GZA
GeoEnvironmental, Inc.

Engineers and Scientists

CBI CLAIM (REDACTED)

December 21, 1999
File No. P3227.99

COMPANY CONFIDENTIAL DOCUMENT (UNLIMITED TIME)
CONFIDENTIALITY CLAIM DOES NOT COVER INDIVIDUAL ANALYSIS SHEETS, BORING LOGS, AND OTHER UNDERLYING DATA.

Ms. Sharon Fennelly Enforcement Coordinator
U.S. Environmental Protection Agency
Office of Site Remediation & Restoration
One Congress Street
Suite 1100, Mail Code HBR
Boston, Massachusetts 02114-2023

140 Broadway
Providence
Rhode Island 02903
401-421-4140
FAX 401-751-8613
http://www.gza.net

Re: Centredale Manor
North Providence, Rhode Island

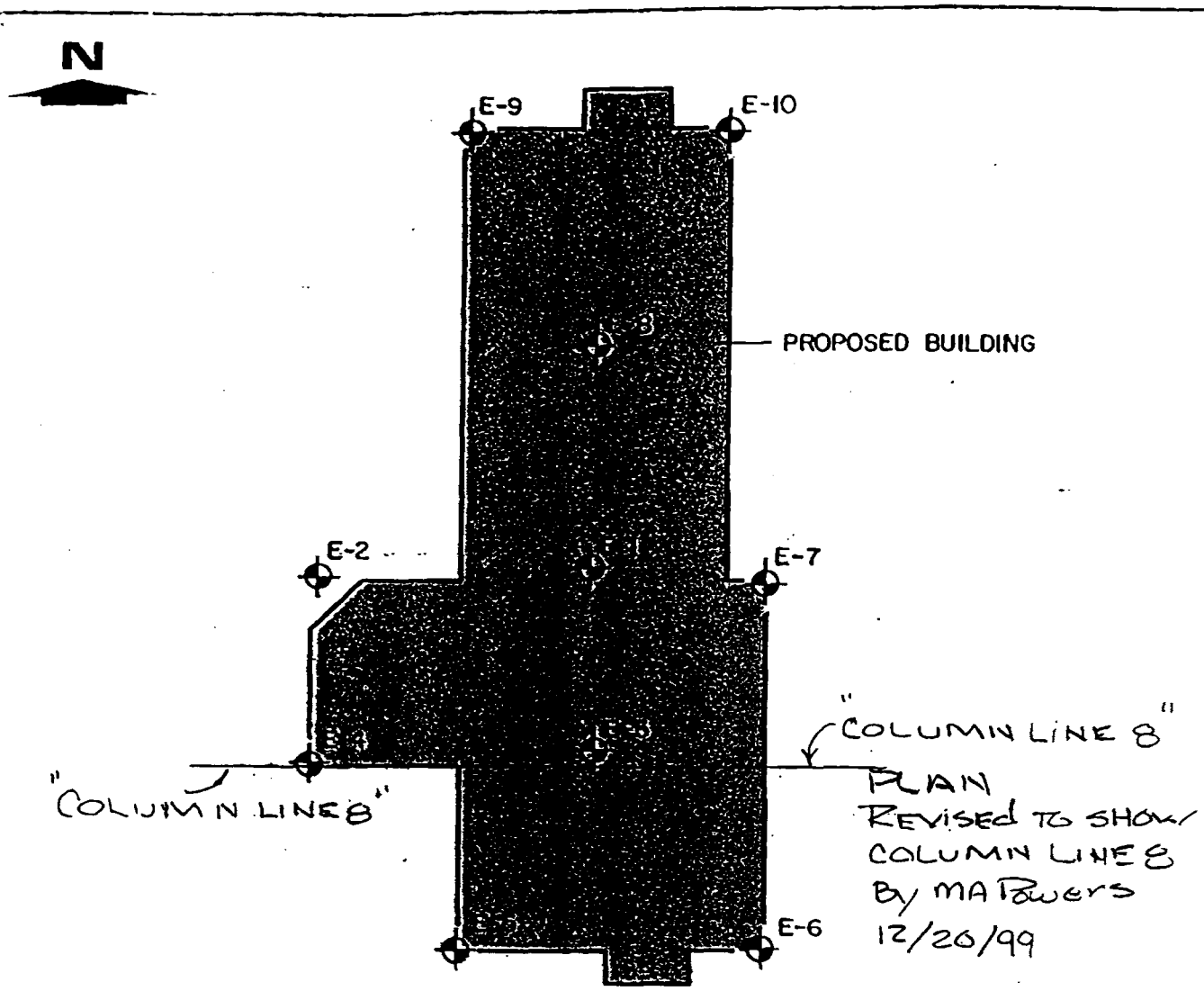
Dear Ms. Fennelly:

Pursuant to a letter dated December 7, 1999 (and received by GZA on December 8th) and our telephone conversations on December 10 and December 20, 1999, following is GZA's Response to EPA's Request for Supplemental Information and documentation relating to environmental conditions at property identified as Centredale Manor, in North Providence, Rhode Island.

A Subsidiary of GZA
GeoEnvironmental
Technologies, Inc.

5614

SDMS DocID 5614



NOTES

1) BORING LOCATIONS ARE APPROXIMATE
2) ⌖ INDICATES APPROXIMATE LOCATION OF BORINGS BY GUILD DRILLING ON FEB. 2, 1982.
3) BORINGS WERE LOCATED BY MARSHALL CONTRACTORS INC.

SCALE: 1" ≈ 40'

FILE No. P-3227

GZA

CENTERDALE MANOR
NORTH PROVIDENCE, R.I.

EXPLORATION LOCATION PLAN

FEB 1982

FIGURE No. 1

CBI
CLAIM
(REDACTED)

RESPONSIVE DOCUMENTS A - G
(REDACTED)
OF
INFORMATION REQUEST ANSWERS
PURSUANT TO SECTION 104 CERCLA
FOR
CENTREDALE MANOR SITE
BY
GZA GEOENVIRONMENTAL, INC. (GZA)
ON
APRIL 14, 1999

CENTERDALE MANOR

CHEMICAL ANALYSES RESULTS

I. WATER SAMPLES

SAMPLE NUMBER	SPECIFIC CONDUCTIVITY µMHOS/CM	pH[1]	VOLATILE ORGANICS[2,3] (compound - peak HT.)
TP-A	245	6.06	N.D.
TP-B	240	5.84	N.D.
TP-C	430	6.58	1 unknown - very low

II. SOIL SAMPLES

TEST PIT NO.	SAMPLE NO.	DEPTH	VOLATILE ORGANICS[2,3] (compound - peak HT.)
TP-A	S-1	2'-3'	3 unknown - very low
TP-A	S-2	5'	1 unknown - very low
TP-B	S-4	2.5'	N.D.
TP-C	S-6	2'	3 unknown - very low
TP-C	S-7	5'	1 unknown - very low

NOTES:

1. pH measured with a Model PHM-8100 Digital pH meter manufactured by Graphic Controls.

2. Volatile organic analyses with a Century Systems Model OVA-128 organic vapor analyzer/gas chromatograph employing headspace techniques. Sample injection size - 0.20 cc. Column employed was 12" long (T-12), packed with 10 percent 1, 2, 3, TRIS Propane on 60/80 mesh chromosorb P, AW.

3. N.D. indicates volatile organic not detected. "Unknowns" refer to unidentified peaks on chromatogram. Peak height is a subjective measure of relative concentration only. Very low generally indicates concentrations less than 0.1 parts per million (ppm).

GZA

TEST PIT FIELD LOG

GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION CENTERDALE MANOR LOCATION NORTH PROVIDENCE, R.I.	TEST PIT No. TP-A FILE No. P-3227 DATE 1/12/82

EXCAVATION EQUIPMENT

GZA ENGINEER W. Kosinski
WEATHER Clear, Cold 10°-20°

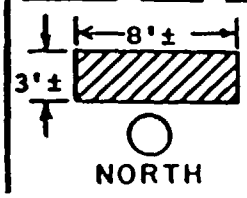
CONTRACTOR Pezza
OPERATOR
MAKE John Deere MODEL JD 510
CAPACITY 1± cuyd. REACH ft

GROUND ELEV. 97±
TIME STARTED AM
TIME COMPLETED AM

DEPTH	SOIL DESCRIPTION (Burmister)		EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMA No
0	Rubbish GRANULAR FILL	Brown, dark brown, coarse to fine SAND, some coarse to fine Gravel, little Silt (non-plastic), little Rubbish Wood, Metal, etc. - RUBBISH FILL	E		
1'			E		
2'	Sandy Organic SILT	Dark brown, dark gray, Organic SILT and fine SAND, little- fine Gravel, trace+ Roots, Organic Silt, slightly plastic, water seeping in localized areas near 2' depth	E		1.
3'			E		
4'	▽ 5'± Sandy GRAVEL	Dark brown, coarse+ to fine GRAVEL, some+ coarse to fine Sand, trace Cobbles, trace+ non-plastic Silt	E		
5'			E - M		2.
6'	7.0'±		E - M		3.
7'		Approximate Bottom of test pit, could not be seen due to rapid groundwater seepage and caving in of sidewalls.			
8'		Note: Oil/chemical odor in all stratas			
9'		Groundwater level from seepage into pit, actual G.W.L. may be higher			
10'		Cobbles ≥ 4", ≤ 6"			
11'					
12'					
13'					
14'					

REMARKS:
1. Jar sample obtained - S1 - at 2' to 3'±.
2. Jar sample obtained - S2 - at 5'±.
3. Water sample obtained from groundwater seepage into pit - GW-A.

TEST PIT PLAN



LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
[illegible]	[illegible]

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN

EXCAVATIO EFFORT

E — EASY
M — MODERA
D — DIFFICU

GROUNDWATE

ELAPSED TIME TO READING ▽ G.

TEST PIT FIELD LOG

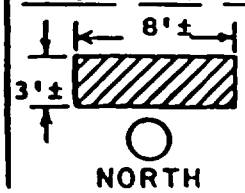
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION CENTERDALE MANOR LOCATION NORTH PROVIDENCE, R.I.	TEST PIT No. TP-B FILE No. P-3227 DATE 1/12/82

	EXCAVATION EQUIPMENT	
GZA ENGINEER W. Kosinski	CONTRACTOR Pezza	GROUND ELEV. 95±
WEATHER Clear, Cold 10°-20°	OPERATOR	TIME STARTED AM
	MAKE John Deere MODEL JD 510	TIME COMPLETED AM
	CAPACITY 1± cuyd. REACH ft	

DEPTH	SOIL DESCRIPTION (Burmister)		EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMA No
0	2"-3"	Brown, green, fine Sandy LOAM, grassy, Roots			
1'	Sandy Or. SILT 1.5'	Dark gray, dark brown, Organic SILT and fine SAND, trace fine Gravel. trace Roots, Organic Silt, slightly plastic, water seeping in localized areas	E		
2'	2.5'	Gray, medium to fine SAND, trace+ coarse Sand and fine Gravel, trace Silt	E		1.
3'	∇ 3.0'±	Brown, gray, coarse+ to fine GRAVEL, some+ coarse to fine Sand, trace+ Cobbles, trace non-plastic Silt	E		2.
4'	Sandy GRAVEL		E		
5'			E - M		3.
6'	6'±	Approximate, Bottom of test pit could not be seen due to rapid groundwater seepage and caving in of sidewalls.	E - M		
7'		Note: No oil or chemical type odor			
8'		Groundwater level from seepage into pit, actual G.W.L. may be higher			
9'		Cobbles ≥ 4", ≤ 6"			
10'					
11'					
12'					
13'					
14'					

REMARKS:
1. Jar sample obtained - S3 - at 1.0' - 1.5'±.
2. Jar sample obtained - S4 - at 2.5'±.
3. Water sample obtained from groundwater seepage into pit - GW-B.

TEST PIT PLAN



LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20 - 35%
[illegible]	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN

EXCAVATIO EFFORT

E — EASY
M — MODERA
D — DIFFICU

GROUNDWATE

ELAPSED TIME TO [illegible] ∇ G

TEST PIT FIELD LOG

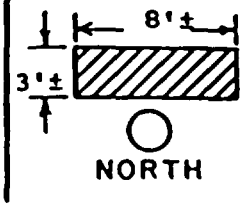
GOLDBERG · ZOINO & ASSOC., INC GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT DESCRIPTION CENTERDALE MANOR LOCATION NORTH PROVIDENCE, R.I.	TEST PIT No. TP-C FILE No. P-3227 DATE 1/12/82

GZA ENGINEER W. Kosinski WEATHER Clear, Cold 10°-20°	EXCAVATION EQUIPMENT CONTRACTOR Pezza OPERATOR MAKE John Deere MODEL JD 510 CAPACITY 1± cuyd. REACH ft.	GROUND ELEV. 97± TIME STARTED AM TIME COMPLETED AM

DEPTH	SOIL DESCRIPTION (Burmister)		EXCAV. EFFORT	BOULDER COUNT QTY. CLASS.	REMARK No.
0	.5-1.0	Brown, dark brown, coarse to fine SAND, some coarse to fine Gravel	E		
1'	Sandy Organic SILT	Brown-gray, Organic SILT and fine SAND, little- fine Gravel, trace Roots, Organic Silt, slightly plastic	E		1.
2'		Localized areas of water seepage. Sweet chemical odor.	E		
3'	3.25		E		
4'	Sandy GRAVEL	Brown, dark gray, stained, coarse+ to fine GRAVEL, some+ coarse to fine Sand, trace+ Cobbles, trace non-plastic Silt	E - M		
5'	∇ 5.5'		E - M		2.
6'	7.0'±		E - M		
7'		Approximate, Bottom of test pit could not see due to rapid groundwater seepage and caving in of side walls.			3.
8'					
9'					
10'		Note: Sweet chemical odor in Sandy Organic SILT stratum, oily odor in Sandy GRAVEL stratum.			
11'		Groundwater level from seepage in pit, actual G.W.L. maybe higher			
12'		Cobbles ≥ 4", ≤ 6"			
13'					
14'					

REMARKS:
1. Jar sample obtained - - @2'±.
2. Jar sample obtained - - @5'±.
3. Water sample obtained from groundwater seepage into pit - GW-C.

TEST PIT PLAN



LEGEND:

BOULDER COUNT

SIZE RANGE CLASSIFICATION	LETTER DESIGNATION
6"-18"	A
18"-36"	B
36" AND LARGER	C

PROPORTIONS USED

TRACE (TR.)	0 - 10%
LITTLE (LI.)	10 - 20%
SOME (SO.)	20-35%
AND	35 - 50%

ABBREVIATIONS

F - FINE
M - MEDIUM
C - COARSE
F/M - FINE TO MEDIUM
F/C - FINE TO COARSE
V - VERY
GR. - GRAY
BN. - BROWN
YEL. - YELLOW

EXCAVATION EFFORT

E — EASY
M — MODERAT
D — DIFFICUL

GROUNDWATE

ELAPSED TIME TO READING — G.W

APPENDIX A

TEST BORING LOGS

HAMMER

CASING WT. 300 FALL 24

SAMPLER WT. 140 FALL 30

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: Marshall Contractors

PROJECT: Centredale Manor

SHEET 1 OF 1

LOCATION No. Prov.

HOLE NO. B-1

LINE & STA.

OFFSET

INSPECTOR

DRILLER R. Cook, Jr.

HELPER J. Jagielo

SAMPLER I.D. 1 3/8

CASING I.D. 2½

ALLSTATE NO. V-725

DATE, START 10/17/81

DATE, FINISH 10/17/81

GROUND ELEVATION 97.1

GROUND WATER DEPTH 4.1'

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV. FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST. MOISTURE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.)
0	1	0-1.5	D	1-5-3			F-M DK BR SAND AND GRAVEL, little silt and rubbish - fill
	5						
	4				loose		
	2						
	1						
	1	6-6-5	D	1-1-7		6.1'	
	10						
	37						F-C LT GRAY SAND, trace of silt
	22						
	17						
10	4	10-11.5	D	5-5-6	med dense		
	5						
	12						
	12						
	12						
	6	15-16.5	D	8-9-9			F-C LT GRAY-BROWN SAND, trace of gravel, trace of silt
	6						
	11						
	12						
	12					20.5'	
20	5	20-21.5	D	5-3-2			F LT BR SAND, trace of silt
	5						
	8				loose		
	9					23.8'	
	11						F-C LT BR SAND, trace of silt (running)
	11	25-26.5	D	2-3-4	loose		
	9						
	11						
	15						
	18						
30	24	30-31.5	D	10-14-12	med dense		
	26						
	30						
	30						
	31						
		35-36.5	D	14-8-13			
40							

GROUND SURFACE TO FT. USED CASING: THEN

HOLE NO. B-1

Summary

Earth Boring 36.5'

Rock Coring -

Samples D-8

Type of Sample: D = Dry, C = Cored, W = Washed, UP = Undisturbed Piston, TP = Test Pit, A = Auger, US = Undisturbed Shelby, V = Vane Test

Proportions Used: trace 0 to 10%, little 11 to 20%, some 21 to 35%, and 36 to 50%

Penetration Resistance: 140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density			Cohesive Consistency	
		0-4	0-2	Very Soft
Very	Loose	5-9	3-4	Soft
Med	Dense	10-29	5-8	M/Stiff
	Dense	30-49	9-15	Stiff
Very	Dense	50	16-30	V. Stiff
			31-4	Hard

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING WT. 300 FALL 24

SAMPLER WT. 140 FALL 30

CLIENT: Marshall Contractors

PROJECT: Centredale Manor

SHEET 1 OF 1

LOCATION No. Prov., R

HOLE NO. B-2

LINE & STA.

OFFSET

INSPECTOR

DRILLER R. Cook, Jr.

HELPER J. Jagielo

SAMPLER I.D. 1 3/8

CASING I.D. 2½

ALLSTATE NO. V-725

DATE START 10/16/81

DATE FINISH 10/16/81

GROUND ELEVATION 92.2

GROUND WATER DEPTH 4.6'

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV. ft	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST. CONSISTENCE	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK: COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.)
0	5	0-1.5	D	3-7-31			F-M DK BR SAND AND GRAV., lt. silt and rubbish - fill
	30				Dense		
	21						
	2						
	2						
	9	5-6.5	D	10-29-19			F-C DK BR-BLACK SAND AND GRAV., some silt - fill
	30						
	29					8.0'	
	15						F-C LT GRAY SAND, trace of silt
	15						
10	10	10-11.5	D	7-9-11	med dense		
	10						
	14						
	17						
	14						
	6	15-16.5	D	5-9-6			F-C LT BR-GRAY SAND, trace of silt
	8						
	9						
	10						
20	12					19.3'	
	10	20-21.5	D	3-2-2	very loose		F-LT BR SAND, trace of silt
	8						
	9						
	12						
	21						
	9	25-26.5	D	9-13-14		25.6'	
	12				med dense		F-C LT BR SAND AND GRAV., tr. of silt
	29					28.2'	
	22				med dense		F-C LT BR SAND, trace of silt (running)
30	20						
		30-31.5	D	10-12-15		31.5'	
40							

GROUND SURFACE TO _____ FT. USED _____ CASING: THEN _____

HOLE NO. B-2

Summary

Total Boring 31.5'

Rock Coring -

Samples D-7

Type of Sample

D - Dry C - Cored W - Washed

UP - Undisturbed Piston

UR - Undisturbed Rotary

V - Vane Test

Proportions Used

Trace 0 to 10%

Little 11 to 20%

Some 21 to 35%

And 36 to 50%

Penetration Resistance

140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density

4-10	Very	Loose
10-30	Med	Dense
30-50		Dense
50+		Very Dense

Cohesive Consistency

0-2	Very Soft
3-4	Soft
5-8	Med Stiff
9-15	Stiff
16-30	Very Stiff
31+	Hard

W 21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING WT. 300 FALL 24

SAMPLER WT 140 FALL 30

CLIENT: Marshall Contractors

PROJECT: Centredale Manor

SHEET 1 OF 1

LOCATION No. Prov.,

HOLE NO. B-3

LINE & STA.

OFFSET

INSPECTOR

DRILLER: R. Cook, Jr.

HELPER: J. Jagielo

SAMPLER I.D. 1 3/8

CASING I.D. 2½

ALLSTATE NO. V-725

DATE, START 10/16/81

DATE, FINISH 10/16/81

GROUND ELEVATION 97.2 ~~97.7~~

GROUND WATER DEPTH 4.5'

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV.	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST. MOISTURE	PROBE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK: CO. & TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.)
0	3	0-1.5	D	5-12-25	dense		F-M DK BR SAND AND GRAV., lt. silt and rubbish - fill
	5						
	4						
	3						
	1						
	10	5-6.5	D	8-31-21		5.5'	
	11				very dense		F-DK BR SAND, tr. of silt
	23					6.3'	
	25						F-C LT GRAY SAND AND GRAV., trace of silt
	32					9.3'	
10	21	10-11.5	D	22-22-10			F-C LT BR SAND AND GRAV., tr. of silt
	11					12.2'	
	13				med dense		F-LT BR SAND, trace of silt
	12						
	13						
	12	15-16.5	D	4-5-15		16.1'	
	14				med dense		F-C LT BR SAND, trace of grav., trace of silt
	22						
	19						
20	16						
		20-20.7	D	16-120/2"		20.7'	
							Refusal on sample spoon 140# hammer, 120 blows/7"
							Probe O.E. - 300# hammer, Refusal 200 blows no penatration
30							
40							

GROUND SURFACE TO _____ FT. USED _____ CASING: THEN _____

HOLE NO. B-3

Summary

Earth Boring 20.7'

Rock Coring -

Samples D-5

Type of sample: D = Dry, C = Cored, W = Washed, UP = Undisturbed Piston, TP = Test Pit, A = Auger, US = Undisturbed Shelby, V = Vane Test

Proportions Used: trace 0 to 10%; little 11 to 20%; some 21 to 35%; and 36 to 50%

Penetration Resistance: 140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density: Very Loose 0-4; Loose 5-9; Med Dense 10-29; Dense 30-49; Very Dense 50 +

Cohesive Consistency: Very Soft 0-2; Soft 3-4; M/Stiff 5-8; Stiff 9-15; V. Stiff 16-30; Hard 31 +

W 21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING WT 300 FALL 24

SAMPLER WT 140 FALL 30

CLIENT: Marshall Contractors

PROJECT: Centredale Manor

SHEET 1 OF 1

LOCATION No. Prov.,

HOLE NO B-4

LINE & STA

OFFSET

INSPECTOR

DRILLER R. Cook, Jr.

HELPER J. Jagielo

SAMPLER I.D. 1 3/8

CASING I.D. 2½

ALLSTATE NO. V-725

DATE START 10/17/81

DATE FINISH 10/17/81

GROUND ELEVATION 95. ~~94.~~ ~~96.4~~

GROUND WATER DEPTH 1.0'

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OF COHESIVE	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
0	1	0-1.5	D	1-0-0		1.5'	TOPSOIL
	1						
	15						F-C DK GRAY SAND AND GRAV., little silt
	12						
	14						
	12	5-6.5	D	10-22-32	very dense		
	10						
	17						
	9					9.6'	
10	9						
	5	10-11.5	D	4-2-3	loose		F-LT BR SAND, trace of silt
	4						
	6						
	9					14.0'	
	12				med dense		F-C LT BR SAND, some grav., trace of silt
	4	15-16.5	D	9-12-14			
	10						
	16						
	20						
20	24						
	11	20-21.5	D	14-18-17	dense		F-C LT BR SAND AND GRAV., tr. of silt
	16						
	20						
	43						
	40						
		25-26.5	D	42-53-120/3"	very dense	26.3'	
30							Refusal on sample spoon 140# hammer 120 blows/3"
							Probe O.E. 300# hammer Refusal 200 blows no Penatration
40							

GROUND SURFACE TO FT. USED CASING THEN

HOLE NO. B-4

Type of sample

D: Dry C: Cored W: Washed

UP: Undisturbed Piston

TP: Test Pit A: Auger

US: Undisturbed Shelby

V: Vane Test

Proportions Used

trace 0 to 10%

little 11 to 20%

some 21 to 35%

and 36 to 50%

Penetration Resistance

140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density		Cohesive Consistency	
		0-2	Very Soft
Very Loose	0-4	3-4	Soft
Loose	5-9	5-8	M/Stiff
Med Dense	10-29	9-15	Stiff
Dense	30-49	16-30	V Stiff
Very Dense	50 +	31 +	Hard

Summary

Earth Boring 26.3'

Rock Coring -

Samples D-6

W-21

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

HAMMER

CASING WT 300 FALL 24

SAMPLER WT 140 FALL 30

CLIENT: Marshall Contractors

PROJECT: Centredale Manor

SHEET 1 OF 1

LOCATION No. Prov., R.I.

HOLE NO. B-5

LINE & STA.

OFFSET

INSPECTOR

DRILLER R. Cook, Jr.

HELPER J. Jagielo

SAMPLER I.D. 1 3/8

CASING I.D. 2½

ALLSTATE NO. V-725

DATE, START 10/17/81

DATE, FINISH 10/17/81

GROUND ELEVATION -2[illegible] 96

GROUND WATER DEPTH 1.[illegible]'

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS FROM TO	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST.	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.)
0	1	0-1.5	D	1-2-1			TOP SOIL
	1					1.7'	
	2				dense		F-C DK BR-GRAY SAND AND GRAV., little silt
	16						
	31						
	14	5-6.5	D	26-27-18			
	12						
	14						
	9						
	12					9.4'	
10	3	10-11.5	D	2-1-2	very loose		F LT GRAY SAND, trace of silt
	3						
	4						
	6					14.0'	
	10						F-LT BR SAND, trace of silt
	7	15-16.5	D	2-2-3			
	8						
	17						
	23					18.5'	
20	10				med dense		F-C LT BR SAND, trace of silt
	6	20-21.5	D	7-9-10			
	8						
	11						
	15						
	21						
		25-26.5	D	12-12-15			F-C LT BR SAND, trace of grav. trace of silt
						26.5'	
30							
40							

GROUND SURFACE TO _____ FT. USED _____ CASING: THEN _____

HOLE NO. B-5

Type of Sample: D = Dry, C = Cored, W = Washed, UP = Undisturbed Piston, TP = Test Pit, A = Auger, US = Undisturbed Shelby, V = Vane Test

Proportions Used: trace 0 to 10%; little 11 to 20%; some 21 to 35%; and 36 to 50%

Penetration Resistance: 140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density: 0-4 Very Loose; 5-9 Loose; 10-29 Med. Dense; 30-49 Dense; 50+ Very Dense

Cohesive Consistency: 0-2 Very Soft; 3-4 Soft; 5-8 M/Stiff; 9-15 Stiff; 16-30 [illegible]; 31+ Hard

Summary

Earth Boring 26.5'

Rock Coring -

Samples D-6

W 21

HAMMER	Allstate Drilling Co.	
CASING WT 300 FALL 24	PROVIDENCE, R. I. 02915	SHEET 1 OF 2
SAMPLER WT 140 FALL 30	CLIENT: Marshall Contractors	LOCATION No. Prov, RI
	PROJECT: Centredale Manor	HOLE NO B-6
		LINE & STA.
		OFFSET

INSPECTOR	SAMPLER I D 1 3/8"	ALLSTATE NO. V-725	GROUND ELEVATION
DRILLER R. Cook	CASING I D 2½"	DATE START 11/5/81	GROUND WATER DEPTH 2.9'
HELPER J. Jagielo		DATE FINISH 11/5/81	

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC; ROCK CO. & TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC)
0	1	0-1.5	D	3-6-2	loose		F-M DK BR SAND AND GRAV., lt. silt and rubbish - fill
	5						
	6						
	3						
	2						
	11	5-6-5	D	39-31-53	very dense	6.2'	
	20						F-C LT GRAY SAND AND GRAV., tr of silt
	33						
	30						
-10	33						
	11	10-11	5 D	15-13-15	med dense		
	12						
	9					12.3'	
	4				med dense		F LT BR SAND, tr of silt
	5					14.7'	
	6	15-16	5 D	4-3-3	loose		F LT GRAY SAND, tr of silt
	6						
	6						
	9					19.0'	
-20	8				very loose		F LT BR SAND, tr of silt
	7	20-21	5 D	1-2-2			
	7						
	5					23.0'	
	18						F-C LT BR SAND, tr of silt
	18						
	7	25-26	5 D	8-14-18	dense		
	14						
	16					28.1'	
	15						F-C LT BR SAND AND GRAV., tr of silt
-30	18						
	15	30-31	5 D	10-22-20	dense		
	20						
	22						
	26						
	20						
	14	35-36	5 D	12-14-14	med dense		
	18						
	15						
	14						
-40	14	40-41	5 D	15-13-6			

GROUND SURFACE TO _____ FT. USED _____ CASING: THEN _____ HOLE NO. B-6

Type of Sample: D = Dry, C = Cored, W = Washed, UP = Undisturbed Piston, TP = Test Pit, A = Auger, US = Undisturbed Shelby, V = Vane Test

Proportions Used: trace 0 to 10%; little 11 to 20%; some 21 to 35%; and 36 to 50%

Penetration Resistance: 140 lb Wt falling 30" on 2" O D Sampler

Cohesionless Density		Cohesive Consistency	
0 4	Very Loose	0 2	Very Soft
5 9	Loose	3 4	Soft
10 29	Med Dense	5 8	M/Stiff
30 49	Dense	9 15	Stiff
50 +	Very Dense	16 30	V Stiff
		31 +	Hard

Summary: Earth Boring 61.5' ; Rock Coring - ; Samples D-13

HAMMER

CASING WT 300 FALL 24

SAMPLER WT 140 FALL 30

Allstate Drilling Co.

PROVIDENCE, R. I. 02915

CLIENT: Marshall Contractors

PROJECT: Centredale Manor

SHEET 2 OF 2

LOCATION No. Prov, R

HOLE NO. B-6

LINE & STA

OFFSET

INSPECTOR

DRILLER R. Cook, Jr.

HELPER J. Jagielo

SAMPLER I.D. 1 3/8

CASING I.D. 2½

ALLSTATE NO. V-725

DATE START 11/5/81

DATE FINISH 11/9/81

GROUND ELEVATION

GROUND WATER DEPTH 2.9

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST.	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS REMARKS
0	13						
	15						
	15						
	15						
	16						
	16	45-46.	S D	12-10-8	med dense		F-C LT BR SAND AND GRAV., tr of silt (running)
	14						
	16						
	18						
-10	18						
	20	50-51.	S D	8-7-7			
	15						
	17						
	15						
	11						
	13	55-56-	S D	10-9-9			
	14					57.0'	
	15				med dense		F LT BR SAND, tr of silt
	18						
-20	21						
		60-61.	S D	10-9-8		61.5'	
-30							
-40							

GROUND SURFACE TO _____ FT. USED _____ CASING THEN _____

HOLE NO. B-6

Penetration Resistance: 140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density: Very Loose, Loose, Med Dense, Dense, Very Dense

Cohesive Consistency: Very Soft, Soft, Stiff, V. Stiff, Hard

Proportions Used

Type of Sample: D Dry, U Undisturbed Piston, P Piston, A Auger, U Undisturbed Shelby, J Jetting Test, W Washed

Earth Boring 61.5'

Rock Coring -

Samples D-13

W 21

HAMMER	Allstate Drilling Co.	
CASING WT. 300 FALL 24	PROVIDENCE, R. I. 02915	SHEET 1 OF 1
SAMPLER WT 140 FALL 30	CLIENT: Marshall Contractors	LOCATION No. Prov. RI
	PROJECT: Centredale Manor	HOLE NO. B-7
		LINE & STA.
		OFFSET

INSPECTOR		ALLSTATE NO. V-725	
DRILLER R. Cook, Jr.	SAMPLER I.D. 1 3/8	DATE START 11/10/81	GROUND ELEVATION
HELPER J. Jagielo	CASING I.D. 2½	DATE FINISH 11/10/81	GROUND WATER DEPTH 3.3'

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO DEPTHS	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OF CONSIST	PROFILE CHANGE DEPTH	FIELD IDENTIFICATION OF SOILS, REMARKS
0	3						No samples to 10.0'
	4						
	6						
	20						
	2						
	15						
	26						
	26						
	46						
-10	37					10.0'	
	17	10-11	S D	13-11-12	med dense		F-C LT GRAY SAND AND GRAV., little silt
	15						
	14					13.6'	
	12						
	12				med dense	15.8'	F-C LT BR SAND, some grav, tr of silt
	9	15-16	S D	9-8-7			
	9						F LT BR SAND, tr of silt
	10						
	8						
-20	10						
		20-21	S D	2-3-6	loose	21.5'	
-30							Note: Water kept pumping while pulling rods in & out of casing
40							

GROUND SURFACE TO _____ FT USED _____ CASING THEN _____ HOLE NO B-7

Summary

Penetration Resistance
140 lb. Wt. falling 30" on 2" O.D. Sampler

Type of Sample

Proportions Used

Cohesionless Density

Cohesive Consistency

Total Depth 21.5'

D-3

W 21

HAMMER	Allstate Drilling Co.	
CASING WT. 300 FALL 24	PROVIDENCE, R. I. 02915	SHEET 1 OF 1
SAMPLER WT. 140 FALL 30	CLIENT: Marshall Contractors	LOCATION No. Prov.
	PROJECT: Centredale Manor	HOLE NO. B-8
		LINE & STA.
		OFFSET

INSPECTOR	SAMPLER I.D. 1 3/8"	ALLSTATE NO. V-725	GROUND ELEVATION
DRILLER R. Cook, Jr.	CASING I.D. 2½"	DATE START 11/10/81	GROUND WATER DEPTH 1.4'
HELPER J. Jagielo		DATE FINISH 11/10/81	

DEPTH BELOW SURFACE	CASING BLOWS PER FOOT	SAMPLE NO. DEPTHS ELEV. FT	TYPE OF SAMPLE	PENETRATION BLOWS PER 6 INCHES	DENSITY OR CONSIST. WOIST.	PROFILE CHANGE DEPTH ELEV.	FIELD IDENTIFICATION OF SOILS, REMARKS (REMARKS INCLUDE COLOR, GRADATION, TYPE OF SOIL, ETC. ROCK COLOR, TYPE, CONDITION, HARDNESS, DRILLING TIME, SEAMS, ETC.)
0	1						No samples to 10.0'
	2						
	4						
	20						
	14						
	29						
	32						
	33						
	24						
10	17					10.0'	
	7	10-11.5	D	10-4-4	loose		F-C LT GRAY SAND AND GRAV., tr of silt
	8						
	12						
	8					14.3'	
	8						
	12	15-16.5	D	1-2-2	very loose		F LT BR SAND, little silt
	10						
	11						
	11						
20	15					20.0'	
		20-21.5	D	31-23-12		21.0'	COBBLE
					med dense	21.5'	F-C LT BR SAND AND GRAV., lt. silt
30							NOTE: Water maintained in casing while pulling rods in & out of casing
40							

GROUND SURFACE TO _____ FT USED _____ CASING THEN _____

HOLE NO. B-8

Summary

Earth Boring 21.5'

Rock Coring -

Samples D-3

Penetration Resistance
140 lb. Wt. falling 30" on 2" O.D. Sampler

Cohesionless Density			Cohesive Consistency	
Very	Loose	0-2	Very Soft	
	Loose	3-4	Soft	
Med	Dense	5-8	M. Stiff	
	Dense	9-15	Stiff	
Very	Dense	16-30	V. Stiff	
		31-[illegible]	Hard	

Typical Sample		Consistency Elev.		
D - Dry	W - Washed	None	0 to 10%	0-4
UP - Undisturbed Piston		Little	11 to 20%	5-9
TP - Test Pit		[illegible]	21 to 35%	10-29
[illegible]		[illegible]	36 to 50%	30-49
[illegible]			[illegible]	50-

GUILD DRILLING CO., INC.

100 WATER STREET EAST PROVIDENCE, R I

SHEET 1 OF
DATE
HOLE NO. 2
LINE & STA.
OFFSET
SURF. ELEV.

TO American Pile Driving Corporation
ADDRESS East Providence, R.I.
PROJECT NAME Check Borings for Proposed
LOCATION North Providence, R.I.
REPORT SENT TO above / Centredale Manor
PROJ. NO.
SAMPLES SENT TO "
OUR JOB NO. 82-186

GROUND WATER OBSERVATIONS

At _____ after _____ Hours

At _____ after _____ Hours

	CASING	SAMPLER	CORE BAR.
Rods-"AW"			
Type	BW	S/S	
Size I.D.	2½"	1 3/8"	
Hammer Wt	300#	140#	BIT
Hammer Fall	24"	30"	

	Date	Time
START	12/23/81	
COMPLETE	12/23/81	
TOTAL HRS.		
BORING FOREMAN	T. Paquette	
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	12-18	Moisture Density or Consist	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc	SAMPLE No	Pen	Re
	3	0'-1.5'	D	5	6	7	Moist medium dense		Brown fine to coarse Sand, Silt, Asphalt & Gravel FILL	1	1.50.	
	4											
	5											
	7											
	9											
	30	5'-6.5'	D	9	84	24	Wet very dense		Brown Black coarse to fine Sand, Silt & coarse to fine Gravel, Cobbles	2	1.50.	
	35											
	76											
	84											
	41							9.5'				
	8	10'-11.5'	D	14	6	6	Wet medium dense		Gray fine to coarse SAND, some medium to fine gravel, little silt	3	1.50.	
	10											
	9											
	9											
	8											
	16	15'-16.5'	D	9	3	2	Wet loose	15.5'	Gray Brown very fine to fine silty SAND	4	1.50.	
	9											
	10											
	9											
	9											
	10	20'-21.5'	D	1	2	1	"	21.5'		5	1.51.	
	9	21.5'-22'	D	7			Wet/m stiff	22'	Yellow Brown SILT & fine Sand	5A	0.50.	
	14											
	17											
	18											
	17	25'-26.5'	D	4	6	5	Wet/m dense	27' ±	Reddish Brown medium to fine SAND, some silt, little fine to medium gravel (running)	6	1.50.	
	14											
	23											
	29											
	26											
	14	30'-31.5'	D	14	10	10	"		Brown coarse to fine SAND, some medium to fine gravel, trace of silt	7	1.50.	
	20											
	21								(33'-34' Boulder - casing bent @ this point)			
	53											
	15								(sand running)			
	20	35'-36.5'	D	9	11	17	"		Brown fine to coarse SAND & Gravel, little silt	8	1.50.	
	49											
	58											
	39											
	34											

GROUND SURFACE TO 60' USED BW CASING THEN S/S to 61.5'

Sample Type | Proportions Used | 140# Wt x 30" fall on 2" O.D. Sampler

SUMMARY Earth Boring 61.

GUILD DRILLING CO., INC.

100 WATER STREET EAST PROVIDENCE, R. I.

Sheet 2 of 2
DATE
HOLE NO 2
LINE & STA.
OFFSET
SURF. ELEV.

TO
PROJECT NAME
ORT SENT TO
SAMPLES SENT TO
ADDRESS
LOCATION
PROJ. NO.
OUR JOB NO. 82-186

GROUND WATER OBSERVATIONS

At _____ after _____ Hours

At _____ after _____ Hours

	CASING	SAMPLER	CORE BAR.
Type			
Size I.D.			
Hammer Wt			BIT
Hammer Fall			

	Date	Time
START		
COMPLETE		
TOTAL HRS.		
BORING FOREMAN		
INSPECTOR		
SOILS ENGR.		

LOCATION OF BORING:

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler From 0-6	To 6-12	12-18	Moisture Density or Consist.	Strata Change Elev	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc	SAMPLE No	Pen	Re
	30	40'-41.5'	D	10	7	9	Wet medium dense		Brown medium to coarse SAND, little fine sand & gravel, trace of silt	9	1.5	1.
	22											
	34											
	41							44.6'				
	47											
	34	45'-46.5'	D	12	11	9	"		Light Brown very fine to fine SAND & Silt with little coarse sand & fine gravel lenses	10	1.5	1.
	35											
	27											
	31											
	33							50'				
	46	50'-51.5'	D	7	7	8	"	(Top)	Light Br. F. SAND, little si	11	1.5	
	37							(Bottom)	Light Br. silty fine to med. SAND, some fine to medium gravel, trace of coarse sand	11A	(2	
	37											
	41							54'				
	65											
	58	55'-56.5'	D	8	8	8	"		Brown fine to coarse SAND, some fine to coarse gravel, trace of silt	12	1.5	
	44											
	52							57.5' ±				
	59								Light Brown SILT with little very fine sand & fine gravel lenses			
	62						Wet/v stiff					
		60'-61.5'	D	8	5	11		61.5'		13	1.5	
									Bottom of Boring 61.5'			

GROUND SURFACE TO _____ USED _____ "CASING: THEN _____

Sample Type
D: Disc C: Cored W: Washed

Proportions Used
trace 0 to 10%

140 lb Wt. x 30" fall on 2" O.D. Sampler
Cohesionless Density
0-4 Loose
Cohesive Consistency
0-4 Soft 30 + Hard

SUMMARY
Earth Boring
Rock Coring

APPENDIX B

ROBINSON GREEN BERETTA TEST PIT LOGS

THE ROBINSON GREEN BERETTA CORPORATION
2 JOHN STREET PROVIDENCE, RHODE ISLAND 02906 401 272-1710

TEST PITS - October 16, 1981
Project: Centerdale Manor
RGB #2629

Observed by the Following:

W. Lund	Marshall Contractors, Inc.
R. Keaney	Marshall Contractors, Inc.
G. H. Graf	The Robinson Green Beretta Corp.

TP-1 Moved 20' West

0	to 2"	broken asphalt
2"	to 4'-0"	mixed sand and gravel fill some oil and chemical saturation chemical odors
4'-0"	to 6'-0"	silty subsoil with chemical saturation
6'-0"	to 7'-0"	boney gravel water weeping @ 4'-0"

TP-2

0	to 2'-0"	mixed debris
2'-0"	to 3'-0"	silty subsoil, possible fill
3'-0"	to 10'-0"	med. dense boney gravel water @ 5'-0" ±

TP-3

0	to 4'-0"	silt & sand fill
4'-0"	to 5'-0"	probable original topsoil and peat
5'-0"	to 10'-0"	med. dense boney gravel water @ 4'-6" ±

TP-4

0	to 4'-6"	misc. earth and organic fill
4'-6"	to 6'-0"	probable original subsoil
6'-0"	to 9'-0"	boney gravel water running @ 3'-0" ± all stratas saturated with heavy oil

TP-5

0	to 4'-0"	misc. organic fill
4'-0"	to 5'-6"	probable original top & subsoil
5'-6"	to 10'-0"	med. dense boney gravel water running @ 3'-0"

TEST PITS - October 16, 1981
Project: Centerdale Manor
RGB #2629

TP-6 15' West of B-2

0	to 3'-6"	earth & timber debris
3'-6"	to 4'-6"	silty subsoil, perched water @ 2'-6"
4'-6"	to 9'-0"	med. dense boney gravel

NOTE: All test pits had chemical odors

GHG:sek

APPENDIX C

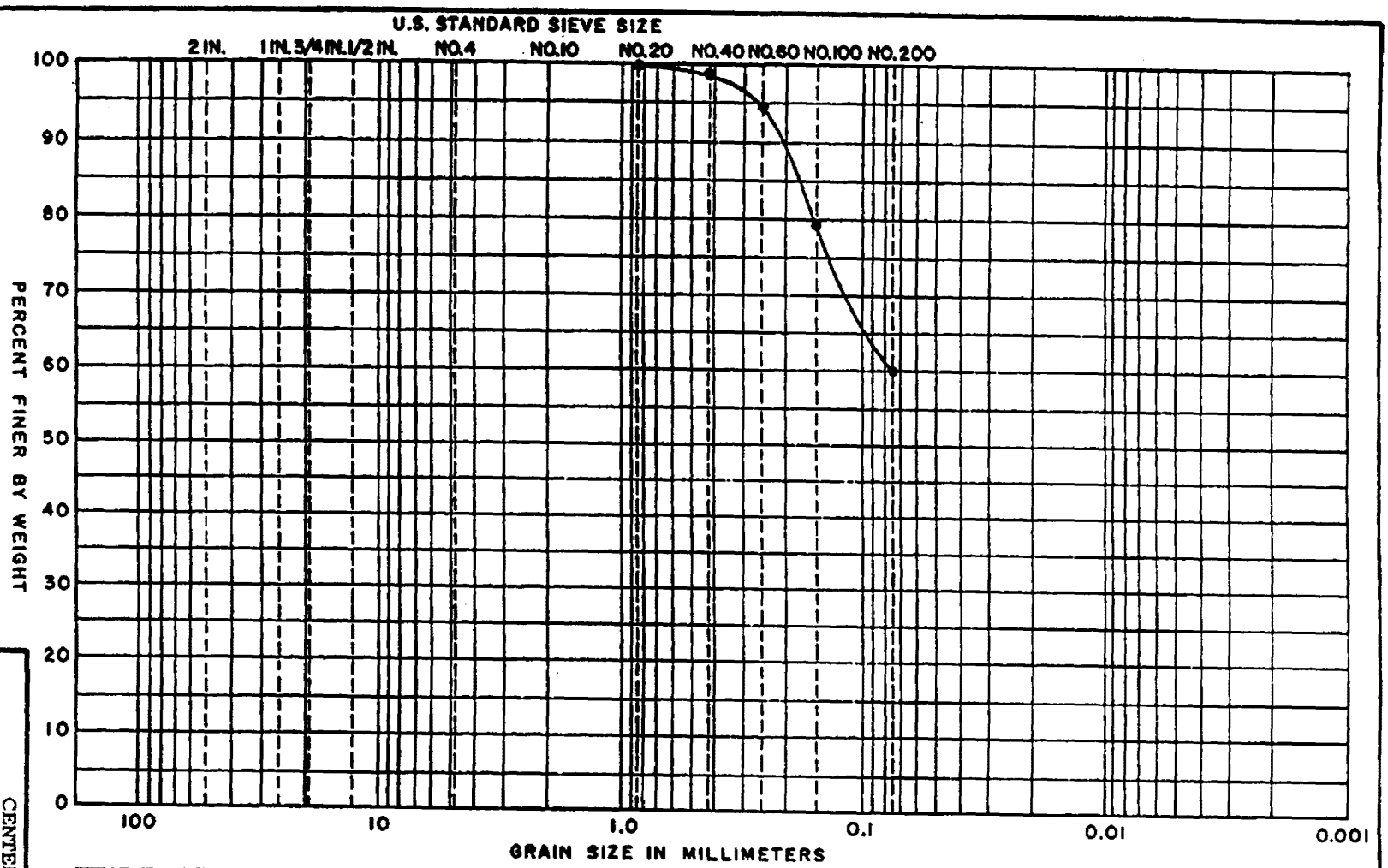
LABORATORY TEST RESULTS

GRADATION TESTS

BORING NO. B4
SAMPLE
DEPTH 10.0-11.5'
TECH.
REVIEWED

TEST SERIES NO. 1
DATE Jan 198

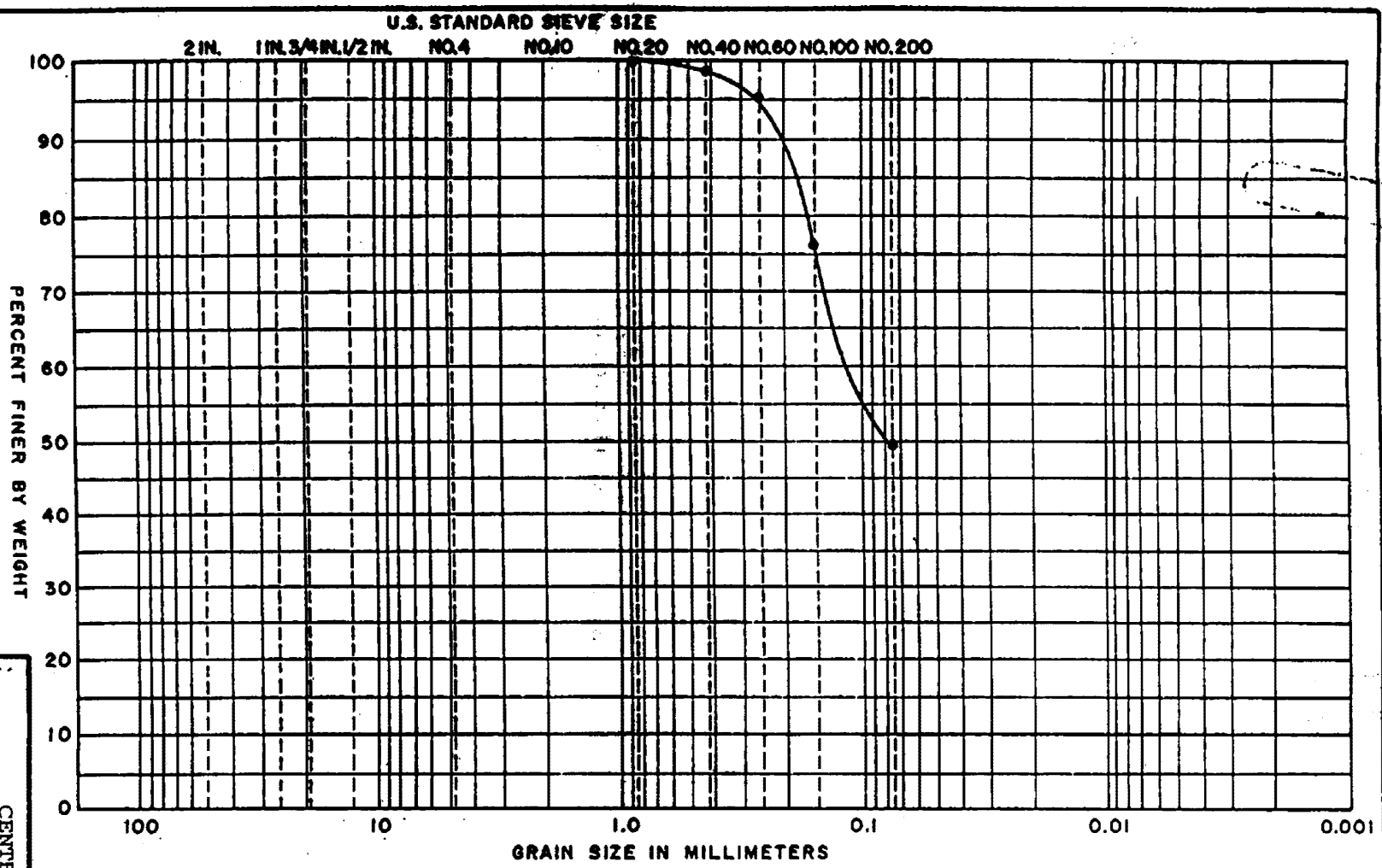
CENTERDALE MANOR



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

TEST NO.	SYM.	MATERIAL SOURCE	REMARKS
S1.1		Boring B4 Depth 10.0 - 11.5'	Light brown SILT and fine SAND



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

UNIFIED SOIL CLASSIFICATION SYSTEM

TEST NO.	SYM.	MATERIAL SOURCE	REMARKS
S2.1		Boring Hole 2 Depth 20.0 - 21.5	Light brown fine SAND and SILT

CENTERDALE MANOR

GRADATION TESTS

BORING NO. Hole 2
SAMPLE
DEPTH 20.0 - 21.5'
TECH.
REVIEWED

TEST SERIES
NO. 2
DATE Jan 1982

FIELD SUMMAR'

FILE No. P3227

DATE 1/27/82 REPORT No. -- SHEET 1 OF 1

PROJECT Centerdale Manor LOCATION North Providence

CLIENT The Robinson Green Beretta Corp. CONTRACTOR Guild Drilling Co.,Inc.

WEATHER CONDITIONS Sunny/Cold REMARKS Groundwater Sampling

A. Arrived on site at 1:00 p.m. Left site at 4:00 p.m. and arrived at R. I. Analytical (Warwick) at 4:30 p.m. for sample delivery. Returned to GZA, Providence, at 5:15 p.m.

B. Equipment Working:

One Guild Drilling Co. truck-mounted acker drill was in position over the borehole location. Four inch (4") diameter casing was in place to depth. A three foot (3') length well screen and gas pump with a one inch (1") discharge line were employed to effect pumping.

C. Work Performed:

Pumping was initiated at 3:05 p.m. with the wellpoint in place at a depth of 9 feet relative to ground surface. Screen was in place at depth of approximately 6' to 9'.

At 3:35 p.m. two (2) one-liter samples were collected for subsequent chemical analysis by R. I. Analytical.

D. Remarks:

Present on site were Guild Driller, Paul Brescia and helper, and Tony DeFelice, a representative of Marshall Contractors, Inc. Mr. DeFelice requested that a copy of this field summary as well as results of the chemical analyses be sent to Bill Lund of Marshall Contractors, Inc.

ON-JOB TIME 3.5

TRAVEL TIME 1.0

OFFICE TIME 0.5

TOTAL TIME 5.0

GZA

Michael Sherill

PREPARED BY

R.I. Analytical Laboratories, Inc.

SPECIALIZING IN ENVIRONMENTAL ANALYSIS

231 ELM STREET
WARWICK, R. I. 02888

PHONE: (401) 467-2452

CERTIFICATE OF ANALYSIS

REPORT TO: Goldberg Zoino & Associates
293 South Main Street
Providence, RI 02903
Attn: Mr. Michael Powers

DATE RECEIVED 1/27/82
DATE REPORTED 2/2/82
PURCHASE ORDER NO.
R.I.A.L. INV. NO. 5995

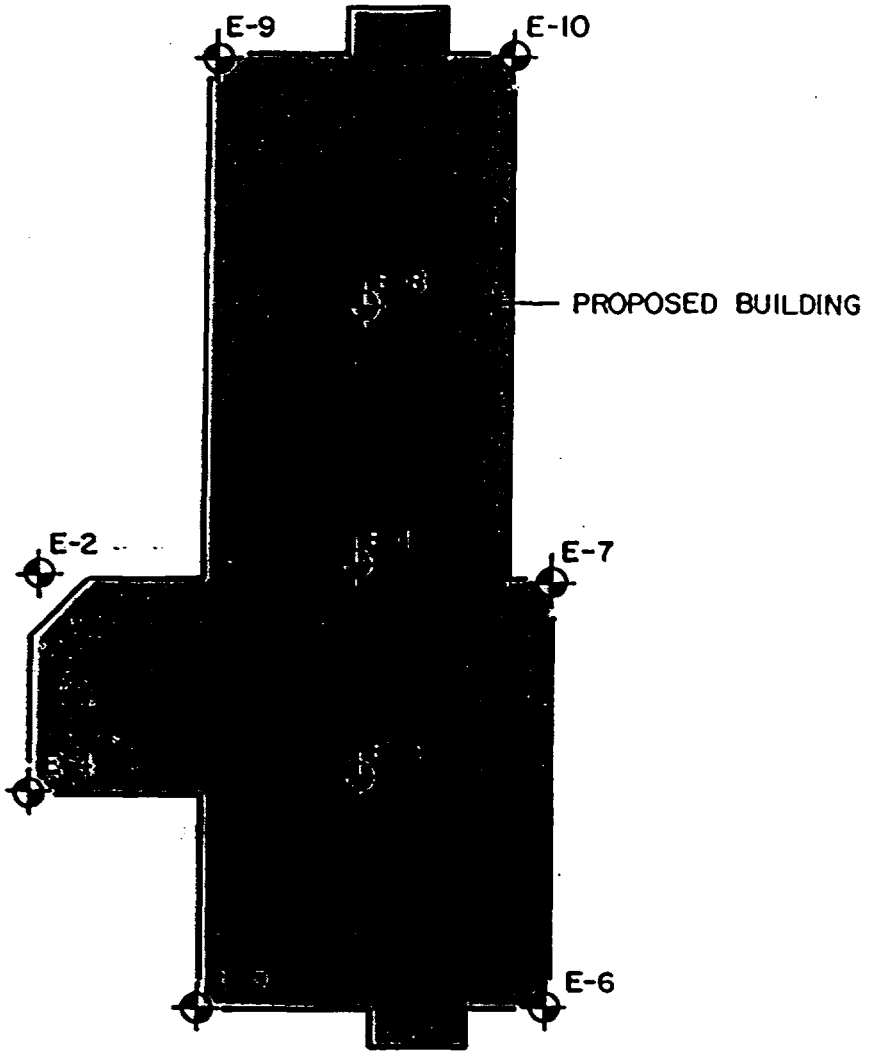
SAMPLE DESCRIPTION One aqueous sample from Centerdale Manor (GZA 3227)

Per your request, subject sample has been analyzed by our laboratory with the following results:

PARAMETER	RESULTS
pH	6.2
Alkalinity (up to pH 4.3)	122 mg/l (as $CaCO_3$)
Chloride	44.6 mg/l
Nitrate (as N)	0.30 mg/l
Sulfate (as SO_4)	17.0 mg/l
Calcium	13 mg/l
Sodium	52 mg/l

If you have any questions regarding this work or if we may be of further assistance, please contact us.

APPROVED BY Anthony E. Perrotti



NOTES

1) BORING LOCATIONS ARE APPROXIMATE
2) ⊕ INDICATES APPROXIMATE LOCATION OF BORINGS BY GUILD DRILLING ON FEB. 2, 1982.
3) BORINGS WERE LOCATED BY MARSHALL CONTRACTORS INC.

SCALE: 1" ≈ 40'

FILE No. P-3227

GZA

CENTERDALE MANOR
NORTH PROVIDENCE, R.I.

EXPLORATION LOCATION PLAN

FEB. 1982

FIGURE No. 1

Appendix A

Test Boring Logs

GOLDBERG · ZOINO & ASSOC., INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CENTERDALE MANOR CENTERDALE, RHODE ISLAND	REPORT OF BORING NO. E-1 SHEET 1 OF 1 DATE 2/2/82 FILE P-322

BORING CO. Guild Drilling Company
FOREMAN D. Serowik
G-Z-A ENGINEER S. Hanna

BORING LOCATION See Location Plan
GROUND ELEV.
DATE START 2/2/82 DATE END 2/2/82

CASING
SIZE: none (auger)
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER 140 lb.
FALL: 30"

GROUNDWATER READINGS			
DATE	DEPTH	CASING AT	STABILIZATION
2/2	4.8'	out	completion

DEPTH	CAS. BL /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	STRTA CHG. and GEN. DESC.	SAMPLE DESCRIPTION CLASSIFICATION
		S-1		0-2	auger sample	FILL	Brown and red-brown, fine to medium SAND, little+ Silt, trace Organics, trace Bricks, trace fine to coarse Gravel
2.5		S-2	24/15	2-4	6-4-2-3	4.0'	Dark brown, orange, and brown, fine to medium SAND, little Silt, trace Organics, trace Wood, Bricks, odor of oil
5							Bottom of Boring at 4.0' (required depth)

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LI OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG · ZOINO & ASSOC., INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CENTERDALE MANOR CENTERDALE, RHODE ISLAND	REPORT OF BORING NO. E-2 SHEET 1 OF 1 DATE 2/2/82 FILE P-3227

BORING CO. Guild Drilling Company
FOREMAN D. Serowik
G-Z-A ENGINEER S. Hanna
BORING LOCATION See Location Plan
GROUND ELEV.
DATE START 2/2/82 DATE END 2/2/82

CASING
SIZE: none (auger)
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER 140 lb.
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
2/2	4.8'	out	completion

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	STRTA CHG. and GEN. DESC.	SAMPLE DESCRIPTION CLASSIFICATION	NOTE
		S-1		0-2	auger sample	FILL	Dark brown-black, fine to medium SAND, little+ Silt, trace Organics, grading to red-brown, fine to medium SAND, little- Silt, trace+ Wood at ~1.5'	
2.5		S-2	24/6	2-4	13-3-4-2		Dark brown, fine to coarse GRAVEL and SAND, trace+ Silt, trace Organics (Wood)	
						4.0'		
5							Bottom of Boring at 4.0' (required depth)	

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG · ZOINO & ASSOC., INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CENTERDALE MANOR CENTERDALE, RHODE ISLAND	REPORT OF BORING NO. E-3 SHEET 1 OF 1 DATE 2/2/82 FILE P-5227

BORING CO. Guild Drilling Company
FOREMAN S. Serowik
G-Z-A ENGINEER S. Hanna

BORING LOCATION See Location Plan
GROUND ELEV.
DATE START 2/2/82 DATE END 2/2/82

CASING
SIZE none (auger)
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER 140 lb.
FALL: 30"

GROUNDWATER READINGS			
DATE	DEPTH	CASING AT	STABILIZATION TIM
2/2	4.3'	out	completion

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	STRTA CHG. and GEN. DESC.	SAMPLE DESCRIPTION CLASSIFICATION	NOTE
		S-1		0-2	auger sample	FILL	Brown, fine to medium SAND, some Silt, trace Organics, Wood, coarse Sand	
2.5		S-2	24/6	2-4	7-4-6-3	4.0'	Brown, fine to medium SAND, trace Silt, ~1" layer PEAT	
5							Bottom of Boring at 4.0' (required depth)	

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVE OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG · ZOINO & ASSOC., INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CENTERDALE MANOR CENTERDALE, RHODE ISLAND	REPORT OF BORING NO. E-4 SHEET 1 OF 1 DATE 2/2/82 FILE P-3227

BORING CO. Guild Drilling Company
FOREMAN D. Serowik
G-Z-A ENGINEER S. Hanna

BORING LOCATION See Location Plan
GROUND ELEV.
DATE START 2/2/82 DATE END 2/2/82

CASING
SIZE: none (auger)
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER 140 lb.
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TI
2/2	2.4'	out	completion

DEPTH	CAS. BL /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	STRTA CHG. and GEN. DESC.	SAMPLE DESCRIPTION CLASSIFICATION
		S-1		0-2	auger sample	FILL	Brown-gray, fine to coarse SAND, some+ Silt, trace Organics
2.5		S-2	24/12	2-4	1-2-11-22	4.0'	Brown, fine to medium SAND, trace Silt, layered with 4" layer Silty PEAT
5							Bottom of Boring at 4.0' (required depth)

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEV OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG · ZOINO & ASSOC., INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CENTERDALE MANOR CENTERDALE, RHODE ISLAND	REPORT OF BORING NO. E-5 SHEET 1 OF 1 DATE 2/2/82 FILE P-322

BORING CO. Guild Drilling Company
FOREMAN D. Serowik
G-Z-A ENGINEER S. Hanna

BORING LOCATION See Location Plan
GROUND ELEV.
DATE START 2/2/82 DATE END 2/2/82

CASING
SIZE: none (auger)
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER 140 lb.
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION
2/2	2.2"	out	completion

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	STRTA CHG. and GEN. DESC.	SAMPLE DESCRIPTION CLASSIFICATION
		S-1		0-2	auger sample	FILL	Brown, fine to medium SAND, little Silt, changing to black, moist, fine to coarse SAND, trace+ Silt, trace Organics at ~1.5'
2.5		S-2	24/5	2-4	2-1-2-15		Paper, Asphalt, and fine to medium SAND, trace Silt
						4.0'	
5							Bottom of Boring at 4.0' (required depth)

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LE OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG · ZOINO & ASSOC., INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CENTERDALE MANOR CENTERDALE, RHODE ISLAND	REPORT OF BORING NO. E-6 SHEET 1 OF 1 DATE 2/2/82 FILE P-3227

BORING CO. Guild Drilling Company
FOREMAN D. Serowik
G-Z-A ENGINEER S. Hanna
BORING LOCATION See Location Plan
GROUND ELEV.
DATE START 2/2/82 DATE END 2/2/82

CASING
SIZE: none (auger)
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER 140 lb.
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TI
2/2	2.1'	out	completion

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	STRTA CHG. and GEN. DESC.	SAMPLE DESCRIPTION CLASSIFICATION
		S-1		0-2	auger sample	FILL	Dark brown-black, fine to medium SAND, little Silt, trace coarse Sand, trace Organics
2.5		S-2	24/10	2-4	12-6-24-70	4.0'	Dark brown, fine to medium SAND, trace coarse Sand, trace Silt, trace Organics
5							Bottom of Boring at 4.0' (required depth)

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LE OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG · ZOINO & ASSOC., INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CENTERDALE MANOR CENTERDALE, RHODE ISLAND	REPORT OF BORING NO. B-7 SHEET 1 OF 1 DATE 2/2/82 FILE P-3227

BORING CO. Guild Drilling Company
FOREMAN D. Serowik
G-Z-A ENGINEER S. Hanna
BORING LOCATION See Location Plan
GROUND ELEV.
DATE START 2/2/82 DATE END 2/2/82

CASING
SIZE: none (auger)
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER 140 lb.
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TI
2/2	4.2'	out	completion

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	STRTA CHG. and GEN. DESC.	SAMPLE DESCRIPTION CLASSIFICATION
		S-1		0-2	auger sample	FILL	Dark brown-black, fine to medium SAND, little Silt, trace Organics, trace Wood, Brick, etc.
2.5		S-2	24/15	2-4	6-3-3-2	4.0'	Dark brown, fine SAND, trace Silt, trace Organics with layers brown, fine to medium SAND, trace Silt
5							Bottom of Boring at 4.0' (required depth)

REMARKS: 1. Obstruction at ~.75'. Moved hole 2' towards E-3. Obstruction again at ~.75'. Moved 2' towards E-3. Hit obstruction at ~1'. Moved to 2' back from original location.

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG · ZOINO & ASSOC., INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CENTERDALE MANOR CENTERDALE, RHODE ISLAND	REPORT OF BORING NO. E-8 SHEET 1 OF 1 DATE 2/2/82 FILE P-3227

BORING CO. Guild Drilling Company
FOREMAN D. Serowik
G-Z-A ENGINEER S. Hanna

BORING LOCATION See Location Plan
GROUND ELEV.
DATE START 2/2/82 DATE END 2/2/82

CASING
SIZE: none (auger)
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER 140 lb.
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
2/2	12"	out	completion

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	STRTA CHG. and GEN. DESC.	SAMPLE DESCRIPTION CLASSIFICATION	NOTE
		S-1		0-2	auger sample	FILL	Dark brown-black, fine to medium SAND, some Silt, trace Organics, trace gray powdery material (mortar?)	
2.5		S-2	24/4	2-4	2-2-3-2		Gray, fine to medium SAND and SILT at ~1.5' in second hole	
						4.0'	Brown-gray, fine to coarse SAND, little Silt	
5							Bottom of Boring at 4.0' (required depth)	

REMARKS: 1. Obstruction at 1.5'; moved hole ~.5' (new location on mortar location for E-8).

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG · ZOINO & ASSOC., INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CENTERDALE MANOR CENTERDALE, RHODE ISLAND	REPORT OF BORING NO. E-9 SHEET 1 OF 1 DATE 2/2/82 FILE P-3227

BORING CO. Guild Drilling Company
FOREMAN D. Serowik
G-Z-A ENGINEER S. Hanna
BORING LOCATION See Location Plan
GROUND ELEV.
DATE START 2/2/82 DATE END 2/2/82

CASING
SIZE: none (auger)
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER 140 lb.
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
2/2	31"	out	completion

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	STRTA CHG. and GEN. DESC.	SAMPLE DESCRIPTION CLASSIFICATION	NOTE
		S-1		0-2	auger sample	FILL	Green-gray, fine to coarse SAND, some- Silt, trace coarse Gravel	
2.5		S-2	24/15	2-4	3-3-2-2	4.0'	Brown, fine to medium SAND, trace Silt, changing to black Silty PEAT at ~3'. Oily odor	
5							Bottom of Boring at 4.0' (required depth)	

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

GOLDBERG · ZOINO & ASSOC., INC. GEOTECHNICAL/GEOHYDROLOGICAL CONSULTANTS	PROJECT CENTERDALE MANOR CENTERDALE, RHODE ISLAND	REPORT OF BORING NO. E-10 SHEET 1 OF 1 DATE 2/2/82 FILE P-3227

BORING CO. Guild Drilling Company
FOREMAN D. Serowik
G-Z-A ENGINEER S. Hanna

BORING LOCATION See Location Plan
GROUND ELEV.
DATE START 2/2/82 DATE END 2/2/82

CASING
SIZE: none (auger)
HAMMER: lb.
FALL:

SAMPLER
TYPE: Split Spoon OTHER:
HAMMER 140 lb.
FALL: 30"

GROUNDWATER READINGS

DATE	DEPTH	CASING AT	STABILIZATION TIME
2/2	20"	out	completion
2/2	18"	out	5 minutes

DEPTH	CAS. BL. /FT.	SAMPLE NO.	PEN./REC.	DEPTH	BLOWS/6"	STRTA CHG. and GEN. DESC.	SAMPLE DESCRIPTION CLASSIFICATION	NOTE
		S-1		0-2	auger sample		Green-brown, fine to medium SAND, some Silt, trace Organics, trace Wood, changing to moist black, fine to medium SAND, trace Silt at ~1.5'	
						FILL		
2.5		S-2	24/10	2-4	3-2-6-24		Brown, fine to medium SAND, trace Silt	
						4.0'		
5							Bottom of Boring at 4.0' (required depth)	

REMARKS:

NOTES: 1) THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDARY BETWEEN SOIL TYPES AND THE TRANSITION MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT TIMES AND UNDER CONDITIONS STATED ON THE BORING LOGS. FLUCTUATIONS IN THE LEVEL OF THE GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.

Appendix B

Compounds Analyzed

Metals

Arsenic
Barium
Cadmium
Total Chromium
Lead
Mercury
Silver
Selenium

VOLATILE ORGANIC PRIORITY POLLUTANTS

COMPOUND
chloromethane
dichlorodifluoromethane
bromomethane
vinyl chloride
methylene chloride
trichlorofluoromethane
1,1-dichloroethylene
bromochloromethane
1,1-dichloroethane
trans-1,2-dichloroethylene
chloroform
1,2-dichloroethane
1,1,1-trichloroethane
carbon tetra chloride
bromodichloromethane
1,2-dichloropropane
trans-1,3-dichloropropene
trichloroethylene
dibromochloromethane
cis-1,3 dichloropropene
1,1,2-trichloroethane
benzene
bromoform
tetrachloroethylene
1,1,2,2-tetrachloroethane
1,4-dichlorobutane
toluene
chlorobenzene
ethylbenzene

Detection limit: <1 ppb

Semivolatile Organics

COMPOUND - Acids

* 2,4,6-trichlorophenol
* p-chloro-m-cresol
* 2-chlorophenol
* 2,4-dichlorophenol
* 2,4-dimethylphenol
* 2-nitrophenol
* 4-nitrophenol
** 2,4-dinitrophenol
** 4,6-dinitrophenol
* pentachlorophenol
* phenol

COMPOUND - Base/Neutrals

acenaphthene
benzidine
1,2,4-trichlorobenzene
hexachlorobenzene
hexachloroethane
bis(chloromethyl)ether
bix(2-chloroethyl)ether
2-chloronaphthalene
1,2-dichlorobenzene
1,3-dichlorobenzene
1,4-dichlorobenzene
3,3'-dichlorobenzidine
2,4-dinitrotoluene
2,6-dinitrotoluene
1,2-diphenylhydrazine
fluoranthene
4-chlorophenyl phenyl ether
4-bromophenyl phenyl ether
bis(2-chloroisopropyl)ether
bis(2-chloroethoxy)methane
hexachlorobutadiene
hexachlorocyclopentadiene
isophorone
naphthalene
nitrobenzene
N-nitrosodimethylamine
N-nitrosodiphenylamine
N-nitrosodi-n-propylamine
bis(2-ethylhexyl)phthalate
butyl benzyl phthalate
di-n-butyl phthalate

COMPOUND - Base/Neutrals (cont'd)

di-n-octyl phthalate
diethyl phthalate
dimethyl phthalate
benzo(a)anthracene
benzo(a)pyrene
3,4benzofluoranthene
benzo(k)fluoranthene
chyrzene
acenaphthylene
anthracene
benzo(g,h,i)perylene
fluorene
phenanthrene
dibenzo(a,h)anthracene
indeno(1,2,3-cd)pyrene
pyrene

Detection limit: 10 ppb
* detection limit: 25 ppb
** detection limits: 250 ppb

Appendix C

Chemical Test Results

R.I. Analytical Laboratories, Inc.

SPECIALIZING IN ENVIRONMENTAL ANALYSIS

231 ELM STREET
WARWICK, R. I. 02888

PHONE: (401) 467-2452

CERTIFICATE OF ANALYSIS

REPORT TO: Goldberg Zoiano & Associates
293 South Main Street
Providence, RI 02903
Attn: Mr. Michael Powers

DATE RECEIVED 2/2/82
DATE REPORTED 2/10/82
PURCHASE ORDER NO. P-3227
R.I.A.L. INV. NO. 6015

SAMPLE DESCRIPTION Fill material from proposed Centerdale Manor

Per your request, subject sample has been analyzed by our laboratory with the following results:

PARAMETER	RESULTS
Volatile Organics:*	
Chloroform	3.4 ppb
Trichloroethylene	5.1 ppb
Toluene	2.6 ppb
Semivolatile Organics:*	
Acid Compounds	N.D.
Base/Neutral Compounds:	
Bis(2-ethylhexyl)phthalate	1.3 ppb
Arsenic	<0.01 mg/l
Barium	0.5 mg/l
Cadmium	<0.005 mg/l
Total Chromium	<0.05 mg/l
Lead	<0.1 mg/l
Mercury	<0.0005 mg/l
Silver	<0.01 mg/l
Selenium	<0.01 mg/l

Continued to Page -2-

APPROVED BY Anthony F. Perrotti

* A list of volatile organic and semivolatile organic compounds and their detection limits is enclosed.

Note: As you requested, all above parameters were performed on an extract from the EP Toxicity Procedure, in accordance with Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, U. S. EPA, SW-846, 1980.

If you have any questions regarding this work or if we may be of further assistance, please contact us.

R. I. Analytical Laboratories, Inc.

SPECIALIZING IN ENVIRONMENTAL ANALYSIS

231 ELM STREET
WARWICK, R. I. 02888

PHONE: (401) 467-2452

CERTIFICATE OF ANALYSIS

REPORT TO: Goldberg Zoino & Assocs.
293 South Main Street
Providence, RI 02903
Attn: Mr. Mike Sherrill

DATE RECEIVED 3/4/82
DATE REPORTED 3/22/82
PURCHASE ORDER NO.
R.I.A.L. INV. NO. 6140

SAMPLE DESCRIPTION Samples from Centerdale Manor, N. Prov., RI

Per your request, subject samples have been analyzed by our laboratory with the following results:

SAMPLE	PARAMETER	RESULTS
#12	pH	1.1
	Sulfate (as SO_4)	<50 mg/l
	EP Toxicity; (no extraction)	
	Arsenic	<0.5 mg/l
	Barium	<0.5 "
	Cadmium	0.23 "
	T. Chromium	0.39 "
	Lead	0.3 "
	Mercury	<0.001 "
	Silver	0.21 "
	Selenium	<0.5 "
#65	pH	9.9
	T. Cyanide	<1 mg/l
	EP Toxicity; (no extraction)	
	Arsenic	<0.5 mg/l
	Barium	<0.5 "
	Cadmium	<0.01 "
	T. Chromium	<0.1 "
	Lead	1.2 "
	Mercury	<0.001 "
	Silver	<0.05 "
	*Selenium	0.7 "

*possible analytical interference

APPROVED BY Anthony E. Perrotti

SAMPLE	PARAMETER	RESULTS
Composite 61,71,72 & 57	Flash Point	>140°F
	EP Toxicity;	
	Arsenic	<0.5 mg/l
	Barium	<0.5 "
	Cadmium	<0.01 "
	T. Chromium	<0.1 "
	Lead	<0.1 "
	Mercury	<0.001 "
	Silver	<0.05 "
	Selenium	<0.5 "
	Volatile Organics;	
	All compounds	N.D.
Composite 62A & 62B	Flash Point	>140°F
	Volatile Organics;	
	toluene	196 ppm
	all other compounds	N.D.
Composite 64,74,59 & 73	Flash Point (sam.#64)	106°F
	Flash Point (sam.#59)	128°F
	Flash Point (sam.#73 &74)	>140°F
	EP Toxicity;	
	Arsenic	<0.5 mg/l
	Barium	<0.5 "
	Cadmium	<0.01 "
	T. Chromium	<0.1 "
	Lead	0.1 "
	Mercury	<0.001 "
	Silver	<0.05 "
	Selenium	<0.5 "
	Volatile Organics	
	xylene	13,600 ppm
	ethyl benzene	180 ppm
	all other compounds	N.D.

continue to Page -3-

SAMPLE	PARAMETER	RESULTS
Composite 55 & 56	Flash Point (sam. #55)	72°F
	Flash Point (sam. #56)	82°F
	EP Toxicity;	
	Arsenic	<0.5 mg/l
	Barium	<0.5 "
	Cadmium	<0.01 "
	T. Chromium	<0.1 "
	Lead	2.0 "
	Mercury	<0.001 "
	Silver	<0.05 "
	Selenium	<0.5 "
	Volatile Organics;	
	toluene	5,500 ppm
	xylene	47,000 ppm
	ethyl benzene	7,100 ppm
	all other compounds	N.D.
Composite 63,66,67,68	Flash Point	>140°F
	EP Toxicity;	
	Arsenic	<0.5 mg/l
	Barium	<0.5 "
	Cadmium	0.23 "
	T. Chromium	<0.1 "
	Lead	<0.1 "
	Mercury	<0.001 "
	Silver	<0.05 "
	Selenium	<0.5 "
	Volatile Organics;	
	xylene	690 ppm
	ethyl benzene	1,100 ppm
	all other compounds	N.D.
Composite 25,31,36,50 53,58 & 60	Flash Point	>140°F
	EP Toxicity;	
	Arsenic	<0.5 mg/l
	Barium	<0.5 "
	Cadmium	0.13 "
	T. Chromium	<0.1 "
	Lead	2.1 "
	Mercury	<0.001 "
	Silver	<0.05 "
	Selenium	<0.5 "

continue to Page -4-

Note: A list of volatile organic compounds tested for and their detection limits is attached.

Metal analyses performed in accordance with "Characteristic of EP Toxicity", Federal Register, Vol. 45, No. 98, Monday, May 19, 1980, Rules and Regulations.

If you have any question regarding this work or if we may be of further assistance, please contact us.

FIELD SUMMARY

FILE No. P-3227

DATE 2/22/82 REPORT No. One SHEET 1 OF 1

PROJECT Centerdale Manor-Site Clearance LOCATION North Providence, R.I.

CLIENT Marshall Engineering CONTRACTOR Pezza

WEATHER CONDITIONS Clear REMARKS Below, D.

A. Arrived on site 0700 hours.

B. Equipment working:
1) 1 JD510 backhoe with front loading bucket.
2) 1 6-wheel dump truck.
(both vehicles supplied by Pezza)
3) 1 operator, 1 foreman and 2 laborers.

C. Work accomplished:
One large concentration of disposed drums was removed from an area along the banks of the Woonasquatucket River and scattered drums were removed from the south end and east portions of the site. This observer selected drums to be saved for later sampling and analysis of contents for subsequent determination by DEM of appropriate disposal techniques.

D. Remarks:
1) Pezza employees were informed of the need for individual protective gear and cautioned to remove said equipment before leaving the site for lunch or the end of the day's work. A first aid station was maintained on site.

2) Drum excavation and removal techniques were modified slightly from those established by DEM. Drums selected for sampling were moved by sling onto the dump truck and subsequently transported to the concrete containment area. Approximately twenty (20) drums were segregated as to probable liquid, solid, or questionable contents.

E. Visitors:
Undersigned met Bill Lund and site supervisor for Marshall Engineering at 0800 hours. John Leo, a DEM engineer from Air and Hazardous Waste, visited the site and expressed approval of protective gear and drum removal techniques.

F. Left site 1600 hours.

Distribution:
William Lund, Marshall Engineering
John Leo, RIDEM
Gerard Graf, Robinson, Green, Beretta Corp.

ON-JOB TIME 8.5
TRAVEL TIME .5
OFFICE TIME --
TOTAL TIME 9.0

Michael Sherrill
PREPARED BY

FIELD SUMMARY

FILE No. P-3227

DATE 2/23/82 REPORT No. Two SHEET 1 OF 1

PROJECT Centerdale Manor LOCATION North Providence, R.I.

CLIENT Marshall Engineering CONTRACTOR Pezza

WEATHER CONDITIONS Clear REMARKS Below, D.

A. Arrived on site 0730 hours.

B. Equipment working:
   1) 1 JD510 backhoe with front loading bucket.
   2) 1 6-wheel dump truck.
   3) 1 operator, 1 foreman and 1 laborer.

C. Work accomplished:
   1) Clearing of the southeast corner of the site continued. Drums were culled from trash piles and removed by hand or with the backhoe from the marsh areas. Drums adjudged to contain no chemical wastes materials were crushed and stockpiled on site for later disposal.
   2) Approximately fifteen (15) drums were placed in the containment area for subsequent sampling. Three (3) 1-pint jars, one 1-gallon plastic jug, and one 1.5 liter bottle of unidentified liquid contents were unearthed and hand carried to the containment area.

D. Remarks:
   1) Site was inspected by John Leo of R.I.D.E.M. He expressed satisfaction and approval of clearing operations.
   2) Removal of drums from wet marsh area disturbed bottom materials and released unpleasant odors; when disturbance of this area ceased, odors dissipated. It is believed that the gases responsible are due to natural decay of vegetation rather than the release of disposed drum contents.
   3) An insurance agent representing Pezza employees briefly observed removal operations. The individual commented that unprotected persons should be waved off from approaching the area.

E. Left site 1600 hours.

Distribution:
William Lund, Marshall Engineering
John Leo, RIDEM
Gerard Graf, Robinson, Green, Beretta Corp.

ON-JOB TIME 8.0
TRAVEL TIME .5
OFFICE TIME --
TOTAL TIME 8.5

Michael Sherrill
PREPARED BY

FIELD SUMMARY

FILE No. P-3227

DATE 2/24/82 REPORT No. Three SHEET 1 OF 1

PROJECT Centerdale Manor LOCATION North Providence, R.I.

CLIENT Marshall Engineering CONTRACTOR Pezza

WEATHER CONDITIONS Clear/Windy REMARKS Below, D.

A. Arrived on site 0730 hours.

B. Equipment working:
   1) 1 backhoe with front bucket.
   2) 1 dump truck.
   3) 1 operator, 1 foreman and 1 laborer.

C. Work accomplished:
   1) The marsh at the south end of the site was cleared of visible drums and three (3) large trash heaps were culled for hidden drums. This observer selected approximately ten (10) drums for containment and subsequent sampling.
   2) One trash heap at the southwest end of the site was colored with fluorescent powder. Drums were culled from this pile for disposal and the remaining material was segregated for subsequent inspection by John Leo of RI DEM.

D. Remarks:
   1) Representatives of the town visited the containment area and construction trailer.
   2) Gusting winds produced some hazard of airborne particles; however, no problem developed.

E. Left site 1600 hours.

Distribution:
William Lund, Marshall Engineering
John Leo, RIDEM
Gerard Graf, Robinson, Green, Beretta Corp.

ON-JOB TIME 8.0
TRAVEL TIME .5
OFFICE TIME --
TOTAL TIME 8.5

Michael Sherrill
PREPARED BY

FIELD SUMMARY

FILE No. P-3

DATE 2/25/82 REPORT No. Four SHEET 1 OF 1

PROJECT Centerdale Manor LOCATION North Providence, R.I.

CLIENT Marshall Engineering CONTRACTOR Pezza

WEATHER CONDITIONS Clear/Windy REMARKS Below, D.

A. Arrived on site 0730 hours.

B. Equipment working:
   1) 1 JD 510 backhoe with front bucket.
   2) 1 dump truck.
   3) 1 operator, 1 foreman and 1 laborer.

C. Work accomplished:
   1) Visible drums were removed from banks of the river and along the northeast bank of the swale. Approximately seven (7) drums were removed to the containment area for subsequent sampling.
   2) Piles of crushed drums were collected and moved to the crushed drum staging area for subsequent removal and disposal off site.
   3) At approximately 1330 hours, excavation of one (1) partially buried drum along the east section also unearthed a second drum which immediately emitted heavy gray smoke upon exposure to the air. Workers were waved off and Marshall survey crew was advised to avoid the area.

      This observed notified John Leo of R.I.DEM, who arrived on site and directed the removal, sealing and handling of this drum. Pezza personnel were instructed as to proper procedure in the event of similar occurrences during future excavations in the area. No injuries were sustained.

      This drum continued smoking slightly when in containment area, was resealed and removed from other drums.

D. Left site 1600 hours.

Distribution:
William Lund, Marshall Engineering
John Leo, RIDEM
Gerard Graf, Robinson, Green, Beretta Corp.

ON-JOB TIME 8.0
TRAVEL TIME .5
OFFICE TIME --
TOTAL TIME 8.5

Michael Sherrill
PREPARED BY

GZA
GOLDBERG-ZOINO & ASSOCIATES, INC.

FIELD SUMMARY

FILE No. P-3227

DATE 2/26/82 REPORT No. Five SHEET 1 OF 1

PROJECT Centerdale Manor LOCATION North Providence, R.I.

CLIENT Marshall Engineering CONTRACTOR Pezza

WEATHER CONDITIONS Clear/Windy REMARKS

A. Arrived on site 0830 hours.

B. Equipment working:
1) 1 Fiat-Allis front-end loader with operator.
2) 1 foreman.
3) Dump trucks with drivers.

C. Work accomplished:
1) Pezza crew initiated removal of crushed drums from site.
2) John Leo of RIDEM and the undersigned opened and sampled the barrels held at the containment area. Approximately twenty (20) barrels were adjudged to contain no hazardous materials and were marked for crushing and removal.

   The remainder were segregated as to liquid, solid, or corrosive contents. These were sampled. Based upon subsequent testing, the final disposition of these drums shall be determined by the DEM.

D. Remarks:
1) A representative of Marshall was notified that disposition of the remaining drums was contingent upon analysis of samples.
2) Pezza foreman was notified to remove additional drums from containment area marked for crushing and non-hazardous solid waste disposal. He was advised to continue handling of any drums encountered in subsequent excavations in the manner established during the past week. Any suspicious drums are to be handled with protective covering. The foreman has phone numbers for RIDEM and Goldberg-Zoino offices in the event additional smoking or drums of questionable contents are uncovered.

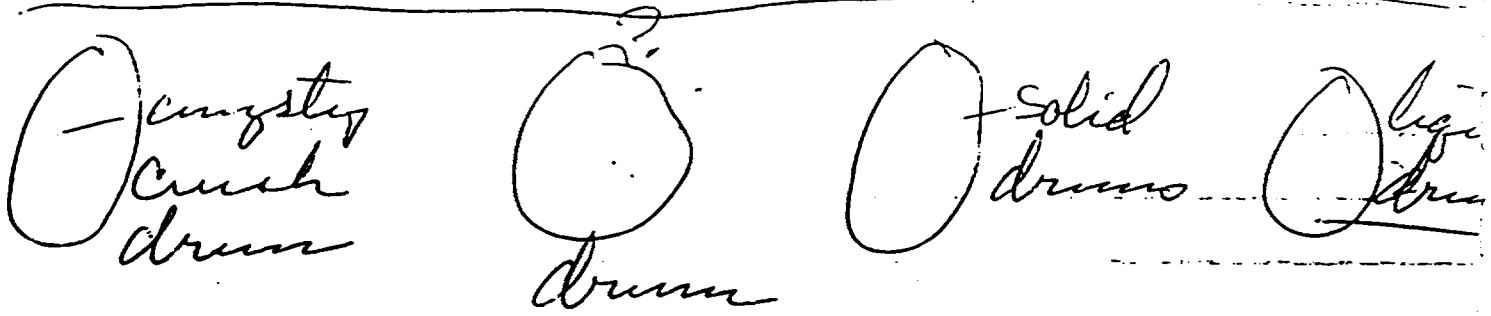
E. Left site at 1330 hours.

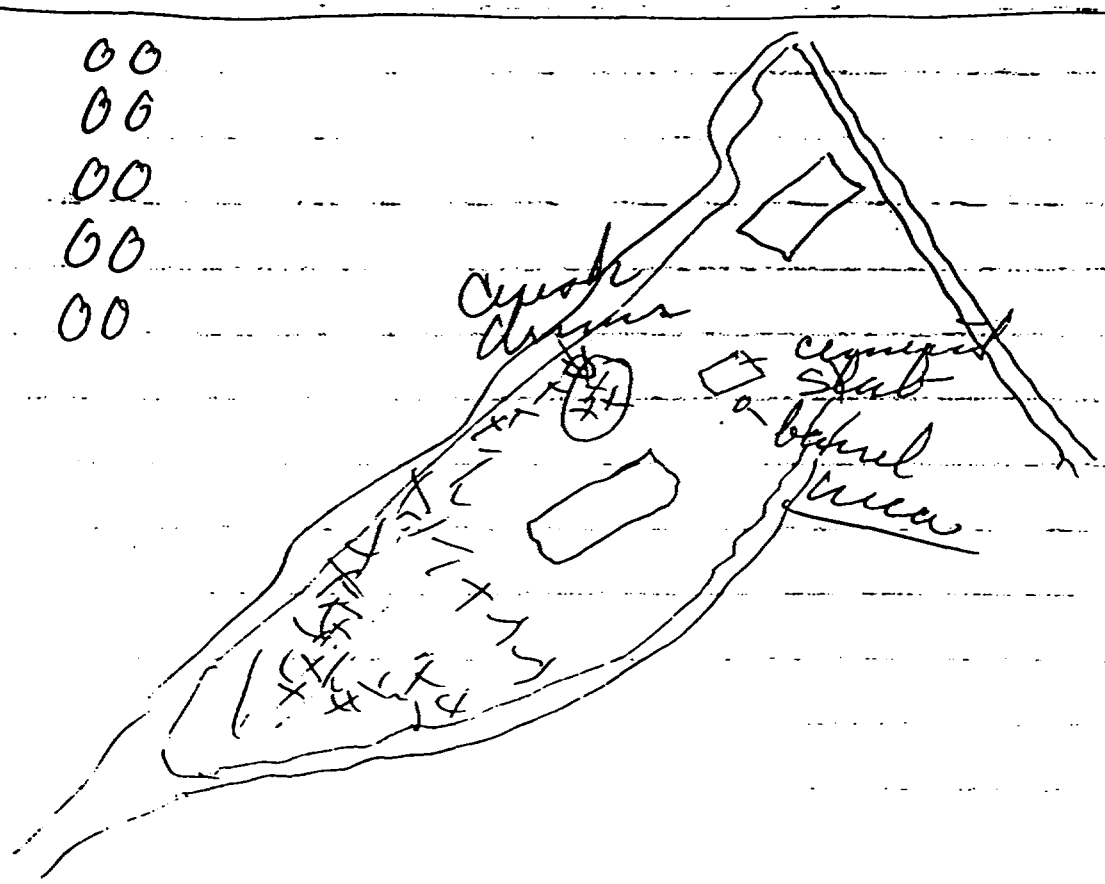
Distribution:
William Lund, Marshall Engineering
John Leo, RIDEM
Gerard Graf, Robinson, Green, Beretta Corp.

ON-JOB TIME 5.0
TRAVEL TIME .5
OFFICE TIME 2.0
TOTAL TIME 7.5

Michael Sherrill
PREPARED BY

(1) Face mask
(2) Tyvek -
(3) disposal boots
(4) work over boot
(5) surgical glove
(6) work gloves
(7) goggles
(8) hard hat





ALSO: CONTR – if someone is uncertain about working in stuff, replace –

) PROTECTIVE EQUIP: NOTE: HANDLERS VS. OPERATOR

TYVEK SUIT
SURG. GLOVES
RUBBER GLOVES
BOOTS → DISP. BOOT → RUBBER BOOT
* RESPIRATORS
HARD HAT

① Procedure for taking off & putting on.
② Coffee break – remove suit, gloves, etc.
③ Don't leave site wearing suits.

1] ACCIDENT

) Materials:

Ⓐ Empty drums → pull out, crush, load, & remove to stockpile.

Ⓑ Full drums → if open – place on-end in bucket, bring up, & move to concrete pad – place in rows of 2 abreast.
Ⓐ Push – if sloshes, or if rocks back → LIQUID
Ⓑ If very heavy, & no rock back, → SOLIDS
→ * Ⓒ Questionable drums – segregate

* Drums with plastic liners → ACIDS, possibly. TAKE CARE
* Drums with steel reinforcing → " " TAKE CARE

Ⓒ Drums buried → DIG AROUND & then use SLING TO PICK-UP. DO NOT USE TEETH of BOCKET TO GRASP OR PICK-UP FROM BENEATH.

Ⓓ ANY QUEST. DRUM → FUMES, HISSING, LEAVE IT. WILL MARK THE AREA.

Field
Sampling → (1) Flash pt - open cup flame lic
(2) Corrosivity test - PH paper -
PH - 1 - 12
(3) glass beaker - 500 mL
water reactive & (4) disposable pipette
with bulb
Specific gravity
(5) cyanide test - for solu
PH 8 - 14 with cyanide paper

Sampling tools
→ (1) planting trowel
→ (2) Coring tube - sword 3/8"
solid
(3) glass tubing
(4) nalgene pint jar
(5) PH Paper - 1-12 - reading
eastern scientific
(6) indelible marker
→ (7) rags
→ (8) plastic sheeting

Safety - FIRST aid kit
eye wash - plastic
fire extinguisher

RI ANALYT → Tot Metals ? EXTR → 6 & TIME

HEAVY METALS — Hard 7 TESTS → 6 BATCH → 1 SEP.

$2138 — 1 wk + 1-2 wk

FLASH POINT 6 TESTS on Batched Samples

VOLATILE ORGANICS 5 TESTS on Batched Samples

pH — 2 TESTS

Sulfates 1 TEST

CN⁻ Cyanide 1 TEST

1 Sample pH Sulfates H M — 3 TESTS

1 Sample pH CN⁻ H M — 3 TESTS

4 Batch S F.P. V.O. H M — 12 TESTS

1 "Lab pack" Batch F.P. V.O. — 2 TESTS.

~~Copper & Nic~~ $48.

EP TOXICITY ? ~$50/SAMPLE on Solids —

Tot. Metals

LEACHATE ?

EXTRACTABLE METALS

TOXICANT TEP FOR As, Bar, Cad, Chrom, Lead, Mer, Selenium, Silver

NON-LEACHABLE

After Non-Haz

Tony (467-2452) Centrifuge analysis

Lab analysis — Mortar bin, soda ash, water, Corrz-Peel

Get $ price by text — $ time

sample #					
12	L	PH	Sulfate	Heavy metals	Poss. of TIA on site
B1 & 65	L	"	Cl⁻	"	

61, 71, 72, 57	Raspberry colored sol's - gran/powder	FL pt	volatile organics	Heavy m	
62A, 62B	lab pack LIQ'S.	FL pt	"	"	has formaldehyde
64, 74, 59, 73	Olive Solid green	"	heavy metals	volatiles	
55, 56	Solids	"	"	"	
63, 66, 67, 68	Paint Solids	"	"		Solids → SEC. L.F. NIAGARA
25, 31, 36, 50, 53, 58	white flaky solids	heavy metals	Flash point		

12/65: FUMES: Sulfur Trioxide

FIELD SUMMARY

FILE No. P-3227.2

DATE March 18,1982 REPORT No. 4 SHEET 1 OF 2

PROJECT Centerdale Manor LOCATION North Providence, R. I.

CLIENT Marshall Contractors CONTRACTOR American Pile Driving/Pezza

WEATHER CONDITIONS Clear 40's-50's REMARKS Pile Driving Logs Attached
Site Sketch Attached

1) Arrived on site at 0815 hours.

2) Equipment working:
   a) 1 John Deere JD510 Backhoe
   b) 1 Fiat Allis 21B Dozer
   c) 1 Buffalo Bomag BW210 Vibratory Compactor
   d) 4-5 Ten-Wheel Dump Trucks
   e) 1 Crane w/Vulcan 06 Pile Driving Hammer and Ingersoll Compressor (AIR 008)

3) Work being accomplished:
   a) Siltation Fence: The JD510 Backhoe and laborers excavated a ditch line, along the eastern side of the site. The ditch was approximately 5'W. x 2'D. and continued for the entire length of the site. Hay bales were positioned and staked within the ditch line by laborers. The hay bale "fence" line will act as a siltation barrier between the site and the adjacent lowland. (The siltation fence will be constructed around the entire site). Work was not complete by the end of the day.

   It was reported by Marshall site personnel that several barrels were uncovered during excavation of the ditch. The barrels were transported to the previously established containment area for subsequent analyses and disposal.

   b) Fill Placement: Granular fill placement continued in the northern half of the site. The granular fill was obtained from an off-site source by Pezza and hauled on site. The Fiat Allis 21B Dozer was used to spread fill in approximately 12 inch(±) thick lifts. Cobbles/boulder-size material was picked from the fill and stockpiled along the outside boundaries of the site. Compaction of the fill was performed by the Vibratory Compactor. A minimum of four to six passes by the compactor over several portions of the fill area was observed by the undersigned during several periods throughout the day. No field density tests were performed this date.

   c) Pile Installation: Six production and one test pile were installed this date. Messrs. Charles Guild (American Pile Driving) and Richard Moulton (Interpile USA) were on site to direct pile driving operations. Mr. Michael Powers, GZA, was on site to discuss driving criteria with Messrs. Guild and Moulton.

   Initially, four production piles (Locations 9-1, 9-2, 9-3 and 8-1) were installed. Final driving depths were determined by Messrs. Guild and Moulton following discussions with Mr. Powers. Specifications call for

ON-JOB TIME _____
TRAVEL TIME _____
OFFICE TIME _____
TOTAL TIME _____

GZA

_____
PREPARED BY

FIELD SUMMARY

FILE No. P-3227.

DATE March 18,1982 REPORT No. 4 SHEET 2 OF 2

PROJECT Centerdale Manor LOCATION No.Providence,R.I.

CLIENT Marshall Contractors CONTRACTOR American Pile Driving/Pezza

WEATHER CONDITIONS Clear 40's-50's REMARKS Pile Driving Logs Attached

the final driving criteria to be not less than six (6) blows per inch of penetration, or to a total depth of forty (40) feet, whichever occurs at a higher elevation. Mr. Moulton noted that this criteria was somewhat stringent for the "Interpile" system being used due to the absence of side friction during driving. Mr. Moulton demonstrated the use of a total blow count value as a better indicator of the bearing ability of the Interpile. He noted that this method had been evaluated through many Interpile installation projects. Mr. Powers agreed to Mr. Moulton's recommendations; however, noted that a re-evaluation of the driving criteria would be based on the performance of the pile load test. Mr. Powers also noted that the test pile should be driven to the least criteria set by the six production piles driven this date, so that a representative test of the piles driven could be performed. Messrs. Guild and Moulton agreed to Mr. Powers recommendation.

Subsequently, the test pile and two additional production piles (Locations 8.5-1, 8-2, and 8-3, respectively) were installed. Pile driving logs recorded by the undersigned are attached with this report.

Cement grout used for all piles installed this date was obtained from Pawtucket Concrete. Flow cone measurements were made at the start of installation of each pile by a Guild representative, under the direction of Mr. Moulton. Three standard concrete cylinders and six cubes of the cement grout were prepared from the grout mix used in the test pile by a representative of the Thompson & Lichtener Testing Laboratory.

4) Visitors on site:

a) Gerhard Graf (Robinson Green Beretta Corp.)
b) Bill Lund (Marshall Contractors)
c) Vito A. Nacci (Prof. of Soils & Foundation Egr., URI)

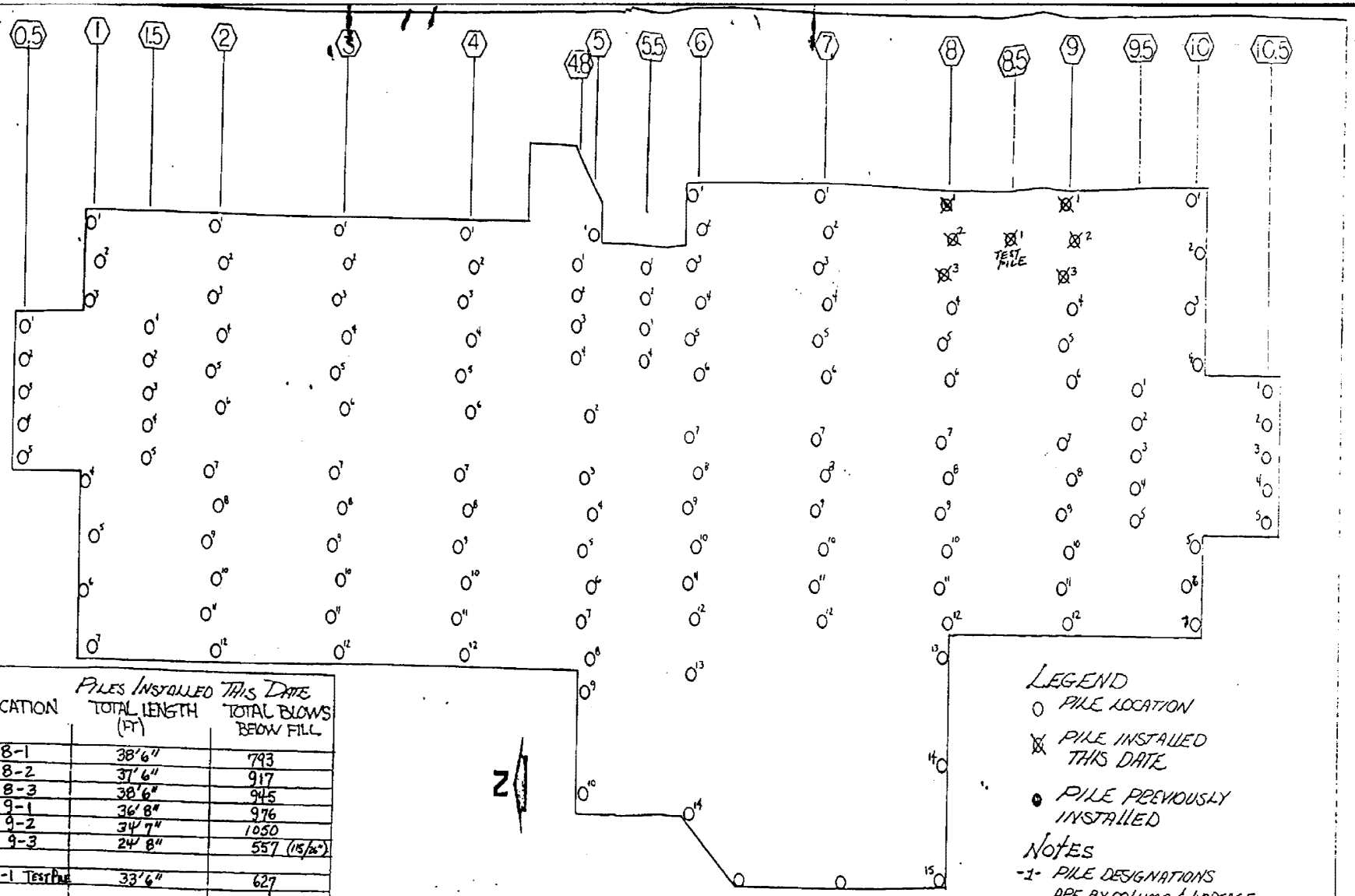
5) Left the site @ 1545 hours.

DISTRIBUTION:
Bill Lund (Marshall Contractors)
Gerhard Graf (Robinson Green Beretta Corp.)
Charles Guild (American Pile Driving) - Pile Driving Logs Only
Michael Puddicombe (Marshall Contractors)

ON-JOB TIME 7½
TRAVEL TIME ½
OFFICE TIME
TOTAL TIME 8 hours

Walter Kosinski

Walter Kosinski
PREPARED BY



LOCATION	PILES INSTALLED THIS DATE TOTAL LENGTH (FT)	TOTAL BLOWS BELOW FILL
8-1	38'6"	793
8-2	37'6"	917
8-3	38'6"	945
9-1	36'8"	976
9-2	34'7"	1050
9-3	24'8"	557 (15/24")
8.5-1 TEST PILE	33'6"	627
	TOTAL LENGTH = 243.92'	
	26 C.Y. GROUT	
	AVE EFFECTIVE DIA. = 23"	

LEGEND

O PILE LOCATION

⊠ PILE INSTALLED THIS DATE

● PILE PREVIOUSLY INSTALLED

Notes

-1- PILE DESIGNATIONS ARE BY COLUMN & INCREASE WEST TO EAST

DO NOT SCALE

Number of PILES INSTALLED THIS DATE 6 (PLUS TEST PILE)

TOTAL NUMBER OF PILES INSTALLED TO DATE 6

GZA

CENTERDALE MANOR
NORTH PROVIDENCE

FIELD SKETCH

MARCH 18, 1982 RPT. NO. 4

R.I. Analytical Laboratories, Inc.

SPECIALIZING IN ENVIRONMENTAL ANALYSIS

231 ELM STREET
WARWICK, R. I. 02888

PHONE: (401) 467-2452

CERTIFICATE OF ANALYSIS

REPORT TO: Goldberg Zoiano & Associates
293 South Main Street
Providence, RI 02903
Attn: Mr. Michael Powers

DATE RECEIVED 2/2/82
DATE REPORTED 2/10/82
PURCHASE ORDER NO. P-3227
R.I.A.L. INV. NO. 6015

SAMPLE DESCRIPTION Fill material from proposed Centerdale Manor

Per your request, subject sample has been analyzed by our laboratory with the following results:

PARAMETER	RESULTS
Volatile Organics:*	
Chloroform	3.4 ppb
Trichloroethylene	5.1 ppb
Toluene	2.6 ppb
Semivolatile Organics:*	
Acid Compounds	N.D.
Base/Neutral Compounds:	
Bis(2-ethylhexyl)phthalate	1.3 ppb
Arsenic	<0.01 mg/l
Barium	0.5 mg/l
Cadmium	<0.005 mg/l
Total Chromium	<0.05 mg/l
Lead	<0.1 mg/l
Mercury	<0.0005 mg/l
Silver	<0.01 mg/l
Selenium	<0.01 mg/l

Continued to Page -2-

APPROVED BY A. Perrotti
Anthony E. Perrotti

* A list of volatile organic and semivolatile organic compounds and their detection limits is enclosed.

Note: As you requested, all above parameters were performed on an extract from the EP Toxicity Procedure, in accordance with Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, U. S. EPA, SW-846, 1980.

If you have any questions regarding this work or if we may be of further assistance, please contact us.