501 13th Street NW
Phone: 319 892-6098
Fax: 319-892-6099

Linn County Public Health

CON 12-15
doc # 3886

Fax

To: Lambert Nnadi **From:** Ruby Perin

Fax: 515-281-8895 **Date:** November 7, 2005

Phone: [Click here and type phone number] **Pages:** [Click here and type number of pages] 24

Re: [Click here and type subject of fax] **CC:** [Click here and type name]

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

Comments:

Lambert,

Here is copy of report. Have also sent copy via mail. Please review and comment.

Also, copy of my observations.

Thanks,

Ruby

Supervisor
John

319-892-6050

Please find observations noted in the Preliminary Limited Site Investigation Report for the LINN COUNTY ELECTION DEPOT, 823 3RD STREET SW, CEDAR RAPIDS, IOWA.

Page 6: **Reported that soil samples collected from B1, B2, B3, B4, B5, B6, & B7 are below Benzene IDNR Statewide Standard of 0.54 mg/kg.**

Observation: Benzene in soil concentrations in B2, B3, B4, & B5 are in excess of IDNR Statewide Standard of 0.54 mg/kg.

Page 6: **Reported that IDNR Statewide Standard for Naphthalene in soil is 1,600 mg/kg**

Observation: According to IAC 567 – Chapter 135 the limiting chemical value for Naphthalene is 7.6 mg/kg. The Total Extractable Hydrocarbon default value would then be 3,800 mg/kg. If this is the case, B6 would exceed IDNR Standards. The Iowa Land Recycling Program standard for Naphthalene in soil is 1,600 mg/kg.

Observation: Total Extractable Hydrocarbons were not reported in soils.

Page 7: **Naphthalene IDNR Statewide Standard is reported at 20 µg/L on page 7 for VOCS groundwater data and 420 µg/L for SVOCs on page 8 groundwater data.**

Observation: According to IAC 567-Chapter 135 the most limiting chemical concentration for Naphthalene is 150 µg/L for the groundwater to ingestion pathway, groundwater to plastic water line pathway, and groundwater to surface water pathway. The Iowa Land Recycling Program standard for Naphthalene in groundwater is 700µg/L for non-protected groundwater and 20 µg/l for protected groundwater. Please clarify.

Page 7: **Reported that Naphthalene IDNR Statewide Standard is 20 µg/L and groundwater samples collected meet State Standards.**

Observation: TWM2, TMW3, TMW4, TMW5, & TMW6 Naphthalene reported groundwater concentrations are in excess of Terracon reported 20 µg/L IDNR Statewide Standard.

Page 7 & 8: **Reported that a detectable concentration of tetrachloroethene was found in TMW7 only.**

Observation: According to Table II: Groundwater Analytical Data TMW4 & TMW6 chemical concentrations are also in excess of the Terracon reported IDNR Statewide Standard of 5 µg/L for Tetrachloroethene.

Observation: Total Extractable Hydrocarbons were not reported in groundwater.

Page 9: **Reported – "Based on elevated PID readings in the near surface substrate at the site, Terracon is recommending that your structural engineer consider a vapor barrier placed beneath the floor slab on the new proposed building in the design. In addition to the vapor barrier, Terracon recommends the consideration of a passive vapor collection system installed beneath the proposed building."**

Observation: Soil samples collected from borings were collected at the highest PID reading. Based on the assumption that the PID reading would indicate the depth in each boring where the greatest soil contamination is, comments to follow:

- benzene in soil concentrations does not exceed the Soil Vapor to Enclosed Space standard of 1.16 mg/kg
- benzene in groundwater concentrations does not exceed Groundwater Vapor to Enclosed Space standard of 1,540 µg/kg

Recommendation:

- Work with IDNR Contaminated Sites Section to determine course of action.
- Deficiencies should be corrected in report to better determine extent of contaminates.
- Determine if site is Protected Groundwater or Non-Protected Groundwater. This impacts groundwater standards for chemicals tested.

PRELIMINARY LIMITED SITE INVESTIGATION

LINN COUNTY ELECTION DEPOT
823 3RD STREET SW
CEDAR RAPIDS, IA

Terracon Project No. 06057116
October 21, 2005

Prepared for:

LINN COUNTY
930 FIRST STREET SW
CEDAR RAPIDS, IOWA

Prepared by:

Terracon Consultants, Inc.
Cedar Rapids, Iowa

Terracon

Terracon
Consulting Engineers & Scientists

Terracon Consultants, Inc.
6666 Willow Creek Drive SW
Cedar Rapids, Iowa 52404-4312
Phone 319.366.8321
Fax 319.366.0032
www.terracon.com

October 21, 2005

Linn County
Administrative Office Building
930 First Street SW
Cedar Rapids, Iowa 52404-2161

Attn: Mr. Michael Goldberg

Re: **Preliminary Limited Site Investigation**
Linn County Election Depot
823 3RD STREET SW
Cedar Rapids, Iowa
Terracon Project No.: 06057116

Dear Mr. Goldberg:

Terracon is pleased to submit two copies of the Preliminary Limited Site Investigation (LSI) report for the above referenced site. This investigation was performed in accordance with Terracon's Proposal Number E05158 dated October 4, 2005.

We appreciate the opportunity to perform these services for Linn County. Please contact Ed D. Bertch at (319) 366-8321 if you have questions regarding the information provided in the report.

Sincerely,
Terracon Consultants, Inc.

Prepared by:

Ed D. Bertch, PG, CGP
Environmental Project Manager

Reviewed by:

Dennis Sensenbrenner, Jr.
Dennis R. Sensenbrenner, PG
Senior Hydrogeologist

Copies to: Addressee (2)

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Enclosure

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LIST OF APPENDICES

PRELIMINARY LIMITED SITE INVESTIGATION

LINN COUNTY ELECTION DEPOT
823 3RD STREET SW
CEDAR RAPIDS, IOWA

Terracon Project No.: 06057116
October 21, 2005

1.0 INTRODUCTION

1.1 Site Description

Site Name	Linn County Election Depot
Site Location/Address	823 3rd Street SW, Linn County, Cedar Rapids, Iowa
General Site Description	The subject site is located within the NE ¼ of the SW ¼ of Section 28, Township 83 North, Range 7 West, in Linn County, Iowa. The property was a rectangle-shaped parcel consisting of approximately 1.20 acres of land currently being developed located in the southwest portion of metropolitan Cedar Rapids in Eastern Iowa. The subject site was bounded by Linn County Veterans Affair on the south followed by a railroad, a local tavern on the north followed by 8th Avenue SW, 3rd Street SW followed by Interstate 380 on the west, and 2nd Street on east.

A topographic map is included as Figure 1 and a site plan is included as Figure 2 of Appendix A.

1.2 Scope of Work

Terracon conducted a Preliminary Limited Site Investigation (PLSI) at Linn County Election Depot property located at 823 3rd Street SW in Linn County, Cedar Rapids, Iowa. At your request, Terracon's PLSI was undertaken in response to your request due to the Sanborn Maps, which were provided by the Linn County Historical Society.

Based on the Sanborn Maps the site was formerly used by the Cedar Rapids Oil Company as what appears to have been a bulk petroleum storage and distribution site. Based on the Sanborn Maps the site contained the following tanks.

Table I-Tank Information

Tank Number	Content Label	Capacity	Apparent Tank Style
1	Iron Oil Tank	Not Labeled	Underground Storage Tank (UST)
2	Iron Oil Tank	Not Labeled	UST
3	Iron Oil Tank	Not Labeled	UST
4	Gasoline	15,000-Gallons	Aboveground Storage Tank (AST)
6	Kerosene	50,000-Gallons	AST
7	Iron Oil Tank	Not Labeled	UST
8	Gasoline	12,000 Gallons	AST
9	Iron Oil Tank	Not Labeled	UST
10	Gasoline	Not Labeled	UST
11	Kerosene	160,000-Gallons	AST
12	Gasoline	Not Labeled	UST
13	Iron Oil Tank	Not Labeled	UST
15	Gasoline	300,000-Gallons	AST
17	Lubricating Oils	37,500-Gallons	AST
18	Iron Oil Tank	180,000-Gallons	AST
19	Lubricating Oils	37,500-Gallons	AST
20	Iron Oil Tank	160,000-Gallons	AST

Tanks numbered 5, 14, and 16 were not observed on the Sanborn Maps provided. Linn County requested that borings not be placed within the newly poured concrete sections on the eastern half of the properties.

The objective of the PLSI was to provide additional information regarding the potential presence of contaminants associated with the above listed tanks (above relevant laboratory method detection limits) in on-site soils and/or groundwater. Terracon's PLSI was conducted in accordance with Terracon's proposal dated October 4, 2005 as verbally authorized by Mr. Michael Goldberg, for Linn County, on October 4, 2005.

2.0 FIELD ACTIVITIES

2.1 Borings and Monitoring Wells

Terracon's field activities were conducted on October 5 and 6, 2005, by Mr. Ed D. Bertch, a Terracon environmental professional. As part of the approved scope of work, seven borings/temporary monitoring wells (B1/MW1, B2/TMW2, B3/TMW3, B4/TMW4, B5/TMW5, and B6/TMW6, and B7/TMW7) were advanced on-site. The seven borings/temporary monitoring wells were used to gather additional subsurface information regarding possible chemicals of concern.

- Boring Number (No.) 1 was advanced in the apparent southeast corner of 300,000-gallon gasoline AST location (tank number 15),
- Boring No. 2 was advanced adjacent to the south end of the apparent two gasoline USTs location (tank numbers 10 and 12),
- Boring No. 3 was advanced between the two iron oil tanks location (tank numbers 1 and 2),
- Boring No. 4 was advanced on the presumed down-gradient side of the 15,000-gallon gasoline AST, 50,000-gallon kerosene AST, and 12,000-gallon gasoline AST (tank numbers 4, 6, and 8),
- Boring No. 5 was advanced within the 160,000-gallon kerosene AST location (tank number 11),
- Boring No. 6 was advanced within the 160,000-gallon oil AST location (tank number 18), and
- Boring No. 7 was advanced within the 160,000-gallon oil AST location (tank number 20).

The chemicals of concern for B1, B2, B3, B4, B5, B6, and B7 were volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) in on-site soil and groundwater.

Figure 1 presents the general boundaries and topography of the site on portions of the USGS topographic quadrangle map of 823 3rd Street SW, Cedar Rapids, Iowa (Appendix A). Figure 2 is a site plan that indicates the approximate locations of the soil borings and temporary monitoring wells in relation to structures on site and general site boundaries (Appendix A).

Drilling services were performed by a State of Iowa licensed well driller using a truck mounted hollow stem auger drilling rig under the supervision of a Terracon environmental professional. Soil samples were collected continuously using split spoon samplers. Drilling equipment was cleaned using a high pressure washer prior to beginning the project and before beginning each boring/temporary monitoring well. Sampling equipment was cleaned using an Alconox® wash and potable water prior to the beginning of the project.

Soil samples were continuously observed to document soil lithology, color, and relative moisture content. Detailed lithologic descriptions are presented on the soil boring logs included in Appendix B. The soil samples were field-screened using a photo-ionization detector (PID – MiniRae 2000 or

equivalent) to indicate the presence of VOCs.

The general soil lithology encountered during sample collection consisted of the following:

- Limestone Gravel Fill or Asphalt- surface to a depth of 4.0 feet below ground surface (bgs),
- Sandy Clay – from 2.0 feet to 9.5 feet bgs,
- Fine to Medium Sand– from 6.0 feet to 21.0 feet bgs, and
- Medium to Coarse Sand – from 14.0 feet to the terminus (30.0 feet) of the borings/temporary monitoring wells.

Subsequent to advancement, soil borings B1, B2, B3, B4, B5, B6, and B7 were converted to temporary groundwater monitoring wells (TMW1, TMW2, TMW3, TMW4, TMW5, TMW6, and TMW7, respectively). The monitoring wells were completed using the following methodology:

- Installation of 10 feet of 2-inch diameter, 0.010-inch machine slotted PVC well screen with a threaded bottom cap;
- Installation of 2-inch diameter, threaded, flush joint PVC riser pipe to the surface.

Groundwater was encountered during the advancement of borings/temporary monitoring wells at the depths shown below.

- B1/TMW1 23.51 feet bgs
- B2/TMW2 24.89 feet bgs
- B3/TMW3 24.80 feet bgs
- B4/TMW4 22.05 feet bgs
- B5/TMW5 21.62 feet bgs
- B6/TMW6 23.24 feet bgs
- B7/TMW7 20.51 feet bgs

The groundwater flow direction and the depth to shallow groundwater would likely vary depending upon seasonal variations in rainfall and depth to the soil/bedrock interface. Without the benefit of permanent on-site groundwater monitoring wells surveyed to a datum, groundwater flow direction beneath the site cannot be ascertained. Based on the temporary monitoring well the groundwater flow direction from the temporary monitoring wells was to the southeast.

Following completion of groundwater sampling, the temporary monitoring well risers and screens were removed from the borings. After removing the temporary casings, risers, and screens, the borings/temporary monitoring wells were backfilled with bentonite pellets to the surface. Soil cuttings, groundwater, and wash water generated during the field activities were left on-site.

2.2 Soil and Groundwater Sampling

Terracon's soil and groundwater sampling program consisted of the following:

- Collection of one soil sample from each boring from the zone exhibiting the highest PID reading, or from the interval at which the sampling professional observes visual indications of potential environmental impact. If no elevated PID readings were observed, a soil sample was collected within the capillary fringe above the first saturated horizon. The soil samples were submitted to an independent laboratory for analysis of VOCs and SVOCs.

- Collection of one groundwater sample from each of the boring/temporary monitoring wells (B1/TMW1, B2/TMW2, B3/TMW3, B4/TMW4, B5/TMW5, B6/TMW6, and B7/TMW7). The groundwater sample was collected using a new, disposable bailer. The groundwater samples were submitted to an independent laboratory for analysis of VOCs and SVOCs.

Soil and groundwater samples were collected and placed in laboratory prepared glassware, sealed with custody tape, and placed on ice in a cooler, which was secured with a custody seal. The sample coolers and completed chain-of-custody forms were relinquished to TestAmerica in Cedar Falls, Iowa for rush turnaround. The executed chain-of-custody form and laboratory data sheets are provided in Appendix C.

3.0 LABORATORY ANALYTICAL METHODS

The soil and groundwater samples collected from the soil boring and temporary monitoring wells were analyzed by the following methods:

	Analysis	Sample Type	Method
OA1	VOCs	Soil/Water	EPA Method 8260B
OA2	SVOCs	Soil/Water	EPA Method 8270C

4.0 DATA EVALUATION

4.1 Soil Samples

Soil concentrations above laboratory method detection limits are reported in Table I below together with Iowa Department of Natural Resources (IDNR) statewide standards for the constituents. Results are reported in milligrams of chemical constituent per kilogram of soil (mg/kg).

Linn County Election Depart
Cedar Rapids, Iowa
Terracon Project Number: 06057116
October 21, 2005

Terracon Consultants, Inc.

Table I: Soil Analytical Data

Parameter	Analytical Results (mg/kg)							IDNR Statewide Standard
Location	B1	B2	B3	B4	B5	B6	B7	(mg/kg)
Date	10/03/05	10/03/05	10/03/05	10/03/05	10/03/05	10/03/05	10/03/05	
Depth Feet bgs	22-23	26-27	26-27	11-12	25-26	6-7	17-18	
VOCs								
Acetone	<0.56	<6.90	<7.07	<6.17	<5.50	1.32	<0.55	7,800
Benzene	<0.056	<0.69	<0.71	<0.62	<0.55	0.089	<0.056	0.54
Bromomethane	<0.056	4.05	4.76	<2.46	7.24	<0.25	<0.22	110
n-Butylbenzene	<0.056	2.14	1.32	4.55	0.062	3.01	0.119	NA
sec- Butylbenzene	<0.056	2.25	2.54	1.83	1.61	1.52	0.439	NA
tert-Butylbenzene	<0.056	<0.69	<0.71	<0.80	<0.55	2.54	<0.056	NA
2-Chlorotoluene	<0.056	<0.69	<0.71	<0.62	1.09	<0.062	0.093	1,600
4-Chlorotoluene	<0.056	<0.69	<0.71	1.10	<0.55	<0.062	<0.056	1,600
Ethylbenzene	<0.056	1.0	1.10	2.85	<0.55	3.66	0.06	15
Isopropylbenzene	<0.056	<0.69	<0.71	2.03	<0.55	1.14	<0.050	NA
p-Isopropyltoluene	<0.056	<0.69	<0.71	5.08	<0.55	1.42	0.073	NA
Naphthalene	<0.28	3.78	<3.59	<3.08	<2.80	17.10	<0.28	1,600
n-Propylbenzene	<0.056	<0.69	<0.71	4.96	0.898	2.21	0.091	NA
Toluene	<0.056	<0.69	<0.71	<0.62	<0.55	0.062	<0.056	42
1,1,2-Trichloroethane	<0.056	<0.69	1.95	0.80	1.25	0.85	0.662	310
1,2,4-Trimethylbenzene	<0.056	2.40	<0.71	5.52	<0.55	17.0	<0.056	NA
1,3,5-Trimethylbenzene	<0.050	<0.69	<0.71	7.26	<0.55	5.32	<0.050	NA
Xylenes	<0.17	<2.07	<2.09	12.40	<1.60	8.47	<0.17	160,000
SVOCs								
Acenaphthene	<0.73	<0.38	<0.38	<0.34	<0.38	7.70	<0.73	4,700
Anthracene	<0.73	<0.38	<0.38	<0.34	<0.38	3.20	<0.73	23,000
Dibenzofuran	<0.73	<0.38	<0.38	<0.34	<0.38	1.6	<0.73	NA
Fluorene	<0.73	<0.38	<0.38	<0.34	<0.38	8.57	<0.73	3,100
2-Methylnaphthalene	<0.73	<0.38	<0.38	0.40	<0.38	509	<0.73	NA
Naphthalene	<0.73	<0.38	<0.38	<0.34	<0.38	47.7	<0.73	1,600
Phenanthrene	<0.73	<0.38	<0.38	<0.34	<0.38	59.9	<0.73	NA
2-Nitrophenol	<0.73	<0.38	0.47	<0.34	<0.38	<0.81	<0.73	630

NA ?

Notes:
Bolded -Sample result above IDNR statewide standard
mg/kg -Indicates milligrams per kilogram, generally equivalent to ppm
NA -No standard for contaminant
NT -Sample Not Collected

References: Table 2, Standards for Soil, Iowa Land Recycling Program (Statewide Standard for Soil); IAC 567 Chapter 137

? most limiting in soil is ? 2,100 mg/kg

Total Extractable Hydrocarbons 5800

Detectable concentrations of VOCs and SVOCs in the soil sample from B1, B2, B3, B4, B5, B6, and B7 were found to be below the Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (IAC 567-Chapter 135) or Standards for Soil, Iowa Land Recycling Program (IAC 567 Chapter 137). Detectable concentrations of n-

butylbenzene, sec-butylbenzene, tert- butylbenzene, isopropyltoluene, p-isopropyltoluene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, dibenzofuran, 2-methylnaphthalene, and phenanthrene in the soil sample from B1, B2, B3, B4, B5, B6, and/or B7 were found not to have a standard.

4.2 Groundwater Samples

Groundwater concentrations above laboratory method detection limits are reported in Table II below together with IDNR statewide standards for the constituents. Other groundwater concentrations that were analyzed from groundwater at TMW1, TMW2, TMW3, TMW4, TMW5, TMW6, and TMW7 were below laboratory method detection limits. Results are reported in micrograms of chemical constituent per liter of water (µg/L). Sample results in bold were detected above the statewide standard.

Table II: Groundwater Analytical Data

Parameter	Analytical Results (µg/L)							IDNR Statewide Standard
Location	TMW1	TMW2	TMW3	TMW4	TMW5	TMW6	TMW7	(µg/L)
Date	10/06/05	10/06/05	10/06/05	10/06/05	10/06/05	10/06/05	10/06/05	
VOCS								
Benzene	0.74	<2.50	70.69	7.58	4.72	<5.00	<0.500	5.0
n- Butylbenzene	<1.00	<5.00	8.77	<10.0	<5.00	<10.0	<1.00	NA
sec-Butylbenzene	<1.00	11.78	19.50	<10.0	<5.00	<10.0	1.18	NA
tert.- Butylbenzene	<1.00	<5.00	18.49	10.1	<5.00	<10.0	<1.00	NA
Ethylbenzene	<1.00	<5.00	119.29	30.5	<5.00	<10.0	<1.00	700
Isopropylbenzene	<1.00	11.35	28.50	<10.0	<5.00	<10.0	<1.00	NA
p- Isopropyltoluene	<1.00	<5.00	11.76	<10.0	<5.00	<10.0	<1.00	NA
Naphthalene	<5.00	<25.00	80.0	<50.0	<25.0	<50.0	<5.00	20
n-Propylbenzene	<1.00	15.94	43.94	17.3	<5.00	<10.0	<1.00	NA
Tetrachloroethene	<1.00	<5.00	<5.00	<10.0	<5.00	<10.0	7.75	5.0
Toluene	<1.00	<5.00	9.64	<10.0	<5.00	<10.0	<1.00	1,000
1,2,4-Trimethylbenzene	<1.00	<5.00	92.28	18.4	31.34	10.6	<1.00	NA
1,3,5-Trimethylbenzene	<1.00	<5.00	22.82	26.5	19.43	<10.0	<1.00	NA
Xylenes	<3.00	<15.0	150.1	120.1	<15.0	<30.0	<3.00	10,000
Hexane	<1.00	7.28	99.55	11.6	6.54	<10.0	<1.00	420

Linn County Election Depot
Cedar Rapids, Iowa
Terracon Project Number: 06057116
October 21, 2005

Terracon Consultants, Inc.

Table II: Groundwater Analytical Data-Continued

Parameter	Analytical Results (µg/L)							IDNR Statewide Standard
Location	TMW1	TMW2	TMW3	TMW4	TMW5	TMW6	TMW7	(µg/L)
Date	10/06/05	10/06/05	10/06/05	10/06/05	10/06/05	10/06/05	10/06/05	
SVOCs								
Benzoic Acid	<20	<20	<20	22	<40	<20	<20	NA
4-Chloroaniline	<10	<10	18	<10	<20	<10	<10	28
2-Methylnaphthalene	<10	18	62	<10	<20	160	<10	NA
Naphthalene	<10	<10	37	11	<20	30	<10	420
N-Nitrosodiphenylamine	<10	<10	<10	<10	<20	11	<10	26
Phenanthrene	<10	<10	<10	<10	<20	19	<10	NA

150 mg/L

Notes:
BDL Below Detectable Limits
µg/L - Indicates micrograms per liter, generally equivalent to ppb
NA - No standard for contaminant
NT - Sample Not Collected

Total Extractable Hydrocarbons 1200

References:
Table 1, Standards for Groundwater, Iowa Land Recycling Program (Statewide Standard for Groundwater):IAC 567 Chapter 137
Iowa Tier 1 Look-Up Table: IAC 567 Chapter 135

Detectable concentrations of VOCs and SVOCs in the groundwater sample from TMW1, TMW2, TMW5, and TMW6 were found to be below the Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (IAC 567-Chapter 135) and the Standards for Groundwater, Iowa Land Recycling Program (IAC 567 Chapter 137). Detectable concentrations of benzene in the groundwater sample from TMW3 and TMW4 were found to be above the Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (IAC 567 Chapter 135) and the Standards for Groundwater, Iowa Land Recycling Program (IAC 567 Chapter 137). Detectable concentration of tetrachloroethene in the groundwater sample from TMW7 was found to be above the Standards for Groundwater, Iowa Land Recycling Program (IAC 567 Chapter 137). Other Detectable concentrations of VOCs and SVOCs in the groundwater sample from TMW3, TMW4, and TMW7 were found to be below the Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (IAC 567-Chapter 135) and the Standards for Groundwater, Iowa Land Recycling Program (IAC 567 Chapter 137).

Detectable concentrations of benzoic acid, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, isopropyltoluene, p-isopropyltoluene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 2-methylnaphthalene, and phenanthrene in the groundwater sample from TMW1, TMW2, TMW3, TMW4, TMW5, TMW5, and/or TMW7 were found not to have a standard.

5.0 FINDINGS AND RECOMMENDATIONS

The findings and recommendations of this investigation are as follows:

- Detectable concentrations of benzene in the groundwater sample from TMW3 and TMW4 were found to be above the Standards for Groundwater, Iowa Land Recycling Program (IAC 567 Chapter 137) for ***Protected Groundwater Pathway***.

- Detectable concentration of tetrachloroethene in the groundwater sample from TMW7 was found to be above the Standards for Groundwater, Iowa Land Recycling Program (IAC 567 Chapter 137) for ***Protected Groundwater Pathway***

- Based on elevated PID readings in the near surface substrata at the site, Terracon is recommending that your structural engineer consider a vapor barrier placed beneath the floor slab on the new proposed building in the design. In addition to the vapor barrier, Terracon recommends the consideration of a passive vapor collection system installed beneath the proposed building. Why?

- Terracon recommends consultation with your environmental attorney, regarding any potential reporting obligations and potential environmental risk or liability issues in connection with constituents detected in the on-site groundwater during this investigation.

- Concentrations of chemicals in soil and/or groundwater were detected in the soil and/or groundwater samples analyzed on site. The client should understand the limitations of this data. Preliminary limited site investigations are conducted to provide additional information regarding possible chemicals in the subsurface related to identified previous petroleum activities on the site. Confirmation of chemical constituents in the subsurface through the PLSI indicates chemicals of concern have been released in or around the area of question. Fate & transport of chemicals in the subsurface can vary significantly across a given site. Additional testing would be required to define the extent of the chemicals of concern in the subsurface.

- If soil and/or groundwater located on the site are to be disturbed during future excavations or construction activities, proper procedures should be followed with respect to worker health and safety, and any affected soil or groundwater encountered should be properly characterized, treated, and/or disposed in accordance with applicable local, state, or federal regulations.

6.0 STANDARD OF CARE, LIMITATIONS AND RELIANCE

Terracon's services were performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographical area during the same time period. Terracon makes no warranties, either express or implied, regarding the findings, conclusions or

recommendations. These PLSI services were performed in accordance with the scope of work agreed with you, our client, as reflected in our proposal and were not restricted by ASTM E1912-98.

Findings, conclusions, and recommendations resulting from these services are based upon information derived from the most recent on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, non-detectable, or not present during these services, and we cannot represent that the site contains no hazardous substances, toxic materials, petroleum products, or other latent conditions beyond those identified during this PLSI. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations, or exploratory services; the data, interpretations, findings, and our recommendations are based solely upon data obtained at the time and within the scope of these services.

This report has been prepared for the exclusive use of the Linn County and any authorization for use or reliance by any other party (except a governmental entity having jurisdiction over the site) is prohibited without the express written authorization of the Linn County and Terracon. Any unauthorized distribution or reuse is at the client's sole risk.

SOIL BORING LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

Boring / Well Number:	Facility Name:	Facility Street Address:
B1/TMW-1	Linn County Election Depot	823 3rd Street SW, Cedar Rapids, IA

Boring Depth (ft) X Diameter (in): 25.0 x 7	Drilling Method: 3-1/4 inch ID HSA
Well Contractor Name: Terracon Registration Number: 2396 - Gary Everman	Logged by: EDR
Ground Surface Elevation (ASL): 728.79	Top of Casing Elevation (ASL): 729.42

Date: 10/05/05	Date: 10/05/05	UST Number:	LUST Number:
Start Time: 1405	End Time: 1450	NA	NA

Depth (feet)	Well Construction Details	Blow Count if applicable	Sample No.	Sample Type*	PID / FID Reading	Rock Formations, Soil, Color and Classifications, Observations (moisture, odor, etc.)
	The temporary PVC monitoring well screen and casing was removed and the soil boring sealed with bentonite chips after completion of soil sampling.			SS	<10	2" Asphalt over 22" Limestone Gravel
				SS	<10	SP Fine to Medium Sand, Light Brown
				SS	<10	CL Lean Clay, Brown
5				SS	<10	
				SS	<10	
				SS	<10	CL Sandy Clay, Brown
				SS	11.2	
				SS	11.3	
				SS	13.3	
10				SS	13.4	SP Fine to Medium Sand, Brown
				SS	14.7	
				SS	14.7	
				SS	16.5	
				SS	16.4	SP Medium to Coarse
15				SS	16.2	SW Sand, Brown
				SS	18.1	
				SS	18.0	
				SS	19.0	
				SS	19.1	
				SS	18.9	
20				SS	20.5	
				SS	<10	
				SS	<10	
				SS	<10	
25	BOW @ 25 feet.					BOH @ 25 feet.

* SS (split spoon) HS (hollow stem auger) ** Sample submitted to laboratory.

Observations	Date:					
Water Levels (ASL)	Level:					
Static Water Level Symbol	Time:					

IOWA DNR 8665 116.38) ROVMENR.GDT 5/2003

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SOIL BORING LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

Boring / Well Number:	Facility Name:	Facility Street Address:
B2/TMW-2	Linn County Election Depot	823 3rd Street SW, Cedar Rapids, IA
Boring Depth (ft) X Diameter (in): 31.0 x 7		Drilling Method: 3-1/4 inch ID HSA
Well Contractor Name: Terracon Registration Number: 2396 - Gary Everman		Logged by: EDB
Ground Surface Elevation (ASL): 728.41		Top of Casing Elevation (ASL): 730.81
Date: 10/05/05 Start Time: 1305	Date: 10/05/05 End Time: 1350	UST Number: NA
		LUST Number: NA

Depth (feet)	Well Construction Details	Blow Count if applicable	Sample No.	Sample Type*	PID / FID Reading	Rock Formations, Soil, Color and Classifications, Observations (moisture, odor, etc.)
						2" Asphalt over 34" Limestone Gravel / Brick
				SS	<10	SP Fine to Medium Sand, Brown
5				SS	<10	
				SS	<10	
				SS	<10	SP Fine to Medium Sand, Brown to Gray
				SS	95.3	CL Sandy Clay, Black to Gray
				SS	95.4	
10				SS	476	SP Fine to Medium Sand, Greenish Gray
				SS	474	
				SS	43.5	
				SS	43.3	
				SS	573	
15				SS	574	SP Coarse to Medium SW Sand, Gray
				SS	120	
				SS	122	
				SS	1665	
				SS	1684	
				SS	1694	
20				SS	1698	
				SS	1450	
				SS	1449	SP Coarse to Medium SW Sand, Gray to Black
				SS	1430	
				SS	1428	SP Coarse to Medium SW Sand, Black
25			**	SS	1700	
				SS	1703	
				SS	195	
				SS	212	
				SS	<10	SP Fine to Medium Sand, Light Brown
30	The temporary PVC monitoring well screen and casing was removed and the soil boring sealed with bentonite chips after completion of soil sampling.					BOH @ 31 feet.
	BOW @ 31 feet.					

* SS (split spoon) HS (hollow stem auger) ** Sample submitted to laboratory.

Observations	Date:					
Water Levels (ASL)	Level:					
Static Water Level Symbol	Time:					

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SOIL BORING LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

Boring / Well Number:	Facility Name:	Facility Street Address:
B3/TMW-3	Linn County Election Depot	823 3rd Street SW, Cedar Rapids, IA
Boring Depth (ft) X Diameter (in): 32.0 x 7		Drilling Method: 3-1/4 inch ID HSA
Well Contractor Name: Terracon Registration Number: 2396 - Gary Everman		Logged by: EDB
Ground Surface Elevation (ASL): 728.29		Top of Casing Elevation (ASL): 730.93
Date: 10/05/05 Start Time: 1355	Date: 10/05/05 End Time: 1450	UST Number: NA / LUST Number: NA

Depth (feet)	Well Construction Details	Blow Count if applicable	Sample No.	Sample Type*	PID / FID Reading	Rock Formations, Soil, Color and Classifications, Observations (moisture, odor, etc.)
	The temporary PVC monitoring well screen and casing was removed and the soil boring sealed with bentonite chips after completion of soil sampling.			SS	0.0	2" Asphalt over 10" Limestone Gravel
				SS	0.0	
				SS	0.0	Concrete
				SS	0.0	SP Fine to Medium Sand, Black
5				SS	1150	CL Sandy Clay, Black
				SS	1148	
				SS	1587	
				SS	1596	
				SS	1623	
10				SS	1622	SP Fine to Medium Sand, Greenish Gray
				SS	1502	SP / SW Medium to Coarse Sand, Greenish Gray
				SS	1478	
				SS	1654	
				SS	1656	
15				SS	1704	SP / SW Medium to Coarse Sand, Gray
				SS	1705	
				SS	1438	
				SS	1439	
				SS	1370	
20				SS	1371	
				SS	1708	SP Medium to Coarse Sand, Black
				SS	1709	
				SS	1096	
				SS	1097	
25				SS	1447	
				SS	1436	
			—	SS	1918	
				SS	1917	
				SS	1210	
30				SS	1211	
				SS	125	
				SS	<10	
	BOW @ 32 feet.					BOH @ 32 feet.

* SS (split spoon) HS (hollow stem auger) ** Sample submitted to laboratory.

Observations	Date:					
Water Levels (ASL)	Level:					
Static Water Level Symbol	Time:					

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SOIL BORING LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

Boring / Well Number:	Facility Name:	Facility Street Address:
B4/TMW-4	Linn County Election Depot	823 3rd Street SW, Cedar Rapids, IA

Boring Depth (ft) X Diameter (in): 26.0 x 7	Drilling Method: 3-1/4 inch ID HSA
Well Contractor Name: Terracon Registration Number: 2396 - Gary Everman	Logged by: EDB
Ground Surface Elevation (ASL): 727.98	Top of Casing Elevation (ASL): 728.45
Date: 10/05/05 Start Time: 1015 / Date: 10/05/05 End Time: 1100	UST Number: NA / LUST Number: NA

Depth (feet)	Well Construction Details	Blow Count if applicable	Sample No.	Sample Type*	PID / FID Reading	Rock Formations, Soil, Color and Classifications, Observations (moisture, odor, etc.)
	The temporary PVC monitoring well screen and casing was removed and the soil boring sealed with bentonite chips after completion of soil sampling.			SS	1264	Limestone Gravel
				SS	1253	
				SS	1286	CL Sandy Clay, Brown
				SS	1292	
5				SS	1412	
				SS	1450	
				SS	1497	
				SS	1518	SP Fine to Medium Sand, Greenish Gray
				SS	1477	
				SS	1478	
10				SS	2022	
			**	SS	2047	
				SS	1821	
				SS	1935	
				SS	1976	SP SW Coarse Sand, Gray to Black
15				SS	1956	
				SS	1996	
				SS	1953	
				SS	1304	
				SS	1331	
20				SS	2024	SP SW Coarse Sand, Black
				SS	2021	
				SS	226	
				SS	225	
				SS	41.6	
25						SP SW Coarse Sand, Light Reddish Brown
	BOW @ 26 feet.					BOH @ 26 feet.

* SS (split spoon) HS (hollow stem auger) ** Sample submitted to laboratory.

Observations	Date:					
Water Levels (ASL)	Level:					
Static Water Level Symbol	Time:					

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SOIL BORING LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

Boring / Well Number:	Facility Name:	Facility Street Address:
B5/TMW-5	Linn County Election Depot	823 3rd Street SW, Cedar Rapids, IA

Boring Depth (ft) X Diameter (in): 28.0 x 7 | Drilling Method: 3-1/4 inch ID HSA

Well Contractor Name: Terracon | Logged by: EDB
Registration Number: 2396 - Gary Everman

Ground Surface Elevation (ASL): 727.92 | Top of Casing Elevation (ASL): 728.50

Date: 10/05/05	Date: 10/05/05	UST Number:	LUST Number:
Start Time: 1245	End Time: 1345	NA	NA

Well Construction Details: The temporary PVC monitoring well screen and casing was removed and the soil boring sealed with bentonite chips after completion of soil sampling.

BOW @ 28 feet.

Sample No.	Sample Type*	PID / FID Reading
	SS	500
	SS	591
	SS	777
	SS	775
	SS	636
	SS	639
	SS	1057
	SS	1058
	SS	745
	SS	747
	SS	114
	SS	112
	SS	135
	SS	136
	SS	1311
	SS	1307
	SS	357
	SS	380
	SS	109
	SS	126
	SS	890
	SS	917
**	SS	1923
	SS	1833
	SS	62.5
	SS	<10

Blow Count if applicable: (none)

Rock Formations, Soil, Color and Classifications, Observations (moisture, odor, etc.)

USCS	Description
	Limestone Gravel
	Brick
	Limestone Gravel
CL	Sandy Clay, Black
SP	Fine to Medium Sand, Greenish Gray
SP SW	Medium to Coarse Sand, Greenish Gray
SP SW	Medium to Coarse Sand, Black
SP SW	Medium to Coarse Sand, Reddish Brown
	BOH @ 28 feet.

Depth (feet): 5, 10, 15, 20, 25

* SS (split spoon) HS (hollow stem auger) ** Sample submitted to laboratory.

Observations	Date:					
Water Levels (ASL)	Level:					
Static Water Level Symbol	Time:					

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IOWA DNR 2K5718.GPJ IOWADNR.GDT 11/2/05

SOIL BORING LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

Boring / Well Number:	Facility Name:	Facility Street Address:
B6/TMW-6	Linn County Election Depot	823 3rd Street SW, Cedar Rapids, IA

Boring Depth (ft) X Diameter (in): 25.0 x 7	Drilling Method: 3-1/4 inch ID HSA
Well Contractor Name: Terracon Registration Number: 2396 - Gary Everman	Logged by: EDB
Ground Surface Elevation (ASL): 729.16	Top of Casing Elevation (ASL): 729.80

Date: 10/05/05	Date: 10/05/05	UST Number:	LUST Number:
Start Time: 730	End Time: 830	NA	NA

Depth (feet)	Well Construction Details	Blow Count if applicable	Sample No.	Sample Type*	PID / FID Reading	Rock Formations, Soil, Color and Classifications, Observations (moisture, odor, etc.)
	The temporary PVC monitoring well screen and casing was removed and the soil boring sealed with bentonite chips after completion of soil sampling.			SS	303	Fill, Limestone
5				SS	304	CL Sandy Clay, Gray to Black
				SS	564	
				SS	550	
				SS	210	
				SS	205	CL Lean Clay, Gray to Dark Gray
10				SS	100	
				SS	99.4	
				SS	421	
				SS	418	
				SS	239	SC Fine to Medium Sand (Clayey), Gray
15				SS	227	SP Fine to Medium Sand, Light Brown to Gray
				SS	115	
				SS	110	
				SS	41.0	
				SS	40.8	
20				SS	15.1	
				SS	14.6	SP Medium to Coarse Sand, Light Brown
				SS	<10	SW
				SS	<10	
25	BOW @ 25 feet.					BOH @ 25 feet.

* SS (split spoon) HS (hollow stem auger) ** Sample submitted to laboratory.

Observations	Date:					
Water Levels (ASL)	Level:					
Static Water Level Symbol	Time:					

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SOIL BORING LOG AND MONITORING WELL CONSTRUCTION DIAGRAM

Boring / Well Number:	Facility Name:	Facility Street Address:
B7/TMW-7	Linn County Election Depot	823 3rd Strect SW, Cedar Rapids, IA

Boring Depth (ft) X Diameter (in): 25.0 x 7	Drilling Method: 3-1/4 inch ID HSA
Well Contractor Name: Terracon Registration Number: 2396 - Gary Everman	Logged by: EDB
Ground Surface Elevation (ASL): 726.31	Top of Casing Elevation (ASL): 727.03

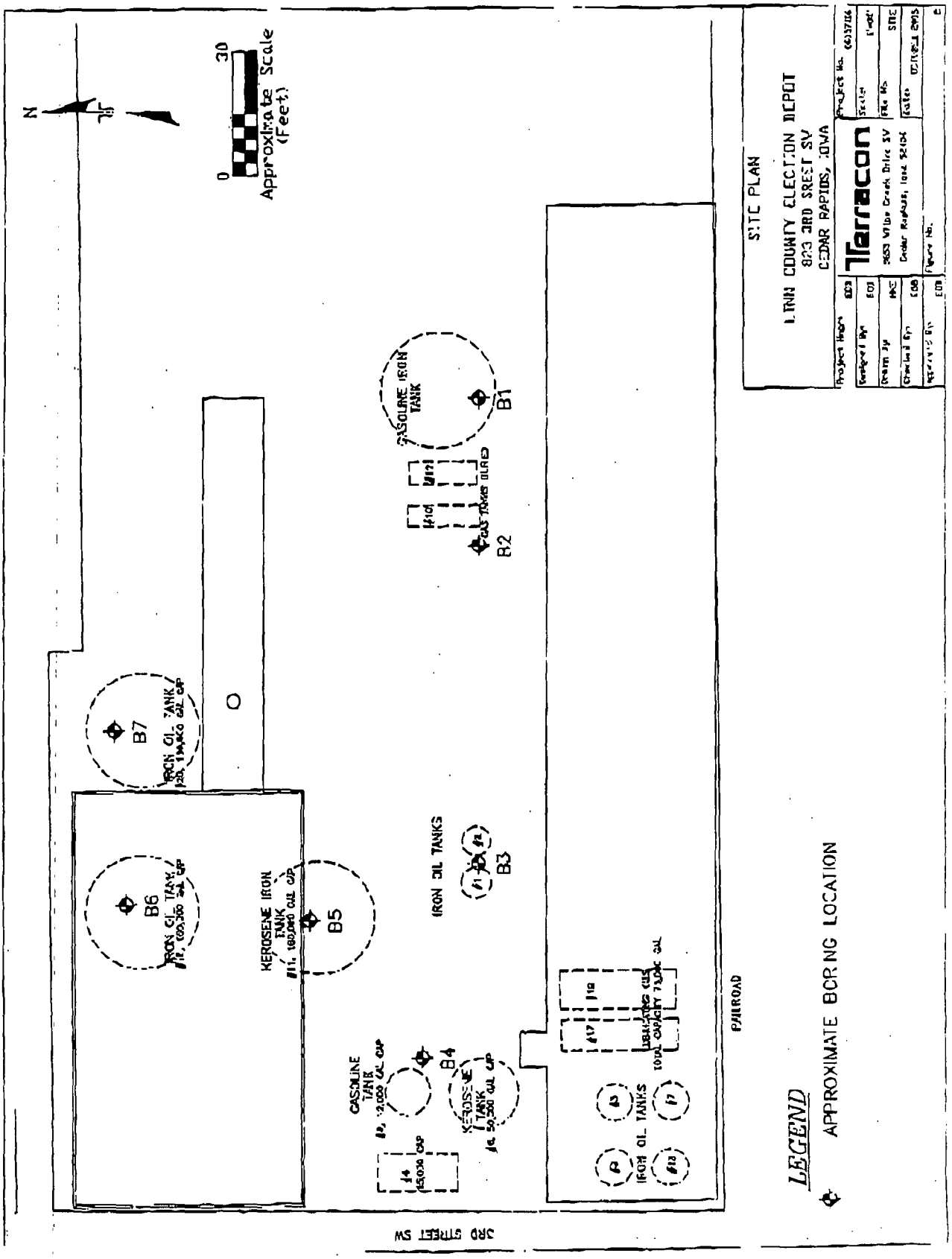
Date: 10/05/05	Date: 10/05/05	UST Number:	LUST Number:
Start Time: 850	End Time: 945	NA	NA

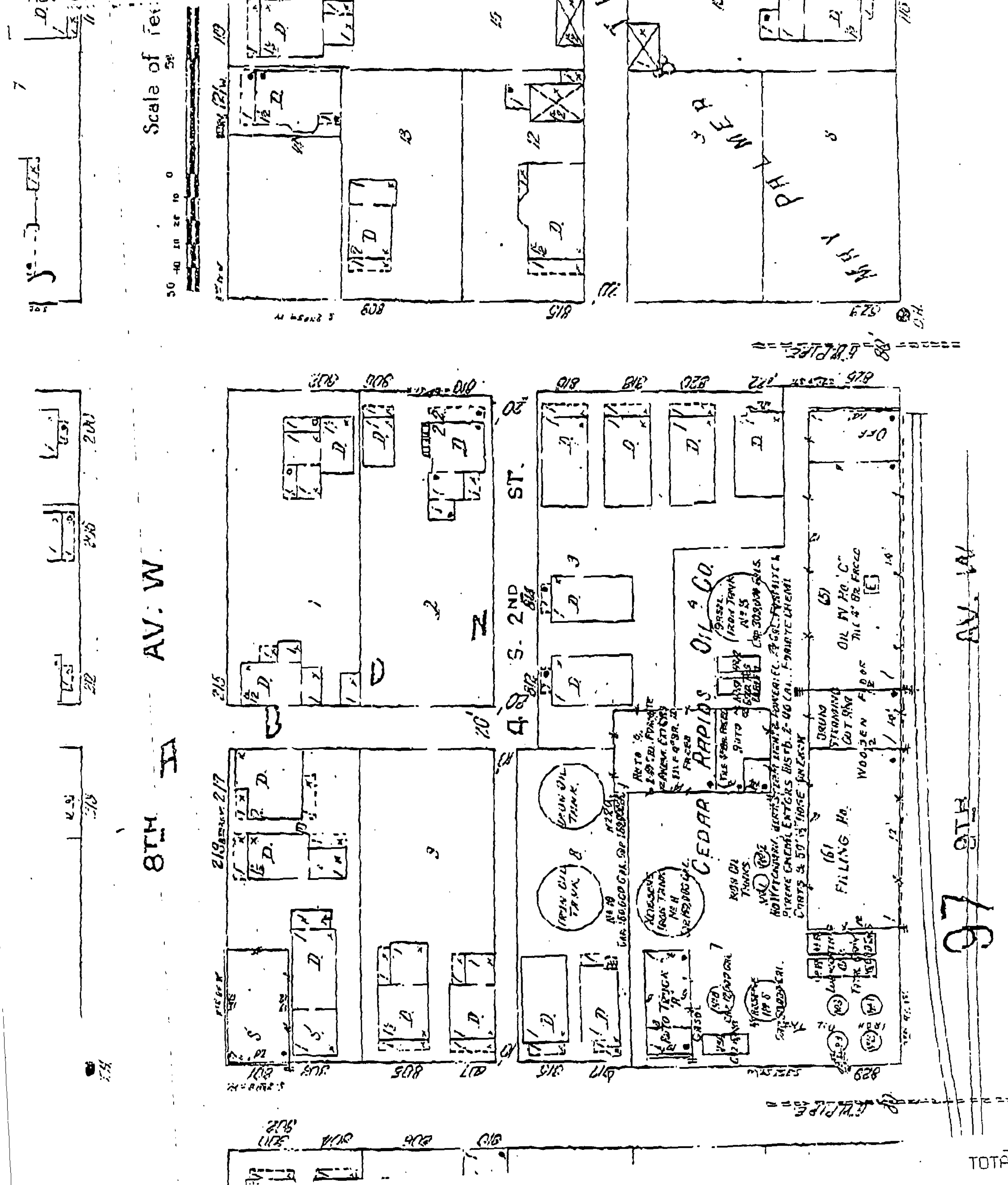
Depth (feet)	Well Construction Details	Blow Count if applicable	Sample No.	Sample Type*	PID / FID Reading	Rock Formations, Soil, Color and Classifications, Observations (moisture, odor, etc.)
5	The temporary PVC monitoring well screen and casing was removed and the soil boring sealed with bentonite chips after completion of soil sampling.			SS	6.3	SP Fine to Medium Sand with Clay, Brown
				SS	6.1	
				SS	21.4	CL Clay (Sandy), Brown to Black
				SS	21.5	
				SS	16.5	SC Sand (Clayey), Dark Gray to Black
				SS	16.2	
				SS	18.8	
				SS	18.3	SP Fine to Medium Sand, Dark Gray
10				SS	<10	SP Fine to Medium Sand, Light Brown
				SS	<10	
				SS	<10	
				SS	<10	
				SS	<10	
				SS	<10	
15				SS	<10	SP Fine to Medium Sand, Gray
				SS	333	
				SS	336	
				SS	195	
				SS	194	
				SS	22.6	
20				SS	22.4	SP Coarse Sand, SW Light Brown
				SS	<10	
				SS	<10	
				SS	<10	
25	BOW @ 25 feet.					BOH @ 25 feet

* SS (split spoon) HS (hollow stem auger) ** Sample submitted to laboratory.

Observations	Date:					
Water Levels (ASL)	Level:					
Static Water Level Symbol	Time:					

DNR FORM 542-1392


N
0
30
Approximate Scale (Feet)
SITE PLAN
LINN COUNTY ELECTION DEPOT
823 3RD SREET SW
CEDAR RAPIDS, IOWA
Terracon
GASOLINE IRON TANK
B1
B2
B3
B4
B5
B6
B7
IRON OIL TANKS
KEROSENE IRON TANK
GASOLINE TANK
RAILROAD
3RD STREET SW
LEGEND
APPROXIMATE BORING LOCATION


8TH AV. W
S. 2ND ST.
CEDAR RAPIDS OIL CO.
9TH AV. W