



# Soil Remediation

Public Road 584  
North of Roblin, Manitoba

Prepared for:

**Red River Mutual**  
245 Centre Street  
Altona, MB R0G 0B0

December 18, 2020

Pinchin File: 282320



**Soil Remediation**  
Public Road 584, North of Roblin, Manitoba  
Red River Mutual

December 18, 2020  
Pinchin File: 282320

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## EXECUTIVE SUMMARY

Pinchin Ltd. (Pinchin) was retained through an Authorization to Proceed, Limit of Liability and Terms of Engagement signed by Red River Mutual (Client) to conduct a Soil Remediation for the property located at Public Road 584 in North of Roblin, Manitoba (hereafter referred to as the Site).

The Site is natural treed area adjacent to a provincial road.

The purposes of the Soil Remediation were as follows:

- To remove contaminated soils identified by a report entitled “*Soil Sampling Program, Public Road 584, North of Roblin, Manitoba*”, dated June 23, 2020, completed by Pinchin for the Client; and
- To conduct a verification soil sampling program following the removal of impacted soils to assess whether the soil at the final limits of the excavation meets the applicable regulatory criteria.

The excavation activities, which consisted of soil excavation, transportation of excavated material, slope matting installation and backfilling were conducted by Winnipeg Environmental Remediations Inc. (WERI) at the Site between November 9, 2020 and November 16, 2020.

Following the excavation of soil with known impacts, soil samples were collected from the floor and sidewalls at the final limits of the excavation for field screening. Based on the results of field screening, a total of six (6) “worst case” soil samples were submitted for laboratory analysis of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs) in the F1 to F4 fraction ranges (F1-F4) and polycyclic aromatic hydrocarbons (PAHs) to assess soil quality at the excavation limits.

Based on Site-specific information, the soil quality was assessed based on the Canadian Council of Ministers of the Environment (CCME) “*Environmental Quality Guidelines*” accessed on the CCME web site in November 2020, the CCME “*Canada-Wide Standards for Petroleum Hydrocarbons in Soil*”, dated 2008, the CCME “*Canadian Environmental Soil Quality Guidelines for the Protection of Environmental and Human Health - Polycyclic Aromatic Hydrocarbons*”, dated 2010, and the *Ontario Ministry of the Environment, Conservation and Parks (MECP) “Soil, Ground water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”, dated April 15, 2011* (hereafter collectively referred to as the Soil Quality Guidelines).

Reported concentrations in the verification soil samples submitted for analysis of BTEX, PHCs (F1-F4), and PAHs satisfied the Soil Quality Guidelines.



Based on the findings of the verification soil sampling program completed for the Soil Remediation, it is Pinchin's opinion that no further remedial work is required in relation to the agricultural tractor and grain cart roll over incident at the Site.

*This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.*



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## 1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained through an Authorization to Proceed, Limit of Liability and Terms of Engagement signed by Red River Mutual (Client) to conduct Soil Remediation for the property located at Public Road 584 in North of Roblin, Manitoba (hereafter referred to as the Site). The Site location is shown on Figure 1 and Figure 2 (all Figures are provided in Appendix I).

The Site is natural treed area adjacent to a provincial road.

The purposes of the Soil Remediation were as follows:

- To remove contaminated soils identified by a report entitled "*Soil Sampling Program, Public Road 584, North of Roblin, Manitoba*", dated June 23, 2020, completed by Pinchin for the Client; and
- To conduct a verification soil sampling program following the removal of impacted soils to assess whether the soil at the final limits of the excavation meets the applicable regulatory criteria.

## 1.1 Background

According to the Client, a roll over incident occurred with an agricultural tractor and grain cart on September 17, 2019 on Public Road 584 approximately 25 kilometres north of Roblin, Manitoba. Manitoba Sustainable Development (now Manitoba Conservation and Climate) conducted a site inspection on October 21, 2019 and observed diesel staining on the roadway as well as damage to the side of the hill. Vehicle parts were also observed hanging in the trees. It was also reported that impacted grain was removed from the Site on October 18, 2019. A volume of loss was not provided.

Pinchin completed a Site Assessment at the Site on December 3, 2019. Due to frozen soil conditions and the inability to access the Site with powered mobile equipment, soil samples could not be collected at the time of the assessment. Strong petroleum hydrocarbon like odours were observed in four grain samples collected during the Site Assessment. Based on the information provided by Manitoba Conservation and Climate and the observations made by Pinchin during the Site Assessment, the potential exists for petroleum hydrocarbon impacts to be present at the Site. Pinchin also collected GPS data points of the Site during the Site Assessment to determine what, if any, remedial activities could be completed during the winter months when ground conditions were frozen. Based on the survey data obtained by Pinchin, the potentially impacted area is approximately 9.0 metres vertically below the elevation of the road and at an approximate horizontal distance of 20.0 metres from the side of the road. Following discussions with excavation contractors in Roblin, Manitoba, soil sampling and Soil Remediation were deemed not feasible with the available equipment and frozen ground conditions during the Site Assessment.



Based on the observations collected during the Site Assessment, it was Pinchin's opinion that the Site should be reassessed, and soil sampling be conducted once ground conditions have thawed during the spring months.

A Soil Sampling Program was conducted by Pinchin at the Site on May 12, 2020, which consisted of collection of near surface soil samples. Soil samples were collected within the area of fuel release. Retrieved soil samples consisted of silty clay. Samples were collected from a maximum depth of 0.3 meters below ground surface due to presence of extensive roots below ground surface. Based on the results of field screening, a total of six (6) "worst case" soil samples were submitted for laboratory analysis of a combination of benzene, toluene, ethylbenzene and xylenes (BTEX), petroleum hydrocarbons (PHCs) in the F1 to F4 fraction ranges (F1-F4) and polycyclic aromatic hydrocarbons (PAHs).

Reported concentrations in the verification soil samples submitted for analysis of BTEX, PHCs (F1-F4), and PAHs met the Soil Quality Guidelines, with the exception of soil sample SS-4 collected from sampling location 4, which had concentrations of PHCs (F1-F3), total methylnaphthalene and naphthalene that exceeded the applicable Soil Quality Guidelines, soil sample SS-5 collected from sampling location 5, which had concentrations of PHCs (F1-F3), total methylnaphthalene and naphthalene that exceeded the Soil Quality Guidelines, soil sample SS-6 collected from sampling location 6, which had concentrations of PHCs (F1-F3), total methylnaphthalene and naphthalene that exceeded the Soil Quality Guidelines and soil sample SS-8 collected from sampling location 8, which had concentrations of PHCs (F1-F3) that exceeded the Soil Quality Guidelines.

Based on the findings of the Soil Sampling Program, Pinchin recommended developing a Remedial Plan for the Site to be submitted to Manitoba Conservation and Climate for approval. The Remedial Plan was approved on October 28, 2020. The Remedial Plan included removal of the impacted soils at the Site.

## **1.2 Scope of Work**

The scope of work completed by Pinchin, as outlined in the Pinchin proposal entitled "*Proposal for Soil Remediation, Public Road 584, North of Roblin, Manitoba*" submitted to the Client on October 20, 2020, included the following:

- Underground services in the vicinity of the work area were cleared by public utility locators and a private utility locator retained by a third-party contractor under contract to Pinchin;
- Observation of the excavation and removal of impacted soil for off-Site disposal completed by the third-party contractor;
- Collection of soil samples from the final limits of the excavation for field screening;



- Submission of select “worst case” soil samples based on the results of field screening for laboratory analysis of BTEX, PHCs (F1-F4) and PAHs;
- Comparison of the soil laboratory analytical results to the applicable regulatory criteria;
- Observation of the slope matting installation and backfilling of the excavation with backfill material imported to the Site by the third-party contractor; and
- Preparation of a factual report detailing the findings of the Soil Remediation and recommendations.

## **2.0 METHODOLOGY**

The Soil Remediation and verification sampling program were conducted in general accordance with the following documents:

- Manitoba Conservation and Climate guidelines entitled:
  - *“Environmental Site Assessments in Manitoba”*, dated April 2016;
  - *“Manitoba Criteria for BTEX in Investigation Results”*, dated October 2014; and
  - *“Treatment and Disposal of Petroleum Contaminated Soil”*, dated January 2015.
- Manitoba Conservation and Climate information bulletins entitled:
  - *“Application of the CCME Canada-Wide Standard for Petroleum Hydrocarbons in Soil: Management Limits”*, dated October 2015;
  - *“Contaminated Sites Remediation Regulation Reporting Requirements and Standards”*, dated October 2015; and
- Canadian Council of Ministers of the Environment (CCME) publication entitled “Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment – Volume 4 Analytical Methods”, dated 2016.
- Pinchin’s standard operating procedures (SOPs).
- Canadian Standards Association publication entitled “Phase II Environmental Site Assessment, CSA Standard Z769-00 (R 2013)”.

### **2.1 Contractors**

The Soil Remediation activities were conducted by Winnipeg Environmental Remediations Inc. (WERI), a third-party contractor, under contract to Pinchin.



## **2.2 Excavation Activities**

The Soil Remediation was conducted at the Site between November 9, 2020 and November 16, 2020.

### *2.2.1 Pre-Excavation Activities*

The following activities were completed prior to conducting the excavation:

- Underground services in the vicinity of the work area were cleared by public utility locators and a private utility locator retained by WERI.

### *2.2.2 Excavation Activities*

Upon completion of the pre-excavation activities, the following were completed by WERI and monitored by Pinchin:

- Traffic control measures were placed around the work area;
- Using a truck-mounted crane, a track-mounted mini excavator was lowered onto the excavation area;
- Using a track-mounted excavator, soil with previously identified impacts and/or obvious visual/olfactory impacts was excavated from the ground by WERI and placed in metal bins which were lifted from the excavation area using the truck-mounted crane; and
- Transport of the excavated soil material directly from the Site for disposal at an approved waste disposal facility.

### *2.2.3 Verification Soil Sampling*

Following the completion of the excavation, Pinchin documented the environmental status of the soil at the excavation limits by completing the following activities:

- The soil was examined for visual/olfactory evidence of impacts and a verification soil sampling program was conducted in accordance with Pinchin's SOPs; and
- Soil samples were collected directly from the sidewalls and floor of the excavation by Pinchin personnel at the frequency specified in Pinchin's SOPs for field screening for petroleum-derived vapour concentrations in soil headspace using a photoionization detector and a combustible gas indicator operated in methane elimination mode (i.e., RKI Eagle 2). The results of the field screening were used to select "worst case" soil samples for submission to the laboratory for analysis of BTEX, PHCs (F1-F4) and PAHs.

Table 1 provides a summary of the soil samples submitted for laboratory analysis (all Tables are provided in Appendix II).



#### 2.2.4 Excavation Backfilling and Slope Matting

A PYRAMAT® 25 turf reinforcement mat was installed along the side of the embankment where the trailer rolled down and stripped vegetation in order to provide soil stabilization.

The excavation was completed from bottom up which included placement of a seeded topsoil imported to the Site by WERI, and LANDLOK® S2 product over the reinforcement matting to allow for vegetation regrowth, as per installation specifications provided by the supplier Propex Geosolutions.

### 2.3 Analytical Laboratory

Selected soil samples were delivered to Bureau Veritas Laboratories (BV Labs) in Winnipeg, Manitoba for analysis. BV Labs is an independent laboratory accredited by the Standards Council of Canada and the Canadian Association for Laboratory Accreditation. Formal chain of custody records of the sample submissions were maintained between Pinchin and the staff at BV Labs.

### 2.4 QA/QC Protocols

Various quality assurance/quality control (QA/QC) protocols were followed during the Soil Remediation to ensure that representative samples were obtained and that representative analytical data were reported by the laboratory.

Field QA/QC protocols that were employed by Pinchin included the following:

- Soil samples were placed in laboratory-supplied sample jars;
- Soil samples were placed in coolers on ice immediately upon collection, with appropriate sample temperatures maintained prior submission to the laboratory;
- Dedicated and disposable nitrile gloves were used for sample handling;
- Non-dedicated sampling equipment (e.g., trowel, sample pick) was cleaned before initial use and between uses to minimize the potential for cross-contamination by washing with an Alconox™/potable water mixture followed by a deionized water rinse; and
- Sample collection and handling procedures were performed in general accordance with the *Manitoba Conservation and Climate Guidelines* and Pinchin's SOPs for excavations.

BV Labs' internal laboratory QA/QC consisted of the analysis of laboratory duplicate, method blank, matrix spike and spiked blank samples, and an evaluation of surrogate recoveries.



## 2.5 Regulatory Criteria

Manitoba Conservation and Climate has adopted Canadian Council of Ministers of the Environment (CCME) guidelines as the regulatory criteria applicable to soil conditions in Manitoba. Analytical results of soil samples are compared to criteria set forth in the CCME “*Environmental Quality Guidelines*” that are accessed at the CCME web site, the CCME “*Canada-Wide Standards for Petroleum Hydrocarbons in Soil*”, dated 2008, and the CCME “*Canadian Environmental Soil Quality Guidelines for the Protection of Environmental and Human Health - Polycyclic Aromatic Hydrocarbons*”, dated 2010. These guidelines are collectively referred to as the “CCME Soil Guidelines”. For assessing soil quality parameters not included in the CCME Soil Guidelines, Manitoba Conservation and Climate has adopted the following guidelines:

- Ontario Ministry of the Environment, Conservation and Parks (MECP) “Soil, Ground water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act”, dated April 15, 2011 (MECP Soil Guidelines); and
- Alberta Environment and Parks (AEP) guidelines specified by the AEP document entitled “Alberta Tier 1 Soil and Groundwater Remediation Guidelines”, dated January 10, 2019 (AEP Soil Guidelines).

The above guidelines have been developed using a risk-based approach. The application of the appropriate criteria is dependent upon several site-specific conditions including:

- The existing/proposed land use;
- The existing/potential groundwater use;
- Soil depth; and
- Soil texture.

Guidelines are further subdivided into the following types of protection:

- Human health guidelines; and
- Environmental health guidelines.

Within each of these categories, several pathways are listed that describe how the chemical or compound in question would come in contact with the receptor. If a pathway is not applicable to a site, or a specific area of a site, then the corresponding guideline value is not applicable. For example, if the site is covered with asphalt or concrete, access to the soil is limited and the human health guideline for soil ingestion is not applicable because there is no pathway for humans to come into contact with the soil if the cover is maintained.



If future use of a site is modified, pathways that were not applicable can become applicable and need to be reassessed. Site-specific details for the evaluation of applicable pathways are as noted below:

- The Site is public land and for the purpose of this Soil Remediation, parkland/residential land use guidelines are considered to be applicable to the Site.
- There are no utilities present on Site for groundwater use. Pinchin conducted a search of Manitoba's GWDriI© database for wells located in the area of the Site. No wells were identified within 1,000 m of the Site, and as such, potable groundwater guidelines are considered not to be applicable for the Site.
- Groundwater is not used for livestock watering at the Site and the Site is located more than 30 metres from the nearest water body. Therefore, the livestock watering and freshwater aquatic life pathways are not applicable to the Site.
- Native soils at the Site are prominently comprised of fine-grained soils (clay and silt) and fine-grained guidelines are applicable to the Site.
- The human health vapour inhalation pathway is applicable within 30 centimetres of a building foundation (or proposed building foundation). For the purpose of this Soil Remediation, the human health vapour inhalation pathway has been considered applicable to the Site.
- The environmental health soil contact, human health ingestion, and human health dermal contact pathways are applicable in areas where access to the soil is possible (i.e., not under asphalt, concrete or a building foundation). The ground surface at the Site included in this Soil Remediation was bare and, therefore, the environmental health soil contact, human health ingestion and human health dermal contact pathways are considered to be applicable to the Site.
- The off-Site migration check, management limit, and nutrient and energy cycling checks are applicable to all areas of the Site.

Based on the above evaluation, all soil analytical results have been compared to the CCME and MECP Soil Guidelines for parkland/residential land use and fine-grained soils excluding the protection of potable water, livestock watering and aquatic life (collectively referred to as the Soil Quality Guidelines). The above evaluation is based on Pinchin's observation of Site conditions at the time of the Soil Remediation. If Site conditions or use of the Site changes in the future, the applicable pathways should be re-evaluated.



### **3.0 RESULTS**

The following subsections present the results of the Soil Remediation. Photographs depicting various aspects of the Soil Remediation work are included in Appendix III.

#### **3.1 Excavation Limits and Site Geology**

The final excavation was roughly rectangular in shape (refer to Figure 3), and measured approximately 7.5 metres long from north to south by 5 metres wide from west to east, and extended to a depth of 1.0 metre below ground surface (mbgs).

Based on observations of soil conditions during the Soil Remediation activities, the soil stratigraphy within the excavation below the ground surface generally consisted of fill material comprised of brown silty clay, gravel, debris and plant roots to a depth of approximately 0.5 mbgs.

Native subsurface material underlying the fill material was observed to generally consist of brown clayey silt, some gravel and some plant roots that extended to the maximum excavation depth of 1.0 mbgs.

#### **3.2 Soil Headspace Vapour Concentrations**

Vapour concentrations measured in the headspace of soil samples collected from the floor and sidewalls at the final limits of the excavation ranged from 0 parts per million by volume (ppmv) to a maximum of 8 ppmv in soil sample F2 collected from the excavation floor at a depth of 1.2 mbgs. The measured vapour concentrations are summarized on Figure 3.

#### **3.3 Field Observations**

PHC-like odours was observed within the excavation floor. As such, additional soil excavation was completed to remove the soil with these observed impacts. Following the additional soil excavation, and based on soil samples collected by Pinchin from the final excavation limits, PHC-like odours were no longer observed by Pinchin within the excavation.

#### **3.4 Analytical**

As indicated in Tables 2 and 3, reported concentrations of BTEX, PHCs (F1-F4) and PAHs in the soil samples that were collected from the final limits of the excavation and submitted for analysis met the Soil quality Guidelines.

The laboratory Certificate of Analysis for the soil samples is provided in Appendix IV.



### **3.5 Waste Disposal and Backfilling**

Based on information provided by WERI, approximately 38.27 tonnes of impacted soil were removed by WERI for disposal as non-hazardous waste at the City of Dauphin Landfill facility in Dauphin, Manitoba. The soil disposal tickets are presented in Appendix V.

A turf reinforcement mat was installed along the side of the embankment where the trailer rolled down and stripped vegetation in order to provide soil stabilization. Following backfilling of the excavation with topsoil, reinforcement matting was installed over and beyond the footprint of the excavation for stability and to allow for vegetation regrowth.

Topsoil material obtained from a local agricultural field was imported to the Site by WERI and used to backfill the excavation.

### **4.0 FINDINGS AND CONCLUSIONS**

Based on the work completed, the following is a summary of the activities and findings of this Soil Remediation:

- The Soil Remediation was conducted at the Site between November 9, 2020 and November 16, 2020;
- A total of 38.27 tonnes of impacted soil were excavated for off-Site disposal at an approved waste disposal facility;
- Soil with PHC-like odours and staining was observed by Pinchin within the excavation. Additional soil excavation was completed to remove this impacted soil. Following the removal of this soil, PHC-like odours and staining were no longer observed by within the excavation;
- The soil stratigraphy observed during the excavation activities consisted of brown silty clay, gravel, debris and plant roots fill material to a depth of approximately 0.5 mbgs overlying native soil comprised of brown clayey silt, some gravel and some plant roots that extended to the maximum excavation depth of 1.0 mbgs;
- Based on Site specific information, the soil quality was assessed based on the CCME and MECP Soil Guidelines for parkland/residential land use and fine-grained soils excluding the protection of potable water, livestock watering and aquatic life (collectively referred to as the Soil Quality Guidelines);



- Following the removal of impacted soils, Pinchin conducted a verification soil sampling and analysis program that included the collection of soil samples for field screening from the excavation floor and sidewalls at the final limits of the excavation. Based on the results of field screening, six (6) “worst case” soil samples were submitted for laboratory analysis of BTEX, PHCs (F1-F4) and PAHs; and
- Reported concentrations in the soil samples submitted for analysis of BTEX, PHCs (F1-F4) and PAHs satisfied their respective Soil Quality Guidelines.

Based on the findings of the verification soil sampling program completed for the Soil Remediation, it is Pinchin’s opinion that no further remedial work is required in relation to the agricultural tractor and grain cart roll over incident at the Site.

## **5.0 TERMS AND LIMITATIONS**

This Soil Remediation was performed for Red River Mutual (Client) in order to identify current and/or recognized environmental conditions at Public Road 584, north of Roblin, Manitoba (Site). The term recognized environmental condition means the presence or likely presence of any hazardous substance on a property under conditions that indicate an existing release, past release, or a material threat of a release of a hazardous substance into structures on the property or into the ground, groundwater, or surface water of the property.

Conclusions derived are specific to the immediate area of study and cannot be extrapolated extensively away from sample locations. Samples have been analysed for a limited number of contaminants that are expected to be present at the Site, and the absence of information relating to a specific contaminant does not indicate that it is not present.

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions on a property. Performance of this Soil Remediation to the standards established by Pinchin is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions on the Site, and recognizes reasonable limits on time and cost.

This Soil Remediation was performed in general compliance with currently acceptable practices for environmental site investigations, and specific Client requests, as applicable to this Site.

This report was prepared for the exclusive use of the Client, subject to the terms, conditions and limitations contained within the duly authorized proposal for this project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. Pinchin accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted.

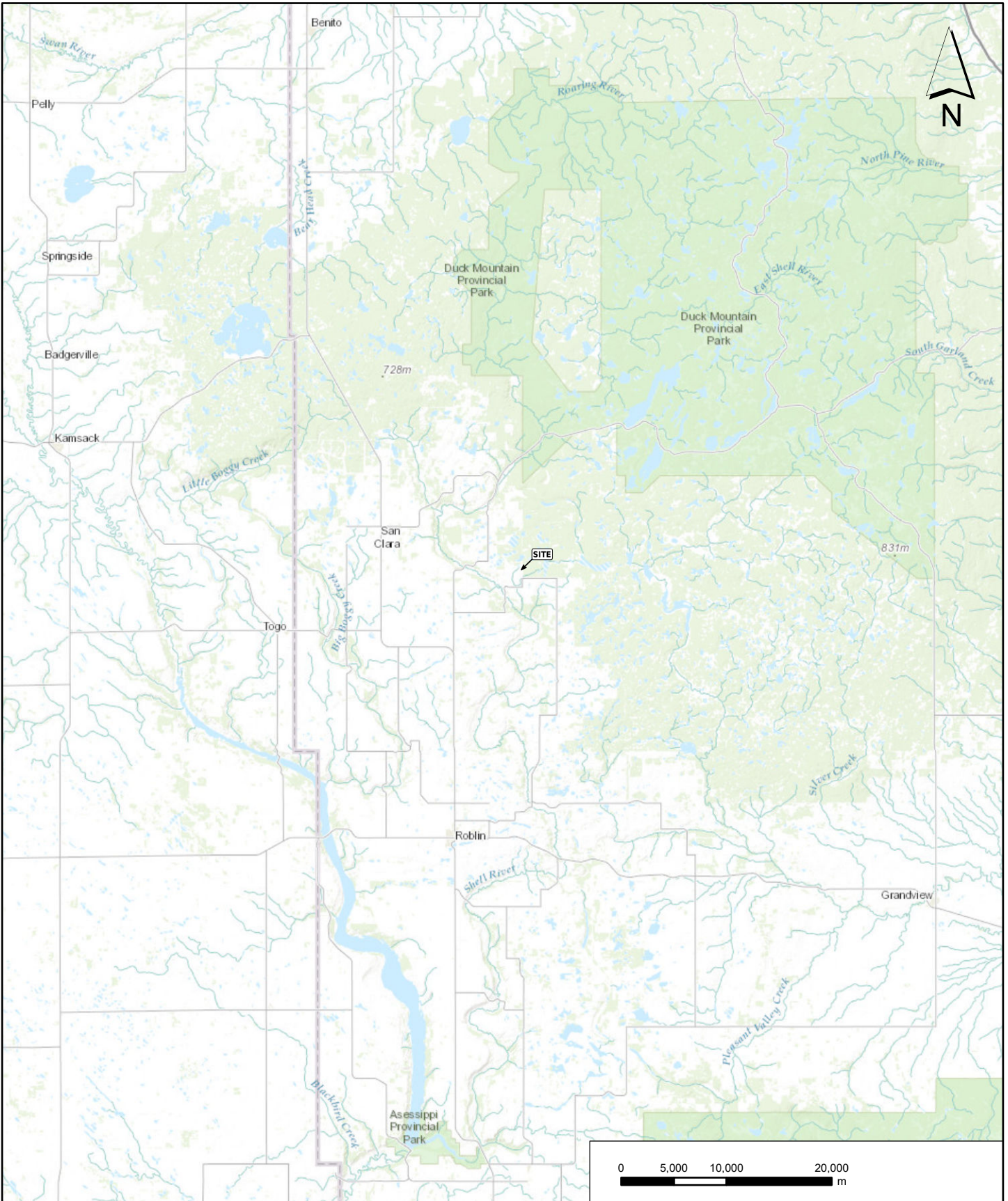


If additional parties require reliance on this report, written authorization from Pinchin will be required. Pinchin disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed. Furthermore, this report should not be construed as legal advice. Pinchin will not provide results or information to any party unless disclosure by Pinchin is required by law.

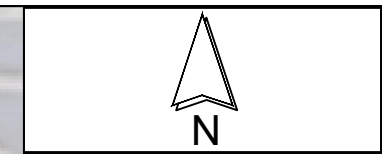
Pinchin makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

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Template: Master Report for Remedial Excavation, EDR, July 14, 2019

**APPENDIX I**  
**Figures**



PROJECT NAME:		REMEDIAL EXCAVATION	
CLIENT NAME:		RED RIVER MUTUAL	
PROJECT LOCATION:		PUBLIC ROAD 584, NORTH OF ROBLIN, MANITOBA	
FIGURE NAME:		KEY MAP	
PROJECT NUMBER:		FIGURE NUMBER	
282320	SCALE:	DRAWN BY:	1
	1:800,000	MBM	
		REVIEWED BY:	
		GEE	
		DATE:	
		DECEMBER 2020	



**LEGEND**

— EXCAVATION AREA

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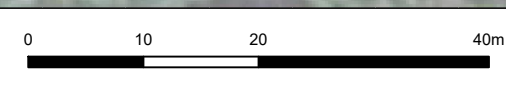
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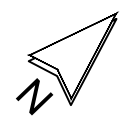
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RED RIVER MUTUAL

PROJECT LOCATION:  
PUBLIC ROAD 584,  
NORTH OF ROBLIN, MANITOBA

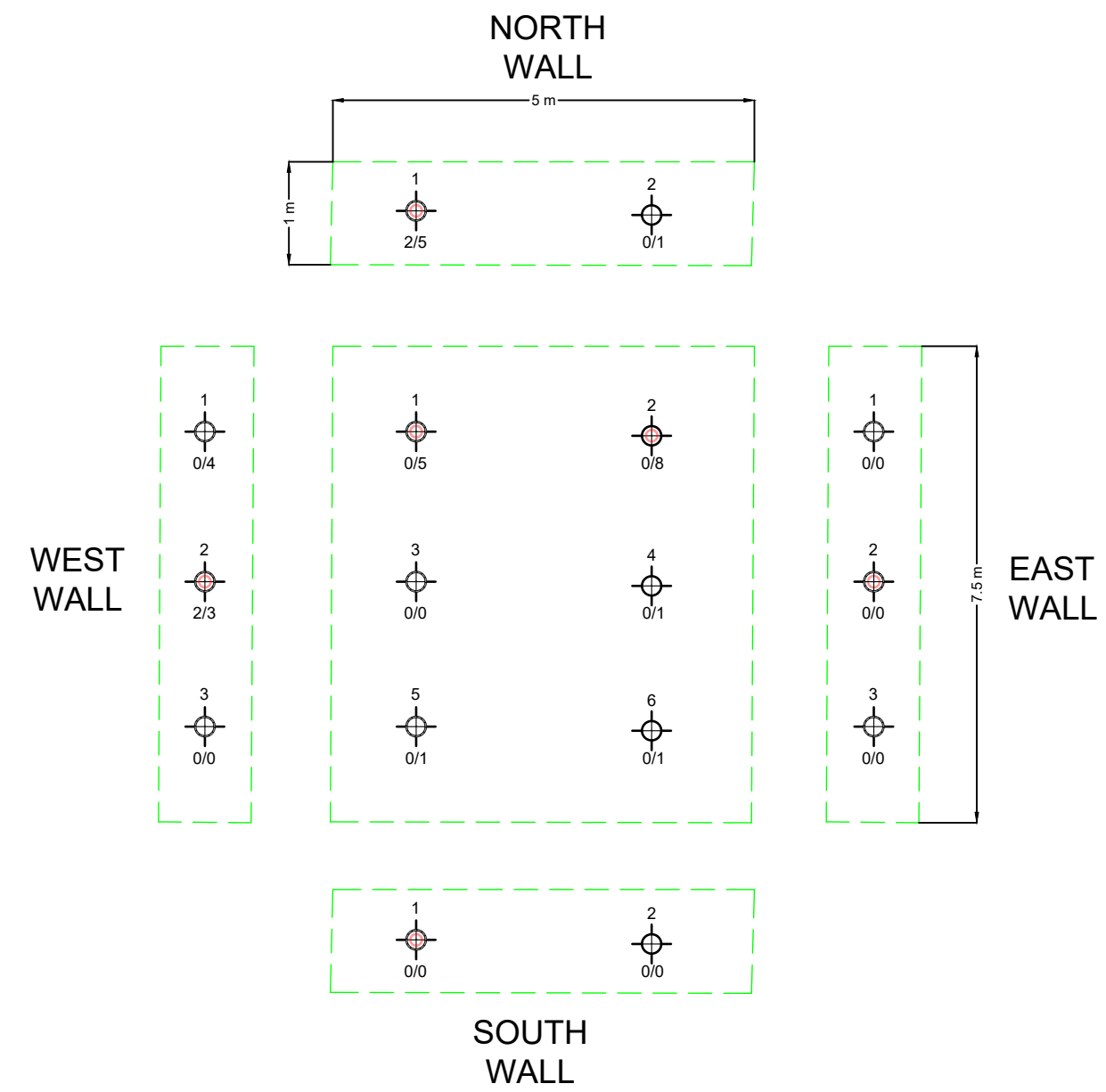
FIGURE NAME:  
SITE PLAN AND  
EXCAVATION LOCATION

PROJECT NUMBER: 282320	SCALE: AS SHOWN
DRAWN BY: MBM	REVIEWED BY: GEE
DATE: DECEMBER 2020	FIGURE NUMBER: 2





- LEGEND**
- EXCAVATION LIMITS
  - FIELD SCREENING SOIL SAMPLE LOCATION
  - SOIL SAMPLE SUBMITTED FOR LABORATORY ANALYSIS
  - 0/0 SOIL VAPOUR READING IN PARTS PER MILLION (HEX/IBL)



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PROJECT NAME:  
**REMEDIAL EXCAVATION**

CLIENT NAME:  
**RED RIVER MUTUAL**

PROJECT LOCATION:  
**PUBLIC ROAD 584,  
NORTH OF ROBLIN, MANITOBA**

FIGURE NAME:  
**EXCAVATION PLAN  
WITH CONFIRMATORY  
SAMPLE LOCATIONS**

PROJECT NUMBER:  
**282320**

SCALE:  
**AS SHOWN**

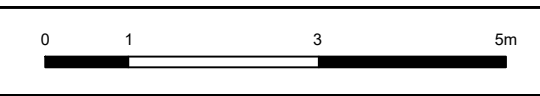
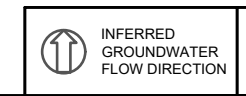
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**MBM**

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**GEE**

DATE:  
**DECEMBER 2020**

FIGURE NUMBER:  
**3**

← PUBLIC ROAD 584 →



**APPENDIX II**  
**Summary Tables**

**TABLE 1**  
**SAMPLES SUBMITTED FOR LABORATORY ANALYSIS**  
**Red River Mutual**  
**Public Road 584, North of Roblin, Manitoba**

<i>Samples</i>			<i>Parameters</i>			<i>Rationale/Notes</i>
<i>Sampling Location</i>	<i>Sample ID</i>	<i>Sample Depth Range (mbgs)</i>	<b>SOIL SAMPLES</b>	<i>PHCs (F1-F4) &amp; BTEX</i>	<i>PAHs</i>	
North wall	NW1	0.5		●	●	Assess soil conditions in relation to fuel release on site.
East wall	EW2	0.5		●	●	Assess soil conditions in relation to fuel release on site.
West Wall	WW2	0.5		●	●	Assess soil conditions in relation to fuel release on site.
South wall	SW1	0.5		●	●	Assess soil conditions in relation to fuel release on site.
Excavation Floor	F1	1		●	●	Assess soil conditions in relation to fuel release on site.
Excavation Floor	F2	1		●	●	Assess soil conditions in relation to fuel release on site.

Notes:

PHCs (F1-F4) Petroleum Hydrocarbons (Fraction 1 to Fraction 4)  
 BTEX Benzene, Toluene, Ethylbenzene, and Xylenes  
 PAHs Polycyclic Aromatic Hydrocarbons  
 mbgs Metres Below Ground Surface

**TABLE 2**  
**PETROLEUM HYDROCARBON AND BTEX ANALYSIS FOR SOIL**  
**Red River Mutual**  
**Public Road 584, North of Roblin, Manitoba**

Parameter	Soil Quality Guidelines		Sample Designation					
			Sample Collection Date (dd/mm/yyyy)					
			Sample Depth (mbgs)					
			NW1	EW2	WW2	SW1	F1	F2
Surface (<1.5 mbgs)	Subsoil (>1.5 mbgs)	09/11/2020	09/11/2020	09/11/2020	09/11/2020	09/11/2020	09/11/2020	
		0.5	0.5	0.5	0.5	1	1	
Benzene	2.1 <sup>a</sup>	2.1 <sup>b</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Toluene	110 <sup>a</sup>	220 <sup>b</sup>	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Ethylbenzene	120 <sup>a</sup>	240 <sup>b</sup>	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Xylenes (Total)	65 <sup>a</sup>	130 <sup>b</sup>	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045
Petroleum Hydrocarbons F1 (C <sub>6</sub> - C <sub>10</sub> )	210 <sup>c</sup>	610 <sup>d</sup>	<10	<10	<10	<10	<10	<10
Petroleum Hydrocarbons F2 (>C <sub>10</sub> - C <sub>16</sub> )	150 <sup>c</sup>	1,000 <sup>d</sup>	<10	<10	<10	<10	<10	<10
Petroleum Hydrocarbons F3 (>C <sub>16</sub> - C <sub>34</sub> )	1,300 <sup>c</sup>	3,500 <sup>d</sup>	<50	<50	<50	<50	<50	<50
Petroleum Hydrocarbons F4 (>C <sub>34</sub> - C <sub>50</sub> )	5,600 <sup>c</sup>	10,000 <sup>d</sup>	<50	<50	<50	<50	<50	<50

Notes:

- CCME Canadian Council of the Ministries of the Environment
- BOLD** Exceeds referenced guideline
- Units All units in mg/kg
- < Indicates concentration is less than the laboratory's minimum reportable detection limit
- mbgs Metres below ground surface
- BTEX Benzene, toluene, ethylbenzene and xylenes

<sup>a</sup> Referenced from the Canadian Council of Ministers of the Environment (CCME) Canadian Environmental Quality Guidelines, accessed on-line in November 2020.

Data represents the most stringent criteria for residential/parkland land-use, fine-grained surface soils excluding the protection of potable water, livestock watering and aquatic life. For benzene, the 10<sup>-5</sup> incremental risk factor is referenced.

<sup>b</sup> Referenced from the CCME Canadian Environmental Quality Guidelines, accessed on-line in November 2020.

Data represents the most stringent criteria for residential/parkland land-use, fine-grained subsoils excluding the protection of potable water, livestock watering and aquatic life. For benzene, the 10<sup>-5</sup> incremental risk factor is referenced.

<sup>c</sup> Referenced from the CCME Canada-Wide Standards for Petroleum Hydrocarbons in Soil, 2008

Data represents the most stringent criteria for residential land-use, fine-grained surface soils excluding the protection of potable water, livestock watering and aquatic life.

<sup>d</sup> Referenced from the CCME Canada-Wide Standards for Petroleum Hydrocarbons in Soil, 2008

Data represents the most stringent criteria for residential land-use, fine-grained subsoils excluding the protection of potable water, livestock watering and aquatic life.

**TABLE 3**  
**POLYCYCLIC AROMATIC HYDROCARBON ANALYSIS FOR SOIL**  
**Red River Mutual**  
**Public Road 584, North of Roblin, Manitoba**

Parameter	Soil Quality Guidelines	Sample Designation					
		Sample Collection Date (dd/mm/yyyy)					
		Sample Depth (mbgs)					
		NW1	EW2	WW2	SW1	F1	F2
		09/11/2020	09/11/2020	09/11/2020	09/11/2020	09/11/2020	09/11/2020
		0.5	0.5	0.5	0.5	1	1
		NC	NC	NC	NC	NC	NC
Index of Additive Cancer Risk (IACR)	Not Applicable						
B[a]P TPE (Total Potency Equivalents) <sup>1</sup>	5.3 <sup>a</sup>	0.0061	0.0061	0.0061	0.0061	0.0061	0.0061
Acenaphthene	21.5	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acenaphthylene	NC	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Acridine	NG	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Anthracene	2.5 <sup>a</sup>	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
Benzo(a)anthracene	1 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(b&j)fluoranthene	1 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(k)fluoranthene	1 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(g,h,i)perylene	NC	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(c)phenanthrene	NG	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo(a)pyrene	7.2 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Benzo[e]pyrene	NG	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Chrysene	6.2	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Dibenz(a,h)anthracene	1 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluoranthene	15.4 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Fluorene	15.4 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Indeno(1,2,3-cd)pyrene	1 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
1-Methylnaphthalene <sup>c</sup>	3.4 <sup>b</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
2-Methylnaphthalene <sup>c</sup>	3.4 <sup>b</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Naphthalene	0.6 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Phenanthrene	5 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Perylene	NG	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Pyrene	7.7 <sup>a</sup>	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Quinoline	NG	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Notes:

<	Indicates concentration is less than the laboratory's minimum reportable detection limit
<b>BOLD</b>	Exceeds soil quality guideline
Units	All units in mg/kg
mbgs	Metres below ground surface
NG	No Guideline
NC	Not calculated

<sup>1</sup> Benzo(a)pyrene Total Potency Equivalents is calculated by summing the products of the detectable levels of following parameters by their respective Benzo(a)pyrene Equivalency Factor : Benzo(a)anthracene (0.1), Benzo(a)pyrene (1), Benzo(b+j)fluoranthene (0.1), Benzo(k)fluoranthene (0.1), Benzo(g,h,i)perylene (0.01), Chrysene (0.01), Dibenz(a,h)anthracene (1) and Indeno(1,2,3-c,d)pyrene (0.1)  
If parameters are below detection, 50% of reportable detection value is used for the calculation.

<sup>a</sup> Referenced from CCME'S Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, Polycyclic Aromatic Hydrocarbons, 2010.

<sup>b</sup> Ontario Ministry of the Environment and Climate Changes "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act", April 15, 2011, Table 3 Standards, Fine-medium-Textured Soils, Non-Potable Groundwater Condition, for Residential/arkland/Institutional Property Use.

<sup>c</sup> The methyl naphthalene standards are applicable to both 1-methyl naphthalene and 2-methylnaphthalene, with the provision that if both are detected the sum of the two must not exceed the standard.

**APPENDIX III**  
**Photographs**



Photo 1 – Excavation activities at the roll over incident area at the Site.



Photo 2 – Metal bin used for recovering excavated soil material from the excavation area.



Photo 3 – Excavation activities at the Site.



Photo 4 – Excavated soil material being loaded for off-Site transport.



Photo 5 – Final limits of the excavation. Photo taken facing north.



Photo 6 – A mini excavator being lowered onto the excavation area for backfilling activities.



Photo 7 – Topsoil backfill material used for backfilling the excavation.



Photo 8 – Backfilling activities at the Site.



Photo 9 – Installation of the PYRAMAT® 25 turf reinforcement mat post-backfilling of the excavation.



Photo 10 – Installation of the LANDLOK® S2 product over the reinforcement matting to allow for vegetation regrowth.



Photo 11 – Final appearance of the backfilled excavation.

**APPENDIX IV**  
**Laboratory Certificate of Analysis**



Your Project #: 282320  
 Site Location: ROBLIN  
 Your C.O.C. #: N012054

**Attention: MARIO MUAN**

PINCHIN LTD.  
 54 Terracon Pl.  
 Winnipeg, MB  
 CANADA R2J 4G7

**Report Date: 2020/11/13**  
 Report #: R2955138  
 Version: 3 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: C083712**

**Received: 2020/11/10, 15:32**

Sample Matrix: Soil  
 # Samples Received: 6

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
BTEX/F1 by HS GC/MS/FID (MeOH extract) (1, 2)	6	N/A	2020/11/13	AB SOP-00039	CCME CWS/EPA 8260d m
F1-BTEX (1)	6	N/A	2020/11/13		Auto Calc
CCME Hydrocarbons (F2-F4 in soil) (1, 3)	6	2020/11/13	2020/11/13	AB SOP-00036	CCME PHC-CWS m
Moisture (1)	6	N/A	2020/11/13	AB SOP-00002	CCME PHC-CWS m
Benzo[a]pyrene Equivalency (1)	6	N/A	2020/11/13		Auto Calc
PAH in Soil by GC/MS (1)	6	2020/11/13	2020/11/13	AB SOP-00036 / AB SOP-00003	EPA 3540C/8270E m

**Remarks:**

Bureau Veritas Laboratories are accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by BV Labs are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by BV Labs, unless otherwise agreed in writing. BV Labs is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.

Results relate to samples tested. When sampling is not conducted by BV Labs, results relate to the supplied samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

\* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

- (1) This test was performed by BV Labs Calgary Environmental
- (2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is date sampled unless otherwise stated.
- (3) All CCME results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Bureau Veritas Laboratories conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil, Validation of Performance-Based Alternative Methods September 2003. Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.



Your Project #: 282320  
Site Location: ROBLIN  
Your C.O.C. #: N012054

**Attention: MARIO MUAN**

PINCHIN LTD.  
54 Terracon Pl.  
Winnipeg, MB  
CANADA R2J 4G7

**Report Date: 2020/11/13**  
Report #: R2955138  
Version: 3 - Final

**CERTIFICATE OF ANALYSIS**

**BV LABS JOB #: C083712**  
**Received: 2020/11/10, 15:32**

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.  
Carmen McKay, Key Account Specialist  
Email: Carmen.MCKAY@bvlabs.com  
Phone# (403)219-3683

=====  
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



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BV Labs Job #: C083712  
Report Date: 2020/11/13

PINCHIN LTD.  
Client Project #: 282320  
Site Location: ROBLIN  
Sampler Initials: MM

### PETROLEUM HYDROCARBONS (CCME)

BV Labs ID		YV7622	YV7623	YV7624	YV7625	YV7626	YV7627		
Sampling Date		2020/11/09	2020/11/09	2020/11/09	2020/11/09	2020/11/09	2020/11/09		
COC Number		N012054	N012054	N012054	N012054	N012054	N012054		
	UNITS	NW1	EW2	WW2	SW1	F1	F2	RDL	QC Batch
<b>Ext. Pet. Hydrocarbon</b>									
F2 (C10-C16 Hydrocarbons)	mg/kg	<10	<10	<10	<10	<10	<10	10	A084961
F3 (C16-C34 Hydrocarbons)	mg/kg	<50	<50	<50	<50	<50	<50	50	A084961
F4 (C34-C50 Hydrocarbons)	mg/kg	<50	<50	<50	<50	<50	<50	50	A084961
Reached Baseline at C50	mg/kg	Yes	Yes	Yes	Yes	Yes	Yes		A084961
<b>Surrogate Recovery (%)</b>									
O-TERPHENYL (sur.)	%	94	88	87	86	83	91		A084961
RDL = Reportable Detection Limit									



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BV Labs Job #: C083712  
Report Date: 2020/11/13

PINCHIN LTD.  
Client Project #: 282320  
Site Location: ROBLIN  
Sampler Initials: MM

**PHYSICAL TESTING (SOIL)**

<b>BV Labs ID</b>		YV7622	YV7623		YV7624		YV7625	YV7626		
<b>Sampling Date</b>		2020/11/09	2020/11/09		2020/11/09		2020/11/09	2020/11/09		
<b>COC Number</b>		N012054	N012054		N012054		N012054	N012054		
	<b>UNITS</b>	<b>NW1</b>	<b>EW2</b>	<b>QC Batch</b>	<b>WW2</b>	<b>QC Batch</b>	<b>SW1</b>	<b>F1</b>	<b>RDL</b>	<b>QC Batch</b>

<b>Physical Properties</b>										
Moisture	%	18	17	A085389	14	A085094	14	12	0.30	A085389
RDL = Reportable Detection Limit										

<b>BV Labs ID</b>		YV7627		
<b>Sampling Date</b>		2020/11/09		
<b>COC Number</b>		N012054		
	<b>UNITS</b>	<b>F2</b>	<b>RDL</b>	<b>QC Batch</b>
<b>Physical Properties</b>				
Moisture	%	18	0.30	A085094
RDL = Reportable Detection Limit				



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BV Labs Job #: C083712  
Report Date: 2020/11/13

PINCHIN LTD.  
Client Project #: 282320  
Site Location: ROBLIN  
Sampler Initials: MM

### SEMIVOLATILE ORGANICS BY GC-MS (SOIL)

BV Labs ID		YV7622	YV7623	YV7624	YV7625	YV7626	YV7627		
Sampling Date		2020/11/09	2020/11/09	2020/11/09	2020/11/09	2020/11/09	2020/11/09		
COC Number		N012054	N012054	N012054	N012054	N012054	N012054		
	UNITS	NW1	EW2	WW2	SW1	F1	F2	RDL	QC Batch

Polycyclic Aromatics									
Acenaphthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
B[a]P TPE Total Potency Equivalents	mg/kg	<0.0071	<0.0071	<0.0071	<0.0071	<0.0071	<0.0071	0.0071	A085232
Acenaphthylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Acridine	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A084959
Anthracene	mg/kg	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040	0.0040	A084959
Benzo(a)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Benzo(b&j)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Benzo(k)fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Benzo(g,h,i)perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Benzo(c)phenanthrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Benzo(a)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Benzo(e)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Chrysene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Dibenz(a,h)anthracene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Fluoranthene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Fluorene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Indeno(1,2,3-cd)pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
1-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
2-Methylnaphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Naphthalene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Phenanthrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Perylene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Pyrene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084959
Quinoline	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A084959

Surrogate Recovery (%)									
D10-ANTHRACENE (sur.)	%	95	96	97	97	99	104		A084959
D8-ACENAPHTHYLENE (sur.)	%	92	91	93	90	92	98		A084959
D8-NAPHTHALENE (sur.)	%	85	84	87	85	87	90		A084959
TERPHENYL-D14 (sur.)	%	86	89	93	91	94	112		A084959

RDL = Reportable Detection Limit



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BV Labs Job #: C083712  
Report Date: 2020/11/13

PINCHIN LTD.  
Client Project #: 282320  
Site Location: ROBLIN  
Sampler Initials: MM

### VOLATILE ORGANICS BY GC-MS (SOIL)

BV Labs ID		YV7622	YV7623	YV7624	YV7625	YV7626	YV7627		
Sampling Date		2020/11/09	2020/11/09	2020/11/09	2020/11/09	2020/11/09	2020/11/09		
COC Number		N012054	N012054	N012054	N012054	N012054	N012054		
	UNITS	NW1	EW2	WW2	SW1	F1	F2	RDL	QC Batch
<b>Volatiles</b>									
Xylenes (Total)	mg/kg	<0.045	<0.045	<0.045	<0.045	<0.045	<0.045	0.045	A085041
F1 (C6-C10) - BTEX	mg/kg	<10	<10	<10	<10	<10	<10	10	A085041
<b>Field Preserved Volatiles</b>									
Benzene	mg/kg	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0050	A084654
Toluene	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.050	A084654
Ethylbenzene	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	A084654
m & p-Xylene	mg/kg	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	A084654
o-Xylene	mg/kg	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	A084654
F1 (C6-C10)	mg/kg	<10	<10	<10	<10	<10	<10	10	A084654
<b>Surrogate Recovery (%)</b>									
1,4-Difluorobenzene (sur.)	%	88	88	87	88	87	88		A084654
4-Bromofluorobenzene (sur.)	%	139	126	137	135	132	135		A084654
D10-o-Xylene (sur.)	%	82	91	91	85	87	98		A084654
D4-1,2-Dichloroethane (sur.)	%	92	92	92	90	90	92		A084654
RDL = Reportable Detection Limit									



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BV Labs Job #: C083712

Report Date: 2020/11/13

PINCHIN LTD.

Client Project #: 282320

Site Location: ROBLIN

Sampler Initials: MM

### GENERAL COMMENTS

Results relate only to the items tested.



**BUREAU  
VERITAS**

BV Labs Job #: C083712

Report Date: 2020/11/13

### QUALITY ASSURANCE REPORT

PINCHIN LTD.

Client Project #: 282320

Site Location: ROBLIN

Sampler Initials: MM

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
A084654	1,4-Difluorobenzene (sur.)	2020/11/13	89	50 - 140	87	50 - 140	88	%		
A084654	4-Bromofluorobenzene (sur.)	2020/11/13	140	50 - 140	140	50 - 140	139	%		
A084654	D10-o-Xylene (sur.)	2020/11/13	93	50 - 140	82	50 - 140	78	%		
A084654	D4-1,2-Dichloroethane (sur.)	2020/11/13	88	50 - 140	87	50 - 140	89	%		
A084959	D10-ANTHRACENE (sur.)	2020/11/13	96	50 - 130	106	50 - 130	113	%		
A084959	D8-ACENAPHTHYLENE (sur.)	2020/11/13	96	50 - 130	107	50 - 130	110	%		
A084959	D8-NAPHTHALENE (sur.)	2020/11/13	92	50 - 130	100	50 - 130	104	%		
A084959	TERPHENYL-D14 (sur.)	2020/11/13	93	50 - 130	105	50 - 130	114	%		
A084961	O-TERPHENYL (sur.)	2020/11/13	99	60 - 140	106	60 - 140	114	%		
A084654	Benzene	2020/11/13	89	50 - 140	95	60 - 130	<0.0050	mg/kg	0	50
A084654	Ethylbenzene	2020/11/13	88	50 - 140	92	60 - 130	<0.010	mg/kg	NC	50
A084654	F1 (C6-C10)	2020/11/13	97	60 - 140	93	60 - 140	<10	mg/kg	NC	30
A084654	m & p-Xylene	2020/11/13	82	50 - 140	83	60 - 130	<0.040	mg/kg	NC	50
A084654	o-Xylene	2020/11/13	77	50 - 140	79	60 - 130	<0.020	mg/kg	NC	50
A084654	Toluene	2020/11/13	84	50 - 140	88	60 - 130	<0.050	mg/kg	NC	50
A084959	1-Methylnaphthalene	2020/11/13	98	50 - 130	106	50 - 130	<0.0050	mg/kg	NC	50
A084959	2-Methylnaphthalene	2020/11/13	88	50 - 130	96	50 - 130	<0.0050	mg/kg	NC	50
A084959	Acenaphthene	2020/11/13	89	50 - 130	99	50 - 130	<0.0050	mg/kg	NC	50
A084959	Acenaphthylene	2020/11/13	88	50 - 130	98	50 - 130	<0.0050	mg/kg	NC	50
A084959	Acridine	2020/11/13	67	50 - 130	78	50 - 130	<0.010	mg/kg	NC	50
A084959	Anthracene	2020/11/13	103	50 - 130	115	50 - 130	<0.0040	mg/kg	NC	50
A084959	Benzo(a)anthracene	2020/11/13	88	50 - 130	99	50 - 130	<0.0050	mg/kg	NC	50
A084959	Benzo(a)pyrene	2020/11/13	80	50 - 130	89	50 - 130	<0.0050	mg/kg	NC	50
A084959	Benzo(b&j)fluoranthene	2020/11/13	79	50 - 130	89	50 - 130	<0.0050	mg/kg	NC	50
A084959	Benzo(c)phenanthrene	2020/11/13	85	50 - 130	96	50 - 130	<0.0050	mg/kg	NC	50
A084959	Benzo(e)pyrene	2020/11/13	80	50 - 130	89	50 - 130	<0.0050	mg/kg	NC	50
A084959	Benzo(g,h,i)perylene	2020/11/13	90	50 - 130	99	50 - 130	<0.0050	mg/kg	NC	50
A084959	Benzo(k)fluoranthene	2020/11/13	81	50 - 130	98	50 - 130	<0.0050	mg/kg	NC	50
A084959	Chrysene	2020/11/13	87	50 - 130	98	50 - 130	<0.0050	mg/kg	NC	50
A084959	Dibenz(a,h)anthracene	2020/11/13	97	50 - 130	108	50 - 130	<0.0050	mg/kg	NC	50
A084959	Fluoranthene	2020/11/13	91	50 - 130	101	50 - 130	<0.0050	mg/kg	NC	50
A084959	Fluorene	2020/11/13	92	50 - 130	103	50 - 130	<0.0050	mg/kg	NC	50



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BV Labs Job #: C083712

Report Date: 2020/11/13

### QUALITY ASSURANCE REPORT(CONT'D)

PINCHIN LTD.

Client Project #: 282320

Site Location: ROBLIN

Sampler Initials: MM

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
A084959	Indeno(1,2,3-cd)pyrene	2020/11/13	90	50 - 130	100	50 - 130	<0.0050	mg/kg	NC	50
A084959	Naphthalene	2020/11/13	86	50 - 130	94	50 - 130	<0.0050	mg/kg	NC	50
A084959	Perylene	2020/11/13	79	50 - 130	89	50 - 130	<0.0050	mg/kg	NC	50
A084959	Phenanthrene	2020/11/13	90	50 - 130	100	50 - 130	<0.0050	mg/kg	NC	50
A084959	Pyrene	2020/11/13	90	50 - 130	101	50 - 130	<0.0050	mg/kg	NC	50
A084959	Quinoline	2020/11/13	102	50 - 130	100	50 - 130	<0.010	mg/kg	NC	50
A084961	F2 (C10-C16 Hydrocarbons)	2020/11/13	103	60 - 140	102	60 - 140	<10	mg/kg	32	40
A084961	F3 (C16-C34 Hydrocarbons)	2020/11/13	114	60 - 140	100	60 - 140	<50	mg/kg	27	40
A084961	F4 (C34-C50 Hydrocarbons)	2020/11/13	109	60 - 140	99	60 - 140	<50	mg/kg	NC	40
A085094	Moisture	2020/11/13					<0.30	%	1.6	20
A085389	Moisture	2020/11/13					<0.30	%	2.1	20

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).



BUREAU  
VERITAS

BV Labs Job #: C083712  
Report Date: 2020/11/13

PINCHIN LTD.  
Client Project #: 282320  
Site Location: ROBLIN  
Sampler Initials: MM

### VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

---

Gita Pokhrel, Laboratory Supervisor

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Janet Gao, B.Sc., QP, Supervisor, Organics

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Veronica Falk, B.Sc., P.Chem., QP, Scientific Specialist, Organics

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

<b>INVOICE INFORMATION</b>		<b>REPORT INFORMATION (if different from invoice)</b>		<b>PROJECT INFORMATION</b>		<b>MAXXAM JOB NUMBER</b>	
Company Name: <u>PINCHIN LTD</u>		Company Name: <u>PINCHIN LTD</u>		Quotation #: <u>R70359</u>		CHAIN OF CUSTODY # <b>N 012054</b>	
Contact Name: <u>ACCOUNTS PAYABLE</u>		Contact Name: <u>VALERIY TYSHCHUK</u>		P.O. #:			
Address:		Address: <u>54 Terracon Place</u> <u>Winnipeg, MB</u>		Project #: <u>282320</u>			
Phone: _____ Fax: _____		Phone: _____ Fax: _____		Project Name:			
Email: <u>apepinchin.com</u>		Email: <u>vtshchuk@pinchin.com</u>		Location: <u>ROBLIN</u>			
				Sampled By: <u>MBM</u>			

<b>REGULATORY REQUIREMENTS SERVICE REQUESTED:</b>					<b>ANALYSIS REQUESTED (Please be specific)</b>										<b>TURNAROUND TIME (TAT) REQUIRED</b>																																																																																																																																																																																																																																																						
<input checked="" type="checkbox"/> CCME <input type="checkbox"/> DRINKING WATER <input type="checkbox"/> Other:					Drinking Water? (Y/N)										<b>PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS.</b> Regular (Standard) TAT: <input type="checkbox"/> 5 to 7 Working Days Rush TAT: <input checked="" type="checkbox"/> 1 day <input type="checkbox"/> 2 days <input type="checkbox"/> 3 days DATE Required: <u>13 Nov 2020</u> <small>TATs for certain tests are &gt; 5 days. Please contact your Project Manager for details</small>																																																																																																																																																																																																																																																						
Special Instructions:					<table border="1"> <tr> <th>Coliforms:</th> <th>Total</th> <th>Fecal</th> <th>MPN</th> <th>OT</th> <th>Disinfectant</th> <th>Field Filtered?</th> <th>Field Acidified?</th> <th>Field Acidified?</th> <th>Total Metal</th> <th>BTEX / F1</th> <th>F2 - F4</th> <th>PCB</th> <th>Biochemical Oxygen Demand</th> <th>PAHs</th> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>										Coliforms:	Total	Fecal	MPN	OT	Disinfectant	Field Filtered?	Field Acidified?	Field Acidified?	Total Metal	BTEX / F1	F2 - F4	PCB	Biochemical Oxygen Demand	PAHs		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<b>HOLD - DO NOT ANALYZE</b> # of Cont. COMMENTS																																																																																																																																																																																																																								
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<b>SAMPLES MUST BE KEPT COOL (&lt;10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO MAXXAM.</b>					<table border="1"> <thead> <tr> <th>Lab Use</th> <th>Sample Identification</th> <th>Date Sampled</th> <th>Time Sampled</th> <th>Matrix (SW, SW, Soil etc)</th> <th>Drinking Water? (Y/N)</th> <th>Coliforms (Method)</th> <th>Disinfectant</th> <th>Field Filtered?</th> <th>Field Acidified?</th> <th>Field Acidified?</th> <th>Total Metal</th> <th>BTEX / F1</th> <th>F2 - F4</th> <th>PCB</th> <th>Biochemical Oxygen Demand</th> <th>PAHs</th> <th># of Cont.</th> <th>COMMENTS</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>NW1</td> <td>9 NOV</td> <td>PM</td> <td>SOIL</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td>X</td> <td>4</td> <td></td> </tr> <tr> <td>2</td> <td>EW2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td>X</td> <td>4</td> <td></td> </tr> <tr> <td>3</td> <td>NW2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td>X</td> <td>4</td> <td>SEND A COPY OF</td> </tr> <tr> <td>4</td> <td>SW1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td>X</td> <td>4</td> <td>LAB RESULTS TO:</td> </tr> <tr> <td>5</td> <td>F1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td>X</td> <td>4</td> <td>mmuan@pinchin.com</td> </tr> <tr> <td>6</td> <td>F2</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td>X</td> <td>4</td> <td></td> </tr> <tr> <td>7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>8</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>9</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>11</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>12</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>										Lab Use	Sample Identification	Date Sampled	Time Sampled	Matrix (SW, SW, Soil etc)	Drinking Water? (Y/N)	Coliforms (Method)	Disinfectant	Field Filtered?	Field Acidified?	Field Acidified?	Total Metal	BTEX / F1	F2 - F4	PCB	Biochemical Oxygen Demand	PAHs	# of Cont.	COMMENTS	1	NW1	9 NOV	PM	SOIL								X	X			X	4		2	EW2											X	X			X	4		3	NW2											X	X			X	4	SEND A COPY OF	4	SW1											X	X			X	4	LAB RESULTS TO:	5	F1											X	X			X	4	mmuan@pinchin.com	6	F2											X	X			X	4		7																			8																			9																			10																			11																			12																		
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10-Nov-20 15:32  
Carmen McKay  
C083712  
JMQ INS-0001

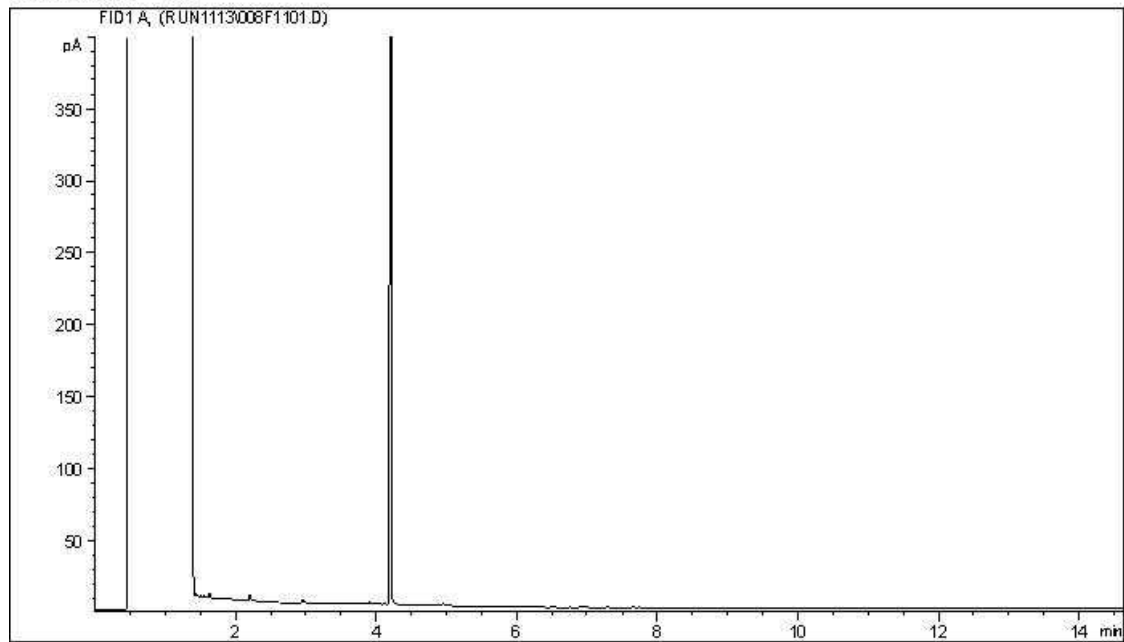
RELINQUISHED BY (Signature/Print)	RECEIVED BY (Signature/Print)	Date	Time	RECEIVED BY (Signature/Print)	Laboratory Use Only
<u>M. MUAN</u>	<u>Alyssa Hilpo</u> <u>M. JESSICA</u>	<u>20/11/10</u> <u>201113</u>	<u>1532</u> <u>08:50</u>	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N	Temperature (°C) on Receipt <u>-2.2   -5.2   -6.4</u>

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Maxxam's standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and acceptance of our terms which are available for viewing at [www.maxxam.ca/terms](http://www.maxxam.ca/terms)

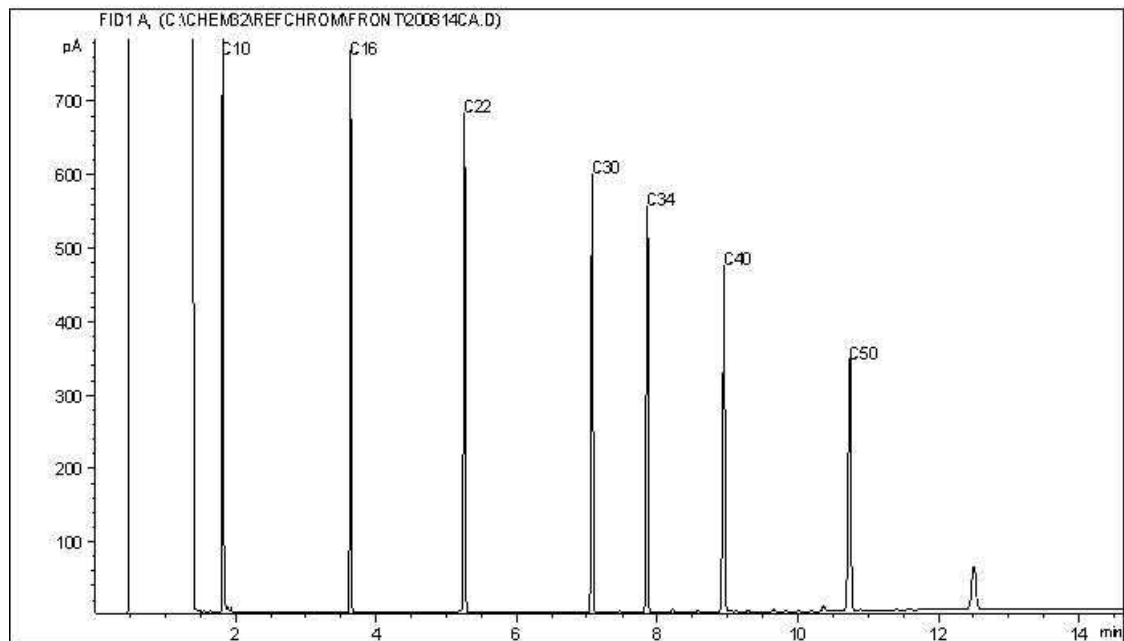
**\*MANDATORY SECTIONS IN GREY MUST BE FILLED OUT. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.**

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



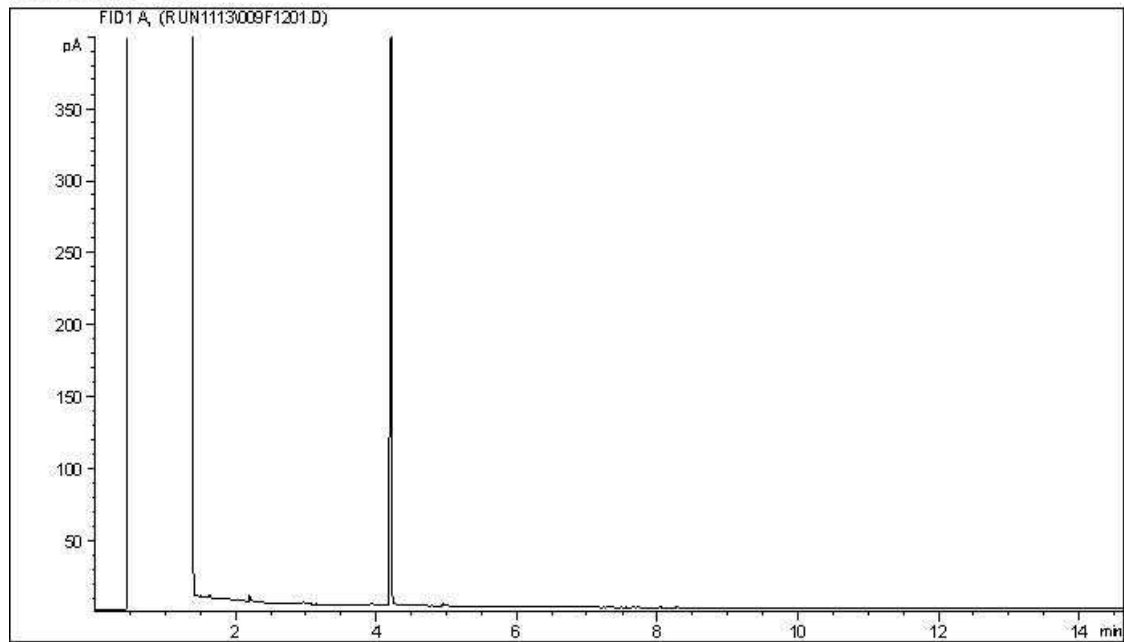
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

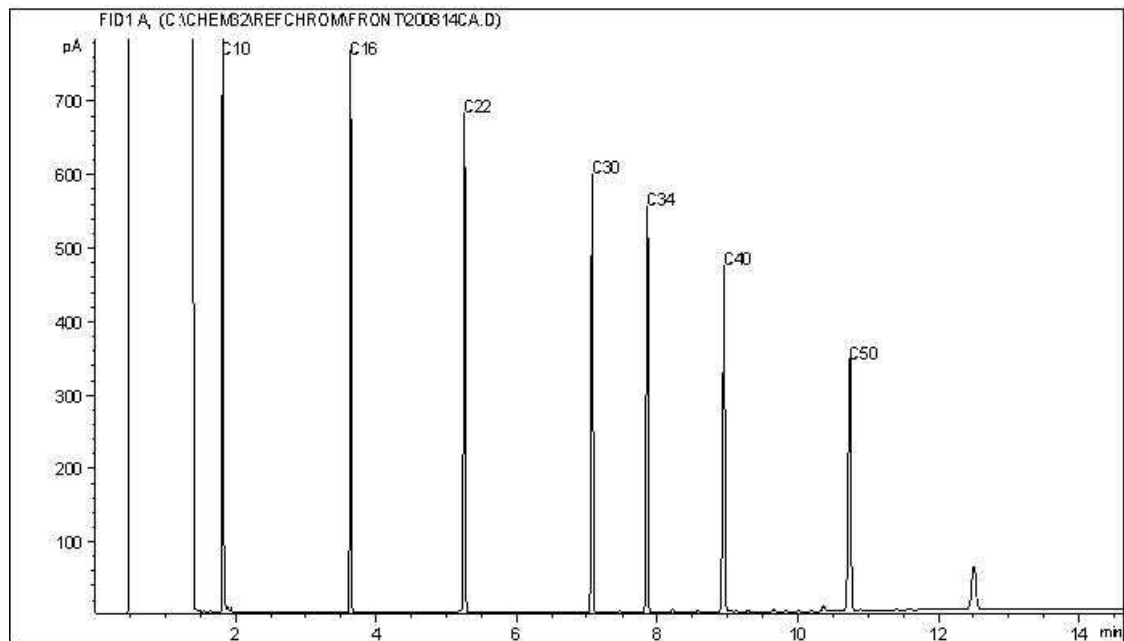
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



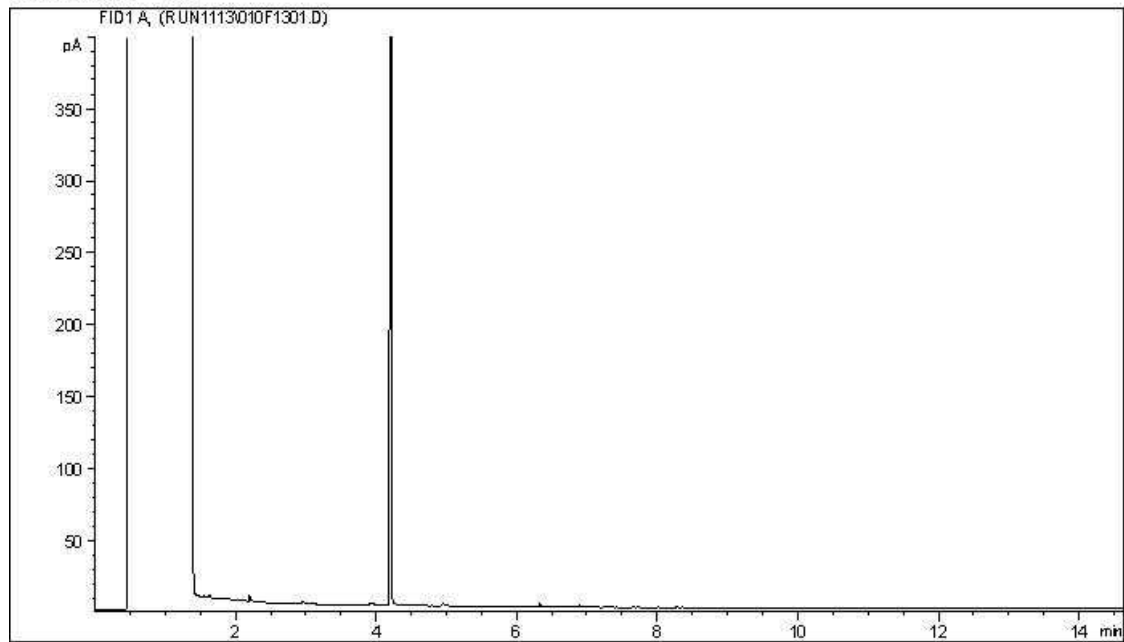
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

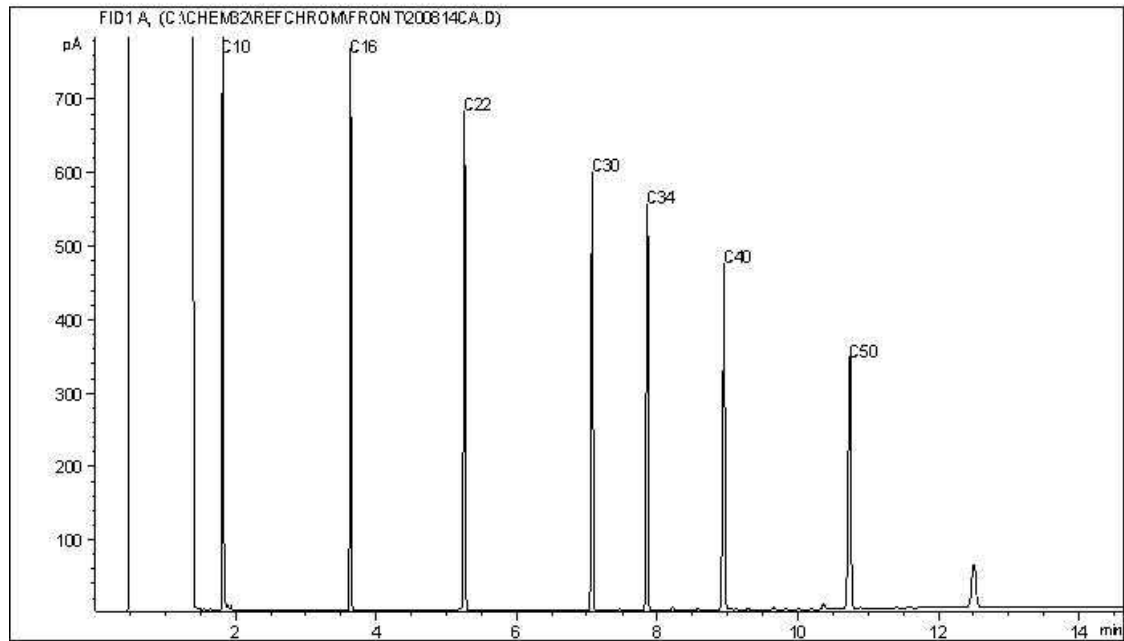
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



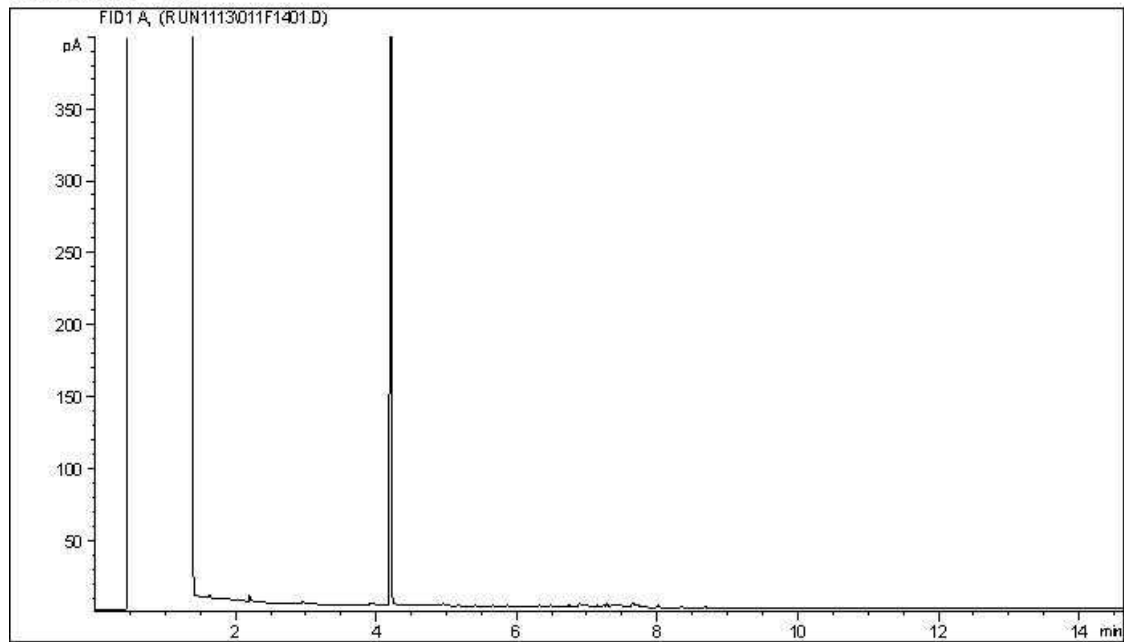
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

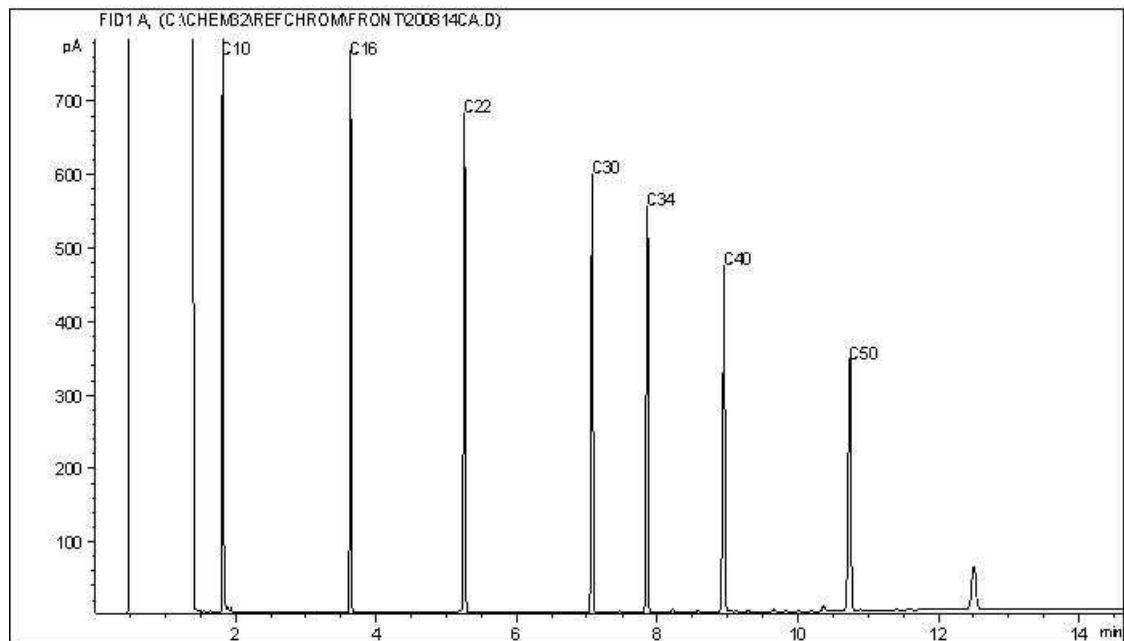
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



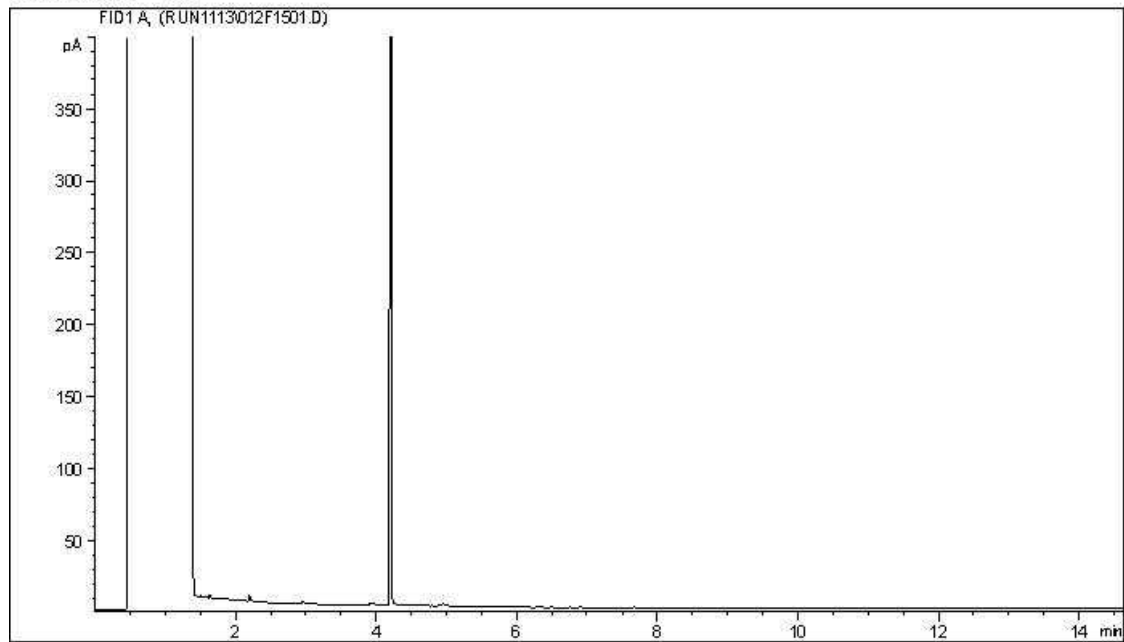
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

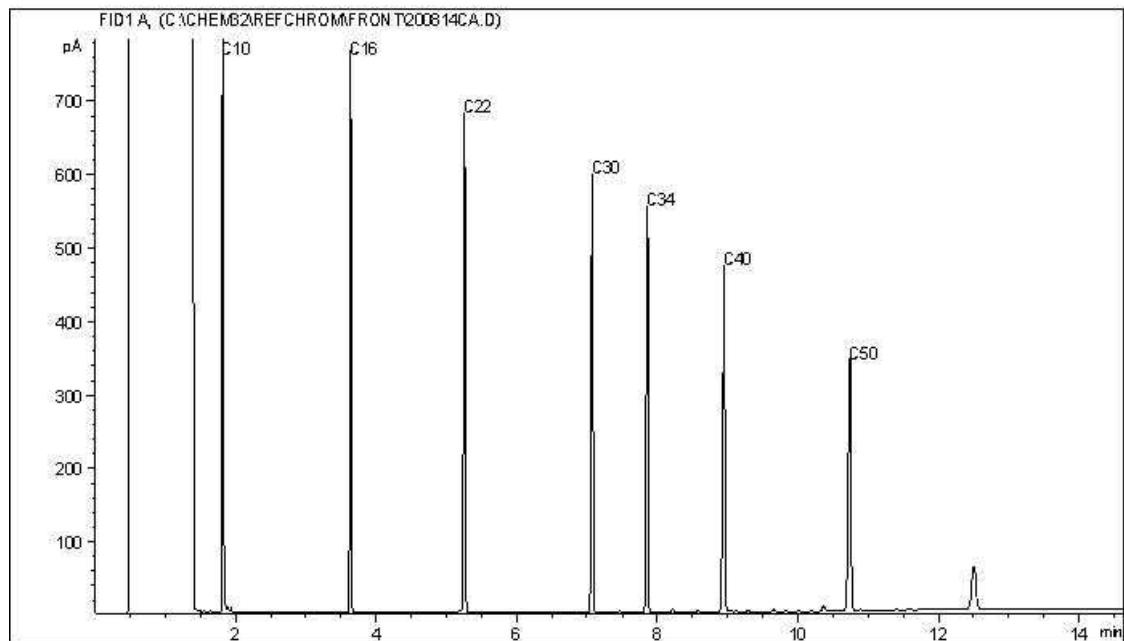
Note: This information is provided for reference purposes only. Should detailed chemist interpretation or fingerprinting be required, please contact the laboratory.

CCME Hydrocarbons (F2-F4 in soil) Chromatogram

Instrument: GC7



Carbon Range Distribution - Reference Chromatogram



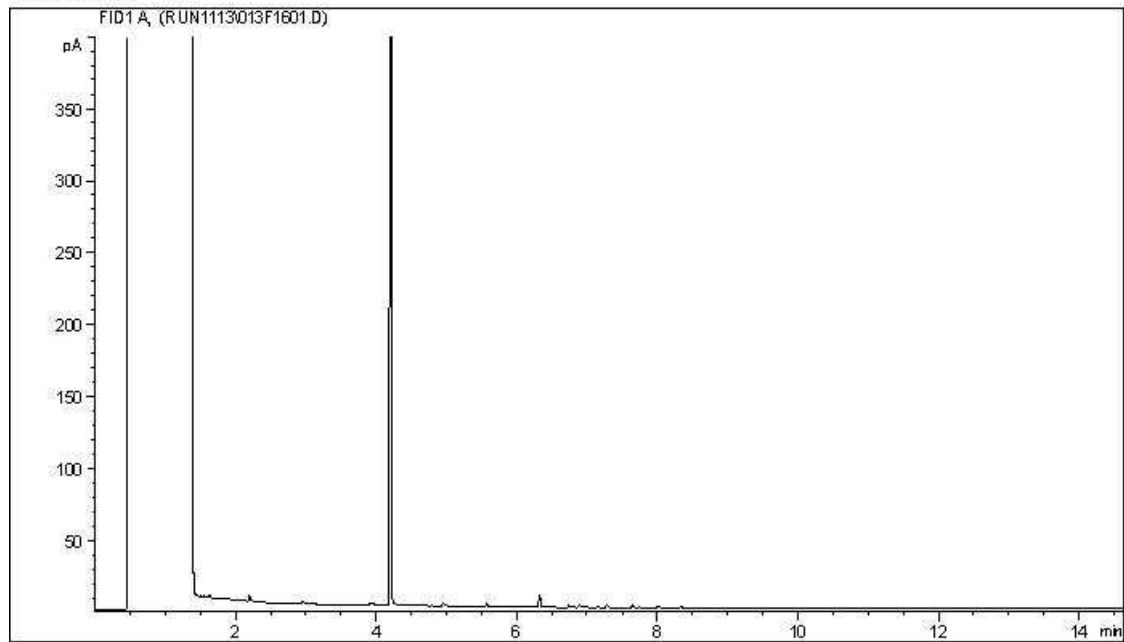
TYPICAL PRODUCT CARBON NUMBER RANGES

Gasoline:	C4 - C12	Diesel:	C8 - C22
Varsol:	C8 - C12	Lubricating Oils:	C20 - C40
Kerosene:	C7 - C16	Crude Oils:	C3 - C60+

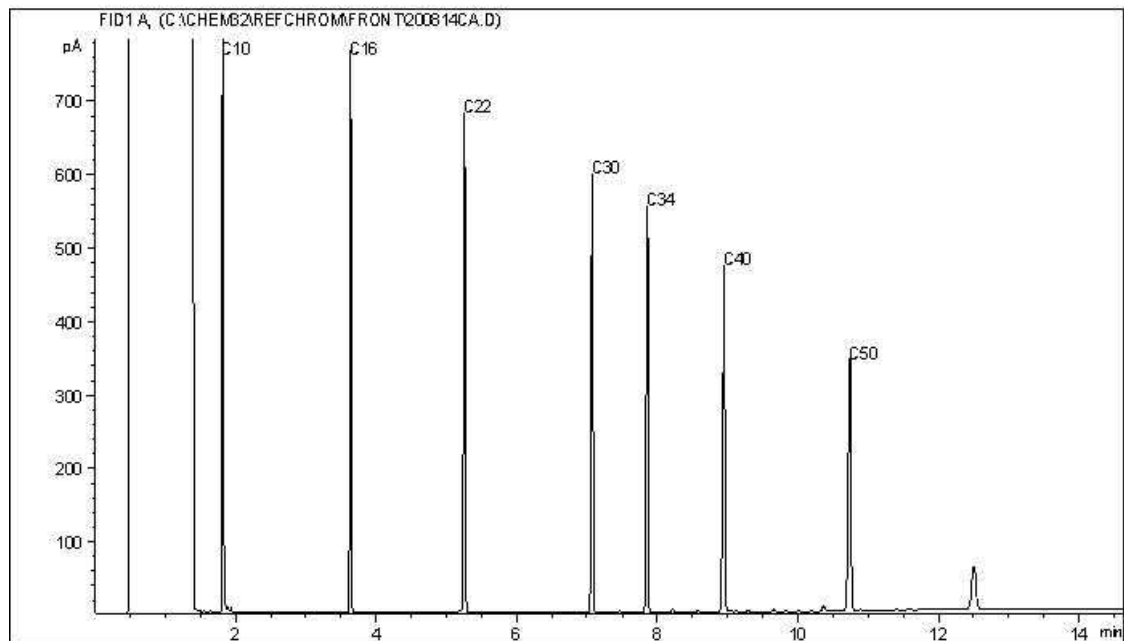
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**APPENDIX V**  
**Waste Manifests and Weigh Bills**



City of Dauphin  
100 Main Street South  
Dauphin, MB, R7N 1K3  
Ph: 204-622-3189 Fax: 204-622-3290

Waste Scale Ticket / Sales Receipt

Ticket #: 00097693

Vehicle: /CFD064 - (/CFD064)

Cust.: WINN008 - Winnipeg Enviromental Remediations Inc. (WERI)

GROSS: 47,900 kg 10-Nov-2020 09:05 AM

TARE: 20,170 kg 10-Nov-2020 09:40 AM

=====

NET WT.: 27,730 kg

Item	Code	Description	Qty	Item Wt*	\$ Charge
1.	5500	CONTAMINATED SOIL (INCLUDES TESTING &		27.730 t.	1,247.86
Items: 1      Payment Method: CHARGE ACC					Total: \$ 1,247.86

Remark: Roblin Contaminated Soil

Printed: 10-Nov-2020 09:40 AM

X



City of Dauphin  
 100 Main Street South  
 Dauphin, MB, R7N 1K3

Ph: 204-622-3189 Fax: 204-622-3290

Waste Scale Ticket / Sales Receipt

Ticket #: 00097691

Vehicle: /CHM503 - (/CHM503)

Cust.: WINN008 - Winnipeg Enviromental Remediations Inc. (WERI)

GROSS: 20,840 kg 10-Nov-2020 09:04 AM

TARE: 10,300 kg 10-Nov-2020 09:36 AM

=====

NET WT.: 10,540 kg

Item	Code	Description	Qty	Item Wt*	\$ Charge
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1.	5500	CONTAMINATED SOIL (INCLUDES TESTING &		10.540 t.	500.00
		Items: 1	Payment Method: CHARGE ACC	Total: \$	500.00
					=====

Remark: Roblin Contaminated Siol

Printed: 10-Nov-2020 09:36 AM

X *Ray Poth*