

December 14, 2023

**RE: Phase 2 Environmental Site Assessment – LSD NE 25-053-17W5M.**

Dear G. Simmons Trucking Ltd.

G. Simmons Trucking Ltd. (G. Simmons) retained Earthmaster Environmental Strategies Inc. (Earthmaster) in 2023 to conduct a Phase 2 Environmental Site Assessment (ESA) at the G. Simmons property located within NE 25-053-17W5M. This report provides a summary of the Phase 2 ESA activities along with the results and conclusions of the environmental assessment.

## **BACKGROUND**

In November 2023, a Phase 1 ESA was completed and recommended a Phase 2 ESA for a former spill area and the former tank farm area (Earthmaster, 2023).

## **OBJECTIVES AND SCOPE OF WORK**

Earthmaster's objective was to identify and characterize any potential soil impacts associated with the former spill area and the former tank farm area.

The scope of work included the following:

- Review background information to assist with establishing site-specific protocols;
- Notify the landowner(s), as applicable, to make them aware of activities to be conducted on their property;
- Coordinate field activities with G Simmons personnel;
- Conduct ground disturbance activities and follow safety protocols in accordance with Earthmaster, G. Simmons, and Alberta Energy Regulator (AER) standards;
- Advance boreholes and collect soil samples from background areas and the areas of concern;
- Identify and record soil types and characteristics encountered at assessment locations;

- Submit selected soil samples to a laboratory accredited for the specific analyses to be conducted;
- Review laboratory test results and compare with appropriate regulatory criteria and/or guidance documents; and,
- Prepare a report summarizing the field observations, analytical data, and overall project findings.

## REMEDIATION OBJECTIVES

Results for soil salinity, including electrical conductivity as measured in a saturated paste extract (ECe), and sodicity as calculated by the sodium adsorption ratio (SAR), were assessed using the Alberta Tier 1 Salt Remediation Guidelines (AEP, 2022). These guidelines define topsoil as the surface A horizon and subsoil as the B and C horizons and upper portion of the parent material. All soil samples analyzed for detailed salinity parameters were compared with control soils from similar topographic positions, horizons, and depths. In naturally saline and sodic soils, the maximum control values can be used as an alternative to the rating categories provided in the remediation guidelines. Below the plant rooting zone, the unconsolidated parent material was compared either with the subsoil rating or maximum control values.

No background boreholes were advanced; therefore, the most stringent salt guidelines were applied: 2 dS/m (ECe) and 4 (SAR) for topsoil and 3 dS/m (ECe) and 4 (SAR) for subsoil. Given the default ECe and SAR values, the topsoil and subsoil in the general area would be given a default quality rating of 'Good' for both ECe and SAR (AEP, 2022).

The commercial site is located within a forested area and the current and future potential land use of the site and surrounding area was determined to be natural areas. Therefore, natural area remediation guidelines were used as comparative criteria for soil data.

Due to a lack of sufficient particle size data to determine the dominant soil particle size of the stratum governing horizontal and vertical migration to potential receptors, the most conservative Tier 1 guidelines were applied (AEP, 2022a). Therefore, the most conservative guideline values (i.e. either for coarse or fine textured soil) for surface soil (for soils to 3.00 m below ground level (bgl)) and the most conservative guideline values for subsoil (for soils greater than 3.00 m bgl) were used to assess contaminant concentrations and determine if remediation was required.

Based on the above, the laboratory analytical test results for soil samples were evaluated using the following applicable remediation guidelines and assessment criteria:

- *Alberta Tier 1 Soil and Groundwater Remediation Guidelines: Natural Area Land Use, Coarse and Fine Grained Soil* (AEP, 2022).

## RESULTS AND DISCUSSION

The field component of the Phase 2 ESA was conducted on November 28, 2023. A diagram illustrating the on-site assessment locations (Figure 1) is appended to this report. Laboratory soil test results are summarized in Table 1, and the associated laboratory analytical report is attached. Six site photographs

taken at the time of the field activities showing the lease characteristics, and the test pit logs summarizing the soil characteristics encountered at each borehole location as recorded during field activities, are also appended. A description of the safety and technical assessment/remediation protocols utilized for the work undertaken is also provided as an attachment.

### **Former Spill Area**

Four test pits (TP01 to TP04) were advanced to a depth of 2.50 m bgl within and surrounding the former spill area (Figure 1). This area was void of vegetation at the time of the assessment (Photographs 1 to 4). Disturbed soil was encountered to a depth of 1.50 m bgl. Field observations did not suggest the presence of impacted soil in this area.

Four soil samples collected from this area (2.00 m to 2.50 m bgl) were submitted to the laboratory for detailed salinity and petroleum hydrocarbon analyses. Laboratory soil test results complied with applicable remediation guidelines (Table 1).

### **Former Tank Farm Area**

Two test pits (TP05 and TP06) were advanced to a depth of 2.00 m bgl within the former tank farm area located in a clearing northeast of the main yard (Figure 1). The vegetation at this location was consistent with that of the surrounding area at the time of the assessment (Photographs 5 and 6). Disturbed soil was encountered to a depth of 1.00 m bgl within this area. Field observations did not suggest the presence of impacted soil in this area.

Three soil samples collected from this area (0.50 m to 1.15 m bgl) were submitted to the laboratory for detailed salinity and petroleum hydrocarbon analysis. Laboratory soil test results complied with applicable remediation guidelines (Table 1).

## **CONCLUSIONS**

Six test pits were advanced to assess the former spill area and the former tank farm area. Analytical results for soil samples collected from the areas of concern complied with applicable remediation guidelines. No further work is required at this time.

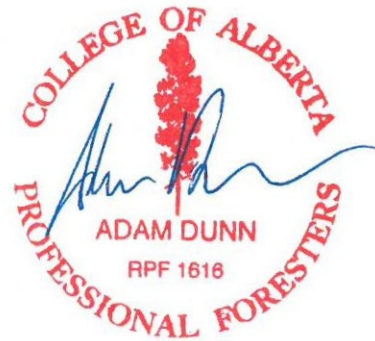
## CLOSURE

If you have any questions regarding the information contained in this letter report, please contact the undersigned at (403) 201-5111.

Respectfully Submitted,



Elizabeth Russell, B.Sc., G.I.T.  
Environmental Project Supervisor  
Earthmaster Environmental Strategies Inc.



Adam Dunn, M.Env.Sc., R.P.F., EP  
Senior Review  
Earthmaster Environmental Strategies Inc.

## ATTACHMENTS

Table 1. Soil Chemistry Summary for G. Simmons's LSD NE 25-053-17W5M Site.

Figure 1: Site Diagram and Assessment Locations as of Nov-28-23.

Site Photographs

Soil Stratigraphy Logs

Laboratory Analytical Report

Field Methodology and Procedures

AER Professional Declaration Form

## REFERENCES

Earthmaster Environmental Strategies Inc., 2023. 2023 Phase I Environmental Site Assessment, NE 25-053-17W5M. Unpublished report prepared for G. Simmons Trucking Ltd. November 2023.

AEP (Alberta Environment and Parks), 2022. Alberta Tier 1 Soil and Groundwater Remediation Guidelines. Land Policy Branch, Policy and Planning Division, 189 pp. August 26, 2022.

## GENERAL CONDITIONS OF ENVIRONMENTAL REPORT

Earthmaster Environmental Strategies Inc. (Earthmaster) has prepared this document for the Client solely for the purpose noted within the Introduction or Scope section(s) of this report and does not accept any responsibility for the use of this report for any purposes other than intended or to any third party unless otherwise stated, in whole or in part, and we exercise no duty of care in relation to this report to any third party.

Any use other than which was originally intended, including that by a third party, or any reliance on, or decisions made based on this document, are not the responsibility of Earthmaster.

The Client is aware that the conclusions and recommendations contained in this document are contingent on the limited observations and testing that were conducted on the subject site(s). The Client is also aware that conditions may vary across the site(s) and are not static over time, which in turn may affect the conclusions and recommendations made. Any justifications regarding the environmental safety or acceptability of any aspect of any assessment or other on-site work conducted or not conducted, and/or recommendations made within the report, should be reviewed by the Client to ensure they are in agreement with the same. If not in agreement the Client will formally notify Earthmaster upon receipt and timely review of the report or will be deemed to have accepted such justifications and/or recommendations.

Earthmaster has exercised reasonable skill, care and diligence to assess the information acquired during the preparation of this report, but makes no guarantees or warranties as to the accuracy or completeness of this information. This report is based upon, and limited by, circumstances, protocols and site conditions acknowledged herein, and upon information available at the time the various associated activities were undertaken.

Earthmaster completed the work outlined within this document using the Scope verbally or otherwise agreed to or approved by the Client, and under the guidance and supervision of a competent employee of the Client. Any claims or restitution sought by the Client against Earthmaster shall be restricted to costs paid to Earthmaster for its consulting fees. Expenses incurred by Earthmaster or the Client as a result of third party contracting for completion of this project assignment will be borne solely by the Client.

## TABLE

Table 1. Soil Chemistry Summary for G. Simmons's LSD NE 25-053-17W5M Site.

Sample Description			General	Salinity											Hydrocarbons							
Sample Location	Sampling Date	Sample Depth (m bgl)	Moisture (%)	Saturation (%)	Calcium (mg/kg)	Chloride (mg/kg)	Chloride <sup>2</sup> (mg/L)	ECe (dS/m)	Magnesium (mg/kg)	Potassium (mg/kg)	SAR	Sodium (mg/kg)	Sulphate (mg/kg)	pH	Fraction 1 (C6-C10) (mg/kg)	Fraction 2 (C10-C16) (mg/kg)	Fraction 3 (C16-C34) (mg/kg)	Fraction 4 (C34-C50) (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
Alberta Tier 1 Soil and Groundwater Remediation Guidelines*	Topsoil		-	-	-	-	-	2	-	-	4	-	-	-	-	-	-	-	-	-	-	-
	Subsoil		-	-	-	-	-	3	-	-	4	-	-	-	-	-	-	-	-	-	-	-
Alberta Tier 1 Soil and Groundwater Remediation Guidelines**	Natural Areas Land Use: Coarse Surface Soil		-	-	-	-	120	-	-	-	-	-	-	6-8.5	210	150	300	2800	0.078	0.12	0.14	1.9
	Natural Areas Land Use: Coarse Subsoil		-	-	-	-	120	-	-	-	-	-	-	6-8.5	420	300	600	5600	0.078	0.12	0.14	1.9
Former Spill Area																						
TP01	Nov-28-23	2.00-2.15	25	78	68	54	69	0.73	11	4	0.30	9	29	7.51	<20	<100	<100	<300	<0.005	<0.05	<0.01	<0.10
TP02	Nov-28-23	2.00-2.15	18	43	18	<25.0	13	0.58	3	1	2.40	27	51	7.54	<20	<100	<100	<300	<0.005	<0.05	<0.01	<0.10
TP03	Nov-28-23	2.35-2.50	17	41	24	<25.0	20	0.52	3	2	0.80	10	27	7.56	<20	<100	<100	<300	<0.005	<0.05	<0.01	<0.10
TP04	Nov-28-23	2.00-2.15	12	42	19	<25.0	21	0.37	3	2	0.40	4	15	7.52	<20	<100	<100	<300	<0.005	<0.05	<0.01	<0.10
Former Tank Farm Area																						
TP05	Nov-28-23	1.00-1.15	16	59	21	<25.0	9	0.31	3	2	0.70	10	17	7.38	<20	<100	<100	<300	<0.005	<0.05	<0.01	<0.10
TP06	Nov-28-23	0.50-0.65	15	53	17	<25.0	7	0.24	2	2	0.30	4	11	7.45	<20	<100	<100	<300	<0.005	<0.05	<0.01	<0.10
TP06	Nov-28-23	1.00-1.15	15	57	21	<25.0	7	0.32	3	3	0.70	9	19	7.49	<20	<100	<100	<300	<0.005	<0.05	<0.01	<0.10

**LEGEND**

 Denotes values that exceed *Alberta Tier 1 Soil and Groundwater Remediation Guidelines* (Alberta Environment and Parks, August 2022)

\* The guideline values are site specific and are calculated from 'background' soil chemistry data. If no background soil chemistry was available, the criteria values were defaulted to the most stringent criteria present.

\*\* The applicable soil guideline (i.e. clean-up criteria) presented here for each hydrocarbon constituent is the lowest value present among the specified exposure pathways and within a specified land use, unless otherwise noted above.

<sup>2</sup>*Italics* Denotes values that exceed the chloride delineation guidelines as stipulated in Alberta Tier 1 Soil and Groundwater Remediation Guidelines (Alberta Environment and Parks, August 2022).



**FIGURE**



**LEGEND**

- ◆ WELLBORE
- PIPELINE
- TESTPIT
- - - APPROXIMATE PROPERTY BOUNDARY
- - - - - FORMER TANK FARM AREA
- - - - - FORMER SPILL AREA

Airphoto: June 2022  
 DATUM: UTM, NAD83, ZONE 11N

Figure 1: Site Diagram and Assessment Locations as of Nov-28-23.

Client:  <b>G Simmons          Trucking Ltd</b>	PROJECT: NE 25-053-17W5M	
	DATE: Dec-13-23	SURFACE LSD: 09-25-053-17W5M
	DRAWN BY: LPR	APPROXIMATE SCALE: 1:2,500



## **SITE PHOTOGRAPHS**



Photograph 1: Looking north across the former spill area (Nov-28-23).



Photograph 2: Looking east across the former spill area (Nov-28-23).



Photograph 3: Looking south across the former spill area (Nov-28-23).



Photograph 4: Looking west across the former spill area (Nov-28-23).



Photograph 5: Looking north across the former tank farm area (Nov-28-23).



Photograph 6: Looking south across the former tank farm area (Nov-28-23).

## **SOIL STRATIGRAPHY LOGS**



**EARTHMASTER**  
ENVIRONMENTAL STRATEGIES INC

**Client:** G. Simmons Trucking Ltd.

**Location:** NE 25-053-17W5M

**Project:** 3327-00001

**TP01**

**Drill Date:** Nov-28-23

**Datum:** NAD83, UTM Zone 11N

**Drill Method:** Solid Stem Auger

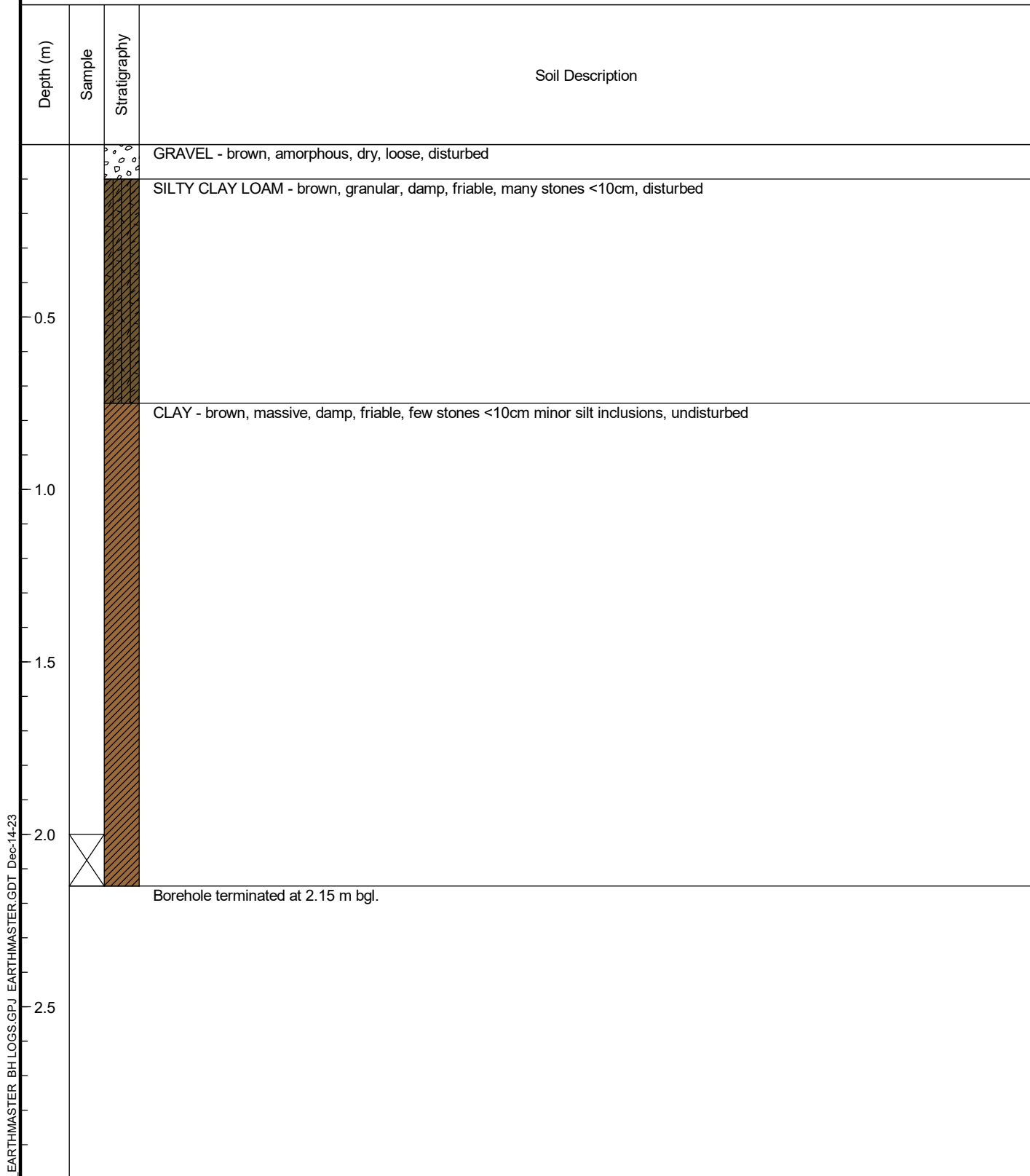
**Northing (m):** 5939978.083

**Drilled By:** G. Simmons Trucking Ltd.

**Easting (m):** 542271.732

**Logged By:** E. Russell

**Elevation (m):**



EARTHMASTER BH LOGS.GPJ EARTHMASTER.GDT Dec-14-23





**EARTHMASTER**  
ENVIRONMENTAL STRATEGIES INC

**Client:** G. Simmons Trucking Ltd.

**Location:** NE 25-053-17W5M

**Project:** 3327-00001

**TP02**

**Drill Date:** Nov-28-23

**Datum:** NAD83, UTM Zone 11N

**Drill Method:** Solid Stem Auger





**Northing (m):** 5939984.223

**Drilled By:** G. Simmons Trucking Ltd.

**Easting (m):** 542304.627

**Logged By:** E. Russell

**Elevation (m):**

Depth (m)	Sample	Stratigraphy	Soil Description
			GRAVEL - brown, amorphous, dry, loose, disturbed
			SILTY CLAY LOAM - brown, granular, damp, friable, many stones <10cm, disturbed
0.5			
			CLAY - brown, massive, damp, friable, few stones <10cm minor silt inclusions, undisturbed
1.0			
1.5			
2.0			
			Borehole terminated at 2.15 m bgl.
2.5			

EARTHMASTER BH LOGS.GPJ EARTHMASTER.GDT Dec-14-23



**EARTHMASTER**  
ENVIRONMENTAL STRATEGIES INC

**Client:** G. Simmons Trucking Ltd.

**Location:** NE 25-053-17W5M

**Project:** 3327-00001

**TP03**

**Drill Date:** Nov-28-23

**Datum:** NAD83, UTM Zone 11N

**Drill Method:** Solid Stem Auger





**Northing (m):** 5939994.448

**Drilled By:** G. Simmons Trucking Ltd.

**Easting (m):** 542280.732

**Logged By:** E. Russell

**Elevation (m):**

Depth (m)	Sample	Stratigraphy	Soil Description
			GRAVEL - brown, amorphous, dry, loose, disturbed
0.5			SILTY CLAY LOAM - brown, granular, damp, friable, many stones <10cm, disturbed
1.0			
1.5			CLAY - brown, massive, damp, friable, few stones <10cm minor silt inclusions, undisturbed
2.0			
2.5			Borehole terminated at 2.50 m bgl.

EARTHMASTER BH LOGS.GPJ EARTHMASTER.GDT Dec-14-23



**EARTHMASTER**  
ENVIRONMENTAL STRATEGIES INC

**Client:** G. Simmons Trucking Ltd.

**Location:** NE 25-053-17W5M

**Project:** 3327-00001

**TP04**

**Drill Date:** Nov-28-23

**Datum:** NAD83, UTM Zone 11N

**Drill Method:** Solid Stem Auger

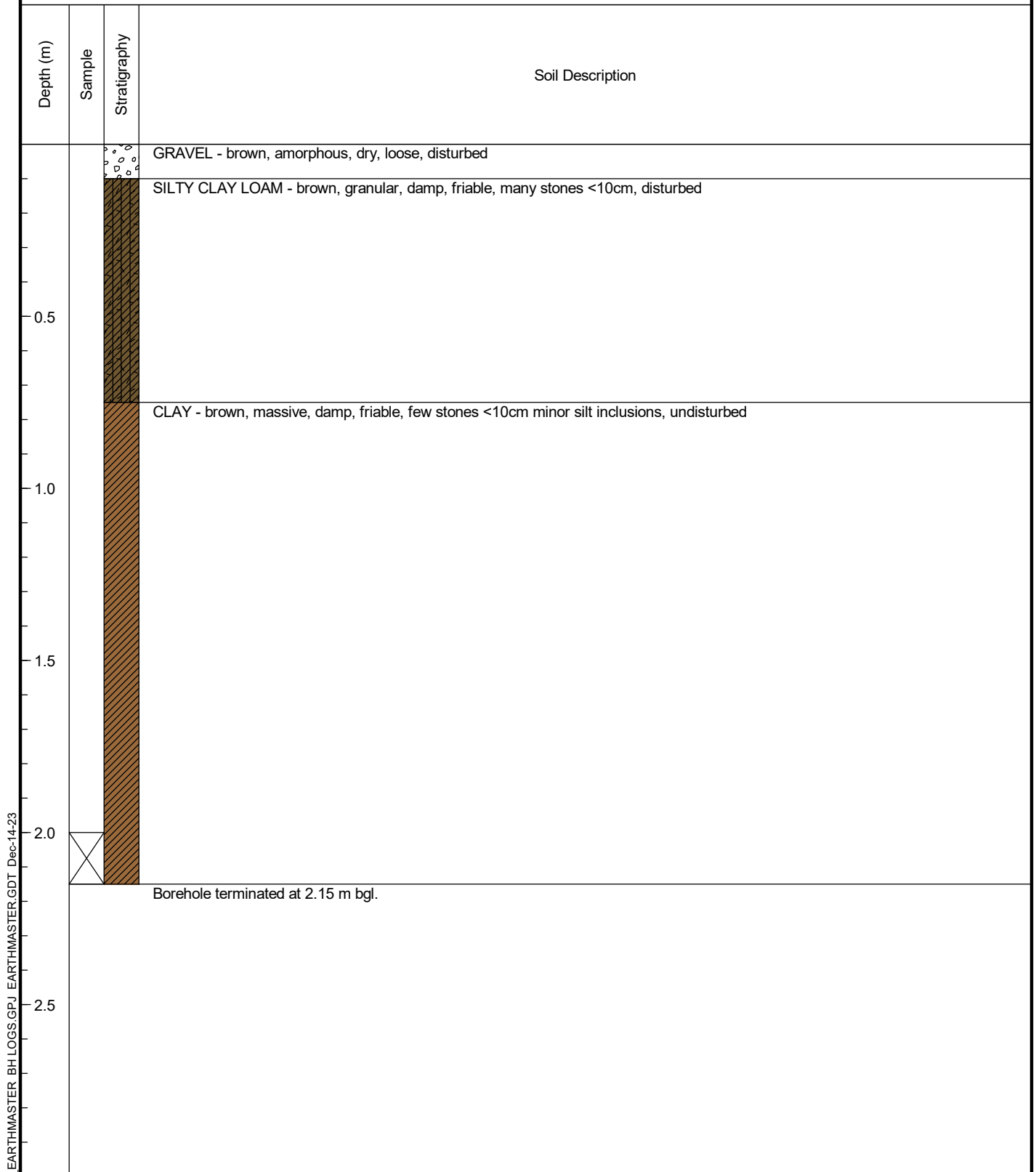
**Northing (m):** 5940011.244

**Drilled By:** G. Simmons Trucking Ltd.

**Easting (m):** 542287.826

**Logged By:** E. Russell

**Elevation (m):**



EARTHMASTER BH LOGS.GPJ EARTHMASTER.GDT Dec-14-23





**EARTHMASTER**  
ENVIRONMENTAL STRATEGIES INC

**Client:** G. Simmons Trucking Ltd.

**Location:** NE 25-053-17W5M

**Project:** 3327-00001

**TP06**

**Drill Date:** Nov-28-23

**Datum:** NAD83, UTM Zone 11N

**Drill Method:** Solid Stem Auger

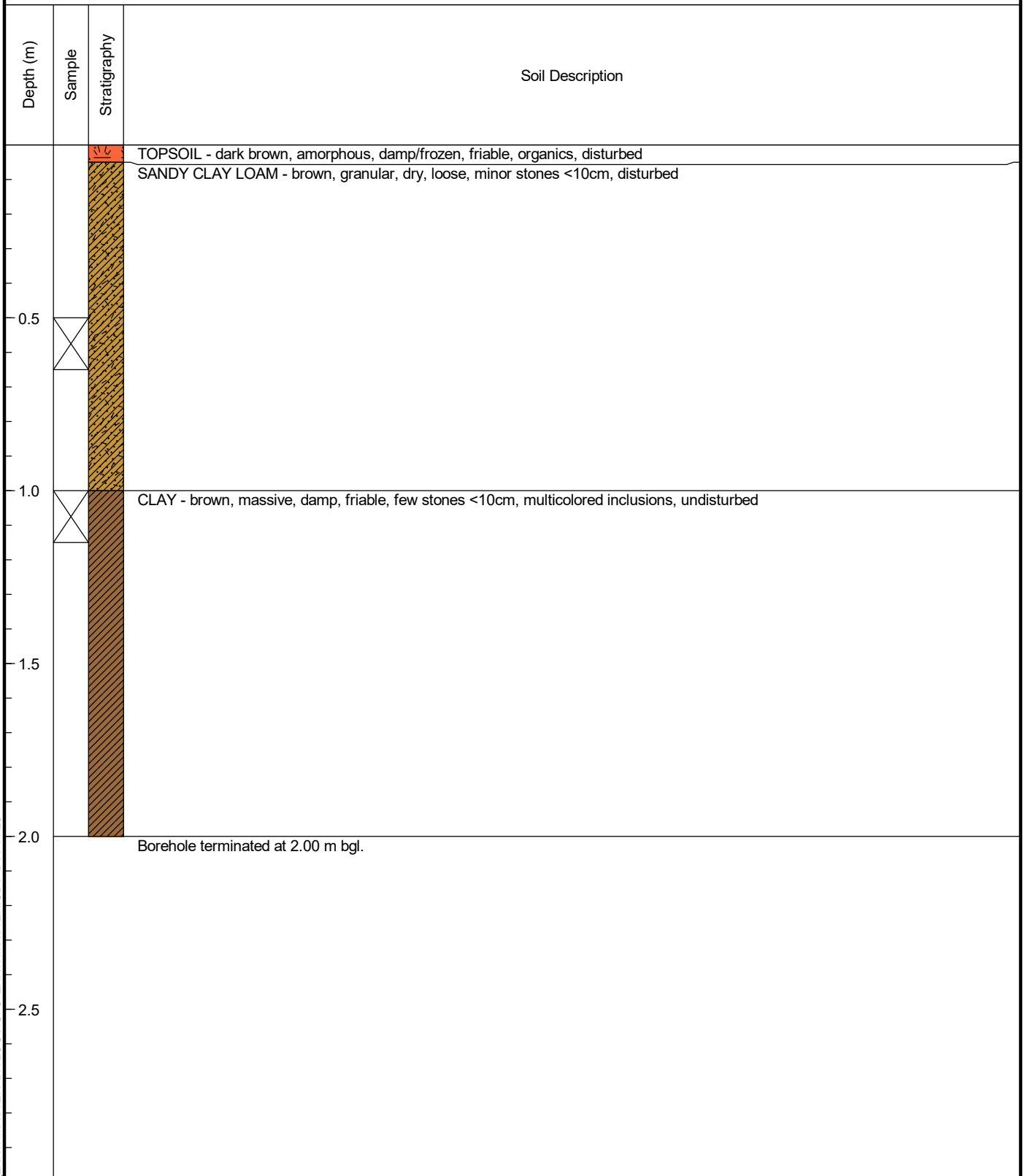
**Northing (m):** 5940225.908

**Drilled By:** G. Simmons Trucking Ltd.

**Easting (m):** 542310.584

**Logged By:** E. Russell

**Elevation (m):**



EARTHMASTER BH LOGS.GPJ EARTHMASTER.GDT Dec-14-23

# **LABORATORY ANALYTICAL REPORT**

## CERTIFICATE OF ANALYSIS

<b>REPORTED TO</b>	Earthmaster Environmental Strategies Inc.(Calgary) 200, 358 58 Ave SW Calgary, AB T2H 2M5	<b>WORK ORDER</b>	23K3211
<b>ATTENTION</b>	Adam Dunn	<b>RECEIVED / TEMP REPORTED</b>	2023-11-28 12:54 / 3.4°C 2023-12-05 14:14
<b>PO NUMBER</b>		<b>COC NUMBER</b>	179987
<b>PROJECT</b>	09-25-053-17 W5M		
<b>PROJECT INFO</b>	NE 25-053-17 W5M		

### Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

#### *Big Picture Sidekicks*



You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

#### *We've Got Chemistry*



It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

#### *Ahead of the Curve*



Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: <https://www.caro.ca/terms-conditions>

If you have any questions or concerns, please contact me at [rpschyk@caro.ca](mailto:rpschyk@caro.ca)

#### Authorized By:

Regan Pshyk  
Account Manager

1-888-311-8846 | [www.caro.ca](http://www.caro.ca)

#110 4011 Viking Way Richmond, BC V6V 2K9 | #102 3677 Highway 97N Kelowna, BC V1X 5C3 | 17225 109 Avenue Edmonton, AB T5S 1H7 | #108 4475 Wayburne Drive Burnaby, BC V5G 4X4

# TEST RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

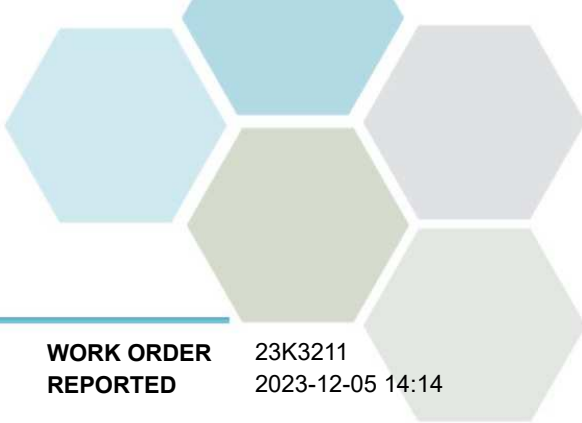
Analyte	Result	RL	Units	Analyzed	Qualifier
<b>BH01 (2-2.15) (23K3211-01)   Matrix: Soil   Sampled: 2023-11-28</b>					
<b>CCME CWS Petroleum Hydrocarbons</b>					
PHC F1 (C6-C10)	< 20	20	mg/kg dry	2023-11-29	
F1-BTEX	< 20	20	mg/kg dry	N/A	
PHC F2 (C10-C16)	< 100	100	mg/kg dry	2023-11-29	
PHC F3 (C16-C34)	< 100	100	mg/kg dry	2023-11-29	
PHC F4 (C34-C50)	< 300	300	mg/kg dry	2023-11-29	
Reached Baseline at nC50	<b>Yes</b>		mg/kg dry	2023-11-29	
Surrogate: 2,4-Dichlorotoluene (VH/F1)	126	60-140	%	2023-11-29	
Surrogate: 2-Methylnonane (EPH/F2-4)	121	60-140	%	2023-11-29	
<b>General Parameters</b>					
Moisture	<b>25.2</b>	1.0	% wet	2023-11-29	
pH (0.01M CaCl2)	<b>7.51</b>	0.10	pH units	2023-12-05	
<b>Salinity Parameters (Sat. Paste Extract)</b>					
Sodium Adsorption Ratio	<b>0.3</b>		-	2023-12-01	
Saturation	<b>78.1</b>	0.0001	%	2023-12-01	
Conductivity, Saturated Paste	<b>0.73</b>	0.20	ds/m	2023-12-01	
Calcium, Saturated Paste.	<b>68</b>	0.2	mg/kg dry	2023-12-01	
Calcium, Saturated Paste	<b>87</b>	0.5	mg/L	2023-12-01	
Chloride, Saturated Paste.	<b>53.7</b>	0.2	mg/kg dry	2023-12-01	
Chloride, Saturated Paste	<b>68.8</b>	0.5	mg/L	2023-12-01	
Magnesium, Saturated Paste.	<b>11.1</b>	0.2	mg/kg dry	2023-12-01	
Magnesium, Saturated Paste	<b>14.2</b>	0.3	mg/L	2023-12-01	
Potassium, Saturated Paste.	<b>3.8</b>	1.0	mg/kg dry	2023-12-01	
Potassium, Saturated Paste	<b>4.8</b>	2.0	mg/L	2023-12-01	
Sodium, Saturated Paste	<b>11.9</b>	0.5	mg/L	2023-12-01	
Sodium, Saturated Paste.	<b>9.3</b>	0.2	mg/kg dry	2023-12-01	
Sulfate, Saturated Paste.	<b>29</b>	1	mg/kg dry	2023-12-01	
Sulfate, Saturated Paste	<b>38</b>	2	mg/L	2023-12-01	
<b>Volatile Organic Compounds (VOC)</b>					
Benzene	< 0.005	0.005	mg/kg dry	2023-11-29	
Ethylbenzene	< 0.010	0.010	mg/kg dry	2023-11-29	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-11-29	
Styrene	< 0.010	0.010	mg/kg dry	2023-11-29	
Toluene	< 0.050	0.050	mg/kg dry	2023-11-29	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-11-29	
Surrogate: Toluene-d8	95	60-140	%	2023-11-29	
Surrogate: 4-Bromofluorobenzene	112	60-140	%	2023-11-29	

**BH02 (2-2.15) (23K3211-02) | Matrix: Soil | Sampled: 2023-11-28**

**CCME CWS Petroleum Hydrocarbons**

PHC F1 (C6-C10)	< 20	20	mg/kg dry	2023-11-29	
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# TEST RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

Analyte	Result	RL	Units	Analyzed	Qualifier
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**BH02 (2-2.15) (23K3211-02) | Matrix: Soil | Sampled: 2023-11-28, Continued**

**CCME CWS Petroleum Hydrocarbons, Continued**

F1-BTEX	< 20	20	mg/kg dry	N/A	
PHC F2 (C10-C16)	< 100	100	mg/kg dry	2023-11-29	
PHC F3 (C16-C34)	< 100	100	mg/kg dry	2023-11-29	
PHC F4 (C34-C50)	< 300	300	mg/kg dry	2023-11-29	
Reached Baseline at nC50	<b>Yes</b>		mg/kg dry	2023-11-29	
Surrogate: 2,4-Dichlorotoluene (VH/F1)	116	60-140	%	2023-11-29	
Surrogate: 2-Methylnonane (EPH/F2-4)	121	60-140	%	2023-11-29	

**General Parameters**

Moisture	17.7	1.0	% wet	2023-11-29	
pH (0.01M CaCl2)	7.54	0.10	pH units	2023-12-05	

**Salinity Parameters (Sat. Paste Extract)**

Sodium Adsorption Ratio	2.4	-		2023-12-01	
Saturation	42.6	0.0001	%	2023-12-01	
Conductivity, Saturated Paste	0.58	0.20	ds/m	2023-12-01	
Calcium, Saturated Paste.	18	0.2	mg/kg dry	2023-12-01	
Calcium, Saturated Paste	43	0.5	mg/L	2023-12-01	
Chloride, Saturated Paste.	< 25.0	0.2	mg/kg dry	2023-12-01	
Chloride, Saturated Paste	12.8	0.5	mg/L	2023-12-01	
Magnesium, Saturated Paste.	2.5	0.2	mg/kg dry	2023-12-01	
Magnesium, Saturated Paste	5.9	0.3	mg/L	2023-12-01	
Potassium, Saturated Paste.	1.4	1.0	mg/kg dry	2023-12-01	
Potassium, Saturated Paste	3.2	2.0	mg/L	2023-12-01	
Sodium, Saturated Paste	64.0	0.5	mg/L	2023-12-01	
Sodium, Saturated Paste.	27.3	0.2	mg/kg dry	2023-12-01	
Sulfate, Saturated Paste.	51	1	mg/kg dry	2023-12-01	
Sulfate, Saturated Paste	120	2	mg/L	2023-12-01	

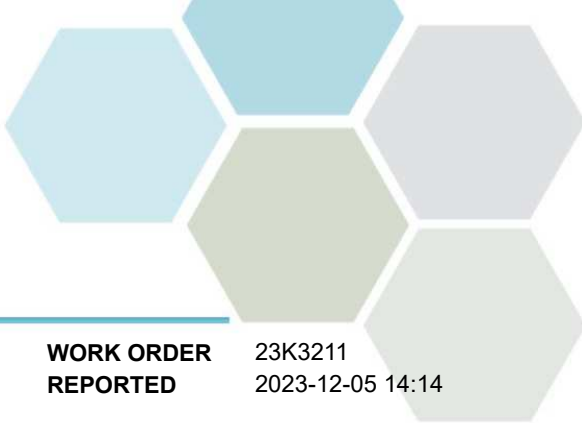
**Volatile Organic Compounds (VOC)**

Benzene	< 0.005	0.005	mg/kg dry	2023-11-29	
Ethylbenzene	< 0.010	0.010	mg/kg dry	2023-11-29	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-11-29	
Styrene	< 0.010	0.010	mg/kg dry	2023-11-29	
Toluene	< 0.050	0.050	mg/kg dry	2023-11-29	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-11-29	
Surrogate: Toluene-d8	86	60-140	%	2023-11-29	
Surrogate: 4-Bromofluorobenzene	99	60-140	%	2023-11-29	

**BH03 (2.35-2.5) (23K3211-03) | Matrix: Soil | Sampled: 2023-11-28**

**CCME CWS Petroleum Hydrocarbons**

PHC F1 (C6-C10)	< 20	20	mg/kg dry	2023-11-29	
F1-BTEX	< 20	20	mg/kg dry	N/A	



# TEST RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

Analyte	Result	RL	Units	Analyzed	Qualifier
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**BH03 (2.35-2.5) (23K3211-03) | Matrix: Soil | Sampled: 2023-11-28, Continued**

**CCME CWS Petroleum Hydrocarbons, Continued**

PHC F2 (C10-C16)	< 100	100	mg/kg dry	2023-11-29	
PHC F3 (C16-C34)	< 100	100	mg/kg dry	2023-11-29	
PHC F4 (C34-C50)	< 300	300	mg/kg dry	2023-11-29	
Reached Baseline at nC50	<b>Yes</b>		mg/kg dry	2023-11-29	
Surrogate: 2,4-Dichlorotoluene (VH/F1)	117	60-140	%	2023-11-29	
Surrogate: 2-Methylnonane (EPH/F2-4)	112	60-140	%	2023-11-29	

**General Parameters**

Moisture	<b>16.6</b>	1.0	% wet	2023-11-29	
pH (0.01M CaCl2)	<b>7.56</b>	0.10	pH units	2023-12-05	

**Salinity Parameters (Sat. Paste Extract)**

Sodium Adsorption Ratio	<b>0.8</b>		-	2023-12-01	
Saturation	<b>40.8</b>	0.0001	%	2023-12-01	
Conductivity, Saturated Paste	<b>0.52</b>	0.20	ds/m	2023-12-01	
Calcium, Saturated Paste.	<b>24</b>	0.2	mg/kg dry	2023-12-01	
Calcium, Saturated Paste	<b>60</b>	0.5	mg/L	2023-12-01	
Chloride, Saturated Paste.	< 25.0	0.2	mg/kg dry	2023-12-01	
Chloride, Saturated Paste	<b>20.4</b>	0.5	mg/L	2023-12-01	
Magnesium, Saturated Paste.	<b>3.3</b>	0.2	mg/kg dry	2023-12-01	
Magnesium, Saturated Paste	<b>8.0</b>	0.3	mg/L	2023-12-01	
Potassium, Saturated Paste.	<b>2.0</b>	1.0	mg/kg dry	2023-12-01	
Potassium, Saturated Paste	<b>4.9</b>	2.0	mg/L	2023-12-01	
Sodium, Saturated Paste	<b>24.0</b>	0.5	mg/L	2023-12-01	
Sodium, Saturated Paste.	<b>9.8</b>	0.2	mg/kg dry	2023-12-01	
Sulfate, Saturated Paste.	<b>27</b>	1	mg/kg dry	2023-12-01	
Sulfate, Saturated Paste	<b>66</b>	2	mg/L	2023-12-01	

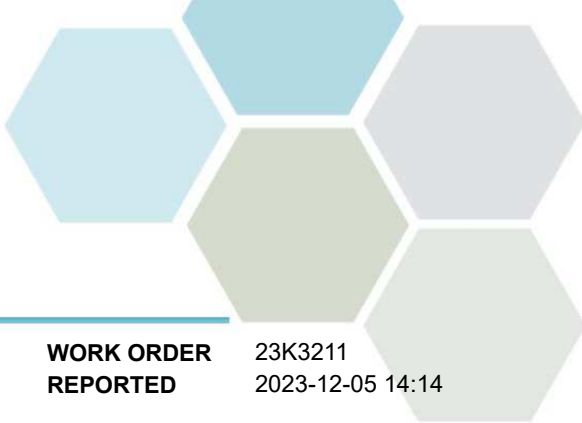
**Volatile Organic Compounds (VOC)**

Benzene	< 0.005	0.005	mg/kg dry	2023-11-29	
Ethylbenzene	< 0.010	0.010	mg/kg dry	2023-11-29	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-11-29	
Styrene	< 0.010	0.010	mg/kg dry	2023-11-29	
Toluene	< 0.050	0.050	mg/kg dry	2023-11-29	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-11-29	
Surrogate: Toluene-d8	91	60-140	%	2023-11-29	
Surrogate: 4-Bromofluorobenzene	106	60-140	%	2023-11-29	

**BH04 (2-2.15) (23K3211-04) | Matrix: Soil | Sampled: 2023-11-28**

**CCME CWS Petroleum Hydrocarbons**

PHC F1 (C6-C10)	< 20	20	mg/kg dry	2023-11-29	
F1-BTEX	< 20	20	mg/kg dry	N/A	
PHC F2 (C10-C16)	< 100	100	mg/kg dry	2023-11-29	



# TEST RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

Analyte	Result	RL	Units	Analyzed	Qualifier
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**BH04 (2-2.15) (23K3211-04) | Matrix: Soil | Sampled: 2023-11-28, Continued**

**CCME CWS Petroleum Hydrocarbons, Continued**

PHC F3 (C16-C34)	< 100	100	mg/kg dry	2023-11-29	
PHC F4 (C34-C50)	< 300	300	mg/kg dry	2023-11-29	
Reached Baseline at nC50	<b>Yes</b>		mg/kg dry	2023-11-29	
Surrogate: 2,4-Dichlorotoluene (VH/F1)	112	60-140	%	2023-11-29	
Surrogate: 2-Methylnonane (EPH/F2-4)	121	60-140	%	2023-11-29	

**General Parameters**

Moisture	<b>11.8</b>	1.0	% wet	2023-11-29	
pH (0.01M CaCl2)	<b>7.52</b>	0.10	pH units	2023-12-05	

**Salinity Parameters (Sat. Paste Extract)**

Sodium Adsorption Ratio	<b>0.4</b>	-		2023-12-01	
Saturation	<b>41.7</b>	0.0001	%	2023-12-01	
Conductivity, Saturated Paste	<b>0.37</b>	0.20	ds/m	2023-12-01	
Calcium, Saturated Paste.	<b>19</b>	0.2	mg/kg dry	2023-12-01	
Calcium, Saturated Paste	<b>46</b>	0.5	mg/L	2023-12-01	
Chloride, Saturated Paste.	< 25.0	0.2	mg/kg dry	2023-12-02	
Chloride, Saturated Paste	<b>20.8</b>	0.5	mg/L	2023-12-02	
Magnesium, Saturated Paste.	<b>2.7</b>	0.2	mg/kg dry	2023-12-01	
Magnesium, Saturated Paste	<b>6.6</b>	0.3	mg/L	2023-12-01	
Potassium, Saturated Paste.	<b>1.6</b>	1.0	mg/kg dry	2023-12-01	
Potassium, Saturated Paste	<b>3.9</b>	2.0	mg/L	2023-12-01	
Sodium, Saturated Paste	<b>9.7</b>	0.5	mg/L	2023-12-01	
Sodium, Saturated Paste.	<b>4.1</b>	0.2	mg/kg dry	2023-12-01	
Sulfate, Saturated Paste.	<b>15</b>	1	mg/kg dry	2023-12-02	
Sulfate, Saturated Paste	<b>36</b>	2	mg/L	2023-12-02	

**Volatile Organic Compounds (VOC)**

Benzene	< 0.005	0.005	mg/kg dry	2023-11-29	
Ethylbenzene	< 0.010	0.010	mg/kg dry	2023-11-29	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-11-29	
Styrene	< 0.010	0.010	mg/kg dry	2023-11-29	
Toluene	< 0.050	0.050	mg/kg dry	2023-11-29	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-11-29	
Surrogate: Toluene-d8	91	60-140	%	2023-11-29	
Surrogate: 4-Bromofluorobenzene	103	60-140	%	2023-11-29	

**BH05 (1-1.15) (23K3211-05) | Matrix: Soil | Sampled: 2023-11-28**

**CCME CWS Petroleum Hydrocarbons**

PHC F1 (C6-C10)	< 20	20	mg/kg dry	2023-11-29	
F1-BTEX	< 20	20	mg/kg dry	N/A	
PHC F2 (C10-C16)	< 100	100	mg/kg dry	2023-11-29	
PHC F3 (C16-C34)	< 100	100	mg/kg dry	2023-11-29	

# TEST RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

Analyte	Result	RL	Units	Analyzed	Qualifier
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**BH05 (1-1.15) (23K3211-05) | Matrix: Soil | Sampled: 2023-11-28, Continued**

**CCME CWS Petroleum Hydrocarbons, Continued**

PHC F4 (C34-C50)	< 300	300	mg/kg dry	2023-11-29	
Reached Baseline at nC50	Yes		mg/kg dry	2023-11-29	
Surrogate: 2,4-Dichlorotoluene (VH/F1)	120	60-140	%	2023-11-29	
Surrogate: 2-Methylnonane (EPH/F2-4)	119	60-140	%	2023-11-29	

**General Parameters**

Moisture	16.4	1.0	% wet	2023-11-29	
pH (0.01M CaCl2)	7.38	0.10	pH units	2023-12-05	

**Salinity Parameters (Sat. Paste Extract)**

Sodium Adsorption Ratio	0.7	-		2023-12-01	
Saturation	58.5	0.0001	%	2023-12-01	
Conductivity, Saturated Paste	0.31	0.20	ds/m	2023-12-01	
Calcium, Saturated Paste.	21	0.2	mg/kg dry	2023-12-01	
Calcium, Saturated Paste	36	0.5	mg/L	2023-12-01	
Chloride, Saturated Paste.	< 25.0	0.2	mg/kg dry	2023-12-02	
Chloride, Saturated Paste	9.0	0.5	mg/L	2023-12-02	
Magnesium, Saturated Paste.	2.8	0.2	mg/kg dry	2023-12-01	
Magnesium, Saturated Paste	4.8	0.3	mg/L	2023-12-01	
Potassium, Saturated Paste.	2.1	1.0	mg/kg dry	2023-12-01	
Potassium, Saturated Paste	3.6	2.0	mg/L	2023-12-01	
Sodium, Saturated Paste	17.0	0.5	mg/L	2023-12-01	
Sodium, Saturated Paste.	10.0	0.2	mg/kg dry	2023-12-01	
Sulfate, Saturated Paste.	17	1	mg/kg dry	2023-12-02	
Sulfate, Saturated Paste	29	2	mg/L	2023-12-02	

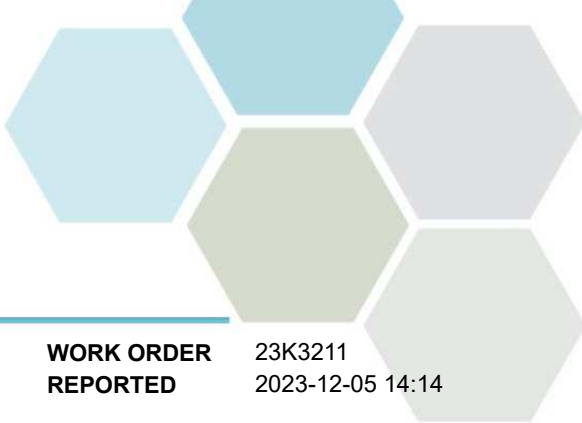
**Volatile Organic Compounds (VOC)**

Benzene	< 0.005	0.005	mg/kg dry	2023-11-29	
Ethylbenzene	< 0.010	0.010	mg/kg dry	2023-11-29	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-11-29	
Styrene	< 0.010	0.010	mg/kg dry	2023-11-29	
Toluene	< 0.050	0.050	mg/kg dry	2023-11-29	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-11-29	
Surrogate: Toluene-d8	94	60-140	%	2023-11-29	
Surrogate: 4-Bromofluorobenzene	109	60-140	%	2023-11-29	

**BH06 (0.5-0.65) (23K3211-06) | Matrix: Soil | Sampled: 2023-11-28**

**CCME CWS Petroleum Hydrocarbons**

PHC F1 (C6-C10)	< 20	20	mg/kg dry	2023-11-29	
F1-BTEX	< 20	20	mg/kg dry	N/A	
PHC F2 (C10-C16)	< 100	100	mg/kg dry	2023-11-29	
PHC F3 (C16-C34)	< 100	100	mg/kg dry	2023-11-29	
PHC F4 (C34-C50)	< 300	300	mg/kg dry	2023-11-29	



# TEST RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

Analyte	Result	RL	Units	Analyzed	Qualifier
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**BH06 (0.5-0.65) (23K3211-06) | Matrix: Soil | Sampled: 2023-11-28, Continued**

**CCME CWS Petroleum Hydrocarbons, Continued**

Reached Baseline at nC50	Yes		mg/kg dry	2023-11-29	
Surrogate: 2,4-Dichlorotoluene (VH/F1)	119	60-140	%	2023-11-29	
Surrogate: 2-Methylnonane (EPH/F2-4)	119	60-140	%	2023-11-29	

**General Parameters**

Moisture	15.0	1.0	% wet	2023-11-29	
pH (0.01M CaCl2)	7.45	0.10	pH units	2023-12-05	

**Salinity Parameters (Sat. Paste Extract)**

Sodium Adsorption Ratio	0.3		-	2023-12-01	
Saturation	52.6	0.0001	%	2023-12-01	
Conductivity, Saturated Paste	0.24	0.20	ds/m	2023-12-01	
Calcium, Saturated Paste.	17	0.2	mg/kg dry	2023-12-01	
Calcium, Saturated Paste	32	0.5	mg/L	2023-12-01	
Chloride, Saturated Paste.	< 25.0	0.2	mg/kg dry	2023-12-02	
Chloride, Saturated Paste	6.6	0.5	mg/L	2023-12-02	
Magnesium, Saturated Paste.	2.2	0.2	mg/kg dry	2023-12-01	
Magnesium, Saturated Paste	4.3	0.3	mg/L	2023-12-01	
Potassium, Saturated Paste.	1.7	1.0	mg/kg dry	2023-12-01	
Potassium, Saturated Paste	3.2	2.0	mg/L	2023-12-01	
Sodium, Saturated Paste	7.1	0.5	mg/L	2023-12-01	
Sodium, Saturated Paste.	3.7	0.2	mg/kg dry	2023-12-01	
Sulfate, Saturated Paste.	11	1	mg/kg dry	2023-12-02	
Sulfate, Saturated Paste	21	2	mg/L	2023-12-02	

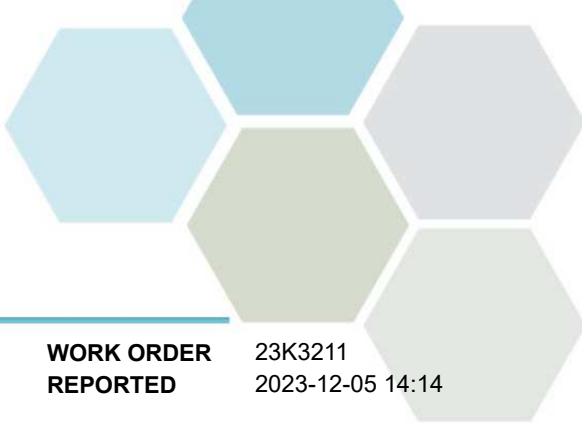
**Volatile Organic Compounds (VOC)**

Benzene	< 0.005	0.005	mg/kg dry	2023-11-29	
Ethylbenzene	< 0.010	0.010	mg/kg dry	2023-11-29	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-11-29	
Styrene	< 0.010	0.010	mg/kg dry	2023-11-29	
Toluene	< 0.050	0.050	mg/kg dry	2023-11-29	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-11-29	
Surrogate: Toluene-d8	93	60-140	%	2023-11-29	
Surrogate: 4-Bromofluorobenzene	111	60-140	%	2023-11-29	

**BH06 (1-1.15) (23K3211-07) | Matrix: Soil | Sampled: 2023-11-28**

**CCME CWS Petroleum Hydrocarbons**

PHC F1 (C6-C10)	< 20	20	mg/kg dry	2023-11-29	
F1-BTEX	< 20	20	mg/kg dry	N/A	
PHC F2 (C10-C16)	< 100	100	mg/kg dry	2023-11-29	
PHC F3 (C16-C34)	< 100	100	mg/kg dry	2023-11-29	
PHC F4 (C34-C50)	< 300	300	mg/kg dry	2023-11-29	
Reached Baseline at nC50	Yes		mg/kg dry	2023-11-29	



# TEST RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

Analyte	Result	RL	Units	Analyzed	Qualifier
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**BH06 (1-1.15) (23K3211-07) | Matrix: Soil | Sampled: 2023-11-28, Continued**

**CCME CWS Petroleum Hydrocarbons, Continued**

Surrogate: 2,4-Dichlorotoluene (VH/F1)	115	60-140	%	2023-11-29	
Surrogate: 2-Methylnonane (EPH/F2-4)	122	60-140	%	2023-11-29	

**General Parameters**

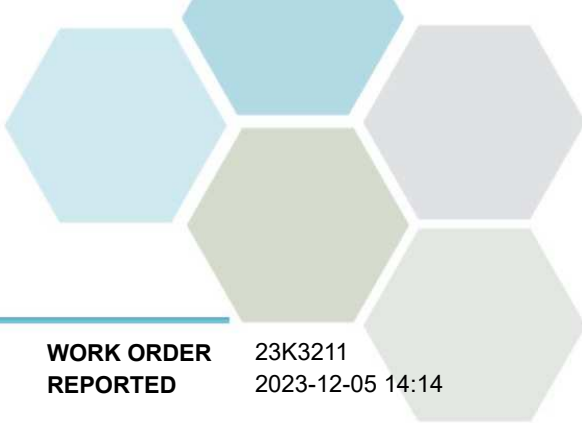
Moisture	15.2	1.0	% wet	2023-11-29	
pH (0.01M CaCl2)	7.49	0.10	pH units	2023-12-05	

**Salinity Parameters (Sat. Paste Extract)**

Sodium Adsorption Ratio	0.7	-		2023-12-01	
Saturation	56.9	0.0001	%	2023-12-01	
Conductivity, Saturated Paste	0.32	0.20	ds/m	2023-12-01	
Calcium, Saturated Paste.	21	0.2	mg/kg dry	2023-12-01	
Calcium, Saturated Paste	37	0.5	mg/L	2023-12-01	
Chloride, Saturated Paste.	< 25.0	0.2	mg/kg dry	2023-12-02	
Chloride, Saturated Paste	7.3	0.5	mg/L	2023-12-02	
Magnesium, Saturated Paste.	2.7	0.2	mg/kg dry	2023-12-01	
Magnesium, Saturated Paste	4.8	0.3	mg/L	2023-12-01	
Potassium, Saturated Paste.	2.8	1.0	mg/kg dry	2023-12-01	
Potassium, Saturated Paste	5.0	2.0	mg/L	2023-12-01	
Sodium, Saturated Paste	16.3	0.5	mg/L	2023-12-01	
Sodium, Saturated Paste.	9.3	0.2	mg/kg dry	2023-12-01	
Sulfate, Saturated Paste.	19	1	mg/kg dry	2023-12-02	
Sulfate, Saturated Paste	33	2	mg/L	2023-12-02	

**Volatile Organic Compounds (VOC)**

Benzene	< 0.005	0.005	mg/kg dry	2023-11-29	
Ethylbenzene	< 0.010	0.010	mg/kg dry	2023-11-29	
Methyl tert-butyl ether	< 0.040	0.040	mg/kg dry	2023-11-29	
Styrene	< 0.010	0.010	mg/kg dry	2023-11-29	
Toluene	< 0.050	0.050	mg/kg dry	2023-11-29	
Xylenes (total)	< 0.100	0.100	mg/kg dry	2023-11-29	
Surrogate: Toluene-d8	93	60-140	%	2023-11-29	
Surrogate: 4-Bromofluorobenzene	110	60-140	%	2023-11-29	



## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

Analysis Description	Method Ref.	Technique	Accredited	Location
BTEX in Soil	EPA 5035A/5030B / EPA 8260D	Methanol Extract, Purge&Trap / GC-MSD (SIM)	✓	Edmonton
CCME PHC F1 in Soil	EPA 5035A/5030B / CCME CWS PHC	Methanol Extract, Purge&Trap / Gas Chromatography (GC-FID)	✓	Edmonton
CCME PHC F2-F4 in Soil	EPA 3570* / CCME CWS PHC	Shaker Extraction (Hexane-Acetone 1:1) / Gas Chromatography (GC-FID)	✓	Edmonton
F1-BTEX in Soil	CCME CWS PHC F1-BTEX	Calculation: F1 - [ Benzene + Toluene + Ethylbenzene + Xylenes ]		N/A
Metals in Sat. Paste Extract in Soil	EPA 6010D	Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES)	✓	Edmonton
Moisture in Soil	ASTM D2974-87*	Gravimetry (Dried at 105C)		N/A
pH in Soil	Carter 16.3 / Carter 16.3	CaCl2 Extraction (0.01M) / 1:2 0.01M CaCl2	✓	Edmonton
Saturated Paste Anions in Soil	SM 4110 B (2020)	Ion Chromatography	✓	Edmonton
Saturated Paste Conductivity in Soil	SM 2510 B (2021)	Conductivity Meter	✓	Edmonton
Sodium Adsorption Ratio in Soil	Carter 15.4.4	Calculation (based on the concentration of Na/Ca/Mg in Sat. Paste extract)		Edmonton

*Note: An asterisk in the Method Reference indicates that the CARO method has been modified from the reference method*

### Glossary of Terms:

RL	Reporting Limit (default)
%	Percent
% wet	Percent (as received basis)
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
ds/m	Decisiemens per metre
mg/kg dry	Milligrams per kilogram (dry weight basis)
mg/L	Milligrams per litre
pH units	pH < 7 = acidic, pH > 7 = basic
ASTM	ASTM International Test Methods
Carter	Soil Sampling and Methods of Analysis, 2nd Edition (2007), Carter/Gregorich
CCME	Canadian Council of Ministers of the Environment, Canada-wide Standard Reference Methods
EPA	United States Environmental Protection Agency Test Methods
SM	Standard Methods for the Examination of Water and Wastewater, American Public Health Association

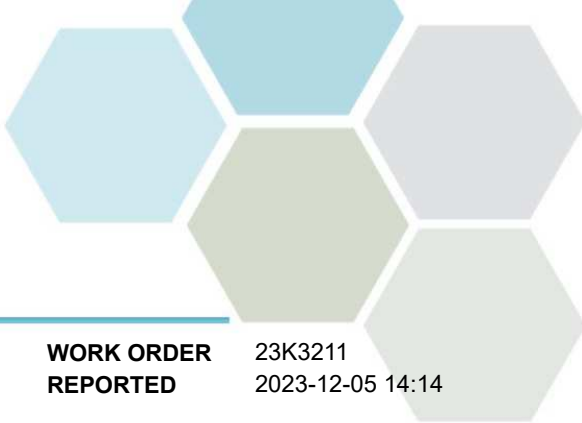
### CCME Petroleum Hydrocarbon Comments:

CARO's methods comply with the Reference Method for the CWS PHC and are validated for use.

In cases where results for both F4 and F4G are reported, the greater of the two numbers must be used in any application of the CWS PHC guidelines. The gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.

Unless otherwise qualified, the following quality control criteria were adhered to:

1. All extraction and analysis holding times were met.
2. F1: The C6 and C10 response factors were within 30% of the response factor for toluene.
3. F2-F4: The C10, C16, and C34 response factors were within 10% of their average.
4. F4: The C50 response factor was at least 70% of the average of the C10, C16 and C34 response factors.
5. Linearity of the gasoline and/or diesel+motor oil response was within 15% throughout the calibration range.



## APPENDIX 1: SUPPORTING INFORMATION

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

**General Comments:**

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager: [rpshyk@caro.ca](mailto:rpshyk@caro.ca)

*Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.*





## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in “batches” and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk):** A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup):** An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS):** A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS):** A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM):** A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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### CCME CWS Petroleum Hydrocarbons, Batch B3K2864

Blank (B3K2864-BLK1)		Prepared: 2023-11-29, Analyzed: 2023-11-29							
PHC F1 (C6-C10)	< 20	20 mg/kg wet							
Surrogate: 2,4-Dichlorotoluene (VH/F1)	35.4	mg/kg wet	32.0		111	60-140			
LCS (B3K2864-BS1)		Prepared: 2023-11-29, Analyzed: 2023-11-29							
PHC F1 (C6-C10)	270	20 mg/kg wet	297		92	60-140			
Surrogate: 2,4-Dichlorotoluene (VH/F1)	36.8	mg/kg wet	32.0		115	60-140			
Duplicate (B3K2864-DUP1)		Source: 23K3211-07		Prepared: 2023-11-29, Analyzed: 2023-11-29					
PHC F1 (C6-C10)	< 20	20 mg/kg dry		< 20					40
Surrogate: 2,4-Dichlorotoluene (VH/F1)	36.3	mg/kg dry	28.6		127	60-140			
Matrix Spike (B3K2864-MS1)		Source: 23K3211-07		Prepared: 2023-11-29, Analyzed: 2023-11-29					
PHC F1 (C6-C10)	290	20 mg/kg dry	266	< 20	108	60-140			
Surrogate: 2,4-Dichlorotoluene (VH/F1)	33.7	mg/kg dry	28.6		118	60-140			

### CCME CWS Petroleum Hydrocarbons, Batch B3K2870

Blank (B3K2870-BLK1)		Prepared: 2023-11-29, Analyzed: 2023-11-29							
PHC F2 (C10-C16)	< 100	100 mg/kg wet							
PHC F3 (C16-C34)	< 100	100 mg/kg wet							
PHC F4 (C34-C50)	< 300	300 mg/kg wet							
Reached Baseline at nC50	Yes	mg/kg wet							
Surrogate: 2-Methylnonane (EPH/F2-4)	132	mg/kg wet	118		112	60-140			
LCS (B3K2870-BS1)		Prepared: 2023-11-29, Analyzed: 2023-11-29							
PHC F2 (C10-C16)	2240	100 mg/kg wet	2550		88	60-140			
PHC F3 (C16-C34)	2600	100 mg/kg wet	2950		88	60-140			
PHC F4 (C34-C50)	2200	300 mg/kg wet	2880		76	60-140			
Surrogate: 2-Methylnonane (EPH/F2-4)	153	mg/kg wet	118		130	60-140			
Duplicate (B3K2870-DUP1)		Source: 23K3211-07		Prepared: 2023-11-29, Analyzed: 2023-11-29					
PHC F2 (C10-C16)	< 100	100 mg/kg dry		< 100					40
PHC F3 (C16-C34)	< 100	100 mg/kg dry		< 100					40
PHC F4 (C34-C50)	< 300	300 mg/kg dry		< 300					40
Surrogate: 2-Methylnonane (EPH/F2-4)	121	mg/kg dry	98.8		122	60-140			



## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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### CCME CWS Petroleum Hydrocarbons, Batch B3K2870, Continued

Matrix Spike (B3K2870-MS1)		Source: 23K3211-07		Prepared: 2023-11-29, Analyzed: 2023-11-29					
PHC F2 (C10-C16)	2080	100 mg/kg dry	2130	< 100	98	60-140			
PHC F3 (C16-C34)	2430	100 mg/kg dry	2460	< 100	98	60-140			
PHC F4 (C34-C50)	1970	300 mg/kg dry	2400	< 300	82	60-140			
Surrogate: 2-Methylnonane (EPH/F2-4)	134	mg/kg dry	98.1		136	60-140			

### General Parameters, Batch B3K2871

Duplicate (B3K2871-DUP1)		Source: 23K3211-07		Prepared: 2023-11-29, Analyzed: 2023-11-29					
Moisture	99.0	1.0 % wet		15.2			146.8	40	

### General Parameters, Batch B3L1198

Duplicate (B3L1198-DUP2)		Source: 23K3211-04		Prepared: 2023-12-05, Analyzed: 2023-12-05					
pH (0.01M CaCl2)	7.50	0.10 pH units		7.52			< 1	5	
Reference (B3L1198-SRM1)				Prepared: 2023-12-05, Analyzed: 2023-12-05					
pH (0.01M CaCl2)	6.79	0.10 pH units		6.67		102	95-105		
Reference (B3L1198-SRM2)				Prepared: 2023-12-05, Analyzed: 2023-12-05					
pH (0.01M CaCl2)	6.86	0.10 pH units		6.67		103	95-105		

### Salinity Parameters (Sat. Paste Extract), Batch B3K3085

Duplicate (B3K3085-DUP2)		Source: 23K3211-03		Prepared: 2023-11-30, Analyzed: 2023-12-01					
Saturation	40.5	0.0001 %		40.8			< 1	20	
Reference (B3K3085-SRM1)				Prepared: 2023-11-30, Analyzed: 2023-12-01					
Saturation	47.1	0.0001 %		48.1		98	70-130		
Reference (B3K3085-SRM2)				Prepared: 2023-11-30, Analyzed: 2023-12-01					
Saturation	47.7	0.0001 %		48.1		99	70-130		

### Salinity Parameters (Sat. Paste Extract), Batch B3L1024

Blank (B3L1024-BLK1)				Prepared: 2023-12-01, Analyzed: 2023-12-01					
Chloride, Saturated Paste	< 5.0	5.0 mg/L							
Chloride, Saturated Paste.	< 25.0	25.0 mg/kg dry							
Sulfate, Saturated Paste	< 20	20 mg/L							
Sulfate, Saturated Paste.	< 10	10 mg/kg dry							
Blank (B3L1024-BLK2)				Prepared: 2023-12-01, Analyzed: 2023-12-01					
Chloride, Saturated Paste	< 5.0	5.0 mg/L							
Chloride, Saturated Paste.	< 25.0	25.0 mg/kg dry							
Sulfate, Saturated Paste	< 20	20 mg/L							
Sulfate, Saturated Paste.	< 10	10 mg/kg dry							
Duplicate (B3L1024-DUP2)		Source: 23K3211-03		Prepared: 2023-12-01, Analyzed: 2023-12-02					
Chloride, Saturated Paste	23.4	0.5 mg/L		20.4				20	
Chloride, Saturated Paste.	< 25.0	0.2 mg/kg dry		< 25.0				30	
Sulfate, Saturated Paste	70	2 mg/L		66				20	
Sulfate, Saturated Paste.	28	1 mg/kg dry		27				30	
Reference (B3L1024-SRM1)				Prepared: 2023-12-01, Analyzed: 2023-12-01					
Chloride, Saturated Paste	850	50.0 mg/L		929		92	70-130		
Chloride, Saturated Paste.	425	25.0 mg/kg dry		446		95	70-130		



## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
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**WORK ORDER REPORTED** 23K3211  
2023-12-05 14:14

Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
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### Salinity Parameters (Sat. Paste Extract), Batch B3L1024, Continued

**Reference (B3L1024-SRM1), Continued**

Prepared: 2023-12-01, Analyzed: 2023-12-01

Sulfate, Saturated Paste	1870	200 mg/L	2250	83	70-130				
Sulfate, Saturated Paste.	933	100 mg/kg dry	1080	86	70-130				

**Reference (B3L1024-SRM2)**

Prepared: 2023-12-01, Analyzed: 2023-12-01

Chloride, Saturated Paste	821	50.0 mg/L	929	88	70-130				
Chloride, Saturated Paste.	411	25.0 mg/kg dry	446	92	70-130				
Sulfate, Saturated Paste	1780	200 mg/L	2250	79	70-130				
Sulfate, Saturated Paste.	889	100 mg/kg dry	1080	82	70-130				

### Salinity Parameters (Sat. Paste Extract), Batch B3L1027

**Blank (B3L1027-BLK1)**

Prepared: 2023-12-01, Analyzed: 2023-12-01

Calcium, Saturated Paste	< 5	5 mg/L							
Calcium, Saturated Paste.	< 2	2 mg/kg dry							
Magnesium, Saturated Paste	< 4.0	4.0 mg/L							
Magnesium, Saturated Paste.	< 2.0	2.0 mg/kg dry							
Potassium, Saturated Paste	< 2.0	2.0 mg/L							
Potassium, Saturated Paste.	< 1.0	1.0 mg/kg dry							
Sodium, Saturated Paste	< 2.0	2.0 mg/L							
Sodium, Saturated Paste.	< 1.0	1.0 mg/kg dry							

**Duplicate (B3L1027-DUP2)**

Source: 23K3211-03

Prepared: 2023-12-01, Analyzed: 2023-12-01

Calcium, Saturated Paste	62	0.5 mg/L	60	4	30				
Calcium, Saturated Paste.	25	0.2 mg/kg dry	24	4	30				
Magnesium, Saturated Paste	8.6	0.3 mg/L	8.0		30				
Magnesium, Saturated Paste.	3.5	0.2 mg/kg dry	3.3		30				
Potassium, Saturated Paste	4.8	2.0 mg/L	4.9		30				
Potassium, Saturated Paste.	1.9	1.0 mg/kg dry	2.0		30				
Sodium, Saturated Paste	24.9	0.5 mg/L	24.0	4	30				
Sodium, Saturated Paste.	10.1	0.2 mg/kg dry	9.8	3	30				

**Reference (B3L1027-SRM1)**

Prepared: 2023-12-01, Analyzed: 2023-12-01

Calcium, Saturated Paste	565	5 mg/L	567	100	70-130				
Calcium, Saturated Paste.	282	2 mg/kg dry	273	103	70-130				
Magnesium, Saturated Paste	170	4.0 mg/L	182	93	70-130				
Magnesium, Saturated Paste.	85.1	2.0 mg/kg dry	88.0	97	70-130				
Potassium, Saturated Paste	50.1	2.0 mg/L	56.8	88	70-130				
Sodium, Saturated Paste	529	2.0 mg/L	593	89	70-130				
Sodium, Saturated Paste.	265	1.0 mg/kg dry	285	93	70-130				

**Reference (B3L1027-SRM2)**

Prepared: 2023-12-01, Analyzed: 2023-12-01

Calcium, Saturated Paste	576	5 mg/L	567	102	70-130				
Calcium, Saturated Paste.	288	2 mg/kg dry	273	106	70-130				
Magnesium, Saturated Paste	168	4.0 mg/L	182	92	70-130				
Magnesium, Saturated Paste.	83.9	2.0 mg/kg dry	88.0	95	70-130				
Potassium, Saturated Paste	49.9	2.0 mg/L	56.8	88	70-130				
Sodium, Saturated Paste	533	2.0 mg/L	593	90	70-130				
Sodium, Saturated Paste.	267	1.0 mg/kg dry	285	94	70-130				

### Salinity Parameters (Sat. Paste Extract), Batch B3L1192

**Blank (B3L1192-BLK1)**

Prepared: 2023-12-01, Analyzed: 2023-12-01

Conductivity, Saturated Paste	< 0.20	0.20 ds/m							
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**Blank (B3L1192-BLK2)**

Prepared: 2023-12-01, Analyzed: 2023-12-01

Conductivity, Saturated Paste	< 0.20	0.20 ds/m							
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## APPENDIX 2: QUALITY CONTROL RESULTS

**REPORTED TO PROJECT** Earthmaster Environmental Strategies Inc.(Calgary)  
09-25-053-17 W5M

**WORK ORDER REPORTED** 23K3211  
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Analyte	Result	RL Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
<b>Salinity Parameters (Sat. Paste Extract), Batch B3L1192, Continued</b>									
<b>LCS (B3L1192-BS1)</b>			Prepared: 2023-12-01, Analyzed: 2023-12-01						
Conductivity, Saturated Paste	1.00	0.20 ds/m	1.00		100	0-200			
<b>LCS (B3L1192-BS2)</b>			Prepared: 2023-12-01, Analyzed: 2023-12-01						
Conductivity, Saturated Paste	1.00	0.20 ds/m	1.00		100	0-200			
<b>Duplicate (B3L1192-DUP2)</b>			<b>Source: 23K3211-03</b>		Prepared: 2023-12-01, Analyzed: 2023-12-01				
Conductivity, Saturated Paste	0.55	0.20 ds/m		0.52				27	
<b>Reference (B3L1192-SRM1)</b>			Prepared: 2023-12-01, Analyzed: 2023-12-01						
Conductivity, Saturated Paste	6.10	0.20 ds/m	6.86		89	70-130			
<b>Reference (B3L1192-SRM2)</b>			Prepared: 2023-12-01, Analyzed: 2023-12-01						
Conductivity, Saturated Paste	6.26	0.20 ds/m	6.86		91	70-130			
<b>Volatile Organic Compounds (VOC), Batch B3K2864</b>									
<b>Blank (B3K2864-BLK1)</b>			Prepared: 2023-11-29, Analyzed: 2023-11-29						
Benzene	< 0.005	0.005 mg/kg wet							
Ethylbenzene	< 0.010	0.010 mg/kg wet							
Methyl tert-butyl ether	< 0.040	0.040 mg/kg wet							
Styrene	< 0.010	0.010 mg/kg wet							
Toluene	< 0.050	0.050 mg/kg wet							
Xylenes (total)	< 0.100	0.100 mg/kg wet							
Surrogate: Toluene-d8	3.36	mg/kg wet	4.00		84	60-140			
Surrogate: 4-Bromofluorobenzene	4.08	mg/kg wet	4.00		102	60-140			
<b>LCS (B3K2864-BS1)</b>			Prepared: 2023-11-29, Analyzed: 2023-11-29						
Benzene	2.16	0.005 mg/kg wet	2.00		108	60-140			
Ethylbenzene	2.14	0.010 mg/kg wet	2.00		107	60-140			
Methyl tert-butyl ether	1.98	0.040 mg/kg wet	2.00		99	60-140			
Styrene	2.00	0.010 mg/kg wet	2.00		100	60-140			
Toluene	2.13	0.050 mg/kg wet	2.00		106	60-140			
Xylenes (total)	6.38	0.100 mg/kg wet	6.02		106	60-140			
Surrogate: Toluene-d8	3.80	mg/kg wet	4.00		95	60-140			
Surrogate: 4-Bromofluorobenzene	4.62	mg/kg wet	4.00		115	60-140			
<b>Duplicate (B3K2864-DUP1)</b>			<b>Source: 23K3211-07</b>		Prepared: 2023-11-29, Analyzed: 2023-11-29				
Benzene	< 0.005	0.005 mg/kg dry		< 0.005					50
Ethylbenzene	< 0.010	0.010 mg/kg dry		< 0.010					50
Methyl tert-butyl ether	< 0.040	0.040 mg/kg dry		< 0.040					50
Styrene	< 0.010	0.010 mg/kg dry		< 0.010					50
Toluene	< 0.050	0.050 mg/kg dry		< 0.050					50
Xylenes (total)	< 0.100	0.100 mg/kg dry		< 0.100					50
Surrogate: Toluene-d8	3.60	mg/kg dry	3.59		101	60-140			
Surrogate: 4-Bromofluorobenzene	4.37	mg/kg dry	3.59		122	60-140			
<b>Matrix Spike (B3K2864-MS1)</b>			<b>Source: 23K3211-07</b>		Prepared: 2023-11-29, Analyzed: 2023-11-29				
Benzene	3.88	0.005 mg/kg dry	3.59	< 0.005	108	60-140			
Ethylbenzene	3.96	0.010 mg/kg dry	3.59	< 0.010	110	60-140			
Methyl tert-butyl ether	4.11	0.040 mg/kg dry	3.59	< 0.040	115	60-140			
Styrene	3.92	0.010 mg/kg dry	3.59	< 0.010	109	60-140			
Toluene	4.00	0.050 mg/kg dry	3.59	< 0.050	111	60-140			
Xylenes (total)	12.1	0.100 mg/kg dry	10.8	< 0.100	112	60-140			
Surrogate: Toluene-d8	3.39	mg/kg dry	3.59		94	60-140			
Surrogate: 4-Bromofluorobenzene	4.09	mg/kg dry	3.59		114	60-140			

## **FIELD METHODOLOGY AND PROCEDURES**

## FIELD METHODOLOGY AND PROCEDURES

Following is a brief description of the protocols utilized, regulatory criteria and guidance documents referenced, and assessment and/or remediation objectives for the work undertaken.

### Safe Work Procedures

Prior to conducting any ground disturbance activities, Earthmaster and/or other client representatives (i.e., Operations personnel) completed the appropriate pre-ground disturbance activities (including contracting a third-party line locator) in accordance with Earthmaster, client, and Alberta Energy Regulator (AER) ground disturbance protocols. Line locators marked the location of all underground facilities (i.e., wellbore, pipelines, cables, etc.) and surveyed in lease corners and/or pipeline Right-of-Ways, as requested. Underground facilities were hydrovac exposed where ground disturbance activities were required within five metres.

For each day of field activities an Earthmaster field supervisor completed a pre-job hazard assessment and conducted a daily tailgate safety meeting to discuss the hazards and hazard mitigation measures with all on-site personnel, who signed a tailgate meeting attendance form upon agreement with the subject(s) discussed.

### Soil Assessment Methods

Historical site information and field observations were used to identify areas of concern and background or control areas to be assessed and/or remediated. A trackhoe, hand auger, shovel, or auger rig equipped with solid-stem augers was used to advance testpits or boreholes and obtain soil samples at assessment locations. Boreholes were backfilled with drill cuttings and bentonite chips, where required.

Assessment locations were measured and mapped in relation to a fixed point (i.e., the wellbore, pipeline release point, etc.) using a measuring wheel and/or a global positioning system (GPS).

Soil characteristics at each inspection location were described utilizing protocol and descriptors presented within the Working Group on Soil Survey Data '*Canada Soil Information System (CanSIS)*' manual (Land Research Resource Institute, 1982 Rev, Edited by J.H. Day. Research Branch, Agriculture Canada. LRRRI Contribution No. 82-52. Ottawa, Ontario.1983) for describing soils in the field and recorded in the field on borehole log sheets. Comments referencing the presence of potential impacts were also recorded on the log sheets. Discrete soil samples (i.e. taken from a specific location and defined depth) from undisturbed or shallow soils were collected generally within one horizon. Discrete samples collected from disturbed soil profiles or from within unconsolidated parent material were generally collected at regular depth intervals, at interfaces where texture or colour changes were evident, or where there was evidence of potential impact.

When a drilling waste disposal location was encountered, sampling and laboratory analyses were conducted as per the AER '*Assessing Drilling Waste Disposal Areas: Compliance Options for Reclamation Certification*' (March 2014).

When required, select soil samples were placed into labelled and sealed plastic bags and screened in the field for volatile hydrocarbons, using a portable hydrocarbon vapour meter (i.e., RKI Instruments Eagle or Eagle 2 in

methane elimination mode or Ion Science Tiger LT PID VOC detector). Each bag of soil was agitated and left to stand for a short period of time to allow hydrocarbons to volatilize and vapours to accumulate. Organic vapour concentrations were then measured in parts per million (ppm) or percent of the lower explosive limit (%LEL) and results were recorded on borehole log sheets. Organic vapour analysis (OVA) readings were used as a gross indicator of volatile hydrocarbon impact which aided in sample selection for laboratory analyses.

When evaluating background soil conditions, areas of little or no previous disturbance and no impact were identified and assessed. When assessing areas of concern, soil samples selected for laboratory analyses were typically those representing worst case situations, based on field observations and organic vapour screening results. Samples for inorganic analyses were placed into plastic bags. Samples submitted for organic analyses were collected from the sampling equipment (e.g. auger flights, hand auger, excavator bucket) and placed into the appropriate sample container.

Laboratory analyses conducted on samples focused on those compounds which would be used to define certain generic or site specific assessment and remediation guidelines or on regulated compounds that may be found within areas of concern at the site. Corporate and regulatory historical records, facility type and design, assumed or known standard operating practices, age, process and production information, field observations, and professional and regulatory knowledge assisted in the selection of laboratory analyses.

### **Monitoring Well Construction**

Boreholes were advanced utilizing 15 cm diameter solid stem continuous flight augers using a truck or track mounted drilling rig. Upon completion of drilling, 50 mm diameter PVC monitoring wells (MWs) with machine slotted screen, void of glues and solvents, were installed in the boreholes to provide access for future monitoring of subsurface conditions and groundwater sampling. Monitoring wells were installed with a screened section to intercept the water table and completed to approximately one metre above ground surface with a solid PVC riser. The annulus surrounding the screened portion of each monitoring well was backfilled with clean silica sand, to approximately 0.50 m above the screen openings. The remainder of the borehole was backfilled with bentonite chips to create a seal and restrict the infiltration of surface water. A lockable steel, above-grade well protector was installed at each monitoring well location and placed in bentonite, sand and concrete to protect the installation and allow future access.

### **Groundwater Monitoring and Sampling**

Monitoring wells selected for groundwater sampling were developed using bailers to remove fine grained material from around the well screen and allow collection of water samples representative of groundwater in the surrounding formation. Existing monitoring wells were purged of approximately three casing volumes of water or until dry and newly installed monitoring wells were purged of approximately ten casing volumes of water or until dry. The monitoring wells were then allowed to recover to a minimum of 50% prior to sampling. Water samples collected for dissolved metals analyses were field filtered (0.45 µm pore size), acidified, and placed in sterile 250 ml plastic containers. Samples obtained for volatile hydrocarbon analyses were preserved with laboratory prepared acid and transferred to three 40 ml clear glass vials with Teflon™ lined septa and no headspace.

Samples for semi-volatile hydrocarbon analyses were placed into three sterile 250 ml amber glass bottles. Routine chemistry samples were placed into sterile 500 ml laboratory-supplied plastic containers. Purge water generated during well development and groundwater sampling was collected and screened for evidence of visible hydrocarbon accumulations. Purge water collected during the assessment that did not contain any evidence of visible liquid hydrocarbon accumulations and did not historically contain chloride levels exceeding guidelines was discharged onto the ground in a location adjacent to the well from which it was purged. No purge water was discharged into, or adjacent to, any surface water bodies.

### **Field EC Screening of Soil/Water (As Required)**

Soil and/or water samples were field screened for salinity parameters (when required) by measuring bulk electrical conductivity (EC) using a Groline direct soil conductivity meter (Hanna® Instruments) or FieldScout Direct Soil EC Meter (Spectrum® Technologies, Inc.) inserted into the soil or water. The EC probe gives a direct measurement of salts in the soil or water sample.

Soil samples were field tested for chloride and pH. Briefly, approximately 30 g of soil was mixed with 30 ml of distilled water and mixed to disperse lumps. Following a minimum 3 minute incubation, the water was separated from the soil by passing the suspension through a 5 µm nylon syringe filter (Tisch Scientific). The water was tested for chloride concentration using Quantabs (Hach®), and for pH using dip-in indicator strips (EMD) to determine soil salinity parameters.

Water samples were field tested for chloride concentration using Quantabs (Hach®), and for pH using dip-in indicator strips (EMD).

### **Field and Laboratory Quality Assurance/Quality Control**

All Phase II ESAs undertaken by Earthmaster are based on the Canadian Standards Association 'CAN/CSA Z769-00 Phase II Environmental Site Assessment Standard' (2018) and the Alberta Government's *Environmental Site Assessment Standard* (2016).

Solid-stem augers and other sampling equipment were cleaned before on-site project work was initiated. Nitrile gloves were worn when handling soil and changed between sampling events (if impacted soils were suspected) to prevent cross-contamination. During augering activities, if soil from the borehole walls or auger flights fell into the borehole, the loose soil was removed as best as possible prior to advancing augers for retrieval of soil samples. Samples collected from auger flights were shaved to remove smeared or remnant soil to prevent cross-contamination of samples. Field notes were accurately recorded at the time of the assessment.

Soil samples collected for hydrocarbon fractions F2 to F4 analyses were tightly packed into sterile 125 ml glass jars to minimize loss of organic vapours into the headspace. Soil samples collected for hydrocarbon fraction F1, benzene, toluene, ethylbenzene and xylenes, or volatile organic compound analyses were collected with a single use coring tool and immediately placed into a laboratory supplied pre-charged vial containing methanol. Vials were inspected visually to ensure sufficient methanol was present prior to sample addition. Preserved samples were stored upright to minimize losses from leakage. Samples were immediately stored on ice in an insulated



cooler until delivery to the laboratory. All sample containers were sealed, labelled, and documented on a laboratory chain-of-custody (COC) form. All standard COC protocol and sample hold-times were adhered to.

Dedicated bailers were used to collect groundwater samples from each well. Groundwater samples were placed into containers with the required preservatives as provided by the laboratory.

Due to the inherent heterogeneity of soil, duplicate soil samples were not analyzed in the laboratory for quality control management, unless requested by the client. When requested by the client for quality control purposes, one travel blank and/or at least one field duplicate water sample was included for every 10 samples submitted for laboratory analyses. When requested, a duplicate is considered to be a reliable indication of sampling quality if the relative percent difference ( $RPD = (X_1 - X_2) \div X_{avg} \times 100$ ) between the original and its duplicate is less than 50% for analytical results that are at least five times the assay's lower limit of detection. If complete, the RPD of all duplicate samples analyzed was less than 50% unless otherwise discussed in the attached report.

The analytical laboratory which performed the sample analyses was accredited by the Canadian Association for Laboratory Accreditation Inc. and/or the Standard Council of Canada for the individual required assays and met standards for proficiency testing. The laboratory used standard quality control measures, including duplicate sample analyses, spiked controls and blank controls, to ensure the data were as accurate and precise as possible. All laboratory reports were reviewed and approved by the laboratory and by Earthmaster to ensure quality control standards were met.

**AER PROFESSIONAL DECLARATION FORM**

## Professional Declaration for Reclamation Certificate Applications

### Submit one Declaration for each report

- 1 This Declaration is made in conjunction with an application for a reclamation certificate (the "Application") made by  
G. Simmons Trucking Ltd. (Applicant)  
for the following land(s): LSD NE 25-053-17W5M (insert legal description).
- 2 I am a practicing professional member [Registration/member number]  
of the Association of Alberta Forest Management Professionals  
which is a regulated professional organization (the "Professional Organization"). I have a minimum of five years verifiable experience in remediation or reclamation relevant to the Competencies Table contained in the Competencies for Remediation and Reclamation Advisory Committee's Recommendations Report (ESRD 2006).
- 3 As a member of the Professional Organization, I have the ability to sign off on work required for reclamation certificate applications as defined by the Alberta Energy Regulator and am authorized by the Applicant to prepare and submit the attached report or document, (the "Professional Report") listed below.
- 4 To the best of my knowledge and the best of my professional ability, recognizing the standard of care expected of a reasonable professional doing this work, it is my professional opinion that all the information contained in the Professional Report is accurate and complete, and contains all the relevant information for the purposes of this Application.
- 5 The results reported in the Professional Report are consistent with all current and applicable Provincial policy, criteria, standards and guidelines for the remediation or reclamation.
- 6 The Professional Report, including all attachments, data and supplemental information, were prepared by me, or under my direct supervision, or was prepared by a third party(ies) and has been reviewed and accepted by me; and was prepared in accordance with an appropriate quality assurance/quality control system that ensured qualified personnel properly gathered and evaluated all the information contained in and underlying the Professional Reports. All the information submitted is, to the best of my knowledge, true, accurate and complete.
- 7 I carry, or my employer: Earthmaster Environmental Strategies Inc.  
(insert legal name of employer)  
carries professional liability insurance (errors and omissions). This insurance will be maintained for the specified liability period, subject to insurance availability.

8 I am aware that it is an offence under section 227 of the Environmental Protection and Enhancement Act to provide false, misleading or inaccurate information and that there are significant fines for committing these offences, including the possibility of imprisonment. See below for the relevant sections.

Report Title: Phase 2 Environmental Site Assessment – LSD NE 25-053-17W5M.

Date: December 14, 2023

Name: Adam Dunn

Signature:



Note: If you wish to sign the form with an electronic signature you are bound with the same force as though you had a fixed signature on paper.

Registration/Member number:

Section 227 of the Environmental Protection and Enhancement Act

Offences s. 227 A person who

- (a) knowingly provides false or misleading information pursuant to a requirement under this Act to provide information,
- (b) provides false or misleading information pursuant to a requirement under this Act to provide information

is guilty of an offence.

Penalties s. 228(1) A person who commits an offence referred to in section 60, 87, 108(1), 109(1) or 227(a), (d), (f) or (h) is liable to

- (a) in the case of an individual, to a fine or not more than \$100 000 or to imprisonment for a period of not more than 2 years or to both fine and imprisonment, or
- (b) in the case of a corporation, to a fine of not more than \$1 000 000.

(2) A person who commits an offence referred to in section 61, 67, 75, 76, 79, 88, 108(2), 109(2) 110(1) or (2), 111, 112, 137, 148, 149, 155, 157, 163, 169, 170, 173, 176, 188, 191, 192, 209, 227(b), (c), (e), (g), or (i) or 251 is liable.

- (a) in the case of an individual, to a fine or not more than \$50 000, or
- (b) in the case of a corporation, to a fine of not more than \$500 000.