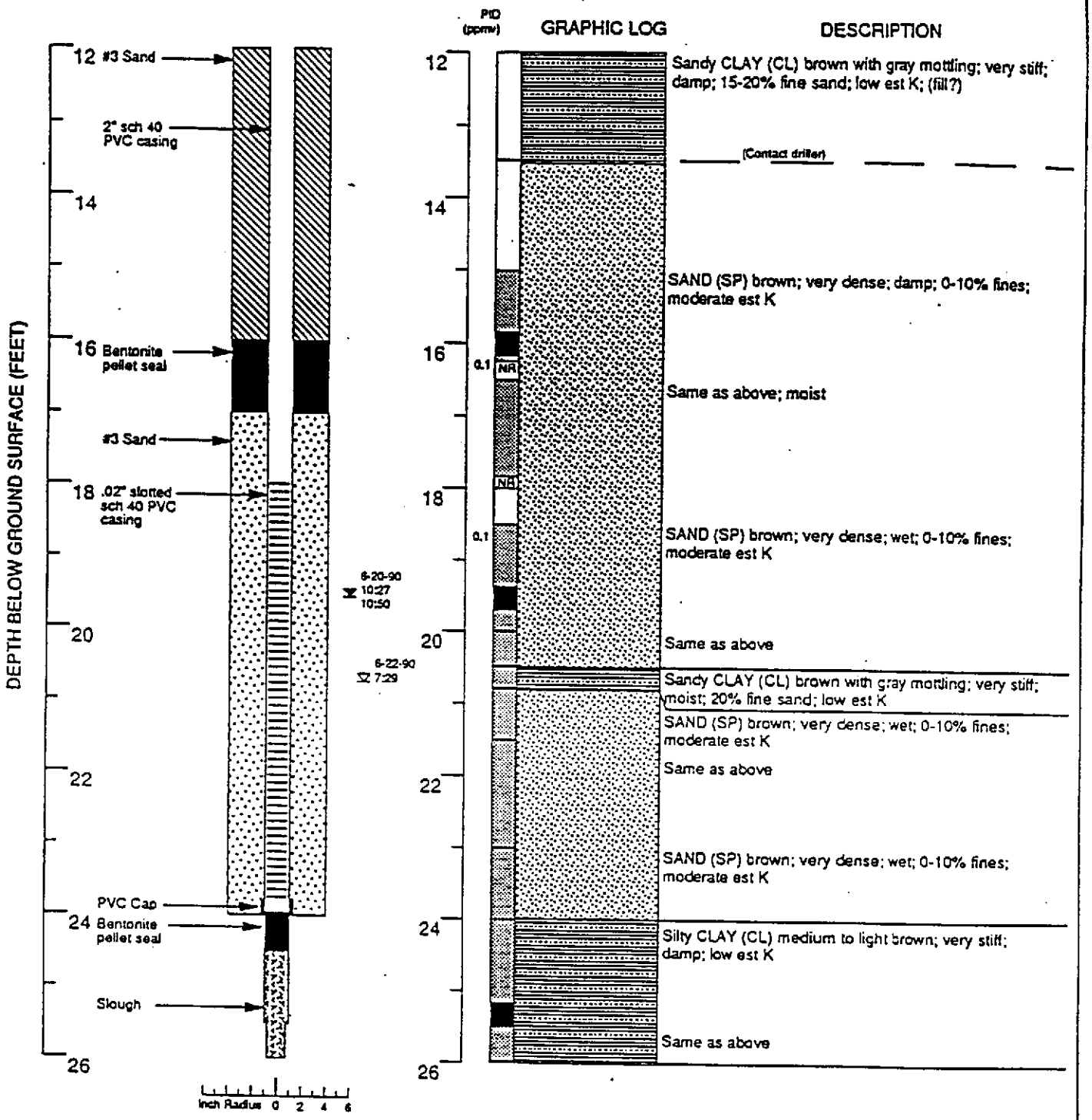
Boring Log and Well Completion Details
MW-10 (Boring B-15)

Chevron Service Station #90020
Oakland, California

MONITOR WELL
10

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



Continues

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

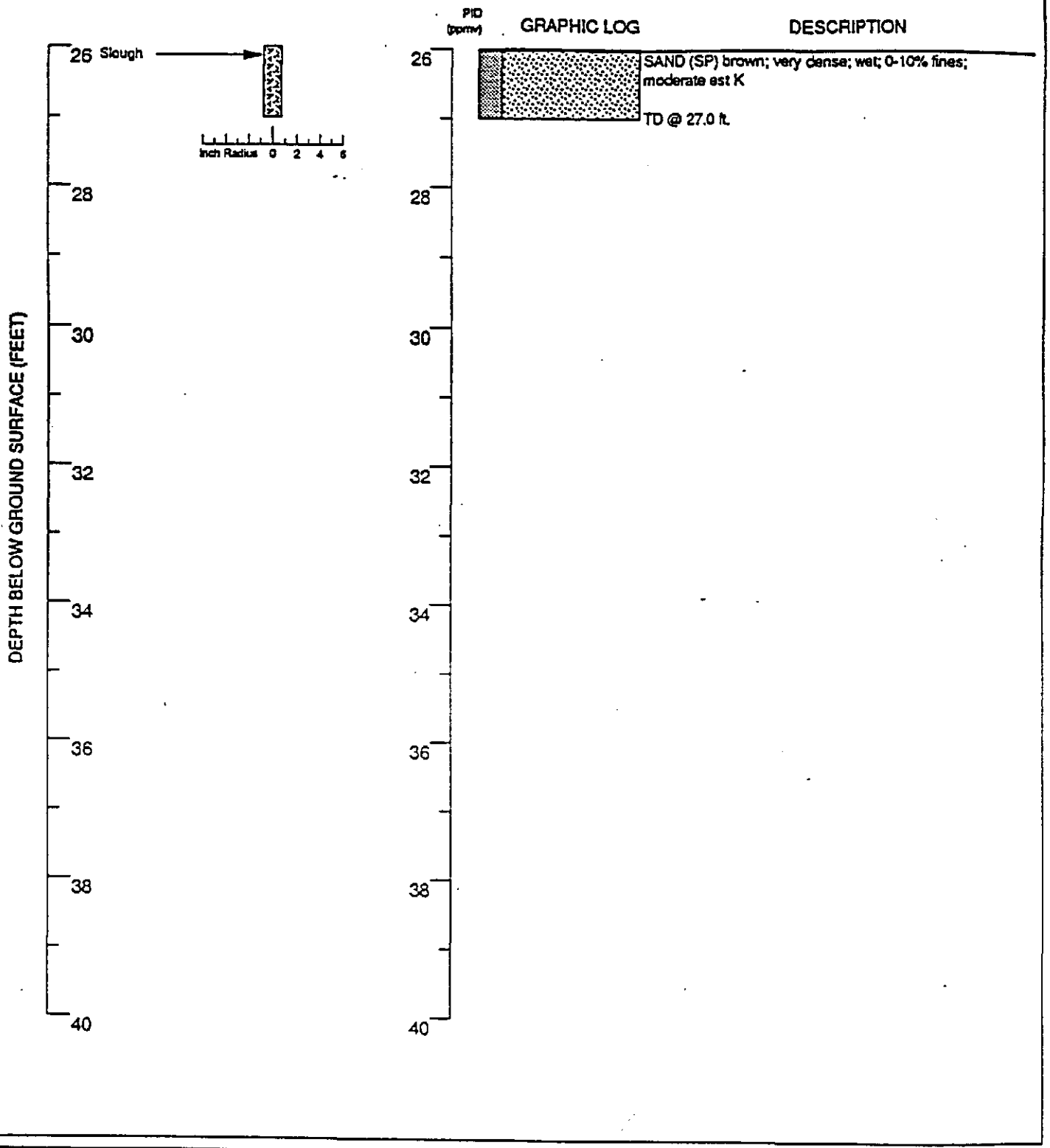
Boring Log and Well Completion Details
MW-10 (Boring B-15)

Chevron Service Station #90020
Oakland, California

MONITOR WELL
10

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

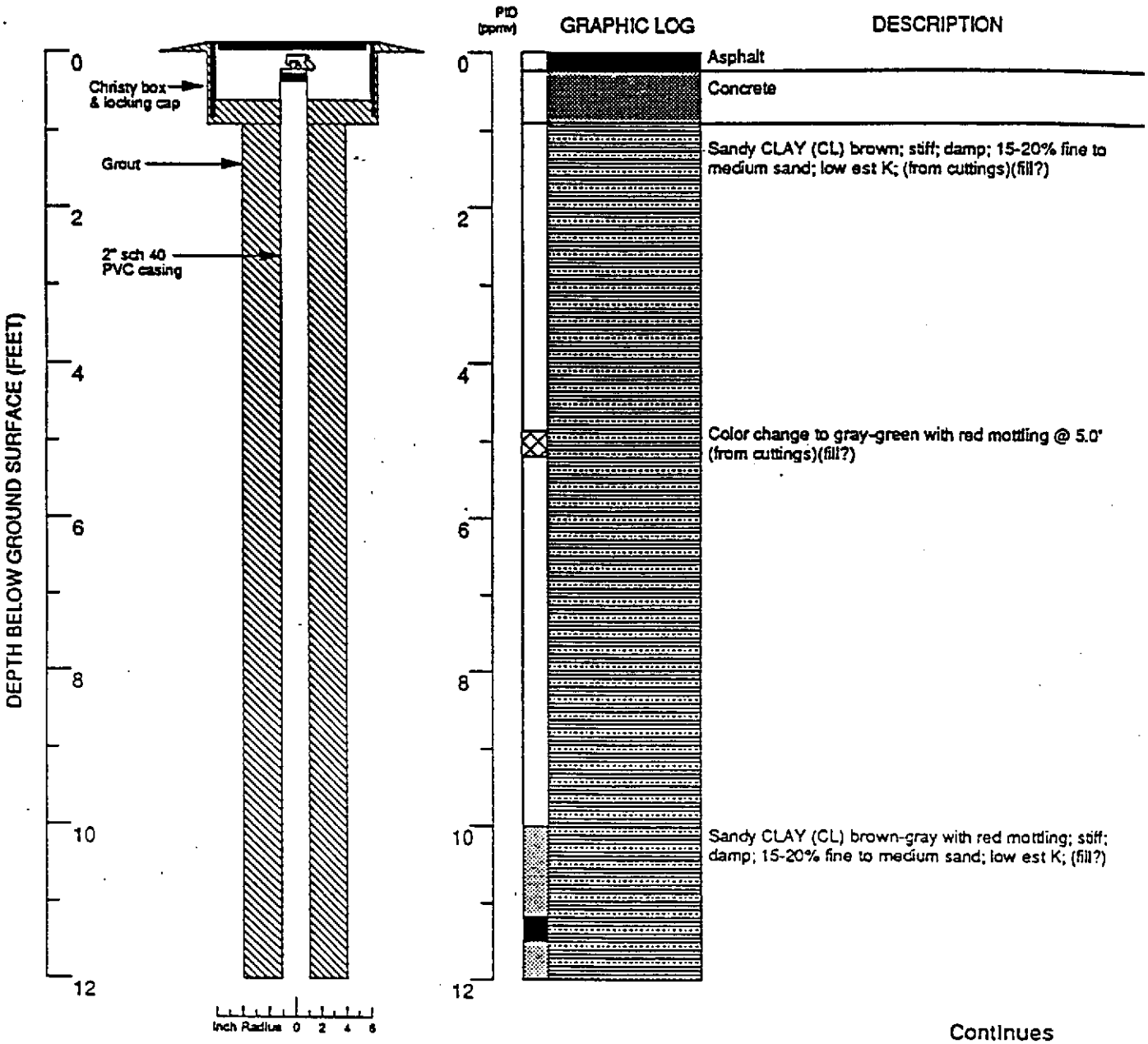
Boring Log and Well Completion Details
MW-10 (Boring B-15)

Chevron Service Station #90020
Oakland, California

MONITOR WELL
10

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



Logged by:	Julie Noffke	Drilling Company:	B & F Drilling Co., Inc.	Well Head Completion:	Christy box & locking cap
Project Mgr:	Len Niles	Drilling Method:	8" Hollow stem auger	Type of Sampler:	2" split barrel
Dates Drilled:	6/18/90	Driller:	Bruce Cox	TD (Total Depth):	29.5 ft.

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain; Dotted where approximate; Dashed where uncertain; Hachured where gradational
- est K — Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR — No recovery

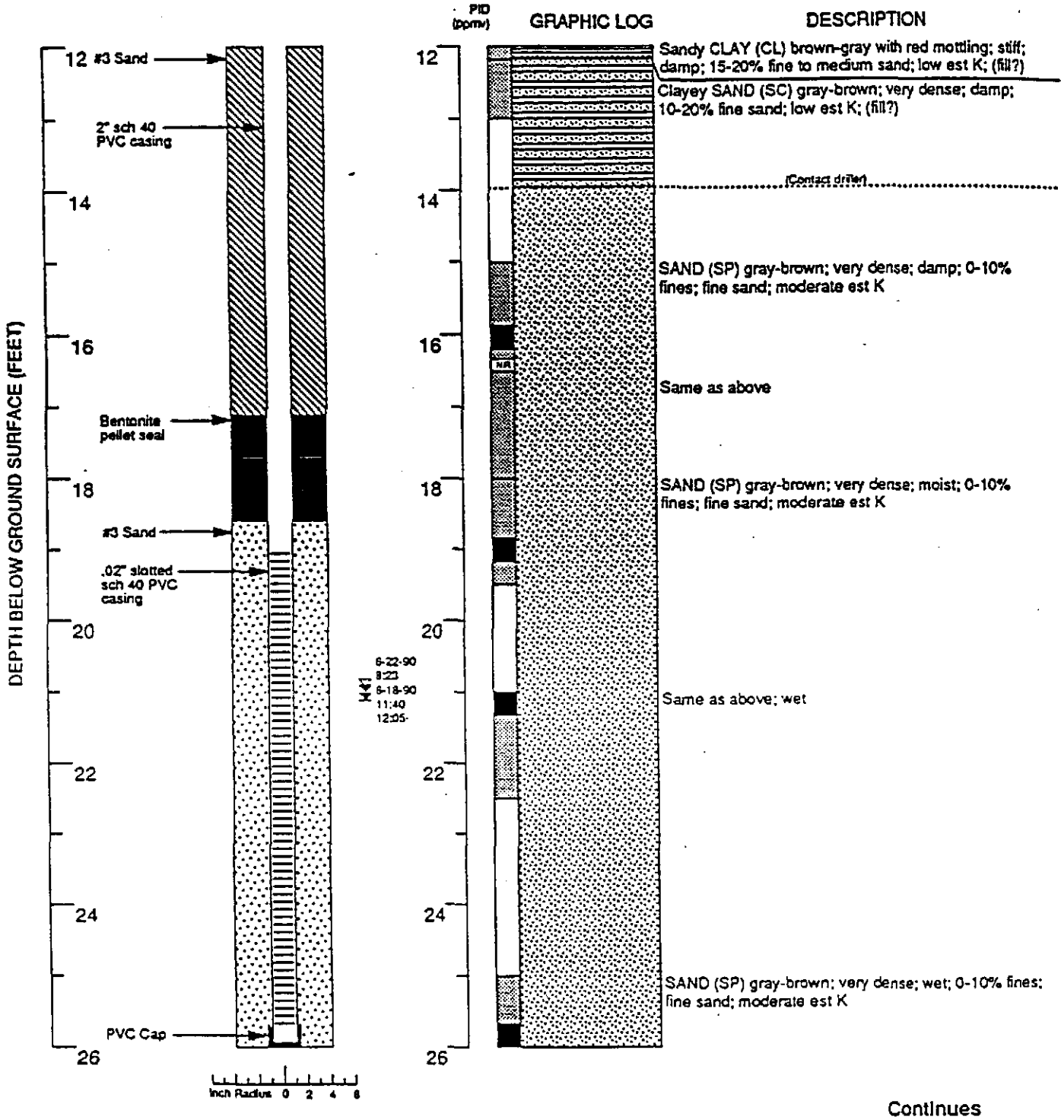
Boring Log and Well Completion Details
MW-11 (Boring B-13)

Chevron Service Station #90020
Oakland, California

MONITOR WELL
11

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample

Contacts:
- Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational

- est K — Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR — No recovery

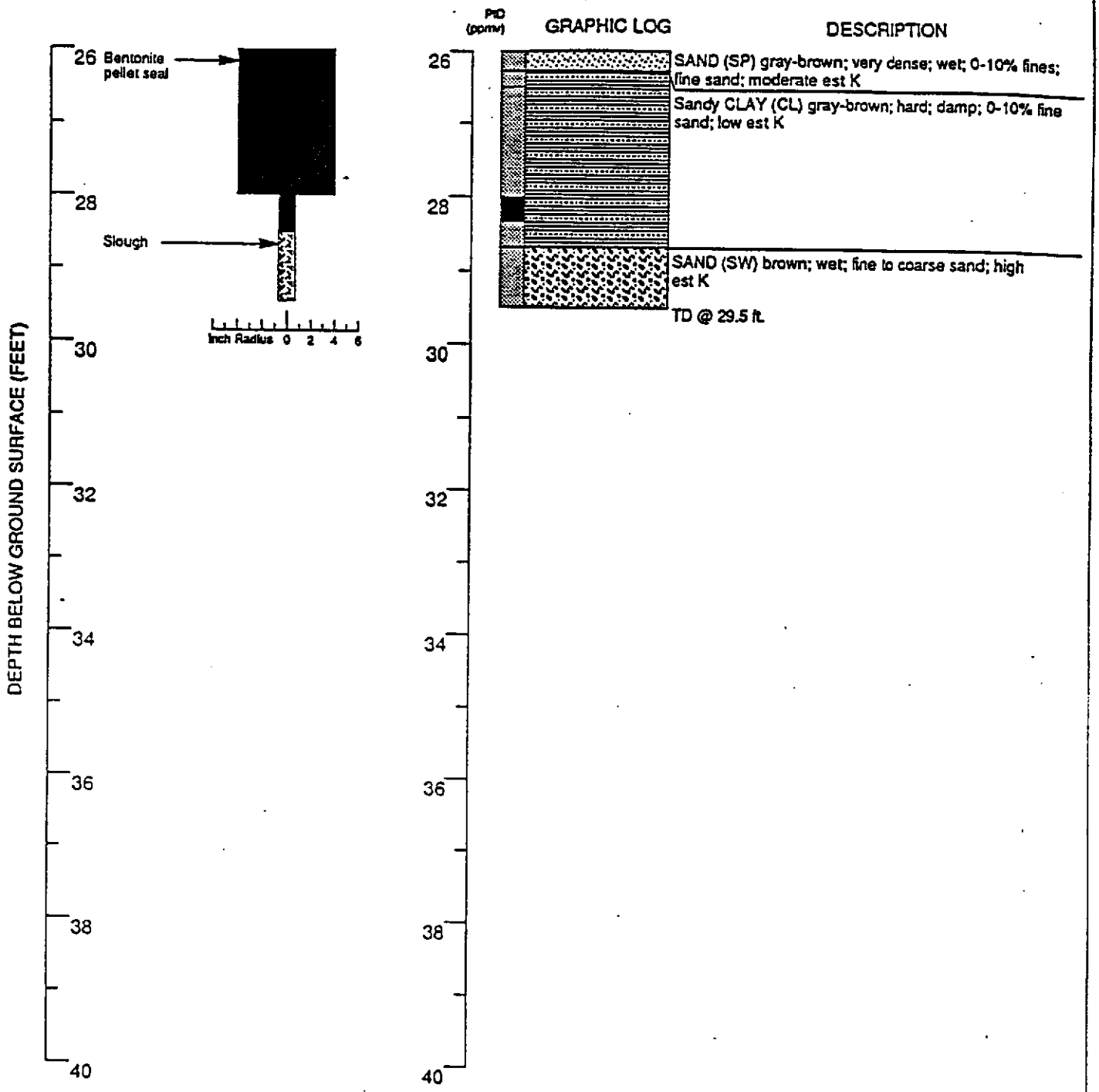
Boring Log and Well Completion Details
MW-11 (Boring B-13)

Chevron Service Station #90020
Oakland, California

MONITOR WELL
11

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

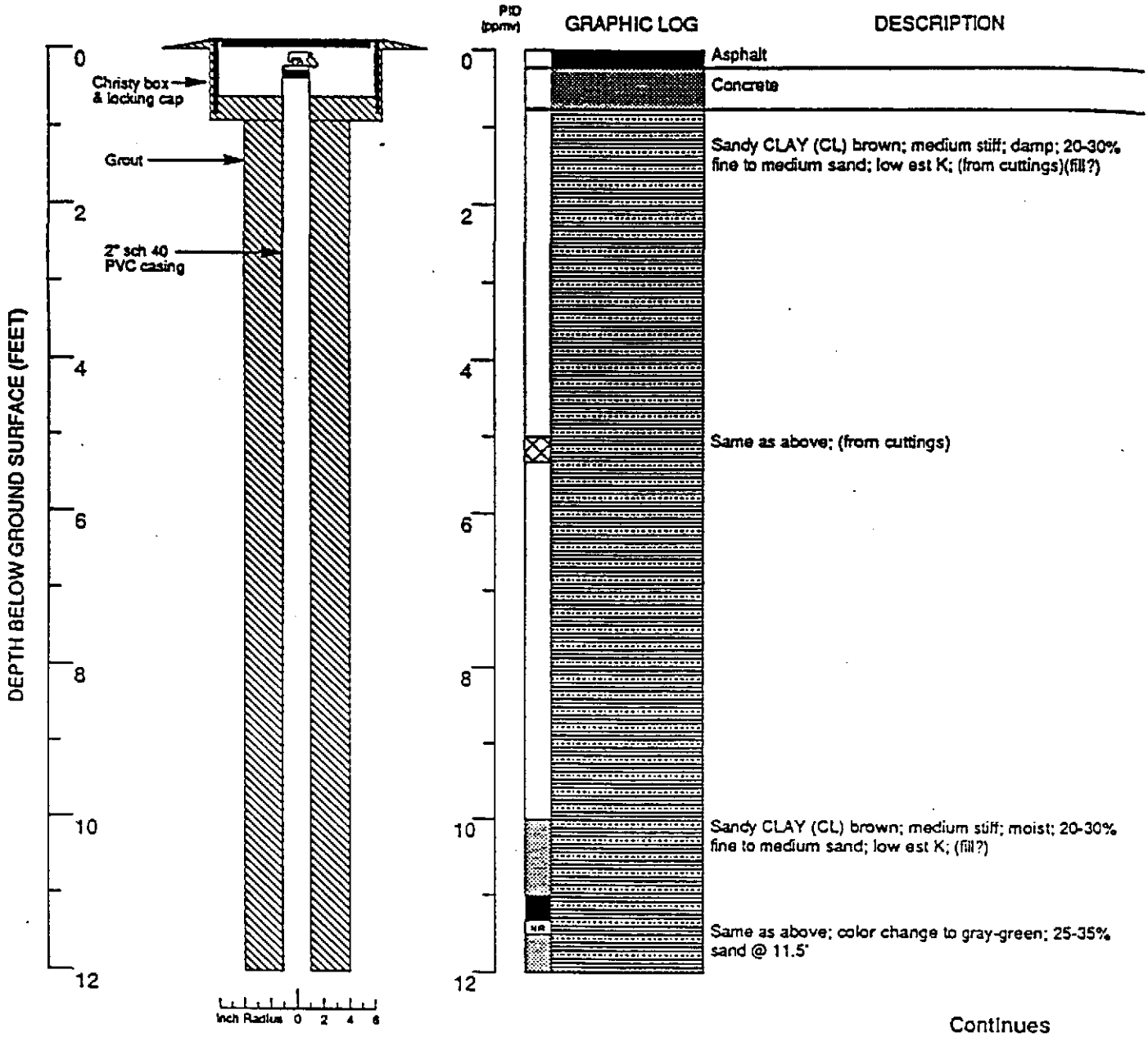
Boring Log and Well Completion Details
MW-11 (Boring B-13)

Chevron Service Station #90020
Oakland, California

MONITOR WELL
11

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



Logged by:	Joel Coffman	Drilling Company:	B & F Drilling Co., Inc.	Well Head Completion:	Christy box & locking cap
Project Mgr:	Len Niles	Drilling Method:	8" Hollow stem auger	Type of Sampler:	2" split barrel
Dates Drilled:	6/19/90	Driller:	Bruce Cox	TD (Total Depth):	29.5 ft.

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

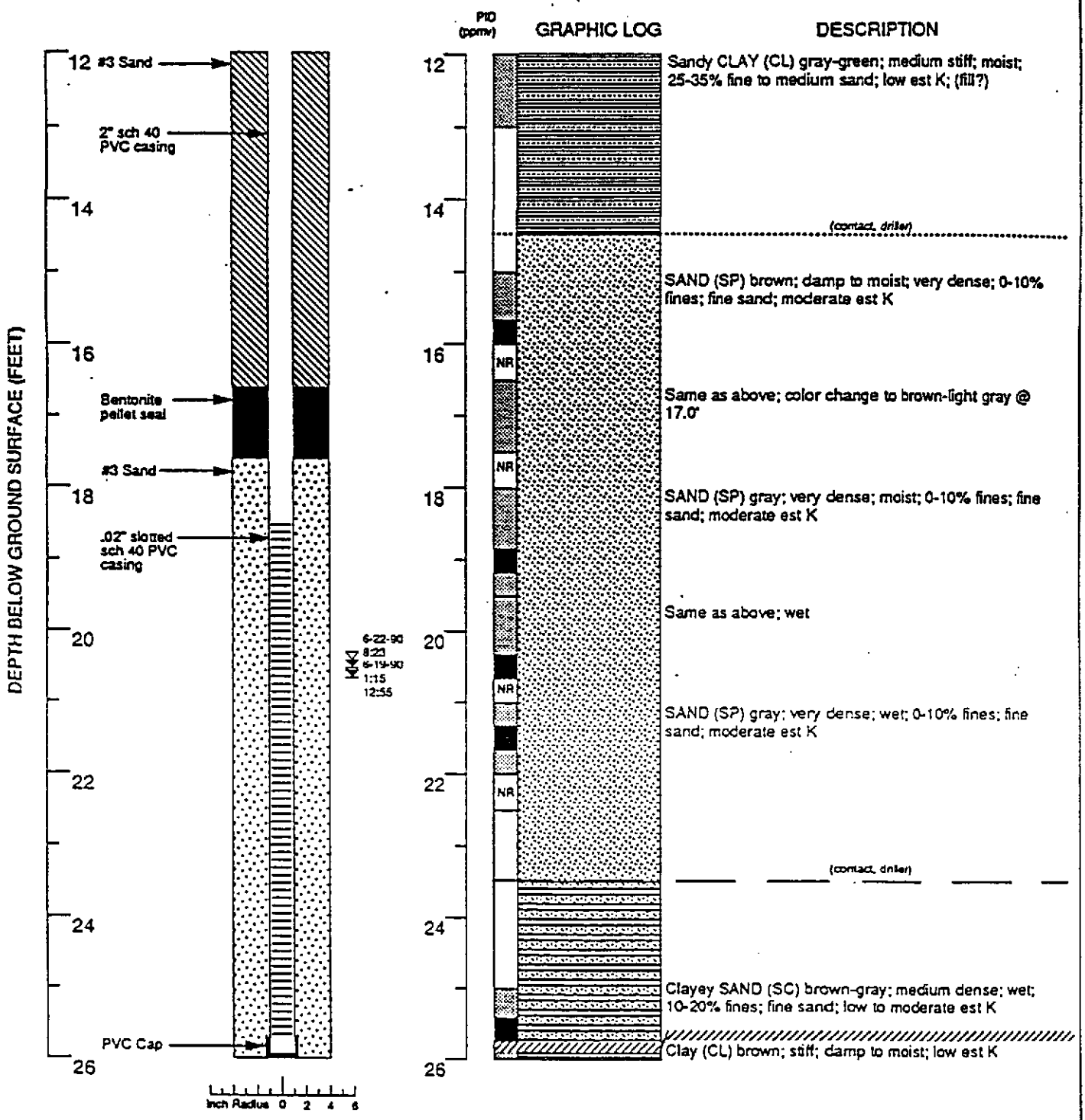
Boring Log and Well Completion Details
MW-12 (Boring B-14)

Chevron Service Station #90020
Oakland, California

MONITOR WELL
12

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



Continues

EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sieve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

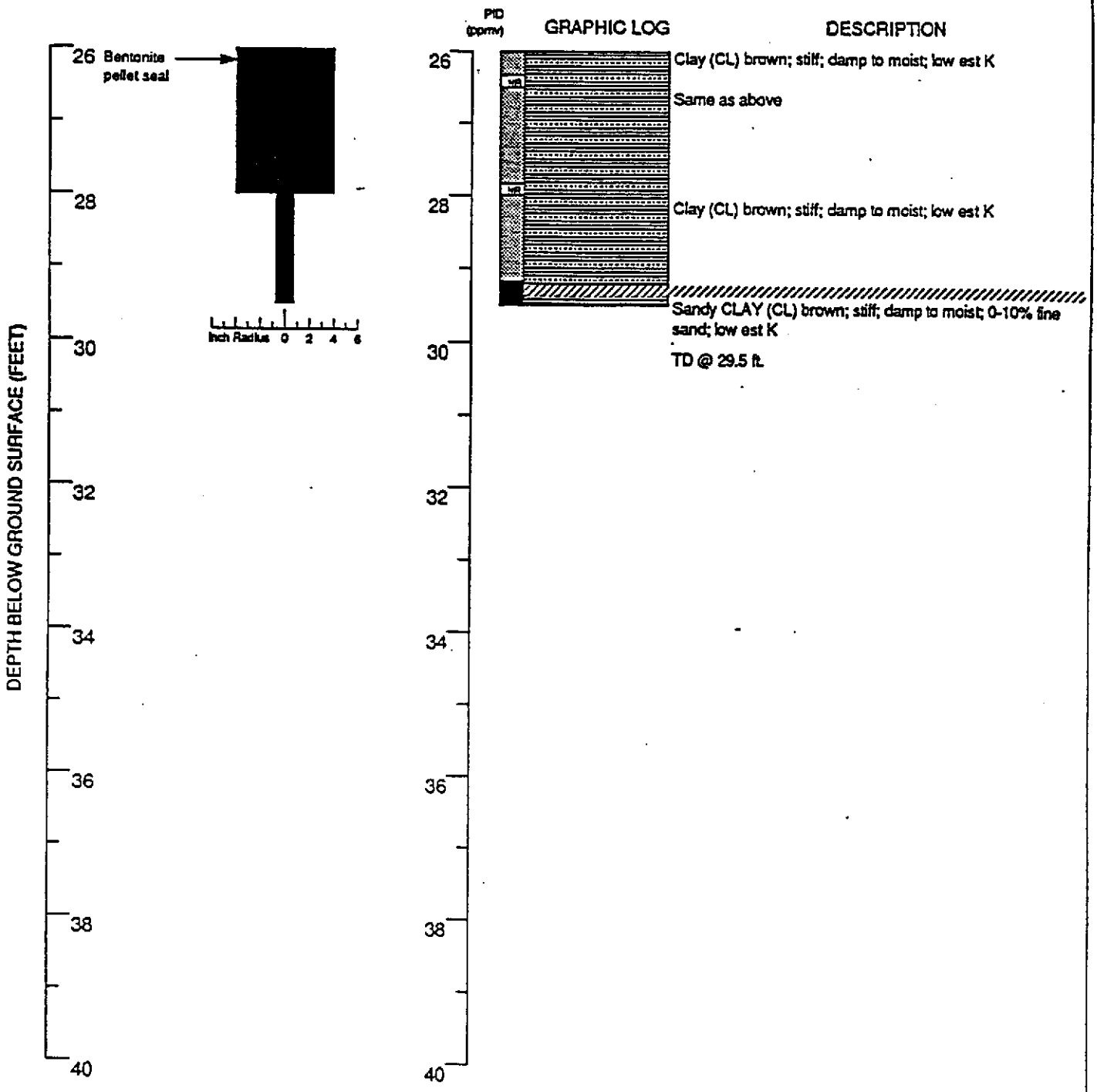
Boring Log and Well Completion Details
MW-12 (Boring B-14)

Chevron Service Station #90020
Oakland, California

MONITOR WELL
12

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



EXPLANATION

- Water level during drilling
- Water level in completed well
- Location of recovered drill sample
- Location of sample sealed for chemical analysis
- Sleeve sample
- Grab sample
- Contacts: Solid where certain
- Dotted where approximate
- Dashed where uncertain
- Hachured where gradational
- est K: Estimated permeability (hydraulic conductivity) 1K = primary 2K = secondary
- NR: No recovery

Boring Log and Well Completion Details
MW-12 (Boring B-14)

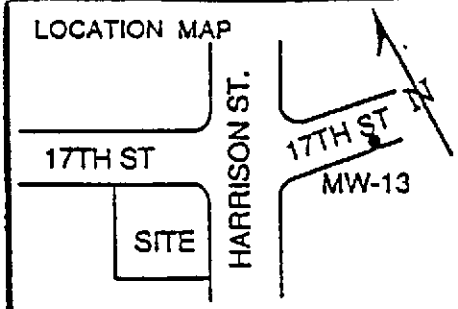
Chevron Service Station #90020
Oakland, California

MONITOR WELL
12

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04

LOCATION MAP



PACIFIC ENVIRONMENTAL GROUP, INC.

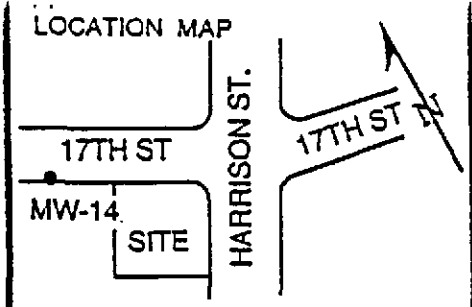
WELL NO. MW-13
PAGE 1 OF 1

PROJECT NO. 320-90.01
LOGGED BY: SVG
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020"
GRAVEL PACK: 2 x 12 SAND

CLIENT: Chevron USA
DATE DRILLED: 10-3-91
LOCATION: 1633 Harrison St.
HOLE DIAMETER: 8"
HOLE DEPTH: 28'
WELL DIAMETER: 2"
WELL DEPTH: 28'
CASING STICKUP: NA

WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	RECOVERY / SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
				0				ASPHALT CONCRETE
	Dp			2			SM	SILTY SAND; yellow brown; 15-20% silty fines; medium sand; well sorted sand; dense; no product odor. @4.5': 6" thick concrete slab
	Dp	0	push	6			ML	SANDY SILT; dark brown; low plasticity; silty fines; 20-30% fine to medium sand; stiff; no product odor.
				8			SM	SILTY SAND; yellow brown; 15-20% silty fines; medium sand; well sorted sand; very dense; no product odor.
NEAT CEMENT	Dp	0	49	10				
				12				
	Dp	0	>50	14				
				16				
				18				
SAND	Dp/ Wt	0	>50	20				@21': color change to light gray; no product odor.
				22				
				24				@25': increase in fines to 30-40%; faint product odor.
BENTONITE	Wt	1.4	45	26			ML	SANDY SILT; light brown; low plasticity; silty fines; 20-30% fine sand; stiff; no product odor.
	Dp	0		28				BOTTOM OF BORING AT 28'
				30				
				32				
				34				
				36				
				38				
				40				
				42				
				44				

LOCATION MAP



NORTHING EASTING ELEVATION

PACIFIC ENVIRONMENTAL GROUP, INC.

WELL NO. MW-14
PAGE 1 OF 1

PROJECT NO. 320-90.01
LOGGED BY: SVG
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: Sch 40 PVC
SLOT SIZE: 0.020"
GRAVEL PACK: 2 x 12 SAND

CLIENT: Chevron USA
DATE DRILLED: 10-3-91
LOCATION: 1633 Harrison St.
HOLE DIAMETER: 8"
HOLE DEPTH: 28.5'
WELL DIAMETER: 2"
WELL DEPTH: 27'
CASING STICKUP: NA

WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	RECOVERY & SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
				0				ASPHALT CONCRETE
				2			GM	SILTY GRAVEL - FILL; light gray; 20-30% silty fines; coarse gravel to 1"; very dense; no product odor.
				4			SM	SILTY SAND - yellowish brown; 15-20% silty fines; medium sand; well sorted sand; loose; no product odor.
NEAT CEMENT	Dp	0	5	6				
				8				@8': 4" thick concrete slab.
	Dp	0	30	10				@10.5': change in color to light gray.
				12				
				14			SP-SM	SAND to SILTY SAND; yellowish brown; 5-10% silty fines; medium sand; well sorted sand; very dense; no product odor.
	Dp/ Mst	0	>50	16				
				18				
BENTONITE	Wt	0	>50	20				@20': wet; no product odor.
				22				
SAND			>50	24				
	Wt	0	push	26			ML	SILT; light tan; silty fines; 0-5% very fine sand; very stiff; no product odor.
	Dry			28				
				30				BOTTOM OF BORING AT 28.5'
				32				
				34				
				36				
				38				
				40				
				42				
				44				

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well MW-15

Project CHV/1633 Harrison Street Owner Chevron U.S.A. Products Co.
Location Oakland, California Project No. 02020 2779 Date drilled 11/11/92
Surface Elev. 28.53 ft. Total Hole Depth 30 ft. Diameter 8.5 inches
Top of Casing 28.04 ft. Water Level Initial 20 ft. Static 12/18/92 19.74 ft.
Screen: Dia 2 in. Length 15 ft. Type/Size 0.020 in.
Casing: Dia 2 in. Length 13 ft. Type SCH 40 PVC
Filter Pack Material Lapis Lustre #3 Rig/Core Type Mobile B-53/Split Spoon
Drilling Company Kvilhaug Well Drilling Method Hollow Stem Auger Permit # 92286
Driller Mike Crocao Log By Chip Hurley
Checked By David Kleesattel License No. RG# 5136 D. Kleesattel

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
-2 to 24		1	8, 10, 12		CL	Approximately 1-foot of concrete Reddish brown sandy CLAY, 50% clay, 20% medium sand, 20% fine sand, 10% silt, moist.
		2	22, 40, 50			Reddish brown clayey SAND, 60% medium sand, 20% clay, 15% fine sand, 5% silt, moist.
		1	34, 40, 50		SC	
		7	25, 45, 50			▼ Encountered groundwater at 20 feet on 11/11/92

01/08/1993 bitlog-mar92

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well **MW-15**

Project *CHV/1633 Harrison Street* Owner *Chevron U.S.A. Products Co.*

Location *Oakland, California* Project No. *02020 2779* Date drilled *11/11/92*

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / Blow Count / % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24					SC	
26		4	7			Tan silty CLAY, 55% clay, 45% silt, moist.
28					CL	
30		1	5			End of boring at 30 feet. Installed groundwater monitoring well.
32						
34						
36						
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						

Drilling Log

GROUNDWATER TECHNOLOGY

Monitoring Well MW-16

Project CHV/1833 Harrison Street Owner Chevron U.S.A. Products Co.
Location Oakland, California Project No. 02020 2779 Date drilled 12/08/92
Surface Elev. 28.59 ft. Total Hole Depth 31.5 ft. Diameter 8.5 inches
Top of Casing 28.32 ft. Water Level Initial 20 ft. Static 12/16/92 19.74 ft.
Screen: Dia 2 in. Length 15 ft. Type/Size 0.020 in.
Casing: Dia 2 in. Length 15 ft. Type SCH 40 PVC
Filter Pack Material Lapis Lustre #3 Rig/Core Type Mobile B-53/Split Spoon
Drilling Company Kvilhaug Well Drilling Method Hollow Stem Auger Permit # 92286
Driller Rod Fowler Log By Chip Hurley
Checked By David Kleesattel License No. RG# 5136

See Site Map For Boring Location

COMMENTS:

Depth (ft.)	Well Completion	PID (ppm)	Sample ID / Blow Count / % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
0						Approximately 6 inches asphalt and 4 inches concrete
6		1	27 18 18		CL	Reddish brown sandy CLAY, 50% clay, 20% coarse sand, 20% fine sand, 10% silt, moist
10		2	50 24			
16		1	50 25		SC	Reddish brown clayey SAND, 60% sand, 30% clay, 10% silt.
20		7	50 45			Encountered groundwater at 20 feet on 12/8/92

01/08/1993 bLNog-mw92

GROUNDWATER TECHNOLOGY

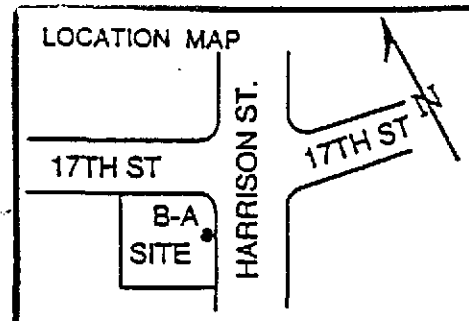
Drilling Log

Monitoring Well MW-16

Project CHV/1633 Harrison Street Owner Chevron U.S.A. Products Co.
Location Oakland, California Project No. 02020 2779 Date drilled 12/08/92

Depth (ft.)	Well Completion	PID (ppm)	Sample ID Blow Count/ % Recovery	Graphic Log	USCS Class.	Description (Color, Texture, Structure) Trace < 10%, Little 10% to 20%, Some 20% to 35%, And 35% to 50%
24					SC	
26		1.4	28 28 30		CL	Gray/brown silty CLAY, 55% clay, 45% silt, wet.
28						
30		0.3	50		SM	Gray silty SAND, 60% sand, 30% silt, 10% clay, saturated.
32						End of boring at 31.5 feet. Installed groundwater monitoring well.
34						
36						
38						
40						
42						
44						
46						
48						
50						
52						
54						
56						

LOCATION MAP



NORTHING EASTING ELEVATION

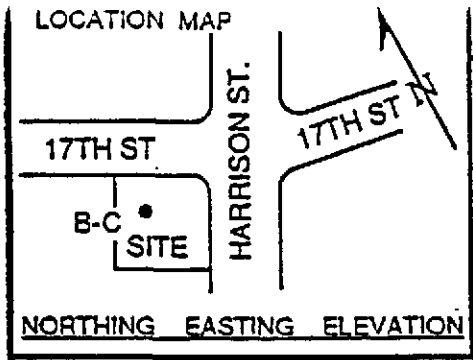
PACIFIC ENVIRONMENTAL GROUP, INC.

BORING NO. B-A
PAGE 1 OF 1

PROJECT NO. 320-90.01
LOGGED BY: SVG
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: CAL MOD
CASING TYPE: NA
SLOT SIZE: NA
GRAVEL PACK: NA

CLIENT: Chevron USA
DATE DRILLED: 10-5-91
LOCATION: 1633 Harrison St.
HOLE DIAMETER: 8"
HOLE DEPTH: 31.5'
WELL DIAMETER: NA
WELL DEPTH: NA
CASING STICKUP: NA

WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	RECOVERY / SAMPLE INTERVAL / GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
NEAT CEMENT				2		SM	ASPHALT SILTY SAND; reddish brown; 15-20% silty fines; minor clay; medium sand; very dense; no product odor.
	Dp	0	49	6			
	Dp	0	40	10		SC	CLAYEY SAND; reddish brown; 20-25% clayey fines; fine to medium sand; dense; no product odor.
	Dp	7.5	>50	16		SW-SM	SAND to SILTY SAND; light gray; 5-10% silty fines; medium sand; very dense; moderate product odor.
	Dp	18.2	>50	20			@20': moderate product odor.
	Wt	0	>50	26			@25': light brown; no product odor.
	Wt	0	40	28			
	Dp			30			
				32		GW	GRAVEL; reddish brown; 0-5% fines; 0-5% sand; fine gravel to 1/2"; well rounded; dense; no product odor.
				34		ML	SILT; light brown; low plasticity; 10-15% fine sand; very stiff; no product odor.
				36			BOTTOM OF BORING AT 31.5'
				38			
				40			
				42			
				44			



PACIFIC ENVIRONMENTAL GROUP, INC.

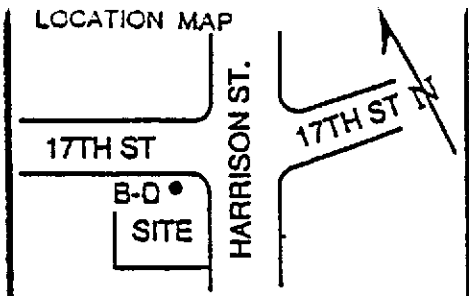
BORING NO. B-C
PAGE 1 OF 1

PROJECT NO. 320-90.01
LOGGED BY: SVG
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: Continuous Core
CASING TYPE: NA
SLOT SIZE: NA
GRAVEL PACK: NA

CLIENT: Chevron USA
DATE DRILLED: 10-5-91
LOCATION: 1633 Harrison St.
HOLE DIAMETER: 8"
HOLE DEPTH: 30'
WELL DIAMETER: NA
WELL DEPTH: NA
CASING STICKUP: NA

WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	RECOVERY / SAMPLE INTERVAL	GRAPHIC	SOIL TYPE	LITHOLOGY / REMARKS
NEAT CEMENT	Dp			2			SM	ASPHALT SILTY SAND; reddish brown; 15-20% silty fines; medium sand; very dense; no product odor.
				4				
	Dp	0	push	6				
				8				
	Dp	0	push	10				
				12				
	Dp	0	push	14				
				16				
				18			SW-SM	SAND to SILTY SAND; light gray; 5-10% silty fines; medium sand; very dense; no product odor.
	Dp	0	push	20				
▽				22				@21': color change to light brown.
				24				
	Wt	0	push	26				
				28			ML	SILT; light gray; low plasticity; 2-5% fine gravel; very stiff; no product odor.
				30				
				32				BOTTOM OF BORING AT 30'
				34				
				36				
				38				
				40				
				42				
				44				

LOCATION MAP



NORTHING EASTING ELEVATION

PACIFIC ENVIRONMENTAL GROUP, INC.

BORING NO. B-D
PAGE 1 OF 1

PROJECT NO. 320-90.01
LOGGED BY: SVG
DRILLER: WEST HAZMAT
DRILLING METHOD: HSA
SAMPLING METHOD: Continuous Core
CASING TYPE: NA
SLOT SIZE: NA
GRAVEL PACK: NA

CLIENT: Chevron USA
DATE DRILLED: 10-5-91
LOCATION: 1633 Harrison St.
HOLE DIAMETER: 8"
HOLE DEPTH: 30'
WELL DIAMETER: NA
WELL DEPTH: NA
CASING STICKUP: NA

WELL COMPLETION	MOISTURE CONTENT	PID	PENETRATION (BLOWS/FT)	DEPTH (FEET)	SOIL TYPE	LITHOLOGY / REMARKS
NEAT CEMENT	Dp			2	SM	ASPHALT SILTY SAND; reddish brown; 20-25% silty fines; medium sand; very dense; no product odor.
				4		
	Dp	0	push	6		
				8		
	Dp	0	push	10		
				12		
	Dp	0	push	14	SW-SM	SAND to SILTY SAND; light gray; 5-10% silty fines; medium sand; very dense; faint product odor.
				16		
				18		
	Dp	6.9	push	20		
	Wt			22		
	Wt	428	push	24		
				26		
	Wt			28	GW	GRAVEL; black; 0-5% fines; 0-5% fine sand; fine gravel to 1/2" well rounded; very dense; no product odor.
	Dp	0		30	ML	SILT; light brown; low plasticity; silty fines; 10-15% fine sand; very stiff; no product odor.
				32		BOTTOM OF BORING AT 30'
				34		
				36		
				38		
				40		
				42		
				44		

APPENDIX I

OAKLAND RBCA ELIGIBILITY CHECKLIST AND TIER I RBSLs TABLE

Oakland RBCA Eligibility Checklist

The Oakland Tier 1 RBSLs and Tier 2 SSTLs are intended to address human health concerns at the majority of sites in Oakland where commonly-found contaminants are present. Complicated sites—especially those with continuing releases, ecological concerns or unusual subsurface conditions—will likely require a Tier 3 analysis. The following checklist is designed to assist you in determining your site's eligibility for the Oakland RBCA levels.

CRITERIA	YES	NO
1. Is there a continuing, *primary* source of a chemical of concern, such as a leaking container, tank or pipe? (This does *not* include residual sources.)	☐	☒
2. Is there any mobile or potentially-mobile free product?	☐	☒
3. Are there more than five chemicals of concern at the site at a concentration greater than the lowest applicable Oakland RBCA level?	☐	☒
4. Are there any preferential vapor migration pathways—such as gravel channels or utility corridors—that are potential conduits for the migration, on-site or off-site, of a volatilized chemical of concern?	☐	☐
5. Do both of the following conditions exist? (a) Groundwater is at depths less than 300 cm (10 feet) (b) Inhalation of volatilized chemicals of concern from groundwater in indoor or outdoor air is a pathway of concern but groundwater ingestion is *not**	☐	☒
6. Are there any existing on-site or off-site structures intended for future use where exposure to indoor air vapors from either soil or groundwater is of concern *and* one of the following three conditions is present? (a) A slab-on-grade foundation that is less than 15 cm (6 inches) thick (b) An enclosed, below-grade space (e.g., a basement) that has floors or walls less than 15 cm (6 inches) thick (c) A crawl space that is not ventilated	☐	☒
7. Are there any immediate, acute health risks to humans associated with contamination at the site, including explosive levels of a chemical?	☐	☒
8. Are there any complete exposure pathways to nearby ecological receptors, such as endangered species, wildlife refuge areas, wetlands, surface water bodies or other protected areas?	☐	☒

*If groundwater ingestion *is* a pathway of concern, the associated Oakland RBCA levels will be more stringent than those for any groundwater-related inhalation scenario, rendering depth to groundwater irrelevant in the risk analysis.

If you answer "no" to all questions, your site is eligible for the Oakland RBCA levels. If you answer "yes" to any of the questions, your site is *not* eligible for the Oakland RBCA levels at this time.

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Acenaph-thene	Acenaph-thylene	Acetone	Anthra-cene	Arsenic	Barium	Benz(a) anthracene	Benzene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					3.2E-01		2.5E-01	2.7E+00
			Hazard	3.1E+03	3.1E+03	4.8E+03	1.6E+04	2.0E+01	5.2E+03		8.1E+01
		Commercial/ Industrial	Carcinogenic					1.5E+00		7.9E-01	8.5E+00
			Hazard	2.0E+04	2.0E+04	3.0E+04	1.0E+05	2.5E+02	9.4E+04		5.1E+02
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							SAT	6.9E-02
			Hazard	SAT	SAT	1.5E+03	SAT				2.3E+00
		Commercial/ Industrial	Carcinogenic							SAT	1.1E+00
			Hazard	SAT	SAT	4.4E+04	SAT				6.6E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							SAT	1.9E-01
			Hazard	SAT	SAT	5.0E+03	SAT				7.6E+00
		Commercial/ Industrial	Carcinogenic							SAT	7.3E-01
			Hazard	SAT	SAT	2.9E+04	SAT				4.4E+01
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic					*4.4E+00*	*1.2E+02*	6.8E-01	*2.1E-03*
			Hazard	2.0E+02	1.4E+02	3.6E-01	SAT	*4.4E+00*	*1.2E+02*		*2.1E-03*
		Commercial/ Industrial	Carcinogenic					*4.4E+00*	*1.2E+02*	2.9E+00	*2.1E-03*
			Hazard	SAT	SAT	2.4E+00	SAT	*4.4E+00*	*1.2E+02*		*2.1E-03*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic							>SOL	1.1E-01
			Hazard	>SOL	>SOL	2.0E+04	>SOL				3.7E+00
		Commercial/ Industrial	Carcinogenic							>SOL	1.8E+00
			Hazard	>SOL	>SOL	5.8E+05	>SOL				1.1E+02
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic							>SOL	5.6E+00
			Hazard	>SOL	>SOL	2.1E+05	>SOL				2.2E+02
		Commercial/ Industrial	Carcinogenic							>SOL	2.1E+01
			Hazard	>SOL	>SOL	>SOL	>SOL				1.3E+03
	Ingestion of Groundwater	Residential	Carcinogenic					*5.0E-02*	*1.0E+00*	5.6E-05	*1.0E-03*
			Hazard	9.4E-01	9.4E-01	1.6E+00	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*
		Commercial/ Industrial	Carcinogenic					*5.0E-02*	*1.0E+00*	2.4E-04	*1.0E-03*
			Hazard	>SOL	>SOL	1.0E+01	>SOL	*5.0E-02*	*1.0E+00*		*1.0E-03*
Water Used for Recreation	Ingestion/ Dermal	Residential	Carcinogenic					2.0E-03		1.6E-05	6.3E-03
			Hazard	1.1E+00	1.7E+00	4.2E+01	>SOL	1.2E-01	2.8E+01		1.8E-01

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Dimethyl-benza(a) anthracene (7,12)	Dimethyl phenol (2,4)	di-n-Butyl-phthalate	di-n-octyl phthalate	Dinitro-toluene (2,4)	Dioxane (1,4)	Ethyl-benzene	Ethylene Dibromide
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic					9.7E-01	1.0E+01		8.4E-02
			Hazard	1.6E+03	1.0E+03	5.2E+03	1.0E+03			5.1E+03	2.7E+00
		Commercial/ Industrial	Carcinogenic					3.0E+00	3.1E+01		2.6E-01
			Hazard	1.0E+04	6.7E+03	3.4E+04	6.8E+03			3.3E+04	1.7E+01
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic					SAT	SAT		2.8E-01
			Hazard		SAT	SAT	SAT			SAT	7.8E-01
		Commercial/ Industrial	Carcinogenic					SAT	SAT		4.5E+00
			Hazard		SAT	SAT	SAT			SAT	2.3E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic					SAT	SAT		7.9E-01
			Hazard		SAT	SAT	SAT			SAT	2.6E+00
		Commercial/ Industrial	Carcinogenic					SAT	SAT		3.0E+00
			Hazard		SAT	SAT	SAT			SAT	1.5E+01
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic					6.7E-04	1.8E-03	*8.0E+00*	*7.8E-05*
			Hazard	SAT	2.0E+00	3.9E+06	SAT			*8.0E+00*	*7.8E-05*
		Commercial/ Industrial	Carcinogenic					2.9E-03	SAT	*8.0E+00*	*7.8E-05*
			Hazard	SAT	1.3E+01	SAT	SAT			*8.0E+00*	*7.8E-05*
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic					>SOL	>SOL		5.7E-01
			Hazard		>SOL	>SOL	>SOL			>SOL	1.6E+00
		Commercial/ Industrial	Carcinogenic					>SOL	>SOL		9.0E+00
			Hazard		>SOL	>SOL	>SOL			>SOL	4.6E+01
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic					>SOL	>SOL		8.7E+00
			Hazard		>SOL	>SOL	>SOL			>SOL	2.9E+01
		Commercial/ Industrial	Carcinogenic					>SOL	>SOL		3.3E+01
			Hazard		>SOL	>SOL	>SOL			>SOL	1.7E+02
	Ingestion of Groundwater	Residential	Carcinogenic					2.2E-04	2.5E-03	*7.0E-01*	*5.0E-05*
			Hazard	>SOL	3.1E-01	1.6E+00	>SOL			*7.0E-01*	*5.0E-05*
		Commercial/ Industrial	Carcinogenic					9.2E-04	1.1E-02	*7.0E-01*	*5.0E-05*
			Hazard	>SOL	2.0E+00	1.0E+01	>SOL			*7.0E-01*	*5.0E-05*
Water Used for Recreation	Ingestion/ Dermal	Residential	Carcinogenic					6.4E-03	>SOL		5.9E-04
			Hazard	>SOL	2.7E+00	7.3E+00	2.1E-03			3.6E+00	1.7E-02

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	MTBE	Naphthalene	Nickel	Nitrobenzene	PCBs	Phenanthrene	Phenol	Pyrene
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			3.4E+04	5.5E+02	5.0E-02			
			Hazard	2.6E+02	2.0E+03	1.5E+03		1.2E+00	1.6E+04	3.1E+04	1.6E+03
		Commercial/ Industrial	Carcinogenic			1.3E+05	1.7E+03	1.8E-01			
			Hazard	1.7E+03	1.3E+04	2.7E+04		1.0E+01	1.0E+05	2.0E+05	1.0E+04
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				SAT	6.9E+01			
			Hazard	4.4E+03	SAT			SAT	SAT	SAT	SAT
		Commercial/ Industrial	Carcinogenic				SAT	1.1E+03			
			Hazard	SAT	SAT			SAT	SAT	SAT	SAT
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				SAT	1.9E+02			
			Hazard	SAT	SAT			SAT	SAT	SAT	SAT
		Commercial/ Industrial	Carcinogenic				SAT	7.3E+02			
			Hazard	SAT	SAT			SAT	SAT	SAT	SAT
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*7.6E-03*	*1.2E+00*	*2.0E+01*	2.9E-01	*4.7E+00*			
			Hazard	*7.6E-03*	*1.2E+00*	*2.0E+01*		*4.7E+00*	SAT	1.0E+01	SAT
		Commercial/ Industrial	Carcinogenic	*7.6E-03*	*1.2E+00*	*2.0E+01*	1.2E+00	*4.7E+00*			
			Hazard	*7.6E-03*	*1.2E+00*	*2.0E+01*		*4.7E+00*	SAT	6.7E+01	SAT
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic				>SOL	2.3E-02			
			Hazard	2.4E+04	>SOL			>SOL	>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic				>SOL	3.6E-01			
			Hazard	>SOL	>SOL			>SOL	>SOL	>SOL	>SOL
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic				>SOL	3.2E-01			
			Hazard	>SOL	>SOL			>SOL	>SOL	>SOL	>SOL
		Commercial/ Industrial	Carcinogenic				>SOL	>SOL			
			Hazard	>SOL	>SOL			>SOL	>SOL	>SOL	>SOL
	Ingestion of Groundwater	Residential	Carcinogenic	*1.3E-02*	*2.0E-02*	*1.0E-01*	1.3E-01	*5.0E-04*			
			Hazard	*1.3E-02*	*2.0E-02*	*1.0E-01*		*5.0E-04*	>SOL	9.4E+00	>SOL
		Commercial/ Industrial	Carcinogenic	*1.3E-02*	*2.0E-02*	*1.0E-01*	5.7E-01	*5.0E-04*			
			Hazard	*1.3E-02*	*2.0E-02*	*1.0E-01*		*5.0E-04*	>SOL	6.1E+01	>SOL
Water Used for Recreation	Ingestion/ Dermal	Residential	Carcinogenic				2.8E+00	1.6E-06			
			Hazard	1.5E+00	1.5E+00	7.9E+00		4.4E-05	>SOL	1.5E+02	>SOL

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water

Table 5. Oakland Tier 1 RBSLs

Medium	Exposure Pathway	Land Use	Type of Risk	Toluene	Trichloroethane (1,1,1-)	Trichloroethane (1,1,2-)	Trichloroethylene (TCE)	Vanadium	Vinyl Chloride	Xylenes	Zinc
Surficial Soil [mg/kg]	Ingestion/ Dermal/ Inhalation	Residential	Carcinogenic			3.8E+00	1.9E+01		5.0E-01		
			Hazard	9.0E+03	1.8E+03	1.9E+02	2.9E+02	5.2E+02		5.4E+04	2.2E+04
		Commercial/ Industrial	Carcinogenic			1.2E+01	5.9E+01		1.6E+00		
			Hazard	5.6E+04	1.2E+04	1.2E+03	1.8E+03	9.5E+03		3.0E+05	4.1E+05
Subsurface Soil [mg/kg]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			5.4E-01	1.1E+00		1.3E-03		
			Hazard	3.6E+02	2.6E+02	3.1E+01	1.3E+01			SAT	
		Commercial/ Industrial	Carcinogenic			8.7E+00	1.7E+01		2.1E-02		
			Hazard	SAT	SAT	8.9E+02	3.6E+02			SAT	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			1.5E+00	3.0E+00		3.7E-03		
			Hazard	SAT	8.7E+02	1.0E+02	4.2E+01			SAT	
		Commercial/ Industrial	Carcinogenic			5.8E+00	1.1E+01		1.4E-02		
			Hazard	SAT	SAT	5.9E+02	2.4E+02			SAT	
	Ingestion of Groundwater Impacted by Leachate	Residential	Carcinogenic	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*		*6.5E-04*	*1.3E+01*	
			Hazard	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*	3.3E+02	*6.5E-04*	*1.3E+01*	8.8E+02
		Commercial/ Industrial	Carcinogenic	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*		*6.5E-04*	*1.3E+01*	
			Hazard	*8.8E-01*	*7.8E-01*	*8.8E-03*	*2.7E-02*	2.2E+03	*6.5E-04*	*1.3E+01*	5.8E+03
Groundwater [mg/l]	Inhalation of Indoor Air Vapors	Residential	Carcinogenic			9.9E-01	6.9E-01		3.7E-03		
			Hazard	2.1E+02	2.4E+02	5.6E+01	8.1E+00			>SOL	
		Commercial/ Industrial	Carcinogenic			1.6E+01	1.1E+01		5.9E-02		
			Hazard	>SOL	>SOL	1.6E+03	2.3E+02			>SOL	
	Inhalation of Outdoor Air Vapors	Residential	Carcinogenic			2.2E+01	4.1E+01		2.5E-01		
			Hazard	>SOL	>SOL	1.5E+03	5.7E+02			>SOL	
		Commercial/ Industrial	Carcinogenic			8.4E+01	1.5E+02		9.6E-01		
			Hazard	>SOL	>SOL	>SOL	>SOL			>SOL	
	Ingestion of Groundwater	Residential	Carcinogenic	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*		*5.0E-04*	*1.8E+00*	
			Hazard	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*	1.1E-01	*5.0E-04*	*1.8E+00*	4.7E+00
		Commercial/ Industrial	Carcinogenic	*1.5E-01*	*2.0E-01*	*5.0E-03*	*5.0E-03*		*5.0E-04*	*1.8E+00*	
			Hazard	*1.5E-01*	2.0E-01	*5.0E-03*	*5.0E-03*	7.2E-01	*5.0E-04*	*1.8E+00*	3.1E+01
Water Used for Recreation	Ingestion/ Dermal	Residential	Carcinogenic			1.8E-02	4.6E-03		2.6E-03		
			Hazard	1.1E+01	4.3E+00	7.8E-01	7.2E-02	2.8E+00		6.6E+01	1.2E+02

*Italicized concentrations based on California MCLs
SAT = RBSL exceeds saturated soil concentration of chemical
>SOL = RBSL exceeds solubility of chemical in water