



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JAMES B. HUNT, JR.
GOVERNOR

DIVISION OF HIGHWAYS
P.O. BOX 25201, RALEIGH, N.C. 27611-5201

SAM HUNT
SECRETARY

May 28, 1993

MAY 28 1993

Ms. Sharon K. Cihak
Toxic and Health Hazard Specialist
Guilford County Emergency Services
1002 Meadowood Road
Greensboro, North Carolina 27409

Subject: McLamb's Grocery, 2323 E. Green St., High Point;
Corrective Action Plan

Dear Ms. Cihak:

A report prepared by Geophex, Ltd., detailing the extent of petroleum contamination in the soils of the subject site is enclosed for your review. A groundwater sample taken from a monitoring well installed immediately down-gradient from the former tank pit indicated the presence of no contaminants above NCAC 2L Standards.

Hand auger borings were extended to the top of the groundwater table in order to delineate the extent of petroleum-contaminated soils in the vicinity of the former USTs. Laboratory sample and PID results indicate the presence of approximately 375 cubic yards of soil with TPH levels in excess of State Standards. NCDOT would now like to remove the soils contaminated in excess of 10 ppm and stockpile them on-site until a decision can be made as to the method of their disposal. Soil screening with a PID will determine the extent of the excavation.

Should there be any evidence whatsoever of contaminants within the groundwater of the excavation zone, we would like to pump this water into a container for transport to a proper disposal facility. A water sample will then be collected for lab analysis to confirm the absence of further contamination.

Once approved by your office, this work will begin as soon as it can be scheduled. Please contact me at (919) 250-4088 if you have any questions or comments. Otherwise, we will await your response to our remediation plans. Thank you for your time and consideration in handling this incident.

Sincerely,

A handwritten signature in black ink that reads "Gregory A. Smith".

Gregory A. Smith
Environmental Geologist



Geophex, Ltd
605 Mercury Street
Raleigh, North Carolina 27603
(919) 839-8515

May 26, 1993

Mr. Gregory A. Smith, P.G.
Environmental Geologist
Geotechnical Unit
NC Department of Transportation
P.O. Box 25201
Raleigh, NC 27611-5201

RECEIVED
MAY 28 1993

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

Subject: Addendum to Underground Storage Tank Closure Report for 2323 East Green Drive, High Point, Guilford County, NC., Geophex Job No. 312.

Ref: NC DOT Project: 8.1570603, ID No.: R-609I, FA Project: MAP-119-1(3).

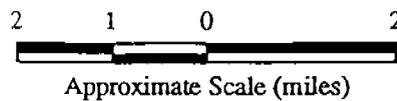
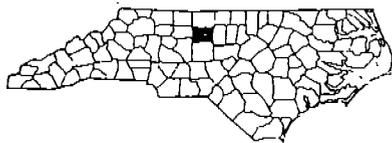
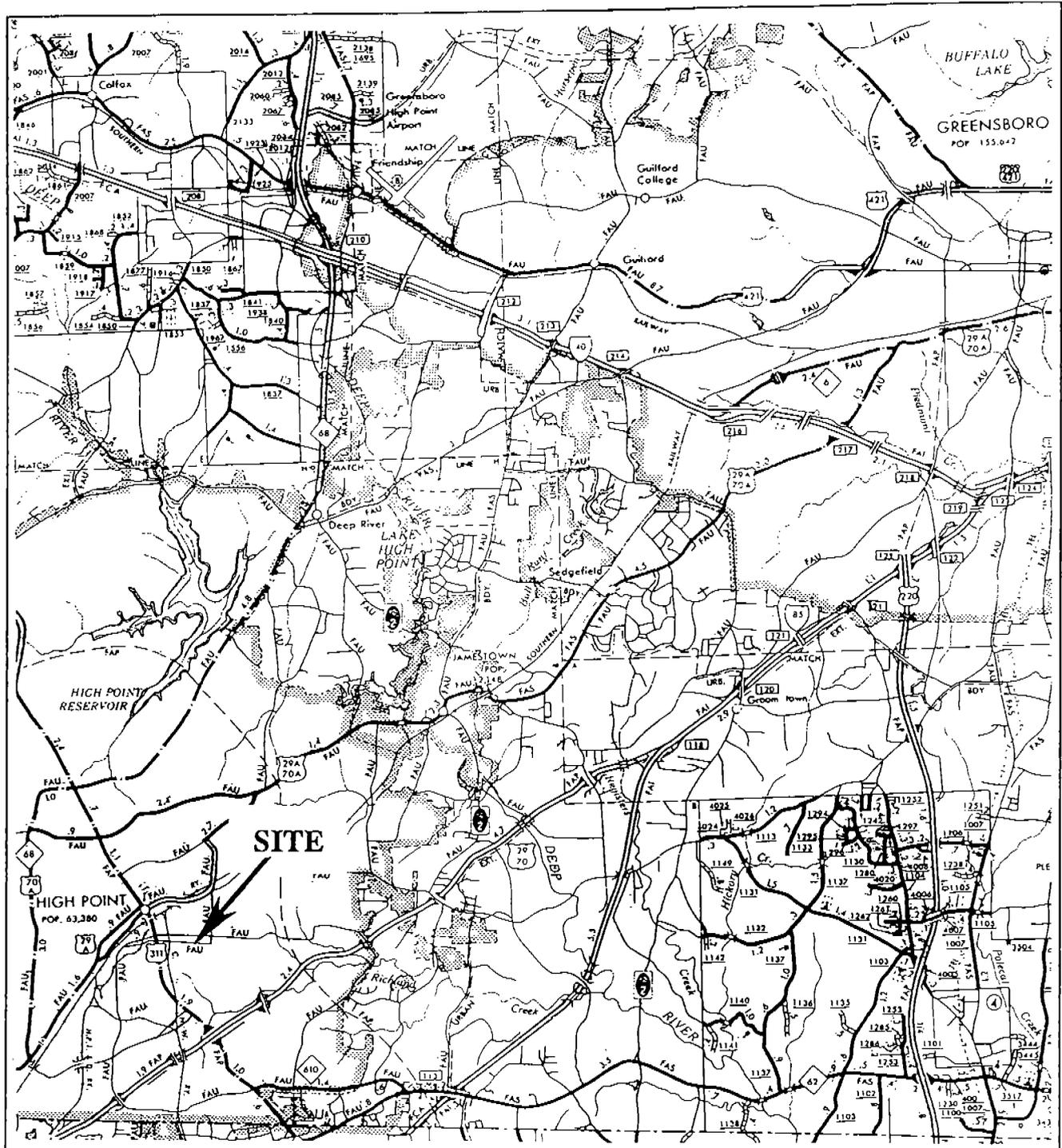
Dear Mr. Smith:

Geophex conducted additional investigations at a former underground storage tank (UST) site located on North Carolina Department of Transportation (NC DOT) property at 2323 East Green Drive, High Point, Guilford Co., NC (Figures 1 and 2). Guilford County Emergency Services asked NC DOT to further delineate the limits of soil and groundwater contamination documented in our closure report of December 16, 1992. NC DOT authorized Geophex to perform the additional work on April 19, 1993. This letter report serves as an addendum to the original site closure report.

We advanced four hand-augered soil borings (labeled T5AO&G, T5BO&G, T6O&B and T7O&G) within or adjacent to the former UST basins of tanks T5 through T7 (Figure 3). We analyzed one soil sample from each boring with photoionization detector (PID) and submitted a duplicate sample to a certified laboratory for analysis by EPA Method 9071 (oil and grease) to determine the presence or absence of used/waste oils in the vicinity of the old tanks.

We advanced sixteen hand-augered soil borings (labeled B1 through B16) and collected twenty-nine soil samples at varying depths to delineate the vertical and lateral extent of soil contamination surrounding the former UST basins of tanks T5 through T7. Figure 4 shows soil boring locations and extent of soil contamination with respect to physical features of the site. We terminated all soil borings at, or immediately after, encountering groundwater.

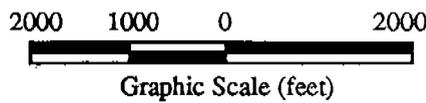
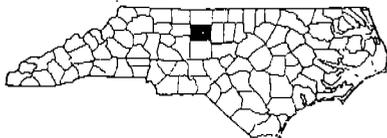
We decontaminated auger buckets in the field before sample collection using a mild detergent wash, water and methanol rinse, and air drying prior to collecting the next sample. We placed each sample in a vapor-tight glass container, filling the entire bottle. We also collected duplicate samples in mason jars, leaving an air-filled, head-space. The duplicate sample bottles had a pre-drilled hole through the jar lid and were temporarily sealed with aluminum foil to prevent loss of



North



Figure 1. Location of 2323 East Green Drive UST site on the NCDOT Guilford County Highway Map.



North



Figure 2. Location of 2323 East Green Drive UST site on the U.S.G.S. 1:24,000 scale Topographic Map (High Point East Quadrangle).

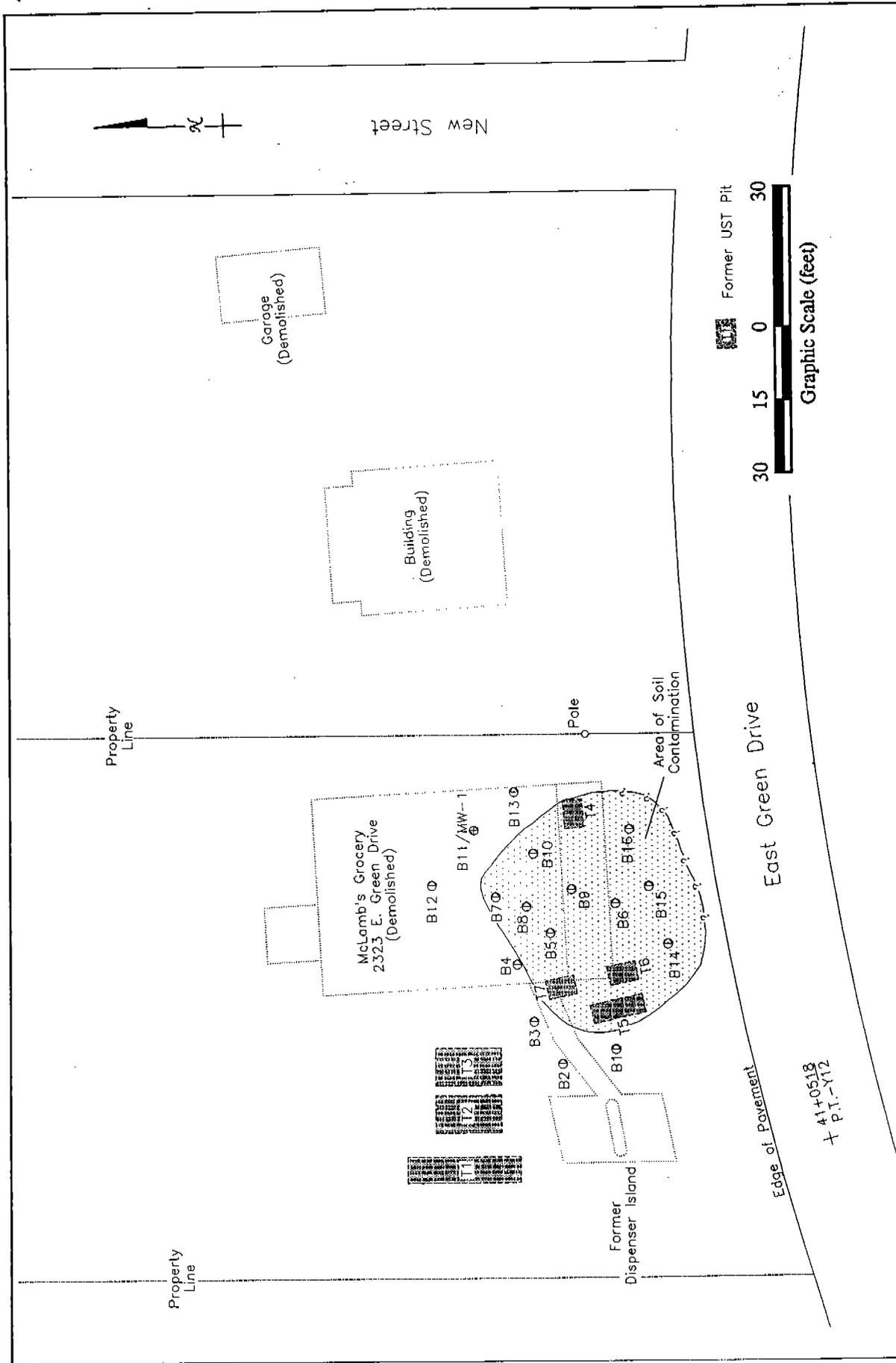


Figure 4. Site map of 2323 East Green Drive UST site, showing existing site conditions, soil borings and monitor well location, and area of soil contamination.



volatile organic compounds. We stored all samples in an ice-filled cooler prior to and during transport from the site to the laboratory.

We analyzed the duplicate samples for total petroleum hydrocarbon (TPH) using a photoionization detector (PID), for organic vapor content by means of a head-space technique modified from the method of Robbins and others (1989). The method involves placing the duplicate sample jar into a specially designed oven. After holding at an elevated constant temperature for 5 minutes to allow organic compounds to volatilize into the existing head-space, we inserted the PID probe through the aluminum foil seal and measured TPH concentration in parts per million (ppm). Based on PID results, we submitted four soil samples (borings B-1, B-6, B-10 and B-11) to an analytical laboratory (IEA, Inc., Cary, NC) for TPH analysis by EPA Methods 3550 (diesel fraction) and 5030 (gasoline fraction).

Lithologic descriptions of borings, soil-gas survey results and TPH analyses by various methods are included in Table 1. Original laboratory certificates of analysis and chain of custody records are included in Appendix A.

Table 1. Soil boring descriptions, PID data, and laboratory results collected from McLamb's Grocery UST Site, 2323 E. Green Drive, High Point, Guilford Co., NC.

Boring	Depth Interval (feet)	Soil Description	Sample Depth (feet)	Petroleum Odor	PID (ppm)	TPH	TPH	TPH
						3550 (mg/kg)	5030 (mg/kg)	9071 (mg/kg)
B1	0.0-1.0	Gravel and sand FILL	6	N	8	-	-	-
	1.0-10.5	Red-brown clayey SILT	9	N	10	-	-	-
	Boring Terminated @ Water Table 10.5 ft		10.5	N	10	<2.0	<2.0	-
B2	0.0-1.0	Gravel and sand FILL						
	1.0-7.5	Red-brown clayey SILT	6	N	6	-	-	-
	7.5-9.5	Maroon clayey SILT/silty CLAY	9	N	13	-	-	-
Boring Terminated @ Water Table 9.5 ft								
B3	0.0-2.0	Mixed FILL, concrete, sand and gravel						
	2.0-5.0	Red-brown clayey SILT	5	N	8	-	-	-
Boring Terminated @ Water Table 5.0 ft								
B4	0.0-1.5	Mixed FILL, concrete, sand and gravel						
	1.5-4.0	Red-brown clayey SILT						
	4.0-5.5	Olive-brown SILT w/trace-little clay	6	N	6	-	-	-
	5.5-6.5	Red-brown clayey SILT						
Boring Terminated @ Water Table 6.5 ft								
B5	0.0-2.0	Sand and gravel FILL						
	2.0-4.5	Red-brown clayey SILT						
	4.5-7.0	Green clayey SILT	5.5	M-H	564	-	-	-
	7.0-9.5	Blue-green clayey SILT	9	H	612			
Boring Terminated @ Water Table 9.5 ft								
B6	0.0-1.5	Sand and gravel FILL						
	1.5-7.0	Red-brown clayey SILT	6	H	1065	-	-	-
	7.0-9.5	Olive-brown clayey SILT	9	M-H	960	7,000	11,000	-
Boring Terminated @ Water Table 9.5 ft								

continued on next page

Table 1 continued. Soil boring descriptions, PID data, and laboratory results collected from
 McLamb's Grocery UST Site, 2323 E. Green Drive, High Point, Guilford Co., NC.

Boring	Depth Interval (feet)	Soil Description	Sample Depth (feet)	Petroleum Odor	PID (ppm)	TPH	TPH	TPH
						3550 (mg/kg)	5030 (mg/kg)	9071 (mg/kg)
B7	0.0-0.5	Asphalt and gravel FILL						
	0.5-5.5	Olive-brown SILT w/some textural fabric Auger Refusal @ 5.5 ft	5.5	N-L	46	-	-	-
B8	0.0-1.0	Sand and gravel FILL						
	1.0-2.5	Red-brown clayey SILT						
	2.5-3.5	Red-brown and Olive-brown clayey SILT						
	3.5-6.5	Olive-green clayey SILT Boring Terminated @ Water Table 6.5 ft	4	M	81	-	-	-
B9	0.0-1.5	Sand and gravel FILL						
	1.0-7.0	Red-brown clayey SILT	6	M-H	834	-	-	-
	7.0-9.0	Olive-green clayey SILT Boring Terminated @ Water Table 9.0 ft	9	M-H	909	-	-	-
B10	0.0-0.5	Sand and gravel FILL						
	0.5-6.5	Red-brown clayey SILT						
	6.5-7.5	Olive-green clayey SILT	6	L-M	43	-	-	-
	7.5-9.0	Blue-green clayey SILT	9	M	195	9.6	2.8	-
	9.0-9.5	Olive-green clayey SILT Boring Terminated @ Water Table 9.5 ft						
B11	0.0-0.5	Gravel and sand FILL						
	0.5-3.5	Red-brown clayey SILT						
	3.5-8.75	Brown-orange-white SAPROLITE Water Table 5.5 ft Boring Terminated @ 8.75 ft	6	N	31	<2.0	<2.0	-
B12	0.0-0.5	Gravel and sand FILL						
	0.5-3.0	Red-brown clayey SILT						
	3.0-6.0	Tan-brown-orange SILT Water Table 5.5 ft Boring Terminated @ 6.0 ft	6	N	23	-	-	-
B13	0.0-1.0	Mixed FILL, cobbles, sand and gravel						
	1.0-4.0	Red-brown clayey SILT						
	4.0-6.0	Red-brown to brown clayey SILT Boring Terminated @ Water Table 6.0 ft	6	N	24	-	-	-
B14	0.0-0.5	Mixed FILL, cobbles, sand and gravel						
	0.5-6.0	Red-brown silty CLAY						
	6.0-8.0	Light orange-red-brown clayey SILT	6	M	576	-	-	-
	8.0-9.0	Yellow to orange-brown clayey SILT	9	H	606	-	-	-
	9.0-13.0	Yellow silty CLAY Boring Terminated @ Water Table 13.0 ft	12	M	524	-	-	-
B15	0.0-1.5	Brown to green-gray silt FILL	6	L-M	17	-	-	-
	1.5-6.5	Red-brown clayey SILT	9	M	159	-	-	-
	6.5-12.0	Red-orange-white SAPROLITE Boring Terminated @ Water Table 12.0 ft	12	M-H	521	-	-	-

continued on next page

Table 1 continued. Soil boring descriptions, PID data, and laboratory results collected from McLamb's Grocery UST Site, 2323 E. Green Drive, High Point, Guilford Co., NC.

Boring	Depth Interval (feet)	Soil Description	Sample Depth (feet)	Petroleum Odor	PID (ppm)	TPH	TPH	TPH
						3550 (mg/kg)	5030 (mg/kg)	9071 (mg/kg)
B16	0.0-0.5	Brown to green-gray sand and gravel FILL						
	0.5-6.5	Red-brown clayey SILT	6	N	8	-	-	-
	6.5-7.0	Quartz PEBBLES horizon	9	M-H	599	-	-	-
	7.0-12.0	Olive-brown to red-brown clayey SILT Boring Terminated @ 12.0 ft	12	M-H	623	-	-	-
T5AO&G		Not logged (sample from beneath pit)	11	-	29	-	-	<10
T5BO&G		Not logged (sample from beneath pit)	7	-	8	-	-	<10
T6O&G		Not logged (sample from side of pit)	8	-	649	-	-	15
T7O&G		Not logged (sample from beneath pit)	7	-	301	-	-	<10

Bolded text denotes sample exceeded action level
 Petroleum Odor: N = None, L = Low, M = Medium, H = High
 Symbol '-' denotes that no analysis is done for the sample.

Soils at the site are classified as Mecklenburg/Urban land complex consisting of reddish-brown sandy clay loam grading into a mottled yellowish-red and red clay (USDA SCS, 1977). These

soils are typical along the side slopes of upland areas with varying grades of 2 to 10 percent. Soil borings at the site show a relatively thin layer (0.5 - 1.5 feet) of fill material overlying a red-brown clayey silt of varying thickness above the groundwater table. Olive- to blue-green clayey silts are present between the red-brown clayey silts and the groundwater table.

Laboratory analyses indicate detectable petroleum contamination in borings B6 and B10. The North Carolina Division of Environmental Management (NC DEM), a branch of the North Carolina Department of Environment, Health, and Natural Resources (NC DEHNR), specifies an action level of 10 ppm for TPH (EPA Method 5030), 40 ppm for TPH (EPA Method 3550), and 250 ppm for oil & grease (EPA Method 9071) as determined by laboratory methods (NC DEHNR, 1993). Above the action level, NC DEM may require additional investigation and/or remediation of the site.

Correlation of the soil-gas survey and laboratory results indicate that a 30 foot x 50 foot area exceeds the NC DEM action level of 40 ppm for high boiling point fuels such as diesel and 10 ppm for low boiling point fuels such as gasoline but not for oil & grease (NC DEHNR, 1993). Approximately 375 cubic yards of soil is contaminated (40 feet x 50 feet x 5 feet) by TPH similar to gasoline and diesel fuel. The total volume of soil contamination may exceed 375 cubic yards as the southern edge of contamination may extend beneath East Green Drive.

We elected to convert boring B11 to a permanent monitor well (MW-1) to investigate the extent of groundwater contamination in proximity to, but beyond the area of known soil contamination. We screened the well from 2.5 to 8.5 feet below ground surface with the static groundwater table

at a depth of 5.5 feet below ground surface. The monitor well construction diagram is included in Appendix B. We collected groundwater samples and analyzed for dissolved petroleum constituents at a certified laboratory (Carolina Environmental Laboratory, Sanford, NC) using EPA Methods 601 and 602. Laboratory results for MW-1 are shown in comparison to NCAC 2L Standards (NCAC 2L, 1989) in Table 2. Certificates of analysis and chain of custody record are included in Appendix C.

Table 2. Laboratory results of groundwater samples collected from monitor well MW-1 at McLamb's Grocery UST Site, 2323 E. Green Drive, High Point, Guilford Co., NC.

<u>EPA Method 601</u>		
<i>Compound</i>	MW-1 (mg/L)	NCAC 2L Standard (mg/L)
Dichlorodifluoromethane	<0.001	0.00019
Chloromethane	<0.001	NSL
Vinyl chloride	<0.001	0.00015
Bromomethane	<0.001	NSL
Chloroethane	<0.001	NSL
Methylene chloride	<0.001	0.005
Trichlorofluoromethane	<0.001	NSL
trans-1,2-dichloroethene	<0.001	0.07
Chloroform	<0.001	0.00019
1,1,1-Trichloroethane	<0.001	0.2
Carbon tetrachloride	<0.001	0.0003
1,2-Dichloroethene	<0.001	NSL
Trichloroethene	<0.001	NSL
1,1-Dichloroethene	<0.001	NSL
1,2-Dichloropropane	<0.001	0.00056
Bromodichloromethane	<0.001	NSL
trans-1,3-Dichloropropene	<0.001	NSL
cis-1,3-Dichloropropene	<0.001	NSL
1,1,2-Trichloroethane	<0.001	NSL
Tetrachloroethene	<0.001	NSL
Dibromochloromethane	<0.001	NSL
Chlorobenzene	<0.001	0.3
Bromoform	<0.001	0.00019
1,1,2,2-Tetrachloroethane	<0.001	NSL
1,3-Dichlorobenzene	<0.001	0.62
1,2-Dichlorobenzene	<0.001	0.62
1,4-Dichlorobenzene	<0.001	0.0018
<u>EPA Method 602</u>		
<i>Compound</i>	MW-1 (mg/L)	NCAC 2L Standard (mg/L)
Benzene	<0.001	0.001
Chlorobenzene	<0.001	0.3
1,2-Dichlorobenzene	<0.001	0.62
1,3-Dichlorobenzene	<0.001	0.62
1,4-Dichlorobenzene	<0.001	0.0018
Ethylbenzene	<0.001	0.029
Toluene	<0.001	1.0
Xylenes (Total)	<0.001	0.4
BTEX (Total)	<0.001	NSL

NSL: No specific limit listed under NCAC 2L Groundwater Standards

Values in µg/L as measured by laboratory GC using EPA Methods 601 and 602

Monitor well MW-1 contained no detectable groundwater contamination despite its proximity to contaminated soils in borings B-7 and B-10. We therefore believe that groundwater contamination is not widespread and is probably limited to the area of soil contamination.

Based on the data collected at this site we recommend the following:

- 1) Remove the estimated 375 cubic yards of contaminated soil and landfarm the material at a land application rate of 3 inches. This would require approximately 3/4 acre. Incorporate the contaminated soil into the native material adding fertilizers approximately 15-30 days after disposal.
- 2) Excavate an area for a sump within the center of the defined soil contamination zone and remove 500-1000 gallons of water by a vacuum pump truck. Transport the water to an approved facility for disposal.
- 3) Collect a groundwater sample from the excavation after pumping to determine presence or absence of groundwater contamination. Reassess the status of the site based on the two alternate scenarios as follows:
 - a) If the groundwater is contaminated with petroleum fuel hydrocarbons after this initial removal of water, additional wells may be required to assist in a Comprehensive Site Assessment (CSA). The CSA will be used to determine the need for remedial action, if any, for groundwater quality.
 - b) If the groundwater is not contaminated with petroleum fuel hydrocarbons, then the groundwater investigation at the site may end.
- 4) Backfill the excavation with an approved borrow-fill material and proceed as needed for additional characterization or site closure.

Sincerely,

Kenneth L. Howard, Jr.

Kenneth L. Howard, Ph.D.
Program Manager



I. J. Won, Ph.D., P.G.
Technical Director

References

NCAC 2L, 1989, North Carolina Administrative Code, Title 15, Subchapter 02L .0202 Water Quality Standards, NC Department of Environment, Health and Natural Resources.

North Carolina Department of Environment, Health, and Natural Resources, 1993, Division of Environmental Management--Groundwater Section--, Groundwater section guidelines for the investigation and remediation of soils and groundwater, 95 p.

Robbins, G. A., Bristol, R. D., and Roe, V. D., 1989, A field screening method for gasoline contamination using a polyethylene bag sampling system: Ground Water Monitoring Review, v. 9, no. 4, p. 87-97.

United States Department of Agriculture, Soil Conservation Service, 1977, Soil survey of Guilford County, North Carolina, 77 p.

Appendix A

Laboratory Analytical Results and Chain of Custody Record

Total petroleum hydrocarbon (TPH) using SW-846 Methods 3550 and/or 5030.
Oil and Grease using SW-846 Method 9071.

<u>Description</u>	<u>Page</u>
<i>TPH using Methods 3550 and/or 5030</i>	
B-1 10.5'	A-1
B-6 9'	A-2
B-10 9'	A-3
B-11 6'	A-4
QC Blank for Method 3550	A-5
QC Blank for Method 5030	A-6
<i>Oil & Grease using Method 9071</i>	
T5AO&G 11'	A-7
T5BO&G 7'	A-8
T6O&G 8'	A-9
T7O&G 7'	A-10
QC Blank for Method 9071	A-11
Chain of Custody Record	A-12



IEA

An Aquarion Company

Total Petroleum Hydrocarbon Analysis

IEA Project No: 646-137 Date Sampled: 04-27-93
IEA Sample No: 9304599-01 Date Received: 04-30-93
Client Sample No: B1 10.5' Date Extracted: 05-06-93
Client Project No: 312 NC DOT Guilford 311 Bypass

Extraction (SW 846 - 3550) / GC-FID analysis (for #2 fuel oil, kerosene, varsol)
Date Analyzed: 05-07-93 Analyzed by: Westhead
Time Analyzed: 1105

The sample does not contain a petroleum hydrocarbon blend in the distillation range referenced above. The quantitation limit is 2.0 mg/kg.

Comment:

Purge and Trap (SW 846 - 5030) / GC-FID analysis (for gasoline only)
Date Analyzed: 05-06-93 Analyzed by: Westhead
Time Analyzed: 2050

The sample does not contain a petroleum hydrocarbon blend with a distillation range similar to gasoline. The quantitation limit is 2.0 mg/kg.

Comment:





Total Petroleum Hydrocarbon Analysis

IEA Project No: 646-137 Date Sampled: 04-28-93
IEA Sample No: 9304599-02 Date Received: 04-30-93
Client Sample No: B6 9' Date Extracted: 05-06-93
Client Project No: 312 NC DOT Guilford 311 Bypass

Extraction (SW 846 - 3550) / GC-FID analysis (for #2 fuel oil, kerosene, varsol)
Date Analyzed: 05-07-93 Analyzed by: Westhead
Time Analyzed: 1426

The sample contains a petroleum hydrocarbon blend with a distillation range similar to #2 fuel oil. The concentration is 7000 mg/kg. The quantitation limit is 1000 mg/kg.

Comment:

Quantitation limit elevated due to extract dilution prior to analysis.
Extract diluted due to the presence of target compounds.

Purge and Trap (SW 846 - 5030) / GC-FID analysis (for gasoline only)
Date Analyzed: 05-07-93 Analyzed by: Westhead
Time Analyzed: 1254

The sample contains a petroleum hydrocarbon blend with a distillation range similar to gasoline. Total concentration is 11000 mg/kg. The quantitation limit is 500 mg/kg.

Comment:

Quantitation limit elevated due to sample dilution prior to analysis.
Sample diluted due to the presence of target compounds.





Total Petroleum Hydrocarbon Analysis

IEA Project No: 646-137 Date Sampled: 04-28-93
IEA Sample No: 9304599-03 Date Received: 04-30-93
Client Sample No: B10 9' Date Extracted: 05-06-93
Client Project No: 312 NC DOT Guilford 311 Bypass

Extraction (SW 846 - 3550) / GC-FID analysis (for #2 fuel oil, kerosene, varsol)
Date Analyzed: 05-07-93 Analyzed by: Westhead
Time Analyzed: 1232

The sample contains a petroleum hydrocarbon blend with a distillation range similar to #2 fuel oil. The concentration is 9.6 mg/kg. The quantitation limit is 2.0 mg/kg.

Comment:

Purge and Trap (SW 846 - 5030) / GC-FID analysis (for gasoline only)
Date Analyzed: 05-06-93 Analyzed by: Westhead
Time Analyzed: 2200

The sample contains a petroleum hydrocarbon blend with a distillation range similar to gasoline. Total concentration is 2.8 mg/kg. The quantitation limit is 2.0 mg/kg.

Comment:





IEA

An Aquarion Company

Total Petroleum Hydrocarbon Analysis

IEA Project No: 646-137 Date Sampled: 04-28-93
IEA Sample No: 9304599-04 Date Received: 04-30-93
Client Sample No: B11 6' Date Extracted: 05-06-93
Client Project No: 312 NC DOT Guilford 311 Bypass

Extraction (SW 846 - 3550) / GC-FID analysis (for #2 fuel oil, kerosene, varsol)
Date Analyzed: 05-07-93 Analyzed by: Westhead
Time Analyzed: 1316

The sample does not contain a petroleum hydrocarbon blend in the distillation range referenced above. The quantitation limit is 2.0 mg/kg.

Comment:

Purge and Trap (SW 846 - 5030) / GC-FID analysis (for gasoline only)
Date Analyzed: 05-06-93 Analyzed by: Westhead
Time Analyzed: 2235

The sample does not contain a petroleum hydrocarbon blend with a distillation range similar to gasoline. The quantitation limit is 2.0 mg/kg.

Comment:





IEA

An Aquarion Company

Total Petroleum Hydrocarbon Analysis

IEA Project No: 646-137 Date Sampled: N/A
IEA Sample No: 9304599 Date Received: N/A
Client Sample No: QC Blank Date Extracted: 05-06-93
Client Project No: 312 NC DOT Guilford 311 Bypass

Extraction (SW 846 - 3550) / GC-FID analysis (for #2 fuel oil, kerosene, varsol)
Date Analyzed: 05-07-93 Analyzed by: Westhead
Time Analyzed: 0936

The sample does not contain a petroleum hydrocarbon blend in the distillation range referenced above. The quantitation limit is 2.0 mg/kg.

Comment:

N/A = Not Applicable

Corresponding Samples: 9304599-01 through 9304599-04

Purge and Trap (SW 846 - 5030) / GC-FID analysis (for gasoline only)
Date Analyzed: 05-06-93 Analyzed by: Westhead
Time Analyzed: 1137

The sample does not contain a petroleum hydrocarbon blend with a distillation range similar to gasoline. The quantitation limit is 2.0 mg/kg.

Comment:

N/A = Not Applicable

Corresponding Samples: 9304599-01, 9304599-03 and 9304599-04



Total Petroleum Hydrocarbon Analysis

IEA Project No: 646-137 Date Sampled: N/A
IEA Sample No: 9304599 Date Received: N/A
Client Sample No: QC Blank
Client Project No: 312 NC DOT Guilford 311 Bypass

Purge and Trap (SW 846 - 5030) / GC-FID analysis (for gasoline only)
Date Analyzed: 05-07-93 Analyzed by: Westhead
Time Analyzed: 0804

The sample does not contain a petroleum hydrocarbon blend with a distillation range similar to gasoline. The quantitation limit is 2.0 mg/kg.

Comment:

N/A = Not Applicable

Corresponding Sample: 9304599-02





IEA

An Aquarion Company

IEA Project #: 646-137(0)
IEA Sample #: 9304600-01
Client Name: Geophex, LTD
Client Proj. I.D.: 312 NCDOT Guilford 311 Bypass
Sample I.D.: T5A0&G11'
Matrix: Soil
Date Received: 04/30/93
Date Sampled: 04/27/93

Parameter	Method	Detection Limits	Results	Date Prepared	Date Analyzed	Analyst
O&G (Grav)	SW-846 9071	10 mg/kg	BQL	05/13/93	05/14/93	LG

Comments:

BQL = Below Quantitation Limit

O&G (Grav) = Oil & Grease Gravimetric





IEA
An Aquarion Company

IEA Project #: 646-137(Ø)
IEA Sample #: 93Ø46ØØ-Ø2 Matrix: Soil
Client Name: Geophex, LTD Date Received: Ø4/3Ø/93
Client Proj. I.D.: 312 NCDOT Guilford 311 Bypass Date Sampled: Ø4/27/93
Sample I.D.: T5BØ&G7'

Parameter	Method	Detection Limits	Results	Date Prepared	Date Analyzed	Analyst
O&G (Grav)	SW-846 9Ø71	1Ø mg/kg	BQL	Ø5/13/93	Ø5/14/93	LG

Comments:

BQL = Below Quantitation Limit

O&G (Grav) = Oil & Grease Gravimetric





IEA

An Aquarion Company

IEA Project #: 646-137(Ø)
IEA Sample #: 93Ø46ØØ-Ø3 Matrix: Soil
Client Name: Geophex, LTD Date Received: 04/30/93
Client Proj. I.D.: 312 NCDOT Guilford 311 Bypass Date Sampled: 04/27/93
Sample I.D.: T6Ø&G8'

Parameter	Method	Detection Limits	Results	Date Prepared	Date Analyzed	Analyst
O&G (Grav)	SW-846 9Ø71	1Ø mg/kg	15 mg/kg	Ø5/13/93	Ø5/14/93	LG

Comments:

O&G (Grav) = Oil & Grease Gravimetric



IEA

An Aquarion Company

IEA Project #: 646-137(0)
IEA Sample #: 9304600-04 Matrix: Soil
Client Name: Geophex, LTD Date Received: 04/30/93
Client Proj. I.D.: 312 NCDOT Guilford 311 Bypass Date Sampled: 04/27/93
Sample I.D.: T70&G7'

Parameter	Method	Detection Limits	Results	Date Prepared	Date Analyzed	Analyst
O&G (Grav)	SW-846 9071	10 mg/kg	BQL	05/13/93	05/14/93	LG

Comments:

BQL = Below Quantitation Limit

O&G (Grav) = Oil & Grease Gravimetric





IEA

An Aquarion Company

IEA Project #: 646-137(0)
IEA Sample #: 9304600 Matrix: Soil
Client Name: Geophex, LTD Date Received: 04/30/93
Client Proj. I.D.: 312 NCDOT Guilford 311 Bypass Date Sampled: 04/27/93
Sample I.D.: QC Blank

Parameter	Method	Detection Limits	Results	Date Prepared	Date Analyzed	Analyst
O&G (Grav)	SW-846 9071	10 mg/kg	BQL	05/13/93	05/14/93	LG

Comments:

BQL = Below Quantitation Limit

N/A = Not Applicable

O&G (Grav) = Oil & Grease Gravimetric

Corresponding Samples: 9304600-01 through 04





IEA
An Aquarion Company

3000 WESTON PKWY.
CARY, N.C. 27513
PH # 919-877-0090
FAX # 919-877-0427

CHAIN OF CUSTODY RECORD

REGULATORY CLASSIFICATION - PLEASE SPECIFY

NPDES DRINKING WATER RCRA OTHER

NO: 36224

COMPANY
GEOPHEX LTD

039-8515

Page 1 of 1

PROJECT NO.	PROJECT NAME	LOCATION	DATE	TIME	COLLECTOR	ANALYST	CONTAINER #	MATERIAL		REQUESTED PARAMETERS				IEA QUOTE NO.	IEA RUSH NO.
								SOIL	WATER	EPA 9071	EPA 3552	EPA 5030			
312	NC DOT Guilford 311 Bypass														
<i>George R. Fields</i>															
75A02911	4/27/93	11:00	X				1	X		X					
75B059	4/27/93	11:15	X				1	X		X					
76019	4/27/93	11:45	X				1	X		X					
77019	4/27/93	12:20	X				1	X		X					
B1105'	4/27/93	13:50	X				1	X		X					
B4 9'	4/28/93	11:10	X				1	X		X					
B10 9'	4/28/93	12:15	X				1	X		X					
B11 6'	4/28/93	14:15	X				1	X		X					
RECEIVED <i>George R. Fields</i> 4/28/93 9:20															
RECEIVED <i>Jim Hump</i> 4/30/93 9:53															
REMARKS IEA # 646-137															
REMARKS 646-137(10)															
PROJECT MANAGER (PLEASE PRINT) GEORGE FIELDS															
P.O. NO. 930429GF															

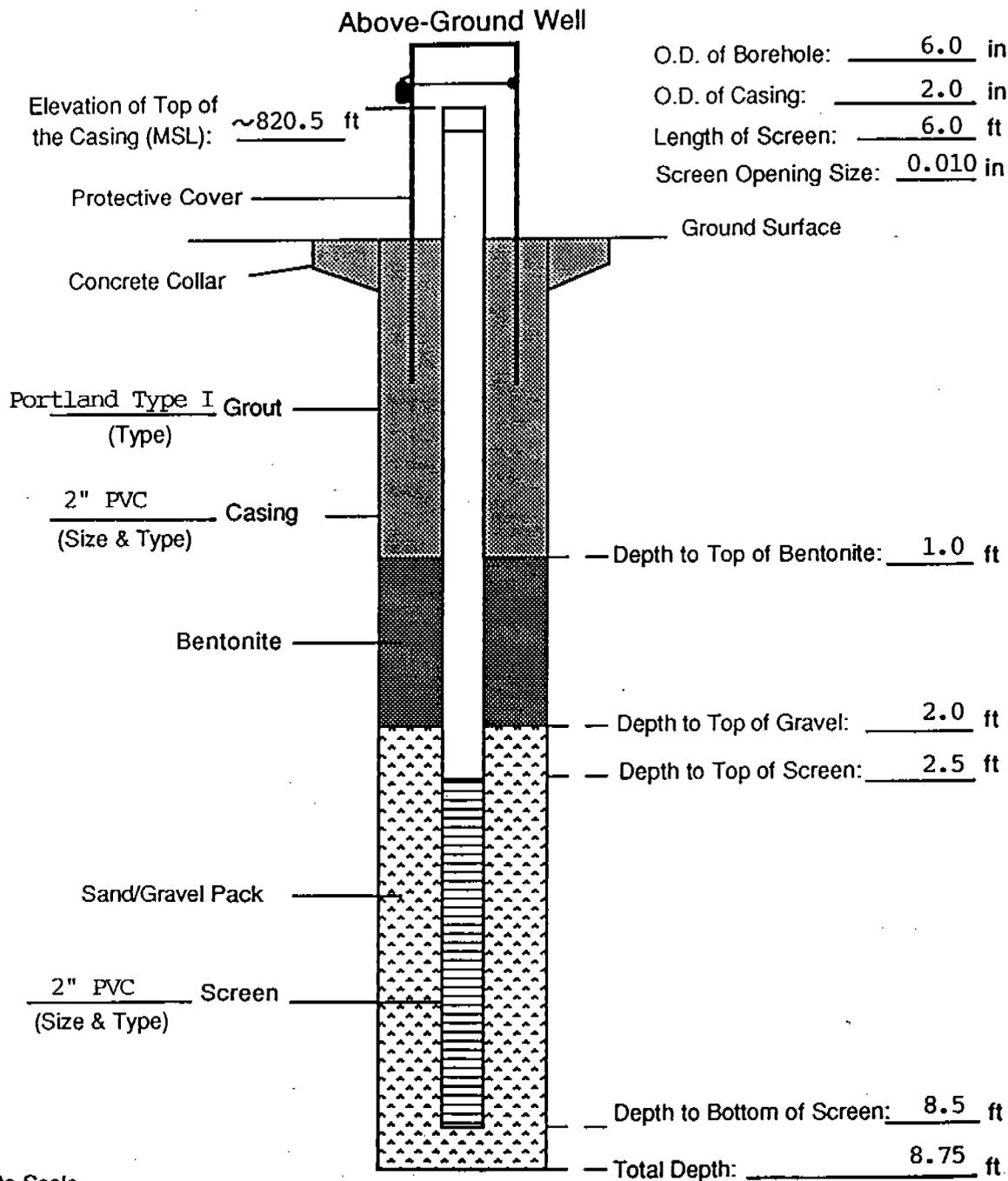
Appendix B

Monitor Well Construction Diagram.

<u>Description</u>	<u>Page</u>
Above Grade Monitor Well Construction Diagram.....	B-1

Well Number: MW-1 Drilling Method: Hand Augering
 Date Started: 5-6-93 Drilling Fluids: None
 Date Finished: 5-6-93 Static Water Level: ~ 815 ft Date: 5-11-93
 Geologist/Engineer: G. Fields Observed By: G. Wade
 Remarks: _____

All depths referenced to ground surface



Not to Scale



Monitor well construction diagram for MW-1.

Appendix C

Laboratory Analytical Results and Chain of Custody Record

Groundwater Sample from MW-1 using EPA Methods 601 and 602.

<u>Description</u>	<u>Page</u>
MW-1 by EPA Method 601	C-1
MW-1 by EPA Method 602	C-2
Chain of Custody Record	C-3



CAROLINA ENVIRONMENTAL LABORATORIES

A Division of Graham Brothers, Inc.

REPORT OF ANALYSIS

Page 1 of 2

Client Name: Geophex, Ltd
 Address: 605 Mercury St Raleigh, NC 27603
 County: Wake
 Collection Point: DOT-Guilford Co
 Collected By: George Wade
 Analyst(s): PK

CEL #: 7826
 Client #: 334
 Type of Sample: Water
 Date Collected: 5-11-93
 Date Received: 5-11-93
 Data Reviewed By: FM

CERTIFIED BY: Tom TIGHE

NCNCD #306 / NCSDWA #37741

EPA METHOD: 602 (Reported in mg/L, mg/kg, or ppm)

CEL #: 7826
 CLIENT #: 334

PARAMETER	SAMPLE 1	SAMPLE 2	SAMPLE 3	SAMPLE 4	DETECTION LIMIT
BENZENE	< 0.001				
TOLUENE	< 0.001				
ETHYLBENZENE	< 0.001				
CHLOROBENZENE	< 0.001				
1,2-DICHLOROBENZENE	< 0.001				
1,3-DICHLOROBENZENE	< 0.001				
1,4-DICHLOROBENZENE	< 0.001				



CAROLINA ENVIRONMENTAL LABORATORIES

A Division of Graham Brothers, Inc.

REPORT OF ANALYSIS

Page 2 of 2

Client Name: Geophex, Ltd

CEL #: 7826

EPA METHOD: 601 (Results in mg/L, ppm)

CEL #: 7826
CLIENT #: 334

<u>COMPONENTS</u>	<u>SAMPLE #1</u>	<u>SAMPLE #2</u>	<u>SAMPLE #3</u>
CHLOROMETHANE	< 0.001		
DICHLORODIFLUOROMETHANE	< 0.001		
VINYL CHLORIDE	< 0.001		
BROMOMETHANE	< 0.001		
CHLOROETHANE	< 0.001		
TRICHLOROFLUOROMETHANE	< 0.001		
1, 1-DICHLOROETHENE	< 0.001		
METHYLENE CHLORIDE	< 0.001		
TRANS-1, 2-DICHLOROETHENE	< 0.001		
CHLOROFORM	< 0.001		
1, 1-DICHLOROETHANE	< 0.001		
1, 1, 1-TRICHLOROETHANE	< 0.001		
CARBON TETRACHLORIDE	< 0.001		
1, 2-DICHLOROETHANE	< 0.001		
TRICHLOROETHENE	< 0.001		
1, 2-DICHLOROPROPANE	< 0.001		
BROMODICHLOROMETHANE	< 0.001		
2-CHLOROETHYL VINYL ETHER	< 0.001		
TRANS-1, 3-DICHLOROPROPENE	< 0.001		
CIS-1, 2-DICHLOROPROPENE	< 0.001		
1, 1, 2-TRICHLOROETHANE	< 0.001		
DIBROMOCHLOROTHANE	< 0.001		
CHLOROBENZENE	< 0.001		
BROMOFORM	< 0.001		
1, 1, 2, 2-TETRACHLOROETHANE	< 0.001		
1, 3-DICHLOROBENZENE	< 0.001		
1, 4-DICHLOROBENZENE	< 0.001		
1, 2-DICHLOROBENZENE	< 0.001		
TETRACHLOROETHENE	< 0.001		

Lab Address: 1229 N. Horner Blvd., Sanford, NC 27330 919/775-1880

Corporate Office: Rt. 1, Box 20, West End, NC 27376 919/673-0487

CHAIN OF CUSTODY

CLIENT NAME: GEOPHEX, LTD
 CLIENT ADDRESS: 605 MERCURY ST
 ATTN: RONALD A CROWSON
 RALEIGH, NC 27603-2343

C.E.L. SAMPLE #: 7826
 CLIENT SAMPLE #: 384
 SAMPLER: GEORGE WANE (Print)
 COUNTY: WAKE GUILFORD CP. (Signature)

CEL #	SAMPLE LOCATION	DATE	TIME	SAMPLE TYPE	NO. OF BOTTLES	ANALYSIS REQUIRED
<u>7826</u>	<u>DOT- Guilford Co.</u>	<u>5/11/93</u>	<u>14:00</u>	<u>WATER</u>	<u>3</u>	<u>601/602</u>

RELINQUISHED BY: [Signature] DATE/TIME: 5/11/93 - 5:30

RECEIVED BY: [Signature] DATE/TIME:

SAMPLE CONDITION/COMMENTS: (A)

RESULTS REPORTED BY: DATE/TIME: