



Planning, Property & Development Department • Service de l'urbanisme, des biens et de l'aménagement

Real Estate Division • Division des biens immobiliers

In reply please refer to / Référence à rappeler :

Mr. R. Senyk
(204) 986-5080
Fax / Téléc. : (204) 944-8476

June 28, 2001

Manitoba Conservation
123 Main Street, Suite 160
Winnipeg, MB R3C 1A5

ATTN: MR. DOUG BELL

Dear Sir:

**RE: PHASE III ENVIRONMENTAL SITE ASSESSMENT OF 1385 WHYTE AVENUE
FILE 32/6950 QUOTE WHEN REPLYING)**

As per our telephone conversation, I am herein forwarding to you a copy of the above report for your review. The report recommends a remediation of portions of the site. Please advise whether your Division agrees with the conclusions of the report and if so, whether your Division will compel the responsible parties for the contamination to attend to the remediation.

Please provide our Department with a closure letter, if appropriate.

Yours truly,

R. Senyk
Real Estate Appraiser

RS:ag
Enclosure

v:\agibson\ag_0514(rs)



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2nd Floor, 65 Garry Street • 65, rue Garry, deuxième étage • Winnipeg • Manitoba R3C 4K4



The City of Winnipeg
Planning, Property and Development Department

**Phase III Environmental Site Assessment
of
1385, Whyte Ave.**



ecologistics (2000) Limited

June 21, 2001

Mr. Ed Dolhun, P.Eng., M.C.I.P.
Consultant to the Land Enhancement Program
The City of Winnipeg,
Planning, Property and Development Department,
Second floor, 65 Garry Street,
Winnipeg. MB. R3C 4K4

Dear Mr. Dolhun,

RE: PHASE III ESA : 1385 WHYTE AVE.

On behalf of Ecologistics (2000) Limited and our sub-contractors AMEC Earth and Environmental, it is my pleasure to present to The City of Winnipeg our report on Phase-III Environmental Site Assessment of 1385 Whyte Avenue.

We trust that this report meets your requirements. If you have any questions or if we can be of further assistance, please contact us.

Thanks,

Yours truly,

Ecologistics (2000) Limited


Jammi Kumar
General Manager

**PHASE III ENVIRONMENTAL SITE ASSESSMENT
1385 WHYTE AVENUE
WINNIPEG, MANITOBA**

Submitted to:

**City of Winnipeg
Planning, Property and Development Department**

Submitted by:

**Ecologistics (2000) Limited
230 – 294 William Avenue
Winnipeg, Manitoba. R3B 0R1**

In Collaboration with

**AMEC Earth & Environmental Limited
440 Dovercourt Drive
Winnipeg, Manitoba R3Y 1N4**

May 2001

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1.0 INTRODUCTION

On behalf of the City of Winnipeg, Ecologistics (2000) Limited, in collaboration with AMEC Earth & Environmental Limited (AMEC) conducted a Phase III Environmental Site Assessment (ESA) of a property located at 1385 Whyte Avenue in Winnipeg, Manitoba. This report summarizes the findings of the investigation and provides recommendations for remedial and/or site management options.

2.0 BACKGROUND

A Phase I ESA, indicated that the site was formerly occupied by an oil & grease plant, a paint manufacturing facility, a feed mill, an oil & grease plant, an oil warehouse and an above ground tank farm for storage of petroleum products.

A Phase II ESA of the site was completed in January 2001. The investigation identified that the Site had been impacted by the historic storage and handling of petroleum products. The Phase II investigation included a total of 11 test holes, the locations of which are shown on Figure A1, Appendix A. Elevated soil vapour levels (>500 ppm_v) were encountered in soil samples from test holes TH10 and TH11. As well, fill materials (consisting of wood, metals, asphalt shingles and gravel), were identified at TH5, with oil visible in the soil structure of samples retrieved between 3.0 and 3.3 m below grade. Hydrocarbon constituent concentrations, above the applicable regulatory criteria, were identified in the subsurface soils in the south (TH1), west central (TH5) and northwest (TH11) portions of the Site. A groundwater sample submitted for analysis from a monitoring well installed in TH1 had a lead concentration which exceeded the applicable non-potable groundwater criteria.

Based on the findings of the Phase II ESA, it was recommended that a Phase III ESA be completed, in order to delineate the subsurface impacts and to evaluate appropriate remedial options and cost estimates. The additional test holes were to be advanced at the former tank farm location (near TH10 and TH11) and in the vicinity of TH5. Subsequent to completion of the Phase II ESA, staff from the City of Winnipeg instructed AMEC to investigate the area surrounding two steel pipes which were observed on the east central portion of the Site. The pipes were identified during a property condition assessment completed by the City of Winnipeg in approximately March 2001.

3.0 SCOPE OF WORK

The scope of work for the study was proposed as follows:

- Drill four to five test holes at the north end of the Site, two test holes in the west central area and one test hole in the vicinity of the two steel pipes identified by the City of Winnipeg;

- Submit up to four soil samples for laboratory analysis of the hydrocarbon constituents benzene, toluene, ethylbenzene, and xylenes (BTEX) and the fractional components of petroleum hydrocarbons (PHC) in soil. Up to two additional soil samples were to be submitted for only the F2-F4 fractional components of PHC;
- Monitor the existing groundwater wells.
- Prepare a report that compares the laboratory results to the applicable CCME Industrial Criteria and provides options and associated costs for remediation at the Site.

4.0 SITE DESCRIPTION

The Site is situated at the northeast corner of Vine Street and Whyte Avenue in Winnipeg, Manitoba. At the time of the investigation, the west and southeast portions of the property were surfaced with concrete, the northwest portion contained a concrete dyke and the northeast and central areas contained miscellaneous rubble piles. The surrounding land consisted of light industrial developments fronting onto Whyte Avenue to the east and west, the CPR Weston Rail Yards to the north, and residential housing to the south, across Whyte Avenue. A more detailed description of the site is provided in AMEC's Phase I ESA. No underground utilities were present at the site.

4.1 REGIONAL GEOLOGY AND HYDROGEOLOGY

Details on the soil and groundwater conditions at the site were provided in AMEC's Phase II ESA report. In summary, the soil profile is such that there is a low potential for impact on groundwater resources, due to the presence of a thick layer of highly plastic clay. Miscellaneous fill soils are present at the ground surface throughout much of the site, as a result of historic infilling of the property.

5.0 ASSESSMENT METHODOLOGY

5.1 SOIL SAMPLING METHODS

On 9 May 2001, a total of 10 test holes (TH12 to TH21) were drilled at the Site. The test hole locations are shown in Figure A1, Appendix A. The test hole logs, as recorded by AMEC's Field Engineer at the time of drilling, are included in Appendix B.

Soil sampling was conducted with the aid of a backhoe mounted drill rig which was supplied and operated by Maple Leaf Enterprises Limited of Winnipeg, Manitoba. The test holes were advanced using 125 mm diameter solid stem augers. At regular intervals during drilling, duplicate soil samples were removed from the auger flights by hand (with clean nitrile gloves) and sealed in clear plastic bags. In areas where excess water was identified in the shallow subsurface soils, a steel sleeve was placed in the upper 1.8 m of the test hole and the auger was advanced within the sleeve. The Ambient Temperature Headspace (ATH) vapour concentration was determined from one of the bagged soil samples at each sampling interval, using a Gastech Tracetestor combustible vapour meter calibrated in the "no methane response mode" with hexane gas. As well, each soil sample was examined for signs of hydrocarbon

contamination, such as staining and odours. The second soil sample from select intervals was sealed in a glass jar with a Teflon lined lid, supplied by AMEC's Edmonton laboratory, for possible chemical analysis. Headspace in the glass jar was minimized to reduce analyte volatilization before laboratory analysis.

All sample containers were labelled with the project number, date of sampling, name of sampler and sample depth. All jarred samples were immediately placed into an ice packed cooler. The jarred samples were retained in the cooler while in the field and during shipping to AMEC's Edmonton Laboratory. A chain of custody/analytical request form was completed and accompanied the soil samples. Jarred samples that were not analyzed are held in cold storage at the laboratory for not less than thirty days prior to disposal.

5.2 LABORATORY ANALYSIS

Based on the findings of the Phase II ESA, petroleum hydrocarbons were identified as the primary source of subsurface contamination at the site. As such, the laboratory program consisted of the analyses for BTEX constituents and the fractional components of petroleum hydrocarbons, consistent with the new Canada-Wide Standards for Petroleum Hydrocarbons (CWS PHC) in Soil (Canadian Council of Ministers of the Environment (CCME), 2001). It should be noted that the Phase II ESA was completed during a transition period from the former petroleum hydrocarbon test standards to the new CWS PHC. As such, some of the testing completed during the Phase II ESA (i.e. oil & grease testing) is not directly comparable to the new standards. The current investigation has utilized only the CWS PHC.

As part of this investigation, five soil samples were submitted to AMEC's Edmonton laboratory for analysis of BTEX and the fractional components of PHC. Samples submitted for laboratory analysis and the laboratory methods utilized are summarized in Table 1. The Certificates of Analyses are included in Appendix C.

Table 1 Laboratory Analysis Methodology			
Sample ID @ depth (m)	Media	Analysis Requested	Laboratory Method Used
TH12-4 @ 1.8 TH13-2 @ 1.2 TH15-1 @ 1.2 TH15-4 @ 0.6 TH18.3 @ 1.8	Soil	BTEX, PHC CWS	BTEX – EPA Reference Method 5021/8000 PHC CWS – EPA 5021/CCME, EPA3560/CCME, EPA 3550/CCME

5.3 QUALITY ASSURANCE/QUALITY CONTROL

Analytical quality control is provided by the laboratory through analysis in duplicate of a percentage of samples submitted and by the determination of the percentage of surrogate analyte recovery. Surrogate analyte recovery, which was determined to be within acceptable ranges, was performed on all of the soil samples submitted. Field quality assurance was provided by adherence to AMEC soil sampling protocols as stated in Section 5.1.

5.4 SITE CLASSIFICATION

Based on the present and expected land use, and the current industrial zoning for the Site, the 1999 Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines (EQG) for an industrial land use situation have been used as the applicable soil criteria for benzene, toluene, ethylbenzene and xylenes (BTEX). Tier I guideline criteria from the CWS PHC (CCME, 2001) have been used as the applicable criteria for fractional components of PHC. The stratigraphy encountered within the test holes indicates that the subsurface conditions (below 1.5 m) are primarily fine grained soils and therefore the fine grained criteria have been utilized. At this point, AMEC has not completed a Tier II evaluation of the site, as the future land use is not well understood. Once proposed re-development plans are in place, a Tier II evaluation could be completed to assess the applicable, site specific remediation criteria.

6.0 RESULTS

6.1 SOIL STRATIGRAPHY

The soil stratigraphy, as recorded on the test hole logs (Appendix B), generally consisted of sand or clay fill materials extending to approximately 1.0 m below grade. An exception was identified at TH16, where 2.0 m of concrete rubble was encountered. Concrete slabs, ranging in thickness from 100 mm to 225 mm, were also present at surface or within the upper 0.5 m of the surface at TH16, TH18, TH19, TH20 and TH21.

The fill materials were underlain by layers of silty clay and medium plastic clay to a depth of up to 3.0 m. The silty clay and medium plastic clay layers were underlain by a high plastic clay that extended to the maximum test hole depth of 4.6 m below grade.

6.2 SOIL COMBUSTIBLE VAPOUR LEVELS

ATH vapour concentrations were determined for each soil sample recovered from the test holes during drilling and the readings are shown on the test hole logs in Appendix B. The soil vapour levels measured during the drilling program are summarized in Table 2. Elevated soil vapour concentrations (greater than 5% LEL or 600 ppm_v) were encountered in six of the ten test holes and significantly elevated vapour concentrations (greater than 10% LEL; 1200 ppm_v) were encountered in test holes TH12, TH13, TH19 and TH19. The maximum soil vapour concentration of 63% LEL (7560 ppm_v) was encountered at TH15, at a depth of 0.6 m from grade.

Table 2 Summary of Soil Combustible Vapour Levels					
Location	Test Hole Depth (m)	Hydrocarbon Staining Zone (m)	Soil Vapour Levels (>5% LEL or 600 ppm _v)	Maximum Soil Vapour Level	
				Level (ppm, %LEL)	Depth (m)
TH 12	4.6	0.3 - 2.4	0.6 - 1.8 m	35%	1.8
TH 13	4.6	0.5 - 2.3 & 2.7 - 3.2	1.2 & 2.4	10%	1.2
TH 14	4.6	0.6 - 1.7 & 2.1 - 2.6	1.8 - 2.4	8%	1.8
TH 15	4.6	0.05 - 1.5	0.3 - 2.4	63%	0.6
TH 16	2.0	0.3 - 2.4	N/A	N/A	N/A
TH 17	4.6	2.2 - 2.7	None	125 ppm	2.4
TH 18	4.6	0.1 - 2.3	1.2 - 1.8	18%	1.8
TH 19	4.6	0.3 - 2.7	1.8 - 2.4	15%	1.8
TH 20	4.6	2.0 - 2.6	None	125 ppm	1.9
TH 21	3.0	None	None	50 ppm	1.2

6.3 GROUNDWATER MONITORING RESULTS

At the completion of the drilling program on 9 May 2001, AMEC monitored all of the monitoring wells which had been installed during the Phase II ESA (TH1, TH4 and TH10). The piezometer headspace vapour concentration, groundwater level and thickness of free product, if applicable, were determined at each location.

The results of the 9 May 2001 monitoring are summarized in Table 3. Previous monitoring results from January 2001 are also presented in the table.

Table 3 Monitoring Results				
Well ID	Date	Piezometer headspace (ppm or %LEL)	Water Level (m below grade)	Product Thickness (mm)
TH1	Jan/01	NM	1.46	0
	May/01	25 ppm	0.50	0
TH4	Jan/01	NM	0.68	0
	May/01	25 ppm	0.22	0
TH10	Jan/01	NM	0.84	0
	May/01	15%	0.16	0

Notes:

ppm - parts per million

% LEL - percent lower explosive limit

NM - not measured

6.4 LABORATORY ANALYSIS RESULTS

The results of the laboratory analyses conducted on selected soil samples are summarized in Table 4. The results of the January 2001 analysis have also been included in Table 4, as well as the applicable remediation criteria. A copy of the Certificate of Analysis is provided in Appendix C.

Table 4 Soil Analytical Results – Hydrocarbons											
Location	Soil Vapour Level (ppm/%LEL)	Soil Type	Benzene	Toluene	Ethylbenzene	Xylenes	VPH (C ₆ -C ₁₀)	EPH (C ₁₀ - C ₁₆)	EPH (C ₁₆ -C ₃₄)	EPH (C ₃₄ - C ₅₀)	
January 2001											
TH1-3 @ 2.1 m	90	Clay	<0.020	0.65	0.22	1.0	1.4	190	<u>5200</u>	760	
TH4-3 @ 2.1 m	55	Clay	<0.020	0.095	<0.020	0.15	0.94	47	33	23	
TH11-2 @ 0.6 m	2200	Sand (fill)	<u>10</u>	3.6	<u>63</u>	<u>490</u>	<u>3000</u>	<u>39000</u>	<u>10000</u>	<10	
TH11-4 @ 2.1 m	1000	Clay	3.6	0.38	9.4	<u>63</u>	600	<u>6700</u>	1300	<10	
TH11-5 @ 2.4 m	160	Clay	1.1	0.74	2.4	13	160	1500	280	<10	
May 2001											
TH12-4 @ 1.8 m	35%	Clay	<u>13</u>	1.9	<u>38</u>	<u>190</u>	<u>2100</u>	<u>13000</u>	<u>2800</u>	<10	
TH13-2 @ 1.2 m	10%	Clay	0.22	0.21	4.0	11	290	<u>2400</u>	350	<10	
TH15-1 @ 0.6 m	63%	Clay	3.7	1.6	9.8	<u>33</u>	530	<u>5000</u>	1300	20	
TH15-4 @ 2.4 m	23%	Silt	3.1	0.5	12	<u>59</u>	710	<u>4800</u>	980	<10	
TH18-3 at 1.8 m	17.5%	Clay	3.6	0.58	8.8	<u>22</u>	670	<u>4300</u>	760	<10	
CCME CWS PHC (fine grained, surface soils)							660	1500	2500	6600	
CCME CWS PHC (fine grained, subsurface soils (>1.5 m))							1000	3000	5000	10000	
CCME Industrial EQG Criteria			5	14 ¹	20	17	NG				

Notes:

- All concentrations in micrograms per dry gram (µg/g) unless otherwise indicated
- 1% LEL = 120 ppm. January 2001 testing recorded in ppm only
- CCME Commercial EQG criteria – Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines (1999).
- CCME CWS PHC - Canadian Council of Ministers of the Environment, Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, Technical Supplement. June, 2000.
- NG No guideline available from CCME EQG (1999)
- **Bold** concentration exceeds applicable CCME Criteria
- ¹ toluene guideline of 14 µg/g, utilized as drinking water sources are not likely to be affected
- VPH – volatile petroleum hydrocarbons
- EPH – extractable petroleum hydrocarbons

As indicated in the Table 4, the hydrocarbon constituent concentrations in soil samples TH12-4 (1.8 m), TH13-2 (1.2 m), TH15-1 (0.6 m), TH15-4 (2.4 m) and TH18-3 (1.8 m) exceeded the applicable guideline criteria. Previous analytical results indicated exceedances of guideline criteria in soil samples TH1-3 (2.1 m), TH5-4 (2.1 m), TH11-2 (0.6 m) and TH11-4 (2.1 m).

7.0 DISCUSSION

On 9 May 2001 AMEC Earth & Environmental Limited advanced ten additional test holes at the vacant property located at 1385 Whyte Avenue, in order to determine the extent of hydrocarbon impacts that were identified during a Phase II ESA conducted in January 2001. A total of seven test holes were advanced within the northern portion of the Site, to determine the extent of hydrocarbon impacts in the vicinity of the former AST farm at the northwest corner of the Site. Two test holes were advanced on the west central portion of the Site and a single test hole was advanced on the east central portion of the Site, where a concrete pad with two steel pipes was identified by the City of Winnipeg.

In summary, the investigation indicated that the lateral extent of the hydrocarbon impacts at the north end of the property was significant, with exceedances noted at TH12, TH13, TH15 and TH18. The hydrocarbon impacts at TH14 and TH19 are also assumed to be in excess of the guideline criteria, based on visual indicators and field vapour testing. The hydrocarbon impacts are present over a depth range beginning at near ground surface (near to the former tank farm) and extending to a maximum depth of about 3.0 m below grade. The approximate lateral extent of hydrocarbon impacts exceeding the applicable criteria is shown on Figure A2. As noted, it appears that the impacts extend to the north and west property lines. As such, migration of impacts off site are likely within these areas. Based on the estimated extent of soil with guideline exceedances, the plan area with impacts exceeding the applicable Tier I criteria is estimated to be in the order of 1800 m². Assuming that the average thickness of the impacted zone is in the order of 2.0 m, the volume of impacted soil at the north end of the property is estimated to be about 3600 m³.

Significant impacts were not identified in the test holes surrounding TH5, during this investigation. However, shallow refusal on a concrete slab was encountered at TH16 (10 m north of TH5) and therefore hydrocarbon impacts may be present below the auger refusal depth. Some evidence of hydrocarbon impacts was observed at TH17 (25 m north of TH5), however, it is more likely related to the contaminant plume at the north end of the site than the contamination observed at TH5. Given the findings at TH5, it can be assumed that impacted soil and extensive fill materials are present in this area of the site. It is unlikely, based on the test hole data available, that significant volumes of impacted soil are present in this area.

As noted in the Phase II ESA, hydrocarbon impacts were also observed at TH1, at the south end of the property. The impacts in this area also do not appear significant and further testing of this area of the site was not completed during this investigation.

8.0 REMEDIAL OPTIONS

Significant impacts are present throughout most of the northern portion of the property. On this basis, consideration should be given to developing a remedial action plan, or alternatively, a long term site management plan. Evaluation of the possible impacts of off-site contamination may also be required as part of any remedial strategy.

Excavation and disposal is typically the most expedient remedial option, in particular given the shallow depth of the contamination. Remedial excavation activities would include the

excavation and segregation of non-impacted and impacted soils, loading and transport of impacted soil, disposal of impacted soil at a licensed treatment facility and backfilling and compaction of fill materials. The approximate costs for the aforementioned contractor activities are typically in the order of about \$45.00/tonne (~ \$80.00/m³). Given that there is a large component of high molecular weight hydrocarbons (F2 and F3 fractions), alternative remedial options for the site are limited. In this regard, remedial options such as single or dual phase vapour extraction or bio-remediation are likely not technically feasible. While these remedial strategies may be successful in reducing the hydrocarbon concentrations, the target remediation criteria are unlikely to be met. Other remedial options may prove appropriate, however, further evaluation would be necessary to determine suitability.

Long term management of the contamination may also be acceptable to Manitoba Conservation. However, such a plan would likely limit the development potential for the impacted portions of the property. In this regard, parking areas and storage areas would likely be permissible within impacted areas, however, construction of buildings over highly impacted areas would likely not be permissible. As well, delineation of off-site impacts may be necessary in order to fully assess the risks of impact, where the impacted soil is to remain on site.

Development within the southern portion of the site is likely not significantly affected by subsurface conditions and re-development can likely proceed with limited remedial efforts. It should be noted that areas of extensive fill were present near TH5, along with elevated hydrocarbon concentrations below the rubble. As such, it would be preferred that future development avoid these areas or alternatively, a limited remedial program undertaken.

9.0 CLOSURE

The American Society for Testing and Materials Standard of Practice notes that no environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with a property. Performance of a standardized environmental site assessment protocol is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with the property, given reasonable limits of time and cost. The findings of this investigation are based on the interpretation of data from a limited number of test holes and analytical results pertaining to specific samples. The evaluation and interpretations do not preclude the existence of chemical substances other than those identified herein, or the possibility that contaminate concentrations can vary between the areas of investigation.

This report has been prepared for the exclusive use of the City of Winnipeg for specific application to the property defined in this report. The environmental assessment was conducted in accordance with generally accepted assessment practices. No other warranty, expressed or implied, is made. The limitations of this report are specified in Appendix D.

We trust that this report meets your present requirements. If you have any questions or if we can be of further assistance, please contact our office.

Respectfully submitted,
Ecologistics (2000) Limited



Jammi S. Kumar
General Manager

REFERENCES

Canadian Council of Ministers of the Environment. 1999. Canadian Environmental Quality Guidelines.

Canadian Council of Ministers of the Environment. 2000. Canada-Wide Standards for Petroleum Hydrocarbons (PHC) in Soil.

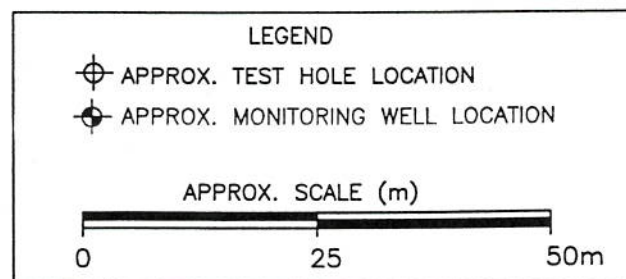
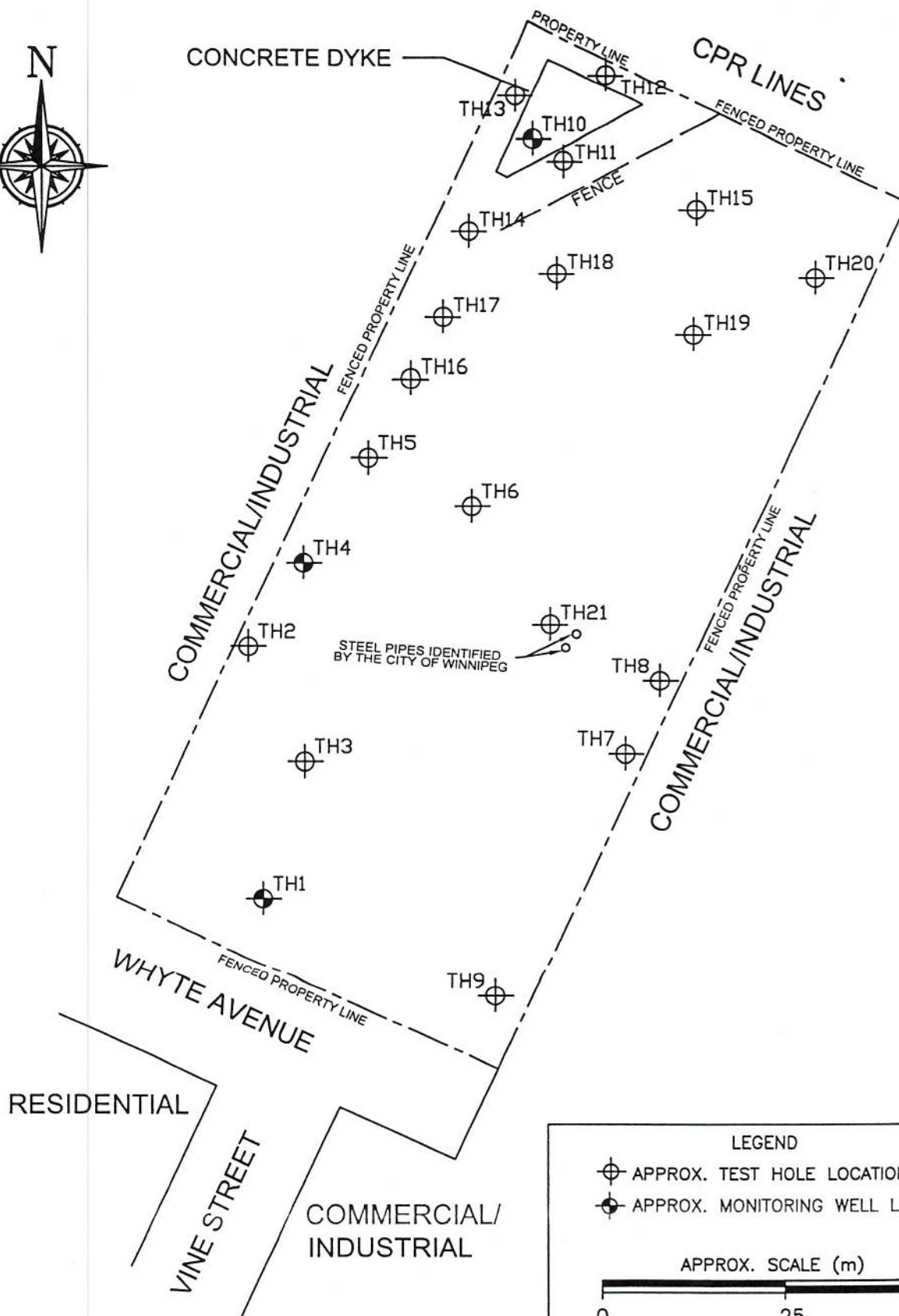
Manitoba Environment. 1993. A Guideline for the Environmental Investigation and Remediation of Petroleum Storage Site in Manitoba.

Manitoba Environment. 1997. A Guideline for the Environmental Site Investigations in Manitoba. Guideline 98-01.

Ontario Ministry of Environment and Energy. Guideline for Use at Contaminated Sites in Ontario. 1997.

APPENDIX A

FIGURES



NOTE: DETAILS SHOWN ON THIS FIGURE ARE APPROXIMATE ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.



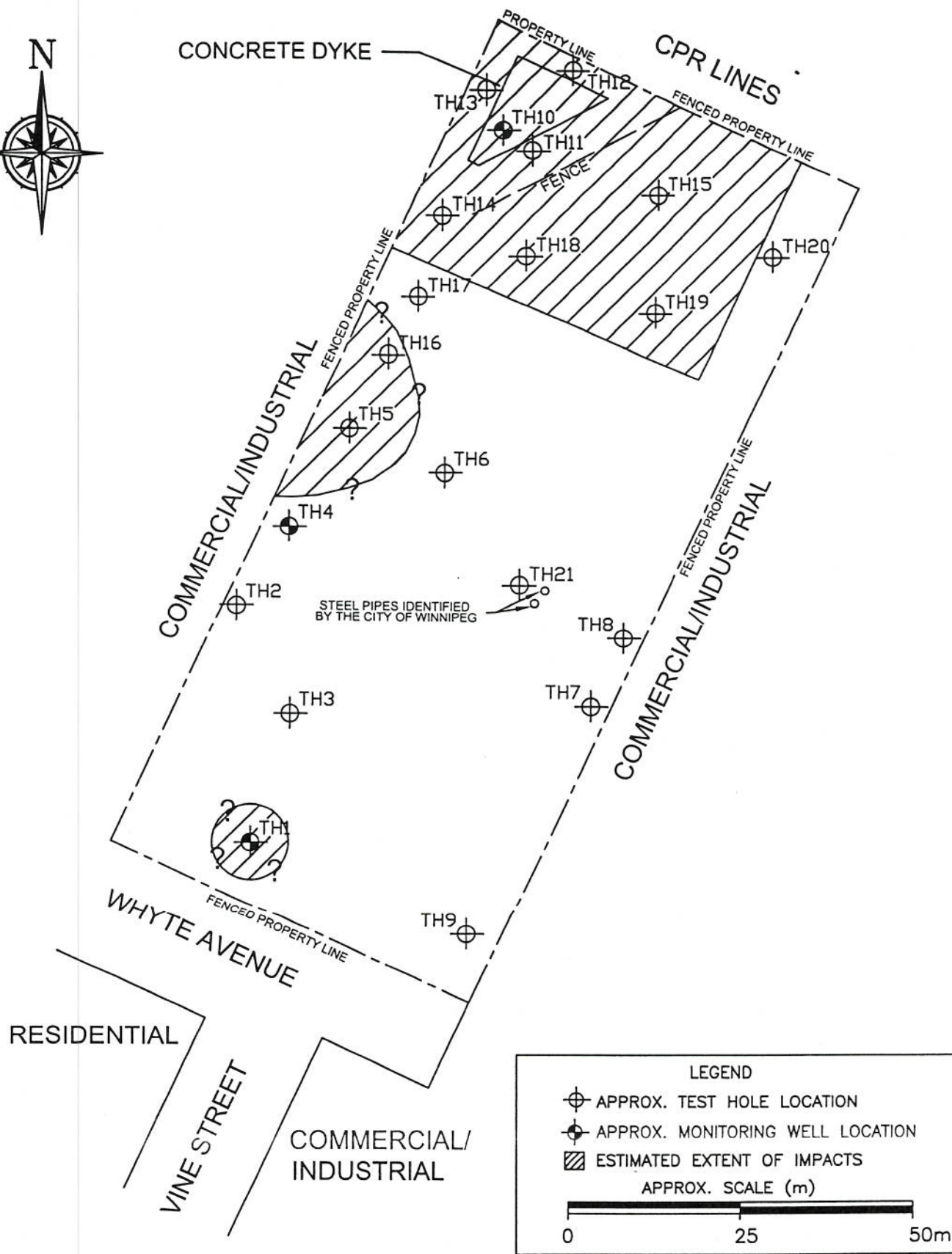
Earth & Environmental Limited

TEST HOLE LOCATION PLAN
 PHASE III ENVIRONMENTAL SITE ASSESSMENT
 CITY OF WINNIPEG
 1385 WHITE AVENUE
 WINNIPEG, MANITOBA

SCALE: SHOWN
 DATE: MAY 2001
 DRAWN BY: WTH
 PROJECT NO: WX-05145

WX-05145

FIGURE A1



APPENDIX B

TEST HOLE LOGS

Phase III ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH12	
City of Winnipeg		Drill Rig: VL-60 Mounted on Backhoe		PROJECT NO: WX05145	
		Auger: 125 Solid Stem		ELEVATION:	

SAMPLE TYPE	☒ SHELBY TUBE	☒ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY	☐ CONT. SAMPLE
-------------	---	--	---	-------------------------------	--------------------------------------	---------------------------------------

DEPTH(m)	VAPOUR (PPM)	VAPOUR (%LEL)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	ELEVATION(m)
0.0	● 100 ● 200 ● 300 ● 400	● 20 ● 40 ● 60 ● 80					CLAY (FILL) - medium plastic, moist, soft to firm, black, organics, some silt, trace gravel, wood rubble	Odour and staining from 0.3 to 2.4 m below grade	0.0
0.5				12-1	CI				
1.0				12-2					
1.5				12-3			CLAY - low to medium plastic, moist, firm, grey, silty		-1.0
2.0				12-4	CL-CI		- wet and silty from 1.5 to 2.2 m		
2.5				12-5				Odour from 2.4 to 3.0 m below grade	-2.0
3.0				12-6			CLAY - medium to high plastic, moist, firm, brown, trace silt		
3.5				12-7	CI-CH				-3.0
4.0				12-8			- soft to firm below 4.2 m below grade		-4.0
4.5							Hole ended at 4.6 m below grade Seepage to 1.5 m below grade and sloughing to 4.0 m below grade at completion of drilling.		-5.0
5.0									-6.0

AMEC Earth & Environmental Limited Winnipeg, Manitoba		LOGGED BY: DB	COMPLETION DEPTH: 4.6 m
		REVIEWED BY: HP	COMPLETE: 09/05/01
		Fig. No: B1	Page 1 of 1

Phase III ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH13	
City of Winnipeg		Drill Rig: VL-60 Mounted on Backhoe		PROJECT NO: WX05145	
		Auger: 125 Solid Stem		ELEVATION:	
SAMPLE TYPE ☒ SHELBY TUBE ☒ CUTTINGS ☒ SPT ☐ CORE ☐ NO RECOVERY ☐ CONT. SAMPLE					

DEPTH(m)	● VAPOUR (PPM) ● 100 200 300 400	● VAPOUR (%LEL) ● 20 40 60 80	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	ELEVATION(m)
0.0							CLAY (FILL) - medium plastic, moist, soft to firm, black, organics, some silt, trace gravel - wet from 0.3 to 0.5 m	Odour and staining from 0.5 to 2.3 m below grade	0.0
1.0				13-1	CL				
				13-2	CL-CL		CLAY - low to medium plastic, moist, firm to stiff, black, trace silt, organics		-1.0
				13-3					
2.0				13-4	CL		SILT - and clay, low plastic, grey, soft to firm, moist	Slight odour from 2.3 to 2.7 m below grade	-2.0
				13-5	CL-CH		CLAY - medium to high plastic, moist, firm, grey, trace silt, till inclusions - and silt, wet, soft to firm from 2.7 to 3.2 m below grade		
3.0				13-6	CH		CLAY - high plastic, moist, brown, firm, trace gravel and gypsum inclusions	Odour and staining from 2.7 to 3.2 m below grade	-3.0
				13-7					
4.0							Hole ended at 4.6 m below grade Seepage to 2.7 m below grade and sloughing to 4.3 m below grade at completion of drilling.		-4.0
5.0									-5.0
6.0									-6.0

AMEC Earth & Environmental Limited Winnipeg, Manitoba		LOGGED BY: DB	COMPLETION DEPTH: 4.6 m
		REVIEWED BY: HP	COMPLETE: 09/05/01
		Fig. No: B2	Page 1 of 1

Phase III ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH14	
City of Winnipeg		Drill Rig: VL-60 Mounted on Backhoe		PROJECT NO: WX05145	
		Auger: 125 Solid Stem		ELEVATION:	
SAMPLE TYPE ☒ SHELBY TUBE ☒ CUTTINGS ☒ SPT ☐ CORE ☐ NO RECOVERY ☐ CONT. SAMPLE					

DEPTH(m)	VAPOUR (PPM)	VAPOUR (%LEL)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	ELEVATION(m)
0.0							CLAY (FILL) - low plastic, moist, soft to firm, black, organics, some silt, trace gravel		0.0
0.5	150			14-1	CL		- some gravel from 0.5 to 0.8 m	Odour and staining from 0.6 to 1.7 m below grade	
1.0	250			14-2	CL-CI		CLAY - low plastic, moist, firm to stiff, black, trace silt, organics		-1.0
1.5				14-3	CL		SILT - and clay, low plastic, very moist, grey, soft to firm	Slight odour from 1.7 to 2.1 m below grade	
2.0				14-4	CI-CH		CLAY - low to medium plastic, moist, firm, grey, trace silt	Odour and staining from 2.1 to 2.6 m	-2.0
2.5				14-5			- and silt, wet from 2.1 to 2.6 m below grade		
3.0	100			14-6	CH		CLAY - high plastic, moist, brown, firm, trace fill and gypsum inclusions	Slight odour from 2.6 to 3.0 m below grade	-3.0
3.5				14-7					
4.0	150								-4.0
4.5	100								
5.0							Hole ended at 4.6 m below grade Seepage to 2.6 m below grade and sloughing to 4.0 m below grade at completion of drilling.		-5.0
5.5									-6.0

AMEC Earth & Environmental Limited		LOGGED BY: DB	COMPLETION DEPTH: 4.6 m
Winnipeg, Manitoba		REVIEWED BY: HP	COMPLETE: 09/05/01
		Fig. No: B3	Page 1 of 1

Phase III ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH15	
City of Winnipeg		Drill Rig: VL-60 Mounted on Backhoe		PROJECT NO: WX05145	
		Auger: 125 Solid Stem		ELEVATION:	
SAMPLE TYPE ☒ SHELBY TUBE ☒ CUTTINGS ☒ SPT ☐ CORE ☐ NO RECOVERY ☐ CONT. SAMPLE					

DEPTH(m)	VAPOUR (PPM)	VAPOUR (%LEL)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	ELEVATION(m)
0.0	● 100 200 300 400	● 20 40 60 80			GP		GRAVEL (FILL) - and sand, poorly graded, medium grained, loose to medium dense, moist, brown	Odour and staining from 0.05 to 1.5 m below grade	0.0
				15-1	CL		CLAY (FILL) - low plastic, moist, soft to firm, black, organics, some silt, trace gravel		
				15-2	CL-CI		CLAY - low plastic, moist, firm to stiff, black, trace silt, some organics		
1.0				15-3	MH		SILT - and clay, medium plastic, very moist, grey, soft to firm	Odour from 1.5 to 2.7 m below grade	-1.0
2.0				15-4			- wet from 2.1 to 2.6 m below grade		-2.0
3.0				15-5	CI-CH		CLAY - medium to high plastic, moist, firm, brown		-3.0
4.0				15-6	CH		CLAY - high plastic, moist, brown, firm, trace gravel and gypsum inclusions		-4.0
5.0				15-7			Hole ended at 4.6 m below grade Seepage to 3.7 m below grade and sloughing to 4.3 m below grade at completion of drilling.		-5.0
6.0									-6.0

AMEC Earth & Environmental Limited Winnipeg, Manitoba		LOGGED BY: DB	COMPLETION DEPTH: 4.6 m
		REVIEWED BY: HP	COMPLETE: 09/05/01
		Fig. No: B4	Page 1 of 1

Phase III ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling	TEST HOLE NO: TH16
City of Winnipeg		Drill Rig: VL-60 Mounted on Backhoe	PROJECT NO: WX05145
		Auger: 125 Solid Stem	ELEVATION:
SAMPLE TYPE	☒ SHELBY TUBE ☒ CUTTINGS ☒ SPT ☐ CORE ☐ NO RECOVERY ☐ CONT. SAMPLE		

DEPTH(m)	● VAPOUR (PPM) ● 100 200 300 400	● VAPOUR (%LEL) ● 20 40 60 80	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	ELEVATION(m)
0.0					CONC		CONCRETE (125 mm)		0.0
					CONC		VOID SPACE		
							CONCRETE (100 mm)		
							CONCRETE RUBBLE		
1.0					CONC				-1.0
2.0					CONC		CONCRETE (25 mm)		-2.0
							Test hole abandoned on suspected concrete slab at 2.0 m below grade. No samples were retrieved.		
3.0									-3.0
4.0									-4.0
5.0									-5.0
6.0									-6.0

AMEC Earth & Environmental Limited
Winnipeg, Manitoba

LOGGED BY: DB	COMPLETION DEPTH: 2 m
REVIEWED BY: HP	COMPLETE: 09/05/01
Fig. No: B5	Page 1 of 1

Phase III ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH17	
City of Winnipeg		Drill Rig: VL-60 Mounted on Backhoe		PROJECT NO: WX05145	
		Auger: 125 Solid Stem		ELEVATION:	

SAMPLE TYPE	☒ SHELBY TUBE	☒ CUTTINGS	☒ SPT	☐ CORE	☐ NO RECOVERY	☐ CONT. SAMPLE
-------------	---	--	---	-------------------------------	--------------------------------------	---------------------------------------

DEPTH(m)	VAPOUR (PPM) 100 200 300 400	VAPOUR (%LEL) 20 40 60 80	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	ELEVATION(m)
0.0					GP		GRAVEL (FILL) - trace sand, poorly graded, medium grained, loose to medium dense, moist, brown		0.0
0.5				17-1	SC		SAND (FILL) - some clay, poorly graded, fine to medium grained, loose to medium dense, moist, brown, trace organics		0.5
1.0				17-2			CLAY - some silt, low to medium plastic, moist, stiff, brown - and silt, wet from 1.0 to 1.4 m		1.0
1.5				17-3					1.5
2.0				17-4		CL-CI	- and silt, low plastic from 2.3 to 2.7 m	Odour and staining from 2.3 to 2.7 m below grade	2.0
2.5				17-5		CI-CH	CLAY - silty, medium to high plastic, moist, firm, brown	Slight odour from 2.7 to 3.2 m below grade	2.5
3.0				17-6		CH	CLAY - high plastic, moist, brown, firm, trace fill and gypsum inclusions		3.0
3.5				17-7					3.5
4.0									4.0
4.5									4.5
5.0							Hole ended at 4.6 m below grade Seepage to 0.5 m below grade and sloughing to 2.4 m below grade at completion of drilling.		5.0
5.5									5.5
6.0									6.0

AMEC Earth & Environmental Limited Winnipeg, Manitoba		LOGGED BY: DB	COMPLETION DEPTH: 4.6 m
		REVIEWED BY: HP	COMPLETE: 09/05/01
		Fig. No: B6	Page 1 of 1

Phase III ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH18	
City of Winnipeg		Drill Rig: VL-60 Mounted on Backhoe		PROJECT NO: WX05145	
		Auger: 125 Solid Stem		ELEVATION:	
SAMPLE TYPE		☒ SHELBY TUBE ☒ CUTTINGS ☒ SPT ☐ CORE ☐ NO RECOVERY ☐ CONT. SAMPLE			

DEPTH(m)	VAPOUR (PPM)	VAPOUR (%LEL)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	ELEVATION(m)
0.0	100 200 300 400	20 40 60 80				CONC	CONCRETE (125 mm)	Odour and staining from 0.13 to 2.3 m below grade	0.0
						CL-CI	CLAY (FILL) - low to medium plastic, moist, firm, black, some organics		
			18-1						
1.0			18-2		CL		CLAY - and silt, low plastic, very moist, stiff, grey		-1.0
			18-3				- wet from 1.4 to 1.7 m		
2.0			18-4		CL-CI		CLAY - some silt, low to medium plastic, moist, firm, grey		-2.0
			18-5		CI-CH		CLAY - silty, medium to high plastic, moist, firm, brown		-3.0
3.0			18-6				CLAY - high plastic, moist, brown, firm		-4.0
4.0			18-7		CH				-4.6
5.0							Hole ended at 4.6 m below grade Seepage to 4.0 m below grade and sloughing to 4.3 m below grade at completion of drilling.		-5.0
6.0									-6.0

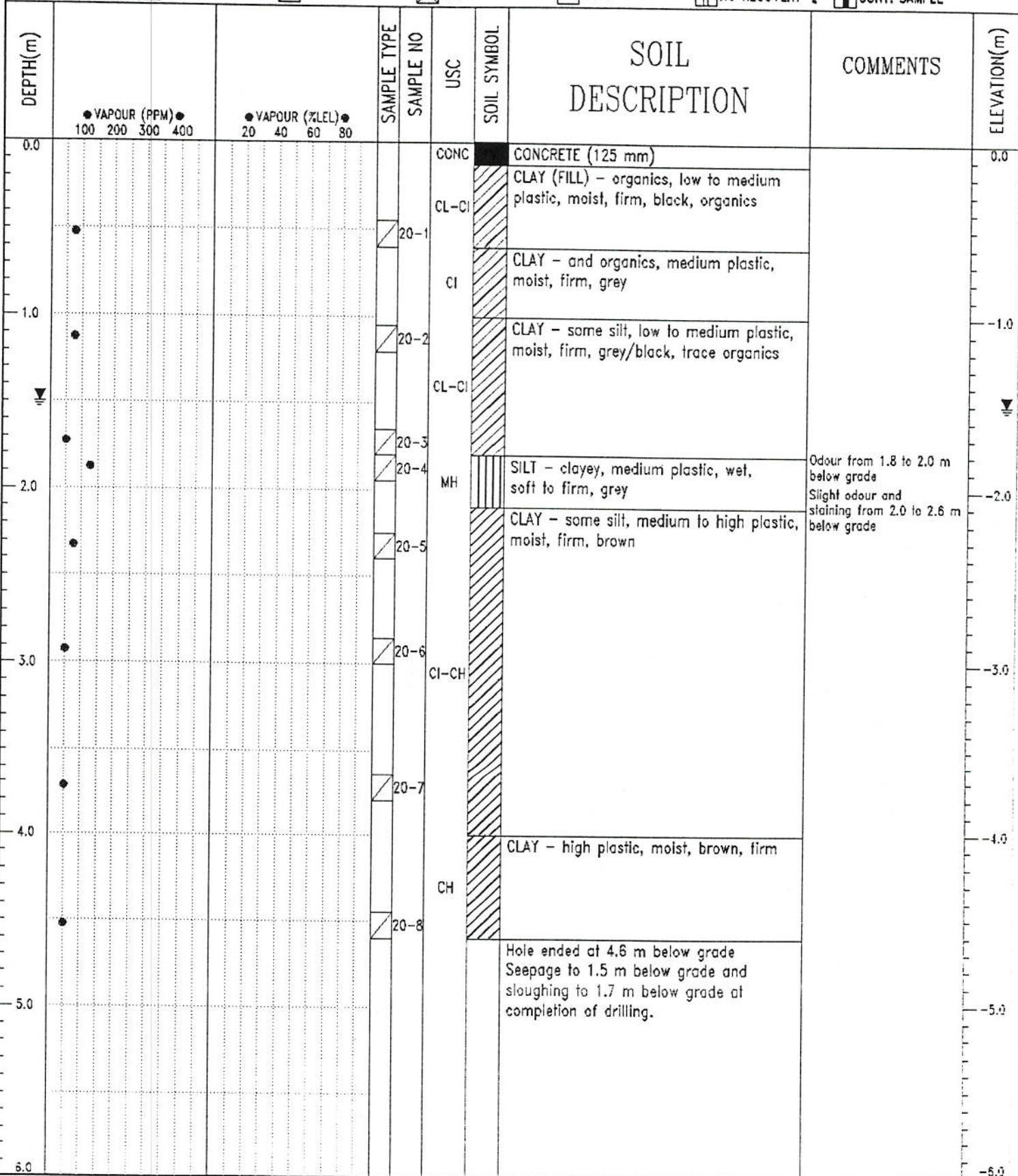
AMEC Earth & Environmental Limited		LOGGED BY: DB		COMPLETION DEPTH: 4.6 m	
Winnipeg, Manitoba		REVIEWED BY: HP		COMPLETE: 09/05/01	
		Fig. No: B7		Page 1 of 1	

Phase III ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH19	
City of Winnipeg		Drill Rig: VL-60 Mounted on Backhoe		PROJECT NO: WX05145	
		Auger: 125 Solid Stem		ELEVATION:	
SAMPLE TYPE ☒ SHELBY TUBE ☒ CUTTINGS ☒ SPT ☐ CORE ☐ NO RECOVERY ☐ CONT. SAMPLE					

DEPTH(m)	VAPOUR (PPM)	VAPOUR (%LEL)	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	ELEVATION(m)
0.0	● 100 200 300 400	● 20 40 60 80				SM	SAND (FILL) - some gravel, trace clay, poorly graded, fine to medium grained, loose to medium dense, moist, brown	Odour and staining from 0.3 to 2.7 m below grade	0.0
						CONC	CONCRETE RUBBLE (125 mm)		
				19-1	CL-CI		CLAY (FILL) - silty, low plastic, moist, firm, black, some organics		
1.0				19-2			CLAY - and silt, low plastic, very moist, stiff, grey		-1.0
				19-3	CL				
2.0				19-4			- wet from 2.4 to 2.7 m below grade		-2.0
				19-5			CLAY - high plastic, moist, brown, firm	Slight odour from 2.7 to 3.4 m below grade	-3.0
3.0				19-6	CH				-4.0
4.0				19-7					-5.0
5.0							Hole ended at 4.6 m below grade Seepage to 2.7 m below grade and sloughing to 4.3 m below grade at completion of drilling.		-6.0

AMEC Earth & Environmental Limited		LOGGED BY: DB	COMPLETION DEPTH: 4.6 m
Winnipeg, Manitoba		REVIEWED BY: HP	COMPLETE: 09/05/01
		Fig. No: B8	Page 1 of 1

Phase III ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling	TEST HOLE NO: TH20
City of Winnipeg		Drill Rig: VL-60 Mounted on Backhoe	PROJECT NO: WX05145
		Auger: 125 Solid Stem	ELEVATION:
SAMPLE TYPE	☒ SHELBY TUBE ☒ CUTTINGS ☒ SPT ☐ CORE ☐ NO RECOVERY ☐ CONT. SAMPLE		



AMEC Earth & Environmental Limited
Winnipeg, Manitoba

LOGGED BY: DB	COMPLETION DEPTH: 4.6 m
REVIEWED BY: HP	COMPLETE: 09/05/01
Fig. No: B9	Page 1 of 1

Phase III ESA - 1385 Whyte Ave		Contractor: Maple Leaf Drilling		TEST HOLE NO: TH21	
City of Winnipeg		Drill Rig: VL-60 Mounted on Backhoe		PROJECT NO: WX05145	
		Auger: 125 Solid Stem		ELEVATION:	
SAMPLE TYPE ☒ SHELBY TUBE ☒ CUTTINGS ☒ SPT ☐ CORE ☐ NO RECOVERY ☐ CONT. SAMPLE					

DEPTH(m)	● VAPOUR (PPM) ● 100 200 300 400	● VAPOUR (%LEL) ● 20 40 60 80	SAMPLE TYPE	SAMPLE NO	USC	SOIL SYMBOL	SOIL DESCRIPTION	COMMENTS	ELEVATION(m)
0.0						CONC	CONCRETE (300mm)		0.0
				21-1	SP		SAND (FILL) - some gravel, poorly graded, fine to medium plastic, loose to medium dense, moist, trace clay		
1.0				21-2	MH		SILT - and clay, medium plastic, moist, soft to firm, grey		-1.0
				21-3					
2.0				21-4	CL-CI		CLAY - silty, low to medium plastic, moist, firm, grey - and silt, organics, black/brown from 2.0 to 2.7 m below grade		-2.0
				21-5	CI-CH		CLAY - trace silt, medium to high plastic, moist, firm, brown		-3.0
3.0							Hole ended at 3.0 m below grade No seepage or sloughing at completion of drilling.		-3.0
4.0									-4.0
5.0									-5.0
6.0									-6.0

AMEC Earth & Environmental Limited		LOGGED BY: DB	COMPLETION DEPTH: 3 m
Winnipeg, Manitoba		REVIEWED BY: HP	COMPLETE: 09/05/01
		Fig. No: B10	Page 1 of 1

APPENDIX C

CERTIFICATES OF ANALYSIS

4810 - 93 Street
Edmonton, Alberta
Canada T6E 5M4
Tel: (780) 436-2152
Fax: (780)435-8425



ANALYTICAL REPORT
AMEC Earth & Environmental Limited
Winnipeg, Manitoba

Date Received: May 11/2001
Date Sampled: May 9/2001
Date of Report: May 16/2001

SOIL ANALYSIS

Attention: David Bynski

Project No.: WX05145

File No.: EC41133

Analyst	Date of Analysis (yyyy/m/d)	Analytical Parameter	Reference Method	Lab. No.	01-3438	01-3439	01-3440	01-3441	01-3442
				Sample I.D.	12-4 @ 1.8m	13-2 @ 1.2m	15-1 @ 0.6m	15-4 @ 2.4m	18.3 @ 1.8m
				Trifluorotoluene Recovery(%)	133	108	118	105	110
				MDL	ug/g (ppm) dry weight				
ST	2001/5/11	Benzene	EPA 5021/CCME	0.020	13	0.22	3.7	3.1	3.6
ST	2001/5/11	Toluene	EPA 5021/CCME	0.030	1.9	0.21	1.6	0.50	0.58
ST	2001/5/11	Ethylbenzene	EPA 5021/CCME	0.020	38	4.0	9.8	12	8.8
ST	2001/5/11	Xylenes	EPA 5021/CCME	0.030	190	11	33	59	22
ST	2001/5/11	F1 - VPH (C ₆ -C ₁₀)	EPA 5021/CCME	1.5	2100	290	530	710	670
ST	2001/5/11	F2 - EPH (C ₁₀ -C ₁₆)	EPA 3550/CCME	10	13000	2400	5000	4800	4300
ST	2001/5/11	F3 - EPH (C ₁₆ -C ₃₄)	EPA 3550/CCME	10	2800	350	1300	980	760
ST	2001/5/11	F4 - EPH (C ₃₄ -C ₅₀)	EPA 3550/CCME	10	< 10	< 10	20	< 10	< 10
ST	2001/5/11	Moisture	%		19.4	26.9	30.3	19.7	24.3

MDL: Method Detection Limit

EPA: U.S. Environmental Protection Agency. 1997. Test Methods of Evaluation of Solid Waste 3rd Ed through Update III.
Office Solid Waste Emergency Response, U.S. Environmental Protection Agency, Washington, D.C.

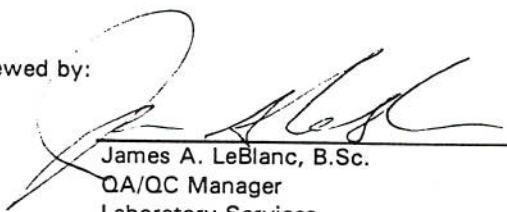
CCME - Canadian Council of Ministers of the Environment - Method for Canada Wide

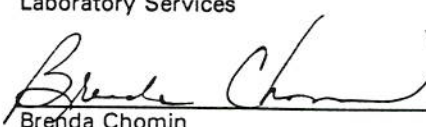
Standards for Petroleum Hydrocarbon in Soil - Tier 1 Method, Revision 5.0

VPH - Volatile Petroleum Hydrocarbons (TVH with BTEX subtracted)

EPH: Extractable Petroleum Hydrocarbon - not corrected for PAH content.

Report reviewed by:


James A. LeBlanc, B.Sc.
QA/QC Manager
Laboratory Services


Brenda Chomin
Manager
Laboratory Services



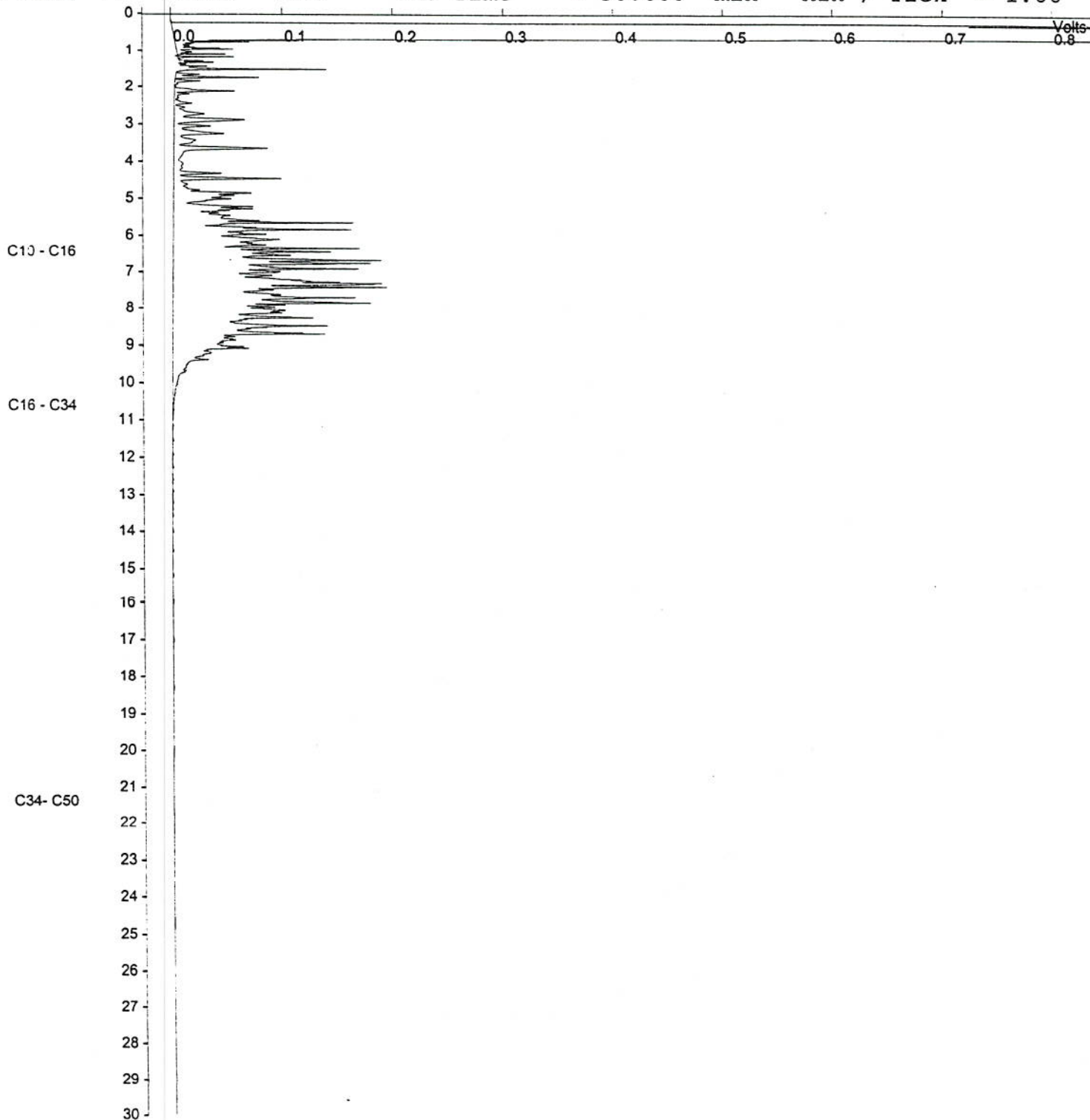
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Data File : c:\star\data\svh\5-11-01-9;12;00 pm--3438.run
Method File : c:\star\tph-ccme-eph-01-04-27.mth
Sample ID : 3438

Injection Date: 5/11/01 9:11 PM Calculation Date: 5/14/01 9:07 AM

Operator : S.THOMSON Detector Type: ADCB (1 Volt)
Workstation: TSH Bus Address : 16
Instrument : Varian Star #1 Sample Rate : 10.00 Hz
Channel : A = FID Run Time : 35.002 min

Star Chromatography Workstation Version 5.3 ** 00243-0E08-D91-22B9 **

Start Speed = 0.66 cm/min Attenuation = 3533 Zero Offset = 3%
Start Time = 0.000 min End Time = 30.000 min Min / Tick = 1.00



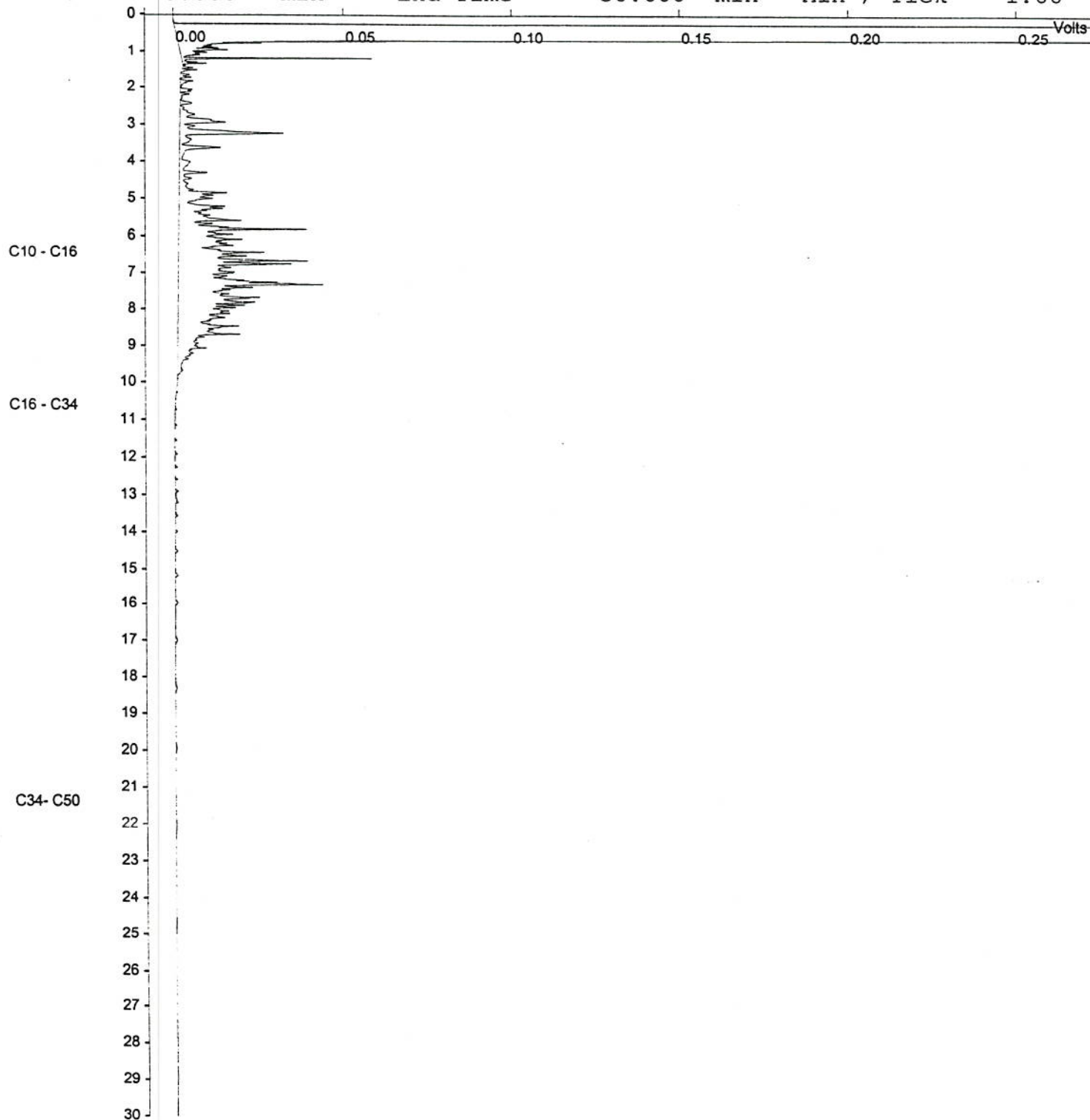
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ethod File : c:\star\tpH-ccme-eph-01-04-27.mth
ample ID : 3439

Injection Date: 5/11/01 9:58 PM Calculation Date: 5/14/01 9:07 AM

erator : S.THOMSON Detector Type: ADCB (1 Volt)
rkstation: TSH Bus Address : 16
nstrument : Varian Star #1 Sample Rate : 10.00 Hz
hannel : A = FID Run Time : 35.002 min

* Star Chromatography Workstation Version 5.3 ** 00243-0E08-D91-22B9 **

art Speed = 0.66 cm/min Attenuation = 1151 Zero Offset = 3%
art Time = 0.000 min End Time = 30.000 min Min / Tick = 1.00



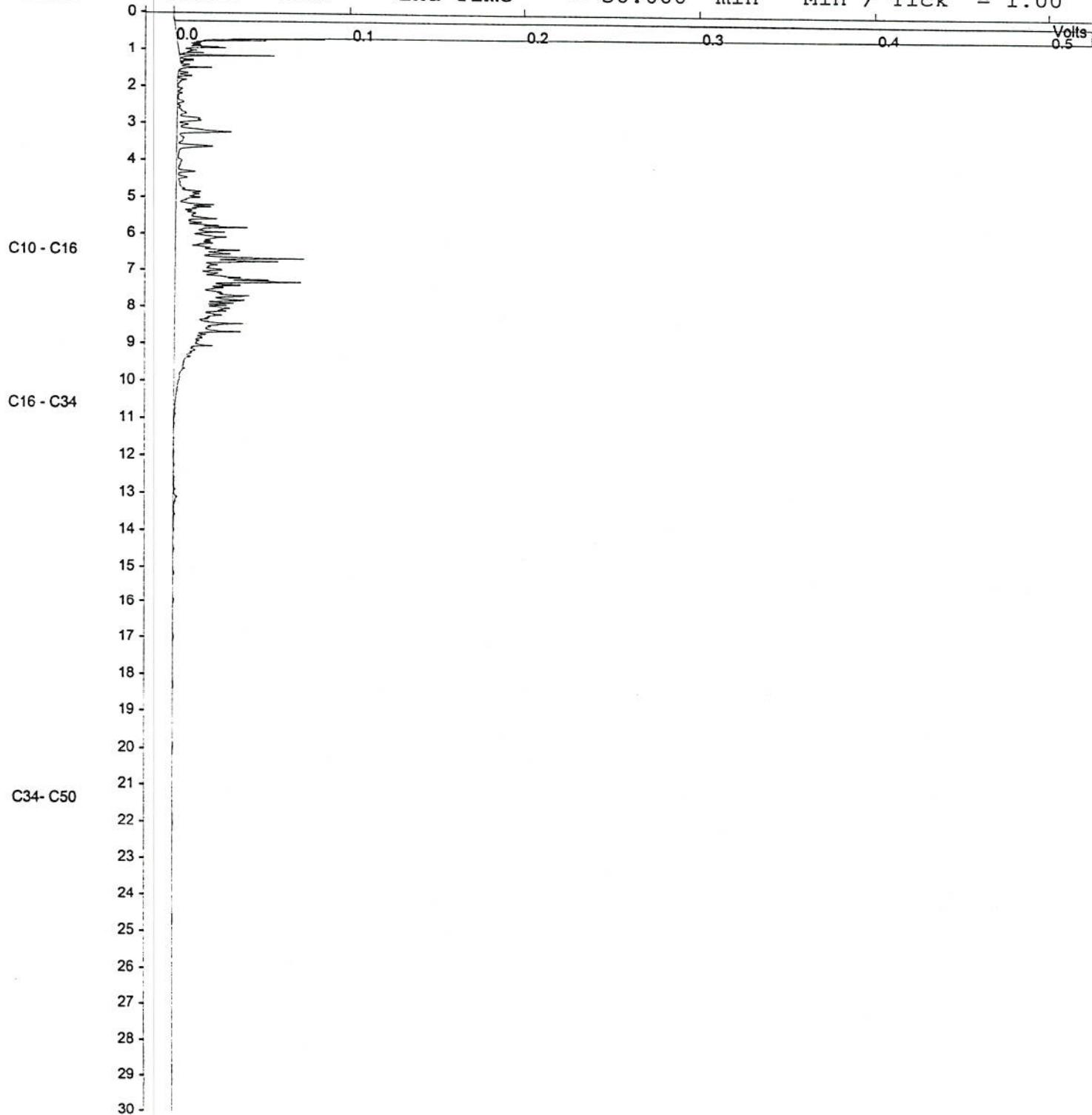
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In File : c:\star\data\svh\5-11-01-10:45:43 pm--3440.run
Method File : c:\star\tph-ccme-eph-01-04-27.mth
Sample ID : 3440

Injection Date: 5/11/01 10:45 PM Calculation Date: 5/14/01 9:10 AM

Operator : S.THOMSON Detector Type: ADCB (1 Volt)
Workstation: TSH Bus Address : 16
Instrument : Varian Star #1 Sample Rate : 10.00 Hz
Channel : A = FID Run Time : 35.002 min

Star Chromatography Workstation Version 5.3 ** 00243-0E08-D91-22B9 **

Flow Rate = 0.66 cm/min Attenuation = 2214 Zero Offset = 3%
Start Time = 0.000 min End Time = 30.000 min Min / Tick = 1.00



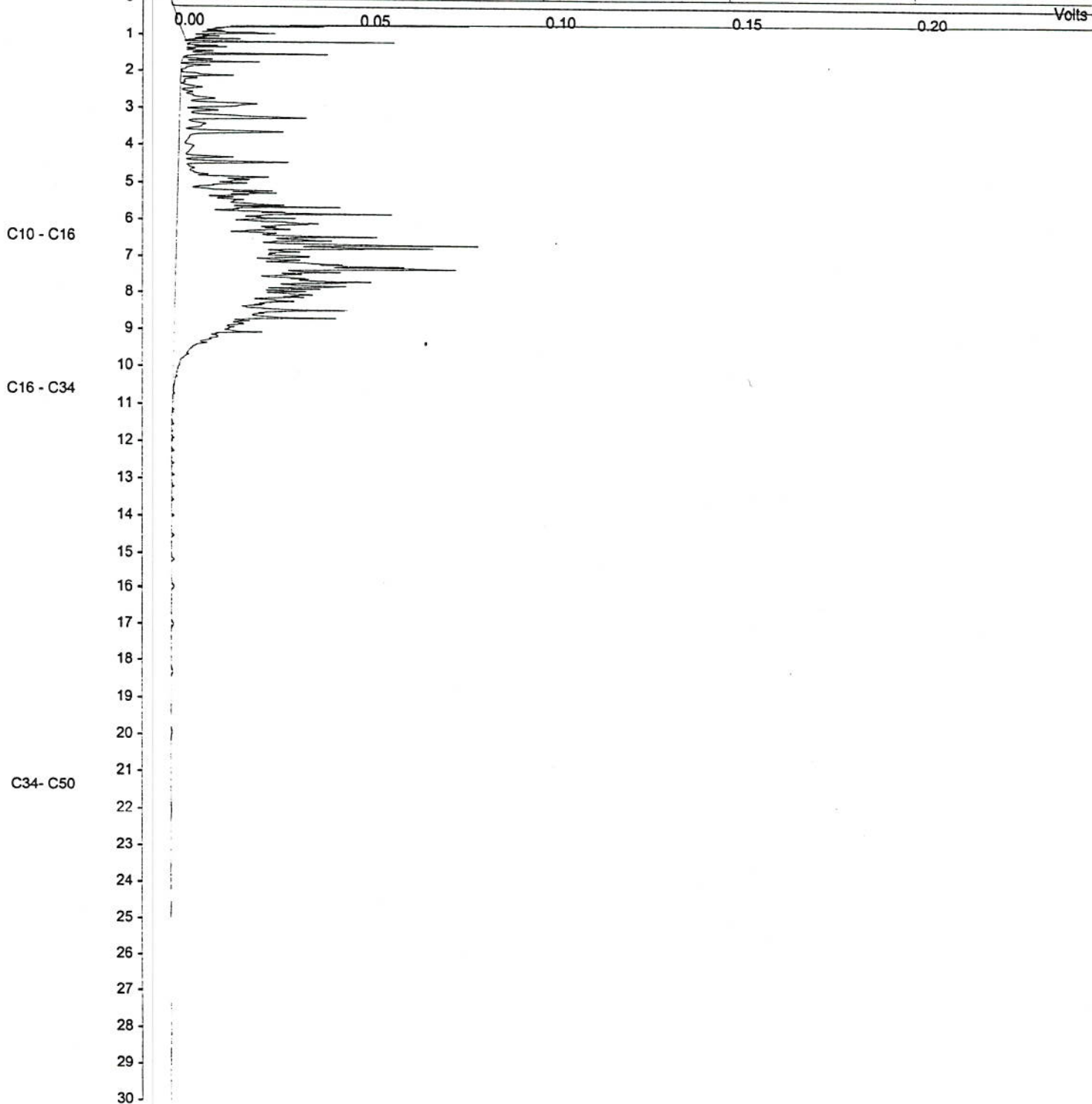
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Run File : c:\star\data\svh\5-11-01-11:32:28 pm--3441.run
Method File : c:\star\tph-ccme-eph-01-04-27.mth
Sample ID : 3441

Injection Date: 5/11/01 11:32 PM Calculation Date: 5/14/01 9:10 AM

Operator : S.THOMSON Detector Type: ADCB (1 Volt)
Workstation: TSH Bus Address : 16
Instrument : Varian Star #1 Sample Rate : 10.00 Hz
Channel : A = FID Run Time : 35.002 min

Star Chromatography Workstation Version 5.3 ** 00243-0E08-D91-22B9 **

Flow Rate = 0.66 cm/min Attenuation = 1048 Zero Offset = 3%
Start Time = 0.000 min End Time = 30.000 min Min / Tick = 1.00



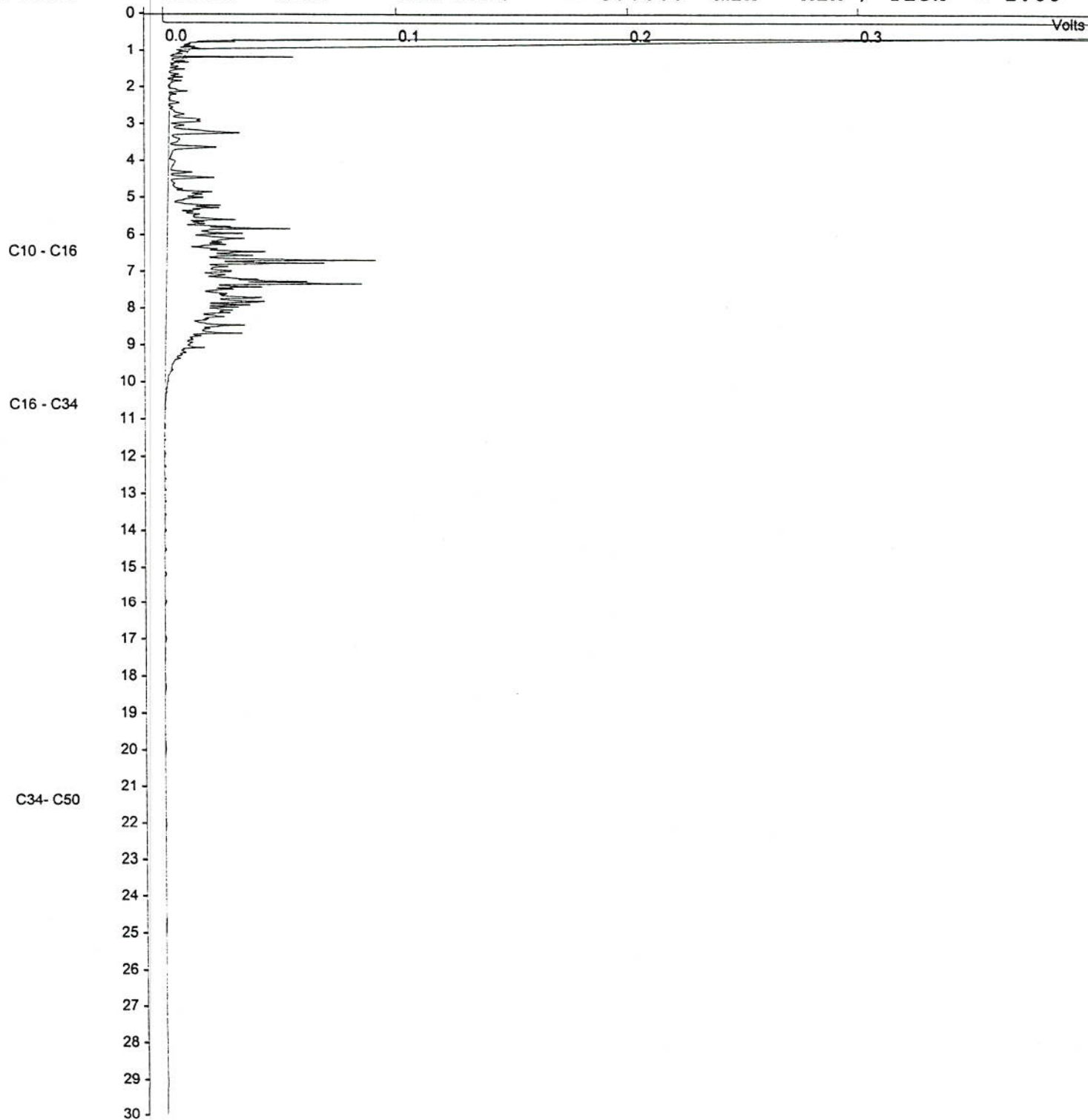
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Method File : c:\star\tph-ccme-eph-01-04-27.mth
Sample ID : 3442

Injection Date: 5/12/01 12:19 AM Calculation Date: 5/14/01 9:11 AM

Operator : S.THOMSON Detector Type: ADCB (1 Volt)
Workstation: TSH Bus Address : 16
Instrument : Varian Star #1 Sample Rate : 10.00 Hz
Channel : A = FID Run Time : 35.002 min

Star Chromatography Workstation Version 5.3 ** 00243-0E08-D91-22B9 **

Start Speed = 0.66 cm/min Attenuation = 1673 Zero Offset = 2%
Start Time = 0.000 min End Time = 30.000 min Min / Tick = 1.00



APPENDIX D

LIMITATIONS

AMEC
STATEMENT OF GENERAL CONDITIONS - ENVIRONMENTAL SERVICES

1. **STANDARD OF CARE** - In the performance of professional services, the CONSULTANT will use that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its professional practicing in the same or similar localities. No other warranty expressed or implied is made or intended by this agreement or by furnishing oral or written reports of the findings made. The CONSULTANT is to be liable only for damage approximately caused by the negligence of the CONSULTANT. The CLIENT recognizes that subsurface conditions may vary from those encountered at the location where borings, surveys, or explorations are made by the CONSULTANT and that the data, interpretations and recommendation of the CONSULTANT are based solely on the information available to him. The CONSULTANT will not be responsible for the interpretation by others of the information developed.

2. **SITE INFORMATION** - The CLIENT agrees to fully cooperate with the CONSULTANT with respect to the provision of all available information on the past, present and proposed conditions of the Site known to it or otherwise requested by the CONSULTANT.

The CONSULTANT agrees to include a review of all historical information obtained by the CLIENT or provided by the Client to assist in the investigation of the Site unless and except to the extent that such a review is limited or excluded from the scope of work to be performed by the CONSULTANT.

3. **FULL DISCLOSURE** - The CLIENT acknowledges that in order for the CONSULTANT to properly advise and assist the CLIENT in respect of the investigation of the Site, the CONSULTANT is relying upon full disclosure by the CLIENT of all matters pertinent to an investigation of the Site.

4. **DELAYS AND INTERRUPTIONS** - Should the CONSULTANT be delayed or interrupted by others in the performance of its services or be required to perform additional services as a result of any delay or interruption caused by others, the CONSULTANT shall be equitably compensated by the CLIENT for all costs, charges and expenses which it may incur as a result of such delay or interruption and any such additional services to be performed and any and all consequences resulting from such delay or interruption.

5. **USE OF WORK PRODUCT** - The CONSULTANT agrees to provide to the CLIENT interim reports outlining the progress of the investigation of the Site on a periodic basis and a final comprehensive report upon the completion of the investigation of the Site.

6. **COMPLETE REPORT** - This document being a part of the Report is of a summary nature and is not intended to stand alone without reference to the instructions given to the CONSULTANT by the CLIENT, communications between the CONSULTANT and the CLIENT, and to any other reports, writings or documents prepared by the CONSULTANT for the CLIENT relative to the specific Site described herein, all of which constitute the Report. Wherever the word Report is used herein, it shall refer to any and all of the documents referred to herein.

In order to properly understand the suggestions, recommendations and opinions expressed herein, reference must be made to the whole of the Report. The CONSULTANT cannot be responsible for use by any part of portions of the report without reference to the whole report.

7. **LIMITATIONS ON SCOPE OF INVESTIGATION AND WARRANTY DISCLAIMER**

There is no warranty, expressed or implied, by the CONSULTANT that:

- a) the investigation shall uncover all potential contaminants, including asbestos, on the Site; or
- b) the Site will be entirely free of all Targeted Contaminants or other contaminants as a result of any cleanup work undertaken on the Site, since it is not possible, even with exhaustive sampling, testing and analysis, to document all potential contaminants on the Site.

Classification and identification of soils, rocks, geological units, contaminated materials and contaminant quantities have been based on commonly accepted practices in environmental consulting practice in this area.

The CLIENT acknowledges that:

- a) the investigation findings are based solely on the information generated as a result of the specific scope of the investigation authorized by the CLIENT;

- b) any assessment regarding the presence of contamination of the Site is based on the interpretation of conditions determined at specific sampling locations and depths and that conditions may vary between sampling locations;
- c) there can be no assurance that isolated pockets of contaminants are not located on the Site;
- d) any assessment is also dependent on and limited by the accuracy of the analytical data generated by the sample analyses;
- e) any assessment is also limited by the scientific possibility of determining the presence of contaminants for which scientific analyses have been conducted; and
- f) the analytical parameters selected are limited to those outlined in the CLIENT's authorized scope of investigation (in the absence of any evidence of potential contamination sources on the Site which may warrant expanding the analytical parameters).

8. **REMEDATION COST ESTIMATES** - Estimates of remediation costs can only be based on the specific information generated and the technical limitations of the investigation authorized by the CLIENT. Accordingly, estimated costs for remediation only represent the cost to clean up known contaminants that have been identified during the course of the investigation. As remediation of a Site is often an iterative exercise, estimated costs for remediation should only be interpreted to cover the first stage of any Site remediation until such time as verification samples indicate that the Site has been fully remediated and the CONSULTANT shall therefore not be liable for the accuracy of any estimates of remediation costs provided.

9. **CONTROL OF WORK AND JOBSITE SAFETY** - The CONSULTANT is only responsible for the activities of its employees on the jobsite. The presence of CONSULTANT personnel on the Site shall not be construed in any way to relieve the CLIENT or any contractors on Site from their responsibilities for Site safety. The CLIENT undertakes to inform the CONSULTANT of all hazardous conditions, or possible hazardous conditions which are known to him. The CLIENT also recognizes that the activities of the CONSULTANT may uncover previously unknown hazardous materials and that such a discovery may result in the necessity to undertake emergency procedures to protect CONSULTANT employees as well as the public at large and the environment in general. The CLIENT also acknowledges that in some cases the discovery of hazardous conditions and materials will require that certain regulatory bodies be informed and the CLIENT agrees that notification to such bodies by the CONSULTANT will not be a cause of action or dispute.

10. **LIMITATION OF RESPONSIBILITY**

Limitation of Liability - The CLIENT hereby agrees that to the fullest extent permitted by the law the CONSULTANT's total liability to CLIENT for any and all injuries, claims losses, expenses or damages whatsoever arising out of or in anyway relating to the Project, the Site, or this agreement from any cause or causes including but not limited to the CONSULTANT's negligence, errors, omissions, strict liability, breach of contract, or breach of warranty shall not exceed the total amount paid by the CLIENT for the services of the CONSULTANT under this contract or \$50,000, whichever is greater.

No Special or Consequential Damages - CLIENT and CONSULTANT agree that to the fullest extent permitted by law the CONSULTANT shall not be liable to CLIENT for any special, indirect or consequential damages whatsoever, whether caused by the CONSULTANT's negligence, errors omissions, strict liability, breach of contract, breach of warranty or other cause of causes whatsoever.

Indemnification - To the fullest extent permitted by law, the CLIENT agrees to defend, indemnify and hold the CONSULTANT, its agents, subcontractors, and employees harmless from and against any and all claims, defense costs, including attorney's fees, damages, and other liabilities arising out of or in any way related to CONSULTANT's reports or recommendations concerning this Agreement, CONSULTANT's presence on the project property, or the presence, release, or threatened release of asbestos, hazardous substances, or pollutants on or from the project property; provided that the CLIENT shall not indemnify CONSULTANT against liability for damages to the extent caused by the negligence or intentional misconduct of CONSULTANT, its agents, subcontractors, or employees.