Appendix 3-E

Baseline Soil Characterization Study

KGHM Ajax Project
Baseline Soil Characterization Study

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1.0 INTRODUCTION

KGHM Ajax Mining Inc. proposes to develop the Ajax Project (Project), an open pit copper-gold mine at the historic Afton Mining Camp, south of the City of Kamloops, British Columbia (BC). The Project is located in the South-Central Interior of British Columbia, southeast of the junction of the Trans-Canada Highway No. 1 and the Coquihalla Highway (No. 5), within the Thompson Nicola Regional District.

The Project lies in the traditional territory of the Secwepemc Nation. Within the Secwepemc Nation, the Tk'emlúps te Secwepemc and the Skeetchestn Indian Band are the Aboriginal groups in closest proximity to the Project. In a cooperative effort, the Tk'emlúps te Secwepemc and Skeetchestn Indian Bands have formed the Stk'emlupsemc te Secwepemc Nation (SSN), as a division of the greater Secwepemc Nation. The Ashcroft Indian Band and Lower Nicola Indian Band, whose members are part of the Nlaka'pamux Nation also assert their Aboriginal rights to the Project area- an area of common interest with the SSN.
The Ajax property includes two historic pits: the Ajax West Pit, and the Ajax East Pit. Both pits were formerly mined in the 1980s and 1990s. As many as 25 rock types have been recognized in the Project area, some of which are "hybrid" units resulting from the intermixing of multiple rock types.

Key Project facilities include the Tailings Storage Facility (TSF), which is planned as a conventional tailings storage facility; water management ponds; Peterson Creek diversion, and the Tailings Embankments, which will be constructed using mine rock; and four mine rock storage facilities (MRSFs). The four MRSFs include:

- the South Mine Rock Storage Facility (SMRSF),
- East Mine Rock Storage Facility (EMRSF),
- West Mine Rock Storage Facility (WMRSF), and
- the In-Pit Mine Rock Storage Facility (IPMRSF).

Several facilities that will be part of the operation phase but not remain after Project closure include the:

- plant facilities and administration buildings,
- reclamation stockpiles,
- explosives facility,
- truck stop and fuel storage,
- power lines, and
- access roads.

The mine plan for the Project predicts an operation based on a mill throughput of 65,000 tonnes of ore per day from the Ajax Pit with up to a 23 year mine life. The construction phase of the Project will be approximately two and a half years, and following the 23 year operation the decommissioning and closure phase is expected to take up to 5 years. Over the mine life the Project will produce approximately 140 million pounds of copper and 130,000 ounces of gold annually with the concentrate shipped by truck to the Port of Vancouver.

2.0 OBJECTIVES

The objectives of the baseline soil characterization study were to:

- Identify the location, depth and volume of existing soil units and map their distribution throughout the Project area;
- Characterize topsoil and subsoil for suitability as a growth medium for reclamation;
- Identify areas from which soil and subsoil must be salvaged and any special handling considerations that must be undertaken to preserve soil quality; and
- Establish pre-mine soil capability and productivity.

Based on the findings of the baseline soil characterization assessment, a Soil Salvage and Handling Plan will be prepared to provide recommendations for appropriate soils salvage, storage and replacement of the soil resource within the Project area. The finding of this report will also be used to support the Mine Closure and Reclamation Plan.

3.0 METHODS

The baseline soil assessment was completed between July 2012 and May 2015. This involved reviewing historic soil surveys for the Project area, developing a detailed bioterrain polygon map that identified and classified surficial geology and terrain characteristics, and conducting a detailed field assessment of soils, surficial materials, vegetation and other landscape features within the Project area. This information was used to determine extent, depths, volume, and quality of various soils as input to planning soil handling for successful reclamation.

3.1 Bioterrain Mapping

Polar Geosciences completed bioterrain mapping on stereoscopic colour aerial photographs at a scale of approximately 1: 15 000 following the standard British Columbia procedures for *Terrain Classification* (Howes and Kenk 1997), *Mapping Methods* (Resources Inventory Committee 1996), and *Bioterrain Mapping Methodology* (Resources Inventory Committee 1998a).

3.2 Field Soils Assessment

Soil inspections were conducted at 526 sites over approximately 1,705 ha of lands associated with the Project. During field investigations, the depth and thickness of soil horizons, soil colour, texture, structure and consistence were described, as were geological materials and landforms, topography, soil drainage, coarse fragment percentage, and vegetation community characteristics. Soil descriptions followed the *Field Manual for Describing Terrestrial Ecosystems* (BC FLNRO and BC MOE, 2010). Tables summarizing soil description data for each assessment site are provided in Appendix A. Chemical and physical analyses were completed on selected samples to provide information on soil nutrient regime, metals concentrations, and physical characteristics relevant to water and nutrient holding capacity, erosivity and suitability as plant growth media.

3.2.1 Soil Sample Design

Soil forms as a result of the interaction of vegetation, climate, parent materials and topography acting over time. Therefore, it is reasonable to assume that variations in bioterrain units are reflected in the development of the underlying soil. Conversely, variations in the subsurface material may be expressed by modified vegetative forms above ground. For this reason full soil pits were situated in such a manner as to intercept all documented bioterrain polygons occurring on a given soil association. Remaining inspections were arranged in transects that intersected the greatest number of topographical,

hydrological and soil boundaries so as to achieve the highest probability of mapping and documenting all soils and soil variants resulting in the best possible description of the pre-disturbance soils and the most accurate estimate of soil and growing medium resources for reclamation. The sample design was developed to achieve a target survey intensity level one (SIL1), with one inspection per one to five hectares (Mapping Systems Working Group, 1981)

3.2.2 Field Investigation Methods

Three types of site inspections were conducted during this study:

Soil Pits

At each full inspection site, the soil profile was investigated according to criteria described in the *Canadian System of Soil Classification* (1998). Soil characteristics recorded at inspection sites included:

- A, B, C horizon type and depth;
- soil texture by manual (field) test procedures;
- coarse fragment content;
- structure and consistence;
- colour identification using Munsell soil colour charts (completed intermittently);
- mottles, including appropriate mottle descriptors;
- presence or lack of carbonates (via 10% Hydrochloric acid test (HCl)); and
- other pertinent features required to aid in soil classification and/or description.

Site and soil characteristics were later used to determine parent material groupings and soil classification to the subgroup and association levels.

Scratch Pits

At each scratch pit site, the soil profile was investigated to the beginning of the C horizon. Soil characteristics recorded at inspection sites included:

- A, B, C1 horizon types and depths;
- soil texture by manual (field) test procedures;
- coarse fragment content;
- structure and consistence;
- colour identification using Munsell soil colour charts (completed intermittently);
- presence/absence of mottles;
- presence/absence of carbonates (via 10% Hydrochloric acid test (HCL)); and
- other pertinent features required to aid in soil classification and/or description.

Surface Inspections

Surface inspections varied according to vegetation, landform and slope position. Where landform, vegetation and slope position were similar to nearby full inspection sites the A horizon was investigated to ensure it was consistent with A horizon characteristics. Where landform, vegetation or slope position varied significantly from nearby full inspection sites, the site was promoted to a scratch pit and if A, B, C1 horizon depths varied from the full inspection site then the site was promoted to a full soil pit.

Surface soil characteristics recorded at inspection sites included A horizon type and depth; and surface soil texture by manual (field) test procedures. At each inspection location, additional site characteristics were recorded to allow for a better understanding of the soil, vegetation, and landscape relationships throughout the Project. Site characteristics recorded at each inspection site included:

- date of inspection;
- slope gradient, aspect; position, and landscape surface expressions;
- soil drainage, moisture regime;
- vegetation types and characteristics;
- UTM coordinates (UTM NAD83); and
- photographs of each site including soil profiles and surrounding vegetation, terrain, etc.

3.2.3 Laboratory Methods

Soil samples from representative soil horizons (excluding very thin, discontinuous horizons) across the Project area were collected in appropriate containers, stored in coolers and delivered to ALS Global Laboratories for processing and analysis. The following analyses were completed on 17 samples collected between 2012 and 2014:

Organic Matter
Particle Size
Texture
Leachable Anions & Nutrients
Total Kjeldahl Nitrogen
Organic / Inorganic Carbon
CaCO3 Equivalent
Inorganic Carbon
Total Organic Carbon
Cation Exchange Capacity
Calcium (Ca)
Conductivity Sat. Paste
Magnesium (Mg)
Potassium (K)
SAR
% Saturation
Sodium (Na)
Metals concentrations

An additional 36 sites were sampled in 2015 in order to supplement baseline metals concentration data. Twenty sites were analyzed for metals, while the remaining 16 sites were analyzed for metals, pH, cation exchange capacity, electrical conductivity and sodium adsorption ratio.

3.2.4 Data Analysis and Mapping Methods

All soil and site inspection data (526 sites) was entered into a geodatabase, which was used to query and analyze specific landscape, parent material and soil variables that consistently occurred together in order to depict soil landscape patterns. In addition to the database, a variety of mapping tools were used collectively to develop the soil map units for the Project.

3.2.5 Soil Map Unit (SMU) Classification

Soil and site inspection data was classified to the soil association level and correlated with the mapped bioterrain and surficial geology information in order to categorize the Project site into seven broad SMU according to their physical and spatial characteristics.

4.0 RESULTS AND DISCUSSION

4.1 Existing Soil Survey Information

Soils within the Project area were surveyed and described in *Soils of the Ashcroft Map Area* (Young et al, 1992). Twelve soil polygons comprised of seven distinct soil associations and components were identified within the Project (Figure 1). A summary of the typical physical and chemical characteristics and capability ratings of the soil associations identified within the Project area is provided in Table 1.

Andrew (AD)
Sandy loam to gravelly textured Degraded Eutric Brunisols developed on gently rolling to hilly ablation moraine deposits, and generally occurring on drier southern aspects at lower elevations. Moderately to exceedingly stony. Dominated by grasses, forbs and shrubs.

Alymer (AY)
Sandy loam to gravelly textured Orthic Black Chernozems developed on gently to strongly rolling alkaline ablation moraine deposits. Moderately to very stony. Dominated by grass and forb vegetation.

Frances (FS)
Sandy loam to silt loam moderately alkaline Carbonated Black and/or Orthic Humic Regosols developed on fluvial deposits. Generally stone-free. Dominated by grass and forb vegetation.

Glimpse (GS)
Orthic Dark Brown Chernozems developed on sandy or loamy fluvioglacial deposits in very gently sloping to gently rolling (<10% slopes) terrain. Moderately to very stony. Vegetation is dominated by grasses, forbs and shrubs.

Timber (TM)
Degraded and Lithic Eutric Brunisols developed in silt loam or silty clay loam morainal deposits on gently sloping to strongly sloping (5-30% slope) terrain. Generally less than 50 cm of soil development over bedrock. Typically associated with open forest vegetation.

Trapp Lake (TP)
Well drained Orthic Dark Brown Chernozems developed on moderately calcareous, slightly saline fine textured morainal materials, on gently sloping to strongly rolling (2-15%) terrain. Dominated by grasses and shrubs. Additional Trapp Lake soil components identified within the Project area include:

- TP3- Well drained Orthic Dark Brown Chernozems, developed on moderately calcareous, slightly saline fine textured morainal materials with up to 40% inclusions of Orthic Black Chernozems which has developed under edaphically or climatically moister conditions. These may be due to northerly aspects, upper elevations or a combination of both.
- TP5 – Orthic Dark Brown Chernozems, developed on moderately calcareous, slightly saline fine textured morainal materials with up to 40% inclusion of Lithic Dark Brown or Lithic Eutric Brunisols with less than 50 cm of soil development over bedrock.

Tullee (TE)
Well drained silt loam to silty clay loam Orthic Black Chernozems developed on gently sloping to strongly rolling moderately alkaline morainal deposits. Slightly to moderately stony. Vegetation is dominated by grasses and shrubs. Additional Tullee soil components identified within the Project area include:

- TE2 – Orthic Dark Brown Chernozems developed under edaphically or climatically drier conditions, typically associated with southerly aspects, lower elevations or a combination of both.
- TE4 – Degraded Eutric Brunisols developed under forest vegetation.

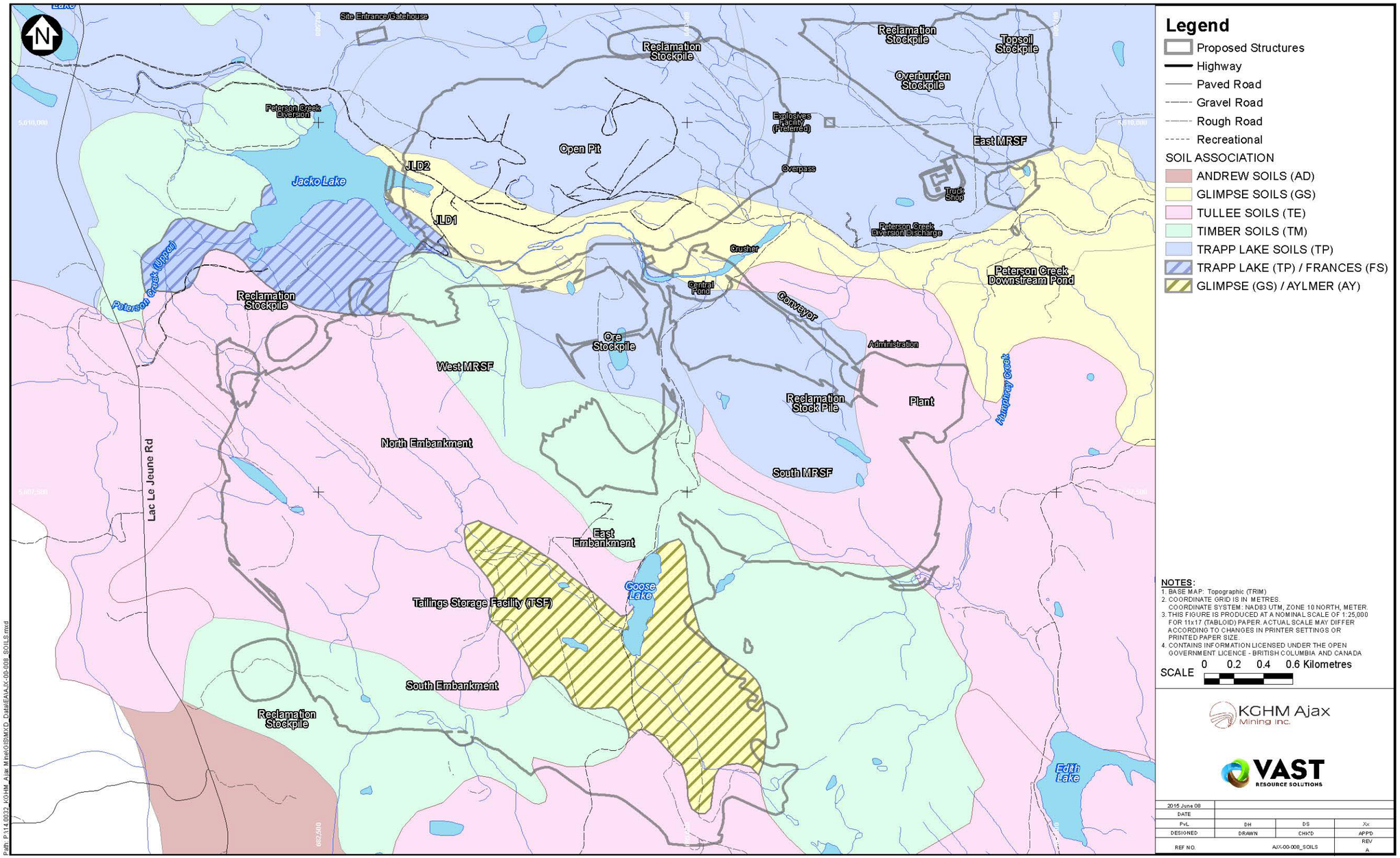

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Figure 1. Soil associations within the Ajax Project site

Table 1. Typical characteristics of soil associations identified on the Ajax Project

Characteristics*	Andrew (AD)	Aylmer (AY)	Frances (FS)	Glimpse (GS)	Timber (TM)	Trapp Lake (TP)	Tullee (TE)
Parent Material	Moraine (Till)	Moraine (Till)	Fluvial	Fluvio-glacial	Moraine (Till)	Moraine (Till)	Moraine (Till)
Classification	Degraded Eutric Brunisol	Orthic Black Chernozem	Carbonated Black/Orthic Humic Regosol	Orthic Dark Brown Chernozem	Degraded Eutric Brunisol	Orthic/Lithic Dark Brown Chernozem	Orthic Black Chernozem
Texture	SL - LS	SL - LS	SL - SiL	LS	SiL - SiCL	SiL - SiCL	SiL - SiCL
Drainage	Well	Well	Moderate - Well	Rapid - Well	Well	Well	Well
Coarse fragments	Moderate - High	Moderate - High	Nil - Slight	Moderate - High	Slight - Moderate	Slight - Moderate	Slight - Moderate
Depth to Bedrock	> 1 m	> 1 m	> 1 m	> 2 m	< 50 cm	50 cm – 1 m	50 cm – 1 m
Agricultural Capability:							
Unimproved	5TP – 6TP	5TP – 6TP	3WM	5TP – 6TP	6TR – 5TM	4MT – 6TP	4TM – 6TPR
Crop Range	grazing, improved pasture	grazing, improved pasture	forages, cereal grains	grazing, improved pasture	grazing, improved pasture	forages, grazing, cereal grains	forages, grazing, cereal grains
Improved	4TP – 6TP	4TP – 6TP	2X – 3T	3TP – 6TP	6TR – 5TP – 3T	3T – 6TPR	3TP - 2P – 6TPR
Crop Range	forages, grazing	forages, grazing	forages, cereal grains, heat loving crops	forages, grazing, cereal grains, some vegetable crops	grazing, improved pasture	forages, grazing, cereal grains, heat loving crops	forages, grazing, cereal grains, heat loving crops
Limiting Factors	stoniness, topography, soil moisture	stoniness, topography	soil moisture, topography, fluctuating water table	soil moisture, topography, stoniness	topography, stoniness, shallow soils	topography, stoniness	topography, stoniness, shallow soils
Grazing Capability:	4MV	2M	4V	3M	3VA	2A	1
Forage Type	pinegrass	bunchgrass	riparian vegetation	bunchgrass	bunchgrass	bunchgrass	bunchgrass
Limiting Factors	forest competition, summer moisture	spring and fall moisture	vegetation competition	soil moisture (spring and fall)	vegetation competition, climatic aridity	climatic aridity (spring and fall)	none
Surface (A) horizon:							
Reaction (pH)	very strongly acid	slightly acid	mildly alkaline	slightly acid	slightly acid	slightly acid	slightly acid
Alkalinity		Moderate - Strong	Moderate	Mild - Moderate	Moderate	Mild	Moderate
Base saturation	low (30 – 50%)	very high (95 – 100%)	very high (95 – 100%)	very high (95 – 100%)	high (80 – 95%)	very high (95 – 100%)	very high (95 – 100%)
Cation Exchange Cap	low (7.5-10 meq/100g)	medium (10-30 meq/100g)	medium - high (30-80 meq/100g)	low - medium (7.5-30 meq/100g)	medium (10-30 meq/100g)	medium (10-30 meq/100g)	medium (10-30 meq/100g)
Fertility (Total N)	very low – low (0.10 - 0.25% N)	moderate (0.25 – 0.40% N)	high (> 0.40% N)	high (> 0.40% N)	high (> 0.40% N)	moderate (0.25 – 0.40% N)	high (> 0.40% N)

* Refer to Appendix B for explanations and abbreviations

4.2 Bioterrain Polygons

4.2.1 Surficial Materials

The Project area was mapped and descriptions developed for the following surficial materials (Figure 2).

Anthropogenic Material (A)
Anthropogenic materials are deposits that are sufficiently reworked or redistributed by human activities that their original character is lost. Examples include gravel pits and fill used for roads and other construction. Within the study area, anthropogenic soils are mapped where waste rock and tailings have placed as a result of past mining activities. Anthropogenic is also mapped on the mining haul road.

Colluvium (C)
Colluvium accumulated during post-glacial times because of gravity-induced slope movement, for example, rock fall and soil creep. The physical characteristics of colluvium are closely related to its source and mode of accumulation. Four processes generally create colluvial deposits; (1) rockfall from bedrock bluffs, (2) soil creep in weathered bedrock, (3) mass movement processes in surficial materials (debris flows and debris slides), and (4) rockslides and rock slumps.

Colluvial veneers (Cv) and blankets (Cb) develop where weathered bedrock or surficial materials have been loosened and moved downslope by gravitational processes such as soil creep. It is loosely packed and usually rapidly drained. Colluvial veneers and very thin veneers are most common on upper, moderately steep and steep gradient slopes and as discontinuous, very thin veneers on bedrock-controlled terrain in the watershed. The matrix texture of the colluvium reflects the bedrock or surficial materials from which it is derived. Within the study area, thin patchy areas of colluvium are found on the steep slopes of scattered bedrock hummocks. The material typically has a silty sand texture and is rapidly drained.

Deep-seated slumps in bedrock and surficial materials result in hummocky, irregular colluvial deposits (Chu). Rock slumps contain blocks and rubble with little or no interstitial silt and sand. Slump/earthflows are mapped north of Highway 1 at the north edge of the study area.

Slope Wash (C1)
Slope wash is a result of rainfall events in which non-channelized overland flow carries surface material from a steeper area to a gentler area down slope. The material is generally derived from eolian sediments. Slope wash generally does not travel far and comes to rest on gentler slopes of 0 to 15 %. In the study area, it is commonly found as a partial veneer overlying till, fluvial or lacustrine deposits. The typical texture is silty sand or sandy silt with generally less than 5 % coarse fragments. It commonly includes some imperfect drainage as it accumulates in receiving sites. Within the study area, slope wash is mapped in scattered linear depressions.

Weathered Bedrock (D)
Weathered bedrock has been modified in situ by mechanical and chemical weathering. In the study area, weathered bedrock is found as a discontinuous very thin veneer (Dx) overlying gently sloping or undulating bedrock outcrops. It typically contains a high proportion of angular coarse fragments with varying amounts of interstitial silty sand. It is non-cohesive and rapidly to very rapidly drained.

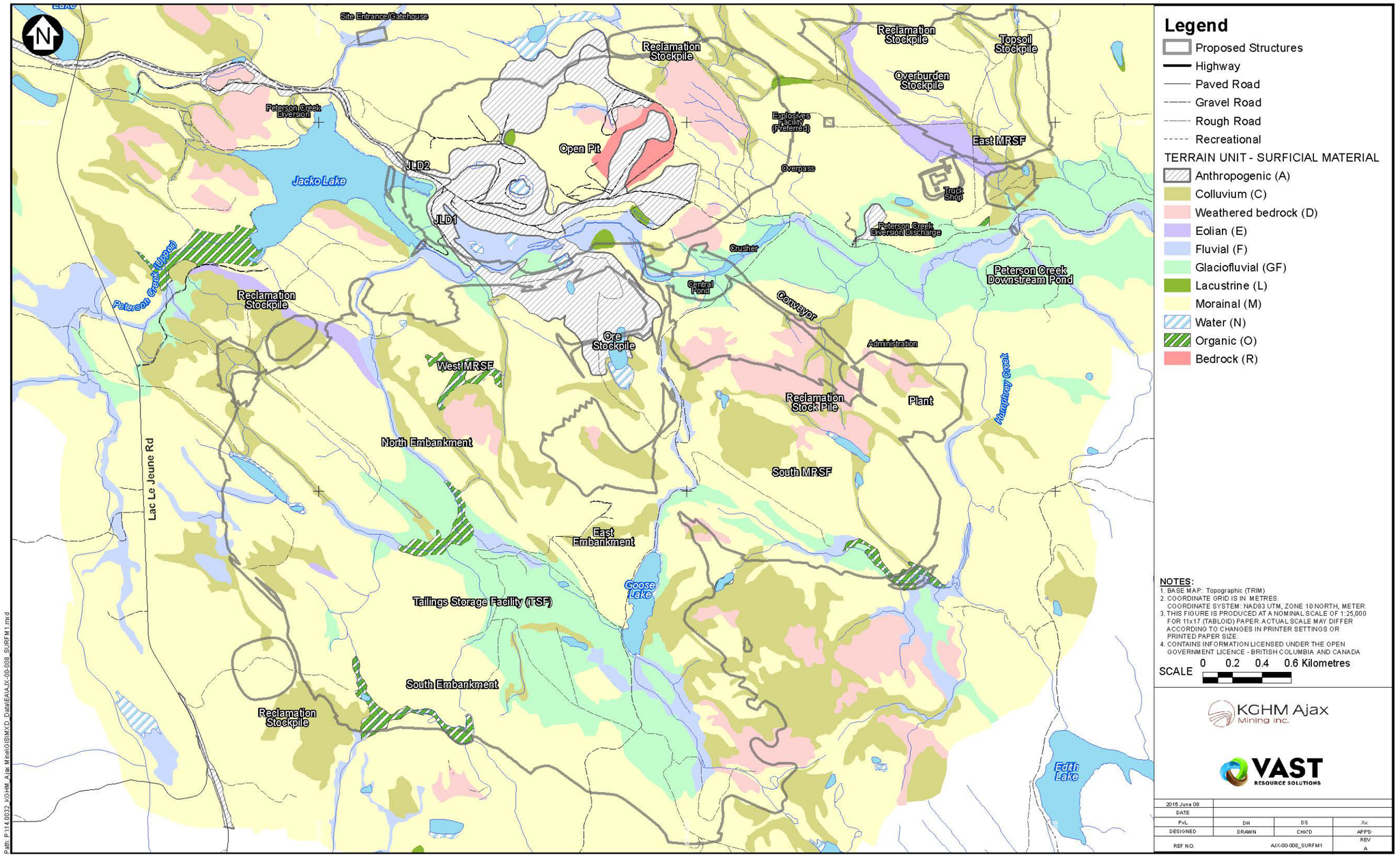

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Figure 2. Surficial soil materials mapped for the Ajax Project site

Eolian Sediments (E)
Eolian sediments are transported and deposited by wind are likely to be found downwind from a large source of fine-grained soils, such as glaciolacustrine sediments. They typically occur as a thin cap (Ev) over other materials, but may locally thicken into a blanket or dunes typically consisting of silt and fine sand. In the study area, the source of the eolian sediments are from the large glaciolacustrine sediment benches found adjacent to the South Thompson, Thompson and Kamloops Lake located to the north of the study area. Eolian sediments were not wide spread, but were most likely along the northern and north eastern edge of the study area.

Fluvial Materials (F, FA)
Fluvial materials have been deposited in post-glacial time by streams. Fluvial materials consist of loosely packed, non-cohesive sands and silt with some gravel. In the study area, fluvial materials are present mainly as small portions of a polygon that include a stream. Fluvial materials are generally mapped as floodplains (Fp, FAp) or gentle fluvial areas (Fj) with imperfect to poor drainage. Within the study area, floodplains are mapped along Humphrey Creek, Peterson Creek and Alkali Creek. Veneers of fluvial sediments are mapped along many of the small draws.

Glaciofluvial Materials (FG)
Glaciofluvial materials were deposited by glacial meltwater streams at the end of the Fraser Glaciation. Sands and gravels accumulated along ice margins and on top of melting ice (FGu) and downstream of melting ice (FGf and FGp). In some areas, rivers were made and quickly abandoned, depositing blankets of sands and gravels over top of till (FGb). In a few areas, post-glacial streams have incised into outwash plains and fans, transforming them into terraces (FGt) and creating erosional slopes (FGk). In general, glaciofluvial materials create well drained and relatively dry sites due to the highly porous and permeable sands and gravels. The material is non-cohesive and therefore erodible, and will tend to ravel when exposed on steep slopes and road cuts. Glaciofluvial sands and gravels are potential sources of aggregate.

Within the study area, glaciofluvial sediments are mapped on either side of Humphrey Creek where the creek flows in a west to east direction at the eastern edge of the Project area. Glaciofluvial sediments are mapped in polygon 2034 near Lucky Strike Lake.

Lacustrine (L)
Lacustrine materials have been deposited from standing bodies of water. Fine sand, silt or clay that has been suspended in the water settles to the lake bed, creating sediments that are commonly stratified and fine textured. These sediments may be exposed when the lake is drained. In the study area, lacustrine materials occur in shallow ponds that are periodically inundated (szLp and szLv).

Till (M)
Till is deposited directly by glacier ice and is the most common surficial material within the study area. The deposits typically consist of poorly sorted silt, sand and gravels. In general, till on slopes is well drained and moderately well drained, and in some cases imperfectly drained, in depressions. Thick till deposits are found throughout the study area, especially in grasslands in the central and eastern sections. The mid to upper slopes of scattered hills, for example, Sugarloaf Hill, are covered with discontinuous veneers of till. Patches of very thin veneers of till cover areas of undulating bedrock. The typical till is a moderately consolidated, slightly cohesive basal till (terrain texture label "dsz" or "dzs"). A finer textured basal till (terrain texture label "dsm") was observed in some soil pits and road cuts.

Organics (O)
Organic materials form where decaying plant material accumulates in poorly or very poorly drained areas. In the study area, organic materials are uncommon, but may occur as veneers (Ov) or very thin veneers (Ox) in some of the wetlands.

Bedrock (R)
Bedrock is mapped where it outcrops at the surface. Polygons mapped with thin or very thin material (Cv, Dx, Mv, Mx), may also have a small proportion of bedrock outcrops. Bedrock outcrops are scattered throughout the study area.

4.3 Field Soil Characterization

In total 526 soil inspections were completed within the Project area to determine baseline soil characteristics. The target survey intensity level of SIL 1 was achieved, with an average of one inspection per 4.4 ha, sufficient for baseline soil mapping at the anticipated 1:5000 production scale. The following soil types, described in accordance with the Canadian System of Soil Classification, were identified:

- Orthic Dark Brown Chernozems
- Orthic Black Chernozems
- Eutric Brunisols (Degraded, Lithic)
- Carbonated Black and/or Orthic Humic Regosols
- Calcareous Anthropogenic materials associated with the former Afton mine operations

Of these soil types, Dark Brown Chernozems and Brunisols developed on calcareous morainal materials are the most prevalent. Chernozem soils have developed where grasses are the dominant vegetation. They are generally found over the majority of the proposed Project site. Surficial textures are typically silt loam; coarse fragment content is variable and average pH of the A horizon is 7.2. Black Chernozems are found in some toe slope areas and imperfect drainage corridors associated with slope wash and/or eolian deposition. In some instances there are accumulations of 1.5 metres of silt textured soil material with little or no coarse fragments. Brunisols are found in areas dominated by forest vegetation. They typically have a fragile, dusty, thin A horizon overlying a thicker, compact B horizon with loam to silt loam textures and an average pH of 7.2. These soils overly a calcareous C horizon. Due to the weak structure and poor quality of the A horizon these soils are best stripped together along with any organic matter to create a soil which will have better overall capability than either of the original soils.

Soil depth and quality are extremely variable across the Project site, with low gradient, moisture enriched sites producing larger quantities of good quality soil with low coarse fragment content and favourable structure and textures. In contrast, steeper drier sites often produce thin, fragile soils with many coarse fragments. Across the Project area the average depth of the A horizon is 17 cm and ranges from 13 to 26 cm, while the average depth of the B horizon is 20 cm with a range from 17 to 30 cm. The B horizon generally has more coarse fragments than the A horizon. In edaphically wetter areas soil profiles are much deeper, with topsoil horizons occasionally exceeding 1.5 metres in depth.

Based on the terrain and surficial geology information collected, soils on the Project site have been categorized into seven broad SMU according to their physical and spatial characteristics (Figure 3).

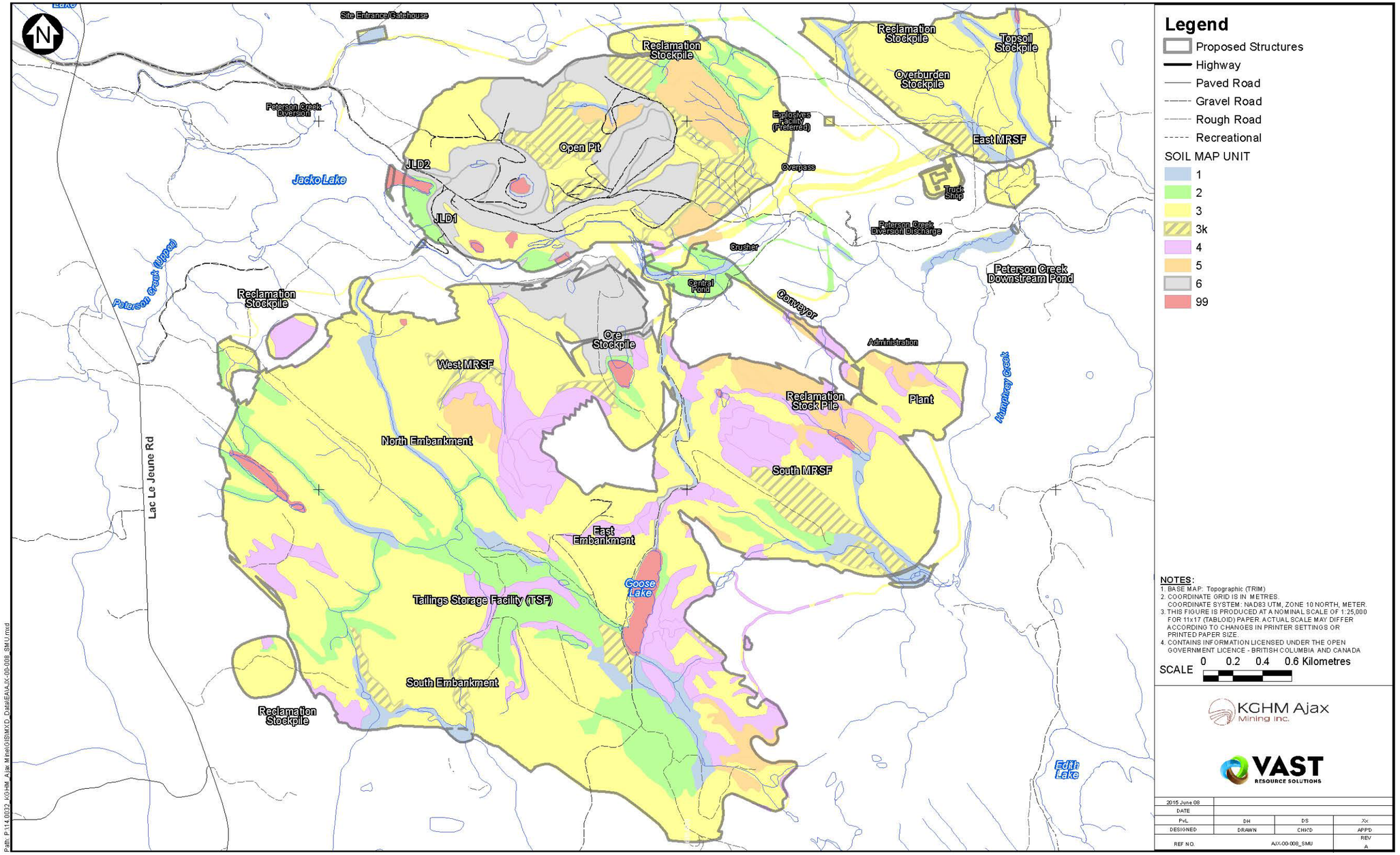

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Figure 3. Soil map units (SMU) identified for the Ajax Project site

SMU 1
Dark Brown and Black Chernozem soils generally associated with fluvial or glaciofluvial deposits formed in edaphically wetter locations, often at toe slopes and imperfectly drained linear depressions where soil accumulation has resulted from slope wash and/or eolian deposition. The typical texture is silt to silt loam with generally less than 5 % coarse fragments. Average depth of the A horizon is 17.5 cm although localized accumulations of 1.5 metres were noted in some locations. B soil horizon depth averages 19.6 cm. The upper C horizon is generally suitable for reclamation purposes. Vegetation is dominate by grasses and forbs.

SMU 2
Dark Brown Chernozems belonging to the Glimpse soil association. A horizons average 15.1 cm; favourable B horizons with an average depth of 20.9 cm. These soils developed on sandy or loamy glaciofluvial deposits in very gently sloping to gently rolling (<10% slopes) terrain. Typical texture is silt loam with moderate coarse fragment content (predominantly gravels). Vegetation is dominated by grasses and shrubs.

SMU 3
Thin Dark Brown Chernozems (Alymer, Trapp Lake and Tullee soil association components) developed on weakly to moderately calcareous glacial till parent materials. Surface textures range from sandy loam to silty clay loam, with moderate to high coarse fragments in the B horizon. Average A and B soil horizon depths are 17.5 and 21.8 cm respectively. Vegetation is dominated by grasses and forbs, with interspersed shrubs.

SMU 3K
Thin Dark Brown Chernozems (Alymer, Trapp Lake and Tullee soil associations) with calcareous A horizons developed on moderately to strongly calcareous glacial till parent materials. Surface textures range from sandy loam to silty clay loam, with moderate to high coarse fragments in the B horizon. Average A and B soil horizon depths are 20.3 and 16.7 cm respectively. Vegetation is dominated by grasses and forbs, with interspersed shrubs.

SMU 4
Fragile Eutric Brunisols (Andrew, Timber, Tullee soil association components) developed on weakly to moderately calcareous glacial till parent materials under forest vegetation. Surface textures range from sandy loam to silty loam, with moderate to high coarse fragments in the B horizon. Average A and B soil horizon depths are 13.9 and 22.8 cm respectively.

SMU 5
Fragile Eutric/Lithic Brunisols (Andrew, Timber, Trapp Lake soil association components) formed by eolian deposition and developed on shallow glacial till parent materials overlying colluvium and/or weathered bedrock deposits. Surface textures range from sandy loam to silty loam, with moderate to high coarse fragment content in both the A and B horizons. Soil depths are highly variable, with average A and B soil horizon depths being 20.3 and 15.5 cm respectively. Vegetation is typically open forest and shrubs.

SMU 6
Anthropogenic disturbances associated with the mine rock waste dumps and road surfaces of the former Afton mine operations. The soils are generally comprised of admixed A, B and C horizons and as a result are moderately to strongly calcareous to the surface. Coarse fragment content is highly variable. These soils are unsuitable for reclamation purposes.

SMU 99
Saline/brackish wetlands and depressional areas with soils that are unsuitable for reclamation purposes.

The relationship between mapped SMUs and previous soil survey mapping (Young, et al, 1992) is provided in Table 2. An estimate of the total area and total soil volume of each SMU, as well as average A and B horizon depths is also provided.

Table 2. Identified soil map units (SMU) for the Ajax Project

Soil Map Unit (SMU)	Represented Soil Associations and Components	Area (ha)	Total Volume (m3)	Average A horizon depth (cm)	Average B horizon depth (cm)
1	FS11, GS1	80.0	296,493	17.5	19.6
2	GS1, GS3	155.9	560,924	15.1	20.9
3	AY1, TP1, TE1, TE2	930.6	3,660,794	17.5	21.8
3K	AY1, TP1, TE1, TE2	110.7	409,691	20.3	16.7
4	AD2, TM5, TE4	167.2	613,846	13.9	22.8
5	AD2, TM5, TP5	80.3	287,515	20.3	15.5
6	n/a	157.7	n/a	n/a	n/a
99	n/a	22.6	n/a	n/a	n/a

4.3.1 Soil Laboratory Analysis

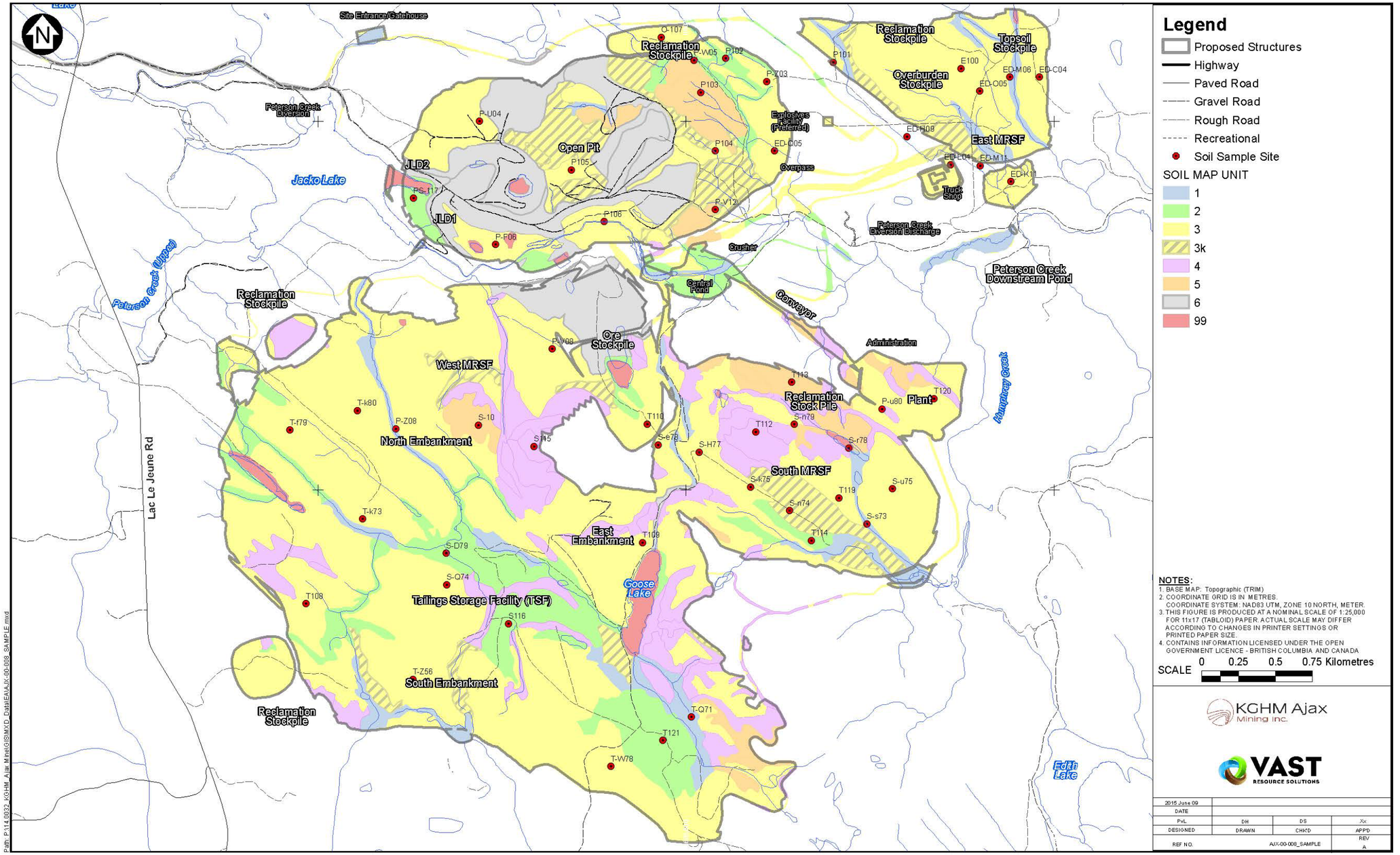
Laboratory analysis was completed on soil samples collected from 53 sites representing a cross-section of all seven SMUs (Figure 4). The primary focus of the laboratory analysis was to establish baseline metals concentrations and to confirm field observations regarding soil texture and calcium carbonate content. A majority of the samples analyzed had boron (B) levels that exceeded CCME (Canadian Council of Ministers of the Environment) guidelines for agricultural land use, but all samples were below average crustal abundances. Exceedances of CCME agriculture and/or industrial guidelines for chromium (Cr), copper (Cu), nickel (Ni) and vanadium (V) were recorded for samples within all SMUs and mine facilities sampled. Twenty-two sites had Cu values that exceeded agricultural land use guidelines, while an additional 20 sites had Cu values exceeding industrial land use guidelines. Nickel and Vanadium concentrations exceeded agricultural and industrial land use guidelines at 25 and 22 sampling sites respectively. Detailed laboratory analysis results with comparisons to CCME guidelines for soil quality (agricultural and industrial land uses) are provided in Appendix C.

4.4 Soil Suitability for Reclamation

The suitability of soils for reclamation purposes was assessed utilizing criteria consistent with the BC Mines Act permitting requirements. The reclamation suitability criteria require consideration of several soil chemical properties (pH, electrical conductivity, and sodicity and saturation percentage) and physical properties (texture, moist consistency, and volumetric stone content). SMUs were rated as Good, Fair, Poor, or Unsuitable for the combined A and B horizon characteristics of their profiles (Table 3). Limitations observed included elevated saturation percentage, excessive carbonates, high salinity, excessive coarse fragments, thin (shallow) soil profiles, adverse structure and erodibility. Rating the soil map units assists in site development and soil handling by determining which soils may present challenges during site construction and reclamation. Table 3 outlines the reclamation suitability ratings for each SMU identified within the Project area, and the soil properties that influence the suitability rating.

Table 3. Reclamation suitability of SMUs for the Ajax Project

SMU	Suitability for Reclamation	Limitations
1	Good	Complex topography; seasonally high water table
2	Good	Complex topography; coarse fragment content
3	Good - Fair	Moderate to high coarse fragment content in B horizon
3k	Poor	Calcareous A horizon; moderate to high coarse fragment content in B horizon
4	Fair	High coarse fragment content in B horizon; calcareous parent material;
5	Fair - Good	Shallow soil horizons over bedrock; complex topography; variable soil depth; calcareous parent material
6	Poor - Unsuitable	Anthropogenic; calcareous to surface due to admixing of horizons during previous handling
99	Unsuitable	Salinity



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Proj # 0230366-0005 | GIS # AJX-00-008_SAMPLE

Figure 4. Soil sampling locations

4.4.1 Soil Volume Available and Required (Reclamation Mass Balance)

During the construction phase of the proposed Ajax Project, the upper lift of suitable SMUs will be salvaged and stored for reclamation use. This upper lift will consist of the vegetation litter (needle/leaf/decomposed organic matter accumulations on the surface) and the A and B mineral soil horizons (collectively referred to as topsoil in this document). Where the subsoil C horizon has a favourable texture and does not contain significant accumulations of salts, carbonates or coarse fragments, it will be salvaged as "growth medium". This material can be amended with nutrients and actively managed to create a soil-like material or be blended with topsoil to increase soil volumes without substantially diminishing overall soil quality.

Preliminary volume estimates of salvageable soil and soil requirements for reclamation have been used to create a Conceptual Reclamation Mass Balance (Table 3).The following assumptions were made in the development of the conceptual reclamation material mass balance:

- No account of site-specific variability in soil placement is included; rather, a uniform surface distribution is assumed;
- For all SMU's, the average combined depth of the A and B horizons was used as the salvageable thickness and,
- Where applicable, the volume of salvaged soil to be placed in windrows adjacent to specific site facilities would be equivalent to the soil volume replaced during reclamation.

Within the Project site, it is estimated that approximately 4,796,000 m^3 of salvageable topsoil material will be available. Salvage depths are expected to be variable due to the complex topography of the site. Based on the average replacement depth, there will be a projected conceptual soil balance surplus of approximately 430,000 m^3. Approximately 5,960,000 m^3 of subsoil/overburden materials will also be required to establish the 0.5 m thickness basal cover over the various mine facilities requiring reclamation.

The actual volumes of topsoil, growth medium and overburden salvaged will be recorded daily during stripping and salvage operations and this information will be used to update the reclamation mass balance. These values will be used to determine actual recovery rates and adjust the reclamation material volume estimates. This will allow the Project to anticipate any shortfalls and adapt accordingly. If it appears that the soil balance is insufficient, growing medium will be created by recovering suitable quality subsoil C horizon material, mixing them with topsoil and actively managing them during storage to improve their overall quality and fertility.

As shown on Table 4, there are a number of facilities such as linear features (mine site roads, diversion ditches, etc.), building sites, parking and laydown/storage areas, and water management ponds which, during construction, will have the soil windrowed on-site rather than removed and stockpiled at another location. For these sites, the soil volume replaced is assumed to be the same as the volume removed, therefore, there will be no soil surplus or shortfall.

In recognition of the potential for limited soil availability, all topsoil within the various mine footprint disturbances will be salvaged unless a qualified person with expertise in soil science determines the soils are unsuitable for reclamation.

Table 4. Conceptual Reclamation Mass Balance for the Ajax Project

Facility	Facility Footprint plan view (m2)	Final Surface Area (m2)	Salvageable topsoil volume (m3)	Average replacement depth (m)	Topsoil required based on surface area (m3)	Surplus (deficit) of topsoil (m3)	Overburden - baseline placement depth (m)	Overburden required based on surface area (m3)
East MRSF	1,003,405	1,008,885	393,918	0.35	353,110	40,808	0.50	504,443
South MRSF	2,105,154	2,407,534	759,956	0.35	842,637	(82,681)	0.50	1,203,767
West MRSF	1,512,592	2,429,126	496,014	0.35	599,330	(354,180)	0.50	1,214,563
North Embankment	283,600	307,224	incl. in TSF	0.35	107,528	(107,528)	0.50	153,612
East Embankment	104,800	113,530	incl. in TSF	0.35	39,736	(39,736)	0.50	56,765
Southeast Embankment	16,500	17,874	incl. in TSF	0.35	6,526	(6,526)	0.50	8,937
South Embankment	130,250	141,100	incl. in TSF	0.35	49,385	(49,385)	0.50	70,550
TSF	5,440,000	5,494,400	2,670,218	0.35	1,923,040	747,178	0.50	2,747,200
Open Pit	3,125,000	3,125,000	475,625	0	0	475,625	0.50	
MG Ore Stockpile	222,886	222,886	Former Afton waste dump	0.35	78,010	(78,010)	0	0
LG Ore stockpiles	331,613	331,613	Former Afton waste dump	0.35	116,065	(116,065)	0	0
Water Mgmt Structures	271,000	271,000	windrowed*	windrowed*	0	0	0	0
Roads	262,000	262,000	windrowed*	windrowed*	0	0	0	0
Buildings & Infrastructure	260,000	260,000	windrowed*	windrowed*	0	0	0	0
Totals	15,068,800	16,392,172	4,795,731	-	4,365,960	429,771	-	5,959,837

* windrowed on-site during construction; stripped volume with equal replaced volume so there will be no surplus or deficit

5.0 STATEMENT OF LIMITATIONS

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- The work performed in this report was carried out in accordance with the terms and conditions specified in VAST's contractual agreement with the client. The conclusions presented herein are based solely upon the scope of services and time and budgetary limitations approved by the client and described in the agreement. Since site conditions may change over time, the report is intended for immediate use only.
- Services provided by VAST Resource Solutions Inc. for this report have been conducted in a manner consistent with the level of skill, care and competence ordinarily exercised by members of the profession currently practicing under similar conditions and like circumstances in the same jurisdiction in which the services were provided. Professional judgment has been applied in developing any conclusions and/or recommendations in this report. No warranties, expressed or implied, are made as to the professional services provided under the terms of the agreement and included in this report.
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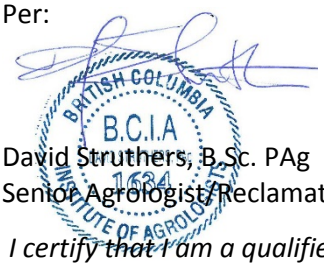
6.0 CLOSURE

VAST Resource Solutions trusts that this report satisfies your present requirements. Should you have any comments, please contact us at your convenience.

Authored By:
VAST Resource Solutions Inc.
Per:



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I certify that I am a qualified registered professional and that I personally supervised and carried out the scope of work described in this report.

7.0 REFERENCES

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Appendix A – Soil description field data

Soil descriptions followed Section 2, Soil Descriptions, of the *Field Manual for Describing Terrestrial Ecosystems* (BC FLNRO and BC MOE, 2010). An electronic version, complete with code legends and detailed explanations is available at the following web link:
https://www.for.gov.bc.ca/hfd/pubs/docs/lmh/Lmh25/LMH25_ed2_(2010).pdf

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
O-a82	5608171	684423	Surface Insp.												12			16									
O-b81	5608092	684498	Soil Pit	NE		j		70		G	P	i			95	hk		7	gjk					50	k		
O-d82	5608249	684760	Soil Pit	NW	M	j				P	U	w			14			70									Calcareous C; Gleyed sand
O-z83	5608293	684339	Scratch Pit	NE		j		30		P	U	r			12	h		30	m	5				10	k		
127	5607635	686005	Surface																								
128	5607588	686031	Surface	NE		t	u																				Rf,snowberry,saskatoon
79	5608258	685253	Surface	S		j	u			P	U																
85	5605950	683540	Soil Pit	W		d				G	P	i			14	h		10	mk					50	gk		
92	5607050	683434	Surface																								
P-s81	5608091	686204	Soil Pit	S	M	j				P	U	v	X		13	h	2	7	mj	2				40	k	20	thin, fragile A and B. Strip 20 cm, single operation. Avoid C
P-u80	5608048	686331	Soil Pit	NW		j	m			G	P		R		17	h	0	35	m	2				20	kj	5	good, high quality, somewhat fragile and light texture
P-u81	5608094	686399	Soil Pit		M	j				P	U	v	X		17	h	2	13	m	3				30	k	15	BbWg, rabbit brush
S-d79	5607946	684739	Soil Pit	NE	M	a				P	U			2	14	h	2	30	m					36			
S-e78	5607805	684812	Soil Pit	E	M	a	m	55		P		w		3	20	h	1	35		2				15	k	3	high quality/volume soil with great structure. Rf dominated.
S-f77	5607698	684849	Soil Pit	E	M	k	r			P	U	w		2	18	h	3	18	m	5				70	k	15	C not suitable
S-f79	5607901	684907	Soil Pit	S		k				P		r			30		10	60		20				20			
S-h77	5607669	685061	Soil Pit	SE	FG	h		70		P	U	v	X		18	h	5	47	m	20		SiCL		85	k	30	lots of spotted knapweed. gravelly, loam,
S-H77	5607755	685089	Soil Pit	NW	M	m	t			P	U	v	X		13	h	5	17	m	10				70	k		C fractures into gravel sized chunks
S-h78	5607797	685119	Soil Pit	W	M	u				P	U	w	X		20	h	1	45	m	10				15	k	15	
S-h78a	5607805	685113	Soil Pit	W				50							30	h	2	30	m	20				45	k	15	BbWg dominated. Some Rf
S-I75	5607510	685517	Soil Pit	S	M	k	m			P	U	v	X	0.5	17	h	5	13	m	15				30	k	30	Fragile soil; large cobbles in B and C
S-i81	5608153	685207	Surface		L	d				G	P																
S-j73	5607303	685302	Soil Pit	NW	FG	t	u			P	P				24	h	0	20	m	3				20	k	20	high productivity Rf meadow. excellent A and B, gravelly C
S-k73	5607251	685422	Soil Pit	N						P					35	h	2	25	m								deep soil; Rf meadow
S-k75	5607519	685441	Soil Pit	S		j	t	70		P	U	w	X		36	h	1	20	tj		30	IIBm	25				A and B1 are high quality reclamation material. Rf, Jg, BbWg
S-l72	5607187	685516	Soil Pit	N	FG					P	U	v			13			30	m	40				45	k	60	calcareous gravel terrace, very good growth despite texture
S-l74	5607401	685550	Surface	SE	ppewa	d				G	P	w															Slopewash; deep class 1 soil
S-l80	5608046	685534	Surface	N	C	h	t																				
S-m71	5607109	685677	Soil Pit	NE		t	u	40		P		w			10		0	35	m	3				30		60	good source of gravel in subsoil
S-m76	5607579	685654	Soil Pit	S	M	k	m	35		P	U				40	h	5	50	m					30			Lots of suitable material; Upper C is not calcareous
S-m80	5607958	685657	Soil Pit	N	ppewa	d	r			P	U	w	X		35	h	2	25	m	3				25	BC	70	Slopewash; good depths but texture is floury. Very fragile.
S-m81	5608148	685605	Surface							P	U	w															
S-n72	5607228	685730	Soil Pit	SE	ppewa	u				G	P	w			45	h	0	55	m	0							high quality soil but fine textured; double strip/handle carefully

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
S-n73	5607297	685737	Soil Pit	SE	M	u				P		w	X		12	h	1	11	m	5				30	k	25	thin fragile soil; stark contrast to adjacent depressional area
S-n74	5607358	685705	Soil Pit	SE		t	m			P		m	R		45	h	1	65	m	2							high quality/volume soil with great structure. BbWg dominated
S-n74	5607397	685720	Soil Pit	S											20	h	3	8		5	10	BC	15	30	k	20	C no use for reclamation
S-n79	5607944	685738	Soil Pit	SW	M	m		35		P	U	w	X		17	h	3	33	mkj	15				30	k	20	
S-n81	5608103	685702	Soil Pit	SE		j				P	U		X		13	h	10	12	m	15				35	k	20	C breaks into small gravel chunks; supports growth of BbWg, Rf
S-o70	5607936	685856	Soil Pit		M	u				P	U	w	X		17	h	5	20	m					70	k	15	
S-o71	5607079	685838	Soil Pit	N	C	d				G	P	i	O	10	15	hk	0	15						35			good textures for reclamation; thin A
S-o73	5607294	685794	Soil Pit							F	P	m															
S-o74	5607353	685844	Soil Pit	S	M	m	j				U				20	h	2	8	m	3	14	BC	5	20	k		
S-o76	5607559	685860	Soil Pit	SE	ppewa	u		50		P	P	w			40	h	2	50	m	2	10						high quality/volume; great structure. A and B are excellent.
S-p22	5607224	685910	Surface		F					G	P	m															shallow hollow flowing se, moister than adjacent sites
S-p70	5607026	685940	Surface	N	M	m	r			P	U	w			14	h		50	m								Thin ashy soil. B is rocky; At has transition to good Soil Pit
S-p71	5607126	685927	Soil Pit	SE	M	u		70		P	U	w			45	h	5	35	m	8	25	IIBm	25	10	k		salvage to second b
S-p74	5607442	685866	Surface	S																							Soil slightly deeper from enrichment above; on slope break
S-p76	5607630	685879	Soil Pit	SE		u	j			P	U		X		18	h		22						5	k		very rocky
S-q71	5607136	686018	Soil Pit	slopewa		d	p			G	U		O		40	hca	1	20	m					40	k		polygon not adjacent. Soil deep to shallow. Bony in meters.
S-q74	5607445	686041	Soil Pit	SE	M	u	j			P		w			25	h	2	20	m	10				15	k	30	BbWg dominated grassland
S-q76	5607638	685943	Soil Pit	NE	M	u	m			P	U		X		16	h	3	16	m	10				30	k	35	BbWg, Rf, excellent grads growth, no weeds
S-r70	5607033	686086	Soil Pit	W	LG			60		P	U				25		0	34	m			BCk		10	k		C has favourable texture for reclamation.
S-r73	5607326	686132	Soil Pit	SE	M	u		45		P	U	w	X		20	h	2	20	m	5				30	k	20	angular coarse fragments. C is not useful for growing medium
S-r78	5607783	686107	Soil Pit		L	d		15	W	G	P	i	A		15	h	0							35			more than 1.6 m of material
S-s71	5607121	686174	Soil Pit		FG	p	d	40		P	U	r	O		13	10		35	m	70				25	k	80	Gravelly Soil. Deep Soil in subtle channels on either side
S-s73	5607268	686231	Soil Pit	SE	ppewa	d	u	40		G	P	w	O		30	h	0	20	m	0	10		2	40			rich deep Soil . Great growth of a. High rec material volumes
S-u73	5607314	686409	Soil Pit	SE	M	j		25		P	U		X		17		2	20	m	5				15	k	15	consistent Soil depths and textures
S-u75	5607506	686402	Soil Pit	S	M	u	p	35		P	U	w	X		36	h	2	15	m	5				25	k	20	
S-v70	5607030	686483	Soil Pit	E	ppewa	j	d			G	P	w	O		45	h	1	55									high quality and volume Soil with great structure.
S-v73	5607314	686508	Soil Pit	SE	ppewa	m	d			P	U	w			75		2	55	tj	3							A varies 75 to 85. B very dark. material great to 1.3m . Class 1.
S-w71	5607101	686596	Soil Pit	SE	M	j				P	U	w	X		17	h	3	23	m	10				15	k	20	consistent A,B. C detrimental to reclamation
S-x70	5606971	686632	Soil Pit	S	M	m		25		P	U	v	X		13	h	3	17		10				200	k	20	thin Soil Pit on steep short hillside on edge of drill pad
T-a67	5606705	684406	Soil Pit	SE	L	m		40		P	U	w			23	h		8	m					80	k		1.5 m of rec material possible. C could be used for blending
T-b63	5606337	684537	Soil Pit	E		u				P	U	w			20	h	1	20	m	5				30		10	
T-b65	5606513	684545	Soil Pit	SW	FG	u				P		r			25	hk		60	mk					15	k	5	fine textured; loamy sand C. Great growing texture; calcareous.
T-C63	5606305	682009	Surface			u				P	U	m															

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T-C67	5606685	682035	Surface			d				G	P	p	O														
T-C77	5607700	681999	Surface		L	d				G	P	i					0										
T-d72	5607174	684748	Soil Pit	E	M					P					30	h		50		20	30		10	20	k		variable moisture in area; IIC observed elsewhere on cut face
T-d74	5607373	684736	Soil Pit	E	LG	h				P	U	w			14			16						28	k		
T-d75	5607479	684707	Scratch Pit	SE		h		30		P		w		1	12			16						28	k		
T-D76	5607597	682107	Surface																								
T-E70	5607001	682234	Scratch Pit	N	FG	m				P	U	w			21	0		24	m	5					k	60	
T-E75	5607514	682201	Surface																								
T-f65	5606517	682303	Soil Pit	W	LG	m		72		G	P	m			22		0	50	m	0	10	BC	20	50	k	25	A, B are Sandy, no CF. overlying angular moraine C. Class 1.
T-f65	5606532	684977	Surface			h																					
T-f65a	5606511	682338	Soil Pit	SW	FG	m		120		P	U	v			20	h	5	72	m	7	48	IIBm	40	30	k		1 m received material
T-f66	5606644	684949	Soil Pit	W	C	h				P	U	w			30	h	7	30	m	20							bony; supports good grass growth. Landform/aspect influenced
T-f70	5607026	682298	Soil Pit	N	E	m				P	U	w	X	2	10	h	0	25	m	7				60	edrock		eolian Soil over weathered bedrock
T-F72	5607266	682292	Soil Pit	NE	FG	u				P	U	r	X	1	22	h		40	m					20			large cobblestone at 80. Not calcareous. Rodent burrow in A.
T-f75	5607510	682313		E	FG	p	h			P	U	r	X	0	8	h		37	m	70				30	kj		bony, awful Soil. Strip 20 cm single lift
T-f79	5607905	682312	Soil Pit		M	p	m	35		P	U	r			12	h		22	m					100	k		calcareous C; gravel size coarse frags. Good reclamation use
T-f80	5608004	682269		NW	M	p	m			P	U	w			16	h	5	25		10				100	k	10	nodding onion, pushy toes
T-g66	5606588	684948		SW	C	h				P	U	v	X	2	13	h		17	m					3530	kj		Soil can quite deep between outcrops
T-g68	5606764	685001			M	h		40		P	U	w			25	h	3	60	m	5				10	k		
T-h64	5606455	685119	Soil Pit	S	M	k	h	56		P	U		X	0.5	30	h	3	70	m	5	30	BCk	10				
T-h66	5606672	685103	Surface			h																					snowberry, Rf,slender wg. Grass is knee high.
T-h68	5606830	685068	Soil Pit	SW	M	h		50		P	U	w	X		17	h	5	73	m	5				100	k	10	wow does this produce grass and forbs
T-h69	5606930	685115	Soil Pit	N	M	u				P	U	w	X	1	25	h		55									green needle grass is most prolific native grass on road spoil
T-i63	5606278	682629	Surface		M	d	u			G	P	w				h											tons of pocket gophers. Rich black Soil Pits. red head and throat
T-i63	5606377	685191	Surface	W	ppewash					G	P		R														snowberry, choke cherry, willow, At, fescue and brome
T-i64	5606439	685169	Soil Pit	S	M			30						0.5	17	h	10	9	m	10				120	k	5	looks like type 3. Below in swale; aspens, snowberry and grass
T-K59	5605954	682782	Soil Pit	SE	E	h				P	U	m		1	30			70									25 slope"
T-K62	5606248	682459	Soil Pit					90		P	U	m	X		45	h	0	45	m	5							Clay loam. Fine texture, little structure, quite fragile
T-k68	5606848	682832	Soil Pit		LG	m		40		P	U	w	X	2	20	h		21	t	10				65	k	20	C Has decent texture but prone to hardness,
T-k73	5607302	682806	Soil Pit	S	E	j				P	U	w	X	0	25	h		20	m					65	k		C: silty in upper, heavier clay below, suitably fine for growth
T-K78	5607770	682758	Soil Pit	SE	FG	j	m			P	U	w	X	0	15	h	1	50	m	3				45		10	heavily grazed
T-k80	5608037	682769	Soil Pit	SE	LG	j	p	40		P	U	v			17		5	23		5				45	k	1	C is good growing texture; very calcareous. Could be amended.
T-K85a	5608618	682868	Soil Pit	NW						G	F		A		20	h		27	k					10	k		excellent growing medium band of ashy material over clay.

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T-K86	5608636	682842	Soil Pit		M	u				P	U	r			12	h	2	15	mk	10				73	k	25	AB single strip
T-l59	5605939	683031	Soil Pit	N	M	u	t	35		P	U	w			3	LFH		25	m					30	k		good volumes of very fragile soil
T-l60	5605991	685554	Scratch Pit	N	M	u				P	U		X		10	h		60	m	25							deep Soil; limitations from rockiness. Good growth medium
T-L63	5606310	682868	Soil Pit	W	FG	u		47		P	U	m			20	h	2	20						45	k	20	text book O.DBC
T-L86	5608623	682919	Soil Pit	W	M	h		40		P	U	r	X		12	h	2	22	m		16	BCk	10	60	k		
T-m59	5605919	683070		N	C	u				P	U	w			3	LFH		17	m		20	BC	40				
T-m60	5606002	683009	Soil Pit	S	R	k	r	35		P	U							10	k					60	k	10	ugly grey Soil, really dry and dusty under Fd. Podzol?
T-M83	5608346	682970	Scratch Pit	W	E	r				P	U	w		2	22	h	2	30	m	2							high quality Soil; fine textured. Double strip, handle carefully
T-n59	5605904	683124	Surface	N	C	u				P		w															angular large rocks. Complex variable terrain. Bike trail.
T-n60	5606016	683134	Surface	SW	M	k	u			P	U				3	h			m								vegetation shows some signs of slough influence. SW, At,Fd
T-N83	5608264	683114	Soil Pit	SE	FG	u		45		P	U	w	X	1	10	h	5	15	m	50				100	k		thin Soil supporting bb,Jg,rfs,Fd
T-o72	5607221	683263	Surface		FG	u	p			P		r															little gravelly hill in between wetland areas.
T-O80	5608014	683175	Soil Pit	NW		m		40	K	P	U	r			20	h	2	20	m	10				65	k		C is very compact, is it useful for reclamation once fractured
T-O84	5608407	683220	Scratch Pit	S	FG	u				P				1	8	h	5	50	m	20							AB can be stripped together
TP-0K	5606620	685181	Surface		E	u				P	U	w															Very high productivity
T-p59	5605851	683339	Scratch Pit	N		u	t			P	U				3	e		38	m								dull coloured Soil. Silty loam texture. Single strip 40 cm
T-p61	5606071	683327	Soil Pit			u	p	35		P		w			14	h	5	34	m	5				10	k	10	C may be useful for reclamation
T-p65	5606542	683323	Soil Pit	N	M	m		60		P	U			2	25	p		50	m					20	k		
T-p72	5607185	683326	Surface		FG							r	O														sand/calcareous gravel band, top of weathered bedrock outcrop
T-p75	5607549	683298	Soil Pit		LG	p					U	w	X	0	20	p		25		0				20	k		heavily grazed
T-P80	5608023	683280	Soil Pit		M	p				P	U	w	X		20	h	0	17	m					40	k		
T-q62	5606231	683372	Scratch Pit	NE		a	m			P	U	w			25	h	1	20		2	15	BC	25				much rockier along BC interface
T-q71	5607069	683372	Surface	NW		p			irrigated																		
T-Q83a	5608288	683431	Soil Pit	SE	M	u				P	U	w	X	1	15	h	2	20	m		10	BCk		65	k		
T-R83	5608282	683446	Soil Pit		L	d				G	P	i	A		30	h		52	tjk					15	kj		no coarse frag, weakly calcareous, clay in C; strip A separate
T-R84	5608427	683507	Soil Pit	S	M	m								2	2	e		34	m	10				100	k	20	single strip 40 cm
T-R88	5608803	683557	Soil Pit	NE	M	r	m	50		P	U	w	X	1	7	h		20	m					30			thin, variable A; brunisol to a chernozem; strip 22 cm in one lift
T-s70	5606978	683616	Scratch Pit	NW	FG	a	r			P	U	r			12	h											developed on gravel outcrop.
T-S76	5607599	683599	Surface		L	d				G	P	m	A														high quality/volume Soil Pit with great structure.
T-S77	5607673	683591	Soil Pit	SW	M	u									25	h	5	23	m	10				15	k	10	Rockies in B, strip separately
T-t63	5606348	683740	Soil Pit	N		p				P	U	w		3	20	h	1	28	m	2				30	k	5	
T-t67	5606735	683714	Soil Pit	NW	FG	u				P	U				10		40	20		50				100	k	70	Poor; rocky. Strip 30 cm for use as base cover, not topsoil
T-t68	5606845	683741	Soil Pit	N	FG	p	t			P	U	w		2	16	h	2	15	m	25				15	k	30	

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T-T78	5607847	683697	Soil Pit	SE	D	u		7		P	U	w	X		25	h	1	30	m					20	k	5	quality Soil. Great material; favourable C texture.
T-T84	5608372	683701	Soil Pit	S	M	m				P	U	r	X		20	h	20	22	m					60	k	15	strip 30, single strip
T-U83	5608267	683854	Surface	NW	M	h				P	U	r		2													33% between two benches. Use same strategy for reclamation.
T-v62	5606182	683932	Surface	W	FG	h	d			P	P	r															
T-W30	5608037	683978	Surface	N		m				P	U	r															
T-w62	5606183	684007	Surface			d	p			P		w															small kettle features. complex/undulating topography to the nw.
T-W78	5607793	683991	Surface	W	D	h				P	U	w		2													
T-x77	5607670	684141	Soil Pit	W	M	h				P		w		3	12	h	5	33	m	5				20	k	10	
T-y60	5606062	684237	Scratch Pit	SE	M	m				P	U	w		1	18	p	0	34	m	5				5	k		As finer than B. eolian deposit over moraine. bony B. A is thinner
T-y67	5606672	684286	Soil Pit	NE	FG	r				P	U	w		1	15	h		45	m		15	BC		50	k		grows great grass; cool aspect
T-y76	5607620	684207	Scratch Pit							P		r			8			12						40			strip 25, fragile rocky Soil
T-Z56	5605583	684317	Soil Pit	N	M	m		90		P	U	w	X		12	h		50	mj					20			Good texture, few coarse frags, non-calcareous
T-z60	5606008	684318	Surface	E		p	m			P	U	w				p											seeded to agronomic species. crf,cw,sub,quackgrass
T-z76	5607599	684297		SW	M	j	m	25	K	P	U	r			8	h	5	12	m	10				40	k	25	thin and poorly developed, very compact subsoil
Y-L85	5608457	682895			FG	u	t					x	X		10	h	20	10	m	70				20	k	90	terraces where glacial stream cut through valley. Very gravelly
x	5607570	685099	Soil Pit	SE	G	r	m	120		P	U	w	X	1	70	h	4	50	mj	15							no effervescence. growing medium exceeds 1.2
x	5607251	686217			LG	h		35		P	U	v			13	h		20	k	0				120			BbWg
28	5610716	679532	Soil Pit		p	d		0		g	p	i	at	0	15	h	0	25	m	0			0	75		0	good texture in C, suitable to include with A/B pile; salvage all
32	5610807	683869	Soil Pit		m	u		45	N	p	u	W		0	12	h	0	28	m	10			0	10	ca	30	C unsuitable for reclamation
33	5610826	684392	Soil Pit	SE	m	u		45	N	p	u	w	x	0	12	h	0	28	m	10			0	60	k	45	
A155	5609647	683355	Soil Pit					70	X-70cm	p	u	Well	x	0	40	h	21	30	BC	25			0	10	ca	30	Data collected by SMeister and transposed to VAST database
A156	5609780	683383	Soil Pit					70	R-70cm	p	u	Well	x	0	30	h	15	40	BC	24			0	0		0	Data collected by SMeister and transposed to VAST database
A157	5609293	683579	Soil Pit					20	X	p	u	Well	x	0	20	h	10	0		0			0	28	pk	45	Data collected by SMeister and transposed to VAST database
A158	5609209	684042	Soil Pit					40	X	p	u	Well	x	0	20	h	10	20	m	10	10	BC	0	0		0	Data collected by SMeister and transposed to VAST database
A159	5609837	683748	Soil Pit					20	X	p	u	Rapid	x	0	0		0	5	kp	65	50	BCkp	70	10	kp	65	Data collected by SMeister and transposed to VAST database
A160	5609613	683612	Soil Pit					0		p	u		x	0	26	pk	35	0		0			40	0	pk	90	Data collected by SMeister and transposed to VAST database
A161	5609626	683835	Soil Pit					0	x	p	u	ry Rap	x	0	0		0	0		0			0	15	k1	70	Data collected by SMeister and transposed to VAST database
A162	5609527	684058	Soil Pit					0	X-0cm	p	u	Well	x	0	0		0	0		0			0	20	kp1	35	Data collected by SMeister and transposed to VAST database
A163	5609440	684123	Soil Pit					60	X-60cm	p	u	Well	x	0	30	h	15	30	m	20			0	20	k	40	Data collected by SMeister and transposed to VAST database
A164	5609451	685027	Soil Pit					50	X-50cm	p	u	od W	x	0	30	h	10	20	BC	15			0	20	ca	10	Data collected by SMeister and transposed to VAST database
A165	5609275	684769	Soil Pit					80	X-80cm	p	u	Well	x	0	20	hb	20	30	m	30	30	BCb	50	10	cab	65	Data collected by SMeister and transposed to VAST database
A166	5609518	684746	Soil Pit					0	X-0cm	p	u	Well	x	0	0		0	15	mkp	50			0	20	kp	75	Data collected by SMeister and transposed to VAST database
A167	5609678	685053	Soil Pit					20	X-0cm	p	u	od W	x	0	0		0	20	kp	25			0	20	kp	45	Data collected by SMeister and transposed to VAST database

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A168	5609837	685159	Soil Pit					60	X-55cm	p	u	Well	x	0	25	h	10	11	m	15	19	BC	40	10	ca	45	Data collected by SMeister and transposed to VAST database
A169	5609799	684764	Soil Pit					26	L-26cm	p	u	Rapid	x	1	26	hk	35	0		0			0	0		0	Data collected by SMeister and transposed to VAST database
A170	5609738	684513	Soil Pit					25	X-0cm	p	u	od W	x	0	0		0	25	kp	22			0	15	kp	35	Data collected by SMeister and transposed to VAST database
A171	5610114	684828	Soil Pit					60	none	p	u	Well	x	1	33	h	5	27	m	10			0	0		0	Data collected by SMeister and transposed to VAST database
A172	5610008	684541	Soil Pit					60	none	p	u	Well	x	3	18	h	15	32	m	30	10	BC	35	0		0	Data collected by SMeister and transposed to VAST database
A173	5610063	684019	Soil Pit					30	X-0cm	p	u	od W	x	0	0		0	25	pk	40			0	25	pk	45	Data collected by SMeister and transposed to VAST database
A174	5610221	684220	Soil Pit					50	X-45cm	p	u	Well	x	0	20	h	5	25	m	10			0	10		20	Data collected by SMeister and transposed to VAST database
A175	5610241	684553	Soil Pit					0		p	u		x	0	0		0	10	mkp	20			0	20	kp1	25	Data collected by SMeister and transposed to VAST database
A176	5610456	684582	Soil Pit					20	L-20cm	p	u	Rapid	x	1	20	h	20	0		0			0	0		0	Data collected by SMeister and transposed to VAST database
A177	5609932	684199	Soil Pit					40	X-40cm	p	u	Well	x	0	22	h	10	18	BC	15			0	10	ca	20	Data collected by SMeister and transposed to VAST database
ED-B05	5610301	685799	Soil Pit					50	N	p	u	w	x	10	0		0	35	m	0			0	50	k	0	grass good to excellent condition
ED-B11	5609700	685900	Surface		m	p		30		p	u	w	x	0	24	h	5	17	m	40			0	0		0	on flat ridge top
ED-B12	5609600	685900	Scratch	S	m	r		22	n	p	u	w	x	0	17	h	10	18	m	50			0	10	k	10	lower slope position. Sage brush present
ED-C03a	5610484	686068	Scratch	W	m	r		0	n	p	u		x	0	30	h	0	14	m	10			0	11	k	60	catena
ED-C04	5610400	686001	Soil Pit		gf	r		25	n	p	u		x	0	17	h	0	10	m	0			0	33		0	C is acceptable for reclamation use
ED-C08	5609996	686001	Scratch		m	p		30		p	u	w	x	0	24	h	5	17	m	40			0	0		0	on flat ridge top
ED-C09	5609904	686002	Surface		m	p		30		p	u	w	x	0	24	h	5	17	m	40			0	0		0	on flat ridge top
ED-C09a	5609828	686054	Surface					0						0	1		0	0		0			0	0		0	weathered bedrock. No good soil on top
ED-C11	5609700	686001	Surface					0						0	20		20	0		0			0	0		0	thin/fragile soil then ridge. 20% coarse frags in A. use 20 cm
ED-C12	5609600	686000	Surface	S	m	r		22	n	p	u	w	x	0	17	h	10	18	m	50			0	10	k	10	lower slope position. Sage brush present
ED-D03	5610498	686102	Scratch	W	m	r		33	n	p	u		x	0	24	h	5	4	m	10			0	12	k	20	A deeper and B richer with less fragments than midslope
ED-D04	5610400	686100	Inspect	W	m	r		0	n	p	u		x	0	30	h	0	14	m	10			0	11	k	60	
ED-D05	5610297	686100	Soil Pit					0						0	0		0	0		0			0	0		0	on cutbank next to dugout
ED-D08	5609970	686106	Soil Pit		m	m		33		p	u		x	0	18	h	5	13	m	30			0	7	BC	30	edge of road . BB native
ED-D10	5609795	686100	Soil Pit		m	h		63	n	g	p	m	x	5	42	h	0	25	m	0			0	11	gj	0	Great deep soils disturbed by fire; C could be growth medium
ED-D12	5609599	686100	Surface	S	m	r		22	n	p	u	w	x	0	17	h	10	18	m	50			0	10	k	10	lower slope position. Sage brush present
ED-E03	5610498	686202	Scratch	W	m	r		24		p	u		x	0	20	h	10	16	m	40			0	17	k	40	catena
ED-E05	5610297	686203	Scratch	W	m	r		33	n	p	u	r	x	0	24	hk	40	3	mk	40			0	18	k	40	calcareous to surface, many cobbles and gravels on surface
ED-E08	5609972	686202	Soil Pit		a	m		56		p	u	w	x	0	21	p	5	31	BC	70			0	12		15	Soil Pit on road edge. meadow brome, crested, fescue.
ED-E12	5609592	686195	Scratch					0						0	0		0	0		0			0	0		0	seepage area
ED-E13	5609496	686203	Soil Pit	s	m	h		23	n	p	u	w	x	0	23	h	10	14	m	50			0	0		0	Area overgrazed and heavily compacted by livestock
ED-F04	5610398	686301	Surface	W	m	r		24		p	u		x	0	20	h	10	16	m	40			0	17	k	40	Same as ED-E03
ED-F05	5610297	686302	Scratch					0						0	10	h	30	14		30			0	0		0	surface cobble; limited reclamation value. Thin/fragile Soil

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
ED-F08	5609974	686303	Soil Pit		m	m		34		p	u	w	r	0	31	p	2	6	m	2	13	BC	2	13		10	pit on road edge. Supports smooth brome, crested wheat, fescue
ED-F13	5609496	686300	Soil Pit	s	m			60	n	p	u	w	x	0	25	h	0	50	m	10			0	0		0	75 cm of reclamation material available
ED-G05	5610300	686400	Surface	W	m	r		24		p	u		x	0	20	h	10	16	m	40			0	17	k	40	consider keeping spoil below ridge top to create natural plateau
ED-G08	5610000	686399	Surface		m	m		0						0	14	h	5	14	m	30			0	0		0	Same texture and colour as A on H07. 14 cm A over rocky hard B
ED-G13	5609494	686403	Soil Pit	s	m	j		50	n	p	u	w	x	0	25	h	0	40	m	50			0	0		0	Double strip, B hard, gravelly, compact
ED-H04	5610447	686492	Soil Pit		m	m		28		p	u		x	0	26	h	5	16	m	10			0	30	k	20	catena 1, good Soil Pit structure excellent material
ED-H09	5609896	686503	Soil Pit	S	m	h		0	n	p	u	r	x	0	10	h	0	15	m	20			0	60	k	50	grass is vigorous, some bare ground between bunch grasses
ED-H14	5609396	686503	Soil Pit	n	m	r		65	n	p	u	w	x	0	25	h	0	70	m	40			0	15		30	no carbonate in top m, double strip 1 m
ED-I04	5610425	686585	Soil Pit		m	m		33		p	u		x	0	31	h	5	15	m	10			0	0		0	catena 2, blocky Soil Pit 2-5 mm excellent structure
ED-I08	5609994	686600	Surface					0						0	14		0	0		0			0	0		0	14 cm A, otherwise same as L-09a
ED-I10	5609795	686600	Scratch		m			20		p	u	r	x	0	13	h	0	0		0			0	20	k	40	regosol. 13 cm A over calcareous, clay, C
ED-I11	5609700	686600	Surface	S	gf	u		59		p	u			0	22	h	0	21	m	0			0	65		0	salvage all
ED-I12	5609599	686602	Surface	S	m	r		22	n	p	u	w	x	0	17	h	10	18	m	50			0	10	k	10	
ED-I14	5609398	686600	Soil Pit		gl	j		55	n	g	p	p	fb	0	30	h	0	30	mca	0			0	40	k	0	Deep, fine textured, carbonate rich Soil
ED-J-01	5610700	686700	Scratch					30						0	20	p	30	18	mp	0			0	0		0	. Disturbed by dri ling traffic. Well # 34357
ED-J02	5610601	686699	Surface		m	m		36		p	u		x	0	26	h	5	19	m	15			0	0		0	Influenced by seepage. Shrubs present nearby
ED-J03	5610498	686699	Surface		m	m		33		p	u		x	0	20	h	5	15	m	10			0	0		0	blocky Soil; 2-5 mm excellent structure
ED-J04	5610407	686686	Scratch		m	m		36		p	u		x	0	26	h	5	19	m	15			0	0		0	catena 3
ED-J06	5610198	686701	Surface		m	m		36		p	u		x	0	20	h	20	19	m	15			0	0		0	Many surface cobbles 20 %
ED-J06	5610297	686699	Surface		m	m		36		p	u		x	0	26	h	5	19	m	15			0	0		0	
ED-J08	5609996	686697	Scratch		m			28		p	u	w	x	0	24	h	0	20	m	0			0	0		0	24 cm A, same texture, veg and aspect as L-09a
ED-J10	5609797	686697	Surface		gf	u		59		p	u			0	25	h	0	21	m	0			0	65		0	Edge of gully. Sand is very fragile but supports good veg. Save all
ED-J11	5609698	686701	Surface	E	gf	u		60		p	u			0	28	h	0	22	m	0			0	66		0	Same as L-14a/b. Slight E aspect may have marginally deeper A
ED-J13	5609498	686699	Surface	W	gf	u		61		p	u			0	29	h	0	23	m	0			0	67		0	and is very fragile but supports good veg. Save all
ED-J14	5609400	686700	Surface	W	m	r		0	n	p	u		x	0	30	h	0	14	m	10			0	11	k	60	Same as B-12
ED-K01	5610700	686800	Scratch		m	d	h	50	n	g	p	m	fb	5	33	h	1	9	m	20			0	10		0	excellent Soil
ED-K02	5610599	686802	Surface		m	m		23		p	u		x	0	18	h	5	6	m	10			0	10	k	30	same as L-04 slightly darker A. Less rabbit brush
ED-K04	5610379	686772	Scratch		m	m		36		p	u		x	0	23	h	5	11	m	10			0	10	k	60	
ED-K05	5610295	686800	Surface		m	m		36		p	u		x	0	26	h	5	19	m	15			0	0		0	same as ED-J04. Lots of yarrow
ED-K06	5610198	686802	Scratch					0						0	15	h	20	12	m	50			0	0		0	large cobbles on surface. Ah thin, 15 cm over very round rocks.
ED-K07	5610099	686800	Scratch		gf			30		p	u	w	x	0	25	h	0	13		0			0	0		0	
ED-K08	5609996	686800	Scratch					0						0	19	h	0	16	m	30			0	0		0	25 cm of A, rocky at 19 cm. Similar to L-09a.
ED-K10	5609797	686800	Surface		m	d	k	20		p	u	r	x	0	6	h	20	0		0			0	0		0	regosol in steep gully. 6cm of A

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
ED-K11	5609700	686798	Surface		gf	u		59		p	u			0	25	h	0	21	m	0			0	65		0	Similar to L-14a/b, deep sandy Soil
ED-K12	5609599	686800	Inspect		gf	u		59		p	u			0	25	h	0	21	m	0			0	65		0	Same as L-14a/b. Veg noticeably thinner on ridge top
ED-K13	5609496	686800	Inspect		gf	u		59		p	u			0	25	h	0	21	m	0			0	65		0	Same as L14 a/b
ED-K14	5609400	686800	Inspect		gf	u		59		p	u			0	25	h	0	21	m	0			0	65		0	A is more developed; better structure; profile is same as L-14a/b
ED-L02	5610599	686897	Inspect		m	m		36		p	u		x	0	26	h	5	19	m	15			0	0		0	same as J-04 and K-01; less organic matter; fine textured Soil Pit
ED-L04	5610358	686870	Scratch		m	m		23		p	u		x	0	18	h	5	6	m	10			0	10	k	30	Soil is finer and more fragile than ED-I04
ED-L09	5609898	686897	Soil Pit		m	u		53		p	u	r	x	0	25	h	0	16	m	0			0	20	k	40	
ED-L10	5609797	686899	Inspect					30						0	25	hk	0	0	k	0			0	0		0	Identical to L-09a
ED-L11	5609698	686899	Inspect	S	m	r		22	n	p	u	w	x	0	12	h	10	16	m	50			0	10	k	10	lower slope position. Sage brush present
ED-L12	5609597	686899	Inspect		gf	u		59		p	u			0	25	h	0	21	m	0			0	65		0	Same as L-14a/b
ED-L13	5609500	686900	Inspect		gf	u		59		p	u			0	25	h	0	21	m	0			0	65		0	Same as L14 a/b
ED-L14a	5609363	686890	Soil Pit		gf	u		59		p	u			0	25	h	0	21	m	0			0	65		0	Sand is very fragile but supports good veg. Save all
ED-L9a	5609815	686937	Soil Pit					30						0	25	hk	0	0	k	0			0	0		0	calcareous B,C. White skins on bottom of coarse fragments .
ED-M08	5609996	687001	Soil Pit		gf	h	j	30	n	p	u	r	x	0	20	h	40	35	m	80			0	200	k	90	moraine on glaciofluvial. Good gravel pit location.
ED-M11	5609698	686999	Soil Pit	SE	gf	d	m	80	n	g	Plh	m	x	2	15	p	0	10	m	10			0	0		0	dense root mat; OM accumulating. high quality Soil deposits
ED-M12	5609600	687000	Inspect	e				33	k	p	u	r	x	0	17	h	0	20		0			0	0		0	same as M-13. Slightly darker due to lower slope position.
ED-M13	5609500	687000	Scratch	e				33	k	p	u	r	x	0	17	h	0	20		0			0	0		0	more shrubs and agronomics than L-14a/b
ED-M14	5609400	687000	Inspect		gf	u		59		p	u			0	25	h	0	21	m	0			0	65		0	same as L-14a/b. Slightly more silt. Same veg, slope, frags
ED-N06	5610202	687103	Scratch		m	j	r	35		p	u	w	x	0	17	h	5	23	m	25			0	20	k	0	well developed Soil at toe of slope
ED-N07	5610101	687101	Scratch	SW		m	h	80		p	u	r	x	0	10	h	40	30	m	70			0	30	k	70	A is worth saving. Too many CF in subsoil, strip carefully
ED-N08	5609998	687101	Soil Pit					0						0	5		60	15	m	70			0	0		0	super gravel gravelistic extra gravedocious
ED-O05	5610300	687200	Scratch	E	m	r		35		p	u	w	x	0	25	h	0	45	m	0			0	0		0	high quality rec material, supervise stripping
ED-O07	5610097	687200	Soil Pit		gf	j		60		p	Ulh	w	x	0	70	p	0	0		0			0	0		0	high quality rec material, supervise stripping
ED-P01	5610700	687300	Soil Pit		gf			0		g	p	i	at	0	30		0	8	g	0			0	25		0	black chernozem; use special handling. Saline, not calcareous
ED-P05	5610300	687300	Scratch	w	m	m	r	35		p	u	w	x	0	18	h	10	17	m	50			0	20	k	50	
ED-Q05	5610300	687400	Scratch	w	m	m	a	25		p	u	w	x	0	21	h	10	19	m	60			0	20	k	60	
ED-Q07	5610099	687401	Soil Pit	SW	m	d		45	l	p	u	r	x	0	20	h	30	25	m	50			0	0		0	thin Soil, good root penetration
ED-Q10	5609800	687400	Soil Pit		m			60		p	u	r	x	0	30	h	20	40	m	50			0	20	ca	40	Surprisingly good given dryness of site, especially A
ED-R02	5610600	687500	Scratch		m	u		34		p	u	m	x	0	31	m	2	19	m	30			0	0		0	32cm A, non calcareous B, good Soil structure. Double strip.
ED-R03	5610500	687500	Scratch		m			44		p	u	w	x	0	40	h	0	11	m	30			0	0		0	40 cm black chernozem; superb Soil Pit in basin near top of hill.
ED-R04	5610400	687500	Scratch	w	m	m	a	33	x	p	u	w	x	0	17		10	16	m	40			0	20	k	0	
ED-R05	5610300	687500	Scratch	w	m			30	x	p	u	w	x	0	15		0	15		40			0	0		0	above midslope bench.
ED-R07	5610100	687500	Inspect	w				30		p	u	w		0	18	h	5	15	m	50			0	0		0	upper slope. West facing. 18 cm A over very rocky B. Photo 2997.

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
ED-R10	5609800	687500	Soil Pit		m	r		60		p	u	w	x	0	30	h	10	40	m	60			0	20	kj	0	bottom of steep narrow coulee
ED-S04	5610400	687600	Soil Pit		m			44		p	u	w	x	0	40	h	0	11	m	30			0	0		0	40 cm black chernozem; superb Soil in basin near top of hill.
ED-S05	5610300	687600	Inspect	w	m			30	x	p	u	w	x	0	15		0	15		40			0	0		0	Same as S-06. A 18 cm. Photo 2999. Pit 27 cm.
ED-S06	5610200	687600	Scratch		m	m	h	17	k	p	u	w	x	0	17	h	10	13	m	50			0	20	k	40	range in good condition, vigorous grass growth
N-A10	5611595	682710	Inspect					0						0	4	h	5	15	m	60			0	0		0	4cm A on gravel S. Take AB together, use as subsoil
N-A11	5611500	682703	Scratch	SE		j		30		p		r	x	0	12	h	0	20	m	0			0	15	k	0	in drainage bottom . Slightly better than upslope
N-B11	5611497	682800	Scratch	SE	m	m		20	k	p	u	r	x	0	7	h	30	8	m	60			0	0		0	thin dusty A, impenetrable gravel B; much exposed Soil Pit poor
N-B2	5612399	682795	Scratch	SW	m	h		25		p	u	r	x	0	17		20	23		0			0	0	k	0	thin dusty A, 13 cm soft B, 10 cm hard B
N-B3	5612301	682803	Soil Pit	n-ne	m	m	r	50	n	p	u	r	x	0	10	h	5	45	m	35			0	0		0	
N-B4	5612201	682803	Scratch	ne	m	j		0	n	p	u	w	x	0	18	h	0	32	m	20			0	0		0	50 cm of good reclamation material
N-B5	5612095	682800	Soil Pit		r	j		35	n	p	u	r	x	0	12	h	0	14	m	40			0	24	k	50	poor reclamation material
N-B6	5611995	682803	Scratch	s	m	m		15		p	u	r	x	0	12	h	20	0		0			0	40	k	30	very dry and rocky, but supporting good grass growth.
N-C2	5612396	682898	Scratch	sw	m	j	h	40	n	p	u	r	x	0	18	h	5	22	m	40			0	45	k	0	non calcareous AB; top small ridge; cobble/gravel in subsoil
N-C3	5612298	682896	Scratch	sw	m	h		50	n	p	u	w	x	0	33	h	5	22	mk	25			0	10	k	25	Deep A, decent B; most Soil on slope occur at these location
N-C4	5612199	682901	Soil Pit	NE	m	m		30	L	p	u	x	x	0	7	h	5	26	m	10			0	0		0	shallow lithic, bedrock at 33 cm
N-C5	5612095	682904	Scratch		m	m		35	n	p	u	r	x	0	12	h	10	23	m	40			0	15	k	50	very rocky, B is useful but would require screening
N-C6	5612000	682904	Scratch		m	j		0		p	u	r	x	0	12	h	20	23	m	35			0	20	k	50	very rocky
N-D08	5611795	683000	Inspect	se	m	u		0		p	u	r	x	0	10	h	0	8	m	0	12	m	40	0		0	
N-D10	5611601	682994	Scratch	se	m	u		0		p	u	r	x	0	10	h	0	8	m	0	12	m	40	0		0	
N-E02	5612390	683175	Soil Pit		m	u		80	n	p	u	w	x	0	13	h	0	15	m	5			0	32	ca	50	
N-E08	5611939	683186	Soil Pit	E	M	U		50	N	p	p	w	x	0	13	h	0	27	m	5			0	20	ca	0	gravels at BC interface
N-E09	5611883	683275	Soil Pit		L	d	u	40	N	g	P	i	at	0	40	h	0	0		0			0	65	gj	0	saline slough
N-E14	5611199	683100	Soil Pit	SW	m	m		25	k	p	u	r	x	0	12		10	33	m	40			0	30	k	20	avoid C, extremely calcareous/cemented, appeared "rock like"
N-E14	5611191	683137	Soil Pit	NE	M	m	r	60	N	p	u	r	x	0	13	h	0	47	m	10			0	40	k	30	
N-E16	5611005	683102	Soil Pit	S	m	m		40		p	u		x	0	9	h	10	20	m	10			0	40		50	Ah diff. from low slope; surface cobble; dusty/fine fragile Soil
N-E16	5611005	683102	Soil Pit	S	m			33		p	u		x	0	17	h	10	9	m	10			0	49		50	salvage 27 cm
N-F02	5612393	683195	Soil Pit	E	m	u		55		p	u	w	x	0	12	e	0	21	kj	0			0	54	k	0	pale very fine A over darker melanized A
N-F10	5611598	683197	Scratch		gf			30	n	p	u		x	0	17	h	5	23	m	40			0	10	k	0	At toe of /edge of valley bottom
N-F11	5611497	683200	Inspect		u	p	r	28	n	p			x	0	14	h	5	9	m	10	12	BC	10	0		0	ridge top Bb and sage.
N-F13	5611300	683200	Soil Pit	W	m	r		40		p	u	w	x	0	43	h	5	10	m	5			0	10		5	excellent reclamation material, strip A and B separately
N-F16	5610997	683200	Soil Pit			m		35		p	u	r	x	0	15	h	0	15	m	0			0	30	k	0	thin and bony
N-F9	5611696	683201	Soil Pit	d	gl	d		23		g	Pob	p	AM	0	26	hk	0	10	mk	0			0	4	k	0	wet meadow; calcareous to surface but supports dense veg.
N-G04	5612200	683300	Inspect	d	gl	d		24		g	Pob	p	AM	0	26	hk	0	10	mk	0			0	4	k	0	saline slough

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SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
N-G11	5611500	683300	Scratch		u	p	r	28	n	p			x	0	14	h	5	9	m	10	12	BC	10	0		0	ridge top Bb and sage.
N-G12	5611402	683300	Inspect		u	p	r	29	n	p			x	0	15	h	6	10	m	10	12	BC	11	0		0	same as N-G11
N-G14	5611198	683300	Soil Pit		gf	j		60		p	u	w	x	0	70		0	0		0			0	0		0	white salt accumulation. Not carbonate enriched. Salvage all
N-G15	5611101	683300	Soil Pit		gf	r		30		p	u	w	x	0	11	h	10	16	m	10			0	46	k	30	
N-G6	5611998	683298	Inspect	d	gl	d		23		g	Pob	p	AM	0	26	hk	0	10	mk	0			0	4	k	0	calcareous black chernozem from inundation by saline slough
N-G7	5611897	683306	Inspect	d	gl	d		23		g	Pob	p	AM	0	26	hk	0	10	mk	0			0	4	k	0	calcareous black chernozem carbonates leach approx. 5cm
N-G8	5611800	683300	Inspect	d	gl	d		23		g	Pob	p	AM	0	26	hk	0	10	mk	0			0	4	k	0	calcareous black chernozem
N-H09	5611696	683401	Soil Pit	W	m	t	u	36		p	u	w	x	0	22	h	5	15	m	5	10	m	20	10	k	30	on terrace midslope, slight N drainage
N-H10	5611585	683409	Scratch	W-NW	gf	d	u	28		p	Ulh	w	x	0	10	p	5	19	m	20	10	m	30	0		0	
N-H15	5611098	683398	Soil Pit		m	h		10	k	p	u	w	x	0	10	h	0	0		0			0	80	k	0	thin A over hard C. Poor rec value
N-H17	5610900	683400	Soil Pit	S	c	h		20	L	p	u		x	0	15	h	10	9	m	10			0	24	k	95	Take A/B in single strip to lithic contact at 26 cm
N-I05	5612117	683391	Soil Pit	n	m	r		50		p	u	w	x	0	33	h	5	7	AB	5	15	m	20	25		0	lower midslope north facing 35%. Bluebunch junegrass
N-I06	5612003	683401	Scratch	n	m	m		36		p	u	w	x	0	21	h	5	23	m	10			0	10	k	0	Same slope as N-I05 different position
N-I07	5612003	683401	Scratch	n	m	m		36		p	u	w	x	0	20	h	5	21	m	10			0	10	k	0	Use same data sheet as N-I06; 2cm A for higher slope position
N-I08	5612004	683402	Scratch	n	m	m		36		p	u	w	x	0	21	h	5	21	m	11			0	11	k	0	
N-H09	5611696	683401	Scratch	W	m	t	u	36		p	u	w	x	0	22	h	5	15	m	5	10	m	20	10	k	30	W slope on bench
N-H10	5611585	683409	Scratch	W-NW	gf	d	u	28		p	Ulh	w	x	0	10	p	5	19	m	20	10	m	30	0		0	bottom of side valley. Many pocket gophers
N-H4a	5612141	683420	Soil Pit		l	d		27	w	g	Plh	p	at	0	60	h	0	10	m	0			0	0		0	outlet of valley different Soil from saline lakeshore
N-HO4	5612198	683396	Scratch		l	d		30	w	g	Plh	i	at	0	6	h	0	18	g	0			0	40		0	standing water encountered at 40 cm
N-L11	5611500	683800	Soil Pit					0						0	0		0	0		0			0	70	k	0	
N-L14	5611167	683841	Soil Pit	S-SE				0		p	u	r	x	0	10	h	0	20	m	0			0	0		0	
N-U14	5611200	684500	Scratch	SW		j	d	40		p	u	w	x	0	35	h	5	30	m	45			0	0		0	Deep, rich Soil
P-B07	5609897	683201	Scratch	N	m	u		20		p	u	m		0	6	h	0	25	m	1			0	0		0	undulating. Very thin . Strip 20 cm.
P-C07	5609897	683301	Inspect	N	m	u		20		p	u	m		0	6	h	0	25	m	1			0	0		0	dug to B. Same as B-07. blocky compacted, A/B. Platy structure
P-D05	5610098	683401	Scratch					0						0	5	h	0	0		0			0	0		0	windblown, regosol, 5 cm deep.
P-D06	5610002	683402	Inspect		m	r	k	18		p	u	r	x	0	7	h	0	21	m	30			0	0		0	same E-06
P-D09	5609700	683400	Scratch		a	l		17	L	p	u	w	x	0	0		0	0		0			0	30		0	bench on highwall
P-D10	5609600	683400	Soil Pit		a	l		20		p	u	w	x	0	0		0	0		0			0	160	k	0	calcareous overburden
P-D11	5609500	683400	Inspect		a	l		20		p	u	w	x	0	0		0	0		0			0	160	k	0	calcareous overburden
P-D14	5609198	683399	Inspect		a	l		20		p	u	w	x	0	0		0	0		0			0	160	k	0	calcareous overburden
P-E04	5610195	683502	Inspect		d			0		p	u	r	x	0	10	h	0	6	BC	40			0	35	k	0	same as D-05 w/ better veg growth. Potential 10cm rec material
P-E05	5610097	683501	Inspect		d			0		p	u	r	x	0	10	h	0	0		0			0	35	k	0	same as D-05 w/ better veg growth. Potential 10 cm rec material
P-E06	5610000	683501	Scratch		m	r	k	18		p	u	r	x	0	7	h	0	21	m	30			0	0		0	thin/fragile/rocky Soil Pit. Not calcareous, salvage 18 cm

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
P-E06a	5609961	683504	Soil Pit		m			64		p	u			0	31	p	0	33	m	10			0	20		10	Deep A&B. Non-calcareous C. Salvage A, B separately.
P-E07	5609900	683501	Inspect		e			15		p	u	w		0	6	h	0	9	m	0			0	0		0	Thin fragile Soil; regosol; 15cm rec material. outcrops nearby
P-E10	5609599	683503	Scratch		a	l		17		p	u	w	x	0	65	p	20	0		0			0	35	k	0	calcareous fill over mine rubble. Effervescent to surface.
P-E11	5609498	683502	Inspect		a	l		17		p	u	w	x	0	33	p	10	0		0			0	30	k	0	calcareous fill over mine rubble. Effervescent to surface.
P-F05	5610097	683601	Inspect					0						0	10		0	0		0			0	0		0	calcareous fill. Pit close to max extent of fill.
P-F06	5610000	683599	Inspect					0						0	10		0	0		0			0	0		0	same as F-05. Salvage 10 cm for A. Many cobbles on surface.
P-G05	5610097	683701	Scratch		a			18		p	u	w	x	0	0		0	0		0			0	40	k	40	overburden with native ingress
P-J07	5609900	684000	Soil Pit		m	h		75		p	u	r	x	0	20	h	5	30	mk	15			0	50	k	15	native Soil on cut bank
P-K04	5610200	684100	Soil Pit		m	m		65		p	u	w	x	0	29	h	4	15	k	10			0	20	k	50	edge of native overburden interface
P-K05	5610095	684100	Scratch		m	d	u	40	k	p	Plh	m	ft	0	40	h	2	22	m	2			0	0		0	native grassland developed in a hollow
P-K06	5609997	684099	Scratch	l	m	j	u	25		p	u	w	x	0	24	h	0	19	mk	5			0	0		0	salvage 24, first strip
P-K08	5609798	684100	Scratch		m			27		p	u	r	x	0	27	h	0	20		0			0	0		0	native rg toe of slope
P-K11	5609498	684099	Inspect			m		23						0	15	h	0	5	m	0	10	k	40	0		0	in steep gully; has 20cm suitable material but is quite steep
P-L03	5610297	684199	Inspect					0						0	0		0	0		0			0	0		0	crested on over burden; calcareous to surface edge of fill 15 m S
P-L05	5610094	684199	Scratch	N				0						0	15	h	0	15	m	50			0	0		0	N facing, midslope position. Gravelly B. Strip 15 cm A separately
P-L06	5609997	684200	Inspect	l	m	j	u	25		p	u	w	x	0	15	h	0	19	mk	5			0	0		0	level hill top. 15cm light A in native.
P-L07	5609900	684200	Scratch	S	m	m		0		p	u	r	x	0	22	h	15	20	m	30			0	0		0	near hill crest in native rg
P-L08	5609797	684199	Scratch	E	d	r		30		p	u	r	x	0	17	h	10	19	m	0			0	0		0	native rg midslope
P-M05	5610097	684300	Soil Pit		gl	d		56		g	plh	i	At	2	33	h	0	33		0			0	20		0	meadow ringed by willows; some sedges. Heavily grazed
P-M07	5609897	684300	Scratch	l	m	d	j	25		p	Ucb	w	ft	0	16	h	0	8	AB	10	12	m	30	0		0	depressional area at edge aspen copse
P-M08	5609798	684302	Inspect	S	d	h		25		p	u	r	x	0	15	h	10	0		0			0	0		0	sparse native rg near rock out crops
P-M09a	5609629	684335	Soil Pit	S	m	r		38		p	u	r	x	0	17	h	6	32	m	22			0	75	k	0	Southern slope, 35%
P-M10	5609598	684299	Inspect	S	m	r		39		p	u	r	x	0	18	h	8	32	m	22			0	75	k	0	Slightly deeper A due to slope position
P-N07	5609900	684400	Scratch	W	d	m		27			u	r	x	0	25	h	2	15	m	20			0	0		0	angular cobbles in B
P-N07a	5609872	684394	Soil Pit		m	h		43	L	p	u	w	x	0	22	h	0	15	m	0			0	0		0	deep topsoil developed on weathered rock outcrop
P-N10	5609597	684401	Inspect	S	m	r		38		p	u	r	x	0	17	h	6	32	m	22			0	75	k	0	many outcrops on hillside. B variable, C calcareous & unusable
P-O02	5610397	684500	Scratch		m	u		18		p	u		x	0	16	h	0	7	mk	40			0	20	k	0	native BB on gently undulating terrain
P-O05	5610096	684501	Scratch		a	j	b	30		p	u	w	x	0	30	pk	0	0		0			0	20	k	50	disturbed seeded to crested decent colour good plant growth
P-O06	5610000	684500	Soil Pit	l	a	b	j	17		p	u	w	x	0	0		0	0		0			0	200	k	50	undifferentiated admixed material
P-O06a	5609927	684480	Soil Pit		m	r		30		p	u	r	x	0	17	h	0	18	mk	30			0	35	k	0	midslope edge of pit rocky and steep
P-P02	5610398	684599	Inspect		m	u		18		p	u		x	0	16	h	0	7	mk	40			0	20	k	0	Salvage 20 cm
P-P03	5610296	684598	Scratch	E	m	j		30		p	u	w	x	0	20	h	0	0	10	5	10	m	10	0		0	gentle east facing slope 55 m n of fill
P-P05	5610099	684602	Scratch	N	d	h		35		p	u	w	x	4	18	h	0	11	m	0			0	20	k	0	native grasses and firs on north facing rocky ridge

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
P-Q02	5610398	684700	Scratch	NE	m	m		18		p	u	w	x	0	18	h	20	7	m	20	10	m	40	0		0	Midslope NE facing rolling terrain
P-Q03	5610292	684702	Inspect	E	m	j		30		p	u	w	x	0	20	h	0	0	10	5	10	m	10	0		0	same community and aspect as p-p03
P-R02	5610398	684802	Inspect	E	m	m		18		p	u	w	x	0	15	h	30	7	m	35	10	m	40	0		0	Midslope NE facing rolling terrain
P-S02	5610400	684901	Scratch	W	m	h		28		p	u	w	x	0	23	h	0	13	m	0			0	20	k	5	slope 22%. Deep Soil few to no rocks
P-S04	5610197	684901	Scratch		e	w	h	20		p	u	w	x	13	8	h	0	21		0			0	0		0	lots of Soil between rock outcrops, need an excavator to strip
P-T02	5610400	685002	Inspect	W	m	h		28		p	u	w	x	0	20	h	10	13	m	20			0	20	k	5	slightly more rock than p-s02. No effervescence in A. pic 2448-49
P-T05	5610099	684998	Scratch		d			27	L	p	u	w	x	0	7	h	0	20	m	0			0	0		0	on ridge top in fir parkland many RO and large boulders.
P-U02	5610397	685099	Soil Pit		m	j		40	n	p	u	w	x	0	12	p	0	20	m	0			0	25	k	0	dug by hand on cut bank. Good textures and productivity .
P-U03	5610299	685101	Scratch	N	m	r		30		p	u	w	x	0	22	h	0	15	m	20		m	0	10		0	35% slope. Few coarse fragments in A
P-U04	5610197	685101	Inspect	E	m	u		18						0	15		30	7	m	20		m	0	0		0	bb Rf 9% E slope. Dk br Chernozem. ridges strike 294
P-U05	5610096	685099	Scratch	NE	m	m		35		p	u	w	x	0	18	h	5	23	m	10			0	10	k	0	15%. Grass less dense with low growing pussytoes
P-U10	5609599	685101	Scratch	N	m	M		29		P	u		x	0	17	h	0	12	m	20	10	Ck	20	20	k	20	salvage 30 cm, single strip
P-U11	5609495	685099	Scratch	W	m	m		30	L	p	u	r	x	0	17	h	0	13	m	0			0	0		0	salvage A B together
P-U12	5609400	685100	Scratch	N	m	r		36		g	u	w	ft	0	20	h	0	20	m	2			0	20		5	salvage 40 cm. E of rock outcrops on ridge; strikes East to W12
P-V08	5609799	685201	Scratch		gf	m		26		p	u	m	x	0	17	h	10	18	m	10			0	0		0	Drainage edge; B has more clay than W-09. Not calcareous
P-V09	5609697	685201	Soil Pit					0		p	U	m	x	0	12	p	50	10	Ck	60			0	15	k	60	Soil disturbed by exploration activities.
P-V10	5609597	685201	Scratch					29	x	p	u		x	0	21	h	0	9	m	20	10	k	20	20	k	20	salvage 30 cm, single lift
P-V11	5609499	685201	Scratch		m			25		p	u		x	0	18	h	0	25	m	0			0	0		0	salvage 32 cm of A/B in single lift. B contains cobbles beyond
P-V12	5609331	685279	Soil Pit		m	u		45	N	p	u	r	x	0	10	h	0	30	m	0			0	10	ca	0	Ah is friable, B is loose, quite fragile not as dusty as TSF Soil
P-V12	5609400	685199	Scratch	E	d	m		0		p	u	w	x	0	11	h	5	20	m	5			0	14		0	strip 30 cm single lift. Ridge strikes E to W12
P-W05	5610415	685057	Soil Pit	N-NE	m			70	N	p	u	w	x	0	30	h	0	30	m	0			0	40	k	20	excellent grass growth and Soil Pit quality
P-W08	5609800	685301	Scratch		m			26		p	u		x	0	21	h	10	17	m	20			0	20	k	0	33 cm no fizz , first strip save 27 cm. Native grass
P-W09	5609700	685301	Scratch		m	j	m	40	n	p	u	w	x	0	26	h	0	19	m	0	10		0	0		0	lower B more compacted than upper B. strip 40 cm in single lift
P-W10	5609595	685301	Inspect					25	x	p	u		x	0	18	h	0	9	m	20	10	k	20	20	k	20	salvage 25 cm, single lift
P-W11	5609500	685301	Inspect		m			25		p	u	w	x	0	25	h	10	21	m	0			0	20	k	10	Salvage 45 cm, single strip as A and B are very similar
P-W12	5609400	685300	Scratch		m			25		p	u	w	x	0	25	h	10	21	m	0			0	20	k	10	Salvage 45 cm, single strip as A and B are very similar
P-W9a	5609650	685298	Soil Pit		m	j	m	32		p	u	w	x	0	19	h	0	14	m	30			0	30		50	Soil Pit on bank of drill site. Many coarse fragments at 21 cm
P-X05	5610099	685401	Soil Pit			j		0		g	p	w	ft	0	15	h	0	21		0			0	29		0	bottom of valley, near water course. Point offset.
P-X06	5609999	685402	Soil Pit	W	gf	r		50		g	g	i	ta	0	24	h	5	9	m	50			0	10	1gj	70	in drainage course 26m at 134 degrees from original point
P-X08	5609795	685360	Soil Pit	E		h		26	n	p	u		x	0	21	h	0	10	m	0			0	30		0	moved point to edge of cutbank
P-X09	5609696	685399	Scratch	S	c	u		20		p	u	r	x	0	15	h	0	8	k	40			0	17	k	60	Thin A over angular calcareous colluvium from nearby outcrop.
P-X10	5609599	685401	Scratch	SE	c	u		18		p	u	r	x	0	15	h	10	10		50			0	0		0	strip 15 cm. On low rocky ridge striking SE
P-X11	5609500	685397	Scratch	S	m	u		23		p	u	w	x	0	14	h	5	15	m	20	10	m	30	10	k	40	BC interface is too hard to penetrate with hand tools

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P-Y07	5609900	685502		W	m	m		25		p	u	w	x	0	25	h	15	8	m	15			0	33	k	0	
P-Y08	5609800	685502	Scratch	W	m	u		22		p	u	r	x	0	22	h	5	10	m	50			0	0		0	20% slope. BB rabbit brush. Salvage 20 cm
P-Y10	5609595	685499	Scratch	SE	l	d		26		g	Plh	m	Ft	3	19	hk	0	11	k	0			0	20	k	40	calcareous to surface but supporting excellent grass
P-Z03	5610270	685549	Soil Pit	N-NE	m	u		50	N	p	u	w	x	0	12	h	0	28	m	0			0	60	k	0	2 B's: B soft 12-30; B hard 30-40. mistaken as non-calcareous C
P-Z07	5609700	685601		W	m	d		35		p	u	w	x	0	26	h	0	30	m	10			0	0		0	bottom of W draining valley. Excellent Soil. No CF until 45 cm
P-Z08	5609799	685601	Scratch	N	m	u		25		p	u	w	x	0	25	h	0	12	m	0	10	m	40	0		0	from z-07 to z-08 valley has very rich Soil
P-Z09	5609699	685599	Scratch	S	m	u		24		p	u	w	x	0	25	h	5	10	m	10	8	m	30	0		0	S facing. Upper slope. A/B similar colour salvage 35 cm together
P-Zo7a	0	0		W	m	m		30		p	u	w	x	0	21	h	5	12	m	10			0	20	k	30	
T-B22	5610156	679048	Soil Pit		m	j	h	35		p	u	w	x	2	6	e	0	49	m	12			0	55	k	20	lower portion of B very compact
T-B24	5609997	679119	Soil Pit	NE	gf	m		40		p	u	w	x	2	3	e	0	37	m	0			0	10	ca	20	Ae is like flour, Ck finer texture and less compact than Cca
T-C19	5610457	679167	Soil Pit	n-nw	gf	j	h	40		p	u	w	x	0	8	e	0	32	m	5			0	55	k	0	complex terrain, bisected and folded
T-C23	5610122	679202	Soil Pit		gf	j	h	45		p	u	w	x	4	0		0	50	m	5			0	50	k	10	ugly dry forest, strip 50 cm
TC29	5609558	679232	Soil Pit		gf	m		40		p	u	r	x	3	6	e	0	39	m	10			0	50	k	10	CF mainly cobbles along C interface
T-D18	5610608	679297	Soil Pit	n	gf			0					x	3	0		0	45	m	0			0	45	k	15	dry needles and bark. C breaks platy
T-D23	5610100	679300	Soil Pit		gl	j	d	0		g	p	w	x	0	20	hca	0	10	mk	0	15	BC	0	10	k	0	Rec material above/below C1. C1 not suitable for rec. No admix
T-D29	5609512	679325	Soil Pit	N		j		50		p	u	r	x	2	0		0	45	m	0			0	55	k	0	
T-E17	5610700	679400	Soil Pit					0				r	x	2	4	e	0	26	m	15			0	70	k	55	generally undesirable for reclamation
T-E24	5610008	679411	Soil Pit			j		60		g	p	i	o	0	130	h	0	0		0			0	70		0	Great Soil, huge volumes stockpile separately from brunisol
T-E28	5609601	679399	Soil Pit	N-NE		m		50		p	u	r	x	2	0		0	43	m	0			0	52	k	25	
T-E29	5609541	679429	Soil Pit	N-NE		m		0		p	u	r	x	2	0		0	35	m	0			0	55	k	10	Very dusty Soil, litter primarily dead grass and needles
T-E30	5609420	679425	Soil Pit	n		m		50	X	p	u	r	x	0	6	e	0	44	m	5			0	3	ca	0	restriction of 99% of root at Cca
T-F06	5611847	679531	Soil Pit	S	m	m		40		p	u	r	x	2	2	e	0	38	m	0			0	10	ca	70	brittle environment poor nutrient cycling
T-F17	5610731	679556	Soil Pit			d		50		g	p	w	o	0	17	h	0	20	m	5			0	63	k	10	edge of large meadow, spray before salvaging?
T-F22	5610223	679538	Soil Pit	sw	gf	j		45		p	u	w	x	2	0		0	45	m	5			0	5	ca	0	
T-F24	5609992	679503	Soil Pit		f	j		70		g	f	i	at	4	15	hca	0	40	mca	0			0	50		0	Edge of At/Sw to Fd transition
T-F27	5609711	679553	Soil Pit	N-NE		m		50		p	u	w	x	1	6	e	0	44	m	0			0	66	k	0	
TG-07	5611700	679600	Soil Pit	N	m	j		35		p	u	r	x	0	3	e	0	30	m	0			0	17	ca	0	Sparse grass growth
TG-09	5611500	679600	Soil Pit	SW	gl	j		30		p	u	r	x	0	0		0	30	m	0			0	65	k	0	like flour, poor development, no structure
T-G16	5610801	679599	Scratch		m	u		15		p	u	r	x	3	3	e	0	20	m	0			0	0		0	
T-G18	5610612	679634	Soil Pit	n-ne	m	m	h	45		p	u	w	x	0	4	e	0	41	m	5			0	50	k	25	
T-G19	5610496	679640	Soil Pit	N	gf	j		30		p	u	w	x	2	6	e	0	22	m	5			0	22	k	5	
T-G20	5610396	679628	Soil Pit	sw	gf	j	h	50		p	u	r	x	1	6	e	0	31	m	5	13	BC	5	45	k	10	
T-G21	5610303	679612	Soil Pit	sw	gf	j	h	0		p	u	r	x	1	4	e	0	36	m	0			0	60	k	0	dusty/fragile Soil, no structure. C breaks to pebble size chunks

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
T-G24	5610049	679589	Soil Pit			j		60		g	p	i	o	0	130	h	0	0		0			0	70		0	Great Soil, huge volumes stockpile separately from brunisol
T-G25	5609900	679600	Soil Pit					0		g	u		o	0	10	h	0	50	m	0			0	5		90	buried A horizon beneath gravel seem 65 -115+
T-G26	5609797	679607	Soil Pit	N-NW		m		50			u	w	x	2	5	e	0	32	m	0			0	88		0	C is useful as reclamation material
T-G27	5609710	679602	Soil Pit		gf	m		60		p	u	r	x	0	8	e	0	37	m	3			0	55	k	10	vigorous rough fescue
T-G28	5609598	679633	Soil Pit		gl	j		35		p	u	w	x	0	6	e	0	24	m	0			0	30	k	0	Very fine textured
T-H05	5611893	679691	Soil Pit	s	m	m		60		p	u	r	x	0	6	e	0	34	m	0			0	90	k	0	very fragile, C less compacted than nearby areas
T-H14	5611014	679734	Soil Pit	sw	gl	j		40		p	u	w	x	1	0		0	40	m	0			0	50		0	Salvage to gravel seam, double strip B/C subsoil Pit; good for rec
T-H21	5610299	679725	Soil Pit		gf	j	h	0		p	u	r	x	1	8	e	0	21	m	0	10	BC	10	60	k	15	
T-H22	5610206	679692	Soil Pit	level	gf	j	h	40		p	u	r	x	1	8	e	0	27	m	0	10	BC	10	45	k	15	Salvage 45 cm
T-H25	5609868	679686	Soil Pit	N-NW		j	h	50		p	u	w	x	2	10	h	0	40	m	5			0	45	k	10	Drainage course 60 m at 200 deg, very productive grasses
T-H29	5609521	679701	Soil Pit	NE	m	j		60		p	u	w	x	2	6	e	0	34	m	0			0	25	k	15	solid rock at hole bottom. Assume a large boulder, not bedrock
T-H30	5609414	679734	Soil Pit		gl	j		45		p	u	w	x	0	6	e	0	39	m	0			0	50	k	7	C is finer textured but very compact, strip 45 cm
TI-10	5611400	679800	Soil Pit		m	j	h	40		p		r	x	0	8	e	5	27	m	7			0	75	k	25	on ridge above low meadow, Soil Pit very fragile and dusty
TI-13	5611116	679766	Soil Pit	sw	u	j	d	40		p	u	r	x	0	8	e	40	27	m	10			0	60	k	15	Lots of rock!
T-I19	5610516	679782	Soil Pit		gf	j		50		p	u	w	x	3	6	e	0	44	m	5			0	20	ca	10	
T-I20	5610392	679809	Soil Pit	n-ne	gf	j		35		p	u	r	x	2	4	e	0	31	m	15			0	65	k	0	SiC texture and no CF in C. could be used to bolster topsoil Pit
T-I26	5609788	679762	Soil Pit					0		p		w	x	2	8	e	0	25	m	0			0	70	k	10	
T-I27	5609711	679831	Soil Pit					0		p		w	x	2	8	e	0	37	m	0			0	55	k	15	
T-I30	5609400	679831	Soil Pit	e	gl	j		45		p	u	w	x	0	10	e	0	35	m	0			0	85	k	0	proximal to drainage near Jacko lake ranch fence
T-J07	5611700	679900	Soil Pit	S-SE	L			70	N	p	u	r	x	0	6	h	0	7	m	0	14	mk	0	13	ca	0	
T-J11	5611269	679866	Soil Pit		gl	j		40		p		r	x	0	6	e	0	39	m	0			0	10	ca	20	top 45cm fine textured/reasonably developed for forest Soil Pit
T-J12	5611183	679849	Soil Pit	level	gl	p		45		p	u	r	x	0	6	e	0	39	m	5			0	55	k	0	platy A; C breaks into angular chunks
T-J17	5610700	679900	Scratch					30		p	u	r	x	0	6	e	0	24	m	10			0	0		0	Not calcareous, not overly rocky. Strip 30 cm.
T-J21	5610303	679886	Soil Pit		gf	j	r	0		p	u	r	x	0	6	e	0	14	m	0			0	80	k	0	C has a favourable texture for rec use if limited for material.
T-J28	5609620	679911	Soil Pit		gf	j	h	0		p	u	r	x	1	6	e	0	49	m	5			0	50	k	10	strip 55 cm
T-J29	5609508	679916	Soil Pit	N	gf	h	j	45	n	p	u	w	x	0	8	e	0	32	m	0			0	60	k	10	strip 40
T-K05	5611900	680000	Soil Pit	130	m	m	r	130	N			R	x	0	20	h	0	25	m	0			0	85	k	60	panorama 3171-3
T-K09	5611547	679976	Soil Pit			d		50		g	P	i	ft	0	27	h	0	9	m	0			0	18	gj	0	small shells present in gleyed C
T-K10	5611400	680000	Soil Pit					40		g	p	i	ot	0	12	h	0	33	m	0			0	55	gjk	5	edge of low meadow, no trees or stumps
T-K12	5611191	679967	Soil Pit	level	gl	p		40		p	u	r	x	0	8	e	0	32	m	0			0	60	k	0	
T-K22	5610211	679990	Soil Pit	level	m	j	l	0		p	u	w	x	0	8	e	0	47	m	0			0	53	k	0	rockier than T-J21
T-K23	5610164	680047	Soil Pit		m	j		30	K	p		r	x	1	6	e	0	31	m	10			0	48	k	10	white skins on coarse fragments
T-K28	5609661	680018	Soil Pit	level		j		40		p	u	r	x	2	8	e	0	32	m	10			0	85	k	15	

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T-K30	5609438	679998	Soil Pit	N	gf	m		30		p	u	w	x	1	8	e	0	22	m	0			0	80	k	20	B paler than nearby Soil Pits
T-L03	5612100	680100	Soil Pit	S	m	m	h	0		p	u		x	0	10	h	0	30	m	50			0	60	k	60	miserable rocky subsoil
T-L12	5611200	680100	Soil Pit	w	gl	j		35		p	u	w	x	0	6	e	0	29	m	0			0	70	k	0	very pale A
T-L23	5610137	680147	Soil Pit		gf	j		0		p	u	r	x	1	9	e	0	21	m	0			0	60	k	0	band of weathered quartz at BC transition
T-L26	5609807	680113	Soil Pit		gf	j	r	0		p	u	w	x	0	8	h	0	22	m	10			0	25	k	35	in clearing on ridge top, strip 30 single lift
T-L28	5609655	680124	Soil Pit		m	j		40		p	u	r	x	1	8	e	0	32	m	10			0	55	k	15	
T-L30	5609402	680101	Soil Pit	N	U	m	H	40		p	u	w	x	0	8	e	0	32	m	5			0	60	k	15	Soil crusts and cryptograms for litter
T-M10	5611405	680233	Soil Pit		m	j		35		p	u	r	x	0	6	e	0	34	m	15			0	10	ca	15	flat open field, heavily grazed
T-M12	5611203	680230				j		40	N	p	u	w	x	0	8	e	0	27	m	15			0	10	ca	15	Strip 35 cm. C breaks into small pebbly chunks.
x	5609400	685301	Soil Pit					0						0	30		0	15		0			0	0		0	dark B; similar to A. Salvage 45 cm.
x	5612098	683300	Inspect					0						0	60		0	0		0			0	0		0	saline slough
x	5611738	683275	Inspect					0						0	60		0	0		0			0	0		0	calcareous black chernozem; see previous field sheet
x	5609614	686714	Soil Pit					0						0	0		0	25	p	0			0	0		0	photo 2565. BGC drill site.
x	5611798	683401	Inspect	n	m	m		36		p	u	w	x	0	16	h	5	23	m	10			0	10	k	0	
T-A11	5611301	678999	Soil Pit	N-NW	gf	m		0	n	p	u	w	x	0	5	e	0	15	lifluct	0	35	m	0	75	k	0	
T-B11	5611301	679099	Soil Pit	NE				40	n	p	u	w	x	4	5	e	0	35	m	0	0		0	90	k	15	
T-C12	5611228	679222	Soil Pit	N		m	r	0	n	p	u	w	x	0	8	h	0	20	m	0	22	BC	10	50	k	15	calcareous skins on CF
T-D12	5611194	679293	Soil Pit	N		m		0	n	p	u	w	x	1	10	h	0	35	m	0	0		0	25	platy	0	grasses scalp off easily
T-D14	5611050	679294	Soil Pit	N	gf	m	r	0	n	p	u	w	x	5	4	h	0	6	m	0	30	m	0	25		0	
T-E13	5611092	679391	Soil Pit	N				35	n	p	u	r	x	1	5	e	0	20	m	20	0		0	80		15	pocket gophers
T-I16	5610831	679822	Soil Pit		gf	m		40	x	p	u	r	x	0	4	e	0	36	m	0	0		0	54	k	10	bare earth between bunch grasses
T-K18	5610669	680032	Soil Pit		gl	m		100	n	p	u	r	x	2	2	e	0	13	m	0	35	BC	0	60	k	10	
T-L18	5610589	680100	Soil Pit		gf	l		40		p	u	r	x	2	6	h	0	34	m	5	0		0	50	k	10	platy C ; hard, partial root penetration barrier. Moister than L19
T-L19	5610525	680100	Soil Pit					0	n	p	u	r	x	4	1	e	0	29	m	2	0		0	65	k	10	
T-A11	5611301	678999	Soil Pit	N-NW	gf	m		0	n	p	u	w	x	0	5	e	0	15	lifluct	0	35	m	0	75	k	0	
T-B11	5611301	679099	Soil Pit	NE				40	n	p	u	w	x	0	5	e	0	35	m	0	0		0	90	k	15	
T-C12	5611228	679222	Soil Pit	N		m	r	0	n	p	u	w	x	0	8	h	0	20	m	0	22	BC	10	50	k	15	white skins on CF
T-D12	5611194	679293	Soil Pit	N		m		0	n	p	u	w	x	0	10	h	0	35	m	0	0		0	25	platy	0	grasses scalp off easily
T-D14	5611050	679294	Soil Pit	N	gf	m	r	0	n	p	u	w	x	0	4	h	0	6	m	0	30	m	0	25		0	
T-E13	5611092	679391	Soil Pit	N				35	n	p	u	r	x	0	5	e	0	20	m	20	0		0	80		15	pocket gophers
T-F14	5611001	679499	Soil Pit					35	n	p	u	r	x	0	6	e	0	35	m	0	0		0	50	k	10	
T-G15	5610944	679598	Soil Pit					40	n	p	u	r	x	0	8	h	0	32	m	10	0		0	60	k	10	White skins on all rocks. Single strip 40 cm
T-H15	5610902	679715	Soil Pit					40	n	p	u	r		0	6	h	0	34	m	0	0		0	60	k	0	

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T-I16	5610831	679822	Soil Pit		gf	m		40	x	p	u	r	x	0	4	e	0	36	m	0	0		0	54	k	10	bare earth between bunch grasses
T-J16	5610815	679906	Soil Pit			m		40	k	p	u	r	x	0	3	e	0	34	m	0	0		0	50	k	25	
T-J19	5610501	679899	Soil Pit	level		l		40	k	p	u	r	x	0	8	e	0	32	m	0	0		0	60	k	0	
T-K16	5610761	679994	Soil Pit	level		l		30	n	p	u	r	x	0	2	e	0	24	m	0	0		0	70	k	0	
T-K18	5610669	680032	Soil Pit		gl	m		100	n	p	u	r	x	0	2	e	0	13	m	0	35	BC	0	60	k	10	
T-K19	5610538	679994	Soil Pit	level	gf	l		40	n	p	u	r	x	0	8	e	0	32	m	0	0		0	45	k	0	
T-L18	5610589	680100	Soil Pit		gf	l		40		p	u	r	x	0	6	h	0	34	m	5	0		0	50	k	10	platy C; hard, partial root penetration barrier. Moister than L19
T-L19	5610525	680100	Soil Pit					0	n	p	u	r	x	0	1	e	0	29	m	2	0		0	65	k	10	
TP14-019	5606538	682217	KP_Excavation												30			0									Silty; SAND; some gravel; trace clay [Glacial Till]
TP14-020	5606336	682232	KP_Excavation												15			0									Silty; gravelly; SAND [Glacial Till]
TP14-021	5606408	682039	KP_Excavation												10			0									Silty; SAND; some gravel; trace cobbles; trace clay [Glacial Till]
TP14-022	5606497	681848	KP_Excavation												20			30									Silty; SAND and GRAVEL; some cobbles [Glacial Till]
TP14-023	5606298	681799	KP_Excavation												10			50									Gravelly; SAND; some silt; trace gravel; trace cobble [Glacial Till]
TP14-024	5606218	681985	KP_Excavation												5			0									Silty; SAND [Loess]
TP14-025	5606160	682190	KP_Excavation												20			0									Sandy; SILT; trace gravel [Loess]
TP14-026	5606184	682339	KP_Excavation												30			0									Silty SAND [Loess]
TP14-027	5606322	682508	KP_Excavation												15			20									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-028	5606380	682377	KP_Excavation												20			20									Gravelly; SAND; some silt; trace clay [Glacial Till}
TP14-029	5606517	682575	KP_Excavation												30			40									Silty; gravelly; SAND [Glacial Till]
TP14-030	5606586	682391	KP_Excavation												30			30									Silty; gravelly; SAND [Glacial Till]
TP14-031	5606727	682255	KP_Excavation												20			30									Silty; gravelly; SAND; trace clay [Glacial Till]
TP14-032	5606761	682472	KP_Excavation												20			30									Silty; gravelly; SAND [Glacial Till]
TP14-033	5606681	682607	KP_Excavation												60			40									Silty; SAND; trace cobbles; trace gravel; trace clay [Glacial Till]
TP14-034	5606898	682700	KP_Excavation												30			30									Silty; gravelly; SAND [Glacial Till]
TP14-035	5606946	682515	KP_Excavation												30			20									Silty; SAND and GRAVEL [Glacial Till]
TP14-036	5606909	682334	KP_Excavation												20			40									Silt; gravelly; SAND; some cobble; trace boulder/clay [Glacial Till
TP14-037	5607107	682404	KP_Excavation												20			30									Sandy; GRAVEL; some silt [Colluvium]
TP14-038	5607130	682630	KP_Excavation												50			20									Silty; gravelly; SAND [Glacial Till]
TP14-039	5607052	682826	KP_Excavation												40			30									Sandy; gravelly; SILT; some clay [Glacial Till]
TP14-040	5607268	682771	KP_Excavation												30			40									Silty; gravelly; SAND; trace boulders/cobbles/clay [Glacial Till]
TP14-041	5607417	682649	KP_Excavation												5			25									Silty; gravelly; SAND; trace clay [Glacial Till]
TP14-042	5607535	682810	KP_Excavation												20			50									Silty; gravelly; SAND; trace clay [Glacial Till]
TP14-043	5607748	682774	KP_Excavation												20			20									Silty; gravelly; SAND; trace cobble/clay [Glacial Till]

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TP14-044	5607643	682595	KP_Excavation												30			20									SILT; some sand; trace gravel/clay [Loess]
TP14-045	5607842	682547	KP_Excavation												10			50									Silty; gravelly; SAND; some cobbles; trace clay [Glacial Till]
TP14-046	5607766	682368	KP_Excavation												20			20									Silty; gravel; SAND; some cobbles [Glacial Till]
TP14-047	5607876	682196	KP_Excavation												20			10									sandy; GRAVEL; some cobbles; trace boulders [Glacial Till]
TP14-048	5607881	682196	KP_Excavation												30			0									Silty; gravelly; SAND; some cobble [Glacial Till]
TP14-049	5608061	682071	KP_Excavation												20			10									silty; gravelly; SAND [Glacial Till]
TP14-050	5607945	682701	KP_Excavation												20			0									Silty; SAND and GRAVEL; trace cobble [Glacial Till]
TP14-051	5608121	682508	KP_Excavation												30			20									Silty; gravelly; SAND; trace cobble; trace clay [Glacial Till]
TP14-052	5608263	682362	KP_Excavation												20			10									Silty; gravelly; SAND; trace cobble; trace clay [Glacial Till]
TP14-053	5608266	682169	KP_Excavation												30			20									Silty; GRAVEL and SAND; trace cobbles [Glacial Till]
TP14-054	5608462	682066	KP_Excavation												20			0									Silty; GRAVEL and SAND; trace cobbles [Glacial Till]
TP14-055	5608466	682266	KP_Excavation												20			20									Silty; SAND and GRAVEL; trace cobbles [Glacial Till]
TP14-056	5608457	682464	KP_Excavation												20			20									SAND and GRAVEL; some silt; trace cobbles [Glacial Till]
TP14-057	5608462	681860	KP_Excavation												10			20									Weathered bedrock
TP14-058	5608651	681764	KP_Excavation												10			20									Weathered bedrock
TP14-059	5608270	681963	KP_Excavation												40			20									Silty gravelly; SAND; trace cobbles [Glacial Till]
TP14-060	5608623	682384	KP_Excavation												10			0									Weathered bedrock
TP14-061	5608659	682167	KP_Excavation												10			0									Weathered bedrock
TP14-062	5608671	681973	KP_Excavation												20			10									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-063	5609053	682315	KP_Excavation												20			10									Sandy; SILT and GRAVEL; trace cobbles; trace clay [Glacial Till]
TP14-064	5609039	682544	KP_Excavation												10			0									Silty; SAND and GRAVEL; trace cobbles [Glacial Till]
TP14-065	5609182	682434	KP_Excavation												20			20									silty SAND; some gravel; trace cobbles [Glacial Till]
TP14-066	5609152	682710	KP_Excavation												20			30									Silty; SAND; some gravel; trace cobbles [Glacial Till]
TP14-067	5608950	682718	KP_Excavation												20			20									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-068	5609071	682896	KP_Excavation												10			20									Gravelly; SAND; some silt; trace cobbles [Glacial Till]
TP14-069	5609056	683122	KP_Excavation												30			20									Silty; SAND; some gravel; some cobble; some boulder[Glacial Till
TP14-070	5609088	683214	KP_Excavation												10			20									Silty; SAND and GRAVEL; trace cobbles [Fluvial]
TP14-071	5608843	682481	KP_Excavation												20			40									Silty; gravelly; SAND; some cobbles [Glacial Till]
TP14-072	5608667	682564	KP_Excavation												20			30									Gravelly; SILT and SAND; trace cobbles; trace clay [Glacial Till]
TP14-073	5608566	682813	KP_Excavation												10			40									Sandy; gravelly; SILT; trace cobbles [Glacial Till]
TP14-074	5608933	683183	KP_Excavation												20			40									Gravelly; SILT; some sand; trace cobbles; trace clay [Glacial Till]
TP14-075	5608913	682993	KP_Excavation												20			10									Silty; SAND and GRAVEL; trace cobbles [Glacial Till]
TP14-076	5608889	682875	KP_Excavation												20			0									Silty; SAND and GRAVEL; trace cobbles; trace clay [Glacial Till]

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
TP14-077	5608404	682902	KP_Excavation												40			0									Silty; gravelly; SAND; trace cobbles; [Glacial Till]
TP14-078	5608410	683008	KP_Excavation												20			20									Gravelly; SILT and SAND; trace cobbles [Colluvium]
TP14-079	5608440	683204	KP_Excavation												10			0									Silty; SAND and GRAVEL; trace boulder trace cobble [Glacial Till]
TP14-080	5608435	683424	KP_Excavation												10			40									Silty; gravelly; SAND; trace cobble [Colluvium]
TP14-081	5608292	683412	KP_Excavation												10			50									Silty; SAND and GRAVEL; trace cobbles [Colluvium]
TP14-082	5608199	683209	KP_Excavation												20			20									Silty; SAND and gravel; trace cobble [Glacial Till]
TP14-083	5608059	683262	KP_Excavation												30			0									Gravelly; silty; SAND; trace cobbles; trace clay [Glacial Till]
TP14-084	5607884	683305	KP_Excavation												30			20									Silty; SAND and GRAVEL; trace cobble [Glacial Till]
TP14-085	5607742	683444	KP_Excavation												20			30									Silty; gravelly; SAND; trace cobbles; trace clay [Colluvium]
TP14-086	5607548	683723	KP_Excavation												20			40									Silty; gravelly; SAND ; trace cobbles [Colluvium]
TP14-087	5607713	683687	KP_Excavation												10			20									Silty; SAND and GRAVELLY; trace cobble [Glacial Till]
TP14-088	5607869	683583	KP_Excavation												40			20									SAND and GRAVEL; trace cobbles [Colluvium]
TP14-089	5607593	683562	KP_Excavation												100			0									Sandy; SILT; some gravel/clay [Weathered Bedrock / Colluvium]
TP14-090	5607548	683466	KP_Excavation												10			30									Silty; SAND and GRAVEL; some cobble; trace boulder [Glacial Till]
TP14-091	5607801	683156	KP_Excavation												10			10									Silty; gravelly; SAND; trace cobbles; trace clay [Glacial Till]
TP14-092	5607986	683071	KP_Excavation												30			0									Silty; gravelly; SAND; trace cobbles [Colluvium?]
TP14-093	5608171	683064	KP_Excavation												10			20									Silty; SAND and GRAVEL; some cobble; trace boulder [Glacial Till]
TP14-094	5608080	682855	KP_Excavation												20			10									Silty; gravelly; SAND; some cobbles [Colluvium?]
TP14-095	5608246	682661	KP_Excavation												10			30									Silty; SAND and GRAVEL; some cobbles [Glacial Till]
TP14-096	5608440	682663	KP_Excavation												10			20									Silty; gravelly; SAND; trace cobbles; trace clay [Glacial Till]
TP14-097	5607632	682973	KP_Excavation												10			0									Sandy; gravelly; SILT; trace cobbles; trace clay [Glacial Till]
TP14-098	5607854	682929	KP_Excavation												10			20									Gravelly; silty; SAND; some cobbles [Glacial Till]
TP14-099	5607501	683107	KP_Excavation												10			20									Sandy; gravelly; SILT; trace cobbles; trace clay [Glacial Till]
TP14-100	5607595	683271	KP_Excavation												10			50									Gravelly; silty sand; some cobbles; trace clay [Glacial Till]
TP14-101	5607402	683327	KP_Excavation												20			70									Sandy; SILT; some gravel; some cobbles; trace clay [Glacial Till]
TP14-102	5607357	683387	KP_Excavation												10			140									Silty; SAND; some gravel; some cobbles; trace clay [Glacial Till]
TP14-103	5607392	682936	KP_Excavation												20			30									Silty; gravelly; SAND; trace cobbles; trace clay [Glacial Till]
TP14-104	5607211	682984	KP_Excavation												30			0									Silty; gravelly; SAND; trace cobbles; trace clay [Glacial Till]
TP14-105	5607268	683153	KP_Excavation												20			0									sandy GRAVEL; some silt [Fluvial]
TP14-106	5607202	683281	KP_Excavation												20			30									Silty; SAND; trace gravel; trace clay [Fluvial]
TP14-107	5607035	683102	KP_Excavation												20			0									SILT and SAND; trace gravel; trace clay [Loess]
TP14-108	5606910	682968	KP_Excavation												10			20									Silty; gravelly; SAND; some cobbles [Glacial Till]
TP14-109	5606744	682866	KP_Excavation												10			20									Sandy; SILT; some gravel; trace cobbles [Loess]

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SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
TP14-110	5606761	683101	KP_Excavation												30			110									Sandy; SILT; some gravel [Loess]
TP14-111	5606620	682973	KP_Excavation												20			20									SILT; some sand and gravel [Loess]
TP14-112	5606347	683073	KP_Excavation												10			30									SILT; some sand and gravel [Loess]
TP14-113	5606161	682989	KP_Excavation												5			15									SILT and SAND; some gravel [Glacial Till]
TP14-114	5606398	682915	KP_Excavation												20			10									SILT; some gravel [Loess]
TP14-115	5606530	682732	KP_Excavation												10			20									SILT; some sand; some gravel; trace cobbles [Glacial Till]
TP14-116	5606253	682868	KP_Excavation												10			10									Silty; GRAVEL; some sand; [Glacial Till]
TP14-117	5606130	682895	KP_Excavation												5			10									SILT; some sand; some gravel; some cobbles glacial Till]
TP14-118	5606364	682714	KP_Excavation												10			20									Weathered bedrock
TP14-119	5605896	682778	KP_Excavation												10			80									clayey; SILT; some boulder [Colluvium]
TP14-120	5605820	682779	KP_Excavation												10			30									Sandy; SILT; [Lacustrine]
TP14-121	5606187	682645	KP_Excavation												5			10									e gravel [Loess]
TP14-123	5606099	683090	KP_Excavation												10			5									sandy Gravelly SILT; trace cobbles [Glacial Till]
TP14-124	5605908	683205	KP_Excavation												12			50									VEL; some boulders; some cobbles [Glacial Till]
TP14-125	5605796	683349	KP_Excavation												30			26									SILT; trace gravel [Loess]
TP14-126	5605720	683515	KP_Excavation												8			19									SILT; some gravel; trace boulder [Lacustrine]
TP14-127	5605668	683711	KP_Excavation												5			22									SILT; trace gravel [Lacustrine]
TP14-128	5605543	683865	KP_Excavation												14			28									GRAVEL and SILT; trace cobbles [Fluvial]
TP14-129	5605471	684067	KP_Excavation												13			18									sandy Gravelly SILT; trace cobbles [Glacial Till]
TP14-130	5605624	684133	KP_Excavation												19			50									Gravelly; SILT [Colluvium]
TP14-131	5605829	683786	KP_Excavation												39			35									SILT; some gravel; trace cobbles [Loess]
TP14-132	5605730	683920	KP_Excavation												5			26									Gravelly; SILT [Colluvium]
TP14-133	5605992	683862	KP_Excavation												10			25									Silty; COBBLES; some gravel [Colluvium]
TP14-134	5605839	684218	KP_Excavation												17			65									Gravelly; SILT; trace cobbles [Glacial Till]
TP14-135	5605912	684054	KP_Excavation												14			48									SILT; some gravel; trace cobbles [Glacial Till]
TP14-136	5606048	684130	KP_Excavation												8			44									Gravelly; SILT; trace cobbles [Glacial Till]
TP14-137	5606239	684094	KP_Excavation												7			25									Gravelly; SILT; trace cobbles [Glacial Till]
TP14-138	5606462	683998	KP_Excavation												10			32									Gravelly; SILT; trace cobbles [Glacial Till]
TP14-139	5606172	683958	KP_Excavation												16			25									Gravelly; SILT; some cobbles [Glacial Till]
TP14-140	5606368	683916	KP_Excavation												8			72									SILT; trace gravel [Loess]
TP14-141	5606600	683893	KP_Excavation												8			62									SILT [Loess]
TP14-142	5606499	683731	KP_Excavation												10			21									Gravelly; SILT; trace cobbles; trace sand [Loess]
TP14-143	5606402	683639	KP_Excavation												9			24									Gravelly; SILT; trace cobbles [Glacial Till]

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TP14-144	5606226	683704	KP_Excavation												10			30									Gravelly; SILT; trace cobbles [Glacial Till]
TP14-145	5606135	683538	KP_Excavation												13			7									SILT; some gravel; trace cobbles [Glacial Till]
TP14-146	5606080	683690	KP_Excavation												15			15									Gravelly; SILT; trace cobbles; trace sand [Glacial Till]
TP14-147	5605945	683601	KP_Excavation												7			23									Gravelly; SILT; trace cobbles [Glacial Till]
TP14-148	5606512	683410	KP_Excavation												35			20									Gravelly; SILT; trace cobbles; trace boulders [Glacial Till]
TP14-149	5606288	683368	KP_Excavation												7			28									Gravelly; SILT; some cobbles [Colluvium]
TP14-150	5606099	683299	KP_Excavation												20			25									SILT; some gravel; trace cobbles; trace sand [Glacial Till]
TP14-151	5605975	683405	KP_Excavation												17			31									Gravelly; SILT; trace cobbles; trace sand [Glacial Till]
TP14-152	5606198	683210	KP_Excavation												20			18									SILT and GRAVEL; trace sand; trace cobble [Glacial Till]
TP14-153	5606627	683592	KP_Excavation												14			52									Silty; GRAVEL; some cobbles [Fluvial]
TP14-154	5606792	683498	KP_Excavation												15			35									Silty; GRAVELLY; trace cobbles; trace sand [Glacial Till]
TP14-155	5606730	683746	KP_Excavation												20			27									VEL some silt; trace cobbles [Fluvial]
TP14-156	5606897	683637	KP_Excavation												25			35									valley; SILT; trace cobbles [Fluvial]
TP14-157	5607088	683585	KP_Excavation												15			21									Trace gravel [Loess]
TP14-158	5606528	684447	KP_Excavation												22			14									Trace gravel [Loess]
TP14-159	5606629	684214	KP_Excavation												20			25									Gravelly; SILT; some cobbles [Fluvial]
TP14-160	5606486	684359	KP_Excavation												22			32									Gravelly; SILT; some gravel [Loess]
TP14-161	5606347	684472	KP_Excavation												31			10									SILT [Loess]
TP14-162	5606095	684527	KP_Excavation												21			69									SILT [Loess]
TP14-163	5605993	684380	KP_Excavation												53			17									SILT; trace gravel [Loess]
TP14-164	5605795	684417	KP_Excavation												30			80									Sandy; gravelly; SILT; trace boulders [Glacial Till]
TP14-165	5606183	684326	KP_Excavation												40			30									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-166	5607665	685121	KP_Excavation												20			10									Sandy; gravelly; SILT; trace cobbles [Glacial Till]
TP14-167	5607134	685245	KP_Excavation												30			20									Silty; gravelly; SAND; trace cobble [Reworked fluvial/glacial till]
TP14-168	5607255	685046	KP_Excavation												20			30									Silty; SAND and GRAVEL; trace cobbles [Colluvium]
TP14-169	5607034	684872	KP_Excavation												10			50									Silty; SAND; some gravel; trace clay [Colluvium]
TP14-170	5606925	684860	KP_Excavation												20			90									Silty; SAND and GRAVEL; trace cobbles [Colluvium]
TP14-171	5606767	684818	KP_Excavation												20			30									Sandy; SILT; some gravel; trace cobbles [Loess]
TP14-172	5606405	684973	KP_Excavation												10			10									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-173	5606463	685102	KP_Excavation												20			50									SAND and SILT; trace cobbles; trace gravel [Loess]
TP14-174	5606465	685100	KP_Excavation												20			20									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-175	5606353	685274	KP_Excavation												30			20									Silty; sandy; GRAVEL; trace cobbles [Glacial Till]
TP14-176	5606279	685110	KP_Excavation												20			40									Silty; SAND and GRAVEL; trace cobble; trace boulder [Glacial Till]

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TP14-177	5606518	685288	KP_Excavation												30			40									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-178	5606611	685185	KP_Excavation												30			50									Gravelly; SAND; some silt; some cobbles [Glacial Till]
TP14-179	5606644	685322	KP_Excavation												40			10									Silty; SAND; some gravel; trace cobbles [Colluvium]
TP14-180	5606014	685506	KP_Excavation												30			30									Silty; gravelly; SAND; some cobbles [Glacial Till]
TP14-181	5606093	685227	KP_Excavation												20			10									Silty; SAND; some gravel; trace cobbles; trace clay [Glacial Till]
TP14-182	5606035	684739	KP_Excavation												20			20									Silty; SAND; some gravel; some cobbles; trace clay [Glacial Till]
TP14-183	5606111	684924	KP_Excavation												40			50									Silty; sandy; GRAVEL; trace cobbles [Glacial Till]
TP14-184	5606283	684838	KP_Excavation												20			20									Silty; gravelly; SAND; trace cobbles; trace boulders [Glacial Till]
TP14-185	5605899	684929	KP_Excavation												20			10									Silty; gravelly; SAND [Glacial Till]
TP14-186	5605976	685069	KP_Excavation												30			40									Silty; SAND; some gravel; trace cobbles [Glacial Till]
TP14-187	5605878	685154	KP_Excavation												10			20									SAND; some silt; some gravel; trace [Glacial Till]
TP14-188	5605901	685335	KP_Excavation												50			0									Silty; gravelly; SAND; trace cobbles; trace boulders [Glacial Till]
TP14-189	5605828	685559	KP_Excavation												20			20									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-190	5605631	685516	KP_Excavation												10			20									Silty; gravel; SAND; trace cobbles [Glacial Till]
TP14-191	5605358	685553	KP_Excavation												20			80									d SAND; trace gravel; trace cobbles [Loess]
TP14-192	5605504	685409	KP_Excavation												40			0									Silty; SAND and GRAVEL; trace cobbles [Glacial Till]
TP14-193	5605345	685395	KP_Excavation												30			40									Silty; SAND; trace gravel; trace cobbles [Glacial Till]
TP14-194	5605642	685301	KP_Excavation												20			30									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-195	5605419	685218	KP_Excavation												20			40									Silty; SAND; some gravel; trace cobbles [Glacial Till]
TP14-196	5605280	685218	KP_Excavation												20			10									some gravel; some silt; trace cobbles [Loess]
TP14-197	5605147	685379	KP_Excavation												20			0									Silty; SAND; trace gravel; trace cobbles [Colluvium]
TP14-198	5605333	685071	KP_Excavation												20			0									Silty; SAND; some gravel; trace cobbles [Loess]
TP14-199	5605089	685060	KP_Excavation												30			10									Gravelly; SAND; some silt; trace cobbles [Glacial Till]
TP14-200	5605232	684804	KP_Excavation												30			0									Silty; SAND; some gravel; trace cobbles [Glacial Till]
TP14-201	5605141	684728	KP_Excavation												20			30									Silty; SAND and GRAVEL; trace cobbles [Glacial Till]
TP14-202	5605260	684549	KP_Excavation												20			30									Silty; gravelly; SAND [Glacial Till]
TP14-203	5605619	684494	KP_Excavation												20			30									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-204	5605437	684652	KP_Excavation												10			70									Silty; SAND; trace gravel [Glacial Till]
TP14-205	5605309	684865	KP_Excavation												30			0									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-206	5605547	684832	KP_Excavation												30			0									SAND; some silt; trace gravel [Loess]
TP14-207	5605826	684809	KP_Excavation												20			40									Silty; gravelly; SAND; some cobbles [Glacial Till]
TP14-208	5608050	685102	KP_Excavation												10			20									Silty; SAND; some gravel; some cobbles [Glacial Till]
TP14-209	5608223	685069	KP_Excavation												10			70									Sandy SILT; some gravel; trace cobbles [Colluvium]

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TP14-210	5608413	685021	KP_Excavation												10			40									Sandy SILT; some gravel [Colluvium]
TP14-211	5608749	685170	KP_Excavation												30			20									Sandy SILT; some gravel; trace cobble/boulder [Reworked Fluvial
TP14-212	5608826	685386	KP_Excavation												15			30									Sandy SILT; some gravel; trace cobbles [Glacial Till]
TP14-213	5609015	685505	KP_Excavation												20			20									Sandy; GRAVEL; some silt; some cobbles [Fluvial]
TP14-214	5609127	685595	KP_Excavation												20			50									Sandy; GRAVEL; some silt; some cobbles [Reworked Fluvial]
TP14-215	5609225	685684	KP_Excavation												5			0									GAVEL with some sand and silt [Fluvial]
TP14-216	5608823	684582	KP_Excavation												0			0									Sandy; cobbly; GRAVEL; some silt; trace boulders [Waste Rock]
TP14-217	5608794	684384	KP_Excavation												0			0									Sandy; cobbly; GRAVEL; some silt; trace boulders [Waste Rock]
TP14-218	5608826	684779	KP_Excavation												0			0									Weathered bedrock
TP14-219	5608451	684306	KP_Excavation												0			0									BOULDERS and COBBLES; some gravel and sand [Waste rock]
TP14-220	5608831	684985	KP_Excavation												25			35									Silty; SAND; some gravel; trace cobbles [Glacial Till]
TP14-221	5608453	684494	KP_Excavation												0			0									Gravelly; COBBLES; some boulders; trace sand [Waste Rock]
TP14-222	5608888	685176	KP_Excavation												15			45									Sandy; GRAVEL; some silt/cobbles; trace boulders [Waste Rock]
TP14-223	5608650	684204	KP_Excavation												0			0									Gravelly; COBBLES; some boulders/sand; trace silt [Waste rock]
TP14-224	5609023	685352	KP_Excavation												20			10									Silty; gravelly; SAND; some cobbles; trace boulders [Glacial Till]
TP14-225	5608655	684401	KP_Excavation												0			0									Gravelly; COBBLES; some sand; trace boulders; [Waste rock]
TP14-226	5608746	684930	KP_Excavation												20			10									Silty; SAND; GRAVEL; trace cobbles [Glacial Till]
TP14-227	5608655	684597	KP_Excavation												0			0									Gravel; COBBLES; some sand; trace boulders/ silt [Waste rock]
TP14-228	5608657	684799	KP_Excavation												15			25									Sandy; Gravelly; SILT; some cobbles [Glacial Till]
TP14-229	5608660	684013	KP_Excavation												5			25									Silty; some SAND; some cobbles; trace boulders [Glacial Till]
TP14-230	5608872	683822	KP_Excavation												0			0									Sandy; GRAVEL some silt; some cobbles/boulders [Waste Rock]
TP14-231	5608453	684092	KP_Excavation												10			60									Gravelly; silty; SAND; some cobbles [Glacial Till]
TP14-232	5608849	683993	KP_Excavation												0			0									COBBLES and BOULDERS; some sand; silt [Waste Rock]
TP14-233	5608457	683898	KP_Excavation												15			35									Silty; SAND; some gravel; trace cobbles [Colluvium]
TP14-234	5608831	684198	KP_Excavation												0			0									Sandy; gravelly; COBBLES; trace boulders [Waste Rock]
TP14-235	5608255	683903	KP_Excavation												20			40									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-236	5609054	684281	KP_Excavation												0			0									GRAVEL and COBBLES; some silt; some boulders. [Waste Rock]
TP14-237	5608249	684193	KP_Excavation												10			40									Silty; gravelly; SAND; some cobbles; trace clay [Glacial Till]
TP14-238	5609034	684067	KP_Excavation												10			15									SILT; some sand; some gravel; trace cobbles [Colluvium]
TP14-239	5608252	684390	KP_Excavation												20			30									Silty; gravelly; SAND; some cobbles [Glacial Till]
TP14-240	5609031	684468	KP_Excavation												0			0									Silty; SAND and GRAVEL; some cobble; some boulder [Waste Rock
TP14-241	5608453	684706	KP_Excavation												15			0									Silty; gravelly; SAND; some cobbles [Glacial Till]
TP14-242	5608072	684497	KP_Excavation												15			0									Sandy; SILT and CLAY; some gravel; trace cobbles [Glacial Till]

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
TP14-243	5608078	684870	KP_Excavation												20			30									Silty; gravelly; SAND; trace cobbles [Glacial Till]
TP14-244	5608040	684704	KP_Excavation												20			20									Silty; SAND and GRAVEL; some cobbles [Glacial Till]
TP14-245	5608241	684821	KP_Excavation												20			30									Silty; gravelly; SAND; some cobbles; trace clay [Glacial Till]
TP14-246	5607849	684800	KP_Excavation												20			40									Silty; gravelly; SAND; some cobbles; trace boulders [Glacial Till]
TP14-247	5608249	684704	KP_Excavation												20			20									Silty; gravelly; SAND; some cobbles [Glacial Till]
TP14-248	5607647	684906	KP_Excavation												20			10									Silty; SAND; some gravel; trace cobbles [Glacial Till]
TP14-249	5607876	684905	KP_Excavation												20			40									Silty; SAND; some to trace gravel; trace cobbles [Glacial Till]
TP14-250	5607652	684689	KP_Excavation												35			0									bedrock
TP14-251	5607576	684458	KP_Excavation												30			10									bedrock
TP14-252	5607524	684166	KP_Excavation												50			40									Silty; SAND and GRAVEL; trace; cobbles [Glacial Till?]
TP14-253	5607664	684341	KP_Excavation												40			10									bedrock
TP14-254	5607487	684654	KP_Excavation												20			20									Silty; SAND and GRAVEL; trace cobbles [Glacial Till]
TP14-255	5608079	683892	KP_Excavation												10			20									Organics
TP14-256	5607170	684738	KP_Excavation												20			20									Silty; Gravelly; SAND; trace cobbles [Reworked Fluvial]
TP14-257	5607366	684633	KP_Excavation												20			20									Sandy; gravelly; SILT; trace cobbles [Reworked Fluvial]
TP14-258	5607479	684824	KP_Excavation												40			0									Sandy; gravelly; SILT; trace cobbles [Glacial Till]
TP14-259	5608128	684056	KP_Excavation												10			40									Silty; gravelly; SAND; trace cobbles; trace clay [Glacial Till]
TP14-260	5607846	684597	KP_Excavation												40			0									Silty; SAND; some cobbles/gravel; trace boulders [Glacial Till]
TP14-261	5607849	684401	KP_Excavation												20			20									Sandy SILT, some gravel; trace cobbles [Glacial Till]
TP14-262	5607410	684417	KP_Excavation												40			10									Silty; SAND; some gravel; trace cobbles [Reworked Fluvial]
TP14-263	5607225	684396	KP_Excavation												10			20									Gravel; SAND; some cobbles; some silt; trace clay [Glacial Till]
TP14-264	5607292	684229	KP_Excavation												25			15									Sand; Gravelly; SILT; some cobbles [Glacial Till]
TP14-265	5607115	684281	KP_Excavation												20			0									Silty; SAND; some Gravel; some to trace cobbles [Glacial Till]
TP14-266	5606863	684141	KP_Excavation												25			0									SAND and silt; trace gravel [Loess]
TP14-267	5606953	684304	KP_Excavation												10			0									Silty; SAND; some gravel; some cobbles [Glacial Till]
TP14-268	5606975	684109	KP_Excavation												5			0									Silty; SAND [Loess]
TP14-269	5606729	684401	KP_Excavation												10			30									SILT and SAND; trace gravel; trace cobbles [Glacial Till]
TP14-270	5606999	683844	KP_Excavation												30			0									SAND and SILT [Loess]
TP14-271	5607048	684582	KP_Excavation												20			0									Gravelly; SAND; some silt; some cobbles [Reworked Fluvial]
TP14-272	5606870	683936	KP_Excavation												40			60									SAND; some gravel; some silt; trace cobbles [Reworked Fluvial]
TP14-273	5606837	684571	KP_Excavation												10			0									SAND; some gravel; some silt; trace cobbles [Loess]
TP14-274	5607235	683826	KP_Excavation												30			0									Sandy; SILT; some gravel; trace cobbles [Glacial Till]
TP14-275	5606663	684542	KP_Excavation												10			0									Sandy SILT; trace cobbles; trace gravel; trace boulders [Loess]

KGHM Ajax - Soil Description database **Soil Description codes as per "Field Manual for Describing Terrestrial Ecosystems"**

SITE_ID	Northing	Easting	SITE_TYPE	ASPECT	Surficial Material	Surface Expression1	Surface Expression2	Rooting Depth (cm)	Root Restriction_type/depth (cm)	Water Source	Hydrogeomorphic System	Drainage	Flooding Regime	Litter layer (cm)	A1 horizon depth (cm)	A1 horizon modifier	A1 coarse fragments (%)	B1 horizon depth (cm)	B1 horizon modifier	B1 coarse fragments (%)	B2 horizon depth (cm)	B2 horizon modifier	B2 coarse fragments (%)	C1 horizon depth (cm)	C1 horizon modifier	C1 coarse fragments (%)	COMMENT
TP14-276	5606876	683447	KP_Excavation												20			0									Silty; SAND; some gravel/cobbles; trace boulders [Glacial Till]
TP14-277	5606494	683442	KP_Excavation												40			0									Gravelly SAND; some silt; some cobbles [Reworked Fluvial]
TP14-278	5609309	685434	KP_Excavation												30			10									Silty; gravelly; SAND; trace cobbles [Loess]
TP14-279	5609230	685295	KP_Excavation												20			10									Silty; gravelly; SAND; trace cobbles [Colluvium]
TP14-280	5609191	685090	KP_Excavation												10			0									Silty; SAND; some gravel [Loess]
TP14-281	5609033	685088	KP_Excavation												20			20									SILT and SAND; some gravel; trace cobbles/boulder [Glacial Till]
TP14-282	5609026	684880	KP_Excavation												20			10									SILT and SAND; some gravel; trace cobbles; trace boulder [Loess]
TP14-283	5609065	684765	KP_Excavation												10			20									Sand; gravelly; SILT [Glacial Till]
TP14-284	5607530	682684	KP_Excavation												10			0									SILT; some sand; trace gravel; trace cobble; trace boulder [Loess]
TP14-285	5608050	682762	KP_Excavation												0			0									SILT; some sand, trace gravel, trace cobbles [Loess]

Appendix B - Explanation of soil characteristics in Table 1

Adapted from Young et al, 1992.

Texture
SL – sand loam
LS – loamy sand
SiL – Silt loam
SiCl – silty clay loam

Typical Agriculture Capability Rating
The agriculture capability ratings are based on the Canada Land Inventory, (1969). This system was refined by the B. C. Land Inventory, (1972). Agriculture Capability ratings take into account the range of crops possible and not the productivity (i.e. yield/hectare) of any crop. The wider the range of crops the higher the capability class on a scale of 1 to 7. Agriculture capability is determined by the combination of climate and soil factors. Class 1 agriculture land has no climatic or soil limitations. All other classes (2 to 7) have some limitation which reduces the capability, such as shallow depth, coarse textures, low moisture holding capacity, or stoniness. Adverse climate such as insufficient climatic moisture or a short growing season reflected by few frost-free days can also reduce ratings as can topography.

The general climatic limitation within the Ashcroft map area is insufficient moisture, and the columns labelled unimproved and improved usually refer to irrigation as the improvement. Other improvements may be removal of surface stones, installation of drainage where necessary, or addition of fertilizers. Agriculture capability ratings assume that lands are well managed or managed at a level which is sufficient to realize the natural capability.

A wide range of vegetables and fruits means that crops such as the following can be grown: asparagus, beans, beets, broccoli, brussel sprouts, cabbage, carrots, cauliflower, celery, kohlrabi, leeks, lettuce, parsnips, peas, potatoes, radishes, rhubarb, turnips, spinach, Swiss chard, strawberries and raspberries.

Forage crops refers to crops such as alfalfa, red clover, alsike clover, orchard grass, and bromegrass.

Cereal grains refer to crops such as wheat, oats, and barley.

In some areas improvements to the soil by irrigation or drainage may not improve or expand the range of crops able to be grown; however, these improvements may increase yields significantly.

Agriculture Capability Classes and Subclasses

Class	Description
1	Soils in this class have no significant limitations for crops. The soils are deep, well to imperfectly drained, hold moisture well, and are well supplied with plant nutrients. They can be managed and cropped without difficulty. Under good management they are moderately high to high in productivity for a wide range of field crops.
2	Soils in this class have moderate limitations that restrict the range of crops or require moderate conservation practices. The soils are deep and hold moisture well. The limitations are moderate and the soils can be managed and cropped with little difficulty. Under good management they are moderately high to high in productivity for a fairly wide range of crops.
3	Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices. The limitations are more severe than for Class 2 soils. They affect one or more of the following practices: timing and ease of tillage, planting and harvesting; choice of crops; and methods of conservation. Under good management they are fairly to moderately high in productivity for a lair range of crops.
4	Soils in this class have severe limitations that restrict the range of crops or require special conservation practices, or both. The limitations seriously affect one or more of the following practices: timing and ease of tillage, planting and harvesting; choice or crops; and methods of conservation. The soils are low to fair in productivity for a fair range of crops but may have high productivity for a specially adapted crop.
5	Soils in this class have very severe limitations that restrict their capability to producing perennial forage crops, and improvement practices are feasible. The limitations are so severe that the soils are not capable of use for sustained production of annual field crops. The soils are capable of producing native or tame species of perennial forage plants, and may be improved by use of farm machinery. The improvement practices may include fertilizing or water control.
6	Soils in this class are capable only of producing perennial forage crops, and improvement practices are not feasible. The soils provide some sustained grazing for farm animals, but the limitations are so severe that improvement by use of farm machinery is impractical. The terrain may be unsuitable for use of farm machinery, or the soils may not respond to improvement, or the growing season may be very short.
7	Soils in this class have no capability for arable culture or permanent pasture. This class also includes rockland, other non-soil areas, and bodies of water too small to be shown on maps.

Agriculture Capability Subclass Limitations

Subclass	Limitation Description
C	adverse climate: refers to a short growing season.
D	undesirable soil structure and/or low permeability: refers to soils which are difficult to till or which absorb water slowly; also refers to soils with layers that physically reduce rooting depth.
E	erosion: soil erosion has reduced agricultural use and productivity; soils which have gullies that impair agriculture practice and productivity.
F	low fertility: lack of available plant nutrients may be due to high acidity or alkalinity, low nutrient exchange capacity, high levels of carbonates or the presence of toxic compounds.
I	inundation by lakes or streams: inundation causing crop damage or restricting agricultural use.
M	moisture limitation: soils with low moisture holding capacity. salinity: salts adversely affect crop growth, or range of crops.
P	stoniness: soils are sufficiently stony to hinder tillage, planting and harvesting operation.
R	rockiness: bedrock outcrops occur at or near the soil surface.
T	topography: adverse slope gradient and/or pattern or frequency of slopes in different directions.
W	excess water: inadequate soil drainage, high water table, or runoff from surrounding areas.

Typical Grazing Capability Ratings

Grazing capability is a 5 class system which rates the productivity of land with regard to its ability to produce native forage, mainly bunchgrass, fescues, or pinegrass. Maps of grazing capability in the Ashcroft map area are not available, but can be derived by applying the ratings given in this report to the map polygons on the soil map. The rating is representative of the potential only and provides a guide to the relative importance of each soil association for grazing uses.

Class	Grazing Capability Description
1	Lands in this class have no limitations for the production of native forage plants. Soils are deep, permeable, medium-textured, moderately well to imperfectly drained, and naturally fertile. These lands are not subject to extremes in temperature and evapotranspiration. Production of forage is greater than 1125 kg/ha/year. This class is commonly associated with Black Chernozem soils in the upper grassland areas.
2	Lands in this class have slight limitations for the production of native forage plants. Soils are deep, well drained and have good moisture holding capacity. These lands have slight limitations due to moisture deficiency, restricted rooting depth, light forest competition, adverse climate, or the cumulative effects of several limitations. Production of forage is between 570 and 1125 kg/ha/year.
3	Lands in this class have moderate limitations for the production of native forage plants. Soils may be deep to somewhat shallow, well to imperfectly drained, medium to fine in texture with moderate to good water holding capacity. Soils may be slightly low in fertility or suffer from periodic moisture imbalances. The most common limitations are adverse climate, restricted rooting depth, moderate forest competition, moderate deficiencies or excesses of moisture, somewhat low fertility, exposure and/or occasional inundation. Production of forage is between 280 and 570 kg/ha/year. This class commonly occurs on Brown Chernozem soils of the lower grasslands, on soils with Eutric Brunisol development in the Interior Douglas-fir Zone (with seral ponderosa pine), and on Brunisolic Gray Luvisol soils supporting lodgepole pine stands in the Engelmann Spruce - Subalpine fir Zone.
4	Lands in this class have moderately severe limitations for the production of native forage plants. The most common limitations are deficient or excess moisture, adverse climate, restricted rooting depth, forest competition, poor structure, excessive carbonates and/or low fertility. Production of forage is between 142 and 280 kg/ha/year. This class is commonly associated with Eutric and Dystric Brunisol soils in the Interior Bunchgrass, Interior Douglas-fir and Englemann Spruce-Subalpine Fir forest zones.
5	Lands in this class have severe limitations for the production of native forages. Soils in this class are considered unsuitable for grazing due to overriding climatic and environmental limitations. The most common limitations (often in combination) are deficient or excess soil moisture, shallowness to bedrock, adverse regional or local climate, forest competition, excessive stoniness, high levels of carbonates and/or salts, and low natural fertility. Production of forage is usually less than 142 kg/ha/year.

Grazing Subclass Limitations

Subclass	Limitation Description
A	Drought or aridity caused by aspect, landscape position, exposure or combinations of these; includes regional climatic aridity.
H	Accumulations of deep snow and/or a short, cool growing season.
I	Soils subject to inundation by lakes or streams for long periods.
M	Moisture deficiencies attributable to soil and land characteristics (i.e. low soil moisture holding capacity).
N	Poor soil fertility due to the presence of toxic elements, such as soluble salts.
V	Soils limited for native forage production by excessive competition from other vegetation. This symbol is used where it is assumed that land management will continue to recognize the forestry values.
R	The restriction of the rooting zone by bedrock.
T	Percent slope and pattern and frequency of slopes in different directions limit these map units.
W	An excess of soil moisture, other than that caused by inundation.

Cation Exchange Capacity and Exchangeable Cations

The ability of the soil to hold exchangeable cations is termed the cation exchange capacity, and is expressed as milli-equivalents of cations required to neutralize the negative charge of 100 grams of soil at pH 7. Depending upon the content of organic matter and the type and content of clay minerals present, the cation exchange capacities range from practically nil to over 100 milli-equivalents per 100 grams of mineral soil. One milli-equivalent of calcium per 100 grams of mineral soil is roughly equivalent to 170 kilograms of calcium per acre to plow depth or the amount of calcium in 420 kilograms of pure limestone.

The cation exchange properties of soils influence plant nutrition. Nutrient cations held as exchangeable bases are in an available state, but not easily leached from soils. Since the cation exchange capacity of a soil depends on the content of organic matter and clay, there is variation in behavior between soil types, and between soil horizons of the same profile.

Hydrogen, aluminum, calcium, magnesium, potassium, and sodium are the most abundant exchangeable cations. Their proportions vary from soil to soil, depending on inherited characteristics and past management practices. Hydrogen and aluminum are the predominant exchangeable cations in most acid soils. Calcium and magnesium are most common in nearly neutral soils, while strongly alkaline soils contain large proportions of exchangeable sodium in addition to calcium and magnesium.

Base Saturation

Base saturation is a measure of how many of the exchange sites within the soil complex are occupied by calcium, magnesium, sodium and potassium. If all exchange sites are occupied by cations then the soil is 100% base saturated. Generally, the higher the percent base saturation the more fertile the soil tends to be.

Appendix C - Soil analysis results

Project KGHM AJAX KA39-KGHM-CON-000186

E = East MRSF PS = Plant Site A, B refers to soil horizon sampled
O = Ore Stockpile S = South MRSF
P = Ajax Pit T = TSF, WMRSF & Embankments

RESULTS OF ANALYSIS				SMU 1						SMU 2						SMU 3			
Sample ID				E-M06	P-Z08	P106	S-S73 A	S-S73 B	T-Q71	PS-117	S-D79	S-116	T114	T121		E-C04	E-L04	E-K11	E-O05
Date Sampled				19-MAY-15	19-MAY-15	19-MAY-15	24-AUG-14	24-AUG-14	20-MAY-15	20-MAY-15	20-MAY-15	20-MAY-15	20-MAY-15	20-MAY-15		19-MAY-15	19-MAY-15	19-MAY-15	19-MAY-15
Time Sampled				15:30	13:20	11:00	00:00	00:00	11:45	18:20	15:45	18:40	13:15	10:00		15:15	16:45	17:10	15:45
ALS Sample ID				L1614542-12	L1614542-6	L1614542-1	L1508663-9	L1508663-10	L1614542-22	L1614542-34	L1614542-30	L1614542-35	L1614542-25	L1614542-21		L1614542-11	L1614542-15	L1614542-16	L1614542-13
Matrix				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		Soil	Soil	Soil	Soil
Physical Tests																			
Loss on Ignition @ 375 C				7.25	7.63	7.23	10.7	3.4	8.59	6.94	7.34	7.10	7.57	6.62		7.26	7.46	7.23	8.00
Organic Matter							8.7	3.0											
pH (1:2 soil:water)							7.06	7.69											
Particle Size																			
% Gravel (>2mm)							11.6	7.49											
% Sand (2.0mm - 0.063mm)							17.3	16.2											
% Silt (0.063mm - 4um)							61.6	60.3											
% Clay (<4um)							9.50	16.0											
Texture							Silt loam	Silt loam											
Leachable Anions & Nutrients																			
Total Kjeldahl Nitrogen							0.576	0.143											
Organic / Inorganic Carbon																			
CaCO3 Equivalent							<0.10	<0.10											
Inorganic Carbon							<0.80	<0.80											
Total Organic Carbon							6.02	1.24											
Plant Available Nutrients																			
Cation Exchange Capacity				22.4	23.7	-	44.5	23.4	-	-	-	22.5	-	29.5		-	-	-	48.1
Saturated Paste Extractables																			
SAR				0.32	0.27	-	0.12	1.04	-	-	-	0.26	-	0.22		-	-	-	3.73
Calcium (Ca)							62.2	38.7											
Conductivity Sat. Paste							0.72	0.49											
Magnesium (Mg)							26.2	16.7											
Potassium (K)							73.0	24.7											
% Saturation							77.4	48.7											
Sodium (Na)							4.6	30.8											
	CCME Soil Quality Guidelines *		Avg. Crustal																
Metals (ppm)	**Agriculture**	**Industrial**	**Abundance ****																
Aluminum (Al)			82,300	20100	21900	22100	17400	20600	11300	19300	19200	19200	19600	20600	20400	21400	19900	14800	
Antimony (Sb)	20	40	0.2	0.35	0.53	0.47	0.40	0.37	0.23	0.38	0.35	0.36	0.67	0.41	0.49	0.52	0.46	0.23	
Arsenic (As)	12	12	1.8	7.07	7.45	5.45	4.20	3.55	3.98	5.07	4.60	5.13	8.33	6.70	5.69	7.90	7.03	3.20	
Barium (Ba)	750	2000	425	188	221	204	198	171	188	217	227	232	205	250	209	149	224	95.1	
Beryllium (Be)	4	8		0.52	0.43	0.44	0.35	0.44	0.25	0.41	0.42	0.36	0.39	0.43	0.43	0.40	0.43	0.32	
Bismuth (Bi)			0.0085	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	
Boron (B)	2	no data	10	5.5	8.2	6.5			11.1	5.9	6.0	5.9	5.6	5.7	6.3	7.6	6.0	24.0	
Cadmium (Cd)	1.4	22	0.15	0.165	0.147	0.116	0.184	0.093	0.150	0.183	0.145	0.182	0.131	0.212	0.179	0.176	0.178	0.278	
Calcium (Ca)			41,500	9260	11300	9830	11800	7790	74000	9710	8210	9850	9980	10100	10300	10000	10000	55100	
Chromium (Cr)	64	87	102	41.0	55.3	66.7	55.8	61.1	36.4	67.4	88.5	58.9	94.4	61.8	48.1	59.6	54.8	28.6	
Cobalt (Co)	40	300	25	14.2	17.9	16.0	14.7	15.1	10.3	14.7	16.1	15.1	16.8	15.1	15.9	16.8	16.0	7.92	
Copper (Cu)	63	91	60	70.2	108	66.7	98.8	96.8	52.8	65.9	56.0	73.6	89.1	58.7	90.7	93.3	78.4	85.9	
Iron (Fe)			56,300	30100	42300	35500	28000	31000	20000	31000	33400	34400	39000	33300	35700	38700	36900	18200	
Lead (Pb)	70	600	14	5.16	4.47	4.00	3.86	3.88	2.95	4.07	4.64	4.00	3.72	4.36	4.37	4.65	4.76	4.06	
Lithium (Li)				9.7	9.4	10.2	8.1	9.0	7.0	8.4	9.1	8.5	9.5	9.4	9.7	9.9	9.0	7.4	
Magnesium (Mg)			23,300	8410	11500	9500	9870	9910	17100	9350	10800	9300	11900	9010	7610	10200	8180	15800	
Manganese (Mn)			950	705	811	701	731	621	650	762	727	779	719	857	745	731	802	255	
Mercury (Hg)	6.6	50	0.085	0.0217	0.0322	0.0340	0.0389	0.0278	0.0376	0.0297	0.0313	0.0456	0.0299	0.0235	0.0299	0.0289	0.0401	0.0299	
Molybdenum (Mo)	5	40	1.2	0.80	0.75	0.78	1.26	0.71	0.71	0.67	1.05	0.71	0.55	0.52	0.84	1.06	0.78	0.77	
Nickel (Ni)	50	50	84	35.1	54.3	52.8	51.4	50.5	39.1	54.0	72.9	40.4	69.6	43.7	34.8	42.0	34.9	24.8	
Phosphorus (P)			1,050	1090	956	822	1110	713	1400	904	906	916	968	1010	846	946	948	1420	
Potassium (K)			20,850	3290	2940	2970	4360	3910	2640	2880	3440	3100	2240	2970	3380	3460	2720	3410	
Selenium (Se)	1	2.9	0.05	0.27	0.25	0.21	0.72	0.25	0.77	0.26	0.30	0.29	<0.20	<0.20	0.20	0.33	0.25	3.58	
Silver (Ag)	20	40	0.075	<0.10	0.11	<0.10	0.10	<0.10	<0.10	0.13	0.11	<0.10	<0.10	0.14	0.13	0.12	0.12	0.16	
Sodium (Na)			23,550	360	304	409	350	490	2180	336	310	347	291	262	262	418	368	689	
Strontium (Sr)			370	113	86.2	83.7	93.2	64.7	234	83.8	76.7	84.0	62.6	75.1	83.2	125	91.5	410	
Thallium (Tl)	1	1	0.85	0.130	0.093	0.082	0.067	0.081	<0.050	0.082	0.081	0.063	0.075	0.065	0.082	0.088	0.083	0.070	
Tin (Sn)	5	300		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Titanium (Ti)			5,650	988	1100	1100	897	1190	321	953	929	1070	1060	894	916	1270	1070	451	
Uranium (U)	23	300	2.7	0.556	0.428	0.466	0.336	0.472	0.886	0.441	0.455	0.349	0.353	0.390	0.413	0.612	0.437	1.28	
Vanadium (V)	130	130	120	98.1	153	125	80.8	85.0	53.7	99.9	103	124	137	102	124	149	134	46.4	
Zinc (Zn)	200	360	70	61.9	61.9	51.1	56.2	53.1	40.9	55.1	57.8	57.2	54.5	64.7	65.2	62.9	64.0	63.2	
Zirconium (Zr)				8.3	5.5	7.5			1.9	6.3	7.7	4.9	3.9	4.8	8.1	5.7	7.3	4.1	

* Canadian Council of Ministers of the Environment (CCME) Soil Quality Guidelines for the Protection of Environmental and Human Health; values are provided for Agricultural and Industrial land uses

** Adapted from: *Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia, 1997.*

reported value exceeds CCME soil quality guidelines for Agricultural land use

reported value exceeds CCME soil quality guidelines for Agricultural and Industrial land use

Project KGHM AJAX KA39-KGHM-CON-000186

RESULTS OF ANALYSIS				SMU 3													
Sample ID				E-Q05	E100	O-107	P-F06	P-U04	P-V08	*P-Z03 A*	*P-Z03 B*	P101	P104	P105	*S-E78 A*	*S-E78 B*	*S-H77 A*	*S-H77 B*
Date Sampled				19-MAY-15	19-MAY-15	20-MAY-15	19-MAY-15	19-MAY-15	19-MAY-15	*20-OCT-12*	*20-OCT-12*	19-MAY-15	19-MAY-15	19-MAY-15	*21-AUG-14*	*21-AUG-14*	*24-AUG-14*	*24-AUG-14*
Time Sampled				16:00	17:25	16:15	00:00	13:45	13:00	*15:00*	*15:00*	14:45	12:10	11:40	*00:00*	*00:00*	*00:00*	*00:00*
ALS Sample ID				L1614542-14	L1614542-17	L1614542-31	L1614542-10	L1614542-7	L1614542-5	*L1229589-50*	*L1229589-51*	L1614542-9	L1614542-3	L1614542-2	*L1508663-5*	*L1508663-6*	*L1508663-11*	*L1508663-12*
Matrix				Soil	Soil	Soil	Soil	Soil	Soil	*Soil*	*Soil*	Soil	Soil	Soil	*Soil*	*Soil*	*Soil*	*Soil*
Physical Tests																		
Loss on Ignition @ 375 C				7.28	7.62	6.84	7.56	7.26	7.65	*4.9*	*2.3*	7.32	7.81	7.35	*7.4*	*5.7*	*4.6*	*1.9*
Organic Matter										*4.1*	*2.0*				*6.0*	*4.8*	*3.9*	*1.8*
pH (1:2 soil:water)										*7.13*	*8.20*				*8.23*	*8.60*	*7.02*	*7.26*
Particle Size																		
% Gravel (>2mm)										*10.8*	*14.2*				*10.1*	*12.3*	*13.9*	*14.6*
% Sand (2.0mm - 0.063mm)										*37.4*	*35.4*				*29.6*	*27.8*	*34.8*	*35.3*
% Silt (0.063mm - 4um)										*43.4*	*32.4*				*55.5*	*54.6*	*44.0*	*36.8*
% Clay (<4um)										*8.41*	*18.0*				*4.85*	*5.35*	*7.33*	*13.3*
Texture										*Silt loam*	*Loam*				*Silt loam*	*Silt loam*	*Silt loam*	*Loam*
Leachable Anions & Nutrients																		
Total Kjeldahl Nitrogen										*0.165*	*0.042*				*0.401*	*0.248*	*0.248*	*0.075*
Organic / Inorganic Carbon																		
CaCO3 Equivalent										*<0.70*	*<0.70*				*<0.10*	*0.16*	*<0.10*	*<0.10*
Inorganic Carbon										*<0.10*	*<0.10*				*<0.80*	*1.37*	*<0.80*	*<0.80*
Total Organic Carbon										*1.98*	*0.47*				*4.45*	*2.55*	*2.42*	*0.73*
Plant Available Nutrients																		
Cation Exchange Capacity				-	-	33.6	23.5	28.5	-	*19.5*	*16.6*	-	-	-	*35.0*	*30.4*	*25.9*	*18.7*
Saturated Paste Extractables																		
SAR				-	-	0.32	0.31	0.57	-	*0.51*	*3.69*	-	-	-	*0.15*	*0.81*	*<0.10*	*0.10*
Calcium (Ca)										*45.1*	*81.8*				*51.6*	*39.1*	*41.1*	*64.9*
Conductivity Sat. Paste										*0.60*	*2.37*				*0.71*	*0.72*	*0.45*	*0.77*
Magnesium (Mg)										*39.8*	*167*				*61.9*	*67.0*	*31.0*	*44.8*
Potassium (K)										*27.8*	*21.7*				*58.0*	*16.6*	*20.3*	*15.8*
% Saturation										*51.6*	*38.8*				*69.6*	*59.4*	*49.4*	*37.8*
Sodium (Na)										*19.7*	*253*				*6.8*	*35.9*	*<4.0*	*4.4*
	CCME Soil Quality Guidelines *		Avg. Crustal															
Metals (ppm)	**Agriculture**	**Industrial**	**Abundance ****															
Aluminum (Al)			82,300	19500	18600	18500	20200	23800	21400	*26000*	*25700*	22100	16100	22400	*19000*	*21600*	*19400*	*20800*
Antimony (Sb)	20	40	0.2	0.47	0.46	0.30	0.54	0.36	0.62	*0.53*	*0.64*	0.52	0.47	0.48	*0.47*	*0.54*	*0.47*	*0.54*
Arsenic (As)	12	12	1.8	9.18	6.24	5.28	5.16	5.30	6.93	*6.18*	*8.83*	6.08	5.45	6.85	*6.62*	*8.33*	*5.29*	*7.02*
Barium (Ba)	750	2000	425	209	182	229	183	247	212	*235*	*211*	173	145	247	*201*	*213*	*189*	*169*
Beryllium (Be)	4	8		0.41	0.36	0.42	0.36	0.46	0.39	*0.47*	*0.43*	0.41	0.31	0.49	*0.36*	*0.42*	*0.37*	*0.39*
Bismuth (Bi)			0.0085	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	*<0.20*	*<0.20*	<0.20	<0.20	<0.20	*<0.20*	*<0.20*	*<0.20*	*<0.20*
Boron (B)	2	no data	10	5.8	8.0	6.0	6.5	6.9	6.2			8.3	6.6	6.1				
Cadmium (Cd)	1.4	22	0.15	0.191	0.169	0.167	0.121	0.168	0.134	*0.194*	*0.170*	0.131	0.093	0.141	*0.163*	*0.165*	*0.119*	*0.099*
Calcium (Ca)			41,500	9040	11200	8760	11100	11200	10900	*9360*	*11500*	11500	11100	8750	*11100*	*14300*	*8370*	*9440*
Chromium (Cr)	64	87	102	53.5	96.6	60.0	50.8	50.9	69.1	*52.2*	*63.3*	61.2	61.0	103	*110*	*122*	*92.8*	*130*
Cobalt (Co)	40	300	25	14.9	18.4	14.1	18.9	16.0	18.4	*17.2*	*20.1*	17.9	16.7	20.4	*20.5*	*21.7*	*19.2*	*22.3*
Copper (Cu)	63	91	60	80.8	73.0	47.1	104	69.5	168	*85.6*	*137*	78.5	153	79.1	*67.7*	*81.4*	*74.6*	*111*
Iron (Fe)			56,300	33500	36600	32200	45300	38400	44100	*36400*	*42800*	44500	41900	39700	*34000*	*36800*	*36600*	*42000*
Lead (Pb)	70	600	14	4.58	4.54	4.96	3.72	4.29	4.05	*4.96*	*4.60*	4.11	2.99	4.30	*3.94*	*3.96*	*3.93*	*3.59*
Lithium (Li)				9.3	8.7	9.1	8.4	10.0	8.3	*11.0*	*11.0*	9.9	7.3	12.2	*11.8*	*12.7*	*10.0*	*10.5*
Magnesium (Mg)			23,300	8570	14200	7870	9180	9070	10400	*10100*	*14900*	11400	9090	13500	*23700*	*27300*	*12500*	*19800*
Manganese (Mn)			950	760	723	814	729	785	718	*867*	*755*	731	617	816	*706*	*685*	*747*	*674*
Mercury (Hg)	6.6	50	0.085	0.0327	0.0793	0.0316	0.0577	0.0261	0.0273	*0.0316*	*0.0992*	0.0258	0.0456	0.0267	*0.0389*	*0.0533*	*0.0290*	*0.0457*
Molybdenum (Mo)	5	40	1.2	0.72	1.34	0.87	0.92	0.68	2.33	*1.18*	*0.85*	0.99	0.88	0.63	*0.52*	*0.51*	*0.68*	*0.62*
Nickel (Ni)	50	50	84	37.3	99.6	43.1	36.9	34.9	47.9	*41.1*	*53.8*	47.5	41.8	99.4	*151*	*165*	*90.8*	*144*
Phosphorus (P)			1,050	975	1180	966	808	954	840	*1040*	*878*	997	894	1010	*980*	*1100*	*967*	*943*
Potassium (K)			20,850	2770	2920	3040	2770	3600	3660	*3800*	*2990*	3230	2230	2300	*2930*	*2460*	*2970*	*2440*
Selenium (Se)	1	2.9	0.05	0.30	0.29	<0.20	0.25	0.23	0.24	*0.35*	*0.45*	0.20	<0.20	<0.20	*0.43*	*0.41*	*0.27*	*0.24*
Silver (Ag)	20	40	0.075	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	*0.14*	*0.15*	<0.10	<0.10	<0.10	*<0.10*	*<0.10*	*<0.10*	*<0.10*
Sodium (Na)			23,550	334	408	281	222	394	273	*340*	*640*	421	271	308	*280*	*420*	*280*	*320*
Strontium (Sr)			370	87.3	121	72.2	79.4	101	87.9	*93.2*	*109*	107	71.4	58.6	*102*	*103*	*65.6*	*72.5*
Thallium (Tl)	1	1	0.85	0.086	0.078	0.078	0.074	0.080	0.075	*0.094*	*0.094*	0.077	0.055	0.094	*0.053*	*0.062*	*0.063*	*0.068*
Tin (Sn)	5	300		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	*<2.0*	*<2.0*	<2.0	<2.0	<2.0	*<2.0*	*<2.0*	*<2.0*	*<2.0*
Titanium (Ti)			5,650	1100	1110	888	1020	1120	1230	*1130*	*1300*	1230	857	1020	*783*	*980*	*1040*	*1220*
Uranium (U)	23	300	2.7	0.437	0.477	0.427	0.343	0.473	0.369	*0.499*	*0.438*	0.419	0.289	0.494	*0.272*	*0.339*	*0.336*	*0.327*
Vanadium (V)	130	130	120	115	123	103	177	138	186	*123*	*161*	169	168	132	*102*	*115*	*115*	*139*
Zinc (Zn)	200	360	70	61.3	58.6	69.9	51.5	60.6	54.2	*66.1*	*62.6*	56.6	45.0	58.9	*49.8*	*54.3*	*54.3*	*50.8*
Zirconium (Zr)				5.6	6.1	5.9	5.4	7.2	6.2			5.9	3.0	8.0				

* Canadian Council of Ministers of the E

** Adapted from: *Guidelines and Recom*

reported value exceeds CCME soil qu

reported value exceeds CCME soil qu

Project KGHM AJAX KA39-KGHM-CON-000186

RESULTS OF ANALYSIS				SMU 3												
Sample ID				S-K75 A	S-K75 B	S-N79 A	S-N79 B	S-Q74	S-U75 A	S-U75 B	T-F79 A	T-F79 B	T-K73 A	T-K73 B	T-K80 A	T-K80 B	T-W78	T-Z56
Date Sampled				21-AUG-14	21-AUG-14	23-AUG-14	23-AUG-14	20-MAY-15	24-AUG-14	24-AUG-14	23-AUG-14	23-AUG-14	26-AUG-14	26-AUG-14	26-AUG-14	26-AUG-14	20-MAY-15	20-MAY-15
Time Sampled				00:00	00:00	00:00	00:00	17:45	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	16:45	14:00
ALS Sample ID				L1508663-15	L1508663-16	L1508663-19	L1508663-20	L1614542-33	L1508663-3	L1508663-4	L1508663-17	L1508663-18	L1508663-23	L1508663-24	L1508663-21	L1508663-22	L1614542-29	L1614542-26
Matrix				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Physical Tests																		
Loss on Ignition @ 375 C				7.5	2.8	5.6	2.6	7.19	4.5	2.2	3.0	2.8	4.2	2.2	3.4	1.5	6.71	6.99
Organic Matter				6.2	2.4	4.7	2.3		3.8	2.0	2.6	2.5	3.5	2.0	2.9	1.5		
pH (1:2 soil:water)				7.16	7.72	7.73	8.17		7.21	7.53	7.75	7.38	7.61	6.68	7.56	8.10		
Particle Size																		
% Gravel (>2mm)				5.52	13.8	22.8	30.8		23.1	15.8	18.2	17.8	17.1	20.4	11.8	21.5		
% Sand (2.0mm - 0.063mm)				10.6	34.3	38.4	33.8		30.9	32.7	38.5	31.9	30.5	37.7	32.4	29.7		
% Silt (0.063mm - 4um)				76.9	45.1	33.5	29.8		39.5	40.1	38.6	44.0	46.3	33.8	48.8	40.8		
% Clay (<4um)				6.93	6.85	5.21	5.65		6.51	11.5	4.64	6.28	6.11	8.09	7.07	8.09		
Texture				Silt	Silt loam	Sandy loam	Sandy loam		Silt loam	Silt loam	Sandy loam	Silt loam	Silt loam	Loam / Sandy	Silt loam	Silt loam		
Leachable Anions & Nutrients																		
Total Kjeldahl Nitrogen				0.358	0.136	0.300	0.146		0.181	0.096	0.193	0.142	0.204	0.117	0.144	0.073		
Organic / Inorganic Carbon																		
CaCO3 Equivalent				<0.10	<0.10	<0.10	0.22		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.13		
Inorganic Carbon				<0.80	<0.80	<0.80	1.80		<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	<0.80	1.11		
Total Organic Carbon				4.09	0.84	3.22	1.37		1.96	0.79	1.58	1.27	1.84	0.94	1.40	0.60		
Plant Available Nutrients																		
Cation Exchange Capacity				33.1	22.9	26.5	19.3	23.9	21.8	19.7	19.9	18.8	22.2	16.5	20.3	13.5	33.4	30.7
Saturated Paste Extractables																		
SAR				<0.10	0.39	<0.10	0.12	0.25	0.36	0.37	0.11	<0.10	0.93	5.09	0.46	4.85	0.32	0.26
Calcium (Ca)				53.3	27.1	85.8	80.0		68.0	28.7	82.8	46.5	284	317	36.7	380		
Conductivity Sat. Paste				0.48	0.29	0.70	0.66		0.84	0.46	0.65	0.39	2.69	6.63	0.45	6.42		
Magnesium (Mg)				20.5	14.5	21.5	29.0		58.1	32.7	32.3	19.5	208	596	27.9	551		
Potassium (K)				40.7	13.5	60.9	26.4		26.6	12.2	17.5	12.0	58.8	60	15.9	50		
% Saturation				67.8	43.2	53.1	42.1		48.7	38.3	44.9	42.1	48.4	39.1	52.2	41.2		
Sodium (Na)				<4.0	10.1	<4.0	4.8		16.7	12.3	4.8	<4.0	85	667	15.1	633		
	CCME Soil Quality Guidelines *		Avg. Crustal															
Metals (ppm)	**Agriculture**	**Industrial**	**Abundance ****															
Aluminum (Al)			82,300	21000	24900	17300	18400	20600	21600	21100	19900	19500	19100	17800	19000	19700	21300	20400
Antimony (Sb)	20	40	0.2	0.47	0.51	0.37	0.50	0.45	0.47	0.67	0.59	0.54	0.59	0.60	0.42	0.62	0.60	0.38
Arsenic (As)	12	12	1.8	5.94	6.57	5.36	6.22	5.35	5.93	7.51	6.59	6.87	7.65	7.94	5.47	7.31	6.68	6.02
Barium (Ba)	750	2000	425	248	220	194	157	200	194	160	225	178	168	104	144	109	314	252
Beryllium (Be)	4	8		0.47	0.55	0.36	0.37	0.38	0.43	0.45	0.41	0.39	0.42	0.38	0.45	0.41	0.46	0.52
Bismuth (Bi)			0.0085	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Boron (B)	2	no data	10					5.8									7.5	5.9
Cadmium (Cd)	1.4	22	0.15	0.197	0.134	0.134	0.115	0.169	0.152	0.113	0.138	0.113	0.139	0.120	0.102	0.094	0.207	0.146
Calcium (Ca)			41,500	10600	8830	10800	15800	9480	8300	8190	10800	9870	9390	8290	8390	13100	10600	10800
Chromium (Cr)	64	87	102	74.8	101	62.5	71.5	76.6	71.8	98.8	86.8	84.0	63.9	72.5	72.6	98.7	65.7	51.5
Cobalt (Co)	40	300	25	17.0	19.7	15.6	16.6	17.8	16.8	20.3	17.1	17.2	14.9	15.8	15.2	17.6	16.4	12.9
Copper (Cu)	63	91	60	94.3	89.1	95.4	112	84.7	93.3	131	87.1	86.7	76.5	89.4	74.5	131	73.9	48.6
Iron (Fe)			56,300	31600	37900	32300	35800	35400	35400	41700	39000	38500	36300	37700	36200	40400	35100	30200
Lead (Pb)	70	600	14	4.15	4.63	3.72	3.53	4.08	3.76	3.64	3.57	3.45	3.79	3.69	3.58	3.57	4.72	4.12
Lithium (Li)				9.8	11.4	9.3	9.7	8.9	10.5	9.9	10.4	10.0	10.3	10.3	10.7	11.2	10.6	10.3
Magnesium (Mg)			23,300	10800	12600	10400	12800	11100	10100	15400	11100	12600	10300	12900	9850	16400	9250	6850
Manganese (Mn)			950	769	704	712	629	767	715	644	662	665	716	637	687	673	924	702
Mercury (Hg)	6.6	50	0.085	0.0274	0.0279	0.0416	0.0710	0.0260	0.0199	0.0354	0.0297	0.0244	0.0234	0.0509	0.0337	0.0601	0.0395	0.0267
Molybdenum (Mo)	5	40	1.2	0.77	0.57	0.90	0.99	0.79	0.73	0.75	0.60	0.58	0.58	0.67	0.57	0.90	0.66	0.41
Nickel (Ni)	50	50	84	78.4	98.0	55.0	63.1	66.6	57.0	89.6	70.4	74.7	48.0	58.5	54.5	75.3	53.1	33.5
Phosphorus (P)			1,050	1100	848	1050	873	877	1010	951	965	1040	1130	859	818	1030	891	1140
Potassium (K)			20,850	3800	3120	2960	2490	3180	3140	2720	2570	2450	2760	2340	2470	2290	3580	2740
Selenium (Se)	1	2.9	0.05	0.22	<0.20	0.22	0.24	0.24	0.27	0.26	0.23	<0.20	0.24	0.41	0.22	0.51	<0.20	0.22
Silver (Ag)	20	40	0.075	0.12	0.11	<0.10	0.10	0.13	<0.10	<0.10	<0.10	<0.10	<0.10	0.10	<0.10	0.12	<0.10	<0.10
Sodium (Na)			23,550	350	420	250	310	311	280	330	310	290	420	800	300	890	243	301
Strontium (Sr)			370	78.4	68.8	70.5	87.4	73.2	65.9	68.6	69.1	64.9	74.8	71.7	60.0	89.9	70.3	76.8
Thallium (Tl)	1	1	0.85	0.081	0.100	0.054	0.066	0.077	0.082	0.094	0.072	0.063	0.076	0.064	0.068	0.067	0.074	0.078
Tin (Sn)	5	300		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)			5,650	1150	1560	807	1020	1130	1040	1120	1160	1070	1030	1070	1100	1360	996	901
Uranium (U)	23	300	2.7	0.415	0.479	0.307	0.296	0.405	0.426	0.405	0.406	0.368	0.418	0.383	0.391	0.354	0.397	0.460
Vanadium (V)	130	130	120	95.2	114	107	124	121	115	144	137	135	125	131	121	147	117	89.4
Zinc (Zn)	200	360	70	59.5	56.8	54.0	48.3	57.1	53.2	47.5	49.3	48.5	52.1	47.0	52.0	49.8	67.1	54.4
Zirconium (Zr)								5.3									7.1	5.3

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reported value exceeds CCME soil qu

reported value exceeds CCME soil qu

Project KGHM AJAX KA39-KGHM-CON-000186

RESULTS OF ANALYSIS				SMU 3					SMU 3k					SMU 4				
Sample ID				T108	T109	T110	T-119	T-120	*E-H09 A*	*E-H09 B*	E-M11 A	*S-N74 A*	*S-N74 B*	*P-U80 A*	*P-U80 B*	P102	S-115	T112
Date Sampled				20-MAY-15	20-MAY-15	20-MAY-15	20-MAY-15	20-MAY-15	*20-OCT-12*	*20-OCT-12*	20-OCT-12	*24-AUG-14*	*24-AUG-14*	*25-AUG-14*	*25-AUG-14*	19-MAY-15	20-MAY-15	20-MAY-15
Time Sampled				07:45	00:00	12:45	15:10	15:25	*13:00*	*13:00*	13:30	*00:00*	*00:00*	*00:00*	*00:00*	14:30	19:15	12:15
ALS Sample ID				L1614542-18	L1614542-19	L1614542-24	L1614542-27	L1614542-28	*L1229589-40*	*L1229589-41*	L1229589-43	*L1508663-13*	*L1508663-14*	*L1508663-7*	*L1508663-8*	L1614542-8	L1614542-36	L1614542-23
Matrix				Soil	Soil	Soil	Soil	Soil	*Soil*	*Soil*	Soil	*Soil*	*Soil*	*Soil*	*Soil*	Soil	Soil	Soil
Physical Tests																		
Loss on Ignition @ 375 C				8.52	7.61	6.85	6.47	9.18	*3.8*	*3.0*	8.0	*7.9*	*2.5*	*8.2*	*5.8*	8.65	8.01	7.32
Organic Matter									*3.3*	*2.6*	6.5	*6.4*	*2.2*	*6.7*	*4.8*			
pH (1:2 soil:water)									*7.43*	*7.50*	7.24	*6.66*	*7.36*	*7.41*	*7.79*			
Particle Size																		
% Gravel (>2mm)									*14.3*	*13.1*	13.7	*18.1*	*9.68*	*6.18*	*8.59*			
% Sand (2.0mm - 0.063mm)									*43.2*	*39.8*	40.0	*14.7*	*24.5*	*22.8*	*22.5*			
% Silt (0.063mm - 4um)									*34.2*	*33.7*	38.4	*60.4*	*57.4*	*64.1*	*62.1*			
% Clay (<4um)									*8.23*	*13.4*	7.92	*6.76*	*8.40*	*6.91*	*6.82*			
Texture									*Sandy loam*	*Loam*	Sandy loam	*Silt loam*	*Silt loam*	*Silt loam*	*Silt loam*			
Leachable Anions & Nutrients																		
Total Kjeldahl Nitrogen									*0.122*	*0.077*	0.263	*0.416*	*0.134*	*0.408*	*0.278*			
Organic / Inorganic Carbon																		
CaCO3 Equivalent									*<0.70*	*<0.70*	<0.70	*<0.10*	*<0.10*	*<0.10*	*<0.10*			
Inorganic Carbon									*<0.10*	*<0.10*	<0.10	*<0.80*	*<0.80*	*<0.80*	*<0.80*			
Total Organic Carbon									*1.57*	*1.03*	2.96	*4.80*	*1.10*	*4.28*	*3.24*			
Plant Available Nutrients																		
Cation Exchange Capacity				29.0	23.0	21.3	-	-	*16.4*	*16.2*	25.5	*33.7*	*21.2*	*32.4*	*29.4*	-	29.1	-
Saturated Paste Extractables																		
SAR				1.87	0.28	0.21	-	-	*0.12*	*0.22*	0.58	*<0.10*	*0.34*	*<0.10*	*0.14*	-	0.45	-
Calcium (Ca)									*51.6*	*67.5*	77.1	*37.6*	*18.7*	*50.6*	*163*			
Conductivity Sat. Paste									*0.55*	*0.63*	0.65	*0.57*	*0.20*	*0.47*	*1.45*			
Magnesium (Mg)									*26.5*	*38.8*	31.6	*16.7*	*8.6*	*22.3*	*78.8*			
Potassium (K)									*21.8*	*8.0*	8.0	*92.2*	*11.5*	*39.5*	*58.2*			
% Saturation									*42.7*	*41.1*	87.9	*68.7*	*48.6*	*67.0*	*62.4*			
Sodium (Na)									*4.4*	*9.3*	23.9	*<4.0*	*7.2*	*<4.0*	*8.7*			
	CCME Soil Quality Guidelines *		Avg. Crustal															
Metals (ppm)	**Agriculture**	**Industrial**	**Abundance ****															
Aluminum (Al)			82,300	15100	20300	23100	18400	13700	*21500*	*20000*	19700	*17500*	*20200*	*18900*	*21000*	25200	20100	18400
Antimony (Sb)	20	40	0.2	0.38	0.45	0.28	0.26	0.23	*0.55*	*0.60*	0.63	*0.34*	*0.44*	*0.49*	*0.55*	0.60	0.56	0.40
Arsenic (As)	12	12	1.8	6.12	5.82	6.33	3.33	2.38	*7.26*	*8.07*	6.46	*4.35*	*5.38*	*6.22*	*7.74*	6.23	7.37	4.39
Barium (Ba)	750	2000	425	181	228	278	238	223	*190*	*171*	113	*226*	*187*	*169*	*171*	196	186	194
Beryllium (Be)	4	8		0.30	0.42	0.39	0.41	0.30	*0.48*	*0.42*	0.36	*0.36*	*0.42*	*0.39*	*0.45*	0.46	0.40	0.45
Bismuth (Bi)			0.0085	<0.20	<0.20	<0.20	<0.20	<0.20	*<0.20*	*<0.20*	<0.20	*<0.20*	*<0.20*	*<0.20*	*<0.20*	<0.20	<0.20	<0.20
Boron (B)	2	no data	10	19.1	5.4	<5.0	<5.0	40.8								29.8	8.7	5.3
Cadmium (Cd)	1.4	22	0.15	0.111	0.165	0.242	0.160	0.136	*0.172*	*0.141*	0.211	*0.193*	*0.140*	*0.132*	*0.121*	0.209	0.151	0.125
Calcium (Ca)			41,500	70800	8340	7050	8210	26000	*9610*	*9140*	13400	*9830*	*8380*	*12300*	*13100*	19600	18100	8310
Chromium (Cr)	64	87	102	73.8	78.5	51.0	47.6	45.0	*54.1*	*53.8*	44.5	*60.3*	*68.5*	*62.2*	*71.1*	52.2	95.2	55.1
Cobalt (Co)	40	300	25	13.1	17.5	17.1	12.3	9.02	*17.1*	*16.3*	12.4	*14.3*	*15.7*	*14.7*	*16.4*	16.5	21.4	12.8
Copper (Cu)	63	91	60	64.7	78.8	56.9	35.7	39.8	*91.8*	*108*	110	*78.5*	*85.7*	*87.5*	*96.1*	115	104	43.0
Iron (Fe)			56,300	29700	36200	36800	28000	21800	*39800*	*36800*	31600	*28700*	*31700*	*34800*	*38800*	32500	40200	32200
Lead (Pb)	70	600	14	2.88	4.20	4.08	4.07	2.91	*5.31*	*4.23*	3.41	*3.46*	*3.72*	*4.18*	*4.09*	4.65	4.23	4.31
Lithium (Li)				10.5	9.7	10.6	8.4	9.1	*11.2*	*9.7*	9.7	*8.1*	*9.1*	*9.9*	*10.4*	12.8	10.8	9.0
Magnesium (Mg)			23,300	27500	11600	9630	6060	23000	*9940*	*11900*	10100	*8840*	*10100*	*11000*	*11700*	22600	20100	6950
Manganese (Mn)			950	559	771	968	818	578	*857*	*753*	421	*697*	*614*	*746*	*771*	816	698	750
Mercury (Hg)	6.6	50	0.085	0.0459	0.0286	0.0239	0.0267	0.0292	*0.0295*	*0.0961*	0.0280	*0.0263*	*0.0346*	*0.0425*	*0.0388*	0.0313	0.0570	0.0250
Molybdenum (Mo)	5	40	1.2	2.59	0.59	0.68	0.61	0.36	*0.93*	*0.78*	0.76	*1.15*	*0.62*	*1.27*	*1.30*	5.32	0.80	0.53
Nickel (Ni)	50	50	84	58.9	74.1	40.8	30.9	29.3	*39.8*	*45.4*	32.4	*65.1*	*72.1*	*44.2*	*48.1*	44.2	116	34.0
Phosphorus (P)			1,050	1100	795	1080	699	1390	*921*	*823*	970	*1220*	*876*	*1050*	*1100*	1180	1050	696
Potassium (K)			20,850	2310	2490	3230	3030	4430	*3210*	*2300*	2930	*3830*	*2940*	*3280*	*3420*	5350	2590	2690
Selenium (Se)	1	2.9	0.05	7.16	<0.20	<0.20	<0.20	1.09	*0.37*	*0.29*	1.25	*0.27*	*<0.20*	*0.46*	*0.55*	0.94	0.27	<0.20
Silver (Ag)	20	40	0.075	<0.10	<0.10	<0.10	<0.10	<0.10	*<0.10*	*0.14*	0.14	*<0.10*	*<0.10*	*<0.10*	*<0.10*	0.15	0.12	<0.10
Sodium (Na)			23,550	982	243	268	266	932	*290*	*280*	410	*270*	*400*	*380*	*430*	1920	335	255
Strontium (Sr)			370	681	58.6	47.8	57.8	578	*93.0*	*79.9*	113	*78.4*	*66.7*	*113*	*123*	229	88.6	54.2
Thallium (Tl)	1	1	0.85	<0.050	0.075	0.078	0.072	0.053	*0.099*	*0.078*	0.058	*0.058*	*0.083*	*0.068*	*0.069*	0.093	0.083	0.069
Tin (Sn)	5	300		<2.0	<2.0	<2.0	<2.0	<2.0	*<2.0*	*<2.0*	<2.0	*<2.0*	*<2.0*	*<2.0*	*<2.0*	<2.0	<2.0	<2.0
Titanium (Ti)			5,650	792	810	1040	991	716	*849*	*949*	876	*907*	*1130*	*1040*	*1180*	1160	1080	1060
Uranium (U)	23	300	2.7	1.64	0.351	0.386	0.386	0.354	*0.469*	*0.392*	0.698	*0.360*	*0.438*	*0.405*	*0.416*	0.633	0.343	0.507
Vanadium (V)	130	130	120	114	114	113	79.0	61.6	*137*	*126*	110	*87.9*	*103*	*121*	*134*	107	135	100
Zinc (Zn)	200	360	70	45.2	56.9	75.7	67.8	49.4	*67.3*	*55.0*	60.5	*63.7*	*47.4*	*47.7*	*50.5*	71.2	56.2	52.1
Zirconium (Zr)				2.2	6.4	6.7	8.6	3.7								5.1	3.2	8.5

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reported value exceeds CCME soil qu

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Project KGHM AJAX KA39-KGHM-CON-000186

RESULTS OF ANALYSIS				**SMU 5**							**SMU 99**
Sample ID				*P-V12 A*	*P-V12 B*	*P-W05 A*	*P-W05 B*	P103	S-10	T113	S-R78 A SALINE
Date Sampled				*20-OCT-12*	*20-OCT-12*	*20-OCT-12*	*20-OCT-12*	19-MAY-15	20-MAY-15	20-MAY-15	24-AUG-14
Time Sampled				*14:30*	*14:30*	*14:00*	*14:00*	12:30	17:30	09:30	00:00
ALS Sample ID				*L1229589-47*	*L1229589-48*	*L1229589-44*	*L1229589-45*	L1614542-4	L1614542-32	L1614542-20	L1508663-2
Matrix				*Soil*	*Soil*	*Soil*	*Soil*	Soil	Soil	Soil	Soil
Physical Tests											
Loss on Ignition @ 375 C				*5.1*	*2.7*	*12.3*	*2.7*	8.12	6.84	7.15	18.6
Organic Matter				*4.3*	*2.4*	*9.8*	*2.4*				14.8
pH (1:2 soil:water)				*7.09*	*7.53*	*6.89*	*7.55*				8.40
Particle Size											
% Gravel (>2mm)				*12.8*	*14.1*	*5.83*	*2.72*				0.31
% Sand (2.0mm - 0.063mm)				*36.9*	*36.1*	*23.7*	*14.2*				4.33
% Silt (0.063mm - 4um)				*41.2*	*37.0*	*61.6*	*59.6*				62.8
% Clay (<4um)				*9.04*	*12.9*	*8.91*	*23.5*				32.6
Texture				*Silt loam*	*Loam*	*Silt loam*	*Silt loam*				Silty clay loam
Leachable Anions & Nutrients											
Total Kjeldahl Nitrogen				*0.157*	*0.063*	*0.356*	*0.044*				0.580
Organic / Inorganic Carbon											
CaCO3 Equivalent				*<0.70*	*<0.70*	*<0.70*	*<0.70*				2.16
Inorganic Carbon				*<0.10*	*<0.10*	*<0.10*	*<0.10*				18.0
Total Organic Carbon				*2.22*	*0.76*	*4.79*	*0.49*				5.65
Plant Available Nutrients											
Cation Exchange Capacity				*17.7*	*16.9*	*37.3*	*21.2*	-	31.1	-	47.8
Saturated Paste Extractables											
SAR				*0.19*	*0.42*	*0.24*	*0.76*	-	0.23	-	24.6
Calcium (Ca)				*66.4*	*52.4*	*40.3*	*22.1*				370
Conductivity Sat. Paste				*0.60*	*0.46*	*0.34*	*0.23*				18.9
Magnesium (Mg)				*25.0*	*22.3*	*19.5*	*9.9*				800
Potassium (K)				*23.2*	*10.6*	*18.4*	*5.5*				653
% Saturation				*54.4*	*41.3*	*92.0*	*45.9*				98.6
Sodium (Na)				*7.2*	*14.5*	*7.5*	*17.1*				3690
	CCME Soil Quality Guidelines *		**Avg. Crustal**								
Metals (ppm)	**Agriculture**	**Industrial**	**Abundance ****								
Aluminum (Al)			82,300	*21200*	*23400*	*25100*	*26900*	20800	17300	21700	14400
Antimony (Sb)	20	40	0.2	*0.37*	*0.51*	*0.24*	*0.61*	0.61	0.36	0.38	0.32
Arsenic (As)	12	12	1.8	*4.72*	*6.21*	*3.32*	*7.86*	7.70	4.63	6.31	2.77
Barium (Ba)	750	2000	425	*228*	*172*	*263*	*196*	192	191	222	147
Beryllium (Be)	4	8		*0.41*	*0.45*	*0.41*	*0.43*	0.35	0.39	0.42	0.31
Bismuth (Bi)			0.0085	*<0.20*	*<0.20*	*<0.20*	*<0.20*	<0.20	<0.20	<0.20	<0.20
Boron (B)	2	no data	10					7.0	5.8	6.5	
Cadmium (Cd)	1.4	22	0.15	*0.176*	*0.114*	*0.138*	*0.094*	0.131	0.160	0.178	0.126
Calcium (Ca)			41,500	*9320*	*9550*	*12600*	*12700*	17400	9520	10900	54500
Chromium (Cr)	64	87	102	*52.1*	*57.0*	*34.2*	*72.4*	56.6	66.6	70.3	37.4
Cobalt (Co)	40	300	25	*19.1*	*20.4*	*15.7*	*21.4*	19.4	14.6	15.9	9.14
Copper (Cu)	63	91	60	*181*	*238*	*60.4*	*116*	110	61.7	63.4	57.0
Iron (Fe)			56,300	*36800*	*41500*	*40000*	*50500*	45400	30600	33600	19800
Lead (Pb)	70	600	14	*4.43*	*3.89*	*3.37*	*4.04*	3.71	3.80	4.01	3.39
Lithium (Li)				*8.6*	*9.2*	*8.7*	*10.6*	8.9	8.8	10.2	12.1
Magnesium (Mg)			23,300	*8580*	*10600*	*9260*	*13700*	12100	9140	9600	41400
Manganese (Mn)			950	*848*	*689*	*855*	*823*	681	668	798	648
Mercury (Hg)	6.6	50	0.085	*0.0838*	*0.0298*	*0.0260*	*0.0911*	0.0608	0.0271	0.0311	0.0298
Molybdenum (Mo)	5	40	1.2	*1.38*	*0.79*	*<0.50*	*0.71*	0.71	0.75	0.61	1.41
Nickel (Ni)	50	50	84	*40.8*	*45.8*	*23.5*	*52.5*	42.1	62.5	44.5	28.4
Phosphorus (P)			1,050	*800*	*718*	*825*	*870*	1030	1120	1100	1140
Potassium (K)			20,850	*3490*	*3050*	*3610*	*2190*	2630	2880	3190	6070
Selenium (Se)	1	2.9	0.05	*<0.20*	*<0.20*	*0.33*	*<0.20*	<0.20	0.22	0.29	0.62
Silver (Ag)	20	40	0.075	*0.11*	*<0.10*	*<0.10*	*0.12*	0.11	<0.10	<0.10	<0.10
Sodium (Na)			23,550	*250*	*310*	*290*	*500*	264	312	293	6610
Strontium (Sr)			370	*74.5*	*79.8*	*115*	*132*	89.0	75.8	75.8	556
Thallium (Tl)	1	1	0.85	*0.069*	*0.082*	*0.065*	*0.081*	0.069	0.069	0.068	0.064
Tin (Sn)	5	300		*<2.0*	*<2.0*	*<2.0*	*<2.0*	<2.0	<2.0	<2.0	<2.0
Titanium (Ti)			5,650	*938*	*1140*	*1030*	*1720*	1050	919	954	679
Uranium (U)	23	300	2.7	*0.379*	*0.458*	*0.382*	*0.460*	0.289	0.452	0.401	2.08
Vanadium (V)	130	130	120	*126*	*152*	*158*	*206*	189	96.7	104	50.0
Zinc (Zn)	200	360	70	*62.2*	*51.1*	*52.3*	*52.3*	51.9	54.4	58.4	44.7
Zirconium (Zr)								2.7	4.9	4.8	

* Canadian Council of Ministers of the E

** Adapted from: *Guidelines and Recom*

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