

GROUNDWATER INVESTIGATION
MARINER WAREHOUSE
ALAMEDA, CALIFORNIA
SCI 554.006

10/29/92

58
10/29/92

Prepared For:

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By:

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(510) 268-0461

October 29, 1992

I INTRODUCTION

This report presents the results of a groundwater investigation conducted by Subsurface Consultants, Inc. (SCI) at the previous Mariner Warehouse site located at 2204 Mariner Square Loop, Alameda, California. The site encompasses the area bounded by the southern portals of the Webster and Posey tubes, as shown on the Site Plan, Plate 1.

The site is presently occupied by Paragon Gateway, a partially developed business park that currently includes two, 2-story buildings. Review of available data indicates that the site was formerly occupied by a warehouse and a carwash facility.

In November 1988, one 10,000-gallon gasoline and two 10,000-gallon diesel underground storage tanks were removed from the site. The tanks were located as shown on the attached Site Plan, Plate 1. A subsequent environmental assessment of the property was conducted by SCI, the results of which are presented in a report dated May 23, 1989.

The environmental assessment identified several areas containing oil and grease, diesel, kerosene and polynuclear aromatic hydrocarbon contamination. The sources of contamination were an undercoating booth, a car wash conveyor trench, the underground diesel/kerosene storage tanks, and hydraulic hoists inside the service building (see Plate 1).

Approximately 9100 cubic yards of diesel, and oil and grease contaminated soil were subsequently excavated and bioremediated on site. The Regional Water Quality Control Board approved the reuse of the treated soil which contained less than 100 mg/kg of oil and grease. Approximately 9050 cubic yards of remediated soil was used to backfill the excavations. Fifty cubic yards of soil contained hydrocarbon concentrations above the 100 mg/kg allowable limit and are currently stockpiled and undergoing additional bio-treatment off-site. The soil was recently sampled and analyzed. The test results will be presented in a letter when the fate of the soil is determined. Our closure report dated March 2, 1990 summarized remedial activities conducted at the site.

SCI was retained in July 1992 to perform a groundwater assessment at the site. SCI's services for the latest phase of investigation have consisted of:

1. Obtaining a permit to install wells from the Alameda County Flood Control and Water Conservation District, Zone 7,
2. Performing a utility check for drilling locations,
3. Drilling 5 test borings about 14 feet deep,
4. Constructing a groundwater monitoring well in each of the test borings,
5. Developing, purging, and sampling the wells in accordance with Regional Water Quality Control Board guidelines,
6. Performing analytical tests on soil and groundwater samples from each test boring/monitoring well, and
7. Preparing this report.

II FIELD INVESTIGATION

SCI has previously performed subsurface investigations at the site and recorded the results in aforementioned reports.

The current scope of investigation consisted of drilling 5 test borings about 14 feet deep and completing them as monitoring wells. The location of the monitoring wells are shown on Plate 1. The logs of the test borings/monitoring wells are presented on Plates 2 through 4. Details regarding monitoring well installation are presented in Appendix A.

Groundwater levels were measured in the wells using a well sounder and/or a steel tape with water sensitive paste. A level survey was performed to determine the top of casing (TOC) elevation for the wells. The elevation reference is the United States Coast and Geodetic Survey Monument V385 situated at the northwest corner of the south portal of the Posey Tube. The benchmark has an elevation of 5.33 feet, mean sea level (MSL) datum.

III SITE CONDITIONS

A. Regional Setting

The site is located on the north end of Alameda Island, about 1200 feet south of the Oakland Inner Harbor Channel. In the early 1800s, about one third of the northern portion of Alameda was marshland, traversed by meandering tidal channels. The Mariner Warehouse site is entirely located within the area of former

marshland. Reclamation of the marshland by filling began in the late 1800s.

B. Surface Conditions

The site occupies an irregularly shaped parcel which lies between Webster Street (west), Webster Street (east) and Mariner Square Loop. The parcel is situated between the southern portals of the Webster and Posey Tubes which connect Alameda to Oakland.

The southern portion of the site has been recently developed and contains two 2-story brick and concrete office buildings. These two buildings are surrounded by asphalt driveways and parking areas which are separated by areas of landscaping.

The northern portion of the site is undeveloped and lies approximately two to three feet lower in elevation than the developed portion. The area is relatively void of vegetation and is enclosed by landscaped areas and paved roadways.

C. Subsurface Conditions

Test borings from this and previous investigations indicate that the site is blanketed by about 3 to 9 feet of fill. In general, the fill consists of medium dense clayey gravel. However, in some areas, the fill contains some silty clay. In general, the fill is relatively uniform in composition and does not contain appreciable debris.

The fill is underlain by a soft clayey silt containing occasional layers of loose silty sand. These soils are highly organic, compressible and are locally referred to as Bay Mud. The

silty sand layers likely represent old channels or sloughs which previously crossed the site.

The Bay Mud extends to depths of 85 to 95 feet and is underlain by stiff silty clays, medium dense to dense clayey sands, and relatively clean, dense to very dense sands and gravels. Detailed descriptions of the soils encountered in our borings/monitoring wells are presented on the Boring Logs Plates 2 through 4. Generalized cross sections showing soil conditions are presented on Plates 6 and 7. Plate 8 shows the location of the cross sections and the borings drilled during previous investigations.

D. Groundwater Conditions

Groundwater level data obtained during the study is presented in Table 1. The data indicates that groundwater exists about 4 to 8 feet below existing grades. The groundwater levels generally correspond to about Elevation 2.4 to -1.4 feet, MSL datum. The direction of groundwater flow is toward the north at a gradient which varies between approximately 0.5 and 1 percent.

IV ANALYTICAL TESTING

Selected soil and groundwater samples were analyzed by Curtis & Tompkins, Ltd., a laboratory certified by the DHS for hazardous waste and water testing. Chain-of-Custody Records are presented in Appendix B.

The analyses performed on selected soil and groundwater samples included tests for total extractable hydrocarbons (TEH), benzene, toluene, xylene, and ethylbenzene (BTXE), oil and grease (O&G), and polynuclear aromatic hydrocarbons (PNAs). The analytical results are presented in Tables 2 and 3 and summarized on Plates 9 and 10. Sample preparation and analytical test methods for the analyses are summarized in Appendix B.

VII DISCUSSION AND CONCLUSIONS

The results of our investigation indicate that relatively low concentrations of petroleum hydrocarbons are present in some of the soils beneath the previous remediation areas. The highest diesel concentration detected during our study was 42 mg/kg. Oil and grease concentrations up to 120 mg/kg were found. Three of the five samples analyzed contained no detectable concentrations of petroleum hydrocarbons. No detectable concentrations of total volatile hydrocarbons (gasoline) or benzene, toluene, ethylbenzene or xylenes (BTEX) were found in the borings. These results are consistent with our closure report. A sample obtained from the boring closest to the previous PNA remediation area, was analyzed for PNA's and no detectable concentrations were detected.

The groundwater at the site contains up to 200 to 300 ug/l of total extractable hydrocarbons (as diesel) and no detectable concentrations of total volatile hydrocarbons or BTEX. No detectable concentrations of polynuclear aromatics were found in

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LETTER OF TRANSMITTAL

TO: Mr. Ronald W. Doll
Attorney-at-Law
The John Beery Organization
2236 Mariner Square
Alameda, California 94501

DATE: October 30, 1992
PROJECT: Mariner Warehouse/Groundwater Investigation
SCI JOB NUMBER: 554.006

WE ARE SENDING YOU:

4 copies

- of our final report
- a draft of our report
- a Service Agreement
- a proposed scope of services
- specifications
- grading/foundation plans
- soil samples/groundwater samples
- an executed contract
- _____

- if you have any questions, please call
- for your review and comment
- please return an executed copy
- for geotechnical services
- with our comments
- with Chain of Custody documents
- for your use
- _____
- _____

REMARKS:

COPIES TO:

- ✓ (1) Ms. Juliet Shin, Alameda County Health Care Services Agency, 80 Swan Way, Room 350, Oakland, CA 94662-0901
- (1) Mr. Rich Hiatt, Regional Water Quality Control Board, 2101 Webster Street, Suite 500, Oakland, CA 94612

BY: Sean Carson
Sean O. Carson (SEA)

■ Subsurface Consultants, Inc.

the groundwater. The groundwater level data indicate that the gradient is generally toward the north (i.e. toward the Oakland Inner Harbor Channel).

LIMITATIONS

This groundwater assessment was intended to provide a preliminary means of evaluating groundwater quality. Contamination may exist in other areas of the site not investigated by SCI.

The conclusions drawn from this assessment are an expression of our professional opinion, and do not constitute a warranty or guaranty, either expressed or implied. Additional investigative work, if undertaken, may modify the conclusions presented herein, as additional information is generated.

SCI has performed this assessment in accordance with generally accepted standards of care which exist in Northern California at the time of this study. Please recognize that the definition and evaluation of environmental conditions is difficult and inexact. Judgements leading to conclusions and recommendations are generally made with an incomplete knowledge of the subsurface and/or historic conditions applicable to the site. In addition, the conclusions made herein reflect site conditions at the time of the investigation. These conditions may change with time and as such the conclusions may also change.

The conclusions and opinions presented herein may also be affected by rapid changes in the field of environmental engineering and the laws governing hazardous waste. The reader is advised to consult with SCI prior to acting upon the information provided.

Illustrations:

Plate 1	Site Plan
Plates 2 thru 4	Logs of Test Borings/Monitoring Wells
Plate 5	Unified Soil Classification System
Plate 6	Cross Section A-A'
Plate 7	Cross Section B-B'
Plate 8	Plan of Cross Sections and Previous Borings
Plate 9	Soil Contaminant Concentrations
Plate 10	Groundwater Conditions 9/11/92

Tables:

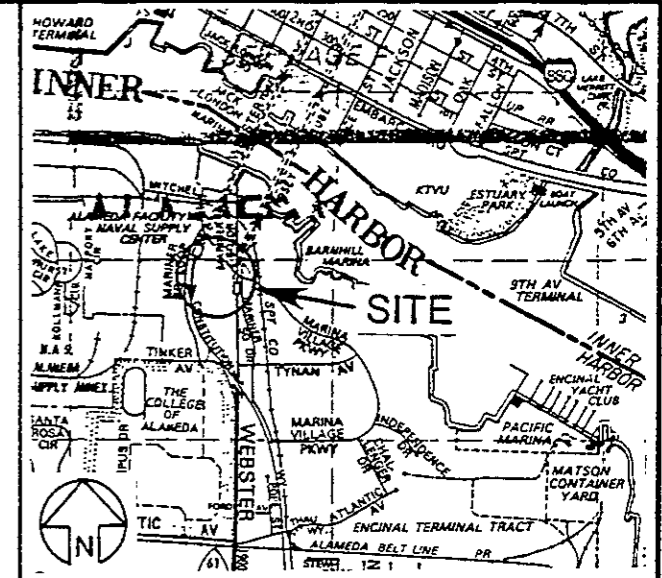
Table 1	- Groundwater Elevation Data
Table 2	- Contaminant Concentrations in Soil
Table 3	- Contaminant Concentrations in Water

Appendices:

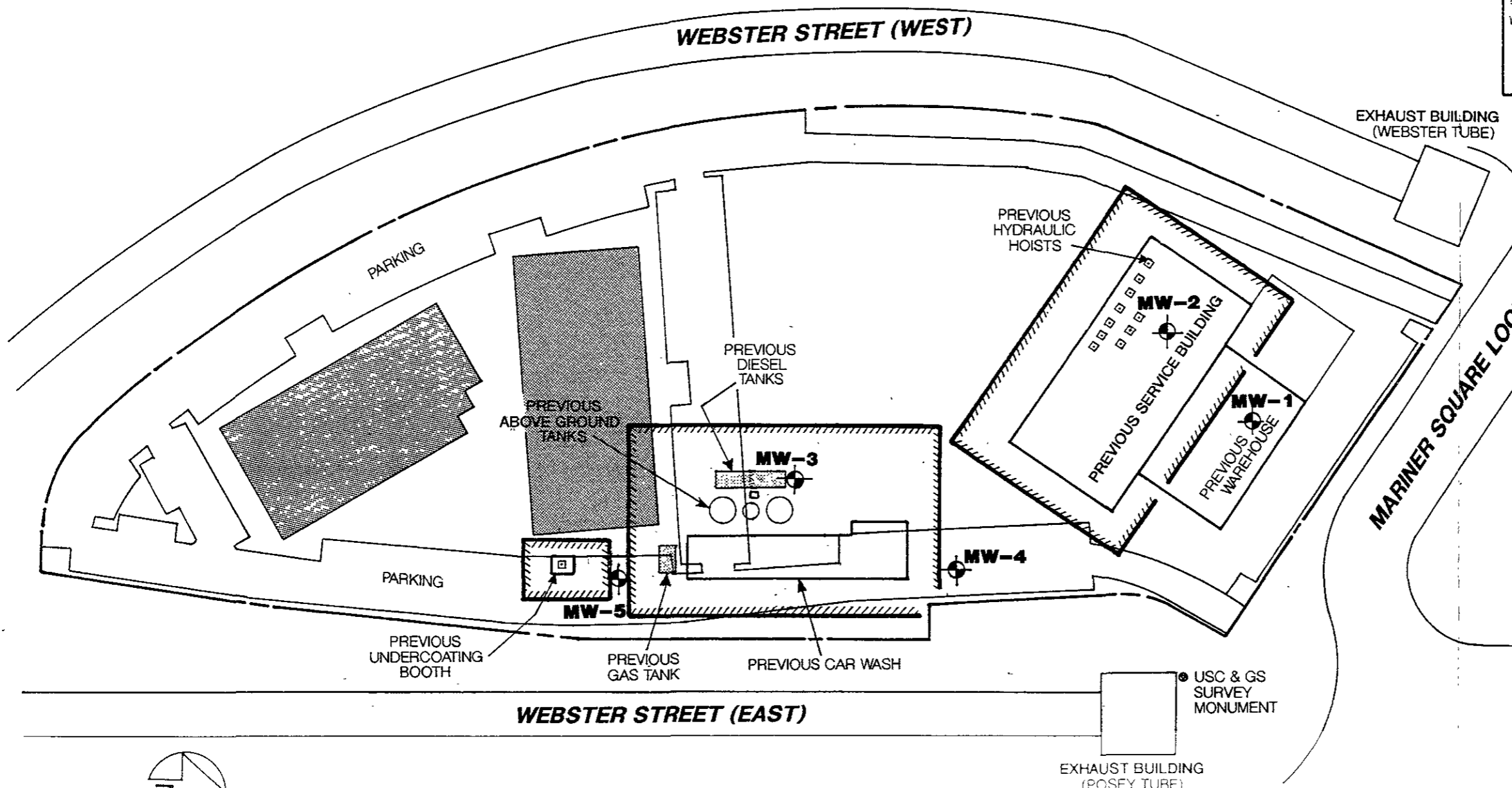
- A - Investigation Protocol
- B - Analytical Testing

Distribution:

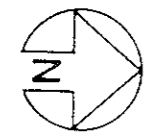
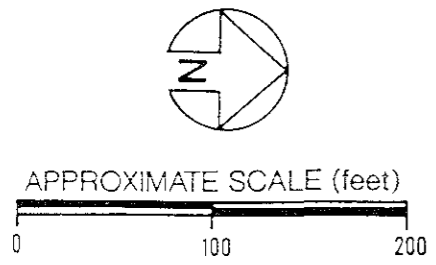
- 4 copies: Mr. Ronald W. Doll
Attorney at Law
The John Beery Organization
2236 Mariner Square
Alameda, California 94501
- 1 copy: Ms. Juliet Shin
Alameda County health Care Services Agency
80 Swan Way, Room 350
Oakland, California 94662-0901
- 1 copy: Mr. Rich Hiett
Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612



VICINITY MAP



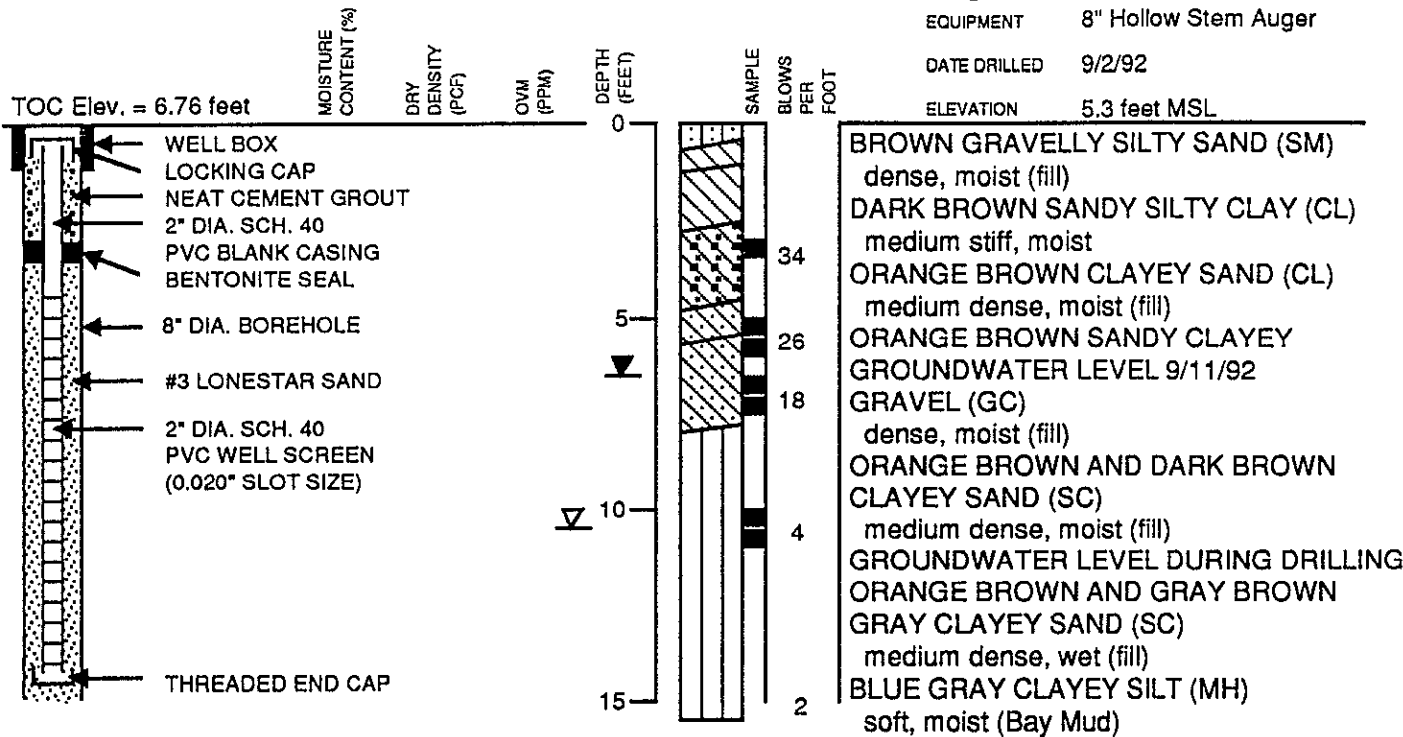
	MONITORING WELL LOCATIONS
	PREVIOUS TANK LOCATION
	EXTENT OF SOIL REMEDIATION
	EXISTING BUILDINGS
	PROPERTY LINE



SITE PLAN			PLATE 1
MARINER WAREHOUSE - ALAMEDA, CA			
JOB NUMBER 554.006	DATE 9/28/92	APPROVED <i>[Signature]</i>	

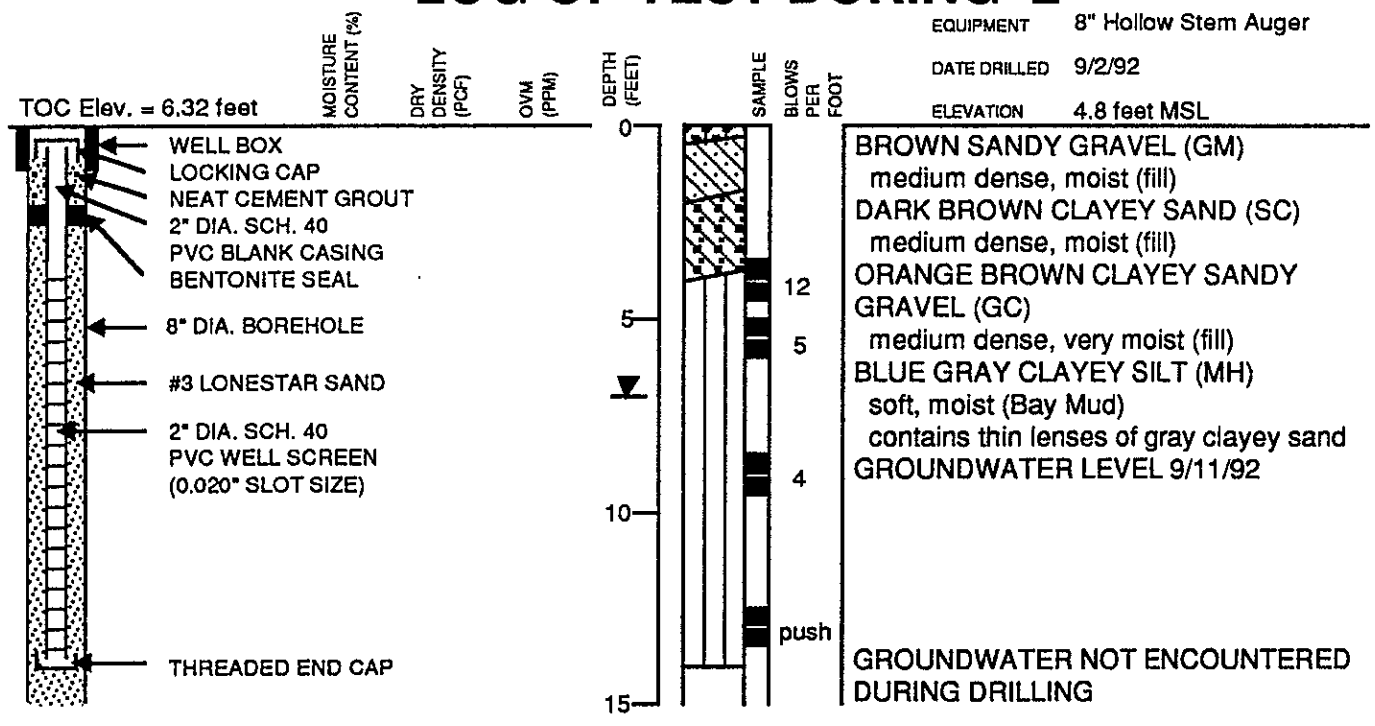
Subsurface Consultants

LOG OF TEST BORING 1



HAMMER WEIGHT: 140 pounds
HAMMER DROP: 30 inches

LOG OF TEST BORING 2

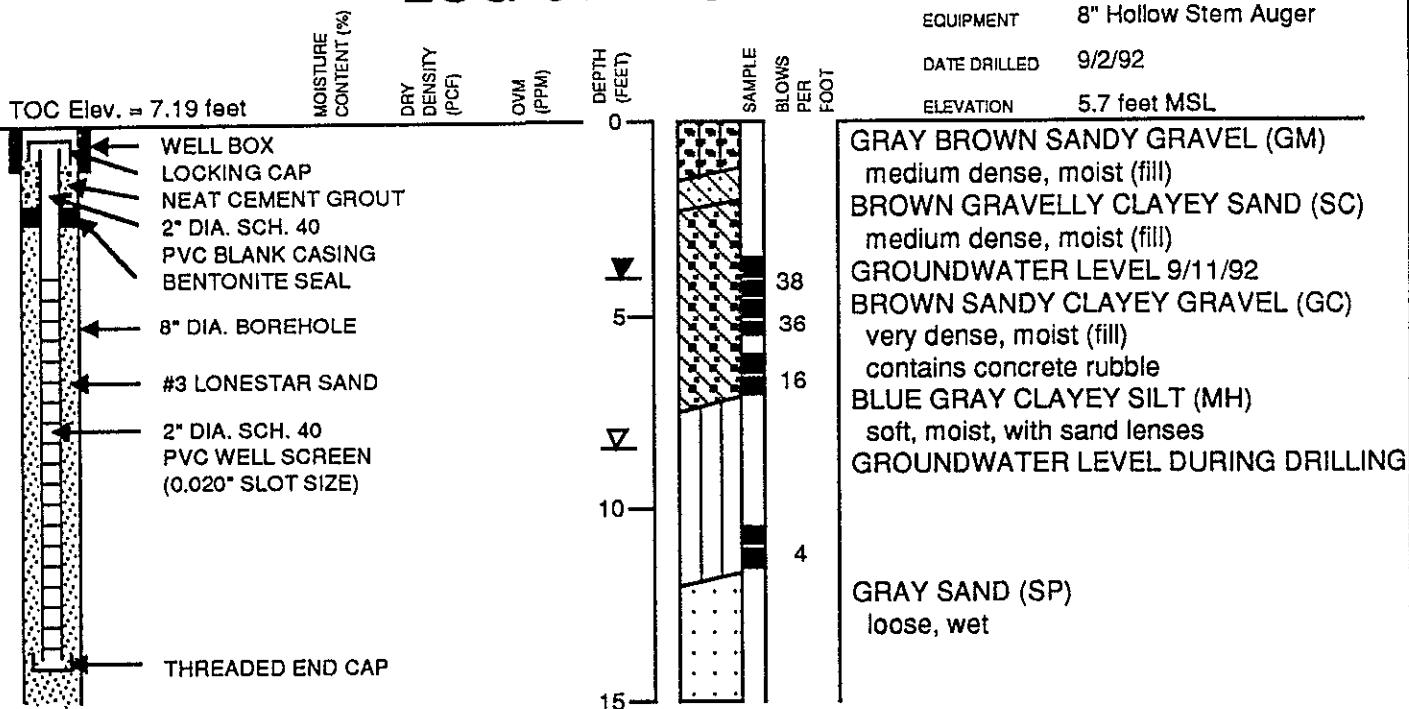


Subsurface Consultants

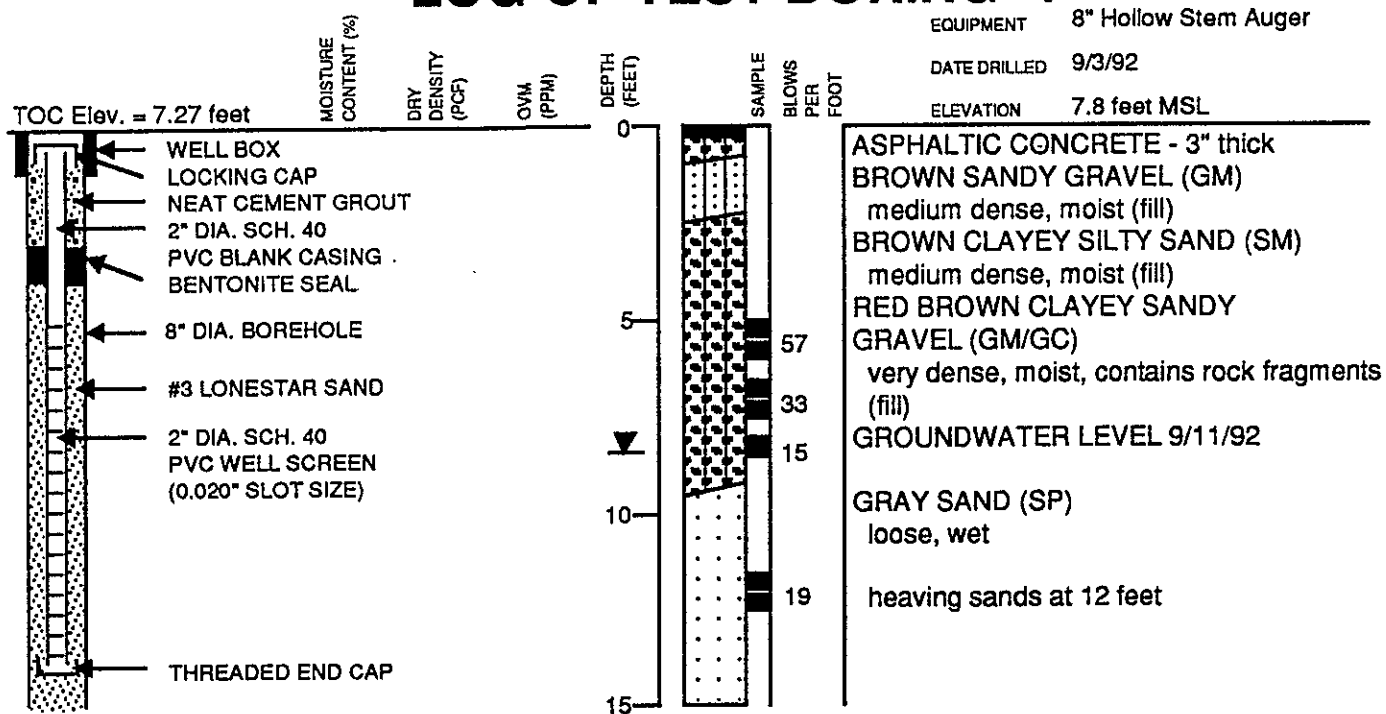
MARINER WAREHOUSE - ALAMEDA, CA
JOB NUMBER 554.006
DATE 9/15/92
APPROVED *[Signature]*

PLATE
2

LOG OF TEST BORING 3



LOG OF TEST BORING 4



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MARINER WAREHOUSE - ALAMEDA, CA

JOB NUMBER
554.006

DATE
9/15/92

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[Signature]

PLATE

3

LOG OF TEST BORING 5

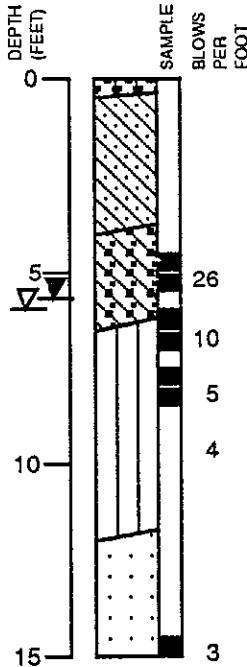
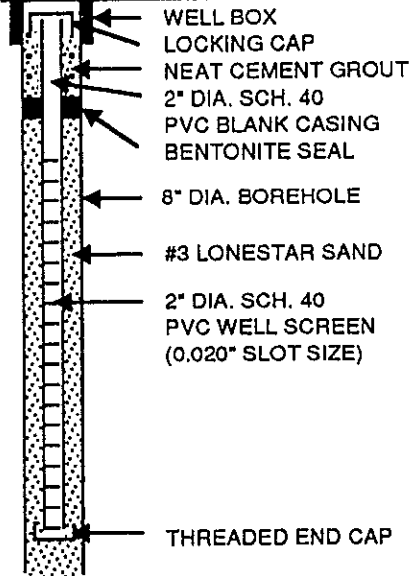
EQUIPMENT 8" Hollow Stem Auger

DATE DRILLED 9/3/92

ELEVATION 7.7 feet MSL

TOC Elec. = 7.22 feet

MOISTURE
CONTENT (%)
DRY
DENSITY
(PCF)
OVM
(PPM)



BROWN SANDY GRAVEL (GM)
dense, moist (fill)
ORANGE BROWN GRAVELLY CLAYEY SAND (SC)
medium dense, moist (fill)
ORANGE BROWN SANDY CLAYEY GRAVEL (GC)
dense, moist (fill)
GROUNDWATER LEVEL 9/11/92
GROUNDWATER LEVEL DURING DRILLING
BLUE GRAY CLAYEY SILT (MH)
soft, moist (Bay Mud)

GRAY SAND (SP)
loose, wet

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MARINER WAREHOUSE - ALAMEDA, CA

JOB NUMBER
554.006

DATE
9/15/92

APPROVED
[Signature]

PLATE

4

GENERAL SOIL CATEGORIES			SYMBOLS	TYPICAL SOIL TYPES
COARSE GRAINED SOILS More than half is larger than No. 200 sieve	GRAVEL More than half coarse fraction is larger than No. 4 sieve size	Clean Gravel with little or no fines	GW	Well Graded Gravel, Gravel-Sand Mixtures
			GP	Poorly Graded Gravel, Gravel-Sand Mixtures
		Gravel with more than 12% fines	GM	Silty Gravel, Poorly Graded Gravel-Sand-Silt Mixtures
			GC	Clayey Gravel, Poorly Graded Gravel-Sand-Clay Mixtures
	SAND More than half coarse fraction is smaller than No. 4 sieve size	Clean Sand with little or no fines	SW	Well Graded Sand, Gravelly Sand
			SP	Poorly Graded Sand, Gravelly Sand
		Sand with more than 12% fines	SM	Silty Sand, Poorly Graded Sand-Silt Mixtures
			SC	Clayey Sand, Poorly Graded Sand-Clay Mixtures
FINE GRAINED SOILS More than half is smaller than No. 200 sieve	SILT AND CLAY Liquid Limit Less than 50%	ML	Inorganic Silt and Very Fine Sand, Rock Flour, Silty or Clayey Fine Sand, or Clayey Silt with Slight Plasticity	
		CL	Inorganic Clay of Low to Medium Plasticity, Gravelly Clay, Sandy Clay, Silty Clay, Lean Clay	
		OL	Organic Clay and Organic Silty Clay of Low Plasticity	
	SILT AND CLAY Liquid Limit Greater than 50%	MH	Inorganic Silt, Micaceous or Diatomaceous Fine Sandy or Silty Soils, Elastic Silt	
		CH	Inorganic Clay of High Plasticity, Fat Clay	
		OH	Organic Clay of Medium to High Plasticity, Organic Silt	
HIGHLY ORGANIC SOILS			PT	Peat and Other Highly Organic Soils

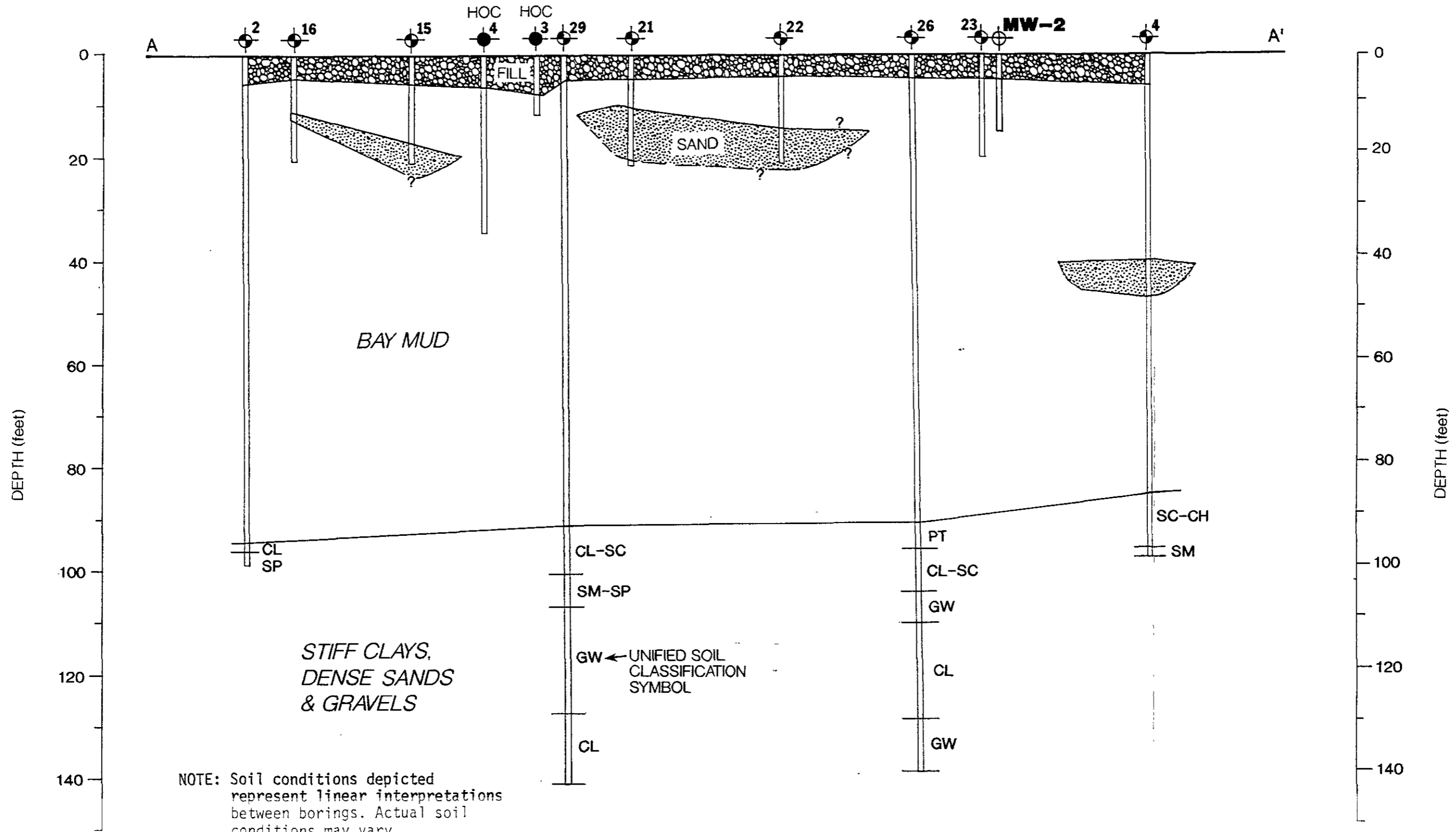
UNIFIED SOIL CLASSIFICATION SYSTEM

Subsurface Consultants

MARINER WAREHOUSE - ALAMEDA, CA

JOB NUMBER: 554.006 DATE: 9/15/92 APPROVED: *[Signature]*

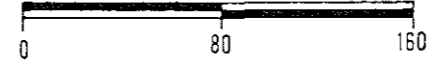
PLATE
5



NOTE: Soil conditions depicted represent linear interpretations between borings. Actual soil conditions may vary.

- TEST BORING BY SUBSURFACE CONSULTANTS
- TEST BORING BY OTHERS
- MONITORING WELL

APPROXIMATE HORIZONTAL SCALE (feet)

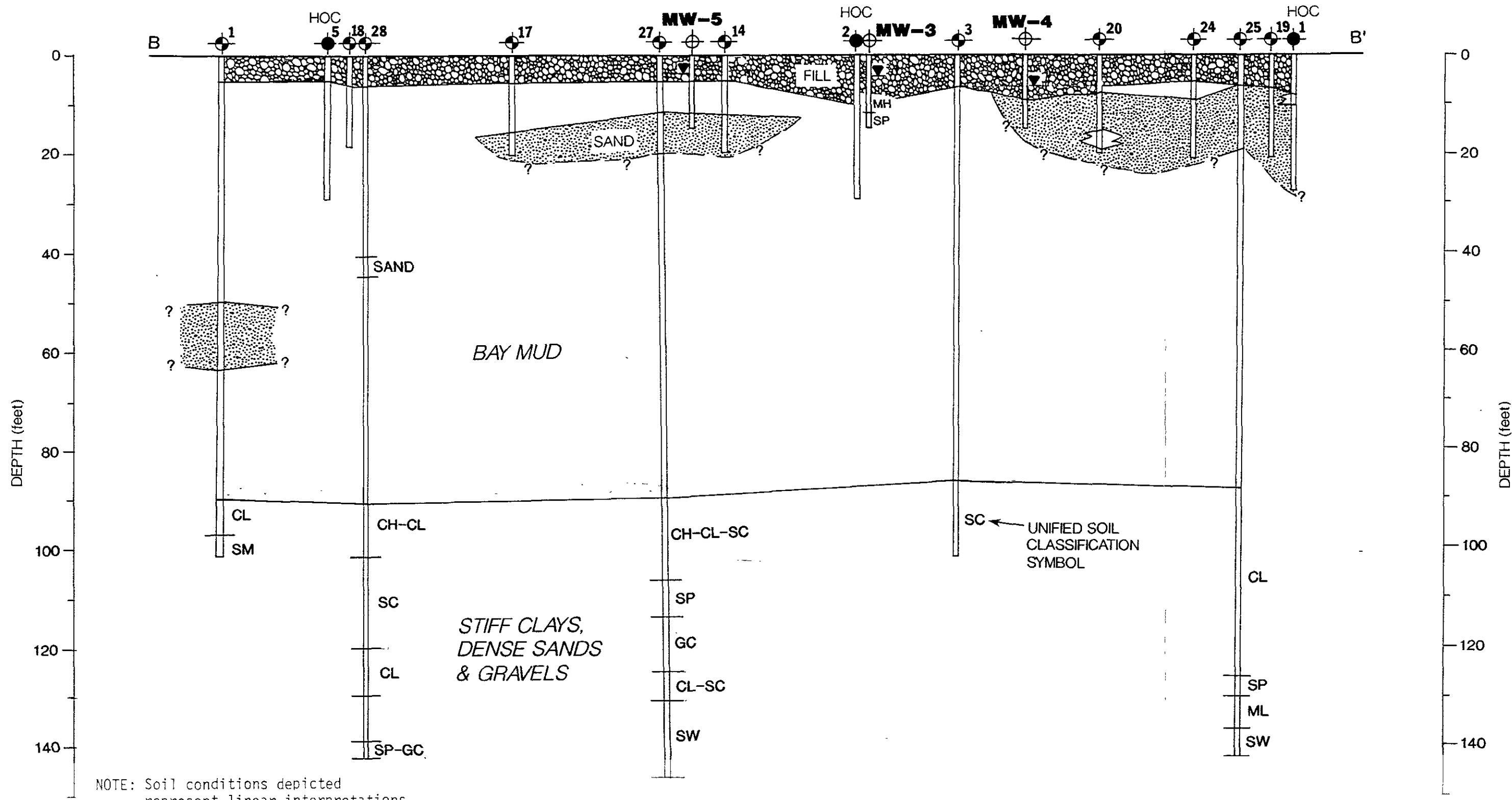


NOTE ALL SURFACE ELEVATIONS ARE ASSUMED

CROSS SECTION A-A'

Subsurface Consultants

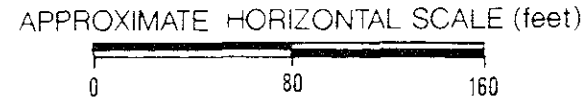
PARAGON GATEWAY - ALAMEDA CA			PLATE
JOB NUMBER	DATE	APPROVED	6
190.005	12/13/89	JVB	



NOTE: Soil conditions depicted represent linear interpretations between borings. Actual soil conditions may vary.

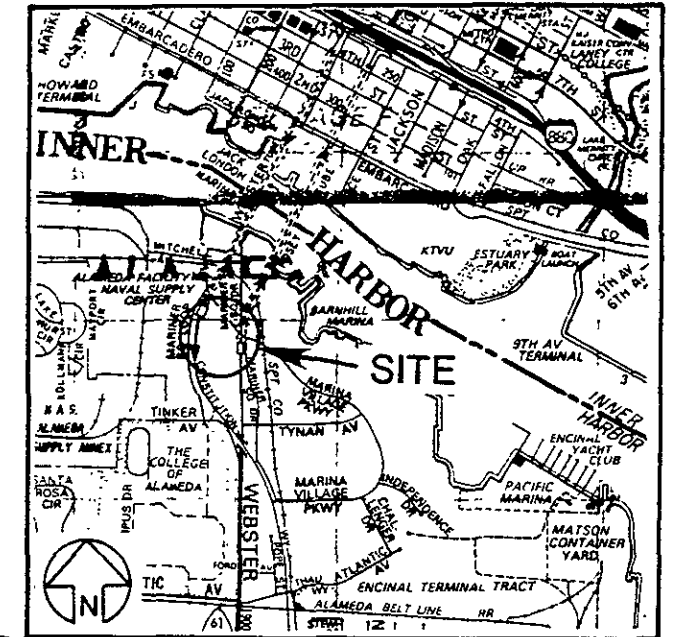
NOTE ALL SURFACE ELEVATIONS ARE ASSUMED

- ⊙ TEST BORING BY SUBSURFACE CONSULTANTS
- TEST BORING BY OTHERS
- ⊕ MONITORING WELL

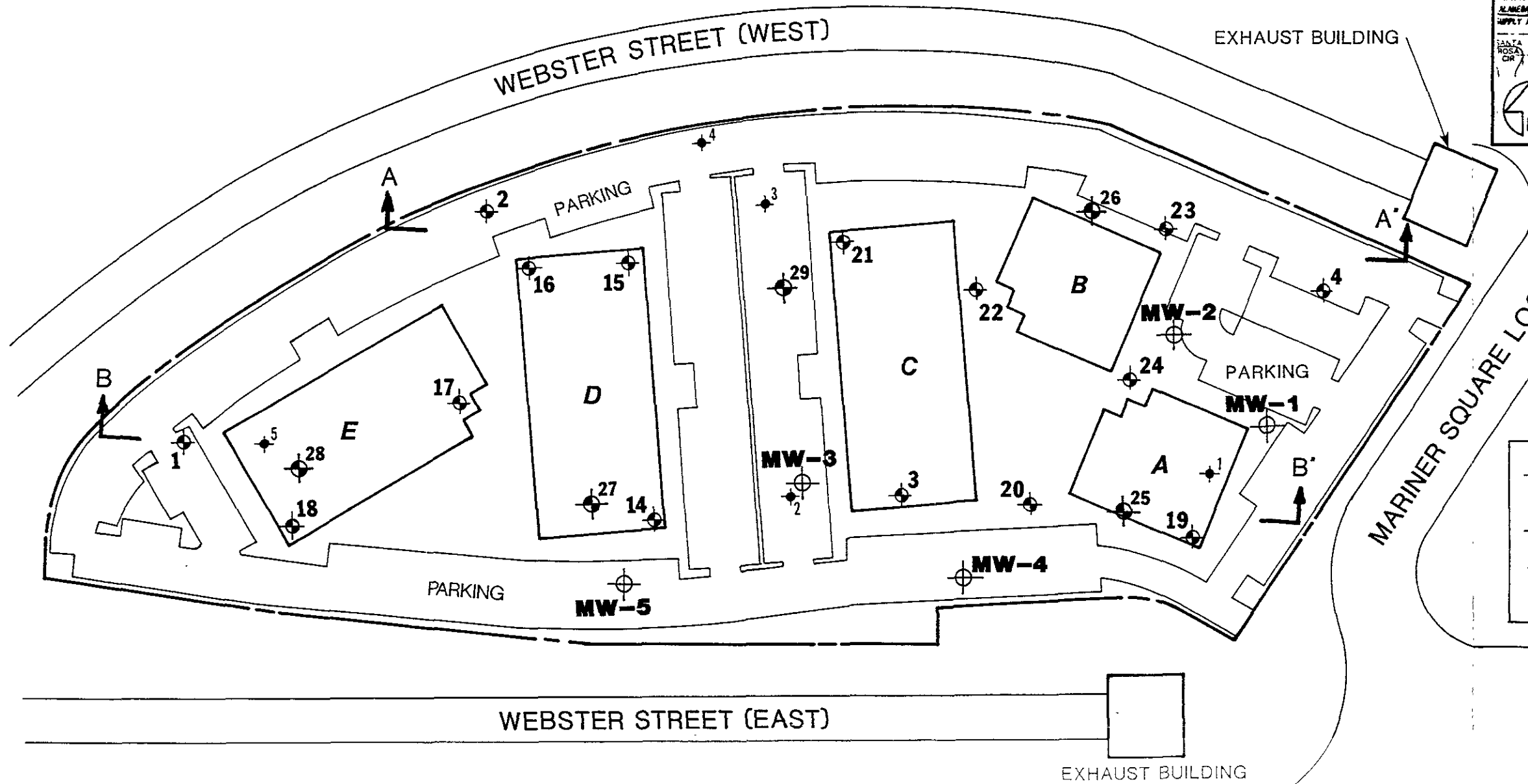


CROSS SECTION B-B'		
PARAGON GATEWAY - ALAMEDA, CA		
JOB NUMBER 190 005	DATE 12/13/89	APPROVED JVS
		PLATE 7

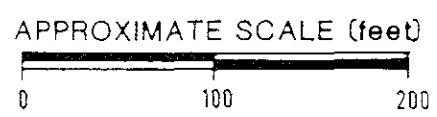
Subsurface Consultants



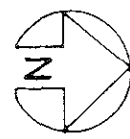
VICINITY MAP



- TEST BORING BY SUBSURFACE CONSULTANTS
- TEST BORING BY OTHERS
- CROSS SECTION (See plates 39 & 40)

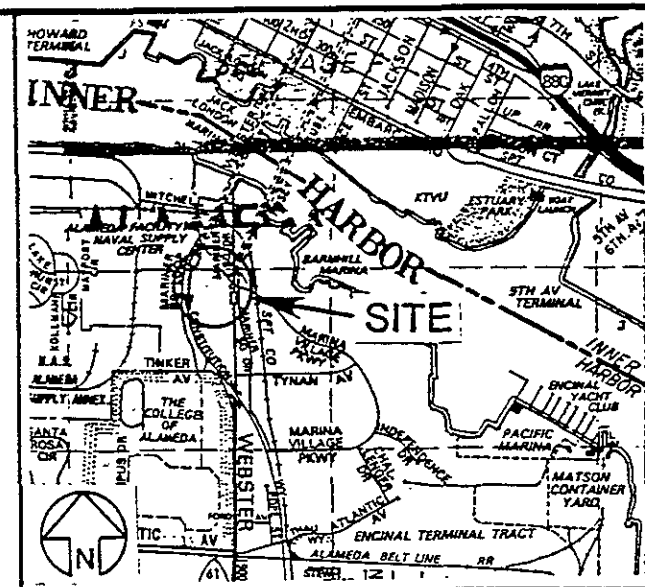


REFERENCE: Site Plan Scheme D by Hornberger Worstell & Associates, dated 2/21/89.



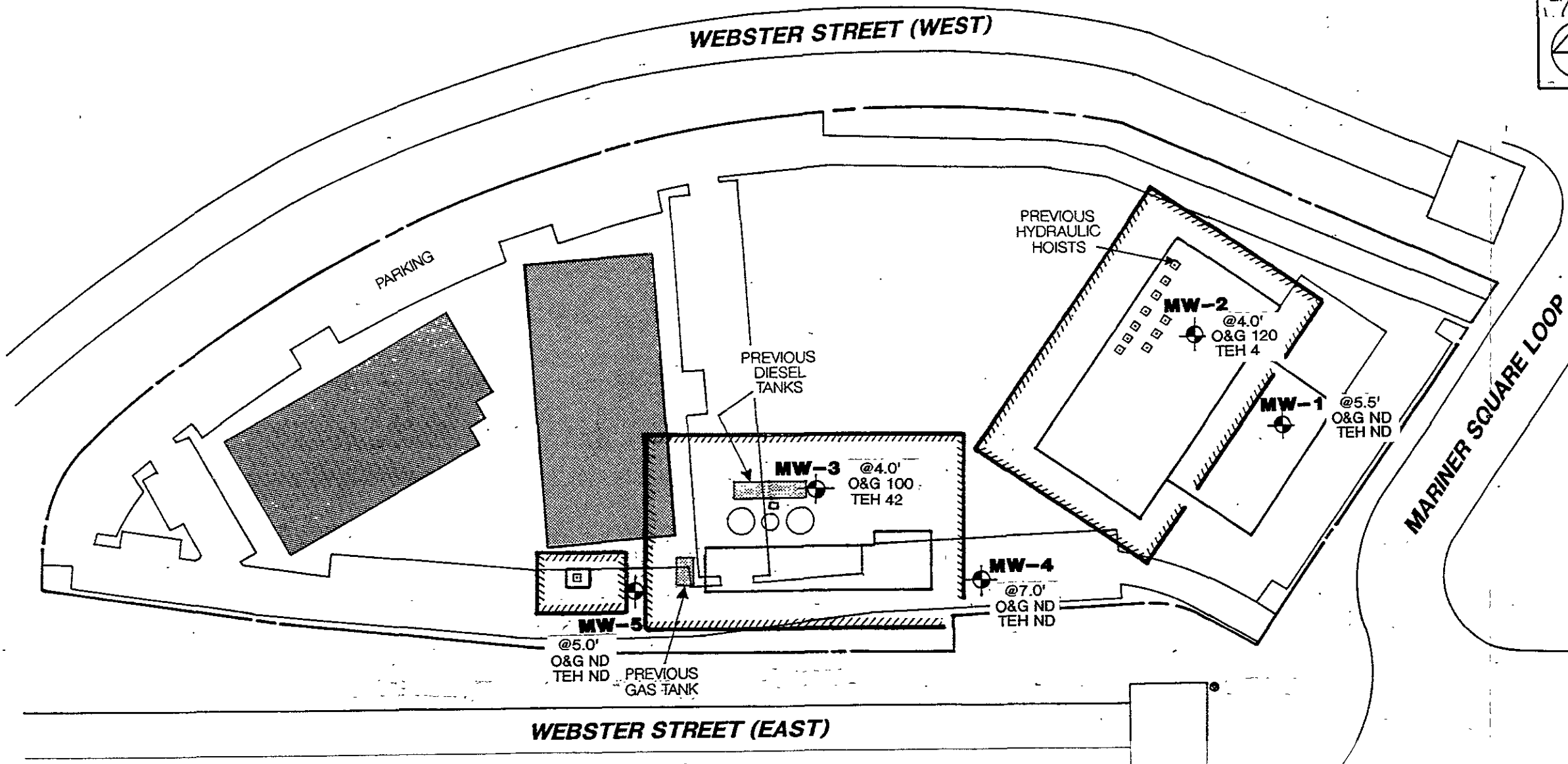
PLAN OF CROSS SECTIONS AND PREVIOUS BORINGS			PLATE 8
PARAGON GATEWAY - ALAMEDA, CA			
JOB NUMBER 190.005	DATE 2/22/89	APPROVED 	

Subsurface Consultants



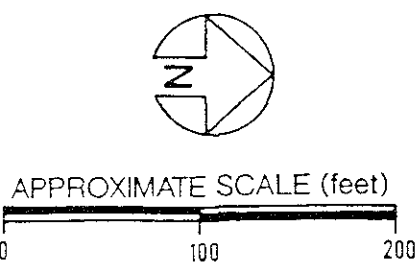
VICINITY MAP

→ Gradient



	MONITORING WELL LOCATIONS
	PREVIOUS TANK LOCATION
	EXTENT OF SOIL REMEDIATION
	EXISTING BUILDINGS
	PROPERTY LINE
O&G	OIL & GREASE (mg/kg)
TEH	TOTAL EXTRACTABLE HYDROCARBONS (ug/l)
PNA's	POLYNUCLEAR AROMATICS (ug/kg)

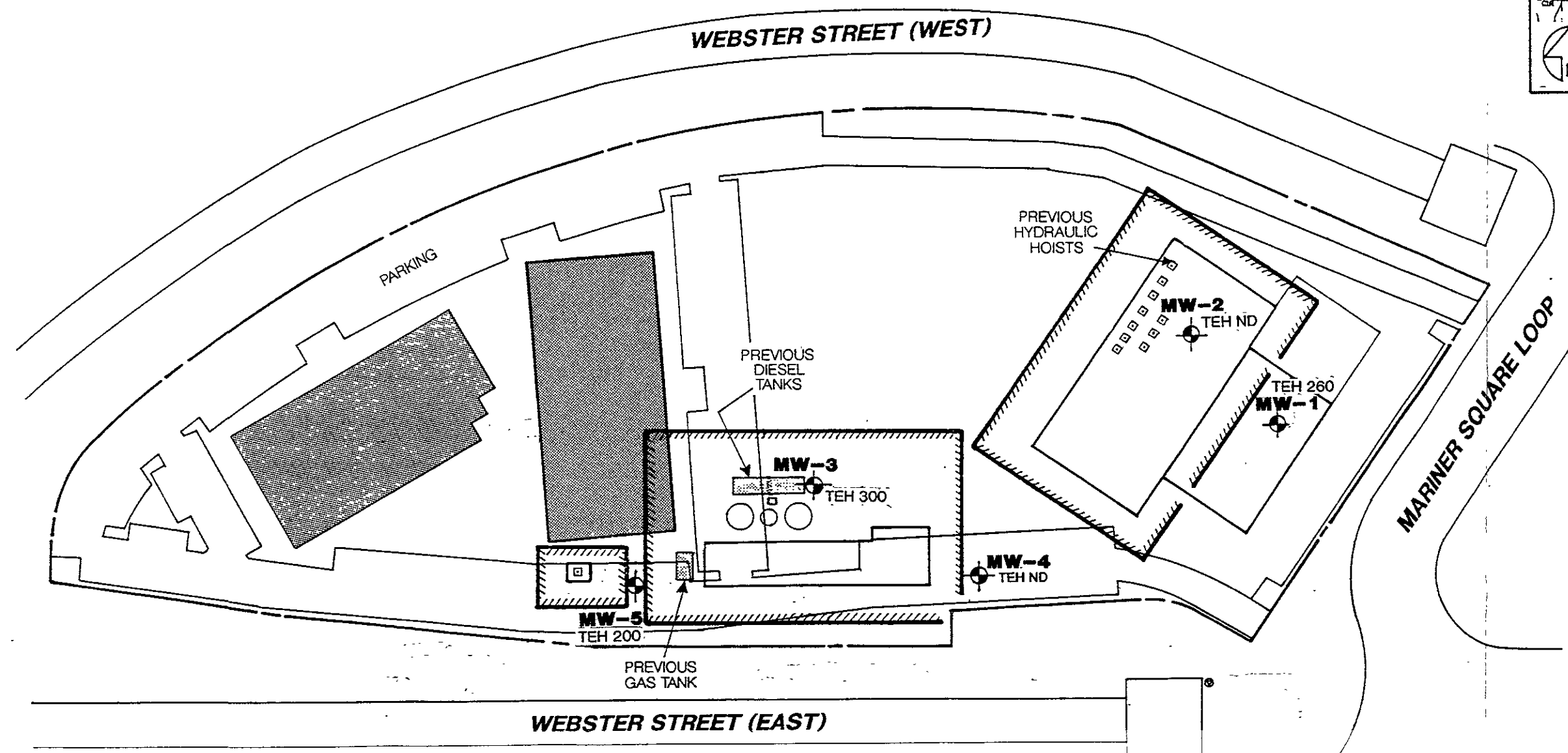
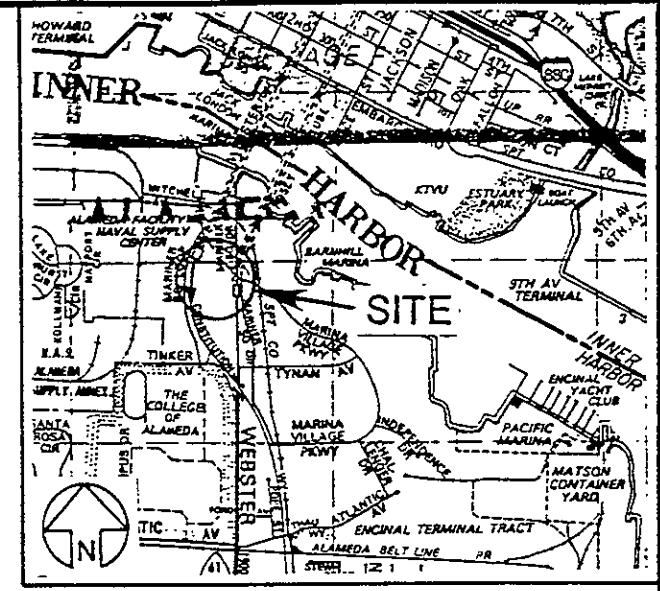
NO DETECTABLE AMOUNTS OF BENZENE, TOLUENE, ETHYL-BENZENE OR XYLENES WERE FOUND IN ANY OF THE SAMPLES TESTED FROM THE BORINGS



SOIL CONTAMINANT CONCENTRATIONS

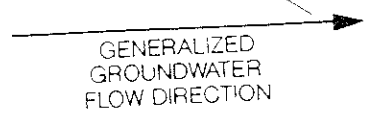
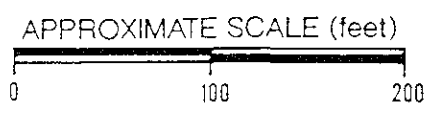
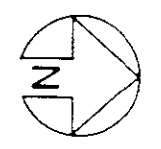
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MARINER WAREHOUSE - ALAMEDA, CA			PLATE
JOB NUMBER	DATE	APPROVED	9
554.006	9/28/92	<i>SR</i>	



- MONITORING WELL LOCATIONS
- PREVIOUS TANK LOCATION
- EXTENT OF SOIL REMEDIATION
- EXISTING BUILDINGS
- PROPERTY LINE
- APPROXIMATE GROUNDWATER CONTOUR
- TEH TOTAL EXTRACTABLE HYDROCARBONS (ug/l)

NO DETECTABLE CONCENTRATIONS OF TOTAL VOLATILE HYDROCARBONS, BENZENE, TOLUENE, ETHYL-BENZENE, XYLENES AND POLYNUCLEAR AROMATICS WERE FOUND IN ANY OF THE WELLS



GROUNDWATER CONDITIONS
9/11/92

Subsurface Consultants	MARINER WAREHOUSE - ALAMEDA, CA		PLATE 10
	JOB NUMBER 554.006	DATE 9/28/92	APPROVED

TABLE 1.
Groundwater Elevation Data

<u>Well</u>	<u>Date</u>	<u>TOC Elev (ft)</u>	<u>Groundwater Depth (ft)</u>	<u>Groundwater Elevation (ft)</u>
MW-1	9/4/92	6.76	8.06	-1.30
	9/8/92		8.02	-1.26
	9/11/92		8.11	-1.35
MW-2	9/4/92	6.32	8.72	-2.40
	9/8/92		6.33	-0.01
	9/11/92		8.65	-2.33
MW-3	9/4/92	7.19	5.60	1.59
	9/8/92		5.45	1.74
	9/11/92		5.50	1.69
MW-4	9/4/92	7.27	7.86	-0.59
	9/8/92		7.84	-0.57
	9/11/92		7.91	-0.64
MW-5	9/4/92	7.22	3.26	3.96
	9/8/92		5.10	2.12
	9/11/92		5.12	2.10

TOC = Top of Casing
Elevation with respect to Mean Sea Level

TABLE 2.
Contaminant Concentrations in Soil

<u>Sample ID</u>	<u>Oil and Grease mg/kg</u>	<u>TEH mg/kg</u>	<u>TVH ug/kg</u>	<u>B ug/kg</u>	<u>T ug/kg</u>	<u>E ug/kg</u>	<u>Polynuclear Aromatics ug/kg</u>
MW-1 @ 5.5'	<50	<1	<1	<1	<1	<1	<300
MW-2 @ 4.0'	120	4	<1	<1	<1	<1	-
MW-3 @ 4.0'	100	42	<1	<1	<1	<1	-
MW-4 @ 7.0'	<50	<1	<1	<1	<1	<1	-
MW-5 @ 5.0'	<50	<1	<1	<1	<1	<1	-

TABLE 3.
Contaminant Concentrations in Groundwater

<u>Sample ID</u>	<u>TEH ug/l</u>	<u>TVH ug/l</u>	<u>Benzene ug/l</u>	<u>Toluene ug/l</u>	<u>Ethyl-Benzene ug/l</u>	<u>Xylenes ug/l</u>	<u>Polynuclear Aromatics ug/l</u>
MW-1	260	<50	<0.5	<0.5	<0.5	<0.5	<5
MW-2	<50	<50	<0.5	<0.5	<0.5	<0.5	<5
MW-3	300	<50	<0.5	<0.5	<0.5	<0.5	<5
MW-4	<50	<50	<0.5	<0.5	<0.5	<0.5	<5
MW-5	200	<50	<0.5	<0.5	<0.5	<0.5	<5

TEH = total extractable hydrocarbons, EPA 8015/3550

TVH = total volatile hydrocarbons, EPA 8020, 3550

mg/kg = milligrams per kilogram or parts per million (ppm)

ug/kg = micrograms per kilogram or parts per billion (ppb)

mg/l = milligrams per liter or parts per billion (ppb)

ug/l = micrograms per liter or parts per billion (ppb)

ND = None detected above reporting limits indicated in parentheses.

APPENDIX A
INVESTIGATION PROTOCOL

A. Test Borings

The test borings were drilled using a truck-mounted drill rig equipped with 8-inch diameter hollow stem augers. Our field geologist observed drilling operations, prepared detailed logs of the test borings and obtained undisturbed samples of the materials encountered. Test boring logs are presented on Plates 2 through 4. Soils are classified in accordance with the Unified Soil Classification System described on Plate 5.

A Modified California Sampler (outside diameter of 3.0 inches, inside diameter of 2.5 inches) and California Drive Sampler (outside diameter of 2.5 inches, inside diameter of 2.0 inches) were used to obtain soil samples. The number of blows required to drive the sampler the final 12 inches of each 18-inch penetration was recorded and are presented on the test boring logs. Drilling and sampling equipment was thoroughly steam-cleaned prior to each use to reduce the likelihood of cross-contamination between samples and/or borings.

Soil samples were retained in 2.0-inch and 2.5-inch-diameter brass liners. Teflon sheeting was placed over the ends of the soil liners; the liners were subsequently capped and sealed with duct tape. The shoe sample from each drive was retained in a plastic bag and screened for volatile organics using an Organic Vapor Meter (OVM). The sealed liners were placed in ice-filled coolers and

remained iced until delivery to the analytical laboratory. Chain-of-custody records accompanied the samples. Soil cuttings generated during drilling were stockpiled on-site.

B. Groundwater Monitoring Wells

At the completion of drilling, a monitoring well was installed in each test boring. Well schematics are shown on the respective test boring logs. In general, the wells consist of 2-inch diameter, Schedule 40 PVC well casing having flush-threaded joints. The well casing was steam-cleaned prior to being placed in the borehole.

The lower 10 feet of each well consists of machine-slotted well screen having 0.020-inch slots. The remaining portion of the well consists of blank casing. Each well is provided with a threaded bottom cap and locking top cap. The well screen is encased in a filter composed of Lonestar No. 3 washed sand. The filter sand was placed by carefully pouring it through the annulus between the hollow stem of the auger and the well casing. Periodically, the augers were raised to allow the sand to fill the annulus between the casing and the borehole. The filter extends from just below the bottom of the well to at least one half foot above the top of the screened section. Bentonite pellets were placed to approximately 6 inches above the sand filter. The annulus above the bentonite pellets was backfilled with cement grout. The grout mixture consists of Portland cement mixed with clean water. Each monitoring well was completed below grade and is protected by a traffic-rated valve box.

The wells were developed after the grout seal had hardened. The depth to water was measured below the top of the well casing using an electronic sounder and/or steel tape with water sensitive paste. The wells were then developed by removing water with a new disposable bailer. Approximately 30 to 55 gallons of water were removed from each well. The wells were sampled 24 hours after development. Prior to sampling the wells were purged of about five gallons of water. When the wells had recharged to within 80 percent of their initial levels they were sampled with a new disposable bailer. Well development and purge water were placed in a 55 gallon drums and left on-site for later disposal by others. Well development and purge logs are attached.

Groundwater samples were retained in chilled, pre-cleaned containers supplied by the laboratory. Water samples were placed in ice-filled coolers and remained iced until delivery to the analytical laboratory. Chain-of-custody records accompanied the samples to the laboratory.

Appendix A
Investigation Protocol

Appendix B
Analytical Testing

APPENDIX B

ANALYTICAL TESTING

Analytical testing services were provided by Curtis and Tompkins, a State of California Department of Health Services (DHS) certified laboratory for hazardous waste and water testing. The analytical tests were performed on individual samples. A summary of sample preparation and test methods are presented below.

<u>Test Analysis</u>	<u>Sample Preparation Method</u>	<u>Analysis Method</u>
Total Extractable Hydrocarbons	EPA 3550	EPA 8015 modified
Benzene, Toluene, Ethylbenzene, and Xylene	EPA 5030	EPA 8020
Polynuclear Aromatics	EPA 3510/3550	EPA 8270
Oil and Grease	EPA 3550	EPA 8015

Test results are summarized in Tables 4 and 5. Analytical test reports and Chain-of-Custody records are attached.



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

DATE RECEIVED: 09/14/92

DATE REPORTED: 09/30/92

LABORATORY NUMBER: 108629

CLIENT: SUBSURFACE CONSULTANTS

PROJECT ID: 554.006

LOCATION: MARINER WAREHOUSE

RESULTS: SEE ATTACHED

Reviewed by

Reviewed by

Berkeley

Los Angeles

LABORATORY NUMBER: 108629-1
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 554.006
 LOCATION: MARINER WAREHOUSE
 SAMPLE ID: MW1@5.5'

DATE SAMPLED: 09/02/92
 DATE RECEIVED: 09/14/92
 DATE EXTRACTED: 09/16/92
 DATE ANALYZED: 09/27/92
 DATE REPORTED: 09/30/92

Polynuclear Aromatic Hydrocarbons in Soils & Wastes by EPA 8270
 Extraction Method: EPA 3550

COMPOUND	RESULT	REPORTING LIMIT
	ug/Kg	ug/Kg
Naphthalene	ND	300
Acenaphthylene	ND	300
Acenaphthene	ND	300
Fluorene	ND	300
Phenanthrene	ND	300
Anthracene	ND	300
Fluoranthene	ND	300
Pyrene	ND	300
Benzo(a)anthracene	ND	300
Chrysene	ND	300
Benzo(b)fluoranthene	ND	300
Benzo(k)fluoranthene	ND	300
Benzo(a)pyrene	ND	300
Indeno(1,2,3-cd)pyrene	ND	300
Dibenzo(a,h)anthracene	ND	300
Benzo(g,h,i)perylene	ND	300

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

Nitrobenzene-d5	82 %
2-Fluorobiphenyl	94 %
Terphenyl-d14	90 %

LABORATORY NUMBER: 108629
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 554.006
 LOCATION: MARINER WAREHOUSE

DATE SAMPLED: 09/02,03/92
 DATE RECEIVED: 09/14/92
 DATE ANALYZED: 09/16/92
 DATE REPORTED: 09/25/92

Total Volatile Hydrocarbons with BTXE in Soils & Wastes
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (mg/Kg)	BENZENE (ug/Kg)	TOLUENE (ug/Kg)	ETHYL BENZENE (ug/Kg)	TOTAL XYLENES (ug/Kg)
108629-1	MW1@5.5'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
108629-2	MW2@4.0'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
108629-3	MW3@4.0'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
108629-4	MW4@7.0'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)
108629-5	MW5@5.0'	ND(1)	ND(5)	ND(5)	ND(5)	ND(5)

ND = Not detected at or above reporting limit; Reporting limit
 indicated in parentheses.

QA/QC SUMMARY

=====
 RPD, % <1
 RECOVERY, % 100
 =====

LABORATORY NUMBER: 108629
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 554.006
 LOCATION: MARINER WAREHOUSE

DATE SAMPLED: 09/02,03/92
 DATE RECEIVED: 09/14/92
 DATE EXTRACTED: 09/14/92
 DATE ANALYZED: 09/17/92
 DATE REPORTED: 09/25/92

Extractable Petroleum Hydrocarbons in Soils & Wastes
 California DOHS Method
 LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
108629-1	MW1@5.5'	ND	ND	1
108629-2	MW2@4.0'	ND	4	1
108629-3	MW3@4.0'	**	42	1
108629-4	MW4@7.0'	ND	ND	1
108629-5	MW5@5.0'	ND	ND	1

ND = Not Detected at or above reporting limit.

* Reporting limit applies to all analytes.

**Kerosene range not reported. Quantitated as diesel range.

QA/QC SUMMARY

```

=====
RPD, %                                15
RECOVERY, %                            57
=====
  
```



Client: Subsurface Consultants

Laboratory Login Number: 108629

Project Name: Mariner Warehouse
Project Number: 554.006

Report Date: 25 September 92

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) METHOD: SMWW 17:5520EF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
108629-001	MW1 @ 5.5'	Soil	02-SEP-92	14-SEP-92	21-SEP-92	ND	mg/Kg	50	TR	6768
108629-002	MW2 @ 4.0'	Soil	02-SEP-92	14-SEP-92	21-SEP-92	120	mg/Kg	50	TR	6768
108629-003	MW3 @ 4.0'	Soil	02-SEP-92	14-SEP-92	21-SEP-92	100	mg/Kg	50	TR	6768
108629-004	MW4 @ 7.0'	Soil	03-SEP-92	14-SEP-92	21-SEP-92	ND	mg/Kg	50	TR	6768
108629-005	MW5 @ 5.0'	Soil	03-SEP-92	14-SEP-92	21-SEP-92	ND	mg/Kg	50	TR	6768

ND = Not Detected at or above Reporting Limit (RL).



Q C B a t c h R e p o r t

Client: Subsurface Consultants
Project Name: Mariner Warehouse
Project Number: 554.006

Laboratory Login Number: 108629
Report Date: 25 September 92

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric)

QC Batch Number: 6768

Blank Results

Sample ID	Result	MDL	Units	Method	Date Analyzed
BLANK	ND	50	mg/Kg	SMWW 17:5520EF	21-SEP-92

Spike/Duplicate Results

Sample ID	Recovery	Method	Date Analyzed
BS	87%	SMWW 17:5520EF	21-SEP-92
BSD	82%	SMWW 17:5520EF	21-SEP-92

		Control Limits
Average Spike Recovery	84%	80% - 120%
Relative Percent Difference	5.7%	< 20%



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

DATE RECEIVED: 09/11/92
DATE REPORTED: 09/25/92

LABORATORY NUMBER: 108623

CLIENT: SUBSURFACE CONSULTANTS

PROJECT ID: 554.006

LOCATION: MARINER WAREHOUSE

RESULTS: SEE ATTACHED

Reviewed by

LABORATORY NUMBER: 108623
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 554.006
 LOCATION: MARINER WAREHOUSE

DATE SAMPLED: 09/11/92
 DATE RECEIVED: 09/11/92
 DATE ANALYZED: 09/15-16/92
 DATE REPORTED: 09/25/92

Total Volatile Hydrocarbons with BTXE in Aqueous Solutions
 TVH by California DOHS Method/LUFT Manual October 1989
 BTXE by EPA 5030/8020

LAB ID	SAMPLE ID	TVH AS GASOLINE (ug/L)	BENZENE (ug/L)	TOLUENE (ug/L)	ETHYL BENZENE (ug/L)	TOTAL XYLENES (ug/L)
108623-1	MW-1	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
108623-2	MW-2	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
108623-3	MW-3	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
108623-4	MW-4	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
108623-5	MW-5	ND(50)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)

ND = Not detected at or above reporting limit; Reporting limit
 indicated in parentheses.

QA/QC SUMMARY

RPD, %	13
RECOVERY, %	91



LABORATORY NUMBER: 108623
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 554.006
LOCATION: MARINER WAREHOUSE

DATE SAMPLED: 09/11/92
DATE RECEIVED: 09/11/92
DATE EXTRACTED: 09/18/92
DATE ANALYZED: 09/22/92
DATE REPORTED: 09/23/92

Extractable Petroleum Hydrocarbons in Aqueous Solutions
California DOHS Method
LUFT Manual October 1989

LAB ID	CLIENT ID	KEROSENE RANGE (ug/L)	DIESEL RANGE (ug/L)	REPORTING LIMIT* (ug/L)
108623-1	MW-1	ND	260	50
108623-2	MW-2	ND	ND	50
108623-3	MW-3	**	300	50
108623-4	MW-4	ND	ND	50
108623-5	MW-5	ND	200	50

ND = Not detected at or above reporting limit.

* Reporting limit applies to all analytes.

** Quantitated as diesel range.

QA/QC SUMMARY

RPD, %	8
RECOVERY, %	66

LABORATORY NUMBER: 108623-1
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 554.006
 LOCATION: MARINER WAREHOUSE
 SAMPLE ID: MW-1

DATE SAMPLED: 09/11/92
 DATE RECEIVED: 09/11/92
 DATE EXTRACTED: 09/16/92
 DATE ANALYZED: 09/16/92
 DATE REPORTED: 09/25/92

Polynuclear Aromatic Hydrocarbons in Water by Epa Method 8270
 Extraction Method: EPA 3510

COMPOUND	RESULTS ug/L	REPORTING LIMIT ug/L
Naphthalene	ND	5
Acenaphthylene	ND	5
Acenaphthene	ND	5
Fluorene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Pyrene	ND	5
Benzo(a)anthracene	ND	5
Chrysene	ND	5
Benzo(b)fluoranthene	ND	5
Benzo(k)fluoranthene	ND	5
Fluoranthene	ND	5
Benzo(a)pyrene	ND	5
Indeno(1,2,3-cd)pyrene	ND	5
Dibenzo(a,h)anthracene	ND	5
Benzo(g,h,i)perylene	ND	5

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

Nitrobenzene-d5	79 %
2-Fluorobiphenyl	73 %
Terphenyl-d14	78 %

LABORATORY NUMBER: 108623-2
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 554.006
 LOCATION: MARINER WAREHOUSE
 SAMPLE ID: MW-2

DATE SAMPLED: 09/11/92
 DATE RECEIVED: 09/11/92
 DATE EXTRACTED: 09/16/92
 DATE ANALYZED: 09/16/92
 DATE REPORTED: 09/25/92

Polynuclear Aromatic Hydrocarbons in Water by Epa Method 8270
 Extraction Method: EPA 3510

COMPOUND	RESULTS ug/L	REPORTING LIMIT ug/L
Naphthalene	ND	5
Acenaphthylene	ND	5
Acenaphthene	ND	5
Fluorene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Pyrene	ND	5
Benzo(a)anthracene	ND	5
Chrysene	ND	5
Benzo(b)fluoranthene	ND	5
Benzo(k)fluoranthene	ND	5
Fluoranthene	ND	5
Benzo(a)pyrene	ND	5
Indeno(1,2,3-cd)pyrene	ND	5
Dibenzo(a,h)anthracene	ND	5
Benzo(g,h,i)perylene	ND	5

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

Nitrobenzene-d5	77 %
2-Fluorobiphenyl	74 %
Terphenyl-d14	77 %

LABORATORY NUMBER: 108623-3
 CLIENT: SUBSURFACE CONSULTANTS
 PROJECT ID: 554.006
 LOCATION: MARINER WAREHOUSE
 SAMPLE ID: MW-3

DATE SAMPLED: 09/11/92
 DATE RECEIVED: 09/11/92
 DATE EXTRACTED: 09/16/92
 DATE ANALYZED: 09/16/92
 DATE REPORTED: 09/25/92

Polynuclear Aromatic Hydrocarbons in Water by Epa Method 8270
 Extraction Method: EPA 3510

COMPOUND	RESULTS ug/L	REPORTING LIMIT ug/L
Naphthalene	ND	5
Acenaphthylene	ND	5
Acenaphthene	ND	5
Fluorene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Pyrene	ND	5
Benzo(a)anthracene	ND	5
Chrysene	ND	5
Benzo(b)fluoranthene	ND	5
Benzo(k)fluoranthene	ND	5
Fluoranthene	ND	5
Benzo(a)pyrene	ND	5
Indeno(1,2,3-cd)pyrene	ND	5
Dibenzo(a,h)anthracene	ND	5
Benzo(g,h,i)perylene	ND	5

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

Nitrobenzene-d5	75 %
2-Fluorobiphenyl	75 %
Terphenyl-d14	77 %



LABORATORY NUMBER: 108623-4
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 554.006
LOCATION: MARINER WAREHOUSE
SAMPLE ID: MW-4

DATE SAMPLED: 09/11/92
DATE RECEIVED: 09/11/92
DATE EXTRACTED: 09/16/92
DATE ANALYZED: 09/16/92
DATE REPORTED: 09/25/92

Polynuclear Aromatic Hydrocarbons in Water by Epa Method 8270
Extraction Method: EPA 3510

COMPOUND	RESULTS ug/L	REPORTING LIMIT ug/L
Naphthalene	ND	5
Acenaphthylene	ND	5
Acenaphthene	ND	5
Fluorene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Pyrene	ND	5
Benzo(a)anthracene	ND	5
Chrysene	ND	5
Benzo(b)fluoranthene	ND	5
Benzo(k)fluoranthene	ND	5
Fluoranthene	ND	5
Benzo(a)pyrene	ND	5
Indeno(1,2,3-cd)pyrene	ND	5
Dibenzo(a,h)anthracene	ND	5
Benzo(g,h,i)perylene	ND	5

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

Nitrobenzene-d5	79 %
2-Fluorobiphenyl	78 %
Terphenyl-d14	80 %



LABORATORY NUMBER: 108623-5
CLIENT: SUBSURFACE CONSULTANTS
PROJECT ID: 554.006
LOCATION: MARINER WAREHOUSE
SAMPLE ID: MW-5

DATE SAMPLED: 09/11/92
DATE RECEIVED: 09/11/92
DATE EXTRACTED: 09/16/92
DATE ANALYZED: 09/16/92
DATE REPORTED: 09/25/92

Polynuclear Aromatic Hydrocarbons in Water by Epa Method 8270
Extraction Method: EPA 3510

COMPOUND	RESULTS ug/L	REPORTING LIMIT ug/L
Naphthalene	ND	5
Acenaphthylene	ND	5
Acenaphthene	ND	5
Fluorene	ND	5
Phenanthrene	ND	5
Anthracene	ND	5
Pyrene	ND	5
Benzo(a)anthracene	ND	5
Chrysene	ND	5
Benzo(b)fluoranthene	ND	5
Benzo(k)fluoranthene	ND	5
Fluoranthene	ND	5
Benzo(a)pyrene	ND	5
Indeno(1,2,3-cd)pyrene	ND	5
Dibenzo(a,h)anthracene	ND	5
Benzo(g,h,i)perylene	ND	5

ND = Not detected at or above reporting limit.

QA/QC SUMMARY: SURROGATE RECOVERIES

Nitrobenzene-d5	79 %
2-Fluorobiphenyl	78 %
Terphenyl-d14	80 %

CHAIN OF CUSTODY FORM

PAGE _____ OF _____

PROJECT NAME: Marmer Warehouse
 JOB NUMBER: 554.006 LAB: Curtis & Tompkins
 PROJECT CONTACT: Sean Carson TURNAROUND: Normal
 SAMPLED BY: Jase Berroudez REQUESTED BY: John Wolfe

ANALYSIS REQUESTED			
TEL Diesel	3550/9015		
TEL	5050/9020		
TEL w/ gasoline	5030/9013		
X PUA's	EPA 8270		

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX				CONTAINERS				METHOD PRESERVED					SAMPLING DATE				NOTES					
		WATER	SOIL	WASTE	AIR	VOA	LITER	PINT	TUBE	HCL	H2SO4	HNO3	ICE	NONE	MONTH	DAY	YEAR	TIME						
-1	MW-1	X				2	2																	
-2	MW-2	X				2	2																	
-3	MW-3	X				2	2																	
-4	MW-4	X				2	2																	
-5	MW-5	X				2	2																	

COMMENTS & NOTES:

Call John Wolfe - nothing was sent off.
 - Change # of 6 to 1700s
 - run everything for everything

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature) <u>[Signature]</u>	DATE/TIME <u>1/28/13</u>	RECEIVED BY: (Signature) <u>[Signature]</u>	DATE/TIME <u>1/28/13</u>
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME

Subsurface Consultants, Inc.

171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607
 (510) 268-0461 • FAX: 510-268-0137

CHAIN OF CUSTODY FORM

PAGE 1 OF 1

PROJECT NAME: Marmer Warehouse
 JOB NUMBER: 554.006 LAB: Curtis & Tompkins
 PROJECT CONTACT: Sean Carson TURNAROUND: Normal
 SAMPLED BY: José Bermudez REQUESTED BY: John Wolfe

ANALYSIS REQUESTED	
TEH as req'd	3550/8015
BTEX	5030/8020
TUH as req'd	5030/8015
Oil & Grease	5160/WI:5570
XIPNA's	EPA 8270

LABORATORY I.D. NUMBER	SCI SAMPLE NUMBER	MATRIX				CONTAINERS				METHOD PRESERVED					SAMPLING DATE				NOTES		
		WATER	SOIL	WASTE	AIR	VOA	LITER	PINT	TUBE	HCL	H2SO4	HNO3	ICE	NONE	MONTH	DAY	YEAR	TIME			
109629	-1	MW1	c 5.5'	X	X				X				X		9	02	92			X	TEH as req'd
	-2	MW2	c 4.0'	X	X				X				X		9	02	92			X	BTEX
	-3	MW3	c 4.0'	X	X				X				X		9	02	92			X	TUH as req'd
	-4	MW4	c 7.0'	X	X				X				X		9	03	92			X	Oil & Grease
	-5	MW5	c 5.0'	X	X				X				X		9	03	92			X	XIPNA's

COMMENTS & NOTES:

CHAIN OF CUSTODY RECORD

RELEASED BY: (Signature) <u>[Signature]</u>	DATE/TIME <u>9/14/92 13:00</u>	RECEIVED BY: (Signature)	DATE/TIME
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	DATE/TIME
RELEASED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature) <u>Teresa Morrison</u>	DATE/TIME <u>9/14/1992</u>

Subsurface Consultants, Inc.

171 12TH STREET, SUITE 201, OAKLAND, CALIFORNIA 94607
 (510) 268-0461 • FAX: 510-268-0137