HYDRO
ENVIRONMENTAL
TECHNOLOGIES, INC.

LOP 3878

WORK PLAN FOR ADDITIONAL SUBSURFACE INVESTIGATION

BP Oil Facility No. 11132
3201 35th Avenue
Oakland, California

Prepared for:

BP Oil Company
16400 Southcenter Parkway, Suite 301
Tukwila, WA 98188

Prepared by:

Hydro-Environmental Technologies, Inc.
2363 Mariner Square Drive, Suite 243
Alameda, CA 94501
HETI Job. No. 9-037

December 22, 1992

HYDRO ENVIRONMENTAL TECHNOLOGIES, INC.

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FIGURES:

HYDRO
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CERTIFICATION

This work plan was prepared under the supervision of a registered professional engineer. All statements, conclusions and recommendations are based solely upon field observations and analytical analyses performed by a state-certified laboratory related to work performed by Hydro-Environmental Technologies, Inc.

It is possible that variations in soil or groundwater conditions exist beyond the points explored in this investigation. Also, site conditions are subject to change at some time in the future due variations in rainfall, temperature, regional water usage, or other factors.

The service performed by Hydro-Environmental Technologies, Inc. has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the area of the site. No other warranty, expressed or implied, is made.

Hydro-Environmental Technologies, Inc. includes in this work plan chemical analytical data from a state-certified laboratory. These analyses are performed according to procedures suggested by the U.S. EPA and the State of California. Hydro-Environmental Technologies, Inc. is not responsible for laboratory errors in procedure or result reporting.

Please note that contamination of soil and groundwater must be reported to the appropriate agencies in a timely manner.

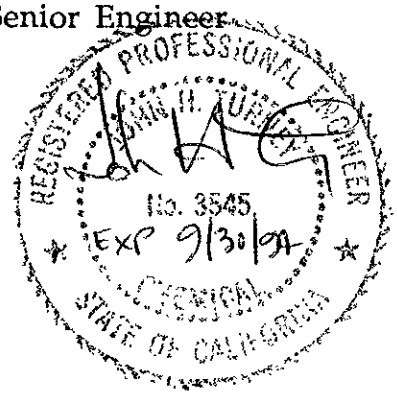
HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

Prepared by:

Brian M. Gwinn
Project Manager

Reviewed by:

John H. Turney, P.E.
Senior Engineer



1.0 INTRODUCTION

1.1 Background

The site is located at 3201 35th Avenue in Oakland, California (Figure 1) and is currently owned and operated by BP Oil Company (BP). In July 1986, Kaprealian Engineering, Inc. (KEI) was retained by Mobil Oil Corporation (Mobil), former owner, to install three monitoring wells, designated MW-1, MW-2, and MW-3, at the site. Dissolved petroleum hydrocarbons were detected in the water samples collected from these wells.

Three underground storage tanks were removed from site in June 1987. Soil samples collected from beneath the tanks contained elevated levels of hydrocarbons in concentrations up to 420 parts per million (ppm).

In May 1990, BP retained Alton Geoscience, Inc. (Alton) to conduct additional subsurface investigation to further evaluate hydrocarbons in the soil and ground water beneath the site. Between May and June 1990, Alton supervised the installation of four additional monitoring wells, designated MW-4, MW-5, MW-6 and MW-7 and one ground water recovery well, designated RW-1.

In August 1990, product lines and dispensers remaining from the underground storage tank removal in 1987, were removed. Soil samples collected from beneath lines and dispensers contained hydrocarbon concentrations up to 21 ppm.

In February 1991, Alton supervised the installation of three off-site monitoring wells, designated MW-8, MW-9, and MW-10, to further evaluate the presence of hydrocarbons in soil and ground water beneath the site.

In August 1992, BP retained HETI to install an interim remediation system at the site. System design was approved by the Alameda County Department of Environmental Health (ACDEH) prior to installation. Ground water and separate phase petroleum is extracted from RW-1 by an electric dual pump, and transferred to the remediation compound via underground conduits. The separate phase petroleum is stored in a double-steel-walled 300-gallon tank and the ground water is treated by two 2,000-lbs. activated carbon vessels in series. Treated ground water is discharged to East Bay Municipal Utility District (EBMUD) sewers by permit. The system has been in operation since November 25, 1992.

Ground water movement in the vicinity of the site has historically been calculated toward the south; however, it was twice calculated toward the east. The extent of the dissolved hydrocarbon plume is delineated to the north,

east, and south. However, the downgradient extent of the dissolved hydrocarbon plume to the west has not been delineated.

The extent of hydrocarbons in subsurface soil in the vicinity of the site has been delineated to the north and east.

Soil types encountered during previous drilling activities were very homogeneous, consisting predominantly of silts and clays to a depth of 40 feet below grade, the maximum depth explored at the site. Depth to ground water is approximately 30 feet below grade.

1.2 Surrounding Properties

A former Exxon, located on the northwest corner of 35th Avenue and School Street, and an active Quik Stop, located at the southwest corner of 35th Avenue and Suter Street, are generally downgradient from the site (refer to Figure 2). HETI personnel visited the offices of the Regional Water Quality Control Board - San Francisco Bay Region (RWQCB) to review files on these sites. The former Exxon station is on file, but no information has been generated regarding the Quik Stop.

Soil borings were drilled at the former Exxon site in March 1992. Soil samples collected from those borings contained gasoline hydrocarbon concentrations up to 2,100 ppm. In a letter dated May 1, 1992, the ACDEH requested a Work Plan from the current property owners to install three monitoring wells on-site to determine if hydrocarbons had impacted ground water beneath that site.

1.3 Proposed Scope of Work

In order to further evaluate the presence of hydrocarbons in subsurface soils and ground water in the vicinity of the site, HETI proposes to install one off-site, downgradient monitoring well located in 35th Avenue (refer to Figure 2). A well is not proposed downgradient from MW-5 because review of soil sample analytical data generated through BP's investigation indicates that adsorbed hydrocarbons in subsurface soils between the BP and Quik Stop site may be commingling.

Hydrocarbons are present in soils in the vicinity of the BP underground storage tank complex at a depth interval from 13 to 27 feet below grade. In the vicinity of well MW-8 adsorbed hydrocarbons are present only at a depth interval from 13 to 17 feet below grade. Adjacent to the Quik Stop site (in the vicinity of well MW-5), the depth interval where adsorbed hydrocarbons are present increases to an interval from 8 to 30 feet below grade. This data

supports the hypothesis that the adsorbed hydrocarbons from both sites are commingling. It is highly unlikely that the adsorbed hydrocarbons in the vicinity of MW-5 were produced solely from the BP station because boring logs generated to date do not indicate the presence of any highly conductive units, such as gravel or sand, within the silts and clays. Based on BP's well MW-5 being located within 20 feet of the Quik Stop site, and the evidence presented above, BP should not be required to perform further subsurface investigation in the vicinity of, or downgradient, from the Quik Stop site.

There is a possibility that hydrocarbons from both the BP and former Exxon sites are also commingling. Analysis of soil and ground water samples collected from the proposed monitoring well (PMW) will determine this. If soil and ground water analytical samples collected from the PMW contain hydrocarbon concentrations equal to or greater than those detected in MW-8, it will be evident that the adsorbed and dissolved hydrocarbons from these two sites are commingling. Therefore, BP will have effectively delineated their portion of the hydrocarbons in subsurface soils and ground water, and should not be required to perform any further investigation in the direction of the former Exxon.

All drilling, well construction, soil and water sampling will be performed in accordance with HETI's standard protocols which are consistent with ACDEH and RWQCB guidelines.

2.0 PROPOSED WORK PLAN

2.1 Soil Boring

HETI will supervise the installation of one soil boring off-site in the location shown on Figure 2. A drill rig equipped with hollow stem augers, 8-3/4-inches in diameter, will be utilized to drill the boring in order to collect undisturbed, native soil samples. A California modified split spoon sampler, lined with brass tubes and driven into subsurface soils via an automatic hammer, will be utilized to collect a soil samples at five foot depth intervals.

The soil samples collected at a depth of 10, 15, 20, and 25 feet below grade will be submitted to PACE Laboratories, a DHS-certified laboratory, located in Novato, California a laboratory, for analysis. Each soil sample will be covered with teflon tape and plastic end caps, and placed in a cooler for transport to the analytical laboratory. The soil samples will be analyzed for total low to medium boiling point hydrocarbons (TPHg), and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Methods 8015 (DHS-modified) and 8020. Soil sample analysis will be performed by .

A portion of each soil sample will also be retained for visual description and screened for the presence of organic vapors. The soil samples will be classified according to the Unified Soil Classification System and screened with an Organic Vapor Meter (OVM) model 580B.

The boring will be advanced ten feet into ground water and terminated at that depth. The anticipated maximum depth of the boring is 40 feet below grade.

Prior to commencement of drilling, HETI will obtain well installation permits from the Alameda County Flood Control and Water Conservation District - Zone Seven and an encroachment permit from the City of Oakland. HETI will conduct a Health and Safety briefing with drilling personnel in attendance, prior to the start of drilling. All field personnel on-site during drilling will be required to review and sign the Health and Safety Plan. Augers will be steam cleaned at the end of drilling and auger rinseate will be stored on-site in labeled 55-gallon drums. Soil generated from drilling activities will also be stockpiled on-site, under visqueen. Auger rinseate and soil generated during drilling activities will be transported for off site disposal by a licensed waste hauler following receipt of analytical results.

2.2 Well Installation, Development and Survey

A monitoring well will be installed in the borehole. Schedule 40, flush joint threaded, 2-inch diameter PVC well materials will be used to construct the well. Machine-slotted well screen will be extended from the bottom of the borehole to approximately 25 feet below grade and blank well casing will be coupled to the screen and extended to the surface. The well casing will be assembled using threaded joints, without solvents. The annular space around the screen will be filled with a clean, uniform sandpack to a depth of approximately 23 feet below grade. A one-foot thick hydrated bentonite seal will be placed above the sandpack, and the remaining annular space around the blank casing will be grouted to the surface.

The top of the well casing will be capped and locked with an expansion plug, and a traffic rated road box will be cemented in place over the wellhead. The dimensions of well construction described above are only approximations and may vary based on field observations made during drilling.

The well will be developed utilizing a combination of surging and bailing. Development will proceed until the ground water being removed is relatively free of turbidity. The purpose of well development is to remove fine sediments from the well and to increase the hydraulic connection between the sandpack and the water bearing zone.

HETI personnel will survey the elevation the wellhead to the nearest one-hundredth of a foot, relative to a temporary benchmark and existing wells at the site, corrected for mean sea level. The point surveyed at each wellhead will be the top of the well casing (north side). Survey data will be used, in combination with gauging data, to determine direction of ground water flow.

2.3 Ground Water Gauging, Sampling, and Analysis

After monitoring well installation and development, a ground water sample will be collected from the proposed well. Prior to sampling, the depth to water in each existing well at the site will be gauged to the nearest one hundredth of a foot using an electronic interface probe. The proposed well will be purged until pH, temperature, and conductivity of the purge water stabilizes. After the well has recovered to at least 70% of static level, a ground water sample will be collected using a disposable teflon bailer.

The water sample will be transferred to 40 ml glass VOA vials, preserved with a drop of HCl, and covered with a teflon septum screw caps. The water sample will be placed in a cooler for transport to the analytical laboratory. The water samples will be analyzed for TPHg and BTEX using EPA Methods 8015 (DHS-modified) and 8020. Water sample analysis will be performed by Pace Laboratories.

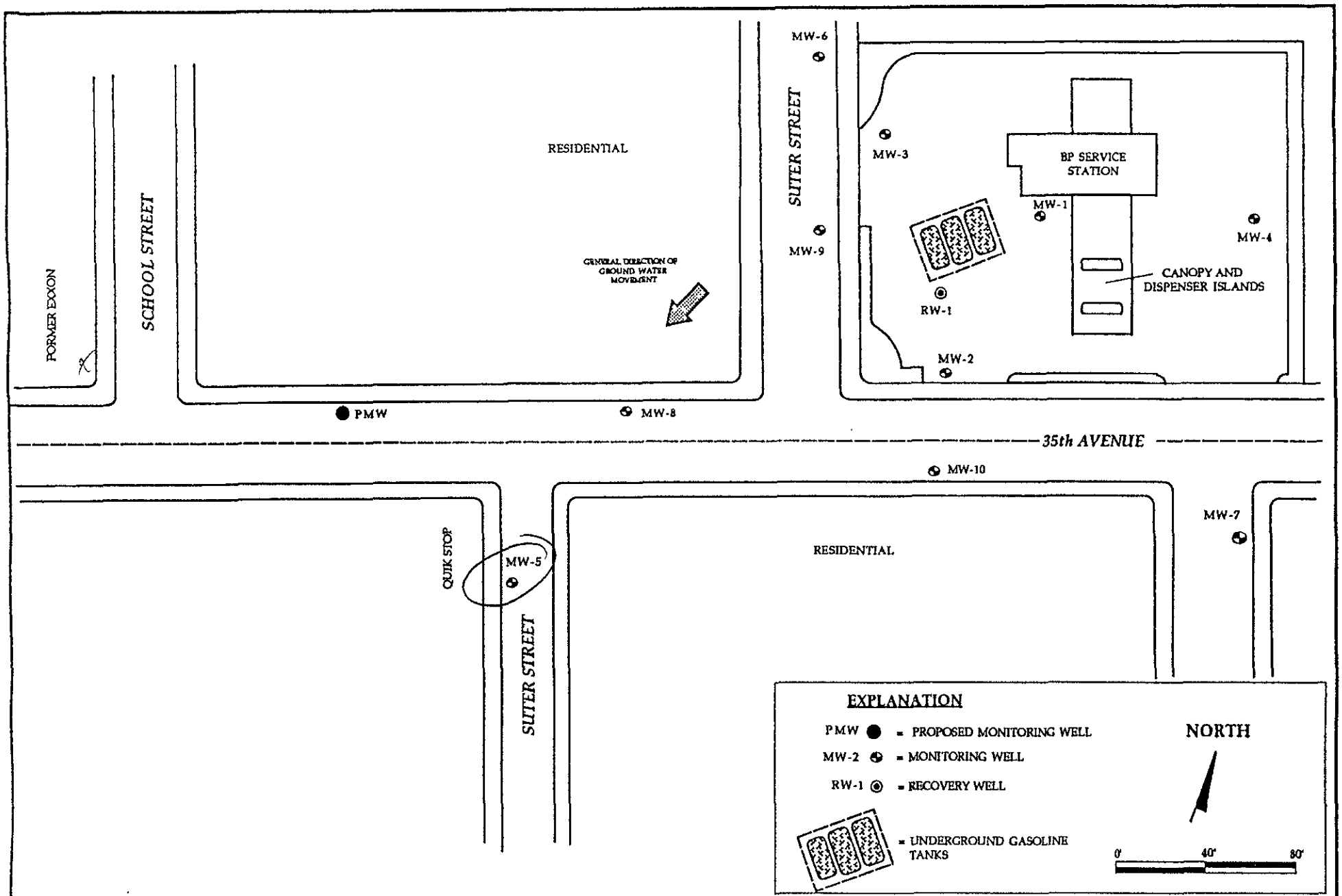
Water generated during well development and sampling will be stored on site in labeled 55-gallon drums until transported for off site disposal by a licensed waste hauler.

2.4 Reporting

The results of the subsurface investigation will be presented in a Remedial Investigation Report. The report will include detailed description of all field work and interpretation of cumulative soil and water sample analytical results as they relate to subsurface conditions at the site. Boring logs, well construction detail, and maps showing ground water elevation contours and dissolved hydrocarbon distribution will be also be included in the report.

2.5 Schedule

This field work will be completed within two weeks following the approval of this workplan by the ACDEH and/or receipt of an encroachment permit from the City of Oakland. A report documenting the results of this investigation will be prepared six to eight weeks following the completion of field activities.



HYDRO ENVIRONMENTAL TECHNOLOGIES, INC.

PROPOSED WELL LOCATION MAP

BP Sevice Station No. 11132
3201 35th Avenue
Oakland, California

Job No. 9-037
Figure 2

2.0 INTERIM REMEDIAL ACTION PLAN

2.1 Summary of Proposed Activity

In order to begin to recover the hydrocarbons floating on ground water and accelerate site remediation, the installation of an interim ground water/product recovery system is recommended. While the rapid deployment of this system is recommended, system components should be designed and installed such that they will be instrumental in the long term, comprehensive remedial approach. The interim system should be monitored for two to three months following installation and start-up. Data collected during this period would be combined with investigative information and a plan for complete remedial action prepared.

2.1 Ground Water/Hydrocarbon Extraction

The existing recovery well will be used as a point for ground water and floating hydrocarbon recovery. Results of the Alton aquifer test indicate that the recovery well can yield approximately 1 gallon per minute (gpm) with a corresponding 5.5 foot drop in water level in the well. Water extracted at 1 gpm during the aquifer test resulted in a measurable drawdown in all monitored wells, with the most significant cone of depression measured in the vicinity of the pumping well.

A Grundfos Model 5E5 electric submersible ground water extraction pump will be set two feet above the bottom of the recovery well. This pump is capable of producing between 0.8 and 7.0 gpm at 100 feet of total dynamic head. Valves on the influent line will be set such that the pump produces between 0.9 and 1.2 gpm without cycling. An electric product recovery pump will be set near the top of the stabilized cone of depression. While the pump motor will be set at approximately 10 feet below static water table elevation (pre-pumping), the inlet will float on the surface of the water such that it will always be in a position to recover hydrocarbons as they collect. A probe to measure the water level in the recovery well will be set just above the motor of the product pump. The probe will be connected to the system control panel, which will be programmed to shut the ground water extraction pump down in the event of a lowering of the water level to that of the sensor probe. This will prevent free-phase hydrocarbons from ever coming in contact with the ground water pump and carbon treatment system. Recovered free-phase hydrocarbons will be transferred through underground piping to a double walled fiberglass above ground storage tank (estimated 500 gallon capacity).

2.2 Ground Water Treatment

Given the needs for flexibility inherent in this interim plan, granular activated carbon will be selected as the means for removing dissolved hydrocarbons from recovered ground water. This carbon will be utilized for the first two to four months of ground water treatment. During this time period influent concentrations will be measured and a determination made relative to the most

sanitary sewer system (East Bay Municipal Utility District - EBMUD) for disposal. The discharge will have to meet or exceed the criteria established by EBMUD for acceptable levels of gasoline constituents. Compounds regulated by the EBMUD are as follows: TPH - no set limit, benzene - 5 ppb, toluene - 15 ppb, ethylbenzene - 5 ppb, and xylene - 14 ppb.

A sewer lateral currently exists beneath the BP site. The effluent line from the remediation system will be coupled to this lateral as shown on Figure 8 to eliminate the need to excavate beyond the borders of the facility to tie into a sewer line. In order to ensure that the long term remediation plan utilizes the most cost-effective means for discharge possible, both surface water discharge and on site reinfiltration will be considered during the two to four months the interim system is in operation.

2.5 Permitting

The interim system will need to satisfy the same permitting requirements as a longer term, comprehensive system. HETI has reviewed procedures with the appropriate local agencies, and has established time frames and monetary requirements of this particular remedial approach. Involved agencies (permitting or simple oversight) are listed below:

City of Oakland Building Department

City of Oakland Planning Department (possible involvement)

City of Oakland Fire Prevention

Alameda County Department of Environmental Health (ACDEH)

Regional Water Quality Control Board (RWQCB)

East Bay Municipal Utility Department (EBMUD)

HETI will submit this plan for action to the appropriate agencies following written receipt of approval from the ACDEH.

2.6 Monitoring and Maintenance, Reporting

The schedule of monitoring and maintenance will be determined following the completion system installation, testing and modification. Reports will be submitted

appropriate form of long term treatment. Extracted ground water will be temporarily stored in a Baker tank during the first two days of system operation to enable a measurement of influent hydrocarbon concentration and a determination of the optimal carbon unit sizing. Given the moderate concentration of hydrocarbons anticipated in extracted ground water and expected low total flow, it is anticipated that two 1,200 pound carbon cannisters, connected in series to prevent the release of hydrocarbons in a breakthrough event, would be sufficient. Figure 5 diagrams treatment system details.

2.3 Piping and Instrumentation

The extracted ground water will be transferred from the recovery well to the treatment compound within 2-inch diameter schedule 80 PVC piping. Sample ports will be installed in-line upstream and downstream of the carbon cannisters to enable the evaluation of the treatment process. Free-phase hydrocarbons will be transferred from the recovery well to the product storage tank within 2-inch diameter double walled fiberglass piping (for secondary containment). Electricity for pump power and probes will be run within galvanized steel piping, sealed per local fire department code. An empty 2-inch diameter schedule 80 PVC chase will also be installed in the trench running from the recovery well to the treatment compound to enable the addition of a soil vapor extraction system at a later date, if necessary. All piping will be placed 4 inches above the bottom of a 2-foot deep trench on a bed of pea gravel ballast. Figure 6 diagrams piping and trench construction detail. The remainder of the trench will be backfilled to 3 inches below grade and sealed with hot patch asphaltic concrete.

Recovered free-phase hydrocarbons will be stored in the double walled fiberglass above ground storage tank for disposal/recycling by a licensed waste hauler. Ground water extracted from the recovery well will be directed to the carbon cannisters for treatment (Figure 7). A pressure switch will be installed in-line upstream of the cannisters to detect significant increases in system pressure. If the pre-determined pressure level is detected (indicating a clogged treatment system or effluent trouble) the system will be automatically shut down. If shut down occurs in the system a green light mounted on a post of the treatment compound will be illuminated. Service station personnel will telephone HETI to inform them in the event of a "green light condition".

2.4 Effluent Disposal

Numerous alternatives exist for the disposal of ground water treated during typical remediation processes. These alternatives include the utilization of the sanitary sewer/POTW, discharge to a surface water body via a storm sewer, and reinfiltration on site. Given the need to implement remedial actions in an expedited manner, discharge to surface water or on site reinfiltration (both requiring a potentially lengthy permitting process) is not feasible. It is therefore recommended that discharge from this interim remedial system be routed to the City of Oakland

at the completion of milestone events in the process. It is estimated that letter reports of progress will be forwarded to the ACDEH and the Regional Board as scheduled below:

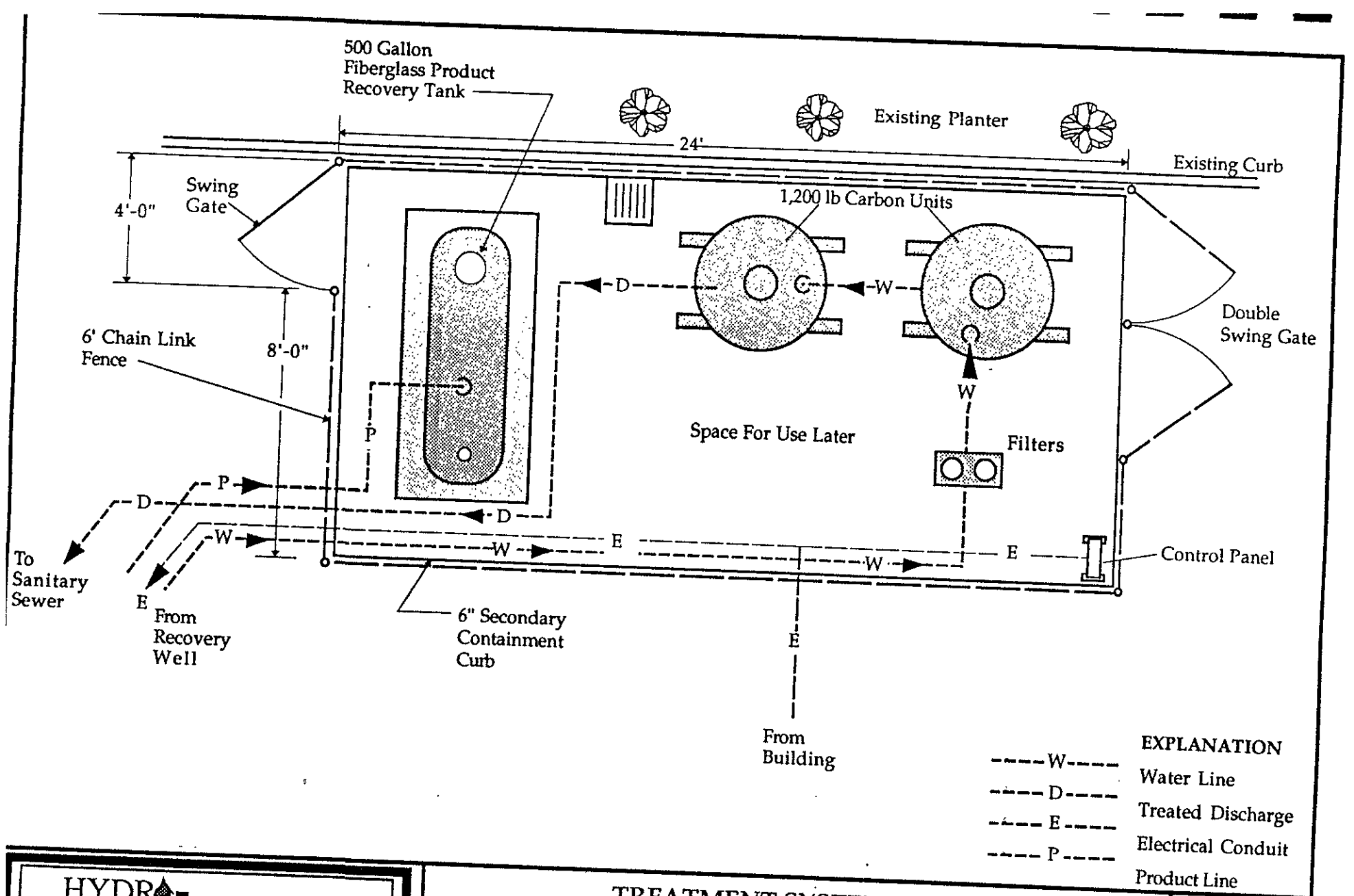
Following the completion of groundwater extraction testing. Influent concentrations will be reported and a final design document submitted (if system modifications are deemed necessary). The appropriate monitoring schedule will be included in this report.

Quarterly monitoring/sampling of investigative wells will continue as normal. Specific progress-related details will likely also be included in these documents.

3.0 SUMMARY AND CONCLUSIONS

In order to facilitate the removal of free and dissolved phase hydrocarbons from the ground water at this BP site, interim remedial action will be implemented. While this system will not be designed to address the off-site portion of the hydrocarbon plume, it will provide data necessary to plan the most cost effective long term remedial solution. This comprehensive remedial plan will likely include the already installed components of the interim system, and will be presented approximately 4 months following interim remedial action system start up.

The hydrocarbon concentrations detected in samples collected from the investigative wells on and off site show a clear attenuation of hydrocarbon concentration with distance from the BP site. Given that the residential areas in the vicinity of the study area are very closely developed, and that the downgradient extent of the hydrocarbon plume can be roughly estimated utilizing current data, an additional downgradient monitoring well may not be necessary. The dimensions of the hydrocarbon plume should be monitored during the operation of the interim remedial system and a determination relative to additional sampling points made towards the end of this time period.

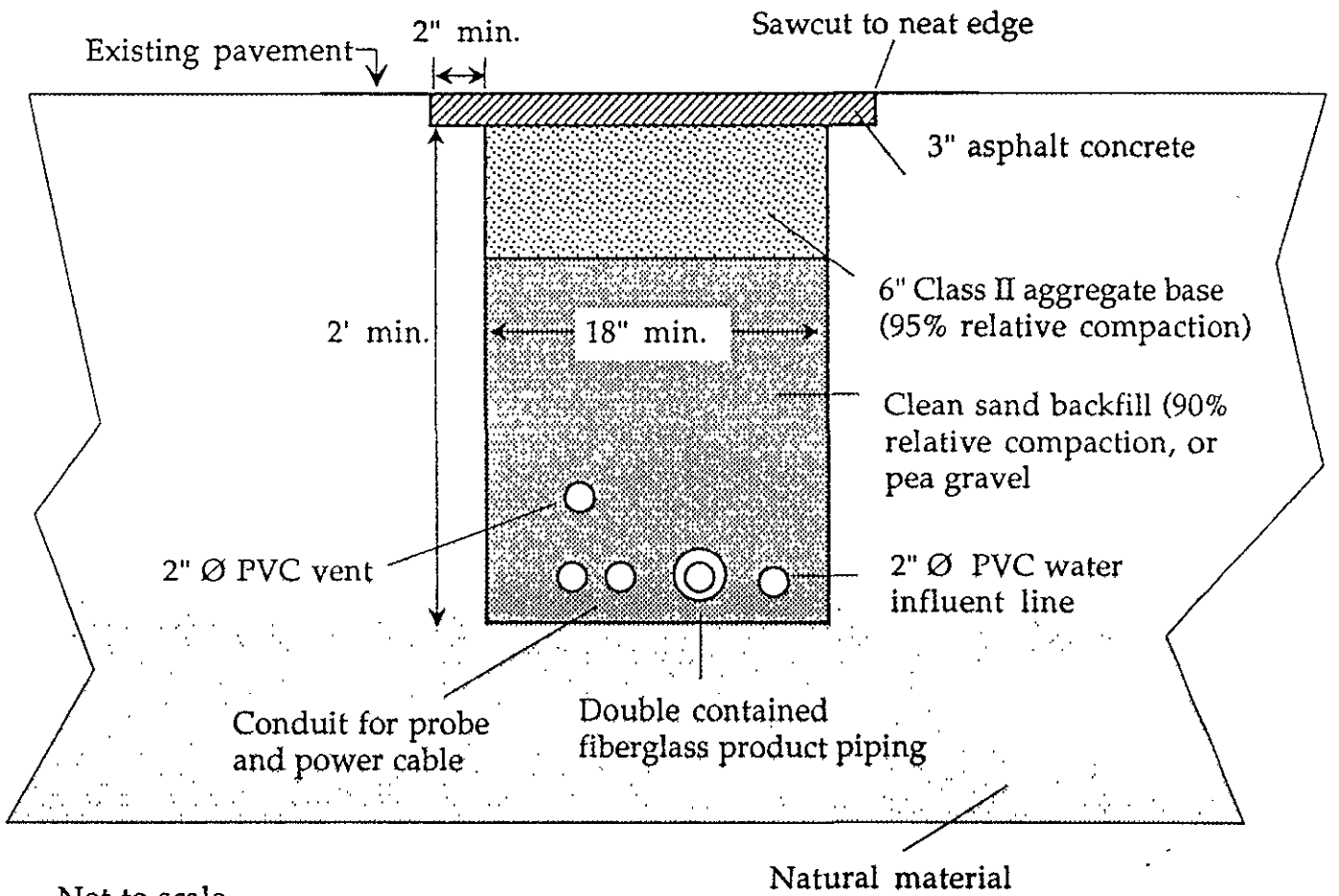


HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

TREATMENT SYSTEM LAYOUT

BP SERVICE STATION NO. 11132
3201 35th. Avenue
Oakland, California

Figure 5
9-037



HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

TRENCH DETAIL

BP SERVICE STATION NO. 11132
3201 35th. Avenue
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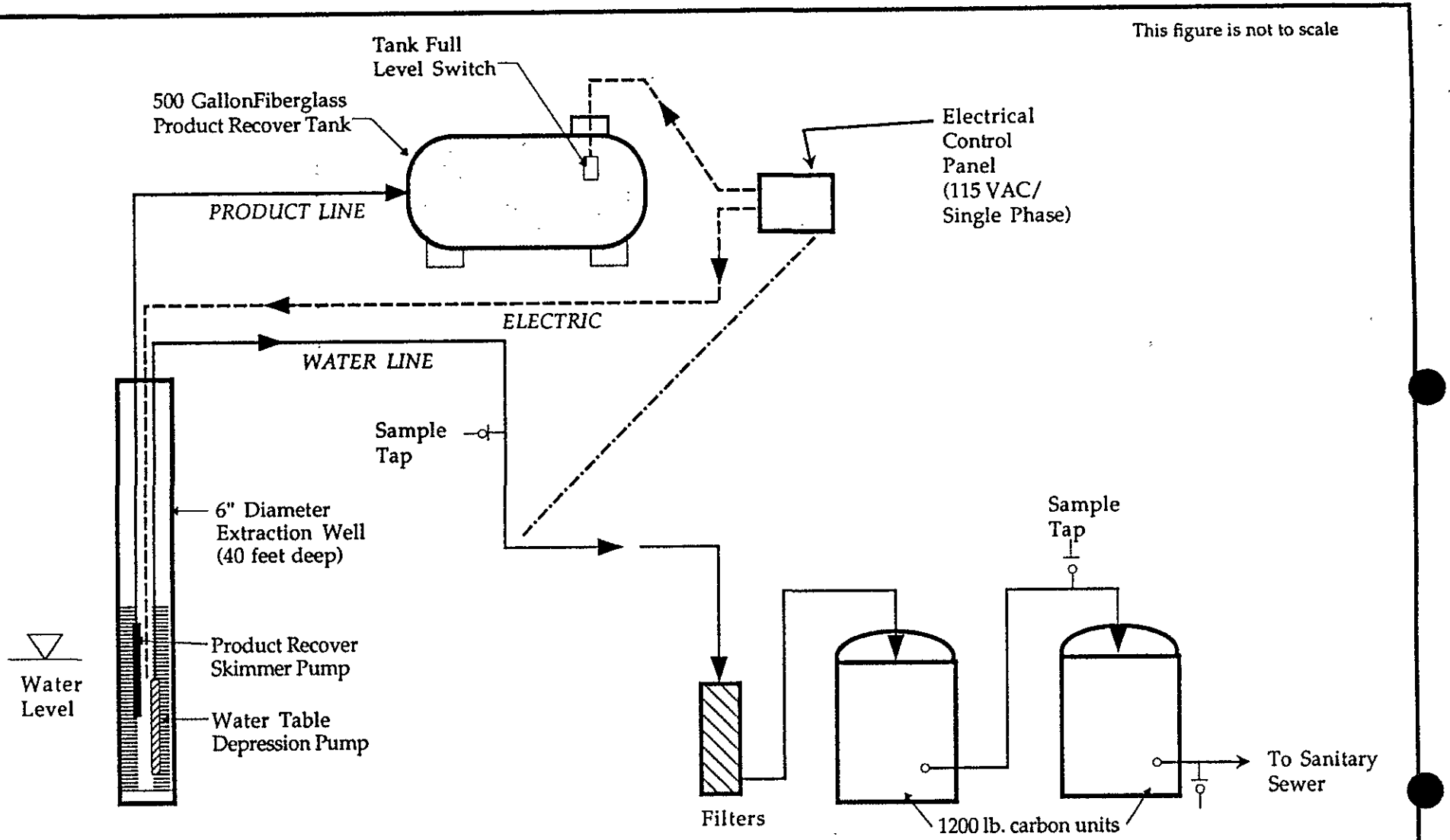
Figure 6
9-037



HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

REMEDIAL SYSTEM SCHEMATIC DIAGRAM
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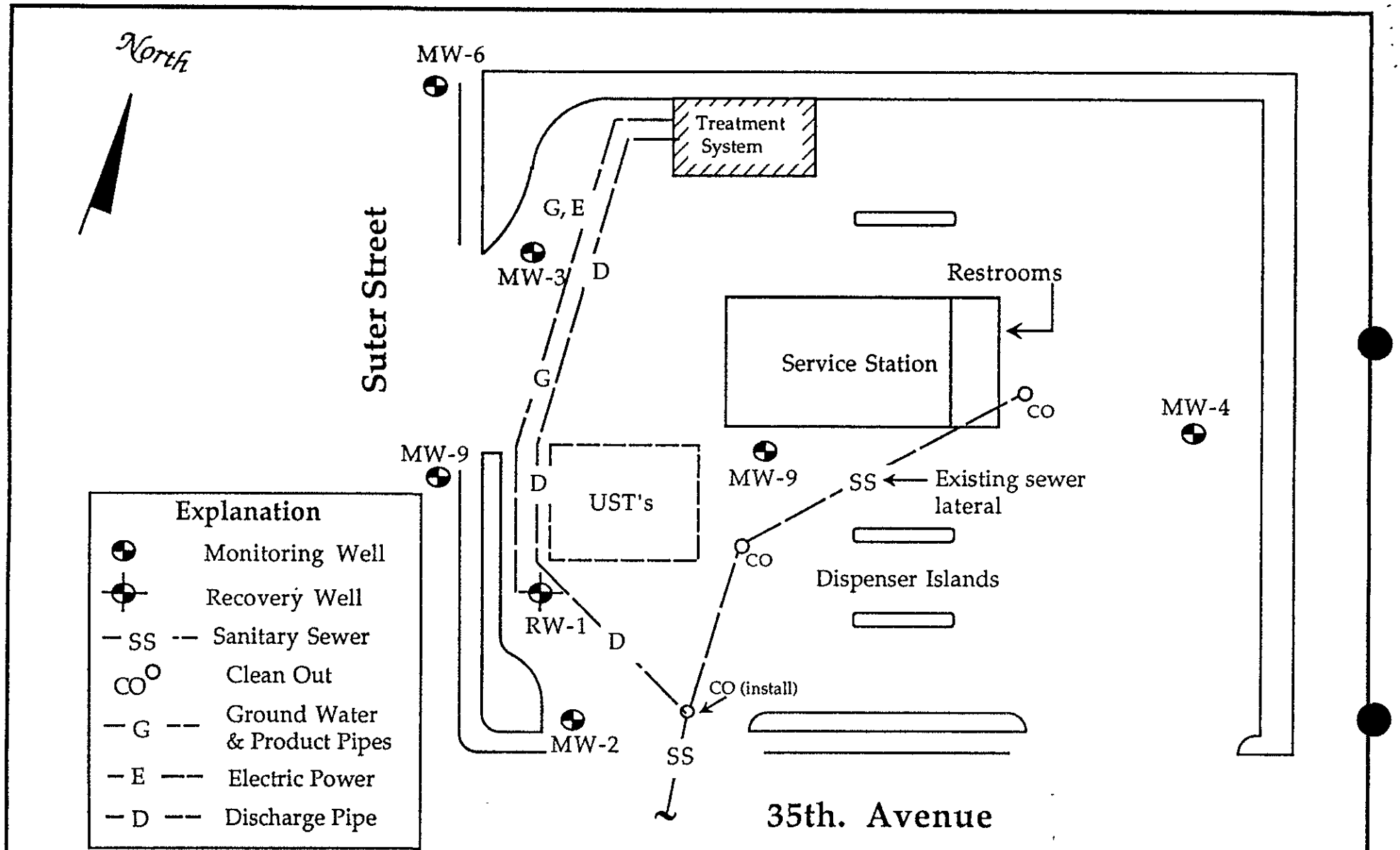
Figure 7
9-037



HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

PIPING AND SITE LAYOUT
BP SERVICE STATION NO. 11132
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Figure 8
9-037

HYDRO ENVIRONMENTAL TECHNOLOGIES, INC.

2363 Mariner Square Drive, Suite 243
Alameda, CA 94501
Tel 510-521-2684
Fax 510-521-5078

1-800-347-HETI
Massachusetts
New York

STID 3878

December 31, 1992 **9-037**

Ms. Susan Hugo
Alameda County Department of Environmental Health
80 Swan Way, Room 200
Oakland, CA 94621

Re: BP Station No. 11132, 3201 35th Avenue, Oakland, CA

Dear Ms. Hugo,

On behalf of BP Oil Company, Hydro-Environmental Technologies, Inc. is pleased to submit this work plan for additional subsurface investigation at the above-referenced site. HETI will begin scheduling field activities following your approval.

If you have any questions or require additional information, please feel free to call.

Sincerely,
HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

Brian Gwinn
Project Manager

Enclosure

cc: Mr. Scott Hooton, BP Oil Company, 16400 Southcenter Pkwy, Ste 301
Tukwila, WA 98188

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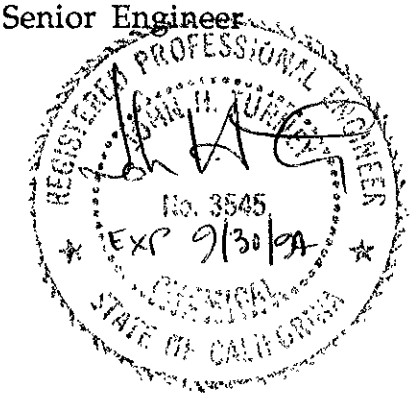

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In order to further evaluate the presence of hydrocarbons in subsurface soils and ground water in the vicinity of the site, HETI proposes to install one off-site, downgradient monitoring well located in 35th Avenue (refer to Figure 2). A well is not proposed downgradient from MW-5 because review of soil sample analytical data generated through BP's investigation indicates that adsorbed hydrocarbons in subsurface soils between the BP and Quik Stop site may be commingling.

Hydrocarbons are present in soils in the vicinity of the BP underground storage tank complex at a depth interval from 13 to 27 feet below grade. In the vicinity of well MW-8 adsorbed hydrocarbons are present only at a depth interval from 13 to 17 feet below grade. Adjacent to the Quik Stop site (in the vicinity of well MW-5), the depth interval where adsorbed hydrocarbons are present increases to an interval from 8 to 30 feet below grade. This data

supports the hypothesis that the adsorbed hydrocarbons from both sites are commingling. It is highly unlikely that the adsorbed hydrocarbons in the vicinity of MW-5 were produced solely from the BP station because boring logs generated to date do not indicate the presence of any highly conductive units, such as gravel or sand, within the silts and clays. Based on BP's well MW-5 being located within 20 feet of the Quik Stop site, and the evidence presented above, BP should not be required to perform further subsurface investigation in the vicinity of, or downgradient, from the Quik Stop site.

There is a possibility that hydrocarbons from both the BP and former Exxon sites are also commingling. Analysis of soil and ground water samples collected from the proposed monitoring well (PMW) will determine this. If soil and ground water analytical samples collected from the PMW contain hydrocarbon concentrations equal to or greater than those detected in MW-8, it will be evident that the adsorbed and dissolved hydrocarbons from these two sites are commingling. Therefore, BP will have effectively delineated their portion of the hydrocarbons in subsurface soils and ground water, and should not be required to perform any further investigation in the direction of the former Exxon.

All drilling, well construction, soil and water sampling will be performed in accordance with HETI's standard protocols which are consistent with ACDEH and RWQCB guidelines.

2.0 PROPOSED WORK PLAN

2.1 Soil Boring

HETI will supervise the installation of one soil boring off-site in the location shown on Figure 2. A drill rig equipped with hollow stem augers, 8-3/4-inches in diameter, will be utilized to drill the boring in order to collect undisturbed, native soil samples. A California modified split spoon sampler, lined with brass tubes and driven into subsurface soils via an automatic hammer, will be utilized to collect a soil samples at five foot depth intervals.

The soil samples collected at a depth of 10, 15, 20, and 25 feet below grade will be submitted to PACE Laboratories, a DHS-certified laboratory, located in Novato, California a laboratory, for analysis. Each soil sample will be covered with teflon tape and plastic end caps, and placed in a cooler for transport to the analytical laboratory. The soil samples will be analyzed for total low to medium boiling point hydrocarbons (TPHg), and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Methods 8015 (DHS-modified) and 8020. Soil sample analysis will be performed by .

A portion of each soil sample will also be retained for visual description and screened for the presence of organic vapors. The soil samples will be classified according to the Unified Soil Classification System and screened with an Organic Vapor Meter (OVM) model 580B.

The boring will be advanced ten feet into ground water and terminated at that depth. The anticipated maximum depth of the boring is 40 feet below grade.

Prior to commencement of drilling, HETI will obtain well installation permits from the Alameda County Flood Control and Water Conservation District - Zone Seven and an encroachment permit from the City of Oakland. HETI will conduct a Health and Safety briefing with drilling personnel in attendance, prior to the start of drilling. All field personnel on-site during drilling will be required to review and sign the Health and Safety Plan. Augers will be steam cleaned at the end of drilling and auger rinseate will be stored on-site in labeled 55-gallon drums. Soil generated from drilling activities will also be stockpiled on-site, under visqueen. Auger rinseate and soil generated during drilling activities will be transported for off site disposal by a licensed waste hauler following receipt of analytical results.

2.2 Well Installation, Development and Survey

A monitoring well will be installed in the borehole. Schedule 40, flush joint threaded, 2-inch diameter PVC well materials will be used to construct the well. Machine-slotted well screen will be extended from the bottom of the borehole to approximately 25 feet below grade and blank well casing will be coupled to the screen and extended to the surface. The well casing will be assembled using threaded joints, without solvents. The annular space around the screen will be filled with a clean, uniform sandpack to a depth of approximately 23 feet below grade. A one-foot thick hydrated bentonite seal will be placed above the sandpack, and the remaining annular space around the blank casing will be grouted to the surface.

The top of the well casing will be capped and locked with an expansion plug, and a traffic rated road box will be cemented in place over the wellhead. The dimensions of well construction described above are only approximations and may vary based on field observations made during drilling.

The well will be developed utilizing a combination of surging and bailing. Development will proceed until the ground water being removed is relatively free of turbidity. The purpose of well development is to remove fine sediments from the well and to increase the hydraulic connection between the sandpack and the water bearing zone.

HETI personnel will survey the elevation the wellhead to the nearest one-hundredth of a foot, relative to a temporary benchmark and existing wells at the site, corrected for mean sea level. The point surveyed at each wellhead will be the top of the well casing (north side). Survey data will be used, in combination with gauging data, to determine direction of ground water flow.

2.3 Ground Water Gauging, Sampling, and Analysis

After monitoring well installation and development, a ground water sample will be collected from the proposed well. Prior to sampling, the depth to water in each existing well at the site will be gauged to the nearest one hundredth of a foot using an electronic interface probe. The proposed well will be purged until pH, temperature, and conductivity of the purge water stabilizes. After the well has recovered to at least 70% of static level, a ground water sample will be collected using a disposable teflon bailer.

The water sample will be transferred to 40 ml glass VOA vials, preserved with a drop of HCl, and covered with a teflon septum screw caps. The water sample will be placed in a cooler for transport to the analytical laboratory. The water samples will be analyzed for TPHg and BTEX using EPA Methods 8015 (DHS-modified) and 8020. Water sample analysis will be performed by Pace Laboratories.

Water generated during well development and sampling will be stored on site in labeled 55-gallon drums until transported for off site disposal by a licensed waste hauler.

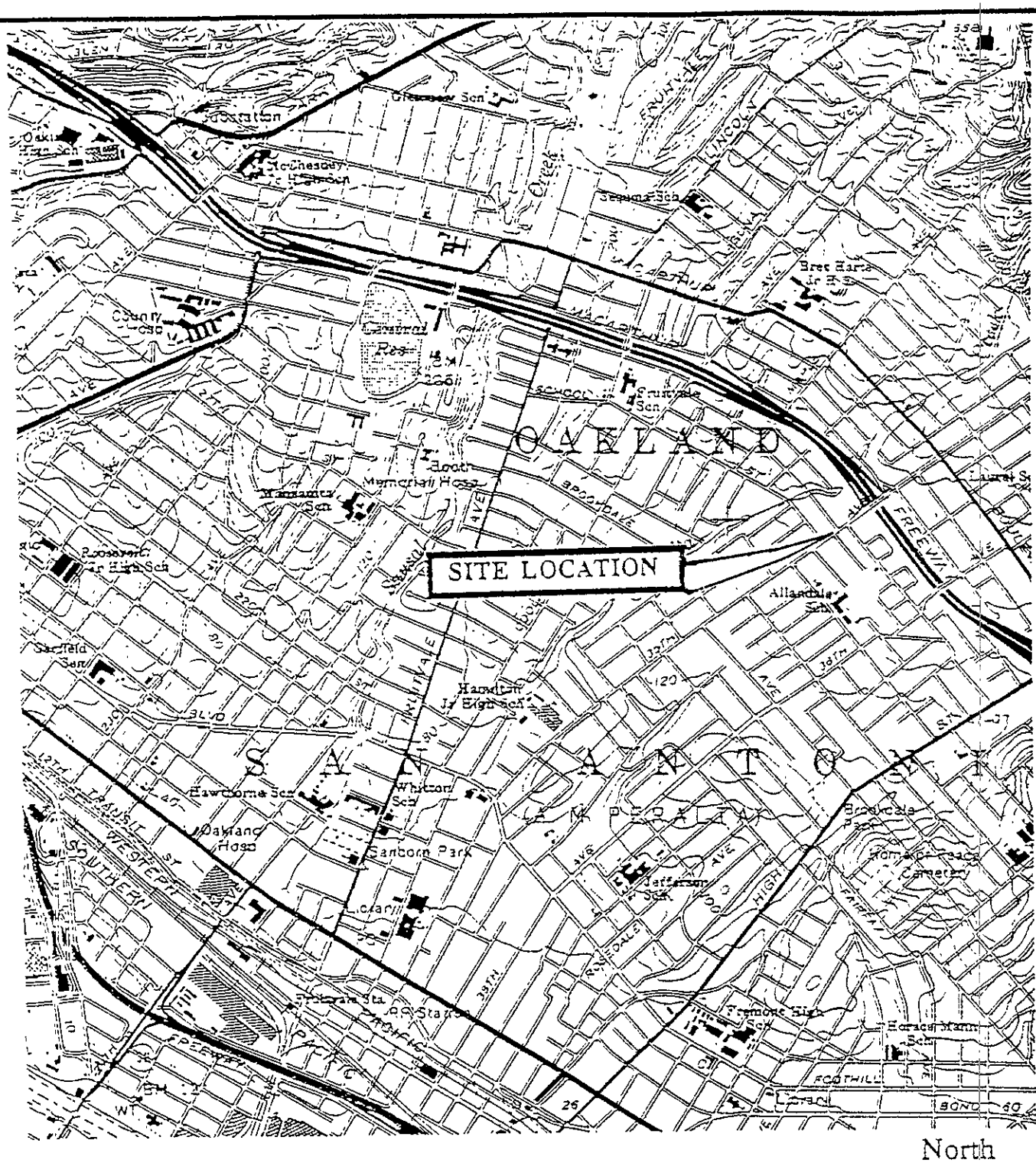
2.4 Reporting

The results of the subsurface investigation will be presented in a Remedial Investigation Report. The report will include detailed description of all field work and interpretation of cumulative soil and water sample analytical results as they relate to subsurface conditions at the site. Boring logs, well construction detail, and maps showing ground water elevation contours and dissolved hydrocarbon distribution will be also be included in the report.

2.5 Schedule

This field work will be completed within two weeks following the approval of this workplan by the ACDEH and/or receipt of an encroachment permit from the City of Oakland. A report documenting the results of this investigation will be prepared six to eight weeks following the completion of field activities.

FIGURES



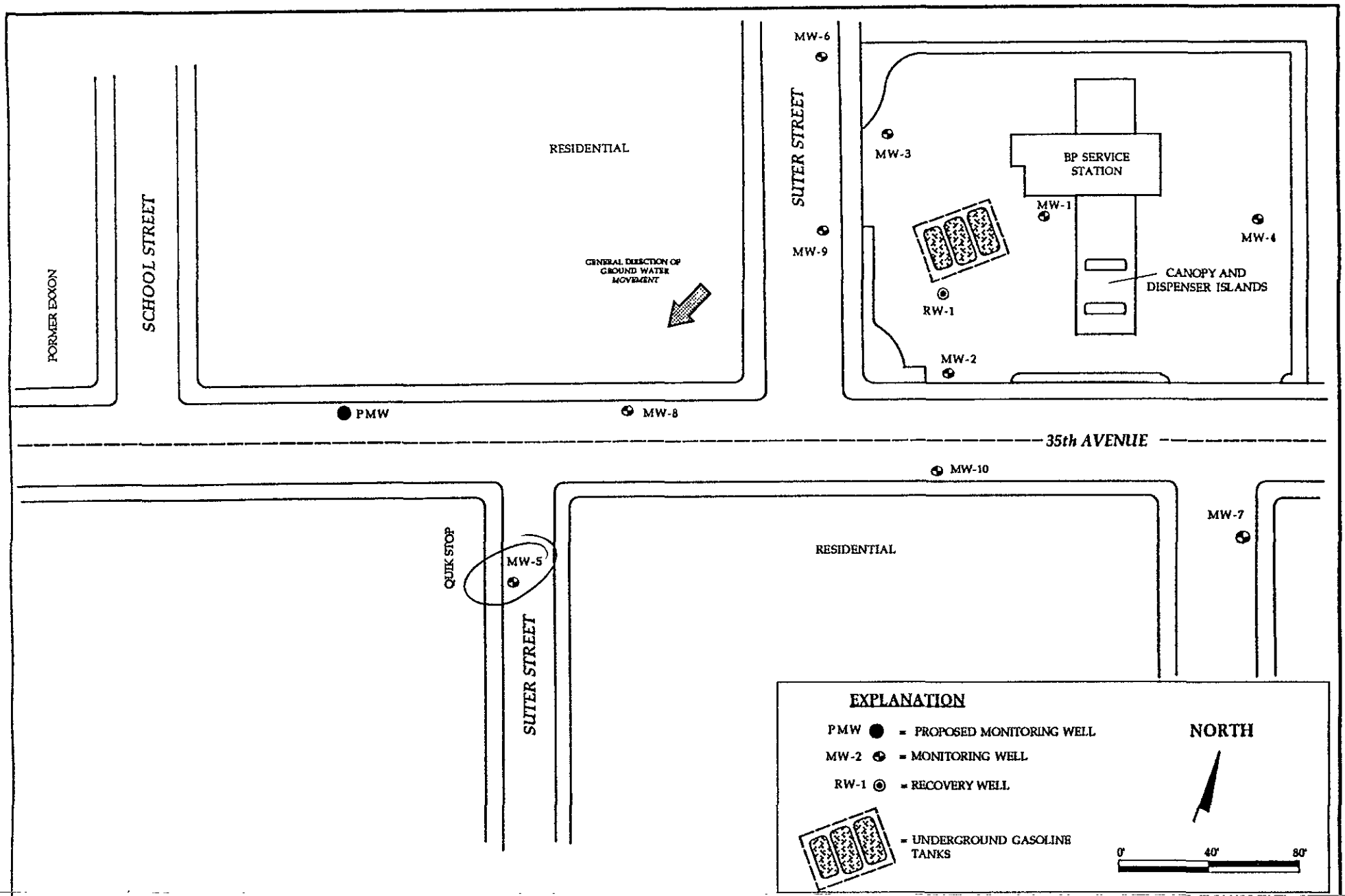
Source: U.S.Geological Survey
7.5 Minute Topographic Maps
Entitled: "Oakland, East",
California. Photorevised 1980

Scale 1:24000

HYDRO-ENVIRONMENTAL TECHNOLOGIES, INC.

SITE LOCATION MAP
BP SERVICE STATION NO. 11132
3201 35th. Avenue
Oakland, California

Figure 1
9-037



HYDRO ENVIRONMENTAL TECHNOLOGIES, INC.

PROPOSED WELL LOCATION MAP

BP Sevice Station No. 11132
3201 35th Avenue
Oakland, California

Job No. 9-037
Figure 2