SLIC 6436

SOIL REMEDIATION REPORT
1155 CLAY STREET
OAKLAND, CALIFORNIA

VOLUME 1
REPORT TEXT
APPENDICES A, B, AND C

Woodward-Clyde Consultants

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Engineering & sciences applied to the earth & its environment

November 27, 1991

Mr. Donnell Choy
Oakland City Attorney's Office
505 14th Street, 12th Floor
Oakland, California 94612

Subject: Soil Remediation Report
1155 Clay Street
Oakland, California

Dear Mr. Choy:

We are pleased to submit our report describing the soil remediation recently performed at the 1155 Clay Street site in Oakland, California. This report describes the work completed to characterize, excavate, and dispose the fill and native soil containing petroleum hydrocarbons at the site.

It has been a pleasure working with you on this project. If you have any questions, please do not hesitate to call.

Yours truly,
WOODWARD-CLYDE CONSULTANTS

George A. Ford, C. E. G.
Associate

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Assistant Project Geologist

cc: Mr. David Ralph, Office of Economic Development and Employment, City of Oakland
Mr. Greg Johnson, Bramalea Pacific, Inc.
Mr. Dennis Byrne, Alameda County Department of Environmental Health
Mr. Lester Feldman, Bay Area Regional Water Quality Control Board

Enclosure

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1.1 AUTHORIZATION AND SCOPE

This report presents the results of work performed to characterize, excavate, and dispose of non-native fill soils containing oil and grease and lead, and native soil containing diesel fuel, that were found on the site of the proposed 1155 Clay Street building (Figure 1) in Oakland, California. Woodward-Clyde Consultants (WCC) has performed this work on behalf of the Redevelopment Agency of the City of Oakland (Agency) in accordance with the August 24, 1990 Contract for Professional Services between WCC and the Agency, the first Amendment to the Contract, dated May 7, 1991 and the second Amendment to the Contract, dated June 1, 1991.

The scope of services included:

1) Reviewing available data and performing additional soil sampling as needed to characterize contaminated soils at the 1155 Clay Street site;

2) Developing a remedial program that was consistent with the objectives of the Agency; and

3) Assisting the Agency in carrying out the remedial program.

WCC began working on the soil remediation phase of this project in June 1990. Soil removal operations began in October 1990 and continued until June 1991. Excavation and disposal of fill and soil containing diesel fuel was completed In June 1991.

1.2 LIMITATIONS

This report was prepared in general accordance with the accepted standard of practice which exists in the San Francisco Bay Area at the time this investigation was performed. No other warranties are expressed or implied. The scope of this investigation is limited by time constraints, expense, and practicality. A limited number of samples were taken at locations at the site and a limited number of laboratory chemical analyses were performed for those samples. Professional opinions concerning the presence of hazardous substances were developed based on the resulting data. It would be prohibitively expensive and time consuming to sample all locations at the site and analyze the samples for all substances which are now, or in the future might be, considered hazardous. Therefore, WCC cannot be held responsible should the investigation fail to detect the presence or quantity of all hazardous substances at all locations of the site.

2.1 PREVIOUS INVESTIGATIONS

In 1990, WCC performed an environmental site assessment at the site of the proposed 1155 Clay Street building under a separate contract with the Agency. That environmental site assessment consisted of four tasks: 1) compilation of information on site history from fire insurance maps, City of Oakland records, and historical aerial photographs; 2) review of Federal, State, and local regulatory agency listings of nearby sites with toxic problems which could impact the site; 3) soil and groundwater sampling; and 4) evaluation of the data and preparation of conclusions and recommendations.

The compiled historical data for the 1155 Clay site indicated that the property had been occupied primarily by retail businesses, with a few parcels occupied by businesses judged to have had some potential for causing contamination of the soil or groundwater:

1) a multi-story parking garage was located on the southwest corner of the site, at the corner of 11th and Jefferson Streets;

2) a machine shop was located at 597 12th Street (circa 1950);

3) an auto body shop was located at 512 12th Street (circa 1922);

4) various surface parking lots (circa 1926 to present);

5) two hat cleaners were located at 567 and 595 12th Street (circa 1940s);

6) a laundry was located at 597 12th Street (circa 1930s); and

7) four printing shops were located at 1160 Jefferson, 555 12th, 571 12th and 597 12th Streets (circa 1920s to 1950s).

Aerial photographs indicate that the buildings on the site were demolished sometime between 1975 and 1981. The basement cavities remaining after the buildings had been demolished were backfilled with imported fill sometime prior to 1981, and an asphaltic concrete surface parking lot was constructed on the site sometime after 1981.

The field investigation performed for the environmental site assessment consisted of drilling seven soil borings and installing three shallow groundwater monitoring wells on the site. The soil and groundwater samples were analyzed by a state-certified analytical laboratory for selected priority pollutants and petroleum hydrocarbons.

The conclusions of the 1990 environmental site assessment were as follows:

1) Total Petroleum Hydrocarbons (TPH) as gasoline was detected in the soil beneath the site of a parking garage formerly located in the southwestern corner of the site;

2) The source of the TPH was unknown; and

3) It was judged unlikely the site has been contaminated by metals at concentrations which would classify the soil as a hazardous waste.

As a result of the site assessment study, WCC recommended additional soil and groundwater sampling and analyses to: 1) more fully characterize the vertical and lateral extent and concentration of gasoline in the soil and groundwater; and 2) investigate whether fill material containing contaminants was present on the site (as had been found on adjacent properties in the area).

Based on WCC's recommendation, the Agency elected to perform additional sampling and analyses of soil and groundwater at the site prior to construction of the new building on the site.

2.2 CHARACTERIZATION OF SOIL CONTAINING GASOLINE

2.2.1 Soil Borings

On July 5 and 6, 1990, WCC drilled six soil borings to explore the extent of soil containing gasoline previously identified in the southwest corner of the site. Two additional soil borings were drilled in the southeast corner of the site, adjacent to Clay Street, to evaluate whether contaminants had migrated down-gradient onto the site from upgradient areas. Previous studies (WCC, 1990, 1991) indicated the local groundwater gradient flow direction was generally from the southeast towards the northwest (approximately N50^{0}W). The locations of the soil borings are shown in Figure 1.

The soil borings were drilled to depths of 25 feet to 30 feet below the surface by HEW Exploration, Inc. using 6-inch-diameter solid augers. WCC personnel collected soil samples for chemical analysis in each boring at an elevation of 1 foot to 2 feet above the groundwater table (in the zone of expected hydrocarbons, if present) or when gasoline odors were either smelled or detected in the drill cuttings by an organic vapor analyzer (OVA).

The soil samples were collected using a 2-inch inside-diameter drive sampler. Soil boring logs showing the depth of soil samples and soil conditions encountered are presented in Appendix A. Soil samples were retained in brass sample liners capped with teflon sheeting and plastic end caps, in accordance with standard sampling protocol described in Appendix C. Following drilling, the borings were backfilled to the ground surface using a sand/cement grout, in accordance with Alameda County-Zone 7 regulatory requirements. Soil cuttings were placed in drums for storage on-site and later disposal. Soil samples were immediately placed in ice chests for transport to the analytical laboratory under chain-of-custody control.

Eureka Laboratories, Inc. of Sacramento, California analyzed the soil samples for TPH as gasoline, diesel, and motor oil by EPA Method 8015, modified, and for aromatic volatile organics including benzene, toluene, ethyl benzene, and xylenes (BTEX) by EPA Method 8020. The chemical analytical results are presented in Appendix D and summarized in Table 1 and in Figure 2.

The chemical analytical results are summarized as follows:

1) In the area of the former parking garage, TPH as gasoline was reported at concentrations of 17 ppm and 61 ppm in borings B4 and B5, respectively, at a depth of about 26 feet below the surface (approximately elevation 8 feet City of Oakland Datum (C. O. O. D.);

2) Of the volatile organic compounds, ethyl benzene and xylenes were reported in borings B4, B5, and B8 at concentrations ranging from 0.006 ppm to 0.075 ppm; and

3) No TPH as gasoline or BTEX were reported at concentrations exceeding their respective detection limits in samples from the borings adjacent to Clay Street.

The analytical results suggest that soil containing relatively low concentrations of gasoline (less than 100 ppm) is limited to a layer about 5 feet thick occurring at elevation 5 feet to 10 feet (C. O. O. D.) which extends about 40 feet east of, and 25 feet north of, the southwest corner of the site at the intersection of Jefferson Street and 11th Street. This area is shown in Figure 2.

In addition, because TPH as gasoline or BTEX were not reported in soil samples from the borings adjacent to Clay Street, TPH as gasoline does not appear to have migrated onto the 1155 Clay Street site from areas upgradient of the parcel.

2.2.2 Monitoring Wells

In October 1990, WCC installed monitoring well W-4 in the southwest corner of the site. The purpose of the well was to collect groundwater samples for chemical analysis to evaluate whether gasoline also occurred in the shallow groundwater.

The monitoring well boring was drilled to a depth of 30 feet below the surface by HEW Exploration using 6-inch-diameter solid augers. The well was constructed using 2-inch-diameter PVC casing with machine-slotted, 0.020-inch aperture well screen placed from a depth of 20 feet to 30 feet. The boring annulus surrounding the screened casing was backfilled with Lonestar No. 3 washed sand. The screened and sand-packed interval of the well was sealed from the surface by a 2-foot-thick bentonite seal and sand/cement grout extending to the ground surface, in accordance with the permit requirements of Alameda County Zone 7. The location of the well is shown on Figure 2.

Monitoring well W-4 was developed and sampled on October 17, 1990. The well was developed and purged by pumping with a submersible pump until the discharged water became clear and the temperature, pH, and specific conductance measurements stabilized. Discharged water was

placed in drums and stored on site for later disposal. The groundwater samples were obtained with a teflon bailer and immediately placed in prepared sample bottles. The bottles were placed in an ice chest and transported to the laboratory under chain-of-custody control. No hydrocarbon sheen or floating product were observed on the groundwater samples recovered from monitoring well W-4.

WCC's Analytical Laboratory in Pleasant Hill, California analyzed the groundwater samples from the monitoring well for TPH as gasoline and diesel by EPA Method 8015, modified, and for BTEX by EPA Method 8020. The chemical analytical results are presented in Appendix D and summarized in Table 4 and in Figure 2.

The results of the analyses of groundwater samples from monitoring well W-4 are summarized as follows:

1) TPH as gasoline was reported at a concentration of 0.060 ppm. The gasoline was characterized by the laboratory as "severely weathered," (lacking in volatile components);

2) No TPH as diesel was reported exceeding the detection limit of 0.050 ppm; and

3) No BTEX was reported at concentrations exceeding the detection limit of 0.0005 ppm.

The available groundwater data indicates that gasoline hydrocarbons occur in the southwestern corner of the site in a relatively low (less than 1 ppm) concentration with no BTEX or diesel reported at concentrations exceeding their respective detection limits. The lateral extent of groundwater contamination within the site is constrained by three borings, B6, B7, and F1/B1, and one monitoring well, W-3. No petroleum hydrocarbons were reported in soil samples from the borings or in groundwater samples from monitoring well W-3, installed approximately 35 feet north of the southwest corner of the site along Jefferson Street.

2.3 CHARACTERIZATION OF IMPORTED FILL

2.3.1 Soil Borings

On July 5 and 6, 1990, WCC drilled 15 additional shallow soil borings on the 1155 Clay Street site to evaluate whether imported fill soil existed on the site and, if so, whether the fill contained contaminants that would require special handling and/or disposal. The locations of the soil borings are shown in Figure 1.

The soil borings were drilled using 6-inch-diameter solid augers and a truck-mounted drill rig. The target depth of the borings was the native soil contact beneath the fill layer which averaged about 5 feet below the surface. WCC collected soil samples for chemical analysis in each boring at depths of 1, 3, and 5 feet, or 2 and 4 feet in alternate borings. Soil boring logs showing the depth of soil samples are presented in Appendix A. Additional samples were collected if the fill layer was judged to be thicker or if the underlying native soil appeared to be contaminated.

The samples were obtained using a 2-inch inside-diameter drive sampler in accordance with the standard soil sampling procedures described in Appendix C. Following drilling, the borings were backfilled to the ground surface using a sand/cement grout, in accordance with Alameda County-Zone 7 regulatory requirements. Soil cuttings were placed in drums for storage on-site and later disposal. Soil samples were immediately placed in ice chests for transport to the analytical laboratory under chain-of-custody control.

Eureka Laboratories analyzed the samples from each boring for oil and grease by EPA Method 503A, total lead by EPA Method 6010, and soluble lead by the California Assessment Manual (CAM) Waste Extraction Test (WET). Selected composite samples were analyzed for metals by EPA Method 6010, semi-volatile compounds by EPA Method 8270, and organochlorine pesticides by EPA Method 8080. The chemical analytical results are presented in Appendix C and summarized in Table 1.

The results of the fill characterization analyses may be summarized as follows:

1) The concentration of oil and grease in the samples was reported to range from below the detection limit of 40 ppm up to 300 ppm;

2) The concentration of total lead in the samples was reported to range from below the detection limit of 3 ppm up to 454 ppm;

3) The concentration of soluble lead in 7 of the 8 analyzed samples ranged from below the detection limit of 0.5 ppm up to 4.4 ppm. Sample F6-1 was reported to have a concentration of 75.8 ppm soluble lead. However, this anomalous high concentration is not confirmed by soluble lead concentrations reported for samples taken elsewhere in the fill. Thirty-three samples of fill material, collected both before and after excavation and stockpiling, were analyzed for soluble lead. The concentration of soluble lead in 32 of these samples, not including F6-1, ranges from below the detection limit of 0.5 ppm or 0.10 ppm (depending on the analyzing laboratory) to 4.4 ppm with a mean of 0.96 ppm;

4) None of the reported total concentrations of CAM 17 metals exceeded the Total Threshold Limit Concentration (TTLC) as defined in the CAM Title 22. The total concentrations of the following metals were reported to be between the TTLC and Soluble Threshold Limit Concentration (STLC), as defined in the CAM Title 22, in one or more samples: arsenic, barium, chromium, copper, nickel, lead, and vanadium. The total concentration of arsenic ranged from 2.4 ppm to 9.0 ppm with an average of 5.0 ppm. The STLC and TTLC for arsenic are 5 ppm and 500 ppm, respectively. The total concentration of barium ranged from 38.6 ppm to 105 ppm with an average of 85 ppm. The STLC and TTLC for barium are 100 ppm and 10,000 ppm, respectively. The total concentration of chromium ranged from 23.1 ppm to 27 ppm with an average of 24.9 ppm. The STLC and TTLC for chromium are 5 ppm and 2,500 ppm, respectively. The total concentration of copper ranged from 9.6 ppm to 28.2 ppm with an average of 15.0 ppm. The STLC and TTLC for copper are 25 ppm and 2,500 ppm, respectively. The total concentration of nickel ranged from 13.9 ppm to 38.1 ppm with an average of

21.2 ppm. The STLC and TTLC for nickel are 5 ppm and 1,000 ppm, respectively. The total concentration of lead ranged from 3.8 ppm to 56.9 ppm with an average of 26.9 ppm. The STLC and TTLC for lead are 5 ppm and 1,000 ppm, respectively. The total concentration of vanadium ranged from 16.2 ppm to 24.6 ppm with an average of 18.8 ppm. The STLC and TTLC for vanadium are 24 ppm and 2,400 ppm, respectively;

5) The concentrations of semi-volatile organic compounds analyzed by EPA Method 8270 in 4 samples were reported below the respective detection limits for the various compounds except as discussed below.

In the composite sample F11-1,2, Bis(2-chloroethoxy)methane was reported at a concentration of 4.180 ppm with a detection limit of 1.000 ppm. This compound, which occurs in plastic materials, is considered a laboratory contaminant if the concentration is less than 10 times the detection limit as discussed in the 1988 "EPA Functional Guidelines for Evaluation of Organic Chemical Data".

In the composite sample F16-1,2,3, N-Nitrosodi-n-propylamine was reported at a concentration of 0.996 ppm with a detection limit of 0.300 ppm. This low concentration is anomalous and unconfirmed by the analyses of the other samples. The reported concentration of this compound did not affect the decision process for definition of the fill material as hazardous waste because there are no regulatory criteria for this compound under CAM Title 22 and no other associated compounds were detected by the EPA Method 8270 analysis; and

6) The concentrations of organochlorine pesticides analyzed by EPA Method 8080 in 4 samples were reported below the respective detection limits for the various compounds except as discussed below.

In the composite sample F4-1,2,3, the compound 4,4' -DDD was reported at a concentration of 0.0037 ppm with a detection limit of 0.0015 ppm. The reported concentration of this compound did not affect the decision process for definition of the fill material as hazardous waste for the following reasons:

1) Matrix interference problems were reported by the analyzing laboratory which could lead to the reporting of a false positive;

2) The compound 4,4' -DDD is a degradation product of 4,4' -DDT and, therefore, usually found in association with 4,4' -DDE and 4,4' -DDT. However, 4,4' -DDE and 4,4' -DDT were not reported in this sample;

3) The compound 4,4' -DDD was not reported in the other samples analyzed for pesticides; and

4) The STLC, as defined in CAM Title 22, is 1.0 ppm, approximately 67 times the reported concentration.

2.3.2 Test Pits

On September 20, 1990, WCC excavated seven test pits on the site to more fully evaluate the thickness and character of the fill through visual examination and sampling and analysis. The depth of the test pits ranged from about 5 feet to 12 feet. Soil samples were taken at selected depths within the pits for additional chemical analyses. The locations of the test pits are shown on Figure 1. Graphical logs of each test pit are shown in Appendix A. The chemical analytical results are shown in Appendix D and summarized in Table 1.

Evaluation of the test pit data and the chemical analyses of soil samples indicated the following:

1) The fill contained debris consisting of asphalt, brick, concrete, reinforcing steel bars, glass, wood, sheet metal, pipe, and wire;

2) The fill within the building basements in the southeast corner of the site contained considerably more concrete rubble and reinforcing steel bars than were seen elsewhere on the site;

3) The concentration of total lead and oil and grease reported for test pit samples was comparable to the concentrations of lead and oil and grease reported in the fill boring samples.

The chemical analyses of fill samples from borings and test pits indicated that a layer of fill containing elevated concentrations of lead and oil and grease occurred over the entire site. The highest detected concentrations of lead in soil occurred in the fill along the west side of the site adjacent to Jefferson Street, in the south central area near 11th Street, and within a former building basement in the southeast corner near Clay Street. Fill in the southeast corner also contained an average concentration of oil and grease about three times higher than fill on the rest of the site.

The thickness of the fill layer ranged from about 3 1/2 feet to about 14 feet and averaged about 6 feet thick. The fill occurred immediately beneath the asphaltic parking lot. Generally, the fill-native soil contact was sharp and readily recognizable. The thickest layer of fill occurred within the old basement in the southeast corner of the site. This area extended approximately 110 feet along Clay Street and 100 feet along 11th Street from the northwest intersection of Clay Street and 11th Street.

2.4 RECOMMENDED REMEDIAL PROGRAM

Based on the data developed during the site investigations, WCC recommended that the existing pavement be removed from the site and that the shallow fill on the site be excavated and placed in stockpiles for additional sampling and analysis prior to off-site disposal. The stockpiled soil would then be disposed of at appropriate Class I, II, or III landfills. On-site retention or treatment and re-use of the fill were not selected as alternatives because the development plan for the property included two levels of underground parking, requiring an open excavation about 25 feet deep over the entire parcel.

3.1 CONTRACTOR SELECTION

Plans and specifications for the excavation, stockpiling and subsequent transportation of fill to appropriate commercial landfills were prepared in September 1990 (see References). The planned work consisted of:

1) removing existing asphaltic pavement and other site improvements;

2) developing segregated stockpiles of fill soil based on the general physical and chemical characteristics identified during the previous environmental site assessment;

3) chemically analyzing stockpiled fill to provide additional characterization;

4) selecting the most appropriate disposal option for each stockpile; and

5) hauling and disposing of the fill soil at the appropriate landfill.

In accordance with the requirements of the Agency, bids were solicited from interested contractors through public advertisements placed beginning September 14, 1990. Five bids deemed to be responsive were received at the public bid opening on September 28, 1990. The contract to perform the work was awarded to Covey Trucking Company, Inc. on October 22, 1990. After a project health and safety plan had been developed, site preparation work consisting of the removal of the existing pavement, trees, and light standards began on October 24, 1990.

3.2 ADDITIONAL CHARACTERIZATION, EXCAVATION, AND STOCKPILING OF FILL

Excavation of the fill soil began in late October, 1990. Fill was segregated into separate stockpiles based on available analytical data and the visual appearance of the fill. The purpose of the segregation operation was to develop a series of stockpiles with characteristics that would be acceptable to Class II and/or Class III landfills. This goal was achieved by creating two separate stockpiles: 1) a stockpile with higher concentrations of lead and lower concentrations of oil and grease; and 2) a stockpile with higher concentrations of oil and grease but lower concentrations of lead. The typical locations of the various stockpiles are shown on Figure 3.

3.2.1 "C" Stockpile

The "C" stockpile was developed from fill soils from the entire site, excluding the basement areas in the southeast corner of the site, and was intended to consist of fill soils with a

relatively low oil and grease concentration. The initial segregation of this fill soil was based on the results of analysis of boring and test pit samples from this area taken during the environmental site assessment. Among these samples with quantifiable oil and grease (concentrations greater than the detection limit), the concentration of oil and grease ranged up to 413 ppm with an average concentration of 93 ppm.

Additional sampling and analysis of the stockpiled fill was performed in order to characterize the soil such that it could be disposed in commercial landfills. WCC collected 41 samples from the "C" stockpile designated C-1 through C-41. The samples were collected in accordance with the standard sampling procedures described in Appendix C.

The samples were analyzed at the Chromalab, Inc. laboratory, San Ramon, California, for total lead using EPA Method 7420, and oil and grease using SM 5520 E & F. Selected samples were also analyzed for gasoline and diesel using EPA Method 8015, modified, BTEX using EPA Method 8020, soluble lead using the CAM WET, CAM 17 metals, volatile organics using EPA Method 8240, and semi-volatile compounds using EPA Method 8270. The analytical results are shown in Appendix D and summarized in Table 2.

The results of this fill sampling and analyses are summarized as follows:

1) The concentration of total lead was reported to range from 4.6 ppm up to 113 ppm;

2) The concentration of soluble lead was reported to range from below the detection limit of 0.10 ppm to 3.88 ppm in the 8 analyzed samples;

3) The concentration of oil and grease was reported to range from 18 ppm up to 5300 ppm with an average concentration of 283 ppm;

4) The concentration of gasoline and BTEX was reported to not exceed the detection limits of 2.5 ppm and 0.005 ppm, respectively;

5) The concentrations of semi-volatile organic compounds analyzed by EPA Method 8270 in 4 samples were reported to be below the respective detection limits for the various compounds except as described below.

In the composite sample C1-1,2,3,4, the Polynuclear Aromatic Hydrocarbons Benzo(B)Fluoranthene and Benzo(K)Fluoranthene were reported at concentrations of 0.7 ppm and 0.5 ppm, respectively with detection limits of 0.5 ppm. This low concentration is anomalous as these compounds were not reported at concentrations exceeding the detection limits in the other samples. The reported concentration of this compound did not affect the decision process for definition of the fill material as hazardous waste because of the low concentrations near the detection limit and because there are no regulatory criteria for these compounds under CAM Title 22;

6) The concentrations of volatile organic compounds analyzed by EPA Method 8240 in 4 samples were reported to be below the respective detection limits for the various compounds; and

7) None of the reported total concentrations of CAM 17 metals exceeded the TTLC. The total concentrations of the following metals were reported to be between the TTLC and STLC in one or more samples: barium, chromium, copper, nickel, lead, selenium, and vanadium. The total concentration of barium ranged from 53 ppm to 140 ppm with an average of 85 ppm. The STLC and TTLC for barium are 100 ppm and 10,000 ppm, respectively. The total concentration of chromium ranged from 31 ppm to 40 ppm with an average of 35 ppm. The STLC and TTLC for chromium are 5 ppm and 2,500 ppm, respectively. The total concentration of copper ranged from 10 ppm to 44 ppm with an average of 19 ppm. The STLC and TTLC for copper are 25 ppm and 2,500 ppm, respectively. The total concentration of nickel ranged from 17 ppm to 28 ppm with an average of 22 ppm. The STLC and TTLC for nickel are 5 ppm and 1,000 ppm, respectively. The total concentration of lead ranged from 35 ppm to 110 ppm with an average of 73 ppm. The STLC and TTLC for lead are 5 ppm and 1,000 ppm, respectively. The total concentration of selenium exceeded the detection limit in one sample at a concentration of 3 ppm. The STLC and TTLC for selenium are 3 ppm and 100 ppm, respectively. The total concentration of vanadium ranged from 19 ppm to 26 ppm with an average of 22 ppm. The STLC and TTLC for vanadium are 24 ppm and 2,400 ppm, respectively;

3.2.2 "B" Stockpile

The "B" stockpile was developed from fill soils from the basement areas in the southeast corner of the site, and was intended to contain fill soils with relatively higher concentrations of oil and grease. The initial segregation of this fill soil was based on analyses of boring and test pit samples from this area taken during the environmental site assessment. As the excavation work continued, additional soil judged to contain relatively higher concentrations of oil and grease was added to this stockpile.

Additional sampling and analyses of the "B" stockpile were performed in order to characterize the fill such that it could be disposed in commercial landfills. WCC collected 20 samples from the "B" stockpile designated 1 through 20. The samples were collected in accordance with the standard sampling procedures described in Appendix C.

The samples were analyzed at Chromalab for total lead using EPA Method 7420, oil and grease using SM 5520 E and F, and diesel using EPA Method 8015, modified. One sample was analyzed for soluble metals using the CAM WET. The analytical results are shown in Appendix D and summarized in Table 2.

The results of this fill sampling and analyses are summarized as follows:

1) The concentration of total lead was reported to range from 5.7 ppm to 90 ppm;

2) The concentration of oil and grease was reported to range from below the detection limit of 10 ppm to 390 ppm; and

3) The concentration of diesel was reported to not exceed the detection limit of 1 ppm except in one sample with a concentration of 38 ppm.

4) The concentrations of the soluble CAM 17 metals were reported to be well below the STLC concentrations.

In addition to the above chemical analyses, a representative sample of soil from this stockpile was analyzed by the California Hazardous Waste Assessment Bioassay (Toxicity Bioassay). The results of this test indicated that the soil is non-toxic and non-hazardous. The laboratory report is included in Appendix D with chemical analytical results from the "B" stockpile.

3.2.2.1 Concrete Rubble

Relatively large volumes of concrete rubble and reinforcing steel bars were also encountered within the fill in the southeast corner of the site. Most of this material was found within former building basements immediately above a 6-inch-thick concrete floor slab that occurred at a depth of approximately 12 feet below the adjacent Clay Street. This slab, as well as concrete foundation walls, reinforced concrete grade beams, and large concrete footings were excavated, cleaned of loose soil, broken up and removed from the site. The location of these materials is shown on Figure 3.

3.2.2.2 Sidewalk Vaults

The fill in the southeast corner of the site also extended into vaults beneath the sidewalk adjacent to 11th Street, as shown on Figure 3. The removal and stockpiling of this fill required the demolition and replacement of a section of the sidewalk and the streetlight conduit along 11th Street from Clay Street 130 feet westward towards Jefferson Street.

After the fill was removed from the under-sidewalk vaults, compacted clean, native soil backfill was placed from May 10, 1991 through May 14, 1991. The area beneath the 11th Street sidewalk was backfilled to an elevation of approximately 34 feet (C.O.O.D.) with clean fill material obtained from elsewhere on the site. The fill was placed in approximately 1-foot to 1 1/2-foot lifts and compacted to a minimum degree of compaction of 90 percent up to elevation 31.5 feet (C.O.O.D.) and 95 percent between elevation 31.5 feet (C.O.O.D.) and elevation 34 feet (C.O.O.D.) based on ASTM Test Method D1557. The field reports, including the results of field density tests, are presented in Appendix B.

Field density tests were performed during the compaction operations to evaluate the compaction of the fill in accordance with the ASTM Test Method D2922 using a nuclear moisture/density gauge. To establish the maximum dry density and optimum moisture content of the materials used for fill, samples previously obtained from adjacent sites were compacted in WCC's soil laboratory in accordance with the ASTM Test Method D1557.

3.2.3 Progress Samples

WCC also collected 29 progress samples from trenches and the exposed fill surface to aid in segregating material for disposal based on the concentration of total lead and oil and grease.

These samples, designated B-1 through B-29, were collected in accordance with sampling procedures discussed in Appendix C.

The samples were analyzed at Chromalab, Inc. for total lead using EPA Method 7420 and oil and grease using SM 5520 E & F. Selected samples were also analyzed for gasoline and diesel using EPA Method 8015, modified, BTEX using EPA Method 8020, soluble lead and oil and grease using the CAM WET, Title 22 metals, volatile organics using EPA Method 8240, and semi-volatile compounds using EPA Method 8270. The analytical results are shown in Appendix D and summarized in Table 2.

The results of this sampling in the fill are summarized as follows:

1) The concentration of total lead was reported to range from 20.8 ppm up to 112 ppm;

2) The concentration of soluble lead was reported to range from below the detection limit of 0.10 ppm up to 2.89 ppm;

3) The concentration of oil and grease was reported to range from 49 ppm up to 1200 ppm;

4) The concentration of gasoline was reported to not exceed the detection limit of 2.5 ppm in 5 analyzed samples;

5) The concentration of diesel was reported to range from below the detection limit of 5 ppm to 690 ppm in 7 analyzed samples;

6) The concentrations of semi-volatile organic compounds analyzed by EPA Method 8270 in 4 samples were reported below the respective detection limits for the various compounds; and

7) The concentrations of volatile organic compounds analyzed by EPA Method 8240 in 4 samples were reported below the respective detection limits for the various compounds.

The remaining in-place fill was excavated and segregated based on the chemical analysis of the progress samples. Most of the fill was placed in the "C" stockpile with a small portion containing higher oil and grease concentrations placed in the "B" stockpile.

Additional soil samples were collected to evaluate whether fill encountered beneath the sidewalk along 12th Street possessed chemical characteristics similar to the on-site fill. These progress samples, designated VL-1 and -2 and VR-1 and -2, were collected from soil on the north side of the site in an area designated for construction of a new utility vault beneath the sidewalk. The analytical results are shown in Appendix D and summarized in Table 2.

The analytical results for the vault-area soil samples are summarized as follows:

1) No oil and grease was reported exceeding the detection limit of 10 ppm; and

2) The concentration of total lead was reported to range from 2.7 ppm to 2.9 ppm.

The concentration of lead and oil and grease reported for soil samples from within the new utility vault area was within the range expected for native soil in this area of Oakland. That soil was therefore left in place.

3.3 DISPOSAL OF FILL

During December 1990 and January 1991, WCC completed and submitted applications for off-site disposal of the fill at various commercial landfills (see References). An application for disposal of fill from the "B" stockpile was submitted to Vasco Sanitary Landfill in Livermore, California on January 8, 1991. That fill soil was accepted for disposal by the Vasco Landfill under the waste disposal application profile number 15270. An application for disposal of fill from the "C" stockpile was submitted to Forward, Inc. Landfill in Stockton, California on December 21, 1991. The Regional Water Quality Control Board, Central Valley Region, approved Forward's acceptance of the "C" stockpile soil as documented in their February 21, 1991 letter. The soil disposal agreement between Forward Landfill and the Agency, approval number 90-069, is contained in Forward's February 22, 1991 letter (see References).

Hauling and disposal of the fill soil occurred from February through June 1991 with occasional delays due to rain. Approximately 10,100 tons of fill from the "B" stockpile and related portions of the remaining fill, were hauled and disposed at the Vasco Landfill between late February and early June 1991. Approximately 14,700 tons of fill from the "C" stockpile and related portions of the remaining fill were hauled to and disposed at Forward Landfill between early March and June 1991.

Soil disposal operations were documented by a series of job-specific weight tickets that were issued to haulers on the 1155 Clay Street site, collected by the landfills, and returned to the Agency. Copies of these records are retained in WCC's project files.

4.1 EXCAVATION AND DISPOSAL OF SOIL CONTAINING DIESEL, PHASE I

4.1.1 Initial Excavation and Stockpiling

On November 1, 1990, during the early stages of the fill excavation, WCC encountered native soil containing diesel beneath the fill near the northwest corner of the site. No tank or other visible source for this contamination was found within the fill. The diesel-bearing soil formed a column that extended downward from the surface to a horizontal layer of soil containing diesel approximately 4 feet to 5 feet thick immediately above the groundwater surface.

Approximately 1100 cubic yards of diesel-contaminated soil were initially excavated using a Caterpillar 235 hydraulic excavator and stockpiled near the southwest corner of the site. The locations of the diesel excavation and soil stockpile, designated the "D" stockpile, are shown on Figure 3.

After the initial excavation and stockpiling of the soil containing diesel, the excavation was temporarily backfilled with clean native soil for the following reasons: 1) the sides of the excavation impinged on areas of fill soils such that enlargement of the diesel excavation would have caused mixing of the soil containing diesel and fill soils; and 2) the location of the diesel excavation impeded the movement of equipment and the stockpiling operation.

4.1.2 Sampling and Analysis

Sampling and analysis of the stockpiled diesel soil was necessary in order to characterize the soil such that it could be properly disposed off-site. WCC collected 13 composite samples from the diesel stockpile, designated G1 and D1 through D12, according to standard sampling procedures discussed in Appendix C.

The samples were analyzed at Chromalab for diesel using EPA Method 8015, modified, and BTEX using EPA Method 8020. One sample, G1, was analyzed for oil and grease using SM 5520 D & F, gasoline using EPA Method 8015, modified, and volatile organics using EPA Method 8240. Selected samples were analyzed for soluble lead using the CAM WET and purgeable halocarbon compounds using EPA Method 8010. In addition, one analysis was performed for CAM 17 metals The analytical results are shown in Appendix D and summarized in Table 2.

The results of the analysis of the "D" stockpile samples indicated that diesel appeared to be the primary petroleum hydrocarbon present with a reported concentration ranging from 490 ppm to 5300 ppm. The results of this sampling are summarized as follows:

1) One sample was analyzed for oil and grease and gasoline with reported concentrations of 4400 ppm and 370 ppm, respectively;

2) The concentration of soluble lead was reported to range from below the detection limit of 0.10 ppm up to 1.40 ppm;

3) The concentration of benzene was reported to not exceed the detection limit of 0.005 ppm;

4) The concentration of toluene was reported to range from below the detection limit of 0.005 ppm up to 0.34 ppm;

5) The concentration of ethyl benzene was reported to range from below the detection limit of 0.005 ppm up to 0.25 ppm;

6) The concentration of xylenes was reported to range from below the detection limit of 0.005 ppm up to 0.53 ppm;

7) The concentrations of volatile organic compounds, analyzed by EPA Method 8240 in one sample, were reported below the respective detection limits for the various compounds except for toluene, ethyl benzene, and xylenes as discussed above; and

8) The concentrations of the purgeable halocarbon compounds analyzed by EPA Method 8010 in 4 composite samples were reported to not the detection limit of 0.005 ppm.

4.1.3 Disposal

WCC prepared an application to dispose of the soil containing high concentrations of diesel at the Gibson Oil and Refining Co., Inc. recycling plant in Bakersfield, California. Beginning in January 1991, the contractor delivered approximately 1,300 tons of soil containing the highest concentrations of diesel from the "D" stockpile to the Gibson facility. The soil was then treated by Gibson using a proprietary process to render it suitable for use as road base.

4.2 ADDITIONAL INVESTIGATION OF SOIL CONTAINING DIESEL

4.2.1 Additional Soil Borings and Analysis of Samples

After surficial fill had been removed from the vicinity of the diesel excavation, removal of the diesel-contaminated soil was resumed. The excavation was extended downward until groundwater was encountered. Analysis of soil sample DBWT-1, collected on April 30, 1990, indicated that diesel occurred at a concentration of 690 ppm in soil about 2 feet below the surface of the groundwater. The analytical data for this sample is shown in Appendix C and summarized in Table 2. This analytical result indicated that soil below the groundwater surface contained elevated diesel concentrations.

Before proceeding with the excavation, the vertical and lateral extent of the diesel contamination were explored by drilling 12 soil borings on May 6 and 7, 1991 around the perimeter of the diesel excavation. The depth of the borings, which varied from 14 feet to 29 feet, depended on the depth to groundwater at the location of the boring. Because the diesel was found in the earlier excavations to occur in a layer of soil approximately 4 feet to 5 feet thick immediately above the groundwater surface, the intended procedure was to drill to below the surface of the groundwater and collect about 2 to 3 samples in a 5-foot-thick zone immediately above groundwater and to collect an additional sample immediately below the groundwater surface. The locations of the borings are shown on Figure 4. The borings are designated DI-1 through DI-12. Boring logs showing the sampling depths are shown in Appendix A.

WCC collected 34 soil samples from the borings around the perimeter of the diesel excavation. The soil samples are designated with the number 1, 2, or 3 following the boring designation, e. g., DI-2-1. The soil samples were obtained using a 2-inch inside-diameter drive sampler in accordance with the standard sampling procedures discussed in Appendix C.

Chromalab, Inc. analyzed the discrete samples from each boring for TPH as gasoline and diesel by EPA Method 8015, modified, and BTEX by EPA Method 8020. The chemical analytical results are presented in Appendix D and summarized in Table 3.

The results of the diesel investigation soil sampling are summarized as follows:

1) TPH as gasoline or diesel was not reported at concentrations exceeding the detection limit of 1 ppm; and

2) BTEX was not reported at concentrations exceeding the detection limit of 0.005 ppm.

Because no diesel, gasoline, or BTEX were detected in any sample from these shallow soil borings, it was inferred that the diesel contamination occurred within the limits of the area defined by the soil borings.

4.2.2 Groundwater Sampling and Analysis

On May 15, 1991, WCC installed temporary monitoring well W-4 in the bottom of the diesel excavation and monitoring well W-5 adjacent to Jefferson Street, on the down-gradient side of the apparent locus of diesel contamination. The monitoring wells were drilled by HEW Exploration, Inc. using 6-inch-diameter solid augers to depths of 15 feet and 30 feet below the surface, respectively. The monitoring wells were constructed using 2-inch-diameter PVC casing with an interval of machine-slotted, 0.020-inch aperture well screen from a depth of 5 to 15 feet in monitoring well W-4 and from a depth of 20 feet to 30 feet in monitoring well W-5. The boring annulus surrounding the screened casing was backfilled with Lonestar No. 3 washed sand. The screened and sand-packed interval of the well was sealed from the surface by a 2-foot-thick bentonite seal and sand/cement grout extending to the ground surface. The locations of the monitoring wells are shown on Figure 4.

The monitoring wells were developed and sampled on May 17 and 20, 1991. WCC developed and purged the wells by bailing with a teflon bailer until the discharged water became clear and the

temperature, pH, and specific conductance measurements stabilized. The groundwater samples were obtained with a teflon bailer and placed immediately in prepared sample bottles. The bottles were placed in a cooled ice chest and transported to the laboratory under chain-of-custody control. No hydrocarbon sheen or floating product was noted on the groundwater samples recovered from the monitoring wells.

Chromalab, Inc. analyzed the groundwater samples from the monitoring wells for TPH as gasoline and diesel by EPA Method 8015, modified and for BTEX by EPA Method 8020. The chemical analytical results are presented in Appendix D and summarized in Table 4. missing

The results of the analyses of samples to characterize the groundwater in the area of the diesel excavation are summarized as follows:

1) No TPH as gasoline or diesel was reported at concentrations exceeding the detection limit of 0.05 ppm; and

2) No BTEX was reported at concentrations exceeding the detection limit of 0.0005 ppm.

Because no diesel, gasoline, or BTEX were detected in any of these groundwater samples, there does not appear to be a down-gradient plume of groundwater containing diesel.

4.3 EXCAVATION AND DISPOSAL OF SOIL CONTAINING DIESEL, PHASE II

4.3.1 Excavation

Based on the 690 ppm concentration of diesel in sample DBWT-1 taken from 2 feet below the groundwater surface, WCC recommended that the Agency take steps to remove the remaining soil containing diesel from below the groundwater surface. It was concluded by the Agency and WCC that, if possible, all soil containing diesel should be removed, because the diesel occurred in an area that would be inaccessible after the building was constructed, and the presence of heavily loaded column footings in the area might limit the use of certain in-situ remediation techniques. The recommended plan included the following steps:

1) Deepen the excavation to an elevation of about 7 feet C. O. O. D.;

2) Excavate a trench drain and install sump pumps for the purpose of dewatering the excavation;

3) Excavate the remaining soil containing diesel;

4) Perform closure sampling to document that the soil containing diesel had been removed;

5) Backfill the part of the excavation below groundwater using lean concrete;

6) Place compacted select fill on top of the backfill concrete; and

7) Haul and dispose all excavated diesel-contaminated soil in an appropriate landfill or recycling facility.

WCC proposed that the lean concrete backfill be placed in all parts of the excavation below groundwater and that the concrete be extended to an elevation of about 7 feet C. O. O. D., about 1 foot above the groundwater surface. Compacted soil would be placed on top of the concrete to an elevation of approximately 12 feet C. O. O. D. The purpose of the lean concrete backfill would be to reduce or eliminate the settlement that might occur if granular soil backfill was placed beneath structural footings for the building.

The final diesel removal work was performed on May 21, 1991. About 1500 cubic yards of soil containing diesel were removed. The deepest part of the excavation extended to an elevation of approximately -0.5 feet C. O. O. D. The approximate location of the diesel excavation is shown on Figure 5.

4.3.2 Stockpiling and Analysis of Samples

Covey stockpiled the additional soil containing diesel adjacent to the excavation. In order to characterize the soil for disposal in an appropriate commercial landfill, WCC collected 20 composite soil samples, each composed of 4 discrete samples. These samples, designated VD1 through VD20, were collected using standard sampling procedures discussed in Appendix C.

Chromalab, Inc. composited and analyzed the soil samples for diesel using EPA Method 8015, modified, and BTEX using EPA Method 8020. The analytical results are shown in Appendix D and summarized in Table 2.

The results of this round of analyses of soil containing diesel are summarized as follows:

1) The concentration of diesel in the composite soil samples was reported to range from 15 ppm up to 150 ppm;

2) The concentration of BTEX was reported to range from below the detection limit of 0.005 ppm up to 0.010 ppm.

4.3.3 Disposal

The analytical results were transmitted to the Vasco Sanitary Landfill in a May 8, 1991 letter requesting disposal under the project's existing waste characterization data form. Vasco agreed to accept the soil, and approximately 3,600 ton of soil were hauled to the landfill in covered trucks in late May and early June 1991.

4.4 CLOSURE OF DIESEL SOIL EXCAVATION

Prior to backfilling of the diesel soil excavation, WCC performed closure sampling of the sides and bottom of the excavation. We collected 21 soil samples, designated D-CL-1 through D-CL-5

Chromalab, Inc. analyzed the closure samples for diesel using EPA Method 8015, modified, and BTEX using EPA Method 8020. The analytical results are shown in Appendix D and summarized in Table 3.

The results of the diesel excavation closure sampling are summarized as follows:

1) No diesel was reported at concentrations exceeding the detection limit of 1 ppm except in samples BDC4, 5, 13, 14, and 14-2. In these samples the concentration of diesel ranged from 5 ppm to 59 ppm. At each of these locations, additional soil was excavated to remove the contaminated soil and additional closure sampling was performed until the additional closure samples indicated that soil containing detectable concentrations of diesel had been removed; and

2) No BTEX was reported exceeding the detection limit of 0.005 ppm in any of the closure samples.

The samples obtained from borings drilled to investigate the lateral extent of diesel contamination, discussed above in Section 4.1, may also be considered closure samples, because they do not contain reported concentrations of diesel and they define the areal extent of the contamination. Collectively, the closure samples from the soil borings and the diesel excavation indicate that the soil containing diesel was successfully removed.

4.5 BACKFILLING OF DIESEL SOIL EXCAVATION

On May 30, 1991, approximately 230 cubic yards of lean concrete were placed as backfill within the diesel excavation. The top surface of the backfill concrete was placed at an elevation of about 7 feet C. O. O. D. The concrete was pumped and placed by Landavazo Brothers, Inc. of San Leandro, California.

Testing Engineers, Inc. (TEI) performed a compression test on two concrete samples obtained from the pour in accordance with ASTM Test Method C-39-86. These samples yielded 28-day compression strengths of 460 pounds-per-square-inch (psi) and 500 psi with an average compressive strength of 480 psi. These compression tests indicate that the concrete backfill will provide a design bearing capacity exceeding the native material. The TEI compression test report is included in Appendix B.

After the concrete backfill had been placed, the underlying dewatering sumps were grouted with neat cement grout pumped through PVC tremie pipes placed into the gravel-filled sump pits.

After the lean concrete backfill had cured for several days and the dewatering sumps had been grouted, compacted native soil backfill was placed on top of the concrete backfill on June 4, 1991. The placement and compaction of the fill were performed in accordance with WCC recommendations and were observed by a WCC field technician. Field density tests were performed during the compaction operations to evaluate the compaction of the fill in accordance with the ASTM Test Method D2922 using a nuclear moisture/density gauge.

The diesel excavation was backfilled to an elevation of approximately 12 feet (C. O. O. D.) with clean native soil obtained from elsewhere on the site. The fill was placed in approximately 1 1/2-foot lifts and compacted to a minimum degree of compaction of 95 percent based on ASTM Test Method D1557. The field report, including the results of field density tests, is presented in Appendix B.

5.1 FILL AREA

After the fill had been removed, WCC performed closure sampling to document that the remaining native soil did not contain elevated concentrations of oil and grease or lead. This sampling was performed in several rounds as the soil removal operations progressed. As soon as the fill had been removed from a discrete area, closure samples were taken.

The first closure samples were collected in the northeast corner of the site in order to document that the soil in this area was suitable for use as clean backfill to form stable embankments adjacent to the sidewalk along Clay Street and 11th Street. The samples were collected using standard sampling procedures discussed in Appendix C.

Chromalab, Inc. analyzed the borrow samples for oil and grease using SM 5520 E and F and total lead using EPA Method 7420. These analyses were chosen because they were judged to be suitable indicator parameters based on contaminants in the fill. The analytical results are shown in Appendix D and summarized in Table 3.

The results of this round of closure sampling are summarized as follows:

1) No oil and grease was reported at concentrations exceeding the detection limit of 10 ppm;

2) The concentration of total lead was reported to range from 2.72 ppm up to 4.26 ppm.

The concentrations of lead and oil and grease in the analyzed samples were within concentrations expected for native soil in this area of Oakland. Based on the results of this closure sampling, the removal of fill contaminated with lead and oil and grease was considered complete in the northeast corner of the site, and the soil from this area was subsequently used as clean borrow material elsewhere on the site.

WCC collected 28 closure soil samples from the rest of the site (excluding the diesel excavation area). The samples were collected using standard sampling procedures discussed in Appendix C. The samples were collected at the intersection of grid lines established on the site with north/south lines designated by letters A through G and east/west lines designated by numbers 1 through 5. The sampling locations are shown on Figure 6.

Chromalab, Inc. analyzed the closure soil samples for oil and grease using SM 5520 E and F, and total lead using EPA Method 7420. Selected samples were analyzed for BTEX using EPA Method 8020. The analytical results are shown in Appendix D and summarized in Table 3.

The results of this round of closure sampling are summarized as follows:

1) No oil and grease was reported at concentrations exceeding the detection limit of 10 ppm;

2) The concentration of total lead was reported to range from 2.23 ppm up to 13.5 ppm; and

3) No BTEX was reported at concentrations exceeding the detection limit of 0.005 ppm.

The reported concentrations of lead, BTEX, and oil and grease in the analyzed samples were within concentrations expected for native soil in this area of Oakland. Based on the results of this closure sampling, the removal of fill contaminated with lead and oil and grease was considered complete.

After the completion of closure sampling, the contractor regraded the site to develop stable slopes adjacent to bordering streets. The end-of-project conditions are shown schematically in Figure 7.

5.2 AREA OF SOIL CONTAINING DIESEL

Closure soil sampling in the area of soil containing diesel is discussed above in Section 4.3. Following the backfilling of the diesel soil excavation, the contractor graded the remaining sides of the excavation to an approximate 1H:1V slope.

Groundwater pumped from the diesel soil excavation during soil removal operations was store in two 21,000-gallon Baker tanks, located adjacent to the excavation on 12th Street, on the north side of the site. This groundwater was sampled on May 30, 1991 and analyzed to evaluate appropriate disposal alternatives.

Chromalab, Inc. analyzed the groundwater sample, designation BTW-1, for diesel using EPA Method 8015, modified, and BTEX using EPA Method 602/8020. The analytical results are shown in Appendix D and summarized in Table 4.

The results of the analysis of the groundwater sample are summarized as follows:

1) No BTEX was reported in the sample at concentrations exceeding the detection limit of 0.0005 ppm; and

2) Diesel was reported at a concentration of 0.150 ppm. The detection limit for diesel is 0.050 ppm.

After a period of approximately 6 weeks during which various disposal options were evaluated, the stored groundwater was again sampled on July 17, 1991 and analyzed for diesel at Chromalab, Inc. using EPA Method 8015, modified. No diesel was reported in the sample at a concentration exceeding the detection limit of 0.050 ppm.

During discussions regarding disposal, the Regional Water Quality Control Board (RWQCB) requested that the stored groundwater be analyzed for chlorinated solvents. WCC submitted two groundwater samples to Chromalab, Inc. on July 26, 1991 for analysis by EPA Method 624. No chlorinated solvents were reported in the samples at concentrations exceeding the detection limit of 0.002 ppm. The analytical results are shown in Appendix D and summarized in Table 4.

In response to WCC's request, the RWQCB issued a letter on August 12, 1991 which stated that the RWQCB had no objection to the discharge of the stored groundwater to the storm drain located at the intersection of 12th Street and Jefferson Street. The groundwater was discharged to the storm drain during the following week. The RWQCB letter is retained in WCC's project files.

5.3 AREA OF SOIL CONTAINING GASOLINE

Because no remediation of the area of soil containing gasoline was undertaken under the scope of this project, the end-of-project conditions in the southwestern corner of the site are as described in Section 2.2. In summary, relatively low concentrations of gasoline (less than 100 ppm) occur in the southwest corner of the site in a volume of soil about 5 feet thick from about 24 feet to 29 feet (elevation 6 feet to 11 feet C. O. O. D.) below the elevation of the adjacent 11th Street. The area of gasoline in the soil extends about 40 feet east of, and 25 feet north of, the southeast corner of the site. This area is shown on Figure 7.

In addition, low concentrations of gasoline (less than 0.10 ppm) occur in the groundwater in this area. The lateral extent of groundwater contamination within the 1155 Clay parcel has been defined by soil borings and two monitoring wells installed in the area.

5.4 STATUS OF MONITORING WELLS

Monitoring wells W-1 and W-2, installed by WCC for the 1990 environmental investigations, were physically removed from the site during the 1991 remediation activities. Temporary monitoring well W-4, in the diesel excavation area shown in Figure 4, was removed during the excavation of the soil containing diesel. Monitoring wells W-3 and MW-4, installed by WCC for the 1990 environmental investigations in the southwest corner of the site, were slightly damaged during the fill removal operations but have been restored to operational use. Monitoring well W-5, installed during the diesel investigation, exists near the northwest corner of the site. The locations of existing monitoring wells are shown on Figure 7

6.0
REFERENCES

California Regional Water Quality Control Board, Central Valley Region, February 21, 1991, letter to Forward Landfill, San Joaquin County

Forward, Inc., February 22, 1991, Agreement for Petroleum-Contaminated Soil at Forward Landfill, Approval Number 90-069

Woodward-Clyde Consultants, June 1990, Oakland Federal Building Soil Removal Project, Oakland Federal Building Site, 12th and Jefferson Streets, Oakland, California

September 1990, Specifications for Excavation, Transportation and Disposal of Fill, 1155 Clay Street Site

December 10, 1990, Disposal of Fill from the 1155 Clay Street Site, Clay Street and 11th Street, Oakland; letter to Zanker Material Recovery Systems, Inc., San Jose, California

December 21, 1990, Application for Disposal of Soil, 1155 Clay Project, Oakland, California; letter to Forward, Inc., Stockton, California

January 8, 1991, Disposal of Fill from the 1155 Clay Street Site, Clay Street and 11th Street, Oakland; letter to BFI Waste Systems, Vasco Road Sanitary Landfill, Livermore, California

April 15, 1991, City Center Garage II Remediation Program, City Center Garage II Parcel, Oakland, California

Table 1. Summary of Chemical Analytical Results of Site Characterization Samples*.

Gasoline Contamination Boring Samples

Sample Number	Benzene	Ethyl Benzene	Toluene	Total Xylenes	Gasoline	Diesel	Motor Oil
B1-3	ND	ND	ND	ND	ND	ND	ND
B2-1	ND	ND	ND	ND	ND	ND	ND
B3-1	ND	ND	ND	ND	ND	ND	ND
B4-1	ND	0.007	ND	0.018	ND	ND	ND
B4-2	ND	0.035	ND	0.075	17	ND	ND
B5-1	ND	0.031	ND	0.052	61	ND	ND
B6-1	ND	ND	ND	ND	ND	ND	ND
B7-1	ND	ND	ND	ND	ND	ND	ND
B7-2	ND	ND	ND	ND	ND	ND	ND
B8-1	ND	ND	ND	ND	ND	ND	ND
B8-2	ND	0.008	ND	0.006	ND	ND	ND
B8-3	ND	ND	ND	ND	ND	ND	ND
Detection Limit	0.001	0.001	0.001	0.001	5	10	25
EPA Method	8020	8020	8020	8020	8015 modified	8015 modified	8015 modified

Fill Characterization Boring Samples

Sample Number	Total Lead	Oil & Grease	WET Lead
F1-1	38.1	40	ND
F1-2	3.4	40	–
F2-1	5.2	60	–
F2-2	4.0	40	–
F3-1	32.9	60	–
F3-2	223.0	80	–
F4-1	7.8	ND	ND
F4-2	40.3	300	–
F4-3	71.7	--	–
F4-4	74.8	--	–
F4-5	9.8	--	–
F5-1	20.3	140	–
F5-2	20.8	980	–
F5-3	113.0	--	–
F6-1	394.0	ND	75.8
F6-2	3.8	ND	–
F7-1	3.4	ND	1.9
F7-2	15.0	40	–
F8-1	454.0	120	–
F8-2	29.0	ND	–
F9-1	399.0	300	–
Detection Limit	3	40	0.5
Method	EPA 6010	SM 503A	EPA 3010/ 7420

* All results reported as parts-per-million (ppm), ND=not detected, dashed where no analysis performed.

Table 1. Summary of Chemical Analytical Results of Site Characterization Samples (Concluded)*.

Fill Characterization Boring Samples (Continued)

Sample Number	Total Lead	Oil & Grease	WET Lead
F10-1	20.6	40	4.4
F10-2	8.3	ND	–
F10-3	5.2	--	–
F11-1	8.9	40	ND
F11-2	3.2	ND	–
F12-1	415.0	ND	–
F12-2	3.7	ND	–
F12-3	ND	--	–
F13-1	5.0	ND	ND
F13-2	ND	--	–
F14-1	28.9	ND	–
F14-2	3.5	60	–
F14-3	8.1	--	–
F15-1	7.2	60	–
F15-2	3.2	ND	–
F16-1	53.3	40	3.7
F16-2	8.5	ND	–
F16-3	3.7	--	–
Detection Limit	3.0	40	0.5
Method	EPA 6010	SM 503A	EPA 3010/ 7420

Test Pit Samples

Sample Number	Total Lead	Oil & Grease
TP1-1	30.8	352
TP1-2	98.9	197
TP1-3	80.6	250
TP2-1	395.0	147
TP2-2	9.3	600
TP2-3	9.3	ND
TP3-1	42.6	ND
TP3-2	126.0	640
TP3-3	8.5	ND
TP4-1	442.0	80
TP4-2	763.0	360
TP4-3	45.8	41
Detection Limit	3.0	40
Method	EPA 6010	SM 503A

* All results reported as parts-per-million (ppm), ND=not detected, dashed where no analysis performed.

Table 2. Summary of Chemical Analytical Results of Stockpiled Soil*.

"B" Stockpile

Sample Number	Total Lead	Oil & Grease	Diesel
1	20	ND	ND
2	21	130	38
3	73	100	ND
4	82	46	ND
5	5.7	25	ND
6	28	22	ND
7	78	84	ND
8	66	140	ND
9	90	87	ND
10	63	230	ND
11	83	240	ND
12	15	30	ND
13	29	84	ND
14	10	ND	ND
15	40	100	ND
16	57	390	ND
17	30	210	ND
18	23	35	ND
19	55	190	ND
20	37	52	ND
Detection Limit	0.05	10	1.0
Method	EPA 3050/ 7420	SM 503A	EPA 3550/ 8015

"C" Stockpile

Sample Number	Total Lead	Oil & Grease	Diesel	Gasoline	Benzene	Toluene	Ethyl Benzene	Total Xylenes	W.E.T. Lead
C-1	72.4	430	ND	ND	ND	ND	ND	ND	3.17
C-2	60.9	1700	32	ND	ND	ND	ND	ND	--
C-3	84.5	140	ND	ND	ND	ND	ND	ND	--
C-4	20.9	300	28	ND	ND	ND	ND	ND	--
C-5	98.3	110	ND	ND	ND	ND	ND	ND	3.88
C-6	77.5	48	ND	ND	ND	ND	ND	ND	--
C-7	87.4	37	ND	ND	ND	ND	ND	ND	--
C-8	99.9	110	ND	ND	ND	ND	ND	ND	--
C-9	95.2	150	ND	ND	ND	ND	ND	ND	--
C-10	49.2	89	ND	ND	ND	ND	ND	ND	--
C-11	63.2	85	ND	ND	ND	ND	ND	ND	--
C-12	73.6	77	ND	ND	ND	ND	ND	ND	--
C-13	89.8	53	ND	ND	ND	ND	ND	ND	--
Detection Limit	0.1	10	5	2.5	0.005	0.005	0.005	0.005	0.10
Method	EPA 3050/ 7420	SM 503A	EPA 3550/ 8015	EPA 5030/ 8015	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 3010/ 7420

* All results reported as parts-per-million (ppm), ND=not detected, dashed where no analysis performed.

Table 2. Summary of Chemical Analytical results of Stockpiled Soil (Continued)*.

"C" Stockpile (Continued)

Sample Number	Total Lead	Oil & Grease	Diesel	Gasoline	Benzene	Toluene	Ethyl Benzene	Total Xylenes	W.E.T. Lead
C-14	113.0	61	ND	ND	ND	ND	ND	ND	3.60
C-15	28.6	56	ND	ND	ND	ND	ND	ND	--
C-16	21.4	60	7.4	ND	ND	ND	ND	ND	--
C-17	49.7	250	14	ND	ND	ND	ND	ND	--
C-18	57.7	160	ND	ND	ND	ND	ND	ND	--
C-19	45.8	130	ND	ND	ND	ND	ND	ND	0.66
C-20	91.0	59	ND	ND	ND	ND	ND	ND	--
C-21	28.2	28	--	--	--	--	--	--	0.11
C-22	4.6	18	--	--	--	--	--	--	--
C-23	14.7	58	--	--	--	--	--	--	--
C-24	6.7	51	--	--	--	--	--	--	--
C-25	15.2	200	--	--	--	--	--	--	--
C-26	62.2	88	--	--	--	--	--	--	0.40
C-27	33.4	100	--	--	--	--	--	--	--
C-28	9.2	150	--	--	--	--	--	--	--
C-29	18.4	570	--	--	--	--	--	--	0.15
C-30	5.1	5300	--	--	--	--	--	--	ND
C-31	25.8	21	--	--	--	--	--	--	--
C-32	26.0	85	--	--	--	--	--	--	--
C-33	33.1	190	--	--	--	--	--	--	--
C-34	54.6	33	--	--	--	--	--	--	--
C-35	33.3	64	--	--	--	--	--	--	--
C-36	86.6	98	--	--	--	--	--	--	--
C-37	48.4	51	--	--	--	--	--	--	--
C-38	60.0	130	--	--	--	--	--	--	--
C-39	95.8	150	--	--	--	--	--	--	--
C-40	55.9	67	--	--	--	--	--	--	--
C-41	62.6	74	--	--	--	--	--	--	--
Detection Limit	0.1	10	5	2.5	0.005	0.005	0.005	0.005	0.10
Method	EPA 3050/ 7420	SM 503A	EPA 3550/ 8015	EPA 5030/ 8015	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 3010/ 7420

* All results reported as parts-per-million (ppm), ND=not detected, dashed where no analysis performed.

Table 2. Summary of Chemical Analytical results of Stockpiled Soil (Continued)*.

"D" Stockpile

Sample Number	Oil & Grease	Diesel	Gasoline	Benzene	Toluene	Ethyl Benzene	Total Xylenes	W.E.T. Lead
G1	4400	5300	370	ND	0.34	0.25	0.53	--
D1	--	2300	--	ND	0.0085	0.070	0.082	--
D2	--	3100	--	ND	0.0071	0.039	0.045	--
D3	--	2600	--	ND	ND	ND	0.013	0.24
D4	--	1400	--	ND	ND	ND	ND	--
D5	--	650	--	ND	ND	ND	ND	--
D6	--	1200	--	ND	ND	0.0053	0.014	ND
D7	--	1200	--	ND	ND	ND	ND	--
D8	--	680	--	ND	ND	ND	ND	--
D9	--	590	--	ND	ND	ND	ND	1.40
D10	--	590	--	ND	ND	ND	ND	--
D11	--	490	--	ND	ND	ND	ND	--
D12	--	670	--	ND	0.0066	ND	ND	0.53
Detection Limit	10	5	2.5	0.005	0.005	0.005	0.005	0.10
Method	SM 503A	EPA 3550/ 8015	EPA 5030/ 8015	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 3010/ 7420

Vasco Road Landfill Stockpile

Sample Number	Diesel	Benzene	Toluene	Ethyl Benzene	Total Xylenes
VD1	150	ND	ND	0.0065	0.015
VD2	150	ND	ND	ND	0.0064
VD3	130	ND	ND	ND	0.0074
VD4	69	ND	ND	0.0056	0.010
VD5	76	ND	ND	ND	ND
VD6	16	ND	ND	ND	ND
VD7	75	ND	ND	ND	ND
VD8	28	ND	ND	ND	ND
VD9	91	ND	ND	ND	ND
VD10	79	ND	ND	ND	ND
VD11	70	ND	ND	0.0087	0.0085
VD12	36	ND	ND	ND	ND
VD13	38	ND	ND	ND	0.0053
VD14	31	ND	ND	ND	ND
VD15	52	ND	ND	ND	ND
VD16	48	ND	ND	ND	ND
VD17	58	ND	ND	ND	ND
VD18	23	ND	ND	ND	ND
VD19	15	ND	0.0069	ND	0.0074
VD20	61	ND	ND	ND	ND
Detection Limit	1.0	0.005	0.005	0.005	0.005
Method	EPA 5030/ 8015	EPA 8020	EPA 8020	EPA 8020	EPA 8020

* All results reported as parts-per-million (ppm), ND=not detected, dashed where no analysis performed.

Table 2. Summary of Chemical Analytical results of Stockpiled Soil (Concluded)*.

Progress Samples

Sample Number	Total Lead	Oil & Grease	Diesel	Gasoline	Benzene	Toluene	Ethyl Benzene	Total Xylenes	W.E.T. Lead	W.E.T. Oil & Grease
VL-1	2.9	ND	--	--	--	--	--	--	--	--
VL-2	2.7	ND	--	--	--	--	--	--	--	--
VR-1	2.9	ND	--	--	--	--	--	--	--	--
VR-2	2.8	ND	--	--	--	--	--	--	--	--
DBWT-1	--	--	690	--	ND	ND	6.4	22	--	--
B-2	69.6	140	ND	ND	--	--	--	--	0.17	--
B-3	84.8	100	ND	ND	--	--	--	--	0.65	1.6
B-4	60.3	470	--	--	--	--	--	--	0.12	ND
B-5	58.0	240	--	--	--	--	--	--	1.71	ND
B-6	66.6	120	ND	ND	--	--	--	--	0.17	--
B-7	33.5	1100	--	--	--	--	--	--	0.11	1.0
B-8	47.1	49	--	--	--	--	--	--	ND	ND
B-9	33.8	120	ND	ND	--	--	--	--	0.12	--
B-10	43.7	390	--	--	--	--	--	--	1.04	ND
B-12	26.0	330	--	--	--	--	--	--	ND	ND
B-13	27.2	100	14	ND	--	--	--	--	0.10	--
B-14	20.8	180	--	--	--	--	--	--	ND	ND
B-15	21.4	200	--	--	--	--	--	--	ND	ND
B-16	27.0	240	230	ND	--	--	--	--	0.13	--
B-17	21.2	320	--	--	--	--	--	--	--	--
B-18	21.0	430	--	--	--	--	--	--	--	--
B-19	23.7	240	--	--	--	--	--	--	0.64	--
B-20	43.5	270	--	--	--	--	--	--	1.48	--
B-21	112.0	1200	--	--	--	--	--	--	1.20	1.4
B-22	81.7	1100	--	--	--	--	--	--	2.89	1.5
B-23	65.4	760	--	--	--	--	--	--	2.10	--
B-24	31.3	380	--	--	--	--	--	--	2.30	--
B-25	53.8	850	--	--	--	--	--	--	2.30	--
B-26	45.4	270	--	--	--	--	--	--	1.58	--
B-27	32.4	180	--	--	--	--	--	--	0.21	--
B-28	62.3	400	--	--	--	--	--	--	0.74	--
B-29	34.7	520	--	--	--	--	--	--	0.53	--
Detection Limit	0.05	10	5	2.5	0.005	0.005	0.005	0.005	0.10	1.0
Method	EPA 3050 7420	SM 503A	EPA 5030/ 8015	EPA 5030/ 8015	EPA 8020	EPA 8020	EPA 8020	EPA8020	EPA 3010 7420	SM 5520/ C and F

* All results reported as parts-per-million (ppm), ND=not detected, dashed where no analysis performed.

Table 3. Summary of Chemical Analytical Results of Closure Samples*.

Borrow Area Closure Samples

Sample Number	Total Lead	Oil & Grease
A1	2.77	ND
A2	3.91	ND
B1	3.21	ND
B2	2.72	ND
C1	3.10	ND
C2	4.12	ND
D1	4.26	ND
D2	3.63	ND
Detection Limit	0.05	10
Method	EPA 7420	SM 503A

Fill Excavation Closure Samples

Sample Number	Total Lead	Oil & Grease	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Diesel
CA1	3.04	ND	ND	ND	ND	ND	
CA3	3.53	ND	ND	ND	ND	ND	--
CA4	4.14	ND	ND	ND	ND	ND	--
CA5	3.40	ND	ND	ND	ND	ND	--
CB1	2.23	ND	ND	ND	ND	ND	--
CB2	--	--	ND	ND	ND	ND	ND
CB3	4.31	ND	ND	ND	ND	ND	--
CB4	3.29	ND	ND	ND	ND	ND	--
CB5	3.54	ND	ND	ND	ND	ND	--
CC1	2.39	ND	ND	ND	ND	ND	--
CC3	4.08	ND	ND	ND	ND	ND	--
CC4	3.56	ND	ND	ND	ND	ND	--
CC5	4.99	ND	ND	ND	ND	ND	--
CD1	4.82	ND	--	--	--	--	--
CD2	3.47	ND	--	--	--	--	--
CD3	3.08	ND	--	--	--	--	--
CD4	3.50	ND	--	--	--	--	--
CE1	3.57	ND	--	--	--	--	--
CE2	4.11	ND	--	--	--	--	--
CE3	3.87	ND	ND	ND	ND	ND	--
CE4	4.25	ND	--	--	--	--	--
CE5	3.74	ND	ND	ND	ND	ND	--
CF1	6.82	ND	--	--	--	--	--
CF2	13.50	ND	--	--	--	--	--
CF3	3.60	ND	--	--	--	--	--
Detection Limit	0.05	10	0.005	0.005	0.005	0.005	1.0
Method	EPA 7420	SM 503A	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 3550/ 8015

* All results reported as parts-per-million (ppm), ND=not detected, dashed where no analysis performed.

Table 3. Summary of Chemical Analytical Results of Closure Samples (Continued)*.

Fill Excavation Closure Samples (Continued)

Sample Number	Total Lead	Oil & Grease
CF4	11.40	ND
CF4-2	7.87	ND
CF5	16.80	ND
CF5-2	4.36	ND
CG1	3.43	ND
CG2	3.62	ND
CG3	9.21	ND
CG4	4.31	ND
CG5	5.01	ND
Detection Limit	0.05	10
Method	EPA 7420	SM 503A

Diesel Boring Closure Samples

Sample Number	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Diesel	Gasoline
DI 1-1	ND	ND	ND	ND	ND	ND
DI 1-2	ND	ND	ND	ND	ND	ND
DI 1-3	ND	ND	ND	ND	ND	ND
DI 2-1	ND	ND	ND	ND	ND	ND
DI 2-2	ND	ND	ND	ND	ND	ND
DI 2-3	ND	ND	ND	ND	ND	ND
DI 3-1	ND	ND	ND	ND	ND	ND
DI 3-2	ND	ND	ND	ND	ND	ND
DI 3-3	ND	ND	ND	ND	ND	ND
DI 4-1	ND	ND	ND	ND	ND	ND
DI 4-2	ND	ND	ND	ND	ND	ND
DI 4-3	ND	ND	ND	ND	ND	ND
DI 5-1	ND	ND	ND	ND	ND	ND
DI 5-2	ND	ND	ND	ND	ND	ND
DI 6-1	ND	ND	ND	ND	ND	ND
DI 6-2	ND	ND	ND	ND	ND	--
DI 6-3	ND	ND	ND	ND	ND	--
DI 7-1	ND	ND	ND	ND	ND	--
DI 7-2	ND	ND	ND	ND	ND	--
DI 7-3	ND	ND	ND	ND	ND	--
DI 8-1	ND	ND	ND	ND	ND	--
DI 8-2	ND	ND	ND	ND	ND	--
DI 8-3	ND	ND	ND	ND	ND	--
DI 9-1	ND	ND	ND	ND	ND	--
DI 9-2	ND	ND	ND	ND	ND	--
Detection Limit	0.005	0.005	0.005	0.005	1.0	1.0
EPA Method	8020	8020	8020	8020	3550/ 8015	5030/ 8015

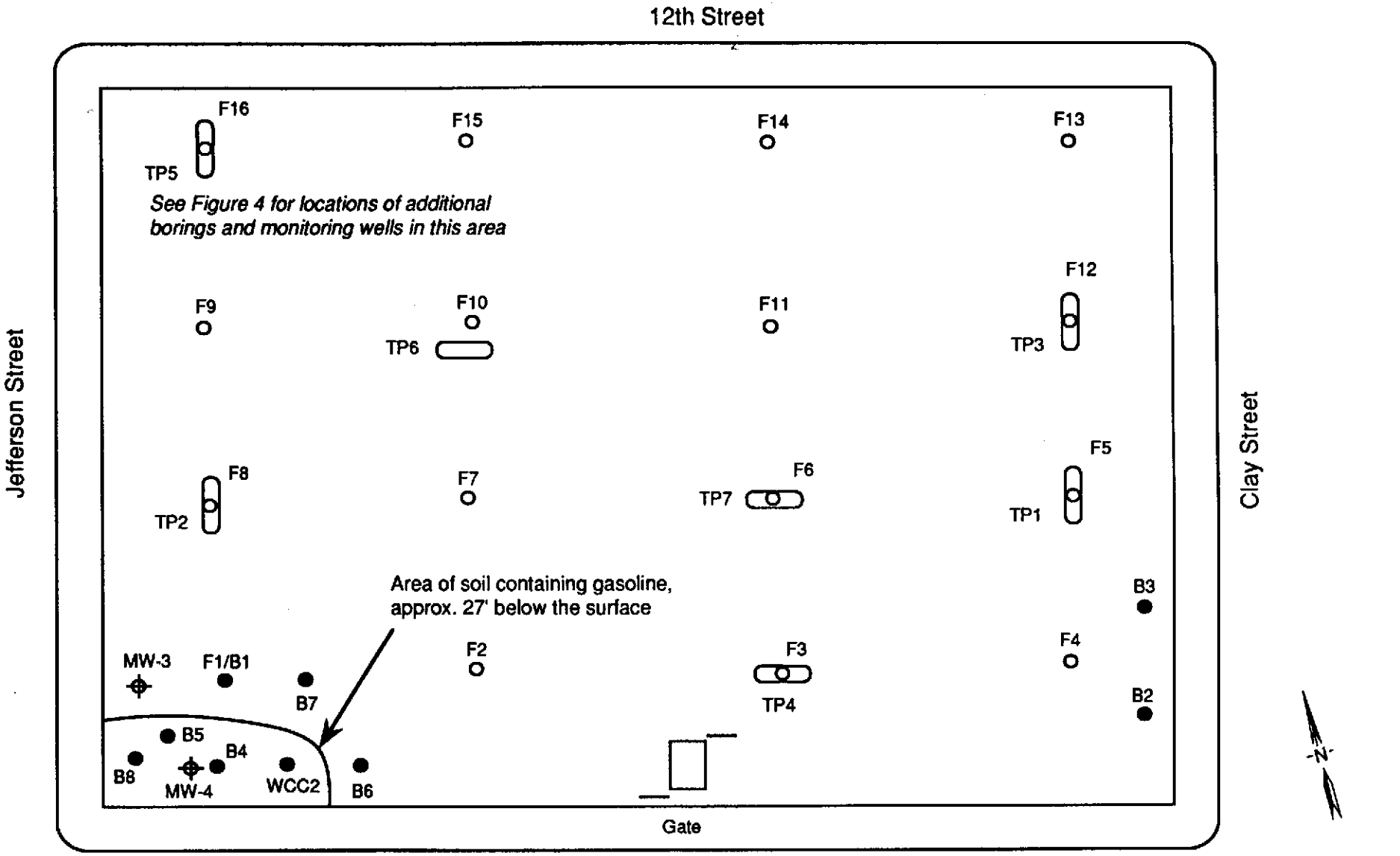
* All results reported as parts-per-million (ppm), ND=not detected, dashed where no analysis performed.

Table 3. Summary of Chemical Analytical Results of Closure Samples (Concluded)*.

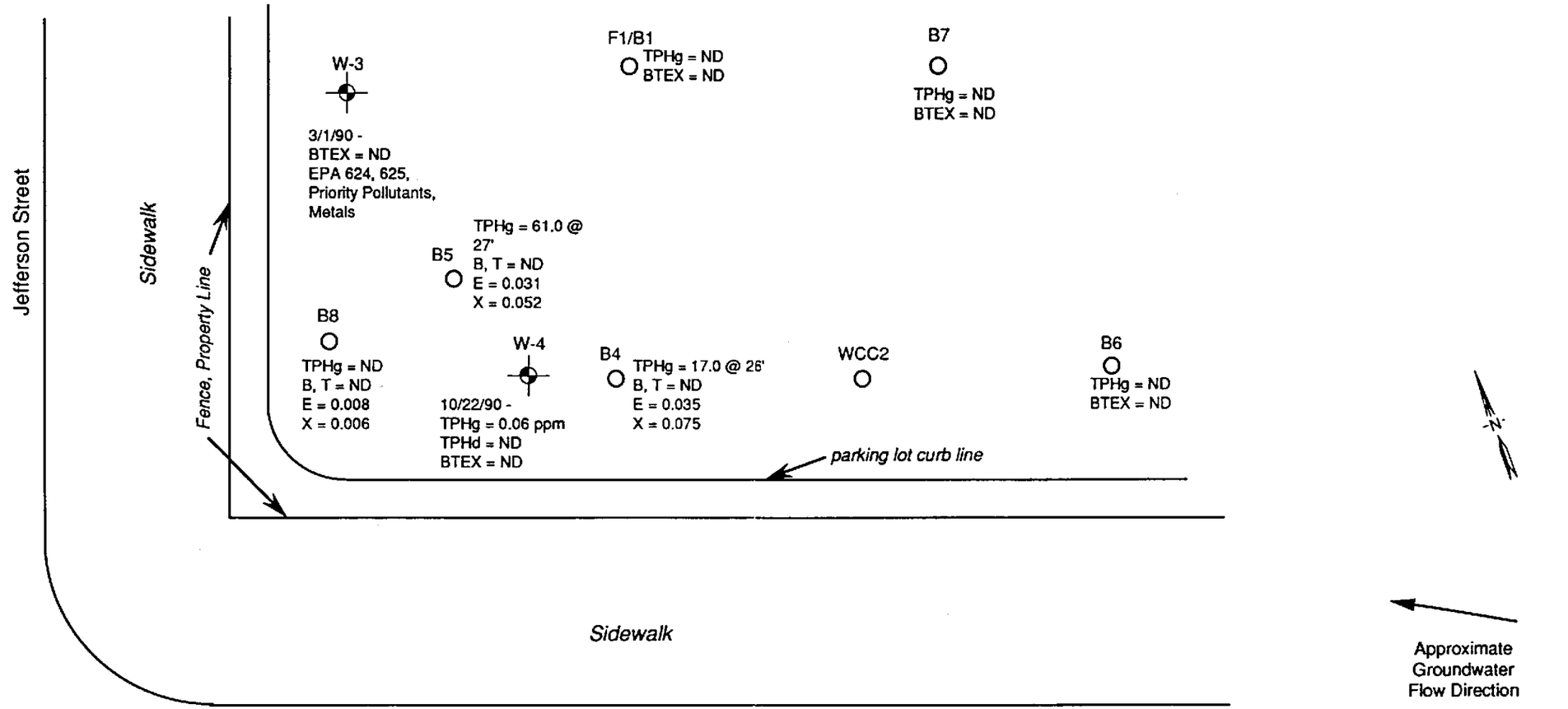
Diesel Excavation Closure Samples

Sample Number	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Diesel	Gasoline
DI 9-3	ND	ND	ND	ND	ND	--
DI 10-1	ND	ND	ND	ND	ND	--
DI 10-2	ND	ND	ND	ND	ND	--
DI 11-1	ND	ND	ND	ND	ND	--
DI 11-3	ND	ND	ND	ND	ND	--
DI 12-1	ND	ND	ND	ND	ND	--
DI 12-2	ND	ND	ND	ND	ND	--
DI 12-3	ND	ND	ND	ND	ND	--
D-CL-1	ND	ND	ND	ND	ND	--
D-CL-2	ND	ND	ND	ND	ND	--
D-CL-3	ND	ND	ND	ND	ND	--
D-CL-4	ND	ND	ND	ND	ND	--
D-CL-5	ND	ND	ND	ND	ND	--
D-C1-1	ND	ND	ND	ND	ND	--
D-C1-2	ND	ND	ND	ND	ND	--
BDC1	ND	ND	ND	ND	ND	--
BDC2	ND	ND	ND	ND	ND	--
BDC3	ND	ND	ND	ND	ND	--
BDC4	ND	ND	ND	ND	11	--
BDC5	ND	ND	ND	ND	5.0	--
BDC6	ND	ND	ND	ND	ND	--
BDC7	ND	ND	ND	ND	ND	--
BDC8	ND	ND	ND	ND	ND	--
BDC9	ND	ND	ND	ND	ND	--
BDC10	ND	ND	ND	ND	ND	--
BDC11	ND	ND	ND	ND	ND	--
BDC12	ND	ND	ND	ND	ND	--
BDC13	ND	ND	ND	ND	59	--
BDC14	ND	ND	ND	ND	36	--
BDC14-2	ND	ND	ND	ND	16	--
BDC15	ND	ND	ND	ND	ND	ND
Detection Limit	0.005	0.005	0.005	0.005	1.0	1.0
EPA Method	8020	8020	8020	8020	3550/ 8015	5030/ 8015

* All results reported as parts-per-millino (ppm), ND=not detected, dashed where no analysis performed.



Project No. 90C0039B	Soil Remediation, 1155 Clay Street	Locations of Borings, Test Pits, and Monitoring Wells, Environmental Site Assessment	Figure 1
Woodward-Clyde Consultants			



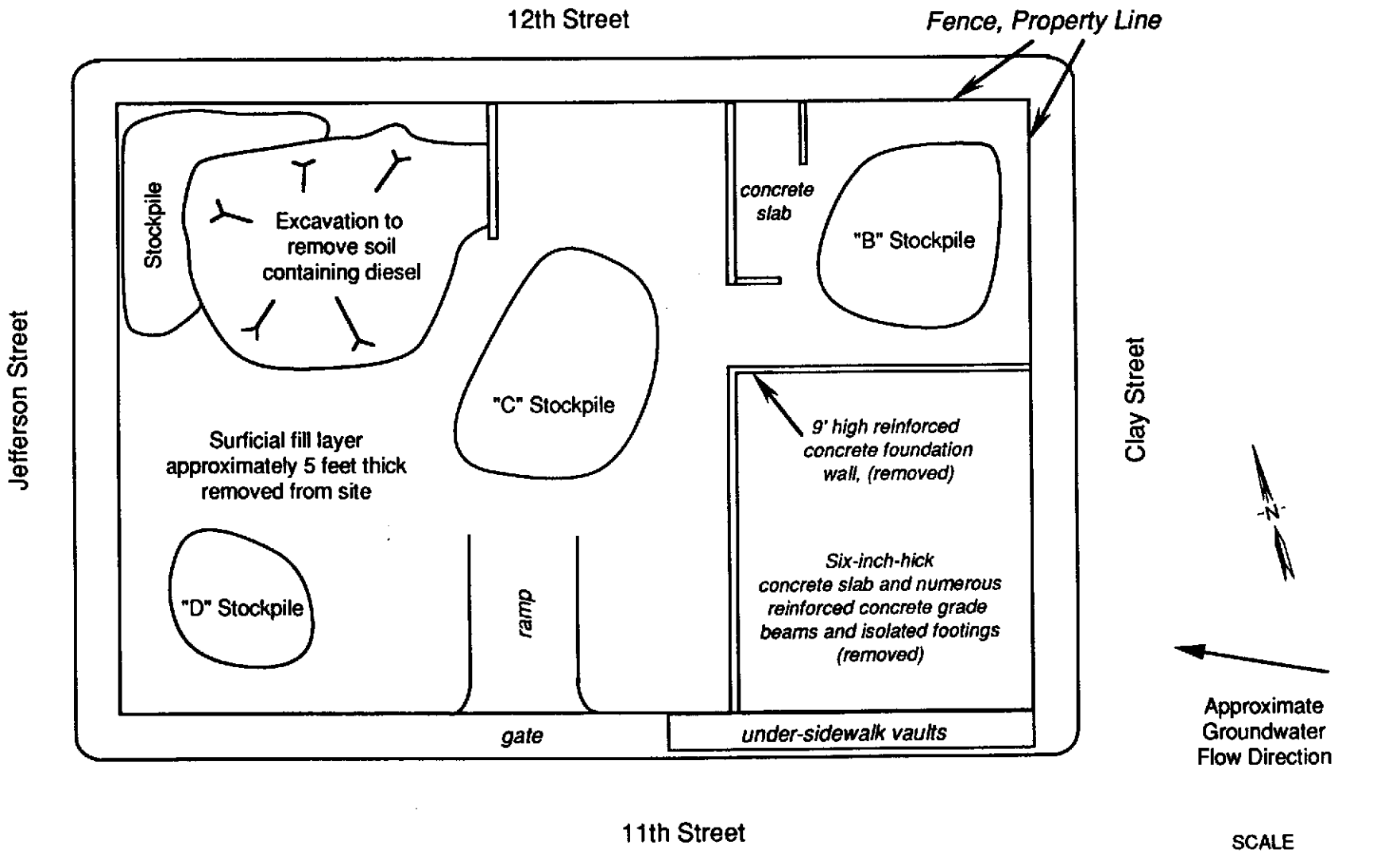
Notes:
1) analytical results reported as parts-per-million (ppm)
2) TPHg = total petroleum hydrocarbons, gasoline
3) TPHd = total petroleum hydrocarbons, diesel
4) B = benzene
5) T = toluene
6) E = ethyl benzene
7) X = xylene

Legend:

Monitoring Well

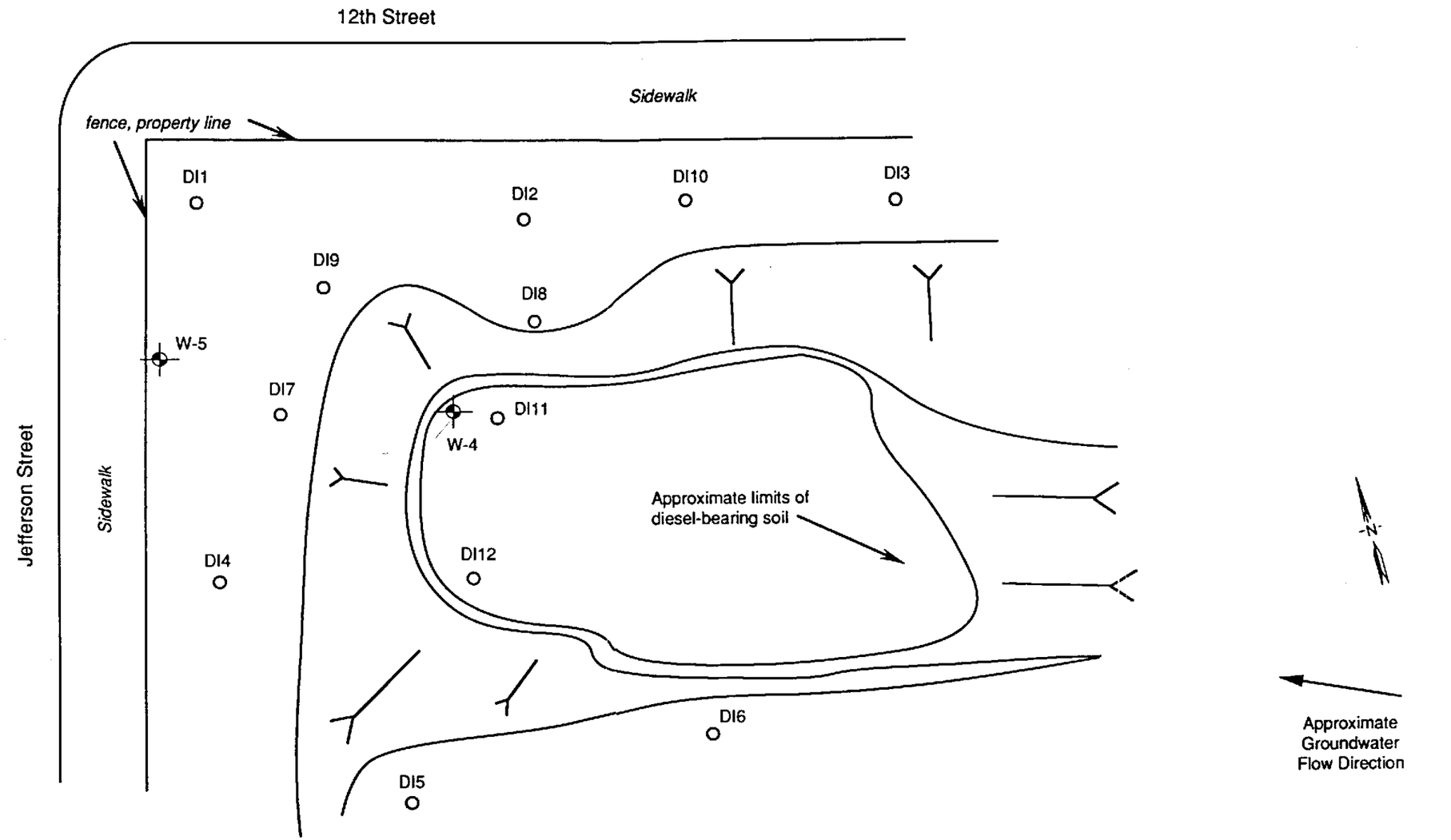
O Soil Borings

Project No. 90C0039B	Soil Remediation, 1155 Clay Street	Locations of Borings and Monitoring Wells, Area of Soil Containing Gasoline	Figure 2
Woodward-Clyde Consultants			



Note: Drawing shows condition of site after pavement had been removed, exposing fill soil and building remnants.

Project No. 90C0039B	Soil Remediation, 1155 Clay Street	Excavation and Stockpiling Plan	Figure 3
Woodward-Clyde Consultants			

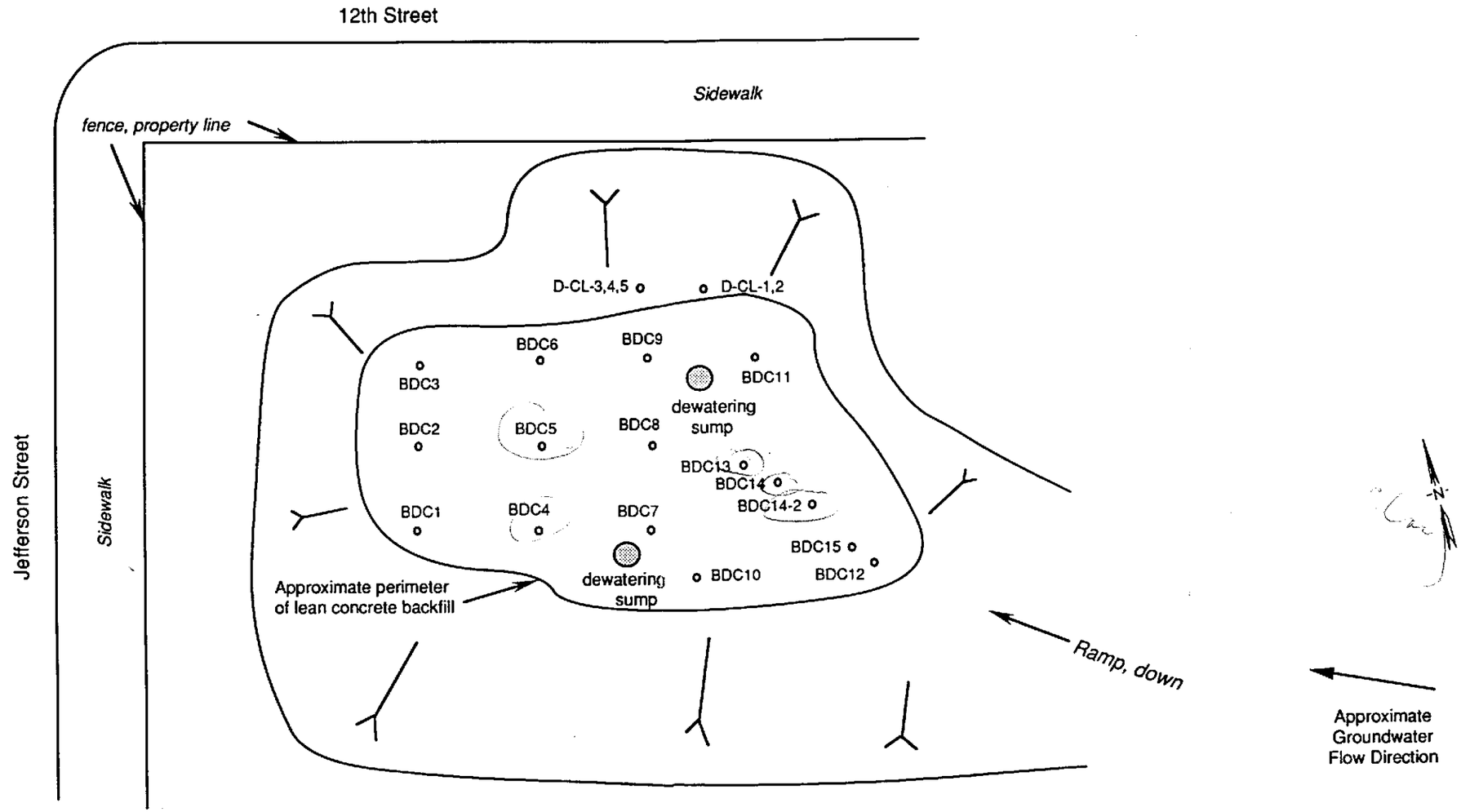


Note: Logs of borings and monitoring wells are contained in Appendix A

Legend

- location of boring
- location of monitoring well

Project No. 90C0039B	Soil Remediation, 1155 Clay Street	Location of Borings and Monitoring Wells, Diesel Excavation Area	Figure 4
Woodward-Clyde Consultants			



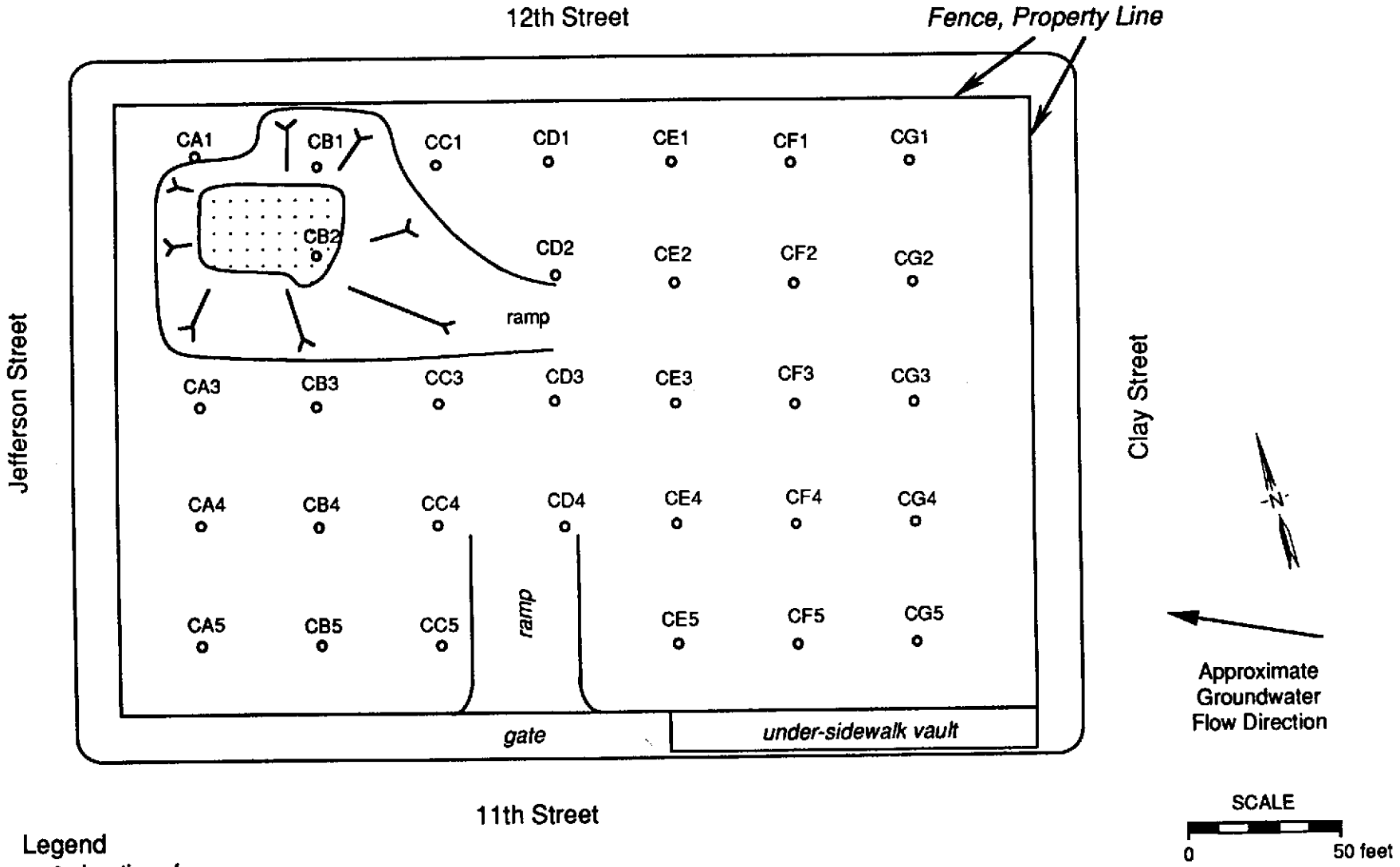
11th Street

Notes: 1) Lean concrete backfill placed in portions of excavation below elevation 7 feet C.O.O.D.
2) Dewatering sumps were grouted after backfill concrete had cured.
3) Select native fill placed on top of backfill slab to raise grade to elevation 13 feet C.O.O.D.

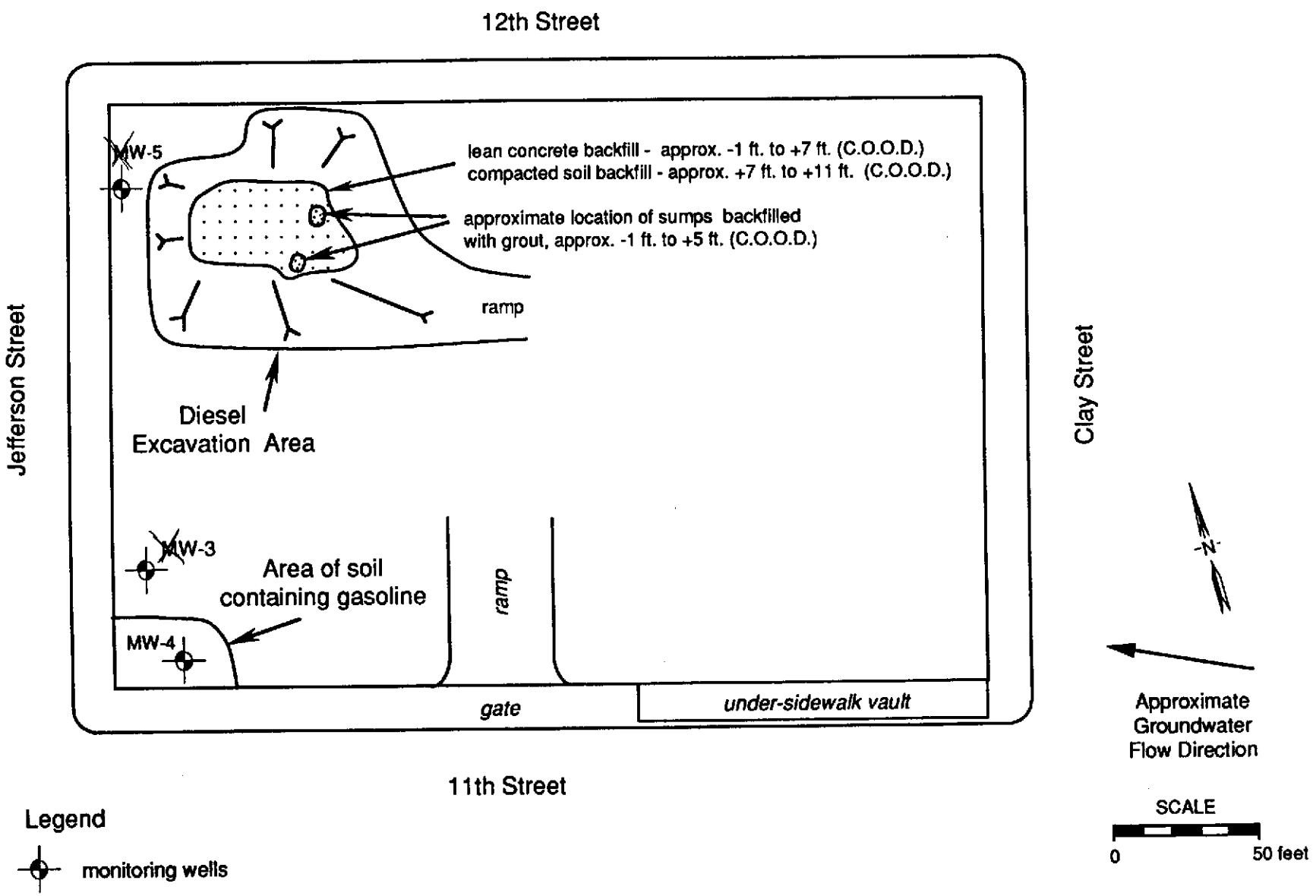
SCALE
0 16 feet

Legend
- o location of closure sample

Project No. 90C0039B	Soil Remediation, 1155 Clay Street	Locations of Closure Soil Samples, Diesel Excavation Area	Figure 5
Woodward-Clyde Consultants			



Project No. 90C0039B	Soil Remediation, 1155 Clay Street	Locations of Closure Soil Samples, Fill Excavation Area	Figure 6
Woodward-Clyde Consultants			



Project No. 90C0039B	Soil Remediation, 1155 Clay Street	End-of-Project Conditions - June 1991	Figure 7
Woodward-Clyde Consultants			

APPENDIX A - SOIL BORING AND TEST PIT LOGS

1) Borings to Characterize Fill
2) Borings to Characterize Gasoline Contamination
3) Borings to Characterize Diesel Contamination
4) Test Pits

Woodward-Clyde Consultants

PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F1/B1		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 5, 1990	
DRILLING EQUIPMENT CME 45		COMPLETION DEPTH 30.0'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 25'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION
	asphaltic concrete + gravel base
	SILTY SAND (SM) dark brown, dry, fine grain sand, pieces of brick, wood (FILL)
	becomes light brown
5	SILTY SAND (SM) mottled orange and brown, damp (NATIVE SOIL)
10	
15	CLAYEY SAND (SC) brown, damp, slight plasticity
20	SILTY SAND (SM) brown, moist, little clay
	becomes orange brown
25	
30	Bottom of Boring at 30 feet
35	

DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
5	1	F1-1		5 5	
	2	F1-2		3 4	
15	3	B1-1		7 13	No odor
20	4	B1-2			No odor
25	5	B1-3			No odor
30					
35					

Woodward-Clyde Consultants

PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F2		ELEVATION AND DATUM	
DRILLING AGENCY Exeltech	DRILLER Frank/Scott	DATE STARTED / DATE FINISHED	July 3, 1990
DRILLING EQUIPMENT Mobile B-53		COMPLETION DEPTH 5.5'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO Ft.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL NO. 1 NA	FROM TO Ft.		
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base		1	F2-1		9 / 9	
	SILTY SAND (SM) dark brown, dry, fine grain sand (FILL)						
	becomes medium brown, damp, pieces of clay pipe		2	F2-2		4 / 4	
5	CLAYEY SAND (SC) mottled orange brown and gray, damp (NATIVE SOIL)	5	3	F2-3		7 / 16	
	Bottom of Boring at 5.5 feet						
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants

PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F3		ELEVATION AND DATUM	
DRILLING AGENCY Exeltech	DRILLER Frank/Scott	DATE STARTED / DATE FINISHED	July 3, 1990
DRILLING EQUIPMENT Mobile B-53		COMPLETION DEPTH 7'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO Ft.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL NO. 1 NA	FROM TO Ft.		
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY SAND (SM) mottled medium brown and dark brown, damp, fine grain sand, pieces of mortor (FILL) becomes light brown		1	F3-1		14 / 11	
5		5	2	F3-2		2 / 3	
	CLAYEY SAND (SC) mottled orange brown and gray, damp (NATIVE SOIL)		3	F3-3		8 / 14	
10	Bottom of Boring at 7 feet	10					
15		15					
20		20					
25		25					
30		30					
35		35					

Woodward-Clyde Consultants

PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F4		ELEVATION AND DATUM	
DRILLING AGENCY Exeltech	DRILLER Frank/Scott	DATE STARTED / DATE FINISHED July 3, 1990	
DRILLING EQUIPMENT Mobile B-53		COMPLETION DEPTH 10'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 5
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY CLAY (CH) mottled gray and green, damp, high plasticity (FILL)		1	F4-1		7 11	
			2	F4-2		7 9	
5		5	3	F4-3		9 9	
	some sand, becomes mottled gray and reddish brown		4	F4-4		4 4	
10		10	5	F4-5			encountered concrete, abondoned boring
	Bottom of Boring at 10 feet						
15		15					
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F5			ELEVATION AND DATUM		
DRILLING AGENCY Exeltech	DRILLER Frank/Scott		DATE STARTED / DATE FINISHED July 3, 1990		
DRILLING EQUIPMENT Mobile B-53			COMPLETION DEPTH 15'	SAMPLER 2" Modified California Type	
DRILLING METHOD 6" Solid Auger	DRILL BIT		NO. OF SAMPLES DIST. NA	UNDIST. 4	
SIZE AND TYPE OF CASING NA			WATER LEVEL FIRST	COMPL. NA	24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.		LOGGED BY: W. Copeland	CHECKED BY:	
SIZE AND TYPE OF PACK NA	FROM TO FT.				
TYPE OF SEAL NO. 1 NA	FROM TO FT.				
NO. 2 NA	FROM TO FT.				

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	gravel fill		1	F5-1		7, 14	
	SILTY CLAY (CH) mottled gray, green, and brown in conveluted layers, damp, little sand, contains flakes of wood		2	F5-2		6, 7	
5		5	3	F5-3		6, 6	
	(FILL)						
10	flakes of wood, some fine gravel	10					
	CLAYEY SAND (SC) mottled orange brown and gray, damp (NATIVE SOIL)		4	F5-4		6, 9	
15		15					
	Bottom of Boring at 10 feet						
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F6		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED	July 5, 1990
DRILLING EQUIPMENT CME		COMPLETION DEPTH 6.5'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY SAND (SM) dark brown, dry, fine grain, gravel to 1/2" diameter (FILL)		1	F6-1		9, 10	
	becomes medium brown		2	F6-2		3, 3	
5	SILTY SAND (SM) reddish brown, damp, fine grain (NATIVE SOIL)	5	3	F6-3		2, 3	
	CLAYEY SAND (SC) mottled orange brown and gray, damp						
10	Bottom of Boring at 6.5 feet	10					
15		15					
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F7		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 5, 1990	
DRILLING EQUIPMENT CME		COMPLETION DEPTH 6.5'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 2
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY SAND (SM) dark brown, damp, fine grain (FILL)		1	F7-1		11 / 11	
	becomes light to medium brown		2	F7-2		4 / 4	
5	CLAYEY SAND (SC) mottled orange brown and gray, damp (NATIVE SOIL)	5					
10	Bottom of Boring at 6.5 feet	10					
15		15					
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F8			ELEVATION AND DATUM		
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil		DATE STARTED / DATE FINISHED July 5, 1990		
DRILLING EQUIPMENT CME			COMPLETION DEPTH 5'	SAMPLER 2" Modified California Type	
DRILLING METHOD 6" Solid Auger	DRILL BIT		NO. OF SAMPLES DIST. NA	UNDIST. 3	
SIZE AND TYPE OF CASING NA			WATER LEVEL FIRST	COMPL. NA	24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FL		LOGGED BY: W. Copeland	CHECKED BY:	
SIZE AND TYPE OF PACK NA	FROM TO FL				
TYPE OF SEAL NO. 1 NA	FROM TO FL				
NO. 2 NA	FROM TO FL				

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY SAND (SM) dark brown to black, damp, fine grain sand with some clay, debris (brick fragments and mortor) (FILL)		1	F8-1		8, 13	
			2	F8-2		8, 8	
5	SILTY SAND (SM) mottled orange brown and brown, damp (NATIVE SOIL)	5	3	F8-3		2, 4	
	Bottom of Boring at 5 feet						
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F9		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 5, 1990	
DRILLING EQUIPMENT CME		COMPLETION DEPTH 5'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 2
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY SAND (SM) dark brown to black, damp, some clay, contains debris (FILL)		1	F9-1		4 / 7	
	SILTY SAND (SM) mottled light and dark brown, damp, fine grain (NATIVE SOIL)		2	F9-2		6 / 8	
5	Bottom of Boring at 5 feet	5					
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F10		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 5, 1990	
DRILLING EQUIPMENT CME		COMPLETION DEPTH 8'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 4
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO Ft.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL NO. 1 NA	FROM TO Ft.		
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY SAND (SM) dark brown to medium brown, damp, some clay (FILL)		1	F10-1		9, 8	
			2	F10-2		7, 8	
5		5	3	F10-3		6, 6	
	CLAYEY SAND (SC) mottled gray and brown, damp (NATIVE SOIL)		4	F10-4		12, 17	
10	Bottom of Boring at 8 feet	10					
15		15					
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F11		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 5, 1990	
DRILLING EQUIPMENT CME		COMPLETION DEPTH 6.5'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 2
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY SAND (SM) black, dry, fine grain (FILL)		1	F11-1		4, 5	
	becomes light brown		2	F11-2		2, 3	
5	CLAYEY SAND (SC) mottled orange and brown, damp, fine grain (NATIVE SOIL)	5					
	Bottom of Boring at 6.5 feet.						
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F12		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 5, 1990	
DRILLING EQUIPMENT CME		COMPLETION DEPTH 5'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base		1	F12-1		4, 12	
	SILTY CLAY (CH) greenish brown, damp (FILL)		2	F12-2		5, 5	
	SILTY SAND (SM) dark brown, dry, fine grain (FILL) becomes orange brown (NATIVE SOIL?)		3	F12-3		2, 3	
5	Bottom of Boring at 5 feet	5					
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F13		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 5, 1990	
DRILLING EQUIPMENT CME		COMPLETION DEPTH 4'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 2
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base					
	SILTY SAND (SM) dark brown, dry, fine grain (FILL)	1	F13-1		5 4	
	becomes orange brown (NATIVE SOIL?)	2	F13-2		1 2	
5	Bottom of Boring at 4 feet					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F14		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 5, 1990	
DRILLING EQUIPMENT CME		COMPLETION DEPTH 5'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY SAND (SM) mottled orange brown and dark brown, dry, fine grain (FILL)		1	F14-1		8, 6	
			2	F14-2		2, 3	
5		5	3	F14-3		1, 2	
	Bottom of Boring at 5 feet						
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER F15			ELEVATION AND DATUM
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil		DATE STARTED / DATE FINISHED July 5, 1990
DRILLING EQUIPMENT CME			COMPLETION DEPTH 8.5' / SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT		NO. OF SAMPLES / DIST. NA / UNDIST. 2
SIZE AND TYPE OF CASING NA			WATER LEVEL / FIRST / COMPL. NA / 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.		LOGGED BY: W. Copeland / CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY SAND (SM) dark to medium brown, damp, some clay, contains debris (FILL)		1	F15-1		8 9	
			2	F15-2		7 7	
5		5					
	SILTY SAND (SM) orange brown, damp, some clay (NATIVE SOIL)						
10	Bottom of Boring at 4 feet	10					
15		15					
20		20					
25		25					
30		30					
35		35					

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BORING NUMBER F16		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 5, 1990	
DRILLING EQUIPMENT CME		COMPLETION DEPTH 7'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY SAND (SM) dark brown, dry, fine grain (FILL)		1	F16-1		7, 10	
			2	F16-2		5, 5	
5		5	3	F16-3		3, 3	
	SILTY SAND (SM) mottled orange brown and dark brown, damp, some clay (NATIVE SOIL)						
	Bottom of Boring at 7 feet						
10		10					
15		15					
20		20					
25		25					
30		30					
35		35					

2) Borings to Characterize Gasoline Contamination

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER B2			ELEVATION AND DATUM
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil		DATE STARTED / DATE FINISHED July 6, 1990
DRILLING EQUIPMENT CME 45			COMPLETION DEPTH 30.0' / SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT		NO. OF SAMPLES / DIST. NA / UNDIST. 1
SIZE AND TYPE OF CASING NA			WATER LEVEL / FIRST 25' / COMPL. NA / 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.		LOGGED BY: W. Copeland / CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY CLAY (CH) greenish brown, damp, fine grain sand, some clay (FILL)						
5	decreasing clay, becomes medium to dark brown, contains little gravel to 1.5" diameter	5					
10		10					← encountered concrete slab (?) possible floor slab
	SILTY SAND (SM) brown, moist, some clay, medium grain (NATIVE SOIL)						No odor
15		15					
20	becomes slightly mottled gray and orange brown	20					No odor
			1	B2-1		16 27 37	No odor OVM=0 ppm
25	▽ ATD	25					No odor
30	Bottom of Boring at 30 feet	30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER B3			ELEVATION AND DATUM
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil		DATE STARTED / DATE FINISHED July 6, 1990
DRILLING EQUIPMENT CME 45			COMPLETION DEPTH 30.0' / SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT		NO. OF SAMPLES: DIST. NA / UNDIST. 1
SIZE AND TYPE OF CASING NA			WATER LEVEL: FIRST 26' / COMPL. NA / 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO Ft.		LOGGED BY: T. Sawyer / CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL: NO. 1 NA	FROM TO Ft.		
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SILTY CLAY (CH) greenish brown, damp (FILL)						
5		5					
10		10					← encountered concrete slab (?) possible floor slab
	SILTY SAND (SM) medium brown, damp, some clay, fine grain (NATIVE SOIL)						No odor
15		15					
	CLAYEY SAND (SC) mottled orange brown and medium brown, moist, fine grain						No odor
20		20					
	SILTY SAND (SM) orange brown, moist, medium grain		1	B3-1		14 / 25	No odor OVM=0 ppm
25	▽ ATD	25					No odor
30	Bottom of Boring at 30 feet	30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER B4		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED	July 6, 1990
DRILLING EQUIPMENT CME 45		COMPLETION DEPTH 30.0'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 2
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 27.5'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO Ft.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL NO. 1 NA	FROM TO Ft.		
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	asphaltic concrete + gravel base					
	SAND (SP) dark brown, damp, fine grain, few brick fragments (FILL)					
5						
	SILTY SAND (SM) orange brown, moist, medium grain, some clay (NATIVE SOIL)					
10						
15						
20						No odor
	SAND (SP) greenish brown, moist, medium grain					
	increasing clay	1	B4-1		11, 13	Slight gasoline odor OVM = 8.8 ppm
25	▽ ATD	2	B4-2		11, 14, 18	Moderate gasoline odor OVM = 96 ppm
30	Bottom of Boring at 30 feet					No odor
35						

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER B5		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED	July 6, 1990
DRILLING EQUIPMENT CME 45		COMPLETION DEPTH 30.0'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 1
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 27'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: T. Sawyer	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SAND (SP) dark brown, damp, fine grain, brick fragments (FILL)						
5	SAND (SP) medium brown to orange brown, damp, medium grain, some silt (NATIVE SOIL)	5					
10		10					
15	becomes orange brown, increasing clay	15					No odor
20		20					No odor
	becomes greenish gray, moist, some clay						Slight gasoline odor
25	▽ ATD	25	1	B5-1		14 / 25	Moderate gasoline odor OVM = 56 ppm
30		30					No odor
	Bottom of Boring at 30 feet						
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER B6		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 6, 1990	
DRILLING EQUIPMENT CME 45		COMPLETION DEPTH 26.0'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 1
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO Ft.	LOGGED BY: T. Sawyer	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL NO. 1 NA	FROM TO Ft.		
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES Drive Number	SAMPLES Sample Number	SAMPLES Recov. (Feet)	SAMPLES Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SAND (SP) medium to dark brown, damp, fine grain, brick fragments (FILL)						
5	CLAYEY SAND (SC) orange brown, damp, medium grain (NATIVE SOIL)	5					
10	increasing clay, becomes mottled dark brown and orange brown	10					
15		15					No odor
20		20					No odor
	SAND (SP) mottled orange and medium brown, moist		1	B6-1		14 16	No odor OVM = 0 ppm
25	Bottom of Boring at 26 feet	25					
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER B7		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED	July 6, 1990
DRILLING EQUIPMENT CME 45		COMPLETION DEPTH 27.0'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 2
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: T. Sawyer	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SAND (SP) dark brown, damp, fine grain (FILL)						
5		5					
	CLAYEY SAND (SC) orange brown, damp, medium grain (NATIVE SOIL)						
10		10					
	decreasing clay, becomes mottled dark brown and orange brown						
15		15					
20		20					No odor
	SAND (SP) orange brown, moist, medium grain		1	B7-1		13 / 19	OVM = 0 ppm
25	Increasing clay	25					slight gasoline odor OVM = 9.3 ppm
	becomes greenish gray		2	B7-2		14 / 22	OVM = 0 ppm
	Bottom of Boring at 27 feet						
30		30					
35		35					

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PROJECT NAME City Center ESA NO. 90C0039A

BORING NUMBER B8		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER Castro/Phil	DATE STARTED / DATE FINISHED July 6, 1990	
DRILLING EQUIPMENT CME 45		COMPLETION DEPTH 28.5'	SAMPLER 2" Modified California Type
DRILLING METHOD 6" Solid Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 25'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: T. Sawyer	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	asphaltic concrete + gravel base						
	SAND (SP) dark brown, damp, fine to medium grain (FILL)						
5		5					
	CLAYEY SAND (SC) orange brown, damp, medium grain (NATIVE SOIL)						
10		10					
15	becomes medium to dark brown	15					
20	SAND (SP) medium brown, moist, medium grain	20					No odor
							Slight gasoline odor
			1	B8-1		11 / 15	OVM = 0 ppm
25	increasing clay, becomes greenish gray	25					weak gasoline odor
							OVM = 17.5 ppm
			2	B8-2		10 / 21	OVM = 2.7 ppm
	▽ ATD becomes orange brown, little clay						
			3	B8-3		19 / 30	
30	Bottom of Boring at 28.5 feet	30					
35		35					

3) Borings to Characterize Diesel Contamination

Woodward-Clyde Consultants

PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI1		ELEVATION AND DATUM Approx. 33 feet	
DRILLING AGENCY HEW Exploration	DRILLER Castro	DATE STARTED / DATE FINISHED May 6, 1991	
DRILLING EQUIPMENT CME 75		COMPLETION DEPTH 29 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 27.5'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
5	SILTY SAND (SM) reddish brown, moist, some clay, medium grain (NATIVE SOIL)	5					
10	little clay, damp	10					
15	some clay	15					No odor
20		20					
25	becomes gray, moist	25	1	DI1-1		10 17	No odor, approx. el. 8'
	▽ ATD		2	DI1-2		15 27	No odor, approx. el. 6' ▽ ATD
			3	DI1-3		16 28	No odor
30	Bottom of Boring at 29 feet	30					
35		35					

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI2		ELEVATION AND DATUM Approx. 29 feet	
DRILLING AGENCY HEW Exploration	DRILLER Castro	DATE STARTED / DATE FINISHED May 6, 1991	
DRILLING EQUIPMENT CME 75		COMPLETION DEPTH 25 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 23.5'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
	SILTY SAND (SM) reddish brown, moist, some clay, medium grain (NATIVE SOIL)						
5	little clay, damp	5					
10	some clay	10					
15		15					No odor
20	becomes gray, moist	20	1	DI2-1		14/18	No odor, approx. el. 8'
	∇ ATD		2	DI2-2		10/15	No odor, approx. el. 6' ∇ ATD
25	Bottom of Boring at 25 feet	25	3	DI2-3		15/20	No odor
30		30					
35		35					

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI3		ELEVATION AND DATUM Approx. 26 feet	
DRILLING AGENCY HEW Exploration	DRILLER Castro	DATE STARTED / DATE FINISHED May 6, 1991	
DRILLING EQUIPMENT CME 75		COMPLETION DEPTH 22 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 20.5'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
5	SILTY SAND (SM) reddish brown, moist, some clay, medium grain (NATIVE SOIL)	5					
10	little clay, damp	10					No odor
15	some clay	15					
20	becomes gray, moist ▽ ATD	20	1	DI3-1		12/16	No odor, approx. el. 8'
			2	DI3-2		10/21	No odor, approx. el. 6' ▽ ATD
			3	DI3-3		16/23	No odor
25	Bottom of Boring at 22 feet	25					
30		30					
35		35					

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI4		ELEVATION AND DATUM Approx. 32 feet	
DRILLING AGENCY HEW Exploration	DRILLER Castro	DATE STARTED / DATE FINISHED May 6, 1991	
DRILLING EQUIPMENT CME 75		COMPLETION DEPTH 28 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 26.5'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FL	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FL		
TYPE OF SEAL NO. 1 NA	FROM TO FL		
NO. 2 NA	FROM TO FL		

DEPTH (feet)	DESCRIPTION	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	SILTY SAND (SM) reddish brown, moist, little clay, medium grain (NATIVE SOIL)					
5	some clay					
10						No odor
15						
20	becomes gray, moist					
25	∇ ATD	1	DI4-1		8 15	No odor, approx. el. 8'
		2	DI4-2		16 23	No odor, approx. el. 6' ∇ ATD
		3	DI4-3		15 26	No odor
30	Bottom of Boring at 28 feet					
35						

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI5		ELEVATION AND DATUM Approx. 29 feet	
DRILLING AGENCY HEW Exploration	DRILLER Castro	DATE STARTED / DATE FINISHED May 6, 1991	
DRILLING EQUIPMENT CME 75		COMPLETION DEPTH 23 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 2
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 21.5'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	SAMPLES: Sample Number	SAMPLES: Recov. (Feet.)	SAMPLES: Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	SILTY SAND (SM) reddish brown, moist, little clay, medium grain (NATIVE SOIL)	0					
5	some clay	5					No odor
10		10					
15	becomes gray, moist	15					No odor
20	∇ ATD	20		DI5-2			sample hand-packed from auger ∇ ATD
			1	DI5-1		17 28	No odor, approx. el. 8'
25	Bottom of Boring at 23 feet	25					
30		30					
35		35					

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI6		ELEVATION AND DATUM Approx. 23.5 feet	
DRILLING AGENCY HEW Exploration	DRILLER Castro	DATE STARTED / DATE FINISHED May 6, 1991	
DRILLING EQUIPMENT CME 75		COMPLETION DEPTH 20 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 18.5'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO Ft.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL NO. 1 NA	FROM TO Ft.		
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
5	SILTY SAND (SM) reddish brown, moist, little clay, medium grain (NATIVE SOIL)					
10	some clay					No odor
15	becomes gray, moist	1	DI6-1		12 15	No odor, approx. el. 8'
		2	DI6-2		12 19	No odor, approx. el. 6'
	▽ ATD					▽ ATD
20		3	DI6-3		16 28	No odor
	Bottom of Boring at 20 feet					
25						
30						
35						

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI7		ELEVATION AND DATUM Approx. 32 feet	
DRILLING AGENCY HEW Exploration	DRILLER Castro	DATE STARTED / DATE FINISHED May 7, 1991	
DRILLING EQUIPMENT CME 75		COMPLETION DEPTH 28 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 25.5'	COMPL. NA / 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO Ft.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO Ft.		
TYPE OF SEAL NO. 1 NA	FROM TO Ft.		
NO. 2 NA	FROM TO Ft.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	SILTY SAND (SM) reddish brown, moist, little clay, medium grain (NATIVE SOIL)	0					
5		5					
10	some clay	10					No odor
15		15					
20	becomes gray, moist	20					
25	▽ ATD	25	1	DI7-1		10/16	No odor, approx. el. 7'
			2	DI7-2		11/20	▽ ATD No odor, approx. el. 5'
			3	DI7-3		19/22	Slight odor (?)
30	Bottom of Boring at 28 feet	30					
35		35					

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI8		ELEVATION AND DATUM Approx. 30 feet	
DRILLING AGENCY HEW Exploration	DRILLER Castro	DATE STARTED / DATE FINISHED May 7, 1991	
DRILLING EQUIPMENT CME 75		COMPLETION DEPTH 26 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 24.5'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION
0	SILTY SAND (SM) reddish brown, moist, some clay, medium grain (NATIVE SOIL)
10	little clay
20	becomes gray, moist
25	▽ ATD
	Bottom of Boring at 26 feet

DEPTH (feet)	SAMPLES Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
20	1	DI8-1		9/7	No odor, approx. el. 8'
	2	DI8-2		14/30	No odor, approx. el. 6'
25					▽ ATD
	3	DI8-3		13/22	Slight odor

No odor

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI9		ELEVATION AND DATUM Approx. 31 feet	
DRILLING AGENCY HEW Exploration	DRILLER Castro	DATE STARTED / DATE FINISHED May 7, 1991	
DRILLING EQUIPMENT CME 75		COMPLETION DEPTH 27 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 3
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 25.5'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	SILTY SAND (SM) reddish brown, moist, some clay, medium grain (NATIVE SOIL)	0					
5	little clay	5					No odor
10		10					
15		15					
20	becomes gray, moist	20					
25	∇ ATD	25	1	DI9-1		12/21	No odor, approx. el. 8'
			2	DI9-2		10/22	No odor, approx. el. 6' ∇ ATD
			3	DI9-3		11/26	No odor
30	Bottom of Boring at 27 feet	30					
35		35					

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI10 (closure sampling)		ELEVATION AND DATUM Approx. 27 feet	
DRILLING AGENCY HEW Exploration	DRILLER Castro	DATE STARTED / DATE FINISHED May 7, 1991	
DRILLING EQUIPMENT CME 75		COMPLETION DEPTH 23 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. 2
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 21.5'	COMPL. NA 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: W. Copeland	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	SILTY SAND (SM) reddish brown, moist, some clay, medium grain, contains paper (FILL SOIL)	0					
5		5					
10	little clay	10					No odor
15	becomes gray, moist	15					
20	▽ ATD	20	1	DI10-1		12 / 30	No odor, approx. el. 6' ▽ ATD
			2	DI10-2		16 / 28	No odor, approx. el. 4'
25	Bottom of Boring at 23 feet	25					
30		30					
35		35					

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER DI11			ELEVATION AND DATUM
DRILLING AGENCY HEW Exploration	DRILLER Castro		DATE STARTED / DATE FINISHED May 7, 1991
DRILLING EQUIPMENT CME 75			COMPLETION DEPTH 14 feet; SAMPLER 2" Modified California Type
DRILLING METHOD 8" Hollow-stem Auger	DRILL BIT		NO. OF SAMPLES; DIST. NA; UNDIST. 3
SIZE AND TYPE OF CASING NA			WATER LEVEL; FIRST 9.5'; COMPL. NA; 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.		LOGGED BY: W. Copeland; CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet.)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
5	SILTY SAND (SM) gray, moist, some clay, medium grain, (FILL SOIL)	5					
10	▽ ATD	10					▽ ATD
	becomes brown		1	DI11-1		17	Slight odor
				DI11-2		34	No odor
			2	DI11-3		10 20	No odor
15	Bottom of Boring at 14 feet	15					
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER	DI12			ELEVATION AND DATUM	Approx. 20 feet
DRILLING AGENCY	HEW Exploration	DRILLER	Castro	DATE STARTED / DATE FINISHED	May 7, 1991
DRILLING EQUIPMENT	CME 75			COMPLETION DEPTH	15 feet
DRILLING METHOD	8" Hollow-stem Auger	DRILL BIT		NO. OF SAMPLES	DIST. NA / UNDIST. 3
SIZE AND TYPE OF CASING	NA			WATER LEVEL	FIRST 13.5' / COMPL. NA / 24 HRS. NA
TYPE OF PERFORATION	NA	FROM	TO FT.	LOGGED BY:	CHECKED BY:
SIZE AND TYPE OF PACK	NA	FROM	TO FT.	W. Copeland	
TYPE OF SEAL	NO. 1 NA	FROM	TO FT.		
	NO. 2 NA	FROM	TO FT.		

SAMPLER: 2" Modified California Type

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	SAMPLES: Drive Number	Sample Number	Recov. (Feet)	Blow Counts	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
0	SILTY SAND (SM) gray, moist, some clay, medium grain (FILL SOIL)	0					
5		5					
10		10	1	DI12-1		9 17	No odor
			2	DI12-2		9 23	No odor
	▽ ATD						▽ ATD
15		15	3	DI12-3		13 19	Slight odor (?) No odor
	Bottom of Boring at 15 feet						
20		20					
25		25					
30		30					
35		35					

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PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER W-4		ELEVATION AND DATUM	
DRILLING AGENCY HEW Exploration	DRILLER	DATE STARTED / DATE FINISHED May 15, 1991	
DRILLING EQUIPMENT CME 55		COMPLETION DEPTH 15 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 10" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. NA
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 9'	COMPL. 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: P. Solberg	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION	DEPTH (feet)	Well Construction Details	REMARKS (Drill Rate, Fluid Loss, Odor, etc.)
5	SILTY SAND (SM) reddish brown, moist, some clay, medium grain	5		Grout Blank 4" Casing Bentonite
10	▽ ATD	10		Sand Screened 4" Casing
	becomes brown, little clay			Slight odor
15	becomes gray	15		2" ?
	Bottom of Boring at 15 feet			
20		20		
25		25		
30		30		
35		35		

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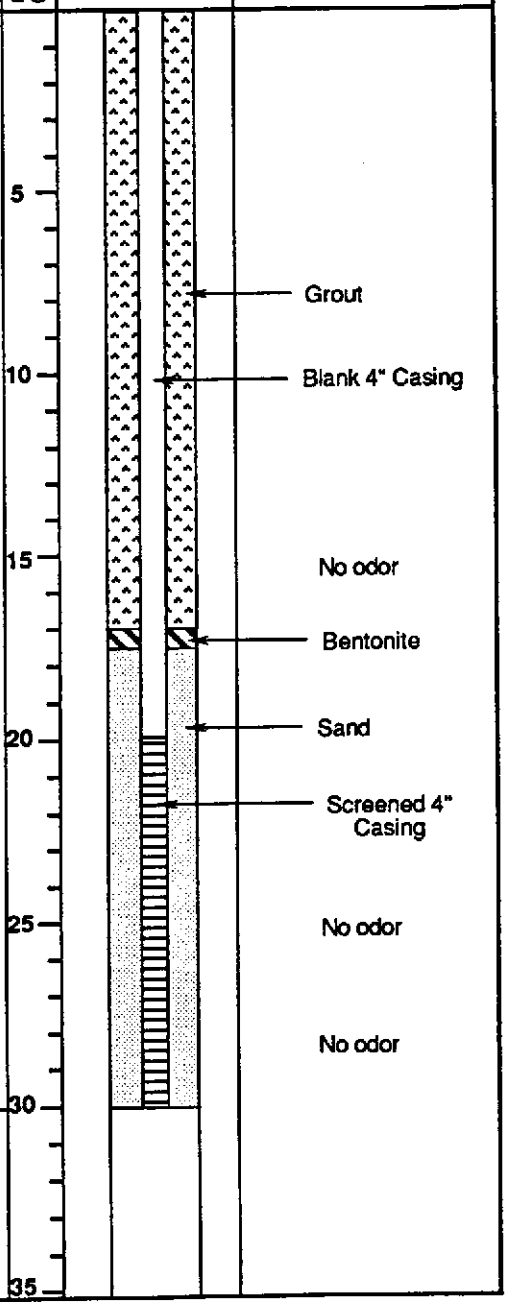
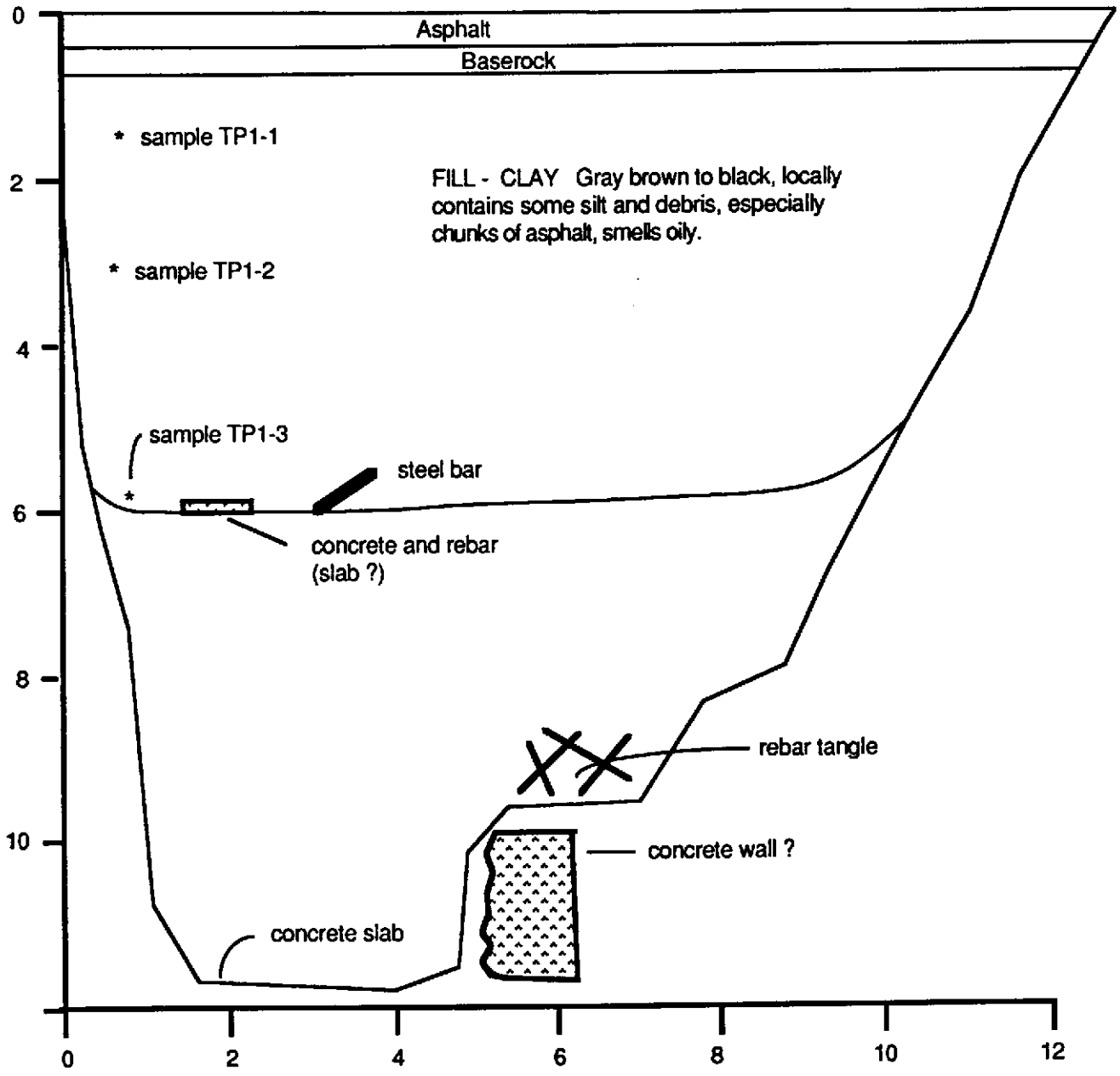
PROJECT NAME 1155 Clay NO. 90C0039B

BORING NUMBER W-5		ELEVATION AND DATUM	Approx. 33 feet
DRILLING AGENCY HEW Exploration	DRILLER	DATE STARTED / DATE FINISHED	May 15, 1991
DRILLING EQUIPMENT CME 55		COMPLETION DEPTH 30 feet	SAMPLER 2" Modified California Type
DRILLING METHOD 10" Hollow-stem Auger	DRILL BIT	NO. OF SAMPLES DIST. NA	UNDIST. NA
SIZE AND TYPE OF CASING NA		WATER LEVEL FIRST 24'	COMPL. 23' / 24 HRS. NA
TYPE OF PERFORATION NA	FROM TO FT.	LOGGED BY: P. Solberg	CHECKED BY:
SIZE AND TYPE OF PACK NA	FROM TO FT.		
TYPE OF SEAL NO. 1 NA	FROM TO FT.		
NO. 2 NA	FROM TO FT.		

DEPTH (feet)	DESCRIPTION
0	SILTY SAND (SM) reddish brown, moist, some clay, medium grain (NATIVE SOIL)
5	becomes brown, little clay
	damp
10	
15	some clay
	trace clay, moist
20	becomes gray
	▽ ATD
25	becomes brown, saturated
30	Bottom of Boring at 30 feet
35	



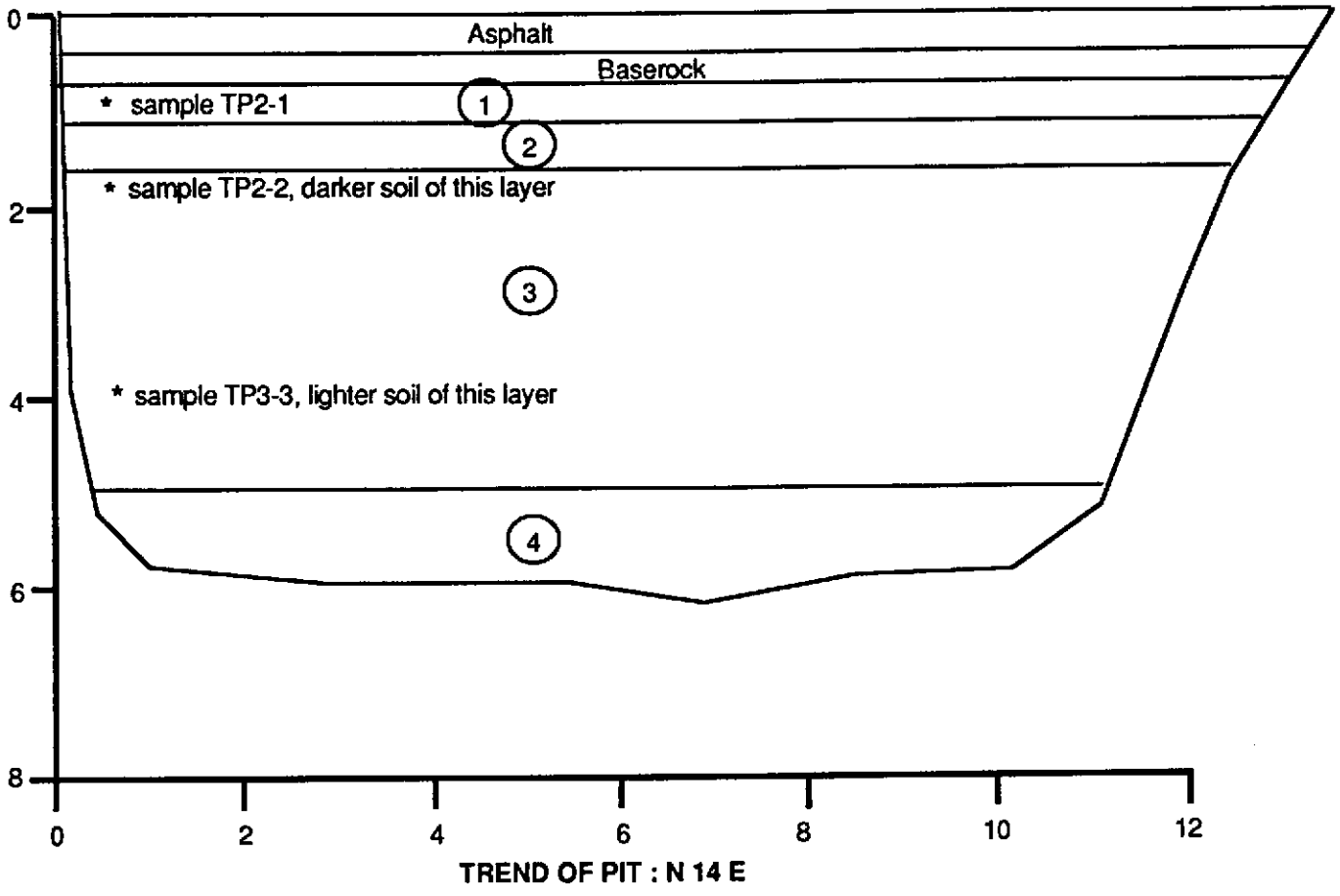


TREND OF PIT : N 14 E

Scale: 1" = 2'

Date Excavated: 9-20-90

Project No. 90C0039B	1155 Clay Soil Removal	Test Pit Log - TP1	
Woodward-Clyde Consultants			



TREND OF PIT : N 14 E

1 FILL - Dark brown to black with bricks.

2. MORTOR - white

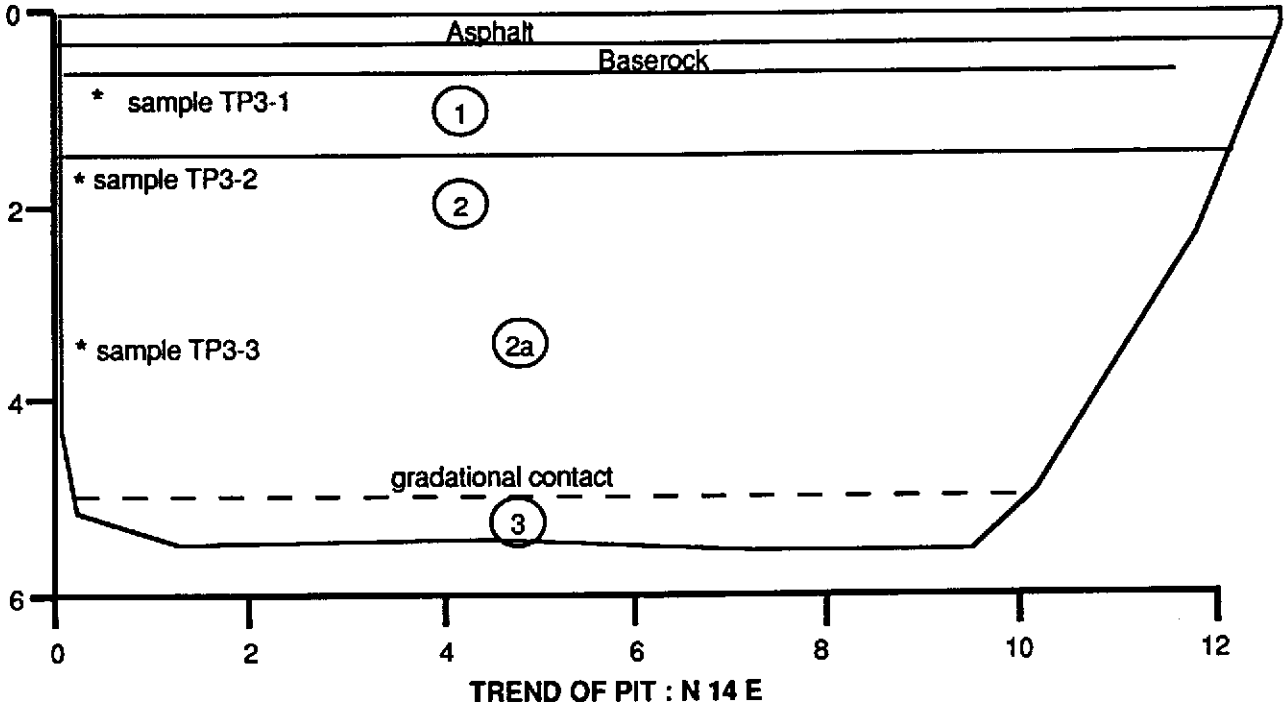
3. FILL, SILTY SAND - Mix of dark brown and light brown, diffuse color contact, no debris, possible flakes of brick and mortor but very few if any, possibly from above.

4. NATIVE SOIL, CLAYEY SAND - Mottled orange and brown.

Scale: 1" = 2'

Date Excavated: 9-20-90

Project No. 90C0039B	1155 Clay Soil Removal	Test Pit Log - TP2	
Woodward-Clyde Consultants			



1. CLAY - Gray brown to yellow brown.

2. FILL, SILTY SAND - Dark brown, dry, contains specks of brick and mortor.

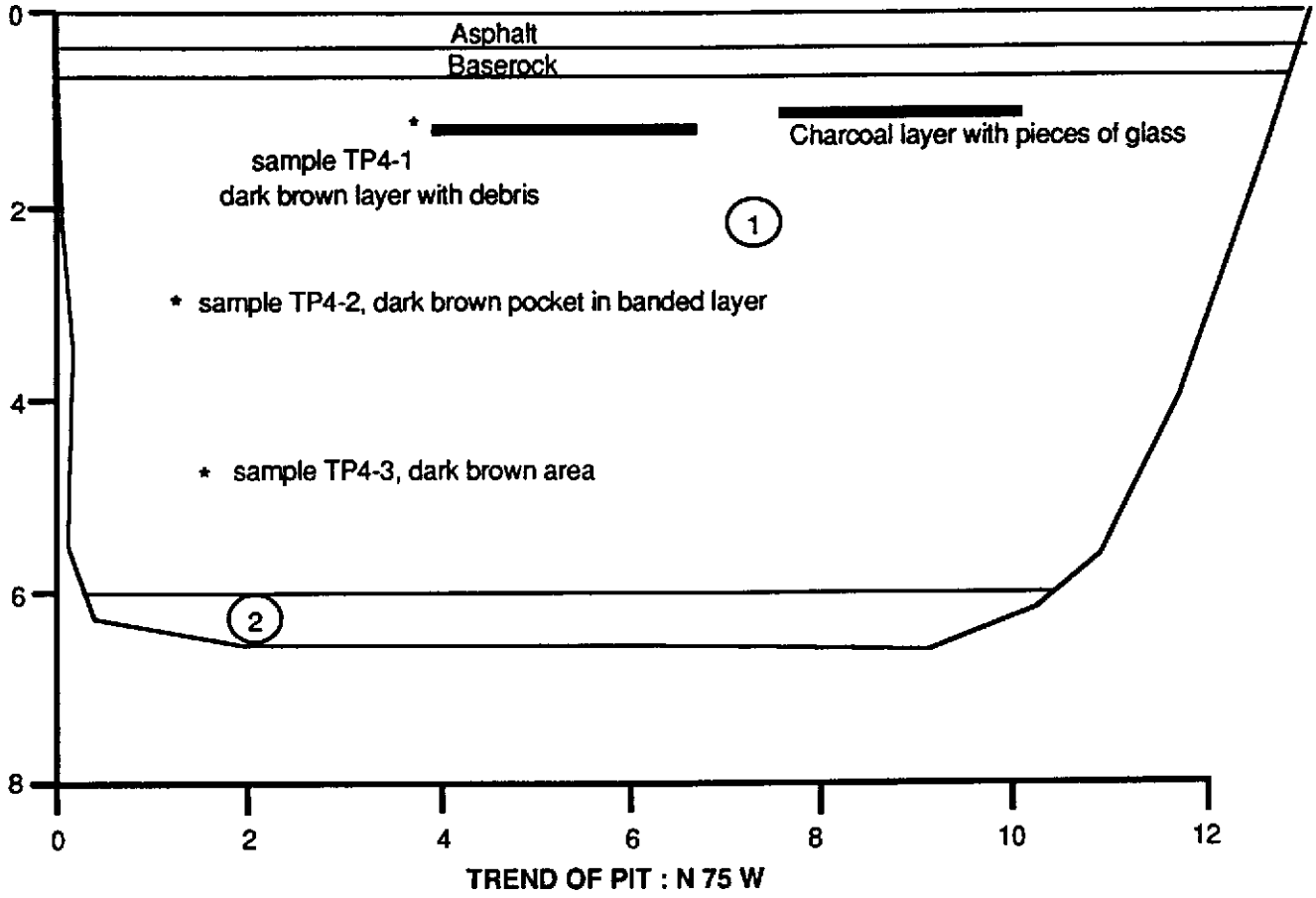
2a. FILL, SILTY SAND - Gradational color change from above unit to light brown with bands of darker color. No evidence of debris.

3. NATIVE SOIL, SILTY SAND - Orange brown.

Scale: 1" = 2'

Date Excavated: 9-20-90

Project No. 90C0039B	1155 Clay Soil Removal	Test Pit Log - TP3	
Woodward-Clyde Consultants			



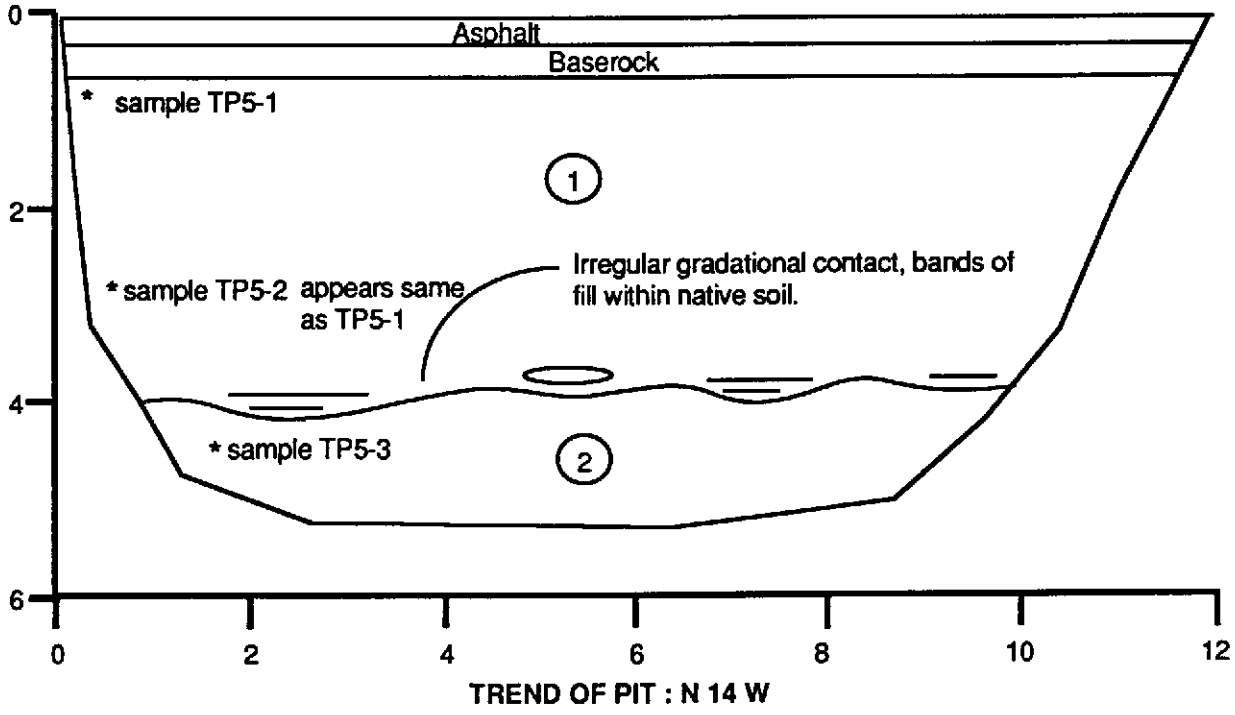
1 FILL, SILTY SAND Reddish brown mixed with dark brown in irregular bands and pockets, contains no mortor.

2. NATIVE SOIL, CLAYEY SAND Mottled orange and red brown, damp.

Scale: 1" = 2'

Date Excavated: 9-20-90

Project No. 90C0039B	1155 Clay Soil Removal	Test Pit Log - TP4	
Woodward-Clyde Consultants			



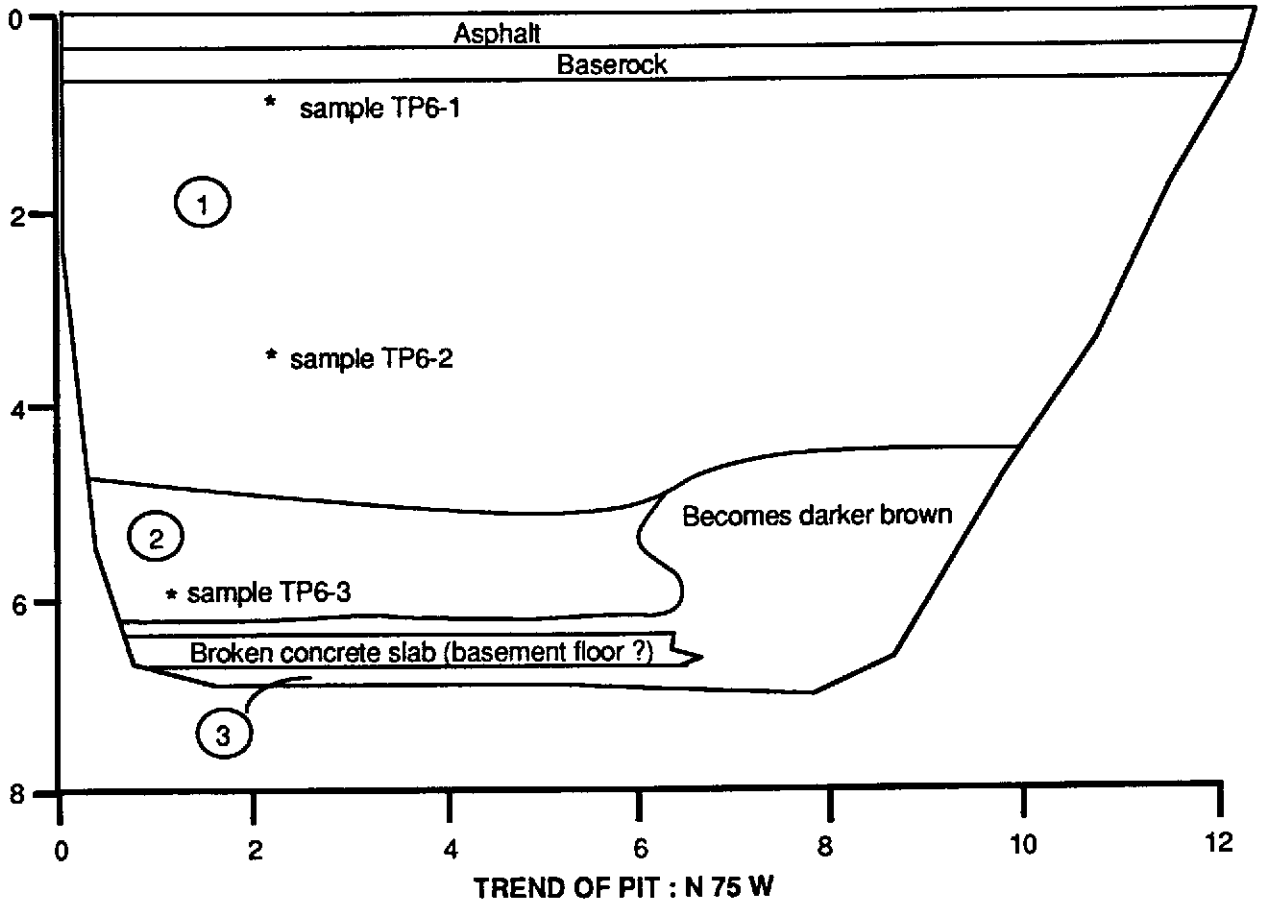
1 FILL, SILTY SAND Dark brown, containing brick, pipe, concrete and wood debris, dry.

2. NATIVE SOIL, SILTY SAND Light brown, slightly mottled.

Date Excavated: 9-20-90

Scale: 1" = 2'

Project No. 90C0039B	1155 Clay Soil Removal	Test Pit Log - TP5	
Woodward-Clyde Consultants			



1 FILL, SILTY SAND reddish brown, contains debris and black streaks, appears to be a relatively clean fill.

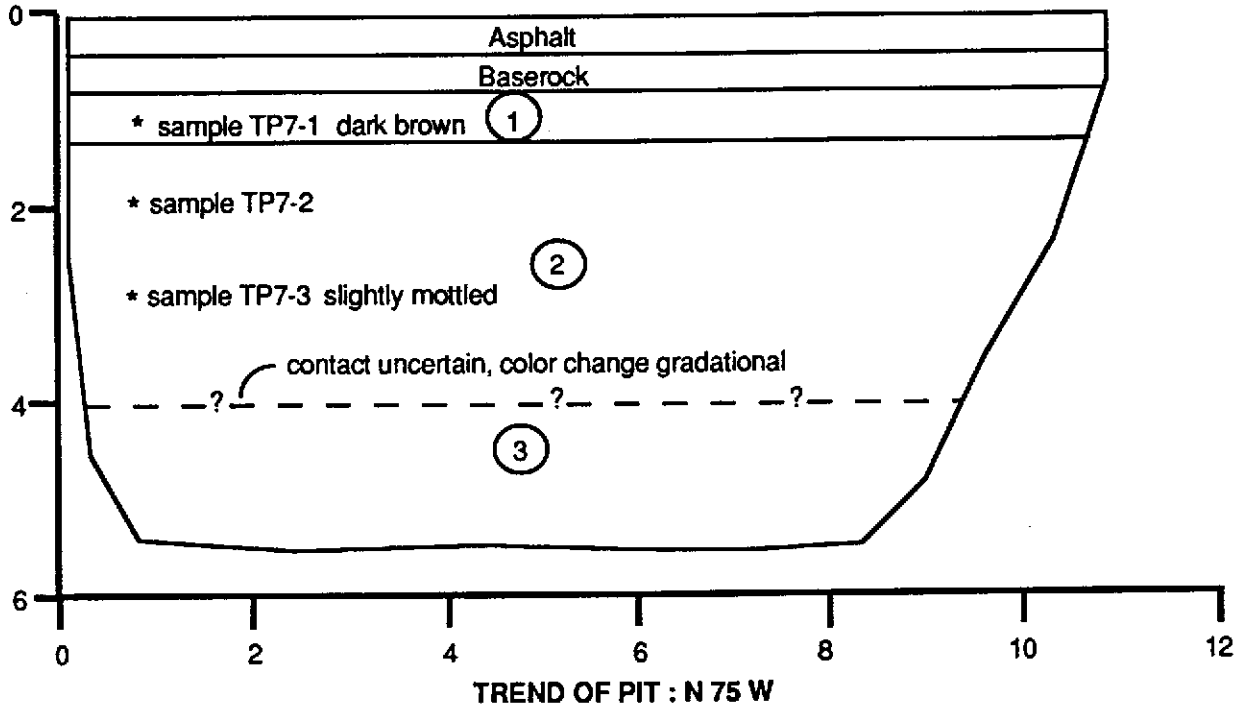
2. FILL, SANDY SILT Black to green black, smells like creosote and charred wood.

3. NATIVE SOIL, CLAYEY SAND Mottled orange and brown.

Scale: 1" = 2'

Date Excavated: 9-20-90

Project No. 90C0039B	1155 Clay Soil Removal	Test Pit Log - TP6	
Woodward-Clyde Consultants			



1 FILL, SILTY SAND Dark brown to black, contains debris.

2. FILL, SILTY SAND Medium brown.

3. NATIVE SOIL Mottled orange and tan.

Date Excavated: 9-20-90

Scale: 1" = 2'

Project No. 90C0039B	1155 Clay Soil Removal	Test Pit Log - TP7	
Woodward-Clyde Consultants			

APPENDIX B - SOIL COMPACTION FIELD RECORDS AND
CONCRETE COMPRESSION TEST REPORTS

Woodward-Clyde Consultants

FIELD RECORD – EARTHWORK

NUCLEAR

THE.

PROJECT NO. 90C0039B-FLDM	PROJECT NAME 1155 CLAY
PROJECT LOCATION OAKLAND, CA.	SIDEWALK FILL

DATE 5-14-91

TIME ON JOB
____ AM TO ____ AM
____ PM ____ PM

FIELD REPRESENTATIVE R. TARAYA

COMMENTS

at the site this morning and met with Dave Simpson. The dual smooth drum vibratory roller was still out of service. Carey brought in a replacement at approx. 0900. Backfill operation at the side walk along 11th street then continued. Fill material was placed with the track loader, spread and track walked with the dozer then compacted it with the roller. Nuclear density tests were performed and results meet the project spec.

FIELD DENSITY TEST NO.	13	14	15	16	17	18	19	20	21
LOCATION	11th ST. SIDEWALK EAST SIDE								
ELEVATION, FEET	30 5/8	31 5/8	31 5/8	32 5/8	32 5/8	33	33	34	34
MOISTURE									
MOISTURE COUNT	123	146	149	134	132	124	127	126	135
MOISTURE RATIO	0.250	0.297	0.303	0.272	0.268	0.252	0.258	0.256	0.274
MOISTURE, PCF	11.9	14.5	14.8	13.0	12.8	12.0	12.3	12.2	13.2
DIRECT TRANSMISSION									
PROBE DEPTH, INCHES	6	6	6	6	6	6	6	6	6
DENSITY COUNT	1854	1761	1630	1876	1886	1885	1882	1732	1676
DENSITY RATIO	0.771	0.740	0.677	0.780	0.784	0.783	0.782	0.720	0.697
WET DENSITY, PCF	128.4	130.2	134.6	127.9	127.7	127.8	127.8	131.3	132.7
DRY DENSITY, PCF	116.5	115.7	119.8	114.9	114.9	115.8	115.5	119.1	119.5
PERCENT MOISTURE	10.2	12.5	12.4	11.3	11.1	10.9	10.6	10.2	11.0
LABORATORY CURVE NO.	4	4	1	4	4	4	4	1	1
MAX. DRY DENSITY, PCF	119.2	119.2	123.4	119.2	119.2	119.2	119.2	123.4	123.4
DEGREE OF COMPACTION, PERCENT	98	97	97	96	96	97	97	97	97
MIN COMPACTION REQUIRED	90	95	95	95	95	95	95	95	95
RETEST NO.									

STANDARD COUNT ____ MOISTURE 492 DENSITY 2406

SERIAL NO. ____ SHEET NO. 3

Woodward-Clyde Consultants

FIELD RECORD – EARTHWORK

NUCLEAR

PROJECT NO. 90C0039R FLDM. PROJECT NAME 1155 CLAY

PROJECT LOCATION OAKLAND CALIF. SIDEWALK FILL

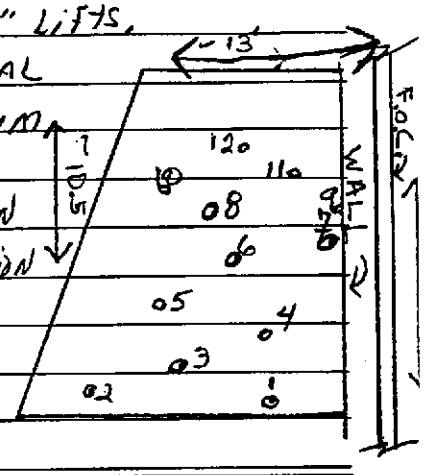
DATE 5-D-91

TIME ON JOB 7:15 AM TO ____ AM ____ PM 3:15 PM

FIELD REPRESENTATIVE L Dawson

COMMENTS

AT project site this A.M. Discussed fill operation with Dave Simpson, WCC on site engineer. Fill is a Reddish Brown clayey sand, placement consists of 8" lifts, moisture good, MATERIAL CLEAN, only occasional 3" max. brick or concrete clod. Dual smooth drum vibratory roller compacting fill. ALL tests performed this date reflect a relative compaction greater than 90.0%. Remaining fill operation to continue on 5-13-91.



FIELD DENSITY TEST NO.	1	2	3	4	5	6	7	8	9
LOCATION	SEE ILLUSTRATION FOR APPROX. LOCATION								
ELEVATION, FEET	-9.5 TOC	-9.5 TOC	-9.0 TOC	-8.0 TOC	-7.0 TOC	-6.0 TOC	-5.0 TOC	-4.5 TOC	-4.5 TOC
MOISTURE EL.	24.9	24.9	25.4	26.4	27.4	28.4	29.4	30.4	30.4
MOISTURE COUNT	141	181	163	172	159	166	172	160	148
MOISTURE RATIO	.214	.275	.248	.261	.242	.252	.261	.243	.225
MOISTURE, PCF	11.3	14.8	13.3	14.0	13.0	13.5	14.0	13.0	11.8
DIRECT TRANSMISSION									
PROBE DEPTH, INCHES	6	6	6	6	6	6	6	6	6
DENSITY COUNT	2753	2643	2789	2822	2771	2638	2661	2757	2873
DENSITY RATIO	.857	.823	.868	.879	.863	.821	.828	.858	.895
WET DENSITY, PCF	126.5	128.5	126.0	125.5	126.5	128.5	128.0	126.5	124.5
DRY DENSITY, PCF	115.2	113.7	112.7	111.5	113.5	115.0	114.0	113.5	112.7
PERCENT MOISTURE	9.8	13.0	11.8	12.5	11.4	11.7	12.2	11.4	10.4
LABORATORY CURVE NO.	4	4	4	4	4	4	4	4	4
MAX. DRY DENSITY, PCF	119.2	119.2	119.2	119.2	119.2	119.2	119.2	119.2	119.2
DEGREE OF COMPACTION, PERCENT	97.0	95.0	95.0	94.0	95.0	96.0	96.0	95.0	95.0
MIN COMPACTION REQUIRED	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
RETEST NO.									

STANDARD COUNT _____ MOISTURE 657 DENSITY 3210

SERIAL NO. 13530

SHEET NO. 1

Woodward-Clyde Consultants

FIELD RECORD – EARTHWORK

NUCLEAR

PROJECT NO. 90C0039B FLDM. PROJECT NAME 1155 CLAY

PROJECT LOCATION OAKLAND CALIF.

DATE 5-13-91

TIME ON JOB ____ AM TO ____ AM ____ PM ____ PM

FIELD REPRESENTATIVE R. Jones

COMMENTS

At project site this A.M. Performed ONE density test 7:15 A.M. WAS INFORMED by D. Simpson (WCC on site field engineer) that 977 C LOADER inoperable. Starter removed early A.M. LOADER MAY be operable by NOON. Contractor placing buttress fill North of entrance on 11th & on JEFFERSON ST. (9:50 A.m.) LOADER operational 11:20 AM. Fill operation resumes 12:15 p.m. within -3.5 TOC @ 2:15 A.M. Compactor down remainder of day.

FIELD DENSITY TEST NO.	10	11	12						
LOCATION	SEE SHEET		2						
ELEVATION, FEET	-4.0 TOC	-4.0 TOC	~~-3.5~~ TOC						
MOISTURE	30.9	30.9	31.4						
MOISTURE COUNT	151	189	164						
MOISTURE RATIO	.231	.289	.251						
MOISTURE, PCF	12.3	15.8	13.5						
DIRECT TRANSMISSION									
PROBE DEPTH, INCHES	6	6	6						
DENSITY COUNT	2890	2574	3108						
DENSITY RATIO	.900	.801	.968						
WET DENSITY, PCF	124.5	127.5	121.0						
DRY DENSITY, PCF	112.2	113.7	107.5						
PERCENT MOISTURE	10.9	13.8	12.5						
LABORATORY CURVE NO.	4	4	4						
MAX. DRY DENSITY, PCF	119.2	119.2	119.2						
DEGREE OF COMPACTION, PERCENT	94.0	95.0	90.0						
MIN COMPACTION REQUIRED	90.0	90.0	90.0						
RETEST NO.									

STANDARD COUNT _____ MOISTURE 652 DENSITY 3210

SERIAL NO. 13530

SHEET NO. 2

Woodward-Clyde Consultants

FIELD RECORD – EARTHWORK

NUCLEAR

PROJECT NO. 90C0039B-1	PROJECT NAME 1155C144
PROJECT LOCATION OAKLAND	

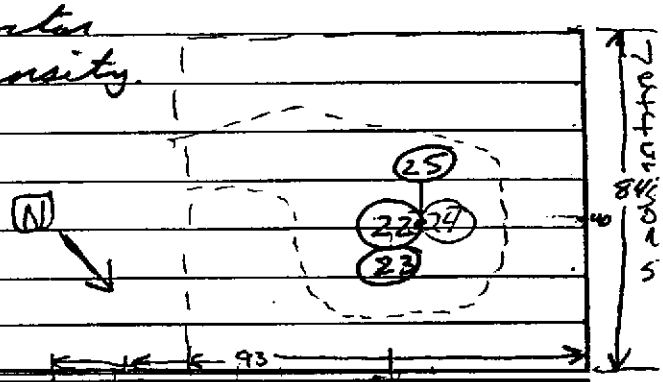
DATE 6-4-91

TIME ON JOB ____ AM TO ____ AM ____ PM ____ PM

FIELD REPRESENTATIVE Otis

COMMENTS

Arrived at the project site this AM. Met Dave Simpson at the site. One S.I.S. tester compacting native brown silty clayey sand material. Tested compaction of backfill, test above 95%. Returned to the site late AM. Had contractor excavate test pit and tested density. All test were 95% or above.



FIELD DENSITY TEST NO.	22	23	24	25				12th ST	
LOCATION	North TANK BACKFILL	WEST	Corner of site.						
ELEVATION, FEET	9.5	9.5	12.0	~~1460~~					
MOISTURE				13.5					
MOISTURE COUNT	144	146	159	137					
MOISTURE RATIO	.258	.262	.285	.245					
MOISTURE, PCF	12.3	12.3	13.8	11.5					
DIRECT TRANSMISSION									
PROBE DEPTH, INCHES	6	6	6	6					
DENSITY COUNT	1418	1393	1295	1524					
DENSITY RATIO	.709	.697	.648	.762					
WET DENSITY, PCF	131.4	132.1	135.2	128.4					
DRY DENSITY, PCF	119.1	119.8	121.4	116.9					
PERCENT MOISTURE	10.3	10.3	11.4	9.8					
LABORATORY CURVE NO.	1	1	1	1					
MAX. DRY DENSITY, PCF	123.4	123.4	123.4	123.4					
DEGREE OF COMPACTION, PERCENT	97	97	98	95					
MIN COMPACTION REQUIRED	95	95	95	95					
RETEST NO.									

STANDARD COUNT _____ MOISTURE 557 DENSITY 1998

SERIAL NO. 1782

SHEET NO. 1 of 1

Quality Assurance Services
Materials Consulting

Testing Engineers, Inc.

COMPRESSION TEST REPORT

WORK REQUEST NUMBER C0136 CLIENT-WOO360 SAMPLE NUMBER 099736

PROJECT NUMBER 27951

PROJECT NAME

1155 CLAY STREET
OAKLAND, CA

DATE 10/08/91

TYPE OF SAMPLE REG. CONCRETE

FILE #:JOB#90C0039B

SUPPLIER (CONCRETE) BERKELEY READY MIX
MIX NUMBER 2002.15

TICKET NO.: 00292

LOCATION IN STRUCTURE

FILL SLAB.

SPECIMENS MADE BY J. CASEY, TEI
WITNESSED BY
DATE SAMPLED 05/30/91
TIME SAMPLED 11:20A.M
DATE RECEIVED 05/31/91
SLUMP
FRESH UNIT WGT. PCF=
AIR TEMPERATURE °F 65
MIXTURE TEMPERATURE °F.: 68
AIR CONTENT %:

DATE TESTED	06/06/91	06/27/91	06/27/91			
ID NUMBER	1A	1B	1C			
MARK SPECIMEN						
DIMENSION, inches						
AREA, sq. inches	28.0					
ULTIMATE LOAD, lbs.	8000	13000	14100			
ULTIMATE STR., psi	290	460	500			
AVERAGE STR., psi			480			
AGE TESTED, DAYS	7	28	28			
DRY UNIT WEIGHT, pcf						
SPECIFIED STRENGTH, psi						

SPECIMENS NOT SCHEDULED FOR TESTING WILL BE DISCARDED AFTER 28 DAYS OLD

REMARKS: SAMPLES TESTED IN ACCORDANCE WITH ASTM C-39-86

CC:
01 WOODWARD-CLYDE

REVIEWED BY

YOUNG F. DAVIS
CONCRETE LAB SUPERVISOR

APPENDIX C - STANDARD SOIL SAMPLING PROCEDURES

APPENDIX C - STANDARD SOIL SAMPLING PROCEDURES

Soil Samples from Borings

Brass sample liners, measuring 2 inches in diameter by 4 inches long within a modified California drive sampler, are used for collecting soil samples. The sample liners are initially cleaned using an Alconox detergent and tap water solution followed by a final de-ionized water rinse. The drive sampler is cleaned between each sample and between each boring by washing the sampler in an Alconox detergent and tap water solution, followed by tap water rinse and a final de-ionized water rinse.

Soil samples are retained in the brass sample liners capped with teflon sheeting and plastic end caps. The samples are immediately placed in an ice chest with ice or "blue ice" for transport the same day, if possible, under chain-of-custody control to a State-certified analytical laboratory.

Soil Samples from a Stockpile or Trench

At each location to be sampled, a 2-inch-diameter by 4-inch-long brass liner is hand-driven into the soil surface. The sample liners are initially cleaned using an Alconox detergent and tap water solution followed by a tap water rinse. The soil samples are retained in the brass liners capped with teflon sheeting and plastic endcaps. The samples are immediately placed in an ice chest with ice or "blue ice" for transport the same day, if possible, under chain-of-custody control to a State-certified analytical laboratory.