DRAFT

MARY RIVER PROJECT
RECLAMATION PILOT STUDY

Revegetation Survey & Preliminary Reclamation Trial
2025 Project Update

Prepared For
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EDI Project
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REV.0
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EDI
ENVIRONMENTAL DYNAMICS INC.
Down to Earth Biology

EXECUTIVE SUMMARY

Background/Objectives— EDI Environmental Dynamics Inc. (EDI) was retained to design and implement a reclamation pilot study at the Mary River Project. This investigation is intended to enhance reclamation success at the Mary River Project and guide future reclamation activities that support the environmental compliance and sustainability of the Project. The study objectives are to:

1) document the status of opportunistic post-disturbance revegetation at the Project;
2) initiate preliminary reclamation trials that examine methods and approaches that are appropriate and adaptable to the inherent challenges of the Arctic environment; and,
3) identify pathways and opportunities for future studies.

The first field component of this reclamation pilot study (Summer 2019) focused on surveying natural/unassisted revegetation at the Project and establishing a preliminary trial design. The second field component (Summer 2021) expanded the number of survey locations and reclamation trial sites. Periodic follow-up monitoring occurred in Summer 2020-25. This report — updated annually (or as required) — summarizes Project findings, including the most recent site monitoring findings.

Study Sites/Baseline Conditions— Study sites were established at four (4) locations along the Tote Road at KM16, KM18, KM52 and within an abandoned airstrip near KM58. These sites were selected to represent different revegetation timeframes, from 1-Year Post-Disturbance to >40 Years Post-Disturbance. Landscape and terrain were typified by a combination of xeric or subxeric conditions and either regosolic or brunisolic cryosols characterized by restrictive growth substrates (comprised of unconsolidated/loose sandy materials, coarse parent materials and/or permafrost) and poor fertility. Vegetation — including a combination of Arctic graminoids, forbs/perennial herbs, shrubs and ericaceous species, and bryophytes and lichen — was representative of the dry-to-moist graminoid/dwarf shrub land cover type that predominate of the broader Project area. Rates of natural revegetation in the Arctic are characteristically slow due to the region's climate, narrow growing season, and challenging site conditions and terrain. A key observation of the revegetation survey is that natural/unassisted revegetation does occur at the Project. Revegetation following disturbance appeared to be shaped by initial starting conditions, such as the level of landscape disturbance (i.e., status of landscape form and function), soil characteristics (i.e., nutrient availability and organic matter content), and integrity of nearby 'undisturbed' vegetation.

Reclamation Trials— Reclamation trials were established at three (3) locations (KM16, KM18, KM52) described above. The purpose of the reclamation trials was to apply and adapt different reclamation site/surface preparations and document natural/unassisted revegetation patterns. Reclamation earthworks at KM16 and KM52 were completed in Summer 2019; reclamation earthworks at KM18 were completed in Summer 2021. Two surface configurations were applied: 'rough-and-loose' and 'track-packing'. Ongoing seasonal monitoring of the trial sites has occurred from 2020 to 2025 which comprised a combination of qualitative and quantitative assessment. During early site monitoring (2020-21), no significant revegetation was recorded; all sites were deemed stable and had low erosion potential, but wind erosion and 'wind-swept' surface soil conditions were apparent. Over time (2022-23), an increasing number of small volunteer forbs and graminoids were found to have colonized all sites (KM16, KM18, KM52). The highest levels of

revegetation (i.e., based on visual assessment) were observed at KM18 and KM16 (both characterized as subxeric), whereas KM52 (characterized as xeric) had the lowest levels of revegetation. More recently (2024-25), cover vegetation continues to increase and the health and vigour of cover vegetation at all sites is improving.

Conclusions/Recommendations— In summary, the reclamation trial's sample size (n=3) is small and represents a short-term timeframe with some design limitations. However, findings provide insight into some of the conditions, challenges and opportunities at the Project. Collectively, these investigations (and any/all subsequent initiatives) are intended to enhance reclamation success in the Arctic and guide future reclamation activities that support the environmental compliance and sustainability of the Project.

During appropriate phases of the Life-of-Mine cycle, it would be beneficial — i.e., as a long-term objective— to evaluate Project features that could be decommissioned and/or reclaimed to reduce the Project's disturbance footprint. For example, discontinued laydown areas, access roads or other features associated with the Mine Site, the Milne Port and/or Tote Road should be evaluated as candidate sites for reclamation studies. Where appropriate, these features could provide a ready landscape for planning, designing and implementing medium- and even large-scale reclamation trials to examine the scalability of reclamation approaches and calibrate the time, effort and cost of reclamation onsite.

AUTHORSHIP

Baffinland retained EDI to design and initiate a reclamation pilot study at the Mary River Mine Site. This report summarizes the study's rationale, methods and outcomes and recommendations to expand the study's scope. The following EDI Environmental Dynamics Inc. personnel contributed to this reclamation pilot study:

Patrick Audet, PhD, PAg, P.Biol., RPBio ..... Project Team Lead and Report Author
Mike Setterington, MSc, RPBio, CWB ..... Senior Review and Project Oversight

Jordyn Renaud, BSc, P.Biol. ..... Field Technician (2019–2021)
Morgan Kanak, BSA ..... Field Technician (2021)
Maria Sonntag, BSc, RPF ..... Field Technician (2022)
Madalena Pinto, MSc, P.Biol. ..... Field Technician (2022–2023)
Brodie Smith, MSc, RPBio. ..... Field Technician (2024)
Andrew Lai, BSc, P.Biol ..... Field Technician (2025)
Bailey Durant, MSc, AIT ..... Field Technician (2022–2025)
Yolanda Navarro, BTech (GIS) ..... GIS/Mapping Support
Christina Tennant, MSc. ..... GIS/Mapping Support

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1 INTRODUCTION

The Mary River Mine Project (the Project) is an open-pit iron ore mine located in the Qikiqtani Region of Nunavut. The Project — owned and operated by Baffinland Iron Mine Corporations (Baffinland) — has been under construction since 2013 and operational since 2014. Under the Project's Terms and Conditions, Baffinland is committed to timely and effective reclamation during appropriate phases of the Life-of-Mine so that post-disturbance landscapes are safe, stable, non-polluting and align with a suitable aesthetic and self-sustaining land use(s). Baffinland recognizes that appropriate studies and field trials should be undertaken to inform and refine reclamation practices onsite that will benefit Final Reclamation and Closure objectives.

EDI Environmental Dynamics Inc. (EDI) was retained to review recent advances in Arctic mine reclamation and examine strategies (i.e., to the extent possible and practical) that are expected to promote natural revegetation at the Project (EDI Environmental Dynamics Inc. 2019). Building from this desktop investigation, a reclamation pilot study was designed with the objectives to:

1) document the status of opportunistic post-disturbance revegetation at the Project (i.e., natural and unassisted);
2) initiate preliminary reclamation trials that examine methods and approaches that are considered appropriate and adaptable to the inherent challenges of the Arctic environment; and,
3) identify pathways and opportunities for future studies.

The Summer 2019 field component of this reclamation pilot study focused on siting and establishing a preliminary trial design (EDI Environmental Dynamics Inc. 2020). The Summer 2021 field component then expanded the number of study sites. Periodic follow-up monitoring (Summer 2020-25) has documented site revegetation status and related observations. This report — which is updated annually — summarizes Project findings, including the most recent site monitoring findings. Collectively, these investigations (and any/all subsequent initiatives) are intended to enhance reclamation success in the Arctic and guide future reclamation activities that support the environmental compliance and sustainability of the Project.

2 POST-DISTURBANCE REVEGETATION SURVEY

2.1 SITE SELECTION AND SURVEY DESIGN

The first part of the reclamation pilot study focused on documenting the terrain, soil conditions, species composition, successional trajectories, and assumed revegetation rates within disturbed Project areas. In consultation with Baffinland's Sustainable Development and Site Environment teams, EDI conducted a desktop review of the Project footprint's available ortho/aerial imagery to establish a preliminary list of potential study sites representative of developed, disturbed or temporarily decommissioned areas. These areas were then field scouted by Baffinland and EDI personnel (accounting for future development plans, logistics and safety) to finalize the sites included in the revegetation survey.

After confirming site selection and delineating disturbed vs. control areas, site layout and boundary markers were established at each study site to facilitate the survey of cover transects (100 or 150 m long), vegetation plots (1x1 m vegetation quadrats), and soil plots (30x30x30 cm soil survey pits) — described in Section 2.2. As shown (Figure 1a), the site layout was comprised of three (3) paired vegetation and soil survey plots distributed at the start, middle and end of the vegetation cover transect. Applying the same experimental design, control areas (i.e., deemed representative of pre-development [undisturbed] site conditions) were sited on adjacent land approximately 30 m from the Project footprint.

2019 BASELINE SURVEY — KM52 & KM16

During the 2019 field/survey period, EDI established two study sites along the Tote Road at KM52 and KM16 (Map 1). Since 2013, the Tote Road has been subject to ongoing re-alignment and maintenance activities, including surface earthworks and regrading. Study site KM52 was selected because it represented approximately 1-year post-disturbance and KM16 represented approximately 5-years post-disturbance (i.e., referring to disturbance associated with the road works; timeframe relative to the time of field survey). The site disturbance history at each location was discussed with road maintenance personnel.

2021 BASELINE SURVEY — KM18 & KM58

During the 2021 field/survey period, EDI established one site along the Tote Road at KM18 (adjacent to a construction borrow pit). Another site was established within an abandoned airstrip near KM58, approximately 500 m outside the Project footprint (Map 2). Survey site KM18 was selected because it was disturbed during the construction of the nearby borrow pit and during ongoing road maintenance activities representing 1-3 years post disturbance (depending on location), and because it reflected a different ecotype than previous field surveys. Survey sites at the KM58 Abandoned Airstrip (i.e., comprising three survey areas, due to the size of the disturbance footprint; Figure 1b) were selected as they represented >40 years post-disturbance[1] and a unique location to investigate natural revegetation after disturbance (i.e., no seeding or planting and no reclamation earthworks and/or surficial preparations).

[1] Erratum: This site was previously reported at representing >60 years post-disturbance (based on available information).

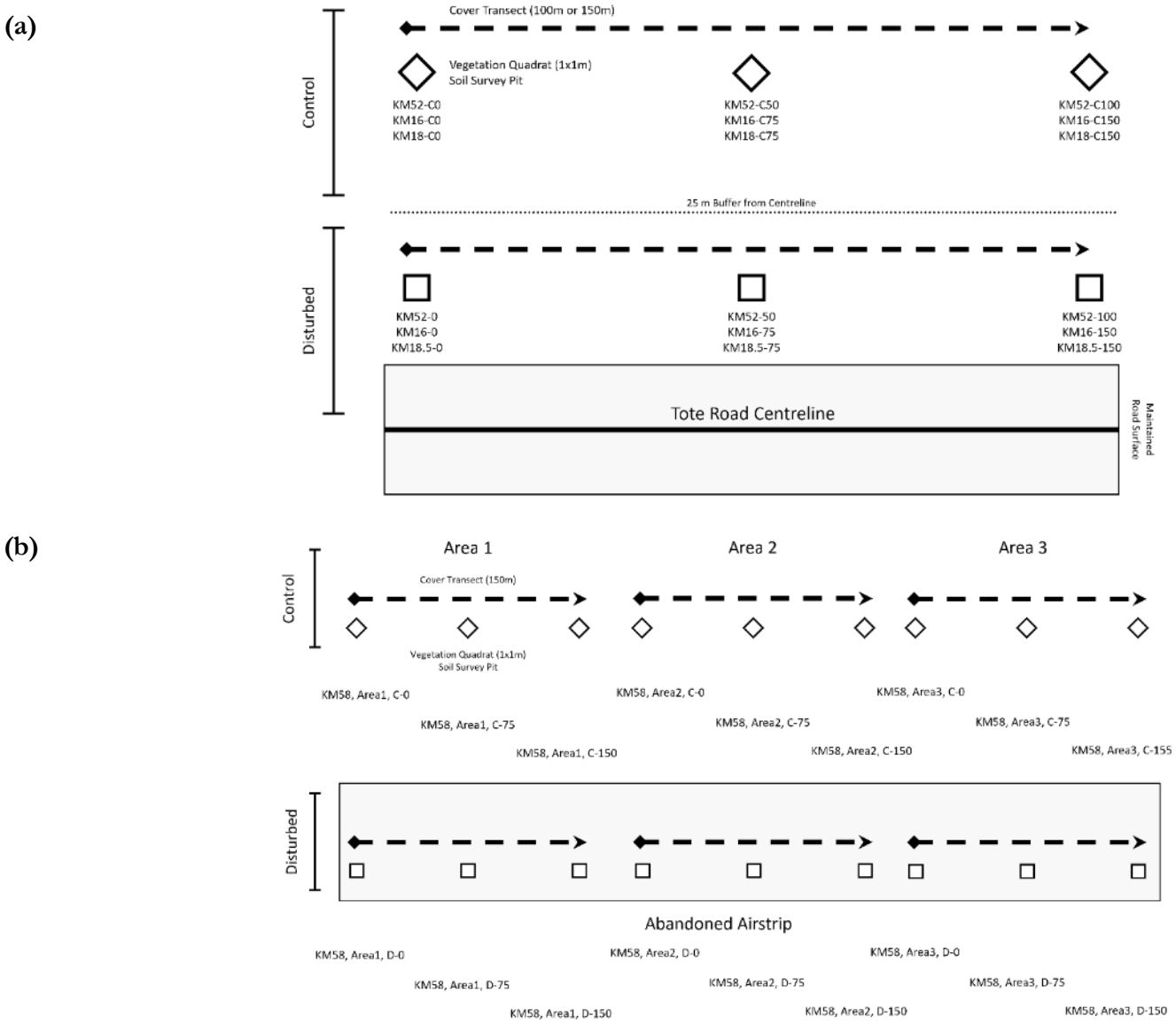

Figure 1. SCHEMA — Survey layout and sampling design (a) at KM52, KM18 and KM16, (b) near KM58.

2019 SURVEY
KM52 and KM16 Survey Locations

Baffinland

Milne Port

KM 16 Survey Location

KM 52 Survey Location

Mary River Mine Site

495000 502500 510000 517500 525000 532500 540000 547500 555000 562500 570000

7975000 7967500 7960000 7952500 7945000 7937500 7930000 7922500 7915000

Legend

- KM 16
- KM 52
- Tote Road
- Port
- Mine

0 5 10 15 20
Kilometers

N

Map Scale = 1:270,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2019
- Inset map. National Geographic World Map.

Disclaimer
EDI Environmental Dynamics Inc. has made every effort to ensure this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

Drawn:	Checked:	Map 1	Date: 2019-08-28
Y. Navarro	P. Audet		

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2021 SURVEY
KM18 and KM58 Survey Locations

Baffinland Iron Mines Corporation

Milne Port

KM 18 Survey Location

KM 58 Survey Location

Mary River Mine Site

Legend

- KM 18
- Km 58
- Tote Road
- Port
- Mine

0 5 10 15 20
Kilometers

N

Map Scale = 1:270,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

• Main map. World Street Map. Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
• Inset map. National Geographic World Map. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

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2.2 METHODS AND ANALYSES

Landscape, Terrain and Soil— Survey procedures for characterizing landscape, terrain and soil were based on methods described in the Field Manual for Describing Terrestrial Ecosystems — Land Management Handbook No. 25 (B.C. Ministry of Forests and Range and B.C. Ministry of Environment 2010) and The Canadian System of Soil Classification, 3rd Edition (Soil Classification Working Group 1998). Landscape features and terrain (e.g., slope grade, aspect, geomorphological process) were assessed at the transect scale. Soils were assessed at the plot scale. At each soil survey plot (Photo 1a), a shovel and hand trowel were used to expose a 30x30 cm area and dig up to a depth of 30 cm (being mindful not to disturb permafrost occurring below this depth) to access the subsoil layers (B or C horizons). Documented soil profile information included parent material, horizon depths, texture, colour, and structure. Soil samples were collected from the top 10–30 cm from each soil pit to analyze textural and nutritional attributes by ALS Environmental Laboratories.

Vegetation Surface Cover and Composition— Survey procedures for characterizing vegetation surface cover and composition were based on methods used in Baffinland's existing vegetation monitoring program, and described in the Canadian Tundra and Taiga Experiment (CANTTEX) — Field Manual (Bean and Henry 2003, Bean et al. 2003). Vegetation species lists within and directly adjacent to the survey plots were recorded using various taxonomic reference guides (Bean and Henry 2003, Aiken et al. 2011, Mallory and Aiken 2012); bryophytes and lichen taxons were not characterized at the species level and only recorded in terms of presence or absence. Vegetation cover and structural composition were assessed at the transect and plot scale. The surface projective cover[2] was calculated based on measurements at 1 m intervals along the 100 m or 150 m transect (Photo 1b). Surface projective cover within the 1x1 m vegetation quadrats was recorded at two basal strata (i.e., due to overlapping structural cover components) and calculated based on 100–200 measurements within the point-frame grid (Photo 1c).

Data Collection and Analysis— Field data summaries are summarized as means or data ranges. Some survey sites had sparse cover vegetation; therefore, field data were commonly consolidated into coarse structural groupings. No statistical analyses were applied due to small sample sizes. An example field data collection sheet is in Appendix A.

[2] Referring to the % presence or absence of exposed rock and bare soil, bryophytes, lichen, graminoids, forbs and shrubs.

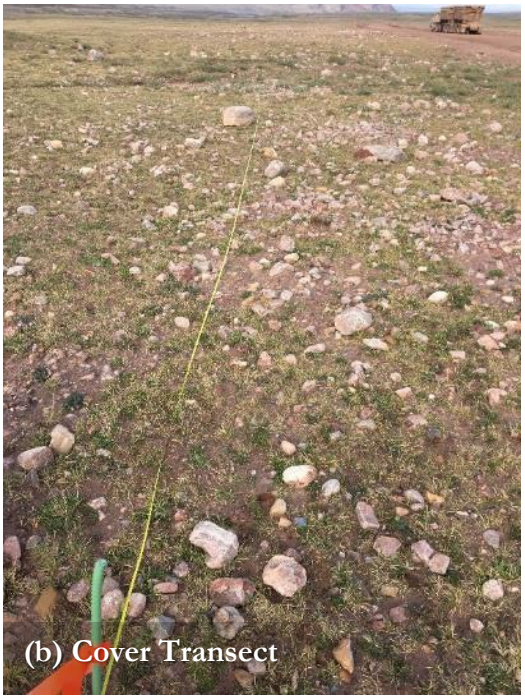

Photo 1. SURVEY METHODS — Soil survey pit (a), cover transect (b), and vegetation quadrat (c).

2.3 2019 SURVEY | RESULTS

KM52 — 1 YEAR POST-DISTURBANCE

Map 3 shows the sampling layout at KM52. Table 1 summarizes landscape, terrain and soil attributes. Table 2 lists observed vegetation species within and directly adjacent to the survey plots. Table 3 summarizes the mean surface projective cover within vegetation quadrats. Figure 2 shows the total projective cover along the survey transect. Supporting information (e.g., geo-referencing and lab analysis) is provided in Appendix B1.

Landscape, Terrain and Soil— Located near Katitkok Lake, the survey transects occur within a glaciofluvial and periglacial landform characterized by an undulating surface expression with nearly level to very gentle slopes with intermittent soils and frost-weathered bedrock (Photo 2a–b). Native (control) soils appeared to be Regosolic Turbic Cryosols as defined by an Om and Cy/Cgy/Cz sequence[3]. Control soil profiles (KM52-C0, -C50, -C100) were characterized by a discontinuous surface organic layer (Om, 0–2 cm in depth) and a sandy loam textured C horizon. If/where soils were present, the high incorporation of coarse parent materials (i.e., till and frost-weathered bedrock at the surface) resulted in a restrictive layer at 25–30 cm in depth. The soil moisture regime was xeric (dry); no mottling or gleying[4] was observed within any soil profile. Disturbed soil profiles (KM52-0, -50, -100) had no surface organic layer, a similarly textured sandy loam C horizon with high incorporation of coarse parent materials, but no discernible subsoil structure due to the site's disturbance history.

Laboratory analysis determined that both control and disturbed sites had poor fertility [as indicated by low available nutrients, low electrical conductivity (EC) and adsorption potential] and little incorporated organic matter for both control and disturbed soils.

Vegetation Surface Cover and Composition— Given the landform attributes and soil conditions described above, vegetation cover in control areas was sparse (29% along the transect; 66% within quadrats) and composed of graminoids, forbs/perennial herbs, shrubs, bryophytes and lichen (Photo 3a–c). Whereas disturbed areas exhibited scarce cover vegetation (4% along the transect; <2% within quadrats), primarily composed of small/juvenile graminoids and forbs (Photo 3d–f) if/where present.

Short-leaved sedge (*Carex fuliginosa* subsp. *misandra*), mountain avens (*Dryas integrifolia*), purple saxifrage (*Saxifraga oppositifolia*), yellow saxifrage (*S. aizoides*), Arctic bladderpod (*Physaria arctica*) and net-veined willow (*Salix reticulata*) were commonly observed within the study site — primarily in control areas. No exotic or non-native species were recorded. The presence and abundance of these species were generally consistent with known habitat descriptors for dry, rocky areas on plains and slopes that are characterized by imperfectly drained substrates composed of rocks, gravel, sand, silt, clay or till (Aiken et al. 2011).

[3] Om = Organic-mesic; Cy = C horizon with cryoturbation; Cgy = Cy with gleying; Cz = C horizon that is frozen due to permafrost.

[4] Referring to secondary soil colours in the soil profile not associated with compositional properties.

KM52
Vegetation and Soil Sampling Sites

Baffinland

Legend

- Tote Road
- Tote Road (25m Buffer)
- Soil
- Vegetation
- Survey Marker
- Cover Transect

0 25 50 75 100
Meters

N

Map Scale = 1:2,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2019
- Inset map. National Geographic World Map.

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Y. Navarro	P. Audet	Map 3	Date: 2019-08-28

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Photo 2. KM52 — Landscape overview southeast (a) and northwest (b).

Photo 3. KM52 — Cover vegetation at KM52-C0, -C50 and -C100 (a-c) and KM52-0, -50 and -100 (d-f).

Table 1. KM52 — Summary of landscape, terrain and soil attributes.

Survey Area	KM52 — Disturbed	KM52 — Control
Survey Marker ID	**KM52-0, -50, -100**	**KM52-C0, -C50, -C100**
Landscape Attributes		
Geomorphological Process	Glaciofluvial and Cryoturbation	
Parent Material	Glacial Till and Bedrock	
Surface Expression	Undulating	
Slope Class Description	Nearly Level (Class 2: 0.5–2%) to Very Gentle Slopes (Class 3: 2–5%)	
Aspect	South	
Drainage	Well Drained	
Soil Moisture Regime	Xeric (Dry)	
Soil Attributes		
* Organic Matter Content	1.3% (±1.0 SD)	1.8% (±3.9 SD)
* pH	8.7 (±0.2 SD)	7.7 (±0.4 SD)
* Texture/Particle Size	Sandy Loam	Sandy Loam
Surface Organic Depth	<*None*>	<*Discontinuous*>
Rooting Depth	<1 cm	8–15 cm
Restrictive Layer	20-25 cm (Till)	23–29 cm (Till)
Nutritional Profile		
* Available Nitrate -N	1.8 ppm (±0.6 SD)	1.5 ppm (±0.9 SD)
* Available Phosphate-P	<*Below Detection Limit*>	<*Below Detection Limit*>
* Available Potassium-K	33.3 ppm (±3.5 SD)	24.7 ppm (±0.6 SD)
* Available Sulfate-S	<*Below Detection Limit*>	<*Below Detection Limit*>
* Electrical Conductivity	0.5 dS/m (±0.2 SD)	0.6 dS/m (±0.4 SD)
* Sodium Adsorption Ratio	0.4 (±0.1 SD)	0.3 (±0.0 SD)
* Saline Classification	Non-Saline	Non-Saline

SD: Standard Deviation
dS/m: deciSiemens per metre
*Mean values; Based on laboratory analyses of soil samples

Table 2. KM52 — Summary of observed vegetation.

Growth Form	Taxon	Common Name	Control	Disturbed	Environs*
Graminoid	***Carex fuliginosa* subsp. *misandra***	**Short-Leaved Sedge**	✓	✓	
Forb/ Perennial Herb	***Dryas integrifolia***	**Mountain Avens**	✓	✓	
	Pedicularis lanata	Woolly Lousewort			✓
	Erysimum pallasii	Arctic Wallflower		✓	
	Saxifraga oppositifolia	**Purple Saxifrage**	✓		
	Saxifraga aizoides	**Yellow Saxifrage**	✓		
	Physaria arctica	**Arctic Bladderpod**	✓	✓	
Shrub/Ericaceae	***Salix reticulata***	**Net-Veined Willow**	✓		
Exotic Weeds	—	—	<*None Recorded*>		

*Recorded adjacent to study area // <**Bold**> Refers to high/predominant abundance.

Table 3. KM52 — Mean surface projective cover (%) within vegetation quadrats.

Survey Site (Survey Marker ID)	KM52 — Disturbed (KM52-0, -50, -100)	KM52 — Control (KM52-C0, -C50, -C100)
*Bare Soil/Rock	98.7% (±0.6 SD)	66.0% (±4.2 SD)
*Bryophytes/Lichen	<*None*>	16.3% (±2.2 SD)
*Litter	<*None*>	<*None*>
*Graminoids	<*None*>	6.2% (±0.4 SD)
*Forbs	1.3% (±0.6 SD)	9.6% (±3.7 SD)
*Shrubs/Ericaceae	<*None*>	1.9% (±3.3 SD)

*Means values // SD: Standard Deviation

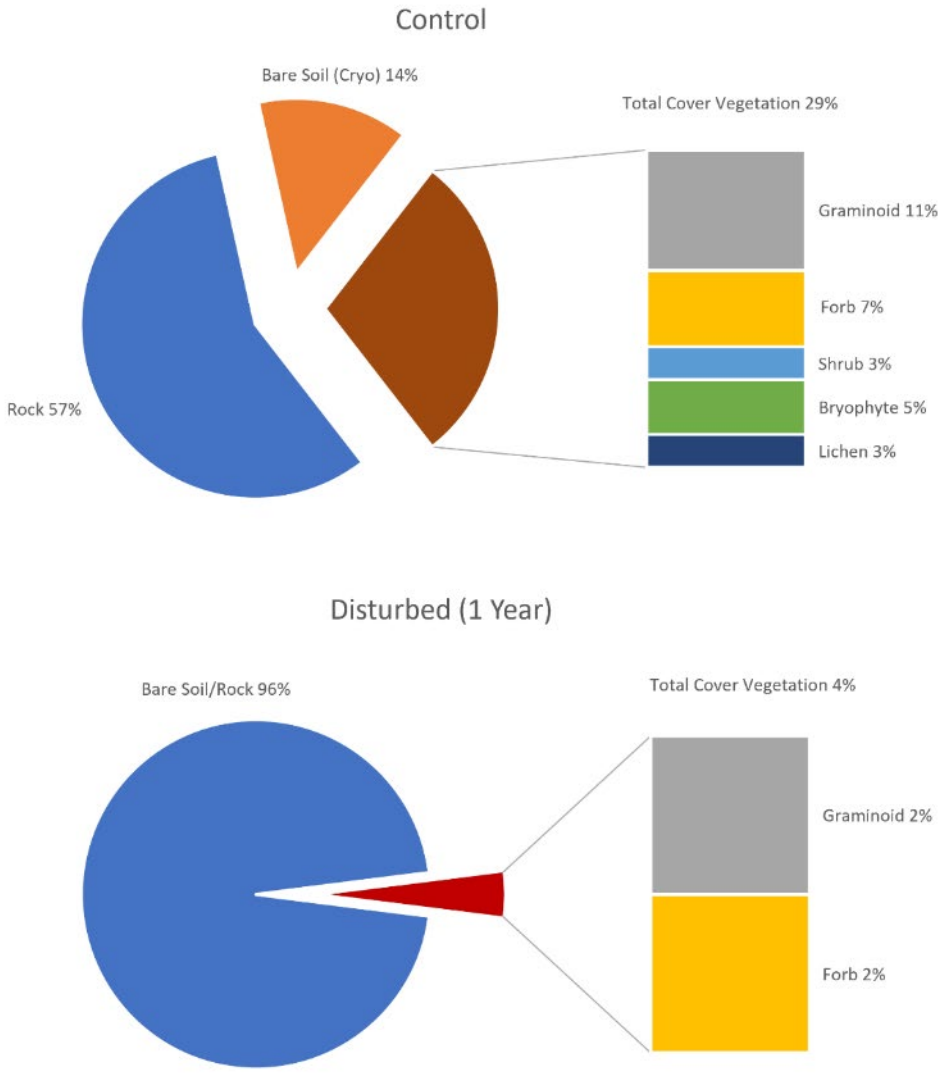

Figure 2. KM52 — Surface projective cover (%) along vegetation transect.

KM16 — 5 YEARS POST-DISTURBANCE

Map 4 shows the sampling layout at KM16. Table 4 summarizes landscape, terrain and soil attributes. Table 5 lists observed vegetation species within and adjacent to the study area. Table 6 summarizes mean surface projective cover within the vegetation quadrats. Figure 3 shows total projective cover along the survey transect. Supporting information (e.g., geo-referencing and lab analysis) is provided in Appendix B2.

Landscape, Terrain and Soil— Located near Phillips Creek, the survey transects occur on an upland plateau with near-level slopes (Photo 4 a–b). The landscape is characterized by low-centred polygons (i.e., patterned ground caused by permafrost), resulting in an abundance of small hummocks and shallow depressions. Native (control) soils appeared to be Brunisolic Turbic Cryosols as defined by an Om and Bm/Bmy sequence[5]. Control soil profiles (KM16-C0, -C75, -C150) were characterized by a thin surface organic layer (Om, 4–6 cm in depth) followed by a sandy loam textured B horizon. The moderate incorporation of coarse parent materials (i.e., till) resulted in a restrictive layer at ~25 cm deep. The soil moisture regime was subxeric (dry); faint mottling[6] was observed in the soil profile. Disturbed soil profiles (KM16-0, -75, -150) were characterized by a discontinuous surface organic layer (Om, up to 2 cm deep, where present), a similar sandy loam B horizon with the incorporation of coarse parent materials and some discernible horizons or structure, but no mottling or gleying. Subsoils were intact, suggesting that the area had only been superficially disturbed.

Laboratory analysis determined that both control and disturbed soils had poor fertility [as indicated by low available nutrients, low EC and adsorption potential] and little incorporated organic matter.

***V*egetation Surface Cover and Composition**— Vegetation cover in control areas was abundant (83% along the transect; 92% within quadrats) with representation by graminoids, forbs/perennial herbs, shrubs, bryophytes and lichen (Photo 5a–c). Disturbed areas were characterized by discontinuous but still moderately abundant cover vegetation (51% along the transect; 40 within quadrats) primarily composed of graminoids and forbs/perennial herbs and few bryophytes or lichen species (Photo 5d–f).

Short-leaved sedge, membranous sedge (*C. membranacea*), mountain avens, dwarf fireweed (*Chamerion latifolium*), yellow oxytropis (*Oxytropis maydelliana* subsp. *melanocephala*), Arctic blueberry (*Vaccinium uliginosum* subsp. *microphyllum*), net-veined willow, and white mountain heather (*Cassiope tetragona*) were commonly observed both in control and disturbed areas. No exotic or non-native species were recorded. The presence and abundance of these species was generally consistent with known habitat descriptors for the dry-to-moist graminoid/dwarf shrub land cover type that is characterized by imperfectly drained to moderately well-drained dry-to-moist substrates characterized by rocks, gravel, sand, silt and clay (Aiken et al. 2011).

[5] Om = Organic-mesic; Bm = B horizon affected by chemical alteration and/or weathering; Bmy = Bm with cryoturbation.

[6] This characteristic results from oxidizing and reducing conditions associated with a fluctuating water table and/or presence of an impermeable subsoil layer.

KM16
Vegetation and Soil Sampling Sites

Baffinland

Legend

- Tote Road
- Tote Road (25m Buffer)
- Soil
- Vegetation
- Survey Marker
- Cover transect

0 25 50 75 100
Meters

N

Map Scale = 1:1,500 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2019
- Inset map. National Geographic World Map.

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Y. Navarro	P. Audet	Map 4	Date: 2019-08-28

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Photo 4. KM16 — Landscape overview southwest (a) and northeast (b).

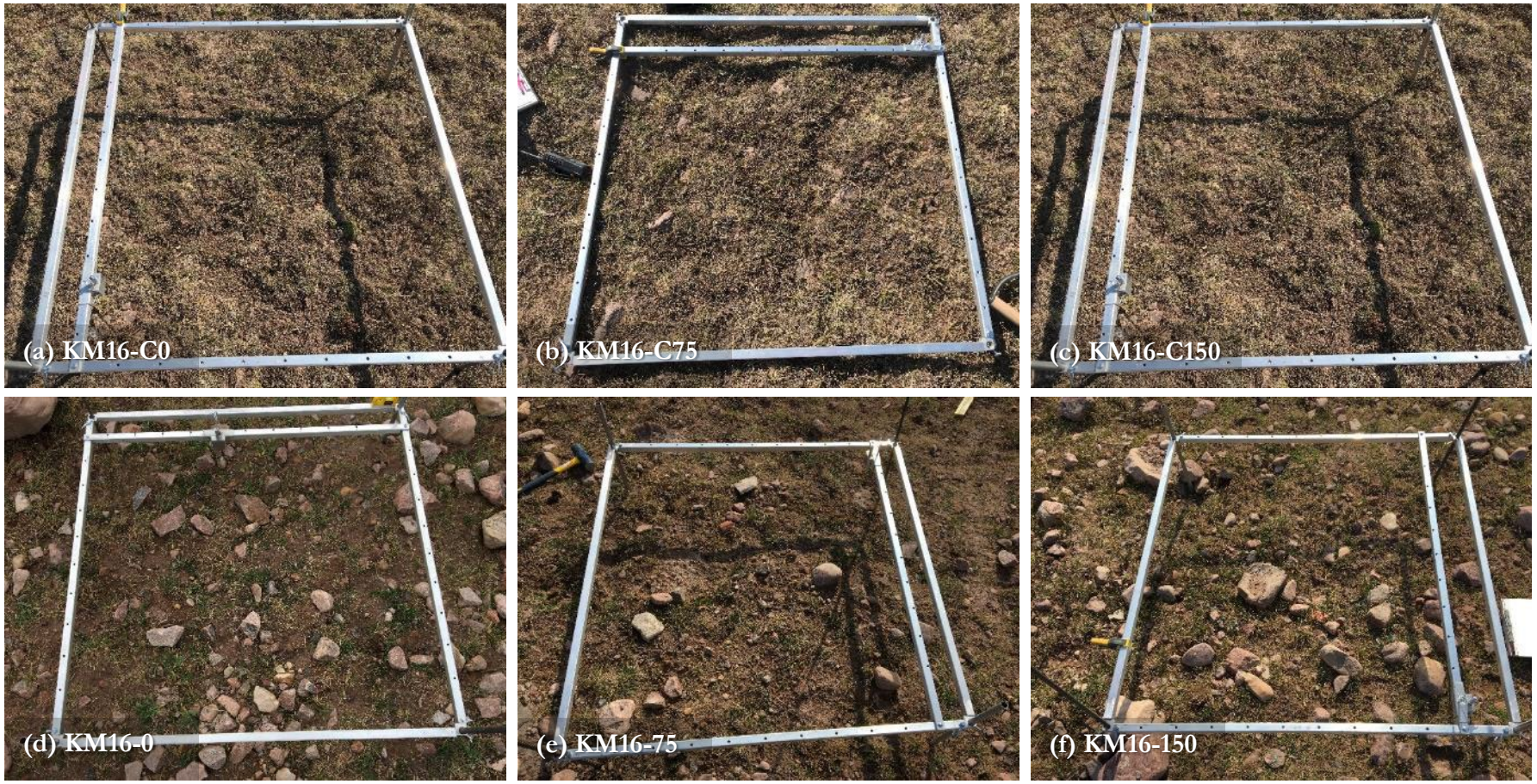

Photo 5. KM16 — Cover vegetation at KM16-C0, -C75 and -C150 (a-c) and KM16-0, -75 and -150 (d-f).

Table 4. KM16 — Summary of landscape, terrain and soil attributes.

Survey Area	KM16 — Disturbed	KM16 — Control
Survey Marker ID	**KM16-0, -75, -100**	**KM16-C0, -C75, -C100**
Landscape Attributes		
Geomorphological Process	Glaciation and Cryoturbation	
Parent Material	Morainal	
Surface Expression	Level	
Slope Class Description	Nearly Level (Class 2: 0.5–2%)	
Aspect	West-Southwest	
Drainage	Moderately Well Drained	
Soil Moisture Regime	Subxeric (Dry)	
Soil Attributes		
* Organic Matter Content	3.9% (±1.8 SD)	6.1% (±3.8 SD)
* pH	7.2 (±0.4 SD)	7.4 (±0.5 SD)
* Texture/Particle Size	Sandy Loam	Sandy Loam
Surface Organic Depth	<*Discontinuous*>	Om/Oh = 4-6 cm
Rooting Depth	13–17 cm	12-14 cm
Restrictive Layer	15–23 cm (Till)	26 cm (Till)
Nutritional Profile		
* Available Nitrate -N	1.4 ppm (±0.4 SD)	1.3 ppm (±0.6 SD)
* Available Phosphate-P	<*Below Detection Limit*>	<*Below Detection Limit*>
* Available Potassium-K	25.0 ppm (±2.6 SD)	29.3 ppm (±9.7 SD)
* Available Sulfate-S	<*Below Detection Limit*>	<*Below Detection Limit*>
* Electrical Conductivity	1.1 dS/m (±0.4 SD)	0.4 dS/m (±0.2 SD)
* Sodium Adsorption Ratio	0.2 (±0.0 SD)	0.2 (±0.0 SD)
* Saline Classification	Non-Saline	Non-Saline

SD: Standard Deviation
dS/m: deciSiemens per metre
Om: Organic-mesic; Oh: Organic-humic.
*Mean values; Based on laboratory analyses of soil samples

Table 5. KM16 — Summary of observed vegetation.

Growth Form	Taxon	Common Name	Control	Disturbed	Environs*
Graminoid	***Carex membranacea***	**Membranous Sedge**	✓	✓	
	Carex fuliginosa* subsp. *misandra	**Short-Leaved Sedge**	✓	✓	
Forb/ Perennial Herb	*Bistorta vivipara*	Alpine Bistort		✓	
	Dryas integrifolia	**Mountain Avens**	✓	✓	
	Pedicularis lanata	Woolly Lousewort			✓
	Chamerion latifolium	**Dwarf Fireweed**			✓
	Oxytropis maydelliana* subsp. *melanocephala	**Yellow Oxytropis**	✓	✓	
	Saxifraga oppositifolia	Purple Saxifrage	✓	✓	
	Saxifraga aizoides	Yellow Saxifrage	✓	✓	
	Potentilla hyparctica	Arctic Cinquefoil		✓	
Shrub/ Ericaceae	***Vaccinium uliginosum* subsp. *microphyllum***	**Arctic Blueberry**	✓	✓	
	Salix reticulata	**Net-Veined Willow**	✓		
	Cassiope tetragona	**White Mountain Heather**	✓		
Exotic Weeds	—	—	*<None Recorded>*		

*Recorded adjacent to study areas // **Bold**> Refers to high/predominant abundance.

Table 6. KM16 — Mean surface projective cover (%) within vegetation quadrats.

Survey Area (Survey Marker ID)	KM16 — Disturbed (KM16-0, -75, -100)	KM16 — Control (KM16-C0, -C75, -C100)
*Bare Soil/Rock	60.3% (±5.0 SD)	8.1% (±4.7 SD)
*Bryophytes/Lichen	2.3% (±3.2 SD)	54.1% (±7.7 SD)
*Litter	3.3% (±1.5 SD)	2.7% (±3.0 SD)
*Graminoids	20.0% (±5.3 SD)	12.9% (±8.9 SD)
*Forbs	10.0% (±1.7 SD)	14.0% (±7.9 SD)
*Shrubs/Ericaceae	4.0% (±2.0 SD)	8.3% (±10.5 SD)

*Mean values; SD: Standard Deviation

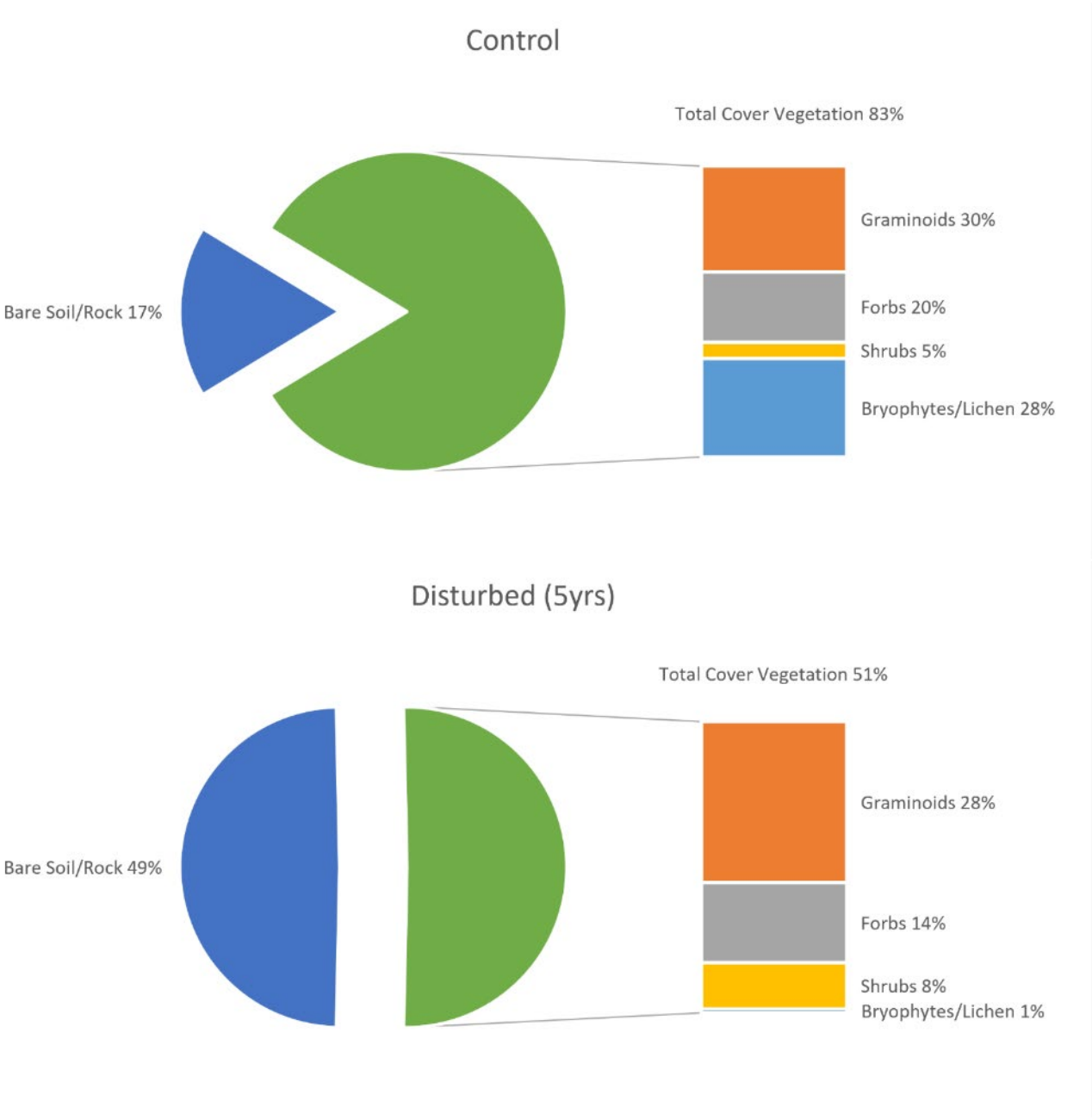

Figure 3. KM16 — Surface projective cover (%) along vegetation transect.

2.4 2021 SURVEY | RESULTS

KM18 — 1–3 YEARS POST DISTURBANCE

Map 5 shows the sampling layout at KM18. Table 7 summarizes landscape, terrain and soil attributes. Table 8 lists observed vegetation species within and adjacent to the study area. Table 9 summarizes mean surface projective cover within the vegetation quadrats. Figure 4 shows total projective cover along the survey transect. Supporting information (e.g., geo-referencing and lab analysis) is provided in Appendix B3.

Landscape, Terrain and Soil— Located along Phillips Creek, the survey transects occur on a sandy terrace with level slopes that are characterized by generally loose, well-drained and unconsolidated surficial geology, and no apparent bedrock (Photo 6a–b). Although terrain within the study area was homogenous and had little micro-topographical variations, the broader landscape indicated ground patterning associated with permafrost. Therefore, native (control) soils likely refer to Brunisolic Turbic Cryosols. Soil profiles at the control (KM18-C0, -C75, -C150) and disturbed locations (KM18-D0, -D75, -D150) were similarly characterized by a discontinuous surface organic layer followed by a sand textured B horizon. Little-to-no coarse parent materials (i.e., till) were observed. The restrictive layer (assumed to be permafrost) was not encountered. The soil moisture regime was xeric (dry); no mottling was observed in the soil profile.

Laboratory analysis determined that both control and disturbed soils had poor fertility [as indicated by low available nutrients, low EC and adsorption potential] and little-to-no incorporated organic matter.

Vegetation Surface Cover and Composition— Vegetation cover in control areas was characterized by a discontinuous vegetative matte (40% along the transect; 90% within quadrats) with representation by graminoids, forbs/perennial herbs, shrubs, and bryophytes (Photo 7a–b), but no lichen. Disturbed areas were also characterized by a discontinuous and uneven (i.e., patchy) vegetative cover (43% along the transect; 2% within quadrats) that was primarily composed of graminoids and forbs/perennial herbs (Photo 7c–d), but no shrubs, bryophytes or lichen.

Short-leaved sedge, mountain avens, yellow oxytropis, alpine (Arctic) willow (*S. arctica*), alpine fescue (*Fescue brachyphylla*), and white Arctic Whitlow-grass (*Drabas* sp) were commonly observed within survey plots both in control and disturbed areas. No exotic and/or non-native species were recorded.

514125 514200 514275 514350 514425 514500

7965325
7965250
7965175
7965100
7965025

KM18-C100
KM18-C50
KM18-D100
KM18-C0
KM18-D50
KM18-D0

KM18
Vegetation and Soil Sampling Sites

Baffinland
Iron Mines Corporation

Legend

- Tote Road
- Tote Road (25m Buffer)
- Soil
- Vegetation
- Cover Transect

0 25 50 75 100
Meters
N

Map Scale = 1:1,500 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2020
- Inset map. National Geographic World Map. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Disclaimer

EDI Environmental Dynamics Inc. has made every effort to ensure this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

Drawn:	Checked:	Map 5	Date: 2021-10-08
Y. Navarro	P. Audet		

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Photo 6. KM18 — Landscape overview at -C50 (a) and -D0 (b).

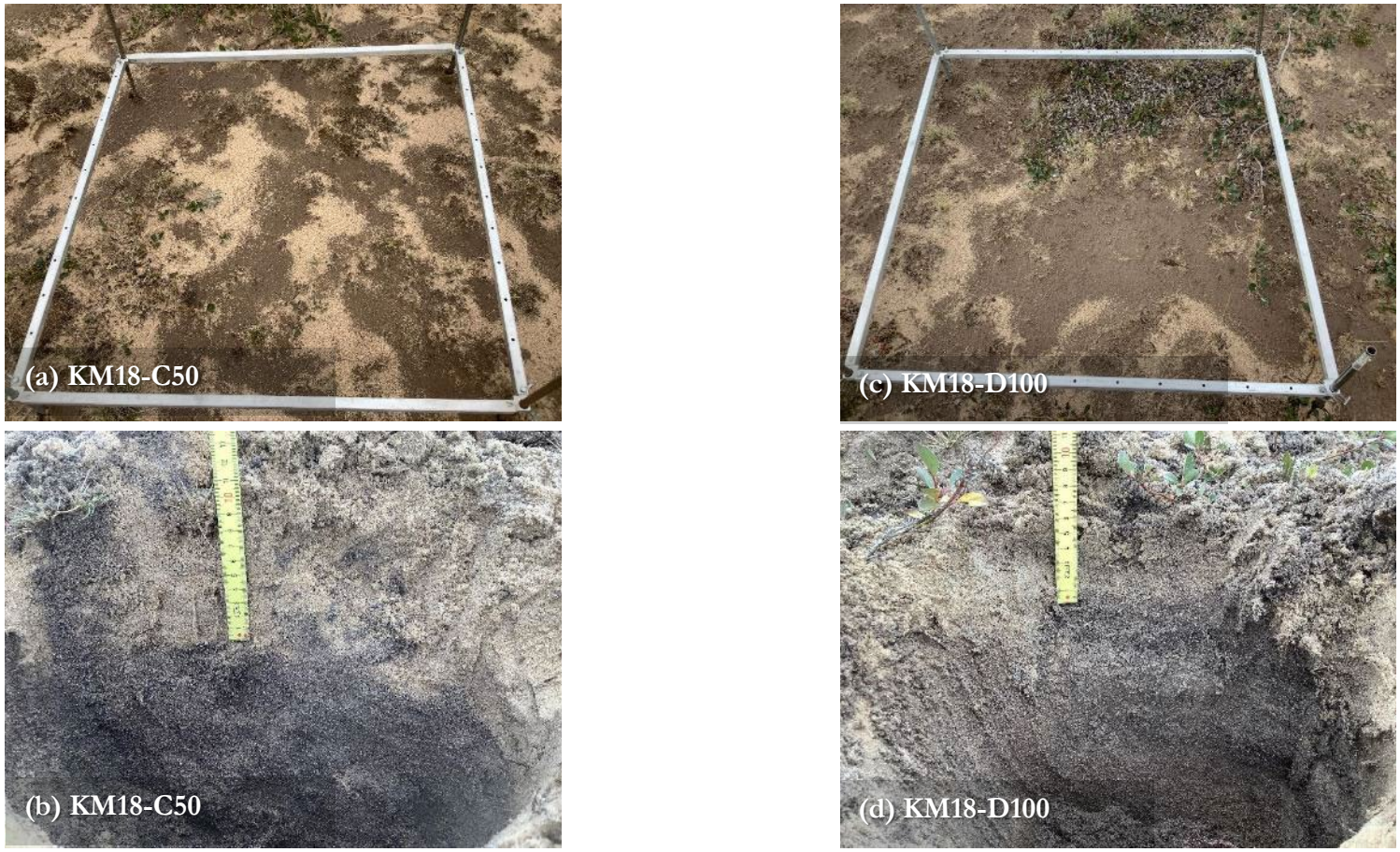

Photo 7. KM18 — Cover vegetation and soil profile at -C50 (a-b) and -D100 (c-d)

Table 7. KM18 — Summary of landscape, terrain and soil attributes.

	Survey Area	KM18 — Disturbed	KM18 — Control
	Survey Marker ID	**KM18-0, -75, -100**	**KM18-C0, -C75, -C100**
Landscape Attributes			
	Geomorphological Process	Glaciation and Cryoturbation	
	Parent Material	Morainal	
	Surface Expression	Level	
	Slope Class Description	Level (Class 1: 0-0.5%)	
	Aspect	No Predominant Aspect	
	Drainage	Moderately Well Drained	
	Soil Moisture Regime	Xeric (Dry)	
Soil Attributes			
*	Organic Matter Content	<1.0%	<1.0-1.7%
*	pH	7.0 (±0.1 SD)	6.7 (±0.3 SD)
*	Texture/Particle Size	Sand	Sand
	Surface Organic Depth	*<Discontinuous>*	*<Discontinuous>*
	Rooting Depth	10 cm	10 cm
	Restrictive Layer	*<None Detected — Assumed Permafrost>*	*<None Detected — Assumed Permafrost>*
Nutritional Profile			
*	Available Nitrate -N	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Phosphate-P	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Potassium-K	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Sulfate-S	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Electrical Conductivity	2.2 dS/m (±0.07 SD)	2.2 dS/m (±0.07 SD)
*	Sodium Adsorption Ratio	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Saline Classification	Non-Saline	Non-Saline

SD: Standard Deviation
dS/m: deciSiemens per metre
*Mean values; Based on laboratory analyses of soil samples

Table 8. KM18 — Summary of observed vegetation.

Growth Form	Taxon	Common Name	Control	Disturbed	Environs*
Graminoid	***Festuca brachyphylla***	**Alpine Fescue**	✓	✓	
	Trisetum spicatum	Spike Trisetum	✓		
	Carex fuliginosa* subsp. *misandra	**Short-Leaved Sedge**	✓	✓	
Forb/ Perennial Herb	*Papaver radicatum*	Arctic Poppy	✓		
	Dryas integrifolia	**Mountain Avens**	✓	✓	
	Drabas sp.	**White Arctic Whitlow-Grass**	✓	✓	
	Chamerion latifolium	Dwarf Fireweed		✓	
	Oxytropis maydelliana* subsp. *melanocephala	**Yellow Oxytropis**	✓	✓	
	Saxifraga oppositifolia	Purple Saxifrage		✓	
	Chamerion latifolium	Dwarf Fireweed		✓	
	Physaria arctica	Arctic Bladderpod		✓	
Shrub/ Ericaceae	***Salix arctica***	**Alpine (Arctic) Willow**	✓	✓	
	Salix reticulata	Net-Veined Willow	✓		
Exotic Weeds	—	—	*<None Recorded>*		

*Only recorded adjacent/outside of the study areas // **Bold**> Refers to high/predominant abundance.

Table 9. KM18 — Mean surface projective cover (%) within vegetation quadrats.

Survey Area (Survey Marker ID)	KM18 — Disturbed (-0, -75, -150)	KM18 — Control (-C0, -C75, -C150)
*Bare Soil	98.7% (±1.5 SD)	10.7% (±7.2 SD)
*Bryophytes	*<None>*	18.7% (±12.7 SD)
*Lichen	*<None>*	*<None>*
*Litter	*<None>*	0.3% (±0.6 SD)
*Graminoids	0.3% (±0.6 SD)	13.0% (±2.6 SD)
*Forbs	1.0% (±1.0 SD)	37.7% (±1.5 SD)
*Shrubs/Ericaceae	*<None>*	15.0% (±3.5 SD)

*Mean values; SD: Standard Deviation.

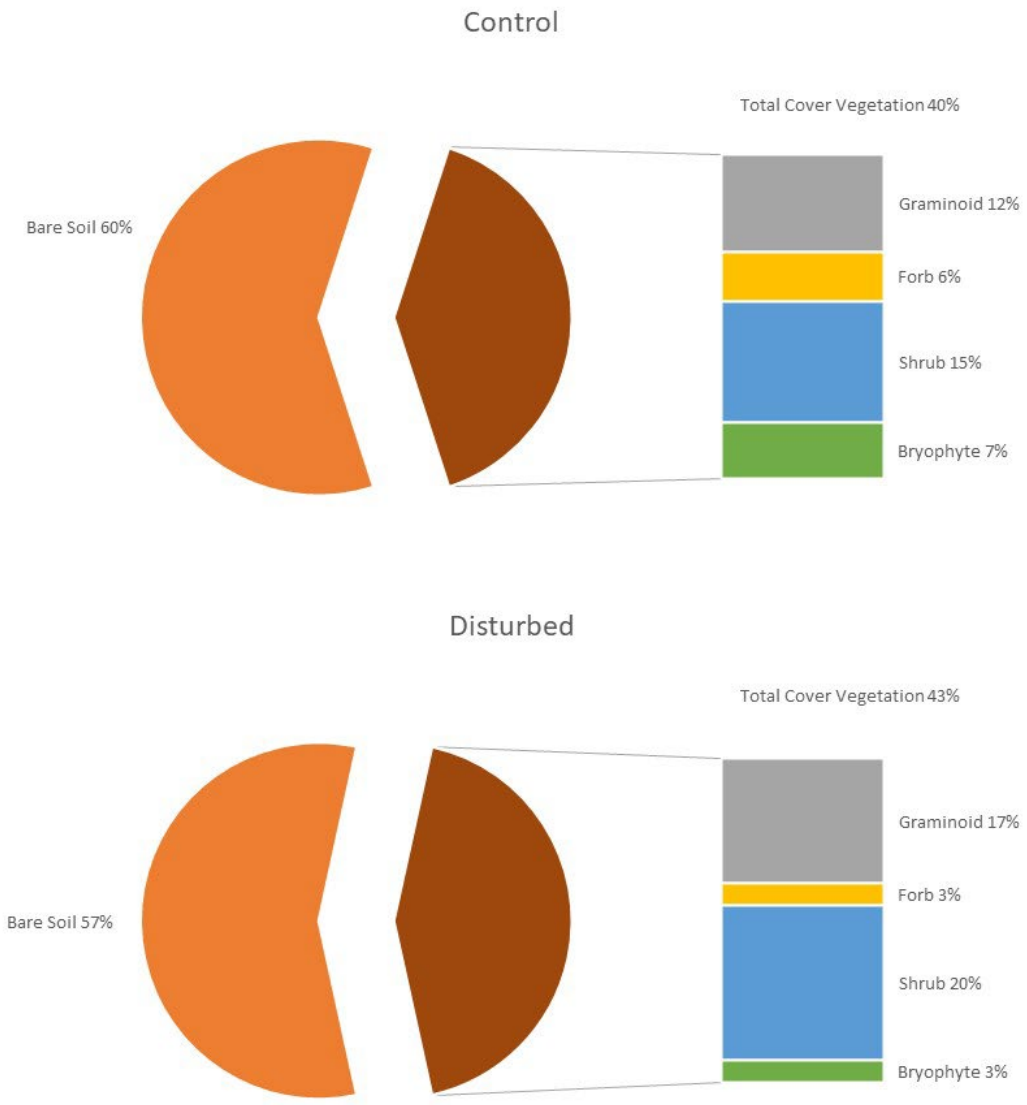

Figure 4. KM18 — Surface projective cover (%) along vegetation transect.

KM58 — >40 YEARS POST-DISTURBANCE

Map 6 shows the sampling layout at the KM58 Airstrip. Table 10 summarizes landscape, terrain and soil attributes. Table 11 lists observed vegetation species within and adjacent to the study area. Table 12 summarizes mean surface projective cover within the vegetation quadrats. Figure 5 shows the total projective cover along the survey transect. Supporting information (e.g., geo-referencing and lab analysis) is provided in Appendix B4.

Landscape, Terrain and Soil— Located south of Katitkok Lake, the survey transects occur on an upland plateau with near-level slopes (Photo 8a–b). Similar to the study site at KM16, the landscape is characterized by low-centred polygons resulting in an abundance of small hummocks and shallow depressions. Native (control) soils were deemed to be Brunisolic Turbic Cryosols as defined by an Om and Bm/Bmy sequence. Soil profiles (KM58-C0, -C75, -C150, Areas 1-3) were characterized by a thin surface organic layer (Om, 1–3 cm in depth) followed by a sand or sandy loam textured Ah or Bm horizon. Disturbed areas (KM58-D0, -D75, -D150, Areas 1-3) were otherwise characterized by a discontinuous surface organic layer followed by a sand or sandy loam textured Ae or Bm horizon; the disturbance footprint was clearly delineated by surface soil compaction. Little-to-no coarse parent materials (i.e., till) were observed and the restrictive layer (assumed to be permafrost) was not encountered. The soil moisture regime was xeric (dry); no mottling was observed in the soil profile.

Laboratory analysis determined that both control and disturbed soils had poor fertility [as indicated by low available nutrients, low EC and adsorption potential] and little incorporated organic matter.

Vegetation Surface Cover and Composition— Vegetation cover in control areas was abundant (90–97% along the transects; 93–99% within quadrats) with representation by graminoids, forbs/perennial herbs, shrubs, bryophytes and lichen (Photo 9a–b). Disturbed areas were characterized by a discontinuous but still moderately abundant vegetation cover (56–69% along the transects; 61–73% within quadrats) that was primarily composed of graminoids and forbs/perennial herbs and few or no bryophytes or lichen species (Photo 9 c–d).

Short-leaved sedge, membranous sedge, Arctic fescue, white Arctic Whitlow-grass, moss campion, snow-bed willow (*S. herbacea*), Arctic willow (*S. arctica*) and white mountain heather were commonly observed within the control and disturbed areas. No exotic or non-native species were recorded.

KM58
Vegetation and Soil Sampling Sites

Baffinland
Iron Mines Corporation

Legend

- Tote Road
- Tote Road (25m Buffer)
- Study Area
- Soil
- Vegetation
- Cover Transect

0 25 50 75 100
Meters

Map Scale = 1:4,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2020
- Inset map. National Geographic World Map. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Disclaimer

EDI Environmental Dynamics Inc. has made every effort to ensure this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

Drawn:	Checked:		
Y. Navarro	P. Audet	**Map 6**	Date: 2021-10-12

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Photo 8. KM58 — Landscape overview at Area2-C150 (a) and Area2-D150 (b).

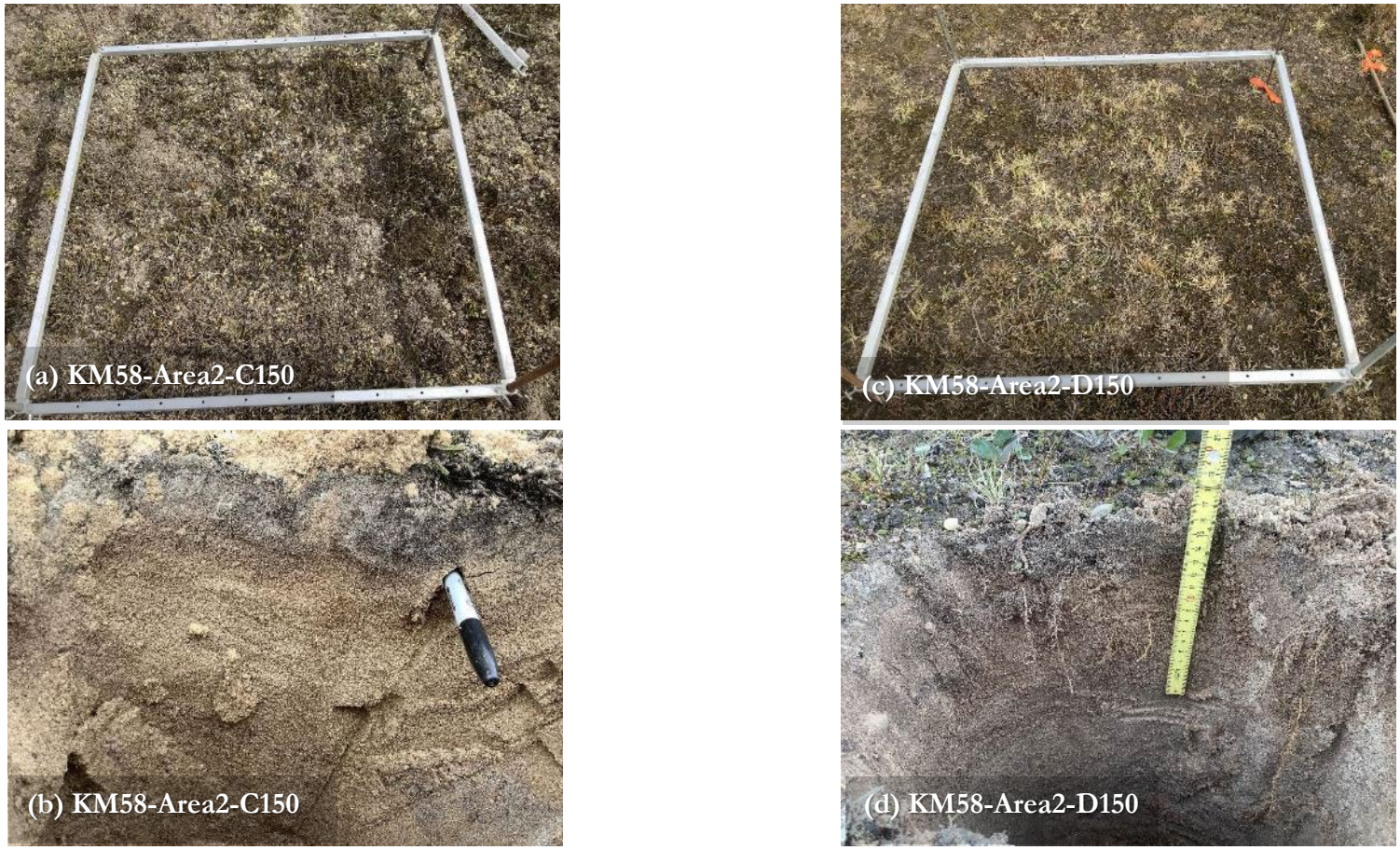


Photo 9. KM58 — Cover vegetation and soil profile at Area 2-C150 (a-b) and Area2-D150 (c-d)

Table 10. KM58 (Abandoned Airstrip) — Summary of landscape, terrain and soil attributes.

Survey Area		KM58 — Disturbed	KM58 — Control
Survey Marker ID		KM58, Area 1, D-0, -75, -100 KM58, Area 2, D-0, -75, -100 KM58, Area 3, D-0, -75, -100	KM58, Area 1, C-0, -75, -100 KM58, Area 2, C-0, -75, -100 KM58, Area 3, C-0, -75, -100
Landscape Attributes			
	Geomorphological Process	Glaciation and Cryoturbation	
	Parent Material	Morainal	
	Surface Expression	Level	
	Slope Class Description	Level (Class 1: 0-0.5%)	
	Aspect	No Predominant Aspect	
	Drainage	Moderately Well Drained	
	Soil Moisture Regime	Xeric (Dry)	
Soil Attributes			
*	Organic Matter Content	2.2% (±0.9 SD)	3.4% (±1.6 SD)
*	pH	4.8 (±0.5 SD)	4.9 (±0.6 SD)
*	Texture/Particle Size	Sand, Sandy Loam	Sand, Sandy Loam
	Surface Organic Depth	*<Discontinuous>*	Om/Oh = 1-3 cm
	Rooting Depth	15 cm	25-30 cm
	Restrictive Layer	*<None Detected — Assumed Permafrost>*	*<None Detected — Assumed Permafrost>*
Nutritional Profile			
*	Available Nitrate -N	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Phosphate-P	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Potassium-K	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Available Sulfate-S	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Electrical Conductivity	<10 dS/M	<10 dS/M
*	Sodium Adsorption Ratio	*<Below Detection Limit>*	*<Below Detection Limit>*
*	Saline Classification	Non-Saline	Non-Saline

SD: Standard Deviation
dS/m: deciSiemens per metre
Om: Organic-mesic; Oh: Organic-humic.
*Mean values; Based on laboratory analyses of soil samples

Table 11. KM58 (Abandoned Airstrip) — Summary of observed vegetation.

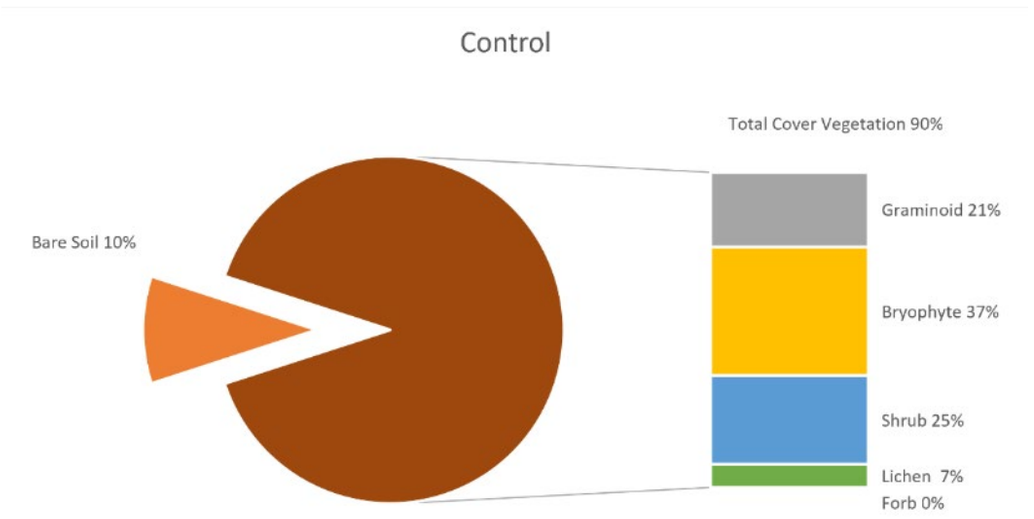
Growth Form	Taxon	Common Name	Control	Disturbed	Environs*
Graminoid	***Carex membranacea***	**Membranous Sedge**	✓	✓	
	Carex aquatilis	Leafy Tussock Sedge	✓		
	Carex fuliginosa* subsp. *misandra	**Short-Leaved Sedge**	✓	✓	
	Festuca rubra subsp. rubra	**Arctic Fescue**	✓	✓	
	Eriophorum callitrix	Arctic Cottongrass	✓		
Forb/ Perennial Herb	***Drabas sp.***	**White Arctic Whitlow-Grass**	✓	✓	
	Pedicularis lanata	**Woolly Lousewort**	✓	✓	
	Armeria sp.	Arctic Thrif	✓		✓
	Saxifraga oppositifolia	**Purple Saxifrage**	✓	✓	
	Silene acaulis	**Moss Campion**	✓	✓	
Shrub/ Ericaceae	***Salix herbacea***	**Snow-Bed Willow**	✓	✓	
	Salix arctica	**Arctic Willow**	✓	✓	
	Cassiope tetragona	**White Mountain Heather**	✓	✓	
Exotic Weeds	—	—	*<None Recorded>*		

*Recorded adjacent to study areas // **Bold**> Refers to high/predominant abundance.

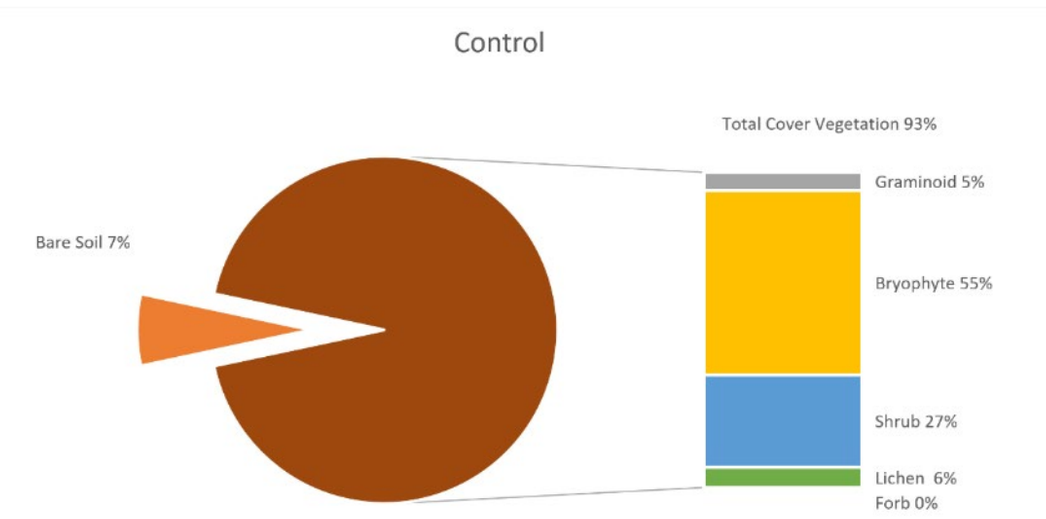
Table 12. KM58 (Abandoned Airstrip) — Mean surface projective cover (%) within vegetation quadrats.

Survey Area (Survey Marker ID)	KM58 — Disturbed (-0, -75, -150)			KM58 — Control (-C0, -C75, -C150)		
	Area 1	Area 2	Area 3	Area 1	Area 2	Area 3
*Bare Soil/Rock	39.0% (±16.4 SD)	34.3% (±28.5 SD)	27.3% (±8.4 SD)	7.6% (±12.4 SD)	0.3% (±0.6 SD)	4.7% (±6.4 SD)
*Bryophytes	33.3% (±13.3 SD)	36.0% (±9.6 SD)	40.3% (±5.7 SD)	33.0% (±12.5 SD)	42.3% (±7.6 SD)	41.3% (±5.5 SD)
*Lichen	2.7% (±3.1 SD)	0.7% (±1.1 SD)	0.3% (±0.6 SD)	25.0% (±12.1 SD)	25.7% (±3.5 SD)	22.3% (±5.1 SD)
*Litter	0.3% (±0.6 SD)	2.7% (±2.5 SD)	0.0% (±0.0 SD)	2.6% (±4.6 SD)	0.0% (±0.0 SD)	0.0% (±0.0 SD)
*Graminoids	11.3% (±4.6 SD)	11.0% (±6.6 SD)	5.7% (±1.5 SD)	7.6% (±12.4 SD)	1.0% (±0.0 SD)	0.3% (±0.6 SD)
*Forbs	2.0% (±2.0 SD)	1.0% (±0.0 SD)	1.3% (±1.5 SD)	0.3% (±0.6 SD)	0.0% (±1.5 SD)	0.0% (±0.0 SD)
*Shrubs/Ericaceae	11.3% (±4.6 SD)	14.3% (±10.2 SD)	25.0% (±1.0 SD)	23.7% (±8.5 SD)	29.3% (±5.9 SD)	31.3% (±4.2 SD)

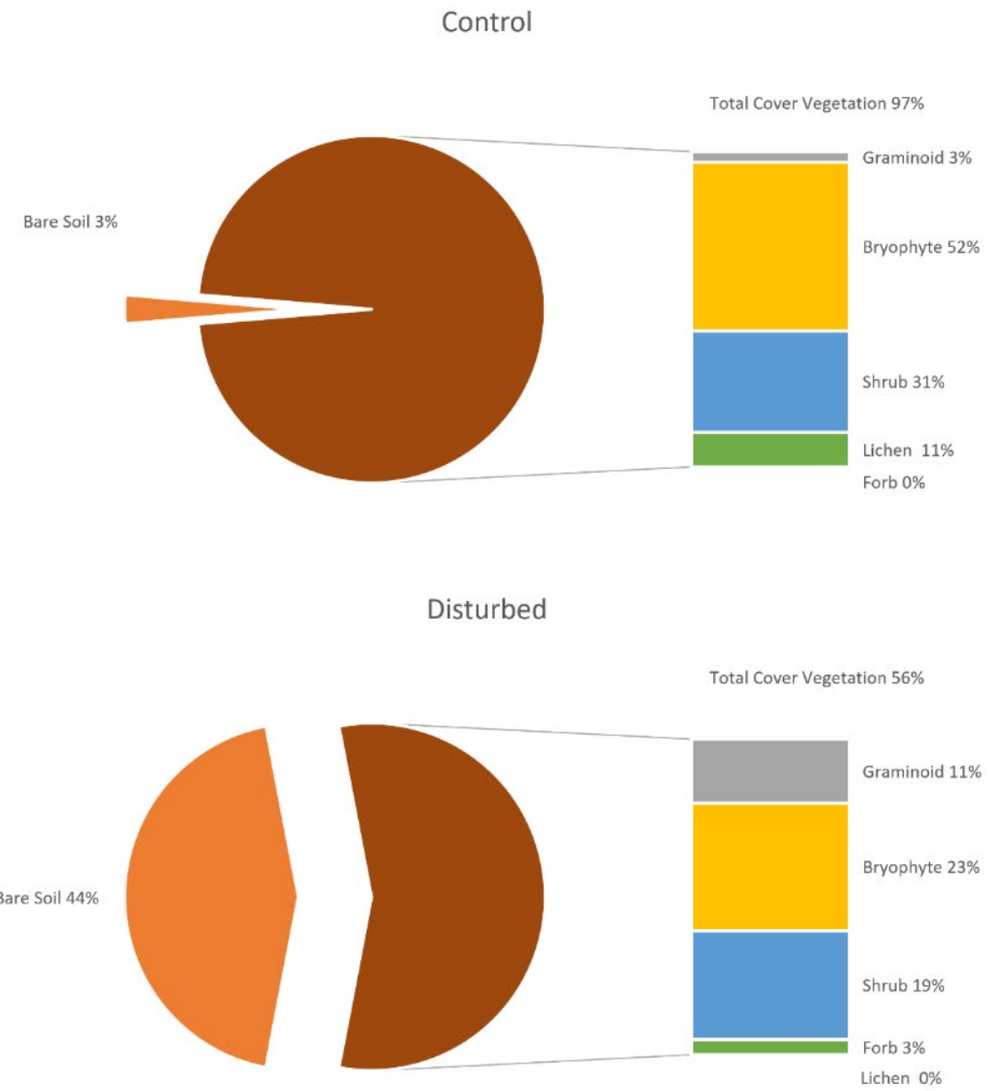
*Mean values; SD: Standard Deviation.



(a) Area 1 Transect



(b) Area 2 Transect



(c) Area 3 Transect

Figure 5. KM58 (Abandoned Airstrip) — Surface projective cover (%) along vegetation transects.

2.5 SUMMARY & DISCUSSION

2019 SURVEY — KM52 & KM16

The purpose of this revegetation survey was to examine and document opportunistic post-disturbance revegetation (i.e., natural vegetation encroachment) within the Project footprint. Rates of natural revegetation in the Arctic are characteristically slow in part due to the region's extreme climate and narrow growing season, but also its challenging site conditions and terrain.

At KM52 and KM16, soils and terrain were defined by xeric or subxeric conditions (respectively) and characterized by restrictive growth substrates (comprised of coarse parent materials) and poor fertility. Consistent with the premise that natural revegetation would be low, KM52 (1-year post-disturbance) exhibited a high level of soil/substrate disturbance that corresponded with low/scarce cover vegetation composed primarily of graminoids and perennial herbs and forbs (if/where present). On the other hand, KM16 exhibited less severe soil/substrate disturbance corresponding with moderately low cover vegetation comprised of graminoids and perennial herbs and forbs, and even some sparse shrubs, bryophytes and lichen.

Given the uncertainty regarding the disturbance histories at both survey locations, findings suggest that KM16 may not have been disturbed or only at a surficial level. Revegetation following disturbance appears to be commensurate to the condition and integrity of the soil and nearby vegetation and proximity to ongoing disturbance. It is expected that revegetation would require a longer timeframe where more severe changes to landscape components, i.e., implying more significant changes in the initial condition.

2021 SURVEY — KM18 & KM58

At KM18, soils and terrain were defined by xeric conditions and characterized by a loose, unconsolidated growth substrate with little-to-no coarse parent material and poor fertility. Unlike KM52 and KM16 (described above) vegetation cover at KM18 was characterized by a discontinuous and uneven (i.e., patchy) vegetative matte comprised of graminoids, forbs/perennial herbs and shrubs with few bryophytes and no lichen.

At the KM58 Abandoned Airstrip, the study area (similar to KM16) is characterized by an upland plateau with the dry-to-moist graminoid/dwarf shrub vegetation composition with species representation by graminoids, forbs/perennial herbs, shrubs, bryophytes and lichen. The abandoned airstrip — believed to be representative of >40-years post-disturbance — has a clearly delineated disturbance footprint and apparent soil compaction. Although the site's disturbance history is incomplete, vegetation cover and composition appear to be on a suitable revegetation trajectory whereby the site is stable, productive and comprised of similar species and cover % to the adjacent undisturbed areas. This study location represents a compelling investigative setting for natural revegetation as it is likely (considering the time since abandonment) that no seeding or planting and no reclamation earthworks or surficial preparations have been applied. It will be necessary to determine (to the extent possible) initial site conditions and the levels of disturbance at this location before deriving recommendations on revegetation based on these observations.

3 RECLAMATION TRIAL

3.1 TRIAL DESIGN

Site Layout— The second portion of the reclamation pilot study focused on initiating preliminary reclamation trials at the Project. The locations of the reclamation trials correspond with the KM52, KM16, and KM18 post-disturbance revegetation survey areas (described in Section 2.1); reclamation trial design and layout are shown on Map 7, Map 8, and Map 9. At each trial location, a 100x10 m (at KM52) or 150x10 m trial strip (at KM16 and KM18) was delineated, all within the 25 m buffer from the centreline of the right of way and corresponding with the permissible Project area for earthworks and maintenance along the Tote Road.

Surface Configurations— Drawing from reclamation best management practices and land management approaches used in mining, pipeline and transportation projects — and being applicable across a wide range of environments and terrain, including coarse-textured substrates, xeric landscapes and exposed slopes in the general Project area — two surface configurations were applied: (1) 'rough-and-loose' and (2) 'track-packing'.

- Rough-and-loose refers to the use of a digging bucket to dig small depressions and generate low-profile mounds within a given landscape (Polster 2013). This method creates surface heterogeneity and micro-site conditions favourable to seed establishment and germination (in the absence of direct/drill seeding) and facilitates soil preparation conducive to root proliferation and water infiltration.
- Track-packing (i.e., surface imprinting) refers to using tracked earthwork equipment to create surface roughness (Neville 2003). This method is typically used to reduce the erosion potential of exposed soils by enhancing surface stability and generate micro-site conditions for seed establishment.

Either of these methods are technically feasible and could be used at the Mary River Project. The 'rough-and-loose' surface configuration was applied to the entire reclamation test strip at KM52, KM16 and KM18 (i.e., to the extent possible due to the loose/unconsolidated substrate); 'track-packing' was applied to half (1/2) of each test strip. The final surface preparations were then inspected to verify the stability of surface materials and that erosion and sedimentation risk was not elevated.

Logistical Parameters and Controls— All earthworks were carefully monitored to limit maximum excavation depths (<35 cm) to prevent potential adverse effects on permafrost. Surface configurations were photo-documented (Photo 10a–b, Photo 11a–b and Photo 12a-b) and geo-referenced (refer to Appendix B1, Appendix B2 and Appendix B3) to facilitate follow-up monitoring. All surficial earthworks were completed by a qualified and experienced operator using a CAT 345D Excavator equipped with a standard-sized 122 cm wide, 4-toothed bucket. This equipment has a maximum digging depth of 8.9 m and a bucket capacity up to 3.8 m^3 maximum volume. The excavator was clean and arrived at each site 12h before site preparation. All earthworks (including pre-work communications and post-work inspections) required approximately 4h per test strip from start to finish.

Timeline— Reclamation earthworks at KM16 (Sandy-Cobbly Site) and KM52 (Rocky Site) were completed in Summer 2019; earthworks at KM18 (Sandy Site) were completed in Summer 2021.

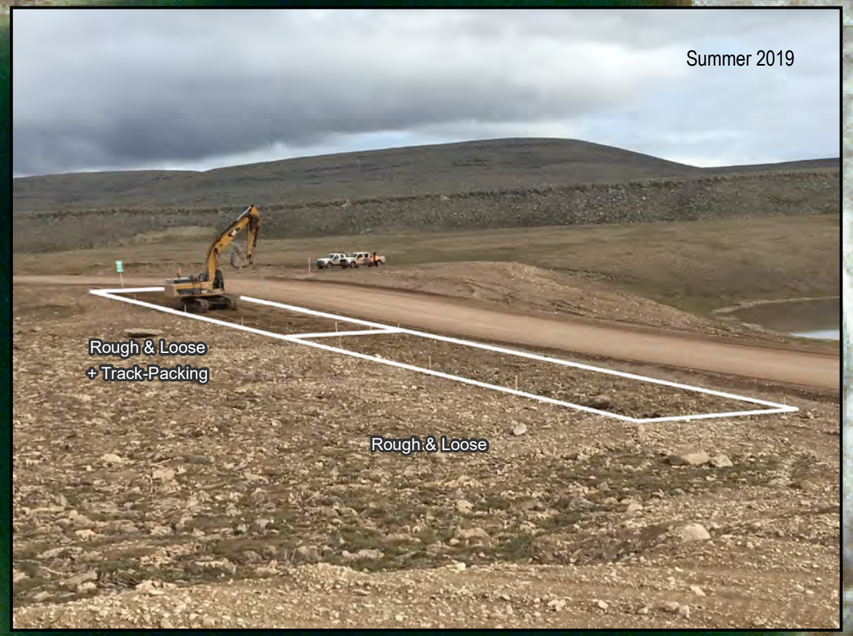
KM52
Layout of Preliminary Reclamation Trial

Baffinland

525825 525900 525975 526050 526125 526200 526275 526350

7936375 7936300 7936225 7936150 7936075 7936000 7935925

KM52-100
KM52-C100
KM52-50
KM52-C50
KM52-0
KM52-C0



Legend

- Survey Marker
- Tote Road
- Excavation Boundary
- Tote Road (25m Buffer)

0 25 50 75 100
Meters

N

Map Scale = 1:2,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2019
- Inset map. National Geographic World Map.

Disclaimer
EDI Environmental Dynamics Inc. has made every effort to ensure this map is free of errors. Data has been derived from a variety of digital sources and, as such, EDI does not warrant the accuracy, completeness, or reliability of this map or its data.

Drawn:	Checked:		
Y. Navarro	P. Audet	Map 7	Date: 2019-08-28

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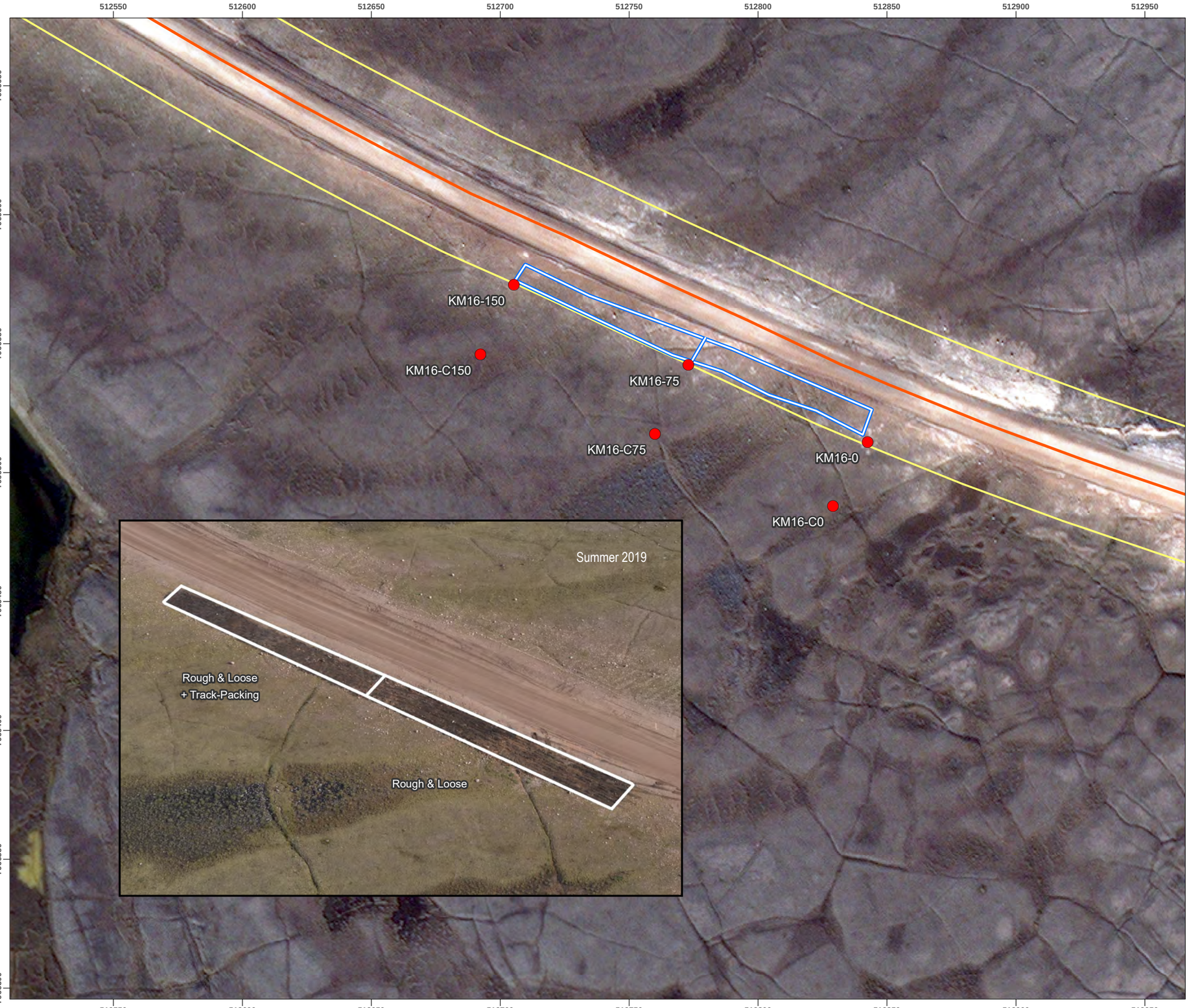
Path: L:\PROJECTS\2019\19SY0005_Baffinland\Mapping\Report\19SY0005_km52_Reclamation_Pilot_Study.mxd

KM16
Layout of Preliminary Reclamation Trial

Baffinland

Legend

- Survey Marker
- Tote Road
- Reclamation Treatment Boundary
- Tote Road (25m Buffer)



0 25 50 75 100
Meters

Map Scale = 1:1,500 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2019
- Inset map. National Geographic World Map.

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Y. Navarro	P. Audet	Map 8	Date: 2019-08-28

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ENVIRONMENTAL DYNAMICS INC.

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KM18
Layout of Preliminary Reclamation Trial

Baffinland
Iron Mines Corporation

514000 514050 514100 514150 514200 514250 514300 514350 514400 514450 514500 514550

7965400 7965350 7965300 7965250 7965200 7965150 7965100 7965050 7965000 7964950

KM18-C100
KM18-C50
KM18-D100
KM18-C0
KM18-D50
KM18-D0

Legend

- Tote Road
- Reclamation Treatment Boundary
- Tote Road (25m Buffer)
- Survey Marker

0 25 50 75 100
Meters

N

Map Scale = 1:2,000 (printed on 11 x 17)
Map Projection: NAD 1983 UTM Zone 17N

Data Sources

- Main map. Baffinland Iron Mines Corporation Imagery. 2020
- Inset map. National Geographic World Map. National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

Disclaimer

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Drawn:	Checked:		
Y. Navarro	P. Audet	**Map 9**	Date: 2021-10-12

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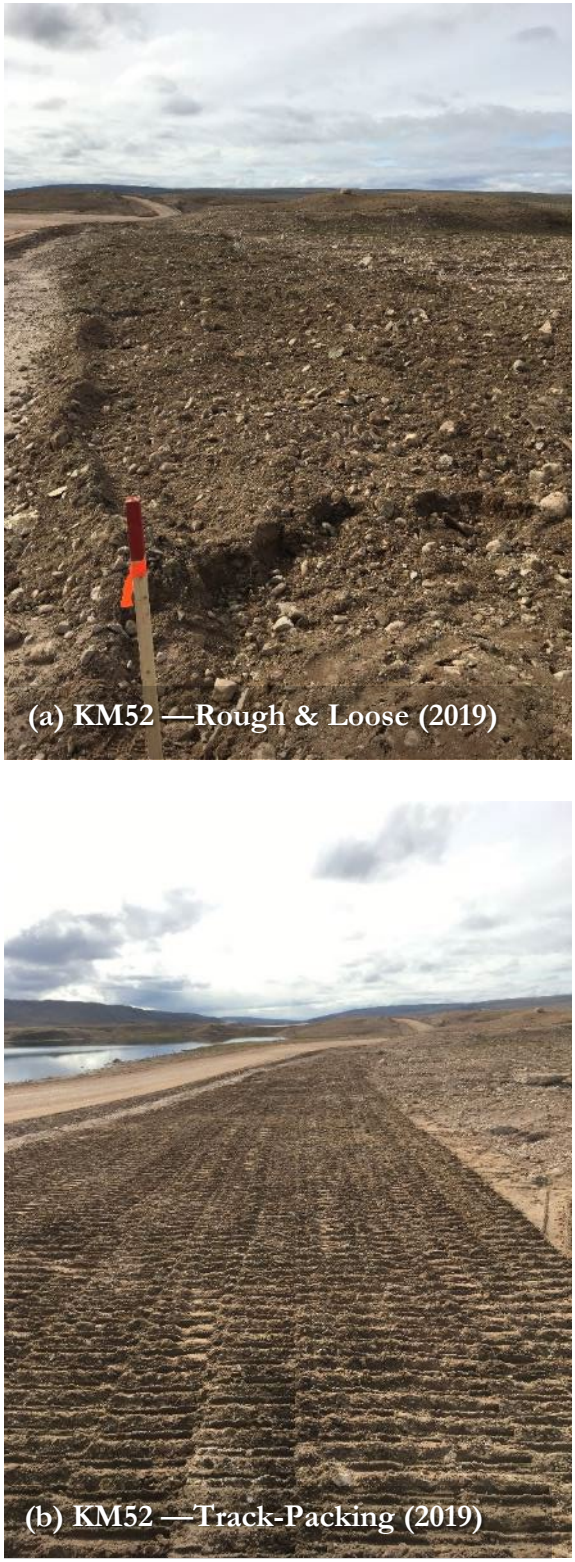


Photo 10. KM52 — Rough-and-loose (a) and track-packing (b).

Photo 11. KM16 — Rough-and-loose (a) and Track-Packing (b).

Photo 12. KM18 — Initial site preparation (a) and surface track-packing (b).

3.2 FOLLOW-UP MONITORING

2020–2021 SURVEY — KM52 & KM16

The KM52 and KM16 trial sites were revisited as part of a qualitative walk-over assessment in 2020 and a quantitative assessment in 2021 using the same methods described in Section 2.2. No measurable changes in revegetation at either site (both at transect and vegetation quadrat scales) were noted, but a few small volunteer forbs and graminoids were found to have colonized the area (Photo 13a and Photo 14a; refer to highlighted plants). A key observation was that the surface preparations (i.e., rough-and-loose and track-packing) had been 'washed out' due to weathering and were no longer apparent at both trial sites (Photo 13b and Photo 14b). The surface preparations are intended to create surface heterogeneity and micro-site conditions favourable to seed establishment and germination while reducing erosion potential and enhancing surface stability. Both sites were stable and deemed to have a low erosion potential. However, due to the nature of the growth substrate and surficial geology (i.e., predominantly sand and sandy loam), surface texturing and micro-topographical variations had been 'washed out' progressively in 2020 and 2021 as a result of snowfall/snowmelt, rainfall, wind and weathering.

Photo 13. KM16 — 2021 Status of Cover Vegetation (a) and Surface Preparations (b).

(a) KM52 — Status of Cover Vegetation (2021)

(b) KM52 — Status of Surface Preparations (2021)

Photo 14. KM52 — 2021 Status of Cover Vegetation (a) and Surface Preparations (b).

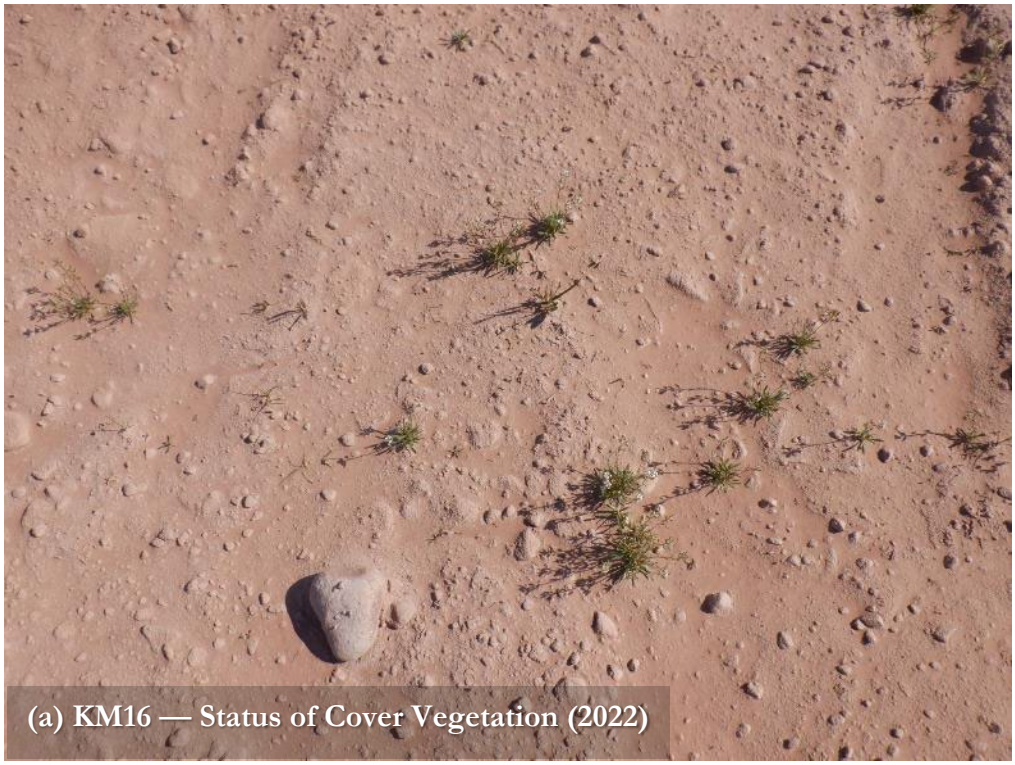
2022 SURVEY — KM52, KM18 & KM16

The KM52, KM18 and KM16 trial sites were revisited as part of a qualitative walk-over assessment in July 2022, comprising visual evaluation and documentation. As observed previously, surface preparations (i.e., rough-and-loose and track-packing) had been 'washed out' due to weathering and were no longer apparent at any trial sites. All sites were stable and deemed to have low erosion potential; but wind erosion and 'wind-swept' surface soil were apparent. Given that the Project setting is prone to prolonged periods of high wind, these surface preparations appear to provide short-term mitigation.

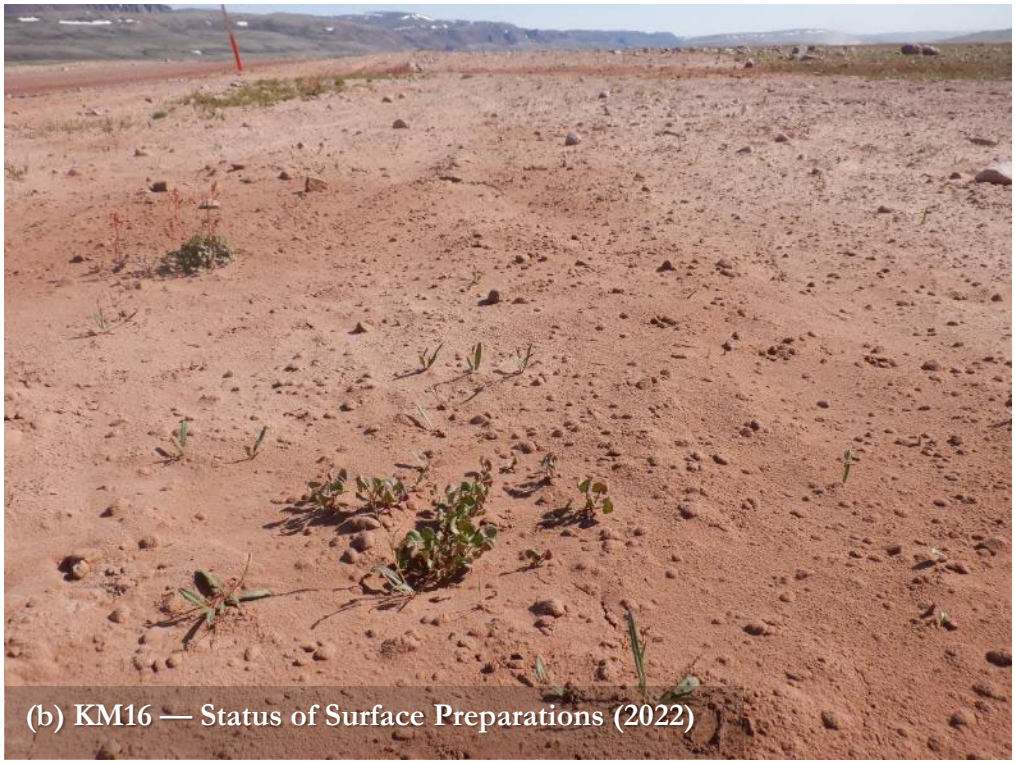
An increasing number of small volunteer forbs and graminoids were found to have colonized all sites (KM16, Photo 15a-b; KM18, PPhoto 16a-b; KM52, Photo 17a-b). The highest levels of revegetation (i.e., based on visual assessment) were observed at KM18 and KM16 (both characterized as subxeric), whereas KM52 (characterized as xeric) had the lowest levels of revegetation. Notably, the status of volunteer colonization and revegetation by Arctic willow (*Salix arctophila*) — a common low-lying, creeping shrub known to hold multiple ethnobiological usages, including fire fuel (*personal communications*) — at KM18 was at a more advanced level than expected, given only 1-year post-disturbance. In this case, adjacent land vegetation cover remained intact and viable. Following 2021 surface preparations, this species is suspected of having quickly adapted to site conditions leading to its predominance within the disturbed landscape. A similar observation regarding the proximity and viability of adjacent vegetation cover was made with respect to the vegetation cover conditions at KM16 during the 2019 assessment (refer to Section 2.5).

2023 SURVEY — KM52, KM18 & KM16

The KM52, KM18 and KM16 trial sites were revisited as part of a qualitative walk-over assessment in July 2023, again comprising visual evaluation and documentation. Consistent with 2022 observations, an increasing number of small volunteer forbs and graminoids were found to have colonized all sites (KM16, Photo 18a-b; KM18, Photo 19a-b; KM52, Photo 20a-b). Indicators of early vegetation re-establishment were most apparent at KM18 and KM16 (both characterized as subxeric), whereas KM52 (characterized as xeric) was still mostly comprised of bare soil.



(a) KM16 — Status of Cover Vegetation (2022)



(b) KM16 — Status of Surface Preparations (2022)

Photo 15. KM16 — 2022 Status of Cover Vegetation (a) and Surface Preparations (b).

(a) KM18 — Status of Cover Vegetation (2022)

(b) KM18 — Status of Surface Preparations (2022)

Photo 16. KM18 — 2022 Status of Cover Vegetation (a) and Surface Preparations (b).

(a) KM52 — Status of Cover Vegetation (2022)

(b) KM52 — Status of Surface Preparations (2022)

Photo 17. KM52 — 2022 Status of Cover Vegetation (a) and Surface Preparations (b).

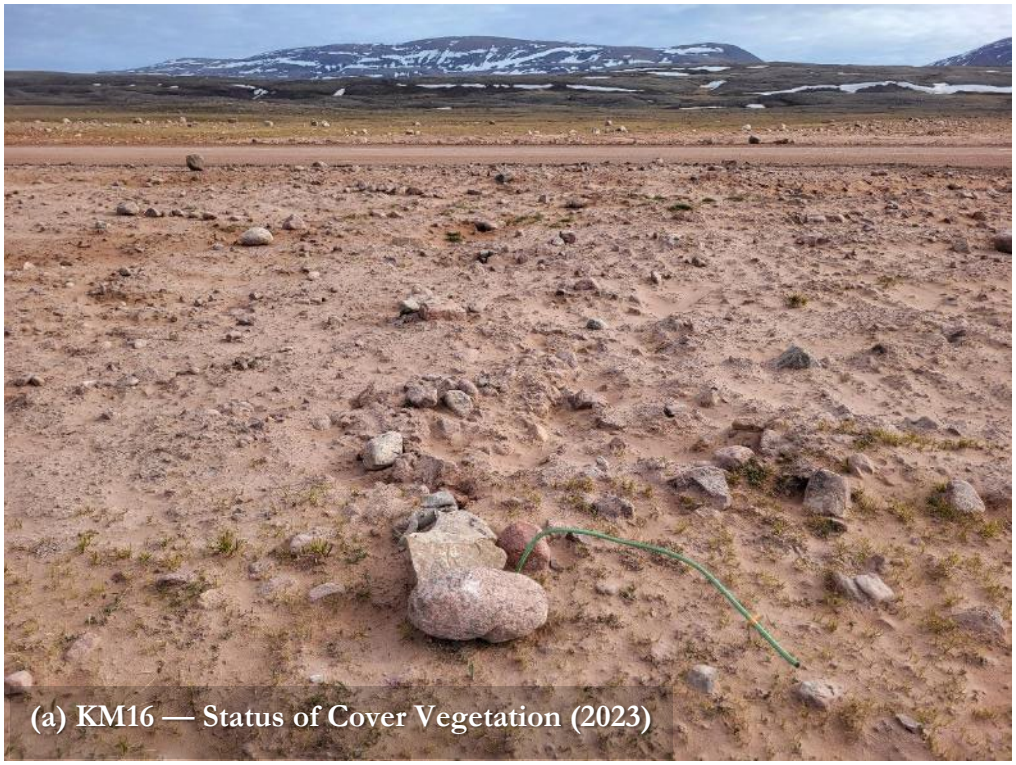


Photo 18. KM16 — 2023 Status of Cover Vegetation (a) and Surface Preparations (b).

(a) KM18 — Status of Cover Vegetation (2023)

(b) KM18 — Status of Surface Preparations (2023)

Photo 19. KM18 — 2023 Status of Cover Vegetation (a) and Surface Preparations (b).

Photo 20. KM52 — 2023 Status of Cover Vegetation (a) and Surface Preparations (b).

2024 SURVEY — KM52, KM18 & KM16

Quantitative evaluations of vegetation cover at the KM52, KM18 and KM16 trial sites were conducted in July 2024 following the methods described in Section 2.2 for assessing vegetation surface cover and composition at quadrat-scale. Visual evaluations and photo-documentation of the trial sites and adjacent areas were also completed. Table 13 to Table 15 summarize observed vegetation and mean surface projective cover (%), respectively, at the KM16, KM18 and KM52 trial sites.

Consistent with 2022 and 2023 observational trends, an increasing number of small volunteer forbs and graminoids were found to have colonized all sites (KM16, Photo 21a-b; KM18, Photo 22a-b; KM52, Photo 23a-b). The proportion of unvegetated bare soil/rock at the trial sites is still high (ranging from ~90-95% depending on location), but vegetation cover re-establishment and accumulated litter has increased (ranging from ~5-10%). Each site had different vegetation species composition that comprised similar species to the adjacent (control) biodiversity. Arctic mountain avens (*Dryas* sp.) were commonly observed at each trial site; Arctic willow had establied as the predominant species at the KM18 trial site.

Note: surface soil disturbances (e.g., rutting and equipment tracking) were observed across and/or along portions of the each trial site as a result of third-party access, Tote Road snow removal and road maintenance activities. Surface soil disturbance are primary along the margins of each trial site nearest to the Tote Road.

2025 SURVEY — KM52, KM18 & KM16

The KM52, KM18 and KM16 trial sites were revisited as part of a qualitative walk-over assessment in July 2025, comprising visual evaluation and photo-documentation. Consistent with 2024 observations, an increasing number of small volunteer forbs and graminoids were found to have colonized all sites (KM16, Photo 24a-b; KM18, Photo 25a-b; KM52, Photo 26a-b). As previously observed, indicators of early revegetation establishment continue to be most apparent at KM18 and KM16 (both characterized as subxeric), whereas KM52 (characterized as xeric) was still mostly comprised of bare soil. Notably, Arctic Willow at the KM18 trial site has become the predominant cover species. The health and vigour of cover vegetation at all sites was deemed to be good and continues to improve (e.g., at some location vegetation were flowering). Established vegetation appeared to have benefited from recent rain resulting in good growth, vibrant tissues, and deep rooting.

Table 13. KM16 Reclamation trial — 2024 Observed vegetation and mean surface projective cover (%).

Survey Site (Survey Marker ID)	KM16 — Trial (KM16-0, -75, -150)	KM16 — Control (KM16-C0, -C75, -C150)	
*Bare Soil/Rock	90.6% (±9.0 SD)	41.3% (±14.5 SD)	
*Forbs/Perennial Herbs/Shrubs	8.3% (±8.5 SD)	35.3% (±6.0 SD)	
*Litter	1.0% (±1.0 SD)	17.7% (±8.5 SD)	
*Exotic Weeds	*<None>*	*<None>*	
Predominant Vegetation Observed	*Oxyria sp.* *Dryas sp.* *Braya sp.* *Bistorta sp.*	*Carex sp.* *Cassiope sp.* *Bistorta sp.* *Dryas sp.*	*Pedicularis sp.* *Saxifragaceae sp.* *Salix sp.* *Vaccinium*

*Mean values // SD: Standard Deviation

Table 14. KM18 Reclamation trial — 2024 Observed vegetation and mean surface projective cover (%).

Survey Site (Survey Marker ID)	KM18 — Trial (KM18-0, -50, -100)		KM18 — Control (KM18-C0, -C50, -C100)	
*Bare Soil/Rock	89.7% (±12.7 SD)		55.3% (±10.0 SD)	
*Forbs/Perennial Herbs/Shrubs	8.0% (±8.7 SD)		20.7% (±2.9 SD)	
*Litter	2.3% (±4.0 SD)		14.3% (±5.8 SD)	
*Bryophytes/Lichen	*<None>*		9.7% (±6.5 SD)	
*Exotic Weeds	*<None>*		*<None>*	
Predominant Vegetation Observed	*Carex sp.* *Dryas sp.* *Oxyria sp.*	*Chamaenerion sp.* *Salix sp.*	*Carex sp.* *Dryas sp.* *Oxyria sp.* *Cassiope sp.*	*Silene acaulis* *Saxifragaceae sp.* *Salix sp.*

*Mean values // SD: Standard Deviation

Table 15. KM52 Reclamation trial — 2024 Observed vegetation and mean surface projective cover (%).

Survey Site (Survey Marker ID)	KM52 — Trial (KM52-0, -50, -100)	KM52 — Control (KM52-C0, -C50, -C100)	
*Bare Soil/Rock	95.0% (±0.0 SD)	81.0% (±22.7 SD)	
*Forbs/Perennial Herbs/Shrubs	5.5% (±0.0 SD)	10.3% (±10.2 SD)	
*Litter	*<None>*	8.7% (±12.5 SD)	
*Exotic Weeds	*<None>*	*<None>*	
Predominant Vegetation Observed	*Dryas sp.*	*Carex sp.* *Draba sp.* *Dryas sp.*	*Pedicularis sp.* *Saxifragaceae sp.* *Salix sp.*

*Mean values // SD: Standard Deviation

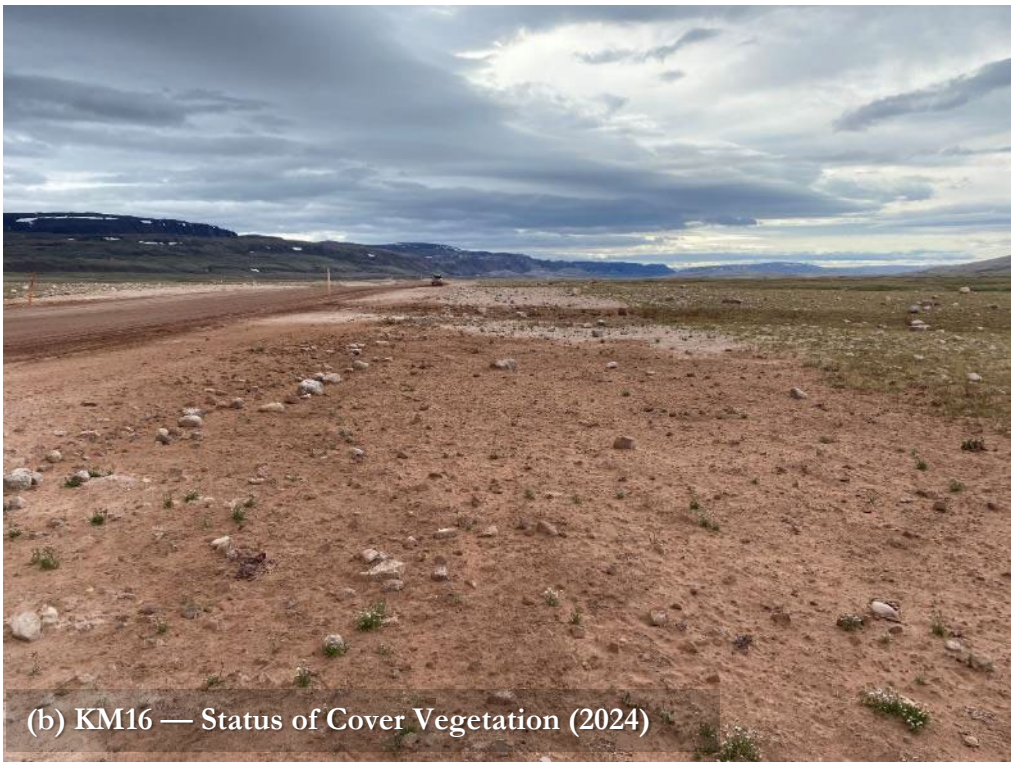


Photo 21. KM16 — 2024 Status of Cover Vegetation (a-b).

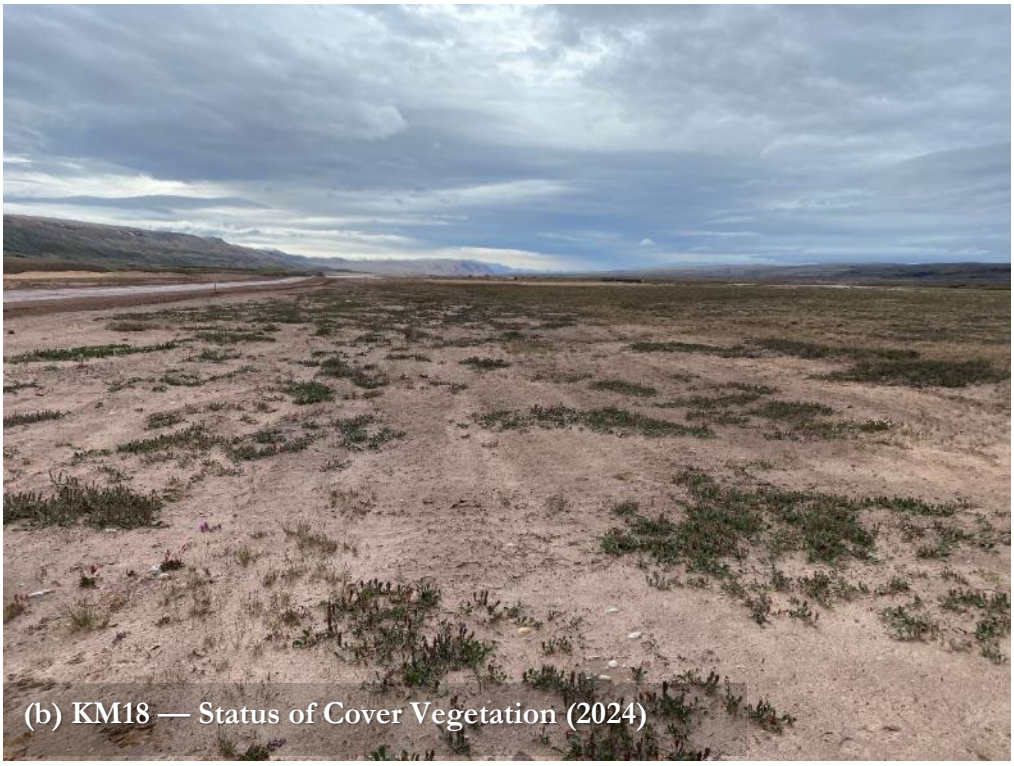


Photo 22. KM18 — 2024 Status of Cover Vegetation (a-b).

(a) KM52 — Status of Cover Vegetation (2024)

(b) KM52 — Status of Cover Vegetation (2024)

Photo 23. KM52 — 2024 Status of Cover Vegetation (a-b).

Photo 24. KM16 — 2025 Status of Cover Vegetation (a-b).

Photo 25. KM18 — 2025 Status of Cover Vegetation (a-b).

(a) KM52 — Status of Cover Vegetation (2025)

(b) KM52 — Status of Cover Vegetation (2025)

Photo 26. KM52 — 2025 Status of Cover Vegetation (a-b).

3.3 PRELIMINARY FINDINGS AND FUTURE DIRECTIONS

The preliminary reclamation trials described in this report are intended to be a starting point for research and development to examine revegetation strategies appropriate for and adaptable to the Project. The reclamation sites (n=3) will require periodic monitoring to determine revegetation status and growth. Since natural revegetation patterns and processes in the Arctic are characteristically slow, annual or biannual surveys are expected to be adequate to assess the long-term performance of surface configurations and to characterize rates of revegetation by early succession species. The reclamation trial's sample size is small and presently represents a short-term timeframe, and therefore imposes some design limitations. However, it does provide insight into some of the conditions, challenges and opportunities at the Project. The following approaches could benefit future directions.

Increase Reclamation Trial Sites / Increase Range of Reclamation Endpoints— Different landscapes and landscape features will likely require different and perhaps even a combination of reclamation strategies and surface configurations to provide safe, stable and desirable end-landscapes. For example, areas with more pronounced slopes or landscapes characterized by unconsolidated surface materials may require additional or site-specific preparations or mitigations. For this reason, it would be beneficial to (1) review the range of different landscape features affected by the Project, (2) examine how they can be grouped as reclamation/revegetation endpoints, and — most importantly — (3) determine what reclamation strategies and surface configurations can be applied to optimize revegetation outcomes. The study approach presented in this reclamation pilot study provides an initial template and investigative strategy to identify candidate sites, initiate reclamation trials and apply consistent survey methods to document revegetation patterns and processes onsite. Increasing reclamation trial sites to increase the range of reclamation endpoints would benefit from direct input from Baffinland's Sustainable Development and Site Environment teams.

Progressive Reclamation Trials— During appropriate phases of the Life-of-Mine cycle, it would be beneficial — i.e., as a long-term objective— to evaluate Project features that could be decommissioned and/or reclaimed to reduce the Project's disturbance footprint. For example, discontinued laydown areas, access roads or other features associated with the Mine Site, the Milne Port and/or Tote Road should be evaluated as candidate sites for reclamation studies. Where appropriate, these features could provide a ready landscape for planning, designing and implementing medium- and even large-scale reclamation trials to examine the scalability of reclamation approaches and calibrate the time, effort and cost of reclamation onsite. This will require consultation with and input from Baffinland's Sustainable Development and Site Environment teams to identify and select suitable sites/locations to expand the reclamation/revegetation activities onsite.

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APPENDICES

APPENDIX A — DATA COLLECTION SHEETS

BRITISH COLUMBIA — GROUND INSPECTION FORM

G ☐ vs V ☐	PHOTO	X:	Y:	DATE
PROJECT ID.		SURV.		
MAP SHEET		PLOT #		POLY. #
UTM ZONE	LAT. / NORTH	LONG. / EAST		
ASPECT °		ELEVATION		m
SLOPE %	SMR	SNR		

MESO SLOPE POSTION

☐ Crest ☐ Mid slope ☐ Depression
☐ Upper slope ☐ Lower slope ☐ Level
☐ Toe

DRAINAGE - MINERAL SOILS

☐ Very rapidly ☐ Well ☐ Poorly
☐ Rapidly ☐ Mod. well ☐ Very poorly
☐ Imperfectly

MOISTURE SUBCLASSES - ORGANIC SOILS

☐ Aqueous ☐ Aquic ☐ Perhumid
☐ Peraquic ☐ Subaquic ☐ Humid

MINERAL SOIL TEXTURE

☐ Sandy (LS,S) ☐ Silty (SiL,Si)
☐ Loamy (SL,L,SCL,FSL) ☐ Clayey (SiCL,CL,SC,SiC,C)

ORGANIC SOIL TEXTURE

☐ Fibric ☐ Mesic ☐ Humic

SURF. ORGANIC HORIZON THICKNESS

☐ 0–40 cm ☐ > 40 cm

HUMUS FORM

☐ Mor ☐ Moder ☐ Mull

ROOT RESTRICTING LAYER

Depth _____ cm Type _____

COARSE FRAGMENT CONTENT

☐ < 20% ☐ 20–35% ☐ 35–70% ☐ > 70%

TERRAIN

COMPONENT: TC1 ☐ TC2 ☐ TC3 ☐

TERRAIN TEXTURE	SURFICIAL MATERIAL	SURFACE EXPRESSION	GEOMORPH PROCESS
1	1	1	1
2	2	2	2

ECOSYSTEM

COMPONENT: EC1 ☐ EC2 ☐ EC3 ☐

BGC UNIT	ECOSECTION
SITE SERIES	SITE MODIFIERS
STRUCTURAL STAGE	CROWN CLOSURE %

ECOSYSTEM POLYGON SUMMARY

	%	SS	SM	ST
EC1				
EC2				
EC3				

TERRAIN POLYGON SUMMARY

	%	Classification
TC1		
TC2		
TC3		

DOMINANT / INDICATOR PLANT SPECIES

TOTAL %	A:	B:	C:	D:

L.	SPECIES	%	L.	SPECIES	%	L.	SPECIES	%

COMPLETE ☐ PARTIAL ☐

Tree Mensuration

Spp.	DBH	Ht. Calculation to DBH						Ht. to DBH	Total HT	BH Age	Path Y/N
		Top	Bot	SD	SL	HD	HT				

NOTES (site diagram, exposure, gleying, etc.)

ECOSYSTEM FIELD FORM

BRITISH COLUMBIA

MINISTRY OF FORESTS
BC ENVIRONMENT

DATE Y M D	PLOT NO.
PROJECT ID.	FIELD NO. / SURVEYOR(S)

SITE DESCRIPTION

LOCATION

GENERAL LOCATION

FOREST REGION	MAPSHEET	UTM ZONE	LAT./ NORTH.	LONG./ EAST.
AIRPHOTO NO.	X CO-ORD.	Y CO-ORD.	MAP UNIT	

SITE INFORMATION

PLOT REPRESENTING

BGC UNIT	SITE SERIES	TRANS./ DISTRIB.	ECOSECTION
MOISTURE REGIME	NUTRIENT REGIME	SUCCESS. STATUS	STRUCT. STAGE	REALM/ CLASS
ELEV. m.	SLOPE %	ASPECT °	MESO SLOPE POS.	SURFACE TOPOG.

SITE DIAGRAM

SITE DISTURB.	PHOTO ROLL
EXPOS. TYPE	FRAME NOS.

NOTES

SUBSTRATE (%)

ORG. MATTER		ROCKS	
DEC. WOOD		MINERAL SOIL	
BEDROCK		WATER	

FS882 (1) HRE 98/5

FS882 (3) HRE 98/5

VEGETATION

NOTES:

TREES	A1	A2	A3	A	B1	B2	B
SHRUBS					B1	B2	B

ADDITIONAL SPECIES	LAYER	%

HERB LAYER (C)	%

MOSS / LICHEN / SEEDLING (D)	%

SPP. LIST: COMP. ☐ PART. ☐

% COVER BY LAYER: TREE (A) ☐ SHRUB (B) ☐ HERB (C) ☐ MOSS / LICHEN (D) ☐

SURVEYOR(S)

PLOT NO.

PAGE OF

SOIL DESCRIPTION

GEOLOGY	BEDROCK	C. F. LITH.	SURVEYOR(S)	PLOT NO.
TERRAIN	TEXTURE 1 / 2	SURFICIAL MATERIAL 1 / 2	SURFACE EXPR. 1 / 2	GEOMORPH. PROCESS 1 / 2
SOIL CLASS.		HUMUS FORM	HYDROGEO.	
ROOTING DEPTH cm	ROOT RESTRICT. LAYER TYPE		WATER SOURCE	DRAINAGE
R. Z. PART. SIZE	ROOT RESTRICT. LAYER DEPTH cm		SEEPAGE cm	FLOOD RG.

PROFILE DIAGRAM

ORGANIC HORIZONS/LAYERS

HOR/ LAYER	DEPTH	FABRIC STRUCTURE	FABRIC vPOST	MYCEL. AB.	FECAL AB.	ROOTS AB.	ROOTS SIZE	pH	COMMENTS (consistency, character, fauna, etc):

MINERAL HORIZONS/LAYERS

HOR/ LAYER	DEPTH	COLOUR	ASP.	TEXT.	% COARSE FRAGMENTS G	C	S	TOTAL	SHAPE	ROOTS AB.	ROOTS SIZE	STRUCTURE CLASS	STRUCTURE KIND	pH	COMMENTS (mottles, clay films, effervesc., etc):

NOTES:

FS882 (2) HRE 98/5

FS 882 (4) HRE 98/5

MENSURATION

MENSURATION FORM

SURVEYOR(S):

TREE#	SPP.	DBH	HEIGHT CALCULATIONS TOP	BOT.	SD	SL.	HD	HT.	HT. TO DBH	TOTAL HT.	BH AGE	SI	SUP.	CONK	BL. CONK	SCAR	F. OR C.	F. CRACK	MISTLE	R. BRAN.	D. OR B. TOP	DAMAGE TYPE	DAMAGE SEV.	SITE SERIES

NOTES

TREE DIAMETER TALLY

TREE #	SPP	DBH	TREE #	SPP	DBH

Vegetation Abundance Monitoring Program 2018 — Point-Quadrat Data

Baffinland Iron Mines Corporation

Page: of

Year:										Frame Ht (cm): start @thick, go counter clockwise	
Site ID:										Thick:	
Treatment:	Exclosure									Temp:	
	Non-Exclosure									Thin:	
Plot:	A	B	X							Temp:	

5 cm CANOPY		15 cm CANOPY		25 cm CANOPY		35 cm CANOPY		45 cm CANOPY		55 cm CANOPY	
A5:		A15:		A25:		A35:		A45:		A55:	
B5:		B15:		B25:		B35:		B45:		B55:	
C5:		C15:		C25:		C35:		C45:		C55:	
D5:		D15:		D25:		D35:		D45:		D55:	
E5:		E15:		E25:		E35:		E45:		E55:	
F5:		F15:		F25:		F35:		F45:		F55:	
G5:		G15:		G25:		G35:		G45:		G55:	
H5:		H15:		H25:		H35:		H45:		H55:	
I5:		I15:		I25:		I35:		I45:		I55:	
J5:		J15:		J25:		J35:		J45:		J55:	
5 cm GROUND		**15 cm GROUND**		**25 cm GROUND**		**35 cm GROUND**		**45 cm GROUND**		**55 cm GROUND**	
A5:		A15:		A25:		A35:		A45:		A55:	
B5:		B15:		B25:		B35:		B45:		B55:	
C5:		C15:		C25:		C35:		C45:		C55:	
D5:		D15:		D25:		D35:		D45:		D55:	
E5:		E15:		E25:		E35:		E45:		E55:	
F5:		F15:		F25:		F35:		F45:		F55:	
G5:		G15:		G25:		G35:		G45:		G55:	
H5:		H15:		H25:		H35:		H45:		H55:	
I5:		I15:		I25:		I35:		I45:		I55:	
J5:		J15:		J25:		J35:		J45:		J55:	

Notes:

Vegetation Abundance Monitoring Program 2018 Point-Quadrat Data

Page: of

65 cm CANOPY		75 cm CANOPY		85 cm CANOPY		95 cm CANOPY	
A65:		A75:		A85:		A95:	
B65:		B75:		B85:		B95:	
C65:		C75:		C85:		C95:	
D65:		D75:		D85:		D95:	
E65:		E75:		E85:		E95:	
F65:		F75:		F85:		F95:	
G65:		G75:		G85:		G95:	
H65:		H75:		H85:		H95:	
I65:		I75:		I85:		I95:	
J65:		J75:		J85:		J95:	
65 cm GROUND		**75 cm GROUND**		**85 cm GROUND**		**95 cm GROUND**	
A65:		A75:		A85:		A95:	
B65:		B75:		B85:		B95:	
C65:		C75:		C85:		C95:	
D65:		D75:		D85:		D95:	
E65:		E75:		E85:		E95:	
F65:		F75:		F85:		F95:	
G65:		G75:		G85:		G95:	
H65:		H75:		H85:		H95:	
I65:		I75:		I85:		I95:	
J65:		J75:		J85:		J95:	

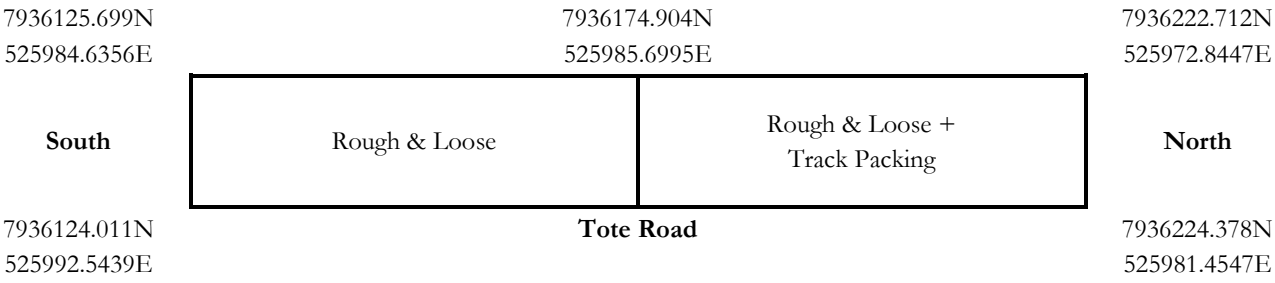
APPENDIX B — SUPPORTING INFORMATION

1. KM52 | 2019 BASELINE SURVEY

Appendix B-1: Table 1. KM52 — Vegetation Survey — Geo-referencing (NAD1983 UTM Zone 17N).

Survey Area	Survey Location	Identifier/Activity	Northing	Easting
Disturbed	KM52-0	Survey Marker	7936125.03	525984.6437
		Soil Pit	7936124.492	525986.242
		Vegetation Quadrat	7936128.389	525985.664
	KM52-50	Survey Marker	7936174.073	525981.6067
		Soil Pit	7936175.986	525982.9982
		Vegetation Quadrat	7936172.624	525981.6597
	KM52-100	Survey Marker	7936223.046	525972.8407
		Soil Pit	7936220.833	525974.2824
		Vegetation Quadrat	7936222.379	525973.0256
Control	KM52-C0	Survey Marker	7936118.877	525955.6433
		Soil Pit	7936123.059	525960.12
		Vegetation Quadrat	7936124.695	525957.0582
	KM52-C50	Survey Marker	7936168.669	525949.9803
		Soil Pit	7936173.391	525953.0002
		Vegetation Quadrat	7936165.329	525950.5161
	KM52-C100	Survey Marker	7936220.338	525942.7386
		Soil Pit	7936217.381	525947.2311
		Vegetation Quadrat	7936214.865	525942.133

Appendix B-1: Table 2. KM52 —Reclamation Trial — Geo-referencing (NAD1983 UTM Zone 17N).



ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318743-7 KM52-0 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	18.2		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	0.82		0.10	%	07-AUG-19	08-AUG-19	R4743748
pH (1:2 soil:water)	8.83		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	7.96		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	56.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	37.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Clay	7.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	2.1		1.0	mg/kg	01-AUG-19	01-AUG-19	R4738808
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Potassium	30		20	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4740489
Saturated Paste Extractables							
SAR	0.53		0.10	SAR		07-AUG-19	
Calcium (Ca)	80.6		5.0	mg/L		06-AUG-19	R4739873
Calcium (Ca)	14.6		0.91	mg/kg		07-AUG-19	
Chloride (Cl)	141		5.0	mg/L	06-AUG-19	06-AUG-19	R4739939
Chloride (Cl)	25.6		0.91	mg/kg		07-AUG-19	
Conductivity Sat. Paste	0.701		0.040	dS/m	06-AUG-19	06-AUG-19	R4739817
Magnesium (Mg)	26.0		5.0	mg/L		06-AUG-19	R4739873
Magnesium (Mg)	4.73		0.91	mg/kg		07-AUG-19	
Potassium (K)	6.5		5.0	mg/L		06-AUG-19	R4739873
Potassium (K)	1.18		0.91	mg/kg		07-AUG-19	
Sodium (Na)	21.4		5.0	mg/L		06-AUG-19	R4739873
Sodium (Na)	3.90		0.91	mg/kg		07-AUG-19	
Sulfate (SO4)	6.4		1.1	mg/kg		07-AUG-19	
Sulfate (SO4)	35.2		6.0	mg/L	06-AUG-19	06-AUG-19	R4739939
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	
L2318743-8 KM52-50 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	25.5		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	2.45		0.10	%	06-AUG-19	07-AUG-19	R4742549
pH (1:2 soil:water)	8.56		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	7.77		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	74.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	20.0		1.0	%	02-AUG-19	06-AUG-19	R4740289

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318743-8 KM52-50 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Particle Size							
% Clay	6.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	2.2		1.0	mg/kg	01-AUG-19	01-AUG-19	R4738808
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4740509
Available Potassium	37		20	mg/kg	02-AUG-19	02-AUG-19	R4740509
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4740489
Saturated Paste Extractables							
SAR	0.25		0.10	SAR		07-AUG-19	
Calcium (Ca)	62.3		5.0	mg/L		06-AUG-19	R4739873
Calcium (Ca)	15.9		1.3	mg/kg		07-AUG-19	
Chloride (Cl)	42.3		5.0	mg/L	06-AUG-19	06-AUG-19	R4739939
Chloride (Cl)	10.8		1.3	mg/kg		07-AUG-19	
Conductivity Sat. Paste	0.414		0.040	dS/m	06-AUG-19	06-AUG-19	R4739817
Magnesium (Mg)	12.8		5.0	mg/L		06-AUG-19	R4739873
Magnesium (Mg)	3.3		1.3	mg/kg		07-AUG-19	
Potassium (K)	9.0		5.0	mg/L		06-AUG-19	R4739873
Potassium (K)	2.3		1.3	mg/kg		07-AUG-19	
Sodium (Na)	8.4		5.0	mg/L		06-AUG-19	R4739873
Sodium (Na)	2.2		1.3	mg/kg		07-AUG-19	
Sulfate (SO4)	3.7		1.5	mg/kg		07-AUG-19	
Sulfate (SO4)	14.6		6.0	mg/L	06-AUG-19	06-AUG-19	R4739939
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	
L2318743-9 KM52-100 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	17.8		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	0.59		0.10	%	06-AUG-19	07-AUG-19	R4742549
pH (1:2 soil:water)	8.84		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	8.03		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	84.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	11.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Clay	5.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	1.2		1.0	mg/kg	02-AUG-19	02-AUG-19	R4739959
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4740509
Available Potassium	33		20	mg/kg	02-AUG-19	02-AUG-19	R4740509
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4739093

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318743-9 KM52-100 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Plant Available Nutrients							
Saturated Paste Extractables							
SAR	0.30		0.10	SAR		07-AUG-19	
Calcium (Ca)	55.2		5.0	mg/L		06-AUG-19	R4739873
Calcium (Ca)	9.84		0.89	mg/kg		07-AUG-19	
Chloride (Cl)	30.6		5.0	mg/L	06-AUG-19	06-AUG-19	R4739939
Chloride (Cl)	5.46		0.89	mg/kg		07-AUG-19	
Conductivity Sat. Paste	0.373		0.040	dS/m	06-AUG-19	06-AUG-19	R4739817
Magnesium (Mg)	9.0		5.0	mg/L		06-AUG-19	R4739873
Magnesium (Mg)	1.61		0.89	mg/kg		07-AUG-19	
Potassium (K)	11.4		5.0	mg/L		06-AUG-19	R4739873
Potassium (K)	2.03		0.89	mg/kg		07-AUG-19	
Sodium (Na)	9.1		5.0	mg/L		06-AUG-19	R4739873
Sodium (Na)	1.63		0.89	mg/kg		07-AUG-19	
Sulfate (SO4)	2.4		1.1	mg/kg		07-AUG-19	
Sulfate (SO4)	13.7		6.0	mg/L	06-AUG-19	06-AUG-19	R4739939
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	
L2318743-10 KM52-C0 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	16.9		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	0.49		0.10	%	06-AUG-19	07-AUG-19	R4742549
pH (1:2 soil:water)	8.85		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	8.11		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	53.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	39.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Clay	8.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	02-AUG-19	02-AUG-19	R4739959
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4740509
Available Potassium	21		20	mg/kg	02-AUG-19	02-AUG-19	R4740509
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4739093
Saturated Paste Extractables							
SAR	0.17		0.10	SAR		07-AUG-19	
Calcium (Ca)	88.8		5.0	mg/L		02-AUG-19	R4738634
Calcium (Ca)	15.0		0.85	mg/kg		07-AUG-19	
Chloride (Cl)	199		5.0	mg/L	02-AUG-19	02-AUG-19	R4738667
Chloride (Cl)	33.7		0.85	mg/kg		07-AUG-19	
Conductivity Sat. Paste	0.995		0.040	dS/m	02-AUG-19	02-AUG-19	R4737628

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318743-10 KM52-C0 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Saturated Paste Extractables							
Magnesium (Mg)	44.3		5.0	mg/L		02-AUG-19	R4738634
Magnesium (Mg)	7.49		0.85	mg/kg		07-AUG-19	
Potassium (K)	8.0		5.0	mg/L		02-AUG-19	R4738634
Potassium (K)	1.36		0.85	mg/kg		07-AUG-19	
Sodium (Na)	7.9		5.0	mg/L		02-AUG-19	R4738634
Sodium (Na)	1.34		0.85	mg/kg		07-AUG-19	
Sulfate (SO4)	5.4		1.0	mg/kg		07-AUG-19	
Sulfate (SO4)	32.0		6.0	mg/L	02-AUG-19	02-AUG-19	R4738667
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	
L2318743-11 KM52-C50 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	15.6		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	0.28		0.10	%	06-AUG-19	07-AUG-19	R4742549
pH (1:2 soil:water)	9.04		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	8.24		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	56.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	38.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Clay	6.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	02-AUG-19	02-AUG-19	R4739959
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4740509
Available Potassium	<20		20	mg/kg	02-AUG-19	02-AUG-19	R4740509
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4739093
Saturated Paste Extractables							
SAR	0.15		0.10	SAR		07-AUG-19	
Calcium (Ca)	94.1		5.0	mg/L		02-AUG-19	R4738634
Calcium (Ca)	14.7		0.78	mg/kg		07-AUG-19	
Chloride (Cl)	242		5.0	mg/L	02-AUG-19	02-AUG-19	R4738667
Chloride (Cl)	37.9		0.78	mg/kg		07-AUG-19	
Conductivity Sat. Paste	0.988		0.040	dS/m	02-AUG-19	02-AUG-19	R4737628
Magnesium (Mg)	43.6		5.0	mg/L		02-AUG-19	R4738634
Magnesium (Mg)	6.83		0.78	mg/kg		07-AUG-19	
Potassium (K)	5.6		5.0	mg/L		02-AUG-19	R4738634
Potassium (K)	0.88		0.78	mg/kg		07-AUG-19	
Sodium (Na)	6.9		5.0	mg/L		02-AUG-19	R4738634
Sodium (Na)	1.07		0.78	mg/kg		07-AUG-19	
Sulfate (SO4)	2.67		0.94	mg/kg		07-AUG-19	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318743-11 KM52-C50 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Saturated Paste Extractables							
Sulfate (SO4)	17.0		6.0	mg/L	02-AUG-19	02-AUG-19	R4738667
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	
L2318743-12 KM52-C100 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	48.2		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	7.22		0.10	%	06-AUG-19	07-AUG-19	R4742549
pH (1:2 soil:water)	8.24		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	7.60		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	75.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	21.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Clay	4.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	2.5		1.0	mg/kg	02-AUG-19	02-AUG-19	R4739959
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4740509
Available Potassium	<20		20	mg/kg	02-AUG-19	02-AUG-19	R4740509
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4739093
Saturated Paste Extractables							
SAR	<0.20	SAR:DL	0.20	SAR		07-AUG-19	
Calcium (Ca)	59.9		5.0	mg/L		02-AUG-19	R4738634
Calcium (Ca)	28.8		2.4	mg/kg		07-AUG-19	
Chloride (Cl)	32.7		5.0	mg/L	02-AUG-19	02-AUG-19	R4738667
Chloride (Cl)	15.8		2.4	mg/kg		07-AUG-19	
Conductivity Sat. Paste	0.381		0.040	dS/m	02-AUG-19	02-AUG-19	R4737628
Magnesium (Mg)	9.0		5.0	mg/L		02-AUG-19	R4738634
Magnesium (Mg)	4.3		2.4	mg/kg		07-AUG-19	
Potassium (K)	<5.0		5.0	mg/L		02-AUG-19	R4738634
Potassium (K)	<2.4		2.4	mg/kg		07-AUG-19	
Sodium (Na)	<5.0		5.0	mg/L		02-AUG-19	R4738634
Sodium (Na)	<2.4		2.4	mg/kg		07-AUG-19	
Sulfate (SO4)	<2.9		2.9	mg/kg		07-AUG-19	
Sulfate (SO4)	<6.0		6.0	mg/L	02-AUG-19	02-AUG-19	R4738667
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)	MS-B	L2318743-1, -10, -11, -12, -2, -3, -4, -6
Matrix Spike	Magnesium (Mg)	MS-B	L2318743-1, -10, -11, -12, -2, -3, -4, -6
Matrix Spike	Sodium (Na)	MS-B	L2318743-1, -10, -11, -12, -2, -3, -4, -6

Sample Parameter Qualifier key listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-PASTE-IC-GP	Soil	Chloride in Soil (Paste) by IC	Carter-CSSS/EPA 300.1 Modified
A soil extract produced by the saturated paste extraction procedure is analyzed for Chloride by IC (Ion Chromatography)..			
EC-PASTE-GP	Soil	Conductivity (Saturated Paste)	CSSS 15.3.1 2ND ED.
Electrical conductivity of sample extracts is measured using a conductivity meter, which essentially consists of a conductance cell and a Wheatstone bridge.			
MET-PASTE-ICP-GP	Soil	Salinity Metals By ICPOES (Sat. Paste)	CSSS CH15/EPA 6010B
A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium, Sodium by ICPOES.			
NO3-AVAIL-SK	Soil	Available Nitrate-N	Alberta Ag (1988)
Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution. Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.			
ORGANIC MATTER-GP	Soil	Organic Matter (LOI)	AAFC 1984 84-045
Weight loss between 105 C and 550 C is approximately equal to the amount of organic matter in a sample.			
PH-1:2 CACL2-GP	Soil	pH (1:2 CaCl2)	CSSS 16.3 - 1:2 Extraction w/0.01M CaCl2
pH 1:2 Soil: 1:2 CaCl2 Extract; The pH is determined in the laboratory using a pH electrode. Field Measurement is recommended where accurate pH measurements are required, due to the 15 minute recommended hold time.			
PH-1:2-GP	Soil	pH in Soil (1:2 Soil:Water Extraction)	CSSS 16.2 - pH of 1:2 water extract
pH 1:2 Soil: Water Extract; The pH is determined in the laboratory using a pH electrode. Field Measurement is recommended where accurate pH measurements are required, due to the 15 minute recommended hold time.			
PO4/K-AVAIL-SK	Soil	Plant Available Phosphorus and Potassium	Comm. Soil Sci. Plant Anal, 25 (5&6)
Plant available phosphorus and potassium are extracted from the soil usng Modified Kelowna solution. Phosphorous in the soil extract is determined colorimetrically at 880 nm, while potassiumis determined by flame emission at 770 nm.			
PSA-1-GP	Soil	Particle Size by Hydrometer	CSSS 55.3 - Hydrometer (modified)
Soil samples oven dried, grinded, and soaked in Calgon solution for 16 hours; soil suspensions measured for their particle size by distribution using a hydrometer after various times of settling.			
SAL-MG/KG-CALC-GP	Soil	Detailed Salinity Calculation (mg/kg)	CALCULATION
SALINITY-INTCHECK-GP	Soil		CALCULATION
SAR-PASTE-CALC-GP	Soil	Sodium Adsorption Ratio (Sat. Paste)	CSSS 15.4.4-Calculation
A soil extract produced by the saturated paste extraction procedure is analyzed for Sodium, Calcium, and Magnesium by ICPOES. Sodium Adsorption Ratio (SAR) is calculated as per "Soil Sampling and Methods of Analysis" by M. Carter.			
SAT-PCNT-GP	Soil	% Saturation	AER D50
As received samples are pasted to saturation. A sub-sample is weighed, oven dried and re-weighed to determine % saturation.			
SO4-AVAIL-SK	Soil	Available Sulfate-S	REC METH SOIL ANAL - AB. AG(1988)
Plant available sulfate in the soil is extracted using a weak calcium chloride solution. Sulfate in the extract is determined by ICP-OES. This extraction may also produce organic sulfur in the extracts when organic soils are analyzed.			
SO4-PASTE-IC-GP	Soil	Sulfate by IC (Saturated Paste)	CSSS CH15/EPA 300.1
A soil extract produced by the saturated paste extraction procedure is analyzed by Ion Chromatography with conductivity or UV detection.			
TGR2-CALC-GP	Soil	Theoretical Gypsum Requirement	J. Ashworth et al (1999)

Reference Information

Theoretical Gypsum Requirement is an estimate of the gypsum amendment required to remediate brine-contaminated or sodic soils, and is provided in units of tonnes per hectare (t/ha) for a treatment depth of 15cm. TGR(brine), intended for brine-contaminated soils, is calculated using Method A from "A Comparison of Methods for Gypsum Requirement of Brine-Contaminated Soils", by J. Ashworth (Cdn J. of Soil Science, 1999), available at www.alsglobal.com. TGR(sodic), intended for naturally sodic soils, uses the Oster and Frenkel method (Method B) from the same paper. Reported TGR values are capped at 50 t/ha, considered the maximum practical gypsum amendment. To convert TGR from t/ha to tons/acre, multiply by 0.446. To determine a TGR value for an alternate treatment depth, multiply by [desired treatment depth (cm) / 15 cm].

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

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

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
GP	ALS ENVIRONMENTAL - GRANDE PRAIRIE, ALBERTA, CANADA

Chain of Custody Numbers:

17-706508

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

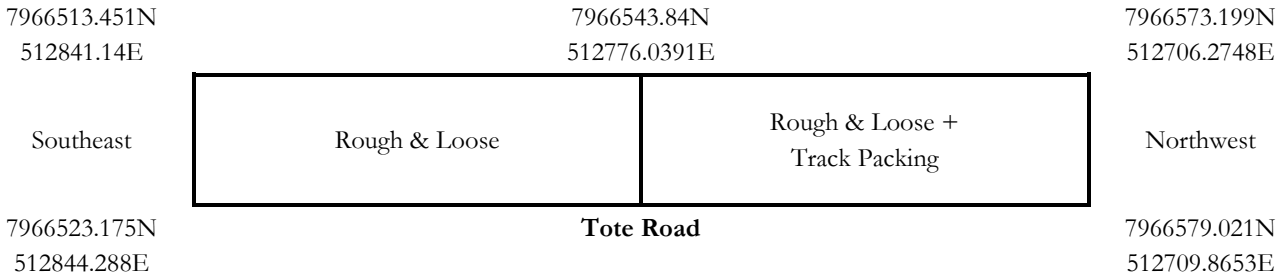
Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

2. KM16 | 2019 BASELINE SURVEY

Appendix B-2: Table 1. KM16 — Georeferencing (NAD1983 UTM Zone 17N).

Survey Area	Survey Location	Identifier/Activity	Northing	Easting
Disturbed	KM16-0	Survey Marker	7966511.786	512842.5098
		Soil Pit	7966515.018	512841.9323
		Vegetation Quadrat	7966518.521	512831.1031
	KM16-75	Survey Marker	7966541.702	512773.019
		Soil Pit	7966543.502	512775.4485
		Vegetation Quadrat	7966545.804	512768.8105
	KM16-150	Survey Marker	7966572.859	512705.3704
		Soil Pit	7966574.11	512709.4418
		Vegetation Quadrat	7966571.42	512707.1571
Control	KM16-C0	Survey Marker	7966487.054	512829.1336
		Soil Pit	7966491.622	512828.3038
		Vegetation Quadrat	7966487.935	512827.2455
	KM16-C75	Survey Marker	7966514.965	512760.0727
		Soil Pit	7966517.305	512759.675
		Vegetation Quadrat	7966518.74	512757.1561
	KM16-C150	Survey Marker	7966545.787	512692.3557
		Soil Pit	7966552.833	512695.4509
		Vegetation Quadrat	7966550.487	512694.8375

Appendix B-2: Table 2. KM16 —Reclamation Trial — Geo-referencing (NAD1983 UTM Zone 17N).



ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318743-1 KM16-0 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	46.3		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	4.29		0.10	%	06-AUG-19	07-AUG-19	R4742549
pH (1:2 soil:water)	7.45		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	6.83		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	88.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	8.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Clay	4.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	LOAMY SAND				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	1.6		1.0	mg/kg	01-AUG-19	01-AUG-19	R4738808
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Potassium	26		20	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4740489
Saturated Paste Extractables							
SAR	0.25		0.10	SAR		07-AUG-19	
Calcium (Ca)	165		5.0	mg/L		02-AUG-19	R4738634
Calcium (Ca)	76.4		2.3	mg/kg		07-AUG-19	
Chloride (Cl)	471	DLA	10	mg/L	02-AUG-19	02-AUG-19	R4738667
Chloride (Cl)	218	DLA	4.6	mg/kg		07-AUG-19	
Conductivity Sat. Paste	1.60		0.040	dS/m	02-AUG-19	02-AUG-19	R4737628
Magnesium (Mg)	57.5		5.0	mg/L		02-AUG-19	R4738634
Magnesium (Mg)	26.6		2.3	mg/kg		07-AUG-19	
Potassium (K)	11.2		5.0	mg/L		02-AUG-19	R4738634
Potassium (K)	5.2		2.3	mg/kg		07-AUG-19	
Sodium (Na)	14.5		5.0	mg/L		02-AUG-19	R4738634
Sodium (Na)	6.7		2.3	mg/kg		07-AUG-19	
Sulfate (SO4)	<5.6	DLA	5.6	mg/kg		07-AUG-19	
Sulfate (SO4)	<12	DLA	12	mg/L	02-AUG-19	02-AUG-19	R4738667
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	
L2318743-2 KM16-75 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	29.0		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	2.03		0.10	%	06-AUG-19	07-AUG-19	R4742549
pH (1:2 soil:water)	7.34		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	6.71		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	89.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	6.0		1.0	%	02-AUG-19	06-AUG-19	R4740289

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318743-2 KM16-75 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Particle Size							
% Clay	5.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	1.0		1.0	mg/kg	01-AUG-19	01-AUG-19	R4738808
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Potassium	22		20	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4740489
Saturated Paste Extractables							
SAR	0.17		0.10	SAR		07-AUG-19	
Calcium (Ca)	79.8		5.0	mg/L		02-AUG-19	R4738634
Calcium (Ca)	23.2		1.5	mg/kg		07-AUG-19	
Chloride (Cl)	180		5.0	mg/L	02-AUG-19	02-AUG-19	R4738667
Chloride (Cl)	52.2		1.5	mg/kg		07-AUG-19	
Conductivity Sat. Paste	0.831		0.040	dS/m	02-AUG-19	02-AUG-19	R4737628
Magnesium (Mg)	23.1		5.0	mg/L		02-AUG-19	R4738634
Magnesium (Mg)	6.7		1.5	mg/kg		07-AUG-19	
Potassium (K)	7.2		5.0	mg/L		02-AUG-19	R4738634
Potassium (K)	2.1		1.5	mg/kg		07-AUG-19	
Sodium (Na)	6.5		5.0	mg/L		02-AUG-19	R4738634
Sodium (Na)	1.9		1.5	mg/kg		07-AUG-19	
Sulfate (SO4)	<1.7		1.7	mg/kg		07-AUG-19	
Sulfate (SO4)	<6.0		6.0	mg/L	02-AUG-19	02-AUG-19	R4738667
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	
L2318743-3 KM16-150 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	40.6		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	5.48		0.10	%	06-AUG-19	07-AUG-19	R4742549
pH (1:2 soil:water)	6.78		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	6.37		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	88.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	7.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Clay	5.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	1.7		1.0	mg/kg	01-AUG-19	01-AUG-19	R4738808
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Potassium	27		20	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4740489

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318743-3 KM16-150 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Plant Available Nutrients							
Saturated Paste Extractables							
SAR	0.23		0.10	SAR		07-AUG-19	
Calcium (Ca)	100		5.0	mg/L		02-AUG-19	R4738634
Calcium (Ca)	40.6		2.0	mg/kg		07-AUG-19	
Chloride (Cl)	269		5.0	mg/L	02-AUG-19	02-AUG-19	R4738667
Chloride (Cl)	109		2.0	mg/kg		07-AUG-19	
Conductivity Sat. Paste	1.00		0.040	dS/m	02-AUG-19	02-AUG-19	R4737628
Magnesium (Mg)	31.9		5.0	mg/L		02-AUG-19	R4738634
Magnesium (Mg)	13.0		2.0	mg/kg		07-AUG-19	
Potassium (K)	9.8		5.0	mg/L		02-AUG-19	R4738634
Potassium (K)	4.0		2.0	mg/kg		07-AUG-19	
Sodium (Na)	10.4		5.0	mg/L		02-AUG-19	R4738634
Sodium (Na)	4.2		2.0	mg/kg		07-AUG-19	
Sulfate (SO4)	<2.4		2.4	mg/kg		07-AUG-19	
Sulfate (SO4)	<6.0		6.0	mg/L	02-AUG-19	02-AUG-19	R4738667
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	
L2318743-4 KM16-C0 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	30.7		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	2.75		0.10	%	06-AUG-19	07-AUG-19	R4742549
pH (1:2 soil:water)	7.89		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	7.08		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	89.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	6.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Clay	5.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	01-AUG-19	01-AUG-19	R4738808
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Potassium	21		20	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4740489
Saturated Paste Extractables							
SAR	0.26		0.10	SAR		07-AUG-19	
Calcium (Ca)	55.0		5.0	mg/L		02-AUG-19	R4738634
Calcium (Ca)	16.9		1.5	mg/kg		07-AUG-19	
Chloride (Cl)	32.8		5.0	mg/L	02-AUG-19	02-AUG-19	R4738667
Chloride (Cl)	10.1		1.5	mg/kg		07-AUG-19	
Conductivity Sat. Paste	0.508		0.040	dS/m	02-AUG-19	02-AUG-19	R4737628

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318743-4 KM16-C0 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Saturated Paste Extractables							
Magnesium (Mg)	22.3		5.0	mg/L		02-AUG-19	R4738634
Magnesium (Mg)	6.8		1.5	mg/kg		07-AUG-19	
Potassium (K)	6.9		5.0	mg/L		02-AUG-19	R4738634
Potassium (K)	2.1		1.5	mg/kg		07-AUG-19	
Sodium (Na)	9.0		5.0	mg/L		02-AUG-19	R4738634
Sodium (Na)	2.7		1.5	mg/kg		07-AUG-19	
Sulfate (SO4)	<1.8		1.8	mg/kg		07-AUG-19	
Sulfate (SO4)	<6.0		6.0	mg/L	02-AUG-19	02-AUG-19	R4738667
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	
L2318743-5 KM16-C75 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	45.6		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	5.36		0.10	%	06-AUG-19	07-AUG-19	R4742549
pH (1:2 soil:water)	7.52		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	6.54		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	87.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	7.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Clay	6.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	01-AUG-19	01-AUG-19	R4738808
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Potassium	27		20	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4740489
Saturated Paste Extractables							
SAR	<0.20	SAR:DL	0.20	SAR		07-AUG-19	
Calcium (Ca)	29.7		5.0	mg/L		06-AUG-19	R4739873
Calcium (Ca)	13.5		2.3	mg/kg		07-AUG-19	
Chloride (Cl)	36.1		5.0	mg/L	06-AUG-19	06-AUG-19	R4739939
Chloride (Cl)	16.5		2.3	mg/kg		07-AUG-19	
Conductivity Sat. Paste	0.261		0.040	dS/m	06-AUG-19	06-AUG-19	R4739817
Magnesium (Mg)	11.9		5.0	mg/L		06-AUG-19	R4739873
Magnesium (Mg)	5.4		2.3	mg/kg		07-AUG-19	
Potassium (K)	<5.0		5.0	mg/L		06-AUG-19	R4739873
Potassium (K)	<2.3		2.3	mg/kg		07-AUG-19	
Sodium (Na)	<5.0		5.0	mg/L		06-AUG-19	R4739873
Sodium (Na)	<2.3		2.3	mg/kg		07-AUG-19	
Sulfate (SO4)	5.0		2.7	mg/kg		07-AUG-19	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318743-5 KM16-C75 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Saturated Paste Extractables							
Sulfate (SO4)	11.0		6.0	mg/L	06-AUG-19	06-AUG-19	R4739939
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	
L2318743-6 KM16-C150 Sampled By: CLIENT on 24-JUL-19 Matrix: SOIL							
Physical Tests							
% Saturation	91.6		1.0	%	02-AUG-19	02-AUG-19	R4738712
Organic Matter (LOI)	10.2		0.10	%	07-AUG-19	08-AUG-19	R4743748
pH (1:2 soil:water)	6.90		0.10	pH	06-AUG-19	06-AUG-19	R4739814
pH (1:2 CaCl2)	6.23		0.10	pH	02-AUG-19	02-AUG-19	R4739805
Particle Size							
% Sand	85.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Silt	9.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
% Clay	6.0		1.0	%	02-AUG-19	06-AUG-19	R4740289
Texture	SANDY LOAM				02-AUG-19	06-AUG-19	R4740289
Plant Available Nutrients							
Available Nitrate-N	2.0		1.0	mg/kg	01-AUG-19	01-AUG-19	R4738808
Available Phosphate-P	<2.0		2.0	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Potassium	40		20	mg/kg	02-AUG-19	02-AUG-19	R4739152
Available Sulfate-S	<4.0		4.0	mg/kg	02-AUG-19	02-AUG-19	R4740489
Saturated Paste Extractables							
SAR	0.22		0.10	SAR		07-AUG-19	
Calcium (Ca)	45.8		5.0	mg/L		02-AUG-19	R4738634
Calcium (Ca)	41.9		4.6	mg/kg		07-AUG-19	
Chloride (Cl)	101		5.0	mg/L	02-AUG-19	02-AUG-19	R4738667
Chloride (Cl)	92.4		4.6	mg/kg		07-AUG-19	
Conductivity Sat. Paste	0.538		0.040	dS/m	02-AUG-19	02-AUG-19	R4737628
Magnesium (Mg)	16.9		5.0	mg/L		02-AUG-19	R4738634
Magnesium (Mg)	15.4		4.6	mg/kg		07-AUG-19	
Potassium (K)	9.0		5.0	mg/L		02-AUG-19	R4738634
Potassium (K)	8.2		4.6	mg/kg		07-AUG-19	
Sodium (Na)	7.0		5.0	mg/L		02-AUG-19	R4738634
Sodium (Na)	6.4		4.6	mg/kg		07-AUG-19	
Sulfate (SO4)	6.6		5.5	mg/kg		07-AUG-19	
Sulfate (SO4)	7.2		6.0	mg/L	02-AUG-19	02-AUG-19	R4738667
TGR(sodic)	<0.10		0.10	t/ha		07-AUG-19	
TGR(brine)	<0.10		0.10	t/ha		07-AUG-19	

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)	MS-B	L2318743-1, -10, -11, -12, -2, -3, -4, -6
Matrix Spike	Magnesium (Mg)	MS-B	L2318743-1, -10, -11, -12, -2, -3, -4, -6
Matrix Spike	Sodium (Na)	MS-B	L2318743-1, -10, -11, -12, -2, -3, -4, -6

Sample Parameter Qualifier key listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-PASTE-IC-GP	Soil	Chloride in Soil (Paste) by IC	Carter-CSSS/EPA 300.1 Modified
A soil extract produced by the saturated paste extraction procedure is analyzed for Chloride by IC (Ion Chromatography)..			
EC-PASTE-GP	Soil	Conductivity (Saturated Paste)	CSSS 15.3.1 2ND ED.
Electrical conductivity of sample extracts is measured using a conductivity meter, which essentially consists of a conductance cell and a Wheatstone bridge.			
MET-PASTE-ICP-GP	Soil	Salinity Metals By ICPOES (Sat. Paste)	CSSS CH15/EPA 6010B
A soil extract produced by the saturated paste extraction procedure is analyzed for Calcium, Magnesium, Potassium, Sodium by ICPOES.			
NO3-AVAIL-SK	Soil	Available Nitrate-N	Alberta Ag (1988)
Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution. Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.			
ORGANIC MATTER-GP	Soil	Organic Matter (LOI)	AAFC 1984 84-045
Weight loss between 105 C and 550 C is approximately equal to the amount of organic matter in a sample.			
PH-1:2 CACL2-GP	Soil	pH (1:2 CaCl2)	CSSS 16.3 - 1:2 Extraction w/0.01M CaCl2
pH 1:2 Soil: 1:2 CaCl2 Extract; The pH is determined in the laboratory using a pH electrode. Field Measurement is recommended where accurate pH measurements are required, due to the 15 minute recommended hold time.			
PH-1:2-GP	Soil	pH in Soil (1:2 Soil:Water Extraction)	CSSS 16.2 - pH of 1:2 water extract
pH 1:2 Soil: Water Extract; The pH is determined in the laboratory using a pH electrode. Field Measurement is recommended where accurate pH measurements are required, due to the 15 minute recommended hold time.			
PO4/K-AVAIL-SK	Soil	Plant Available Phosphorus and Potassium	Comm. Soil Sci. Plant Anal, 25 (5&6)
Plant available phosphorus and potassium are extracted from the soil usng Modified Kelowna solution. Phosphorous in the soil extract is determined colorimetrically at 880 nm, while potassiumis determined by flame emission at 770 nm.			
PSA-1-GP	Soil	Particle Size by Hydrometer	CSSS 55.3 - Hydrometer (modified)
Soil samples oven dried, grinded, and soaked in Calgon solution for 16 hours; soil suspensions measured for their particle size by distribution using a hydrometer after various times of settling.			
SAL-MG/KG-CALC-GP	Soil	Detailed Salinity Calculation (mg/kg)	CALCULATION
SALINITY-INTCHECK-GP	Soil		CALCULATION
SAR-PASTE-CALC-GP	Soil	Sodium Adsorption Ratio (Sat. Paste)	CSSS 15.4.4-Calculation
A soil extract produced by the saturated paste extraction procedure is analyzed for Sodium, Calcium, and Magnesium by ICPOES. Sodium Adsorption Ratio (SAR) is calculated as per "Soil Sampling and Methods of Analysis" by M. Carter.			
SAT-PCNT-GP	Soil	% Saturation	AER D50
As received samples are pasted to saturation. A sub-sample is weighed, oven dried and re-weighed to determine % saturation.			
SO4-AVAIL-SK	Soil	Available Sulfate-S	REC METH SOIL ANAL - AB. AG(1988)
Plant available sulfate in the soil is extracted using a weak calcium chloride solution. Sulfate in the extract is determined by ICP-OES. This extraction may also produce organic sulfur in the extracts when organic soils are analyzed.			
SO4-PASTE-IC-GP	Soil	Sulfate by IC (Saturated Paste)	CSSS CH15/EPA 300.1
A soil extract produced by the saturated paste extraction procedure is analyzed by Ion Chromatography with conductivity or UV detection.			
TGR2-CALC-GP	Soil	Theoretical Gypsum Requirement	J. Ashworth et al (1999)

Reference Information

Theoretical Gypsum Requirement is an estimate of the gypsum amendment required to remediate brine-contaminated or sodic soils, and is provided in units of tonnes per hectare (t/ha) for a treatment depth of 15cm. TGR(brine), intended for brine-contaminated soils, is calculated using Method A from "A Comparison of Methods for Gypsum Requirement of Brine-Contaminated Soils", by J. Ashworth (Cdn J. of Soil Science, 1999), available at www.alsglobal.com. TGR(sodic), intended for naturally sodic soils, uses the Oster and Frenkel method (Method B) from the same paper. Reported TGR values are capped at 50 t/ha, considered the maximum practical gypsum amendment. To convert TGR from t/ha to tons/acre, multiply by 0.446. To determine a TGR value for an alternate treatment depth, multiply by [desired treatment depth (cm) / 15 cm].

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

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

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA
GP	ALS ENVIRONMENTAL - GRANDE PRAIRIE, ALBERTA, CANADA

Chain of Custody Numbers:

17-706508

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

3. KM18 | 2021 BASELINE SURVEY

Appendix B-3: Table 1. KM18 — Georeferencing (NAD1983 UTM Zone 17N).

Survey Area	Survey Location	Identifier/Activity	Northing	Easting
Disturbed	KM18-0	Vegetation Quadrat + Soil Pit	7965153.4	514351.5
	KM18-50	Vegetation Quadrat + Soil Pit	7965201.6	514261.6
	KM18-100	Vegetation Quadrat + Soil Pit	7965176.9	514307.3
Control	KM18-C0	Vegetation Quadrat + Soil Pit	7965188.7	514369.8
	KM18-C50	Vegetation Quadrat + Soil Pit	7965222.6	514332.7
	KM18-C100	Vegetation Quadrat + Soil Pit	7965256.4	514297.6

Appendix B-3: Table 2. KM18 —Reclamation Trial — Georeferencing (NAD1983 UTM Zone 17N).

7965188.7N 514307.3E		7965163.4N 514351.5E
West-Northwest	Rough & Loose + Track Packing	South-Southeast

Tote Road

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-7 KM 18.5 - CONTROL 100M Sampled By: JR/MK on 21-JUL-21 @ 16:00 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	6.37		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	1.7		1.0	%	10-AUG-21	12-AUG-21	R5548985

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-7 KM 18.5 - CONTROL 100M Sampled By: JR/MK on 21-JUL-21 @ 16:00 Matrix: SOIL							
Particle Size							
% Sand (1.00mm - 0.50mm)	18.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	48.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	23.8		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	2.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	1.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	1.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	1.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	<0.30	SAR:DL	0.30	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	3.6		1.5	mg/kg		11-AUG-21	
Calcium (Ca)	12.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<3.0		3.0	mg/kg		11-AUG-21	
Conductivity Sat. Paste	0.11		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	1.6		1.5	mg/kg		11-AUG-21	
Magnesium (Mg)	5.4		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.5		1.5	mg/kg		11-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	29.6		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.5		1.5	mg/kg		11-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	1.8		1.5	mg/kg		11-AUG-21	
Sulfur (as SO4)	6.1		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	<0.10		0.10	t/ha		11-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		11-AUG-21	
L2622738-8 KM 18.5 - CONTROL 50M Sampled By: JR/MK on 21-JUL-21 @ 15:50 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	6.88		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	1.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	14.7		1.0	%	10-AUG-21	12-AUG-21	R5548985

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-8 KM 18.5 - CONTROL 50M Sampled By: JR/MK on 21-JUL-21 @ 15:50 Matrix: SOIL							
Particle Size							
% Sand (0.50mm - 0.25mm)	51.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	24.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	2.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	2.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	2.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	1.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	1.7		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	<0.20	SAR:DL	0.20	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	10.6		1.5	mg/kg		11-AUG-21	
Calcium (Ca)	36.6		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<2.9		2.9	mg/kg		11-AUG-21	
Conductivity Sat. Paste	0.24		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.5		1.5	mg/kg		11-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.5		1.5	mg/kg		11-AUG-21	
Potassium (K)	5.1		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	29.1		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.5		1.5	mg/kg		11-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	<1.5		1.5	mg/kg		11-AUG-21	
Sulfur (as SO4)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	<0.10		0.10	t/ha		11-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		11-AUG-21	
L2622738-9 KM 18.5 - CONTROL 0M Sampled By: JR/MK on 21-JUL-21 @ 14:30 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	6.76		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	1.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	15.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	54.3		1.0	%	10-AUG-21	12-AUG-21	R5548985

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-9 KM 18.5 - CONTROL 0M Sampled By: JR/MK on 21-JUL-21 @ 14:30 Matrix: SOIL							
Particle Size							
% Sand (0.25mm - 0.125mm)	25.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	1.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	<0.20	SAR:DL	0.20	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	7.5		1.5	mg/kg		11-AUG-21	
Calcium (Ca)	24.9		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<3.0		3.0	mg/kg		11-AUG-21	
Conductivity Sat. Paste	0.18		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	1.5		1.5	mg/kg		11-AUG-21	
Magnesium (Mg)	5.1		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.5		1.5	mg/kg		11-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	30.1		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.5		1.5	mg/kg		11-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	3.8		1.5	mg/kg		11-AUG-21	
Sulfur (as SO4)	12.5		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	<0.10		0.10	t/ha		11-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		11-AUG-21	
L2622738-10 KM 18.5 - D100M Sampled By: JR/MK on 24-JUL-21 @ 10:05 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	1.8		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	1.7		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	6.96		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	10.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	52.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	28.7		1.0	%	10-AUG-21	12-AUG-21	R5548985

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-10 KM 18.5 - D100M Sampled By: JR/MK on 24-JUL-21 @ 10:05 Matrix: SOIL							
Particle Size							
% Sand (0.125mm - 0.063mm)	2.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	2.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	2.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	0.18		0.10	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	16.8		1.9	mg/kg		11-AUG-21	
Calcium (Ca)	45.1		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	23		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	8.4		3.7	mg/kg		11-AUG-21	
Conductivity Sat. Paste	0.32		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	3.8		1.9	mg/kg		11-AUG-21	
Magnesium (Mg)	10.2		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.9		1.9	mg/kg		11-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	37.3		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	1.9		1.9	mg/kg		11-AUG-21	
Sodium (Na)	5.2		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	2.9		1.9	mg/kg		11-AUG-21	
Sulfur (as SO4)	7.8		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	<0.10		0.10	t/ha		11-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		11-AUG-21	
L2622738-11 KM 18.5 - D50M Sampled By: JR/MK on 24-JUL-21 @ 09:40 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	6.85		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	2.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	20.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	47.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	20.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	2.3		1.0	%	10-AUG-21	12-AUG-21	R5548985

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-11 KM 18.5 - D50M Sampled By: JR/MK on 24-JUL-21 @ 09:40 Matrix: SOIL							
Particle Size							
% Silt (0.063mm - 0.0312mm)	2.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	2.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	1.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	<0.20	SAR:DL	0.20	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	8.0		1.4	mg/kg		11-AUG-21	
Calcium (Ca)	28.2		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<2.8		2.8	mg/kg		11-AUG-21	
Conductivity Sat. Paste	0.21		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	2.3		1.4	mg/kg		11-AUG-21	
Magnesium (Mg)	8.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.4		1.4	mg/kg		11-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	28.4		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.4		1.4	mg/kg		11-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	3.9		1.4	mg/kg		11-AUG-21	
Sulfur (as SO4)	13.7		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	<0.10		0.10	t/ha		11-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		11-AUG-21	
L2622738-12 KM 18.5 - D0M Sampled By: JR/MK on 24-JUL-21 @ 09:00 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	7.11		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	1.8		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	13.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	47.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	29.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	2.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	1.9		1.0	%	10-AUG-21	12-AUG-21	R5548985

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-12 KM 18.5 - D0M Sampled By: JR/MK on 24-JUL-21 @ 09:00 Matrix: SOIL							
Particle Size							
% Silt (0.0312mm - 0.004mm)	1.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	<0.20	SAR:DL	0.20	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	8.7		1.6	mg/kg		11-AUG-21	
Calcium (Ca)	27.9		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<3.1		3.1	mg/kg		11-AUG-21	
Conductivity Sat. Paste	0.19		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	1.9		1.6	mg/kg		11-AUG-21	
Magnesium (Mg)	6.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.6		1.6	mg/kg		11-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	31.3		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.6		1.6	mg/kg		11-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	2.3		1.6	mg/kg		11-AUG-21	
Sulfur (as SO4)	7.2		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	<0.10		0.10	t/ha		11-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		11-AUG-21	

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)

Sample Parameter Qualifier key listed:

Qualifier	Description
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.
SAR:INC	SAR is incalculable due to Ca, Mg below detection limit.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-PASTE-COL-SK	Soil	Chloride (Cl) (Saturated Paste)	CSSS 15.2.1/ APHA 4500-Cl E

A soil extract is produced by the saturated paste extraction procedure. The extract is analyzed for Chloride by Colourimetry using a discrete analyzer.

EC-SAR-SK	Soil	EC (Saturated Paste)	CSSS 18.2.2/CSSS 18.3.1

After saturated soil paste equilibrium, an extract is obtained by vacuum filtration with conductivity of the extract measured by a conductivity meter.

NO3-AVAIL-SK	Soil	Available Nitrate-N	Alberta Ag / APHA 4500 NO3F

Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution.
Nitrate is quantitatively reduced to nitrite by passing of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.

OM-LOI-SK	Soil	Organic Matter by LOI at 375 deg C.	CSSS (1978) p. 160

The dry-ash method involves the removal of organic matter by combustion at 375 degrees C for a minimum of 16 hours. Samples are dried prior to combustion.

PH-1:2CACL2-SK	Soil	pH (1:2 Soil:CaCl2 Extraction)	CSSS 2008 16.3

1 part dry soil and 2 parts de-ionized 0.01M CaCl2 (by volume) is mixed. The slurry is allowed to stand with occasional stirring for 30 - 60 minutes. pH of the soil slurry is then measured using a pH meter.

PO4/K-AVAIL-SK	Soil	Plant Available Phosphorus and Potassium	Comm. Soil Sci. Plant Anal, 25 (5&6)

Plant available phosphorus and potassium are extracted from the soil usng Modified Kelowna solution. Phosphorous in the soil extract is determined colorimetrically at 880 nm, while potassiumis determined by flame emission at 770 nm.

PSA-PIPET-DETAIL-SK	Soil	Particle size - Sieve and Pipette	SSIR-51 METHOD 3.2.1

Particle size distribution is determined by a combination of techniques. Dry sieving is performed for coarse particles, wet sieving for sand particles and the pipette sedimentation method for clay particles.

SAL-MG/KG-CALC-SK	Soil	Detail Salinity in mg/kg	Manual Calculation
SALINITY-INTCHECK-SK	Soil		CSSS 18.4-Calculation
SAR-CALC-SO4-SK	Soil	SAR, Cations and SO4 in saturated soil	APHA 3120B

Ca, Mg, Na, K and SO4 in a saturated soil extract are determined by ICP-OES.

SAT-PCNT-SK	Soil	Saturated Paste	CSSS Ch. 15

A saturated paste is generated by adding water to soil with mixing until the following criteria are met.:
The sample paste glistens as it reflects light.
The sample flows slightly when container is tipped, and slides freely and cleanly off the spatula.
A trench carved in the soil surface will close readily upon jarring the container.
There should be no free layer of water on top of the sample.
An aliquot of the sample is obtained, dried at 105C and saturation percentage is determined.

SO4-AVAIL-SK	Soil	Available Sulfate-S	REC METH SOIL ANAL - AB. AG(1988)

Plant available sulfate in the soil is extracted using a weak calcium chloride solution. Sulfate in the extract is determined by ICP-OES. This extraction may also produce organic sulfur in the extracts when organic soils are analyzed.

TGR2-CALC-SK	Soil	Theoretical Gypsum Requirement	J. Ashworth et al (1999)

Theoretical Gypsum Requirement is an estimate of the gypsum amendment required to remediate brine-contaminated or sodic soils, and is provided in units of tonnes per hectare (t/ha) for a treatment depth of 15cm. TGR(brine), intended for brine-contaminated soils, is calculated using Method A from "A Comparison of Methods for Gypsum Requirement of Brine-Contaminated Soils", by J. Ashworth (Cdn J. of Soil Science, 1999), available at www.alsglobal.com. TGR(sodic), intended for naturally sodic soils, uses the Oster and Frenkel method (Method B) from the same paper. Reported TGR values are capped at 50 t/ha, considered the maximum practical gypsum amendment. To convert TGR from t/ha to tons/acre, multiply by 0.446.

Reference Information

To determine a TGR value for an alternate treatment depth, multiply by [desired treatment depth (cm) / 15 cm].

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

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

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

4. KM58 | 2021 BASELINE SURVEY

Appendix B-4: Table 1. KM58 — Georeferencing (NAD1983 UTM Zone 17N).

Study Zone	Survey Area	Survey Location	Identifier/Activity	Northing	Easting
Area1	Disturbed	KM58-0	Vegetation Quadrat + Soil Pit	7930265.6	527483.1
		KM58-75	Vegetation Quadrat + Soil Pit	7930192.3	527503.7
		KM58-150	Vegetation Quadrat + Soil Pit	7930119.3	527523.716
	Control	KM58-C0	Vegetation Quadrat + Soil Pit	7930260.4	527438.1
		KM58-C75	Vegetation Quadrat + Soil Pit	7930188.3	527457.7
		KM58-C150	Vegetation Quadrat + Soil Pit	7930118.8	527479.2
Study Zone	**Survey Area**	**Survey Location**	**Identifier/Activity**	**Northing**	**Easting**
Area2	Disturbed	KM58-0	Vegetation Quadrat + Soil Pit	7930033.8	527548.2
		KM58-75	Vegetation Quadrat + Soil Pit	7929959.7	527566.6
		KM58-150	Vegetation Quadrat + Soil Pit	7929889	527585
	Control	KM58-C0	Vegetation Quadrat + Soil Pit	7930032.2	527503.7
		KM58-C75	Vegetation Quadrat + Soil Pit	7929959.3	527515
		KM58-C150	Vegetation Quadrat + Soil Pit	7929887.2	527537
Study Zone	**Survey Area**	**Survey Location**	**Identifier/Activity**	**Northing**	**Easting**
Area3	Disturbed	KM58-0	Vegetation Quadrat + Soil Pit	7929819.3	527602.1
		KM58-75	Vegetation Quadrat + Soil Pit	7929747.8	527620.1
		KM58-150	Vegetation Quadrat + Soil Pit	7929674	527637.8
	Control	KM58-C0	Vegetation Quadrat + Soil Pit	7929822.9	527558.9
		KM58-C75	Vegetation Quadrat + Soil Pit	7929746.8	527575.5
		KM58-C150	Vegetation Quadrat + Soil Pit	7929672.5	527596.9

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-1 KM 58 - PLOT 2 D150M Sampled By: JR/MK on 22-JUL-21 @ 15:05 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	4.70		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	3.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	20.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	22.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	48.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	2.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	Incalculable	SAR:INC	0.10	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	<1.4		1.4	mg/kg		14-AUG-21	
Calcium (Ca)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<2.8		2.8	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.4		1.4	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.4		1.4	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	28.1		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.4		1.4	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	<1.4		1.4	mg/kg		14-AUG-21	
Sulfur (as SO4)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	N/A		0.10	t/ha		14-AUG-21	
TGR(brine)	N/A		0.10	t/ha		14-AUG-21	
L2622738-2 KM 58 - PLOT 2 D75M Sampled By: JR/MK on 22-JUL-21 @ 14:20 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-2 KM 58 - PLOT 2 D75M Sampled By: JR/MK on 22-JUL-21 @ 14:20 Matrix: SOIL							
Physical Tests							
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	5.45		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	2.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	13.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	35.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	39.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	8.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	Incalculable	SAR:INC	0.10	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	<1.3		1.3	mg/kg		14-AUG-21	
Calcium (Ca)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<2.5		2.5	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.3		1.3	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.3		1.3	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	25.2		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.3		1.3	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	<1.3		1.3	mg/kg		14-AUG-21	
Sulfur (as SO4)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	N/A		0.10	t/ha		14-AUG-21	
TGR(brine)	N/A		0.10	t/ha		14-AUG-21	
L2622738-3 KM 58 - PLOT 2 D0M Sampled By: JR/MK on 22-JUL-21 @ 13:45 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	2.2		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	2.0		1.0	%	10-AUG-21	12-AUG-21	R5549996

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-3 KM 58 - PLOT 2 D0M Sampled By: JR/MK on 22-JUL-21 @ 13:45 Matrix: SOIL							
Physical Tests							
pH (1:2 CaCl2)	4.88		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	2.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	8.8		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	23.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	35.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	21.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	2.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	2.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	2.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	1.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	Incalculable	SAR:INC	0.10	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	<1.6		1.6	mg/kg		14-AUG-21	
Calcium (Ca)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<3.2		3.2	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.6		1.6	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.6		1.6	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	32.4		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.6		1.6	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	2.2		1.6	mg/kg		14-AUG-21	
Sulfur (as SO4)	6.9		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	N/A		0.10	t/ha		14-AUG-21	
TGR(brine)	N/A		0.10	t/ha		14-AUG-21	
L2622738-4 KM 58 - PLOT 2 C150M Sampled By: JR/MK on 24-JUL-21 @ 13:07 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	4.65		0.10	pH	09-AUG-21	09-AUG-21	R5546928

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-4 KM 58 - PLOT 2 C150M Sampled By: JR/MK on 24-JUL-21 @ 13:07 Matrix: SOIL							
Physical Tests							
Particle Size							
% Gravel (>2mm)	2.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	4.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	25.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	38.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	25.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	1.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	Incalculable	SAR:INC	0.10	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	<1.3		1.3	mg/kg		14-AUG-21	
Calcium (Ca)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<2.5		2.5	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.3		1.3	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.3		1.3	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	25.3		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.3		1.3	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	3.5		1.3	mg/kg		14-AUG-21	
Sulfur (as SO4)	13.9		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	N/A		0.10	t/ha		14-AUG-21	
TGR(brine)	N/A		0.10	t/ha		14-AUG-21	
L2622738-5 KM 58 - PLOT 2 C75M Sampled By: JR/MK on 24-JUL-21 @ 13:25 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	4.47		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-5 KM 58 - PLOT 2 C75M Sampled By: JR/MK on 24-JUL-21 @ 13:25 Matrix: SOIL							
Particle Size							
% Gravel (>2mm)	1.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	4.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	16.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	41.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	33.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	Incalculable	SAR:INC	0.10	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	<1.4		1.4	mg/kg		14-AUG-21	
Calcium (Ca)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<2.7		2.7	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.4		1.4	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.4		1.4	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	27.4		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.4		1.4	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	1.5		1.4	mg/kg		14-AUG-21	
Sulfur (as SO4)	5.4		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	N/A		0.10	t/ha		14-AUG-21	
TGR(brine)	N/A		0.10	t/ha		14-AUG-21	
L2622738-6 KM 58 - PLOT 2 C0M Sampled By: JR/MK on 24-JUL-21 @ 14:00 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	4.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	3.4		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	6.08		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	3.2		1.0	%	10-AUG-21	12-AUG-21	R5548985

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-6 KM 58 - PLOT 2 C0M Sampled By: JR/MK on 24-JUL-21 @ 14:00 Matrix: SOIL							
Particle Size							
% Sand (2.00mm - 1.00mm)	2.8		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	16.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	40.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	26.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	2.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	3.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	3.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	1.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	<0.50	SAR:DL	0.50	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	3.5		2.4	mg/kg		14-AUG-21	
Calcium (Ca)	7.2		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<4.8		4.8	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<2.4		2.4	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	2.5		2.4	mg/kg		14-AUG-21	
Potassium (K)	5.2		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	48.0		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<2.4		2.4	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	8.3		2.4	mg/kg		14-AUG-21	
Sulfur (as SO4)	17.3		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	<0.10		0.10	t/ha		14-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		14-AUG-21	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-13 KM 58 - PLOT 1 C150M Sampled By: JR/MK on 26-JUL-21 @ 13:55 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	6.1		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	5.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	4.44		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	2.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	6.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	22.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	36.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	21.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	2.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	3.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	3.6		1.0	%	10-AUG-21	12-AUG-21	R5548985

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-13 KM 58 - PLOT 1 C150M Sampled By: JR/MK on 26-JUL-21 @ 13:55 Matrix: SOIL							
Particle Size							
% Clay (<4um)	1.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	<0.50	SAR:DL	0.50	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	4.0		2.7	mg/kg		14-AUG-21	
Calcium (Ca)	7.4		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<5.4		5.4	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<2.7		2.7	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	2.9		2.7	mg/kg		14-AUG-21	
Potassium (K)	5.5		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	53.6		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<2.7		2.7	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	6.9		2.7	mg/kg		14-AUG-21	
Sulfur (as SO4)	13.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	<0.10		0.10	t/ha		14-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		14-AUG-21	
L2622738-14 KM 58 - PLOT 1 C75M Sampled By: JR/MK on 26-JUL-21 @ 14:22 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	4.51		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	1.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	2.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	8.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	40.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	42.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	1.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-14 KM 58 - PLOT 1 C75M Sampled By: JR/MK on 26-JUL-21 @ 14:22 Matrix: SOIL							
Particle Size							
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	Incalculable	SAR:INC	0.10	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	<1.4		1.4	mg/kg		14-AUG-21	
Calcium (Ca)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<2.8		2.8	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.4		1.4	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.4		1.4	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	27.8		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.4		1.4	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	<1.4		1.4	mg/kg		14-AUG-21	
Sulfur (as SO4)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	N/A		0.10	t/ha		14-AUG-21	
TGR(brine)	N/A		0.10	t/ha		14-AUG-21	
L2622738-15 KM 58 - PLOT 1 C0M Sampled By: JR/MK on 26-JUL-21 @ 14:40 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	5.06		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	2.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	7.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	49.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	31.7		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	7.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-15 KM 58 - PLOT 1 C0M Sampled By: JR/MK on 26-JUL-21 @ 14:40 Matrix: SOIL							
Particle Size							
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Potassium	<20		20	mg/kg	11-AUG-21	11-AUG-21	R5549241
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	Incalculable	SAR:INC	0.10	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	<1.3		1.3	mg/kg		14-AUG-21	
Calcium (Ca)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<2.5		2.5	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.3		1.3	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.3		1.3	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	25.2		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.3		1.3	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	<1.3		1.3	mg/kg		14-AUG-21	
Sulfur (as SO4)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	N/A		0.10	t/ha		14-AUG-21	
TGR(brine)	N/A		0.10	t/ha		14-AUG-21	
L2622738-16 KM 58 - PLOT 1 D150M Sampled By: JR/MK on 22-JUL-21 @ 10:58 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	1.7		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	1.6		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	4.36		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	5.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	7.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	37.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	37.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	8.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	1.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	1.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-16 KM 58 - PLOT 1 D150M Sampled By: JR/MK on 22-JUL-21 @ 10:58 Matrix: SOIL							
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Potassium	<20		20	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	<0.60	SAR:DL	0.60	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	1.8		1.6	mg/kg		14-AUG-21	
Calcium (Ca)	5.5		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<3.3		3.3	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.6		1.6	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.6		1.6	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	32.8		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.6		1.6	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	2.5		1.6	mg/kg		14-AUG-21	
Sulfur (as SO4)	7.5		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	<0.10		0.10	t/ha		14-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		14-AUG-21	
L2622738-17 KM 58 - PLOT 1 D75M Sampled By: JR/MK on 22-JUL-21 @ 10:45 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	5.52		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	10.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	42.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	39.8		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	5.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-17 KM 58 - PLOT 1 D75M Sampled By: JR/MK on 22-JUL-21 @ 10:45 Matrix: SOIL							
Plant Available Nutrients							
Available Phosphate-P	<2.0		2.0	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Potassium	<20		20	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	<0.50	SAR:DL	0.50	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	1.7		1.3	mg/kg		14-AUG-21	
Calcium (Ca)	6.3		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<2.7		2.7	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.3		1.3	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.3		1.3	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	26.5		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.3		1.3	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	<1.3		1.3	mg/kg		14-AUG-21	
Sulfur (as SO4)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	<0.10		0.10	t/ha		14-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		14-AUG-21	
L2622738-18 KM 58 - PLOT 1 OM - DISTURBED Sampled By: JR/MK on 19-JUL-21 @ 14:00 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	4.51		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	3.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	5.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	16.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	43.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	23.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	3.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	1.8		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	1.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	1.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	12-AUG-21	12-AUG-21	R5549242

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-18 KM 58 - PLOT 1 OM - DISTURBED Sampled By: JR/MK on 19-JUL-21 @ 14:00 Matrix: SOIL							
Plant Available Nutrients							
Available Potassium	<20		20	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	Incalculable	SAR:INC	0.10	SAR	11-AUG-21	11-AUG-21	R5548444
Calcium (Ca)	<1.3		1.3	mg/kg		14-AUG-21	
Calcium (Ca)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Chloride (Cl)	<10		10	mg/L	11-AUG-21	11-AUG-21	R5548463
Chloride (Cl)	<2.5		2.5	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	10-AUG-21	11-AUG-21	R5548472
Magnesium (Mg)	<1.3		1.3	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Potassium (K)	<1.3		1.3	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
% Saturation	25.3		1.0	%	10-AUG-21	11-AUG-21	R5548472
Sodium (Na)	<1.3		1.3	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
Sulfur (as SO4)	<1.3		1.3	mg/kg		14-AUG-21	
Sulfur (as SO4)	<5.0		5.0	mg/L	11-AUG-21	11-AUG-21	R5548444
TGR(sodic)	N/A		0.10	t/ha		14-AUG-21	
TGR(brine)	N/A		0.10	t/ha		14-AUG-21	
L2622738-19 KM 58 - PLOT 3 C0M Sampled By: JR/MK on 23-JUL-21 @ 15:10 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	4.56		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	1.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	11.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	54.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	29.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	1.5		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	<2.0		2.0	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Potassium	<20		20	mg/kg	12-AUG-21	12-AUG-21	R5549242

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-19 KM 58 - PLOT 3 C0M Sampled By: JR/MK on 23-JUL-21 @ 15:10 Matrix: SOIL							
Plant Available Nutrients							
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516
Saturated Paste Extractables							
SAR	Incalculable	SAR:INC	0.10	SAR	13-AUG-21	13-AUG-21	R5550009
Calcium (Ca)	<1.4		1.4	mg/kg		14-AUG-21	
Calcium (Ca)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Chloride (Cl)	<10		10	mg/L	13-AUG-21	13-AUG-21	R5549854
Chloride (Cl)	<2.9		2.9	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	12-AUG-21	13-AUG-21	R5549936
Magnesium (Mg)	<1.4		1.4	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Potassium (K)	<1.4		1.4	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
% Saturation	28.9		1.0	%	12-AUG-21	13-AUG-21	R5549936
Sodium (Na)	<1.4		1.4	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Sulfur (as SO4)	2.2		1.4	mg/kg		14-AUG-21	
Sulfur (as SO4)	7.8		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
TGR(sodic)	N/A		0.10	t/ha		14-AUG-21	
TGR(brine)	N/A		0.10	t/ha		14-AUG-21	
L2622738-20 KM 58 - PLOT 3 C75M Sampled By: JR/MK on 23-JUL-21 @ 14:35 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	2.0		1.0	%	10-AUG-21	12-AUG-21	R5549996
Organic Matter	1.8		1.0	%	10-AUG-21	12-AUG-21	R5549996
pH (1:2 CaCl2)	4.67		0.10	pH	09-AUG-21	09-AUG-21	R5546928
Particle Size							
% Gravel (>2mm)	5.8		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (2.00mm - 1.00mm)	5.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (1.00mm - 0.50mm)	12.9		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.50mm - 0.25mm)	36.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.25mm - 0.125mm)	27.2		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Sand (0.125mm - 0.063mm)	5.1		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.063mm - 0.0312mm)	3.3		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Silt (0.0312mm - 0.004mm)	2.6		1.0	%	10-AUG-21	12-AUG-21	R5548985
% Clay (<4um)	1.4		1.0	%	10-AUG-21	12-AUG-21	R5548985
Texture	Sand				10-AUG-21	12-AUG-21	R5548985
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548495
Available Phosphate-P	2.7		2.0	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Potassium	<20		20	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Sulfate-S	<3.0		3.0	mg/kg	13-AUG-21	13-AUG-21	R5552516

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-20 KM 58 - PLOT 3 C75M Sampled By: JR/MK on 23-JUL-21 @ 14:35 Matrix: SOIL							
Plant Available Nutrients							
Saturated Paste Extractables							
SAR	<0.60	SAR:DL	0.60	SAR	13-AUG-21	13-AUG-21	R5550009
Calcium (Ca)	1.9		1.6	mg/kg		14-AUG-21	
Calcium (Ca)	5.8		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Chloride (Cl)	<10		10	mg/L	13-AUG-21	13-AUG-21	R5549854
Chloride (Cl)	<3.3		3.3	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	12-AUG-21	13-AUG-21	R5549936
Magnesium (Mg)	<1.6		1.6	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Potassium (K)	<1.6		1.6	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
% Saturation	32.5		1.0	%	12-AUG-21	13-AUG-21	R5549936
Sodium (Na)	<1.6		1.6	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Sulfur (as SO4)	2.5		1.6	mg/kg		14-AUG-21	
Sulfur (as SO4)	7.6		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
TGR(sodic)	<0.10		0.10	t/ha		14-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		14-AUG-21	
L2622738-21 KM 58 - PLOT 3 C150M Sampled By: JR/MK on 23-JUL-21 @ 12:10 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	<1.0		1.0	%	10-AUG-21	11-AUG-21	R5548257
Organic Matter	<1.0		1.0	%	10-AUG-21	11-AUG-21	R5548257
pH (1:2 CaCl2)	5.87		0.10	pH	13-AUG-21	13-AUG-21	R5550037
Particle Size							
% Gravel (>2mm)	8.9		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (2.00mm - 1.00mm)	7.7		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (1.00mm - 0.50mm)	18.0		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.50mm - 0.25mm)	36.8		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.25mm - 0.125mm)	23.7		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.125mm - 0.063mm)	2.3		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Silt (0.063mm - 0.0312mm)	1.1		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Silt (0.0312mm - 0.004mm)	1.0		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	11-AUG-21	R5548430
Texture	Sand				10-AUG-21	11-AUG-21	R5548430
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548494
Available Phosphate-P	12.4		2.0	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Potassium	<20		20	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Sulfate-S	<3.0		3.0	mg/kg	12-AUG-21	12-AUG-21	R5549251
Saturated Paste Extractables							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-21 KM 58 - PLOT 3 C150M Sampled By: JR/MK on 23-JUL-21 @ 12:10 Matrix: SOIL							
Saturated Paste Extractables							
SAR	<0.50	SAR:DL	0.50	SAR	13-AUG-21	13-AUG-21	R5550009
Calcium (Ca)	1.8		1.3	mg/kg		14-AUG-21	
Calcium (Ca)	7.2		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Chloride (Cl)	<10		10	mg/L	13-AUG-21	13-AUG-21	R5549854
Chloride (Cl)	<2.6		2.6	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	12-AUG-21	13-AUG-21	R5549936
Magnesium (Mg)	<1.3		1.3	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Potassium (K)	<1.3		1.3	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
% Saturation	25.8		1.0	%	12-AUG-21	13-AUG-21	R5549936
Sodium (Na)	<1.3		1.3	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Sulfur (as SO4)	1.7		1.3	mg/kg		14-AUG-21	
Sulfur (as SO4)	6.7		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
TGR(sodic)	<0.10		0.10	t/ha		14-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		14-AUG-21	
L2622738-22 KM 58 - PLOT 3 D0M Sampled By: JR/MK on 23-JUL-21 @ 09:45 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	1.3		1.0	%	10-AUG-21	11-AUG-21	R5548257
Organic Matter	1.3		1.0	%	10-AUG-21	11-AUG-21	R5548257
pH (1:2 CaCl2)	5.35		0.10	pH	13-AUG-21	13-AUG-21	R5550037
Particle Size							
% Gravel (>2mm)	2.8		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (2.00mm - 1.00mm)	4.3		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (1.00mm - 0.50mm)	10.2		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.50mm - 0.25mm)	32.5		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.25mm - 0.125mm)	42.5		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.125mm - 0.063mm)	4.5		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Silt (0.063mm - 0.0312mm)	1.7		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Silt (0.0312mm - 0.004mm)	1.1		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	11-AUG-21	R5548430
Texture	Sand				10-AUG-21	11-AUG-21	R5548430
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548494
Available Phosphate-P	<2.0		2.0	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Potassium	<20		20	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Sulfate-S	<3.0		3.0	mg/kg	12-AUG-21	12-AUG-21	R5549251
Saturated Paste Extractables							
SAR	<0.50	SAR:DL	0.50	SAR	13-AUG-21	13-AUG-21	R5550009

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-22 KM 58 - PLOT 3 D0M Sampled By: JR/MK on 23-JUL-21 @ 09:45 Matrix: SOIL							
Saturated Paste Extractables							
Calcium (Ca)	2.0		1.5	mg/kg		14-AUG-21	
Calcium (Ca)	6.7		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Chloride (Cl)	<10		10	mg/L	13-AUG-21	13-AUG-21	R5549854
Chloride (Cl)	<3.0		3.0	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	12-AUG-21	13-AUG-21	R5549936
Magnesium (Mg)	<1.5		1.5	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Potassium (K)	<1.5		1.5	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
% Saturation	30.4		1.0	%	12-AUG-21	13-AUG-21	R5549936
Sodium (Na)	<1.5		1.5	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Sulfur (as SO4)	1.8		1.5	mg/kg		14-AUG-21	
Sulfur (as SO4)	5.9		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
TGR(sodic)	<0.10		0.10	t/ha		14-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		14-AUG-21	
L2622738-23 KM 58 - PLOT 3 D75M Sampled By: JR/MK on 23-JUL-21 @ 10:40 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	3.5		1.0	%	10-AUG-21	11-AUG-21	R5548257
Organic Matter	3.0		1.0	%	10-AUG-21	11-AUG-21	R5548257
pH (1:2 CaCl2)	4.31		0.10	pH	13-AUG-21	13-AUG-21	R5550037
Particle Size							
% Gravel (>2mm)	4.4		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (2.00mm - 1.00mm)	13.3		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (1.00mm - 0.50mm)	29.2		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.50mm - 0.25mm)	33.5		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.25mm - 0.125mm)	11.8		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.125mm - 0.063mm)	1.5		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Silt (0.063mm - 0.0312mm)	2.7		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Silt (0.0312mm - 0.004mm)	3.1		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	11-AUG-21	R5548430
Texture	Sand				10-AUG-21	11-AUG-21	R5548430
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548494
Available Phosphate-P	4.6		2.0	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Potassium	<20		20	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Sulfate-S	<3.0		3.0	mg/kg	12-AUG-21	12-AUG-21	R5549251
Saturated Paste Extractables							
SAR	<0.50	SAR:DL	0.50	SAR	13-AUG-21	13-AUG-21	R5550009
Calcium (Ca)	3.1		2.0	mg/kg		14-AUG-21	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-23 KM 58 - PLOT 3 D75M Sampled By: JR/MK on 23-JUL-21 @ 10:40 Matrix: SOIL							
Saturated Paste Extractables							
Calcium (Ca)	7.9		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Chloride (Cl)	<10		10	mg/L	13-AUG-21	13-AUG-21	R5549854
Chloride (Cl)	<3.9		3.9	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	12-AUG-21	13-AUG-21	R5549936
Magnesium (Mg)	<2.0		2.0	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Potassium (K)	<2.0		2.0	mg/kg		14-AUG-21	
Potassium (K)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
% Saturation	39.1		1.0	%	12-AUG-21	13-AUG-21	R5549936
Sodium (Na)	<2.0		2.0	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Sulfur (as SO4)	4.0		2.0	mg/kg		14-AUG-21	
Sulfur (as SO4)	10.3		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
TGR(sodic)	<0.10		0.10	t/ha		14-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		14-AUG-21	
L2622738-24 KM 58 - PLOT 3 D150M Sampled By: JR/MK on 23-JUL-21 @ 11:20 Matrix: SOIL							
Physical Tests							
Loss on Ignition @ 375 C	3.8		1.0	%	10-AUG-21	11-AUG-21	R5548257
Organic Matter	3.3		1.0	%	10-AUG-21	11-AUG-21	R5548257
pH (1:2 CaCl2)	4.19		0.10	pH	13-AUG-21	13-AUG-21	R5550037
Particle Size							
% Gravel (>2mm)	<1.0		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (2.00mm - 1.00mm)	3.6		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (1.00mm - 0.50mm)	13.4		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.50mm - 0.25mm)	40.1		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.25mm - 0.125mm)	34.8		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Sand (0.125mm - 0.063mm)	2.0		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Silt (0.063mm - 0.0312mm)	2.4		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Silt (0.0312mm - 0.004mm)	2.3		1.0	%	10-AUG-21	11-AUG-21	R5548430
% Clay (<4um)	<1.0		1.0	%	10-AUG-21	11-AUG-21	R5548430
Texture	Sand				10-AUG-21	11-AUG-21	R5548430
Plant Available Nutrients							
Available Nitrate-N	<1.0		1.0	mg/kg	11-AUG-21	11-AUG-21	R5548494
Available Phosphate-P	<2.0		2.0	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Potassium	<20		20	mg/kg	12-AUG-21	12-AUG-21	R5549242
Available Sulfate-S	<3.0		3.0	mg/kg	12-AUG-21	12-AUG-21	R5549251
Saturated Paste Extractables							
SAR	<0.50	SAR:DL	0.50	SAR	13-AUG-21	13-AUG-21	R5550009
Calcium (Ca)	3.3		2.2	mg/kg		14-AUG-21	
Calcium (Ca)	7.6		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2622738-24 KM 58 - PLOT 3 D150M Sampled By: JR/MK on 23-JUL-21 @ 11:20 Matrix: SOIL							
Saturated Paste Extractables							
Chloride (Cl)	<10		10	mg/L	13-AUG-21	13-AUG-21	R5549854
Chloride (Cl)	<4.4		4.4	mg/kg		14-AUG-21	
Conductivity Sat. Paste	<0.10		0.10	dS m-1	12-AUG-21	13-AUG-21	R5549936
Magnesium (Mg)	<2.2		2.2	mg/kg		14-AUG-21	
Magnesium (Mg)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Potassium (K)	2.6		2.2	mg/kg		14-AUG-21	
Potassium (K)	6.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
% Saturation	43.6		1.0	%	12-AUG-21	13-AUG-21	R5549936
Sodium (Na)	<2.2		2.2	mg/kg		14-AUG-21	
Sodium (Na)	<5.0		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
Sulfur (as SO4)	5.0		2.2	mg/kg		14-AUG-21	
Sulfur (as SO4)	11.6		5.0	mg/L	13-AUG-21	13-AUG-21	R5550009
TGR(sodic)	<0.10		0.10	t/ha		14-AUG-21	
TGR(brine)	<0.10		0.10	t/ha		14-AUG-21	

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)

Sample Parameter Qualifier key listed:

Qualifier	Description
SAR:DL	SAR is incalculable due to undetectable Na. Detection Limit represents maximum possible SAR value.
SAR:INC	SAR is incalculable due to Ca, Mg below detection limit.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-PASTE-COL-SK	Soil	Chloride (Cl) (Saturated Paste)	CSSS 15.2.1/ APHA 4500-Cl E

A soil extract is produced by the saturated paste extraction procedure. The extract is analyzed for Chloride by Colourimetry using a discrete analyzer.

EC-SAR-SK	Soil	EC (Saturated Paste)	CSSS 18.2.2/CSSS 18.3.1

After saturated soil paste equilibrium, an extract is obtained by vacuum filtration with conductivity of the extract measured by a conductivity meter.

NO3-AVAIL-SK	Soil	Available Nitrate-N	Alberta Ag / APHA 4500 NO3F

Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution.
Nitrate is quantitatively reduced to nitrite by passing of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.

OM-LOI-SK	Soil	Organic Matter by LOI at 375 deg C.	CSSS (1978) p. 160

The dry-ash method involves the removal of organic matter by combustion at 375 degrees C for a minimum of 16 hours. Samples are dried prior to combustion.

PH-1:2CACL2-SK	Soil	pH (1:2 Soil:CaCl2 Extraction)	CSSS 2008 16.3

1 part dry soil and 2 parts de-ionized 0.01M CaCl2 (by volume) is mixed. The slurry is allowed to stand with occasional stirring for 30 - 60 minutes. pH of the soil slurry is then measured using a pH meter.

PO4/K-AVAIL-SK	Soil	Plant Available Phosphorus and Potassium	Comm. Soil Sci. Plant Anal, 25 (5&6)

Plant available phosphorus and potassium are extracted from the soil usng Modified Kelowna solution. Phosphorous in the soil extract is determined colorimetrically at 880 nm, while potassiumis determined by flame emission at 770 nm.

PSA-PIPET-DETAIL-SK	Soil	Particle size - Sieve and Pipette	SSIR-51 METHOD 3.2.1

Particle size distribution is determined by a combination of techniques. Dry sieving is performed for coarse particles, wet sieving for sand particles and the pipette sedimentation method for clay particles.

SAL-MG/KG-CALC-SK	Soil	Detail Salinity in mg/kg	Manual Calculation
SALINITY-INTCHECK-SK	Soil		CSSS 18.4-Calculation
SAR-CALC-SO4-SK	Soil	SAR, Cations and SO4 in saturated soil	APHA 3120B

Ca, Mg, Na, K and SO4 in a saturated soil extract are determined by ICP-OES.

SAT-PCNT-SK	Soil	Saturated Paste	CSSS Ch. 15

A saturated paste is generated by adding water to soil with mixing until the following criteria are met.:
The sample paste glistens as it reflects light.
The sample flows slightly when container is tipped, and slides freely and cleanly off the spatula.
A trench carved in the soil surface will close readily upon jarring the container.
There should be no free layer of water on top of the sample.
An aliquot of the sample is obtained, dried at 105C and saturation percentage is determined.

SO4-AVAIL-SK	Soil	Available Sulfate-S	REC METH SOIL ANAL - AB. AG(1988)

Plant available sulfate in the soil is extracted using a weak calcium chloride solution. Sulfate in the extract is determined by ICP-OES. This extraction may also produce organic sulfur in the extracts when organic soils are analyzed.

TGR2-CALC-SK	Soil	Theoretical Gypsum Requirement	J. Ashworth et al (1999)

Theoretical Gypsum Requirement is an estimate of the gypsum amendment required to remediate brine-contaminated or sodic soils, and is provided in units of tonnes per hectare (t/ha) for a treatment depth of 15cm. TGR(brine), intended for brine-contaminated soils, is calculated using Method A from "A Comparison of Methods for Gypsum Requirement of Brine-Contaminated Soils", by J. Ashworth (Cdn J. of Soil Science, 1999), available at www.alsglobal.com. TGR(sodic), intended for naturally sodic soils, uses the Oster and Frenkel method (Method B) from the same paper. Reported TGR values are capped at 50 t/ha, considered the maximum practical gypsum amendment. To convert TGR from t/ha to tons/acre, multiply by 0.446.

Reference Information

To determine a TGR value for an alternate treatment depth, multiply by [desired treatment depth (cm) / 15 cm].

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

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

Laboratory Definition Code	Laboratory Location
SK	ALS ENVIRONMENTAL - SASKATOON, SASKATCHEWAN, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

APPENDIX C — ASSESSMENT & MONITORING TIMELINE

Reclamation Pilot Study | Assessment and Monitoring Timeline