PHASE III
Environmental Site Assessment

2737 and 2750
West Commodore Way Properties
Seattle, Washington

prepared for
TIME OIL COMPANY

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prepared by:
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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
AST	above-ground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
cPAH	carcinogenic polyaromatic hydrocarbon
DPE	dual-phase extraction
EC	equivalent carbon
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
Foster Wheeler Environmental	Foster Wheeler Environmental Corporation
HDPE	high-density polyethylene
ID	inner diameter
IT	IT Corporation
LUST	leaking underground storage tank
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MNA	monitored natural attenuation
mS/cm	millisiemens per centimeter
MTCA	Model Toxics Control Act
NAD	North America Datum
NAVD	National America Vertical Datum
NOAA	National Oceanic Atmospheric Administration
NTU	nephelometric turbidity unit
NWTPH-D_x	Northwest total petroleum hydrocarbon-diesel extended
NWTPH-G_x	Northwest total petroleum hydrocarbon-gasoline
OSWER	Office of Solid Waste and Emergency Response
PAH	polyaromatic hydrocarbons
PCP	pentachlorophenol
PID	photoionization detector
ppb	parts per billion

ACRONYMS AND ABBREVIATIONS

ppm	parts per million
Property	2737 West Commodore Way
PVC	polyvinyl chloride
RBCA	Risk Based Corrective Action
SQuiRT	Screening Quick Reference Table
TOC	Time Oil Company
TPH	total petroleum hydrocarbon
UST	underground storage tank

1. INTRODUCTION

In August 2000, Foster Wheeler Environmental Corporation (Foster Wheeler Environmental) completed Phase I Environmental Site Assessments (ESAs) at seven properties owned by the Time Oil Company (TOC) that are located along West Commodore Way in Seattle, Washington. The results of the Phase I ESA activity were documented in Phase I ESA reports prepared for each of the seven properties (Foster Wheeler Environmental 2000).

The Phase I ESA report prepared for the property located at 2737 West Commodore Way (Property) concluded that additional investigation was required to better understand subsurface conditions. Phase II ESA activities were subsequently conducted at the Property in November and December 2000, and results are documented in Phase II's Final ESA (Foster Wheeler Environmental 2001a). The Phase II report recommended additional subsurface sampling at 2737 West Commodore Way and quarterly groundwater sampling at 2737 and 2750 West Commodore Way; consequently, investigation activities and quarterly sampling were conducted in July 2001.

Figure 1-1 depicts the general location of the project area. Figure 1-2 illustrates the locations of 2737 and 2750 West Commodore Way.

1.1 PURPOSE AND ORGANIZATION

The purpose of Phase III field activities was to evaluate subsurface conditions at 2737 West Commodore Way in specific areas identified during the Phase II ESA. This report includes the results from the subsurface investigation and from quarterly groundwater sampling at 2737 and 2750 West Commodore Way.

This report is organized into six sections and three appendices:

- Section 1 – Introduction
- Section 2 – Property History and Previous Investigations
- Section 3 – Field Activities
- Section 4 – Analytical Results
- Section 5 – Conclusions and Recommendations

- Section 6 – References
- Appendix A – Soil Boring Logs
- Appendix B – Surveyor's Report
- Appendix C – Laboratory Data Packages

1.2 PROJECT OBJECTIVES

The results of the Phase II ESA conducted at 2737 West Commodore Way suggested that additional investigation activities be conducted at five areas to further evaluate subsurface conditions and to conduct quarterly groundwater sampling at both properties (i.e., 2737 and 2750 West Commodore Way). A layout of the property at 2737 West Commodore Way and the areas investigated is provided in Figure 1-3. The areas and the justification for additional investigation are as follows:

1. Upper Rail Line Spur Area – Historical photographs show stained soil along the former rail line spur on the south side of the Upper Tank Yard Area. Previous investigations did not show extensive petroleum-impacted soil. Petroleum-impacted groundwater was detected beneath the tank yards north of the Upper Rail Line Spur Area. A monitoring well was planned in the area to evaluate up-gradient (background) groundwater conditions.
2. Former PCP/Diesel Mixing Area – The Former PCP/Diesel Mixing Area is a sub-area of the Lower Tank Yard Area. An above-ground storage tank (AST) was used in the Lower Tank Yard Area to mix pentachlorophenol (PCP) and diesel during a short period of time in the late 1960s. Soil borings, near subsurface sampling, and a monitoring well were planned to evaluate the potential for petroleum-impacted and PCP-impacted soil and groundwater.
3. Former Barrel Shed Area – The Former Barrel Shed Area was between the warehouse and the office building. The pipeline from the PCP/diesel mixing tank also ran underground in this area. During the Phase II activities (December 2000), several borings and a monitoring well were installed in this area. Soil samples were not analyzed for PCP but the groundwater sample from the monitoring well (01MW-06) did contain low levels of PCP. A soil boring was planned near 01MW-06 to evaluate the potential for petroleum-impacted and PCP-impacted soil from the former structure.
4. New Barrel Shed Area – The New Barrel Shed Area is west of the warehouse. The area was used for a short time during the late 1960s to fill 55-gallon barrels with the

PCP/diesel mixture through an overhead distribution system. The pipeline ran from the Former PCP/Diesel Mixing Area, beneath the Former Barrel Shed Area, and into the New Barrel Shed Area. A soil boring was drilled on the north end of the New Barrel Shed Area near the pipeline, and a well was installed. Samples were analyzed for petroleum products, lead, and PCP.

5. West Commodore Way Perimeter Area – Historical releases from a leaking underground storage tank (LUST) used to store petroleum products have affected the subsurface soil and groundwater in this area. A soil boring and monitoring well were planned to evaluate the extent of petroleum-impacted soil and groundwater in the area.

2. PROPERTY HISTORY AND PREVIOUS INVESTIGATIONS

The following sections describe the history of the Property and summarize previously conducted investigations.

2.1 PROPERTY DESCRIPTION

The Property runs from West Commodore Way south to the Burlington Northern rail line. Except for the area of the former rail lines behind the warehouse, and the Upper and Lower Tank Yard Areas on the east side of the Property, the Property has been paved. A two-story office building is located in the center of the Property toward West Commodore Way. A three-section warehouse is located behind the office building, and a former boiler room is connected to the east side of the warehouse via a covered loading dock. An open-air barrel shed is located to the northwest of the warehouse. The Tank Yard is divided into two sections, the Lower Tank Yard Area and the Upper Tank Yard Area, each constructed at a different time. The Lower Tank Yard Area contains six ASTs. The Upper Tank Yard Area contains eight ASTs that are larger in volume than those in the Lower Tank Yard Area. The south side of the Upper Tank Yard Area, banks steeply upward to the fence line and former rail line spur. The surface of the Tank Yards is unpaved gravel with patches of grass. Immediately to the west of the Tank Yards are a pump shed and foamite shed (used for fire suppression).

According to available regulatory records and interviews with TOC personnel, there are several underground storage tanks (USTs) on the Property. Two USTs are located on the north side of the office building: an unused heating oil tank is located on the east side of the office building adjacent to the former furnace room, and a gasoline vapor knock-out tank is located along the north side of the Lower Tank Yard Area. The knock-out tank is associated with the overhead fuel loading racks located just north of the Lower Tank Yard Area of the tank farm. There are no known drinking water wells on the Property, but several monitoring wells from previous site investigations are installed within the shallow water-bearing zone beneath the Property.

2.2 PROPERTY OPERATION

The Property is used by TOC for a variety of purposes: it is the site of the TOC administrative offices; it previously served as a tank farm for petroleum products; and

portions are used to store equipment and supplies for service stations, such as fuel dispensers, fascia, signs, and miscellaneous supplies (most of these materials are kept near the New Barrel Shed Area or in part of the warehouse). The ASTs range in size from approximately 5,225 barrels to 23,000 barrels. Fuel distribution lines connect the ASTs to an extensive manifold system that is connected to the truck loading rack and a waterfront dock located in the ship canal across West Commodore Way. When the tank farm was operating, fuel was off-loaded from barges and tankers in the ship canal and transferred to the ASTs. From there, the fuel was transferred to tanker trucks via the overhead loading rack outside of, and just north of, the Lower Tank Yard Area.

Operation of the TOC Seattle Terminal as a petroleum storage and transfer facility was discontinued in October 2001. The ASTs and pipelines have been purged of petroleum products, appropriately cleaned, and are currently empty. Although the terminal improvements remain in place, there are currently no plans to use the facility for petroleum storage and/or transfer again; thus, the potential for additional hydrocarbon releases is believed to be very low.

2.3 PROPERTY HISTORY

Information about the history of the Property was derived from a review of available documents, historical photographs, and regulatory records. Former and current employees of TOC were also interviewed.

The Property was acquired by TOC around 1941. Before 1936, the Property appears to have been used for agricultural purposes. Historical aerial photographs and fire insurance maps presented in the Phase I reports (Foster Wheeler Environmental 2000) show the Rattan Furniture factory, a sawmill, dry kiln, and a U.S. Coast Guard facility located across West Commodore Way.

A 1946 photograph shows the original office building, the Lower and Upper Tank Yard Areas of the tank farm, the pump shed and foamite building, a former barrel shed located immediately west of the office building, and overhead fuel loading racks. The unpaved surface of the Lower Tank Yard Area is noticeably dark, and it is unclear whether this darkness is an artifact of the photograph or is indicative of site operations. Numerous rows of empty 55-gallon drums are located to the west of the Property, which, according to interviews with TOC employees, were filled with petroleum products in the Former Barrel Shed Area, rolled under West Commodore Way via a barrel incline and tunnel to the TOC

dock in the ship canal, and loaded onto ships. This operation was conducted primarily to support World War II efforts. According to the interviewees, laborers were hired to fill the barrels and load them onto ships. The filling apparatus was controlled by pulling a line to dispense fuel into a drum. One pull of the line would automatically dispense 50 gallons of fuel into the 55-gallon drums via an overhead nozzle at a very high rate and if the line was pulled twice, then twice as much fuel would be dispensed (and so on). The interviewees stated they had heard of many times when drums were overfilled and fuel spilled on the ground.

In 1946, a large volume of fuel arrived at the Property via rail cars. There were four rail spurs off the main Burlington Northern line leading onto the TOC property: one spur ran behind the Former Barrel Shed Area and the other lines led toward the southwest end of the tank farm's Upper Tank Yard Area. One of these lines ran all the way behind the Upper Tank Yard Area toward 27th Avenue West. Fuel was transferred from tanker cars via hoses to a subsurface line, from which it was pumped into the ASTs. Careful examination of the historical photograph from 1946 shows what appear to be equally spaced dark patches of soil on the rail spur on the south side of the tank farm's Upper Tank Yard Area. According to the interviewees, the tank cars were off-loaded with hoses; therefore, these dark patches may be related to petroleum leaks and spills that occurred during off-loading operations. After the lines were disconnected, it was not uncommon for residual fuel to drain from the lines and onto the ground.

The historical photograph from 1960 depicts the Property largely as it is today. A warehouse building, built in the late 1940s according to information in the Puget Sound Regional Archives, is located south of the office building parallel to the rail spurs (several of the rail spurs were deactivated by the time of this photograph). A new barrel shed, built in 1952 according to the Puget Sound Regional Archive files, is located just northwest of the warehouse; the boiler house was added in 1950 (Puget Sound Regional Archive files). The barrel shed seen in the 1946 photograph is no longer on the Property in the 1960 photograph.

According to interviewees, TOC operated a fleet of fuel delivery service trucks that were serviced across the street at the vehicle maintenance facility at 2750 West Commodore Way. Historical photographs show three ASTs located north of the New Barrel Shed Area. According to TOC employees, these ASTs were used to store used motor oil. The immediate area surrounding the ASTs was unpaved, but an outer area was paved. The

interviewees also indicated that this area had been affected by several small spills and leaks related to used motor oil transfer and storage activities.

By 1974 a new vehicle maintenance facility was added on the adjacent property (2800 block) immediately west of the Property. After TOC terminated its fuel truck distribution service, this building was leased to Precision Engineering Specialists (a marine and engine repair facility) in 1976.

According to TOC employees, pentachlorophenol (PCP) was mixed in a small AST near the west wall of the tank farm's Lower Tank Yard Area. The PCP was transferred via underground lines to the new barrel shed where 55-gallon drums and 5-gallon drums were filled, rolled onto a loading dock between the warehouse and the barrel shed, and loaded onto rail cars. This operation reportedly ran for 3 to 4 months during 1967 as part of a military contract. A few of the interviewees also stated that the parking lot on the Property had subsided in the vicinity where the former barrel incline ducked under West Commodore Way; the area was leveled and patched with new asphalt. The 1997 photograph shows the Property as it exists today.

Several of the interviewees mentioned that TOC had wanted to demolish the existing office building to construct a new office building; however, there was concern about excavating to the west of the existing office building because of the potential presence of petroleum-impacted soil. A couple of the interviewees also mentioned that many of the ASTs had small weeps or leaks near the bases. While there were no reports of large releases, numerous small leaks could have had a cumulative impact. Some of the interviewees also indicated that the fuel line between the rail spurs was an area where there had been releases in the past. Other statements by the interviewees noted a release of gasoline near the northern (outer) overhead fuel-loading rack. During one incident, the driver of a tanker truck is reported to have struck a portion of the loading facilities, resulting in a spill of over 1,000 gallons of gasoline; most of the fuel was reportedly recovered. The overhead loading racks initially had a center island surrounded by sand with only the driveways paved. The southern (inside) rack was replaced in the mid-1980s, and the entire area surrounding both loading racks was paved. Interviewees identified the pipeline leading to the dock across the street as an area where petroleum releases may have occurred. The pipeline consists of several pipes encased in an outer conduit. The speculation was that the older 8-inch pipes had failed and newer 6-inch pipes were placed within the older pipes.

2.4 PREVIOUS INVESTIGATIONS

In September 1991 (TOC 1991), three USTs were removed from the Property, including a 4,000-gallon unleaded gasoline tank, a 2,500-gallon diesel fuel tank, and a 1,500-gallon regular leaded gasoline tank. Figure 2-1 shows the locations of the former USTs and soil sampling locations.

The diesel fuel and leaded gasoline tanks were part of a baffled system (one 4,000-gallon tank) that was installed in 1980. Following removal of the USTs, a new 4,000-gallon UST was installed at the same location. This new tank is baffled to provide two compartments (one 3,000-gallon compartment and one 1,000-gallon compartment) and is therefore registered with Washington State Department of Ecology (Ecology) as two tanks. Two new fuel dispensers were also installed. The TOC report from 1991 indicated that the soil in the excavation appeared discolored and a hydrocarbon odor was evident. In addition, water with a hydrocarbon sheen was encountered at a depth of 18 feet below ground surface (bgs).

Efforts to excavate the petroleum-impacted soil were impeded by the proximity of the TOC building to the excavation and the presence of groundwater in the excavation space. Water samples were not collected, but soil samples indicated that the highest concentration (12,000 parts per million [ppm]) of hydrocarbons was present in surficial soils beneath the former fuel dispensers (east side of the building).

Additional site assessment activities were conducted in 1999, including the installation of nine soil borings and five groundwater monitoring wells (IT Corporation [IT] 2000). The locations of the 1999 borings are shown in Figure 2-2. Soil boring logs included in the IT report indicate that soil composition beneath the Property from the surface to approximately 20 to 25 feet bgs consists of sands and silts, with varying amounts of clay and gravel. Very dense dry clay underlies this sand/silt unit and acts as an aquitard. Several soil samples contained diesel and gasoline at concentrations above the historic Model Toxics Control Act (MTCA) Method A level. The concentrations ranged from 381 ppm to 755,000 ppm. One soil sample (01SB-09 at 2.5 feet bgs) contained heavy oil above the historic MTCA Method A level and, although the analytical results for heavy oil on several other samples were below limits of detection, the detection limits exceed the historic MTCA cleanup level. Benzene was reported above the soil cleanup level in samples collected from borings 01SB-08, 01SB-09, and 01MW-05.

Table 2-1 presents the analytical results for soil samples with petroleum concentrations above the cleanup levels. Concentrations of benzene in soil samples ranged from 2.12 ppm to 5,590 ppm. Several soil samples also exceeded the cleanup level for toluene, ethylbenzene, and xylene.

Groundwater was encountered in eight of the nine borings and all of the monitoring wells. Depth to groundwater ranged from 14 to 17 feet bgs. The wells were sampled in September 1999; only one well (01MW-01) did not contain detectable concentrations of hydrocarbons.

Table 2-2 lists the analytical results from the groundwater monitoring well and boring water samples collected in 1999. Well 01MW-05 contained floating product with an apparent thickness of 0.78 feet; consequently, this well was not sampled. The concentrations of gasoline in wells 01MW-01 through 01MW-04 ranged from 12.2 milligrams per liter (mg/L) to 27.2 mg/L, and concentrations of diesel ranged from 0.7 mg/L to 1.32 mg/L. Heavy oil was not detected in any of the wells. Benzene ranged from 3,880 mg/L to 11,300 mg/L. Wells 01MW-02 through 01MW-04 contained concentrations of toluene, ethylbenzene, and xylene above the MTCA Method A level. Total lead exceeded the cleanup level in every well except 01MW-01, with the highest concentration (130 parts per billion [ppb]) detected in 01MW-04. Most of the elevated concentrations appear to be located near the northeast corner of the office building. The IT report recommended additional site characterization.

In May 2000, TOC submitted a letter (TOC 2000) to Mr. Joe Hickey of the UST division of Ecology that summarizes previous field activities. In the letter, TOC indicated that the extent of contamination beneath the Property would be assessed.

During November and December 2000, Foster Wheeler Environmental conducted additional investigation activities at 2805, 2750, and 2737 West Commodore Way. The findings of these investigations are documented in the Environmental Site Assessment (Foster Wheeler Environmental 2001a). The report concluded that additional subsurface investigations were not necessary at 2805 or 2750 West Commodore Way. Groundwater monitoring was recommended for 2737 and 2750 West Commodore Way.

The investigation at 2737 West Commodore Way focused on several distinct areas and recommended additional work in five areas:

- Upper Rail Line Spur Area
- Former PCP/Diesel Mixing Area

- Former Barrel Shed Area
- New Barrel Shed Area
- West Commodore Way Perimeter Area

3. FIELD ACTIVITIES

Field activities at 2737 West Commodore Way included soil borings, near subsurface soil sampling, well installation, soil sampling, quarterly groundwater sampling, fuel characterization, and surveying. The following sections describe the methodology used to complete the field activities.

3.1 SOIL BORINGS

3.1.1 Soil Boring Locations

Nine soil borings were drilled at 2737 West Commodore Way, as shown on Figure 3-1. The total depth of each soil boring and the depth groundwater encountered at each location is described below:

Upper Rail Line Spur Area:

- SB-61 was located between SB-21 and SB-22 and advanced to a depth of 32 feet. Groundwater was encountered at a depth of approximately 22 feet bgs during drilling. Monitoring well 01MW-17 was installed at this location as an up-gradient well.

Former PCP/Diesel Mixing Area (Lower Tank Yard Area):

- SB-52 was located south of the Former PCP/Diesel Mixing Area (near SB-01). The boring was advanced to a depth of 14 feet. Groundwater was encountered at a depth of approximately 11 feet bgs.
- SB-53 was located east of the Former PCP/Diesel Mixing Area (near SB-02). The boring was advanced to a depth of 12 feet. Groundwater was encountered at a depth of approximately 11 feet bgs.
- SB-54 was located west of the Former PCP/Diesel Mixing Area (near SB-04). The boring was advanced to a depth of 12 feet. Groundwater was encountered at a depth of approximately 10.5 feet bgs.

- SB-55 was located northeast of the Former PCP/Diesel Mixing Area. The boring was advanced to a depth of 12 feet. Groundwater was encountered at a depth of approximately 11.5 feet bgs.
- SB-56 was located north of the Former PCP/Diesel Mixing Area. The boring was advanced to a depth of 15 feet. Groundwater was encountered at a depth of approximately 8 feet bgs. Monitoring well 01MW-14 was completed in this location.
- SB-57 was located southeast of the Former PCP/Diesel Mixing Area. This sampling location was not a soil boring, because of restricted access and the presence of utilities. A near sub-surface sample was collected by removing the upper 18 inches of overburden with a clean shovel. A decontaminated stainless steel spoon was then used to collect a soil sample.

Former Barrel Shed Area:

- SB-59 was located on the west end of the Former Barrel Shed Area near 01MW-06. The boring was advanced to a depth of 20 feet. Groundwater was not encountered during drilling.

New Barrel Shed Area:

- SB-58 was located in the parking lot near the subsurface pipes as they enter the foundation of the New Barrel Shed Area. The boring was advanced to a depth of 30 feet. Groundwater was encountered at a depth of 22 feet bgs during drilling. Monitoring well 01MW-15 was completed at this location.

West Commodore Way Perimeter Area:

- SB-60 was located east of the LUST area, between 01MW-02 and 01MW-10. The boring was advanced to a depth of 22.5 feet. Groundwater was encountered at a depth of approximately 18 feet bgs. Monitoring well 01MW-16 was installed at this location.

3.1.2 Soil Boring Methods

Soil borings in the Former PCP/Diesel Mixing Area were drilled with an Acker Soil Mechanic operated by BoreTec. The Acker Soil Mechanic is a portable drilling machine that can be broken down into smaller pieces to allow for access into restricted areas. The machine uses 2-inch inner

diameter (ID) hollow-stem augers. Split-spoon samples were driven every 5 feet. The spoons were 12 inches long, 1 inch ID, and driven with a 140-pound hammer.

The remaining borings were drilled with a CME 75 High Torque drill rig operated by Cascade Drilling. The augers used on the drill rig were 4.25-ID hollow stem. Split-spoon samples were driven every 5 feet to describe lithologies and collect soil samples. In most borings, an extra split-spoon sample was driven at the 2-foot-depth interval. Split-spoon samples were 12 inches long (not including the shoe), 2-inch ID, and driven by a 300-pound down-hole jar hammer. Appendix A contains the soil boring logs for the Property.

3.1.3 Soil Sampling Methods

Soil samples were collected directly from the split spoon and placed in the appropriate laboratory-supplied sample container. The analyses requested for each sample depended on the location. In general, the samples were analyzed for:

- Gasoline using Ecology's Northwest total petroleum hydrocarbon-gasoline (NWTPH-Gx) method
- Benzene, toluene, ethylbenzene, and xylene (BTEX) using U.S. Environmental Protection Agency (EPA) 8021B
- Diesel and oil using Ecology's Northwest total petroleum hydrocarbon-diesel extended (NWTPH-Dx) method
- PCP using EPA Method 8270-sim (selected ion monitoring)
- Carcinogenic polyaromatic hydrocarbons (cPAHs) using EPA Method 8270-sim
- Total lead using EPA 6000/7000 series

The gasoline/BTEX samples were collected first out of each spoon. The sample containers were placed in sealed baggies and placed directly into a chilled cooler for transport to the laboratory. Soil samples were labeled according to their soil boring location and depth collected (i.e., SB-52-2 = soil boring 52, sample depth 2 feet). North Creek Analytical (Bothell, Washington) received the samples at the end of each day in the field.

The split spoons were decontaminated by thoroughly washing them in soapy water, rinsing with water, rinsing with methanol, and finally rinsing with deionized water supplied by the analytical laboratory.

3.1.4 Product Sampling

Product samples were collected from three wells: 01MW-05, 01MW-10, and 01MW-14. The samples were collected using capillary tubes and submitted to Friedman & Bruya, Inc. for characterization of product and PCP analysis.

3.2 MONITORING WELL INSTALLATION

Four new monitoring wells were installed and developed during the Phase III investigation activities. The locations of the new monitoring wells as well as the existing wells are shown on Figure 3-2. Table 3-1 presents the available well construction information for wells at 2737 West Commodore Way.

3.2.1 Monitoring Well Locations

Each of the wells installed was designed and located with a specific purpose in mind. The rationale behind each well location is as follows:

- 01MW-14 (SB-56) was located south of the Former PCP/Diesel Mixing Area. The well is screened within the shallow water-bearing zone. The purpose of this well is to evaluate the potential impacts of fuel and PCP from the Former PCP/Diesel Mixing Area.
- 01MW-15 (SB-58) was located downgradient and north of the New Barrel Shed Area to evaluate potential groundwater impacts. The well is screened within the shallow water-bearing zone with the bottom of the well above a dry, impermeable clay/silt layer.
- 01MW-16 (SB-60) was located just east of the office building near the Former LUST Area, between 01MW-02 and 01MW-10, to evaluate the extent of petroleum-impacted groundwater. The well is screened within the shallow water-bearing zone with the bottom of the well above a dry, impermeable clay/silt layer.
- 01MW-17 (SB-61) was located upgradient of the Upper Tank Yard Area to evaluate background groundwater conditions. The well is screened within the shallow water-bearing zone with the bottom of the well above a dry, impermeable clay/silt layer.

3.2.2 Well Installation Methods

The monitoring wells were drilled as described in Section 3.1.2.

3.2.3 Installation Materials

Most of wells were installed with flush-threaded, 2-inch ID polyvinyl chloride (PVC) casing with variable screen lengths of 0.010-inch slots. The sand pack consists of a 20-40 Colorado silica sand around the screen to 2 feet (typically) above the top of the screen. The sand pack is overlain by a bentonite seal of at least 1 foot (typically). Concrete and flush-mount monuments were used to complete the wells. Heavy-duty well monuments were used for wells in areas with high levels of vehicular traffic.

Monitoring well 01MW-14 was installed with the Acker Soil Mechanic. Because of the smaller boring diameter, this well features a 1-inch ID casing. The annular materials are identical to those of the 2-inch ID wells.

3.2.4 Well Development

The wells were developed following installation. For development, the wells were surged frequently with a double-stage purge pump. At least three well volumes of water were pumped from the wells using the double-stage purge pump. Before a different well was pumped, the tubing was changed on the pump, and the pump was decontaminated by washing it with soapy (Liquinox) water, pumping soapy water through it, and rinsing it with deionized water supplied by the analytical laboratory.

Visual observations and measurement of physical parameters provided monitoring of development progress. Measurements during development and well sampling were made for pH, temperature, conductivity, and turbidity using a Hydrolab Data Sonde. The meter was calibrated before each use using standards supplied by the instrument provider. Table 3-2 provides the final parameters measured during the sampling and development of the wells.

3.3 SURVEYING

The soil boring locations were surveyed by Inca Engineering, Inc. Horizontal control was specified to 0.1 foot, based on Washington State Plane Coordinate System, North America Datum (NAD) 83/91 City of Seattle. Vertical control was specified to 0.01 foot, based on

the National America Vertical Datum (NAVD) 88 City of Seattle. A summary of the survey results is presented in Table 3-1, and the complete data are provided in Appendix B.

3.4 WATER LEVEL MEASUREMENTS

Water level measurements were made from all available wells. Depth to groundwater measurements were subtracted from surveyed measuring point elevations to determine the water level elevations (potentiometric head), as shown in Table 3-3. The potentiometric surface maps for 2737 and 2750 West Commodore Way are shown in Figures 3-3 and 3-4, respectively.

3.5 GROUNDWATER SAMPLING AND ANALYSIS

Groundwater samples were collected from July 25 through July 27, 2001. Water samples were collected in laboratory-supplied glassware and delivered to the laboratory each evening after sampling.

Samples were collected using a peristaltic pump, disposable high-density polyethylene (HDPE) tubing, and silicone tubing. At each well the HDPE tubing was inserted into the water at approximately the center of the well screen. A piece of disposable silicon tubing was connected to the HDPE tubing and run through the pump. Both pieces of tubing were discarded after each use, and new tubing was used for the next well.

The analyses performed on each groundwater sample depended on the location. In general, the water samples were analyzed for the following potential contaminants:

- Gasoline, using Ecology's NWTPH-Gx Method
- BTEX, using EPA Method 8021B
- Diesel and oil, using Ecology's NWTPH-Dx Method
- cPAHs, using EPA Method 8270-sim
- PCP, using EPA Method 8270-sim
- Total lead, using EPA 6000/7000 series

3.6 INVESTIGATION DERIVED WASTE

Soil cuttings from the Property were transferred to the stock piles on the Property for disposal by TOC. Decontamination water was collected by the drilling company in 55-gallon type 1A drums, transferred to TOC.

4. ANALYTICAL RESULTS

Soil samples and groundwater were analyzed by North Creek Analytical Labs in Bothell, Washington. Product characterization samples were analyzed by Friedman & Bruya, Inc., in Seattle, Washington. Where applicable, results were compared to Ecology's new Method A soil levels for unrestricted land use. Ecology's new rule does not differentiate between industrial property and unrestricted land use. The new soil levels for diesel and oil are higher than the previous MTCA Method A levels, with the new soil levels for gasoline divided into two categories: gasoline without benzene and less than 20 percent aromatics between equivalent carbon (EC) 8 and EC16 (proposed soil cleanup level of 100 milligrams per kilogram [mg/kg]); and all other gasoline mixtures (proposed soil cleanup level of 30 mg/kg). The new BTEX levels for soil are lower than previous levels. For PCP, the soil results were compared to the MTCA Method B carcinogenic levels for residential soils. Groundwater concentrations were compared to the National Oceanic Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRT) values. The SQuiRT values provide screening levels for acute and chronic exposures to both freshwater and saltwater. Because the groundwater beneath the site is not used for drinking water and the ultimate point of exposure is the Ship Canal (a fishwater body), it is appropriate to compare the groundwater concentrations to the NOAA SQuiRT values for fishwater. Groundwater concentrations were compared to the MTCA Method A levels for groundwater for analytes that did not have applicable NOAA SQuiRT values. The analytical results are presented in Tables 4-1 through 4-5. The footnotes at the bottom of each table identify the applicable action levels.

Appendix C contains the laboratory data packages for the samples collected at the Property. The data packages are presented in their entirety to allow the reader to evaluate the data relative to the quality control data associated with the environmental samples.

The following sections present the analytical results. The results for Phase III soil samples and the new monitoring wells are presented in Section 4.1. Quarterly groundwater results are presented in Section 4.2.

4.1 PHASE III ACTIVITIES

4.1.1 Upper Rail Line Spur Area

Soil

One soil boring (SB-61) was located near the Upper Rail Line Spur Area on the south side of the Upper Tank Yard Area. Four soil samples were collected from the boring and analyzed for gasoline, diesel, and oil. Diesel and oil were detected at low concentrations in the sample collected from a depth of 2 feet bgs. None of the soil samples showed concentrations of petroleum analytes above the reporting limit.

Groundwater

The groundwater sample collected from 01MW-17 contained concentrations of diesel (0.884 mg/L) above the MTCA Method A level (0.500 mg/L). None of the other petroleum analytes were detected above the reporting limits.

4.1.2 Former PCP/Diesel Mixing Area

Soil

Five soil borings (SB-52 through SB-56) were installed in the Former PCP/Diesel Mixing Area. Gasoline (1,410 mg/kg) and diesel (4,180 mg/kg) were detected above the MTCA Method A level for unrestricted soil in SB-52 at a depth of 2.5 feet bgs. None of the samples collected from the 6-foot or 10-foot depth showed concentrations above the MTCA Method A level for unrestricted soil.

None of the soil samples from SB-53 or SB-54 showed concentrations above the MTCA Method A levels for unrestricted soil. Gasoline, diesel, and oil were detected in SB-54 at a depth of 2 feet bgs.

Gasoline (185 mg/kg) was detected above the MTCA Method A level in SB-55 at a depth of 6 feet bgs. None of the petroleum analytes were detected above the reporting limit in SB-55. None of the petroleum analytes exceeded the MTCA Method A levels for unrestricted soil in the sample collected from the 10-foot depth in SB-55. PCP was not detected above the MTCA cleanup level.

Gasoline, benzene, ethylbenzene, xylene, and diesel were detected above the MTCA Method A level for unrestricted soil in SB-56 at depths of 2.5 feet bgs and 5 feet bgs. PCP was detected (8.88 mg/kg) above the MTCA Method B level (8.33 mg/kg) for soil. None of the analytes exceeded the MTCA Method A levels for unrestricted soil in the sample collected from the 10-foot depth. The concentration of cPAHs (2.6240 mg/kg) exceeded the MTCA Method A level of 1.0 mg/kg in SB-56 at a depth of 2.5 feet bgs.

A near subsurface sample was collected at SB-57 from a depth of 1.5 feet. Gasoline (2,590 mg/kg), ethylbenzene (18.2 mg/kg), and diesel (3,970 mg/kg) were detected above the MTCA Method A level for unrestricted soil. PCP was not detected above the laboratory reporting limit.

Groundwater

A monitoring well (01MW-14) was installed in SB-55. The well contained approximately 6.7 feet of product with no discernable groundwater present. A product sample was collected for fuel characterization and PCP analysis. The lab concluded that the majority of the material present in the sample is indicative of a middle distillate such as diesel fuel #2 or heating oil. The report also concluded that low-level degraded gasoline may have impacted the sample. PCP was detected in the sample at a concentration of 140 µg/g (ppm).

4.1.3 Former Barrel Shed Area

Soil

One soil boring (SB-59) was installed near the Former Barrel Shed Area. Gasoline (799 mg/kg) and diesel (4,950 mg/kg) were detected above the MTCA Method A levels for unrestricted soil at a depth of 5 feet. Samples from the 15-foot and 20-foot-depth interval in SB-27 did not contain concentrations of petroleum-impacted soil above the method reporting limit.

Lead, PCP, and cPAHs were not detected above the MTCA Method A levels in SB-59.

4.1.4 New Barrel Shed Area

Soil

One boring (SB-58) was installed just north of the loading dock directly north of the New Barrel Shed Area. None of the samples had concentrations of analytes above the MTCA Method A level for unrestricted soil.

Groundwater

A monitoring well (01MW-15) was installed in boring SB-58. None of the analytes exceeded the MTCA Method A levels or the NOAA SQuiRT values.

4.1.5 West Commodore Way Perimeter Area

Soil

One boring (SB-60) was located along West Commodore Way and north of the Lower Tank Yard Area. Gasoline (1,240 mg/kg), benzene (1.68 mg/kg), xylenes (10.2 mg/kg), and diesel (11,400 mg/kg) were detected above the MTCA Method A level for unrestricted soil at a depth of 15 feet. The sample from the 20-foot depth did not show concentrations of analytes above the reporting limits.

Lead was not detected above the MTCA Method A levels.

Groundwater

A monitoring well (01MW-16) was installed in boring SB-60. Gasoline (11,000 μg/L) and diesel (11.1 mg/L) were detected at concentrations above the MTCA levels.

4.2 QUARTERLY GROUNDWATER SAMPLING

Groundwater samples are collected on a quarterly basis (January, April, July, and October) at 2737 and 2750 West Commodore Way. The first quarterly sampling event occurred during the third quarter of the 2001 calendar year. The specific analyses depend on the sample location. The following sections present the results for each property.

4.2.1 Quarterly Groundwater Sampling at 2737 West Commodore Way

Diesel exceeded the MTCA Method A level in every groundwater sample except the sample from well 01MW-15. Gasoline exceeded the MTCA Method A level in 01MW-02, 01MW-03, 01MW-04, 01MW-09, 01MW-12, and 01MW-16. Benzene exceeded the NOAA SQuiRT value in 01MW-02, and 01MW-03. Total xylene exceeded the cleanup level in 01MW-02 and 01MW-04. PCP did not exceed the NOAA SQuiRT values in any of the samples.

4.2.2 Quarterly Groundwater Sampling at 2750 West Commodore Way

Diesel exceeded the MTCA Method A level in every well except 02MW-07. Gasoline (4,270 μg/L) exceeded the MTCA Method A level in 02MW-04. None of the other analytes were detected above the applicable regulatory levels.

5. CONCLUSIONS AND RECOMMENDATIONS

The following sections describe the nature and extent of contamination as well as recommendations for future actions.

5.1 NATURE AND EXTENT OF CONTAMINATION

The following subsections describe the nature and extent of contamination within each area. A summary table (Table 5-1) shows the soil samples exceeding the MTCA Method A levels for unrestricted soil. Tables 5-2 and 5-3 show the groundwater samples exceeding action levels at 2737 and 2750 West Commodore Way, respectively.

5.1.1 Upper Rail Line Spur Area

None of the samples collected from the new boring (SB 61) exceeded the MTCA levels for unrestricted soil. The groundwater sample from 01MW-17 showed concentrations of diesel (0.884 mg/L) above the MTCA cleanup level (0.500 mg/L). The potentiometric surface for the site also showed that 01MW-17 is downgradient from the site, possibly owing to a localized recharge area beneath the Tank Yards. Figure 5-1 shows the extent of diesel-impacted groundwater beneath the site.

5.1.2 Former PCP/Diesel Mixing Area

Diesel- and gasoline-impacted soil appears to be present near the Former PCP/Diesel Mixing Area in SB-52, SB-55, and SB-56 at depths ranging from 2.5 feet to 6 feet. The samples collected from the 10-foot depth in each boring did not show concentrations of petroleum contaminants above the MTCA level for unrestricted soil. PCP was detected (8.88 mg/kg) at a level just above the cleanup level (8.33 mg/kg) in SB-56 at a depth of 5 feet. A well (01MW-14) was installed in boring SB-56. The well was found to contain more than 6 feet of product, with no measurable groundwater present. When the product was sampled, PCP was detected at a concentration of 140 μg/g. Carcinogenic PAHs exceeded the cleanup level (1 mg/kg) in SB-56 at a depth of 2.5 feet. Based on the recent findings and previous investigations, it appears that petroleum-impacted soil is generally limited to the upper 5 feet.

5.1.3 Former Barrel Shed Area

Petroleum-impacted soil was evident in SB-59 at a depth of 5 feet. This result is consistent with the findings from previous investigations. PCP was not detected in soil above the MTCA levels. Analytes were not detected above applicable regulatory levels in groundwater. PCP was detected at low levels and may be a result of historic operations or related to wood preservatives used on former buildings or railroad ties.

5.1.4 New Barrel Shed Area

None of the soil samples from SB-58, located north of the New Barrel Shed Area, exceeded the MTCA Method A levels.

The groundwater samples from 01MW-15 did not show concentrations above the regulatory levels. PCP was detected at low levels and may be a result of historic operations or related to wood preservatives used on former buildings or railroad ties.

5.1.5 West Commodore Way Perimeter Area

Petroleum-impacted soil was found in SB-60 at a depth of 15 feet. The soil contamination was found near the water table and may be the result of groundwater influence rather than contaminated soil. A well (01MW-16) was installed in this location. The groundwater sample showed concentrations of gas and diesel above the MTCA levels. It is not clear whether groundwater contamination is due solely to activities at the Former PCP/Diesel Mixing Area to the south, the loading rack immediately to the south, the Former LUST Area to the west, or a combination of these areas. Figures 5-2 and 5-3 show the extent of gasoline- and benzene-impacted groundwater beneath the site, respectively.

5.2 QUARTERLY GROUNDWATER MONITORING

5.2.1 2737 West Commodore Way

Figures 5-1 through 5-3 show the extent of impacted groundwater beneath 2737 West Commodore Way. In general, groundwater concentrations are consistent with those measured in December 2000.

There appear to be two distinct sources of petroleum hydrocarbon-impacted groundwater beneath the site. One source of hydrocarbon-impacted groundwater may be near the Former

LUST Area where gasoline and benzene concentrations are the highest. Another distinct source of hydrocarbon-impacted groundwater appears to originate in the Tank Yards and extend to the north through the tank farm valve manifold to the truck loading rack area. Although the groundwater impact originating in the Tank Yards consists primarily of petroleum hydrocarbon compounds, a low concentration of PCP was detected in a free product sample collected immediately adjacent to the Former PCP/Diesel Mixing Area.

Although results of the Phase III assessment indicate that groundwater that is impacted with PCP is likely present near the Former PCP/Diesel Mixing Area, the source of low-level PCP impacts in other areas of the site is undetermined. It is possible that the low-level PCP groundwater impacts in areas distant from the Former PCP/Diesel Mixing Area could be related to historical PCP handling at the site. It is also possible that the low-level PCP impacts could be the result of wood treatment chemicals used on former site structures or railroad ties. Additional groundwater sampling and analysis for PCP is necessary to more accurately evaluate potential sources of the low-level PCP impacts to groundwater. None of the PCP concentrations detected in the groundwater samples exceeded the corresponding NOAA SquiRT value.

5.2.2 2750 West Commodore Way

Table 5-3 shows the detections of analytes above the MTCA levels for groundwater. Gasoline and diesel were the only analytes detected above the applicable regulatory levels. The petroleum-impacted groundwater appears to be centered around 02MW-04 near the former garage area. Elevated concentrations in up-gradient well 02MW-05 indicate that it is possible that the petroleum-impacted groundwater is entering the property from the LUST area at 2737 West Commodore Way. Table 5-5 shows the cumulative results of groundwater samples collected at the site.

5.3 RECOMMENDATIONS FOR FUTURE ACTIONS

Based on the conclusions above, Foster Wheeler Environmental recommends future actions for the Property, as described in the sections below. The suggestions below include source removal, installation of a dual-phase extraction (DPE) system, and groundwater monitoring.

In addition to typical fuel-related analytes in groundwater, other parameters may be analyzed to evaluate the natural attenuation process at the site. These parameters include iron, nitrate,

sulfate, and dissolved oxygen. Monitored natural attenuation (MNA) is a useful tool to demonstrate compliance with regulatory cleanup levels.

According to a directive from EPA's Office of Solid Waste and Emergency Response titled Use of Monitored Natural Attenuation at Superfund RCRA Correction and UST Sites (April 1999), MNA is most appropriate when used in conjunction with other remedial actions or as a follow-up remediation measure. At this particular site, source removal activities have been conducted and additional activities are recommended depending on the area. Bioremediation and MNA, in conjunction with the quarterly monitoring of groundwater movement and petroleum and BTEX concentrations, will provide useful information to evaluate groundwater movement and monitor the effectiveness of the source removal and bioremediation activities, coupled with the natural attenuation of contaminants as they undergo degradation. Risk Based Corrective Action (RBCA) evaluations are currently being conducted to ensure that soil and groundwater impacts proposed to be addressed by MNA do not present unacceptable threats to the environment or to the current or future inhabitants of the property.

5.3.1 Upper Rail Line Spur Area

The purpose of installing 01MW-17 was to establish an up-gradient (background) well for the site. Based on the potentiometric surface for July 24, 2001, it appears that the groundwater is mounded beneath the Tank Yards; consequently, groundwater flows in a southwesterly direction from the site toward 01MW-17. The groundwater flow direction to the south from the Tank Yards may provide an explanation for the elevated diesel concentration in the groundwater sample collected from 01MW-17. Continued groundwater monitoring will be useful in evaluating the extent of impacted groundwater.

In order to address the need for a background well, Foster Wheeler Environmental recommends that two additional wells be installed at the site. Possible locations and the rationale for the wells are as follows:

- 01MW-21 (new well) – to be located on the east side of the 2737 West Commodore Way property. The well would be screened in the shallow aquifer and is intended to determine the extent of groundwater mounding beneath the Tank Yards and to provide a potential background well.

- 01MW-22 (new well) – to be located south of the warehouse. The area south of the warehouse was identified as the Former Lower Rail Line Spur Area in the Phase I ESA. Sampling activities conducted during Phase II did not indicate any contaminated soil in this area. Consequently, this area may be a good location to install a background well and further define the potentiometric surface at the site.

5.3.2 Former PCP/Diesel Mixing Area

Petroleum- and PCP-impacted soil has been identified in the upper 2 feet to 5 feet in many of the soil borings in the Former PCP/Diesel Mixing Area. The samples showing the elevated concentrations are from locations surrounding the former PCP/diesel mixing tank. One sample from the 5 foot depth showed elevated concentrations of PCP and cPAHs. Product was detected in the monitoring well (01MW-14) installed north of the former PCP/diesel mixing tank. The thickness of the fuel was estimated to be more than 6 feet. Foster Wheeler Environmental recommends several additional activities in the Former PCP/Diesel Mixing Area, including well installation, groundwater monitoring, surface soil removal, and fuel recovery.

Additional wells, screened in the shallow aquifer, are recommended within the Lower Tank Yard Area near the Former PCP/Diesel Mixing Area, to delineate the lateral extent of the floating product phase. In order to install the new monitoring wells, some surface piping may need to be removed to allow a drill rig to maneuver. If surface piping cannot be removed, a limited access drill rig may be lifted via a crane and lowered into selected areas. Four-inch diameter wells are recommended so they can be used for fuel recovery, should that become necessary.

It is recommended that quarterly groundwater monitoring continue in order to evaluate groundwater concentrations. In addition, water levels will be measured quarterly to develop potentiometric surface maps. Quarterly samples will be analyzed for fuel-related compounds (gasoline, diesel, oil, BTEX) and PCP.

The removal of affected surface soil is also recommended. PCP pellets are visible on the surface due to historical practices of mixing PCP and diesel fuel. Removal of the surface soil, with possible excavation to a depth of 2 feet to 5 feet, may remove source material that could be contributing to the groundwater impacts.

The pipelines that were formerly used to transfer wood-treating solutions from the Former PCP/Diesel Mixing Area to the New Barrel Shed Area have been purged, cleaned, and either decommissioned or converted to stormwater conveyance lines. Because PCP was not detected in soil samples collected from a boring immediately adjacent to the former conveyance lines, and the conveyance lines are no longer used to transfer hydrocarbons or wood treating solutions, it is unlikely that these lines or the soils surrounding them could serve as an ongoing source of hydrocarbon or PCP impacts.

5.3.3 Former Barrel Shed Area

Soil boring SB-59 was installed in the Former Barrel Shed Area to determine whether the operation of the PCP/diesel pipeline had resulted in PCP-impacted soil. The soil samples collected from the boring did not indicate the presence of PCP-impacted soil; however, groundwater beneath the area did show elevated concentrations of PCP. Continued groundwater monitoring is recommended in the area to evaluate PCP-impacted groundwater trends.

5.3.4 New Barrel Shed Area

Soil boring SB-58 was installed in the New Barrel Shed Area to determine whether the operation of the PCP/diesel pipeline and New Barrel Shed Area resulted in PCP-impacted soil. The soil samples collected from the boring did not indicate the presence of PCP-impacted soil; however, groundwater beneath the area did show detectable concentrations of PCP below the regulatory level. Continued groundwater monitoring is recommended in the area to evaluate PCP-impacted groundwater trends.

5.3.5 West Commodore Way Perimeter Area

Petroleum-impacted soil was detected in soil boring SB-60 at a depth of 15 feet below ground surface. Monitoring well 01MW-16 was installed in this location. Groundwater at this location was found to be affected by diesel, gasoline, benzene, and PCP. Because groundwater was found at a depth of approximately 18 feet during drilling, it is possible that the elevated petroleum contamination in soil is a result of groundwater impacts and not due to historic operations affecting the soil directly. During the July quarterly sampling event, product was discovered in nearby well 01MW-10, which was dry during the last sampling episode (December 2000). With the elevated concentrations in 01MW-16, the proximity of

the Former LUST Area, and the newly detected product in 01MW-10, it is recommended that an additional well be installed, groundwater monitoring continue, and pilot-testing activities (Foster Wheeler Environmental 2001c) be conducted.

An additional well located to the south near the truck-loading rack would be useful for many reasons. It is important to determine the extent of product discovered in the Former PCP/Diesel Mixing Area and whether it is related to the product discovered in 01MW-01. In addition, the loading rack may be a potential source area.

Continued quarterly groundwater monitoring is recommended, as mentioned in the previous subsections. Groundwater samples should be analyzed for petroleum products and PCP.

The document *Proposed Product Pilot Testing Activities*, published in October 2001 (Foster Wheeler Environmental 2001c), outlined several steps necessary to design a fuel-recovery system for the Former LUST Area. Implementation of this plan and the ensuing fuel recovery system will aid in the removal of a portion of the contaminant source that appears to be affecting the groundwater beneath the site.

5.3.6 Quarterly Groundwater Sampling

Groundwater samples are collected on a quarterly basis at 2737 and 2750 West Commodore Way. In the past, analyses for PCP have been limited to a few wells. It is recommended that PCP be added to the analyses for wells at both properties. This information will be useful in evaluating the extent of PCP-impacted groundwater, as well as understanding whether the different service areas are mixing or extending across the street from 2737 West Commodore Way to 2750 West Commodore Way. In addition, silica gel cleanup of groundwater samples collected may remove naturally occurring compounds that could be yielding false positive detection of diesel.

6. REFERENCES

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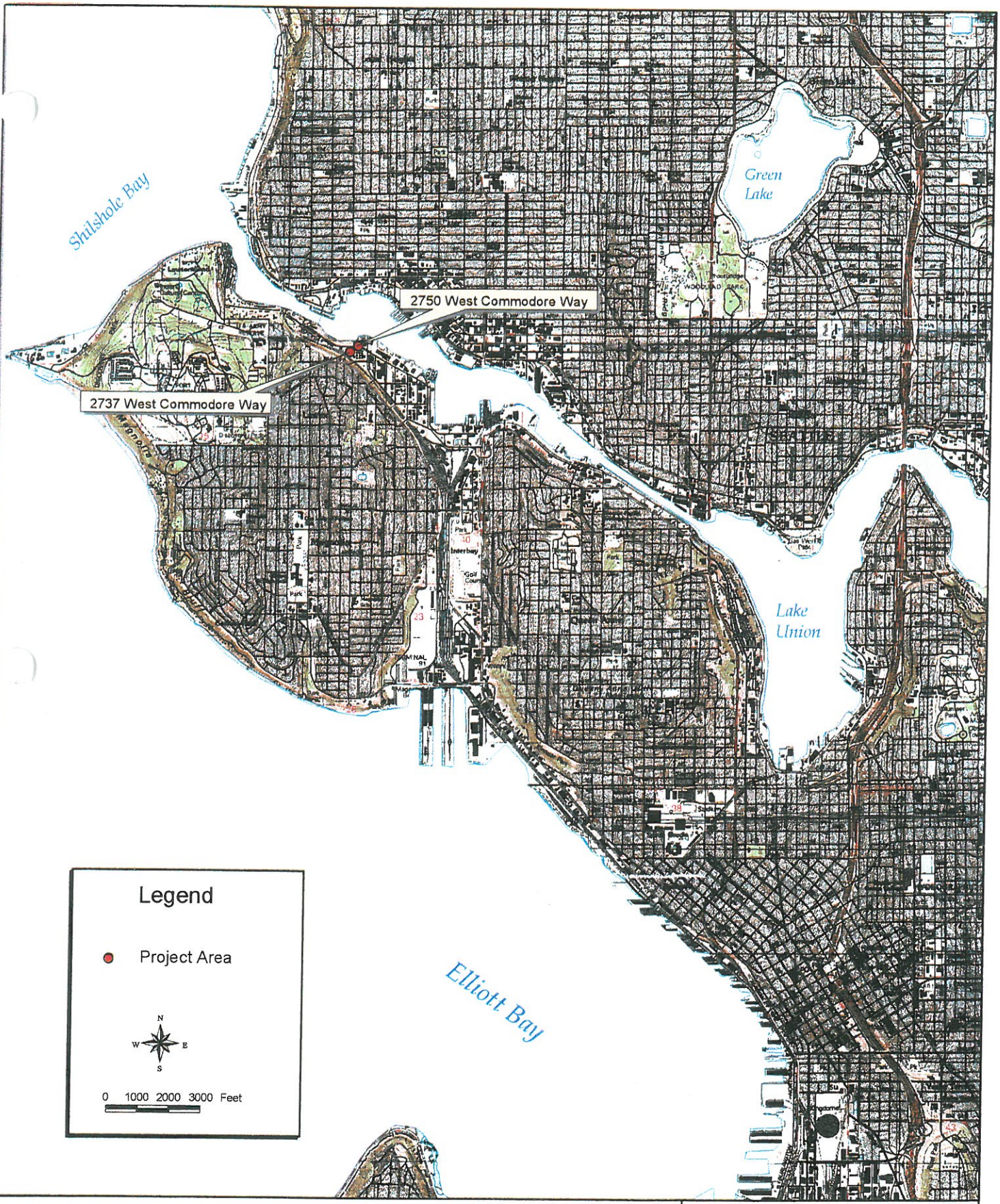

Time Oil Company
Phase III Environmental Site Assessment
and Quarterly Groundwater Sampling

Figure 1-1

Locations of 2737 and 2750
West Commodore Way

c:\projects\time_oil\vic_map_2001 apr December 2001

I:\Projects\23063312\dwg\ETIOFG07.dwg 11/05/01 09:58:26 AM PST

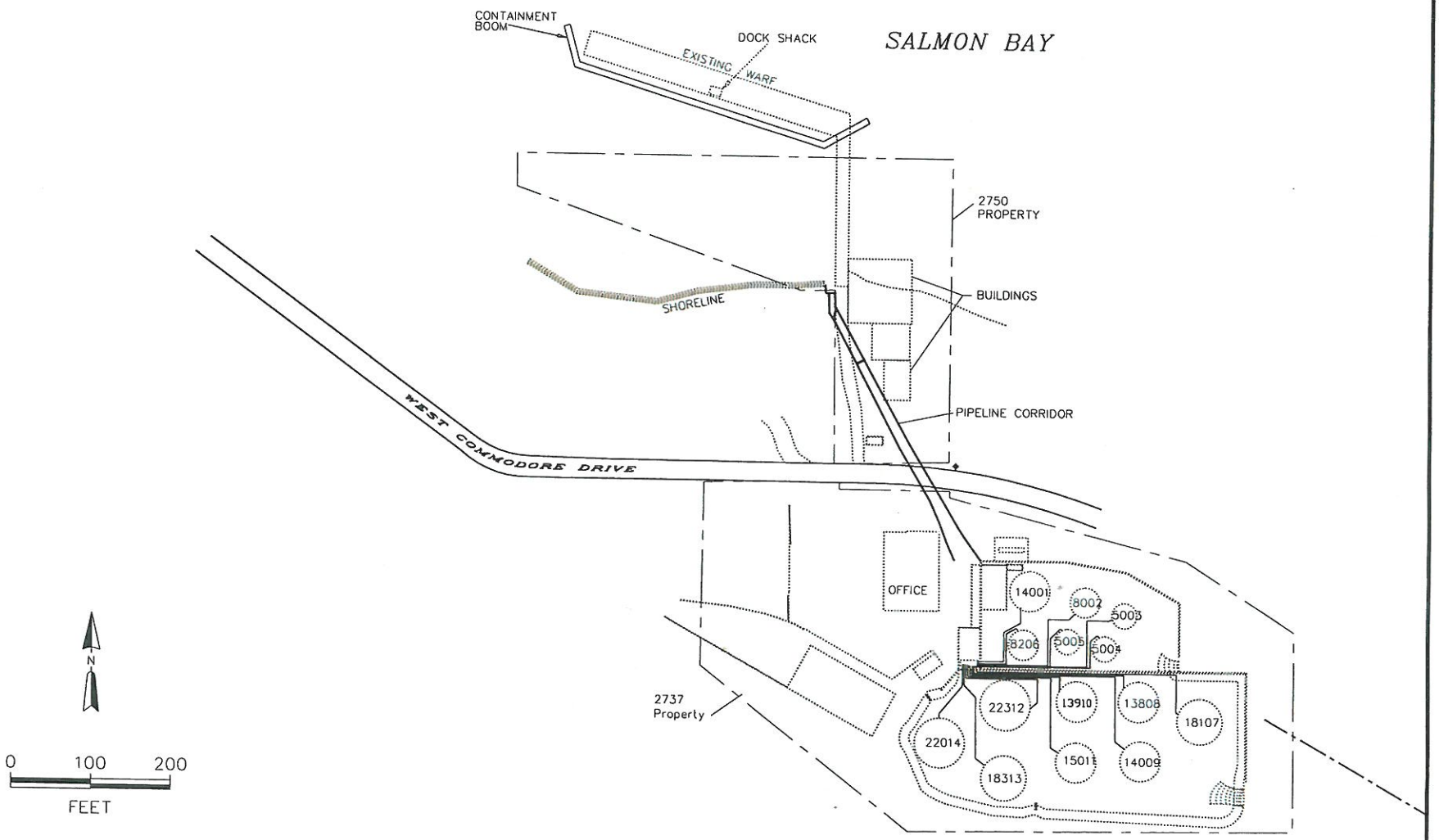

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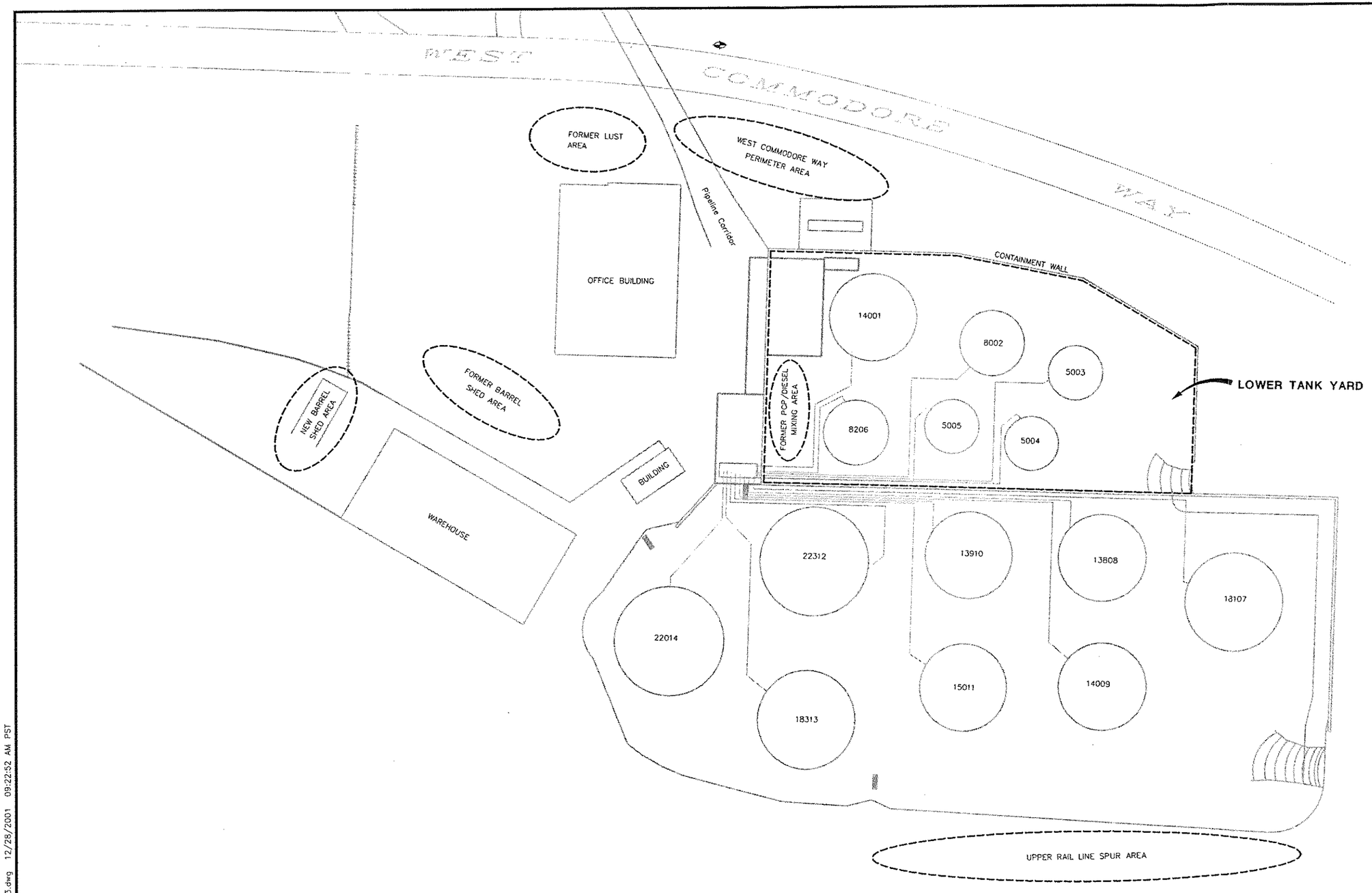
Figure 1-2

Location of 2737 and 2750 West Commodore Way



FOSTER FW WHEELER ENVIRONMENTAL CORPORATION

Figure 1-3

Layout of Property and Investigation Areas at 2737 West Commodore Way

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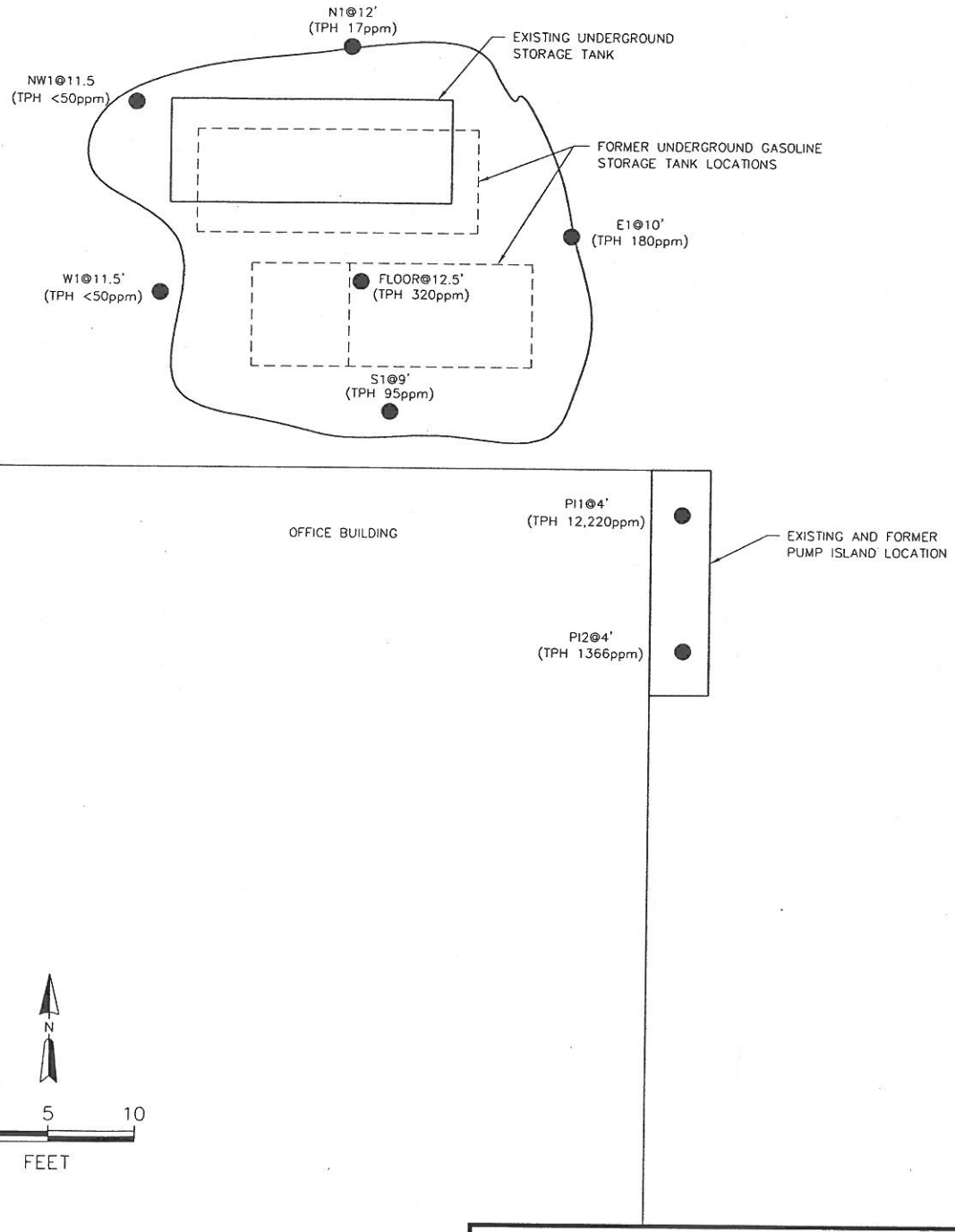

LEGEND

N1@12' (TPH 17 ppm) ● APPROXIMATE SAMPLING LOCATION WITH RESPECTIVE DEPTH AND TPH CONCENTRATION

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Figure 2-1

1991 Sampling Locations
2737 West Commodore Way

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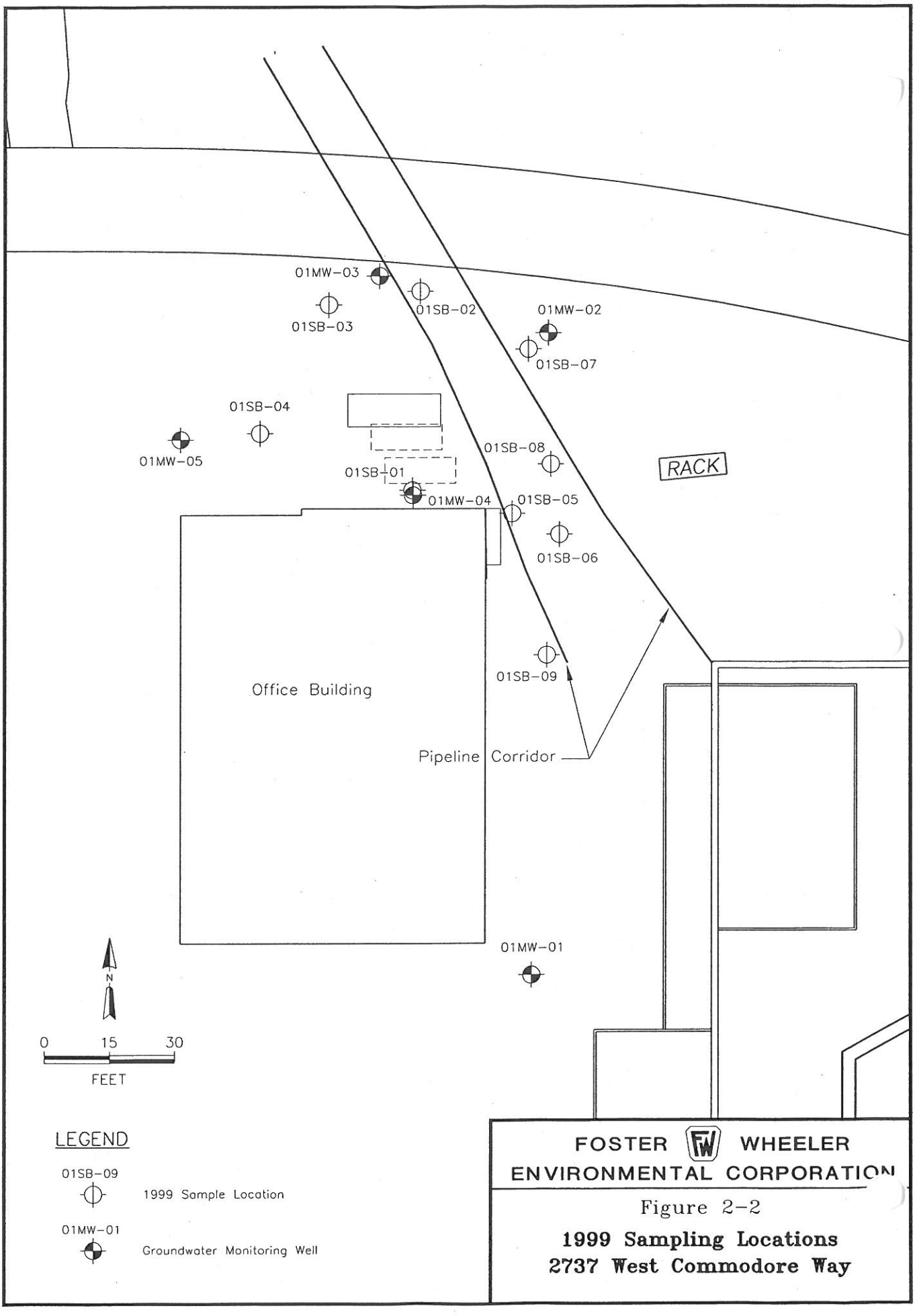

I:\PROJECTS\23063312\DWG\ETIOFG10.DWG
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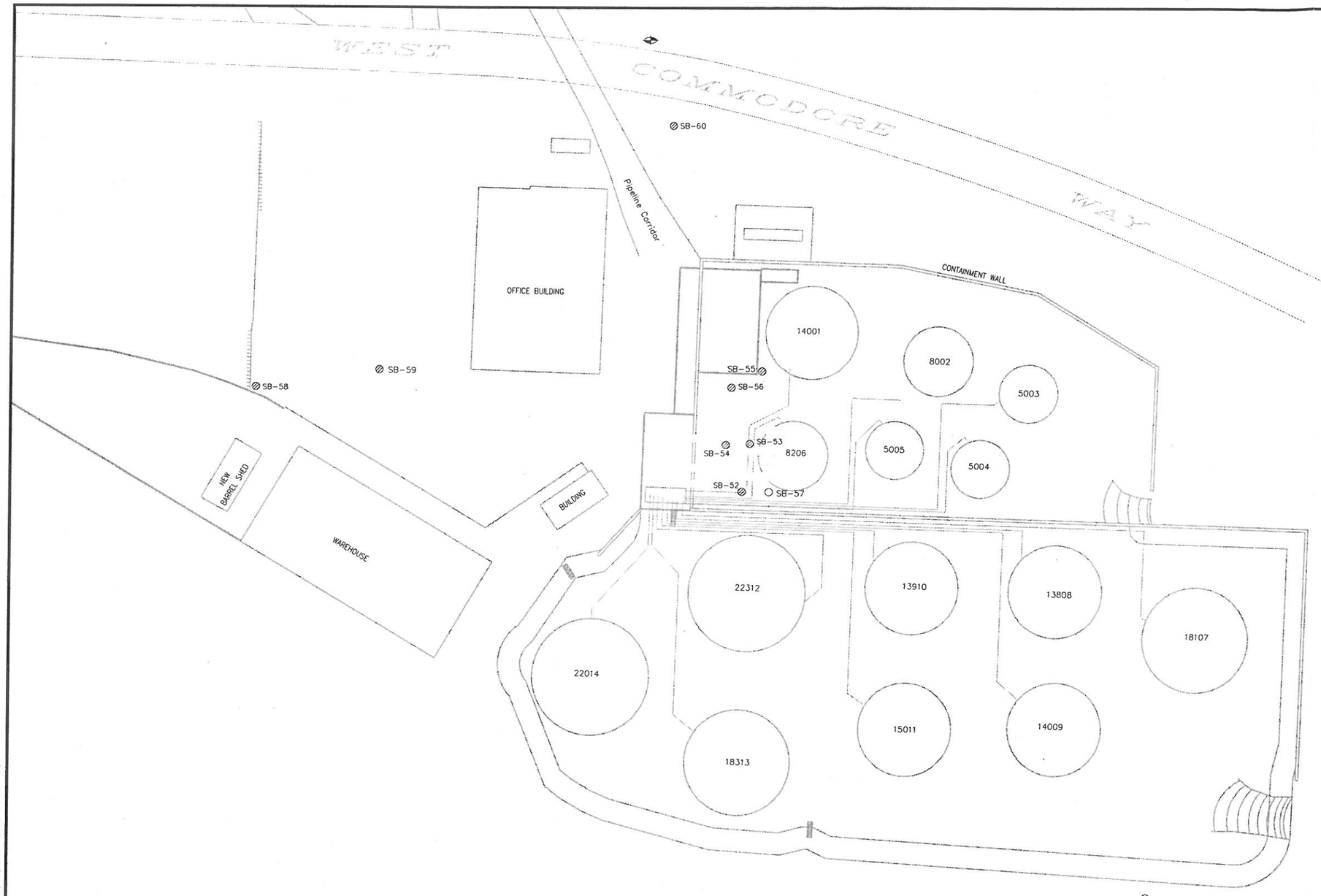
FOSTER WHEELER ENVIRONMENTAL CORPORATION

Figure 2-2

1999 Sampling Locations
2737 West Commodore Way



LEGEND

- SOIL BORING
- NEAR-SURFACE SAMPLE
- SURVEY MONUMENT

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Figure 3-1

Locations of Phase III Soil Borings at 2737 West Commodore Way

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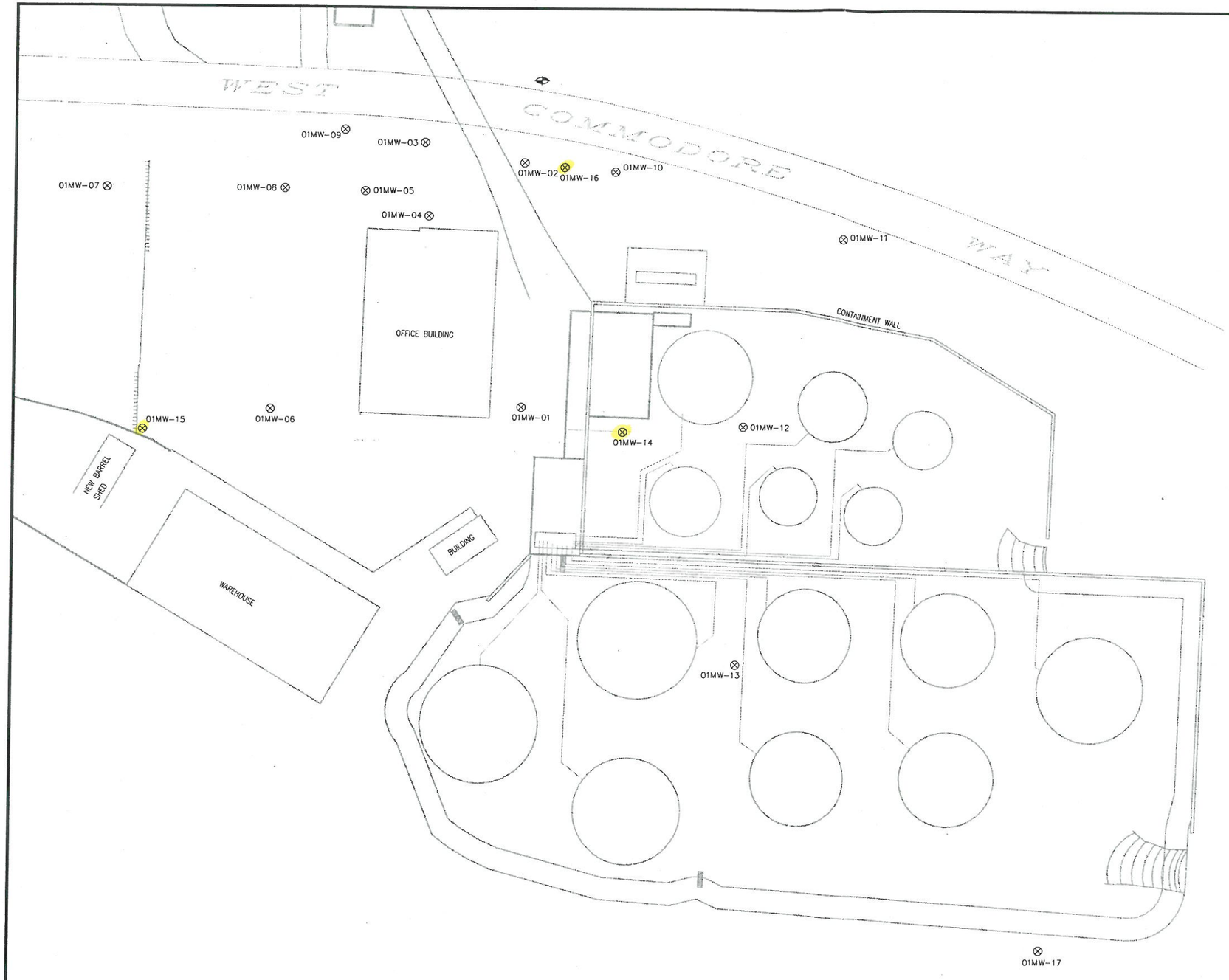

LEGEND

- ⊗ MONITORING WELL
- ⇔ SURVEY MONUMENT

N

GRAPHIC SCALE

0 30 60

SCALE IN FEET

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Figure 3-2
Location of Wells at 2737 West Commodore Way

I:\PROJECTS\23063312\DWG\ETIOFG2-2.DWG
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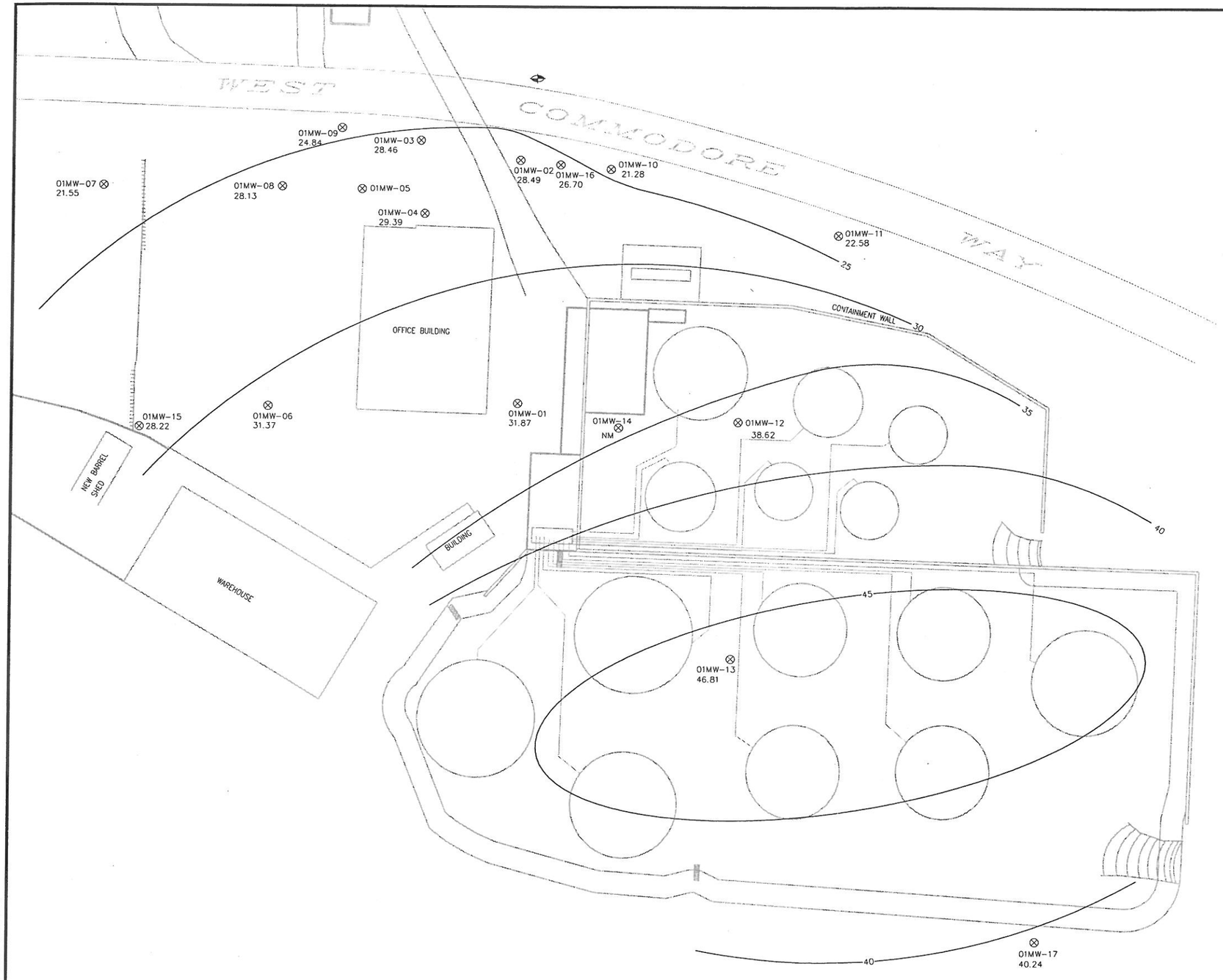


LEGEND

- ⊗ MONITORING WELL WITH GROUNDWATER ELEVATION (Feet MSL)
- SURVEY MONUMENT
- 5.0 EQUIPOTENTIAL CONTOUR (Feet MSL) CONTOUR INTERVAL 5 FEET
- NM NOT MEASURED DUE TO FUEL THICKNESS

N

GRAPHIC SCALE

0 30 60

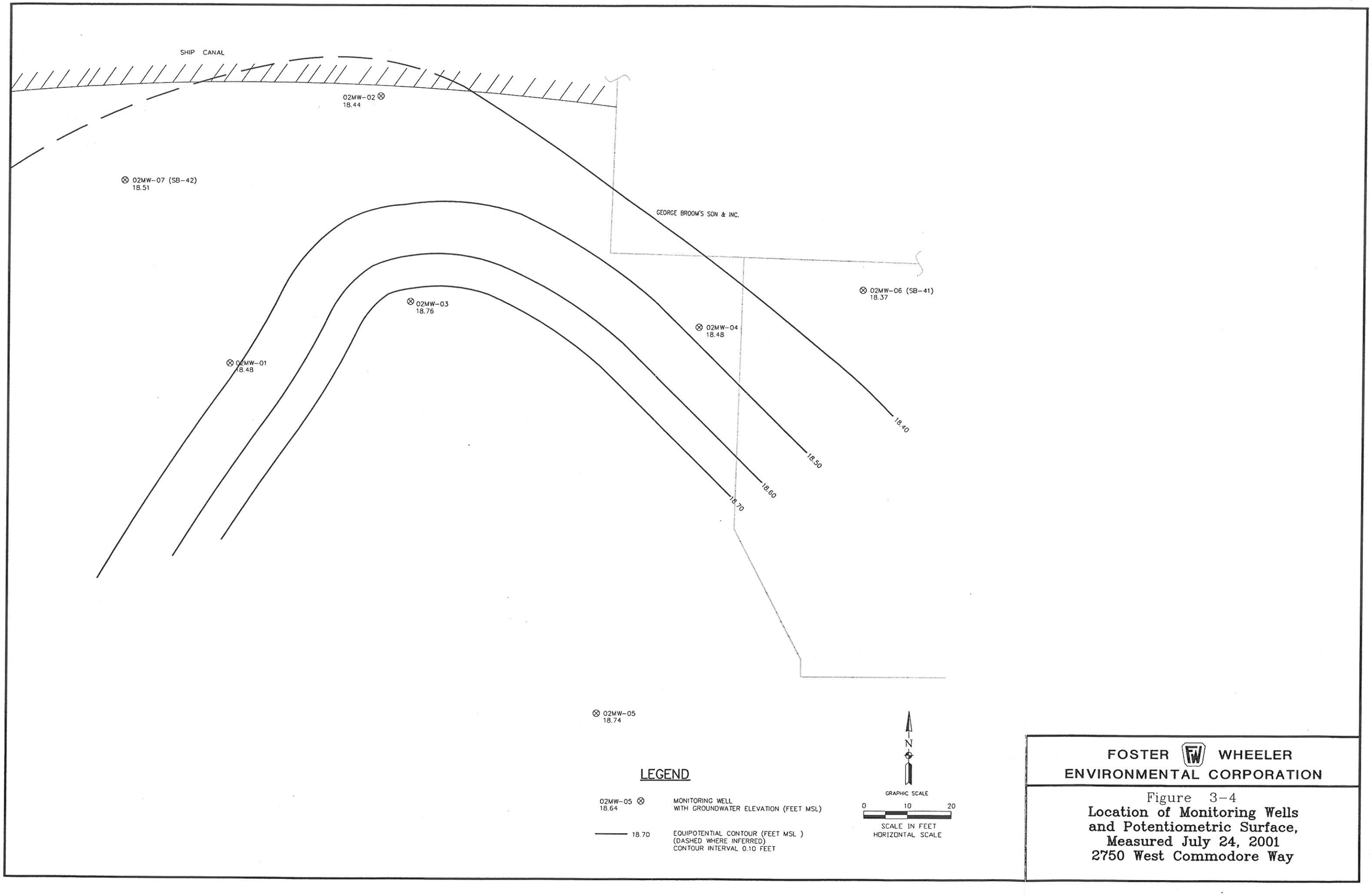
SCALE IN FEET

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Figure 3-3

Potentiometric Surface, July 24, 2001
2737 West Commodore Way

I:\PROJECTS\23063312\DWG\ETIOFG3-3.DWG
PLOT/UPDATE: DEC 28 2001 09:11:27



I:\PROJECTS\23063312\DWG\ETIOFG26.DWG
PLOT/UPDATE: NOV 05 2001 10:19:35

FOSTER WHEELER
ENVIRONMENTAL CORPORATION

Figure 3-4
Location of Monitoring Wells and Potentiometric Surface, Measured July 24, 2001 2750 West Commodore Way

WEST COMMODORE WAY

01MW-09 1,830
01MW-03 24,500
01MW-02 14,800
01MW-10 P
01MW-16 11,000
01MW-05 P
01MW-07 <50.0
01MW-08 <50.0
01MW-04 6,460
10,000
Pipeline Corridor
01MW-11 <50.0
OFFICE BUILDING
CONTAINMENT WALL
14001
8002
5003
01MW-15 <50.0
01MW-06 <50.0
01MW-01 <50.0
01MW-14 P
01MW-12 1,350
8206
5005
5004
NEW BARREL SHED
BUILDING
WAREHOUSE
1,000
22312
01MW-13 221
13910
13808
18107
100
10
0
22014
15011
14009
18313
01MW-17 <50.0

CITY OF SEATTLE
TBM #9962 = EL. 79.61

LEGEND

- ⊗ MONITORING WELL
- ⌖ SURVEY MONUMENT
- 5.0 GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- P = PRODUCT IN WELL
- CONCENTRATIONS IN µg/L

N

GRAPHIC SCALE

0 30 60

SCALE IN FEET

I:\PROJECTS\23063312\DWG\ETIOFG5-2.DWG
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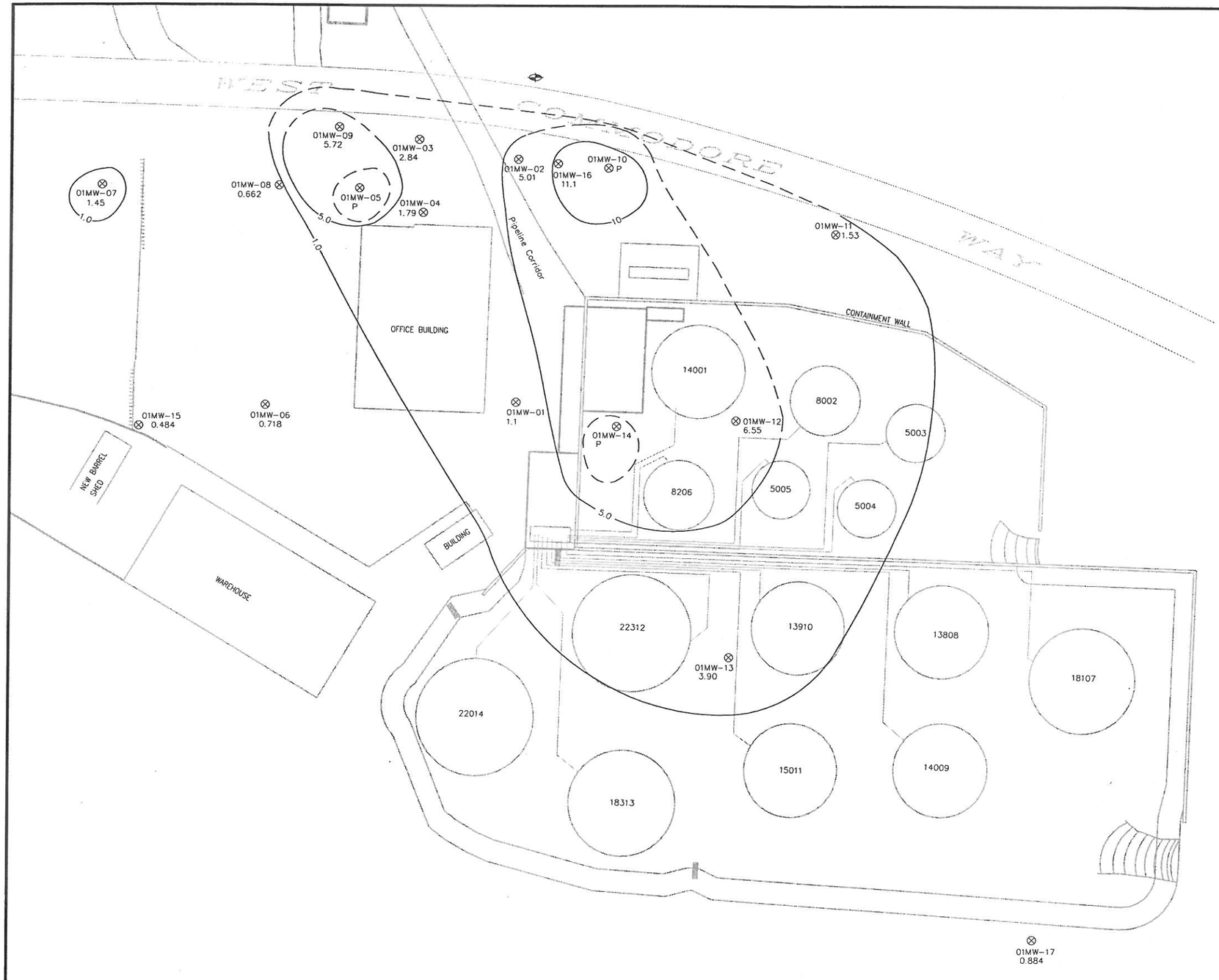
FOSTER WHEELER ENVIRONMENTAL CORPORATION

Figure 5-2
Gasoline-Impacted Groundwater, July 2001
2737 West Commodore Way



LEGEND

- ⊗ MONITORING WELL
- SURVEY MONUMENT
- 5.0 GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- CONCENTRATIONS IN mg/L
- P = PRODUCT IN WELL
- ZERO CONTOUR STILL UNDER EVALUATION

N

GRAPHIC SCALE

0 30 60

SCALE IN FEET

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Figure 5-1

Diesel-Impacted Groundwater, July 2001
2737 West Commodore Way

I:\PROJECTS\23063312\DWG\ETIOFG5-3.DWG
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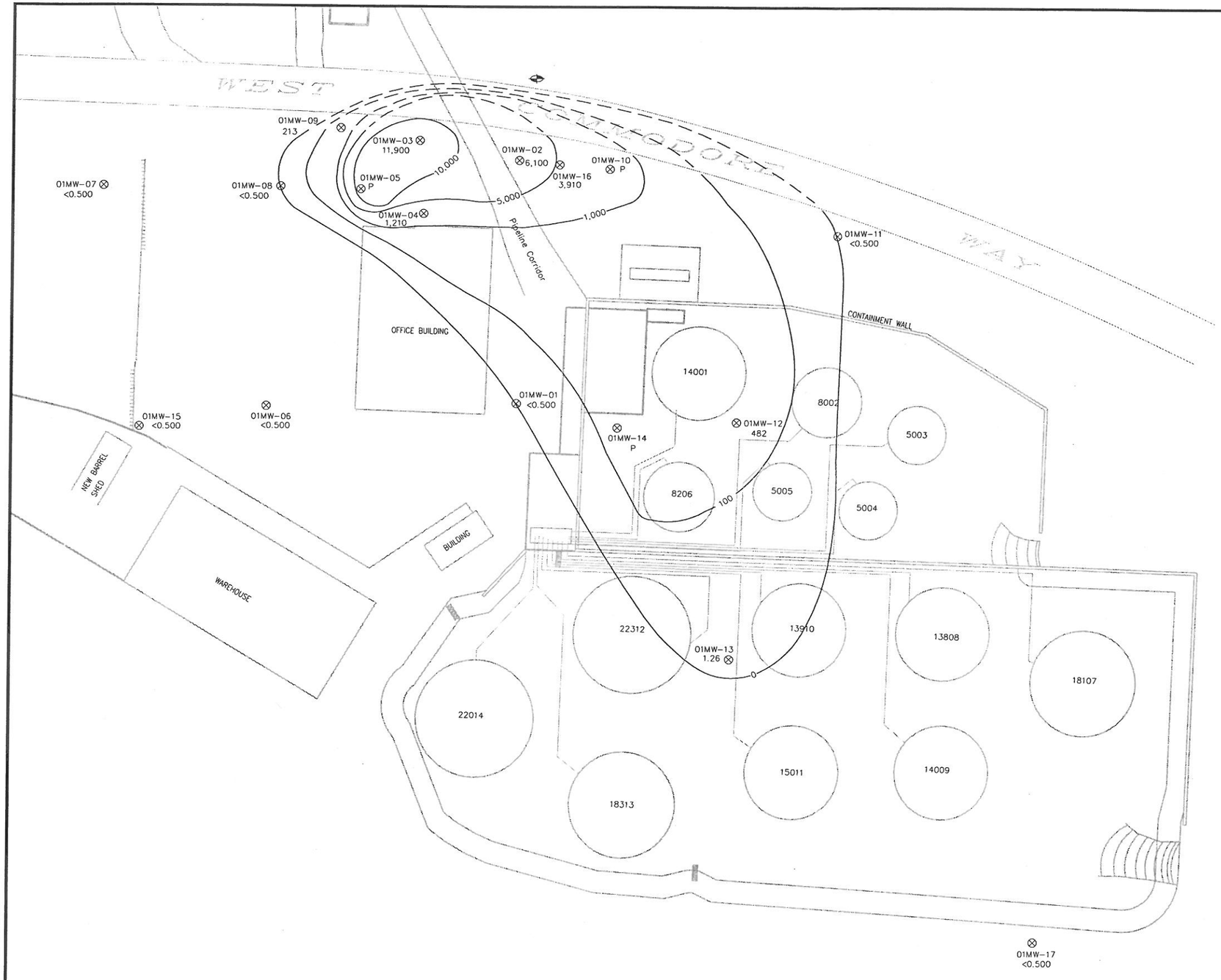


LEGEND

- ⊗ MONITORING WELL
- SURVEY MONUMENT
- 1.0 GROUNDWATER CONTOUR (DASHED WHERE INFERRED)
- P = PRODUCT IN WELL
- CONCENTRATIONS IN ug/L

N

GRAPHIC SCALE

0 30 60

SCALE IN FEET

I:\PROJECTS\23063312\DWG\ETIOFG5-1.DWG
PLOT/UPDATE: DEC 28 2001 09:07:34

FOSTER WHEELER ENVIRONMENTAL CORPORATION

Figure 5-3
Benzene-Impacted Groundwater, July 2001
2737 West Commodore Way

Table 2-1. Analytical Results from 1999 Soil Samples above Cleanup Levels (mg/kg)

	Depth (Feet)	Gasoline	Diesel	Oil	Benzene	Toluene	Ethyl benzene	Total xylene
MTCA		**100**	**200**	**200**	**0.5**	**40**	**20**	**20**
01SB-05	10	***2,360***	***2,450***	<126	<2.5	33.5	***31***	***190***
01SB-08	12.5	***3,650***	***33,900***	<1,030	***9.96***	<5.0	***20.9***	***73.4***
01SB-09	2.5	***381***	***1,780***	***514***	***2.12***	<0.2	<1.4	**<1.2**
01SB-09	7.0	***2,360***	***24,800***	<525	***3.45***	8.11	11.9	***32.1***
01SB-09	12.5	***755,000***	***15,000***	<525	***5,590***	***26,200***	***9,500***	***55,800***
01SB-09	18	***3,970***	***5,870***	<525	***5.26***	10.5	13.7	***61.5***

Notes: Detections above historic MTCA Method A levels are shown in ***bold italic*** type.
Source: IT Corporation 2000

Table 2-2. Analytical Results from 1999 Groundwater and Boring Water Samples

	Date	Total lead (µg/L)	Gasoline (mg/L)	Diesel (mg/L)	Oil (mg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl benzene (µg/L)	Total xylene (µg/L)
MTCA		**5.0**	**1.0**	**1.0**	**1.0**	**5.0**	**40.0**	**30.0**	**20.0**
01MW-01	9/28/99	4.15	<0.0500	<0.0500	<1.0	<0.500	<0.500	<0.500	<1.00
01MW-02	9/28/99	***84.9***	***12.2***	0.714	<0.5	***3,880***	***525***	***230***	***1,100***
01MW-03	9/28/99	***87***	***27.2***	0.944	<0.5	***11,300***	***405***	***398***	***1,590***
01MW-04	9/28/99	***130***	***18.9***	***1.32***	<0.5	***4,370***	***1,150***	***606***	***2,780***
01SB-01	6/6/99	--	***9***	***7.56***	<0.5	***2,280***	***579***	***106***	***483***
01SB-02	6/6/99	--	***1.12***	0.965	<0.5	***25.1***	13.5	19.8	***43.6***
01SB-03	6/6/99	--	0.881	<0.25	<0.5	***147***	5.58	24.6	***68***
01SB-04	6/6/99	--	***11***	***7.12***	<0.5	***547***	***847***	***358***	***1,630***
01SB-05	6/6/99	--	***42.9***	***8.71***	***1.01***	***9,580***	***6,600***	***657***	***3,050***
01SB-07	6/6/99	--	***5.36***	***4.18***	0.577	***1,360***	***270***	***139***	***586***
01SB-08	6/6/99	--	***3.41***	***9.55***	<2.5	***1,160***	***93.3***	***60.5***	***218***
01SB-09	6/6/99	--	***54.8***	***12.8***	***1.06***	***11,000***	***7,510***	***840***	***4,570***

Notes: Detections above historic MTCA Method A levels are shown in ***bold italic*** type.
-- = No data.
µg/L = micrograms per liter
mg/L = milligrams per liter
Source: IT Corporation 2000

Table 3-1. Well Construction Details

Well	Coordinates (WA State Plane)		Top of Casing Elevation (Feet msl)	Ground Elevation (Feet msl)	Total Depth of Boring (Feet bgs)	Total Depth of Well (Feet bgs)	Depth of Screen Interval (Feet bgs)	Elevation of Screen Interval (Feet msl)
	Northing (Feet)	Easting (Feet)						
2737 West Commodore Way								
01MW-01	245454.603	1256198.248	46.48	46.76	25.00	25.25	10 - 25	36.76 - 21.76
01MW-02	245585.027	1256198.518	44.78	45.15	25.00	24.91	10 - 25	35.15 - 20.15
01MW-03	245597.585	1256160.493	44.35	44.75	25.20	25.15	10 - 25	34.75 - 19.75
01MW-04	245563.117	1256163.148	45.08	45.56	25.00	24.90	10 - 25	35.56 - 20.56
01MW-05	245569.311	1256114.025	45.40	45.77	25.00	24.88	10 - 25	35.77 - 20.77
01MW-06	245452.677	1256064.638	47.74	48.23	25	25.10	10 - 25	38.23 -23.23
01MW-07	245570.711	1255975.885	45.17	45.53	30	28.17	15 - 30	30.53 - 15.53
01MW-08	245570.471	1256070.985	45.21	45.63	25	24.93	10 - 25	35.63 - 20.63
01MW-09	245602.062	1256103.039	43.91	44.37	25	24.70	10 - 25	34.37 - 19.37
01MW-10	245580.377	1256246.968	45.02	45.35	25	24.90	10 - 25	35.35 - 20.35
01MW-11	245545.081	1256368.92	46.10	46.45	30	29.90	15 - 30	31.45 - 16.45
01MW-12	245444.877	1256316.069	45.84	46.29	20	20.00	5 - 20	40.84 - 25.84
01MW-13	245317.347	1256313.287	46.36	46.81	20	19.88	15 - 20	31.81 - 26.81
01MW-14	245441.662	1256252.373	46.15	46.15	15	15.00	5 - 15	41.15 - 31.15
01MW-15	245441.314	1255996.388	50.89	50.89	30.12	30.00	10 - 30	40.89 - 20.89
01MW-16	245582.687	1256220.015	44.95	44.95	22.5	20.00	10 - 20	34.95 - 24.95
01MW-17	245166.941	1256477.520	59.42	59.42	30	30.00	15 - 30	44.42 - 29.42
2750 West Commodore Way								
02MW-01	245789.704	1255985.066	24.19	24.72	20	19.60	20 - 10	15.22 - 5.22
02MW-02	245848.029	1256019.016	20.06	20.57	10	9.90	10 - 5	16.07 - 11.07
02MW-03	245801.020	1256026.193	27.86	28.41	20	19.75	20 - 10	18.91 - 8.91
02MW-04	245795.225	1256092.088	27.17	27.59	20	20.05	20 - 10	18.09 - 8.09
02MW-05	245706.854	1256069.207	36.59	37.05	35	33.85	35 - 20	17.55 - 2.55
02MW-06	245803.277	1256129.549	26.54	27.00	20	19.97	20 - 10	17.50 - 7.50
02MW-07	245828.584	1255960.724	20.85	21.39	12	12.20	12 - 2	19.89 - 9.89

Notes: bgs = below ground surface
msl = mean sea level

Table 3-2. Well Development and Sampling Parameters, July 2001

Well	Date	Gallons Purged	pH	Temperature (Celsius)	Dissolved O_2 (mg/L)	Conductivity (mS/cm)	Turbidity (NTU)	Notes
2737 West Commodore Way								
01MW-01	7/24/01	48	7.14	13.98	0.31	0.733	25.8	None
01MW-02	7/26/01	30	6.9	15.1	2.1	1.159	96	Purges dry, recharges in ~5 minutes
01MW-03	7/26/01	28	6.76	14.6	2.6	0.682	62.1	Fuel odor, purges dry after 10 gallons
01MW-04	7/26/01	38	6.89	15.02	2.59	0.754	35.2	None
01MW-06	7/24/01	24	7.25	14.01	0.42	0.961	58.4	None
01MW-07	7/24/01	24	6.86	17.61	0.49	1.052	20.3	None
01MW-08	7/24/01	24	6.97	14.70	0.26	1.152	57.6	None
01MW-09	7/24/01	36	6.96	15.87	0.14	0.849	12.3	None
01MW-10	*Not developed due to product in well*							
01MW-11	7/24/01	25	7.14	14.38	0.28	0.844	2.9	None
01MW-12	7/26/01	24	6.76	12.29	2.46	1.199	104.2	None
01MW-13	7/26/01	45	6.75	12.02	0.38	1.030	52.7	None
01MW-14	*Not developed due to product in well*							
01MW-15	7/26/01	47	7.31	12.65	1.32	1.046	67.9	Slight H_2S odor
01MW-16	*Insufficient water to sample*							
01MW-17	7/26/01	30	7.26	12.56	0.39	0.801	44.2	None
2750 West Commodore Way								
02MW-01	7/23/01	*Instrument failure*						
02MW-02	7/26/01	70	6.67	14.06	2.64	0.775	10.9	None
02MW-03	7/26/01	85	6.58	12.36	0.19	1.219	560	None
02MW-04	7/26/01	25	6.81	12.83	1.24	0.971	120.5	None
02MW-05	7/24/01	20	6.70	13.50	2.61	1.040	>1,000	None
02MW-06	7/26/01	20	6.81	11.60	0.36	0.846	30.2	None

Notes: mg/L = milligrams per liter
mS/cm = millisiemens per centimeter
NTU = nephelometric turbidity unit
H_2S = hydrogen sulfide

Table 4-1. Analytical Results for TPH, Lead, and PCP in Soil at 2737 West Commodore Way, July 2001

Sample	PCP (mg/kg)	Diesel (mg/kg)	Oil (mg/kg)	Gas (mg/kg)		Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Lead (mg/kg)
MTCA[1/]	**8.33[2/]**	**2,000**	**2,000**	**30[3/]**	**100[4/]**	**0.03**	**7**	**6**	**9**	**250**
New Barrel Shed Area										
SB-58-2	<0.500	116	180	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	4.49
SB-58-5	<0.0500	21.4	29.6	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	5.12
SB-58-10	<0.0500	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.49
SB-58-15	0.159	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	3.98
SB-58-25	<0.0500	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.27
Former Barrel Shed Area										
SB-59-2	<0.0500	528	470	65.6		<0.0500	<0.0500	0.0733	0.126	5.24
SB-59-5	<0.500	***4,950***	1,170	***799***		<1.00	<1.00	1.94	<2.00	8.14
SB-59-10	<0.0500	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	5.10
SB-59-15	<0.0500	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.67
SB-59-20	0.148	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.00
West Commodore Way Perimeter Area										
SB-60-2	Na	58.7	79.8	22.8		<0.0500	<0.0500	<0.0500	< 0.100	4.53
SB-60-5	Na	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	8.64
SB-60-10	Na	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	8.20
SB-60-15	Na	***11,400***	<2,520	***1,240***		***1.68***	<1.00	4.04	***10.2***	2.29
SB-60-20	Na	<10.0	<25.0	<5.00		0.0500	<0.0500	<0.500	< 0.100	2.09

Notes: 1/ Results above MTCA Method A level for unrestricted land uses are in ***bold italic*** type.
2/ Results above MTCA Method B carcinogenic level are in ***bold italic*** type.
3/ All other gasoline mixtures.
4/ Without benzene and <20% aromatic hydrocarbons between EC8 and EC16.
< symbol indicates that result is less than reporting limit.
na = No analysis requested.
TPH = total petroleum hydrocarbon
PCP = pentachlorophenol
mg/kg = milligrams per kilogram
MTCA = Model Toxics Control Act

Table 4-2. Analytical Results for PAHs in Soil at 2737 West Commodore Way, July 2001

Sampl	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Total cPAHs
Former PCP/Diesel Mixing Area (Lower Tank Yard Area)								
SB-52-2.5	0.0252	0.0187	0.0138	<0.0100	0.0301	<0.0100	0.0309	0.1187
SB-52-6	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-52-10	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-53-2	<0.0100	0.0109	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0109
SB-53-5	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-53-10	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-54-2	0.159	0.111	<0.0200	<0.0200	0.204	<0.0200	0.0896	0.5636
SB-54-5	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-54-10	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.000
SB-55-2.5	<0.0100	0.0133	<0.0100	<0.0100	<0.0100	<0.0100	0.0289	0.0422
SB-55-6	<0.0100	0.0143	<0.0100	<0.0100	0.0143	<0.0100	0.0286	0.0572
SB-55-10	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-56-2.5	0.717	0.757	<0.500	<0.500	1.15	<0.500	<0.500	***2.6240***
SB-56-5	<0.500	0.736	<0.500	<0.500	<0.500	<0.500	<0.500	0.7360
SB-56-10	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0112	0.0279	0.0391
SB-57-1.5	<0.100	<0.100	<0.100	<0.100	0.189	<0.100	<0.100	0.189
Former Barrel Shed Area								
SB-59-2	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-59-5	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	0.000
SB-59-10	<0.0100	0.111	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.1110
SB-59-15	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-59-20	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000

Table 4-2. Analytical Results for PAHs in Soil at 2737 West Commodore Way, July 2001

Sample	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Total cPAHs
New Barrel Shed Area								
SB-58-2	0.221	<0.100	<0.100	<0.100	0.122	<0.100	<0.100	0.343
SB-58-5	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-58-10	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-58-15	<0.0100	0.102	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.1020
SB-58-20	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-58-25	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
West Commodore Way Perimeter Area								
SB-60-2	<0.0100	<0.0100	<0.0100	<0.0100	0.0209	<0.0100	<0.0100	0.0209
SB-60-5	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-60-10	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-60-15	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-60-20	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
Upper Rail Line Spur Area								
SB-61-2	<0.0100	0.0327	0.0295	<0.0100	<0.0100	<0.0100	0.0463	0.1085
SB-61-5	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-61-10	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000
SB-61-15	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	0.0000

Notes: Total cPAHs include sum of detections. Half of reporting limit used for non-detects.
All values in milligrams per kilogram (mg/kg).
Total cPAHs that exceed MTCA Method A level of 1 mg/kg are in ***bold italic*** type.
cPAHs = carcinogenic polyaromatic hydrocarbons

Table 4-3. Analytical Results for Groundwater Samples from 2737 West Commodore Way, July 2001

Sample	PCP (µg/L)	Diesel (mg/L)	Oil (mg/L)	Gas (µg/L)		Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Lead (µg/L)
MTCA[1/]	**15[2/]**	**0.5**	**0.5**	**800[3/]**	**1,000[4/]**	**5,300[5/]**	**17,500[5/]**	**32,000[5/]**	**1,000**	**15**
Former LUST Area										
01MW-01	3.94	***1.11***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
01MW-02	na	***5.01***	<1.50	***14,800***		***6,900***	162	262	***1,110***	< 1.00
01MW-03	na	***2.84***	<1.50	***24,500***		***11,900***	238	414	515	< 1.00
01MW-04	na	***1.79***	<1.50	***6,460***		1,210	204	134	***1,470***	< 1.00
01MW-07	na	***1.45***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
01MW-08	na	***0.662***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
01MW-09	na	***5.72***	< 0.500	***1,830***		213	114	48.1	230	< 1.00
West Commodore Way Perimeter Area										
01MW-10	na	na	na	na		na	na	na	na	na
01MW-11	na	***1.53***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
01MW-16A	2.54	***11.1***	< 2.50	***11,000***		3,910	123	261	891	< 1.00
01MW-16B	2.09	***9.62***	< 2.50	***9,390***		3,700	122	209	745	< 1.00
Relative Percent Difference	*19%*	*14%*	*nc*	*16%*		*6%*	*1%*	*22%*	*18%*	*nc*
Lower Tank Yard Area										
01MW-12	na	***6.55***	< 1.50	***1,350***		482	8.84	14.0	26.4	< 1.00
Upper Tank Yard Area										
01MW-13	na	***3.90***	< 1.50	221		1.26	< 0.500	< 0.500	2.31	< 1.00
Former PCP/Diesel Mixing Area (Lower Tank Yard Area)										
01MW-14	na	na	na	na		na	na	na	na	na
Former Barrel Shed Area										
01MW-06	2.17	***0.718***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
New Barrel Shed Area										
01MW-15	1.66	0.484	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
Upper Rail Line Spur Area										
01MW-17	< 0.500	***0.884***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00	< 1.00

Notes: 1/ Results above MTCA Method A level are in ***bold italic*** type.
2/ NOAA SQuiRT value for freshwater continuous concentration.
3/ Gasoline range with benzene present.
4/ Gasoline range without benzene present.
5/ NOAA SQuiRT value for freshwater maximum concentration.
na = No analysis requested.
nc = Not able to calculate.
µg/L = micrograms per liter
mg/L = milligrams per liter
< symbol indicates that result is less than reporting limit.

Table 3-3. Water Levels Measured at 2737 and 2750 West Commodore Way, July 24, 2001

Well	Top of Casing Elevation (Feet msl)	Ground Elevation (Feet msl)	Total Depth of Well (Feet bgs)	Depth of Fuel (Feet bgs)	Depth of Water (Feet bgs)	Fuel Thickness (Feet)	Water Elevation (Feet msl)
2737 West Commodore Way							
01MW-01	46.48	46.76	25.25	0.00	14.61	0.00	31.87
01MW-02	44.78	45.15	24.91	0.00	16.29	0.00	28.49
01MW-03	44.35	44.75	25.15	0.00	15.89	0.00	28.46
01MW-04	45.08	45.56	24.90	0.00	15.69	0.00	29.39
01MW-05	45.40	45.77	24.88	15.82	21.77	5.95	28.39
01MW-06	47.74	48.23	25.10	0.00	16.37	0.00	31.37
01MW-07	45.17	45.53	28.17	0.00	23.62	0.00	21.55
01MW-08	45.21	45.63	24.93	0.00	17.08	0.00	28.13
01MW-09	43.91	44.37	24.70	0.00	19.07	0.00	24.84
01MW-10	45.02	45.35	24.90	23.74	24.47	0.73	21.28
01MW-11	46.10	46.45	29.90	0.00	23.52	0.00	22.58
01MW-12	45.84	46.29	20.00	0.00	7.22	0.00	38.62
01MW-13	46.36	46.81	19.88	0.00	6.47	0.00	46.81
01MW-14	46.15	46.15	15.00	8.30	na	6.70	na
01MW-15	50.89	50.89	30.00	0.00	22.67	0.00	28.22
01MW-16	44.95	44.95	20.00	0.00	18.25	0.00	26.70
01MW-17	59.42	59.42	30.00	0.00	19.18	0.00	40.24
2750 West Commodore Way							
02MW-01	24.19	24.72	19.60	0.00	5.71	0.00	18.48
02MW-02	20.06	20.57	9.90	0.00	1.62	0.00	18.44
02MW-03	27.86	28.41	19.75	0.00	9.10	0.00	18.76
02MW-04	27.17	27.59	20.05	0.00	8.69	0.00	18.48
02MW-05	36.59	37.05	33.85	0.00	17.85	0.00	18.74
02MW-06	26.54	27.00	19.97	0.00	8.17	0.00	18.37
02MW-07	20.85	21.39	12.20	0.00	2.34	0.00	18.51

Notes: na = Water level was not determined because product was present.
msl = mean sea level
bgs = below ground surface

Table 4-1. Analytical Results for TPH, Lead, and PCP in Soil at 2737 West Commodore Way, July 2001

Sample	PCP (mg/kg)	Diesel (mg/kg)	Oil (mg/kg)	Gas (mg/kg)		Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	Lead (mg/kg)
MTCA[1/]	**8.33[2/]**	**2,000**	**2,000**	**30[3/]**	**100[4/]**	**0.03**	**7**	**6**	**9**	**250**
Upper Rail Line Spur Area										
SB-61-2	na	20.1	88.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	5.14
SB-61-5	na	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	7.43
SB-61-10	na	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.86
SB-61-15	na	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	4.17
Former PCP/Diesel Mixing Area (Lower Tank Yard Area)										
SB-52-2.5	<0.0500	***4,180***	<1,020	***1,410***		<1.00	<1.00	1.42	2.18	5.02
SB-52-6	<0.0500	34.4	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	7.45
SB-52-10	0.129	10.3	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.39
SB-53-2	0.0916	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.67
SB-53-5	<0.0500	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	5.83
SB-53-10	<0.0500	15.7	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.54
SB-54-2	0.181	1,500	1,230	86.2		<0.100	<0.100	<0.100	< 0.200	3.24
SB-54-5	<0.0500	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	4.08
SB-54-10	0.0780	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.37
SB-55-2.5	<0.0500	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	4.98
SB-55-6	0.174	370	<75.0	***185***		<0.200	<0.200	0.811	3.06	7.56
SB-55-10	0.0770	13.4	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.58
SB-56-2.5	<0.500	***28,300***	<5,020	***5,100***		***10.2***	6.24	***29.3***	***75.6***	10.9
SB-56-5	***8.88***	***2,040***	<525	***4,060***		***9.36***	<1.00	***22.3***	***60.5***	6.85
SB-56-10	0.0765	<10.0	<25.0	<5.00		<0.0500	<0.0500	<0.0500	< 0.100	2.59
SB-57-1.5	<0.0500	***3,970***	881	***2,590***		***0.387***	1.94	***18.2***	8.85	13.2

Table 4-4. Analytical Results for PAHs in Groundwater at 2737 West Commodore Way, July 2001

Sample	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Indeno(1,2,3-cd)pyrene	Total cPAHs
Former Barrel Shed Area								
01MW-06	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
New Barrel Shed Area								
01MW-15	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
West Commodore Way Perimeter Area								
01MW-16A	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
01MW-16B	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Relative Percent Difference	nc	nc	nc	nc	nc	nc	nc	nc
Upper Rail Line Spur Area								
01MW-17	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100

Notes: Total cPAHs include sum of detections. Half of reporting limit used for non-detects.
All values in micrograms per liter (µg/L).
nc = Not able to calculate.
cPAHs = carcinogenic polyaromatic hydrocarbons

Table 4-5. Analytical Results for Groundwater at 2750 West Commodore Way, July 2001

Sample	Gas (µg/L)		Diesel (mg/L)	Oil (mg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Lead (µg/L)
MTCA	**800[1/]**	**1,000[2/]**	**0.5**	**0.5**	**5,300[3/]**	**1,000**	**32,000[3/]**	**1,000**	**15**
02MW-01	119		***0.500***	< 0.500	44.4	0.662	< 0.500	1.15	< 1.00
02MW-02	< 50.0		***0.679***	< 0.500	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
02MW-03	90.4		***0.619***	< 0.500	38.6	0.664	< 0.500	< 1.00	< 1.00
02MW-04	***4,270***		***1.41***	< 0.500	23.9	231	165	484	4.68
02MW-05	51.8		***0.997***	< 0.500	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
02MW06A	< 50.0		***0.923***	< 0.500	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
02MW06B	< 50.0		***0.897***	< 0.500	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
Relative Percent Difference	*nc*		*3%*	*nc*	*nc*	*nc*	*nc*	*nc*	*nc*
02MW-07	244		0.417	< 0.500	< 0.500	< 0.500	< 0.500	2.79	< 1.00

Notes: Detections above MTCA Method A are in ***bold italic*** type.

1/ Gasoline range with benzene present.

2/ Gasoline range without benzene present.

3/ NOAA SQuiRT values for freshwater continuous concentration.

na = Not applicable.

nc = Not able to calculate.

µg/L = micrograms per liter

mg/L = milligrams per liter

Table 5-1. Phase III Soil Sample Results Exceeding MTCA Method A Levels for Unrestricted Soil at 2737 West Commodore Way

Sample	PCP (mg/kg)	Diesel (mg/kg)	Gas (mg/kg)		Benzene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)	cPAHs (mg/kg)
MTCA[1/]	**8.33[2/]**	**2,000**	**30[3/]**	**100[4/]**	**0.03**	**6**	**9**	**1.0**
Former PCP/Diesel Mixing Area (Lower Tank Yard Area)								
SB-52-2.5	<0.0500	***4,180***	***1,410***		<1.00	1.42	2.18	0.1187
SB-55-6	0.174	370	***185***		<0.200	0.811	3.06	0.0572
SB-56-2.5	<0.500	***28,300***	***5,100***		***10.2***	***29.3***	***75.6***	***2.624***
SB-56-5	***8.88***	***2,040***	***4,060***		***9.36***	***22.3***	***60.5***	0.736
SB-57-1.5	<0.0500	***3,970***	***2,590***		***0.387***	***18.2***	8.85	0.189
Former Barrel Shed Area								
SB-59-5	<0.500	***4,950***	***799***		<1.00	1.94	<2.00	na
West Commodore Way Perimeter Area								
SB-60-15	na	***11,400***	***1,240***		***1.68***	4.04	***10.2***	0.0000

Notes: 1/ Results above MTCA Method A level for unrestricted land uses are in ***bold italic*** type.
2/ Results above MTCA Method B carcinogenic level are in ***bold italic*** type.
3/ All other gasoline mixtures
4/ Without benzene and <20% aromatic hydrocarbons between EC8 and EC16
< symbol indicates that result is less than reporting limit.
na = No analysis requested.
MTCA = Model Toxics Control Act
PCP = pentachlorophenol
cPAHs = carcinogenic polyaromatic hydrocarbons
mg/kg = milligrams per kilogram

Table 5-2. Groundwater Samples Exceeding Cleanup Levels at 2737 West Commodore Way, July 2001

Sample	PCP (µg/L)	Diesel (mg/L)	Gas (µg/L)		Benzene (µg/L)	Xylenes (µg/L)
MTCA[1/]	**15[2/]**	**0.5**	**800[3/]**	**1,000[4/]**	**5,300[5/]**	**1,000**
Former LUST Area						
01MW-01	3.94	***1.11***	< 50.0		< 0.500	< 1.00
01MW-02	na	***5.01***	***14,800***		***6,900***	***1,110***
01MW-03	na	***2.84***	***24,500***		***11,900***	515
01MW-04	na	***1.79***	***6,460***		1,210	***1,470***
01MW-07	na	***1.45***	< 50.0		< 0.500	< 1.00
01MW-08	na	***0.662***	< 50.0		< 0.500	< 1.00
01MW-09	na	***5.72***	***1,830***		213	230
West Commodore Way Perimeter Area						
01MW-11	na	***1.53***	< 50.0		< 0.500	< 1.00
01MW-16A	2.54	***11.1***	***11,000***		*3,910*	891
01MW-16B	2.09	***9.62***	***9,390***		3,700	745
Lower Tank Yard Area						
01MW-12	na	***6.55***	***1,350***		482	26.4
Upper Tank Yard Area						
01MW-13	na	***3.90***	221		1.26	2.31
Former Barrel Shed Area						
01MW-06	2.17	***0.718***	< 50.0		< 0.500	< 1.00
New Barrel Shed Area						
01MW-15	1.66	0.484	<50.0		<0.500	<1.00
Upper Rail Line Spur Area						
01MW-17	<0.500	***0.884***	<50.0		<0.500	<1.00

Notes: 1/ Results above MTCA Method A level are in ***bold italic*** type.
2/ NOAA SQuiRT value for freshwater continuous concentrations.
3/ Gasoline range with benzene present.
4/ Gasoline range without benzene present.
5/ NOAA SQuiRT value for freshwater maximum concentration.
na = No analysis requested.
µg/L = micrograms per liter
mg/L = milligrams per liter
< symbol indicates that result is less than reporting limit.

Table 5-3. Groundwater Samples Exceeding Cleanup Levels at 2750 West Commodore Way, July 2001

Sample	Diesel (mg/L)	Gas (µg/L)	
MTCA	**0.5**	**800[1/]**	**1,000[2/]**
02MW-01	***0.500***	119	
02MW-02	***0.679***	< 50.0	
02MW-03	***0.619***	90.4	
02MW-04	***1.41***	***4,270***	
02MW-05	***0.997***	51.8	
02MW-06A	***0.923***	< 50.0	
02MW-06B	***0.897***	< 50.0	
02MW-07	0.417	244	

Notes: Detections above MTCA Method A are in ***bold italic*** type.
1/ Gasoline range with benzene present.
2/ Gasoline range without benzene present.
mg/L = milligrams per liter
µg/L = micrograms per liter

Table 5-4. Cumulative Groundwater Samples, 2737 West Commodore Way

Sample	Date	PCP (µg/L)	Diesel (mg/L)	Oil (mg/L)	Gas (µg/L)		Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)
MTCA[1/]		15[2/]	0.5	0.5	800[3/]	1,000[4/]	5,300[5/]	17,500[5/]	32,000[5/]	1,000
Former LUST Area										
01MW-01	Sep-99	na	< 50.0	< 1.0	< 50.0		< 0.500	< 0.500	< 0.500	1.93
01MW-01	Dec-00	na	***1.65***	< 0.500	75.2		0.924	1.46	< 0.500	1.93
01MW-01	Jul-01	3.94	***1.11***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00
01MW-02	Sep-99	na	***0.714***	< 0.500	***12,200***		3,880	525	230	***1,100***
01MW-02	Dec-00	na	***5.00***	< 0.500	***12,700***		3,300	1010	331	***1,510***
01MW-02	Jul-01	na	***5.01***	<1.50	***14,800***		***6,900***	162	262	***1,110***
01MW-03	Sep-99	na	***0.944***	< 0.500	***27,200***		***11,300***	405	398	***1,590***
01MW-03	Dec-00	na	***1.65***	< 0.500	***3,620***		1,020	26.9	63.6	210
01MW-03	Jul-01	na	***2.84***	<1.50	***24,500***		***11,900***	238	414	515
01MW-04	Sep-99	na	***1.32***	< 0.500	***18,900***		4,370	1,150	606	***2,780***
01MW-04	Dec-00	na	***1.86***	< 0.500	***7,930***		71.2	402	570	***2,840***
01MW-04	Jul-01	na	***1.79***	<1.50	***6,460***		1,210	204	134	***1,470***
01MW-07	Dec-00	na	< 0.250	< 0.500	< 50.0		< 1.08	< 0.500	< 0.500	< 1.00
01MW-07	Jul-01	na	***1.45***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00
01MW-08	Dec-00	na	0.404	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00
01MW-08	Jul-01	na	***0.662***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00
01MW-09	Dec-00	na	***1.07***	< 0.500	***2,210***		302	143	65.2	333
01MW-09	Jul-01	na	***5.72***	< 0.500	***1,830***		213	114	48.1	230
West Commodore Way Perimeter Area										
01MW-10	Jul-01	na	na	na	na		na	na	na	na
01MW-11	Dec-00	na	***0.504***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00
01MW-11	Jul-01	na	***1.53***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00
01MW-16A	Jul-01	2.54	***11.1***	<2.50	***11,000***		3,910	123	261	891
01MW-16B	Jul-01	2.09	***9.62***	<2.50	***9,390***		3,700	122	209	745
Upper Tank Yard Area										
01MW-13	Dec-00	na	***3.94***	0.513	254		< 0.500	0.694	< 0.817	< 1.23
01MW-13	Jul-01	na	***3.90***	<1.50	221		1.26	< 0.500	< 0.500	2.31
Lower Tank Yard Area										
01MW-12	Dec-00	na	***1.07***	< 0.500	***802***		98.4	11.0	17.4	24.6
01MW-12	Jul-01	na	***6.55***	<1.50	***1,350***		482	8.84	14.0	26.4
Former PCP/Diesel Mixing Area										
01MW-14	Jul-01	na	na	na	na		na	na	na	na
Former Barrel Shed Area										
01MW-06	Dec-00	1.80	< 0.250	< 0.500	87.4		< 0.500	< 0.500	< 0.500	< 1.00
01MW-06	Jul-01	2.17	***0.718***	< 0.500	< 50.0		< 0.500	< 0.500	< 0.500	< 1.00
New Barrel Shed Area										
01MW-15	Jul-01	1.66	0.484	<0.500	< 50.0		<0.500	<0.500	<0.500	<1.00
Upper Rail Line Spur Area										
01MW-17	Jul-01	<0.500	***0.884***	<0.500	< 50.0		<0.500	<0.500	<0.500	<1.00

Notes: 1/ Results above MTCA Method A cleanup level are in ***bold italic*** type.
2/ NOAA SQuiRT value for freshwater continuous concentrations.
3/ Gasoline range with benzene present.
4/ Gasoline range without benzene present.
5/ NOAA SQuiRT value for freshwater maximum concentration.
PCP = pentachlorophenol
na = No analysis requested.
µg/L = micrograms per liter
mg/L = milligrams per liter
< symbol indicates that result is less than method reporting limit.

Table 5-5. Cumulative Groundwater Results, 2750 West Commodore Way

Sample	Date	Diesel (mg/L)	Oil (mg/L)	Gas (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Xylenes (µg/L)	Lead (µg/L)
MTCA		**0.500**	**0.500**	**800[1/] 1,000[2/]**	**5,300[3/]**	**17,500[3/]**	**32,000[3/]**	**1,000**	**15**
02MW-01	9/28/99	< 250	< 500	172	72.9	0.811	< 0.5	< 1.0	**36**
02MW-01	11/16/00	0.488	< 0.500	79.0	19.6	1.04	< 0.500	2.35	< 1.00
02MW-01	7/25/01	**0.500**	< 0.500	119.0	44.4	0.662	< 0.500	1.15	< 1.00
02MW-02	9/28/99	< 250	< 500	< 50	< 0.5	< 0.5	< 0.5	< 1.0	**133**
02MW-02	11/16/00	***0.666***	< 0.500	55.0	< 0.580	1.63	0.598	3.28	< 1.00
02MW-02	7/25/01	***0.679***	< 0.500	< 50	< 0.500	< 0.500	< 0.500	< 1.00	< 1.00
02MW-03	9/28/99	< 250	< 500	160	56.7	1.13	< 0.5	1.14	< 1.00
02MW-03	11/16/00	***0.534***	< 0.500	241	118	2.05	< 1.25	< 2.50	< 1.00
02MW-03	7/25/01	***0.619***	< 0.500	90.4	38.6	0.664	< 0.500	< 1.00	< 1.00
02MW-04	9/28/99	< 250	< 500	***3700***	< 30.0	185	226	473	< 1.00
02MW-04	11/16/00	***1.07***	< 0.500	***9020***	< 12.5	972	617	1,840	4.66
02MW-04A	11/16/00	***1.23***	< 0.500	***9650***	< 25.0	996	627	1,850	5.12
02MW-04	7/25/01	***1.41***	< 0.500	***4270***	23.9	231	165	484	4.68
02MW-05	9/28/99	< 250	< 500	< 50	2.84	< 0.5	< 0.5	< 1.0	**86.3**
02MW-05	11/16/00	***0.536***	< 0.500	64.0	< 0.500	< 0.500	< 0.500	1.17	< 0.00100
02MW-05	7/25/01	***0.997***	< 0.500	51.8	< 0.500	< 0.500	< 0.500	< 1.00	< 0.00100
02MW-06	11/30/00	***1.00***	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 0.00100
02MW-06A	7/25/01	***0.923***	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 0.00100
02MW-06B	7/25/01	***0.897***	< 0.500	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	< 0.00100
02MW-07	12/1/00	0.299	< 0.500	356	< 0.500	< 0.820	< 3.55	< 9.83	< 0.00100
02MW-07	7/25/01	***0.417***	< 0.500	244	< 0.500	< 0.500	< 0.500	2.79	< 0.00100
Trip Blank (11/30)	12/1/00	na	na	< 50.0	< 0.500	< 0.500	< 0.500	< 1.00	na

Notes: Detections are in ***bold italic*** type.
1/ Gasoline range with benzene present.
2/ Gasoline range without benzene present.
3/ NOAA SQuiRT value for freshwater maximum concentration.
µg/L = micrograms per liter
mg/L = milligrams per liter
na = No analysis requested.

APPENDIX A

SOIL BORING LOGS

FOSTER WHEELER ENVIRONMENTAL CORP.

PROJECT NAME: Phase III Site Assessment

BORING NUMBER: SB-52

LOCATION: 2737 West Commodore Way

AREA: Former PCP/Diesel Mixing Area

CLIENT: Time Oil Company

SITE MANAGER: Scott Sloan

DRILLING METHOD: 2-inch Acker Soil Mechanic

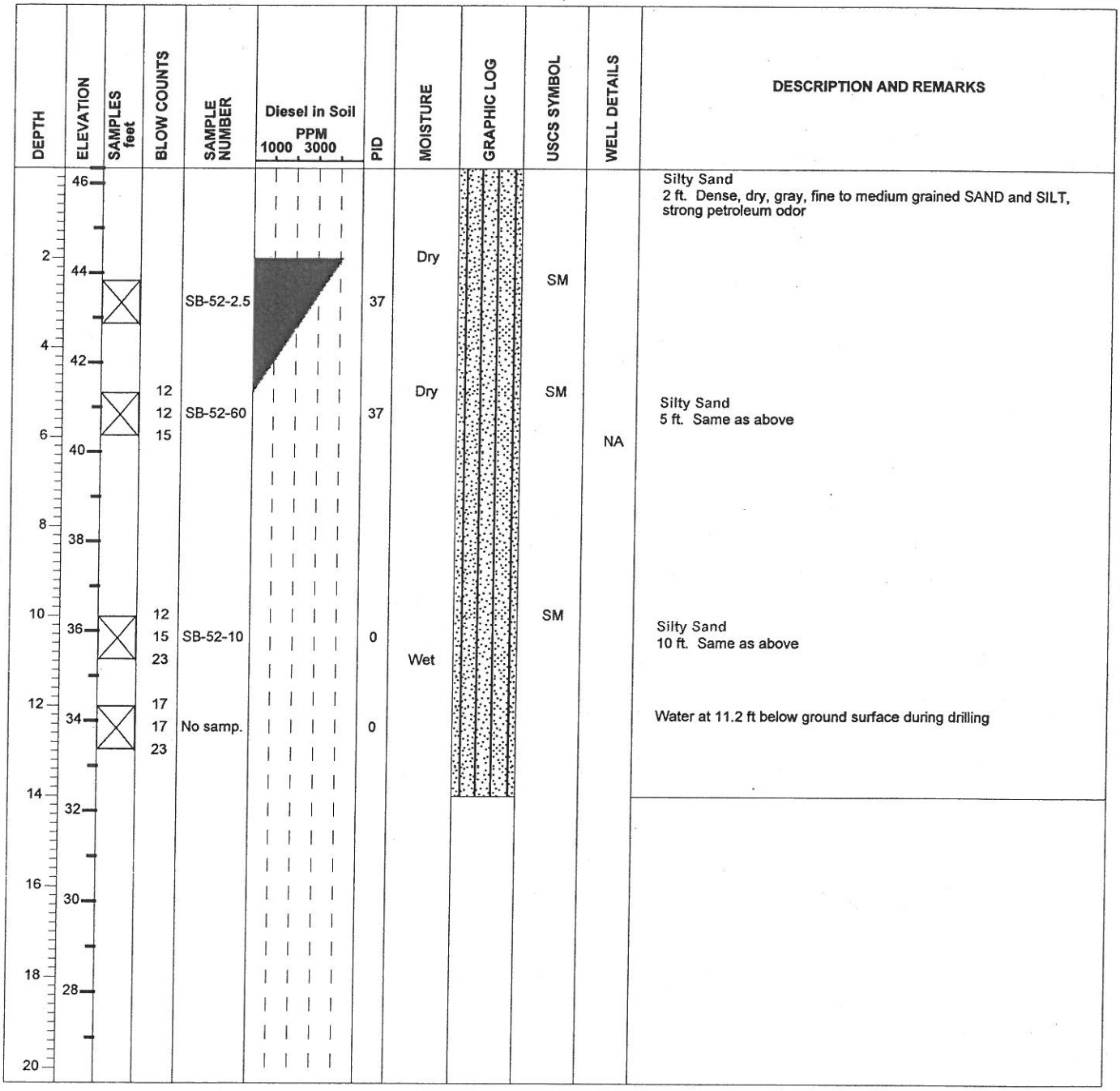
DRILLING CONTRACTOR: BoreTec

DATE/TIME STARTED: 7/16/01 0830

DATE/TIME COMPLETED: 7/16/01 0930

TOTAL DEPTH: 14 feet

WATER DEPTH: 11 feet



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FOSTER WHEELER ENVIRONMENTAL CORP.

PROJECT NAME: Phase III Site Assessment
BORING NUMBER: SB-53
LOCATION: 2737 West Commodore Way
AREA: Former PCP/Diesel Mixing Area
CLIENT: Time Oil Company
SITE MANAGER: Scott Sloan

DRILLING METHOD: 2-inch Acker Soil Mechanic
DRILLING CONTRACTOR: BoreTec
DATE/TIME STARTED: 7/16/01 1030
DATE/TIME COMPLETED: 7/16/01 1130
TOTAL DEPTH: 12 feet
WATER DEPTH: 11 feet

DEPTH	ELEVATION	SAMPLES feet	BLOW COUNTS	SAMPLE NUMBER	Diesel in Soil PPM 20 30 40	PID	MOISTURE	GRAPHIC LOG	USCS SYMBOL	WELL DETAILS	DESCRIPTION AND REMARKS
0	46								SM		Silty Sand 0 to 2 ft. Medium dense, dry, gray, fine to medium grained SILTY SAND, petroleum odor, some oxidized layers in upper 2 feet
2	44	X	12 16	SB-53-2		7.3	Dry		GP		Gravel 2 ft. Dense, dry, gray to brown, GRAVEL
4	42	X	17 13 14	SB-53-5		5.1	Dry		SM		Silty Sand 3 ft. medium dense, dry, gray, fine to medium grained SILTY SAND, petroleum odor
6	40								ML	NA	Silt 6 ft. Silt lenses
8	38								SM		Silty Sand 7 ft. Silty Sand as above
10	36	X	12 13 15	SB-53-10		0	Wet		SW		Sand 10 ft. Medium dense, wet, gray, fine to medium grained SAND, no odor
12	34										
14	32										
16	30										
18	28										
20											

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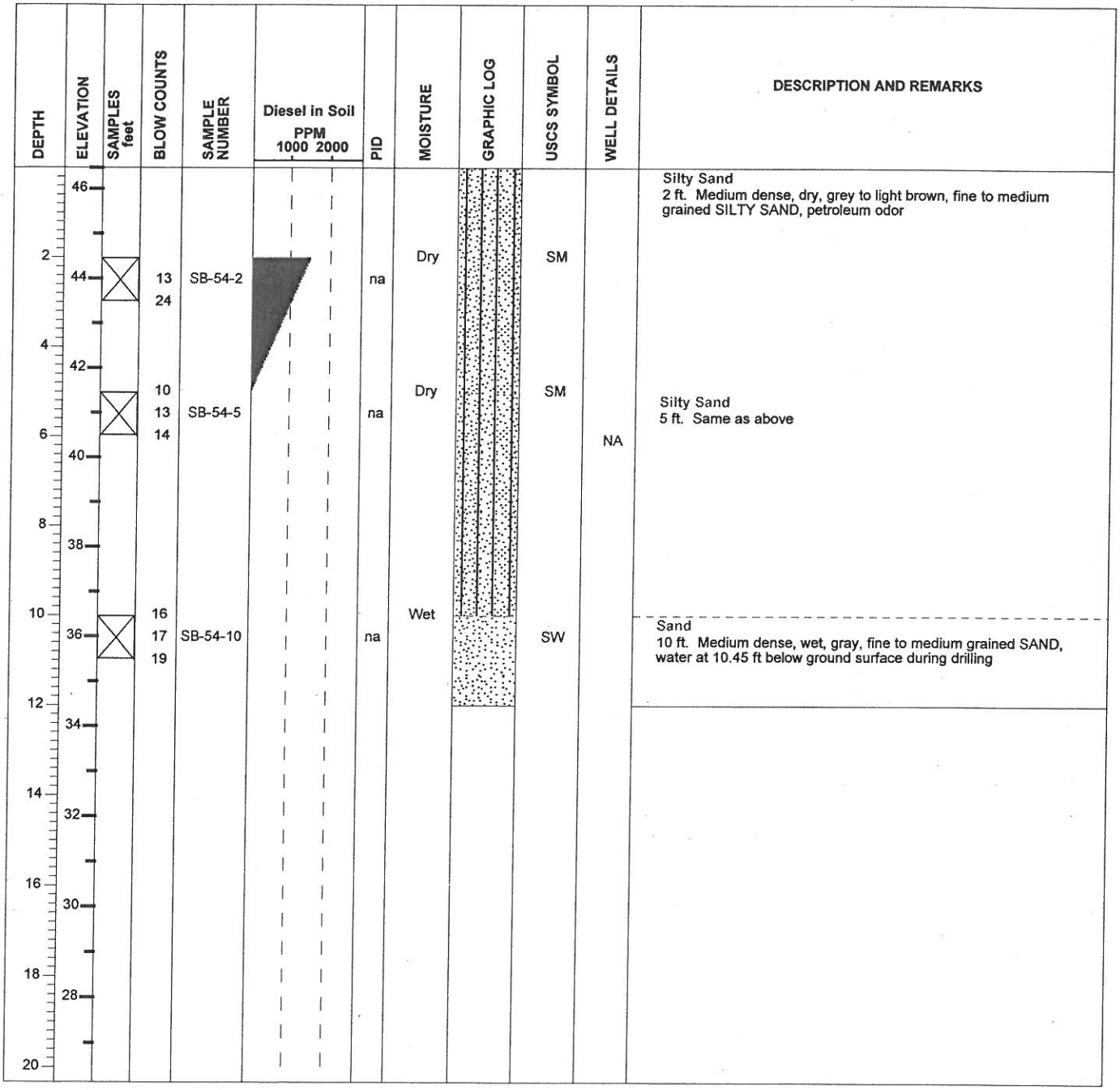
FOSTER WHEELER ENVIRONMENTAL CORP.

PROJECT NAME: Phase III Site Assessment
BORING NUMBER: SB-54
LOCATION: 2737 West Commodore Way
AREA: Former PCP/Diesel Mixing Area
CLIENT: Time Oil Company
SITE MANAGER: Scott Sloan

DRILLING METHOD: 2-inch Acker Soil Mechanic
DRILLING CONTRACTOR: Foster Wheeler
DATE/TIME STARTED: 7/16/01 1245
DATE/TIME COMPLETED: 7/16/01 1320
TOTAL DEPTH: 12 feet
WATER DEPTH: 10.5 ft



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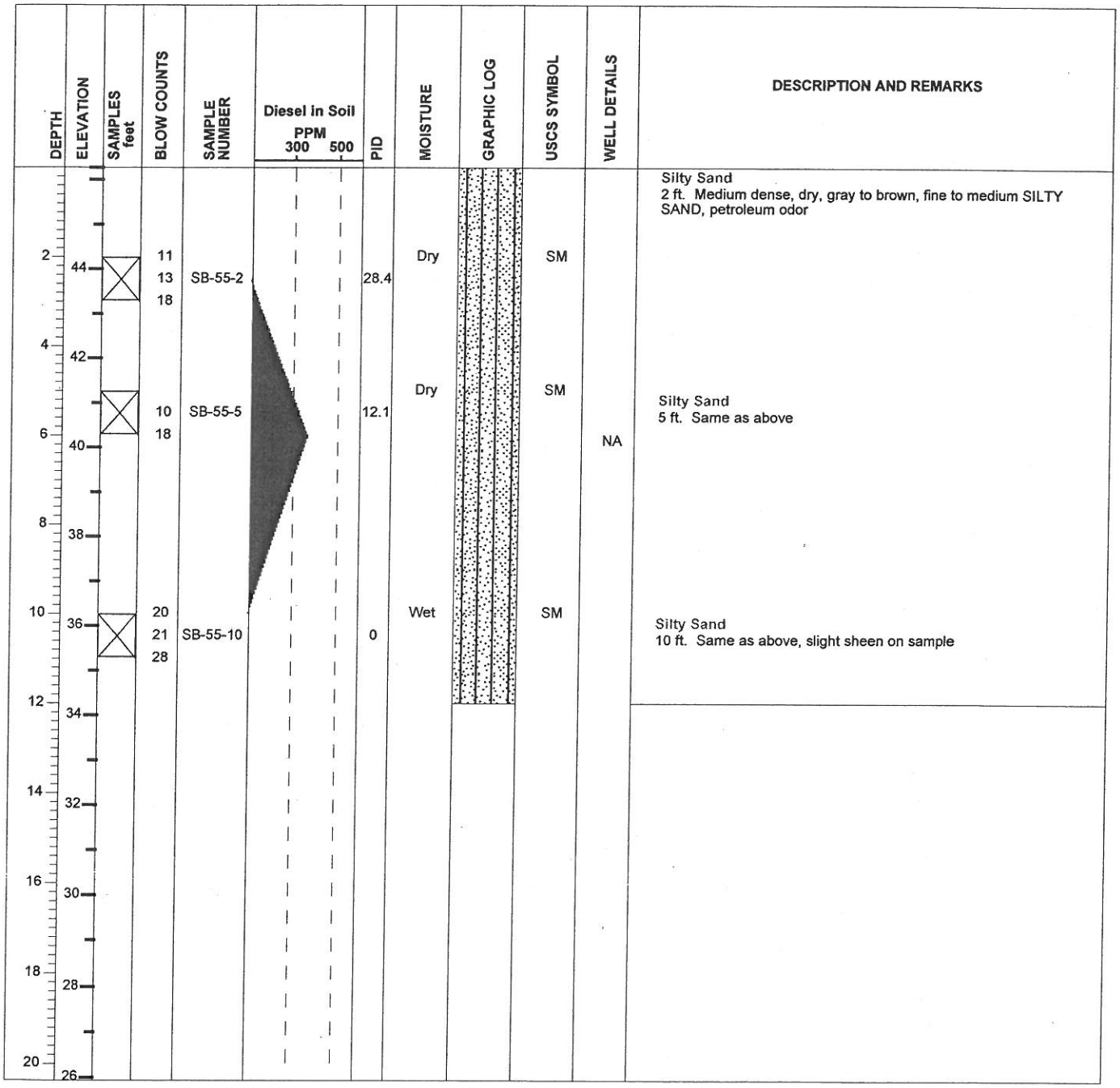
FOSTER WHEELER ENVIRONMENTAL CORP.

PROJECT NAME: Phase III Site Assessment
BORING NUMBER: SB-55
LOCATION: 2737 West Commodore Way
AREA: Former PCP/Diesel Mixing Area
CLIENT: Time Oil Company
SITE MANAGER: Scott Sloan

DRILLING METHOD: 2-inch Acker Soil Mechanic
DRILLING CONTRACTOR: Cascade
DATE/TIME STARTED: 7/16/01 1410
DATE/TIME COMPLETED: 7/16/01 1500
TOTAL DEPTH: 12 feet
WATER DEPTH: 10.5 ft



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FOSTER WHEELER ENVIRONMENTAL CORP.

PROJECT NAME: Phase III Site Assessment

BORING NUMBER: SB-56 (01MW-14)

LOCATION: 2737 West Commodore Way

AREA: Former PCP/Diesel Mixing Area

CLIENT: Time Oil Company

SITE MANAGER: Scott Sloan

DRILLING METHOD: 2-inch Acker Soil Mechanic

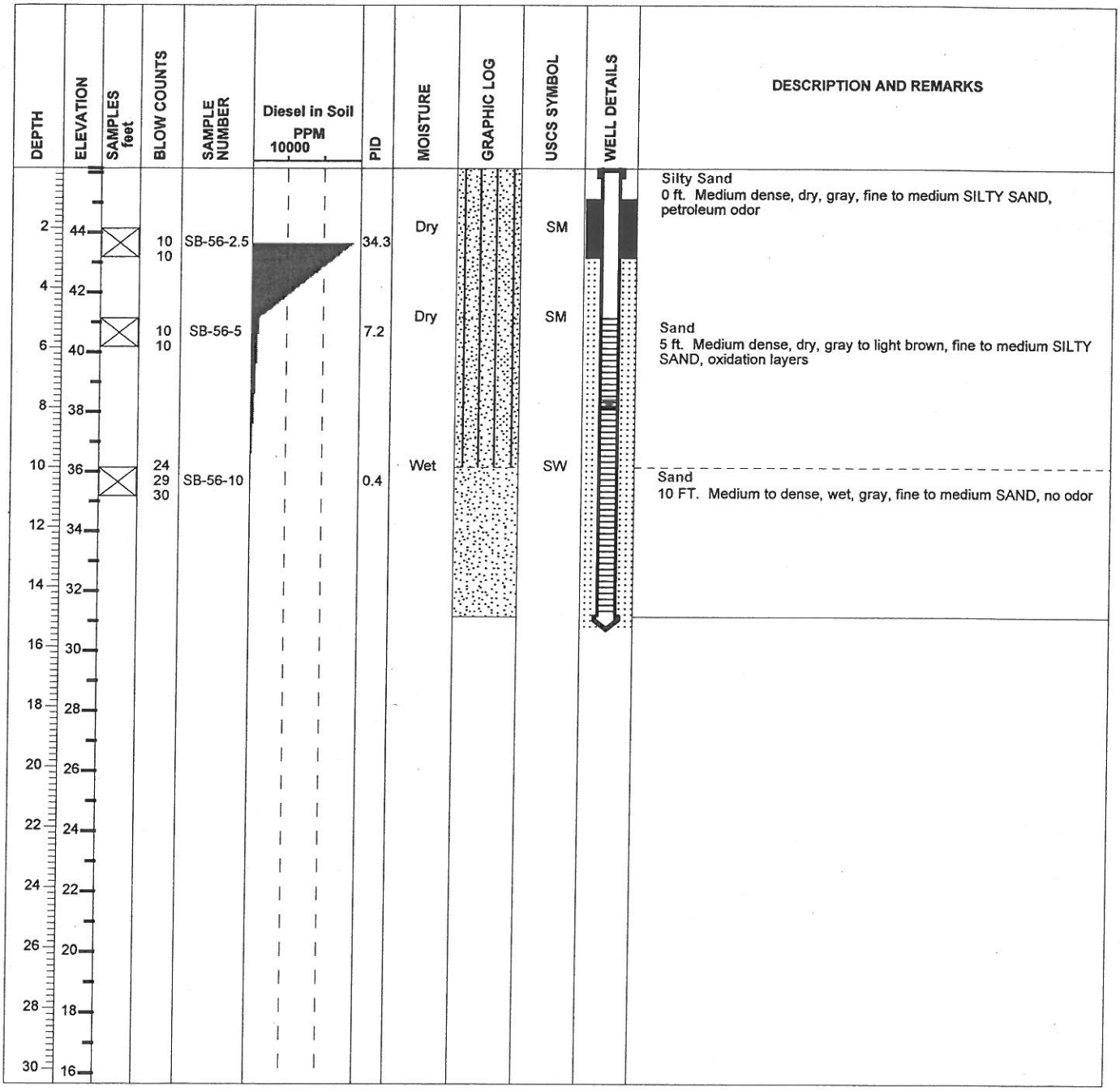
DRILLING CONTRACTOR: BoreTec

DATE/TIME STARTED: 7/17/01 0715

DATE/TIME COMPLETED: 7/17/01 1047

TOTAL DEPTH: 15 ft

WATER DEPTH: 8 ft



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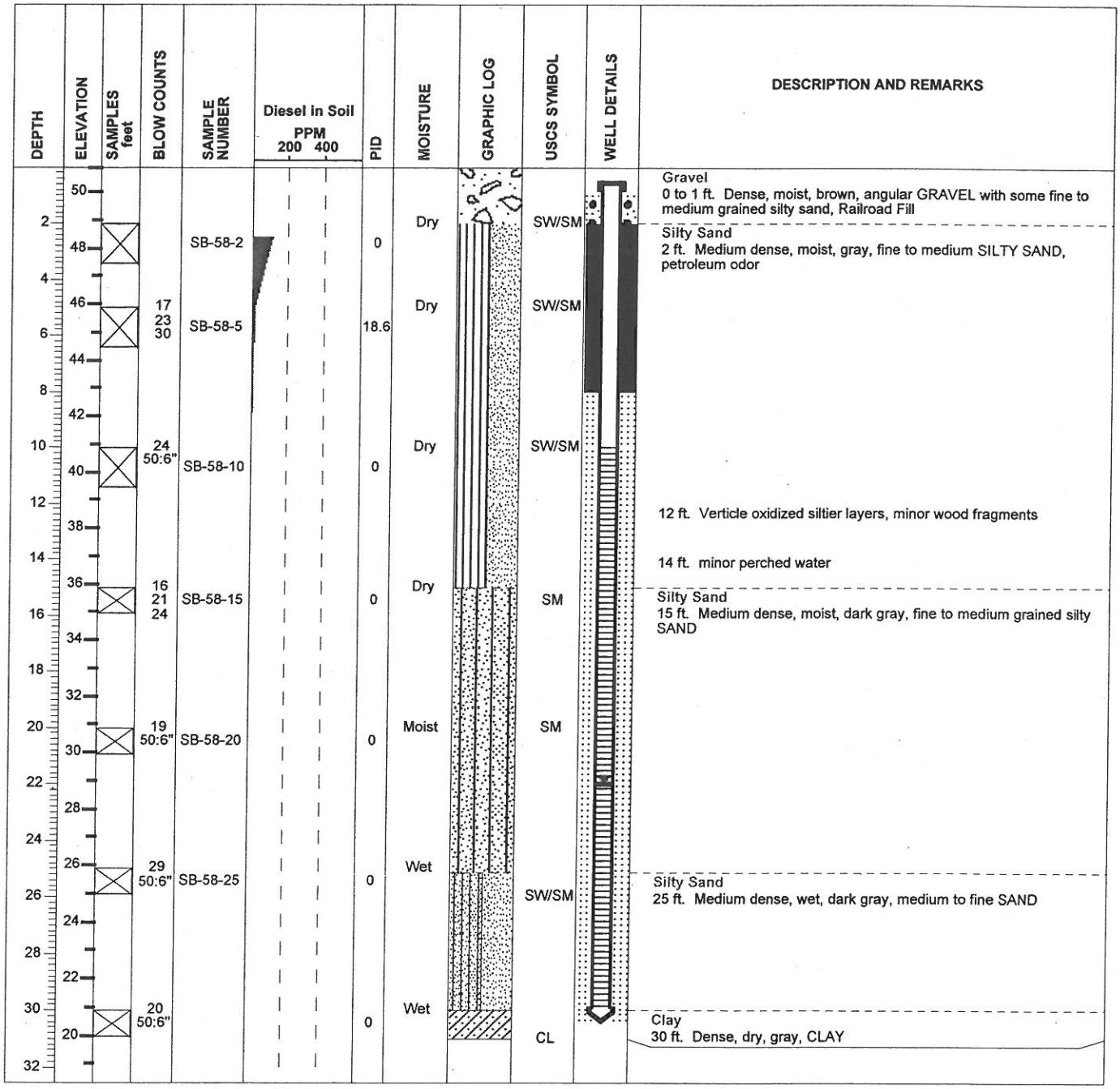
FOSTER WHEELER ENVIRONMENTAL CORP.

PROJECT NAME: Phase III Site Assessment
BORING NUMBER: SB-58 (01MW-15)
LOCATION: 2737 West Commodore Way
AREA: New Barrel Shed
CLIENT: Time Oil Company
SITE MANAGER: Scott Sloan

DRILLING METHOD: 4-inch HSA
DRILLING CONTRACTOR: Cascade
DATE/TIME STARTED: 7/19/01 0750
DATE/TIME COMPLETED: 7/19/01 1015
TOTAL DEPTH: 30 ft
WATER DEPTH: 22 ft



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FOSTER WHEELER ENVIRONMENTAL CORP.

PROJECT NAME: Phase III Site Assessment

BORING NUMBER: SB-59

LOCATION: 2737 West Commodore Way

AREA: Old Barrel Shed

CLIENT: Time Oil Company

SITE MANAGER: Scott Sloan

DRILLING METHOD: 4-inch HSA

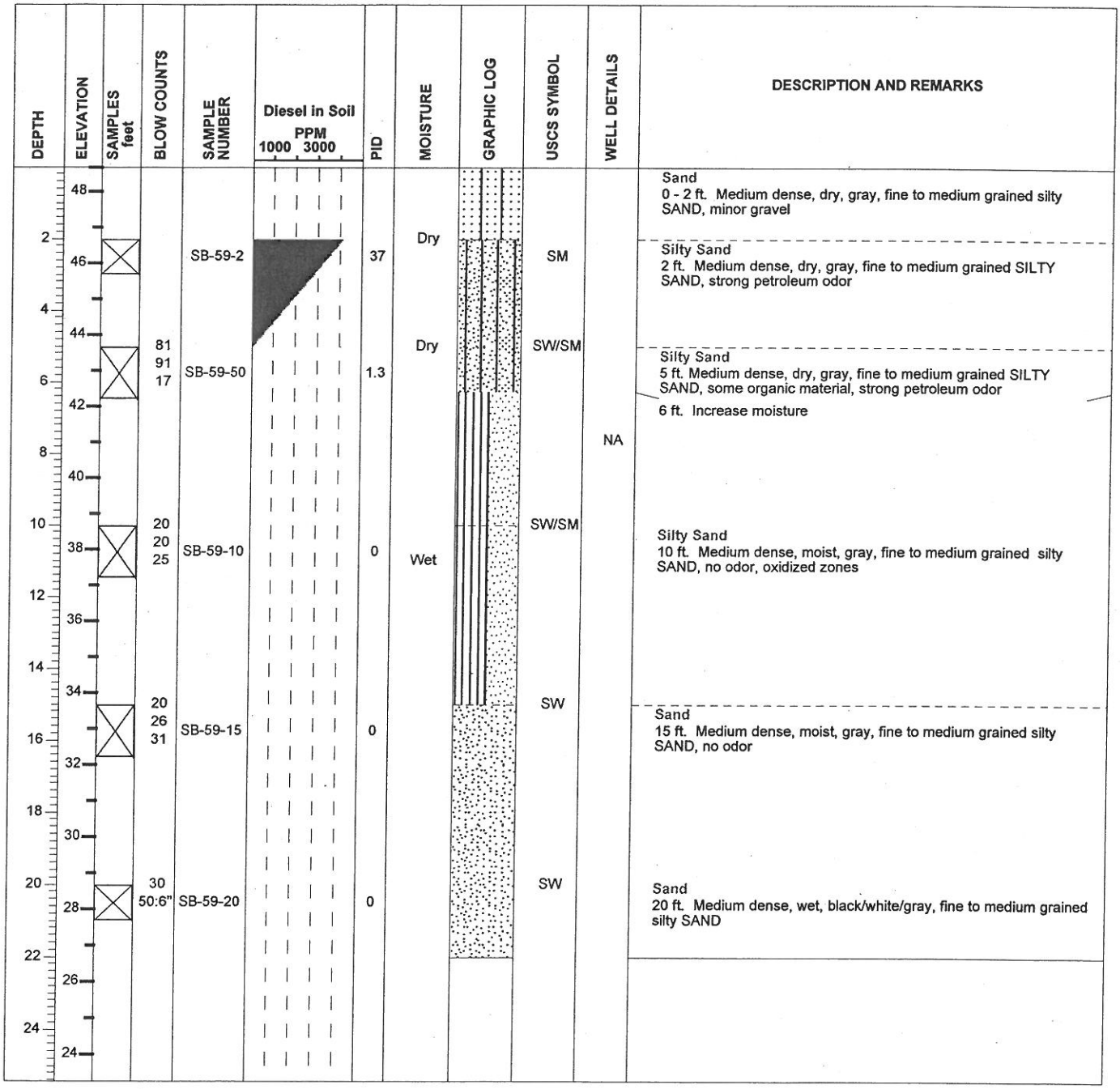
DRILLING CONTRACTOR: Cascade

DATE/TIME STARTED: 7/19/01 1030

DATE/TIME COMPLETED: 7/19/01 1125

TOTAL DEPTH: 20 feet

WATER DEPTH: na



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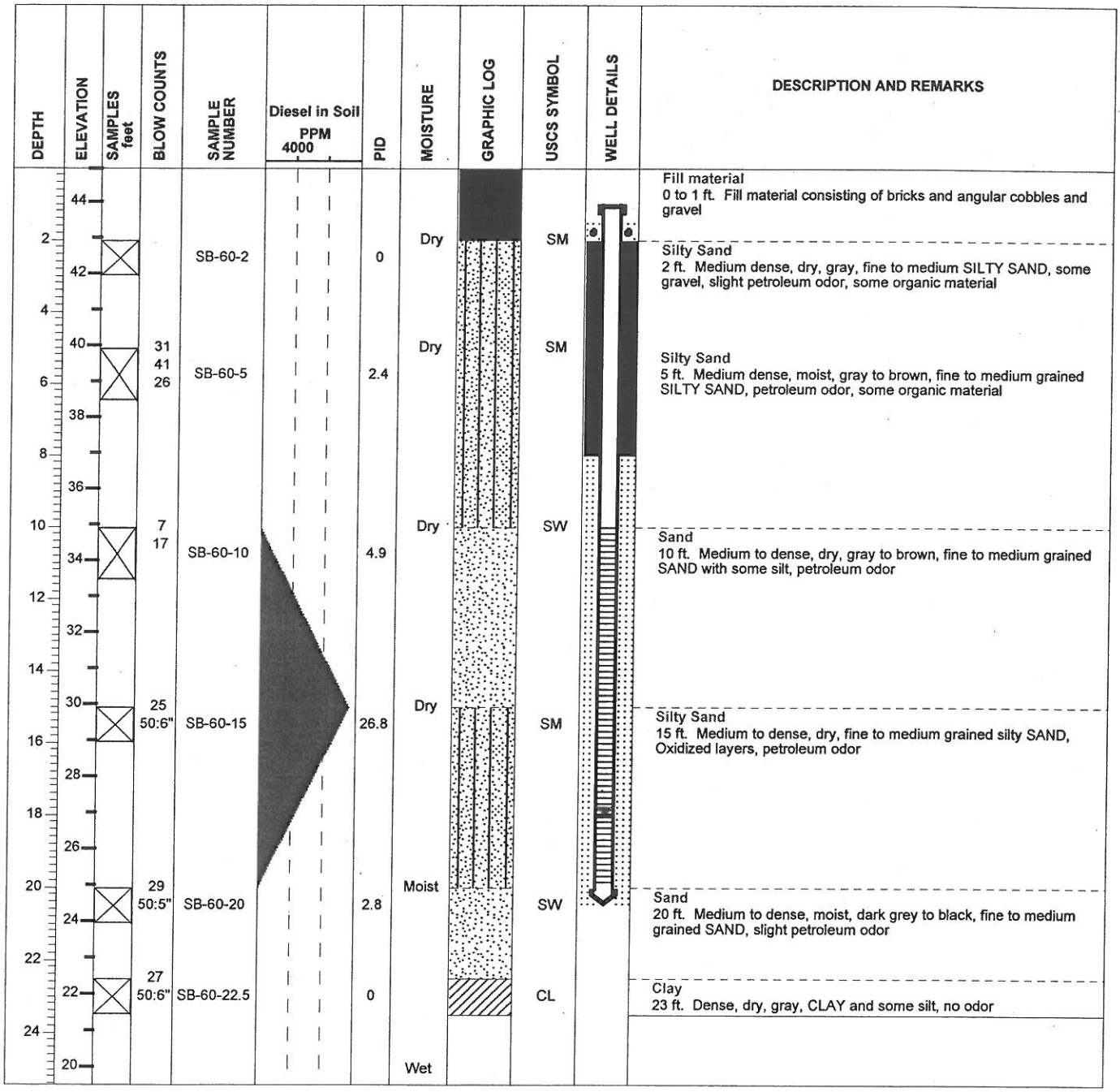
FOSTER WHEELER ENVIRONMENTAL CORP.

PROJECT NAME: Phase III Site Assessment
BORING NUMBER: SB-60 (01MW-16)
LOCATION: 2737 West Commodore Way
AREA: West Commodore Way Perimeter
CLIENT: Time Oil Company
SITE MANAGER: Scott Sloan

DRILLING METHOD: 4-inch HSA
DRILLING CONTRACTOR: Cascade
DATE/TIME STARTED: 7/19/01 1255
DATE/TIME COMPLETED: 7/19/01 1415
TOTAL DEPTH: 22.5 ft
WATER DEPTH: 18 ft



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FOSTER WHEELER ENVIRONMENTAL CORP.

PROJECT NAME: Phase III Site Assessment

BORING NUMBER: SB-61 (01MW-17)

LOCATION: 2737 West Commodore Way

AREA: Upper Railroad Spur

CLIENT: Time Oil Company

SITE MANAGER: Scott Sloan

DRILLING METHOD: 4-inch HSA

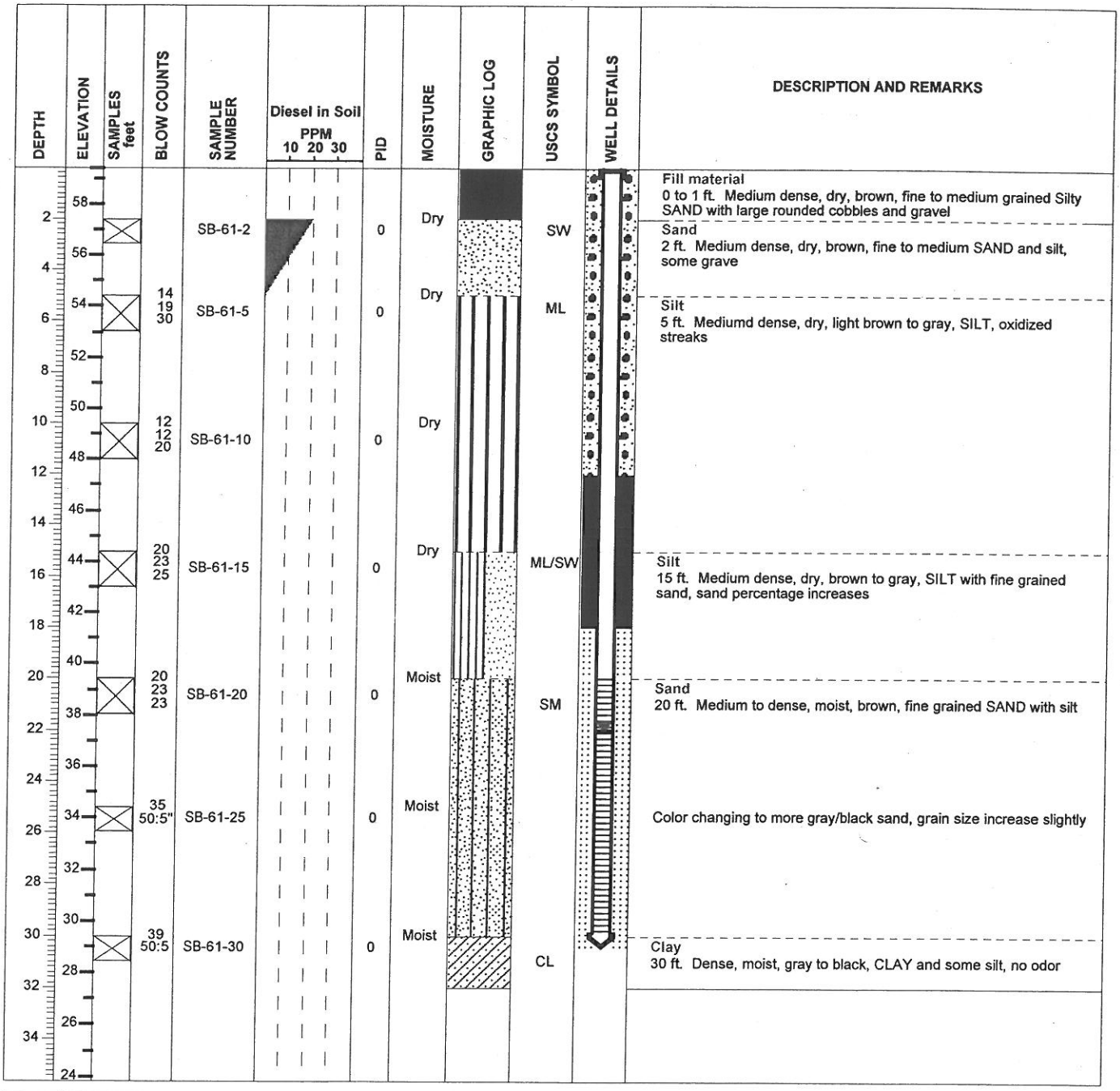
DRILLING CONTRACTOR: Cascade

DATE/TIME STARTED: 7/19/01 1438

DATE/TIME COMPLETED: 7/19/01 1745

TOTAL DEPTH: 32 ft

WATER DEPTH: 22 ft



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