



September 10, 2020
Project No. 20-039-CAI

Via E-mail: paul.fuellbrandt@edmonton.ca
Original Will Remain on File

The City of Edmonton
11004 - 190th Street NW
Edmonton, Alberta
T5S 0G9

ATTN: Mr. Paul Fuellbrandt
RE: 2020 Anti-Icing Soil Sampling Program
Edmonton, Alberta

Dear Mr. Fuellbrandt:

Nichols Environmental (Canada) Ltd. (Nichols) was retained by The City of Edmonton (COE) to complete the 2020 Anti-Icing Soil Sampling Program at a number of locations across Edmonton, Alberta. Figure 1 (attached) depicts the locations of the sampling sites across the Edmonton area.

BACKGROUND

A planning and monitoring program was initiated in 2018 to assess the effects of calcium chloride (CaCl_2), an anti-icing agent, on the soils and vegetation adjacent to treated roadways. In total, eighteen sites across Edmonton were selected and sampled in 2018 and 2019 as part of the assessment program. Twelve sites (S1 through S12) were selected by The City of Edmonton and six sites (SA through SF) were selected by the Urban Development Institute (UDI). Of the eighteen sites, nine used only road salt (sand mixed with sodium chloride), while the other nine were in areas where CaCl_2 was also used. Soil samples were collected from the sites at varying distances from the road shoulder (1.5 m, 3.0 m, and 7.0 m) and depths (10 cm, 20 cm, and 30 cm).

SCOPE OF WORK

The scope of work completed on the Property for the 2020 Anti-Icing Soil Sampling Program was as follows:

- Prepared a site-specific health and safety plan and completed a hazard assessment;
- In May 2020, mobilized to each of the eighteen sampling sites (S1 through S12 and SA through SF), described as follows:
 - S1: 75th Street NW (78th - 79th Avenue NW);
 - S2: Roper Road NW (67th - 70th Street NW);

Nichols Environmental
(Canada) Ltd.

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PHASE I ESA
Historical Review
Due Diligence

PHASE II ESA
Soil & Groundwater
Assessment
Decontamination

REMEDIATION
Engineering Design
Installation
Management
Closure Monitoring

GEOMATICS
Spatial Analysis
Data Visualization
Cartography

SPILL RESPONSE
Regulatory Liaison
Investigation
Remediation

GEOSCIENCES
Civil /Municipal
Foundations
Site Development
Top-of-Bank
Slope Stability
Earthworks Design
Tendering
Construction
Supervision



- ▶ S3: 50th Street NW (44th Avenue NW - Whitemud Drive NW);
 - ▶ S4: Whitemud Drive NW (66th - 76th Street NW);
 - ▶ S5: 99th Street NW (47th - 48th Avenue NW);
 - ▶ S6: 97th Street NW (35th - 37th Avenue NW);
 - ▶ S7: 50th Street SW (4th Avenue SW - Anthony Henday Drive);
 - ▶ S8: 91st Street NW (35th - 39th Avenue NW);
 - ▶ S9: Argyll Road NW (Sherwood Park Freeway - 76th Avenue NW);
 - ▶ S10: 66th Street NW (23rd - 28th Avenue NW);
 - ▶ S11: 17th Street NW (23rd - 28th Avenue NW);
 - ▶ S12: Ellerslie Road SW (Parsons Road SW - 101st Street SW);
 - ▶ SA: Griesbach (Sir Arthur Currie Way west of Gault Boulevard);
 - ▶ SB: 127th Street NW (south of 121st Avenue NW)
 - ▶ SC: Windermere Boulevard (west of Windermere Wynd);
 - ▶ SD: Chappelle Road SW (east of Chappelle Vista SW);
 - ▶ SE: Rabbit Hill Road SW (south of 156th Street SW); and
 - ▶ SF: Rabbit Hill Road SW (south of Ellerslie Road SW).
- Collected a maximum of nine composite soil samples from each site at intervals of 1.5 m, 3.0 m, and 7.0 m from the road shoulder and at depths of 10 cm, 20 cm, and 30 cm;
 - Submitted soil samples for laboratory analysis as follows:
 - ▶ 147 samples for detailed salinity;
 - Photographed each site with an unmanned aerial vehicle (UAV) for vegetation stress and general site condition assessments; and
 - Prepared a report documenting the field observations and the analytical results.

METHODOLOGY

Health and Safety

Prior to completing any field work on the Property, Nichols completed a site-specific health and safety plan and hazard assessment. Included in the health and safety plan were requirements for personal protective equipment (PPE), an emergency contact section for situations where workers may require medical attention, and protocols for working around the public and traffic and for implementing precautionary COVID-19-related health measures including social distancing with contractors/clients and proper sanitizing techniques.

Soil Sampling

Nichols mobilized to the sampling sites from May 25 through 28, 2020 to collect a total of 147 composite samples via a Dutch hand auger. Soil samples were collected at intervals of 1.5 m, 3.0 m, and 7.0 m from the road shoulder and at depths of 10 cm, 20 cm, and 30 cm. Composite samples for each interval were created via samples collected at 0 m, 30 m and 60 m parallel to the roadway across the sampling site. Samples were placed in large disposable sample bags, sealed,



and were kept on ice in a cooler to moderate temperature fluctuations prior to delivery to the laboratory.

The field protocols and quality assurance/quality control (QA/QC) procedures utilized by Nichols were in accordance with standard industry protocols, and all samples were transported under chain of custody protocols. AGAT Laboratories conducted all soil laboratory analyses.

ASSESSMENT GUIDELINES

Regulatory Framework and Land Use Assessment

The analytical results for the Property are presented and discussed in context of the *Alberta Tier 1 and 2 Soil and Groundwater Remediation Guidelines*, as amended up to January 2019 (2019 Alberta Guidelines).

Under these guidelines, three management options are provided: Tier 1, Tier 2, and Exposure Control. Tier 1 guidelines are considered applicable for the majority of the sites in Alberta and are somewhat conservative as they have been developed for protection of the more sensitive land uses. Tier 2 guidelines allow for consideration of site-specific conditions through the modification of Tier 1 guidelines and/or by removing exposure pathways that may not be applicable to the site. The Tier 2 approach still provides the same level of protection to human and ecological receptor pathways as the Tier 1 approach but must be done through the collection of more site-specific data. Exposure Control involves risk management through exposure barriers or administrative controls based on a site-specific risk management approach.

The above remediation criteria may be used as benchmarks to evaluate the need for further investigation, remediation or to guide in the establishment of land-use restrictions.

Based on the location of the sampling sites across the Edmonton area and the dominant grain-size observed, the 2019 Alberta Tier 1 Soil and Groundwater Natural Area Land Use Guidelines for fine-grained soils would be considered applicable.

RESULTS

Vegetation Assessments

A total of 18 sampling sites (S1 through S12 and SA through SF) were assessed during the soil sampling program. A summary for each sampling site location and vegetation assessment is provided in Table 1 (attached), while UAV aerial imagery and select site photographs are presented on Figures 2 through 18.

Based on field observations and the UAV aerial imagery, impacted/stressed vegetation was present at both the road salt and CaCl₂ sites at a comparable rate. Five of the nine road-salt sites and five of the nine CaCl₂ sites were observed to have consistently stressed vegetation greater than 0.3 m from the roadway.



Analytical Data Summary

As part of the investigation, the data sets from the most recent sampling program (May 2020) and historical sampling programs (November 2018 and May 2019) were combined to evaluate data trends for both the road salt and CaCl_2 sites. The data sets for each site group were separated by sampling event, depth interval, and distance interval for both The COE and UDI site groups for all parameters of concern (electrical conductivity [EC], sodium absorption ratio [SAR], calcium, chloride, and sodium) for trend evaluation and comparison.

City of Edmonton Sites (S1 through S12)

A summary of the City of Edmonton sites is provided in Table 2 and on Charts 1 through 3 (attached). Specific comparison tables for each sampling event, depth interval, and distance interval are also provided in Tables A-1 through A-20.

The average EC and SAR on road salt sites were 3.0 decSiemens per metre (dS/m) and 14.3 (respectively), while the average EC and SAR on CaCl_2 sites were 3.6 dS/m and 12.6 (respectively). Overall, both the road salt and CaCl_2 site group averages would be classified as having "Unsuitable" soil condition ratings. However, sites that used CaCl_2 generally reported overall higher average concentrations for each parameter of concern, with the exception of SAR, at most depth and distance intervals. It should also be noted that the concentration deviation at the CaCl_2 sites was found to increase as both depth from surface and distance from the road shoulder increased, suggesting potential increased mobility and/or migration. However, when the concentration averages are compared over the three sampling events (2018, 2019, and 2020), they have remained relatively consistent/comparable over time.

Urban Development Institute Sites (SA through SF)

A summary of the UDI sites is provided in Table 3 and on Charts 4 through 6. Specific comparison tables for each sampling event, depth interval, and distance interval are also provided in Tables A-21 through A-40.

The average EC and SAR on road-salt sites were 1.7 dS/m and 2.6 (respectively), while the average EC and SAR on CaCl_2 sites were 1.5 dS/m and 3.0 (respectively). Overall, both site group averages would be classified as having a "Good" soil condition rating. Sites that used only road salt generally reported overall higher average concentrations for each parameter of concern, with the exception of SAR, at most depth and distance intervals. However, soil conditions and parameter concentrations were generally found to be similar to those of the same sampling interval within the opposite site group over all sampling events and for most depth and distance intervals.

A copy of the final signed soil laboratory report is attached.



LIMITATIONS

In conducting the 2020 Anti-Icing Soil Sampling Program at the site and in rendering our conclusions on the potential presence or level of contamination, Nichols Environmental (Canada) Ltd. gives the benefit of its best judgment based on its experience and in accordance with generally accepted professional standards for this type of investigation. Our conclusions are limited by the following:

- Nichols spent only a limited amount of time on the sampling sites. Thus, any activities conducted on the site following the assessment work that Nichols is not aware of may have an impact on the conclusions and recommendations presented;
- The sampling areas and analyses were limited to the sample locations outlined on Figures 2 through 18 and laboratory analyses were limited to those parameters outlined in the enclosed tables; and
- It was not possible to test for all forms of contamination at each and every location in the study areas. Although site-specific locations were used during testing, it is our opinion that the information obtained is representative of the conditions at the time the assessment was conducted based on Nichols' understanding of the potential contaminants of concern at the time of assessment.

This report is intended to provide information to reduce, but not necessarily eliminate, uncertainty regarding the potential for contamination of a property. This report has been prepared for the exclusive use of The City of Edmonton for the purpose of assessing the current environmental conditions that may be present at the sampling sites. Any uses that a third party makes of this report, or any reliance on or decisions made based on it, are the responsibility of such third parties. Nichols Environmental (Canada) Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The City of Edmonton
2020 Anti-Icing Soil Sampling Program
Sampling Sites S1 - S12 and SA - SF
Edmonton, Alberta
Project No. 20-039-CAI
September 10, 2020
Page 6 of 6



CLOSURE

We trust this meets your current requirements. If you have any questions, please contact our office at 780-484-3377 at your convenience.

Yours truly,
NICHOLS ENVIRONMENTAL (CANADA) LTD.
APEGA PERMIT TO PRACTICE NO. P6730

A handwritten signature in black ink, appearing to read "KJ".

Kyle Jackson, C.E.T.
Senior Project Manager
jackson@nichols.ca

Reviewed by:



Barry Rakewich, P.Ag., EP
General Manager - Environmental
rakewich@nichols.ca

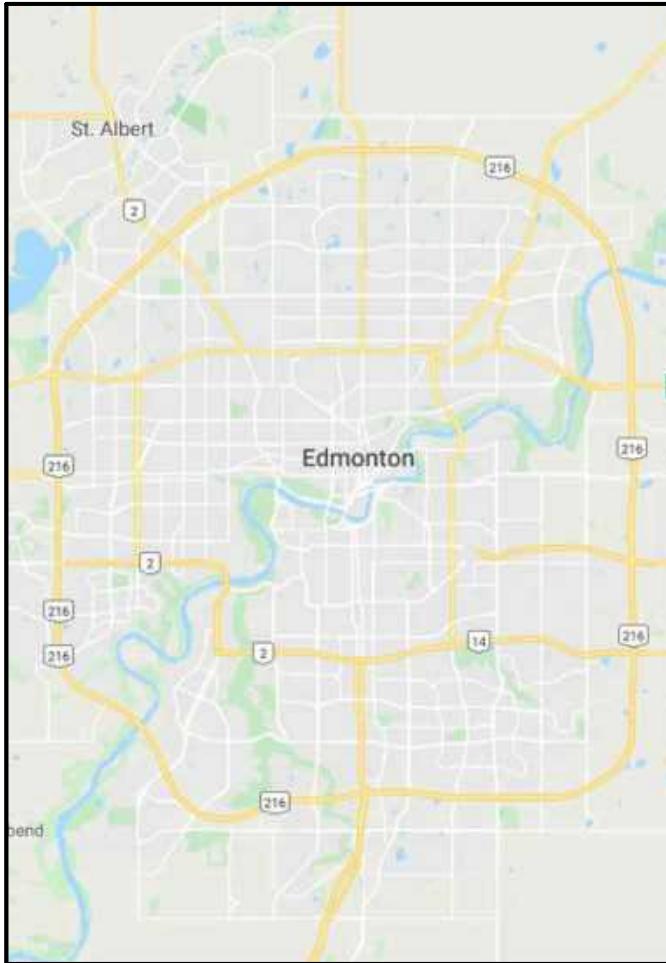
KJ/BR/RWD/kf

Attachments



R.W. (Rob) Dickie, P.Geol., R.E.T.
President
dickie@nichols.ca

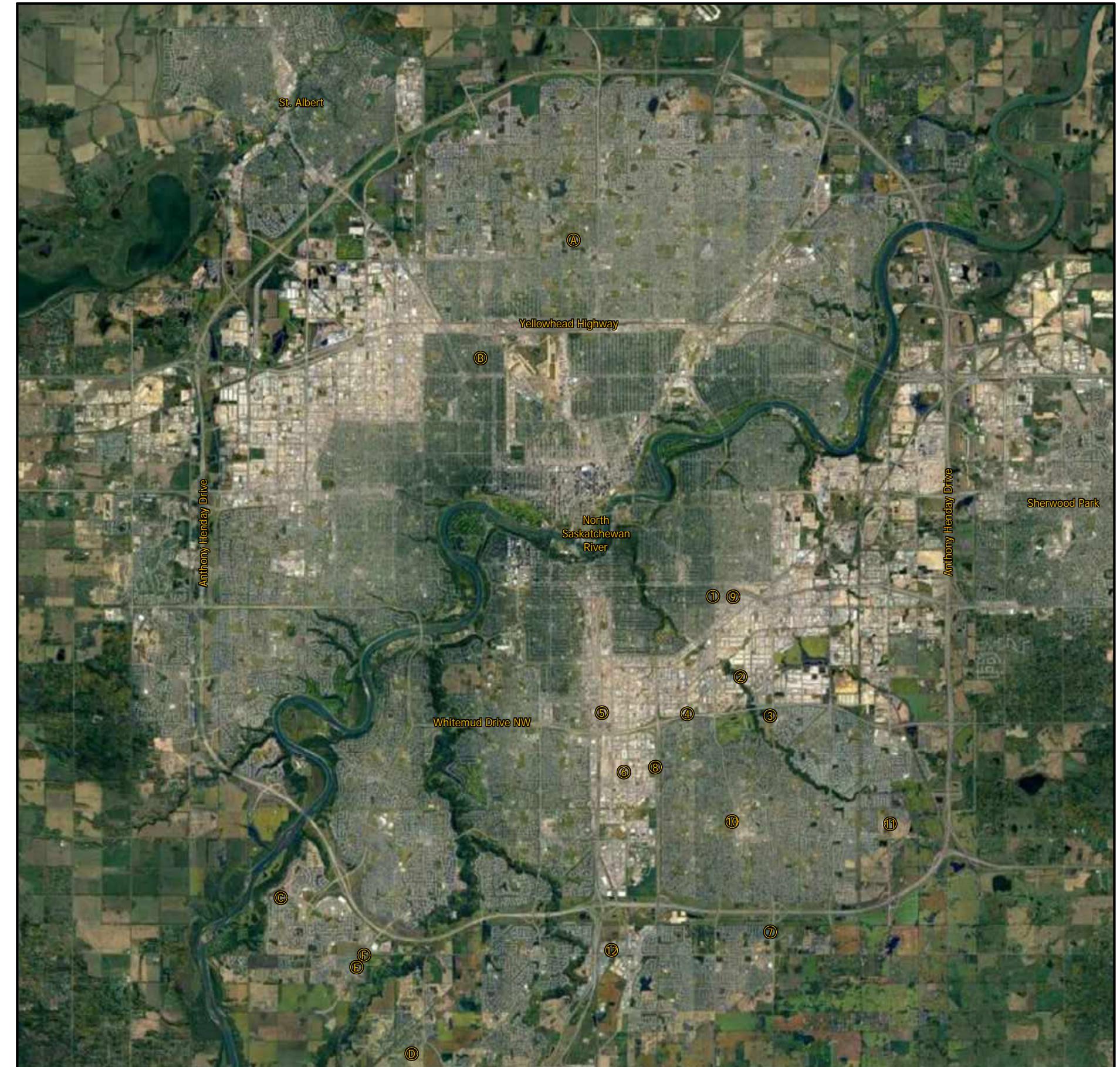
Reference image scale 1:275,000



Original drawing in colour. Black and white copies may not interpret properly.

Legend:

- COE Site Location (S1 through S12)
- UDI Site Location (SA through SF)



2015 Air Photo Source: Google Earth



THE CITY OF
Edmonton

PROJECT
2020 Anti-Icing Soil Sampling Program
Sampling Sites S1 through S12 and
SA through SF
Edmonton, Alberta

DRAWING TITLE
Site Location and
Soil Sampling Sites

BASE/SITE PLAN PROVIDED BY
Nichols Environmental (Canada) Ltd.

REVISION DATE
September 2020

SCALE APPROVED
1:125,000 KH/KJ

PROJECT NO.
20-039-CAI

DRAWING NO.
Figure 1

Legend:

— Approximate Site Location



Site S1: Road salt (sand and sodium chloride)



Photo 1: Looking south toward the site.



Photo 2: Looking north toward the site.

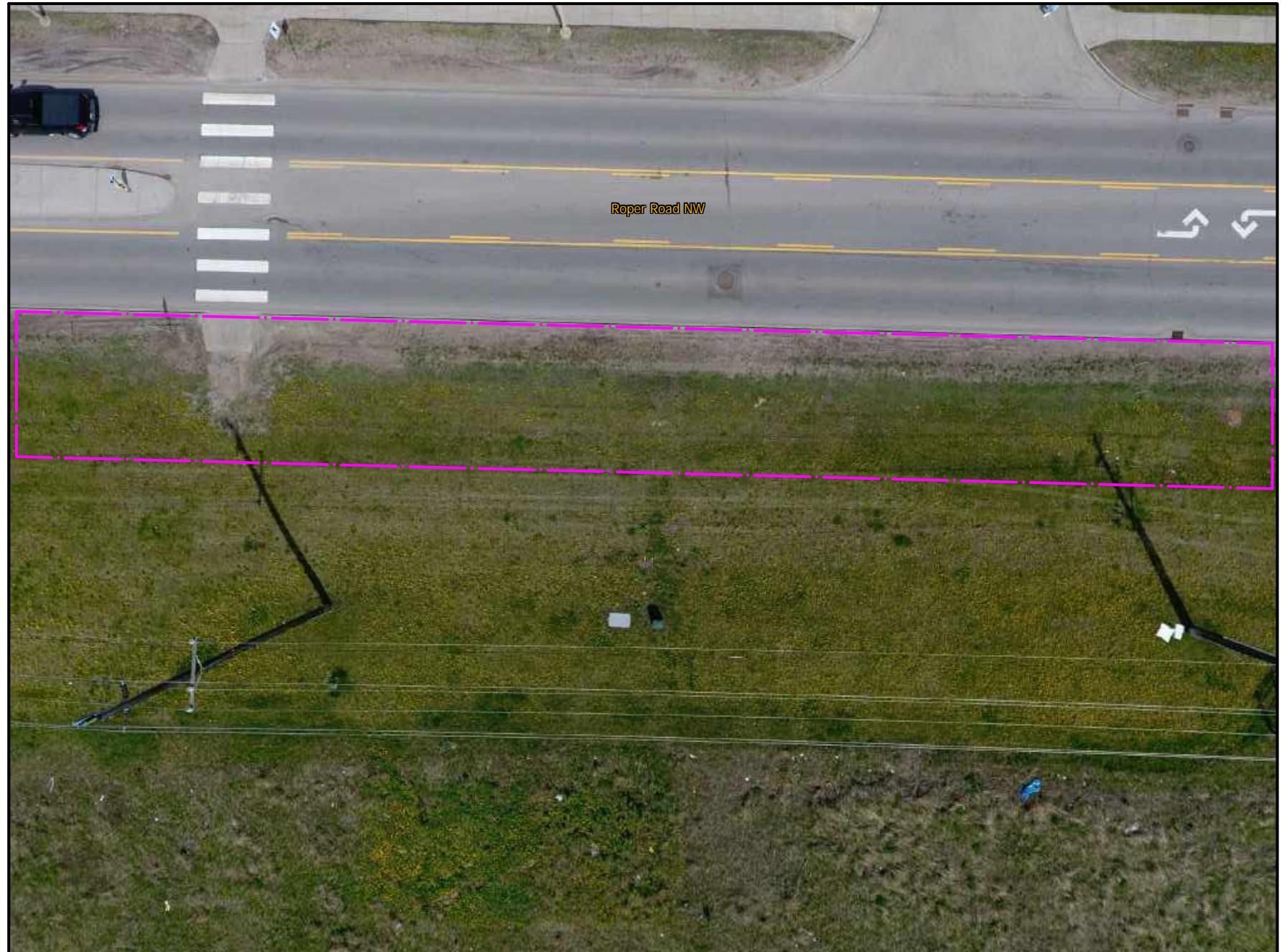


Photo 3: The vegetation immediately adjacent to 75th Street NW.



CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site S1 75th Street NW (78 th - 79 th Avenue NW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 2		

Legend:
— Approximate Site Location



Site S2: Road salt (sand and sodium chloride)



Photo 1: Looking west toward the site.



Photo 2: Looking east toward the site.



Photo 3: The vegetation immediately adjacent to Roper Road NW.

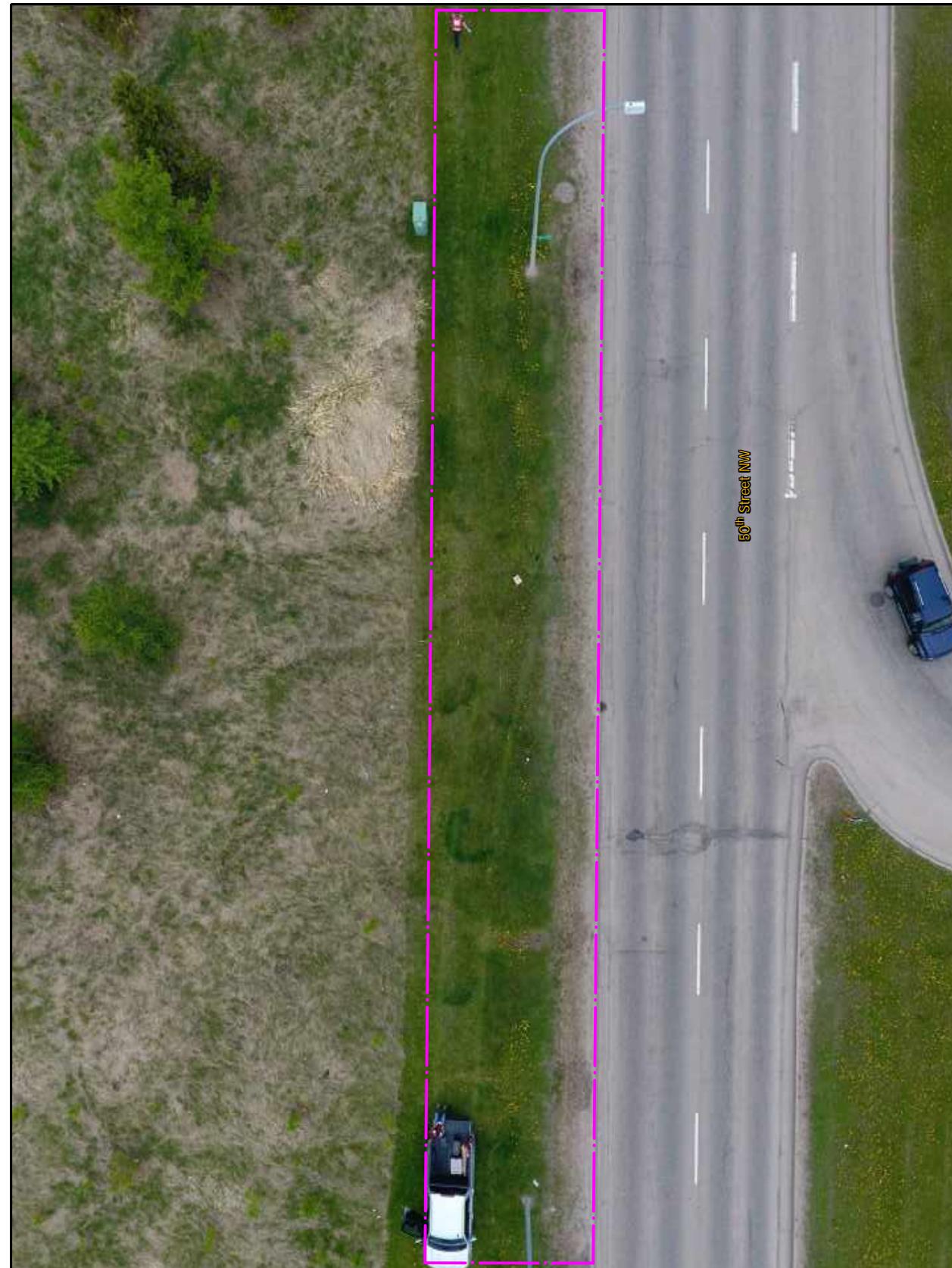


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CLIENT	THE CITY OF Edmonton		
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site S2 Roper Road NW (67 th - 70 th Street NW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 3		

Legend:

— Approximate Site Location



Site S3: Road salt (sand and sodium chloride)



Photo 1: Looking north toward the site.



Photo 2: Looking south toward the site.



Photo 3: The vegetation immediately adjacent to 50th Street NW.



CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site S3 50th Street NW (44th Avenue NW - Whitemud NW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 4		

Legend:
— Approximate Site Location



Site S4: Calcium chloride



Photo 1: Looking east toward the site.



Photo 2: Looking west toward the site.



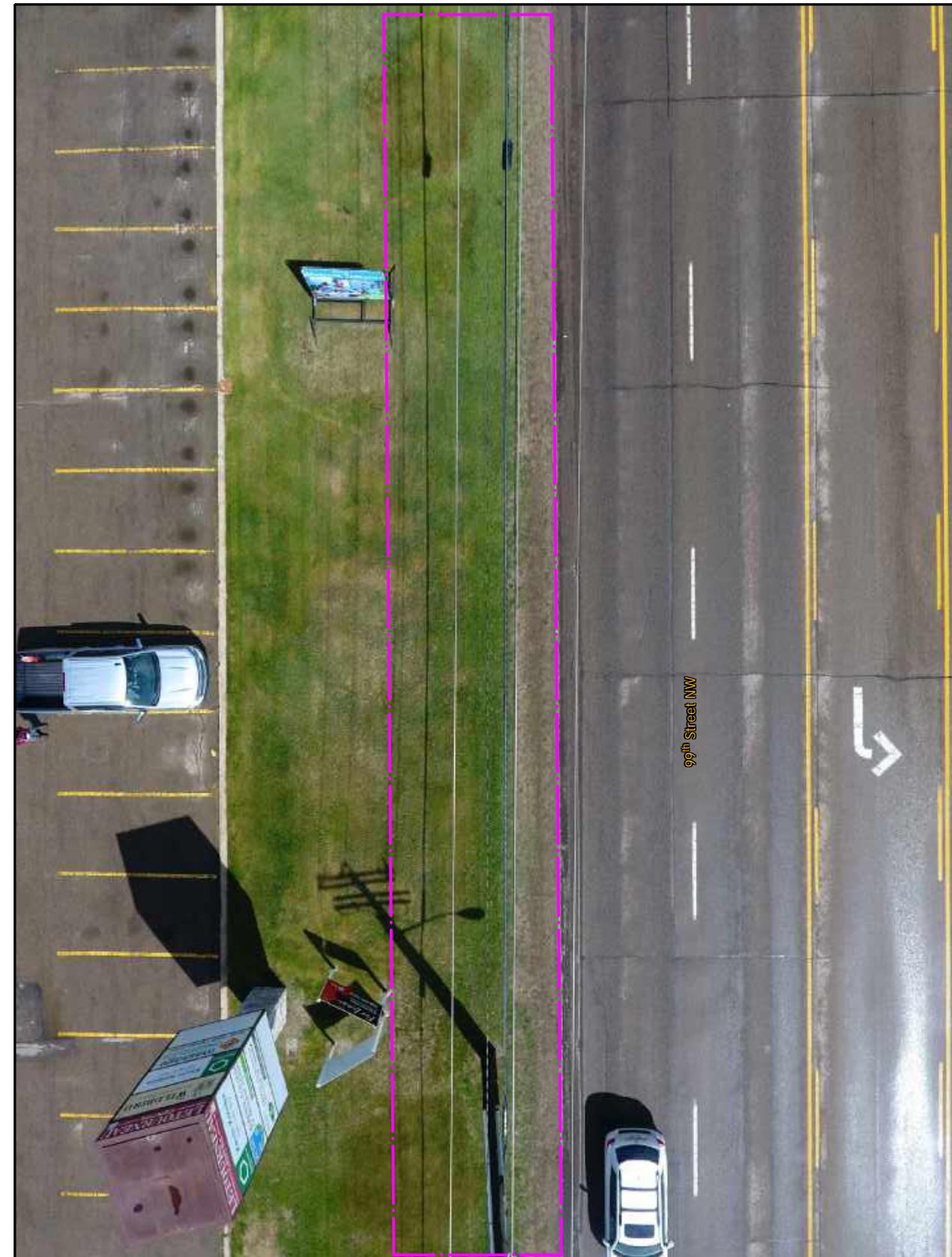
Photo 3: The vegetation immediately adjacent to Whitemud Drive NW.



CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site S4 Whitemud Drive NW (66 th - 76 th Street NW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 5		

Legend:

— Approximate Site Location



Site S5: Calcium chloride



Photo 1: Looking south toward the site.



Photo 2: Looking north toward the site.



Photo 3: The vegetation immediately adjacent to 99thStreet NW.



CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site S5 99 th Street NW (47 th - 48 th Avenue NW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 6		

Legend:

— Approximate Site Location



Site S6: Calcium chloride

97th Street NW



Photo 1: Looking north toward the site.



Photo 2: Looking south toward the site.



Photo 3: The vegetation immediately adjacent to 97th Street NW.

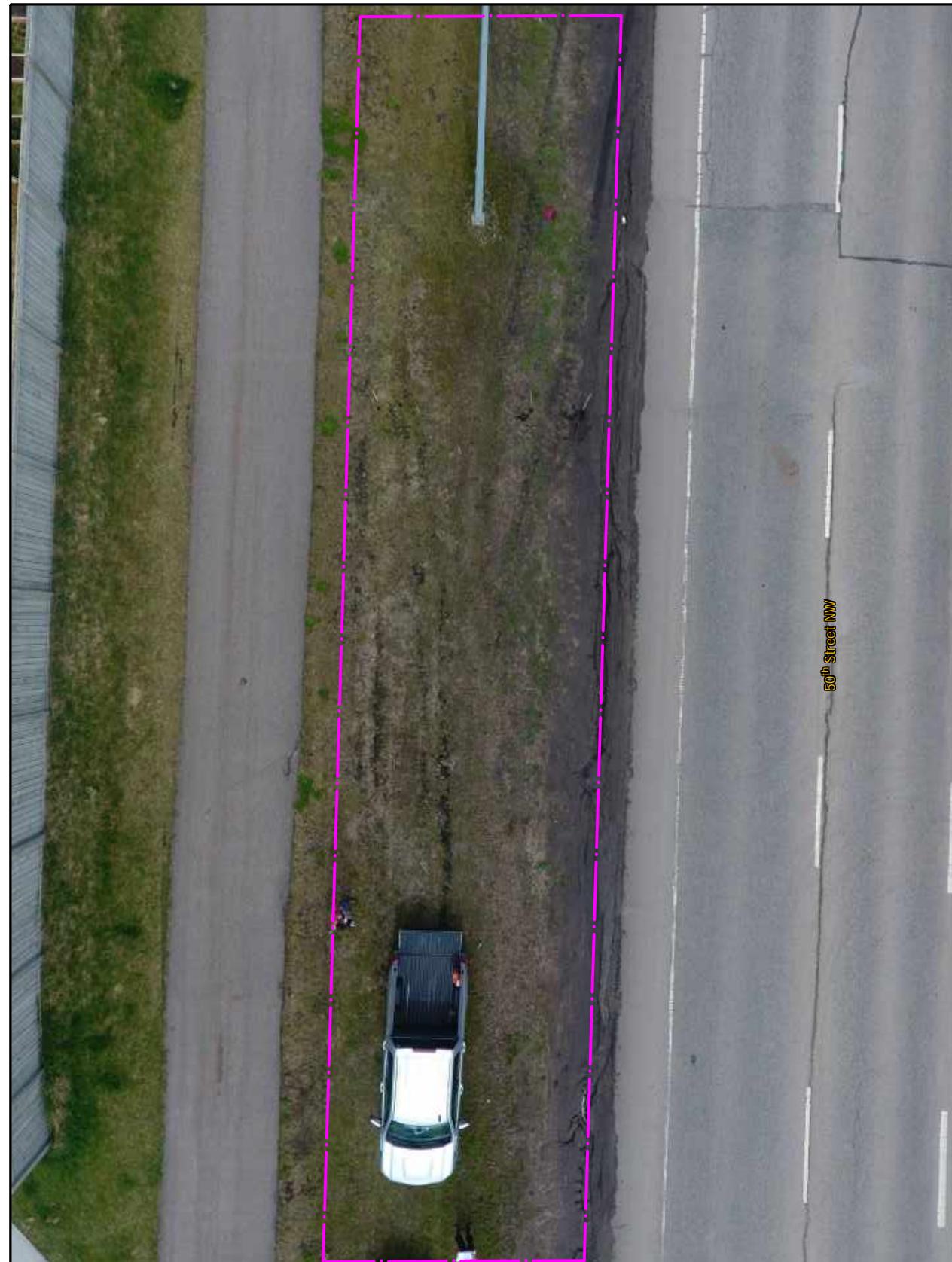


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CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site S6 97 th Street NW (35 th - 37 th Avenue NW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 7		

Legend:

— Approximate Site Location



Site S7: Road salt (sand and sodium chloride)

50th Street NW



Photo 1: Looking south toward the site.



Photo 2: Looking north toward the site.



Photo 3: The vegetation immediately adjacent to 50thStreet NW.



CLIENT

PROJECT
2020 Anti-Icing Soil Sampling Program
Sampling Sites S1 through S12 and
SA through SF
Edmonton, Alberta

DRAWING TITLE
Sampling Site S7
50th Street SW
(4th Avenue SW - Anthony Henday Drive)

BASE/SITE PLAN PROVIDED BY
Nichols Environmental (Canada) Ltd.

REVISION DATE
September 2020

SCALE NTS APPROVED KH/KJ

PROJECT NO. 20-039-CAI

DRAWING NO. Figure 8

Legend:

— Approximate Site Location



Site S8: Calcium chloride



Photo 1: Looking north toward the site.



Photo 2: Looking south toward the site.



Photo 3: The vegetation immediately adjacent to 91st Street NW.



CLIENT
 THE CITY OF Edmonton

PROJECT
2020 Anti-Icing Soil Sampling Program
Sampling Sites S1 through S12 and
SA through SF
Edmonton, Alberta

DRAWING TITLE
Sampling Site S8
91st Street NW
(35th - 39th Street NW)

BASE/SITE PLAN PROVIDED BY
Nichols Environmental (Canada) Ltd.

REVISION DATE
September 2020

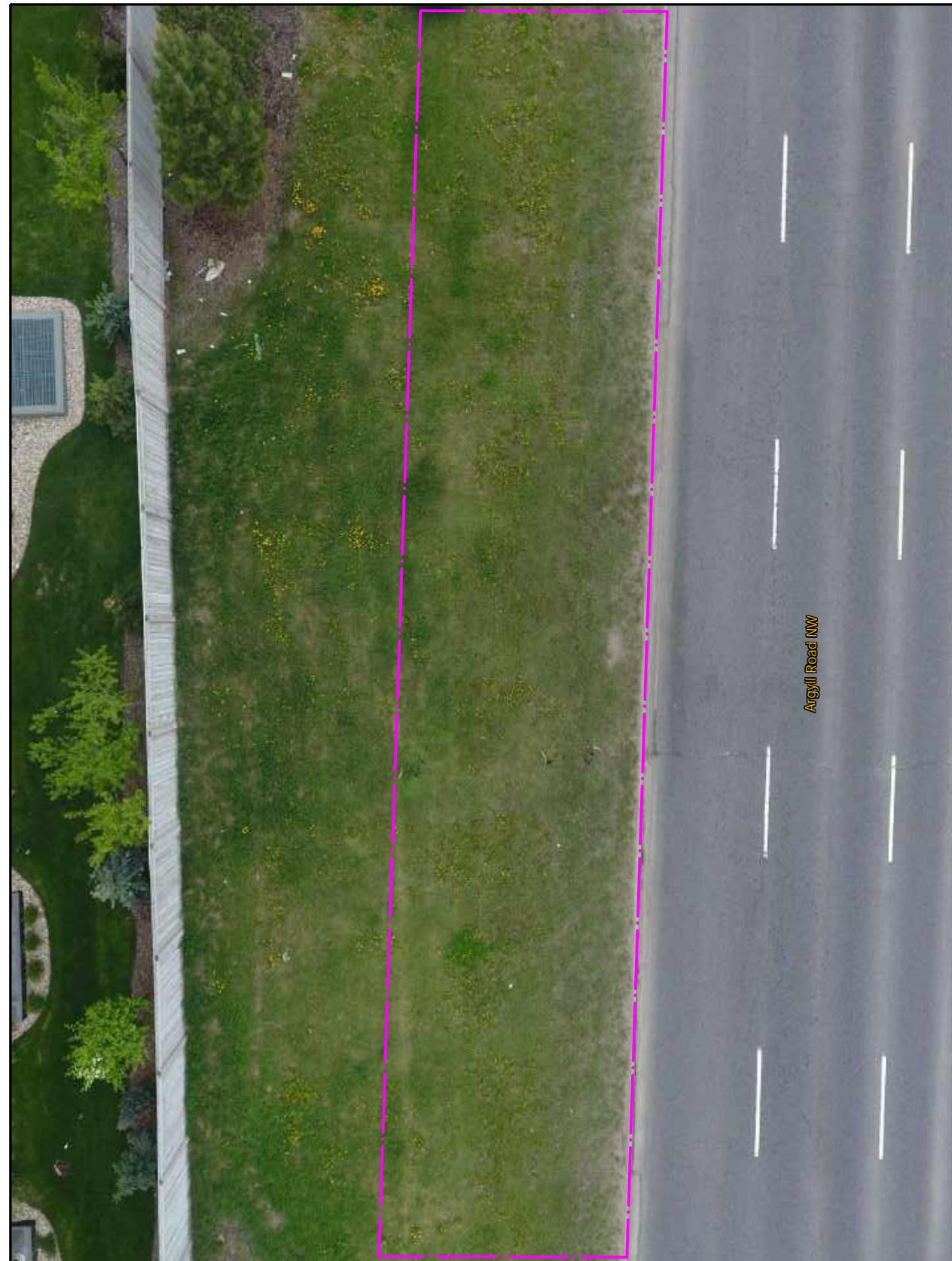
SCALE NTS APPROVED KH/KJ

PROJECT NO.
20-039-CAI

DRAWING NO.
Figure 9

Legend:

— Approximate Site Location



Site S9: Calcium chloride



Photo 1: Looking northeast toward the site.



Photo 2: Looking southwest toward the site.



Photo 3: The vegetation immediately adjacent to Argyll Road NW.



CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site S9 Argyll Road NW (Sherwood Park Freeway - 76 th Avenue NW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 10		

Legend:

— Approximate Site Location



Site S10: Road salt (sand and sodium chloride)



Photo 1: Looking north toward the site.



Photo 2: Looking south toward the site.



Photo 3: The vegetation immediately adjacent to 66th Street NW.



CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site S10 66 th Street NW (23 rd - 28 th Avenue NW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 11		

Legend:

— Approximate Site Location



Photo 1: Looking south toward the site.



Photo 2: Looking north toward the site.



Photo 3: The vegetation immediately adjacent to 17th Street NW.



CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site S11 17 th Street NW (23 rd - 28 th Avenue NW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 12		



Site S12: Road salt (sand and sodium chloride)

Legend:
— Approximate Site Location



Photo 1: Looking west toward the site.



Photo 2: Looking east toward the site.



Photo 3: The vegetation immediately adjacent to Ellerslie Road SW.



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(CANADA) LTD.

CLIENT	THE CITY OF Edmonton	
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta	
DRAWING TITLE	Sampling Site S12 Ellerslie Road SW (Parsons Road SW - 101 st Street SW)	
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.	
REVISION DATE	September 2020	
SCALE	NTS	APPROVED KH/KJ
PROJECT NO.	20-039-CAI	
DRAWING NO.	Figure 13	

Legend:
— Approximate Site Location



Site SA: Calcium chloride



Photo 1: Looking west toward the site.



Photo 2: Looking east toward the site.



Photo 3: The vegetation immediately adjacent to Sir Arthur Currie Way.



CLIENT
THE CITY OF Edmonton

PROJECT
2020 Anti-Icing Soil Sampling Program
Sampling Sites S1 through S12 and
SA through SF
Edmonton, Alberta

DRAWING TITLE
Sampling Site SA
Griesbach (Sir Arthur Currie
Way west of Gault Blvd)

BASE/SITE PLAN PROVIDED BY
Nichols Environmental (Canada) Ltd.

REVISION DATE
September 2020

SCALE NTS APPROVED KH/KJ

PROJECT NO.
20-039-CAI

DRAWING NO.
Figure 14

Legend:

— Approximate Site Location



Site SB: Calcium chloride



Photo 1: Looking north toward the site.



Photo 2: Looking south toward the site.



Photo 3: The vegetation immediately adjacent to 127th Street NW.



CLIENT	 THE CITY OF Edmonton		
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site SB 127 th Street NW (South of 121 st Avenue NW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 15		



Site SC: Road Salt (sand and sodium chloride)



Photo 1: Looking west toward the site.



Photo 2: Looking east toward the site.



Photo 3: The vegetation immediately adjacent to Windermere Boulevard.



CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site SC Windermere Boulevard (West of Windermere Wynd)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 16		



Site SD: Calcium chloride

Legend:

— Approximate Site Location



Photo 1: Looking west toward the site.



Photo 2: Looking east toward the site.



Photo 3: The vegetation immediately adjacent to Chappelle Road SW.



CLIENT	 THE CITY OF Edmonton		
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site SD Chappelle Road SW (East of Chappelle Vista SW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 17		



Site SE: Road salt (sand and sodium chloride)

Legend:
— Approximate Site Location



Photo 1: Looking northeast toward the site.



Photo 2: Looking southwest toward the site.



Photo 3: The vegetation immediately adjacent to Rabbit Hill Road SW.



CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site SE Rabbit Hill Road SW (South of 156 th Street SW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 18		

Legend:

— Approximate Site Location



Site SF: Calcium chloride

Rabbit Hill Road SW



Photo 1: Looking northeast toward the site.



Photo 2: Looking southwest toward the site.



Photo 3: The vegetation immediately adjacent to Rabbit Hill Road SW.



CLIENT			
PROJECT	2020 Anti-Icing Soil Sampling Program Sampling Sites S1 through S12 and SA through SF Edmonton, Alberta		
DRAWING TITLE	Sampling Site SF Rabbit Hill Road SW (South of Ellerslie Road SW)		
BASE/SITE PLAN PROVIDED BY	Nichols Environmental (Canada) Ltd.		
REVISION DATE	September 2020		
SCALE	NTS	APPROVED	KH/KJ
PROJECT NO.	20-039-CAI		
DRAWING NO.	Figure 19		



Nichols Environmental (Canada) Ltd.

TABLE: 1
TITLE: SITE SAMPLING VEGETATION ASSESSMENT
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
SITE: Sampling Sites S1 through S12 and SA through SF
LOCATION: Edmonton, Alberta

Site Name	Sampling Date	Treatment	Street Location	Street Side	Site Centre Coordinates	Sample Distances (1.5, 3.0, 7.0 m)	Depths (0-10, 10-20, 20-30 cm)	Intervals (0, 30, 60 m)	Impacted Vegetation >0.3 m from Roadway	Notes
S1	25-May-20	Sand and salt	75th Street NW (78th - 79th Avenue NW)	West	53° 30' 53" N 113° 26' 35" W	All	All	All	No	Mowed grass, limited impacted vegetation observed at several locations within 1.0 m of roadway.
S2	25-May-20	Sand and salt	Roper Road (67th - 70th Street NW)	South	53° 29' 40" N 113° 25' 53" W	All	All	All	Yes	Mowed grass, impacted vegetation observed up to 1.2 m from roadway. Gravel present at depths ranging from 5-10 cm at all 1.5 and 3.0-m sampling locations.
S3	25-May-20	Sand and salt	50th Street NW (44th Avenue NW - Whitemud Drive)	West	53° 29' 06" N 113° 25' 06" W	All	All	All	Yes	Mowed grass, impacted vegetation observed up to 1.0 - 1.5 m from roadway. Gravel present at depths ranging from 5-10 cm at all 1.5-m sampling locations.
S4	25-May-20	Calcium chloride	Whitemud Drive NW (66th - 76th Street NW)	North	53° 29' 10" N 113° 27' 20" W	All	All	All	Yes	Mowed grass, impacted vegetation observed up to 2.0 m from roadway. Some gravel present up to 3.0 m from roadway. Gravel at depths ranging from 5-10 cm at all 1.5-m sampling locations and 10-15 cm at one 3.0-m sampling interval.
S5	26-May-20	Calcium chloride	99th Street NW (47th - 48th Avenue NW)	West	53° 29' 07" N 113° 29' 11" W	All	All	All	Yes	Mowed grass, impacted vegetation observed up to 1.0 - 1.5 m from roadway. Gravel present at depths up to 5 cm at all 1.5-m sampling locations. Clay encountered at 1.5 and 3.0-m sampling intervals at 30 cm.
S6	26-May-20	Calcium chloride	97th Street NW (35th - 37th Avenue NW)	West	53° 28' 15" N 113° 28' 47" W	All	All	All	No	Mowed grass, limited impacted vegetation observed up to 0.5 - 1.0 m from roadway (patchy). Gravel present at depths ranging from 0-5 cm at all 1.5-m sampling locations.
S7	26-May-20	Sand and salt	50th Street SW (4th Avenue SW - Anthony Henday Drive)	West	53° 28' 50" N 113° 28' 06" W	All	All	All	Yes	Mowed grass, impacted vegetation observed up to 3.5 m from roadway. Gravel present at depths ranging from 0-5 cm at all 1.5-m sampling locations.
S8	26-May-20	Calcium chloride	91st Street NW (35th - 39th Avenue NW)	West	53° 28' 21" N 113° 28' 01" W	All	All	All	Yes	Mowed grass, limited impacted vegetation observed up to 3.5 m from roadway (patchy). Gravel present 2.0-3.0 m from roadway at depths ranging from 10-20 cm. Standing water at 7.0-m sample interval.
S9	27-May-20	Calcium chloride	Argyll Road NW (Sherwood Park Freeway - 76th Avenue NW)	North	53° 30' 52" N 113° 26' 06" W	All	All	All	No	Mowed grass, limited impacted vegetation observed, gravel present at several locations adjacent to roadway.
S10	27-May-20	Sand and salt	66th Street NW (23rd - 28th Avenue NW)	West	53° 27' 27" N 113° 26' 04" W	All	All	All	No	Mowed grass, impacted vegetation observed up to 2.0 m from roadway. Gravel present 2.5-3.5 m from roadway. Walking path present at 7.0-m interval resulting in increased stressed vegetation in the area.
S11	27-May-20	Calcium chloride	17th Street NW (23rd - 28th Avenue NW)	East	53° 27' 28" N 113° 22' 07" W	All	All	All	Yes	Mowed grass, impacted vegetation observed up to 0.5 m from roadway. Gravel present 2.5-3.5 m from roadway. Topsoil only present to 10-15 cm at all sampling locations, and clay encountered thereafter.
S12	27-May-20	Sand and salt	Ellerslie Road SW (Parsons Road SW - 101st Street SW)	North	53° 25' 30" N 113° 29' 12" W	All	All	All	Yes	Mowed grass, impacted vegetation observed up to 3.0 m from roadway. Walking path at 2.0-3.0 m from roadway had almost no vegetation present. Topsoil only present to 20-25 cm at all sampling locations, and clay encountered thereafter.
SA	28-May-20	Calcium chloride	Griesbach (Sir Arthur Currie Way west of Gault Boulevard)	North	53° 36' 17" N 113° 30' 10" W	1.5	All	All	Yes	Mowed grass, impacted vegetation observed up to 0.5 m from roadway (patchy). Topsoil only present to 10-15 cm at 1.5-m interval, and clay encountered thereafter.



Nichols Environmental (Canada) Ltd.

TABLE: 1
TITLE: SITE SAMPLING VEGETATION ASSESSMENT
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
SITE: Sampling Sites S1 through S12 and SA through SF
LOCATION: Edmonton, Alberta

Site Name	Sampling Date	Treatment	Street Location	Street Side	Site Centre Coordinates	Sample Distances (1.5, 3.0, 7.0 m)	Depths (0-10, 10-20, 20-30 cm)	Intervals (0, 30, 60 m)	Impacted Vegetation >0.3 m from Roadway	Notes
SB	28-May-20	Calcium chloride	127th Street NW (south of 121st Avenue NW)	East	53° 34' 29" N 113° 32' 28" W	1.5 and 3.0	All	All	No	Mowed grass, limited impacted vegetation observed up to 1.5 m from roadway (patchy). Gravel present at 3.0-m sample interval at depths ranging from 20-25 cm. Topsoil only present to 10-15 cm at 1.5-m interval, and clay encountered thereafter.
SC	28-May-20	Sand and salt	Windermere (west of Windermere Wynd)	North	53° 26' 23" N 113° 37' 33" W	All	All	All	No	Mowed grass, impacted vegetation observed up to 0.3 m from roadway. Topsoil only present to 20-25 cm at all sampling intervals, and clay encountered thereafter.
SD	27-May-20	Calcium chloride	Chapelle Road SW (east of Chappelle Vista SW)	North	53° 23' 55" N 113° 34' 14" W	1.5 and 7.0	All	All	No	Mowed grass, limited impacted vegetation observed. Topsoil only present to 15-25 cm at all samplings intervals, and clay encountered thereafter.
SE	28-May-20	Sand and salt	Rabbit Hill Road SW (south of 156th Street SW)	West	53° 25' 18" N 113° 35' 33" W	1.5 and 3.0	All	All	No	Mowed grass, impacted vegetation, and trace gravel observed up to 0.3 m from roadway. Topsoil only present to 10-15 cm at 1.5-m interval and 15-20 cm at 3.0-m interval, and clay encountered thereafter.
SF	28-May-20	Sand and salt	Rabbit Hill Road SW (south of Ellerslie Road SW)	West	53° 25' 29" N 113° 35' 26" W	All	All	0 and 30	Yes	Mowed grass, impacted vegetation and gravel observed up to 1.5-2.0 m from roadway. Topsoil only present to 10-20 cm at 1.5 and 3.0-m intervals and 20-25 cm at 7.0-m interval, and clay encountered thereafter.



Nichols Environmental (Canada) Ltd.

TABLE: 2

TITLE: COE SITE SUMMARY

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

SITE: Sampling Sites S1 through S12 and SA through SF

LOCATION: Edmonton, Alberta

All Data - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	0.6	-	6	11	29
MAX	27.8	50.0	-	638	6900	2630
GEOMEAN	2.0	8.9	Poor	53	259	229
AVERAGE	3.0	14.3	Unsuitable	90	559	365
2018 - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	0.6	-	6	11	29
MAX	27.8	50.0	-	638	6900	2630
GEOMEAN	2.1	9.0	Poor	53	269	233
AVERAGE	3.1	14.6	Unsuitable	96	607	379
2019 - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	1.2	-	14	25	35
MAX	7.8	50.0	-	497	1510	1030
GEOMEAN	1.9	8.3	Poor	53	231	212
AVERAGE	2.7	13.2	Unsuitable	80	455	329
2020 - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	0.6	-	9	11	29
MAX	27.8	42.8	-	638	6900	2630
GEOMEAN	2.2	9.6	Poor	49	292	236
AVERAGE	3.6	14.7	Unsuitable	94	725	393
10 cm - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	0.6	-	6	30	30
MAX	27.8	41.0	-	638	6900	2630
GEOMEAN	1.7	7.5	Poor	42	193	169
AVERAGE	2.6	12.9	Unsuitable	69	479	286
20 cm - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	1.6	-	12	12	29
MAX	9.5	50.0	-	325	2010	915
GEOMEAN	1.9	9.3	Poor	47	239	229
AVERAGE	2.6	15.0	Unsuitable	67	507	356
30 cm - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	1.6	-	12	11	38
MAX	9.4	49.0	-	513	1760	1120
GEOMEAN	2.6	9.5	Poor	74	343	293
AVERAGE	3.5	14.6	Unsuitable	134	654	439
1.5 m - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.8	6.7	-	11	32	104
MAX	27.8	50.0	-	638	6900	2630
GEOMEAN	3.4	20.0	Unsuitable	47	651	481
AVERAGE	4.4	23.5	Unsuitable	99	951	583
3.0 m - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.6	3.1	-	6	44	70
MAX	7.4	50.0	-	391	1630	1090
GEOMEAN	2.3	12.3	Unsuitable	47	333	291
AVERAGE	3.0	15.6	Unsuitable	77	526	379
7.0 m - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	0.6	-	16	11	29
MAX	12.1	25.6	-	325	3420	1380
GEOMEAN	1.0	2.7	Good	64	74	81
AVERAGE	1.4	3.4	Good	90	156	111

All Data - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.6	-	7	9	10
MAX	11.6	46.3	-	1290	2870	2050
GEOMEAN	2.9	8.3	Poor	97	321	292
AVERAGE	3.6	12.6	Unsuitable	189	575	435
2018 - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.7	0.6	-	8	19	23
MAX	9.1	38.0	-	1290	2310	2050
GEOMEAN	2.8	7.4	Poor	123	301	310
AVERAGE	3.5	11.5	Poor	235	576	497
2019 - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	0.9	-	10	12	18
MAX	9.3	36.0	-	866	1840	1550
GEOMEAN	3.1	8.0	Poor	113	351	305
AVERAGE	3.7	11.7	Poor	211	570	436
2020 - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	1.3	-	7	9	10
MAX	11.6	46.3	-	660	2870	1330
GEOMEAN	2.8	9.8	Poor	64	303	257
AVERAGE	3.6	14.6	Unsuitable	121	573	370
10 cm - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	0.6	-	7	16	10
MAX	9.0	39.7	-	362	2040	1620
GEOMEAN	2.1	7.9	Poor	58	212	194
AVERAGE	2.6	12.3	Unsuitable	91	392	296
20 cm - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	1.3	-	9	10	20
MAX	11.6	46.3	-	760	2870	1610
GEOMEAN	2.8	8.6	Poor	88	318	290
AVERAGE	3.5	13.2	Unsuitable	163	544	404
30 cm - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	1.1	1.6	-	16	9	87
MAX	9.3	33.0	-	1290	2310	2050
GEOMEAN	4.0	8.5	Poor	173	478	431
AVERAGE	4.7	12.2	Unsuitable	310	780	600
1.5 m - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	1.1	3.4	-	8	47	117
MAX	11.6	46.3	-	509	2870	2050
GEOMEAN	3.8	15.5	Unsuitable	73	596	462
AVERAGE	4.6	18.8	Unsuitable	133	873	610
3.0 m - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.7	1.6	-	7	38	62
MAX	9.3	38.0	-	1180	1800	1550
GEOMEAN	2.8	9.8	Poor	76	348	297
AVERAGE	3.5	12.6	Unsuitable	180	525	400
7.0 m - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.6	-	16	9	10
MAX	6.9	22.2	-	1290	1410	994
GEOMEAN	2.3	3.8	Good	157	155	177
AVERAGE	2.7	6.				



Nichols Environmental (Canada) Ltd.

TABLE: 3

TITLE: UDI SITE SUMMARY

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

All Data - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.4	-	29	3	12
MAX	4.6	12.2	-	595	948	440
GEOMEAN	1.5	1.7	Good	135	105	79
AVERAGE	1.7	2.6	Good	160	206	119
2018 - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	0.4	-	66	3	18
MAX	4.6	6.3	-	506	948	256
GEOMEAN	1.5	1.5	Good	165	90	80
AVERAGE	1.7	2.1	Good	188	197	113
2019 - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.7	0.5	-	91	16	20
MAX	4.0	11.0	-	595	670	440
GEOMEAN	1.7	1.8	Good	166	117	88
AVERAGE	1.9	2.8	Good	190	217	137
2020 - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.5	-	29	7	12
MAX	3.9	12.2	-	234	687	297
GEOMEAN	1.4	2.0	Good	89	111	72
AVERAGE	1.6	2.9	Good	101	203	106
10 cm - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.9	0.4	-	44	3	22
MAX	3.0	12.2	-	289	670	440
GEOMEAN	1.4	2.0	Good	119	104	85
AVERAGE	1.5	3.1	Good	129	178	124
20 cm - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.6	0.5	-	53	14	19
MAX	3.4	9.9	-	388	818	415
GEOMEAN	1.4	1.8	Good	121	105	77
AVERAGE	1.6	2.6	Good	138	206	118
30 cm - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.5	-	29	7	12
MAX	4.6	6.1	-	595	948	430
GEOMEAN	1.7	1.5	Good	170	107	76
AVERAGE	2.1	2.0	Good	213	234	115
1.5 m - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	1.2	0.8	-	44	3	46
MAX	4.6	12.2	-	397	948	440
GEOMEAN	2.1	3.2	Fair	147	202	151
AVERAGE	2.3	4.2	Fair	169	346	188
3.0 m - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.4	-	29	10	12
MAX	3.3	6.3	-	595	450	269
GEOMEAN	1.4	1.6	Good	128	94	72
AVERAGE	1.6	2.2	Good	162	159	103
7.0 m - Road Salt						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.6	0.4	-	53	7	18
MAX	2.1	1.5	-	289	139	78
GEOMEAN	1.1	0.8	Good	127	47	36
AVERAGE	1.2	0.9	Good	142	66	39

All concentrations in mg/kg = ppm, unless noted

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

= Favorable Condition/Concentration

All Data - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.2	-	22	6	8
MAX	3.1	13.0	-	523	716	503
GEOMEAN	1.2	1.7	Good	98	56	65
AVERAGE	1.5	3.0	Good	136	140	113
2018 - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.2	-	42	9	8
MAX	3.1	9.4	-	523	290	255
GEOMEAN	1.0	1.3	Good	101	49	54
AVERAGE	1.2	2.2	Good	146	77	81
2019 - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.5	0.3	-	45	7	11
MAX	3.1	13.0	-	439	716	503
GEOMEAN	1.4	1.8	Good	109	61	74
AVERAGE	1.7	3.3	Good	140	204	138
2020 - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.4	-	22	6	14
MAX	3.0	10.2	-	382	419	335
GEOMEAN	1.2	1.9	Good	81	53	64
AVERAGE	1.6	3.4	Good	116	129	114
10 cm - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.6	0.2	-	39	11	8
MAX	2.8	10.2	-	292	688	382
GEOMEAN	1.3	1.3	Good	110	70	56
AVERAGE	1.4	2.9	Good	130	146	107
20 cm - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.6	-	31	7	18
MAX	3.0	8.0	-	431	709	337
GEOMEAN	1.1	1.7	Good	91	49	62
AVERAGE	1.4	2.6	Good	122	126	98
30 cm - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.9	-	22	6	17
MAX	3.1	13.0	-	523	716	503
GEOMEAN	1.3	2.2	Good	88	44	75
AVERAGE	1.7	3.5	Good	154	137	132
1.5 m - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.4	-	22	8	17
MAX	3.1	13.0	-	523	716	503
GEOMEAN	1.5	1.9	Good	122	77	82
AVERAGE	1.9	3.4	Good	170	176	138
3.0 m - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.7	1.7	-	31	60	67
MAX	1.6	7.8	-	109	279	185
GEOMEAN	1.1	3.5	Good	68	121	112
AVERAGE	1.2	4.1	Fair	75	146	120
7.0 m - CaCl ₂						
	EC	SAR	Rating	Ca	Cl-	Na
MIN	0.4	0.2	-	30	6	8
MAX	0.9	1.9	-	110	20	44
GEOMEAN	0.6	0.7	Good	60	11	20
AVERAGE	0.6	0.9	Good	64	12	2



Nichols Environmental (Canada) Ltd.

TABLE: A-1
TITLE: Soil Analyses - COE Sand&NaCl
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S1-1.5	10	Nov-2018	0.75	6.7	Fair	19.5	32	104
S1-1.5	10	May-2019	0.80	7.1	Fair	20.6	67	113
S1-1.5	10	May-2020	1.56	10.8	Poor	37	271	238
S1-1.5	20	Nov-2018	1.03	10.1	Poor	31.5	158	231
S1-1.5	20	May-2019	0.88	9.1	Poor	24.8	124	175
S1-1.5	20	May-2020	1.25	11.4	Poor	21	185	186
S1-1.5	30	Nov-2018	1.51	13.3	Unsuitable	34.1	320	322
S1-1.5	30	May-2019	1.16	12.1	Unsuitable	20.8	190	204
S1-1.5	30	May-2020	1.38	12.8	Unsuitable	25	410	241
S1-3.0	10	Nov-2018	0.71	3.6	Good	32.6	60	80
S1-3.0	10	May-2019	0.59	3.3	Good	32.7	44	70
S1-3.0	10	May-2020	0.69	3.1	Good	42	82	77
S1-3.0	20	Nov-2018	0.63	5.3	Fair	24	50	105
S1-3.0	20	May-2019	0.66	6.1	Fair	22.8	56	105
S1-3.0	20	May-2020	0.87	6.8	Fair	25	158	126
S1-3.0	30	Nov-2018	0.82	7.4	Fair	25.9	116	151
S1-3.0	30	May-2019	0.95	8.2	Poor	22.8	115	133
S1-3.0	30	May-2020	1.09	8.8	Poor	26	265	164
S1-7.0	10	Nov-2018	0.70	2.7	Good	50.9	70	90
S1-7.0	10	May-2019	0.48	1.4	Good	37.6	41	35
S1-7.0	10	May-2020	0.62	0.9	Good	66	113	35
S1-7.0	20	Nov-2018	0.54	3.5	Good	27	28	74
S1-7.0	20	May-2019	0.47	2.9	Good	24.5	25	54
S1-7.0	20	May-2020	0.53	3.3	Good	29	18	65
S1-7.0	30	Nov-2018	0.67	5.2	Fair	30.5	55	122
S1-7.0	30	May-2019	0.57	4.3	Fair	20.9	35	69
S1-7.0	30	May-2020	0.58	5.4	Fair	18	36	79
S2-1.5	10	Nov-2018	1.74	21.8	Unsuitable	10.5	217	228
S2-1.5	10	May-2019	3.16	28.0	Unsuitable	16	489	322
S2-1.5	10	May-2020	2.43	24.1	Unsuitable	15	379	292
S2-1.5	20	Nov-2018	3.30	37.0	Unsuitable	27	1090	885
S2-1.5	20	May-2019	5.01	36.0	Unsuitable	37	1310	851
S2-1.5	20	May-2020	4.50	37.4	Unsuitable	32	1460	863
S2-1.5	30	Nov-2018	5.04	32.0	Unsuitable	63	1440	1050
S2-1.5	30	May-2019	4.96	31.0	Unsuitable	44	1230	799
S2-1.5	30	May-2020	4.97	26.7	Unsuitable	49	1570	763
S2-3.0	10	Nov-2018	2.36	28.0	Unsuitable	11	341	297
S2-3.0	10	May-2019	2.95	17.0	Unsuitable	36	563	334
S2-3.0	10	May-2020	3.97	29.1	Unsuitable	31	639	529
S2-3.0	20	Nov-2018	4.95	26.0	Unsuitable	82	1330	915
S2-3.0	20	May-2019	4.54	23.0	Unsuitable	68	1130	723
S2-3.0	20	May-2020	4.69	27.2	Unsuitable	50	1140	747
S2-3.0	30	Nov-2018	6.90	19.6	Unsuitable	208	1630	1090
S2-3.0	30	May-2019	6.08	19.6	Unsuitable	139	1370	853
S2-3.0	30	May-2020	5.35	28.8	Unsuitable	60	1510	927
S2-7.0	10	Nov-2018	0.97	3.3	Good	64.8	106	111
S2-7.0	10	May-2019	0.94	4.0	Fair	54.1	131	126
S2-7.0	10	May-2020	0.68	4.0	Good	37	72	99
S2-7.0	20	Nov-2018	1.02	4.1	Fair	51.4	103	116
S2-7.0	20	May-2019	1.04	4.6	Fair	53.9	102	136
S2-7.0	20	May-2020	0.50	5.5	Fair	16	61	86
S2-7.0	30	Nov-2018	1.96	3.8	Good	128	221	164
S2-7.0	30	May-2019	1.97	3.9	Good	125	180	162
S2-7.0	30	May-2020	0.95	4.9	Fair	44	76	127
S3-1.5	10	Nov-2018	2.00	30.0	Unsuitable	11	372	383
S3-1.5	10	May-2019	4.15	38.0	Unsuitable	20	939	585
S3-1.5	10	May-2020	4.13	38.0	Unsuitable	22	844	583
S3-1.5	20	Nov-2018	3.80	45.0	Unsuitable	22	1000	787
S3-1.5	20	May-2019	5.98	50.0	Unsuitable	27	1280	866
S3-1.5	20	May-2020	4.58	38.2	Unsuitable	29	938	699
S3-1.5	30	Nov-2018	6.00	46.0	Unsuitable	37	1530	1030
S3-1.5	30	May-2019	6.81	49.0	Unsuitable	39	1510	1030
S3-1.5	30	May-2020	3.95	37.6	Unsuitable	26	927	702
S3-3.0	10	Nov-2018	2.25	41.0	Unsuitable	5.6	314	259
S3-3.0	10	May-2019	2.00	20.0	Unsuitable	14	299	234
S3-3.0	10	May-2020	2.16	13.0	Unsuitable	9	284	121
S3-3.0	20	Nov-2018	5.01	50.0	Unsuitable	25	1150	866



Nichols Environmental (Canada) Ltd.

TABLE: A-1
TITLE: Soil Analyses - COE Sand&NaCl
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S3-3.0	20	May-2019	3.51	31.0	Unsuitable	24	700	511
S3-3.0	20	May-2020	4.36	36.3	Unsuitable	29	944	657
S3-3.0	30	Nov-2018	5.62	45.0	Unsuitable	41	1530	1090
S3-3.0	30	May-2019	5.33	37.0	Unsuitable	44	971	850
S3-3.0	30	May-2020	4.74	42.8	Unsuitable	27	1120	798
S3-7.0	10	Nov-2018	0.97	3.7	Good	56.1	118	114
S3-7.0	10	May-2019	0.94	3.5	Good	46.3	103	86
S3-7.0	10	May-2020	0.99	3.2	Good	61	62	92
S3-7.0	20	Nov-2018	1.02	2.9	Good	57.7	87	81
S3-7.0	20	May-2019	0.74	3.1	Good	32	74	58
S3-7.0	20	May-2020	0.58	4.9	Fair	20	50	81
S3-7.0	30	Nov-2018	2.74	2.6	Fair	319	171	168
S3-7.0	30	May-2019	0.70	3.3	Good	29.5	80	64
S3-7.0	30	May-2020	0.54	5.4	Fair	18	32	85
S7-1.5	10	Nov-2018	7.52	13.4	Unsuitable	314	1690	818
S7-1.5	10	May-2019	7.13	13.2	Unsuitable	206	1180	564
S7-1.5	10	May-2020	27.80	33.8	Unsuitable	638	6900	2630
S7-1.5	20	Nov-2018	5.87	14.0	Unsuitable	197	1250	679
S7-1.5	20	May-2019	4.11	9.4	Poor	145	804	379
S7-1.5	20	May-2020	9.53	14.9	Unsuitable	229	2010	707
S7-1.5	30	Nov-2018	7.03	8.4	Poor	513	1250	670
S7-1.5	30	May-2019	5.98	8.3	Poor	248	959	404
S7-1.5	30	May-2020	9.42	10.2	Unsuitable	394	1750	649
S7-3.0	10	Nov-2018	2.50	6.1	Fair	139	468	249
S7-3.0	10	May-2019	5.85	13.0	Unsuitable	192	1020	577
S7-3.0	10	May-2020	2.20	6.6	Fair	65	217	174
S7-3.0	20	Nov-2018	2.61	7.9	Fair	94.9	361	253
S7-3.0	20	May-2019	3.85	8.3	Poor	156	672	340
S7-3.0	20	May-2020	5.04	10.5	Poor	131	1130	391
S7-3.0	30	Nov-2018	2.74	6.3	Fair	135	468	254
S7-3.0	30	May-2019	4.69	7.8	Poor	185	737	327
S7-3.0	30	May-2020	5.40	8.0	Poor	180	1150	356
S7-7.0	10	Nov-2018	1.11	1.7	Good	100	119	63
S7-7.0	10	May-2019	0.91	1.8	Good	54.4	81	43
S7-7.0	10	May-2020	12.10	25.6	Unsuitable	238	3420	1380
S7-7.0	20	Nov-2018	2.63	2.1	Fair	325	320	138
S7-7.0	20	May-2019	1.38	2.1	Good	97.1	65	67
S7-7.0	20	May-2020	4.31	6.3	Poor	181	649	274
S7-7.0	30	Nov-2018	3.02	2.5	Fair	290	256	142
S7-7.0	30	May-2019	2.62	1.6	Fair	281	61	90
S7-7.0	30	May-2020	4.23	4.8	Poor	219	234	224
S10-1.5	10	Nov-2018	2.29	37.0	Unsuitable	11	304	364
S10-1.5	10	May-2019	2.35	22.0	Unsuitable	24	335	379
S10-1.5	10	May-2020	3.61	29.6	Unsuitable	20	852	413
S10-1.5	20	Nov-2018	4.22	36.0	Unsuitable	35	868	756
S10-1.5	20	May-2019	2.88	25.0	Unsuitable	32	592	520
S10-1.5	20	May-2020	3.37	27.4	Unsuitable	19	812	393
S10-1.5	30	Nov-2018	4.69	42.0	Unsuitable	38	1500	1120
S10-1.5	30	May-2019	3.30	27.0	Unsuitable	34	856	621
S10-1.5	30	May-2020	3.48	23.9	Unsuitable	33	1100	478
S10-3.0	10	Nov-2018	0.92	7.0	Fair	25.3	81	120
S10-3.0	10	May-2019	1.07	8.9	Poor	27.2	67	160
S10-3.0	10	May-2020	1.73	9.6	Poor	37	141	187
S10-3.0	20	Nov-2018	1.05	12.6	Unsuitable	18.8	105	190
S10-3.0	20	May-2019	1.16	12.4	Unsuitable	20.9	92	200
S10-3.0	20	May-2020	1.33	14.0	Unsuitable	12	163	143
S10-3.0	30	Nov-2018	1.96	18.4	Unsuitable	23.8	293	320
S10-3.0	30	May-2019	1.32	13.9	Unsuitable	21.8	173	253
S10-3.0	30	May-2020	1.39	14.6	Unsuitable	12	130	154
S10-7.0	10	Nov-2018	0.76	1.1	Good	80.6	34	38
S10-7.0	10	May-2019	0.76	1.2	Good	79	30	39
S10-7.0	10	May-2020	1.01	0.6	Good	138	34	30
S10-7.0	20	Nov-2018	0.60	1.7	Good	44.3	32	40
S10-7.0	20	May-2019	0.64	1.9	Good	47.4	36	48
S10-7.0	20	May-2020	0.49	1.7	Good	26	12	29
S10-7.0	30	Nov-2018	0.66	3.0	Good	39.3	61	73
S10-7.0	30	May-2019	0.83	3.0	Good	44.5	84	73



Nichols Environmental (Canada) Ltd.

TABLE: A-1
TITLE: Soil Analyses - COE Sand&NaCl
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S10-7.0	30	May-2020	0.50	2.8	Good	18	11	38
S12-1.5	10	Nov-2018	1.25	8.5	Poor	29.6	110	147
S12-1.5	10	May-2019	3.39	16.0	Unsuitable	56	616	387
S12-1.5	10	May-2020	1.76	17.1	Unsuitable	20	278	250
S12-1.5	20	Nov-2018	2.54	15.0	Unsuitable	50	372	359
S12-1.5	20	May-2019	4.43	16.0	Unsuitable	118	863	614
S12-1.5	20	May-2020	3.95	15.5	Unsuitable	76	936	454
S12-1.5	30	Nov-2018	5.66	9.2	Poor	369	729	581
S12-1.5	30	May-2019	7.79	13.0	Unsuitable	497	1130	1010
S12-1.5	30	May-2020	9.08	11.8	Unsuitable	464	1760	857
S12-3.0	10	Nov-2018	1.11	6.9	Fair	32.9	117	130
S12-3.0	10	May-2019	2.17	8.5	Poor	71	288	241
S12-3.0	10	May-2020	2.11	10.9	Poor	45	277	251
S12-3.0	20	Nov-2018	2.82	10.0	Poor	98.9	345	340
S12-3.0	20	May-2019	2.28	8.5	Poor	89.6	198	279
S12-3.0	20	May-2020	4.63	6.9	Poor	295	378	407
S12-3.0	30	Nov-2018	4.99	7.0	Poor	391	465	454
S12-3.0	30	May-2019	3.09	8.1	Poor	171	262	368
S12-3.0	30	May-2020	7.39	9.9	Poor	383	952	656
S12-7.0	10	Nov-2018	0.74	1.1	Good	79.6	36	36
S12-7.0	10	May-2019	0.82	1.7	Good	62.2	62	47
S12-7.0	10	May-2020	1.02	1.9	Good	78	51	64
S12-7.0	20	Nov-2018	1.20	1.6	Good	109	69	57
S12-7.0	20	May-2019	0.93	2.0	Good	79.6	45	66
S12-7.0	20	May-2020	0.98	2.6	Good	55	61	66
S12-7.0	30	Nov-2018	1.82	1.8	Good	213	144	96
S12-7.0	30	May-2019	1.80	2.0	Good	187	107	100
S12-7.0	30	May-2020	1.90	1.6	Good	187	72	78

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	0.6	6	11	29
MAX	27.8	50.0	638	6900	2630
GEOMEAN	2.0	8.9	53	259	229
AVERAGE	3.0	14.3	90	559	365



Nichols Environmental (Canada) Ltd.

TABLE: A-2
TITLE: Soil Analyses - 2018 Sand&NaCl
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S1-1.5	10	Nov-2018	0.75	6.7	Fair	19.5	32	104
S1-1.5	10	May-2020	1.56	10.8	Poor	37	271	238
S1-1.5	20	Nov-2018	1.03	10.1	Poor	31.5	158	231
S1-1.5	20	May-2020	1.25	11.4	Poor	21	185	186
S1-1.5	30	Nov-2018	1.51	13.3	Unsuitable	34.1	320	322
S1-1.5	30	May-2020	1.38	12.8	Unsuitable	25	410	241
S1-3.0	10	Nov-2018	0.71	3.6	Good	32.6	60	80
S1-3.0	10	May-2020	0.69	3.1	Good	42	82	77
S1-3.0	20	Nov-2018	0.63	5.3	Fair	24	50	105
S1-3.0	20	May-2020	0.87	6.8	Fair	25	158	126
S1-3.0	30	Nov-2018	0.82	7.4	Fair	25.9	116	151
S1-3.0	30	May-2020	1.09	8.8	Poor	26	265	164
S1-7.0	10	Nov-2018	0.70	2.7	Good	50.9	70	90
S1-7.0	10	May-2020	0.62	0.9	Good	66	113	35
S1-7.0	20	Nov-2018	0.54	3.5	Good	27	28	74
S1-7.0	20	May-2020	0.53	3.3	Good	29	18	65
S1-7.0	30	Nov-2018	0.67	5.2	Fair	30.5	55	122
S1-7.0	30	May-2020	0.58	5.4	Fair	18	36	79
S2-1.5	10	Nov-2018	1.74	21.8	Unsuitable	10.5	217	228
S2-1.5	10	May-2020	2.43	24.1	Unsuitable	15	379	292
S2-1.5	20	Nov-2018	3.30	37.0	Unsuitable	27	1090	885
S2-1.5	20	May-2020	4.50	37.4	Unsuitable	32	1460	863
S2-1.5	30	Nov-2018	5.04	32.0	Unsuitable	63	1440	1050
S2-1.5	30	May-2020	4.97	26.7	Unsuitable	49	1570	763
S2-3.0	10	Nov-2018	2.36	28.0	Unsuitable	11	341	297
S2-3.0	10	May-2020	3.97	29.1	Unsuitable	31	639	529
S2-3.0	20	Nov-2018	4.95	26.0	Unsuitable	82	1330	915
S2-3.0	20	May-2020	4.69	27.2	Unsuitable	50	1140	747
S2-3.0	30	Nov-2018	6.90	19.6	Unsuitable	208	1630	1090
S2-3.0	30	May-2020	5.35	28.8	Unsuitable	60	1510	927
S2-7.0	10	Nov-2018	0.97	3.3	Good	64.8	106	111
S2-7.0	10	May-2020	0.68	4.0	Good	37	72	99
S2-7.0	20	Nov-2018	1.02	4.1	Fair	51.4	103	116
S2-7.0	20	May-2020	0.50	5.5	Fair	16	61	86
S2-7.0	30	Nov-2018	1.96	3.8	Good	128	221	164
S2-7.0	30	May-2020	0.95	4.9	Fair	44	76	127
S3-1.5	10	Nov-2018	2.00	30.0	Unsuitable	11	372	383
S3-1.5	10	May-2020	4.13	38.0	Unsuitable	22	844	583
S3-1.5	20	Nov-2018	3.80	45.0	Unsuitable	22	1000	787
S3-1.5	20	May-2020	4.58	38.2	Unsuitable	29	938	699
S3-1.5	30	Nov-2018	6.00	46.0	Unsuitable	37	1530	1030
S3-1.5	30	May-2020	3.95	37.6	Unsuitable	26	927	702
S3-3.0	10	Nov-2018	2.25	41.0	Unsuitable	5.6	314	259
S3-3.0	10	May-2020	2.16	13.0	Unsuitable	9	284	121
S3-3.0	20	Nov-2018	5.01	50.0	Unsuitable	25	1150	866
S3-3.0	20	May-2020	4.36	36.3	Unsuitable	29	944	657
S3-3.0	30	Nov-2018	5.62	45.0	Unsuitable	41	1530	1090
S3-3.0	30	May-2020	4.74	42.8	Unsuitable	27	1120	798
S3-7.0	10	Nov-2018	0.97	3.7	Good	56.1	118	114
S3-7.0	10	May-2020	0.99	3.2	Good	61	62	92
S3-7.0	20	Nov-2018	1.02	2.9	Good	57.7	87	81
S3-7.0	20	May-2020	0.58	4.9	Fair	20	50	81
S3-7.0	30	Nov-2018	2.74	2.6	Fair	319	171	168
S3-7.0	30	May-2020	0.54	5.4	Fair	18	32	85
S7-1.5	10	Nov-2018	7.52	13.4	Unsuitable	314	1690	818
S7-1.5	10	May-2020	27.80	33.8	Unsuitable	638	6900	2630
S7-1.5	20	Nov-2018	5.87	14.0	Unsuitable	197	1250	679
S7-1.5	20	May-2020	9.53	14.9	Unsuitable	229	2010	707
S7-1.5	30	Nov-2018	7.03	8.4	Poor	513	1250	670
S7-1.5	30	May-2020	9.42	10.2	Unsuitable	394	1750	649
S7-3.0	10	Nov-2018	2.50	6.1	Fair	139	468	249
S7-3.0	10	May-2020	2.20	6.6	Fair	65	217	174
S7-3.0	20	Nov-2018	2.61	7.9	Fair	94.9	361	253
S7-3.0	20	May-2020	5.04	10.5	Poor	131	1130	391
S7-3.0	30	Nov-2018	2.74	6.3	Fair	135	468	254
S7-3.0	30	May-2020	5.40	8.0	Poor	180	1150	356
S7-7.0	10	Nov-2018	1.11	1.7	Good	100	119	63
S7-7.0	10	May-2020	12.10	25.6	Unsuitable	238	3420	1380
S7-7.0	20	Nov-2018	2.63	2.1	Fair	325	320	138
S7-7.0	20	May-2020	4.31	6.3	Poor	181	649	274
S7-7.0	30	Nov-2018	3.02	2.5	Fair	290	256	142
S7-7.0	30	May-2020	4.23	4.8	Poor	219	234	224
S10-1.5	10	Nov-2018	2.29	37.0	Unsuitable	11	304	364



Nichols Environmental (Canada) Ltd.

TABLE: A-2

TITLE: Soil Analyses - 2018 Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S10-1.5	10	May-2020	3.61	29.6	Unsuitable	20	852	413
S10-1.5	20	Nov-2018	4.22	36.0	Unsuitable	35	868	756
S10-1.5	20	May-2020	3.37	27.4	Unsuitable	19	812	393
S10-1.5	30	Nov-2018	4.69	42.0	Unsuitable	38	1500	1120
S10-1.5	30	May-2020	3.48	23.9	Unsuitable	33	1100	478
S10-3.0	10	Nov-2018	0.92	7.0	Fair	25.3	81	120
S10-3.0	10	May-2020	1.73	9.6	Poor	37	141	187
S10-3.0	20	Nov-2018	1.05	12.6	Unsuitable	18.8	105	190
S10-3.0	20	May-2020	1.33	14.0	Unsuitable	12	163	143
S10-3.0	30	Nov-2018	1.96	18.4	Unsuitable	23.8	293	320
S10-3.0	30	May-2020	1.39	14.6	Unsuitable	12	130	154
S10-7.0	10	Nov-2018	0.76	1.1	Good	80.6	34	38
S10-7.0	10	May-2020	1.01	0.6	Good	138	34	30
S10-7.0	20	Nov-2018	0.60	1.7	Good	44.3	32	40
S10-7.0	20	May-2020	0.49	1.7	Good	26	12	29
S10-7.0	30	Nov-2018	0.66	3.0	Good	39.3	61	73
S10-7.0	30	May-2020	0.50	2.8	Good	18	11	38
S12-1.5	10	Nov-2018	1.25	8.5	Poor	29.6	110	147
S12-1.5	10	May-2020	1.76	17.1	Unsuitable	20	278	250
S12-1.5	20	Nov-2018	2.54	15.0	Unsuitable	50	372	359
S12-1.5	20	May-2020	3.95	15.5	Unsuitable	76	936	454
S12-1.5	30	Nov-2018	5.66	9.2	Poor	369	729	581
S12-1.5	30	May-2020	9.08	11.8	Unsuitable	464	1760	857
S12-3.0	10	Nov-2018	1.11	6.9	Fair	32.9	117	130
S12-3.0	10	May-2020	2.11	10.9	Poor	45	277	251
S12-3.0	20	Nov-2018	2.82	10.0	Poor	98.9	345	340
S12-3.0	20	May-2020	4.63	6.9	Poor	295	378	407
S12-3.0	30	Nov-2018	4.99	7.0	Poor	391	465	454
S12-3.0	30	May-2020	7.39	9.9	Poor	383	952	656
S12-7.0	10	Nov-2018	0.74	1.1	Good	79.6	36	36
S12-7.0	10	May-2020	1.02	1.9	Good	78	51	64
S12-7.0	20	Nov-2018	1.20	1.6	Good	109	69	57
S12-7.0	20	May-2020	0.98	2.6	Good	55	61	66
S12-7.0	30	Nov-2018	1.82	1.8	Good	213	144	96
S12-7.0	30	May-2020	1.90	1.6	Good	187	72	78

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	0.6	6	11	29
MAX	27.8	50.0	638	6900	2630
GEOMEAN	2.1	9.0	53	269	233
AVERAGE	3.1	14.6	96	607	379



Nichols Environmental (Canada) Ltd.

TABLE: A-3
 TITLE: Soil Analyses - 2019 Sand&NaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S1-1.5	10	May-2019	0.80	7.1	Fair	20.6	67	113
S1-1.5	20	May-2019	0.88	9.1	Poor	24.8	124	175
S1-1.5	30	May-2019	1.16	12.1	Unsuitable	20.8	190	204
S1-3.0	10	May-2019	0.59	3.3	Good	32.7	44	70
S1-3.0	20	May-2019	0.66	6.1	Fair	22.8	56	105
S1-3.0	30	May-2019	0.95	8.2	Poor	22.8	115	133
S1-7.0	10	May-2019	0.48	1.4	Good	37.6	41	35
S1-7.0	20	May-2019	0.47	2.9	Good	24.5	25	54
S1-7.0	30	May-2019	0.57	4.3	Fair	20.9	35	69
S2-1.5	10	May-2019	3.16	28.0	Unsuitable	16	489	322
S2-1.5	20	May-2019	5.01	36.0	Unsuitable	37	1310	851
S2-1.5	30	May-2019	4.96	31.0	Unsuitable	44	1230	799
S2-3.0	10	May-2019	2.95	17.0	Unsuitable	36	563	334
S2-3.0	20	May-2019	4.54	23.0	Unsuitable	68	1130	723
S2-3.0	30	May-2019	6.08	19.6	Unsuitable	139	1370	853
S2-7.0	10	May-2019	0.94	4.0	Fair	54.1	131	126
S2-7.0	20	May-2019	1.04	4.6	Fair	53.9	102	136
S2-7.0	30	May-2019	1.97	3.9	Good	125	180	162
S3-1.5	10	May-2019	4.15	38.0	Unsuitable	20	939	585
S3-1.5	20	May-2019	5.98	50.0	Unsuitable	27	1280	866
S3-1.5	30	May-2019	6.81	49.0	Unsuitable	39	1510	1030
S3-3.0	10	May-2019	2.00	20.0	Unsuitable	14	299	234
S3-3.0	20	May-2019	3.51	31.0	Unsuitable	24	700	511
S3-3.0	30	May-2019	5.33	37.0	Unsuitable	44	971	850
S3-7.0	10	May-2019	0.94	3.5	Good	46.3	103	86
S3-7.0	20	May-2019	0.74	3.1	Good	32	74	58
S3-7.0	30	May-2019	0.70	3.3	Good	29.5	80	64
S7-1.5	10	May-2019	7.13	13.2	Unsuitable	206	1180	564
S7-1.5	20	May-2019	4.11	9.4	Poor	145	804	379
S7-1.5	30	May-2019	5.98	8.3	Poor	248	959	404
S7-3.0	10	May-2019	5.85	13.0	Unsuitable	192	1020	577
S7-3.0	20	May-2019	3.85	8.3	Poor	156	672	340
S7-3.0	30	May-2019	4.69	7.8	Poor	185	737	327
S7-7.0	10	May-2019	0.91	1.8	Good	54.4	81	43
S7-7.0	20	May-2019	1.38	2.1	Good	97.1	65	67
S7-7.0	30	May-2019	2.62	1.6	Fair	281	61	90
S10-1.5	10	May-2019	2.35	22.0	Unsuitable	24	335	379
S10-1.5	20	May-2019	2.88	25.0	Unsuitable	32	592	520
S10-1.5	30	May-2019	3.30	27.0	Unsuitable	34	856	621
S10-3.0	10	May-2019	1.07	8.9	Poor	27.2	67	160
S10-3.0	20	May-2019	1.16	12.4	Unsuitable	20.9	92	200
S10-3.0	30	May-2019	1.32	13.9	Unsuitable	21.8	173	253
S10-7.0	10	May-2019	0.76	1.2	Good	79	30	39
S10-7.0	20	May-2019	0.64	1.9	Good	47.4	36	48
S10-7.0	30	May-2019	0.83	3.0	Good	44.5	84	73
S12-1.5	10	May-2019	3.39	16.0	Unsuitable	56	616	387
S12-1.5	20	May-2019	4.43	16.0	Unsuitable	118	863	614
S12-1.5	30	May-2019	7.79	13.0	Unsuitable	497	1130	1010
S12-3.0	10	May-2019	2.17	8.5	Poor	71	288	241
S12-3.0	20	May-2019	2.28	8.5	Poor	89.6	198	279
S12-3.0	30	May-2019	3.09	8.1	Poor	171	262	368
S12-7.0	10	May-2019	0.82	1.7	Good	62.2	62	47
S12-7.0	20	May-2019	0.93	2.0	Good	79.6	45	66
S12-7.0	30	May-2019	1.80	2.0	Good	187	107	100

BOLD = Parameter Exceeds Recommended Guideline Criteria
 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	1.2	14	25	35
MAX	7.8	50.0	497	1510	1030
GEOMEAN	1.9	8.3	53	231	212
AVERAGE	2.7	13.2	80	455	329



Nichols Environmental (Canada) Ltd.

TABLE: A-4
 TITLE: Soil Analyses - 2020 Sand&NaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S1-1.5	10	May-2020	1.56	10.8	Poor	37	271	238
S1-1.5	20	May-2020	1.25	11.4	Poor	21	185	186
S1-1.5	30	May-2020	1.38	12.8	Unsuitable	25	410	241
S1-3.0	10	May-2020	0.69	3.1	Good	42	82	77
S1-3.0	20	May-2020	0.87	6.8	Fair	25	158	126
S1-3.0	30	May-2020	1.09	8.8	Poor	26	265	164
S1-7.0	10	May-2020	0.62	0.9	Good	66	113	35
S1-7.0	20	May-2020	0.53	3.3	Good	29	18	65
S1-7.0	30	May-2020	0.58	5.4	Fair	18	36	79
S2-1.5	10	May-2020	2.43	24.1	Unsuitable	15	379	292
S2-1.5	20	May-2020	4.50	37.4	Unsuitable	32	1460	863
S2-1.5	30	May-2020	4.97	26.7	Unsuitable	49	1570	763
S2-3.0	10	May-2020	3.97	29.1	Unsuitable	31	639	529
S2-3.0	20	May-2020	4.69	27.2	Unsuitable	50	1140	747
S2-3.0	30	May-2020	5.35	28.8	Unsuitable	60	1510	927
S2-7.0	10	May-2020	0.68	4.0	Good	37	72	99
S2-7.0	20	May-2020	0.50	5.5	Fair	16	61	86
S2-7.0	30	May-2020	0.95	4.9	Fair	44	76	127
S3-1.5	10	May-2020	4.13	38.0	Unsuitable	22	844	583
S3-1.5	20	May-2020	4.58	38.2	Unsuitable	29	938	699
S3-1.5	30	May-2020	3.95	37.6	Unsuitable	26	927	702
S3-3.0	10	May-2020	2.16	13.0	Unsuitable	9	284	121
S3-3.0	20	May-2020	4.36	36.3	Unsuitable	29	944	657
S3-3.0	30	May-2020	4.74	42.8	Unsuitable	27	1120	798
S3-7.0	10	May-2020	0.99	3.2	Good	61	62	92
S3-7.0	20	May-2020	0.58	4.9	Fair	20	50	81
S3-7.0	30	May-2020	0.54	5.4	Fair	18	32	85
S7-1.5	10	May-2020	27.80	33.8	Unsuitable	638	6900	2630
S7-1.5	20	May-2020	9.53	14.9	Unsuitable	229	2010	707
S7-1.5	30	May-2020	9.42	10.2	Unsuitable	394	1750	649
S7-3.0	10	May-2020	2.20	6.6	Fair	65	217	174
S7-3.0	20	May-2020	5.04	10.5	Poor	131	1130	391
S7-3.0	30	May-2020	5.40	8.0	Poor	180	1150	356
S7-7.0	10	May-2020	12.10	25.6	Unsuitable	238	3420	1380
S7-7.0	20	May-2020	4.31	6.3	Poor	181	649	274
S7-7.0	30	May-2020	4.23	4.8	Poor	219	234	224
S10-1.5	10	May-2020	3.61	29.6	Unsuitable	20	852	413
S10-1.5	20	May-2020	3.37	27.4	Unsuitable	19	812	393
S10-1.5	30	May-2020	3.48	23.9	Unsuitable	33	1100	478
S10-3.0	10	May-2020	1.73	9.6	Poor	37	141	187
S10-3.0	20	May-2020	1.33	14.0	Unsuitable	12	163	143
S10-3.0	30	May-2020	1.39	14.6	Unsuitable	12	130	154
S10-7.0	10	May-2020	1.01	0.6	Good	138	34	30
S10-7.0	20	May-2020	0.49	1.7	Good	26	12	29
S10-7.0	30	May-2020	0.50	2.8	Good	18	11	38
S12-1.5	10	May-2020	1.76	17.1	Unsuitable	20	278	250
S12-1.5	20	May-2020	3.95	15.5	Unsuitable	76	936	454
S12-1.5	30	May-2020	9.08	11.8	Unsuitable	464	1760	857
S12-3.0	10	May-2020	2.11	10.9	Poor	45	277	251
S12-3.0	20	May-2020	4.63	6.9	Poor	295	378	407
S12-3.0	30	May-2020	7.39	9.9	Poor	383	952	656
S12-7.0	10	May-2020	1.02	1.9	Good	78	51	64
S12-7.0	20	May-2020	0.98	2.6	Good	55	61	66
S12-7.0	30	May-2020	1.90	1.6	Good	187	72	78

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 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	0.6	9	11	29
MAX	27.8	42.8	638	6900	2630
GEOMEAN	2.2	9.6	49	292	236
Average	3.6	14.7	94	725	393



Nichols Environmental (Canada) Ltd.

TABLE: A-5
 TITLE: Soil Analyses - 10 cm Sand&NaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S1-1.5	10	Nov-2018	0.75	6.7	Fair	19.5	32	104
S1-1.5	10	May-2019	0.80	7.1	Fair	20.6	67	113
S1-1.5	10	May-2020	1.56	10.8	Poor	37	271	238
S1-3.0	10	Nov-2018	0.71	3.6	Good	32.6	60	80
S1-3.0	10	May-2019	0.59	3.3	Good	32.7	44	70
S1-3.0	10	May-2020	0.69	3.1	Good	42	82	77
S1-7.0	10	Nov-2018	0.70	2.7	Good	50.9	70	90
S1-7.0	10	May-2019	0.48	1.4	Good	37.6	41	35
S1-7.0	10	May-2020	0.62	0.9	Good	66	113	35
S2-1.5	10	Nov-2018	1.74	21.8	Unsuitable	10.5	217	228
S2-1.5	10	May-2019	3.16	28.0	Unsuitable	16	489	322
S2-1.5	10	May-2020	2.43	24.1	Unsuitable	15	379	292
S2-3.0	10	Nov-2018	2.36	28.0	Unsuitable	11	341	297
S2-3.0	10	May-2019	2.95	17.0	Unsuitable	36	563	334
S2-3.0	10	May-2020	3.97	29.1	Unsuitable	31	639	529
S2-7.0	10	Nov-2018	0.97	3.3	Good	64.8	106	111
S2-7.0	10	May-2019	0.94	4.0	Fair	54.1	131	126
S2-7.0	10	May-2020	0.68	4.0	Good	37	72	99
S3-1.5	10	Nov-2018	2.00	30.0	Unsuitable	11	372	383
S3-1.5	10	May-2019	4.15	38.0	Unsuitable	20	939	585
S3-1.5	10	May-2020	4.13	38.0	Unsuitable	22	844	583
S3-3.0	10	Nov-2018	2.25	41.0	Unsuitable	5.6	314	259
S3-3.0	10	May-2019	2.00	20.0	Unsuitable	14	299	234
S3-3.0	10	May-2020	2.16	13.0	Unsuitable	9	284	121
S3-7.0	10	Nov-2018	0.97	3.7	Good	56.1	118	114
S3-7.0	10	May-2019	0.94	3.5	Good	46.3	103	86
S3-7.0	10	May-2020	0.99	3.2	Good	61	62	92
S7-1.5	10	Nov-2018	7.52	13.4	Unsuitable	314	1690	818
S7-1.5	10	May-2019	7.13	13.2	Unsuitable	206	1180	564
S7-1.5	10	May-2020	27.80	33.8	Unsuitable	638	6900	2630
S7-3.0	10	Nov-2018	2.50	6.1	Fair	139	468	249
S7-3.0	10	May-2019	5.85	13.0	Unsuitable	192	1020	577
S7-3.0	10	May-2020	2.20	6.6	Fair	65	217	174
S7-7.0	10	Nov-2018	1.11	1.7	Good	100	119	63
S7-7.0	10	May-2019	0.91	1.8	Good	54.4	81	43
S7-7.0	10	May-2020	12.10	25.6	Unsuitable	238	3420	1380
S10-1.5	10	Nov-2018	2.29	37.0	Unsuitable	11	304	364
S10-1.5	10	May-2019	2.35	22.0	Unsuitable	24	335	379
S10-1.5	10	May-2020	3.61	29.6	Unsuitable	20	852	413
S10-3.0	10	Nov-2018	0.92	7.0	Fair	25.3	81	120
S10-3.0	10	May-2019	1.07	8.9	Poor	27.2	67	160
S10-3.0	10	May-2020	1.73	9.6	Poor	37	141	187
S10-7.0	10	Nov-2018	0.76	1.1	Good	80.6	34	38
S10-7.0	10	May-2019	0.76	1.2	Good	79	30	39
S10-7.0	10	May-2020	1.01	0.6	Good	138	34	30
S12-1.5	10	Nov-2018	1.25	8.5	Poor	29.6	110	147
S12-1.5	10	May-2019	3.39	16.0	Unsuitable	56	616	387
S12-1.5	10	May-2020	1.76	17.1	Unsuitable	20	278	250
S12-3.0	10	Nov-2018	1.11	6.9	Fair	32.9	117	130
S12-3.0	10	May-2019	2.17	8.5	Poor	71	288	241
S12-3.0	10	May-2020	2.11	10.9	Poor	45	277	251
S12-7.0	10	Nov-2018	0.74	1.1	Good	79.6	36	36
S12-7.0	10	May-2019	0.82	1.7	Good	62.2	62	47
S12-7.0	10	May-2020	1.02	1.9	Good	78	51	64

BOLD = Parameter Exceeds Recommended Guideline Criteria
 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	0.6	6	30	30
MAX	27.8	41.0	638	6900	2630
GEOMEAN	1.7	7.5	42	193	169
AVERAGE	2.6	12.9	69	479	286



Nichols Environmental (Canada) Ltd.

TABLE: A-6
 TITLE: Soil Analyses - 20 cm Sand&NaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S1-1.5	20	Nov-2018	1.03	10.1	Poor	31.5	158	231
S1-1.5	20	May-2019	0.88	9.1	Poor	24.8	124	175
S1-1.5	20	May-2020	1.25	11.4	Poor	21	185	186
S1-3.0	20	Nov-2018	0.63	5.3	Fair	24	50	105
S1-3.0	20	May-2019	0.66	6.1	Fair	22.8	56	105
S1-3.0	20	May-2020	0.87	6.8	Fair	25	158	126
S1-7.0	20	Nov-2018	0.54	3.5	Good	27	28	74
S1-7.0	20	May-2019	0.47	2.9	Good	24.5	25	54
S1-7.0	20	May-2020	0.53	3.3	Good	29	18	65
S2-1.5	20	Nov-2018	3.30	37.0	Unsuitable	27	1090	885
S2-1.5	20	May-2019	5.01	36.0	Unsuitable	37	1310	851
S2-1.5	20	May-2020	4.50	37.4	Unsuitable	32	1460	863
S2-3.0	20	Nov-2018	4.95	26.0	Unsuitable	82	1330	915
S2-3.0	20	May-2019	4.54	23.0	Unsuitable	68	1130	723
S2-3.0	20	May-2020	4.69	27.2	Unsuitable	50	1140	747
S2-7.0	20	Nov-2018	1.02	4.1	Fair	51.4	103	116
S2-7.0	20	May-2019	1.04	4.6	Fair	53.9	102	136
S2-7.0	20	May-2020	0.50	5.5	Fair	16	61	86
S3-1.5	20	Nov-2018	3.80	45.0	Unsuitable	22	1000	787
S3-1.5	20	May-2019	5.98	50.0	Unsuitable	27	1280	866
S3-1.5	20	May-2020	4.58	38.2	Unsuitable	29	938	699
S3-3.0	20	Nov-2018	5.01	50.0	Unsuitable	25	1150	866
S3-3.0	20	May-2019	3.51	31.0	Unsuitable	24	700	511
S3-3.0	20	May-2020	4.36	36.3	Unsuitable	29	944	657
S3-7.0	20	Nov-2018	1.02	2.9	Good	57.7	87	81
S3-7.0	20	May-2019	0.74	3.1	Good	32	74	58
S3-7.0	20	May-2020	0.58	4.9	Fair	20	50	81
S7-1.5	20	Nov-2018	5.87	14.0	Unsuitable	197	1250	679
S7-1.5	20	May-2019	4.11	9.4	Poor	145	804	379
S7-1.5	20	May-2020	9.53	14.9	Unsuitable	229	2010	707
S7-3.0	20	Nov-2018	2.61	7.9	Fair	94.9	361	253
S7-3.0	20	May-2019	3.85	8.3	Poor	156	672	340
S7-3.0	20	May-2020	5.04	10.5	Poor	131	1130	391
S7-7.0	20	Nov-2018	2.63	2.1	Fair	325	320	138
S7-7.0	20	May-2019	1.38	2.1	Good	97.1	65	67
S7-7.0	20	May-2020	4.31	6.3	Poor	181	649	274
S10-1.5	20	Nov-2018	4.22	36.0	Unsuitable	35	868	756
S10-1.5	20	May-2019	2.88	25.0	Unsuitable	32	592	520
S10-1.5	20	May-2020	3.37	27.4	Unsuitable	19	812	393
S10-3.0	20	Nov-2018	1.05	12.6	Unsuitable	18.8	105	190
S10-3.0	20	May-2019	1.16	12.4	Unsuitable	20.9	92	200
S10-3.0	20	May-2020	1.33	14.0	Unsuitable	12	163	143
S10-7.0	20	Nov-2018	0.60	1.7	Good	44.3	32	40
S10-7.0	20	May-2019	0.64	1.9	Good	47.4	36	48
S10-7.0	20	May-2020	0.49	1.7	Good	26	12	29
S12-1.5	20	Nov-2018	2.54	15.0	Unsuitable	50	372	359
S12-1.5	20	May-2019	4.43	16.0	Unsuitable	118	863	614
S12-1.5	20	May-2020	3.95	15.5	Unsuitable	76	936	454
S12-3.0	20	Nov-2018	2.82	10.0	Poor	98.9	345	340
S12-3.0	20	May-2019	2.28	8.5	Poor	89.6	198	279
S12-3.0	20	May-2020	4.63	6.9	Poor	295	378	407
S12-7.0	20	Nov-2018	1.20	1.6	Good	109	69	57
S12-7.0	20	May-2019	0.93	2.0	Good	79.6	45	66
S12-7.0	20	May-2020	0.98	2.6	Good	55	61	66

BOLD = Parameter Exceeds Recommended Guideline Criteria
 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	1.6	12.0	12.0	29.0
MAX	9.5	50.0	325.0	2010.0	915.0
GEOMEAN	1.9	9.3	46.8	239.2	228.7
AVERAGE	2.6	15.0	67.2	506.8	355.6



Nichols Environmental (Canada) Ltd.

TABLE: A-7
 TITLE: Soil Analyses - 30 cm Sand&NaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S1-1.5	30	Nov-2018	1.51	13.3	Unsuitable	34.1	320	322
S1-1.5	30	May-2019	1.16	12.1	Unsuitable	20.8	190	204
S1-1.5	30	May-2020	1.38	12.8	Unsuitable	25	410	241
S1-3.0	30	Nov-2018	0.82	7.4	Fair	25.9	116	151
S1-3.0	30	May-2019	0.95	8.2	Poor	22.8	115	133
S1-3.0	30	May-2020	1.09	8.8	Poor	26	265	164
S1-7.0	30	Nov-2018	0.67	5.2	Fair	30.5	55	122
S1-7.0	30	May-2019	0.57	4.3	Fair	20.9	35	69
S1-7.0	30	May-2020	0.58	5.4	Fair	18	36	79
S2-1.5	30	Nov-2018	5.04	32.0	Unsuitable	63	1440	1050
S2-1.5	30	May-2019	4.96	31.0	Unsuitable	44	1230	799
S2-1.5	30	May-2020	4.97	26.7	Unsuitable	49	1570	763
S2-3.0	30	Nov-2018	6.90	19.6	Unsuitable	208	1630	1090
S2-3.0	30	May-2019	6.08	19.6	Unsuitable	139	1370	853
S2-3.0	30	May-2020	5.35	28.8	Unsuitable	60	1510	927
S2-7.0	30	Nov-2018	1.96	3.8	Good	128	221	164
S2-7.0	30	May-2019	1.97	3.9	Good	125	180	162
S2-7.0	30	May-2020	0.95	4.9	Fair	44	76	127
S3-1.5	30	Nov-2018	6.00	46.0	Unsuitable	37	1530	1030
S3-1.5	30	May-2019	6.81	49.0	Unsuitable	39	1510	1030
S3-1.5	30	May-2020	3.95	37.6	Unsuitable	26	927	702
S3-3.0	30	Nov-2018	5.62	45.0	Unsuitable	41	1530	1090
S3-3.0	30	May-2019	5.33	37.0	Unsuitable	44	971	850
S3-3.0	30	May-2020	4.74	42.8	Unsuitable	27	1120	798
S3-7.0	30	Nov-2018	2.74	2.6	Fair	319	171	168
S3-7.0	30	May-2019	0.70	3.3	Good	29.5	80	64
S3-7.0	30	May-2020	0.54	5.4	Fair	18	32	85
S7-1.5	30	Nov-2018	7.03	8.4	Poor	513	1250	670
S7-1.5	30	May-2019	5.98	8.3	Poor	248	959	404
S7-1.5	30	May-2020	9.42	10.2	Unsuitable	394	1750	649
S7-3.0	30	Nov-2018	2.74	6.3	Fair	135	468	254
S7-3.0	30	May-2019	4.69	7.8	Poor	185	737	327
S7-3.0	30	May-2020	5.40	8.0	Poor	180	1150	356
S7-7.0	30	Nov-2018	3.02	2.5	Fair	290	256	142
S7-7.0	30	May-2019	2.62	1.6	Fair	281	61	90
S7-7.0	30	May-2020	4.23	4.8	Poor	219	234	224
S10-1.5	30	Nov-2018	4.69	42.0	Unsuitable	38	1500	1120
S10-1.5	30	May-2019	3.30	27.0	Unsuitable	34	856	621
S10-1.5	30	May-2020	3.48	23.9	Unsuitable	33	1100	478
S10-3.0	30	Nov-2018	1.96	18.4	Unsuitable	23.8	293	320
S10-3.0	30	May-2019	1.32	13.9	Unsuitable	21.8	173	253
S10-3.0	30	May-2020	1.39	14.6	Unsuitable	12	130	154
S10-7.0	30	Nov-2018	0.66	3.0	Good	39.3	61	73
S10-7.0	30	May-2019	0.83	3.0	Good	44.5	84	73
S10-7.0	30	May-2020	0.50	2.8	Good	18	11	38
S12-1.5	30	Nov-2018	5.66	9.2	Poor	369	729	581
S12-1.5	30	May-2019	7.79	13.0	Unsuitable	497	1130	1010
S12-1.5	30	May-2020	9.08	11.8	Unsuitable	464	1760	857
S12-3.0	30	Nov-2018	4.99	7.0	Poor	391	465	454
S12-3.0	30	May-2019	3.09	8.1	Poor	171	262	368
S12-3.0	30	May-2020	7.39	9.9	Poor	383	952	656
S12-7.0	30	Nov-2018	1.82	1.8	Good	213	144	96
S12-7.0	30	May-2019	1.80	2.0	Good	187	107	100
S12-7.0	30	May-2020	1.90	1.6	Good	187	72	78

BOLD = Parameter Exceeds Recommended Guideline Criteria
 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	1.6	12	11	38
MAX	9.4	49.0	513	1760	1120
GEOMEAN	2.6	9.5	74	343	293
AVERAGE	3.5	14.6	134	654	439



Nichols Environmental (Canada) Ltd.

TABLE: A-8
 TITLE: Soil Analyses - 1.5 m Sand&NaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S1-1.5	10	Nov-2018	0.75	6.7	Fair	19.5	32	104
S1-1.5	10	May-2019	0.80	7.1	Fair	20.6	67	113
S1-1.5	10	May-2020	1.56	10.8	Poor	37	271	238
S1-1.5	20	Nov-2018	1.03	10.1	Poor	31.5	158	231
S1-1.5	20	May-2019	0.88	9.1	Poor	24.8	124	175
S1-1.5	20	May-2020	1.25	11.4	Poor	21	185	186
S1-1.5	30	Nov-2018	1.51	13.3	Unsuitable	34.1	320	322
S1-1.5	30	May-2019	1.16	12.1	Unsuitable	20.8	190	204
S1-1.5	30	May-2020	1.38	12.8	Unsuitable	25	410	241
S2-1.5	10	Nov-2018	1.74	21.8	Unsuitable	10.5	217	228
S2-1.5	10	May-2019	3.16	28.0	Unsuitable	16	489	322
S2-1.5	10	May-2020	2.43	24.1	Unsuitable	15	379	292
S2-1.5	20	Nov-2018	3.30	37.0	Unsuitable	27	1090	885
S2-1.5	20	May-2019	5.01	36.0	Unsuitable	37	1310	851
S2-1.5	20	May-2020	4.50	37.4	Unsuitable	32	1460	863
S2-1.5	30	Nov-2018	5.04	32.0	Unsuitable	63	1440	1050
S2-1.5	30	May-2019	4.96	31.0	Unsuitable	44	1230	799
S2-1.5	30	May-2020	4.97	26.7	Unsuitable	49	1570	763
S3-1.5	10	Nov-2018	2.00	30.0	Unsuitable	11	372	383
S3-1.5	10	May-2019	4.15	38.0	Unsuitable	20	939	585
S3-1.5	10	May-2020	4.13	38.0	Unsuitable	22	844	583
S3-1.5	20	Nov-2018	3.80	45.0	Unsuitable	22	1000	787
S3-1.5	20	May-2019	5.98	50.0	Unsuitable	27	1280	866
S3-1.5	20	May-2020	4.58	38.2	Unsuitable	29	938	699
S3-1.5	30	Nov-2018	6.00	46.0	Unsuitable	37	1530	1030
S3-1.5	30	May-2019	6.81	49.0	Unsuitable	39	1510	1030
S3-1.5	30	May-2020	3.95	37.6	Unsuitable	26	927	702
S7-1.5	10	Nov-2018	7.52	13.4	Unsuitable	314	1690	818
S7-1.5	10	May-2019	7.13	13.2	Unsuitable	206	1180	564
S7-1.5	10	May-2020	27.80	33.8	Unsuitable	638	6900	2630
S7-1.5	20	Nov-2018	5.87	14.0	Unsuitable	197	1250	679
S7-1.5	20	May-2019	4.11	9.4	Poor	145	804	379
S7-1.5	20	May-2020	9.53	14.9	Unsuitable	229	2010	707
S7-1.5	30	Nov-2018	7.03	8.4	Poor	513	1250	670
S7-1.5	30	May-2019	5.98	8.3	Poor	248	959	404
S7-1.5	30	May-2020	9.42	10.2	Unsuitable	394	1750	649
S10-1.5	10	Nov-2018	2.29	37.0	Unsuitable	11	304	364
S10-1.5	10	May-2019	2.35	22.0	Unsuitable	24	335	379
S10-1.5	10	May-2020	3.61	29.6	Unsuitable	20	852	413
S10-1.5	20	Nov-2018	4.22	36.0	Unsuitable	35	868	756
S10-1.5	20	May-2019	2.88	25.0	Unsuitable	32	592	520
S10-1.5	20	May-2020	3.37	27.4	Unsuitable	19	812	393
S10-1.5	30	Nov-2018	4.69	42.0	Unsuitable	38	1500	1120
S10-1.5	30	May-2019	3.30	27.0	Unsuitable	34	856	621
S10-1.5	30	May-2020	3.48	23.9	Unsuitable	33	1100	478
S12-1.5	10	Nov-2018	1.25	8.5	Poor	29.6	110	147
S12-1.5	10	May-2019	3.39	16.0	Unsuitable	56	616	387
S12-1.5	10	May-2020	1.76	17.1	Unsuitable	20	278	250
S12-1.5	20	Nov-2018	2.54	15.0	Unsuitable	50	372	359
S12-1.5	20	May-2019	4.43	16.0	Unsuitable	118	863	614
S12-1.5	20	May-2020	3.95	15.5	Unsuitable	76	936	454
S12-1.5	30	Nov-2018	5.66	9.2	Poor	369	729	581
S12-1.5	30	May-2019	7.79	13.0	Unsuitable	497	1130	1010
S12-1.5	30	May-2020	9.08	11.8	Unsuitable	464	1760	857

BOLD = Parameter Exceeds Recommended Guideline Criteria
 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.8	6.7	11	32	104
MAX	27.8	50.0	638	6900	2630
GEOMEAN	3.4	20.0	47	651	481
AVERAGE	4.4	23.5	99	951	583



Nichols Environmental (Canada) Ltd.

TABLE: A-9
 TITLE: Soil Analyses - 3.0 m Sand&NaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S1-3.0	10	Nov-2018	0.71	3.6	Good	32.6	60	80
S1-3.0	10	May-2019	0.59	3.3	Good	32.7	44	70
S1-3.0	10	May-2020	0.69	3.1	Good	42	82	77
S1-3.0	20	Nov-2018	0.63	5.3	Fair	24	50	105
S1-3.0	20	May-2019	0.66	6.1	Fair	22.8	56	105
S1-3.0	20	May-2020	0.87	6.8	Fair	25	158	126
S1-3.0	30	Nov-2018	0.82	7.4	Fair	25.9	116	151
S1-3.0	30	May-2019	0.95	8.2	Poor	22.8	115	133
S1-3.0	30	May-2020	1.09	8.8	Poor	26	265	164
S2-3.0	10	Nov-2018	2.36	28.0	Unsuitable	11	341	297
S2-3.0	10	May-2019	2.95	17.0	Unsuitable	36	563	334
S2-3.0	10	May-2020	3.97	29.1	Unsuitable	31	639	529
S2-3.0	20	Nov-2018	4.95	26.0	Unsuitable	82	1330	915
S2-3.0	20	May-2019	4.54	23.0	Unsuitable	68	1130	723
S2-3.0	20	May-2020	4.69	27.2	Unsuitable	50	1140	747
S2-3.0	30	Nov-2018	6.90	19.6	Unsuitable	208	1630	1090
S2-3.0	30	May-2019	6.08	19.6	Unsuitable	139	1370	853
S2-3.0	30	May-2020	5.35	28.8	Unsuitable	60	1510	927
S3-3.0	10	Nov-2018	2.25	41.0	Unsuitable	5.6	314	259
S3-3.0	10	May-2019	2.00	20.0	Unsuitable	14	299	234
S3-3.0	10	May-2020	2.16	13.0	Unsuitable	9	284	121
S3-3.0	20	Nov-2018	5.01	50.0	Unsuitable	25	1150	866
S3-3.0	20	May-2019	3.51	31.0	Unsuitable	24	700	511
S3-3.0	20	May-2020	4.36	36.3	Unsuitable	29	944	657
S3-3.0	30	Nov-2018	5.62	45.0	Unsuitable	41	1530	1090
S3-3.0	30	May-2019	5.33	37.0	Unsuitable	44	971	850
S3-3.0	30	May-2020	4.74	42.8	Unsuitable	27	1120	798
S7-3.0	10	Nov-2018	2.50	6.1	Fair	139	468	249
S7-3.0	10	May-2019	5.85	13.0	Unsuitable	192	1020	577
S7-3.0	10	May-2020	2.20	6.6	Fair	65	217	174
S7-3.0	20	Nov-2018	2.61	7.9	Fair	94.9	361	253
S7-3.0	20	May-2019	3.85	8.3	Poor	156	672	340
S7-3.0	20	May-2020	5.04	10.5	Poor	131	1130	391
S7-3.0	30	Nov-2018	2.74	6.3	Fair	135	468	254
S7-3.0	30	May-2019	4.69	7.8	Poor	185	737	327
S7-3.0	30	May-2020	5.40	8.0	Poor	180	1150	356
S10-3.0	10	Nov-2018	0.92	7.0	Fair	25.3	81	120
S10-3.0	10	May-2019	1.07	8.9	Poor	27.2	67	160
S10-3.0	10	May-2020	1.73	9.6	Poor	37	141	187
S10-3.0	20	Nov-2018	1.05	12.6	Unsuitable	18.8	105	190
S10-3.0	20	May-2019	1.16	12.4	Unsuitable	20.9	92	200
S10-3.0	20	May-2020	1.33	14.0	Unsuitable	12	163	143
S10-3.0	30	Nov-2018	1.96	18.4	Unsuitable	23.8	293	320
S10-3.0	30	May-2019	1.32	13.9	Unsuitable	21.8	173	253
S10-3.0	30	May-2020	1.39	14.6	Unsuitable	12	130	154
S12-3.0	10	Nov-2018	1.11	6.9	Fair	32.9	117	130
S12-3.0	10	May-2019	2.17	8.5	Poor	71	288	241
S12-3.0	10	May-2020	2.11	10.9	Poor	45	277	251
S12-3.0	20	Nov-2018	2.82	10.0	Poor	98.9	345	340
S12-3.0	20	May-2019	2.28	8.5	Poor	89.6	198	279
S12-3.0	20	May-2020	4.63	6.9	Poor	295	378	407
S12-3.0	30	Nov-2018	4.99	7.0	Poor	391	465	454
S12-3.0	30	May-2019	3.09	8.1	Poor	171	262	368
S12-3.0	30	May-2020	7.39	9.9	Poor	383	952	656

BOLD = Parameter Exceeds Recommended Guideline Criteria
 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.6	3.1	6	44	70
MAX	7.4	50.0	391	1630	1090
GEOMEAN	2.3	12.3	47	333	291
AVERAGE	3.0	15.6	77	526	379



Nichols Environmental (Canada) Ltd.

TABLE: A-10
 TITLE: Soil Analyses - 7.0 m Sand&NaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S1-7.0	10	Nov-2018	0.70	2.7	Good	50.9	70	90
S1-7.0	10	May-2019	0.48	1.4	Good	37.6	41	35
S1-7.0	10	May-2020	0.62	0.9	Good	66	113	35
S1-7.0	20	Nov-2018	0.54	3.5	Good	27	28	74
S1-7.0	20	May-2019	0.47	2.9	Good	24.5	25	54
S1-7.0	20	May-2020	0.53	3.3	Good	29	18	65
S1-7.0	30	Nov-2018	0.67	5.2	Fair	30.5	55	122
S1-7.0	30	May-2019	0.57	4.3	Fair	20.9	35	69
S1-7.0	30	May-2020	0.58	5.4	Fair	18	36	79
S2-7.0	10	Nov-2018	0.97	3.3	Good	64.8	106	111
S2-7.0	10	May-2019	0.94	4.0	Fair	54.1	131	126
S2-7.0	10	May-2020	0.68	4.0	Good	37	72	99
S2-7.0	20	Nov-2018	1.02	4.1	Fair	51.4	103	116
S2-7.0	20	May-2019	1.04	4.6	Fair	53.9	102	136
S2-7.0	20	May-2020	0.50	5.5	Fair	16	61	86
S2-7.0	30	Nov-2018	1.96	3.8	Good	128	221	164
S2-7.0	30	May-2019	1.97	3.9	Good	125	180	162
S2-7.0	30	May-2020	0.95	4.9	Fair	44	76	127
S3-7.0	10	Nov-2018	0.97	3.7	Good	56.1	118	114
S3-7.0	10	May-2019	0.94	3.5	Good	46.3	103	86
S3-7.0	10	May-2020	0.99	3.2	Good	61	62	92
S3-7.0	20	Nov-2018	1.02	2.9	Good	57.7	87	81
S3-7.0	20	May-2019	0.74	3.1	Good	32	74	58
S3-7.0	20	May-2020	0.58	4.9	Fair	20	50	81
S3-7.0	30	Nov-2018	2.74	2.6	Fair	319	171	168
S3-7.0	30	May-2019	0.70	3.3	Good	29.5	80	64
S3-7.0	30	May-2020	0.54	5.4	Fair	18	32	85
S7-7.0	10	Nov-2018	1.11	1.7	Good	100	119	63
S7-7.0	10	May-2019	0.91	1.8	Good	54.4	81	43
S7-7.0	10	May-2020	12.10	25.6	Unsuitable	238	3420	1380
S7-7.0	20	Nov-2018	2.63	2.1	Fair	325	320	138
S7-7.0	20	May-2019	1.38	2.1	Good	97.1	65	67
S7-7.0	20	May-2020	4.31	6.3	Poor	181	649	274
S7-7.0	30	Nov-2018	3.02	2.5	Fair	290	256	142
S7-7.0	30	May-2019	2.62	1.6	Fair	281	61	90
S7-7.0	30	May-2020	4.23	4.8	Poor	219	234	224
S10-7.0	10	Nov-2018	0.76	1.1	Good	80.6	34	38
S10-7.0	10	May-2019	0.76	1.2	Good	79	30	39
S10-7.0	10	May-2020	1.01	0.6	Good	138	34	30
S10-7.0	20	Nov-2018	0.60	1.7	Good	44.3	32	40
S10-7.0	20	May-2019	0.64	1.9	Good	47.4	36	48
S10-7.0	20	May-2020	0.49	1.7	Good	26	12	29
S10-7.0	30	Nov-2018	0.66	3.0	Good	39.3	61	73
S10-7.0	30	May-2019	0.83	3.0	Good	44.5	84	73
S10-7.0	30	May-2020	0.50	2.8	Good	18	11	38
S12-7.0	10	Nov-2018	0.74	1.1	Good	79.6	36	36
S12-7.0	10	May-2019	0.82	1.7	Good	62.2	62	47
S12-7.0	10	May-2020	1.02	1.9	Good	78	51	64
S12-7.0	20	Nov-2018	1.20	1.6	Good	109	69	57
S12-7.0	20	May-2019	0.93	2.0	Good	79.6	45	66
S12-7.0	20	May-2020	0.98	2.6	Good	55	61	66
S12-7.0	30	Nov-2018	1.82	1.8	Good	213	144	96
S12-7.0	30	May-2019	1.80	2.0	Good	187	107	100
S12-7.0	30	May-2020	1.90	1.6	Good	187	72	78

BOLD = Parameter Exceeds Recommended Guideline Criteria
 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	0.6	16	11	29
MAX	12.1	25.6	325	3420	1380
GEOMEAN	1.0	2.7	64	74	81
AVERAGE	1.4	3.4	90	156	111



Nichols Environmental (Canada) Ltd.

TABLE: A-11

TITLE: Soil Analyses - All COE CaCl
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S4-1.5	10	Nov-2018	6.37	37.0	Unsuitable	100	2040	1620
S4-1.5	10	May-2019	5.02	36.0	Unsuitable	30	986	647
S4-1.5	10	May-2020	5.20	39.7	Unsuitable	33	1140	778
S4-1.5	20	Nov-2018	6.63	37.0	Unsuitable	103	1970	1610
S4-1.5	20	May-2019	4.42	36.0	Unsuitable	35	1240	900
S4-1.5	20	May-2020	4.65	39.2	Unsuitable	32	1200	852
S4-1.5	30	Nov-2018	6.47	31.0	Unsuitable	190	2310	2050
S4-1.5	30	May-2019	4.41	31.0	Unsuitable	54	1160	1020
S4-1.5	30	May-2020	2.82	33.0	Unsuitable	20	1080	745
S4-3.0	10	Nov-2018	1.56	15.2	Unsuitable	14.3	157	169
S4-3.0	10	May-2019	1.58	16.1	Unsuitable	9.5	139	128
S4-3.0	10	May-2020	2.55	21.0	Unsuitable	16	237	215
S4-3.0	20	Nov-2018	2.38	19.0	Unsuitable	26	429	344
S4-3.0	20	May-2019	2.57	21.0	Unsuitable	19	349	278
S4-3.0	20	May-2020	2.90	25.0	Unsuitable	21	531	389
S4-3.0	30	Nov-2018	4.22	24.0	Unsuitable	74	1070	818
S4-3.0	30	May-2019	3.40	24.0	Unsuitable	32	637	470
S4-3.0	30	May-2020	3.80	29.9	Unsuitable	37	979	746
S4-7.0	10	Nov-2018	1.26	9.8	Poor	42.7	226	287
S4-7.0	10	May-2019	2.41	13.0	Unsuitable	52	486	359
S4-7.0	10	May-2020	1.30	11.6	Poor	25	238	226
S4-7.0	20	Nov-2018	2.44	17.0	Unsuitable	54	558	505
S4-7.0	20	May-2019	2.58	17.0	Unsuitable	41	534	431
S4-7.0	20	May-2020	1.94	18.2	Unsuitable	25	362	354
S4-7.0	30	Nov-2018	3.31	21.0	Unsuitable	79	961	874
S4-7.0	30	May-2019	3.75	19.0	Unsuitable	100	699	844
S4-7.0	30	May-2020	1.86	22.2	Unsuitable	22	455	449
S5-1.5	10	Nov-2018	1.59	8.2	Poor	39.2	107	155
S5-1.5	10	May-2019	1.23	9.3	Poor	21	124	135
S5-1.5	10	May-2020	1.41	19.9	Unsuitable	10	107	176
S5-1.5	20	Nov-2018	2.31	13.0	Unsuitable	49	417	299
S5-1.5	20	May-2019	2.50	14.0	Unsuitable	46	443	296
S5-1.5	20	May-2020	1.15	10.3	Poor	19	171	140
S5-1.5	30	Nov-2018	4.34	16.1	Unsuitable	135	1010	655
S5-1.5	30	May-2019	1.45	11.6	Poor	21	192	160
S5-1.5	30	May-2020	1.94	17.6	Unsuitable	20	284	277
S5-3.0	10	Nov-2018	1.01	1.6	Good	98.7	73	62
S5-3.0	10	May-2019	1.16	3.7	Good	72.4	184	120
S5-3.0	10	May-2020	1.60	9.3	Poor	49	201	223
S5-3.0	20	Nov-2018	1.89	4.1	Fair	176	275	216
S5-3.0	20	May-2019	2.60	6.0	Fair	192	550	344
S5-3.0	20	May-2020	1.47	7.2	Fair	43	217	167
S5-3.0	30	Nov-2018	6.49	7.7	Poor	1180	1640	1260
S5-3.0	30	May-2019	6.42	7.5	Poor	866	1410	980
S5-3.0	30	May-2020	1.26	14.2	Unsuitable	16	202	203
S5-7.0	10	Nov-2018	1.73	2.2	Good	242	127	158
S5-7.0	10	May-2019	2.32	2.6	Fair	299	238	195
S5-7.0	10	May-2020	1.01	2.6	Good	121	95	119
S5-7.0	20	Nov-2018	4.00	4.6	Poor	760	221	579
S5-7.0	20	May-2019	3.58	3.7	Fair	559	207	378
S5-7.0	20	May-2020	0.90	2.9	Good	92	73	113
S5-7.0	30	Nov-2018	5.50	4.4	Poor	1290	351	830
S5-7.0	30	May-2019	4.56	3.4	Poor	806	279	459
S5-7.0	30	May-2020	3.92	1.8	Fair	660	369	200
S6-1.5	10	Nov-2018	1.60	3.4	Good	111	47	117
S6-1.5	10	May-2019	1.97	5.6	Fair	87.5	203	172
S6-1.5	10	May-2020	3.25	17.5	Unsuitable	33	487	318
S6-1.5	20	Nov-2018	1.18	8.8	Poor	26.8	155	166
S6-1.5	20	May-2019	1.34	9.3	Poor	24	177	152
S6-1.5	20	May-2020	1.50	12.3	Unsuitable	20	335	215
S6-1.5	30	Nov-2018	1.31	9.7	Poor	32.3	250	230
S6-1.5	30	May-2019	1.08	9.5	Poor	17.2	150	141
S6-1.5	30	May-2020	2.37	15.2	Unsuitable	25	277	276
S6-3.0	10	Nov-2018	0.68	4.0	Fair	32.1	38	86
S6-3.0	10	May-2019	0.75	5.5	Fair	19.4	52	81
S6-3.0	10	May-2020	1.15	5.1	Fair	32	46	90
S6-3.0	20	Nov-2018	0.94	7.1	Fair	28.1	131	153



Nichols Environmental (Canada) Ltd.

TABLE: A-11
TITLE: Soil Analyses - All COE CaCl
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S6-3.0	20	May-2019	1.17	8.6	Poor	21.9	154	141
S6-3.0	20	May-2020	0.79	9.2	Poor	9	63	94
S6-3.0	30	Nov-2018	1.82	7.5	Fair	65.1	252	236
S6-3.0	30	May-2019	1.22	7.7	Fair	26.3	176	144
S6-3.0	30	May-2020	2.40	8.0	Fair	70	95	246
S6-7.0	10	Nov-2018	0.68	0.6	Good	81.1	23	23
S6-7.0	10	May-2019	0.48	0.9	Good	31.1	16	18
S6-7.0	10	May-2020	1.09	<0.34	Good	96	29	10
S6-7.0	20	Nov-2018	0.85	2.0	Good	59.2	19	58
S6-7.0	20	May-2019	1.83	1.5	Good	187	12	75
S6-7.0	20	May-2020	0.42	1.5	Good	16	10	20
S6-7.0	30	Nov-2018	3.00	2.5	Fair	412	34	192
S6-7.0	30	May-2019	2.98	2.2	Fair	329	19	142
S6-7.0	30	May-2020	2.63	1.8	Fair	213	9	87
S8-1.5	10	Nov-2018	1.91	23.8	Unsuitable	7.6	179	179
S8-1.5	10	May-2019	7.26	27.0	Unsuitable	80.8	1090	702
S8-1.5	10	May-2020	8.98	35.8	Unsuitable	48	1280	704
S8-1.5	20	Nov-2018	5.59	35.0	Unsuitable	35	789	622
S8-1.5	20	May-2019	6.62	24.1	Unsuitable	115	1090	884
S8-1.5	20	May-2020	11.60	46.3	Unsuitable	71	2870	1330
S8-1.5	30	Nov-2018	8.05	25.1	Unsuitable	211	1530	1330
S8-1.5	30	May-2019	8.71	16.9	Unsuitable	483	1290	1350
S8-1.5	30	May-2020	7.96	31.6	Unsuitable	79	2020	1170
S8-3.0	10	Nov-2018	1.76	12.8	Unsuitable	22.9	178	181
S8-3.0	10	May-2019	3.96	34.0	Unsuitable	18	586	410
S8-3.0	10	May-2020	2.06	25.4	Unsuitable	7	154	170
S8-3.0	20	Nov-2018	2.82	38.0	Unsuitable	11	374	422
S8-3.0	20	May-2019	5.90	29.0	Unsuitable	68	1130	821
S8-3.0	20	May-2020	4.84	35.5	Unsuitable	23	874	538
S8-3.0	30	Nov-2018	9.08	18.5	Unsuitable	448	1220	1400
S8-3.0	30	May-2019	9.34	18.9	Unsuitable	513	1390	1550
S8-3.0	30	May-2020	7.93	21.5	Unsuitable	212	1800	1120
S8-7.0	10	Nov-2018	2.57	12.0	Poor	110	457	607
S8-7.0	10	May-2019	3.24	13.0	Unsuitable	155	1410	842
S8-7.0	10	May-2020	3.82	9.7	Poor	165	1060	569
S8-7.0	20	Nov-2018	4.98	11.3	Poor	297	707	789
S8-7.0	20	May-2019	3.27	15.0	Unsuitable	79	801	517
S8-7.0	20	May-2020	3.46	12.9	Unsuitable	63	790	397
S8-7.0	30	Nov-2018	6.91	9.9	Poor	597	1230	994
S8-7.0	30	May-2019	3.50	11.0	Poor	130	934	534
S8-7.0	30	May-2020	3.72	13.0	Unsuitable	72	816	474
S9-1.5	10	Nov-2018	3.72	16.0	Unsuitable	86	710	495
S9-1.5	10	May-2019	6.08	18.3	Unsuitable	130	1220	688
S9-1.5	10	May-2020	4.01	21.8	Unsuitable	35	939	415
S9-1.5	20	Nov-2018	6.20	13.3	Unsuitable	258	1260	755
S9-1.5	20	May-2019	6.22	15.5	Unsuitable	195	1370	769
S9-1.5	20	May-2020	8.18	13.7	Unsuitable	300	1350	787
S9-1.5	30	Nov-2018	8.32	14.9	Unsuitable	401	2010	1170
S9-1.5	30	May-2019	9.30	14.5	Unsuitable	480	1840	1150
S9-1.5	30	May-2020	7.23	16.9	Unsuitable	150	1740	724
S9-3.0	10	Nov-2018	1.29	8.0	Poor	34	171	160
S9-3.0	10	May-2019	1.66	7.9	Fair	48.4	262	189
S9-3.0	10	May-2020	1.74	12.7	Unsuitable	30	170	235
S9-3.0	20	Nov-2018	2.47	9.9	Poor	76.3	369	302
S9-3.0	20	May-2019	3.94	7.2	Fair	221	559	367
S9-3.0	20	May-2020	5.41	7.2	Poor	272	490	393
S9-3.0	30	Nov-2018	8.17	9.3	Unsuitable	589	1630	863
S9-3.0	30	May-2019	6.50	8.8	Poor	408	1080	655
S9-3.0	30	May-2020	7.30	9.2	Poor	323	1020	572
S9-7.0	10	Nov-2018	1.09	1.3	Good	99.7	61	48
S9-7.0	10	May-2019	1.21	1.8	Good	89.7	115	59
S9-7.0	10	May-2020	1.09	1.4	Good	89	63	48
S9-7.0	20	Nov-2018	1.02	1.7	Good	91	37	58
S9-7.0	20	May-2019	2.35	1.9	Fair	244	98	102
S9-7.0	20	May-2020	2.18	1.3	Fair	210	24	63
S9-7.0	30	Nov-2018	3.27	2.4	Fair	444	190	193
S9-7.0	30	May-2019	3.42	2.2	Fair	459	154	196



Nichols Environmental (Canada) Ltd.

TABLE: A-11
TITLE: Soil Analyses - All COE CaCl
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S9-7.0	30	May-2020	3.46	1.7	Fair	334	54	109
S11-1.5	10	Nov-2018	2.84	11.0	Poor	96.7	271	340
S11-1.5	10	May-2019	5.10	10.4	Poor	207	717	488
S11-1.5	10	May-2020	2.17	16.4	Unsuitable	29	198	278
S11-1.5	20	Nov-2018	5.25	6.9	Poor	424	501	491
S11-1.5	20	May-2019	5.46	6.4	Poor	414	551	445
S11-1.5	20	May-2020	6.15	7.6	Poor	283	690	396
S11-1.5	30	Nov-2018	4.58	4.2	Poor	509	590	358
S11-1.5	30	May-2019	5.30	5.0	Poor	435	555	355
S11-1.5	30	May-2020	5.10	5.2	Poor	296	456	285
S11-3.0	10	Nov-2018	2.69	5.3	Fair	211	230	268
S11-3.0	10	May-2019	4.79	6.0	Poor	334	519	353
S11-3.0	10	May-2020	5.46	14.2	Unsuitable	139	904	536
S11-3.0	20	Nov-2018	5.02	5.0	Poor	414	441	334
S11-3.0	20	May-2019	3.83	3.5	Fair	431	315	261
S11-3.0	20	May-2020	5.80	5.4	Poor	358	570	331
S11-3.0	30	Nov-2018	4.93	3.3	Poor	437	540	238
S11-3.0	30	May-2019	4.60	3.4	Poor	438	427	249
S11-3.0	30	May-2020	5.44	3.9	Poor	389	685	268
S11-7.0	10	Nov-2018	2.08	1.2	Fair	274	31	66
S11-7.0	10	May-2019	3.02	1.9	Fair	362	136	122
S11-7.0	10	May-2020	2.71	3.2	Fair	181	211	141
S11-7.0	20	Nov-2018	3.32	1.6	Fair	407	147	110
S11-7.0	20	May-2019	3.20	1.6	Fair	419	133	126
S11-7.0	20	May-2020	3.99	2.0	Fair	324	237	121
S11-7.0	30	Nov-2018	3.40	1.6	Fair	413	210	112
S11-7.0	30	May-2019	3.31	1.7	Fair	417	188	128
S11-7.0	30	May-2020	3.89	1.8	Fair	284	178	95

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.6	7	9	10
MAX	11.6	46.3	1290	2870	2050
GEOMEAN	2.9	8.3	97	321	292
AVERAGE	3.6	12.6	189	575	435



Nichols Environmental (Canada) Ltd.

TABLE: A-12

TITLE: Soil Analyses - 2018 CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area Topsoil	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S4-1.5	10	Nov-2018	6.37	37.0	Unsuitable	100	2040	1620
S4-1.5	20	Nov-2018	6.63	37.0	Unsuitable	103	1970	1610
S4-1.5	30	Nov-2018	6.47	31.0	Unsuitable	190	2310	2050
S4-3.0	10	Nov-2018	1.56	15.2	Unsuitable	14.3	157	169
S4-3.0	20	Nov-2018	2.38	19.0	Unsuitable	26	429	344
S4-3.0	30	Nov-2018	4.22	24.0	Unsuitable	74	1070	818
S4-7.0	10	Nov-2018	1.26	9.8	Poor	42.7	226	287
S4-7.0	20	Nov-2018	2.44	17.0	Unsuitable	54	558	505
S4-7.0	30	Nov-2018	3.31	21.0	Unsuitable	79	961	874
S5-1.5	10	Nov-2018	1.59	8.2	Poor	39.2	107	155
S5-1.5	20	Nov-2018	2.31	13.0	Unsuitable	49	417	299
S5-1.5	30	Nov-2018	4.34	16.1	Unsuitable	135	1010	655
S5-3.0	10	Nov-2018	1.01	1.6	Good	98.7	73	62
S5-3.0	20	Nov-2018	1.89	4.1	Fair	176	275	216
S5-3.0	30	Nov-2018	6.49	7.7	Poor	1180	1640	1260
S5-7.0	10	Nov-2018	1.73	2.2	Good	242	127	158
S5-7.0	20	Nov-2018	4.00	4.6	Poor	760	221	579
S5-7.0	30	Nov-2018	5.50	4.4	Poor	1290	351	830
S6-1.5	10	Nov-2018	1.60	3.4	Good	111	47	117
S6-1.5	20	Nov-2018	1.18	8.8	Poor	26.8	155	166
S6-1.5	30	Nov-2018	1.31	9.7	Poor	32.3	250	230
S6-3.0	10	Nov-2018	0.68	4.0	Fair	32.1	38	86
S6-3.0	20	Nov-2018	0.94	7.1	Fair	28.1	131	153
S6-3.0	30	Nov-2018	1.82	7.5	Fair	65.1	252	236
S6-7.0	10	Nov-2018	0.68	0.6	Good	81.1	23	23
S6-7.0	20	Nov-2018	0.85	2.0	Good	59.2	19	58
S6-7.0	30	Nov-2018	3.00	2.5	Fair	412	34	192
S8-1.5	10	Nov-2018	1.91	23.8	Unsuitable	7.6	179	179
S8-1.5	20	Nov-2018	5.59	35.0	Unsuitable	35	789	622
S8-1.5	30	Nov-2018	8.05	25.1	Unsuitable	211	1530	1330
S8-3.0	10	Nov-2018	1.76	12.8	Unsuitable	22.9	178	181
S8-3.0	20	Nov-2018	2.82	38.0	Unsuitable	11	374	422
S8-3.0	30	Nov-2018	9.08	18.5	Unsuitable	448	1220	1400
S8-7.0	10	Nov-2018	2.57	12.0	Poor	110	457	607
S8-7.0	20	Nov-2018	4.98	11.3	Poor	297	707	789
S8-7.0	30	Nov-2018	6.91	9.9	Poor	597	1230	994
S9-1.5	10	Nov-2018	3.72	16.0	Unsuitable	86	710	495
S9-1.5	20	Nov-2018	6.20	13.3	Unsuitable	258	1260	755
S9-1.5	30	Nov-2018	8.32	14.9	Unsuitable	401	2010	1170
S9-3.0	10	Nov-2018	1.29	8.0	Poor	34	171	160
S9-3.0	20	Nov-2018	2.47	9.9	Poor	76.3	369	302
S9-3.0	30	Nov-2018	8.17	9.3	Unsuitable	589	1630	863
S9-7.0	10	Nov-2018	1.09	1.3	Good	99.7	61	48
S9-7.0	20	Nov-2018	1.02	1.7	Good	91	37	58
S9-7.0	30	Nov-2018	3.27	2.4	Fair	444	190	193
S11-1.5	10	Nov-2018	2.84	11.0	Poor	96.7	271	340
S11-1.5	20	Nov-2018	5.25	6.9	Poor	424	501	491
S11-1.5	30	Nov-2018	4.58	4.2	Poor	509	590	358
S11-3.0	10	Nov-2018	2.69	5.3	Fair	211	230	268
S11-3.0	20	Nov-2018	5.02	5.0	Poor	414	441	334
S11-3.0	30	Nov-2018	4.93	3.3	Poor	437	540	238
S11-7.0	10	Nov-2018	2.08	1.2	Fair	274	31	66
S11-7.0	20	Nov-2018	3.32	1.6	Fair	407	147	110
S11-7.0	30	Nov-2018	3.40	1.6	Fair	413	210	112

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.7	0.6	8	19	23
MAX	9.1	38.0	1290	2310	2050
GEOMEAN	2.8	7.4	123	301	310
AVERAGE	3.5	11.5	235	576	497



Nichols Environmental (Canada) Ltd.

TABLE: A-13

TITLE: Soil Analyses - 2019 CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area Topsoil	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S4-1.5	10	May-2019	5.02	36.0	Unsuitable	30	986	647
S4-1.5	20	May-2019	4.42	36.0	Unsuitable	35	1240	900
S4-1.5	30	May-2019	4.41	31.0	Unsuitable	54	1160	1020
S4-3.0	10	May-2019	1.58	16.1	Unsuitable	9.5	139	128
S4-3.0	20	May-2019	2.57	21.0	Unsuitable	19	349	278
S4-3.0	30	May-2019	3.40	24.0	Unsuitable	32	637	470
S4-7.0	10	May-2019	2.41	13.0	Unsuitable	52	486	359
S4-7.0	20	May-2019	2.58	17.0	Unsuitable	41	534	431
S4-7.0	30	May-2019	3.75	19.0	Unsuitable	100	699	844
S5-1.5	10	May-2019	1.23	9.3	Poor	21	124	135
S5-1.5	20	May-2019	2.50	14.0	Unsuitable	46	443	296
S5-1.5	30	May-2019	1.45	11.6	Poor	21	192	160
S5-3.0	10	May-2019	1.16	3.7	Good	72.4	184	120
S5-3.0	20	May-2019	2.60	6.0	Fair	192	550	344
S5-3.0	30	May-2019	6.42	7.5	Poor	866	1410	980
S5-7.0	10	May-2019	2.32	2.6	Fair	299	238	195
S5-7.0	20	May-2019	3.58	3.7	Fair	559	207	378
S5-7.0	30	May-2019	4.56	3.4	Poor	806	279	459
S6-1.5	10	May-2019	1.97	5.6	Fair	87.5	203	172
S6-1.5	20	May-2019	1.34	9.3	Poor	24	177	152
S6-1.5	30	May-2019	1.08	9.5	Poor	17.2	150	141
S6-3.0	10	May-2019	0.75	5.5	Fair	19.4	52	81
S6-3.0	20	May-2019	1.17	8.6	Poor	21.9	154	141
S6-3.0	30	May-2019	1.22	7.7	Fair	26.3	176	144
S6-7.0	10	May-2019	0.48	0.9	Good	31.1	16	18
S6-7.0	20	May-2019	1.83	1.5	Good	187	12	75
S6-7.0	30	May-2019	2.98	2.2	Fair	329	19	142
S8-1.5	10	May-2019	7.26	27.0	Unsuitable	80.8	1090	702
S8-1.5	20	May-2019	6.62	24.1	Unsuitable	115	1090	884
S8-1.5	30	May-2019	8.71	16.9	Unsuitable	483	1290	1350
S8-3.0	10	May-2019	3.96	34.0	Unsuitable	18	586	410
S8-3.0	20	May-2019	5.90	29.0	Unsuitable	68	1130	821
S8-3.0	30	May-2019	9.34	18.9	Unsuitable	513	1390	1550
S8-7.0	10	May-2019	3.24	13.0	Unsuitable	155	1410	842
S8-7.0	20	May-2019	3.27	15.0	Unsuitable	79	801	517
S8-7.0	30	May-2019	3.50	11.0	Poor	130	934	534
S9-1.5	10	May-2019	6.08	18.3	Unsuitable	130	1220	688
S9-1.5	20	May-2019	6.22	15.5	Unsuitable	195	1370	769
S9-1.5	30	May-2019	9.30	14.5	Unsuitable	480	1840	1150
S9-3.0	10	May-2019	1.66	7.9	Fair	48.4	262	189
S9-3.0	20	May-2019	3.94	7.2	Fair	221	559	367
S9-3.0	30	May-2019	6.50	8.8	Poor	408	1080	655
S9-7.0	10	May-2019	1.21	1.8	Good	89.7	115	59
S9-7.0	20	May-2019	2.35	1.9	Fair	244	98	102
S9-7.0	30	May-2019	3.42	2.2	Fair	459	154	196
S11-1.5	10	May-2019	5.10	10.4	Poor	207	717	488
S11-1.5	20	May-2019	5.46	6.4	Poor	414	551	445
S11-1.5	30	May-2019	5.30	5.0	Poor	435	555	355
S11-3.0	10	May-2019	4.79	6.0	Poor	334	519	353
S11-3.0	20	May-2019	3.83	3.5	Fair	431	315	261
S11-3.0	30	May-2019	4.60	3.4	Poor	438	427	249
S11-7.0	10	May-2019	3.02	1.9	Fair	362	136	122
S11-7.0	20	May-2019	3.20	1.6	Fair	419	133	126
S11-7.0	30	May-2019	3.31	1.7	Fair	417	188	128

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	0.9	10	12	18
MAX	9.3	36.0	866	1840	1550
GEOMEAN	3.1	8.0	113	351	305
	3.7	11.7	211	570	436



Nichols Environmental (Canada) Ltd.

TABLE: A-14

TITLE: Soil Analyses - 2020 CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area Topsoil	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S4-1.5	10	May-2020	5.20	39.7	Unsuitable	33	1140	778
S4-1.5	20	May-2020	4.65	39.2	Unsuitable	32	1200	852
S4-1.5	30	May-2020	2.82	33.0	Unsuitable	20	1080	745
S4-3.0	10	May-2020	2.55	21.0	Unsuitable	16	237	215
S4-3.0	20	May-2020	2.90	25.0	Unsuitable	21	531	389
S4-3.0	30	May-2020	3.80	29.9	Unsuitable	37	979	746
S4-7.0	10	May-2020	1.30	11.6	Poor	25	238	226
S4-7.0	20	May-2020	1.94	18.2	Unsuitable	25	362	354
S4-7.0	30	May-2020	1.86	22.2	Unsuitable	22	455	449
S5-1.5	10	May-2020	1.41	19.9	Unsuitable	10	107	176
S5-1.5	20	May-2020	1.15	10.3	Poor	19	171	140
S5-1.5	30	May-2020	1.94	17.6	Unsuitable	20	284	277
S5-3.0	10	May-2020	1.60	9.3	Poor	49	201	223
S5-3.0	20	May-2020	1.47	7.2	Fair	43	217	167
S5-3.0	30	May-2020	1.26	14.2	Unsuitable	16	202	203
S5-7.0	10	May-2020	1.01	2.6	Good	121	95	119
S5-7.0	20	May-2020	0.90	2.9	Good	92	73	113
S5-7.0	30	May-2020	3.92	1.8	Fair	660	369	200
S6-1.5	10	May-2020	3.25	17.5	Unsuitable	33	487	318
S6-1.5	20	May-2020	1.50	12.3	Unsuitable	20	335	215
S6-1.5	30	May-2020	2.37	15.2	Unsuitable	25	277	276
S6-3.0	10	May-2020	1.15	5.1	Fair	32	46	90
S6-3.0	20	May-2020	0.79	9.2	Poor	9	63	94
S6-3.0	30	May-2020	2.40	8.0	Fair	70	95	246
S6-7.0	10	May-2020	1.09	<0.34	Good	96	29	10
S6-7.0	20	May-2020	0.42	1.5	Good	16	10	20
S6-7.0	30	May-2020	2.63	1.8	Fair	213	9	87
S8-1.5	10	May-2020	8.98	35.8	Unsuitable	48	1280	704
S8-1.5	20	May-2020	11.60	46.3	Unsuitable	71	2870	1330
S8-1.5	30	May-2020	7.96	31.6	Unsuitable	79	2020	1170
S8-3.0	10	May-2020	2.06	25.4	Unsuitable	7	154	170
S8-3.0	20	May-2020	4.84	35.5	Unsuitable	23	874	538
S8-3.0	30	May-2020	7.93	21.5	Unsuitable	212	1800	1120
S8-7.0	10	May-2020	3.82	9.7	Poor	165	1060	569
S8-7.0	20	May-2020	3.46	12.9	Unsuitable	63	790	397
S8-7.0	30	May-2020	3.72	13.0	Unsuitable	72	816	474
S9-1.5	10	May-2020	4.01	21.8	Unsuitable	35	939	415
S9-1.5	20	May-2020	8.18	13.7	Unsuitable	300	1350	787
S9-1.5	30	May-2020	7.23	16.9	Unsuitable	150	1740	724
S9-3.0	10	May-2020	1.74	12.7	Unsuitable	30	170	235
S9-3.0	20	May-2020	5.41	7.2	Poor	272	490	393
S9-3.0	30	May-2020	7.30	9.2	Poor	323	1020	572
S9-7.0	10	May-2020	1.09	1.4	Good	89	63	48
S9-7.0	20	May-2020	2.18	1.3	Fair	210	24	63
S9-7.0	30	May-2020	3.46	1.7	Fair	334	54	109
S11-1.5	10	May-2020	2.17	16.4	Unsuitable	29	198	278
S11-1.5	20	May-2020	6.15	7.6	Poor	283	690	396
S11-1.5	30	May-2020	5.10	5.2	Poor	296	456	285
S11-3.0	10	May-2020	5.46	14.2	Unsuitable	139	904	536
S11-3.0	20	May-2020	5.80	5.4	Poor	358	570	331
S11-3.0	30	May-2020	5.44	3.9	Poor	389	685	268
S11-7.0	10	May-2020	2.71	3.2	Fair	181	211	141
S11-7.0	20	May-2020	3.99	2.0	Fair	324	237	121
S11-7.0	30	May-2020	3.89	1.8	Fair	284	178	95

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*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	1.3	7	9	10
MAX	11.6	46.3	660	2870	1330
GEOMEAN	2.8	9.8	64	303	257
AVERAGE	3.6	14.6	121	573	370



Nichols Environmental (Canada) Ltd.

TABLE: A-15
 TITLE: Soil Analyses - 10 cm CaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S4-1.5	10	Nov-2018	6.37	37.0	Unsuitable	100	2040	1620
S4-1.5	10	May-2019	5.02	36.0	Unsuitable	30	986	647
S4-1.5	10	May-2020	5.20	39.7	Unsuitable	33	1140	778
S4-3.0	10	Nov-2018	1.56	15.2	Unsuitable	14.3	157	169
S4-3.0	10	May-2019	1.58	16.1	Unsuitable	9.5	139	128
S4-3.0	10	May-2020	2.55	21.0	Unsuitable	16	237	215
S4-7.0	10	Nov-2018	1.26	9.8	Poor	42.7	226	287
S4-7.0	10	May-2019	2.41	13.0	Unsuitable	52	486	359
S4-7.0	10	May-2020	1.30	11.6	Poor	25	238	226
S5-1.5	10	Nov-2018	1.59	8.2	Poor	39.2	107	155
S5-1.5	10	May-2019	1.23	9.3	Poor	21	124	135
S5-1.5	10	May-2020	1.41	19.9	Unsuitable	10	107	176
S5-3.0	10	Nov-2018	1.01	1.6	Good	98.7	73	62
S5-3.0	10	May-2019	1.16	3.7	Good	72.4	184	120
S5-3.0	10	May-2020	1.60	9.3	Poor	49	201	223
S5-7.0	10	Nov-2018	1.73	2.2	Good	242	127	158
S5-7.0	10	May-2019	2.32	2.6	Fair	299	238	195
S5-7.0	10	May-2020	1.01	2.6	Good	121	95	119
S6-1.5	10	Nov-2018	1.60	3.4	Good	111	47	117
S6-1.5	10	May-2019	1.97	5.6	Fair	87.5	203	172
S6-1.5	10	May-2020	3.25	17.5	Unsuitable	33	487	318
S6-3.0	10	Nov-2018	0.68	4.0	Fair	32.1	38	86
S6-3.0	10	May-2019	0.75	5.5	Fair	19.4	52	81
S6-3.0	10	May-2020	1.15	5.1	Fair	32	46	90
S6-7.0	10	Nov-2018	0.68	0.6	Good	81.1	23	23
S6-7.0	10	May-2019	0.48	0.9	Good	31.1	16	18
S6-7.0	10	May-2020	1.09	<0.34	Good	96	29	10
S8-1.5	10	Nov-2018	1.91	23.8	Unsuitable	7.6	179	179
S8-1.5	10	May-2019	7.26	27.0	Unsuitable	80.8	1090	702
S8-1.5	10	May-2020	8.98	35.8	Unsuitable	48	1280	704
S8-3.0	10	Nov-2018	1.76	12.8	Unsuitable	22.9	178	181
S8-3.0	10	May-2019	3.96	34.0	Unsuitable	18	586	410
S8-3.0	10	May-2020	2.06	25.4	Unsuitable	7	154	170
S8-7.0	10	Nov-2018	2.57	12.0	Poor	110	457	607
S8-7.0	10	May-2019	3.24	13.0	Unsuitable	155	1410	842
S8-7.0	10	May-2020	3.82	9.7	Poor	165	1060	569
S9-1.5	10	Nov-2018	3.72	16.0	Unsuitable	86	710	495
S9-1.5	10	May-2019	6.08	18.3	Unsuitable	130	1220	688
S9-1.5	10	May-2020	4.01	21.8	Unsuitable	35	939	415
S9-3.0	10	Nov-2018	1.29	8.0	Poor	34	171	160
S9-3.0	10	May-2019	1.66	7.9	Fair	48.4	262	189
S9-3.0	10	May-2020	1.74	12.7	Unsuitable	30	170	235
S9-7.0	10	Nov-2018	1.09	1.3	Good	99.7	61	48
S9-7.0	10	May-2019	1.21	1.8	Good	89.7	115	59
S9-7.0	10	May-2020	1.09	1.4	Good	89	63	48
S11-1.5	10	Nov-2018	2.84	11.0	Poor	96.7	271	340
S11-1.5	10	May-2019	5.10	10.4	Poor	207	717	488
S11-1.5	10	May-2020	2.17	16.4	Unsuitable	29	198	278
S11-3.0	10	Nov-2018	2.69	5.3	Fair	211	230	268
S11-3.0	10	May-2019	4.79	6.0	Poor	334	519	353
S11-3.0	10	May-2020	5.46	14.2	Unsuitable	139	904	536
S11-7.0	10	Nov-2018	2.08	1.2	Fair	274	31	66
S11-7.0	10	May-2019	3.02	1.9	Fair	362	136	122
S11-7.0	10	May-2020	2.71	3.2	Fair	181	211	141

BOLD = Parameter Exceeds Recommended Guideline Criteria
 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	0.6	7	16	10
MAX	9.0	39.7	362	2040	1620
GEOMEAN	2.1	7.9	58	212	194
AVERAGE	2.6	12.3	90.5	392.0	295.9



Nichols Environmental (Canada) Ltd.

TABLE: A-16
 TITLE: Soil Analyses - 20 cm CaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S4-1.5	20	Nov-2018	6.63	37.0	Unsuitable	103	1970	1610
S4-1.5	20	May-2019	4.42	36.0	Unsuitable	35	1240	900
S4-1.5	20	May-2020	4.65	39.2	Unsuitable	32	1200	852
S4-3.0	20	Nov-2018	2.38	19.0	Unsuitable	26	429	344
S4-3.0	20	May-2019	2.57	21.0	Unsuitable	19	349	278
S4-3.0	20	May-2020	2.90	25.0	Unsuitable	21	531	389
S4-7.0	20	Nov-2018	2.44	17.0	Unsuitable	54	558	505
S4-7.0	20	May-2019	2.58	17.0	Unsuitable	41	534	431
S4-7.0	20	May-2020	1.94	18.2	Unsuitable	25	362	354
S5-1.5	20	Nov-2018	2.31	13.0	Unsuitable	49	417	299
S5-1.5	20	May-2019	2.50	14.0	Unsuitable	46	443	296
S5-1.5	20	May-2020	1.15	10.3	Poor	19	171	140
S5-3.0	20	Nov-2018	1.89	4.1	Fair	176	275	216
S5-3.0	20	May-2019	2.60	6.0	Fair	192	550	344
S5-3.0	20	May-2020	1.47	7.2	Fair	43	217	167
S5-7.0	20	Nov-2018	4.00	4.6	Poor	760	221	579
S5-7.0	20	May-2019	3.58	3.7	Fair	559	207	378
S5-7.0	20	May-2020	0.90	2.9	Good	92	73	113
S6-1.5	20	Nov-2018	1.18	8.8	Poor	26.8	155	166
S6-1.5	20	May-2019	1.34	9.3	Poor	24	177	152
S6-1.5	20	May-2020	1.50	12.3	Unsuitable	20	335	215
S6-3.0	20	Nov-2018	0.94	7.1	Fair	28.1	131	153
S6-3.0	20	May-2019	1.17	8.6	Poor	21.9	154	141
S6-3.0	20	May-2020	0.79	9.2	Poor	9	63	94
S6-7.0	20	Nov-2018	0.85	2.0	Good	59.2	19	58
S6-7.0	20	May-2019	1.83	1.5	Good	187	12	75
S6-7.0	20	May-2020	0.42	1.5	Good	16	10	20
S8-1.5	20	Nov-2018	5.59	35.0	Unsuitable	35	789	622
S8-1.5	20	May-2019	6.62	24.1	Unsuitable	115	1090	884
S8-1.5	20	May-2020	11.60	46.3	Unsuitable	71	2870	1330
S8-3.0	20	Nov-2018	2.82	38.0	Unsuitable	11	374	422
S8-3.0	20	May-2019	5.90	29.0	Unsuitable	68	1130	821
S8-3.0	20	May-2020	4.84	35.5	Unsuitable	23	874	538
S8-7.0	20	Nov-2018	4.98	11.3	Poor	297	707	789
S8-7.0	20	May-2019	3.27	15.0	Unsuitable	79	801	517
S8-7.0	20	May-2020	3.46	12.9	Unsuitable	63	790	397
S9-1.5	20	Nov-2018	6.20	13.3	Unsuitable	258	1260	755
S9-1.5	20	May-2019	6.22	15.5	Unsuitable	195	1370	769
S9-1.5	20	May-2020	8.18	13.7	Unsuitable	300	1350	787
S9-3.0	20	Nov-2018	2.47	9.9	Poor	76.3	369	302
S9-3.0	20	May-2019	3.94	7.2	Fair	221	559	367
S9-3.0	20	May-2020	5.41	7.2	Poor	272	490	393
S9-7.0	20	Nov-2018	1.02	1.7	Good	91	37	58
S9-7.0	20	May-2019	2.35	1.9	Fair	244	98	102
S9-7.0	20	May-2020	2.18	1.3	Fair	210	24	63
S11-1.5	20	Nov-2018	5.25	6.9	Poor	424	501	491
S11-1.5	20	May-2019	5.46	6.4	Poor	414	551	445
S11-1.5	20	May-2020	6.15	7.6	Poor	283	690	396
S11-3.0	20	Nov-2018	5.02	5.0	Poor	414	441	334
S11-3.0	20	May-2019	3.83	3.5	Fair	431	315	261
S11-3.0	20	May-2020	5.80	5.4	Poor	358	570	331
S11-7.0	20	Nov-2018	3.32	1.6	Fair	407	147	110
S11-7.0	20	May-2019	3.20	1.6	Fair	419	133	126
S11-7.0	20	May-2020	3.99	2.0	Fair	324	237	121

BOLD = Parameter Exceeds Recommended Guideline Criteria
 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	1.3	9	10	20
MAX	11.6	46.3	760	2870	1610
GEOMEAN	2.8	8.6	88	318	290
AVERAGE	3.5	13.2	163	544	404



Nichols Environmental (Canada) Ltd.

TABLE: A-17
 TITLE: Soil Analyses - 30 cm CaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S4-1.5	30	Nov-2018	6.47	31.0	Unsuitable	190	2310	2050
S4-1.5	30	May-2019	4.41	31.0	Unsuitable	54	1160	1020
S4-1.5	30	May-2020	2.82	33.0	Unsuitable	20	1080	745
S4-3.0	30	Nov-2018	4.22	24.0	Unsuitable	74	1070	818
S4-3.0	30	May-2019	3.40	24.0	Unsuitable	32	637	470
S4-3.0	30	May-2020	3.80	29.9	Unsuitable	37	979	746
S4-7.0	30	Nov-2018	3.31	21.0	Unsuitable	79	961	874
S4-7.0	30	May-2019	3.75	19.0	Unsuitable	100	699	844
S4-7.0	30	May-2020	1.86	22.2	Unsuitable	22	455	449
S5-1.5	30	Nov-2018	4.34	16.1	Unsuitable	135	1010	655
S5-1.5	30	May-2019	1.45	11.6	Poor	21	192	160
S5-1.5	30	May-2020	1.94	17.6	Unsuitable	20	284	277
S5-3.0	30	Nov-2018	6.49	7.7	Poor	1180	1640	1260
S5-3.0	30	May-2019	6.42	7.5	Poor	866	1410	980
S5-3.0	30	May-2020	1.26	14.2	Unsuitable	16	202	203
S5-7.0	30	Nov-2018	5.50	4.4	Poor	1290	351	830
S5-7.0	30	May-2019	4.56	3.4	Poor	806	279	459
S5-7.0	30	May-2020	3.92	1.8	Fair	660	369	200
S6-1.5	30	Nov-2018	1.31	9.7	Poor	32.3	250	230
S6-1.5	30	May-2019	1.08	9.5	Poor	17.2	150	141
S6-1.5	30	May-2020	2.37	15.2	Unsuitable	25	277	276
S6-3.0	30	Nov-2018	1.82	7.5	Fair	65.1	252	236
S6-3.0	30	May-2019	1.22	7.7	Fair	26.3	176	144
S6-3.0	30	May-2020	2.40	8.0	Fair	70	95	246
S6-7.0	30	Nov-2018	3.00	2.5	Fair	412	34	192
S6-7.0	30	May-2019	2.98	2.2	Fair	329	19	142
S6-7.0	30	May-2020	2.63	1.8	Fair	213	9	87
S8-1.5	30	Nov-2018	8.05	25.1	Unsuitable	211	1530	1330
S8-1.5	30	May-2019	8.71	16.9	Unsuitable	483	1290	1350
S8-1.5	30	May-2020	7.96	31.6	Unsuitable	79	2020	1170
S8-3.0	30	Nov-2018	9.08	18.5	Unsuitable	448	1220	1400
S8-3.0	30	May-2019	9.34	18.9	Unsuitable	513	1390	1550
S8-3.0	30	May-2020	7.93	21.5	Unsuitable	212	1800	1120
S8-7.0	30	Nov-2018	6.91	9.9	Poor	597	1230	994
S8-7.0	30	May-2019	3.50	11.0	Poor	130	934	534
S8-7.0	30	May-2020	3.72	13.0	Unsuitable	72	816	474
S9-1.5	30	Nov-2018	8.32	14.9	Unsuitable	401	2010	1170
S9-1.5	30	May-2019	9.30	14.5	Unsuitable	480	1840	1150
S9-1.5	30	May-2020	7.23	16.9	Unsuitable	150	1740	724
S9-3.0	30	Nov-2018	8.17	9.3	Unsuitable	589	1630	863
S9-3.0	30	May-2019	6.50	8.8	Poor	408	1080	655
S9-3.0	30	May-2020	7.30	9.2	Poor	323	1020	572
S9-7.0	30	Nov-2018	3.27	2.4	Fair	444	190	193
S9-7.0	30	May-2019	3.42	2.2	Fair	459	154	196
S9-7.0	30	May-2020	3.46	1.7	Fair	334	54	109
S11-1.5	30	Nov-2018	4.58	4.2	Poor	509	590	358
S11-1.5	30	May-2019	5.30	5.0	Poor	435	555	355
S11-1.5	30	May-2020	5.10	5.2	Poor	296	456	285
S11-3.0	30	Nov-2018	4.93	3.3	Poor	437	540	238
S11-3.0	30	May-2019	4.60	3.4	Poor	438	427	249
S11-3.0	30	May-2020	5.44	3.9	Poor	389	685	268
S11-7.0	30	Nov-2018	3.40	1.6	Fair	413	210	112
S11-7.0	30	May-2019	3.31	1.7	Fair	417	188	128
S11-7.0	30	May-2020	3.89	1.8	Fair	284	178	95

BOLD = Parameter Exceeds Recommended Guideline Criteria
 BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	1.1	1.6	16	9	87
MAX	9.3	33.0	1290	2310	2050
GEOMEAN	4.0	8.5	173	478	431
AVERAGE	4.7	12.2	310	780	600



Nichols Environmental (Canada) Ltd.

TABLE: A-18

TITLE: Soil Analyses - 1.5 m CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area Topsoil	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S4-1.5	10	Nov-2018	6.37	37.0	Unsuitable	100	2040	1620
S4-1.5	10	May-2019	5.02	36.0	Unsuitable	30	986	647
S4-1.5	10	May-2020	5.20	39.7	Unsuitable	33	1140	778
S4-1.5	20	Nov-2018	6.63	37.0	Unsuitable	103	1970	1610
S4-1.5	20	May-2019	4.42	36.0	Unsuitable	35	1240	900
S4-1.5	20	May-2020	4.65	39.2	Unsuitable	32	1200	852
S4-1.5	30	Nov-2018	6.47	31.0	Unsuitable	190	2310	2050
S4-1.5	30	May-2019	4.41	31.0	Unsuitable	54	1160	1020
S4-1.5	30	May-2020	2.82	33.0	Unsuitable	20	1080	745
S5-1.5	10	Nov-2018	1.59	8.2	Poor	39.2	107	155
S5-1.5	10	May-2019	1.23	9.3	Poor	21	124	135
S5-1.5	10	May-2020	1.41	19.9	Unsuitable	10	107	176
S5-1.5	20	Nov-2018	2.31	13.0	Unsuitable	49	417	299
S5-1.5	20	May-2019	2.50	14.0	Unsuitable	46	443	296
S5-1.5	20	May-2020	1.15	10.3	Poor	19	171	140
S5-1.5	30	Nov-2018	4.34	16.1	Unsuitable	135	1010	655
S5-1.5	30	May-2019	1.45	11.6	Poor	21	192	160
S5-1.5	30	May-2020	1.94	17.6	Unsuitable	20	284	277
S6-1.5	10	Nov-2018	1.60	3.4	Good	111	47	117
S6-1.5	10	May-2019	1.97	5.6	Fair	87.5	203	172
S6-1.5	10	May-2020	3.25	17.5	Unsuitable	33	487	318
S6-1.5	20	Nov-2018	1.18	8.8	Poor	26.8	155	166
S6-1.5	20	May-2019	1.34	9.3	Poor	24	177	152
S6-1.5	20	May-2020	1.50	12.3	Unsuitable	20	335	215
S6-1.5	30	Nov-2018	1.31	9.7	Poor	32.3	250	230
S6-1.5	30	May-2019	1.08	9.5	Poor	17.2	150	141
S6-1.5	30	May-2020	2.37	15.2	Unsuitable	25	277	276
S8-1.5	10	Nov-2018	1.91	23.8	Unsuitable	7.6	179	179
S8-1.5	10	May-2019	7.26	27.0	Unsuitable	80.8	1090	702
S8-1.5	10	May-2020	8.98	35.8	Unsuitable	48	1280	704
S8-1.5	20	Nov-2018	5.59	35.0	Unsuitable	35	789	622
S8-1.5	20	May-2019	6.62	24.1	Unsuitable	115	1090	884
S8-1.5	20	May-2020	11.60	46.3	Unsuitable	71	2870	1330
S8-1.5	30	Nov-2018	8.05	25.1	Unsuitable	211	1530	1330
S8-1.5	30	May-2019	8.71	16.9	Unsuitable	483	1290	1350
S8-1.5	30	May-2020	7.96	31.6	Unsuitable	79	2020	1170
S9-1.5	10	Nov-2018	3.72	16.0	Unsuitable	86	710	495
S9-1.5	10	May-2019	6.08	18.3	Unsuitable	130	1220	688
S9-1.5	10	May-2020	4.01	21.8	Unsuitable	35	939	415
S9-1.5	20	Nov-2018	6.20	13.3	Unsuitable	258	1260	755
S9-1.5	20	May-2019	6.22	15.5	Unsuitable	195	1370	769
S9-1.5	20	May-2020	8.18	13.7	Unsuitable	300	1350	787
S9-1.5	30	Nov-2018	8.32	14.9	Unsuitable	401	2010	1170
S9-1.5	30	May-2019	9.30	14.5	Unsuitable	480	1840	1150
S9-1.5	30	May-2020	7.23	16.9	Unsuitable	150	1740	724
S11-1.5	10	Nov-2018	2.84	11.0	Poor	96.7	271	340
S11-1.5	10	May-2019	5.10	10.4	Poor	207	717	488
S11-1.5	10	May-2020	2.17	16.4	Unsuitable	29	198	278
S11-1.5	20	Nov-2018	5.25	6.9	Poor	424	501	491
S11-1.5	20	May-2019	5.46	6.4	Poor	414	551	445
S11-1.5	20	May-2020	6.15	7.6	Poor	283	690	396
S11-1.5	30	Nov-2018	4.58	4.2	Poor	509	590	358
S11-1.5	30	May-2019	5.30	5.0	Poor	435	555	355
S11-1.5	30	May-2020	5.10	5.2	Poor	296	456	285

BOLD = Parameter Exceeds Recommended Guideline Criteria
BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	1.1	3.4	8	47	117
MAX	11.6	46.3	509	2870	2050
GEOMEAN	3.8	15.5	73	596	462
	4.6	18.8	133	873	610



Nichols Environmental (Canada) Ltd.

TABLE: A-19
 TITLE: Soil Analyses - 3.0 m CaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S4-3.0	10	Nov-2018	1.56	15.2	Unsuitable	14.3	157	169
S4-3.0	10	May-2019	1.58	16.1	Unsuitable	9.5	139	128
S4-3.0	10	May-2020	2.55	21.0	Unsuitable	16	237	215
S4-3.0	20	Nov-2018	2.38	19.0	Unsuitable	26	429	344
S4-3.0	20	May-2019	2.57	21.0	Unsuitable	19	349	278
S4-3.0	20	May-2020	2.90	25.0	Unsuitable	21	531	389
S4-3.0	30	Nov-2018	4.22	24.0	Unsuitable	74	1070	818
S4-3.0	30	May-2019	3.40	24.0	Unsuitable	32	637	470
S4-3.0	30	May-2020	3.80	29.9	Unsuitable	37	979	746
S5-3.0	10	Nov-2018	1.01	1.6	Good	98.7	73	62
S5-3.0	10	May-2019	1.16	3.7	Good	72.4	184	120
S5-3.0	10	May-2020	1.60	9.3	Poor	49	201	223
S5-3.0	20	Nov-2018	1.89	4.1	Fair	176	275	216
S5-3.0	20	May-2019	2.60	6.0	Fair	192	550	344
S5-3.0	20	May-2020	1.47	7.2	Fair	43	217	167
S5-3.0	30	Nov-2018	6.49	7.7	Poor	1180	1640	1260
S5-3.0	30	May-2019	6.42	7.5	Poor	866	1410	980
S5-3.0	30	May-2020	1.26	14.2	Unsuitable	16	202	203
S6-3.0	10	Nov-2018	0.68	4.0	Fair	32.1	38	86
S6-3.0	10	May-2019	0.75	5.5	Fair	19.4	52	81
S6-3.0	10	May-2020	1.15	5.1	Fair	32	46	90
S6-3.0	20	Nov-2018	0.94	7.1	Fair	28.1	131	153
S6-3.0	20	May-2019	1.17	8.6	Poor	21.9	154	141
S6-3.0	20	May-2020	0.79	9.2	Poor	9	63	94
S6-3.0	30	Nov-2018	1.82	7.5	Fair	65.1	252	236
S6-3.0	30	May-2019	1.22	7.7	Fair	26.3	176	144
S6-3.0	30	May-2020	2.40	8.0	Fair	70	95	246
S8-3.0	10	Nov-2018	1.76	12.8	Unsuitable	22.9	178	181
S8-3.0	10	May-2019	3.96	34.0	Unsuitable	18	586	410
S8-3.0	10	May-2020	2.06	25.4	Unsuitable	7	154	170
S8-3.0	20	Nov-2018	2.82	38.0	Unsuitable	11	374	422
S8-3.0	20	May-2019	5.90	29.0	Unsuitable	68	1130	821
S8-3.0	20	May-2020	4.84	35.5	Unsuitable	23	874	538
S8-3.0	30	Nov-2018	9.08	18.5	Unsuitable	448	1220	1400
S8-3.0	30	May-2019	9.34	18.9	Unsuitable	513	1390	1550
S8-3.0	30	May-2020	7.93	21.5	Unsuitable	212	1800	1120
S9-3.0	10	Nov-2018	1.29	8.0	Poor	34	171	160
S9-3.0	10	May-2019	1.66	7.9	Fair	48.4	262	189
S9-3.0	10	May-2020	1.74	12.7	Unsuitable	30	170	235
S9-3.0	20	Nov-2018	2.47	9.9	Poor	76.3	369	302
S9-3.0	20	May-2019	3.94	7.2	Fair	221	559	367
S9-3.0	20	May-2020	5.41	7.2	Poor	272	490	393
S9-3.0	30	Nov-2018	8.17	9.3	Unsuitable	589	1630	863
S9-3.0	30	May-2019	6.50	8.8	Poor	408	1080	655
S9-3.0	30	May-2020	7.30	9.2	Poor	323	1020	572
S11-3.0	10	Nov-2018	2.69	5.3	Fair	211	230	268
S11-3.0	10	May-2019	4.79	6.0	Poor	334	519	353
S11-3.0	10	May-2020	5.46	14.2	Unsuitable	139	904	536
S11-3.0	20	Nov-2018	5.02	5.0	Poor	414	441	334
S11-3.0	20	May-2019	3.83	3.5	Fair	431	315	261
S11-3.0	20	May-2020	5.80	5.4	Poor	358	570	331
S11-3.0	30	Nov-2018	4.93	3.3	Poor	437	540	238
S11-3.0	30	May-2019	4.60	3.4	Poor	438	427	249
S11-3.0	30	May-2020	5.44	3.9	Poor	389	685	268

BOLD = Parameter Exceeds Recommended Guideline Criteria
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*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
 (all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.7	1.6	7	38	62
MAX	9.3	38.0	1180	1800	1550
GEOMEAN	2.8	9.8	76	348	297
AVERAGE	3.5	12.6	180	525	400



Nichols Environmental (Canada) Ltd.

TABLE: A-20

TITLE: Soil Analyses - 7.0 m CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
S4-7.0	10	Nov-2018	1.26	9.8	Poor	42.7	226	287
S4-7.0	10	May-2019	2.41	13.0	Unsuitable	52	486	359
S4-7.0	10	May-2020	1.30	11.6	Poor	25	238	226
S4-7.0	20	Nov-2018	2.44	17.0	Unsuitable	54	558	505
S4-7.0	20	May-2019	2.58	17.0	Unsuitable	41	534	431
S4-7.0	20	May-2020	1.94	18.2	Unsuitable	25	362	354
S4-7.0	30	Nov-2018	3.31	21.0	Unsuitable	79	961	874
S4-7.0	30	May-2019	3.75	19.0	Unsuitable	100	699	844
S4-7.0	30	May-2020	1.86	22.2	Unsuitable	22	455	449
S5-7.0	10	Nov-2018	1.73	2.2	Good	242	127	158
S5-7.0	10	May-2019	2.32	2.6	Fair	299	238	195
S5-7.0	10	May-2020	1.01	2.6	Good	121	95	119
S5-7.0	20	Nov-2018	4.00	4.6	Poor	760	221	579
S5-7.0	20	May-2019	3.58	3.7	Fair	559	207	378
S5-7.0	20	May-2020	0.90	2.9	Good	92	73	113
S5-7.0	30	Nov-2018	5.50	4.4	Poor	1290	351	830
S5-7.0	30	May-2019	4.56	3.4	Poor	806	279	459
S5-7.0	30	May-2020	3.92	1.8	Fair	660	369	200
S6-7.0	10	Nov-2018	0.68	0.6	Good	81.1	23	23
S6-7.0	10	May-2019	0.48	0.9	Good	31.1	16	18
S6-7.0	10	May-2020	1.09	<0.34	Good	96	29	10
S6-7.0	20	Nov-2018	0.85	2.0	Good	59.2	19	58
S6-7.0	20	May-2019	1.83	1.5	Good	187	12	75
S6-7.0	20	May-2020	0.42	1.5	Good	16	10	20
S6-7.0	30	Nov-2018	3.00	2.5	Fair	412	34	192
S6-7.0	30	May-2019	2.98	2.2	Fair	329	19	142
S6-7.0	30	May-2020	2.63	1.8	Fair	213	9	87
S8-7.0	10	Nov-2018	2.57	12.0	Poor	110	457	607
S8-7.0	10	May-2019	3.24	13.0	Unsuitable	155	1410	842
S8-7.0	10	May-2020	3.82	9.7	Poor	165	1060	569
S8-7.0	20	Nov-2018	4.98	11.3	Poor	297	707	789
S8-7.0	20	May-2019	3.27	15.0	Unsuitable	79	801	517
S8-7.0	20	May-2020	3.46	12.9	Unsuitable	63	790	397
S8-7.0	30	Nov-2018	6.91	9.9	Poor	597	1230	994
S8-7.0	30	May-2019	3.50	11.0	Poor	130	934	534
S8-7.0	30	May-2020	3.72	13.0	Unsuitable	72	816	474
S9-7.0	10	Nov-2018	1.09	1.3	Good	99.7	61	48
S9-7.0	10	May-2019	1.21	1.8	Good	89.7	115	59
S9-7.0	10	May-2020	1.09	1.4	Good	89	63	48
S9-7.0	20	Nov-2018	1.02	1.7	Good	91	37	58
S9-7.0	20	May-2019	2.35	1.9	Fair	244	98	102
S9-7.0	20	May-2020	2.18	1.3	Fair	210	24	63
S9-7.0	30	Nov-2018	3.27	2.4	Fair	444	190	193
S9-7.0	30	May-2019	3.42	2.2	Fair	459	154	196
S9-7.0	30	May-2020	3.46	1.7	Fair	334	54	109
S11-7.0	10	Nov-2018	2.08	1.2	Fair	274	31	66
S11-7.0	10	May-2019	3.02	1.9	Fair	362	136	122
S11-7.0	10	May-2020	2.71	3.2	Fair	181	211	141
S11-7.0	20	Nov-2018	3.32	1.6	Fair	407	147	110
S11-7.0	20	May-2019	3.20	1.6	Fair	419	133	126
S11-7.0	20	May-2020	3.99	2.0	Fair	324	237	121
S11-7.0	30	Nov-2018	3.40	1.6	Fair	413	210	112
S11-7.0	30	May-2019	3.31	1.7	Fair	417	188	128
S11-7.0	30	May-2020	3.89	1.8	Fair	284	178	95

BOLD = Parameter Exceeds Recommended Guideline Criteria
BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.6	16	9	10
MAX	6.9	22.2	1290	1410	994
GEOMEAN	2.3	3.8	157	155	177
AVERAGE	2.7	6.2	250	317	289



Nichols Environmental (Canada) Ltd.

TABLE: A-21

TITLE: Soil Analyses - All UDI Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area Topsoil	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SC-1.5	10	Nov-2018	1.60	3.0	Good	148	386	162
SC-1.5	10	May-2019	2.09	3.9	Fair	144	379	183
SC-1.5	10	May-2020	2.13	4.1	Fair	125	416	174
SC-1.5	20	Nov-2018	3.26	3.7	Fair	285	818	238
SC-1.5	20	May-2019	2.38	3.5	Fair	144	443	149
SC-1.5	20	May-2020	3.42	4.4	Fair	215	649	234
SC-1.5	30	Nov-2018	4.59	3.5	Poor	397	948	250
SC-1.5	30	May-2019	3.01	3.4	Fair	207	508	168
SC-1.5	30	May-2020	3.93	4.3	Fair	212	687	209
SC-3.0	10	Nov-2018	1.17	1.9	Good	126	120	90
SC-3.0	10	May-2019	1.44	2.5	Good	138	146	117
SC-3.0	10	May-2020	1.17	2.0	Good	86	89	72
SC-3.0	20	Nov-2018	1.22	2.7	Good	86.3	161	95
SC-3.0	20	May-2019	1.59	2.9	Good	125	214	121
SC-3.0	20	May-2020	1.29	3.0	Good	70	160	89
SC-3.0	30	Nov-2018	2.68	2.3	Fair	266	450	135
SC-3.0	30	May-2019	2.06	2.5	Fair	154	288	111
SC-3.0	30	May-2020	1.17	2.6	Good	65	92	75
SC-7.0	10	Nov-2018	1.05	0.4	Good	180	44	25
SC-7.0	10	May-2019	1.66	0.6	Good	289	46	41
SC-7.0	10	May-2020	1.08	0.5	Good	129	22	22
SC-7.0	20	Nov-2018	0.84	0.5	Good	103	15	21
SC-7.0	20	May-2019	1.54	0.6	Good	210	25	32
SC-7.0	20	May-2020	0.88	0.6	Good	95	16	23
SC-7.0	30	Nov-2018	1.11	0.5	Good	138	18	21
SC-7.0	30	May-2019	1.30	0.6	Good	154	28	26
SC-7.0	30	May-2020	0.64	0.6	Good	65	7	18
SE-1.5	10	Nov-2018	1.50	1.1	Good	194	3	60
SE-1.5	10	May-2019	1.20	1.1	Good	141	55	51
SE-1.5	10	May-2020	1.17	4.3	Fair	48	83	106
SE-1.5	20	Nov-2018	1.73	1.0	Good	258	62	66
SE-1.5	20	May-2019	1.17	1.1	Good	118	42	46
SE-1.5	20	May-2020	1.16	2.2	Good	70	102	67
SE-1.5	30	Nov-2018	1.39	0.8	Good	207	34	55
SE-1.5	30	May-2019	2.05	0.8	Fair	284	26	53
SE-1.5	30	May-2020	1.45	1.4	Good	126	112	60
SE-3.0	10	Nov-2018	0.98	0.4	Good	163	30	23
SE-3.0	10	May-2019	1.06	0.5	Good	162	23	25
SE-3.0	10	May-2020	1.05	0.7	Good	103	57	28
SE-3.0	20	Nov-2018	0.60	0.5	Good	83.8	14	20
SE-3.0	20	May-2019	0.74	0.5	Good	100	16	21
SE-3.0	20	May-2020	0.58	0.6	Good	64	17	19
SE-3.0	30	Nov-2018	0.54	0.5	Good	65.8	11	18
SE-3.0	30	May-2019	0.79	0.5	Good	100	20	20
SE-3.0	30	May-2020	0.43	0.6	Good	29	10	12
SF-1.5	10	Nov-2018	1.82	6.3	Fair	100	283	256
SF-1.5	10	May-2019	3.03	11.0	Poor	100	670	440
SF-1.5	10	May-2020	2.35	12.2	Unsuitable	44	371	297
SF-1.5	20	Nov-2018	1.53	5.0	Fair	107	146	221
SF-1.5	20	May-2019	2.89	9.9	Poor	109	592	415
SF-1.5	20	May-2020	2.53	7.2	Fair	84	377	250
SF-1.5	30	Nov-2018	2.25	3.2	Fair	251	188	206
SF-1.5	30	May-2019	4.01	6.1	Poor	351	578	430
SF-1.5	30	May-2020	2.05	4.7	Fair	107	390	221
SF-3.0	10	Nov-2018	1.60	3.7	Good	142	183	184
SF-3.0	10	May-2019	2.15	6.3	Fair	117	284	269
SF-3.0	10	May-2020	1.65	5.0	Fair	80	253	172
SF-3.0	20	Nov-2018	1.99	3.9	Good	166	236	199
SF-3.0	20	May-2019	3.26	3.2	Fair	388	294	239
SF-3.0	20	May-2020	2.38	3.3	Fair	159	296	158
SF-3.0	30	Nov-2018	2.91	1.9	Fair	506	277	182
SF-3.0	30	May-2019	3.11	1.8	Fair	595	243	168
SF-3.0	30	May-2020	2.95	2.1	Fair	234	315	126
SF-7.0	10	Nov-2018	1.22	1.1	Good	181	104	68
SF-7.0	10	May-2019	0.98	1.4	Good	91.1	91	52
SF-7.0	10	May-2020	0.87	1.5	Good	68	139	48
SF-7.0	20	Nov-2018	0.72	1.1	Good	92.5	69	48
SF-7.0	20	May-2019	1.06	1.0	Good	117	87	44
SF-7.0	20	May-2020	0.66	1.0	Good	53	95	28
SF-7.0	30	Nov-2018	2.06	1.1	Fair	269	132	78
SF-7.0	30	May-2019	1.96	1.1	Good	228	116	67
SF-7.0	30	May-2020	1.18	1.2	Good	95	126	46

BOLD = Parameter Exceeds Recommended Guideline Criteria**BOLD** = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

EC MIN 0.4 0.4

MAX 4.6 12.2

GEOMEAN 1.5 1.7

AVERAGE 1.7 2.6

Ca 29 3 12

Cl- 595 948 440

Na 135 105 79

160 206 119



Nichols Environmental (Canada) Ltd.

TABLE: A-22

TITLE: Soil Analyses - 2018 Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SC-1.5	10	Nov-2018	1.60	3.0	Good	148	386	162
SC-1.5	20	Nov-2018	3.26	3.7	Fair	285	818	238
SC-1.5	30	Nov-2018	4.59	3.5	Poor	397	948	250
SC-3.0	10	Nov-2018	1.17	1.9	Good	126	120	90
SC-3.0	20	Nov-2018	1.22	2.7	Good	86.3	161	95
SC-3.0	30	Nov-2018	2.68	2.3	Fair	266	450	135
SC-7.0	10	Nov-2018	1.05	0.4	Good	180	44	25
SC-7.0	20	Nov-2018	0.84	0.5	Good	103	15	21
SC-7.0	30	Nov-2018	1.11	0.5	Good	138	18	21
SE-1.5	10	Nov-2018	1.50	1.1	Good	194	3	60
SE-1.5	20	Nov-2018	1.73	1.0	Good	258	62	66
SE-1.5	30	Nov-2018	1.39	0.8	Good	207	34	55
SE-3.0	10	Nov-2018	0.98	0.4	Good	163	30	23
SE-3.0	20	Nov-2018	0.60	0.5	Good	83.8	14	20
SE-3.0	30	Nov-2018	0.54	0.5	Good	65.8	11	18
SF-1.5	10	Nov-2018	1.82	6.3	Fair	100	283	256
SF-1.5	20	Nov-2018	1.53	5.0	Fair	107	146	221
SF-1.5	30	Nov-2018	2.25	3.2	Fair	251	188	206
SF-3.0	10	Nov-2018	1.60	3.7	Good	142	183	184
SF-3.0	20	Nov-2018	1.99	3.9	Good	166	236	199
SF-3.0	30	Nov-2018	2.91	1.9	Fair	506	277	182
SF-7.0	10	Nov-2018	1.22	1.1	Good	181	104	68
SF-7.0	20	Nov-2018	0.72	1.1	Good	92.5	69	48
SF-7.0	30	Nov-2018	2.06	1.1	Fair	269	132	78

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	0.4	66	3	18
MAX	4.6	6.3	506	948	256
GEOMEAN	1.5	1.5	165	90	80
AVERAGE	1.7	2.1	188	197	113



Nichols Environmental (Canada) Ltd.

TABLE: A-23

TITLE: Soil Analyses - 2019 Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area Topsoil	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SC-1.5	10	May-2019	2.09	3.9	Fair	144	379	183
SC-1.5	20	May-2019	2.38	3.5	Fair	144	443	149
SC-1.5	30	May-2019	3.01	3.4	Fair	207	508	168
SC-3.0	10	May-2019	1.44	2.5	Good	138	146	117
SC-3.0	20	May-2019	1.59	2.9	Good	125	214	121
SC-3.0	30	May-2019	2.06	2.5	Fair	154	288	111
SC-7.0	10	May-2019	1.66	0.6	Good	289	46	41
SC-7.0	20	May-2019	1.54	0.6	Good	210	25	32
SC-7.0	30	May-2019	1.30	0.6	Good	154	28	26
SE-1.5	10	May-2019	1.20	1.1	Good	141	55	51
SE-1.5	20	May-2019	1.17	1.1	Good	118	42	46
SE-1.5	30	May-2019	2.05	0.8	Fair	284	26	53
SE-3.0	10	May-2019	1.06	0.5	Good	162	23	25
SE-3.0	20	May-2019	0.74	0.5	Good	100	16	21
SE-3.0	30	May-2019	0.79	0.5	Good	100	20	20
SF-1.5	10	May-2019	3.03	11.0	Poor	100	670	440
SF-1.5	20	May-2019	2.89	9.9	Poor	109	592	415
SF-1.5	30	May-2019	4.01	6.1	Poor	351	578	430
SF-3.0	10	May-2019	2.15	6.3	Fair	117	284	269
SF-3.0	20	May-2019	3.26	3.2	Fair	388	294	239
SF-3.0	30	May-2019	3.11	1.8	Fair	595	243	168
SF-7.0	10	May-2019	0.98	1.4	Good	91.1	91	52
SF-7.0	20	May-2019	1.06	1.0	Good	117	87	44
SF-7.0	30	May-2019	1.96	1.1	Good	228	116	67

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.7	0.5	91	16	20
MAX	4.0	11.0	595	670	440
GEOMEAN	1.7	1.8	166	117	88
AVERAGE	1.9	2.8	190	217	137



Nichols Environmental (Canada) Ltd.

TABLE: A-24

TITLE: Soil Analyses - 2020 Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SC-1.5	10	May-2020	2.13	4.1	Fair	125	416	174
SC-1.5	20	May-2020	3.42	4.4	Fair	215	649	234
SC-1.5	30	May-2020	3.93	4.3	Fair	212	687	209
SC-3.0	10	May-2020	1.17	2.0	Good	86	89	72
SC-3.0	20	May-2020	1.29	3.0	Good	70	160	89
SC-3.0	30	May-2020	1.17	2.6	Good	65	92	75
SC-7.0	10	May-2020	1.08	0.5	Good	129	22	22
SC-7.0	20	May-2020	0.88	0.6	Good	95	16	23
SC-7.0	30	May-2020	0.64	0.6	Good	65	7	18
SE-1.5	10	May-2020	1.17	4.3	Fair	48	83	106
SE-1.5	20	May-2020	1.16	2.2	Good	70	102	67
SE-1.5	30	May-2020	1.45	1.4	Good	126	112	60
SE-3.0	10	May-2020	1.05	0.7	Good	103	57	28
SE-3.0	20	May-2020	0.58	0.6	Good	64	17	19
SE-3.0	30	May-2020	0.43	0.6	Good	29	10	12
SF-1.5	10	May-2020	2.35	12.2	Unsuitable	44	371	297
SF-1.5	20	May-2020	2.53	7.2	Fair	84	377	250
SF-1.5	30	May-2020	2.05	4.7	Fair	107	390	221
SF-3.0	10	May-2020	1.65	5.0	Fair	80	253	172
SF-3.0	20	May-2020	2.38	3.3	Fair	159	296	158
SF-3.0	30	May-2020	2.95	2.1	Fair	234	315	126
SF-7.0	10	May-2020	0.87	1.5	Good	68	139	48
SF-7.0	20	May-2020	0.66	1.0	Good	53	95	28
SF-7.0	30	May-2020	1.18	1.2	Good	95	126	46

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.5	29	7	12
MAX	3.9	12.2	234	687	297
GEOMEAN	1.4	2.0	89	111	72
AVERAGE	1.6	2.9	101	203	106



Nichols Environmental (Canada) Ltd.

TABLE: A-25

TITLE: Soil Analyses - 10 cm Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area Topsoil	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SC-1.5	10	Nov-2018	1.60	3.0	Good	148	386	162
SC-1.5	10	May-2019	2.09	3.9	Fair	144	379	183
SC-1.5	10	May-2020	2.13	4.1	Fair	125	416	174
SC-3.0	10	Nov-2018	1.17	1.9	Good	126	120	90
SC-3.0	10	May-2019	1.44	2.5	Good	138	146	117
SC-3.0	10	May-2020	1.17	2.0	Good	86	89	72
SC-7.0	10	Nov-2018	1.05	0.4	Good	180	44	25
SC-7.0	10	May-2019	1.66	0.6	Good	289	46	41
SC-7.0	10	May-2020	1.08	0.5	Good	129	22	22
SE-1.5	10	Nov-2018	1.50	1.1	Good	194	3	60
SE-1.5	10	May-2019	1.20	1.1	Good	141	55	51
SE-1.5	10	May-2020	1.17	4.3	Fair	48	83	106
SE-3.0	10	Nov-2018	0.98	0.4	Good	163	30	23
SE-3.0	10	May-2019	1.06	0.5	Good	162	23	25
SE-3.0	10	May-2020	1.05	0.7	Good	103	57	28
SF-1.5	10	Nov-2018	1.82	6.3	Fair	100	283	256
SF-1.5	10	May-2019	3.03	11.0	Poor	100	670	440
SF-1.5	10	May-2020	2.35	12.2	Unsuitable	44	371	297
SF-3.0	10	Nov-2018	1.60	3.7	Good	142	183	184
SF-3.0	10	May-2019	2.15	6.3	Fair	117	284	269
SF-3.0	10	May-2020	1.65	5.0	Fair	80	253	172
SF-7.0	10	Nov-2018	1.22	1.1	Good	181	104	68
SF-7.0	10	May-2019	0.98	1.4	Good	91.1	91	52
SF-7.0	10	May-2020	0.87	1.5	Good	68	139	48

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.9	0.4	44	3	22
MAX	3.0	12.2	289	670	440
GEOMEAN	1.4	2.0	119	104	85
AVERAGE	1.5	3.1	129	178	124



Nichols Environmental (Canada) Ltd.

TABLE: A-26

TITLE: Soil Analyses - 20 cm Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area Topsoil	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SC-1.5	20	Nov-2018	3.26	3.7	Fair	285	818	238
SC-1.5	20	May-2019	2.38	3.5	Fair	144	443	149
SC-1.5	20	May-2020	3.42	4.4	Fair	215	649	234
SC-3.0	20	Nov-2018	1.22	2.7	Good	86.3	161	95
SC-3.0	20	May-2019	1.59	2.9	Good	125	214	121
SC-3.0	20	May-2020	1.29	3.0	Good	70	160	89
SC-7.0	20	Nov-2018	0.84	0.5	Good	103	15	21
SC-7.0	20	May-2019	1.54	0.6	Good	210	25	32
SC-7.0	20	May-2020	0.88	0.6	Good	95	16	23
SE-1.5	20	Nov-2018	1.73	1.0	Good	258	62	66
SE-1.5	20	May-2019	1.17	1.1	Good	118	42	46
SE-1.5	20	May-2020	1.16	2.2	Good	70	102	67
SE-3.0	20	Nov-2018	0.60	0.5	Good	83.8	14	20
SE-3.0	20	May-2019	0.74	0.5	Good	100	16	21
SE-3.0	20	May-2020	0.58	0.6	Good	64	17	19
SF-1.5	20	Nov-2018	1.53	5.0	Fair	107	146	221
SF-1.5	20	May-2019	2.89	9.9	Poor	109	592	415
SF-1.5	20	May-2020	2.53	7.2	Fair	84	377	250
SF-3.0	20	Nov-2018	1.99	3.9	Good	166	236	199
SF-3.0	20	May-2019	3.26	3.2	Fair	388	294	239
SF-3.0	20	May-2020	2.38	3.3	Fair	159	296	158
SF-7.0	20	Nov-2018	0.72	1.1	Good	92.5	69	48
SF-7.0	20	May-2019	1.06	1.0	Good	117	87	44
SF-7.0	20	May-2020	0.66	1.0	Good	53	95	28

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.6	0.5	53	14	19
MAX	3.4	9.9	388	818	415
GEOMEAN	1.4	1.8	121	105	77
AVERAGE	1.6	2.6	138	206	118



Nichols Environmental (Canada) Ltd.

TABLE: A-27

TITLE: Soil Analyses - 30 cm Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area Topsoil	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SC-1.5	30	Nov-2018	4.59	3.5	Poor	397	948	250
SC-1.5	30	May-2019	3.01	3.4	Fair	207	508	168
SC-1.5	30	May-2020	3.93	4.3	Fair	212	687	209
SC-3.0	30	Nov-2018	2.68	2.3	Fair	266	450	135
SC-3.0	30	May-2019	2.06	2.5	Fair	154	288	111
SC-3.0	30	May-2020	1.17	2.6	Good	65	92	75
SC-7.0	30	Nov-2018	1.11	0.5	Good	138	18	21
SC-7.0	30	May-2019	1.30	0.6	Good	154	28	26
SC-7.0	30	May-2020	0.64	0.6	Good	65	7	18
SE-1.5	30	Nov-2018	1.39	0.8	Good	207	34	55
SE-1.5	30	May-2019	2.05	0.8	Fair	284	26	53
SE-1.5	30	May-2020	1.45	1.4	Good	126	112	60
SE-3.0	30	Nov-2018	0.54	0.5	Good	65.8	11	18
SE-3.0	30	May-2019	0.79	0.5	Good	100	20	20
SE-3.0	30	May-2020	0.43	0.6	Good	29	10	12
SF-1.5	30	Nov-2018	2.25	3.2	Fair	251	188	206
SF-1.5	30	May-2019	4.01	6.1	Poor	351	578	430
SF-1.5	30	May-2020	2.05	4.7	Fair	107	390	221
SF-3.0	30	Nov-2018	2.91	1.9	Fair	506	277	182
SF-3.0	30	May-2019	3.11	1.8	Fair	595	243	168
SF-3.0	30	May-2020	2.95	2.1	Fair	234	315	126
SF-7.0	30	Nov-2018	2.06	1.1	Fair	269	132	78
SF-7.0	30	May-2019	1.96	1.1	Good	228	116	67
SF-7.0	30	May-2020	1.18	1.2	Good	95	126	46

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.5	29	7	12
MAX	4.6	6.1	595	948	430
GEOMEAN	1.7	1.5	170	107	76
AVERAGE	2.1	2.0	213	234	115



Nichols Environmental (Canada) Ltd.

TABLE: A-28

TITLE: Soil Analyses - 1.5 m Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SC-1.5	10	Nov-2018	1.60	3.0	Good	148	386	162
SC-1.5	10	May-2019	2.09	3.9	Fair	144	379	183
SC-1.5	10	May-2020	2.13	4.1	Fair	125	416	174
SC-1.5	20	Nov-2018	3.26	3.7	Fair	285	818	238
SC-1.5	20	May-2019	2.38	3.5	Fair	144	443	149
SC-1.5	20	May-2020	3.42	4.4	Fair	215	649	234
SC-1.5	30	Nov-2018	4.59	3.5	Poor	397	948	250
SC-1.5	30	May-2019	3.01	3.4	Fair	207	508	168
SC-1.5	30	May-2020	3.93	4.3	Fair	212	687	209
SE-1.5	10	Nov-2018	1.50	1.1	Good	194	3	60
SE-1.5	10	May-2019	1.20	1.1	Good	141	55	51
SE-1.5	10	May-2020	1.17	4.3	Fair	48	83	106
SE-1.5	20	Nov-2018	1.73	1.0	Good	258	62	66
SE-1.5	20	May-2019	1.17	1.1	Good	118	42	46
SE-1.5	20	May-2020	1.16	2.2	Good	70	102	67
SE-1.5	30	Nov-2018	1.39	0.8	Good	207	34	55
SE-1.5	30	May-2019	2.05	0.8	Fair	284	26	53
SE-1.5	30	May-2020	1.45	1.4	Good	126	112	60
SF-1.5	10	Nov-2018	1.82	6.3	Fair	100	283	256
SF-1.5	10	May-2019	3.03	11.0	Poor	100	670	440
SF-1.5	10	May-2020	2.35	12.2	Unsuitable	44	371	297
SF-1.5	20	Nov-2018	1.53	5.0	Fair	107	146	221
SF-1.5	20	May-2019	2.89	9.9	Poor	109	592	415
SF-1.5	20	May-2020	2.53	7.2	Fair	84	377	250
SF-1.5	30	Nov-2018	2.25	3.2	Fair	251	188	206
SF-1.5	30	May-2019	4.01	6.1	Poor	351	578	430
SF-1.5	30	May-2020	2.05	4.7	Fair	107	390	221

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	1.2	0.8	44	3	46
MAX	4.6	12.2	397	948	440
GEOMEAN	2.1	3.2	147	202	151
AVERAGE	2.3	4.2	169	346	188



Nichols Environmental (Canada) Ltd.

TABLE:

A-29

TITLE: Soil Analyses - 3.0 m Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SC-3.0	10	Nov-2018	1.17	1.9	Good	126	120	90
SC-3.0	10	May-2019	1.44	2.5	Good	138	146	117
SC-3.0	10	May-2020	1.17	2.0	Good	86	89	72
SC-3.0	20	Nov-2018	1.22	2.7	Good	86.3	161	95
SC-3.0	20	May-2019	1.59	2.9	Good	125	214	121
SC-3.0	20	May-2020	1.29	3.0	Good	70	160	89
SC-3.0	30	Nov-2018	2.68	2.3	Fair	266	450	135
SC-3.0	30	May-2019	2.06	2.5	Fair	154	288	111
SC-3.0	30	May-2020	1.17	2.6	Good	65	92	75
SE-3.0	10	Nov-2018	0.98	0.4	Good	163	30	23
SE-3.0	10	May-2019	1.06	0.5	Good	162	23	25
SE-3.0	10	May-2020	1.05	0.7	Good	103	57	28
SE-3.0	20	Nov-2018	0.60	0.5	Good	83.8	14	20
SE-3.0	20	May-2019	0.74	0.5	Good	100	16	21
SE-3.0	20	May-2020	0.58	0.6	Good	64	17	19
SE-3.0	30	Nov-2018	0.54	0.5	Good	65.8	11	18
SE-3.0	30	May-2019	0.79	0.5	Good	100	20	20
SE-3.0	30	May-2020	0.43	0.6	Good	29	10	12
SF-3.0	10	Nov-2018	1.60	3.7	Good	142	183	184
SF-3.0	10	May-2019	2.15	6.3	Fair	117	284	269
SF-3.0	10	May-2020	1.65	5.0	Fair	80	253	172
SF-3.0	20	Nov-2018	1.99	3.9	Good	166	236	199
SF-3.0	20	May-2019	3.26	3.2	Fair	388	294	239
SF-3.0	20	May-2020	2.38	3.3	Fair	159	296	158
SF-3.0	30	Nov-2018	2.91	1.9	Fair	506	277	182
SF-3.0	30	May-2019	3.11	1.8	Fair	595	243	168
SF-3.0	30	May-2020	2.95	2.1	Fair	234	315	126

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.4	29	10	12
MAX	3.3	6.3	595	450	269
GEOMEAN	1.4	1.6	128	94	72
AVERAGE	1.6	2.2	162	159	103



Nichols Environmental (Canada) Ltd.

TABLE: A-30

TITLE: Soil Analyses - 7.0 m Sand&NaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SC-7.0	10	Nov-2018	1.05	0.4	Good	180	44	25
SC-7.0	10	May-2019	1.66	0.6	Good	289	46	41
SC-7.0	10	May-2020	1.08	0.5	Good	129	22	22
SC-7.0	20	Nov-2018	0.84	0.5	Good	103	15	21
SC-7.0	20	May-2019	1.54	0.6	Good	210	25	32
SC-7.0	20	May-2020	0.88	0.6	Good	95	16	23
SC-7.0	30	Nov-2018	1.11	0.5	Good	138	18	21
SC-7.0	30	May-2019	1.30	0.6	Good	154	28	26
SC-7.0	30	May-2020	0.64	0.6	Good	65	7	18
SF-7.0	10	Nov-2018	1.22	1.1	Good	181	104	68
SF-7.0	10	May-2019	0.98	1.4	Good	91.1	91	52
SF-7.0	10	May-2020	0.87	1.5	Good	68	139	48
SF-7.0	20	Nov-2018	0.72	1.1	Good	92.5	69	48
SF-7.0	20	May-2019	1.06	1.0	Good	117	87	44
SF-7.0	20	May-2020	0.66	1.0	Good	53	95	28
SF-7.0	30	Nov-2018	2.06	1.1	Fair	269	132	78
SF-7.0	30	May-2019	1.96	1.1	Good	228	116	67
SF-7.0	30	May-2020	1.18	1.2	Good	95	126	46

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.
(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio	EC	SAR	Ca	Cl-	Na
MIN	0.6	0.4	53	7	18
MAX	2.1	1.5	289	139	78
GEOMEAN	1.1	0.8	127	47	36
AVERAGE	1.2	0.9	142	66	39



Nichols Environmental (Canada) Ltd.

TABLE: A-31
 TITLE: Soil Analyses - All UDI CaCl
 PROJECT#: 20-039-CAI
 CLIENT: The City of Edmonton
 PROJECT: 2020 Anti-Icing Soil Sampling Program
 LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
		2-4	4-8	Fair			
		4-8	8-12	Poor			
Fine Grained	Topsoil	>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SA-1.5	10	Nov-2018	1.36	0.5	Good	249	57	37
SA-1.5	10	May-2019	2.04	0.9	Fair	292	48	59
SA-1.5	10	May-2020	2.63	2.1	Fair	269	239	139
SA-1.5	20	Nov-2018	2.60	1.0	Fair	431	38	86
SA-1.5	20	May-2019	2.31	1.2	Fair	319	37	84
SA-1.5	20	May-2020	1.90	1.3	Good	182	91	64
SA-1.5	30	Nov-2018	3.14	1.4	Fair	523	56	134
SA-1.5	30	May-2019	3.07	1.5	Fair	439	42	128
SA-1.5	30	May-2020	2.97	0.9	Fair	382	39	70
SB-1.5	10	Nov-2018	0.87	4.4	Fair	49.4	146	142
SB-1.5	10	May-2019	2.78	9.2	Poor	106	688	382
SB-1.5	10	May-2020	2.67	10.2	Poor	73	419	335
SB-1.5	20	Nov-2018	1.46	6.1	Fair	60.6	219	182
SB-1.5	20	May-2019	2.98	8.0	Poor	124	709	337
SB-1.5	20	May-2020	2.84	6.2	Fair	145	298	274
SB-1.5	30	Nov-2018	1.96	9.4	Poor	56.4	290	255
SB-1.5	30	May-2019	2.88	13.0	Unsuitable	87	716	503
SB-1.5	30	May-2020	2.73	8.0	Fair	99	408	302
SB-3.0	10	Nov-2018	0.97	1.8	Good	104	65	74
SB-3.0	10	May-2019	1.38	3.8	Good	84.1	246	139
SB-3.0	10	May-2020	1.30	7.8	Fair	39	148	185
SB-3.0	20	Nov-2018	0.73	1.7	Good	82.8	60	67
SB-3.0	20	May-2019	1.56	3.6	Good	109	279	143
SB-3.0	20	May-2020	0.97	5.8	Fair	31	80	109
SD-1.5	10	Nov-2018	1.37	0.6	Good	170	49	34
SD-1.5	10	May-2019	0.79	0.6	Good	95.3	19	24
SD-1.5	10	May-2020	1.09	0.4	Good	138	28	18
SD-1.5	20	Nov-2018	0.64	0.8	Good	70.7	32	27
SD-1.5	20	May-2019	0.82	0.8	Good	77.5	15	26
SD-1.5	20	May-2020	0.49	0.7	Good	44	10	18
SD-1.5	30	Nov-2018	0.55	1.1	Good	41.7	32	24
SD-1.5	30	May-2019	0.70	1.1	Good	53.9	20	29
SD-1.5	30	May-2020	0.37	1.1	Good	22	8	17
SD-7.0	10	Nov-2018	0.55	0.2	Good	85.3	13	8
SD-7.0	10	May-2019	0.69	0.3	Good	81	11	11
SD-7.0	10	May-2020	0.86	0.4	Good	110	20	14
SD-7.0	20	Nov-2018	0.41	0.6	Good	52	9	18
SD-7.0	20	May-2019	0.52	0.9	Good	44.7	7	21
SD-7.0	20	May-2020	0.56	0.7	Good	53	9	20
SD-7.0	30	Nov-2018	0.77	1.5	Good	65.9	17	44
SD-7.0	30	May-2019	0.73	1.7	Good	50.9	14	41
SD-7.0	30	May-2020	0.60	1.9	Good	30	6	34

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.2	22	6	8
MAX	3.1	13.0	523	716	503
GEOMEAN	1.2	1.7	98	56	65
AVERAGE	1.5	3.0	136	140	113



Nichols Environmental (Canada) Ltd.

TABLE: A-32

TITLE: Soil Analyses - 2018 CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SA-1.5	10	Nov-2018	1.36	0.5	Good	249	57	37
SA-1.5	20	Nov-2018	2.60	1.0	Fair	431	38	86
SA-1.5	30	Nov-2018	3.14	1.4	Fair	523	56	134
SB-1.5	10	Nov-2018	0.87	4.4	Fair	49.4	146	142
SB-1.5	20	Nov-2018	1.46	6.1	Fair	60.6	219	182
SB-1.5	30	Nov-2018	1.96	9.4	Poor	56.4	290	255
SB-3.0	10	Nov-2018	0.97	1.8	Good	104	65	74
SB-3.0	20	Nov-2018	0.73	1.7	Good	82.8	60	67
SD-1.5	10	Nov-2018	1.37	0.6	Good	170	49	34
SD-1.5	20	Nov-2018	0.64	0.8	Good	70.7	32	27
SD-1.5	30	Nov-2018	0.55	1.1	Good	41.7	32	24
SD-7.0	10	Nov-2018	0.55	0.2	Good	85.3	13	8
SD-7.0	20	Nov-2018	0.41	0.6	Good	52	9	18
SD-7.0	30	Nov-2018	0.77	1.5	Good	65.9	17	44

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.2	42	9	8
MAX	3.1	9.4	523	290	255
GEOMEAN	1.0	1.3	101	49	54
AVERAGE	1.2	2.2	146	77	81



Nichols Environmental (Canada) Ltd.

TABLE: A-33

TITLE: Soil Analyses - 2019 CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SA-1.5	10	May-2019	2.04	0.9	Fair	292	48	59
SA-1.5	20	May-2019	2.31	1.2	Fair	319	37	84
SA-1.5	30	May-2019	3.07	1.5	Fair	439	42	128
SB-1.5	10	May-2019	2.78	9.2	Poor	106	688	382
SB-1.5	20	May-2019	2.98	8.0	Poor	124	709	337
SB-1.5	30	May-2019	2.88	13.0	Unsuitable	87	716	503
SB-3.0	10	May-2019	1.38	3.8	Good	84.1	246	139
SB-3.0	20	May-2019	1.56	3.6	Good	109	279	143
SD-1.5	10	May-2019	0.79	0.6	Good	95.3	19	24
SD-1.5	20	May-2019	0.82	0.8	Good	77.5	15	26
SD-1.5	30	May-2019	0.70	1.1	Good	53.9	20	29
SD-7.0	10	May-2019	0.69	0.3	Good	81	11	11
SD-7.0	20	May-2019	0.52	0.9	Good	44.7	7	21
SD-7.0	30	May-2019	0.73	1.7	Good	50.9	14	41

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.5	0.3	45	7	11
MAX	3.1	13.0	439	716	503
GEOMEAN	1.4	1.8	109	61	74
AVERAGE	1.7	3.3	140	204	138



Nichols Environmental (Canada) Ltd.

TABLE: A-34

TITLE: Soil Analyses - 2020 CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SA-1.5	10	May-2020	2.63	2.1	Fair	269	239	139
SA-1.5	20	May-2020	1.90	1.3	Good	182	91	64
SA-1.5	30	May-2020	2.97	0.9	Fair	382	39	70
SB-1.5	10	May-2020	2.67	10.2	Poor	73	419	335
SB-1.5	20	May-2020	2.84	6.2	Fair	145	298	274
SB-1.5	30	May-2020	2.73	8.0	Fair	99	408	302
SB-3.0	10	May-2020	1.30	7.8	Fair	39	148	185
SB-3.0	20	May-2020	0.97	5.8	Fair	31	80	109
SD-1.5	10	May-2020	1.09	0.4	Good	138	28	18
SD-1.5	20	May-2020	0.49	0.7	Good	44	10	18
SD-1.5	30	May-2020	0.37	1.1	Good	22	8	17
SD-7.0	10	May-2020	0.86	0.4	Good	110	20	14
SD-7.0	20	May-2020	0.56	0.7	Good	53	9	20
SD-7.0	30	May-2020	0.60	1.9	Good	30	6	34

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.4	22	6	14
MAX	3.0	10.2	382	419	335
GEOMEAN	1.2	1.9	81	53	64
AVERAGE	1.6	3.4	116	129	114



Nichols Environmental (Canada) Ltd.

TABLE: A-35

TITLE: Soil Analyses - 10 cm CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
>8		>12	Unsuitable				

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SA-1.5	10	Nov-2018	1.36	0.5	Good	249	57	37
SA-1.5	10	May-2019	2.04	0.9	Fair	292	48	59
SA-1.5	10	May-2020	2.63	2.1	Fair	269	239	139
SB-1.5	10	Nov-2018	0.87	4.4	Fair	49.4	146	142
SB-1.5	10	May-2019	2.78	9.2	Poor	106	688	382
SB-1.5	10	May-2020	2.67	10.2	Poor	73	419	335
SB-3.0	10	Nov-2018	0.97	1.8	Good	104	65	74
SB-3.0	10	May-2019	1.38	3.8	Good	84.1	246	139
SB-3.0	10	May-2020	1.30	7.8	Fair	39	148	185
SD-1.5	10	Nov-2018	1.37	0.6	Good	170	49	34
SD-1.5	10	May-2019	0.79	0.6	Good	95.3	19	24
SD-1.5	10	May-2020	1.09	0.4	Good	138	28	18
SD-7.0	10	Nov-2018	0.55	0.2	Good	85.3	13	8
SD-7.0	10	May-2019	0.69	0.3	Good	81	11	11
SD-7.0	10	May-2020	0.86	0.4	Good	110	20	14

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.6	0.2	39	11	8
MAX	2.8	10.2	292	688	382
GEOMEAN	1.3	1.3	110	70	56
AVERAGE	1.4	2.9	130	146	107



Nichols Environmental (Canada) Ltd.

TABLE: A-36

TITLE: Soil Analyses - 20 cm CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SA-1.5	20	Nov-2018	2.60	1.0	Fair	431	38	86
SA-1.5	20	May-2019	2.31	1.2	Fair	319	37	84
SA-1.5	20	May-2020	1.90	1.3	Good	182	91	64
SB-1.5	20	Nov-2018	1.46	6.1	Fair	60.6	219	182
SB-1.5	20	May-2019	2.98	8.0	Poor	124	709	337
SB-1.5	20	May-2020	2.84	6.2	Fair	145	298	274
SB-3.0	20	Nov-2018	0.73	1.7	Good	82.8	60	67
SB-3.0	20	May-2019	1.56	3.6	Good	109	279	143
SB-3.0	20	May-2020	0.97	5.8	Fair	31	80	109
SD-1.5	20	Nov-2018	0.64	0.8	Good	70.7	32	27
SD-1.5	20	May-2019	0.82	0.8	Good	77.5	15	26
SD-1.5	20	May-2020	0.49	0.7	Good	44	10	18
SD-7.0	20	Nov-2018	0.41	0.6	Good	52	9	18
SD-7.0	20	May-2019	0.52	0.9	Good	44.7	7	21
SD-7.0	20	May-2020	0.56	0.7	Good	53	9	20

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.6	31	7	18
MAX	3.0	8.0	431	709	337
GEOMEAN	1.1	1.7	91	49	62
AVERAGE	1.4	2.6	122	126	98



Nichols Environmental (Canada) Ltd.

TABLE: A-37

TITLE: Soil Analyses - 30 cm CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SA-1.5	30	Nov-2018	3.14	1.4	Fair	523	56	134
SA-1.5	30	May-2019	3.07	1.5	Fair	439	42	128
SA-1.5	30	May-2020	2.97	0.9	Fair	382	39	70
SB-1.5	30	Nov-2018	1.96	9.4	Poor	56.4	290	255
SB-1.5	30	May-2019	2.88	13.0	Unsuitable	87	716	503
SB-1.5	30	May-2020	2.73	8.0	Fair	99	408	302
SD-1.5	30	Nov-2018	0.55	1.1	Good	41.7	32	24
SD-1.5	30	May-2019	0.70	1.1	Good	53.9	20	29
SD-1.5	30	May-2020	0.37	1.1	Good	22	8	17
SD-7.0	30	Nov-2018	0.77	1.5	Good	65.9	17	44
SD-7.0	30	May-2019	0.73	1.7	Good	50.9	14	41
SD-7.0	30	May-2020	0.60	1.9	Good	30	6	34

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.9	22	6	17
MAX	3.1	13.0	523	716	503
GEOMEAN	1.3	2.2	88	44	75
AVERAGE	1.7	3.5	154	137	132



Nichols Environmental (Canada) Ltd.

TABLE: A-38

TITLE: Soil Analyses - 1.5 m CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SA-1.5	10	Nov-2018	1.36	0.5	Good	249	57	37
SA-1.5	10	May-2019	2.04	0.9	Fair	292	48	59
SA-1.5	10	May-2020	2.63	2.1	Fair	269	239	139
SA-1.5	20	Nov-2018	2.60	1.0	Fair	431	38	86
SA-1.5	20	May-2019	2.31	1.2	Fair	319	37	84
SA-1.5	20	May-2020	1.90	1.3	Good	182	91	64
SA-1.5	30	Nov-2018	3.14	1.4	Fair	523	56	134
SA-1.5	30	May-2019	3.07	1.5	Fair	439	42	128
SA-1.5	30	May-2020	2.97	0.9	Fair	382	39	70
SB-1.5	10	Nov-2018	0.87	4.4	Fair	49.4	146	142
SB-1.5	10	May-2019	2.78	9.2	Poor	106	688	382
SB-1.5	10	May-2020	2.67	10.2	Poor	73	419	335
SB-1.5	20	Nov-2018	1.46	6.1	Fair	60.6	219	182
SB-1.5	20	May-2019	2.98	8.0	Poor	124	709	337
SB-1.5	20	May-2020	2.84	6.2	Fair	145	298	274
SB-1.5	30	Nov-2018	1.96	9.4	Poor	56.4	290	255
SB-1.5	30	May-2019	2.88	13.0	Unsuitable	87	716	503
SB-1.5	30	May-2020	2.73	8.0	Fair	99	408	302
SD-1.5	10	Nov-2018	1.37	0.6	Good	170	49	34
SD-1.5	10	May-2019	0.79	0.6	Good	95.3	19	24
SD-1.5	10	May-2020	1.09	0.4	Good	138	28	18
SD-1.5	20	Nov-2018	0.64	0.8	Good	70.7	32	27
SD-1.5	20	May-2019	0.82	0.8	Good	77.5	15	26
SD-1.5	20	May-2020	0.49	0.7	Good	44	10	18
SD-1.5	30	Nov-2018	0.55	1.1	Good	41.7	32	24
SD-1.5	30	May-2019	0.70	1.1	Good	53.9	20	29
SD-1.5	30	May-2020	0.37	1.1	Good	22	8	17

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.4	22	8	17
MAX	3.1	13.0	523	716	503
GEOMEAN	1.5	1.9	122	77	82
AVERAGE	1.9	3.4	170	176	138



Nichols Environmental (Canada) Ltd.

TABLE: A-39

TITLE: Soil Analyses - 3.0 m CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SB-3.0	10	Nov-2018	0.97	1.8	Good	104	65	74
SB-3.0	10	May-2019	1.38	3.8	Good	84.1	246	139
SB-3.0	10	May-2020	1.30	7.8	Fair	39	148	185
SB-3.0	20	Nov-2018	0.73	1.7	Good	82.8	60	67
SB-3.0	20	May-2019	1.56	3.6	Good	109	279	143
SB-3.0	20	May-2020	0.97	5.8	Fair	31	80	109

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.7	1.7	31	60	67
MAX	1.6	7.8	109	279	185
GEOMEAN	1.1	3.5	68	121	112
AVERAGE	1.2	4.1	75	146	120



Nichols Environmental (Canada) Ltd.

TABLE: A-40

TITLE: Soil Analyses - 7.0 m CaCl

PROJECT#: 20-039-CAI

CLIENT: The City of Edmonton

PROJECT: 2020 Anti-Icing Soil Sampling Program

LOCATION: Edmonton, Alberta

2019 Alberta*	Natural Area	EC	SAR	Rating	Calcium	Chloride	Sodium
		<2	<4	Good	No Guidelines Available		
Fine Grained	Topsoil	2-4	4-8	Fair			
		4-8	8-12	Poor			
		>8	>12	Unsuitable			

Sample ID	Depth (cm)	Date	EC	SAR	Rating	Calcium	Chloride	Sodium
SD-7.0	10	Nov-2018	0.55	0.2	Good	85.3	13	8
SD-7.0	10	May-2019	0.69	0.3	Good	81	11	11
SD-7.0	10	May-2020	0.86	0.4	Good	110	20	14
SD-7.0	20	Nov-2018	0.41	0.6	Good	52	9	18
SD-7.0	20	May-2019	0.52	0.9	Good	44.7	7	21
SD-7.0	20	May-2020	0.56	0.7	Good	53	9	20
SD-7.0	30	Nov-2018	0.77	1.5	Good	65.9	17	44
SD-7.0	30	May-2019	0.73	1.7	Good	50.9	14	41
SD-7.0	30	May-2020	0.60	1.9	Good	30	6	34

BOLD = Parameter Exceeds Recommended Guideline Criteria

BOLD = Parameter is Elevated Compared to Background Concentrations

*Alberta Soil and Groundwater Remediation Guidelines (Table 4). January 2019.

(all concentrations in mg/kg = ppm, unless noted)

Topsoil = surface A, L, F, H and O horizons on the control area, or the equivalent surface soil where these horizons are not present.

EC = Electrical Conductivity (dS/m)

SAR = Sodium Adsorption Ratio

	EC	SAR	Ca	Cl-	Na
MIN	0.4	0.2	30	6	8
MAX	0.9	1.9	110	20	44
GEOMEAN	0.6	0.7	60	11	20
AVERAGE	0.6	0.9	64	12	23



CHART: 1

TITLE: COE CONCENTRATION VS. DEPTH CHARTS

PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta

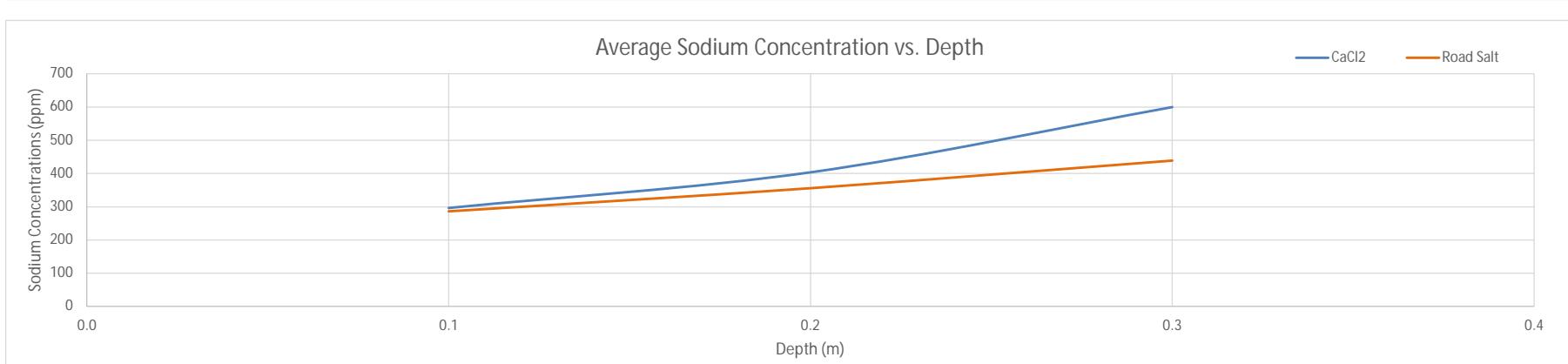
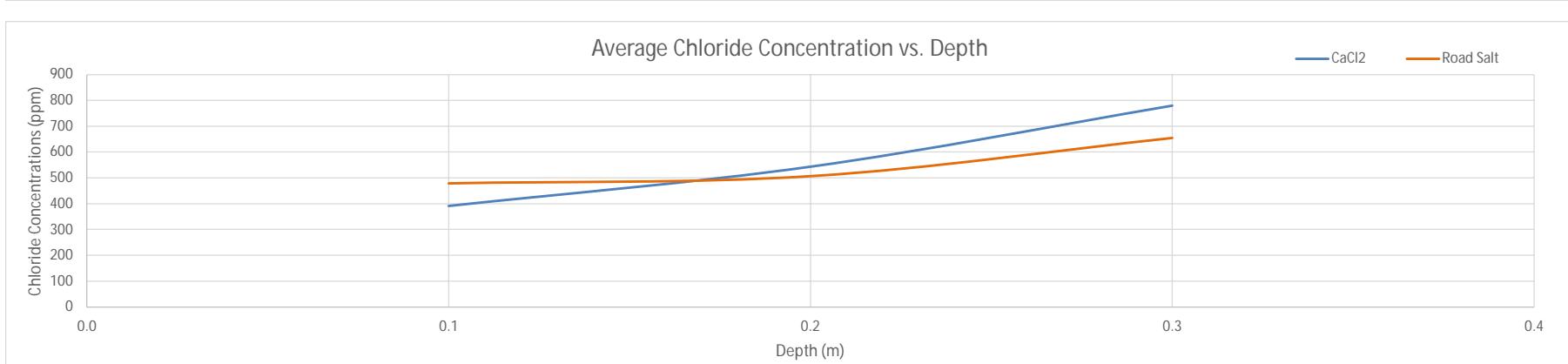
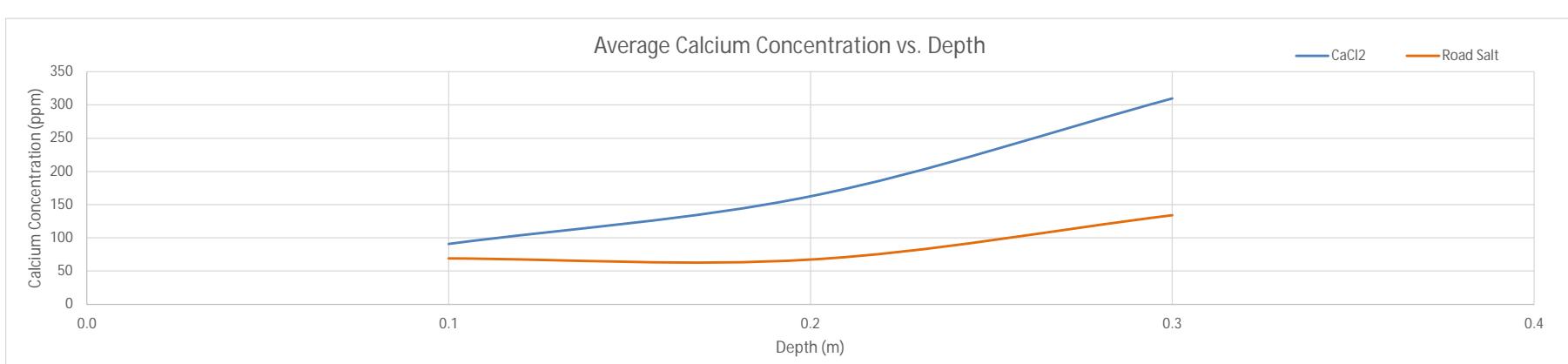
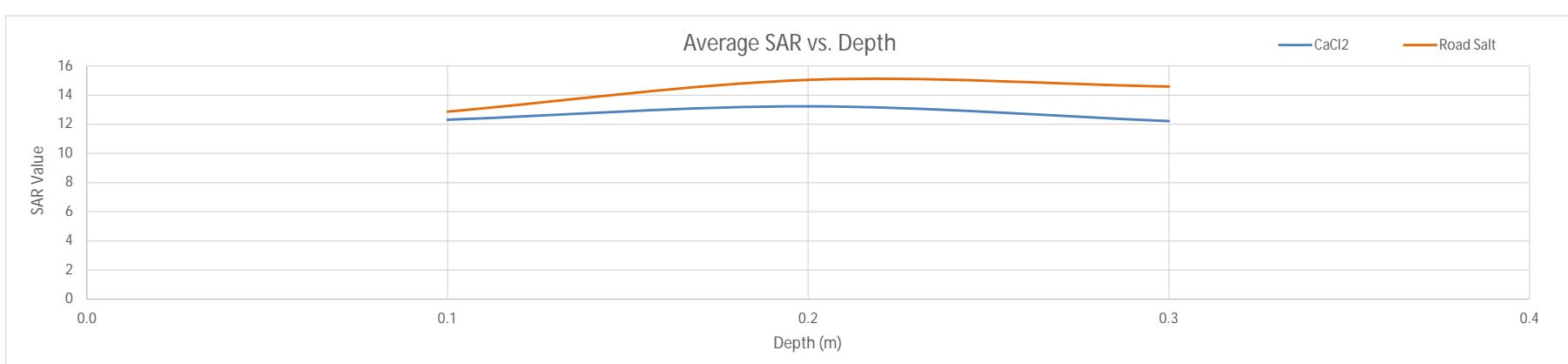
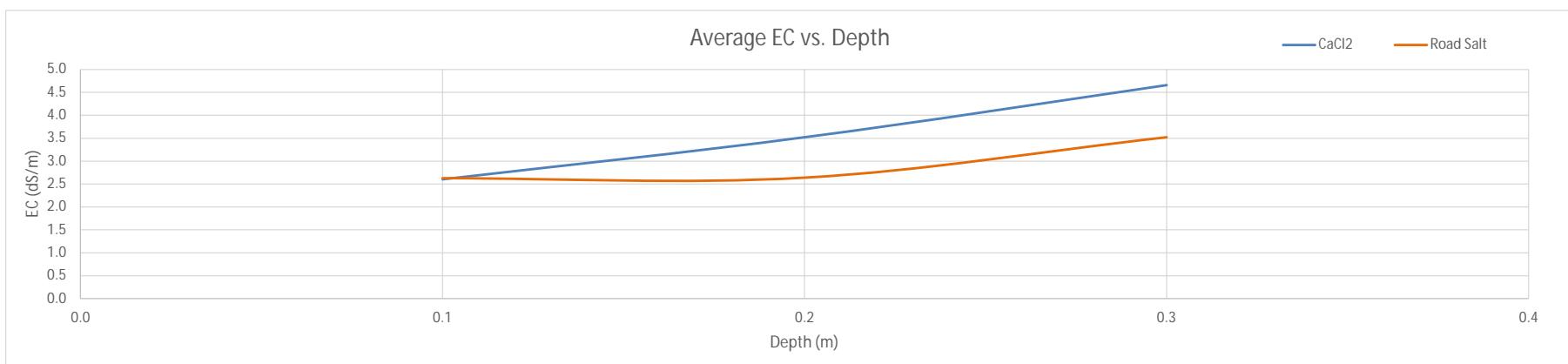
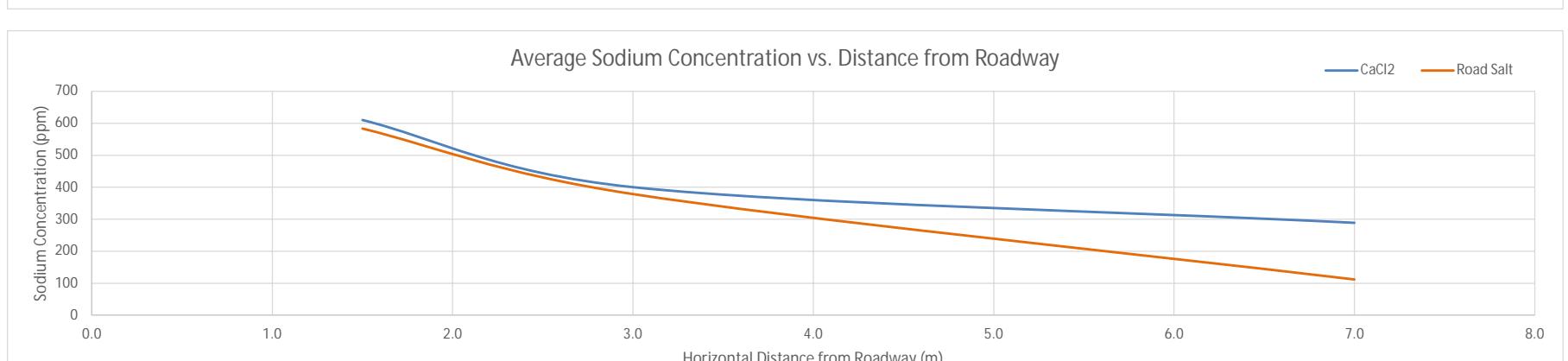
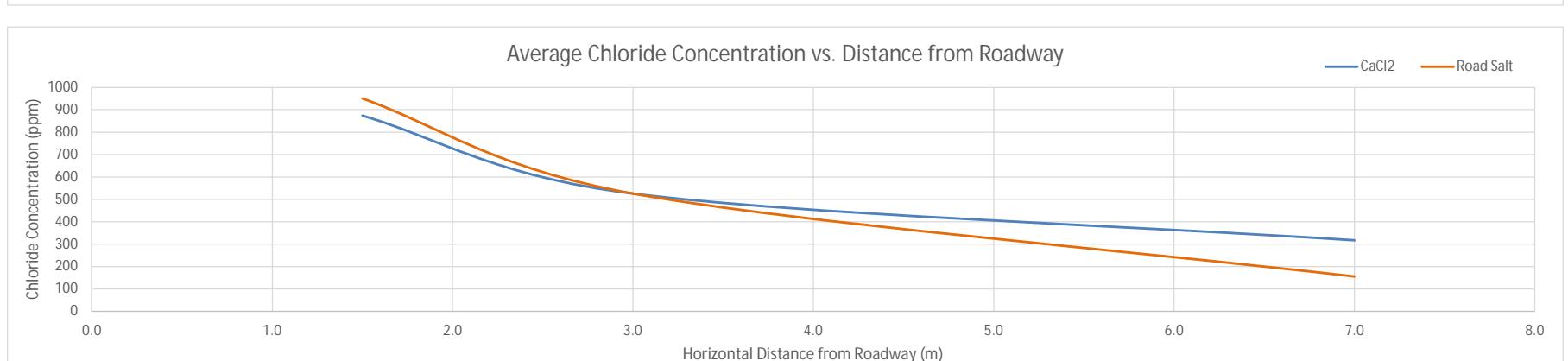
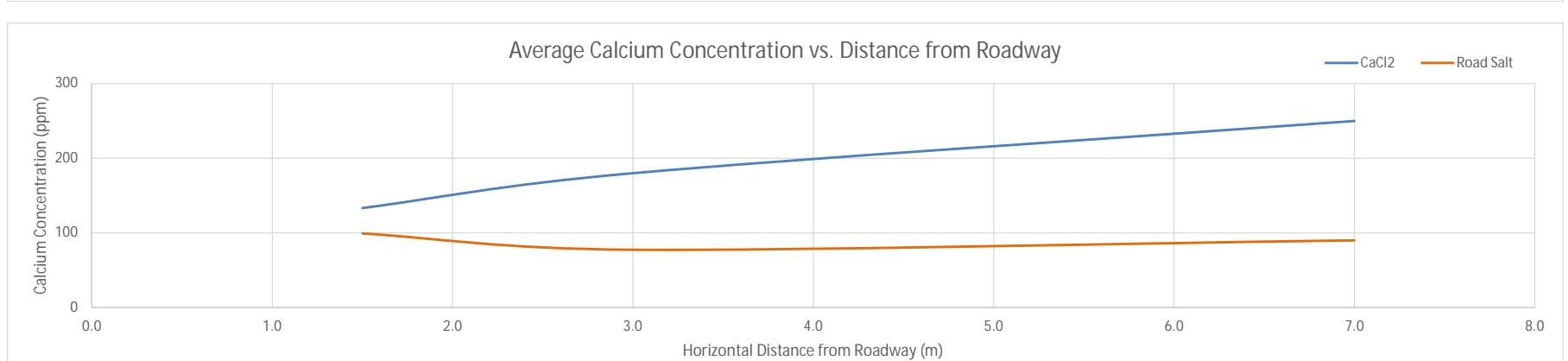
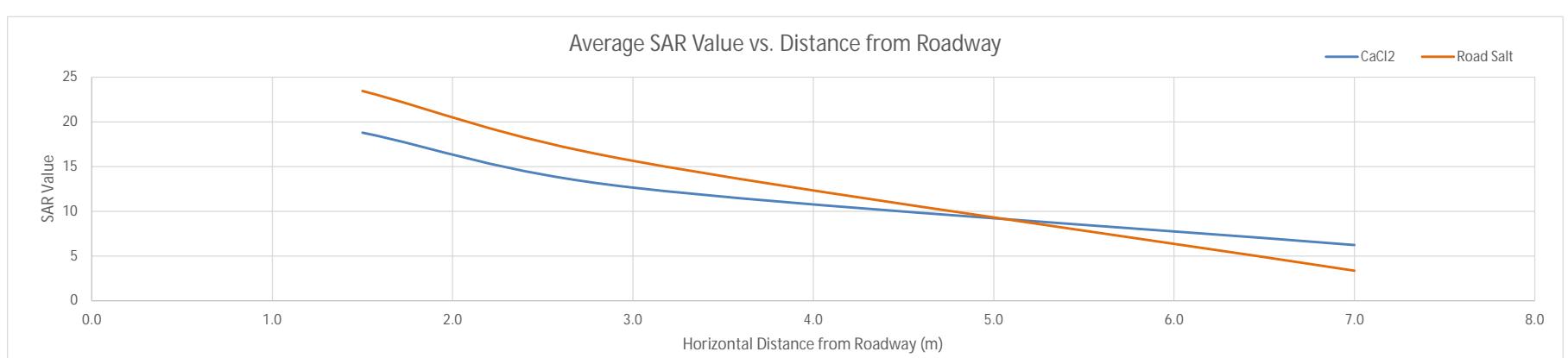
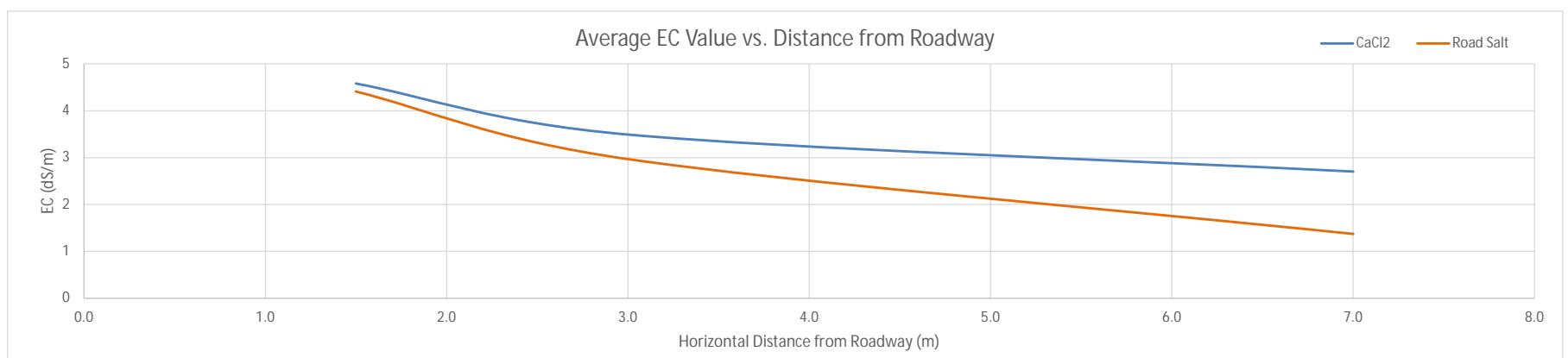




CHART: 2
TITLE: COE CONCENTRATION VS. HORIZONTAL DISTANCE CHARTS
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta



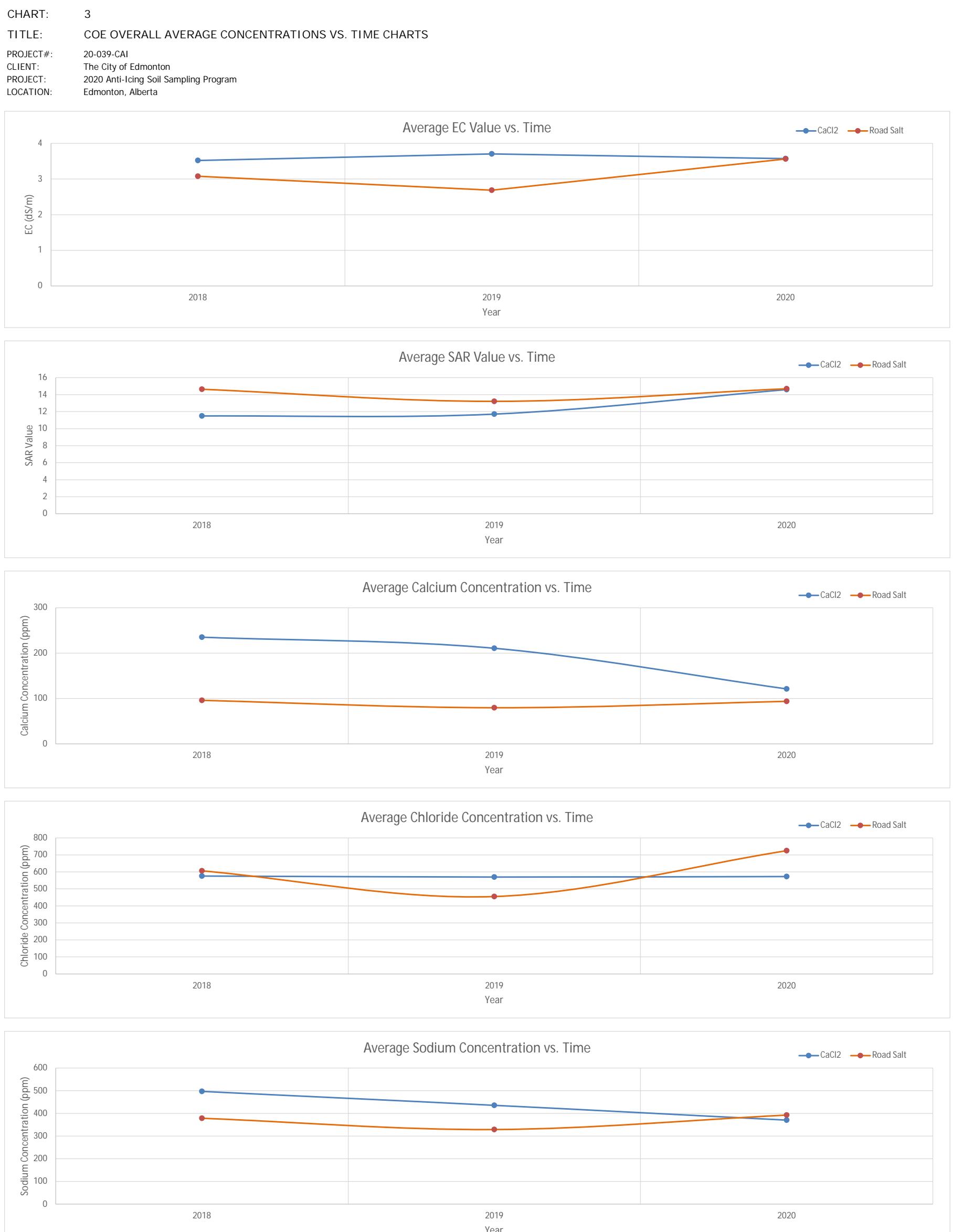




CHART: 4

TITLE: UDI CONCENTRATION VS. DEPTH CHARTS

PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta

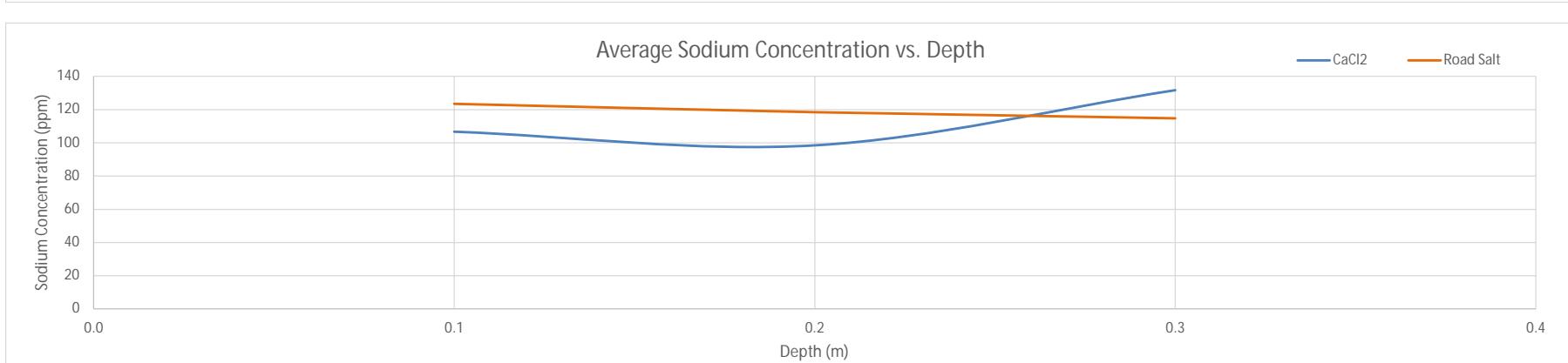
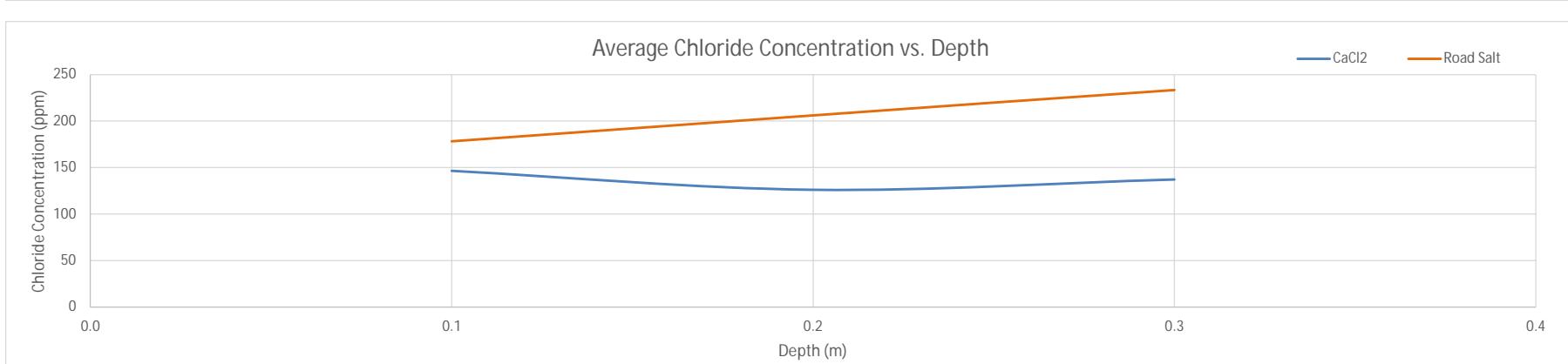
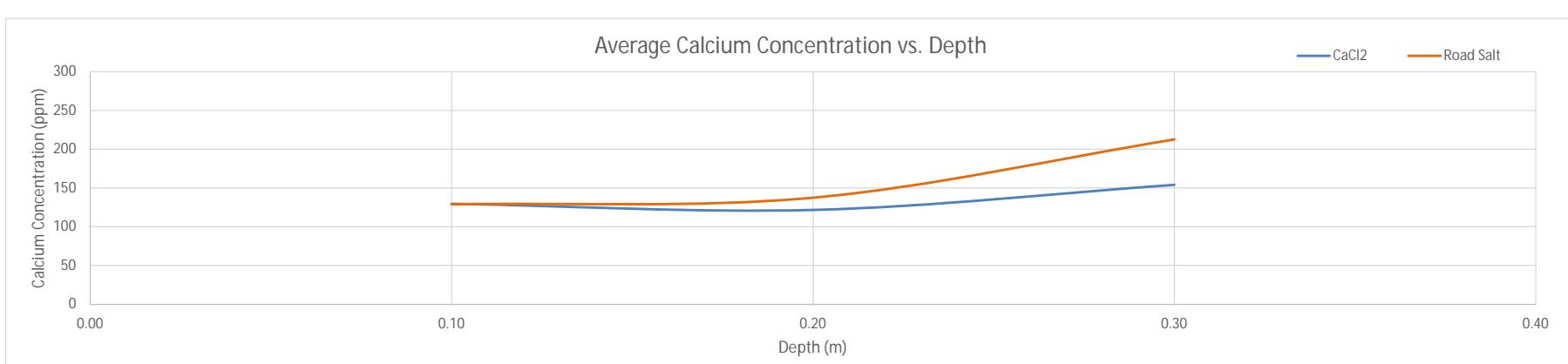
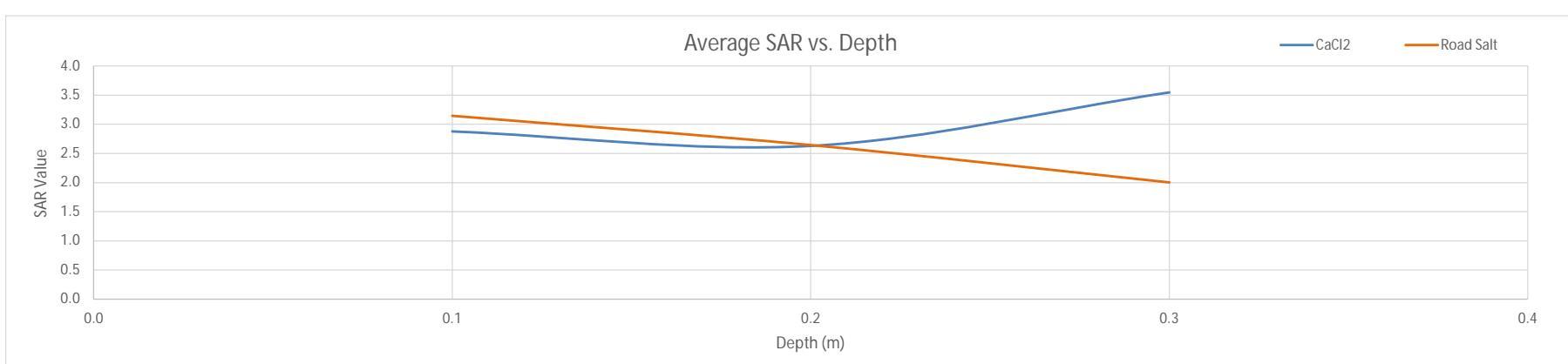
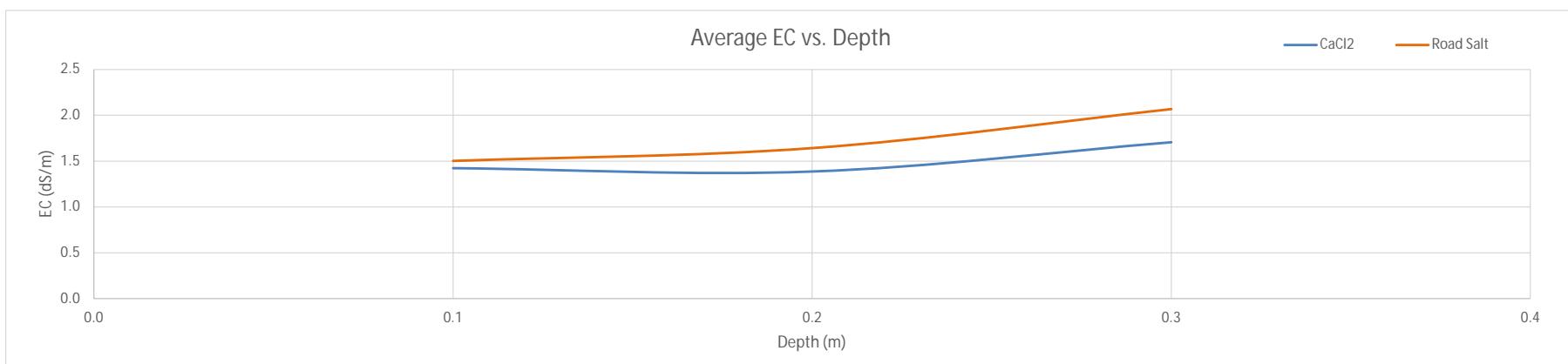
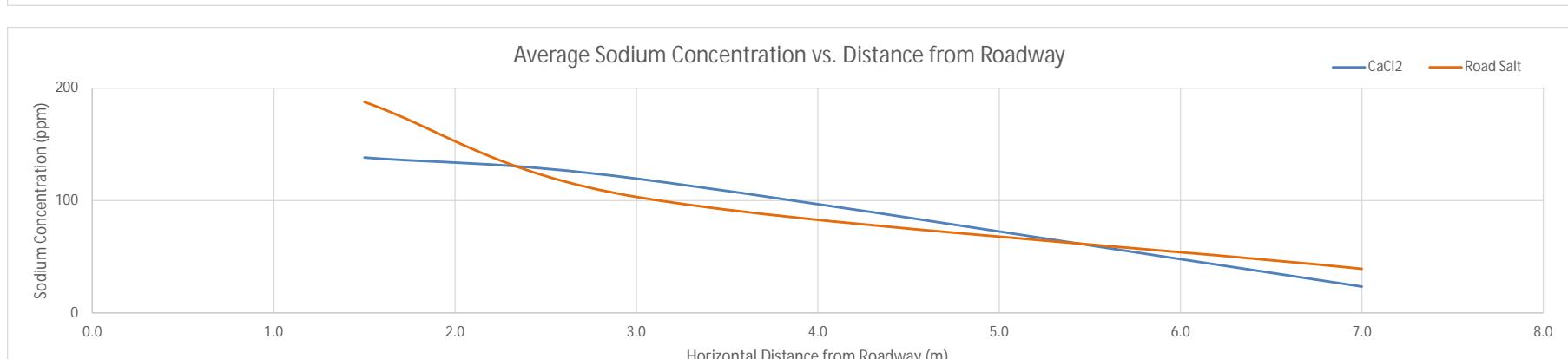
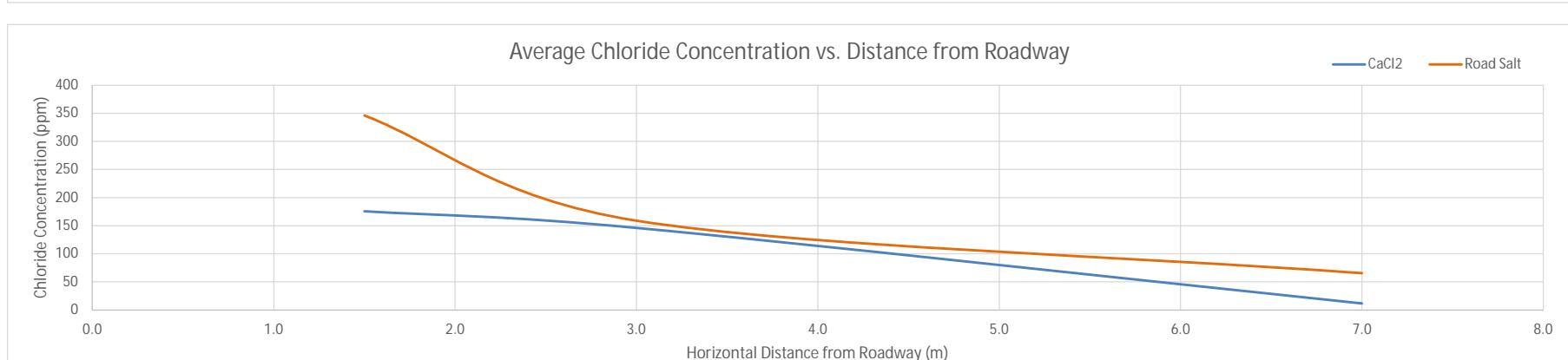
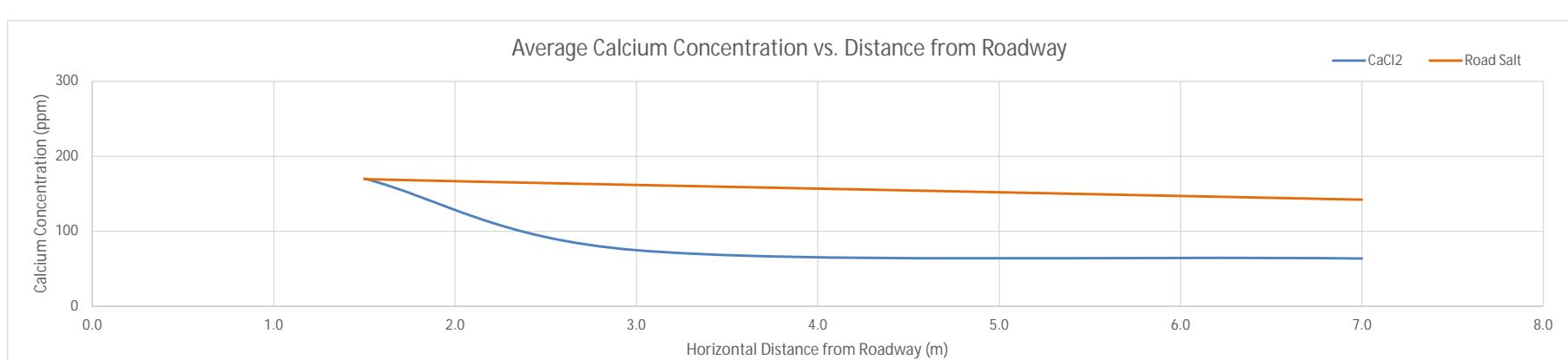
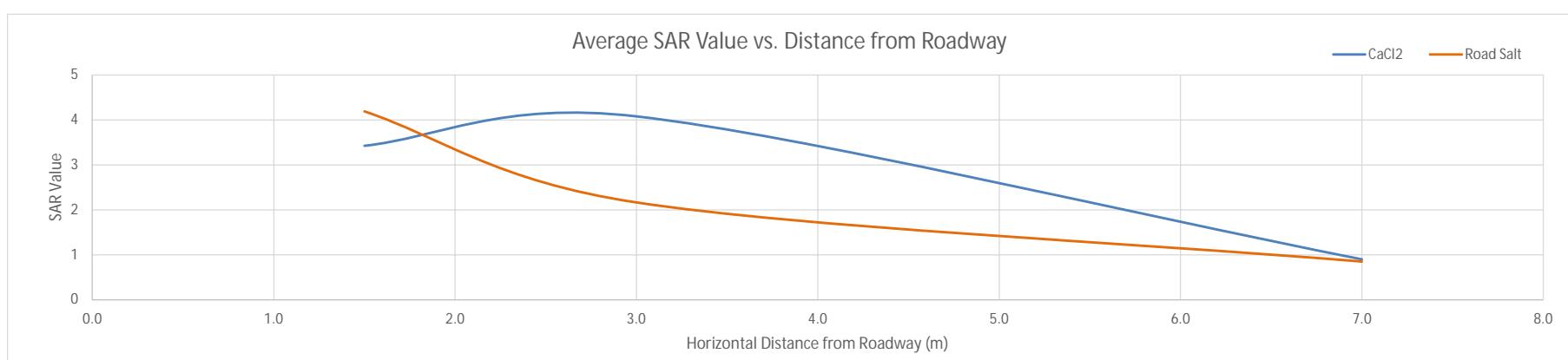
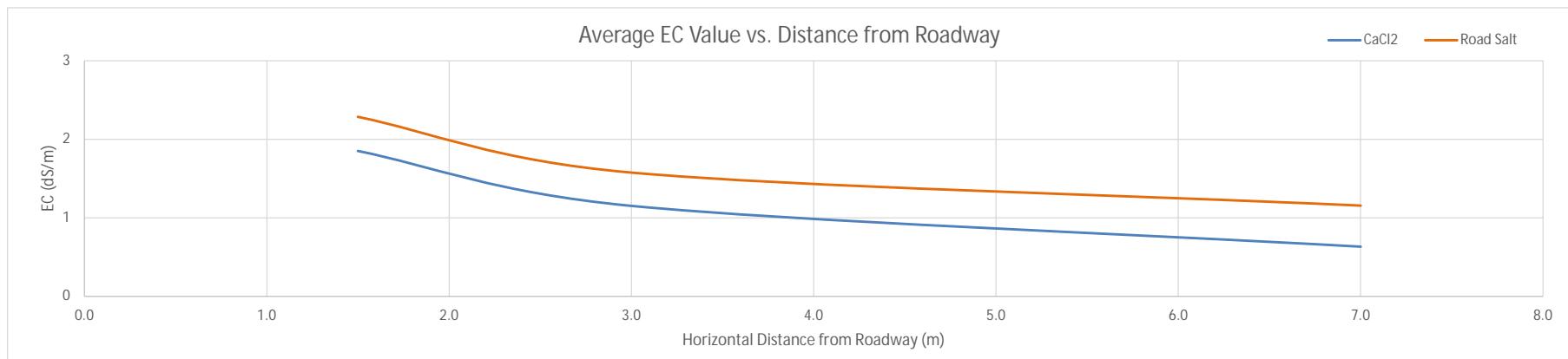
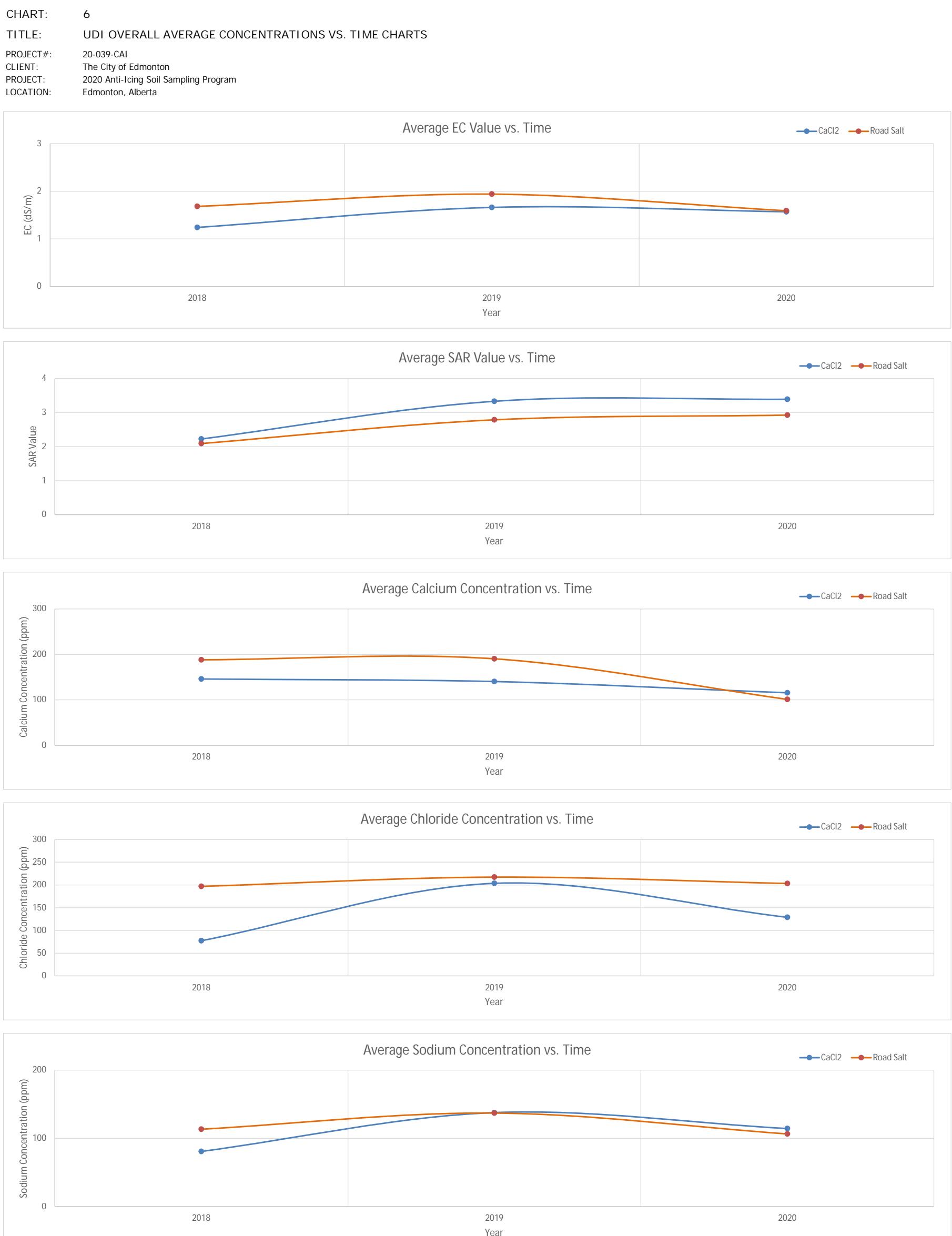




CHART: 5
TITLE: UDI CONCENTRATION VS. HORIZONTAL DISTANCE CHARTS
PROJECT#: 20-039-CAI
CLIENT: The City of Edmonton
PROJECT: 2020 Anti-Icing Soil Sampling Program
LOCATION: Edmonton, Alberta





CLIENT NAME: CITY OF EDMONTON
11004 - 190 Street NW
EDMONTON, AB T5S 0G9
780-496-4732

ATTENTION TO: Paul Fuellbrandt

PROJECT: 20-039-CAI Sites 1-12, A-F

AGAT WORK ORDER: 20E607181

SOIL ANALYSIS REVIEWED BY: Shanna Mills, Inorganics Manager

DATE REPORTED: Jun 04, 2020

PAGES (INCLUDING COVER): 45

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (780) 395-2525

***Notes**

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
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- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.



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Certificate of Analysis

AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

6310 ROPER ROAD
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CANADA T6B 3P9
TEL (780)395-2525
FAX (780)462-2490
<http://www.agatlabs.com>

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:		S1-1.5, 0-0.1	S1-1.5, 0.1-0.2	S1-1.5, 0.2-0.3	S1-3.0, 0-0.1	S1-3.0, 0.1-0.2	S1-3.0, 0.2-0.3	S1-7.0, 0-0.1	S1-7.0, 0.1-0.2
		SAMPLE TYPE:	G / S	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
				RDL	1160466	1160470	1160471	1160472	1160473	1160474	1160475
pH (CaCl ₂ Extraction)	pH Units	N/A	N/A	7.06	7.49	7.49	6.76	7.11	7.31	6.26	6.86
Electrical Conductivity (Sat. Paste)	dS/m	0.05	0.05	1.56	1.25	1.38	0.69	0.87	1.09	0.62	0.53
Sodium Adsorption Ratio	N/A	0.34	0.34	10.8	11.4	12.8	3.06	6.84	8.83	0.93	3.34
Saturation Percentage	%	1	1	80	76	85	85	77	75	113	71
Chloride, Soluble	mg/L	5	5	339	244	482	97	205	353	100	26
Calcium, Soluble	mg/L	1	1	46	27	29	49	32	35	58	41
Potassium, Soluble	mg/L	2	2	25	12	6	34	15	8	58	25
Magnesium, Soluble	mg/L	1	1	7	5	5	11	7	7	16	10
Sodium, Soluble	mg/L	2	2	298	245	283	91	164	219	31	92
Sulfate, Soluble	mg/L	2	2	68	53	55	46	51	67	40	28
Theoretical Gypsum Requirement	tonnes/ha	0.01	0.01	0.53	0.37	0.62	<0.01	<0.01	0.17	<0.01	<0.01
Calcium, Soluble (meq/L)	meq/L	0.05	0.05	2.30	1.35	1.45	2.45	1.60	1.75	2.89	2.05
Calcium, Soluble (mg/kg)	mg/kg	1	1	37	21	25	42	25	26	66	29
Chloride, Soluble (meq/L)	meq/L	0.06	0.06	9.56	6.88	13.6	2.74	5.78	9.96	2.82	0.73
Chloride, Soluble (mg/kg)	mg/kg	2	2	271	185	410	82	158	265	113	18
Magnesium, Soluble (meq/L)	meq/L	0.08	0.08	0.58	0.41	0.41	0.91	0.58	0.58	1.32	0.82
Magnesium, Soluble (mg/kg)	mg/kg	1	1	6	4	4	9	5	5	18	7
Potassium, Soluble (meq/L)	meq/L	0.05	0.05	0.64	0.31	0.15	0.87	0.38	0.20	1.48	0.64
Potassium, Soluble (mg/kg)	mg/kg	2	2	20	9	5	29	12	6	66	18
Sodium, Soluble (meq/L)	meq/L	0.09	0.09	13.0	10.7	12.3	3.96	7.13	9.53	1.35	4.00
Sodium, Soluble (mg/kg)	mg/kg	2	2	238	186	241	77	126	164	35	65
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04	0.04	1.42	1.10	1.15	0.96	1.06	1.40	0.83	0.58
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2	2	54	40	47	39	39	50	45	20

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

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ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: S1-7.0, 0.2-0.3				S2-1.5, 0-0.1				S2-1.5, 0.1-0.2				S2-1.5, 0.2-0.3				S2-3.0, 0-0.1			
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil			
		G / S	RDL	DATE SAMPLED:	2020-05-25	1160477	1160478	RDL	2020-05-25	1160479	RDL	2020-05-25	1160480	RDL	2020-05-25	1160481	RDL	2020-05-25			
pH (CaCl ₂ Extraction)	pH Units	N/A		7.39	7.39	N/A		7.44	N/A	7.51	N/A		7.51	N/A		7.51	N/A		7.30		
Electrical Conductivity (Sat. Paste)	dS/m	0.05		0.58	2.43	0.05		4.50	0.05	4.97	0.05		4.97	0.05		4.97	0.05		3.97		
Sodium Adsorption Ratio	N/A	0.34		5.35	24.1	0.34		37.4	0.34	26.7	0.34		26.7	0.34		26.7	0.34		29.1		
Saturation Percentage	%	1		67	62	1		94	1	89	1		89	1		89	1		62		
Chloride, Soluble	mg/L	5		54	612	5		1550	5	1760	5		1760	5		1760	5		1030		
Calcium, Soluble	mg/L	1		27	24	1		34	1	55	1		55	1		55	1		50		
Potassium, Soluble	mg/L	2		10	10	2		8	2	7	2		7	2		7	2		11		
Magnesium, Soluble	mg/L	1		6	3	1		7	1	14	1		14	1		14	1		9		
Sodium, Soluble	mg/L	2		118	471	2		918	2	857	2		857	2		857	2		853		
Sulfate, Soluble	mg/L	2		32	62	6		75	2	159	6		159	6		159	6		56		
Theoretical Gypsum Requirement	tonnes/ha	0.01		<0.01	1.63	0.01		9.89	0.01	7.87	0.01		7.87	0.01		7.87	0.01		5.50		
Calcium, Soluble (meq/L)	meq/L	0.05		1.35	1.20	0.05		1.70	0.05	2.74	0.05		2.74	0.05		2.74	0.05		2.50		
Calcium, Soluble (mg/kg)	mg/kg	1		18	15	1		32	1	49	1		49	1		49	1		31		
Chloride, Soluble (meq/L)	meq/L	0.06		1.52	17.3	0.06		43.7	0.06	49.6	0.06		49.6	0.06		49.6	0.06		29.1		
Chloride, Soluble (mg/kg)	mg/kg	2		36	379	2		1460	2	1570	2		1570	2		1570	2		639		
Magnesium, Soluble (meq/L)	meq/L	0.08		0.49	0.25	0.08		0.58	0.08	1.15	0.08		1.15	0.08		1.15	0.08		0.74		
Magnesium, Soluble (mg/kg)	mg/kg	1		4	2	1		7	1	12	1		12	1		12	1		6		
Potassium, Soluble (meq/L)	meq/L	0.05		0.26	0.26	0.05		0.20	0.05	0.18	0.05		0.18	0.05		0.18	0.05		0.28		
Potassium, Soluble (mg/kg)	mg/kg	2		7	6	2		8	2	6	2		6	2		6	2		7		
Sodium, Soluble (meq/L)	meq/L	0.09		5.13	20.5	0.09		39.9	0.09	37.3	0.09		37.3	0.09		37.3	0.09		37.1		
Sodium, Soluble (mg/kg)	mg/kg	2		79	292	2		863	2	763	2		763	2		763	2		529		
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		0.67	1.29	0.04		1.56	0.04	3.31	0.04		3.31	0.04		3.31	0.04		1.17		
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		21	38	2		71	2	142	2		142	2		142	2		35		

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

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<http://www.agatlabs.com>

CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: S2-3.0, 0.1-0.2 S2-3.0, 0.2-0.3				S2-7.0, 0-0.1 S2-7.0, 0.1-0.2 S2-7.0, 0.2-0.3				S3-1.5, 0-0.1				
		SAMPLE TYPE: Soil		Soil		Soil		Soil		Soil				
		G / S	RDL	DATE SAMPLED: 2020-05-25	1160482	DATE SAMPLED: 2020-05-25	1160483	DATE SAMPLED: 2020-05-25	1160484	DATE SAMPLED: 2020-05-25	1160485	DATE SAMPLED: 2020-05-25	1160486	RDL
pH (CaCl ₂ Extraction)	pH Units	N/A		7.18	6.94	N/A	6.46	6.43	6.69	N/A	7.73			
Electrical Conductivity (Sat. Paste)	dS/m	0.05		4.69	5.35	0.05	0.68	0.50	0.95	0.05	4.13			
Sodium Adsorption Ratio	N/A	0.34		27.2	28.8	0.34	3.99	5.54	4.85	0.34	38.0			
Saturation Percentage	%	1		81	90	1	86	80	78	1	67			
Chloride, Soluble	mg/L	5		1410	1680	5	84	76	98	5	1260			
Calcium, Soluble	mg/L	1		62	67	1	43	20	56	1	33			
Potassium, Soluble	mg/L	2		8	6	2	19	<2	4	2	16			
Magnesium, Soluble	mg/L	1		15	18	1	12	5	18	1	4			
Sodium, Soluble	mg/L	2		922	1030	2	115	107	163	2	870			
Sulfate, Soluble	mg/L	6		115	106	2	53	53	84	6	50			
Theoretical Gypsum Requirement	tonnes/ha	0.01		8.32	11.6	0.01	<0.01	<0.01	<0.01	0.01	6.34			
Calcium, Soluble (meq/L)	meq/L	0.05		3.09	3.34	0.05	2.15	1.00	2.79	0.05	1.65			
Calcium, Soluble (mg/kg)	mg/kg	1		50	60	1	37	16	44	1	22			
Chloride, Soluble (meq/L)	meq/L	0.06		39.8	47.4	0.06	2.37	2.14	2.76	0.06	35.5			
Chloride, Soluble (mg/kg)	mg/kg	2		1140	1510	2	72	61	76	2	844			
Magnesium, Soluble (meq/L)	meq/L	0.08		1.23	1.48	0.08	0.99	0.41	1.48	0.08	0.33			
Magnesium, Soluble (mg/kg)	mg/kg	1		12	16	1	10	4	14	1	3			
Potassium, Soluble (meq/L)	meq/L	0.05		0.20	0.15	0.05	0.49	<0.05	0.10	0.05	0.41			
Potassium, Soluble (mg/kg)	mg/kg	2		6	5	2	16	<2	3	2	11			
Sodium, Soluble (meq/L)	meq/L	0.09		40.1	44.8	0.09	5.00	4.65	7.09	0.09	37.8			
Sodium, Soluble (mg/kg)	mg/kg	2		747	927	2	99	86	127	2	583			
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		2.39	2.21	0.04	1.10	1.10	1.75	0.04	1.04			
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		93	95	2	46	42	66	2	34			

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

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ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:		S3-1.5, 0.1-0.2	S3-1.5, 0.2-0.3	S3-3.0, 0-0.1	S3-3.0, 0.1-0.2	S3-3.0, 0.2-0.3
		SAMPLE TYPE:	G / S	Soil	Soil	Soil	Soil	Soil
				2020-05-25	2020-05-25	2020-05-25	2020-05-25	2020-05-25
pH (CaCl ₂ Extraction)	pH Units	N/A	N/A	7.91	8.05	N/A	7.47	N/A
Electrical Conductivity (Sat. Paste)	dS/m	0.05	0.05	4.58	3.95	0.05	2.16	0.05
Sodium Adsorption Ratio	N/A	0.34	0.34	38.2	37.6	0.34	13.0	0.34
Saturation Percentage	%	1	1	70	85	1	60	1
Chloride, Soluble	mg/L	5	5	1340	1090	5	474	5
Calcium, Soluble	mg/L	1	1	42	30	1	15	1
Potassium, Soluble	mg/L	2	2	9	5	2	5	2
Magnesium, Soluble	mg/L	1	1	6	4	1	2	1
Sodium, Soluble	mg/L	2	2	999	826	2	202	2
Sulfate, Soluble	mg/L	6	6	65	80	2	19	6
Theoretical Gypsum Requirement	tonnes/ha	0.01	0.01	8.73	7.24	0.01	0.22	0.01
Calcium, Soluble (meq/L)	meq/L	0.05	0.05	2.10	1.50	0.05	0.75	0.05
Calcium, Soluble (mg/kg)	mg/kg	1	1	29	26	1	9	1
Chloride, Soluble (meq/L)	meq/L	0.06	0.06	37.8	30.7	0.06	13.4	0.06
Chloride, Soluble (mg/kg)	mg/kg	2	2	938	927	2	284	2
Magnesium, Soluble (meq/L)	meq/L	0.08	0.08	0.49	0.33	0.08	0.16	0.08
Magnesium, Soluble (mg/kg)	mg/kg	1	1	4	3	1	1	1
Potassium, Soluble (meq/L)	meq/L	0.05	0.05	0.23	0.13	0.05	0.13	0.05
Potassium, Soluble (mg/kg)	mg/kg	2	2	6	4	2	3	2
Sodium, Soluble (meq/L)	meq/L	0.09	0.09	43.5	35.9	0.09	8.79	0.09
Sodium, Soluble (mg/kg)	mg/kg	2	2	699	702	2	121	2
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04	0.04	1.35	1.67	0.04	0.40	0.04
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2	2	46	68	2	11	2

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:				DATE SAMPLED:				DATE REPORTED:			
		SAMPLE TYPE:		S3-7.0, 0-0.1	S3-7.0, 0.1-0.2	S3-7.0, 0.2-0.3	Soil		S4-1.5, 0-0.1	S4-1.5, 0.1-0.2	S4-1.5, 0.2-0.3	S4-3.0, 0-0.1	
		G / S	RDL	1160493	1160494	1160495	RDL	2020-05-25	2020-05-25	2020-05-25	2020-05-25		
pH (CaCl ₂ Extraction)	pH Units	N/A		6.79	7.47	7.53	N/A	7.94	8.08	8.24	7.59		
Electrical Conductivity (Sat. Paste)	dS/m	0.05		0.99	0.58	0.54	0.05	5.20	4.65	2.82	2.55		
Sodium Adsorption Ratio	N/A	0.34		3.19	4.94	5.38	0.34	39.7	39.2	33.0	21.0		
Saturation Percentage	%	1		74	74	77	1	72	91	126	42		
Chloride, Soluble	mg/L	5		84	68	41	5	1590	1320	856	564		
Calcium, Soluble	mg/L	1		83	27	24	1	46	35	16	37		
Potassium, Soluble	mg/L	2		42	11	4	2	14	8	6	21		
Magnesium, Soluble	mg/L	1		19	6	5	1	6	5	5	5		
Sodium, Soluble	mg/L	2		124	109	111	2	1080	936	591	513		
Sulfate, Soluble	mg/L	2		47	30	51	6	110	142	112	75		
Theoretical Gypsum Requirement	tonnes/ha	0.01		<0.01	<0.01	<0.01	0.01	10.5	9.98	5.44	1.27		
Calcium, Soluble (meq/L)	meq/L	0.05		4.14	1.35	1.20	0.05	2.30	1.75	0.80	1.85		
Calcium, Soluble (mg/kg)	mg/kg	1		61	20	18	1	33	32	20	16		
Chloride, Soluble (meq/L)	meq/L	0.06		2.37	1.92	1.16	0.06	44.8	37.2	24.1	15.9		
Chloride, Soluble (mg/kg)	mg/kg	2		62	50	32	2	1140	1200	1080	237		
Magnesium, Soluble (meq/L)	meq/L	0.08		1.56	0.49	0.41	0.08	0.49	0.41	0.41	0.41		
Magnesium, Soluble (mg/kg)	mg/kg	1		14	4	4	1	4	5	6	2		
Potassium, Soluble (meq/L)	meq/L	0.05		1.07	0.28	0.10	0.05	0.36	0.20	0.15	0.54		
Potassium, Soluble (mg/kg)	mg/kg	2		31	8	3	2	10	7	8	9		
Sodium, Soluble (meq/L)	meq/L	0.09		5.39	4.74	4.83	0.09	47.0	40.7	25.7	22.3		
Sodium, Soluble (mg/kg)	mg/kg	2		92	81	85	2	778	852	745	215		
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		0.98	0.62	1.06	0.04	2.29	2.96	2.33	1.56		
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		35	22	39	2	79	129	141	32		

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:				DATE SAMPLED:				DATE REPORTED:			
		SAMPLE TYPE:		S4-3.0, 0.1-0.2		S4-3.0, 0.2-0.3		Soil		Soil		Soil	
		G / S	RDL	1160500	1160501	RDL	1160502	1160503	1160504	1160505	1160506	1160507	1160508
pH (CaCl ₂ Extraction)	pH Units	N/A		7.60	7.93	N/A	7.15	7.49	7.70	7.12	7.53		
Electrical Conductivity (Sat. Paste)	dS/m	0.05		2.90	3.80	0.05	1.30	1.94	1.86	1.41	1.15		
Sodium Adsorption Ratio	N/A	0.34		25.0	29.9	0.34	11.6	18.2	22.2	19.9	10.3		
Saturation Percentage	%	1		67	95	1	82	83	103	55	62		
Chloride, Soluble	mg/L	5		792	1030	5	290	436	442	195	276		
Calcium, Soluble	mg/L	1		31	39	1	31	30	21	18	30		
Potassium, Soluble	mg/L	2		5	5	2	8	4	3	26	9		
Magnesium, Soluble	mg/L	1		6	8	1	7	7	5	1	4		
Sodium, Soluble	mg/L	2		580	785	2	276	427	436	320	226		
Sulfate, Soluble	mg/L	6		116	203	2	102	110	159	88	80		
Theoretical Gypsum Requirement	tonnes/ha	0.01		2.69	7.16	0.01	0.52	1.67	2.28	0.64	0.22		
Calcium, Soluble (meq/L)	meq/L	0.05		1.55	1.95	0.05	1.55	1.50	1.05	0.90	1.50		
Calcium, Soluble (mg/kg)	mg/kg	1		21	37	1	25	25	22	10	19		
Chloride, Soluble (meq/L)	meq/L	0.06		22.3	29.1	0.06	8.18	12.3	12.5	5.50	7.78		
Chloride, Soluble (mg/kg)	mg/kg	2		531	979	2	238	362	455	107	171		
Magnesium, Soluble (meq/L)	meq/L	0.08		0.49	0.66	0.08	0.58	0.58	0.41	0.08	0.33		
Magnesium, Soluble (mg/kg)	mg/kg	1		4	8	1	6	6	5	<1	2		
Potassium, Soluble (meq/L)	meq/L	0.05		0.13	0.13	0.05	0.20	0.10	0.08	0.66	0.23		
Potassium, Soluble (mg/kg)	mg/kg	2		3	5	2	7	3	3	14	6		
Sodium, Soluble (meq/L)	meq/L	0.09		25.2	34.1	0.09	12.0	18.6	19.0	13.9	9.83		
Sodium, Soluble (mg/kg)	mg/kg	2		389	746	2	226	354	449	176	140		
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		2.42	4.23	0.04	2.12	2.29	3.31	1.83	1.67		
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		78	193	2	84	91	164	48	50		

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:				DATE SAMPLED:				Soil	
		SAMPLE TYPE:		S5-1.5, 0.2-0.3	S5-3.0, 0-0.1	S5-3.0, 0.1-0.2	S5-3.0, 0.2-0.3	S5-7.0, 0-0.1	S5-7.0, 0.1-0.2	S5-7.0, 0.2-0.3	
		G / S	RDL	2020-05-26	2020-05-26	2020-05-26	2020-05-26	2020-05-26	2020-05-26	2020-05-26	
pH (CaCl ₂ Extraction)	pH Units	N/A		7.93	7.05	7.31	7.82	6.68	7.24	N/A	7.48
Electrical Conductivity (Sat. Paste)	dS/m	0.05		1.94	1.60	1.47	1.26	1.01	0.90	0.05	3.92
Sodium Adsorption Ratio	N/A	0.34		17.6	9.28	7.24	14.2	2.57	2.88	0.34	1.78
Saturation Percentage	%	1		79	73	75	79	106	97	1	111
Chloride, Soluble	mg/L	5		359	276	289	256	90	75	5	332
Calcium, Soluble	mg/L	1		25	67	57	20	114	95	1	595
Potassium, Soluble	mg/L	2		8	35	48	5	67	15	2	14
Magnesium, Soluble	mg/L	1		3	9	9	3	18	18	1	107
Sodium, Soluble	mg/L	2		351	305	223	257	112	117	2	180
Sulfate, Soluble	mg/L	2		98	94	90	90	92	143	6	1680
Theoretical Gypsum Requirement	tonnes/ha	0.01		1.06	0.38	0.03	0.51	<0.01	<0.01	0.01	<0.01
Calcium, Soluble (meq/L)	meq/L	0.05		1.25	3.34	2.84	1.00	5.69	4.74	0.05	29.7
Calcium, Soluble (mg/kg)	mg/kg	1		20	49	43	16	121	92	1	660
Chloride, Soluble (meq/L)	meq/L	0.06		10.1	7.78	8.15	7.22	2.54	2.12	0.06	9.36
Chloride, Soluble (mg/kg)	mg/kg	2		284	201	217	202	95	73	2	369
Magnesium, Soluble (meq/L)	meq/L	0.08		0.25	0.74	0.74	0.25	1.48	1.48	0.08	8.80
Magnesium, Soluble (mg/kg)	mg/kg	1		2	7	7	2	19	17	1	119
Potassium, Soluble (meq/L)	meq/L	0.05		0.20	0.90	1.23	0.13	1.71	0.38	0.05	0.36
Potassium, Soluble (mg/kg)	mg/kg	2		6	26	36	4	71	15	2	16
Sodium, Soluble (meq/L)	meq/L	0.09		15.3	13.3	9.70	11.2	4.87	5.09	0.09	7.83
Sodium, Soluble (mg/kg)	mg/kg	2		277	223	167	203	119	113	2	200
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		2.04	1.96	1.87	1.87	1.92	2.98	0.04	35.0
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		77	69	68	71	98	139	2	1860

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: S6-1.5, 0-0.1				S6-1.5, 0.1-0.2				S6-1.5, 0.2-0.3				S6-3.0, 0-0.1				S6-3.0, 0.1-0.2				S6-3.0, 0.2-0.3			
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil			
		G / S	RDL	DATE SAMPLED:	2020-05-26	1160515	RDL	1160516	2020-05-26	1160517	2020-05-26	1160518	2020-05-26	1160519	2020-05-26	1160520	2020-05-26	1160521	2020-05-26	1160520	2020-05-26	1160521	2020-05-26		
pH (CaCl ₂ Extraction)	pH Units	N/A	7.33	N/A	7.73	7.61	7.26	7.49	7.61	7.31															
Electrical Conductivity (Sat. Paste)	dS/m	0.05	3.25	0.05	1.50	2.37	1.15	0.79	2.40	1.09															
Sodium Adsorption Ratio	N/A	0.34	17.5	0.34	12.3	15.2	5.09	9.17	7.96	<0.34															
Saturation Percentage	%	1	61	1	86	72	54	65	69	67															
Chloride, Soluble	mg/L	5	798	5	390	385	86	97	137	44															
Calcium, Soluble	mg/L	1	54	1	23	35	60	14	102	144															
Potassium, Soluble	mg/L	2	23	2	8	6	22	7	6	49															
Magnesium, Soluble	mg/L	1	8	1	5	8	13	3	30	31															
Sodium, Soluble	mg/L	2	522	2	250	384	167	145	356	15															
Sulfate, Soluble	mg/L	6	33	2	33	71	58	43	920	34															
Theoretical Gypsum Requirement	tonnes/ha	0.01	1.81	0.01	0.47	1.08	<0.01	0.07	0.26	<0.01															
Calcium, Soluble (meq/L)	meq/L	0.05	2.69	0.05	1.15	1.75	2.99	0.70	5.09	7.19															
Calcium, Soluble (mg/kg)	mg/kg	1	33	1	20	25	32	9	70	96															
Chloride, Soluble (meq/L)	meq/L	0.06	22.5	0.06	11.0	10.9	2.43	2.74	3.86	1.24															
Chloride, Soluble (mg/kg)	mg/kg	2	487	2	335	277	46	63	95	29															
Magnesium, Soluble (meq/L)	meq/L	0.08	0.66	0.08	0.41	0.66	1.07	0.25	2.47	2.55															
Magnesium, Soluble (mg/kg)	mg/kg	1	5	1	4	6	7	2	21	21															
Potassium, Soluble (meq/L)	meq/L	0.05	0.59	0.05	0.20	0.15	0.56	0.18	0.15	1.25															
Potassium, Soluble (mg/kg)	mg/kg	2	14	2	7	4	12	5	4	33															
Sodium, Soluble (meq/L)	meq/L	0.09	22.7	0.09	10.9	16.7	7.26	6.31	15.5	0.65															
Sodium, Soluble (mg/kg)	mg/kg	2	318	2	215	276	90	94	246	10															
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04	0.69	0.04	0.69	1.48	1.21	0.90	19.2	0.71															
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2	20	2	28	51	31	28	635	23															

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: S6-7.0, 0.1-0.2				S6-7.0, 0.2-0.3				S7-1.5, 0-0.1				S7-1.5, 0.1-0.2		S7-1.5, 0.2-0.3	
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
		G / S	RDL	DATE SAMPLED:	2020-05-26	1160522	RDL	1160523	RDL	2020-05-26	1160524	RDL	2020-05-26	1160525	RDL	2020-05-26	1160526
pH (CaCl ₂ Extraction)	pH Units	N/A	7.56	N/A	7.65	N/A	7.22	N/A	6.59	N/A	7.38	N/A	7.22	N/A	6.59	N/A	7.38
Electrical Conductivity (Sat. Paste)	dS/m	0.05	0.42	0.05	2.63	0.05	27.8	0.05	9.53	0.05	9.42	0.05	27.8	0.05	9.53	0.05	9.42
Sodium Adsorption Ratio	N/A	0.34	1.52	0.34	1.76	0.34	33.8	0.34	14.9	0.34	10.2	0.34	33.8	0.34	14.9	0.34	10.2
Saturation Percentage	%	1	53	1	62	1	57	1	57	1	59	1	57	1	57	1	59
Chloride, Soluble	mg/L	5	19	5	15	5	12100	5	3520	5	2970	5	12100	5	3520	5	2970
Calcium, Soluble	mg/L	1	30	1	343	2	1120	1	402	1	668	1	1120	1	402	1	668
Potassium, Soluble	mg/L	2	7	2	11	2	34	2	10	2	15	2	180	1	76	1	134
Magnesium, Soluble	mg/L	1	9	1	82	2	180	1	76	1	134	1	4620	2	1240	2	1100
Sodium, Soluble	mg/L	2	37	2	140	2	4620	2	1240	2	1100	2	207	20	223	20	1420
Sulfate, Soluble	mg/L	2	32	4	1540	40	207	20	223	20	1420	20	207	20	223	20	1420
Theoretical Gypsum Requirement	tonnes/ha	0.01	<0.01	0.01	<0.01	0.01	151	0.01	8.82	0.01	4.84	0.01	151	0.01	8.82	0.01	4.84
Calcium, Soluble (meq/L)	meq/L	0.05	1.50	0.05	17.1	0.05	55.9	0.05	20.1	0.05	33.3	0.05	55.9	1	20.1	1	33.3
Calcium, Soluble (mg/kg)	mg/kg	1	16	1	213	1	638	1	229	1	394	1	213	1	638	1	229
Chloride, Soluble (meq/L)	meq/L	0.06	0.54	0.06	0.42	0.06	341	0.06	99.3	0.06	83.8	0.06	341	2	2010	2	1750
Chloride, Soluble (mg/kg)	mg/kg	2	10	2	9	2	6900	2	2010	2	1750	2	9	2	6900	2	1750
Magnesium, Soluble (meq/L)	meq/L	0.08	0.74	0.08	6.75	0.08	14.8	0.08	6.25	0.08	11.0	0.08	14.8	1	43	1	79
Magnesium, Soluble (mg/kg)	mg/kg	1	5	1	51	1	103	1	43	1	79	1	51	1	103	1	43
Potassium, Soluble (meq/L)	meq/L	0.05	0.18	0.05	0.28	0.05	0.87	0.05	0.26	0.05	0.38	0.05	0.87	2	6	2	9
Potassium, Soluble (mg/kg)	mg/kg	2	4	2	7	2	19	2	6	2	9	2	7	2	19	2	9
Sodium, Soluble (meq/L)	meq/L	0.09	1.61	0.09	6.09	0.09	201	0.09	53.9	0.09	47.8	0.09	201	2	707	2	649
Sodium, Soluble (mg/kg)	mg/kg	2	20	2	87	2	2630	2	707	2	649	2	87	2	2630	2	649
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04	0.67	0.04	32.1	0.04	4.31	0.04	4.64	0.04	29.6	0.04	4.31	2	127	2	838
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2	17	2	955	2	118	2	127	2	838	2	118	2	127	2	838

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

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ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:		S7-3.0, 0-0.1		S7-3.0, 0.1-0.2		S7-3.0, 0.2-0.3		S7-7.0, 0-0.1		S7-7.0, 0.1-0.2	
		G / S	RDL	SAMPLE TYPE:		Soil		Soil		Soil		Soil	
				DATE SAMPLED:	2020-05-26	1160527	RDL	2020-05-26	1160528	2020-05-26	1160529	RDL	2020-05-26
pH (CaCl ₂ Extraction)	pH Units	N/A		6.67	N/A	6.68		6.80	N/A	6.96	N/A		7.22
Electrical Conductivity (Sat. Paste)	dS/m	0.05		2.20	0.05	5.04		5.40	0.05	12.1	0.05		4.31
Sodium Adsorption Ratio	N/A	0.34		6.57	0.34	10.5		7.97	0.34	25.6	0.34		6.29
Saturation Percentage	%	1		60	1	61		62	1	73	1		59
Chloride, Soluble	mg/L	5		361	5	1860		1860	5	4690	5		1100
Calcium, Soluble	mg/L	1		108	1	215		291	1	326	1		306
Potassium, Soluble	mg/L	2		7	2	8		9	2	16	2		12
Magnesium, Soluble	mg/L	1		24	1	41		62	1	52	1		64
Sodium, Soluble	mg/L	2		290	2	641		574	2	1890	2		464
Sulfate, Soluble	mg/L	2		259	10	95		161	20	109	10		849
Theoretical Gypsum Requirement	tonnes/ha	0.01		<0.01	0.01	1.80		0.60	0.01	31.2	0.01		<0.01
Calcium, Soluble (meq/L)	meq/L	0.05		5.39	0.05	10.7		14.5	0.05	16.3	0.05		15.3
Calcium, Soluble (mg/kg)	mg/kg	1		65	1	131		180	1	238	1		181
Chloride, Soluble (meq/L)	meq/L	0.06		10.2	0.06	52.5		52.5	0.06	132	0.06		31.0
Chloride, Soluble (mg/kg)	mg/kg	2		217	2	1130		1150	2	3420	2		649
Magnesium, Soluble (meq/L)	meq/L	0.08		1.97	0.08	3.37		5.10	0.08	4.28	0.08		5.27
Magnesium, Soluble (mg/kg)	mg/kg	1		14	1	25		38	1	38	1		38
Potassium, Soluble (meq/L)	meq/L	0.05		0.18	0.05	0.20		0.23	0.05	0.41	0.05		0.31
Potassium, Soluble (mg/kg)	mg/kg	2		4	2	5		6	2	12	2		7
Sodium, Soluble (meq/L)	meq/L	0.09		12.6	0.09	27.9		25.0	0.09	82.2	0.09		20.2
Sodium, Soluble (mg/kg)	mg/kg	2		174	2	391		356	2	1380	2		274
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		5.39	0.04	1.98		3.35	0.04	2.27	0.04		17.7
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		155	2	58		100	2	80	2		501

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PROJECT: 20-039-CAI Sites 1-12, A-F

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: S7-7.0, 0.2-0.3				S8-1.5, 0-0.1				S8-1.5, 0.1-0.2				S8-1.5, 0.2-0.3				S8-3.0, 0-0.1			
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil			
		G / S	RDL	DATE SAMPLED:	2020-05-26	RDL	1160533	2020-05-26	2020-05-26	1160534	2020-05-26	1160535	RDL	1160536	2020-05-26	2020-05-26	RDL	1160536			
pH (CaCl ₂ Extraction)	pH Units		N/A	7.57		N/A	7.44		7.32		7.57		N/A		7.47						
Electrical Conductivity (Sat. Paste)	dS/m		0.05	4.23		0.05	8.98		11.6		7.96		0.05		2.06						
Sodium Adsorption Ratio	N/A		0.34	4.83		0.34	35.8		46.3		31.6		0.34		25.4						
Saturation Percentage	%		1	54		1	44		63		82		1		40						
Chloride, Soluble	mg/L		5	433		5	2910		4550		2460		5		386						
Calcium, Soluble	mg/L		1	406		1	110		113		96		1		18						
Potassium, Soluble	mg/L		2	17		2	13		13		7		2		18						
Magnesium, Soluble	mg/L		1	91		1	25		27		36		1		2						
Sodium, Soluble	mg/L		2	414		2	1600		2110		1430		2		426						
Sulfate, Soluble	mg/L		10	1600		20	523		331		729		2		75						
Theoretical Gypsum Requirement	tonnes/ha		0.01	<0.01		0.01	14.0		35.5		20.6		0.01		0.87						
Calcium, Soluble (meq/L)	meq/L		0.05	20.3		0.05	5.49		5.64		4.79		0.05		0.90						
Calcium, Soluble (mg/kg)	mg/kg		1	219		1	48		71		79		1		7						
Chloride, Soluble (meq/L)	meq/L		0.06	12.2		0.06	82.1		128		69.4		0.06		10.9						
Chloride, Soluble (mg/kg)	mg/kg		2	234		2	1280		2870		2020		2		154						
Magnesium, Soluble (meq/L)	meq/L		0.08	7.49		0.08	2.06		2.22		2.96		0.08		0.16						
Magnesium, Soluble (mg/kg)	mg/kg		1	49		1	11		17		30		1		<1						
Potassium, Soluble (meq/L)	meq/L		0.05	0.43		0.05	0.33		0.33		0.18		0.05		0.46						
Potassium, Soluble (mg/kg)	mg/kg		2	9		2	6		8		6		2		7						
Sodium, Soluble (meq/L)	meq/L		0.09	18.0		0.09	69.6		91.8		62.2		0.09		18.5						
Sodium, Soluble (mg/kg)	mg/kg		2	224		2	704		1330		1170		2		170						
Sulfur (as Sulfate), Soluble (meq/L)	meq/L		0.04	33.3		0.04	10.9		6.89		15.2		0.04		1.56						
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg		2	864		2	230		209		598		2		30						

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

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SAMPLING SITE:

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ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:				SAMPLE TYPE:				DATE RECEIVED: 2020-05-29				DATE REPORTED: 2020-06-04			
		S8-3.0, 0.1-0.2		S8-3.0, 0.2-0.3		S8-7.0, 0-0.1		S8-7.0, 0.1-0.2		S8-7.0, 0.2-0.3		S9-1.5, 0-0.1		S9-1.5, 0.1-0.2		S9-1.5, 0.2-0.3	
		G / S	RDL	DATE SAMPLED:	Soil	DATE SAMPLED:	Soil	DATE SAMPLED:	Soil	DATE SAMPLED:	Soil	DATE SAMPLED:	Soil	DATE SAMPLED:	Soil	DATE SAMPLED:	Soil
pH (CaCl ₂ Extraction)	pH Units	N/A		7.47	7.64	6.52	7.30	7.59	7.22	7.51	7.68						
Electrical Conductivity (Sat. Paste)	dS/m	0.05		4.84	7.93	3.82	3.46	3.72	4.01	8.18	7.23						
Sodium Adsorption Ratio	N/A	0.34		35.5	21.5	9.68	12.9	13.0	21.8	13.7	16.9						
Saturation Percentage	%	1		62	82	110	76	84	63	65	67						
Chloride, Soluble	mg/L	5		1410	2190	961	1040	971	1490	2070	2600						
Calcium, Soluble	mg/L	1		37	259	150	83	86	56	462	224						
Potassium, Soluble	mg/L	2		8	15	19	8	9	10	10	15						
Magnesium, Soluble	mg/L	1		5	26	40	25	34	8	80	51						
Sodium, Soluble	mg/L	2		867	1360	517	523	564	658	1210	1080						
Sulfate, Soluble	mg/L	10		168	1990	558	362	638	108	2160	790						
Theoretical Gypsum Requirement	tonnes/ha	0.01		5.79	17.5	1.82	1.90	2.46	3.16	9.08	8.38						
Calcium, Soluble (meq/L)	meq/L	0.05		1.85	12.9	7.49	4.14	4.29	2.79	23.1	11.2						
Calcium, Soluble (mg/kg)	mg/kg	1		23	212	165	63	72	35	300	150						
Chloride, Soluble (meq/L)	meq/L	0.06		39.8	61.8	27.1	29.3	27.4	42.0	58.4	73.3						
Chloride, Soluble (mg/kg)	mg/kg	2		874	1800	1060	790	816	939	1350	1740						
Magnesium, Soluble (meq/L)	meq/L	0.08		0.41	2.14	3.29	2.06	2.80	0.66	6.58	4.20						
Magnesium, Soluble (mg/kg)	mg/kg	1		3	21	44	19	29	5	52	34						
Potassium, Soluble (meq/L)	meq/L	0.05		0.20	0.38	0.49	0.20	0.23	0.26	0.26	0.38						
Potassium, Soluble (mg/kg)	mg/kg	2		5	12	21	6	8	6	7	10						
Sodium, Soluble (meq/L)	meq/L	0.09		37.7	59.2	22.5	22.7	24.5	28.6	52.6	47.0						
Sodium, Soluble (mg/kg)	mg/kg	2		538	1120	569	397	474	415	787	724						
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		3.50	41.4	11.6	7.54	13.3	2.25	45.0	16.4						
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		104	1630	614	275	536	68	1400	529						

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

6310 ROPER ROAD
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ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:		S9-3.0, 0-0.1		S9-3.0, 0.1-0.2		S9-3.0, 0.2-0.3		S9-7.0, 0-0.1		S9-7.0, 0.1-0.2		
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		
		G / S	RDL	DATE SAMPLED:	2020-05-27	1160546	RDL	2020-05-27	1160547	1160548	RDL	2020-05-27	1160549	2020-05-27
pH (CaCl ₂ Extraction)	pH Units		N/A	7.29		N/A	7.38	7.60		N/A	6.84		7.31	
Electrical Conductivity (Sat. Paste)	dS/m		0.05	1.74		0.05	5.41	7.30		0.05	1.09		2.18	
Sodium Adsorption Ratio	N/A		0.34	12.7		0.34	7.21	9.20		0.34	1.40		1.29	
Saturation Percentage	%		1	68		1	62	64		1	72		66	
Chloride, Soluble	mg/L		5	250		5	791	1590		5	88		37	
Calcium, Soluble	mg/L		1	44		1	438	504		1	123		318	
Potassium, Soluble	mg/L		2	10		2	9	15		2	19		7	
Magnesium, Soluble	mg/L		1	7		1	89	128		1	28		61	
Sodium, Soluble	mg/L		2	345		2	634	894		2	66		96	
Sulfate, Soluble	mg/L		2	60		10	2140	2550		2	42		1080	
Theoretical Gypsum Requirement	tonnes/ha		0.01	0.73		0.01	0.19	2.79		0.01	<0.01		<0.01	
Calcium, Soluble (meq/L)	meq/L		0.05	2.20		0.05	21.9	25.1		0.05	6.14		15.9	
Calcium, Soluble (mg/kg)	mg/kg		1	30		1	272	323		1	89		210	
Chloride, Soluble (meq/L)	meq/L		0.06	7.05		0.06	22.3	44.8		0.06	2.48		1.04	
Chloride, Soluble (mg/kg)	mg/kg		2	170		2	490	1020		2	63		24	
Magnesium, Soluble (meq/L)	meq/L		0.08	0.58		0.08	7.32	10.5		0.08	2.30		5.02	
Magnesium, Soluble (mg/kg)	mg/kg		1	5		1	55	82		1	20		40	
Potassium, Soluble (meq/L)	meq/L		0.05	0.26		0.05	0.23	0.38		0.05	0.49		0.18	
Potassium, Soluble (mg/kg)	mg/kg		2	7		2	6	10		2	14		5	
Sodium, Soluble (meq/L)	meq/L		0.09	15.0		0.09	27.6	38.9		0.09	2.87		4.18	
Sodium, Soluble (mg/kg)	mg/kg		2	235		2	393	572		2	48		63	
Sulfur (as Sulfate), Soluble (meq/L)	meq/L		0.04	1.25		0.04	44.6	53.1		0.04	0.87		22.5	
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg		2	41		2	1330	1630		2	30		713	

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

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ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:				S10-3.0, 0-0.1				S10-3.0, 0.1-0.2	
		SAMPLE TYPE:		Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
		G / S	RDL	1160551	1160552	1160553	1160554	RDL	1160555	RDL	1160556
pH (CaCl ₂ Extraction)	pH Units	N/A		7.57	7.61	7.61	7.90	N/A	7.19	N/A	7.42
Electrical Conductivity (Sat. Paste)	dS/m	0.05		3.46	3.61	3.37	3.48	0.05	1.73	0.05	1.33
Sodium Adsorption Ratio	N/A	0.34		1.69	29.6	27.4	23.9	0.34	9.60	0.34	14.0
Saturation Percentage	%	1		65	65	66	81	1	61	1	54
Chloride, Soluble	mg/L	5		83	1310	1230	1360	5	231	5	302
Calcium, Soluble	mg/L	1		514	30	29	41	1	61	1	22
Potassium, Soluble	mg/L	2		17	8	6	4	2	15	2	4
Magnesium, Soluble	mg/L	1		135	3	4	3	1	10	1	3
Sodium, Soluble	mg/L	2		167	636	595	590	2	307	2	265
Sulfate, Soluble	mg/L	10		2060	39	42	135	2	48	6	31
Theoretical Gypsum Requirement	tonnes/ha	0.01		<0.01	3.21	2.83	3.34	0.01	0.35	0.01	0.37
Calcium, Soluble (meq/L)	meq/L	0.05		25.6	1.50	1.45	2.05	0.05	3.04	0.05	1.10
Calcium, Soluble (mg/kg)	mg/kg	1		334	20	19	33	1	37	1	12
Chloride, Soluble (meq/L)	meq/L	0.06		2.34	37.0	34.7	38.4	0.06	6.52	0.06	8.52
Chloride, Soluble (mg/kg)	mg/kg	2		54	852	812	1100	2	141	2	163
Magnesium, Soluble (meq/L)	meq/L	0.08		11.1	0.25	0.33	0.25	0.08	0.82	0.08	0.25
Magnesium, Soluble (mg/kg)	mg/kg	1		88	2	3	2	1	6	1	2
Potassium, Soluble (meq/L)	meq/L	0.05		0.43	0.20	0.15	0.10	0.05	0.38	0.05	0.10
Potassium, Soluble (mg/kg)	mg/kg	2		11	5	4	3	2	9	2	2
Sodium, Soluble (meq/L)	meq/L	0.09		7.26	27.7	25.9	25.7	0.09	13.4	0.09	11.5
Sodium, Soluble (mg/kg)	mg/kg	2		109	413	393	478	2	187	2	143
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		42.9	0.81	0.87	2.81	0.04	1.00	0.04	0.65
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		1340	25	28	109	2	29	2	17

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: S10-3.0, 0.2-0.3				S10-7.0, 0-0.1				S10-7.0, 0.1-0.2				S10-7.0, 0.2-0.3				S11-1.5, 0-0.1					
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil			
		G / S	RDL	DATE SAMPLED:	2020-05-27	G / S	RDL	DATE SAMPLED:	2020-05-27	G / S	RDL	DATE SAMPLED:	2020-05-27	G / S	RDL	DATE SAMPLED:	2020-05-27	G / S	RDL	DATE SAMPLED:	2020-05-27		
pH (CaCl ₂ Extraction)	pH Units	N/A		7.54		N/A		6.57		7.42		7.48		7.42		N/A							7.58
Electrical Conductivity (Sat. Paste)	dS/m	0.05		1.39		0.05		1.01		0.49		0.50		2.17		0.05							6.15
Sodium Adsorption Ratio	N/A	0.34		14.6		0.34		0.63		1.70		2.83		16.4		0.34							7.57
Saturation Percentage	%	1		57		1		98		60		57		64		1							57
Chloride, Soluble	mg/L	5		228		5		35		20		19		310		5							1210
Calcium, Soluble	mg/L	1		21		1		141		44		31		45		1							497
Potassium, Soluble	mg/L	2		3		2		33		7		4		8		2							14
Magnesium, Soluble	mg/L	1		3		1		25		10		7		5		1							84
Sodium, Soluble	mg/L	2		270		2		31		48		67		434		2							694
Sulfate, Soluble	mg/L	6		37		2		24		30		54		111		10							1840
Theoretical Gypsum Requirement	tonnes/ha	0.01		0.41		0.01		<0.01		<0.01		<0.01		1.27		0.01							0.52
Calcium, Soluble (meq/L)	meq/L	0.05		1.05		0.05		7.04		2.20		1.55		2.25		0.05							24.8
Calcium, Soluble (mg/kg)	mg/kg	1		12		1		138		26		18		29		1							283
Chloride, Soluble (meq/L)	meq/L	0.06		6.43		0.06		0.99		0.56		0.54		8.74		0.06							34.1
Chloride, Soluble (mg/kg)	mg/kg	2		130		2		34		12		11		198		2							690
Magnesium, Soluble (meq/L)	meq/L	0.08		0.25		0.08		2.06		0.82		0.58		0.41		0.08							6.91
Magnesium, Soluble (mg/kg)	mg/kg	1		2		1		25		6		4		3		1							48
Potassium, Soluble (meq/L)	meq/L	0.05		0.08		0.05		0.84		0.18		0.10		0.20		0.05							0.36
Potassium, Soluble (mg/kg)	mg/kg	2		<2		2		32		4		2		5		2							8
Sodium, Soluble (meq/L)	meq/L	0.09		11.7		0.09		1.35		2.09		2.91		18.9		0.09							30.2
Sodium, Soluble (mg/kg)	mg/kg	2		154		2		30		29		38		278		2							396
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		0.77		0.04		0.50		0.62		1.12		2.31		0.04							38.3
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		21		2		24		18		31		71		2							1050

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

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ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: S11-1.5, 0.2-0.3 S11-3.0, 0-0.1 S11-3.0, 0.1-0.2 S11-3.0, 0.2-0.3				S11-7.0, 0-0.1 Soil				S11-7.0, 0.1-0.2 Soil	
		SAMPLE TYPE: Soil		Soil		Soil		Soil		2020-05-27	2020-05-27
		G / S	RDL	1160563	1160564	1160565	1160566	RDL	1160567	RDL	1160568
pH (CaCl ₂ Extraction)	pH Units	N/A		7.54	7.41	7.64	7.55	N/A	7.53	N/A	7.49
Electrical Conductivity (Sat. Paste)	dS/m	0.05		5.10	5.46	5.80	5.44	0.05	2.71	0.05	3.99
Sodium Adsorption Ratio	N/A	0.34		5.17	14.2	5.36	3.94	0.34	3.18	0.34	2.01
Saturation Percentage	%	1		58	65	61	64	1	64	1	60
Chloride, Soluble	mg/L	5		787	1390	934	1070	5	329	5	395
Calcium, Soluble	mg/L	1		511	214	587	608	1	283	1	540
Potassium, Soluble	mg/L	2		14	15	15	20	2	13	2	13
Magnesium, Soluble	mg/L	1		105	26	114	147	1	50	1	133
Sodium, Soluble	mg/L	2		491	825	542	418	2	221	2	201
Sulfate, Soluble	mg/L	10		2010	703	2180	1900	4	726	6	1930
Theoretical Gypsum Requirement	tonnes/ha	0.01		<0.01	4.32	<0.01	<0.01	0.01	<0.01	0.01	<0.01
Calcium, Soluble (meq/L)	meq/L	0.05		25.5	10.7	29.3	30.3	0.05	14.1	0.05	26.9
Calcium, Soluble (mg/kg)	mg/kg	1		296	139	358	389	1	181	1	324
Chloride, Soluble (meq/L)	meq/L	0.06		22.2	39.2	26.3	30.2	0.06	9.28	0.06	11.1
Chloride, Soluble (mg/kg)	mg/kg	2		456	904	570	685	2	211	2	237
Magnesium, Soluble (meq/L)	meq/L	0.08		8.64	2.14	9.38	12.1	0.08	4.11	0.08	10.9
Magnesium, Soluble (mg/kg)	mg/kg	1		61	17	70	94	1	32	1	80
Potassium, Soluble (meq/L)	meq/L	0.05		0.36	0.38	0.38	0.51	0.05	0.33	0.05	0.33
Potassium, Soluble (mg/kg)	mg/kg	2		8	10	9	13	2	8	2	8
Sodium, Soluble (meq/L)	meq/L	0.09		21.4	35.9	23.6	18.2	0.09	9.61	0.09	8.74
Sodium, Soluble (mg/kg)	mg/kg	2		285	536	331	268	2	141	2	121
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		41.9	14.6	45.4	39.6	0.04	15.1	0.04	40.2
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		1170	457	1330	1220	2	465	2	1160

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

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ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: S11-7.0, 0.2-0.3				S12-1.5, 0-0.1				S12-1.5, 0.1-0.2				S12-1.5, 0.2-0.3			
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
		G / S	RDL	DATE SAMPLED:	2020-05-27	G / S	RDL	DATE SAMPLED:	2020-05-27	G / S	RDL	DATE SAMPLED:	2020-05-27	G / S	RDL	DATE SAMPLED:	2020-05-27
pH (CaCl ₂ Extraction)	pH Units	N/A		7.61		N/A		7.34		N/A		7.41		N/A		7.49	
Electrical Conductivity (Sat. Paste)	dS/m	0.05		3.89		0.05		1.76		0.05		3.95		0.05		9.08	
Sodium Adsorption Ratio	N/A	0.34		1.79		0.34		17.1		0.34		15.5		0.34		11.8	
Saturation Percentage	%	1		53		1		70		1		72		1		72	
Chloride, Soluble	mg/L	5		335		5		397		5		1300		5		2450	
Calcium, Soluble	mg/L	1		535		1		28		1		106		1		645	
Potassium, Soluble	mg/L	2		15		2		11		2		7		2		11	
Magnesium, Soluble	mg/L	1		136		1		3		1		12		1		74	
Sodium, Soluble	mg/L	2		179		2		357		2		631		2		1190	
Sulfate, Soluble	mg/L	6		2040		2		68		6		149		20		2160	
Theoretical Gypsum Requirement	tonnes/ha	0.01		<0.01		0.01		0.96		0.01		2.95		0.01		8.56	
Calcium, Soluble (meq/L)	meq/L	0.05		26.7		0.05		1.40		0.05		5.29		0.05		32.2	
Calcium, Soluble (mg/kg)	mg/kg	1		284		1		20		1		76		1		464	
Chloride, Soluble (meq/L)	meq/L	0.06		9.45		0.06		11.2		0.06		36.7		0.06		69.1	
Chloride, Soluble (mg/kg)	mg/kg	2		178		2		278		2		936		2		1760	
Magnesium, Soluble (meq/L)	meq/L	0.08		11.2		0.08		0.25		0.08		0.99		0.08		6.09	
Magnesium, Soluble (mg/kg)	mg/kg	1		72		1		2		1		9		1		53	
Potassium, Soluble (meq/L)	meq/L	0.05		0.38		0.05		0.28		0.05		0.18		0.05		0.28	
Potassium, Soluble (mg/kg)	mg/kg	2		8		2		8		2		5		2		8	
Sodium, Soluble (meq/L)	meq/L	0.09		7.79		0.09		15.5		0.09		27.4		0.09		51.8	
Sodium, Soluble (mg/kg)	mg/kg	2		95		2		250		2		454		2		857	
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		42.5		0.04		1.42		0.04		3.10		0.04		45.0	
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		1080		2		48		2		107		2		1560	

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

6310 ROPER ROAD
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ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: S12-3.0, 0-0.1				S12-3.0, 0.1-0.2				S12-3.0, 0.2-0.3				S12-7.0, 0-0.1		S12-7.0, 0.1-0.2	
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
		G / S	RDL	DATE SAMPLED:	2020-05-27	1160573	RDL	2020-05-27	1160574	RDL	2020-05-27	1160575	RDL	2020-05-27	1160576	2020-05-27	1160577
pH (CaCl ₂ Extraction)	pH Units	N/A	7.03	N/A	7.40	N/A	7.69	N/A	6.74	N/A	7.15						
Electrical Conductivity (Sat. Paste)	dS/m	0.05	2.11	0.05	4.63	0.05	7.39	0.05	1.02	0.05	0.98						
Sodium Adsorption Ratio	N/A	0.34	10.9	0.34	6.93	0.34	9.88	0.34	1.94	0.34	2.64						
Saturation Percentage	%	1	72	1	73	1	68	1	75	1	65						
Chloride, Soluble	mg/L	5	385	5	518	5	1400	5	68	5	94						
Calcium, Soluble	mg/L	1	63	1	404	1	563	1	104	1	85						
Potassium, Soluble	mg/L	2	16	2	12	2	17	2	16	2	7						
Magnesium, Soluble	mg/L	1	9	1	53	1	96	1	25	1	17						
Sodium, Soluble	mg/L	2	349	2	558	2	964	2	85	2	102						
Sulfate, Soluble	mg/L	2	101	6	1870	10	2480	2	44	2	99						
Theoretical Gypsum Requirement	tonnes/ha	0.01	0.67	0.01	<0.01	0.01	4.07	0.01	<0.01	0.01	<0.01						
Calcium, Soluble (meq/L)	meq/L	0.05	3.14	0.05	20.2	0.05	28.1	0.05	5.19	0.05	4.24						
Calcium, Soluble (mg/kg)	mg/kg	1	45	1	295	1	383	1	78	1	55						
Chloride, Soluble (meq/L)	meq/L	0.06	10.9	0.06	14.6	0.06	39.5	0.06	1.92	0.06	2.65						
Chloride, Soluble (mg/kg)	mg/kg	2	277	2	378	2	952	2	51	2	61						
Magnesium, Soluble (meq/L)	meq/L	0.08	0.74	0.08	4.36	0.08	7.90	0.08	2.06	0.08	1.40						
Magnesium, Soluble (mg/kg)	mg/kg	1	6	1	39	1	65	1	19	1	11						
Potassium, Soluble (meq/L)	meq/L	0.05	0.41	0.05	0.31	0.05	0.43	0.05	0.41	0.05	0.18						
Potassium, Soluble (mg/kg)	mg/kg	2	12	2	9	2	12	2	12	2	5						
Sodium, Soluble (meq/L)	meq/L	0.09	15.2	0.09	24.3	0.09	41.9	0.09	3.70	0.09	4.44						
Sodium, Soluble (mg/kg)	mg/kg	2	251	2	407	2	656	2	64	2	66						
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04	2.10	0.04	38.9	0.04	51.6	0.04	0.92	0.04	2.06						
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2	73	2	1370	2	1690	2	33	2	64						

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AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: S12-7.0, 0.2-0.3				SA-1.5, 0-0.1				SA-1.5, 0.1-0.2		SA-1.5, 0.2-0.3		SB-1.5, 0-0.1	
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil	
		G / S	RDL	DATE SAMPLED:	2020-05-27	G / S	RDL	DATE SAMPLED:	2020-05-28	G / S	RDL	DATE SAMPLED:	2020-05-28	G / S	RDL
pH (CaCl ₂ Extraction)	pH Units	N/A	7.51	N/A	7.22	N/A	7.17	N/A	7.17	N/A	7.50	7.50	7.50	7.50	6.33
Electrical Conductivity (Sat. Paste)	dS/m	0.05	1.90	0.05	2.63	0.05	1.90	0.05	1.90	0.05	2.97	2.97	2.97	2.97	2.67
Sodium Adsorption Ratio	N/A	0.34	1.56	0.34	2.11	0.34	1.31	0.34	1.31	0.34	0.94	0.94	0.94	0.94	10.2
Saturation Percentage	%	1	76	1	88	1	73	1	73	1	81	81	81	81	84
Chloride, Soluble	mg/L	5	95	5	272	5	124	5	124	5	48	48	48	48	499
Calcium, Soluble	mg/L	1	246	1	306	1	249	1	249	1	471	471	471	471	87
Potassium, Soluble	mg/L	2	9	2	32	2	18	2	18	2	22	22	22	22	12
Magnesium, Soluble	mg/L	1	47	1	73	1	51	1	51	1	109	109	109	109	17
Sodium, Soluble	mg/L	2	102	2	158	2	87	2	87	2	87	87	87	87	399
Sulfate, Soluble	mg/L	2	860	4	466	2	724	4	724	4	1800	1800	1800	1800	312
Theoretical Gypsum Requirement	tonnes/ha	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	0.92
Calcium, Soluble (meq/L)	meq/L	0.05	12.3	0.05	15.3	0.05	12.4	0.05	12.4	0.05	23.5	23.5	23.5	23.5	4.34
Calcium, Soluble (mg/kg)	mg/kg	1	187	1	269	1	182	1	182	1	382	382	382	382	73
Chloride, Soluble (meq/L)	meq/L	0.06	2.68	0.06	7.67	0.06	3.50	0.06	3.50	0.06	1.35	1.35	1.35	1.35	14.1
Chloride, Soluble (mg/kg)	mg/kg	2	72	2	239	2	91	2	91	2	39	39	39	39	419
Magnesium, Soluble (meq/L)	meq/L	0.08	3.87	0.08	6.01	0.08	4.20	0.08	4.20	0.08	8.97	8.97	8.97	8.97	1.40
Magnesium, Soluble (mg/kg)	mg/kg	1	36	1	64	1	37	1	37	1	88	88	88	88	14
Potassium, Soluble (meq/L)	meq/L	0.05	0.23	0.05	0.82	0.05	0.46	0.05	0.46	0.05	0.56	0.56	0.56	0.56	0.31
Potassium, Soluble (mg/kg)	mg/kg	2	7	2	28	2	13	2	13	2	18	18	18	18	10
Sodium, Soluble (meq/L)	meq/L	0.09	4.44	0.09	6.87	0.09	3.78	0.09	3.78	0.09	3.78	3.78	3.78	3.78	17.4
Sodium, Soluble (mg/kg)	mg/kg	2	78	2	139	2	64	2	64	2	70	70	70	70	335
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04	17.9	0.04	9.70	0.04	15.1	0.04	15.1	0.04	37.5	37.5	37.5	37.5	6.50
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2	654	2	410	2	529	2	529	2	1460	1460	1460	1460	262

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PROJECT: 20-039-CAI Sites 1-12, A-F

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: SB-1.5, 0.1-0.2 SB-1.5, 0.2-0.3				SB-3.0, 0-0.1	SB-3.0, 0.1-0.2	SB-3.0, 0.2-0.3	SC-1.5, 0-0.1	
		SAMPLE TYPE:		Soil	Soil					
		G / S	RDL	1160583	1160584					
pH (CaCl ₂ Extraction)	pH Units	N/A		6.62	7.39	N/A	6.40	6.74	7.37	6.40
Electrical Conductivity (Sat. Paste)	dS/m	0.05		2.84	2.73	0.05	1.30	0.97	1.22	2.13
Sodium Adsorption Ratio	N/A	0.34		6.17	7.95	0.34	7.81	5.77	5.00	4.10
Saturation Percentage	%	1		80	83	1	81	68	49	81
Chloride, Soluble	mg/L	5		373	492	5	183	118	114	514
Calcium, Soluble	mg/L	1		181	119	1	48	45	67	154
Potassium, Soluble	mg/L	2		6	5	2	13	5	7	17
Magnesium, Soluble	mg/L	1		32	24	1	10	8	10	33
Sodium, Soluble	mg/L	2		343	364	2	228	160	166	215
Sulfate, Soluble	mg/L	4		465	285	2	59	54	269	56
Theoretical Gypsum Requirement	tonnes/ha	0.01		<0.01	0.32	0.01	0.11	<0.01	<0.01	<0.01
Calcium, Soluble (meq/L)	meq/L	0.05		9.03	5.94	0.05	2.40	2.25	3.34	7.68
Calcium, Soluble (mg/kg)	mg/kg	1		145	99	1	39	31	33	125
Chloride, Soluble (meq/L)	meq/L	0.06		10.5	13.9	0.06	5.16	3.33	3.22	14.5
Chloride, Soluble (mg/kg)	mg/kg	2		298	408	2	148	80	56	416
Magnesium, Soluble (meq/L)	meq/L	0.08		2.63	1.97	0.08	0.82	0.66	0.82	2.72
Magnesium, Soluble (mg/kg)	mg/kg	1		26	20	1	8	5	5	27
Potassium, Soluble (meq/L)	meq/L	0.05		0.15	0.13	0.05	0.33	0.13	0.18	0.43
Potassium, Soluble (mg/kg)	mg/kg	2		5	4	2	11	3	3	14
Sodium, Soluble (meq/L)	meq/L	0.09		14.9	15.8	0.09	9.92	6.96	7.22	9.35
Sodium, Soluble (mg/kg)	mg/kg	2		274	302	2	185	109	81	174
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		9.68	5.93	0.04	1.23	1.12	5.60	1.17
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		372	237	2	48	37	132	45

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SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: SC-1.5, 0.1-0.2 SC-1.5, 0.2-0.3				SC-3.0, 0-0.1	SC-3.0, 0.1-0.2	SC-3.0, 0.2-0.3	SD-1.5, 0-0.1	SD-1.5, 0.1-0.2	
		SAMPLE TYPE:		Soil	Soil						
		G / S	RDL	DATE SAMPLED: 2020-05-28	1160589	1160590	RDL	2020-05-28	2020-05-28	2020-05-28	2020-05-27
pH (CaCl ₂ Extraction)	pH Units	N/A		6.90	7.46	N/A	6.30	6.62	6.61	7.33	7.39
Electrical Conductivity (Sat. Paste)	dS/m	0.05		3.42	3.93	0.05	1.17	1.29	1.17	1.09	0.49
Sodium Adsorption Ratio	N/A	0.34		4.44	4.28	0.34	2.04	3.01	2.63	0.40	0.74
Saturation Percentage	%	1		73	63	1	77	70	69	80	74
Chloride, Soluble	mg/L	5		889	1090	5	115	228	134	35	14
Calcium, Soluble	mg/L	1		295	336	1	112	100	94	173	60
Potassium, Soluble	mg/L	2		11	10	2	16	8	8	20	5
Magnesium, Soluble	mg/L	1		60	71	1	28	21	22	32	12
Sodium, Soluble	mg/L	2		320	331	2	93	127	109	22	24
Sulfate, Soluble	mg/L	4		170	303	2	96	188	194	27	25
Theoretical Gypsum Requirement	tonnes/ha	0.01		<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Calcium, Soluble (meq/L)	meq/L	0.05		14.7	16.8	0.05	5.59	4.99	4.69	8.63	2.99
Calcium, Soluble (mg/kg)	mg/kg	1		215	212	1	86	70	65	138	44
Chloride, Soluble (meq/L)	meq/L	0.06		25.1	30.7	0.06	3.24	6.43	3.78	0.99	0.39
Chloride, Soluble (mg/kg)	mg/kg	2		649	687	2	89	160	92	28	10
Magnesium, Soluble (meq/L)	meq/L	0.08		4.94	5.84	0.08	2.30	1.73	1.81	2.63	0.99
Magnesium, Soluble (mg/kg)	mg/kg	1		44	45	1	22	15	15	26	9
Potassium, Soluble (meq/L)	meq/L	0.05		0.28	0.26	0.05	0.41	0.20	0.20	0.51	0.13
Potassium, Soluble (mg/kg)	mg/kg	2		8	6	2	12	6	6	16	4
Sodium, Soluble (meq/L)	meq/L	0.09		13.9	14.4	0.09	4.05	5.52	4.74	0.96	1.04
Sodium, Soluble (mg/kg)	mg/kg	2		234	209	2	72	89	75	18	18
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		3.54	6.31	0.04	2.00	3.91	4.04	0.56	0.52
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		124	191	2	74	132	134	22	19

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:				DATE SAMPLED:				DATE REPORTED:			
		SAMPLE TYPE:		SD-1.5, 0.2-0.3	SD-7.0, 0-0.1	SD-7.0, 0.1-0.2	SD-7.0, 0.2-0.3	SE-1.5, 0-0.1	SE-1.5, 0.1-0.2	SE-1.5, 0.2-0.3	SE-3.0, 0-0.1		
		G / S	RDL	2020-05-27	2020-05-27	2020-05-27	2020-05-28	2020-05-28	2020-05-28	2020-05-28	2020-05-28		
pH (CaCl ₂ Extraction)	pH Units	N/A		7.55	7.01	7.23	7.55	7.03	7.30	7.46	7.21		
Electrical Conductivity (Sat. Paste)	dS/m	0.05		0.37	0.86	0.56	0.60	1.17	1.16	1.45	1.05		
Sodium Adsorption Ratio	N/A	0.34		1.10	0.35	0.73	1.85	4.30	2.18	1.39	0.74		
Saturation Percentage	%	1		64	81	75	61	69	71	79	75		
Chloride, Soluble	mg/L	5		12	25	12	10	120	144	142	76		
Calcium, Soluble	mg/L	1		34	136	71	49	69	99	160	137		
Potassium, Soluble	mg/L	2		5	8	4	6	10	7	10	13		
Magnesium, Soluble	mg/L	1		7	26	15	11	17	27	40	31		
Sodium, Soluble	mg/L	2		27	17	26	55	154	95	76	37		
Sulfate, Soluble	mg/L	2		35	24	28	132	60	129	469	99		
Theoretical Gypsum Requirement	tonnes/ha	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Calcium, Soluble (meq/L)	meq/L	0.05		1.70	6.79	3.54	2.45	3.44	4.94	7.98	6.84		
Calcium, Soluble (mg/kg)	mg/kg	1		22	110	53	30	48	70	126	103		
Chloride, Soluble (meq/L)	meq/L	0.06		0.34	0.71	0.34	0.28	3.38	4.06	4.01	2.14		
Chloride, Soluble (mg/kg)	mg/kg	2		8	20	9	6	83	102	112	57		
Magnesium, Soluble (meq/L)	meq/L	0.08		0.58	2.14	1.23	0.91	1.40	2.22	3.29	2.55		
Magnesium, Soluble (mg/kg)	mg/kg	1		4	21	11	7	12	19	32	23		
Potassium, Soluble (meq/L)	meq/L	0.05		0.13	0.20	0.10	0.15	0.26	0.18	0.26	0.33		
Potassium, Soluble (mg/kg)	mg/kg	2		3	6	3	4	7	5	8	10		
Sodium, Soluble (meq/L)	meq/L	0.09		1.17	0.74	1.13	2.39	6.70	4.13	3.31	1.61		
Sodium, Soluble (mg/kg)	mg/kg	2		17	14	20	34	106	67	60	28		
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		0.73	0.50	0.58	2.75	1.25	2.69	9.77	2.06		
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		22	19	21	81	41	92	371	74		

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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: SE-3.0, 0.1-0.2 SE-3.0, 0.2-0.3				SF-1.5, 0-0.1 Soil 2020-05-28 1160606	SF-1.5, 0.1-0.2 Soil 2020-05-28 1160607	SF-1.5, 0.2-0.3 Soil 2020-05-28 1160608	SF-3.0, 0-0.1 Soil 2020-05-28 1160609		
		SAMPLE TYPE:		Soil	Soil						
		G / S	RDL	2020-05-28 1160604	2020-05-28 1160605						
pH (CaCl ₂ Extraction)	pH Units	N/A		7.29	7.57	N/A	6.97	7.08	N/A	6.55	6.57
Electrical Conductivity (Sat. Paste)	dS/m	0.05		0.58	0.43	0.05	2.35	2.53	0.05	2.05	1.65
Sodium Adsorption Ratio	N/A	0.34		0.58	0.60	0.34	12.2	7.19	0.34	4.72	4.99
Saturation Percentage	%	1		90	69	1	79	78	1	100	81
Chloride, Soluble	mg/L	5		19	15	5	469	483	5	390	312
Calcium, Soluble	mg/L	1		71	42	1	56	108	1	107	99
Potassium, Soluble	mg/L	2		6	6	2	10	8	2	10	12
Magnesium, Soluble	mg/L	1		18	12	1	10	26	1	36	23
Sodium, Soluble	mg/L	2		21	17	2	376	321	2	221	212
Sulfate, Soluble	mg/L	2		59	64	4	54	124	2	311	67
Theoretical Gypsum Requirement	tonnes/ha	0.01		<0.01	<0.01	0.01	0.97	0.05	0.01	<0.01	<0.01
Calcium, Soluble (meq/L)	meq/L	0.05		3.54	2.10	0.05	2.79	5.39	0.05	5.34	4.94
Calcium, Soluble (mg/kg)	mg/kg	1		64	29	1	44	84	1	107	80
Chloride, Soluble (meq/L)	meq/L	0.06		0.54	0.42	0.06	13.2	13.6	0.06	11.0	8.80
Chloride, Soluble (mg/kg)	mg/kg	2		17	10	2	371	377	2	390	253
Magnesium, Soluble (meq/L)	meq/L	0.08		1.48	0.99	0.08	0.82	2.14	0.08	2.96	1.89
Magnesium, Soluble (mg/kg)	mg/kg	1		16	8	1	8	20	1	36	19
Potassium, Soluble (meq/L)	meq/L	0.05		0.15	0.15	0.05	0.26	0.20	0.05	0.26	0.31
Potassium, Soluble (mg/kg)	mg/kg	2		5	4	2	8	6	2	10	10
Sodium, Soluble (meq/L)	meq/L	0.09		0.91	0.74	0.09	16.4	14.0	0.09	9.61	9.22
Sodium, Soluble (mg/kg)	mg/kg	2		19	12	2	297	250	2	221	172
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04		1.23	1.33	0.04	1.12	2.58	0.04	6.48	1.40
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2		53	44	2	43	97	2	311	54

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Laboratories

Certificate of Analysis

AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

6310 ROPER ROAD
EDMONTON, ALBERTA
CANADA T6B 3P9
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CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION: SF-3.0, 0.1-0.2				SF-3.0, 0.2-0.3				SF-7.0, 0-0.1		SF-7.0, 0.1-0.2		SF-7.0, 0.2-0.3		SC-7.0, 0-0.1	
		SAMPLE TYPE:		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
		G / S	RDL	DATE SAMPLED:	2020-05-28	1160610	RDL	1160611	RDL	2020-05-28	1160612	2020-05-28	1160613	2020-05-28	1160614	2020-05-25	1161152
pH (CaCl ₂ Extraction)	pH Units	N/A	7.47	N/A	7.59	N/A	6.10	6.18	7.35	6.74							
Electrical Conductivity (Sat. Paste)	dS/m	0.05	2.38	0.05	2.95	0.05	0.87	0.66	1.18	1.08							
Sodium Adsorption Ratio	N/A	0.34	3.25	0.34	2.11	0.34	1.45	1.01	1.19	0.49							
Saturation Percentage	%	1	79	1	77	1	85	81	79	83							
Chloride, Soluble	mg/L	5	375	5	409	5	163	117	160	26							
Calcium, Soluble	mg/L	1	201	1	304	1	80	65	120	155							
Potassium, Soluble	mg/L	2	11	2	13	2	14	6	9	9							
Magnesium, Soluble	mg/L	1	52	1	93	1	20	16	37	35							
Sodium, Soluble	mg/L	2	200	2	164	2	56	35	58	26							
Sulfate, Soluble	mg/L	2	285	4	866	2	42	63	142	206							
Theoretical Gypsum Requirement	tonnes/ha	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01							
Calcium, Soluble (meq/L)	meq/L	0.05	10.0	0.05	15.2	0.05	3.99	3.24	5.99	7.73							
Calcium, Soluble (mg/kg)	mg/kg	1	159	1	234	1	68	53	95	129							
Chloride, Soluble (meq/L)	meq/L	0.06	10.6	0.06	11.5	0.06	4.60	3.30	4.51	0.73							
Chloride, Soluble (mg/kg)	mg/kg	2	296	2	315	2	139	95	126	22							
Magnesium, Soluble (meq/L)	meq/L	0.08	4.28	0.08	7.65	0.08	1.65	1.32	3.04	2.88							
Magnesium, Soluble (mg/kg)	mg/kg	1	41	1	72	1	17	13	29	29							
Potassium, Soluble (meq/L)	meq/L	0.05	0.28	0.05	0.33	0.05	0.36	0.15	0.23	0.23							
Potassium, Soluble (mg/kg)	mg/kg	2	9	2	10	2	12	5	7	7							
Sodium, Soluble (meq/L)	meq/L	0.09	8.70	0.09	7.13	0.09	2.44	1.52	2.52	1.13							
Sodium, Soluble (mg/kg)	mg/kg	2	158	2	126	2	48	28	46	22							
Sulfur (as Sulfate), Soluble (meq/L)	meq/L	0.04	5.93	0.04	18.0	0.04	0.87	1.31	2.96	4.29							
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg	2	225	2	667	2	36	51	112	171							

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Laboratories

CLIENT NAME: CITY OF EDMONTON

SAMPLING SITE:

Certificate of Analysis

AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

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ATTENTION TO: Paul Fuellbrandt

SAMPLED BY:

Soil Analysis - Salinity (pH Calcium Chloride)

DATE RECEIVED: 2020-05-29

DATE REPORTED: 2020-06-04

Parameter	Unit	SAMPLE DESCRIPTION:		SC-7.0, 0.1-0.2	SC-7.0, 0.2-0.3
		G / S	RDL	Soil	Soil
				DATE SAMPLED:	2020-05-25
pH (CaCl ₂ Extraction)	pH Units		N/A	6.72	7.33
Electrical Conductivity (Sat. Paste)	dS/m		0.05	0.88	0.64
Sodium Adsorption Ratio	N/A		0.34	0.64	0.58
Saturation Percentage	%		1	78	80
Chloride, Soluble	mg/L		5	21	9
Calcium, Soluble	mg/L		1	122	81
Potassium, Soluble	mg/L		2	6	5
Magnesium, Soluble	mg/L		1	27	18
Sodium, Soluble	mg/L		2	30	22
Sulfate, Soluble	mg/L		2	112	80
Theoretical Gypsum Requirement	tonnes/ha		0.01	<0.01	<0.01
Calcium, Soluble (meq/L)	meq/L		0.05	6.09	4.04
Calcium, Soluble (mg/kg)	mg/kg		1	95	65
Chloride, Soluble (meq/L)	meq/L		0.06	0.59	0.25
Chloride, Soluble (mg/kg)	mg/kg		2	16	7
Magnesium, Soluble (meq/L)	meq/L		0.08	2.22	1.48
Magnesium, Soluble (mg/kg)	mg/kg		1	21	14
Potassium, Soluble (meq/L)	meq/L		0.05	0.15	0.13
Potassium, Soluble (mg/kg)	mg/kg		2	5	4
Sodium, Soluble (meq/L)	meq/L		0.09	1.30	0.96
Sodium, Soluble (mg/kg)	mg/kg		2	23	18
Sulfur (as Sulfate), Soluble (meq/L)	meq/L		0.04	2.33	1.67
Sulfur (as Sulfate), Soluble (mg/kg)	mg/kg		2	87	64

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

1160466-1161154 If sodium results in mg/L are less than detection, SAR is non-calculable and is reported as 0.

Sodium Adsorption Ratio is a calculated parameter. The calculated value is the ratio of the sodium concentration in mmol/L over the square rooted sum of the calcium and magnesium concentrations in mmol/L.

Theoretical Gypsum Requirement is a calculated parameter. The calculation is from "A Comparison of Methods for Gypsum Requirement of Brine-Contaminated Soils", Canadian Journal of Soil Science, 1998.

Analysis performed at AGAT Edmonton (unless marked by *)

Certified By:

Quality Assurance

CLIENT NAME: CITY OF EDMONTON

AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

ATTENTION TO: Paul Fuellbrandt

SAMPLING SITE:
SAMPLED BY:

Soil Analysis

RPT Date: Jun 04, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Soil Analysis - Salinity (pH Calcium Chloride)

pH (CaCl ₂ Extraction)	153	1160470	7.49	7.46	0.4%	N/A	100%	90%	110%						
Electrical Conductivity (Sat. Paste)	153	1160470	1.25	1.27	1.3%	< 0.05	108%	80%	120%						
Saturation Percentage	153	1160470	76	78	2.6%	< 1	98%	80%	120%						
Chloride, Soluble	40	1160470	244	255	4.6%	< 5	96%	70%	130%	115%	80%	120%	77%	70%	130%
Calcium, Soluble	155	1160537	37	38	2.6%	< 1	88%	70%	130%	103%	80%	120%	91%	70%	130%
Potassium, Soluble	155	1160537	8	9	NA	< 2	87%	70%	130%	99%	80%	120%	90%	70%	130%
Magnesium, Soluble	155	1160537	5	5	4.4%	< 1	89%	70%	130%	98%	80%	120%	89%	70%	130%
Sodium, Soluble	155	1160537	867	877	1.1%	< 2	90%	70%	130%	98%	80%	120%	111%	70%	130%
Sulfate, Soluble	155	1160537	168	169	0.8%	< 2	87%	70%	130%	99%	80%	120%	103%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

Soil Analysis - Salinity (pH Calcium Chloride)

pH (CaCl ₂ Extraction)	155	1160476	6.86	6.84	0.3%	N/A	100%	90%	110%						
Electrical Conductivity (Sat. Paste)	155	1160476	0.53	0.60	12.4%	< 0.05	108%	80%	120%						
Saturation Percentage	155	1160476	71	72	1.4%	< 1	100%	80%	120%						
Chloride, Soluble	40	1160558	35	36	3.2%	< 5	111%	70%	130%	113%	80%	120%	127%	70%	130%
Calcium, Soluble	155	1160476	41	41	0.1%	< 1	98%	70%	130%	108%	80%	120%	108%	70%	130%
Potassium, Soluble	155	1160476	25	25	1.6%	< 2	96%	70%	130%	104%	80%	120%	101%	70%	130%
Magnesium, Soluble	155	1160476	10	10	0.1%	< 1	104%	70%	130%	106%	80%	120%	106%	70%	130%
Sodium, Soluble	155	1160476	92	93	1.5%	< 2	99%	70%	130%	104%	80%	120%	94%	70%	130%
Sulfate, Soluble	155	1160476	28	28	0.8%	< 2	97%	70%	130%	105%	80%	120%	102%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

Soil Analysis - Salinity (pH Calcium Chloride)

pH (CaCl ₂ Extraction)	155	1160497	8.08	8.09	0.1%	N/A	99%	90%	110%						
Electrical Conductivity (Sat. Paste)	155	1160497	4.65	4.64	0.2%	< 0.05	108%	80%	120%						
Chloride, Soluble	2844	1160578	95	95	0.1%	< 5	112%	70%	130%	116%	80%	120%	111%	70%	130%
Calcium, Soluble	155	1160497	35	34	3.1%	< 1	97%	70%	130%	110%	80%	120%	101%	70%	130%
Potassium, Soluble	155	1160497	8	8	NA	< 2	98%	70%	130%	108%	80%	120%	105%	70%	130%
Magnesium, Soluble	155	1160497	5	5	0.1%	< 1	105%	70%	130%	110%	80%	120%	108%	70%	130%
Sodium, Soluble	155	1160497	936	917	2.1%	< 2	100%	70%	130%	104%	80%	120%	103%	70%	130%
Sulfate, Soluble	155	1160497	142	140	0.9%	< 2	94%	70%	130%	104%	80%	120%	110%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated

If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

Soil Analysis - Salinity (pH Calcium Chloride)

pH (CaCl ₂ Extraction)	155	1160517	7.61	7.58	0.4%	N/A	99%	90%	110%						
Electrical Conductivity (Sat. Paste)	155	1160517	2.37	2.43	2.5%	< 0.05	101%	80%	120%						
Saturation Percentage	155	1160517	72	74	2.7%	< 1	95%	80%	120%						
Chloride, Soluble	40	1160598	12	12	NA	< 5	119%	70%	130%	119%	80%	120%	129%	70%	130%

AGAT QUALITY ASSURANCE REPORT (V1)

Page 27 of 45

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Results relate only to the items tested. Results apply to samples as received.

Quality Assurance

CLIENT NAME: CITY OF EDMONTON

AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

ATTENTION TO: Paul Fuellbrandt

SAMPLING SITE:
SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Jun 04, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Calcium, Soluble	155	1160517	35	35	0.9%	< 1	83%	70%	130%	97%	80%	120%	100%	70%	130%
Potassium, Soluble	155	1160517	6	7	NA	< 2	80%	70%	130%	92%	80%	120%	88%	70%	130%
Magnesium, Soluble	155	1160517	8	9	1.2%	< 1	85%	70%	130%	92%	80%	120%	88%	70%	130%
Sodium, Soluble	155	1160517	384	391	1.8%	< 2	83%	70%	130%	90%	80%	120%	99%	70%	130%
Sulfate, Soluble	155	1160517	71	69	2.1%	< 2	82%	70%	130%	97%	80%	120%	92%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated
 If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

Soil Analysis - Salinity (pH Calcium Chloride)

pH (CaCl ₂ Extraction)	155	1160537	7.47	7.41	0.8%	N/A	99%	90%	110%						
Electrical Conductivity (Sat. Paste)	155	1160537	4.84	4.78	1.2%	< 0.05	108%	80%	120%						
Saturation Percentage	155	1160537	62	59	5.0%	< 1	105%	80%	120%						
Chloride, Soluble	40	1162355	3690	3560	3.6%	< 5	100%	70%	130%	112%	80%	120%	113%	70%	130%
Calcium, Soluble	155	1160470	27	27	0.0%	< 1	86%	70%	130%	97%	80%	120%	107%	70%	130%
Potassium, Soluble	155	1160470	12	12	2.1%	< 2	87%	70%	130%	94%	80%	120%	95%	70%	130%
Magnesium, Soluble	155	1160470	5	5	NA	< 1	89%	70%	130%	93%	80%	120%	94%	70%	130%
Sodium, Soluble	155	1160470	245	251	2.7%	< 2	90%	70%	130%	95%	80%	120%	112%	70%	130%
Sulfate, Soluble	155	1160470	53	52	0.2%	< 2	86%	70%	130%	98%	80%	120%	89%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated
 If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

Soil Analysis - Salinity (pH Calcium Chloride)

pH (CaCl ₂ Extraction)	155	1160578	7.51	7.46	0.7%	N/A	100%	90%	110%						
Electrical Conductivity (Sat. Paste)	155	1160558	1.01	1.13	11.2%	< 0.05	100%	80%	120%						
Saturation Percentage	155	1160558	98	100	2.0%	< 1	114%	80%	120%						
Chloride, Soluble	2845	1157371	173	173	0.0%	< 5	110%	70%	130%	107%	80%	120%	NA	70%	130%
Calcium, Soluble	155	1160598	71	72	1.1%	< 1	82%	70%	130%	112%	80%	120%	91%	70%	130%
Potassium, Soluble	155	1160598	4	4	NA	< 2	80%	70%	130%	105%	80%	120%	86%	70%	130%
Magnesium, Soluble	155	1160598	15	15	0.2%	< 1	84%	70%	130%	107%	80%	120%	83%	70%	130%
Sodium, Soluble	155	1160598	26	26	1.0%	< 2	82%	70%	130%	106%	80%	120%	81%	70%	130%
Sulfate, Soluble	155	1160598	28	27	3.0%	< 2	81%	70%	130%	106%	80%	120%	86%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated
 If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

Soil Analysis - Salinity (pH Calcium Chloride)

pH (CaCl ₂ Extraction)	155	1160598	7.23	7.17	0.8%	N/A	100%	90%	110%						
Electrical Conductivity (Sat. Paste)	155	1160578	1.90	1.90	0.0%	< 0.05	102%	80%	120%						
Saturation Percentage	155	1160578	76	66	14.1%	< 1	98%	80%	120%						
Chloride, Soluble	2845	1160537	333	343	2.8%	< 5	104%	70%	130%	110%	80%	120%	104%	70%	130%
Calcium, Soluble	155	1160558	141	142	0.6%	< 1	83%	70%	130%	85%	80%	120%	94%	70%	130%
Potassium, Soluble	155	1160558	33	33	0.4%	< 2	80%	70%	130%	80%	80%	120%	85%	70%	130%
Magnesium, Soluble	155	1160558	25	25	1.5%	< 1	84%	70%	130%	82%	80%	120%	83%	70%	130%

AGAT QUALITY ASSURANCE REPORT (V1)

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Quality Assurance

CLIENT NAME: CITY OF EDMONTON

AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

ATTENTION TO: Paul Fuellbrandt

SAMPLING SITE:
SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Jun 04, 2020			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
							Lower	Upper		Lower	Upper		Lower	Upper	
Sodium, Soluble	155	1160558	31	31	0.5%	< 2	83%	70%	130%	81%	80%	120%	91%	70%	130%
Sulfate, Soluble	155	1160558	24	24	1.9%	< 2	84%	70%	130%	83%	80%	120%	89%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated
 If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

Soil Analysis - Salinity (pH Calcium Chloride)

pH (CaCl ₂ Extraction)	155	1160558	6.57	6.66	1.4%	N/A	99%	90%	110%						
Electrical Conductivity (Sat. Paste)	155	1160598	0.56	0.58	3.5%	< 0.05	101%	80%	120%						
Saturation Percentage	155	1160598	75	70	6.9%	< 1	103%	80%	120%						
Calcium, Soluble	155	1160578	246	248	1.1%	< 1	82%	70%	130%	98%	80%	120%	98%	70%	130%
Potassium, Soluble	155	1160578	9	9	NA	< 2	80%	70%	130%	92%	80%	120%	91%	70%	130%
Magnesium, Soluble	155	1160578	47	47	1.1%	< 1	84%	70%	130%	93%	80%	120%	93%	70%	130%
Sodium, Soluble	155	1160578	102	104	1.6%	< 2	83%	70%	130%	90%	80%	120%	96%	70%	130%
Sulfate, Soluble	155	1160578	860	856	0.4%	< 2	82%	70%	130%	93%	80%	120%	95%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated
 If Matrix spike value is NA, the spiked analyte concentration was lower than that of the matrix contribution.

Certified By:




AGAT

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Method Summary

CLIENT NAME: CITY OF EDMONTON

AGAT WORK ORDER: 20E607181

PROJECT: 20-039-CAI Sites 1-12, A-F

ATTENTION TO: Paul Fuellbrandt

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
pH (CaCl ₂ Extraction)	INOR-171-6207	SHEPPARD 2007; HENDERSHOT 2008	PH METER
Electrical Conductivity (Sat. Paste)	INOR-171-6208	SHEPPARD 2007; MILLER 2007	CONDUCTIVITY METER
Sodium Adsorption Ratio	INOR-171-6201 & INOR-171-6002	McKeague 3.26	CALCULATION
Saturation Percentage	INOR-171-6002	MILLER 2007; SHEPPARD 2007	GRAVIMETRIC
Chloride, Soluble	INOR-171-6212	CARTER & GREGORICH 2007, SM 3120B	COLORIMETER
Calcium, Soluble	INOR-171-6201	CARTER & GREGORICH 2007, SM 3120B	ICP/OES
Potassium, Soluble	INOR-171-6201	CARTER & GREGORICH 2007, SM 3120B	ICP/OES
Magnesium, Soluble	INOR-171-6201	CARTER & GREGORICH 2007, SM 3120B	ICP/OES
Sodium, Soluble	INOR-171-6201	CARTER & GREGORICH 2007, SM 3120B	ICP/OES
Sulfate, Soluble	SOIL 0110; SOIL 0120; INST 0140	SHEPPARD 2007; EATON 2005	ICP/OES
Theoretical Gypsum Requirement	INOR-171-6201 & INOR-171-6002	USDA HDBK 60, 22D	CALCULATION



AGAT Laboratories

5001275

310 Roper Road NW
Edmonton, Alberta
T6B 3P9
webearth.agatlabs.com

Chain of Custody Record

Report Information

Company: Nichols Environmental
Contact: Kyle Jackson
Address: 17331 107 Ave, Edmonton, AB

Phone: _____ Fax: _____
LSD: Sites 1-12, A-F
Client Project #: 20-039-CAI

Invoice To Same Yes / No

Company: The City of Edmonton
Contact: Paul Fuellbrandt
Address: _____

Phone: _____ Fax: _____
PO/AFE#: C-release 4000063963

P: 780.395.2525 • F: 780.462.2490

Report Information

1. Name: Kyle Hunter
Email: hunter@nichols.ca
2. Name: Kyle Jackson
Email: jackson@nichols.ca

Requirements (Check one)

- | | | |
|---|--|---------------------------------|
| <input type="checkbox"/> CCME | <input checked="" type="checkbox"/> AB Tier 1 | <input type="checkbox"/> BC CSR |
| <input type="checkbox"/> Agricultural | <input type="checkbox"/> Agricultural | <input type="checkbox"/> AW |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Industrial | <input type="checkbox"/> IW |
| <input type="checkbox"/> Residential/Park | <input checked="" type="checkbox"/> Residential/Park | <input type="checkbox"/> LW |
| <input type="checkbox"/> Commercial | <input type="checkbox"/> Commercial | <input type="checkbox"/> DW |
| <input type="checkbox"/> Drinking Water | <input type="checkbox"/> Natural Area | |
| <input type="checkbox"/> PWAL | | |
| <input type="checkbox"/> Other | | |
| <input type="checkbox"/> D50 (Drilling) | | <input type="checkbox"/> SPIGEC |

Report Format

- Single
- Sample per page
- Multiple
- Samples per page
- Excel Format Included

Laboratory Use Only

Arrival Temperature:

NIA

AGAT Job Number:

20F607181

Notes:

20 MAY 29 14:10

RUSH TAT REQUESTED
UPON FILLING OUT
THIS SECTION,
CLIENT ACCEPTS
THAT SURCHARGES
WILL BE ATTACHED
TO THIS ANALYSIS.
IF NOT COMPLETED,
REGULAR TAT WILL BE
DEEMED.

Turnaround Time Required (TAT)

- Regular TAT 5 to 7 working days
Rush TAT Less than 24 hours
 24 to 48 hours
 48 to 72 hours

Date Required: _____

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO, SAMPLE CONTAINMENT	# OF CONTAINERS	TESTS					PRESERVED (Y/N)
						Microtox	CCME PHC BTEX/F1/F4	Metals	AB Class II Landfill	Detailed Salinity	
1160466	S1-1.5, 0-10m	Soil	25-May, 2020		1						
470	S1-1.5, 0.10-0.20m	Soil			1						
471	S1-1.5, 0.20-0.30	Soil			1						
472	S1-3.0, 0-0.10	Soil			1						
473	S1-3.0, 0.10-0.20	Soil			1						
474	S1-3.0, 0.20-0.30	Soil			1						
475	S1-7.0, 0-0.10	Soil			1						
476	S1-7.0, 0.10-0.20	Soil			1						
477	S1-7.0, 0.20-0.30	Soil			1						
478	S2-1.5, 0-0.1	Soil			1						
479	S2-1.5, 0.1-0.2	Soil			1						

Samples Delivered By (Print Name and Sign): Kyle Hunter	Date/Time: May 29, 1:00pm	Samples Received By (Print Name and Sign): _____ <td>Date/Time: May 29, 2020</td> <td>Date/Time: May 29, 2020</td> <td>Pink Copy - Client</td> <td>Page 1 of 14</td>	Date/Time: May 29, 2020	Date/Time: May 29, 2020	Pink Copy - Client	Page 1 of 14
Samples Delivered By (Print Name and Sign):	Date/Time:	Samples Received By (Print Name and Sign):	Date/Time:	Date/Time:	Yellow Copy - AGAT	
Samples Delivered By (Print Name and Sign):	Date/Time:	Samples Received By (Print Name and Sign):	Date/Time:	Date/Time:	White Copy - AGAT	E 17792



AGAT Laboratories

6310 Roper Road NW
Edmonton, Alberta
T6B 3P9
webearth.agatlabs.com

Chain of Custody Record

Report Information

Company:	Nichols Environmental	
Contact:	Kyle Jackson	
Address:	17331 107 Ave, Edmonton, AB	
Phone:	Fax:	
LSD:	Sites 1-12, A-F	
Client Project #:	20-038-CAI	

Invoice To	Same Yes <input type="checkbox"/> / No <input checked="" type="checkbox"/>
Company:	The City of Edmonton
Contact:	Paul Fuellbrandt
Address:	
Phone:	Fax:
PQ/APE#:	C-release 4000063963

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO, SAMPLE CONTAINMENT
1160480	s2-1.5, 0.2-0.3	Soil	25-May, 2020	
481	S2-3.0, 0-0.1	Soil		
482	S2-3.0, 0.1-0.2	Soil		
483	S2-3.0, 0.2-0.3	Soil		
484	S2-7.0, 0-0.1	Soil		
485	S2-7.0, 0.1-0.2	Soil		
486	S2-7.0, 0.2-0.3	Soil		
487	S3-1.5, 0-0.1	Soil		
488	S3-1.5, 0.1-0.2	Soil		
489	S3-1.5, 0.2-0.3	Soil		
490	S3-3.0, 0-0.1	Soil		

Samples Relinquished By (Print Name and Sign):
Kyle Hunter

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:

Samples Relinquished By (Print Name and Sign):

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:

P: 780.395.2525 - F: 780.462.2490

Report Information

1. Name: Kyle Hunter
Email: hunter@nichols.ca
2. Name: Kyle Jackson
Email: jackson@nichols.ca

Requirements (Check one)

- | | | |
|---|--|---------------------------------|
| <input type="checkbox"/> CCME | <input checked="" type="checkbox"/> AB Tier 1 | <input type="checkbox"/> BC CSR |
| <input type="checkbox"/> Agricultural | <input type="checkbox"/> Agricultural | <input type="checkbox"/> AW |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Industrial | <input type="checkbox"/> IW |
| <input type="checkbox"/> Residential/Park | <input checked="" type="checkbox"/> Residential/Park | <input type="checkbox"/> LW |
| <input type="checkbox"/> Commercial | <input type="checkbox"/> Commercial | <input type="checkbox"/> DW |
| <input type="checkbox"/> Drinking Water | <input type="checkbox"/> Natural Area | |
| <input type="checkbox"/> FWAL | | |
| <input type="checkbox"/> Other | | |
| <input type="checkbox"/> D50 (Drilling) <input type="checkbox"/> SPIGEC | | |

Report Format

- Single
 Sample per page
 Multiple
 Samples per page
 Excel Format Included

Laboratory Use Only

Arrival Temperature: **NIA**
AGAT Job Number: **20E607181**

Notes:

1 '20 MAY 29 14:10

Turnaround Time Required (TAT)

- Regular TAT 5 to 7 working days
 Rush TAT Less than 24 hours
 24 to 48 hours
 48 to 72 hours

RUSH/TAT REQUESTS
UPON FILLING OUT
THIS SECTION,
CLIENT AGREES
THAT SURCHARGES
WILL BE ATTACHED
TO THIS ANALYSIS.
IF NOT COMPLETED,
REGULAR TAT WILL BE
DEFAULT.

Date Required:

# OF CONTAINERS	Microtox	CCME PHC BTEx/F1/F4	Metals	AB Class II Landfill	Detailed Salinity	Routine Potability	PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)
1					-			
1					✓			
1					✓			
1					✓			
1					✓			
1					✓			
1					✓			
1					✓			
1					✓			
1					✓			
1					✓			

Page **2** of **14**

E 17793



AGAT

Laboratories

6310 Roper Road NW
Edmonton, Alberta
T6B 3P9
webearth.agatlabs.com

Laboratory Use Only

Arrival Temperature:

NIA

AGAT Job Number:

20F607181

Notes:

20 MAY 29 14:10

RUSH TAT REQUESTS
UPON FILLING OUT
THIS SECTION,
CLIENT AGREES
THAT SURCHARGES
WILL BE ATTACHED
TO THIS ANALYSIS.
IF NOT COMPLETED,
REGULAR TAT WILL BE
DEFAULT.

Chain of Custody Record

Report Information

Company: Nichols Environmental

Contact: Kyle Jackson

Address: 17331 107 Ave, Edmonton, AB

Phone: _____ Fax: _____

LSD: Sites 1-12, A-F

Client Project #: 20-039-CAI

Invoice To Same Yes / No

Company: The City of Edmonton

Contact: Paul Fuellbrandt

Address: _____

Phone: _____ Fax: _____

PO/AFE#: C-release 4000063963

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO. SAMPLE CONTAINMENT	# OF CONTAINERS	Mycotox	COCME PHC BTEX/F1-F4	Metals	AB Class II Landfill	Detailed Salinity	Routine Reliability	PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)
1160502	S4-7.0, 0-0.1	Soil	25-MAY, 2020		1					✓			
503	S4-7.0, 0.1-0.2	Soil		↓						✓			
504	S4-7.0, 0.2-0.3	Soil		↓						✓			
505	S5-1.5, 0-0.1	Soil	26-May, 2020							✓			
507	S5-1.5, 0.1-0.2	Soil		↓						✓			
508	S5-1.5, 0.2-0.3	Soil		↓						✓			
509	S5-3.0, 0-0.1	Soil		↓						✓			
510	S5-3.0, 0.1-0.2	Soil		↓						✓			
511	S5-3.0, 0.2-0.3	Soil		↓						✓			
512	S5-7.0, 0-0.1	Soil		↓						✓			
513	S5-7.0, 0.1-0.2	Soil		↓						✓			

Sample Received By (Print Name and Sign):
Kyle Hunter

Date/Time

Samples Received By (Print Name and Sign):

Date/Time
2020-05-26

Print Copy - Client

Page 4 of 14

Sample Rebuffuted By (Print Name and Sign):

Date/Time

Samples Rebuffuted By (Print Name and Sign):

Date/Time

Yellow Copy - AGAT

Sample Requeseted by (Print Name and Sign):

Date/Time

Samples Requeseted by (Print Name and Sign):

Date/Time

White Copy - AGAT

E 17795



AGAT

Laboratories

6310 Roper Road NW
Edmonton, Alberta
T6B 3P9
www.agatlab.com

Chain of Custody Record

Report Information

Company: Nichols Environmental

Contact: Kyle Jackson

Address: 17331 107 Ave, Edmonton, AB

Phone: _____ Fax: _____

LSD: Sites 1-12, A-F

Client Project #: 20-039-CAI

Invoice To

Same Yes / No

Company: The City of Edmonton

Contact: Paul Fuellbrandt

Address: _____

Phone: _____ Fax: _____

PO/AFE#: C-release 4000063963

P: 780.395.2525 - F: 780.462.2490

Report Information

1. Name: Kyle Hunter
Email: hunter@nichols.ca
2. Name: Kyle Jackson
Email: jackson@nichols.ca

Report Format

- Single Sample per page
 Multiple Samples per page
 Excel Format Included

Requirements (Check one)

- | | | |
|---|--|---------------------------------|
| <input type="checkbox"/> CCME | <input checked="" type="checkbox"/> AB Tier 1 | <input type="checkbox"/> BC CSR |
| <input type="checkbox"/> Agricultural | <input type="checkbox"/> Agricultural | <input type="checkbox"/> AW |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Industrial | <input type="checkbox"/> IW |
| <input type="checkbox"/> Residential/Park | <input checked="" type="checkbox"/> Residential/Park | <input type="checkbox"/> LW |
| <input type="checkbox"/> Commercial | <input type="checkbox"/> Commercial | <input type="checkbox"/> DW |
| <input type="checkbox"/> Drinking Water | <input type="checkbox"/> Natural Area | |
| <input type="checkbox"/> FWAL | | |
| <input type="checkbox"/> Other | | |
| <input type="checkbox"/> O50 (Drilling) | | <input type="checkbox"/> SPIGEC |

Laboratory Use Only

Arrival Temperature:

N/A

AGAT Job Number:

20E607181

Notes:

20 MAY 29 14:10

RUSH TAT REQUESTS
UPON FILLING OUT
THIS SECTION,
CLIENT AGREES
THAT SURCHARGES
WILL BE ATTACHED
TO THIS ANALYSIS.
IF NOT COMPLETED,
REGULAR TAT WILL BE
DEEMED.

Turnaround Time Required (TAT)

Regular TAT 5 to 7 working daysRush TAT Less than 24 hours
 24 to 48 hours
 48 to 72 hours

Data Required: _____

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO: SAMPLE CONTAINMENT	# OF CONTAINERS	Microtox	CCME PHC BTEx/F1-F4	Metals	AB Class II Landfill	Detailed Salinity	Routine Potability	PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)
					1								
1160514	S5-7.0, 0.2-0.3	Soil	26-May, 2020										
515	S6-1.5, 0-0.1	Soil											
516	S6-1.5, 0.1-0.2	Soil											
517	S6-1.5, 0.2-0.3	Soil											
518	S6-3.0, 0-0.1	Soil											
519	S6-3.0, 0.1-0.2	Soil											
520	S6-3.0, 0.2-0.3	Soil											
521	S6-7.0, 0-0.1	Soil											
522	S6-7.0, 0.1-0.2	Soil											
523	S6-7.0, 0.2-0.3	Soil											
524	S7-1.5, 0-0.1	Soil											

Samples Relinquished By (Print Name and Sign):
Kyle Hunter

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:

Print Copy - Client

Page 5 of 14

Samples Relinquished By (Print Name and Sign):

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:

Yellow Copy - AGAT

Samples Relinquished By (Print Name and Sign):

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:

White Copy - AGAT

E 17796



AGAT Laboratories

6310 Roper Road NW
Edmonton, Alberta
T6B 3P9
wehearth.agatlabs.com

P: 780.395.2525 • F: 780.462.2490

Chain of Custody Record

Report Information

Company: Nichols Environmental
Contact: Kyle Jackson
Address: 17331 107 Ave, Edmonton, AB

Phone: _____ Fax: _____
LSD: Sites 1-12, A-F
Client Project #: 20-039-CAI

Invoice To

Same Yes / No

Company: The City of Edmonton
Contact: Paul Fuellbrandt
Address: _____

Phone: _____ Fax: _____
PO/AFE#: C-release 4000063963

Report Information

1. Name:	Kyle Hunter
Email:	hunter@nichols.ca
2. Name:	Kyle Jackson
Email:	jackson@nichols.ca

Requirements (Check one)

<input type="checkbox"/> CCME	<input checked="" type="checkbox"/> AB Tier 1	<input type="checkbox"/> BC CSR
<input type="checkbox"/> Agricultural	<input type="checkbox"/> Agricultural	<input type="checkbox"/> AW
<input type="checkbox"/> Industrial	<input type="checkbox"/> Industrial	<input type="checkbox"/> IW
<input type="checkbox"/> Residential/Park	<input checked="" type="checkbox"/> Residential/Park	<input type="checkbox"/> LW
<input type="checkbox"/> Commercial	<input type="checkbox"/> Commercial	<input type="checkbox"/> DW
<input type="checkbox"/> Drinking Water	<input type="checkbox"/> Natural Area	
<input type="checkbox"/> PWAL		
<input type="checkbox"/> Other		
<input type="checkbox"/> D50 (Drilling)		<input type="checkbox"/> SPIGEC

Report Format

- Single Sample per page
- Multiple Samples per page
- Excel Format Included

Laboratory Use Only

Arrival Temperature:

NIA

AGAT Job Number:

20E607181

Notes:

20 MAY 29 14:10

READ THE REQUESTS
UPON FILLING OUT
THIS SECTION.
CLIENT AGREES
THAT SURCHARGES
WILL BE ATTACHED
TO THIS ANALYSIS.
IF NOT COMPLETED,
REGULAR PAYMENT WILL BE
DEEMED.

Turnaround Time Required (TAT)

Regular TAT 5 to 7 working days

Rush TAT Less than 24 hours
 24 to 48 hours
 48 to 72 hours

Date Required: _____

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO. SAMPLE CONTAINMENT	# OF CONTAINERS						PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)	
						Mitobox	CCME PHC BTEV/F1-F4	Metals	AB Class II Landfill	Detailed Salinity	Routine Potability		
1160525	S7-1.5, 0.1-0.2	Soil	26-MAY, 2020		1								
526	S7-1.5, 0.2-0.3	Soil											
521	S7-3.0, 0-0.1	Soil											
528	S7-3.0, 0.1-0.2	Soil											
529	S7-3.0, 0.2-0.3	Soil											
530	S7-7.0, 0-0.1	Soil											
531	S7-7.0, 0.1-0.2	Soil											
532	S7-7.0, 0.2-0.3	Soil											
533	S8-1.5, 0-0.1	Soil											
534	S8-1.5, 0.1-0.2	Soil											
535	S8-1.5, 0.2-0.3	Soil											

Sample Received by Print Name and Sign:
Kyle Hunter *[Signature]*

Sample Relinquished by Print Name and Sign:

Sample Relinquished by Print Name and Sign:

Date/Time

Date/Time

Date/Time

Samples Received By Print Name and Sign:

Samples Received By Print Name and Sign:

Samples Received By Print Name and Sign:

5/29/2020

Date/Time

Date/Time

Pink Copy - Client

Yellow Copy - AGAT

White Copy - AGAT

Page 6 of 17

E 17797

Printed Date: 2020-05-29 14:10



AGAT

Laboratories

6310 Roper Road NW
Edmonton, Alberta
T6B 3P9
webearth.agatlabs.com

Chain of Custody Record

Report Information

Company: Nichols Environmental
Contact: Kyle Jackson
Address: 17331 107 Ave, Edmonton, AB

Phone: _____ Fax: _____
LSD: Sites 1-12, A-F
Client Project #: 20-039-CAI

Invoice To Same Yes / No
 Company: The City of Edmonton
 Contact: Paul Fuellbrandt
 Address: _____
 Phone: _____ Fax: _____
 PO/AFE#: C-release 4000063963

Report Information

1. Name: Kyle Hunter
Email: hunter@nichols.ca
2. Name: Kyle Jackson
Email: jackson@nichols.ca

P: 780.395.2525 • F: 780.462.2490

Report Format

- Single Sample per page
- Multiple Samples per page
- Excel Format Included

Requirements (Check one)

- | | | |
|---|--|---------------------------------|
| <input type="checkbox"/> CCME | <input checked="" type="checkbox"/> AB Tier 1 | <input type="checkbox"/> BC CSR |
| <input type="checkbox"/> Agricultural | <input type="checkbox"/> Agricultural | <input type="checkbox"/> AW |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Industrial | <input type="checkbox"/> IW |
| <input type="checkbox"/> Residential/Park | <input checked="" type="checkbox"/> Residential/Park | <input type="checkbox"/> LW |
| <input type="checkbox"/> Commercial | <input type="checkbox"/> Commercial | <input type="checkbox"/> DW |
| <input type="checkbox"/> Drinking Water | <input type="checkbox"/> Natural Area | |
| <input type="checkbox"/> PWAL | | |
| <input type="checkbox"/> Other | | |
| <input type="checkbox"/> D50 (Drilling) <input type="checkbox"/> SPIGEC | | |

Laboratory Use Only

Arrival Temperature: NIA

AGAT Job Number: 20E607181

Notes:

20 MAY 29 14:18

RUSH/TAT REQUESTS
UPON FILLING OUT
THIS SECTION,
CLIENT AGREES
THAT CHARGES
WILL BE ATTACHED
TO THIS ANALYSIS.
IF NOT COMPLETED,
REGULAR TAT WILL BE
DEFAULT.

Turnaround Time Required (TAT)

Regular TAT 5 to 7 working days

Rush TAT Less than 24 hours
 24 to 48 hours
 48 to 72 hours

Date Required: _____

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO. SAMPLE CONTAINMENT	# OF CONTAINERS	Microtox	CCME PHC BTEK/F1-F4	Metals	AB Glass II Landfill	Detailed Salinity	Routine Potability	PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)
					1								
1160536	S8-3.0, 0-0.1	Soil	26-MAY										
537	S8-3.0, 0.1-0.2	Soil											
538	S8-3.0, 0.2-0.3	Soil											
539	S8-7.0, 0-0.1	Soil											
540	S8-7.0, 0.1-0.2	Soil											
541	S8-7.0, 0.2-0.3	Soil											
542	S9-1.5, 0-0.1	Soil	27-MAY										
544	S9-1.5, 0.1-0.2	Soil											
545	S9-1.5, 0.2-0.3	Soil											
546	S9-3.0, 0-0.1	Soil											
547	S9-3.0, 0.1-0.2	Soil											

Samples Received By (Print Name and Sign):
Kyle Hunter

Date/Time

Samples Received By (Print Name and Sign):

Date/Time

Pink Copy - Client

Page 7 of 14

Samples Received By (Print Name and Sign):

Date/Time

Samples Received By (Print Name and Sign):

Date/Time

Yellow Copy - AGAT

Samples Received By (Print Name and Sign):

Date/Time

Samples Received By (Print Name and Sign):

Date/Time

White Copy - AGAT

E 17798



AGAT Laboratories

Chain of Custody Record

Report Information

Company: Nichols Environmental

Contact: Kyle Jackson

Address: 17331 107 Ave, Edmonton, AB

Phone: _____ Fax: _____

LSD: Sites 1-12, A-F

Client Project #: 20-039-CAI

Invoice To

Same Yes / No

Company: The City of Edmonton

Contact: Paul Fuellbrandt

Address: _____

Phone: _____ Fax: _____

PO/AFE#: C-release 4000063963

6310 Roper Road NW
Edmonton, Alberta
T6B 3P9
webearth.agatlabs.com

P: 780.396.2625 • F: 780.462.2490

Report Information

1. Name: Kyle Hunter
Email: hunter@nichols.ca
2. Name: Kyle Jackson
Email: jackson@nichols.ca

Report Format

- Single
 Sample per page
 Multiple Samples per page
 Excel Format Included

Requirements (Check one)

- | | | |
|---|--|---------------------------------|
| <input type="checkbox"/> CCME | <input checked="" type="checkbox"/> AB Tier 1 | <input type="checkbox"/> BC CSR |
| <input type="checkbox"/> Agricultural | <input type="checkbox"/> Agricultural | <input type="checkbox"/> AW |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Industrial | <input type="checkbox"/> IW |
| <input type="checkbox"/> Residential/Park | <input checked="" type="checkbox"/> Residential/Park | <input type="checkbox"/> LW |
| <input type="checkbox"/> Commercial | <input type="checkbox"/> Commercial | <input type="checkbox"/> DW |
| <input type="checkbox"/> Drinking Water | <input type="checkbox"/> Natural Area | |
| <input type="checkbox"/> PWAL | | |
|
<input type="checkbox"/> Other | | |
| <input type="checkbox"/> D50 (Drilling) <input type="checkbox"/> SPIGEC | | |

Laboratory Use Only

Arrival Temperature: NIAAGAT Job Number: 20E607181

Notes:

20 MAY 29 14:10

Turnaround Time Required (TAT)

Regular TAT 5 to 7 working daysRush TAT Less than 24 hours
 24 to 48 hours
 48 to 72 hours

RUSH TAT REQUESTS
UPON FILLING OUT
THIS SECTION,
CLIENT AGREES
THAT SURCHARGES
WILL BE ATTACHED
TO THIS ANALYSIS.
IF NOT COMPLETED,
REGULAR TAT WILL
DEFAULT.

Date Required: _____

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO. / SAMPLE CONTAINMENT	# OF CONTAINERS	Microtox	CCME PHC ETEX/F1-F4	Metals	AB Class II Landfill	Detailed Salinity	Routine Potability	PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)
1160548	S9-3.0, 0.2-0.3	Soil	27-May, 2020		1								
549	S9-7.0, 0-0.1	Soil											
550	S9-7.0, 0.1-0.2	Soil											
551	S9-7.0, 0.2-0.3	Soil											
552	S10-1.5, 0-0.1	Soil											
553	S10-1.5, 0.1-0.2	Soil											
554	S10-1.5, 0.2-0.3	Soil											
555	S10-3.0, 0-0.10	Soil											
556	S10-3.0, 0.1-0.2	Soil											
557	S10-3.0, 0.2-0.3	Soil											
558	S10-7.0, 0-0.1	Soil											

Samples Received/Print Name and Sign: Kyle Hunter

Samples Relinquished By (Print Name and Sign):

Samples Relinquished By (Print Name and Sign):

Date/Time

Date/Time

Date/Time

Samples Received By (Print Name and Sign): As L. L. L. L.

Samples Received By (Print Name and Sign):

Samples Received By (Print Name and Sign):

Date/Time 5/29/2020

Date/Time

Date/Time

Pink Copy - Client
Yellow Copy - AGAT
White Copy - AGAT

Page 8 of 14

E 17799

Data Entered by: AGATData Entered on: 2020-05-29



AGAT Laboratories

Chain of Custody Record

Report Information

Company: Nichols Environmental
 Contact: Kyle Jackson
 Address: 17331 107 Ave, Edmonton, AB

Phone: _____ Fax: _____
 LSD: Sites 1-12, A-F
 Client Project #: 20-039-CAI

Invoice To

Same Yes / No
 Company: The City of Edmonton
 Contact: Paul Fuellbrandt
 Address: _____
 Phone: _____ Fax: _____
 PO/AFE#: C-release 4000063963

Report Information

1. Name: Kyle Hunter
 Email: hunter@nichols.ca
 2. Name: Kyle Jackson
 Email: jackson@nichols.ca

P: 780.395.2526 • F: 780.462.2490

6310 Roper Road NW
 Edmonton, Alberta
 T6B 3P9
webearth.agatlabs.com

Laboratory Use Only

Arrival Temperature:

NIA

20E607181

AGAT Job Number:

Notes:

20 MAY 29 14:11

Report Format

- Single
- Sample per page
- Multiple
- Samples per page
- Excel Format Included

Turnaround Time Required (TAT)

Regular TAT 5 to 7 working days

Rush TAT Less than 24 hours
 24 to 48 hours
 48 to 72 hours

RUSH TAT REQUESTS
 UPON FILLING OUT
 THIS SECTION,
 CLIENT ACCEPTS
 THAT SURCHARGES
 WILL BE ATTACHED
 TO THIS ANALYSIS.
 IF NOT COMPLETED,
 REGULAR TAT WILL BE
 DEFAULT.

Date Required: _____

Requirements (Check one)

- | | | |
|---|--|---------------------------------|
| <input type="checkbox"/> CCME | <input checked="" type="checkbox"/> AB Tier 1 | <input type="checkbox"/> BC CSR |
| <input type="checkbox"/> Agricultural | <input type="checkbox"/> Agricultural | <input type="checkbox"/> AW |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Industrial | <input type="checkbox"/> IW |
| <input type="checkbox"/> Residential/Park | <input checked="" type="checkbox"/> Residential/Park | <input type="checkbox"/> LW |
| <input type="checkbox"/> Commercial | <input type="checkbox"/> Commercial | <input type="checkbox"/> DW |
| <input type="checkbox"/> Drinking Water | <input type="checkbox"/> Natural Area | |
| <input type="checkbox"/> FWAL | | |
| <input type="checkbox"/> Other | | |
| <input type="checkbox"/> DSO (Drilling) <input type="checkbox"/> SPIGEC | | |

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO. SAMPLE CONTAINMENT	# OF CONTAINERS	Micotox	CCME PHC BTEX/F1-F4	Metals	AB Class II Landfill	Detailed Salinity	Routine Potability	PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)
					1								
1160570	S12-1.5, 0-0.1	Soil	27-May, 2020										
571	S12-1.5, 0.1-0.2	Soil											
572	S12-1.5, 0.2-0.3	Soil											
573	S12-3.0, 0-0.1	Soil											
574	S12-3.0, 0.1-0.2	Soil											
575	S12-3.0, 0.2-0.3	Soil											
576	S12-7.0, 0-0.1	Soil											
577	S12-7.0, 0.1-0.2	Soil											
578	S12-7.0, 0.2-0.3	Soil	↓										
579	SA-1.5, 0-0.1	Soil	May 28, 2020										
580	SA-1.5, 0.1-0.2	Soil	↓										

Samples Received By (Print Name and Sign):
 Kyle Hunter *[Signature]*

Date/Time

Samples Received By (Print Name and Sign):

Date/Time
5/28/2020

Pink Copy - Client

Yellow Copy - AGAT

Page 10 of 14

Samples Relinquished By (Print Name and Sign):

Date/Time

Samples Relinquished By (Print Name and Sign):

Date/Time

White Copy - AGAT

Samples Retained by (Print Name and Sign):

Date/Time

Samples Retained by (Print Name and Sign):

Date/Time

E 17801



AGAT

Laboratories

6310 Roper Road NW
Edmonton, Alberta
T6B 3P9
webearth.agatlab.com

P: 780.395.2525 • F: 780.462.2490

Chain of Custody Record

Report Information

Company: Nichols Environmental
Contact: Kyle Jackson
Address: 17331 107 Ave, Edmonton, AB

Phone: _____ Fax: _____
LSD: Sites 1-12, A-F
Client Project #: 20-039-CAI

Invoice To Same Yes / No

Company: The City of Edmonton

Contact: Paul Fuellbrandt

Address: _____

Phone: _____ Fax: _____
PO/AFE#: C-release 4000063963

Report Information

1. Name: Kyle Hunter
Email: hunter@nichols.ca
2. Name: Kyle Jackson
Email: jackson@nichols.ca

Requirements (Check one)

- | | | |
|---|--|---------------------------------|
| <input type="checkbox"/> CCEME | <input checked="" type="checkbox"/> AB Tier 1 | <input type="checkbox"/> BC CSR |
| <input type="checkbox"/> Agricultural | <input type="checkbox"/> Agricultural | <input type="checkbox"/> AW |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Industrial | <input type="checkbox"/> IW |
| <input type="checkbox"/> Residential/Park | <input checked="" type="checkbox"/> Residential/Park | <input type="checkbox"/> LW |
| <input type="checkbox"/> Commercial | <input type="checkbox"/> Commercial | <input type="checkbox"/> DW |
| <input type="checkbox"/> Drinking Water | <input type="checkbox"/> Natural Area | |
| <input type="checkbox"/> FWAL | | |
| <input type="checkbox"/> Other | | |
| <input type="checkbox"/> D50 (Drilling) | | <input type="checkbox"/> SPIGEC |

Report Format

- Single Sample per page
- Multiple Samples per page
- Excel Format Included

Laboratory Use Only

Arrival Temperature: N/A

AGAT Job Number: 20E607181

Notes:

20 MAY 29 14:11

Turnaround Time Required (TAT)

Regular TAT 5 to 7 working days

Rush TAT Less than 24 hours
 24 to 48 hours
 48 to 72 hours

RUSH/TAT REQUESTS
UPON FILLING OUT
THIS SECTION,
CLIENT AGREES
THAT SURCHARGES
WILL BE ATTACHED
TO THIS ANALYSIS.
IF NOT COMPLETED,
REGULAR TAT WILL BE
DEFAULT.

Date Required: _____

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO. SAMPLE CONTAINMENT	# OF CONTAINERS	Microtox	OCME PHC BTEX/F1/F4	Metals	AB Class II Landfill	Detailed Salinity	Routine Probability	PRESERVED Y/N	CONTAMINATED/HAZARDOUS Y/N
1160581	SA-1.5, 0.2-0.3	Soil	28-MAY, 2020		1					✓			
582	SB-1.5, 0-0.1	Soil								✓			
583	SB-1.5, 0.1-0.2	Soil								✓			
584	SB-1.5, 0.2-0.3	Soil								✓			
585	SB-3.0, 0-0.1	Soil								✓			
586	SB-3.0, 0.1-0.2	Soil								✓			
587	SB-3.0, 0.2-0.3	Soil								✓			
588	SC-1.5, 0-0.1	Soil								✓			
589	SC-1.5, 0.1-0.2	Soil								✓			
590	SC-1.5, 0.2-0.3	Soil								✓			
591	SC-3.0, 0-0.1	Soil								✓			

Samples Reinquished By (Print Name and Sign):
Kyle Hunter

Samples Reinquished By (Print Name and Sign):

Samples Reinquished By (Print Name and Sign):

Date/Time

Date/Time

Date/Time

Samples Received By (Print Name and Sign):

Samples Received By (Print Name and Sign):

Samples Received By (Print Name and Sign):

Date/Time

Date/Time

Date/Time

Print Copy - Client

Yellow Copy - AGAT

White Copy - AGAT

Page 11 of 14

E 17802



AGAT Laboratories

Chain of Custody Record

Report Information

Company: Nichols Environmental
Contact: Kyle Jackson
Address: 17331 107 Ave, Edmonton, AB

Phone: _____ Fax: _____
LSD: Sites 1-12, A-F
Client Project #: 20-039-CAJ

Invoice To Same Yes / No

Company: The City of Edmonton

Contact: Paul Fuellbrandt

Address: _____

Phone: _____ Fax: _____
PO/AFE#: C-release 4000063983

Report Information

1. Name: Kyle Hunter
Email: hunter@nichols.ca
2. Name: Kyle Jackson
Email: jackeon@nichols.ca

P: 780.395.2525 • F: 780.462.2490

Report Format

- Single
- Sample per page
- Multiple
- Samples per page
- Excel Format Included

Requirements (Check one)

- | | | |
|---|--|---------------------------------|
| <input type="checkbox"/> CCME | <input checked="" type="checkbox"/> AB Tier 1 | <input type="checkbox"/> BC CSR |
| <input type="checkbox"/> Agricultural | <input type="checkbox"/> Agricultural | <input type="checkbox"/> AW |
| <input type="checkbox"/> Industrial | <input type="checkbox"/> Industrial | <input type="checkbox"/> IW |
| <input type="checkbox"/> Residential/Park | <input checked="" type="checkbox"/> Residential/Park | <input type="checkbox"/> LW |
| <input type="checkbox"/> Commercial | <input type="checkbox"/> Commercial | <input type="checkbox"/> DW |
| <input type="checkbox"/> Drinking Water | <input type="checkbox"/> Natural Area | |
| <input type="checkbox"/> FWAL | | |
| <input type="checkbox"/> Other | | |
| <input type="checkbox"/> D50 (Drilling) | | <input type="checkbox"/> SPIGEC |

Laboratory Use Only

NIA

Arrival Temperature:

AGAT Job Number: 20E607181

Notes:

20 MAY 29 14:11

Turnaround Time Required (TAT)

Regular TAT 5 to 7 working days

Rush TAT Less than 24 hours
 24 to 48 hours
 48 to 72 hours

RUSH REQUESTS
UPON FILLING OUT THIS SECTION, CLIENT ACCEPTS THAT SURCHARGES WILL BE ATTACHED TO THIS ANALYSIS. IF NOT COMPLETED, REGULAR TAT WILL BE DEFAULT.

Date Required:

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO. SAMPLE CONTAINMENT	# OF CONTAINERS	Microtox	CCME PHC BTEX/F1-F4	Metals	AB Class II Landfill	Detailed Salinity	Routine Potability	PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)
					1								
1160592	SC-3.0, 0.1-0.2	Soil	28-May, 2020										
593	SC-3.0, 0.2-0.3	Soil											
594	SD-1.5, 0-0.1	Soil	27-may, 2020										
595	SD-1.5, 0.1-0.2	Soil											
596	SD-1.5, 0.2-0.3	Soil											
597	SD-7.0, 0-0.1	Soil											
598	SD-7.0, 0.1-0.2	Soil											
599	SD-7.0, 0.2-0.3	Soil											
600	SE-1.5, 0-0.1	Soil	28-may, 2020										
601	SE-1.5, 0.1-0.2	Soil											
602	SE-1.5, 0.2-0.3	Soil											

Samples Received By (Print Name and Sign):
Kyle Hunter

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:

SYNTHETIC

Pink Copy - Client

Yellow Copy - AGAT

White Copy - AGAT

Page 12 of 14

E 17803

Samples Retained By (Print Name and Sign):

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:



Chain of Custody Record

Report Information

Company: Nichols Environmental
Contact: Kyle Jackson
Address: 17331 107 Ave, Edmonton, AB

Phone: _____ Fax: _____
LSD: Sites 1-12, A-F
Client Project #: 20-039-CAI

Invoice To

Same Yes / No

Company: The City of Edmonton

Contact: Paul Fuellbrandt

Address: _____

Phone: _____ Fax: _____

PO/AFE#: C-release 4000063963

LABORATORY USE (LAB ID #)	SAMPLE IDENTIFICATION	SAMPLE MATRIX	DATE/TIME SAMPLED	COMMENTS - SITE SAMPLE INFO, SAMPLE CONTAINMENT	# OF CONTAINERS	Microwave	OCME IPHC BTEX/F1-F4	Metals	AB Class II Landfill	Detailed Salinity	Routine Potability	PRESERVED (Y/N)	CONTAMINATED/HAZARDOUS (Y/N)
1160603	SE-3.0, 0-0.1	Soil	28-MAY 2020		1					✓			
604	SE-3.0, 0.1-0.2	Soil								✓			
605	SE-3.0, 0.2-0.3	Soil								✓			
606	SF-1.5, 0-0.1	Soil								✓			
607	SF-1.5, 0.1-0.2	Soil								✓			
608	SF-1.5, 0.2-0.3	Soil								✓			
609	SF-3.0, 0-0.1	Soil								✓			
610	SF-3.0, 0.1-0.2	Soil								✓			
611	SF-3.0, 0.2-0.3	Soil								✓			
612	SF-7.0, 0-0.1	Soil								✓			
613	SF-7.0, 0.1-0.2	Soil								✓			

Samples Received By (Print Name and Sign):
Kyle Hunter

Date/Time:

Samples Received By (Print Name and Sign):

Date/Time:

Laboratory Use Only

Arrival Temperature:

N/A

AGAT Job Number:

20E607181

Notes:

20 MAY 29 14:11

Turnaround Time Required (TAT)

Regular TAT 5 to 7 working days

Rush TAT Less than 24 hours

24 to 48 hours

48 to 72 hours

RUSH TAT REQUESTS UPON FILLING OUT THIS SECTION, CLIENT ACCEPTS THAT SURCHARGES WILL BE ATTACHED TO THIS ANALYSIS. IF NOT COMPLETED, REGULAR TAT WILL BE DEFAULT.

Date Required:

E 17804



AGAT Laboratories

SAMPLE INTEGRITY RECEIPT FORM

RECEIVING BASICS - Shipping

Company/Consultant: Nichols City of Elmendorf

Courier: Drop off Prepaid Collect

Waybill# /

Branch EDM GP FN FM RD VAN LYD FSJ EST SASK Other:

If multiple sites were submitted at once: Yes No

Custody Seal Intact: Yes No NA

TAT: <24hr 24-48hr 48-72hr Reg Other:

Cooler Quantity: 5

TIME SENSITIVE ISSUES - Shipping

ALREADY EXCEEDED HOLD TIME? Yes No

Inorganic Tests (Please Circle): Mibi, BOD, Nitrate/Nitrite, Turbidity, Color, Microtox, Ortho PO4, Tedlar Bag, Residual Chlorine, Chlorophyll*, Chloroamines*

Earliest Expiry:

Hydrocarbons: Earliest Expiry

SAMPLE INTEGRITY - Shipping

Hazardous Samples: YES NO Precaution Taken:

Legal Samples: Yes No

International Samples: Yes No

Tape Sealed: Yes No

Coolant Used: Icetrap Bagged Ice Free Ice Free Water None

Temperature (Bottles/Jars only) N/A if only Soil Bags Received

FROZEN (Please Circle if samples received Frozen)

1 (Bottle/Jar) + + = °C 2 (Bottle/Jar) + + = °C
 3 (Bottle/Jar) + + = °C 4 (Bottle/Jar) + + = °C
 5 (Bottle/Jar) + + = °C 6 (Bottle/Jar) + + = °C
 7 (Bottle/Jar) + + = °C 8 (Bottle/Jar) + + = °C
 9 (Bottle/Jar) + + = °C 10 (Bottle/Jar) + + = °C

(If more than 10 coolers are received use another sheet of paper and attach)

LOGISTICS USE ONLY

Workorder No: 20E607181

Samples Damaged: Yes No If YES why?

No Bubble Wrap Frozen Courier

Other:

Account Project Manager: _____ have they been notified of the above issues: Yes No

Whom spoken to: _____ Date/Time: _____

CPM Initial: _____

General Comments: sample 466-mislabel
sample 152A, 153A, 154A rec'd
extra detailed salinity assigned.