

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY
DAVID J. KEARS, Agency Director



RO#807

July 31, 1998

STID #3663

Mr. William Gomban
409 13th Street,
Oakland, CA 94612

Chad Schwartz
PO Box 41841
Sacramento, CA 95841

ENVIRONMENTAL HEALTH SERVICES

1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
(510) 337-9335 (FAX)

Re: Fuel Leak Site Case Closure at Oakland Tribune Building,
2302 Valdez St., Oakland, CA 94612

Dear Mr. Gomban & Mr. Schwartz:

This letter transmits the enclosed underground storage tank (UST) case closure letter in accordance with Chapter 6.75 (Article 4, Section 25299.37[h]). The State Water Resources Control Board adopted this letter on February 20, 1997. As of March 1, 1997, the Alameda County Environmental Protection Division is required to use this case closure letter for all UST leak sites. We are also transmitting to you the enclosed case closure summary. These documents confirm the completion of the investigation and cleanup of the reported release at the subject site. The subject fuel leak case is closed.

SITE INVESTIGATION AND CLEANUP SUMMARY

Please be advised that the following condition(s) exist at the site:

- 1) The final level(s) of contamination consists of 655 parts per Billion of TPH(g) and 630, 49, 21 130 parts per billion (ppb) respectively, of BTEX.
- 2) If a change in land use is proposed or excavation of soils is planned at this site, the an evaluation of risk from exposure to contaminated soil and groundwater must be made.

If you have any questions, please contact this office at (510) 567-6737.

Sincerely,

Brian P. Oliva, REHS, REA,
Hazardous Materials Specialist

enclosures: Case Closure Letter, Case Closure Summary

ALAMEDA COUNTY
HEALTH CARE SERVICES

AGENCY
DAVID J. KEARS, Agency Director



July 31, 1998

STID #3663

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700

REMEDIAL ACTION COMPLETION CERTIFICATION

William Gomban
409 13th Street,
Oakland, CA 94612

Chad Schwartz
PO Box 418172,
Sacramento, CA 95841

Subject: Oakland Tribune, 2302 Valdez Street, Oakland, CA, removal of one (1) 8,000 gallon gasoline and one (1) 750 gallon waste oil underground fuel storage tank

Dear Mr. Gomban & Mr. Schwartz:

This letter confirms the completion of a site investigation and remedial action for the underground storage tank formerly located at the above described location. Thank you for your cooperation throughout this investigation. Your willingness and promptness in responding to our inquiries concerning the former underground storage tank are greatly appreciated.

Based upon the available information in the above-referenced file and with the provision that the information provided to this agency was accurate and representative of site conditions, no further action related to the underground storage tank release is required.

This notice is issued pursuant to a regulation contained in Section 2721(e) of Title 23 of the California Code of Regulations.

Please contact Brian P. Oliva, at (510) 567-6737 if you have any questions regarding this matter.

Sincerely,

Mee Ling Tung
Director of Environmental Health Services

c: Chief, Hazardous Materials Division - files
Brian P. Oliva, ACDEH
Chuck Headlee, RWQCB
Lori Casias, SWRCB
Cheryl Gordon, State Cleanup Fund
Leroy Griffin Fire Department
enclosure

**CASE CLOSURE SUMMARY
LEAKING UNDERGROUND FUEL STORAGE TANK PROGRAM**

*OK 10
Close
✓CTH*

I. AGENCY INFORMATION DATE: July 8, 1998

Agency Name; **Alameda County Haz-Mat** Address: **1131 Harbor Bay Pkwy**
City/State/Zip: **Alameda, CA 94502** Phone: **(510) 567-6737**
Responsible Staff Person: **Brian P. Oliva** Title: **Hazardous Materials Specialist**

**ENVIRONMENTAL
PROTECTION**

JUL 12 1998

II. CASE INFORMATION

Site Facility Name: **Oakland Tribune 2302 Valdez St.**
Site Facility Address: **2300 Valdez Street, Oakland, CA 94612**
RB LUSTIS Case No. **N/A** Local Case No./LOP Cases No. **3663**

Responsible Parties: Addresses Phone Numbers:

William Gomban 409 13th Street, Oakland, CA 94612
Oakland Tribune

Chad Schwartz, Attorney, PO Box 418172, Sacramento, CA 95811 (916) 972-8300
Oakland Tribune *941*

Tank No:	Size in gallons	Contents:	Closed in-place or removed:	Date:
1	8,000	gasoline	removed	02/23/88
2	750	waste oil	removed	02/23/88

III. RELEASE AND CHARAACTERIZATION INFORMATION

0
Cause and type of release: **Unknown**
Site Characterization completed? **Yes**
Date Approved by oversight agency: **03/31/98**
Monitoring wells installed? **Yes** Number: **9**
Proper screen interval? **Yes**
Highest GW depth below ground surface? **6.53'** Lowest depth: **8.43'**
Flow direction: **Westerly/Southwestly**
Most sensitive current use: **Commercial**
Are drinking wells affected? **Unknown** Aquifer name: **N/A**
Are surface waters affected? **No** Nearest affected SW name: **Unknown**
Off-site beneficial use impacts (address/location):
Reports on file? **Yes** Where is report filed? **Alameda County
1131 Harbor Bay Pkwy,
Alameda, CA 94502**

CASE CLOSURE SUMMARY
Leaking Underground Fuel Storage Tank Program

Treatment and disposal of Affected Materials

<u>Material</u>	<u>Amount (include units)</u>	<u>Action (Treatment or disposal with destination)</u>	<u>Date</u>
Tank & Piping	1-8,000 gallon gasoline	removed H&H, San Francisco	02/23/88
Free Product	1-750 gallon waste oil	removed H& H San Francisco	02/23/88
Soil	60cy	aerated on site	
Groundwater			

Maximum Documented Contaminant Concentrations—Before and After Cleanup

<u>Contaminant</u>	<u>Soil</u>		<u>Water</u>	
	<u>Before¹</u>	<u>After²</u>	<u>Before³</u>	<u>After</u>
TPH (gas)	5,500	655	6,300	3,500
TPH(diesel)	N/A	N/A	990	<50
TPH (motor oil)			2,500	<100
Oil & Grease	12,000	3,600	10,200	N/A
Benzene	2.3	0.74	630	630
Toluene	17	0.40	300	49
Ethylbenzene	5.6	4.1	400	21
Xylene	67	2.34	600	130
MTBE	N/A	N/A	<5	<10
CARBONTET.	N/A	N/A	20	64
CHLOROFORM	N/A	N/A	4.6	16

¹ “Before” results were revealed in soil samples collected in 02/89 during removal of USTs and the subsequent sampling.

² “After” results were revealed in soil samples collected on 08/88 and 08/89 during soil borings and monitoring well installation.

³ “Before” results were revealed in groundwater samples collected in 08/89 from MW-5 and on 01/18/96, from MW-1

⁴ “After” results were revealed in the final sampling of well MW-1 on 02/11/98

CASE CLOSURE SUMMARY
Leaking Underground Fuel Storage Tank Program

Comments (Depth of Remediation Etc.)

The Oakland Tribune utilized the site for a maintenance garage beginning in 1943 and remained there until about 1986. The USTs, both gasoline and the waste oil tanks were apparently present prior to 1943 (See figure 1).

The two USTs were removed by Clayton Environmental Services in February 1988. Soils samples collected beneath removed USTs showed elevated levels of gasoline and heavy hydrocarbons. Based on these results (see attached figures) the UST excavation cavity was over-excavated down to about 18 feet bgs.

In August, 1988, three monitoring wells were installed by Clayton Environmental, indicating groundwater impact from the site. One year later, in September, 1989, eight soil borings were advanced as well as four additional monitoring wells (MW-4 through MW-7). In August 1990, two more monitoring wells were installed (MW-8 & MW-9) Soils samples from each boring to 11 feet bgs, did not reveal significant levels of TPH-G or BTEX.

In January of 1996, the nine previously installed wells were purged and sampled annually for the next three years (see attached tables).

In light of the levels of contamination encountered in the groundwater, a *Risk-Base Corrective Action* was undertaken for the site. The possible complex exposure pathways for the site include (1) inhalation of hydrocarbons vapors via subsurface soil and groundwater volatilization to both outdoor air and enclosed buildings; and (2) Ingestion of hydrocarbons in groundwater resulting from dissolved plume migration and from hydrocarbons in subsurface soil leaching to groundwater. Calculations show that representative constituent concentrations in subsurface soils and groundwater are below calculated site specific target cleanup levels calculated for the site, therefore, residual contamination does not pose a risk to human health.

See section VII, additional comments...

IV. Closure

Does completed corrective action protect existing beneficial uses per the Regional Board Basin Plan? **Undetermined**

Does the completed corrective action protect potential beneficial uses per the Regional Board Basin Plan? **Undetermined**

Does corrective action protect public health for current land use? **Yes**

Site management requirements: **Site health and safety plan requires if excavation/trenching is proposed in the vicinity of the former USTs.**

Should corrective action be reviewed if land use changes? **Yes**

Monitoring wells on site? **Nine (9)** Monitoring well decommissioned? **None**

List enforcement actions taken: **None**

List enforcement actions rescinded: **N/A**

CASE CLOSURE SUMMARY
Leaking Underground Fuel Tank Program

V. LOCAL AGENCY REPRESENTATIVE DATA

Name: Brian P. Oliva, REHS, REA


Title: Hazardous Materials Specialist

Signature:



Date:

7/8/98

Reviewed by 

Title: Hazardous Materials Specialist

Name:



Date:

7/10/98

Name: Thomas Peacock

Title: Supervising Hazardous Materials Specialist

Signature:



Date:

7-10-98

VI. RWQCB NOTIFICATION

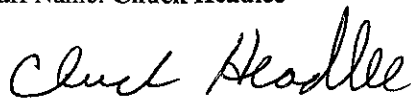
Date Submitted to RB:

RB Response:

RWQCB Staff Name: Chuck Headlee

Title: ~~AWRCE~~ EG

Signature:



Date:

7/14/98

VI. ADDITIONAL COMMENTS, DATA, ETC.

Case closure is warranted for the site as a "Low-Risk Groundwater Case" for the following reasons.

- a) The source has been sufficiently removed or has been remediated.

Laboratory analysis of verification soil samples collected from the site indicate sufficiently low numbers in the area of the former gasoline and waste oil tanks. A "Risk Based Site Assessment" indicated the site is in all probability, safe, regarding public health.

CASE CLSOURE SUMMARY
Leaking Underground Fuel Storage Tank Program

VII. Additional Comments Continued...

- b) The site has been adequately characterized.

Laboratory analysis of soil and groundwater samples collected during site investigations document that the previous release is small in extent and appears to be limited to soils which have come in contact with ground water in the vicinity of MW-1.

- c) The dissolve hydrocarbon plume appears to be stable and has is not migrating.

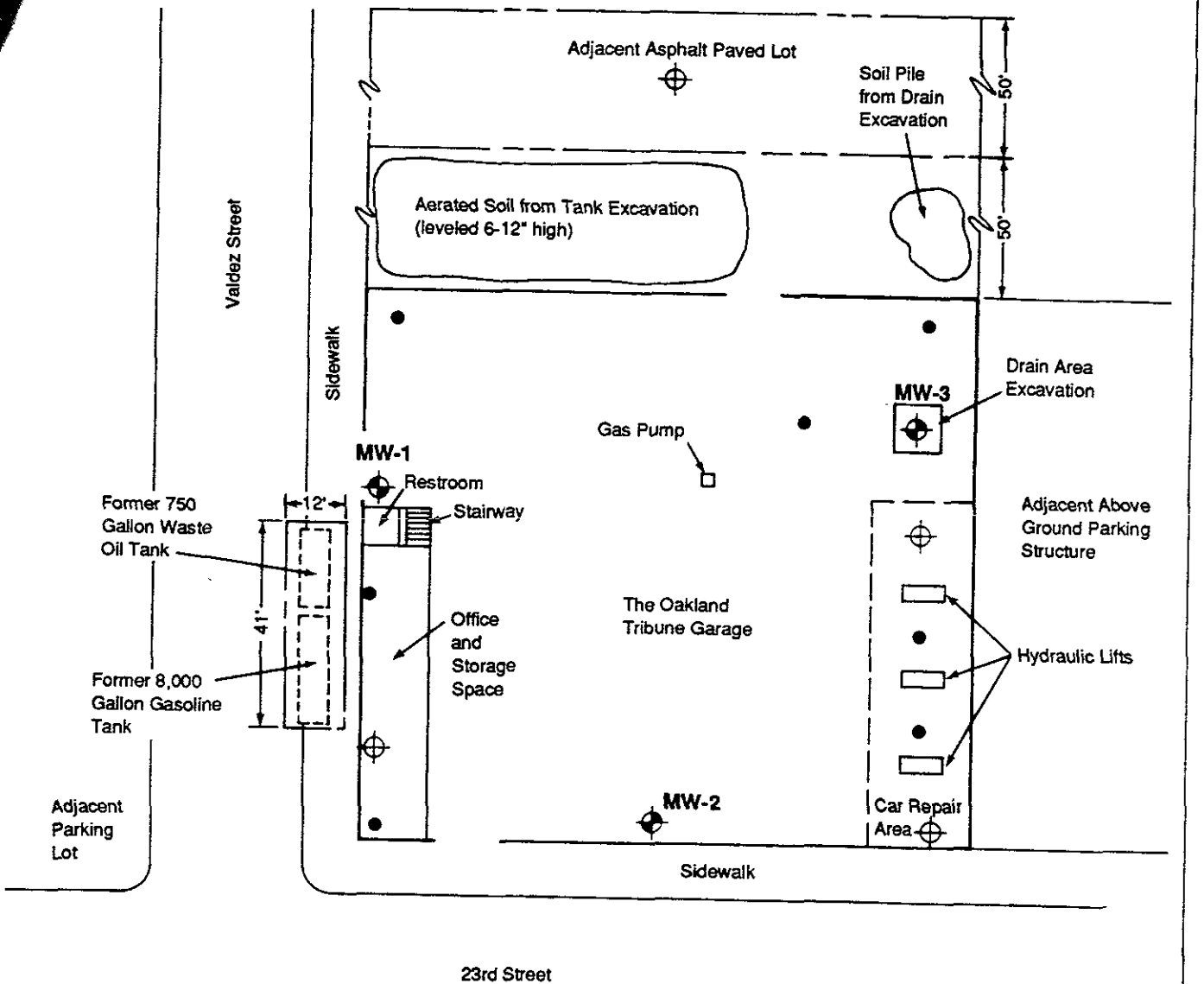
Petroleum hydrocarbons were detected in the groundwater samples collected in MW-1, during the sampling events from 1996-1998. Laboratory analysis of groundwater samples collected from the down-gradient wells MW-8 and MW-9, revealed non-detectable concentrations of TPH-G and BTEX. The petroleum hydrocarbon contamination should continue to naturally degrade over time.

- d) No water wells, deeper water wells, surface water or other sensitive receptors are likely to be impacted.

- e) The site presents no significant risk to human health or the environment.

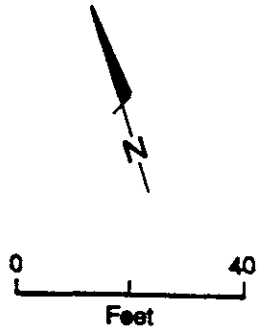
Laboratory analysis of soil and groundwater samples collected during the groundwater monitoring well installation and subsequent UST removals, and the subsequent investigations revealed non-detectable concentrations of benzene (with the exception of MW-1, and MW-4).

Figure 1.



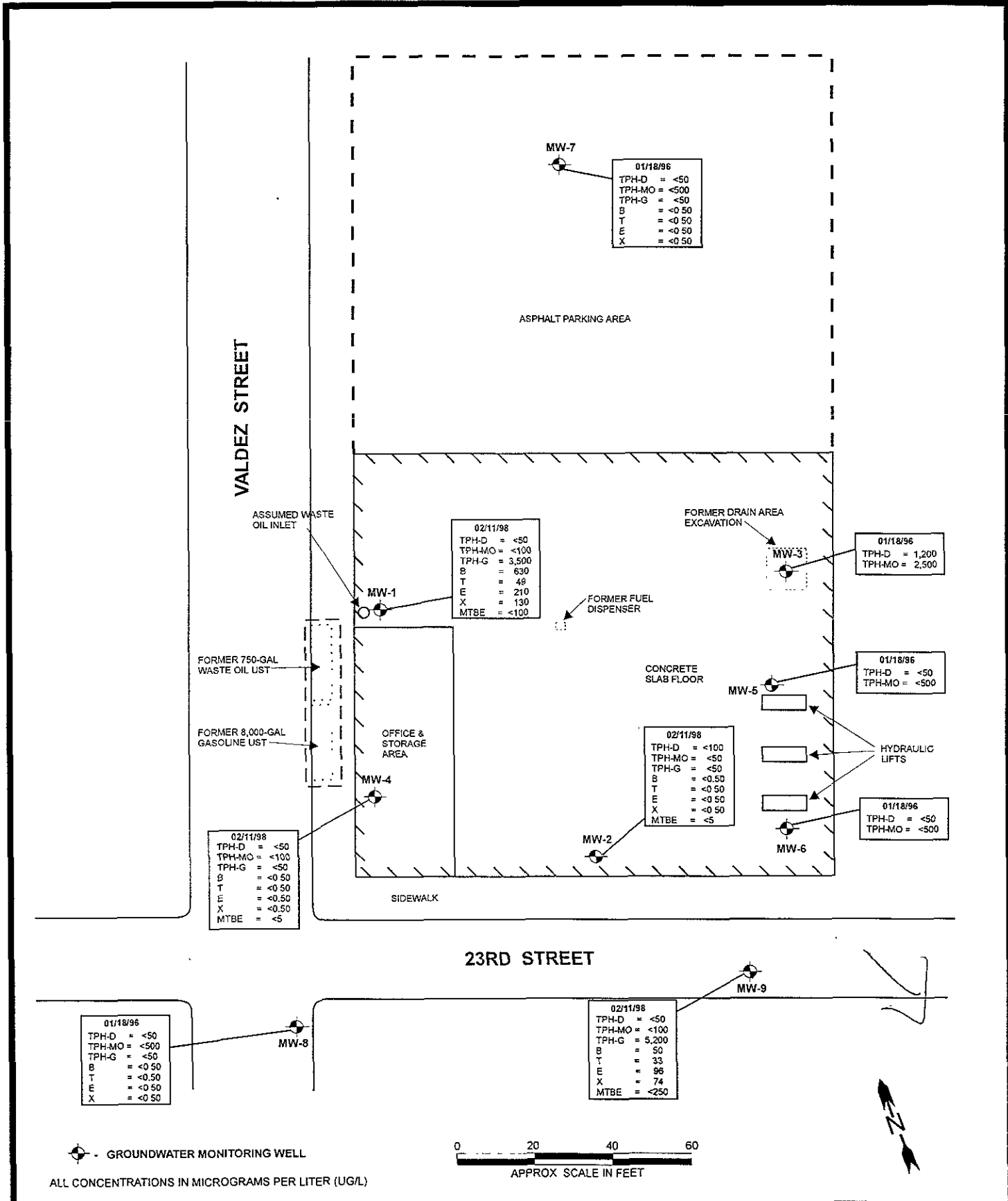
KEY

- ⊕ Existing Groundwater Monitoring Well
- ⊕ Proposed Groundwater Monitoring Well
- Proposed Soil Boring

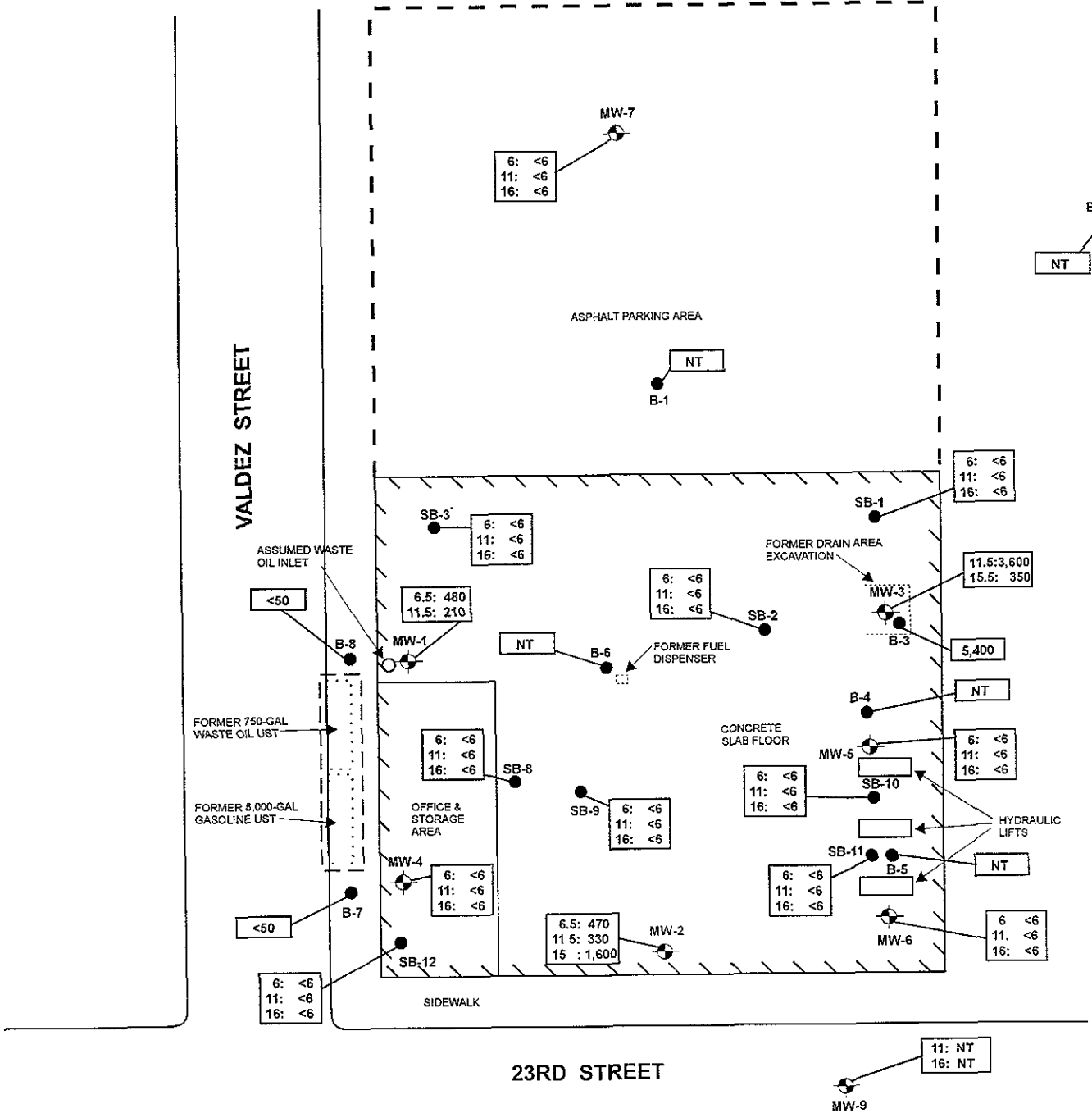


Source: Clayton Environmental Consultants, Inc.

8735-043	Oakland Tribune	PROPOSED SOIL AND GROUNDWATER SAMPLING LOCATIONS
Dames & Moore	OAKLAND TRIBUNE GARAGE Oakland, California	



DESIGNED BY:	CHECKED BY:	GROUNDWATER HYDROCARBON RESULTS, VARIOUS DATES	DATE: 02/27/98	FIGURE: 5
DRAWN BY: JG	SCALE:		GRIBI Associates	
PROJECT NO: 125-01-02		FORMER OAKLAND TRIBUNE SHOP OAKLAND, CALIFORNIA		

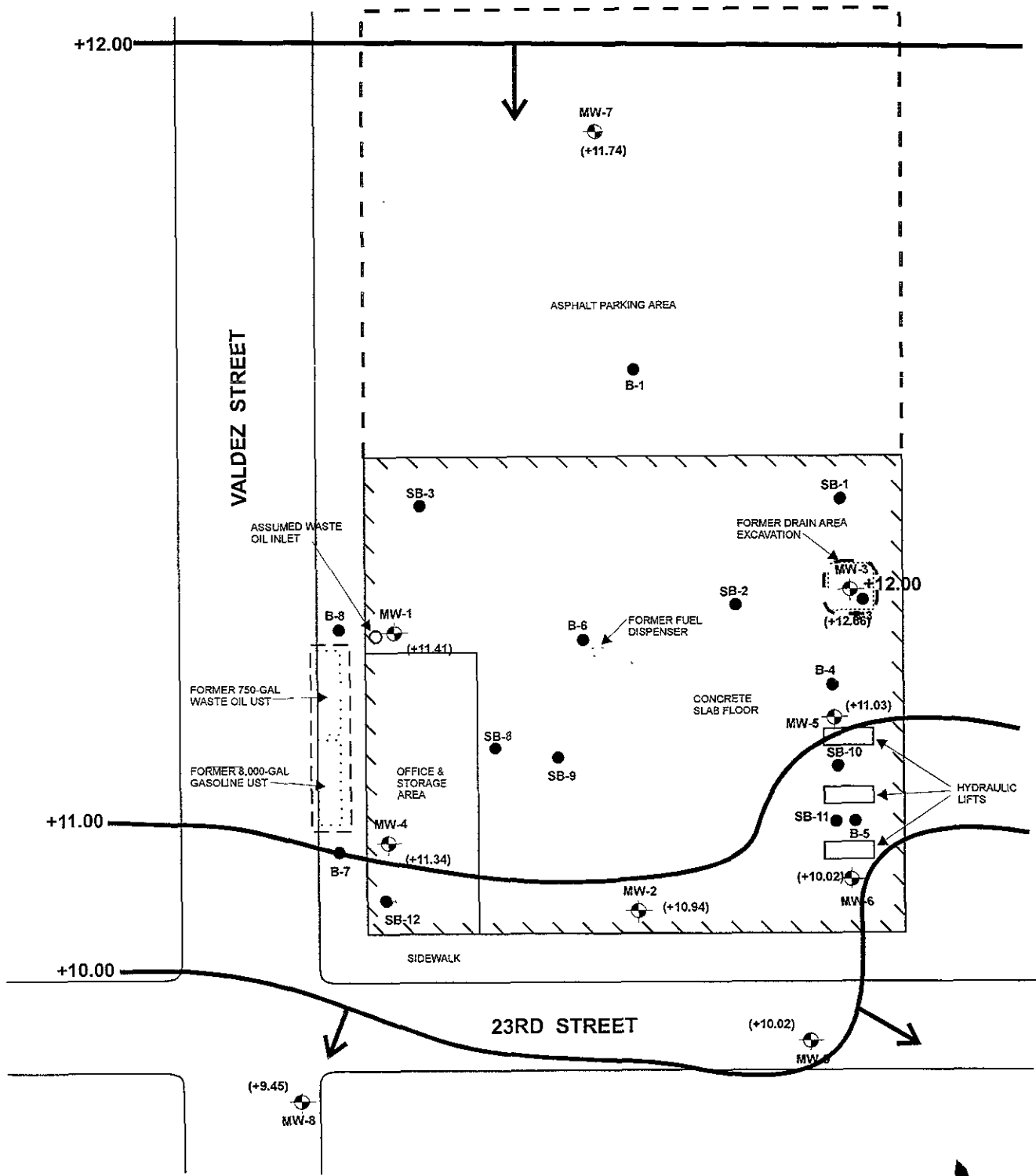


- - INVESTIGATIVE SOIL BORING
- ⊕ - GROUNDWATER MONITORING WELL

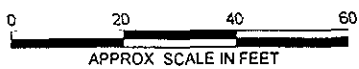
DEPTH: TOG (MG/KG) NT = NOT TESTED



DESIGNED BY:	CHECKED BY:	SOIL TOTAL OIL & GREASE	DATE: 02/27/98	FIGURE: 3
DRAWN BY JG	SCALE:		GRIBI Associates	
PROJECT NO. 125-01-02		FORMER OAKLAND TRIBUNE SHOP OAKLAND, CALIFORNIA		



- ⊕ - GROUNDWATER MONITORING WELL
- - INVESTIGATIVE SOIL BORING



DESIGNED BY:	CHECKED BY:	GROUNDWATER ELEVATION MAP 02/11/98	DATE: 02/27/98	FIGURE: 2
DRAWN BY: JG	SCALE:		GRIBI Associates	
PROJECT NO: 125-01-02		FORMER OAKLAND TRIBUNE SHOP OAKLAND, CALIFORNIA		

Table 3
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS FOR
PETROLEUM HYDROCARBONS
Former Oakland Tribune Maintenance Garage

Sample ID	Sampling Date	Concentration (mg/l)							
		TPH-D	TPH-MO	TPH-G	B	T	E	X	MTBE
MW-6	08/15/89	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	05/14/90	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	01/18/96	<0.05	<0.5	--	--	--	--	--	--
MW-7	08/15/89	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	05/14/90	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	01/18/96	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
MW-8	05/18/90	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	01/18/96	<0.05	<0.5	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	--
MW-9	05/18/90	--	--	--	0.0085	0.0081	0.0044	0.0054	--
	01/18/96	0.70 ⁴	<0.5	2.4	0.028	0.020	0.028	0.028	--
	12/30/97	<0.10 ⁶	<0.10	4.7	0.056	0.020	0.030	0.027	<0.025
	02/11/98	<0.05	<0.10	5.2	0.050	0.033	0.096	0.074	<0.025

- 1 - Not analyzed for this analyte.
- 2 - Not detected above the expressed value.
- 3 - West Laboratory report states "Increased reporting limit due to gas and oil range interference."
- 4 - NET laboratory report states: "The positive result appears to be a lighter hydrocarbon than Diesel."
- 5 - West Laboratory report states "Not typical diesel."
- 6 - West Laboratory report states "Increased reporting limit due to gasoline range interference."

Table 4
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS FOR
HALOGENATED VOLATILE ORGANICS
Former Oakland Tribune Maintenance Garage

Sample ID	Sampling Date	Concentration (ug/l)							
		CARB.	CHL.	1,2-DCB	1,3-DCB	1,4-DCB	1,1-DCA	1,2-DCA	TCE
MW-1	07/27/89	0.7	2.6	0.5	<0.5	<0.5	1.2	1.9	1.4
	05/14/90	<0.5	<0.5	4.0	<0.5	<0.5	2.9	1.0	1.6
MW-2	07/27/89	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	05/14/90	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-3	07/27/89	0.7	0.5	11.0	2.7	31.0	<0.5	<0.5	<0.5
	05/14/90	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-4	08/15/89	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	2.2	<0.5
	05/14/90	<0.5	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5
MW-5	08/15/89	0.9	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	05/14/90	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-6	08/15/89	1.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	05/14/90	<0.5	<0.5	<0.5	<0.5	<0.5	1.5	<0.5	<0.5

Groundwater analytical results from previous investigations are summarized in Tables 3 and 4 (see Figure 5). Table 3 summarizes groundwater analytical results for TPH as Diesel (TPH-D), TPH as Motor Oil (TPH-MO), TPH-G, BTEX, and Methyl-t-butyl Ether (MTBE). Note that Table 3 also contains groundwater analytical results for groundwater samples collected from MW-1, MW-2, MW-4, and MW-9 on February 11, 1998. These samples were collected with a clean disposable bailer, without prior purging of the wells. The laboratory data report for this sampling is contained in Appendix B. Table 4 summarizes detected halogenated volatile organic compounds in groundwater.

Sample ID	Sampling Date	Concentration (mg/l)							
		TPH-D	TPH-MO	TPH-G	B	T	E	X	MTBE
MW-1	08/16/88	--	--	--	1.0	0.30	0.40	0.60	--
	07/27/89	--	--	--	0.10	0.0051	<0.001 ²	0.26	--
	5/14/90	--	--	--	0.37/	0.13	0.17	0.11	--
	01/18/96	0.99	<0.5	3.3	0.330	0.039	0.10	0.085	--
	12/30/97	<0.100 ³	0.190	6.3	1.10/	0.073	0.35	0.20	<0.050
	02/11/98	<0.05	<0.10	3.5	0.63/	0.049	0.21	0.13	<0.100
MW-2	08/16/88	--	--	--	<0.0004	<0.0003	<0.0003	<0.0004	--
	07/27/89	--	--	--	0.024	<0.001	<0.001	0.08	--
	5/14/90	--	--	--	<0.03	0.012	0.12	0.02	--
	01/18/96	--	--	0.20	<0.0005	0.0008	0.0034	0.0025	--
	12/30/97	<0.100 ³	0.150	0.32	<0.0005	<0.0005	0.0035	0.00083	<0.005
	02/11/98	<0.05	<0.10	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
MW-3	08/16/88	--	--	--	0.052	0.001	0.0049	0.017	--
	07/27/89	--	--	--	<0.001	<0.001	<0.001	0.011	--
	05/14/90	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	01/18/96	1.2 ⁴	2.5	--	--	--	--	--	--
MW-4	08/15/89	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	05/14/90	--	--	--	0.22	0.02	0.12	0.18	--
	01/18/96	0.47 ⁴	<0.5	0.42	0.005	0.0008	0.0054	0.0071	--
	12/30/97	0.079 ⁵	0.21	0.19	0.0045	0.00093	0.0037	0.0031	<0.005
	02/11/98	<0.05	<0.10	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.005
MW-5	08/15/89	--	--	--	<0.0005	<0.0005	<0.0005	<0.0005	--
	05/14/90	--	--	--	0.043	0.001	0.0094	0.011	--
	01/18/96	<0.05	<0.5	--	--	--	--	--	--

Table 4
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS FOR
HALOGENATED VOLATILE ORGANICS
 Former Oakland Tribune Maintenance Garage

Sample ID	Sampling Date	Concentration (ug/l)							
		CARB.	CHL	1,2-DCB	1,3-DCB	1,4-DCB	1,1-DCA	1,2-DCA	TCE
MW-7	08/15/89	20.0	4.6	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	05/14/90	64	16	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-8	05/18/90	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-9	05/18/90	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

CARB. - Carbon Tetrachloride
 1,3-DCB - 1,3-Dichlorobenzene
 1,2-DCA - 1,2-Dichloroethane

CHL - Chloroform
 1,4-DCB - 1,4-Dichlorobenzene
 TCE - Trichloroethene

1,2-DCB - 1,2-Dichlorobenzene
 1,1-DCA - 1,1-Dichloroethane

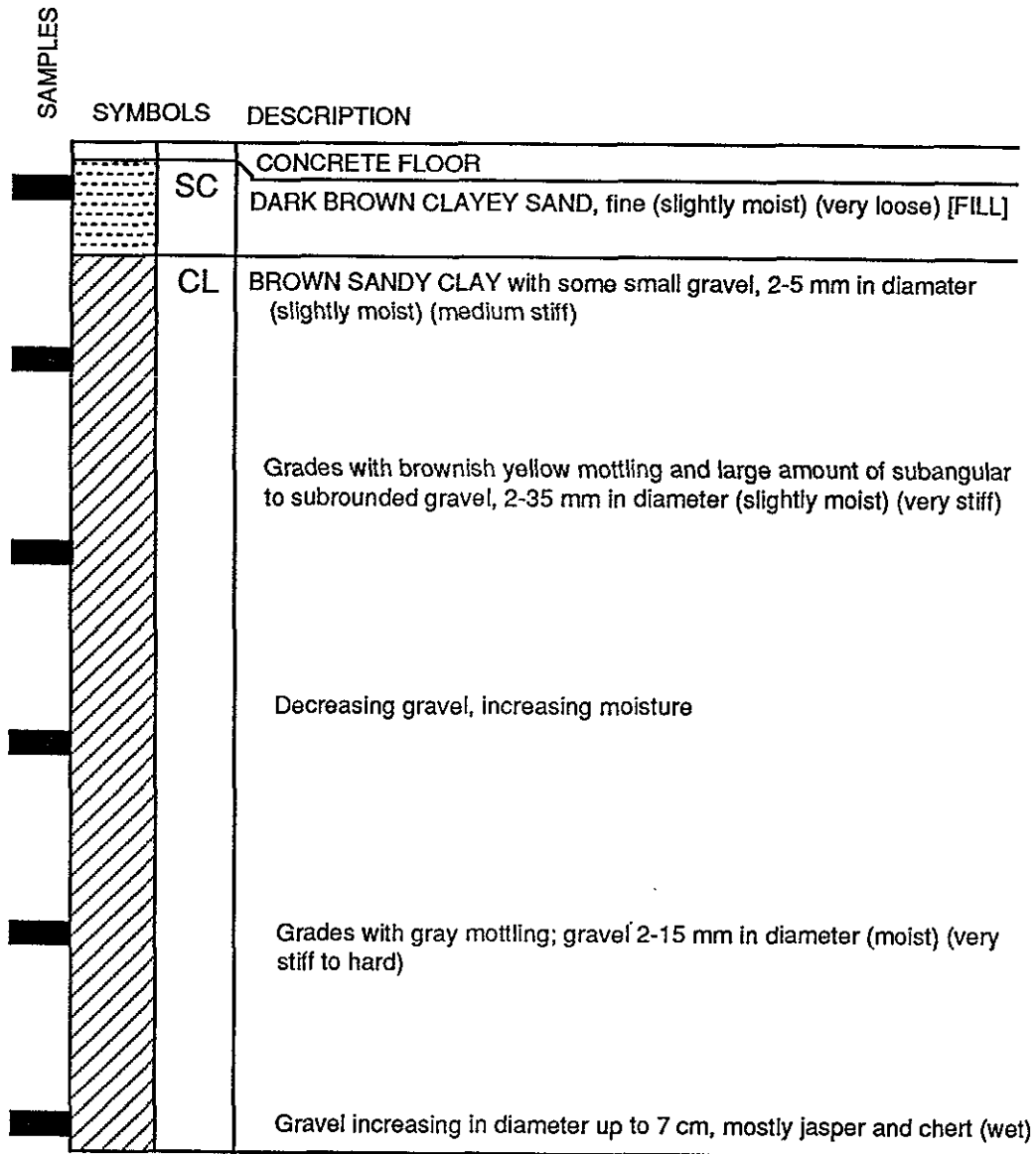
Based on our review and interpretation of available site data, we draw the following conclusions about the project site:

- **Subsurface soils consist of a low permeability clay layer, underlain by more permeable sands and gravels below about 16 feet in depth.** Well borings and investigative soil borings encountered clays, silty clays, sandy clays, and gravelly clays down to about 16 feet below grade. Soils beneath about 16 feet in depth consist primarily of clayey sands and gravels. Dames & Moore conducted single well slug tests on wells MW-4 through MW-7 in August 1989 using the Bower and Rice method. Calculated hydraulic conductivities in the four wells, which are all screened from about ten feet to 25 feet in depth, ranged from 2.41×10^{-5} to 2.68×10^{-4} , with an average hydraulic conductivity of 1.08×10^{-4} .
- **Subsurface soils are not significantly impacted by waste oil range hydrocarbons.** Waste oil range hydrocarbons have been encountered in three areas of the site: (1) Adjacent to a former floor sump located in the northeast corner of the site building; (2) Adjacent to the assumed inlet to the former waste oil UST, located adjacent to MW-1; and (3) In soil samples from MW-2, located on the south side of the project site building. However, soil analytical results from borings located downgradient (south) from these locations indicates that these waste oil-impacted soils are very localized and do not represent a significant soil impact.
- **Subsurface soils are gasoline impacted at approximate groundwater depth (10 to 15 feet in depth), extending south away from the former USTs.** Soil analytical results from samples at approximate groundwater depth show TPH-G results ranging between nondetect to 560 milligrams per kilogram. Benzene concentrations in these soil samples tend to be nondetectable at increased distance away from the UST and floor sump source areas.
- **Groundwater is not significantly impacted by waste oil range hydrocarbons or identified solvents.** Groundwater analytical results show low levels of diesel and motor oil range hydrocarbons immediately adjacent to source areas, but not extending

BORING SB-1

DATE DRILLED: 8/3/89

DEPTH IN FEET	SAMPLING		
	OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0	0	U	3
5	0	U	20
10	0	U	68
15	0	U	17
20	0	U	70
25	0	U	46
30			
35			



NOTES:

1. Boring completed at a depth of 26.5 feet on 8/3/89.
2. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

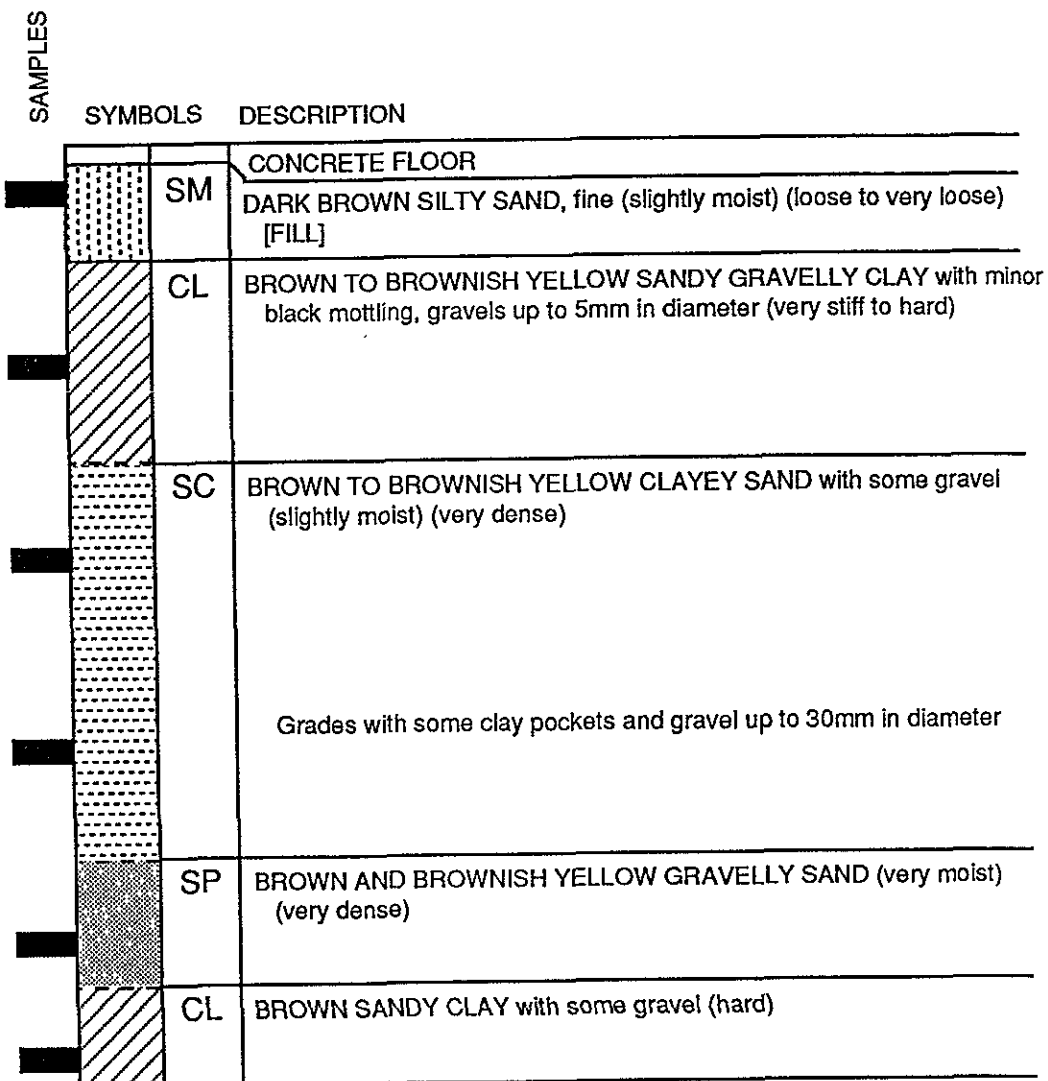
LOG OF BORING

Dames & Moore

BORING SB-2

DATE DRILLED: 8/3/89

DEPTH IN FEET	SAMPLING		
	OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0	0	U	6
5	0	U	72
10	0	U	50
15	0	U	57
20	0	U	91
24.5	0	U	68
30			
35			



NOTES:

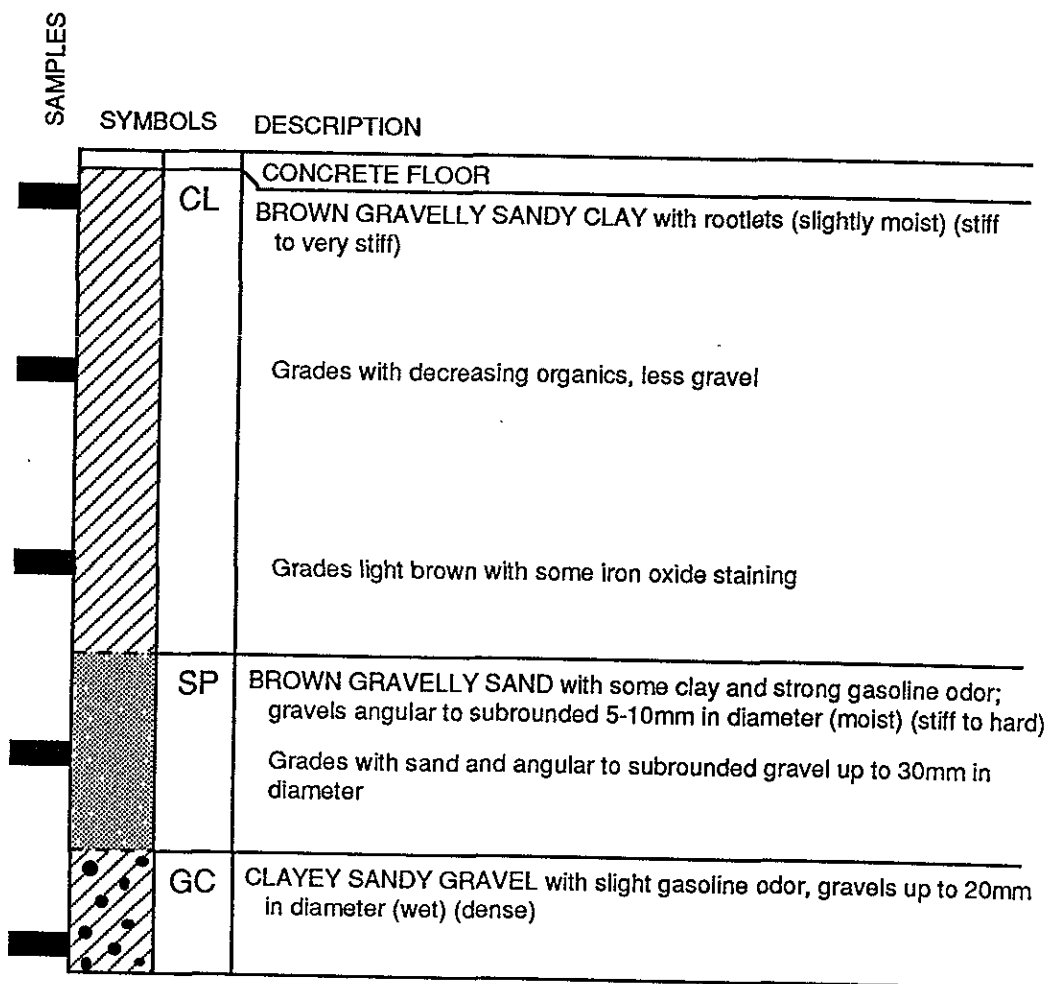
1. Boring completed at a depth of 24.5 feet on 8/3/89.
2. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

LOG OF BORING
Dames & Moore

BORING SB-3

DATE DRILLED: 8/3/89

DEPTH IN FEET	SAMPLING		
	OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0	0	U	35
5	0	U	29
10	0	U	36
15	>1000	U	76
20	10	U	95
25			
30			
35			



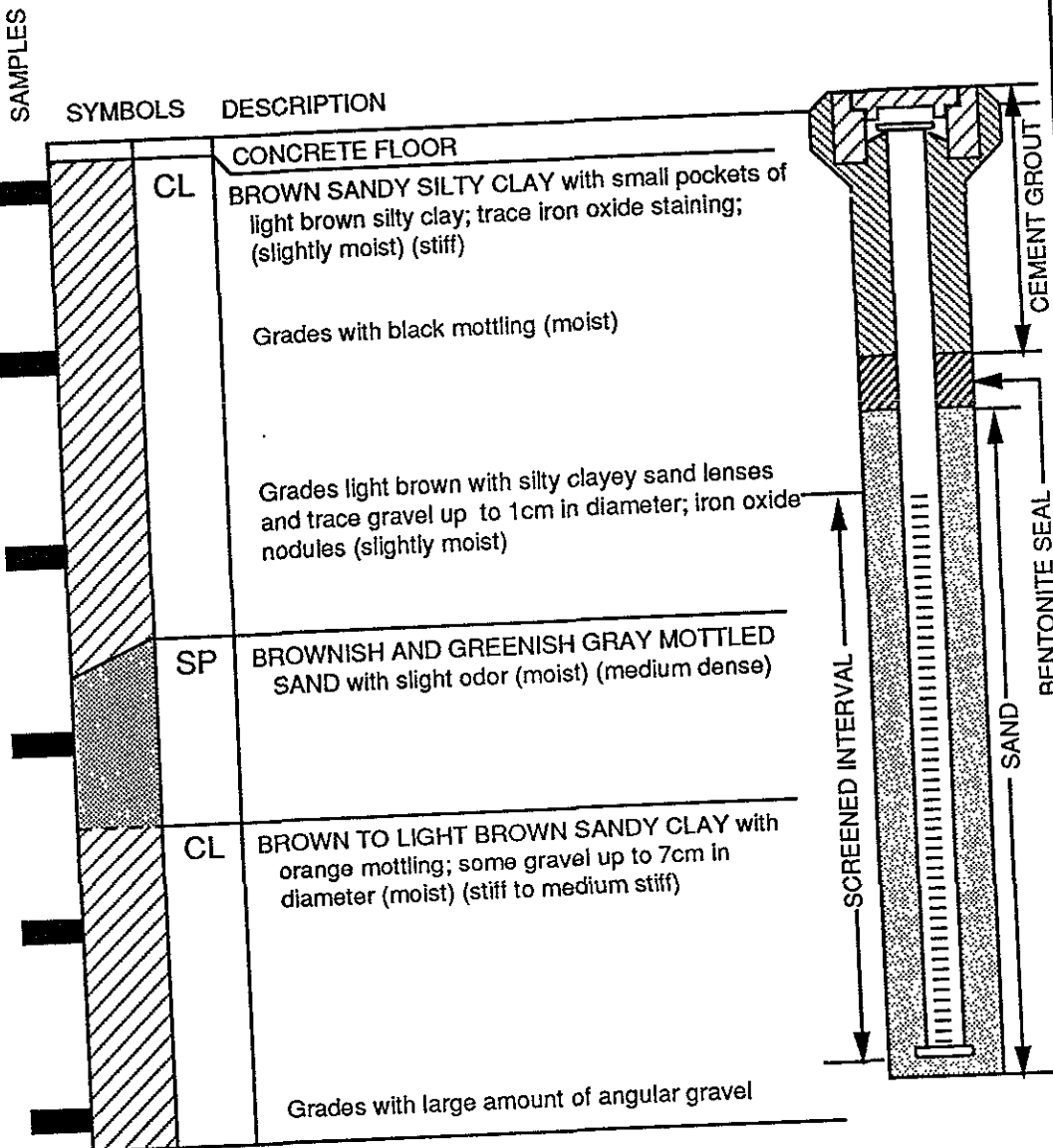
NOTES:

1. Boring completed at a depth of 21.5 feet on 8/3/89.
2. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

BORING SB-4 / MW-4

DATE DRILLED: 8/8/89

SAMPLING		
OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0	U	36
0	U	35
0	U	39
8	U	40
0	U	23
0	U	76



NOTES:

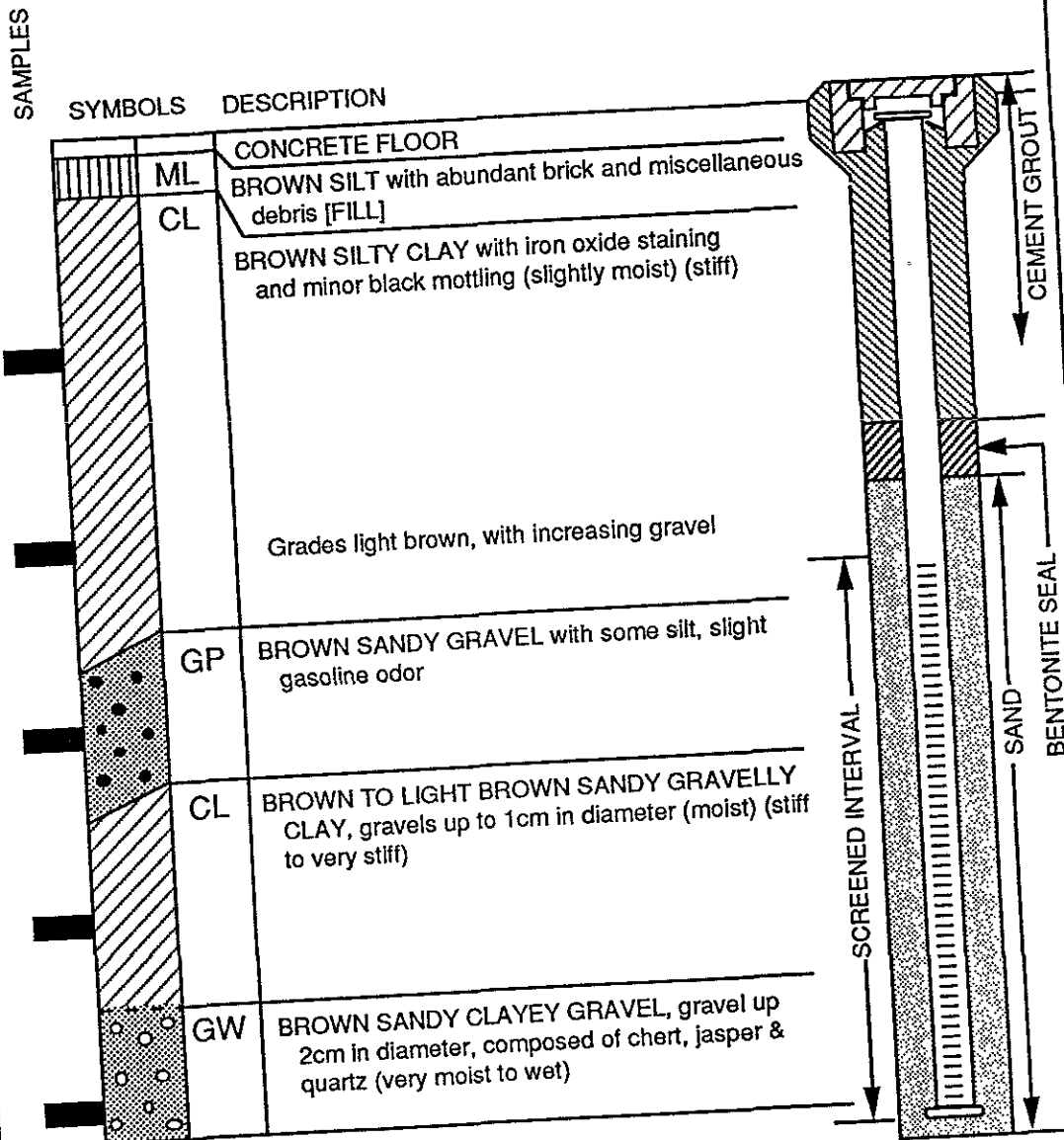
1. Boring completed at a depth of 26.5 feet on 8/8/89.
2. 4-inch PVC observation well installed to a depth of 25.5 feet; screened interval from 10.0 to 25.0 feet.
3. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
4. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
5. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

LOG OF BORING
Dames & Moore

BORING SB-5 / MW-5

DATE DRILLED: 8/9/89

DEPTH (FEET)	SAMPLING		
	OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0			
5	0	U	41
10	2	U	38
15	200	U	60
20	0	U	41
25	2	U	86
30			
35			



NOTES:

- Boring completed at a depth of 26.5 feet on 8/9/89.
- 4-inch PVC observation well installed to a depth of 27.5 feet; screened interval from 12.0 to 27.0 feet.
- Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
- Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
- For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

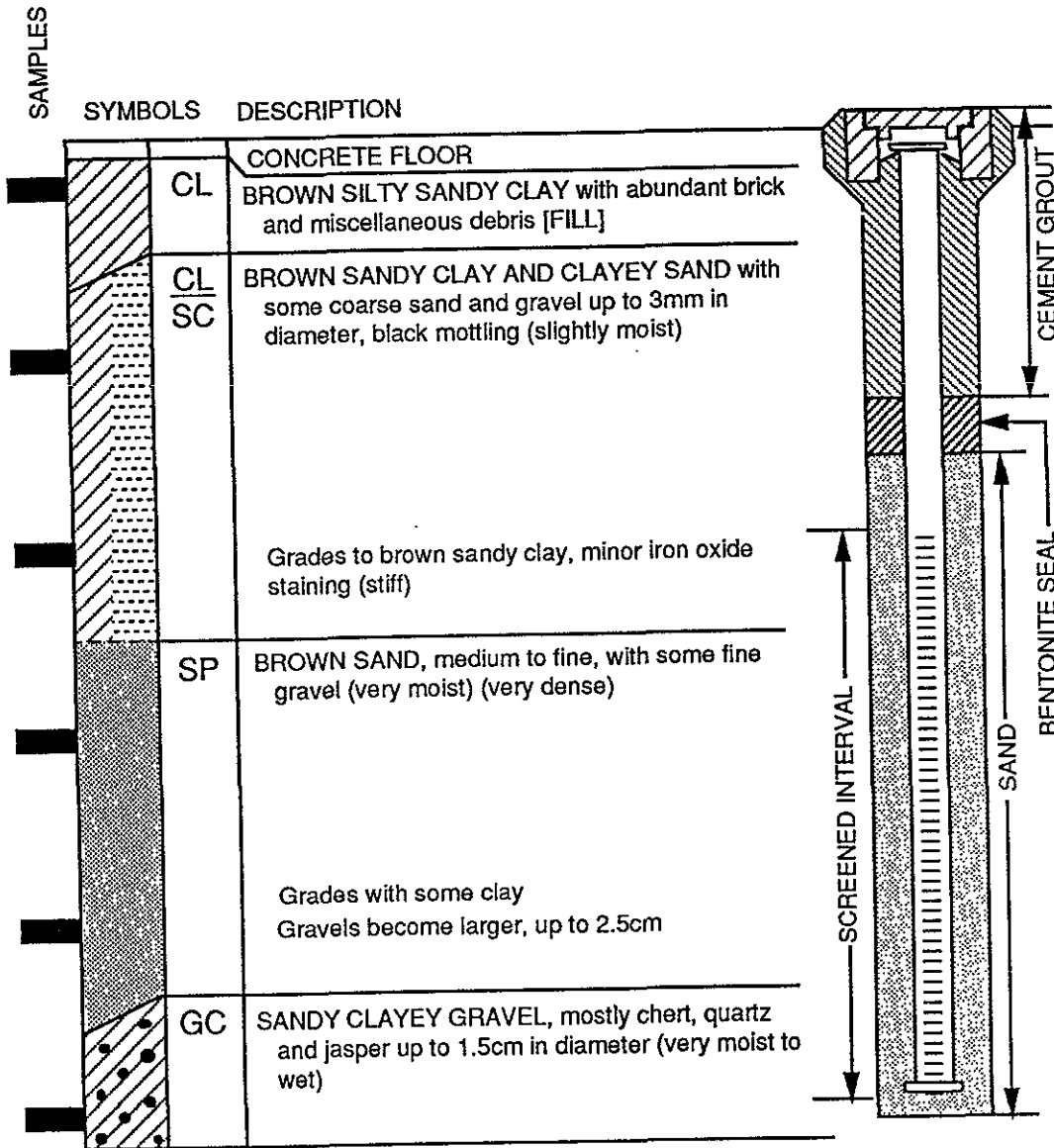
LOG OF BORING
Dames & Moore

PLATE B-5

BORING SB-6 / MW-6

DATE DRILLED: 8/9/89

SAMPLING		
OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0	U	31
0	U	35
0	U	24
0.5	U	85
1.5	U	47
2.5	U	118



NOTES:

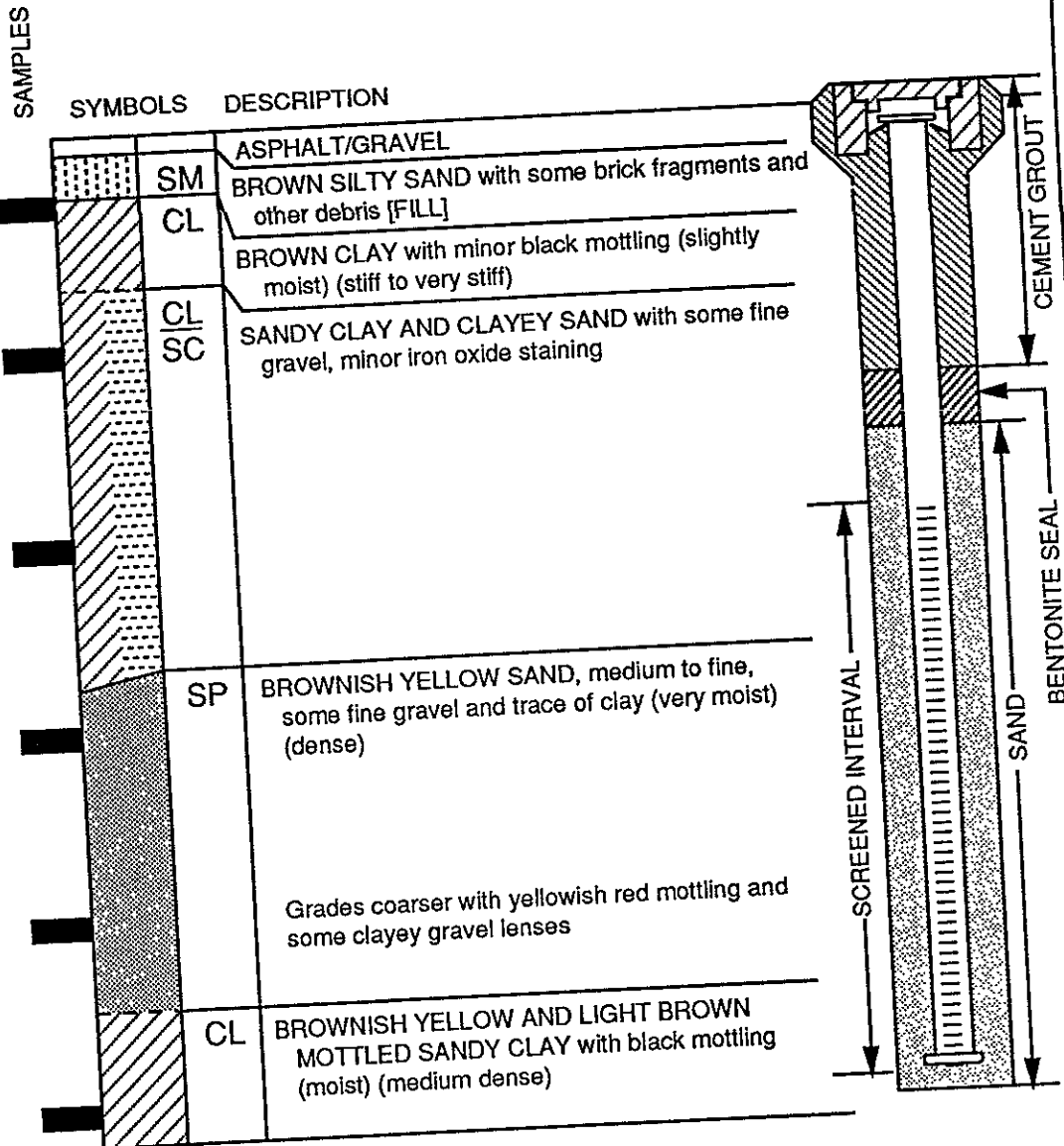
1. Boring completed at a depth of 26.5 feet on 8/9/89.
2. 4-inch PVC observation well installed to a depth of 26.0 feet; screened interval from 10.5 to 25.5 feet.
3. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
4. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
5. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

LOG OF BORING
Dames & Moore

BORING SB-7 / MW-7

DATE DRILLED: 8/10/89

SAMPLING		
OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0	U	20
0	U	47
0	U	30
0	U	62
0	U	57
0	U	34



NOTES:

1. Boring completed at a depth of 26.5 feet on 8/9/89.
2. 4-inch PVC observation well installed to a depth of 26.0 feet; screened interval from 10.5 to 25.5 feet.
3. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
4. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
5. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

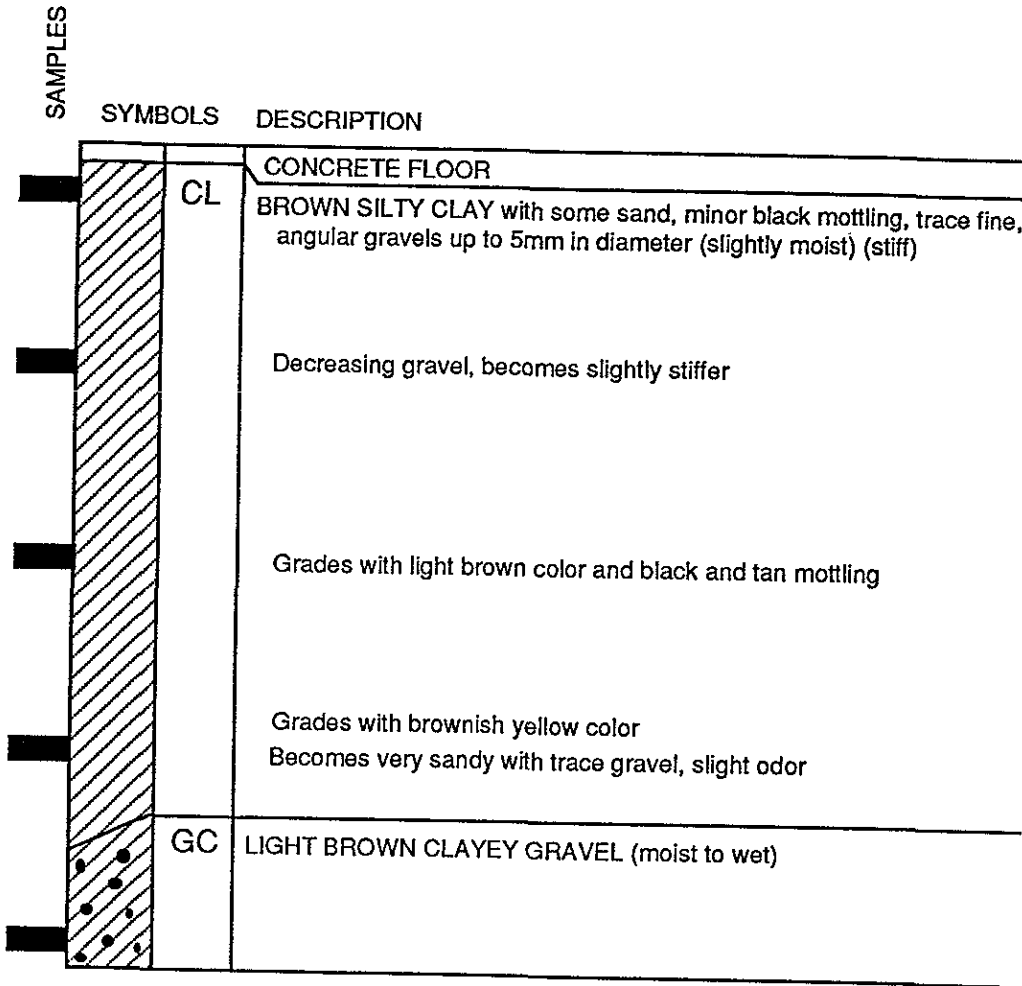
LOG OF BORING
Dames & Moore

PLATE B-7

SAMPLING		
DEPTH (FEET)	SAMPLER TYPE	SAMPLING RESISTANCE
0	U	28
1	U	46
1	U	30
0	U	38
0	U	46

BORING SB-8

DATE DRILLED: 8/7/89



NOTES:

1. Boring completed at a depth of 21.5 feet on 8/3/89.
2. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

LOG OF BORING

Dames & Moore

A
F
P
E
N
D
I
X
C

DEPTH IN FEET

0
5

10

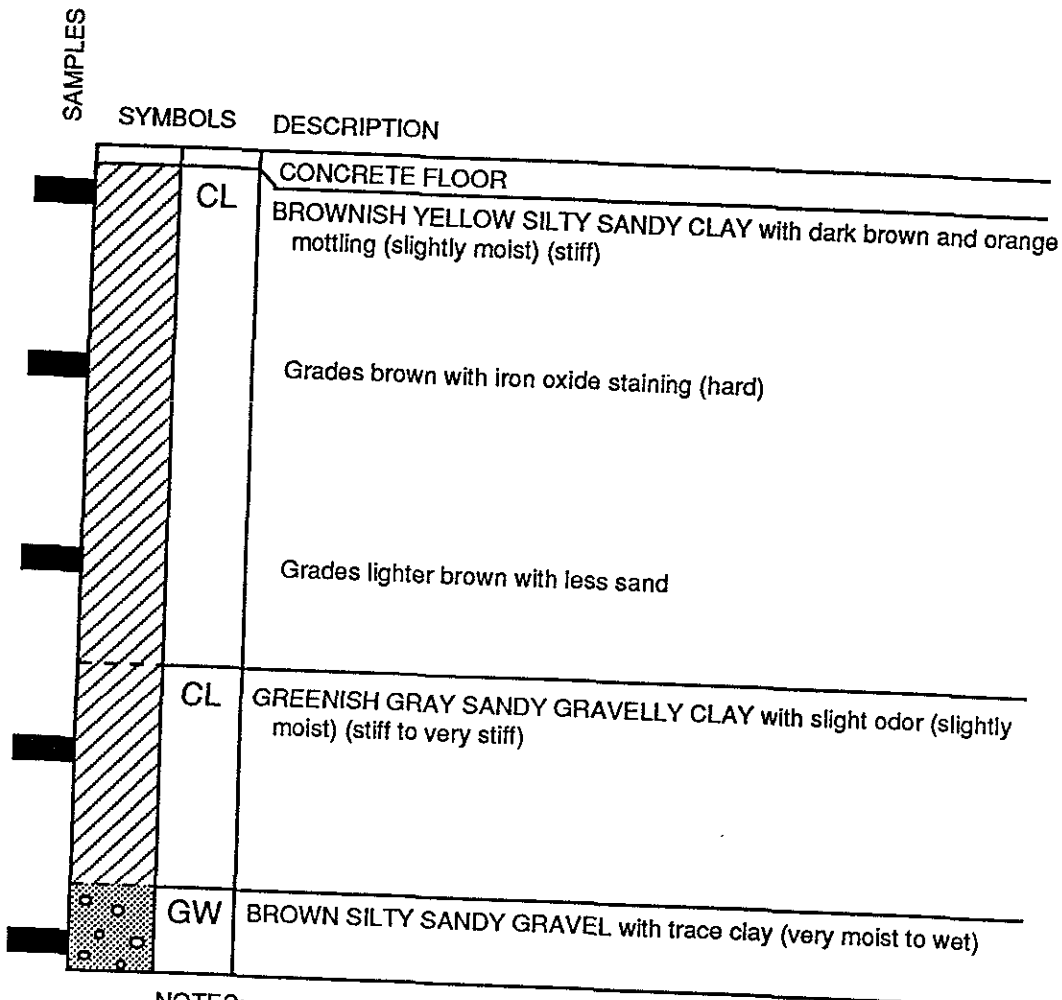
10

SAMPLING

OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0	U	26
0	U	46
0	U	32
10	U	31
10	U	80

BORING SB-9

DATE DRILLED: 8/7/89



NOTES:

1. Boring completed at a depth of 21.5 feet on 8/7/89.
2. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

LOG OF BORING

Dames & Moore

BORING SB-10

DATE DRILLED: 8/7/89

DEPTH IN FEET	SAMPLING		
	OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0			
	0	U	14
5			
	0	U	58
10			
	0	U	41
15			
	2	U	25
20			
	0	U	57
	0	U	37
25			
30			

SAMPLES	SYMBOLS	DESCRIPTION
		CONCRETE FLOOR
	ML	DARK BROWN CLAYEY SILT with some sand (dry to slightly moist) (loose) [FILL]
	CL	BROWN TO BROWNISH YELLOW SILTY SANDY CLAY with gravel, black mottling (stiff to hard)
		Grades to brown to light brown with less sand, iron oxide or manganese nodules (slightly moist) (very stiff)
		Grades brown to brownish yellow with more sand
	SC	LIGHT BROWN CLAYEY SAND, medium to fine, with black mottling and gravel (moist) (medium dense)
	GC	BROWN CLAYEY SANDY GRAVEL, fine (very moist)

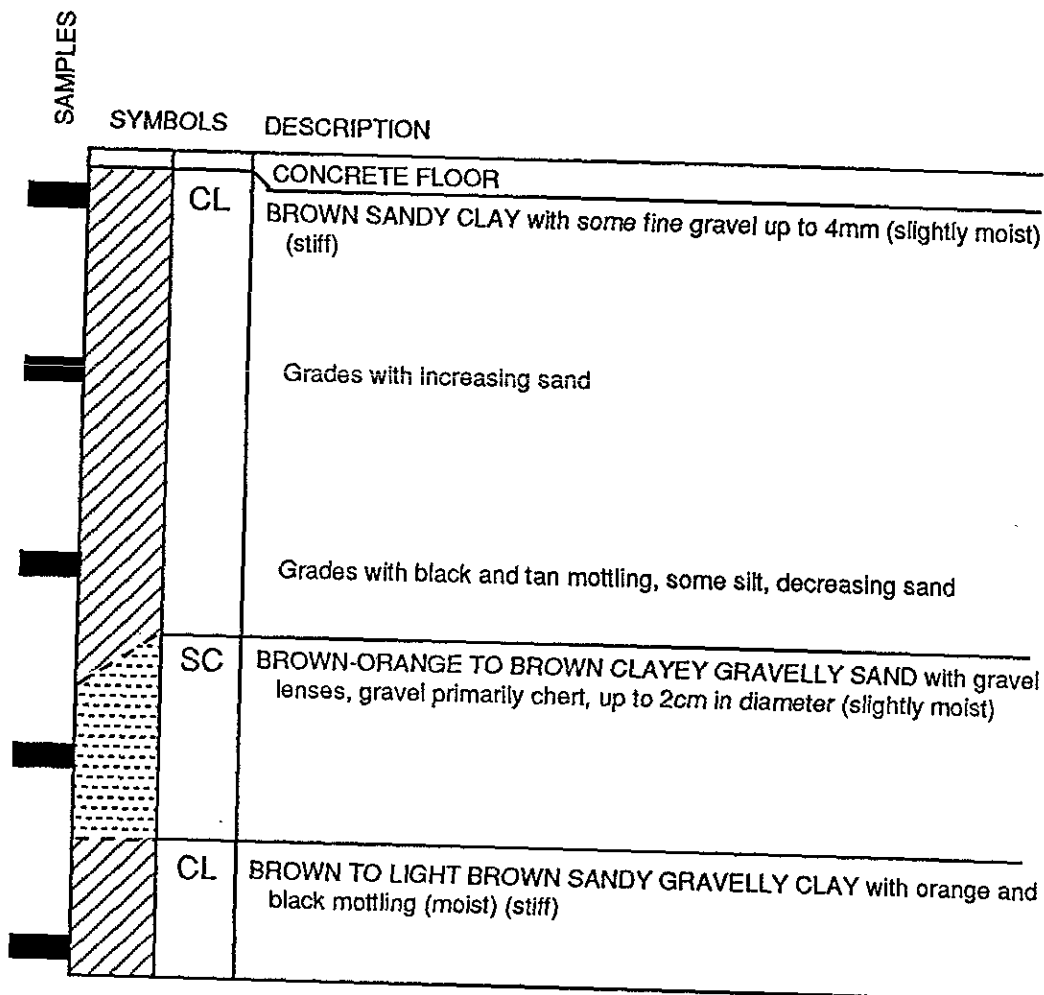
NOTES:

1. Boring completed at a depth of 24.0 feet on 8/7/89.
2. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

BORING SB-11

DATE DRILLED: 8/7/89

DEPTH IN FEET	SAMPLING		
	OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0	0	U	21
5	0	U	53
10	5	U	32
15	0	U	76
20	0.5	U	26
25			
30			
35			



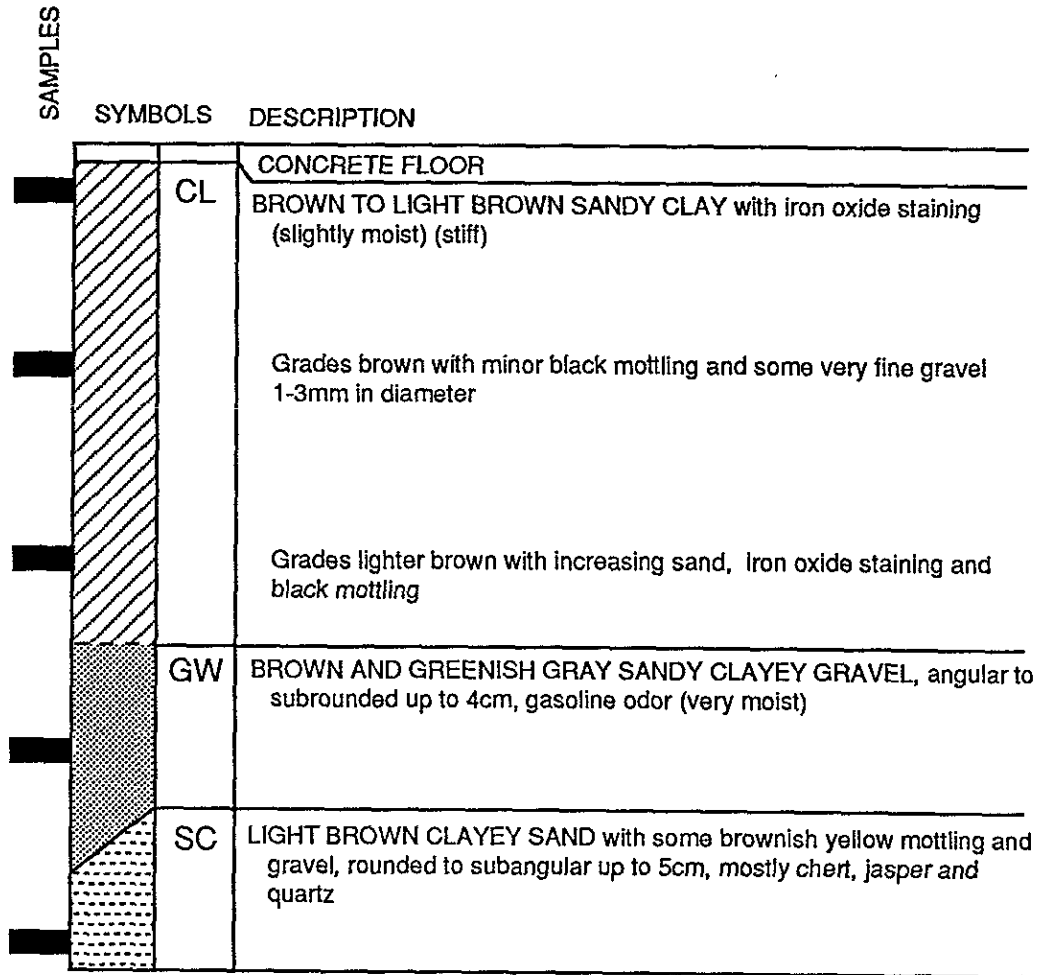
NOTES:

1. Boring completed at a depth of 24.0 feet on 8/7/89.
2. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

BORING SB-12

DATE DRILLED: 8/8/89

DEPTH IN FEET	SAMPLING		
	OVA READING (PPM)	SAMPLER TYPE	SAMPLING RESISTANCE
0	0	U	32
5	0	U	26
10	0	U	27
15	20	U	94
20	20	U	59
25			
30			
35			



NOTES:

1. Boring completed at a depth of 21.5 feet on 8/7/89.
2. Sampling resistance is measured in blows per foot required to drive the sampler 12 inches with a 140 lb. hammer falling 30 inches after sampler has been seated 6 inches.
3. Boring log indicates interpreted subsurface conditions only at the location and the time the boring was drilled.
4. For an explanation of terms used see the Soils Classification Chart and Key to Test Data, Plate B-13.

LOG OF BORING

Dames & Moore

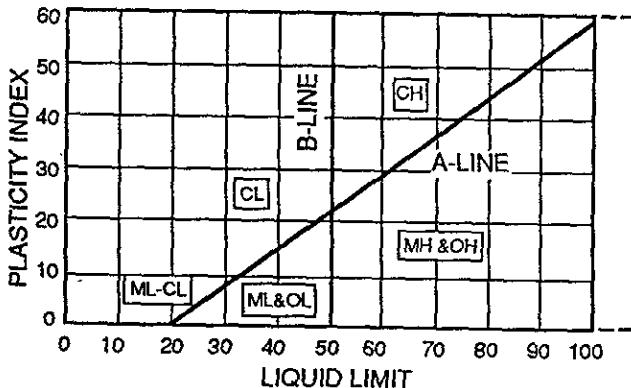
UNIFIED SOIL CLASSIFICATION CHART

SYMBOL	LETTER	DESCRIPTION	MAJOR DIVISIONS			
GW	GW	WELL-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	CLEAN GRAVELS (LITTLE OR NO FINES)	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO.4 SIEVE SIZE	COARSE-GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO.200 SIEVE SIZE	
GP	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES				
GM	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES				
GC	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES				
SW	SW	WELL-GRADED SAND OR GRAVELLY SANDS, LITTLE OR NO FINES	CLEAN SANDS (LITTLE OR NO FINES)	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO.4 SIEVE SIZE		
SP	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES				
SM	SM	SILTY SANDS, SAND-SILT MIXTURES				
SC	SC	CLAYEY SANDS, SAND-CLAY MIXTURES				
ML	ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	SILTS & CLAYS LIQUID LIMIT LESS THAN 50			FINE-GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO.200 SIEVE SIZE
CL	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS				
OL	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY				
MH	MH	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY	SILTS & CLAYS LIQUID LIMIT GREATER THAN 50			
CH	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS				
OH	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS				
PT	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	HIGHLY ORGANIC SOILS			

FOR VISUAL CLASSIFICATION, THE 1/4" SIZE MAY BE USED AS EQUIVALENT TO THE NO.4 SIEVE SIZE

THE NO.200 U.S. STANDARD SIEVE IS ABOUT THE SMALLEST PARTICLE VISIBLE TO THE NAKED EYE

PLASTICITY CHART



KEY TO SAMPLES

- INDICATES UNDISTURBED SAMPLES
- INDICATES DISTURBED SAMPLE
- INDICATES NO RECOVERY IN SAMPLE

KEY TO TEST DATA

- LV - LABORATORY VANE SHEAR TEST
- TV - TORVANE (PERFORMED IN FIELD)
- PP - POCKET PENETROMETER
- TXUU - TRIAXIAL COMPRESSION-UNCONSOLIDATED UNDRAINED
- DCSU - DIRECT SHEAR-CONSOLIDATED UNDRAINED
- AL - ATTERBERG LIMITS
- GSA - GRAIN SIZE ANALYSES
- C - CONSOLIDATION TEST

TYPES OF SOIL SAMPLERS

- U - DAMES & MOORE TYPE "U" SAMPLER

**SOIL CLASSIFICATION CHART
AND KEY TO TEST DATA**

Dames & Moore