

Manitoba Sustainable Development

Winnipeg Soil Survey Fall 2018

Addendum

Environmental Compliance and Enforcement Branch January 2019

Winnipeg Soil Survey, Fall 2018. Environmental Compliance and Enforcement, Manitoba Sustainable Development, January 2019

Certificates of Analysis from the ALS Environmental

Notes: Correction to Lab Work Order No. L2184284

- Reported sample No. 05-013 was corrected as 05-015
- Reported sample No. 05-015 was corrected as 05-016
- Reported sample No. 06-002 was corrected as 06-008
- Reported sample No. 06-008D was corrected as 06-008D



Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 05-OCT-18 Report Date: 22-NOV-18 10:09 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2176898

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721 ALS CANADA LTD Part of the ALS Group An ALS Limited Company

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L2176898 CONTD.... PAGE 2 of 4 22-NOV-18 10:09 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2176898-1 SOIL 05-OCT-18 10:40 WSC1	L2176898-2 SOIL 05-OCT-18 10:40 WSC1D	L2176898-3 SOIL 05-OCT-18 10:33 WSD1	L2176898-4 SOIL 05-OCT-18 09:40 WSD2	L2176898-5 SOIL 05-OCT-18 10:20 WSE1
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		199	219	375	184	372

L2176898 CONTD.... PAGE 3 of 4 22-NOV-18 10:09 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2176898-6 SOIL 05-OCT-18 09:50 WSE2	L2176898-7 SOIL 05-OCT-18 10:10 WSF1	L2176898-8 SOIL 05-OCT-18 10:00 WSF2	L2176898-9 SOIL 05-OCT-18 11:00 COMPOSITE 1	
Grouping	Analyte						
SOIL							
Metals	Lead (Pb) (mg/kg)		151	342	180	198	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, TI, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on dry weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L217689	8	Report Date: 22	-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cer Winnipeg	nental Operations ntury Street 9 MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS	-WP	Soil							
Batch	R4287630								
WG2906349 Lead (Pb)	9-3 CRM		CANMET TIL	. L-1 105.4		%		70-130	17-OCT-18
WG2906349 Lead (Pb)	9-2 LCS			102.1		%		80-120	17-OCT-18
WG2906349 Lead (Pb)	9-1 MB			<0.20		mg/kg		0.2	17-OCT-18
Batch	R4299872								
WG2911829 Lead (Pb)	9-4 CRM		CANMET TIL	. L-1 112.8		%		70-130	24-OCT-18
WG2911829 Lead (Pb)	9-2 LCS			100.3		%		80-120	24-OCT-18
WG2911829 Lead (Pb))-1 MB			<0.20		mg/kg		0.2	24-OCT-18

Workorder: L2176898

Report Date: 22-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

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hone:	AAC 52 X (Compare Res	ults to Criteria on Report - J	provide details below if	box checked	0817 0850	3 day [P3]	Π		Same	- Dav V	Veekend	or Stat	utory -	_
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Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2176904

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2176904 CONTD.... PAGE 2 of 4 22-NOV-18 10:09 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2176904-1 SOIL 05-OCT-18 09:40 WSA5	L2176904-2 SOIL 05-OCT-18 09:59 WSB5	L2176904-3 SOIL 05-OCT-18 10:13 WSC5	L2176904-4 SOIL 05-OCT-18 10:26 WSA4	L2176904-5 SOIL 05-OCT-18 10:46 WSB4
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		96.3	203	171	201	120

L2176904 CONTD.... PAGE 3 of 4 22-NOV-18 10:09 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2176904-6 SOIL 05-OCT-18 11:00 WSC4	L2176904-7 SOIL 05-OCT-18 11:14 WSC3	L2176904-8 SOIL 05-OCT-18 11:14 WSC3D	
Grouping	Analyte					
SOIL						
SOIL Metals	Lead (Pb) (mg/kg)		225	119	117	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, TI, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

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			Workorder:	L2176904	ŀ	Report Date:	22-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cei Winnipeg	nental Operations ntury Street g MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-W	VP	Soil							
Batch F	R4299872								
WG2911829-4 Lead (Pb)	4 CRM			L -1 112.8		%		70-130	24-OCT-18
WG2911829-2 Lead (Pb)	2 LCS			100.3		%		80-120	24-OCT-18
WG2911829-1 Lead (Pb)	I MB			<0.20		mg/kg		0.2	24-OCT-18

Workorder: L2176904

Report Date: 22-NOV-18

Legend:

Limit DUP	ALS Control Limit (Data Quality Objectives)
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

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Chain of Custody (COC) Request Form L2176904-COFC Canada Toll Free: 1 800 6 Canada Toll Free: 1 800 6 Canada Toll Free: 1 800 6 Canada Toll Free: 1 800 6 Contact: Vonce Hacory Lick Company address below will appear on the freel report Company address below will appear on the freel report Select Report Volt Report Vill Rep												46 s apply								
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REFER TO BACK F	PAGE FOR ALS LOCATIONS AND	SAMPLING IN	FORMATION			WHE	FE - LABORATORY	COPY YELLO	N - CLIE	INT CO	PY									OCTOBER 2015 FRONT

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Certificate of Analysis

Lab Work Order #: L2176912

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Hua Wo Chemistry Laboratory Manager

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L2176912 CONTD.... PAGE 2 of 4 22-NOV-18 10:10 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2176912-1 SOIL 05-OCT-18 09:47 WSA1	L2176912-2 SOIL 05-OCT-18 10:12 WSB1	L2176912-3 SOIL 05-OCT-18 10:31 WSB2	L2176912-4 SOIL 05-OCT-18 10:48 WSC2	L2176912-5 SOIL 05-OCT-18 10:48 WSC2-D
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Lead (Pb) (mg/kg)		271	114	239	189	259

L2176912 CONTD.... PAGE 3 of 4 22-NOV-18 10:10 (MT) Version: FINAL

	Sample ID Description Sampled Date Sampled Time Client ID	L2176912-6 SOIL 05-OCT-18 11:22 WSB3	L2176912-7 SOIL 05-OCT-18 11:32 WSA2	L2176912-8 SOIL 05-OCT-18 11:32 WSA3	
Grouping Analyte					
SOIL					
Grouping Analyte SOIL Metals Lead (Pb) (mg/kg)	183	446	224	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2176912	2	Report Date:	22-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cer Winnipeg	nental Operations ntury Street g MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-W	VP	Soil							
Batch F	R4299872								
WG2911829-4 Lead (Pb)	CRM		CANMET TILI	L -1 112.8		%		70-130	24-OCT-18
WG2911829-2 Lead (Pb)	2 LCS			100.3		%		80-120	24-OCT-18
WG2911829-1 Lead (Pb)	I MB			<0.20		mg/kg		0.2	24-OCT-18

Workorder: L2176912

Report Date: 22-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

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ompany:	Minthe Sistingthe Dersborrent	Select Report Format: XPDF	EXCEL EDD (DIGITAL)		Regular	[R]	Standar	d TAT if rec	eived by 3 p	m - busines	s daγs - n	o surcharge	es apply
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complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy. ter samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 10-OCT-18 Report Date: 22-NOV-18 10:11 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2177910

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2177910 CONTD.... PAGE 2 of 5 22-NOV-18 10:11 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177910-1 SOIL 09-OCT-18 08:58 03-001	L2177910-2 SOIL 09-OCT-18 09:38 03-002	L2177910-3 SOIL 09-OCT-18 10:20 03-003	L2177910-4 SOIL 09-OCT-18 11:44 03-004	L2177910-5 SOIL 09-OCT-18 10:49 03-005
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		98.8	72.5	134	87.4	14.2

L2177910 CONTD.... PAGE 3 of 5 22-NOV-18 10:11 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177910-6 SOIL 09-OCT-18 11:19 03-006	L2177910-7 SOIL 09-OCT-18 14:26 03-007	L2177910-8 SOIL 09-OCT-18 15:03 03-009	L2177910-9 SOIL 09-OCT-18 13:50 03-012	L2177910-10 SOIL 09-OCT-18 14:02 03-013
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		27.9	67.5	29.1	21.6	34.3

L2177910 CONTD.... PAGE 4 of 5 22-NOV-18 10:11 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177910-11 SOIL 09-OCT-18 13:04 03-016	L2177910-12 SOIL 09-OCT-18 14:26 03-007-D		
Grouping	Analyte					
SOIL						
Metals	Lead (Pb) (mg/kg)		43.9	17.0		

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2177910)	Report Date:	22-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cer Winnipeg	nental Operations ntury Street g MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-V	NP	Soil							
Batch	R4294048								
WG2910802- Lead (Pb)	4 CRM		CANMET TILI	1 100.9		%		70-130	22-OCT-18
WG2910802- Lead (Pb)	2 LCS			99.3		%		80-120	22-OCT-18
WG2910802- Lead (Pb)	1 MB			<0.20		mg/kg		0.2	22-OCT-18

Workorder: L2177910

Report Date: 22-NOV-18

Legend:

Limit DUP	ALS Control Limit (Data Quality Objectives)
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 10-OCT-18 Report Date: 22-NOV-18 10:11 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2177911

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2177911 CONTD.... PAGE 2 of 6 22-NOV-18 10:11 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177911-1 SOIL 09-OCT-18 09:20 02-012	L2177911-2 SOIL 09-OCT-18 09:45 02-013	L2177911-3 SOIL 09-OCT-18 10:00 02-015	L2177911-4 SOIL 09-OCT-18 10:30 02-014	L2177911-5 SOIL 09-OCT-18 10:45 02-016
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		96.9	57.4	75.5	17.9	24.9

L2177911 CONTD.... PAGE 3 of 6 22-NOV-18 10:11 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177911-6 SOIL 09-OCT-18 11:00 02-005	L2177911-7 SOIL 09-OCT-18 11:40 02-006	L2177911-8 SOIL 09-OCT-18 11:50 02-004	L2177911-9 SOIL 09-OCT-18 13:00 02-001	L2177911-10 SOIL 09-OCT-18 13:15 02-003
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		34.3	34.4	36.0	26.3	27.1
L2177911 CONTD.... PAGE 4 of 6 22-NOV-18 10:11 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177911-11 SOIL 09-OCT-18 13:15 02-003 D	L2177911-12 SOIL 09-OCT-18 13:20 02-002	L2177911-13 SOIL 09-OCT-18 13:45 02-007	L2177911-14 SOIL 09-OCT-18 14:15 02-008	L2177911-15 SOIL 09-OCT-18 14:30 02-009
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		24.4	56.7	17.8	26.6	70.4

L2177911 CONTD.... PAGE 5 of 6 22-NOV-18 10:11 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177911-16 SOIL 09-OCT-18 13:45 02-017	L2177911-17 SOIL 02-018		
Grouping	Analyte					
SOIL						
Metals	Lead (Pb) (mg/kg)		110	25.4		

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2177911	I	Report Date	e: 22-NOV-18	Pag	e 1 of 2
Client:	Environm 1007 Cen Winnipeg YVONNE	ental Operations htury Street MB R3H 0W4 HAWRYI IUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-W	/P	Soil							-
Batch F	R4311589								
WG2918216-4	CRM		CANMET TILL	-1					
Lead (Pb)				106.3		%		70-130	31-OCT-18
WG2918216-2 Lead (Pb)	LCS			97.7		%		80-120	31-OCT-18
WG2918216-1 Lead (Pb)	MB			<0.20		mg/kg		0.2	31-OCT-18
Batch F	R4313464								
WG2920638-1 Lead (Pb)	0 CRM		CANMET TILL	-1 103.3		%		70-130	01-NOV-18
WG2920638-8 Lead (Pb)	LCS			103.3		%		80-120	01-NOV-18
WG2920638-7 Lead (Pb)	MB			<0.20		mg/kg		0.2	01-NOV-18
Batch F	R4323648								
WG2923180-4 Lead (Pb)	CRM		CANMET TILL	-1 104.1		%		70-130	05-NOV-18
WG2923180-2 Lead (Pb)	LCS			98.9		%		80-120	05-NOV-18
WG2923180-1 Lead (Pb)	MB			<0.20		mg/kg		0.2	05-NOV-18

Workorder: L2177911

Report Date: 22-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (Analytical Paguest Form

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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 10-OCT-18 Report Date: 23-NOV-18 15:18 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2177915

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721 ALS CANADA LTD Part of the ALS Group An ALS Limited Company

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RIGHT SOLUTIONS RIGHT PARTNER

L2177915 CONTD.... PAGE 2 of 4 23-NOV-18 15:18 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177915-1 SOIL 09-OCT-18 13:30 06-011	L2177915-2 SOIL 09-OCT-18 09:40 04-002	L2177915-3 SOIL 09-OCT-18 10:25 04-005	L2177915-4 SOIL 09-OCT-18 09:00 04-010	L2177915-5 SOIL 09-OCT-18 11:45 04-014
Grouping	Analyte						
SOIL							
SOIL Metals	Lead (Pb) (mg/kg)		141	22.9	204	78.3	29.9

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

L2177915 CONTD.... PAGE 3 of 4 23-NOV-18 15:18 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177915-6 SOIL 09-OCT-18 09:45 04-021	L2177915-7 SOIL 09-OCT-18 11:20 04-022		
Grouping	Analyte					
SOIL						
Metals	Lead (Pb) (mg/kg)		99.1	25.4		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Lead (Pb)	DUP-H	L2177915-1, -2, -3, -4, -5, -6, -7

Qualifiers for Individual Parameters Listed:

Qualifier Description

DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on dry weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2177915	5	Report Date:	23-NOV-18	Pa	ge 1 of 2
Client:	Environm 1007 Cer Winnipeg	nental Operations ntury Street g MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-W	VP	Soil							
Batch F	R4355740								
WG2925425-4 Lead (Pb)	4 CRM		CANMET TILI	1 105.9		%		70-130	22-NOV-18
WG2925425-2 Lead (Pb)	2 LCS			97.4		%		80-120	22-NOV-18
WG2925425-1 Lead (Pb)	I MB			<0.20		mg/kg		0.2	22-NOV-18

Workorder: L2177915

Report Date: 23-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



Chain of Custody / Analytical Request Form

COC #

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Report To					0177915-CO	FC			Service Requested (Rush for routine analysis subject to availability)								ity)			
Company:	Sustainable Devel	opment (W1	0410)	i	2171310-00				Re	gular (Standa	rd Tun	naround	d Times	s - Busi	iness Day	/s)			
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Address:	1007 Century Stree	t		Email 1:	yvonne.hawryliu	ik@gov.mb.ca	_		On	nergen	cγ (1-2	Bus. D)ays) - :	100% :	Surchai	rge - Con	tact AL	S to C	onfirm T	AT
	Winnipeg, MB, R3H	1 0W4		Email 2:		· · · ·			O a	me Da	y or W	eekend	Emerg	ency -	Contac	t ALS to	Confirm	n TAT		
Phone:	204-945-5305	CELL # :		Email 3:									A	nalys	sis Re	quest				
Invoice To	Same as Report ?	🗸 Yes	マ No	Client / P	roject Informati	on			Ple	ase ir	idicat	e bel	ow Fil	tered,	Pres	erved	or bot	:h (F,	P, F/P	<u>)</u>
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Chain of Custody / Analytical Request Form

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Address:	1007 Century Stree	et		Email 1:	vvonne.hawryliu	ik@gov.mb.ca			Œ	Otmergency (1-2 Bus, Days) - 100% Surcharge - Contact ALS to Confirm TAT										
	Winnipeg, MB, R3I	1 0W4		Email 2:	<i></i>	· · · · · · · · · · · · · · · · · · ·			Ō	me Day	y or We	eekend	Emerge	ency -	Contac	t ALS to	Confirm	n TAT		·
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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 10-OCT-18 Report Date: 26-NOV-18 07:16 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2177919

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721 ALS CANADA LTD Part of the ALS Group An ALS Limited Company

Environmental 🔊

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

L2177919 CONTD.... PAGE 2 of 4 26-NOV-18 07:16 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177919-1 SOIL 09-OCT-18 09:15 05-001	L2177919-2 SOIL 09-OCT-18 10:25 05-002	L2177919-3 SOIL 09-OCT-18 11:50 05-004	L2177919-4 SOIL 09-OCT-18 13:36 05-011	L2177919-5 SOIL 09-OCT-18 13:45 05-012
Grouping	Analyte						
SOIL							
SOIL Metals	Lead (Pb) (mg/kg)		58.6	30.2	72.1	82.0	91.9

L2177919 CONTD.... PAGE 3 of 4 26-NOV-18 07:16 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177919-6 SOIL 09-OCT-18 14:41 05-014		
Grouping	Analyte				
SOIL					
Metals	Lead (Pb) (mg/kg)		85.8		

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, TI, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on dry weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L217791	9	Report Date:	26-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cer Winnipeg	ental Operations ntury Street MB_R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-V	VP	Soil							
Batch	R4325448								
WG2924284- Lead (Pb)	4 CRM		CANMET TILI	1 107.8		%		70-130	06-NOV-18
WG2924284-2 Lead (Pb)	2 LCS			100.2		%		80-120	06-NOV-18
WG2924284- Lead (Pb)	1 MB			<0.20		mg/kg		0.2	06-NOV-18

Workorder: L2177919

Report Date: 26-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 10-OCT-18 Report Date: 26-NOV-18 07:20 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2177921

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2177921 CONTD.... PAGE 2 of 4 26-NOV-18 07:20 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177921-1 SOIL 09-OCT-18 11:09 01-001	L2177921-2 SOIL 09-OCT-18 12:11 01-002	L2177921-3 SOIL 09-OCT-18 11:41 01-003	L2177921-4 SOIL 09-OCT-18 13:34 01-004	L2177921-5 SOIL 09-OCT-18 14:41 01-005
Grouping	Analyte						
SUIL Matala	Lood (Dh) (ma/ka)						
Metals	Lead (Pb) (mg/kg)		61.7	22.3	45.0	28.0	50.7

L2177921 CONTD.... PAGE 3 of 4 26-NOV-18 07:20 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2177921-6 SOIL 09-OCT-18 14:09 01-006	L2177921-7 SOIL 09-OCT-18 08:57 01-011	L2177921-8 SOIL 09-OCT-18 10:04 01-012	L2177921-9 SOIL 09-OCT-18 09:26 01-015	
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Lead (Pb) (mg/kg)		46.4	19.6	14.5	11.3	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, TI, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on dry weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2177921		Report Date:	26-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cei Winnipeç	nental Operations ntury Street g MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-V	NP	Soil							
Batch	R4308933								
WG2918093-	4 CRM		CANMET TILI	1					
Lead (Pb)				103.7		%		70-130	30-OCT-18
WG2918093- Lead (Pb)	2 LCS			101.8		%		80-120	30-OCT-18
WG2918093- Lead (Pb)	1 MB			<0.20		mg/kg		0.2	30-OCT-18

Workorder: L2177921

Report Date: 26-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 11-OCT-18 Report Date: 23-NOV-18 15:19 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2178855

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2178855 CONTD.... PAGE 2 of 4 23-NOV-18 15:19 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2178855-1 SOIL 10-OCT-18 08:50 01-016	L2178855-2 SOIL 10-OCT-18 09:32 01-018	L2178855-3 SOIL 10-OCT-18 10:00 01-017	L2178855-4 SOIL 10-OCT-18 11:11 01-014	L2178855-5 SOIL 10-OCT-18 11:39 01-013
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		32.4	105	37.9	33.1	43.2

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

L2178855 CONTD.... PAGE 3 of 4 23-NOV-18 15:19 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2178855-6 SOIL 10-OCT-18 12:12 01-010	L2178855-7 SOIL 10-OCT-18 13:45 01-008	L2178855-8 SOIL 10-OCT-18 14:12 01-009	L2178855-9 SOIL 10-OCT-18 14:36 01-007	L2178855-10 SOIL 10-OCT-18 08:50 01-016D
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		48.8	24.3	33.5	18.1	26.3

* Please refer to the Reference Information section for an explanation of any qualifiers detected.
Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Lead (Pb)	DUP-H	L2178855-1, -10, -2, -3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier Description

DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on dry weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L217885	5	Report Date:	23-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cer Winnipeg	ental Operations ntury Street MB_R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-V	ΝP	Soil							
Batch	R4355740								
WG2925425-4 Lead (Pb)	4 CRM		CANMET TILI	1 105.9		%		70-130	22-NOV-18
WG2925425-2 Lead (Pb)	2 LCS			97.4		%		80-120	22-NOV-18
WG2925425- Lead (Pb)	1 MB			<0.20		mg/kg		0.2	22-NOV-18

Workorder: L2178855

Report Date: 23-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



Chain of Custody (COC) / Analytical Request Form



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COC Number: 15 - 552843

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Canada Toll Free: 1 800 668 9878

Report To	Contact and company name below will a	appear on the final report	1	Report Format	713150 1000007						<u>F</u>	TATs wit	1 your A	M surc	harges v	vill apply			
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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 11-OCT-18 Report Date: 23-NOV-18 15:19 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2178858

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2178858 CONTD.... PAGE 2 of 4 23-NOV-18 15:19 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2178858-1 SOIL 10-OCT-18 13:55 05-008	L2178858-2 SOIL 10-OCT-18 11:00 05-009	L2178858-3 SOIL 10-OCT-18 10:10 05-010	L2178858-4 SOIL 10-OCT-18 09:07 05-013	L2178858-5 SOIL 10-OCT-18 12:36 05-019
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		19.2	95.0	32.0	53.2	45.6

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

L2178858 CONTD.... PAGE 3 of 4 23-NOV-18 15:19 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2178858-6 SOIL 10-OCT-18 12:36 05-019D		
Grouping	Analyte				
SOIL					
Metals	Lead (Pb) (mg/kg)		52.0		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)		
Duplicate	Lead (Pb)	DUP-H	L2178858-1, -2, -3		

Qualifiers for Individual Parameters Listed:

Qualifier Description

DUP-H Duplicate results outside ALS DQO, due to sample heterogeneity.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

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Laboratory Demitton Code Labo	oratory Location
WP ALS	ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

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			Workorder:	L2178858	3	Report Date: 23-1	NOV-18	Pa	ge 1 of 2
Client:	Environm 1007 Cen Winnipeg	ental Operations htury Street MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-	WP	Soil							
Batch	R4326053								
WG2925574- Lead (Pb)	4 CRM		CANMET TILI	1 100.1		%		70-130	07-NOV-18
WG2925574- Lead (Pb)	2 LCS			98.4		%		80-120	07-NOV-18
WG2925574- Lead (Pb)	·1 MB			<0.20		mg/kg		0.2	07-NOV-18
Batch	R4355740								
WG2925425- Lead (Pb)	4 CRM		CANMET TILI	1 105.9		%		70-130	22-NOV-18
WG2925425- Lead (Pb)	2 LCS			97.4		%		80-120	22-NOV-18
WG2925425- Lead (Pb)	1 MB			<0.20		mg/kg		0.2	22-NOV-18

Workorder: L2178858

Report Date: 23-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

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Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY, By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy. 1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.



Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 11-OCT-18 Report Date: 22-NOV-18 10:12 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2178859

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2178859 CONTD.... PAGE 2 of 4 22-NOV-18 10:12 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2178859-1 SOIL 10-OCT-18 09:00 02-019	L2178859-2 SOIL 10-OCT-18 09:15 02-020	L2178859-3 SOIL 10-OCT-18 09:30 02-010	L2178859-4 SOIL 10-OCT-18 09:45 02-011	L2178859-5 SOIL 10-OCT-18 10:00 06-003
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Lead (Pb) (mg/kg)		14.4	14.2	125	107	102

L2178859 CONTD.... PAGE 3 of 4 22-NOV-18 10:12 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2178859-6 SOIL 10-OCT-18 11:00 06-005	L2178859-7 SOIL 10-OCT-18 11:45 06-004	L2178859-8 SOIL 10-OCT-18 13:30 06-013	L2178859-9 SOIL 10-OCT-18 14:30 06-015	L2178859-10 SOIL 10-OCT-18 09:45 02-011 D
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		21.5	32.9	15.9	33.0	92.7

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**					
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A					

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

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Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2178859)	Report Date:	22-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cei Winnipeg	nental Operations ntury Street g MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-	WP	Soil							
Batch	R4325448								
WG2924284- Lead (Pb)	-4 CRM		CANMET TILI	1 107.8		%		70-130	06-NOV-18
WG2924284- Lead (Pb)	-2 LCS			100.2		%		80-120	06-NOV-18
WG2924284- Lead (Pb)	-1 MB			<0.20		mg/kg		0.2	06-NOV-18

Workorder: L2178859

Report Date: 22-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

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Page ____ of ____

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Report To	· · · · · · · · · · · · · · · · · · ·		L2178859-0			Serv	ice F	eque	ested	(Rush	for ro	utine a	nalysis	subjec	t to ava	ailability	/)
Company:	Sustainable Development (W10410)					Ore	gular (Standa	ard Turr	around	d Times	s - Busir	ness Da	ys)			<u> </u>
Contact:	YVONNE HAWRYLIUK	Excel Digital Fax						2~4 B⊔	siness C)ays) -	50% S	urcharg	e - Con	tact ALS	to Confi	ìrm ĩAT	
Address:	1007 Century Street	Email 1:	yvonne hawryliu	<u>lk@gov.mb.ca</u>		Ormergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT											
	Winnipeg, MB, R3H 0W4	Email 2:				Same Day or Weekend Emergency - Contact ALS to Confirm TAT											
Phone:	204-945-5305 CELL # :	Email 3:								A	nalys	sis Re	quest				
Invoice To	Same as Report ? 🗹 Yes 🗹 No	Client / P	roject Informatio	on		Ple	ase ii	ndica	te belo	w Fil	tered,	Pres	erved	or both	ι (F, Ρ	, F/P)	1
Hardcopy of I	nvoice with Report? Yes No	Job #:	Lead in Soil Sur	vey													4
Company:	Sustainable Development (W10410)	PO / AFE:	:						tion)								
Contact:	· · · ·	LSD:				₹			niza				· ·				
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Lab W (lab	Vork Order # use only)	ALS Contact:	Craig Riddell	Sampled By:		:T-200.2	WP-PB	ecial Re	/grind &								er of Co
Sample #	Sample Identification (This description will appear on the report)		Date Sampled	Time Sampled	Sample Type	(2) ME	(REP)	(14) Sp	(for dry								qunn
i se (seas	02-019		Oct 10-18	9:00	Soil	x	x	x									1
2	02-020	•	Oct 10-18	9:15	Soil	x	x	x									1
3	02-010		Oct 10-18	9:30	Soil	x	X	Х									1
4	02-011		Oct 10-18	9:45	Soil	x	x	x									1
	06-003		Oct 10-18	10:00	Soil	x	x	X							-		1
4	06-005		Oct 10-18	11:00	Soil	X	X	X									1
1	06-004		Oct 10-18	11:45	Soil	X	X	X									1
233 8	06-013		Oct 10-18	13:30	Soil	X	X	X									1
9	06-015		Oct 10-18	14:30	Soil	X	X	X									1
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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 11-OCT-18 Report Date: 22-NOV-18 10:13 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2178862

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2178862 CONTD.... PAGE 2 of 4 22-NOV-18 10:13 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2178862-1 SOIL 10-OCT-18 09:00 03-008	L2178862-2 SOIL 10-OCT-18 09:50 03-010	L2178862-3 SOIL 10-OCT-18 09:15 03-011	L2178862-4 SOIL 10-OCT-18 10:25 03-014	L2178862-5 SOIL 10-OCT-18 11:29 03-015
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		25.6	60.2	141	47.7	25.6

L2178862 CONTD.... PAGE 3 of 4 22-NOV-18 10:13 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2178862-6 SOIL 10-OCT-18 11:02 03-017	L2178862-7 SOIL 10-OCT-18 12:39 06-007	L2178862-8 SOIL 10-OCT-18 13:58 06-016	
Grouping	Analyte					
SOIL						
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		87.6	123	19.8	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, TI, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

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mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

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< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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			Workorder:	L2178862	2	Report Date:	22-NOV-18	Pa	ge 1 of 2
Client:	Environm 1007 Cer Winnipeg	ental Operations ntury Street MB_R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-W	VP	Soil							
Batch F	R4326053								
WG2925574-4 Lead (Pb)	4 CRM		CANMET TILI	1 100.1		%		70-130	07-NOV-18
WG2925574-2 Lead (Pb)	2 LCS			98.4		%		80-120	07-NOV-18
WG2925574-1 Lead (Pb)	I MB			<0.20		mg/kg		0.2	07-NOV-18

Workorder: L2178862

Report Date: 22-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 11-OCT-18 Report Date: 23-NOV-18 15:55 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2178864

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2178864 CONTD.... PAGE 2 of 4 23-NOV-18 15:55 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2178864-1 COMPOSITE 10-OCT-18 09:50 06-009	L2178864-2 COMPOSITE 10-OCT-18 10:50 06-010	L2178864-3 COMPOSITE 10-OCT-18 12:20 04-007	L2178864-4 COMPOSITE 10-OCT-18 12:40 04-011	L2178864-5 COMPOSITE 10-OCT-18 12:55 04-003
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		64.0	119	36.6	136	15.6

L2178864 CONTD.... PAGE 3 of 4 23-NOV-18 15:55 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2178864-6 COMPOSITE 10-OCT-18 13:15 04-016	L2178864-7 COMPOSITE 10-OCT-18 14:30 04-012	L2178864-8 COMPOSITE 10-OCT-18 14:50 04-004	L2178864-9 COMPOSITE 10-OCT-18 12:20 04-007D	
Grouping	Analyte						
SOIL							
Metals	Lead (Pb) (mg/kg)		26.4	216	620	69.3	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

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			Workorder:	L2178864	Ļ	Report Date:	23-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cer Winnipeg	ental Operations ntury Street MB_R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-V	VP	Soil							
Batch F	R4326053								
WG2925574-4 Lead (Pb)	4 CRM		CANMET TILI	1 100.1		%		70-130	07-NOV-18
WG2925574-2 Lead (Pb)	2 LCS			98.4		%		80-120	07-NOV-18
WG2925574-1 Lead (Pb)	I MB			<0.20		mg/kg		0.2	07-NOV-18

Workorder: L2178864

Report Date: 23-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
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MS	Matrix Spike
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IRM	Internal Reference Material
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CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

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Address:	1007 Century Street	Email 1:	yvonne	<u>. hawryliu</u>	ik@gov.mb.ca			<u>O</u> ∎	Emergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT										
	Winnipeg, MB, R3H 0W4	Email 2:						 ○₁	me Da	y or W	eekend	Emerge	ncy - (Contact A	LS to Co	nfirm TA	ر آ		
Phone:	204-945-5305 CELL #	Email 3:	Email 3:									Ar	nalys	is Req	uest				
Invoice To	Same as Report ? 🗹 Yes 🖓 No	Client / P	Client / Project Information						Please indicate below Filtered, Preserved or both (F, P, F/P)										
Hardcopy of	Invoice with Report? Yes No	Job #:	Lead ir	n Soil Sur	vey														
Company:	Sustainable Development (W10410)	PO / AFE	:				•]		(uoj						1		
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Lab \	Work Order # b use only)	ALS Contact:	Craig F	Riddell	Sampled By:			T-200.2	MP-PB-	scial Req	grind & h								ir of Cor
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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 11-OCT-18 Report Date: 26-NOV-18 07:21 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2179792

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2179792 CONTD.... PAGE 2 of 5 26-NOV-18 07:21 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2179792-1 COMPOSITE 11-OCT-18 09:20 04-015	L2179792-2 COMPOSITE 11-OCT-18 09:45 04-008	L2179792-3 COMPOSITE 11-OCT-18 10:30 04-018	L2179792-4 COMPOSITE 11-OCT-18 11:00 04-013	L2179792-5 COMPOSITE 11-OCT-18 12:25 04-001
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		210	94.5	150	400	53.2

L2179792 CONTD.... PAGE 3 of 5 26-NOV-18 07:21 (MT) Version: FINAL

Crouming	Angluto	Sample ID Description Sampled Date Sampled Time Client ID	L2179792-6 COMPOSITE 11-OCT-18 12:45 04-009	L2179792-7 COMPOSITE 11-OCT-18 13:00 04-020	L2179792-8 COMPOSITE 11-OCT-18 13:20 04-017	L2179792-9 COMPOSITE 11-OCT-18 13:40 04-019	L2179792-10 COMPOSITE 11-OCT-18 13:40 04-019D
	Analyte						
Motolo	Lood (Ph) (ma/ka)						
Metals	Lead (Pb) (mg/kg)		99.1	278	236	755	885

L2179792 CONTD.... PAGE 4 of 5 26-NOV-18 07:21 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2179792-11 COMPOSITE 11-OCT-18 13:40 04-018D		
Grouping	Analyte				
SOIL					
Metals	Lead (Pb) (mg/kg)		168		
<u> </u>					
Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2179792	2	Report Date:	26-NOV-18	Pa	ge 1 of 2
Client:	Environm 1007 Cer Winnipeg	nental Operations ntury Street g MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-V	WP	Soil							
Batch	R4340015								
WG2930599-	4 CRM		CANMET TILI	1		04			
Lead (Pb)				101.1		%		70-130	15-NOV-18
WG2930599-2 Lead (Pb)	2 LCS			97.7		%		80-120	15-NOV-18
WG2930599- Lead (Pb)	1 MB			<0.20		mg/kg		0.2	15-NOV-18

Workorder: L2179792

Report Date: 26-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



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Hardcopy of Invoice with Report?	No Job #:	Lead in	Soil Sur	vey										<u>.</u>			
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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 12-OCT-18 Report Date: 22-NOV-18 10:13 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2179801

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2179801 CONTD.... PAGE 2 of 3 22-NOV-18 10:13 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2179801-1 SOIL 11-OCT-18 09:03 06-018	L2179801-2 SOIL 11-OCT-18 10:19 06-028	L2179801-3 SOIL 11-OCT-18 11:25 06-025	L2179801-4 SOIL 11-OCT-18 13:27 06-024	L2179801-5 SOIL 11-OCT-18 11:25 06-025-D
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		53.0	56.6	39.2	136	36.1

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, TI, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

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The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2179801		Report Date:	22-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cei Winnipeg	nental Operations ntury Street g MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-\	NP	Soil							
Batch	R4328669								
WG2927273-	4 CRM		CANMET TILI	1		<u>.</u>			
Lead (Pb)				103.1		%		70-130	09-NOV-18
WG2927273- Lead (Pb)	2 LCS			98.6		%		80-120	09-NOV-18
WG2927273- Lead (Pb)	1 MB			<0.20		mg/kg		0.2	09-NOV-18

Workorder: L2179801

Report Date: 22-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 11-OCT-18 Report Date: 22-NOV-18 10:14 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2179809

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2179809 CONTD.... PAGE 2 of 3 22-NOV-18 10:14 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2179809-1 SOIL 11-OCT-18 09:00 06-02	L2179809-2 SOIL 11-OCT-18 10:16 06-21	L2179809-3 SOIL 11-OCT-18 10:16 06-21D	L2179809-4 SOIL 11-OCT-18 11:16 06-22	L2179809-5 SOIL 11-OCT-18 12:23 06-23
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		48.1	22.7	26.6	54.4	83.1

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
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Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

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WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

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Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2179809)	Report Date:	22-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cer Winnipeg	nental Operations ntury Street g MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-V	VP	Soil							
Batch	R4328669								
WG2927273- Lead (Pb)	4 CRM		CANMET TILI	1 103.1		%		70-130	09-NOV-18
WG2927273-2	2 LCS								
Lead (Pb)				98.6		%		80-120	09-NOV-18
WG2927273- Lead (Pb)	1 MB			<0.20		mg/kg		0.2	09-NOV-18

Workorder: L2179809

Report Date: 22-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



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Report To		Repu		ww		Serv	/ice F	Reque	sted	(Rush	for routin	e analy	sis sub	oject to	availa	bility)
Company:	Sustainable Development (W10410)	Standard	Other			Regular (Standard Turnaround Times - Business Days)										
Contact:	YVONNE HAWRYLIUK	PDF	✓Excel	Digital	Fax	(Or	iority (2-4 Bu	siness D	ays) - 5	0% Surch	arge - C	Contact /	ALS to (Jonfirm	TAT
Address:	1007 Century Street	Email 1:	vvonne.hawryliu	uk@gov.mb.ca		Otmergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT										
	Winnipeg, MB, R3H 0W4	Email 2:				Same Day or Weekend Emergency - Contact ALS to Confirm TAT										
Phone:	204-945-5305 CELL # :	Email 3:				Analysis Request										
Invoice To	Same as Report ? 🗹 Yes 🗹 No	Client / P	roject Informati	on	<u>.</u>	Ple	ase i	ndica	te bek	w Filt	ered, Pr	eserve	ed or b	oth (F	, P, F	/P)
Hardcopy of	Invoice with Report? Yes No	Job #:	Lead in Soil Su	rvey		1	T					T				
Company:	Sustainable Development (W10410)	PO / AFE							ŝ							
Contact:		LSD:				1₽			izati							
Address:						17	N	₽	gen			,			·	2
Phone:	Fax:	Quote #:	Q70175			l₿	ន្ត្រ	5	Duc o							tai Lia
Lab V	Work Order # b use only)	ALS Contact:	Craig Riddell	Sampled By:	bsav	T-200.2-	MP-PB-	ecial Req	grind & h							r of Con
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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 11-OCT-18 Report Date: 19-NOV-18 07:00 (MT) Version: FINAL

Client Phone: 204-785-5305

Certificate of Analysis

Lab Work Order #: L2179814

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2179814-1 05-006 Sampled By: MR on 11-OCT-18 @ 10:37 Matrix: SOIL Single Metal in Soil by ICPMS Metals Lead (Pb)	57.4		0.20	mg/kg	22-OCT-18	22-OCT-18	R4294048
L2179814-2 05-017 Sampled By: MR on 11-OCT-18 @ 12:44 Matrix: SOIL Single Metal in Soil by ICPMS Metals Lead (Pb)	81.7		0.20	mg/kg	22-OCT-18	22-OCT-18	R4294048
L2179814-3 05-018 Sampled By: MR on 11-OCT-18 @ 08:57 Matrix: SOIL Single Metal in Soil by ICPMS Metals Lead (Pb)	439		0.20	mg/kg	22-OCT-18	22-OCT-18	R4294048

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200 2-MS-WP	Soil	Matals	EPA 200 2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including AI, Ba, Be, Cr, S, Sr, Ti, TI, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.

mg/kg - milligrams per kilogram based on dry weight of sample

mg/kg wwt - milligrams per kilogram based on wet weight of sample

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight

mg/L - unit of concentration based on volume, parts per million.

< - Less than.

D.L. - The reporting limit.

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2179814	1	Report Date:	19-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cer Winnipeg	ental Operations ntury Street MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-\	WP	Soil							
Batch	R4294048								
WG2910802-	4 CRM		CANMET TILL	1		0 (
Lead (Pb)				100.9		%		70-130	22-OCT-18
WG2910802- Lead (Pb)	2 LCS			99.3		%		80-120	22-OCT-18
WG2910802- Lead (Pb)	1 MB			<0.20		mg/kg		0.2	22-OCT-18

Workorder: L2179814

Report Date: 19-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.



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Contact	YVONNE HAWRYLIUK				Ear	Ö r	iority ()	2-4 Bu	iness D	avs) -	50% S	urchar	ae - Co	ntact Al	LS to Co	nfirm 1		
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	Winnipeg, MB, R3H 0W4	Email 2:	yvonne, nawryne	14(02901-1110-00		ŏ	ime Da	y or W	eekend	Emerg	jency -	Conta	t ALS t	o Confi	rm TAT			
Phone:	204-945-5305 CELL # :	Email 3:				Ť				A	nalys	sis R	eques	st				
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Hardcopy of I	Invoice with Report? Yes No	Job #:	Lead in Soil Su	rvey														
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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 12-OCT-18 Report Date: 22-NOV-18 10:14 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2179985

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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L2179985 CONTD.... PAGE 2 of 3 22-NOV-18 10:14 (MT) Version: FINAL

	:	Sample ID Description Sampled Date Sampled Time Client ID	L2179985-1 SOIL 12-OCT-18 11:00 04-006		
Grouping	Analyte				
SOIL					
Metals	Lead (Pb) (mg/kg)		87.8		

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

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The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

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mg/kg - milligrams per kilogram based on dry weight of sample.

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mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

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UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

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			Workorder:	L2179985	i	Report Date:	22-NOV-18	Pa	ige 1 of 2
Client:	Environm 1007 Cei Winnipeg	nental Operations ntury Street g MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-V	NP	Soil							
Batch	R4328669								
WG2927273-	4 CRM		CANMET TILI	1		0/		70.400	00 101/ 40
				103.1		70		70-130	09-NOV-18
WG2927273-2 Lead (Pb)	2 LCS			98.6		%		80-120	09-NOV-18
WG2927273- Lead (Pb)	1 MB			<0.20		mg/kg		0.2	09-NOV-18

Workorder: L2179985

Report Date: 22-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

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Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

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Drinkin	g Water (DW) Samples ¹ (client use)	Special instructions /	opecity Criteria to (elec	adu on report by clic stronic COC only)	king on the drop-d	Own list below	Frozen	1				SI	F Oher	arvation	15	Yes		No	
Are samples take	n from a Regulated DW System?		····	·····			Ice Par	cks	Π	lce Cu	bes	Πũ	istody	seal int	tact	Yes	H I	No	H I
YES							Cooline	g Initia	ted								-		-
Are samples for h	uman drinking water use?						7 7 7	100	TIAL CO	DLER TER	PERATL	RES:ºC			: FIN		LER TEM	PERATUR	ES °C
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Released by	SHIPMENT RELEASE (client Use)				Date: Time: F Received by:						Dat	e:		<u>ase one</u>	//	ne:			
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REFER TO BACK	PAGE FOR ALS LOCATIONS AND SAMPLING INF	ORMATION		WHI	TE - LABORATORY	COPY YELLO	V CLIEI	NT CO	PΥ				*						OCTOBER 2015 FRONT

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Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the while - report copy. 1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

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Environmental Operations ATTN: YVONNE HAWRYLIUK 1007 Century Street Winnipeg MB R3H OW4 Date Received: 19-OCT-18 Report Date: 22-NOV-18 10:15 (MT) Version: FINAL

Client Phone: 204-945-5305

Certificate of Analysis

Lab Work Order #: L2184284

Project P.O. #: Job Reference: C of C Numbers: Legal Site Desc: Contract#: 5648 (MICROCHEM) LEAD IN SOIL SURVEY

Hua Wo Chemistry Laboratory Manager

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ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721 ALS CANADA LTD Part of the ALS Group An ALS Limited Company

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L2184284 CONTD.... PAGE 2 of 6 22-NOV-18 10:15 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2184284-1 SOIL 19-OCT-18 09:29 06-026	L2184284-2 SOIL 19-OCT-18 10:13 06-030	L2184284-3 SOIL 19-OCT-18 11:08 06-001	L2184284-4 SOIL 19-OCT-18 09:27 06-029	L2184284-5 SOIL 19-OCT-18 10:39 06-002D
Grouping	Analyte						
SUIL	Lood (Dh) (mg/kg)						
Metals	Lead (Pb) (mg/kg)		38.7	59.8	58.9	79.0	19.3

L2184284 CONTD.... PAGE 3 of 6 22-NOV-18 10:15 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2184284-6 SOIL 19-OCT-18 10:39 06-002	L2184284-7 SOIL 19-OCT-18 09:15 05-007	L2184284-8 SOIL 19-OCT-18 09:55 05-013	L2184284-9 SOIL 19-OCT-18 10:44 05-015	L2184284-10 SOIL 19-OCT-18 09:46 06-019
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		18.0	90.3	52.4	55.3	30.4

L2184284 CONTD.... PAGE 4 of 6 22-NOV-18 10:15 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2184284-11 SOIL 19-OCT-18 10:41 06-020	L2184284-12 SOIL 19-OCT-18 11:00 06-027	L2184284-13 SOIL 19-OCT-18 09:15 05-005	L2184284-14 SOIL 19-OCT-18 09:15 05-005D	L2184284-15 SOIL 19-OCT-18 11:47 05-003
Grouping	Analyte						
SOIL							
Grouping SOIL Metals	Analyte Lead (Pb) (mg/kg)		75.1	97.5	86.9	85.0	34.6

L2184284 CONTD.... PAGE 5 of 6 22-NOV-18 10:15 (MT) Version: FINAL

		Sample ID Description Sampled Date Sampled Time Client ID	L2184284-16 SOIL 19-OCT-18 10:36 05-006 (BAG LABELED 06-006)	L2184284-17 SOIL 19-OCT-18 13:12 06-017	L2184284-18 SOIL 19-OCT-18 12:30 06-012	L2184284-19 SOIL 19-OCT-18 09:20 06-014	
Grouping	Analyte						
SOIL							
Metals	Lead (Pb) (mg/kg)		14.6	36.3	15.1	11.5	

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Lead (Pb)	DUP-H	L2184284-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -2,
			-3, -4, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DUP-H	Duplicate results outside ALS DQO, due to sample heterogeneity.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**		
MET-200.2-MS-WP	Soil	Metals	EPA 200.2/6020A		

Soil/sediment is dried, disaggregated, and sieved (2 mm). Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WP	ALS ENVIRONMENTAL - WINNIPEG, MANITOBA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory. UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION. Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



			Workorder:	L2184284	Ļ	Report Date: 2	2-NOV-18	Pa	ge 1 of 2
Client:	Environm 1007 Cen Winnipeg	ental Operations htury Street MB R3H 0W4							
Contact:	YVONNE	HAWRYLIUK							
Test		Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-200.2-MS-	WP	Soil							
Batch	R4340015								
WG2930599- Lead (Pb)	-4 CRM		CANMET TILI	L -1 101.1		%		70-130	15-NOV-18
WG2930599- Lead (Pb)	2 LCS			97.7		%		80-120	15-NOV-18
WG2930599- Lead (Pb)	-1 MB			<0.20		mg/kg		0.2	15-NOV-18
Batch	R4341016								
WG2929475- Lead (Pb)	-4 CRM		CANMET TILI	L -1 105.5		%		70-130	15-NOV-18
WG2929475- Lead (Pb)	-2 LCS			103.3		%		80-120	15-NOV-18
WG2929475- Lead (Pb)	-1 MB			<0.20		mg/kg		0.2	15-NOV-18

Workorder: L2184284

Report Date: 22-NOV-18

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.
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Report To		Repc	SELECTION COLORIS			Serv	ice R	leque	ested	(Rush f	or rout	tine ar	nalysis	subject	to avail	ability)	,				
Company:	Sustainable Development (W10410)	⊡Sta	Sta L2184284-001 (Standard Turnaround Times - Business Days)										5)	·							
Contact:	YVONNE HAWRYLIUK	PDF		Oriority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm TAT																	
Address:	1007 Century Street	Email 1:	Email 1: yvonne.hawryliuk@gov.mb.ca						Ormergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm TAT												
•••••	Winnipeg, MB, R3H 0W4	Email 2:	Email 2:						Same Day or Weekend Emergency - Contact ALS to Confirm TAT												
Phone:	204-945-5305 CELL # :	Email 3:	Email 3:						Analysis Request												
Invoice To	Same as Report ? Yes	Client / P	Client / Project Information						Please indicate below Filtered, Preserved or both (F, P, F/P)												
Hardcopy of I	nvoice with Report? Yes No	Job #:	Job #: Lead in Soil Survey																		
Company:	Sustainable Development (W10410)	PO / AFE:	PO/AFE:						, Б												
Contact:		LSD:	LSD:						izati												
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	05-005D		19-Oct-18	9:15	Soil	x	x	x							+		1				
	05-003		19-Oct-18	11:47	Soil	x	x	x									1				
	05-006 * bac labelled 96-006 *	•	19-Oct-18	10:36	Soil	X	x	x									1				
	06-017	<u> </u>	19-Oct-18	13:12	Soil	X	X	X									1				
	06-012		.19-Oct-18	12:30	Soil	X	X	X									1				
	06-014		19-Oct-18	9:20	Soil	X	X	X									1				
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Report To				F	L2184284-COFC					Service Requested (Rush for routine analysis subject to availability)															
Company:	mpany: Sustainable Development (W10410)											Regular (Standard Turnaround Times - Business Days)													
Contact:	YVONNE HAWRYLIUK					PDF DExcel Digital Fax Priority (2-4 Business Days) - 50% Surcharge - Contact ALS to Confirm								m TAT											
Address: 1007 Century Street					mail 1: yvonne.hawryliuk@gov.mb.ca Ofmergency (1-2 Bus. Days) - 100% Surcharge - Contact ALS to Confirm									im TA'l											
Winnipeg, MB, R3H 0W4						Email 2:						Same Day or Weekend Emergency - Contact ALS to Confirm TAT													
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	06-030				19-Oct-18	10:13	Soil	X	X	Х									1						
2011-107 ≤ 2011-101	06-001			_	19-Oct-18	11:08	Soil	X	X	X								<u> </u>	1						
	06-029				19-Oct-18	9:27	Soil	X	X	X									1						
	06-002D				19-Oct-18	10:39	Soil	X	X	X									1						
	06-002				19-Oct-18	10:39	Soil	X	X	X									1						
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	05-015				19-Oct-18	10:44	Soil	X	X	X									1						
	06-019				19-Oct-18	9:46	Soil	X	X	X									1						
	06-020			19-Oct-18	10:41	Soil	X	X	X									1							
	06-027					• 19-Oct-18	11:00	Soil	X	X	X		:							1					
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