Baseline Soil Survey for the Proposed Suncor Steepbank Mine

May, 1996

Prepared for:

Suncor Inc.

Prepared by:

Golder Associates

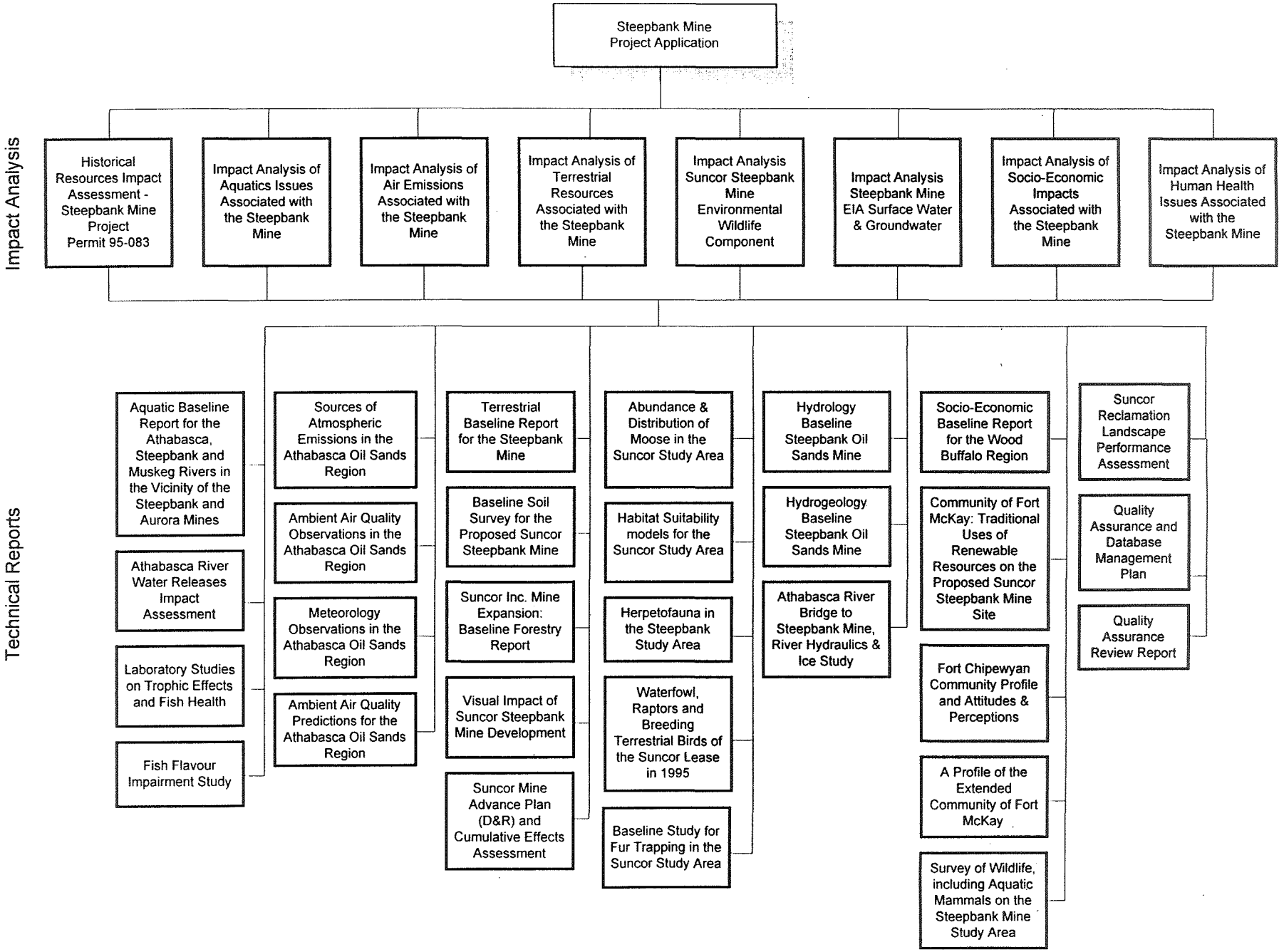
CAN~AG Enterprises Ltd.

952-2307

This report is one of a series of reports prepared for Suncor Inc. Oil Sands Group for the Environmental Impact Assessment for the development and operation of the Steepbank Mine, north of Fort McMurray, Alberta. These reports provided information and analysis in support of Suncor's application to the Alberta Energy Utilities Board and Alberta Environmental Protection to develop and operate the Steepbank Mine, and associated reclamation of the current mine (Lease 86/17) with Consolidated Tailings technology.

For further information, please contact:

Manager, Regulatory Affairs
Suncor Oil Sands Group
P.O. Box 4001
Fort McMurray, AB
T9H 3E3



Reports Prepared for the Steepbank Mine Environmental Assessment

r \1995\2307\repprep5 040\rpt-sch vsd

BASELINE SOIL SURVEY FOR THE PROPOSED SUNCOR STEEPBANK MINE SUNCOR INC.

Prepared for

Golder Associates Ltd.
1011 6 AVE SW
CALGARY AB T2P 0W1

Prepared by

L. A. Leskiw, M.Sc., P.Ag.
A. D. Laycock, P.Ag.
J. J. Pluth
Can-Ag Enterprises Ltd.
10303 65 AVE
EDMONTON AB T6H 1V1

#9518.3

April 1996

TABLE OF CONTENTS

LIST OF TABLES

1.0 INTRODUCTION

Can-Ag Enterprises Ltd. was subcontracted by Golder Associates Ltd. to conduct a soil survey of the area and a baseline environmental survey. The objectives of the survey were: to map the soil resources; to provide baseline soils data; to characterize soil materials for soil rating and for soil classification; to evaluate agricultural and forestry capability ratings in the pre-disturbance landscape; and to assess suitability and volume of materials for reclamation and attaining equivalent capability.

Soil mapping was conducted in July 1995, on an approximately 1:40,000 scale photomosaic. The soils and landscapes were described in terms of landform, surficial materials, slope, texture, stoniness, drainage conditions, profile morphology and soil chemistry. Soils were examined to a depth of 1.0 m at the majority of the sample sites. A combination of transect mapping, with inspections at 100 m or 200 m intervals along access cutlines, and free survey approach was used to characterize the map units. The transect method allows soil variability to be examined in a quantitative manner, not biased by the mappers selection of inspection points. The free survey approach entails strategically locating inspection sites within differing map units so as to characterize the map units. Soil inspections were also made at vegetation and forestry plots to provide a linkage at the site level. The distribution and extent of the various soils in the proposed area are shown on the accompanying Soil Maps for the Local and Intensive Study Areas. Soil-landscape units delineated are described in detail in the report. Forestry and agricultural capability ratings of existing and proposed reclaimed soils are tabulated. Materials are evaluated with respect to areas, volumes and suitability for reclamation. The Soil Map is Appended (in envelope inside backcover).

2.0 THE STUDY AREA

2.1 LOCATION AND EXTENT

The "Local Study Area" covers 340 square km (131 square miles) to the south, east and west of the Suncor Plant, north of Fort McMurray. It is located within townships 91, 92, ranges 8, 9, 10, 11 W4 Meridian. Mapping was conducted at a scale of 1:40,000 over this area. The "Intensive Study Area" lies within the above, on the east side of the Athabasca River, and totals 3234 ha of which 108 ha are waterbodies. This portion of the area was mapped at 1:10,000.

2.2 SURFICIAL DEPOSITS, LANDFORMS, SOILS AND LAND USES

The Local Study Area is characterized by six principal types of materials, the features of which are summarized as follows:

Organic bog and fen deposits - Surficial organic deposits, usually 0.5-1.5 m thick, cover 63% of the Local Study Area. These are most extensive in a band, about 6-10 km wide, on the uplands immediately east of the banks of the Athabasca River. There are also extensive tracts west of the river. Topography is nearly level. Water tables are at or near the surface (<1 m) much of the growing season.

Kinosis till - This till covers 10% of the area, mainly on the uplands east of the Athabasca River, towards the eastern end of the Local Study Area. The till is sandy loam, sandy clay loam to clay loam textured and very stony. Topography is gently undulating.

Colluvial deposits - These occur on the steep banks of the Athabasca and Steepbank Rivers and their smaller tributaries. A series of large rotational slump blocks have produced a ridged landform pattern on the upper, steeper slopes, whereas, a more gently sloping apron occurs along the lower slopes. Textures vary from sandy to clayey, but till-like materials are predominant. These deposits cover about 10% of the area.

Horse River till - Till and lacustro-till - This material covers about 9% of the area and occurs mainly on the upland plains west of the Athabasca River, primarily towards the western boundary of the Local Study Area. The till is clayey, slightly stony, and includes glacio-lacustrine and lacustro-till deposits. Topography is nearly level to very gently undulating.

Fluvial deposits - Recent fluvial deposits occur in the valley bottoms of the Athabasca and Steepbank Rivers. These materials are primarily fine sandy to silty, but gravelly tracts occur. Over half of this landform is well drained with water tables deeper than 1 m, however, sizeable poorly drained areas and wetlands occur. Topography is terraced, with meander scars, creating a gently undulating terrain. These deposits cover nearly 4% of the area.

Glacio-fluvial - A glacial-meltwater channel occurs on the upland plateau, west of the Athabasca River, south west of the Suncor Plant. It covers 4% of the area and contains sandy, gravelly and stony materials. In places, appreciable finer material occurs making the deposit till-like. Topography is very gently to gently undulating.

Principal soils occurring on the foregoing materials and their extent is given in Table 1.

TABLE 1. EXTENT OF MAP UNITS AND LAND USES WITHIN THE SUNCOR LOCAL STUDY AREA[1].

MAP UNIT	WOODED (ha)	MUSKEG (ha)	TOTAL (%)
Algar (ALG) / Till	26		0.1
Firebag (FIR) / Fluvial-eolian	157		0.5
Horse River (HRR) / Till	2 881		8.8
Kinosis (KNS) / Till	3 101		9.5
McLelland (MLD) / Organic		6 860	21.0
McMurray (MMY) / Fluvial	414		1.3
Gleyed McMurray (glMMY) / Fluvial	271		0.8
Muskeg (MUS) / Organic		13 596	41.5
Ruth Lake (RUT) / Glaciofluvial	1357		4.1
Rough Broken 1 (RB1) / Fluvial	382		1.2
Rough Broken 2 (RB2) / Colluvial	738		2.2
Rough Broken 3 (RB3) / Colluvial	2 604		8.0
Total ha (%)	11 931 (37%)	20 456 (63%)	32 387 (100%)

Note 1: Total calculated area does not include the rivers (1003 ha) nor water (436 ha).

2.3 BEDROCK GEOLOGY

According to Green (1972), the survey area is underlain by three Lower Cretaceous Formations and one Upper Devonian Formation. The Grand Rapids Formation which occurs along the eastern boundary of the area is comprised of fine-grained quartzose and feldspathic sandstone, laminated siltstone and silty shale, with thin coal beds. This formation is of shoreline complex origin. On the upland plains on both sides of the Athabasca River lies the Clearwater Formation, which is a dark gray, fossiliferous silty shale with laminated siltstone and fine grained cherty sandstone. The McMurray Formation, consisting of oil impregnated sandstone and siltstone, occurs on the banks of the Athabasca River. This formation is non marine to deltaic. In the valley bottom of the Athabasca River, lies the Devonian - Waterways Formation, which is shale and limestone of marine origin (AOSERP 1982).

2.4 CLIMATE

Climate characteristics are discussed in relation to the requirements for agricultural capability evaluation. This area is rated Class 3H in terms of agricultural climate, including an energy component of 1 100 and a moisture component of -200 (Leskiw and Kutash 1993). Climate is expected to remain unaffected by mining activities thereby not affecting capability ratings.

3.0 SOILS

3.1 SOIL INVESTIGATION METHODS

Soils were classified and described according to the criteria established by the Agriculture Canada Expert Committee on Soil Survey (1987). Soil mapping and sampling was conducted July 10-20, 1995. Topsoil moisture conditions varied from dry on knolls to moist or saturated in depressional areas. Bog soils were moist and thawed but fens were usually inundated and frozen at depths of approximately 60 cm. Soils were examined at 742 inspection sites. Inspections were performed along transects at 100 m or 200 m intervals, with additional inspections strategically located to characterize differences in landscape features, and to characterize vegetation and forestry plots. The soil was examined to a depth of 1 m at the majority of the sites, except where stoniness or frost precluded augering. Information from soil inspections was extrapolated to map units using the principles of geomorphology and surficial geology in concert with the vegetation patterns to delineate the individual soil map units. Soil samples to the approximate 1 m depth were taken at 20 sites, for analyses. Laboratory analyses costs were minimized and restricted to critical requirements of each typical profile. Photographs displaying principal units/features are appended. In the typical soil units described in the following sections (3.2.1 to 3.2.11), the dominant soils are presented first followed by the significant soils. A semicolon separates dominant (>50%) and significant (20-50%) soils.

Soils from the Suncor Local Study Area were sampled for chemical and physical analyses, and conducted by Norwest Labs, Edmonton. The soils were analyzed using standard soil investigation methods, as outlined by McKeague (1978). Only the typical soils were analyzed and are presented after each soil unit description. Rough Broken 1 (RB1) and Rough Broken 3 (RB3) do not have laboratory analyses as they are similar to a shallow Ruth Lake and Kinosis soils, respectively. The routine soil chemical characteristics include electrical conductivity (EC), saturation percentage (SAT%), soluble cations, sodium adsorption ratio (SAR), and soil reaction (pH) of the saturated paste. Soil organic matter (OM), total nitrogen (N), carbon to nitrogen ratio and pH ($CaC1_2$) were also analyzed. To convert %OM to %OC multiply by 0.57 and to convert %OC to %OM multiply by 1.75. Results indicate that there are no salinity, sodicity or pH concerns. The exchangeable calcium, magnesium, sodium and potassium cations were analyzed. Total exchange capacity (TEC), cation exchange capacity (CEC), base saturation, and exchangeable sodium percentage (ESP) were also determined. Soil fertility of selected samples was analyzed in terms of available plant nutrients including nitrogen (ammonium and nitrate), phosphorus, potassium, sulphate, calcium, magnesium and sodium.

Physical analyses consisted of water retention characteristics, Atterberg limits, and particle size analysis. The difference between field capacity (-33 kPa) and wilting point (-1500 kPa) equals the available water holding capacity (AWHC).

The soil quality is rated based on *the Soil Quality Criteria Relative to Disturbance and Reclamation* (Alberta Soil Advisory Committee 1987). Descriptive and analytical data are used in rating present soil capability for agriculture and forestry landuses and for modelling equivalent capability of the reclaimed landscape (Leskiw and Kutash 1993, Leskiw 1996).

Distribution of soils is shown onthe Soils Map (Appendix 7.5).

3.2 SOIL UNITS

3.2.1 ALGAR (ALG) SOIL UNIT

Extent (area / percentage)			26 ha / 0.1%		
Soil Classification			Peaty Orthic Gleysol; Orthic Gleysol		
Parent Material			morainal and glaciofluvial		
Texture: (surface / subsoil)			peat / sandy clay loam (sandy loam to clay loam)		
Topography / Percent Slope			2 / 0-2 %		
Surface Stoniness			mainly S0-S1, minor S4		
Drainage Class			poorly drained; imperfectly drained		
Slope Position			lower, level, depressional		
Land Use			wooded 70%, muskeg 30%		
Vegetation Quality (good / poor)			poor tree growth due to excessive wetness		
Colour Transition (surface / subsoil) (good / poor)			good colour change from peat to mineral soil		
PROFILE SITE # 601			56 sites total, 10 in ALG map units		
Horizon	**Depth (cm)**	**Colour**	**Texture**	**Structure**	**Consistence**
Of	0-15	brown	organic	na	na
Oh	15-25	black	organic	na	na
Bg	25-60	gray	sandy clay loam	massive	friable
Ccag	60-100	dark gray	clay loam	massive	friable to firm

na: not applicable

Inventory comments:

- The majority of ALG sites are in MUS units, while a significant number are in RB3 units, and the remaining few are scattered among upland units.
- Generally, these are wet, poorly drained mineral soils with <30 cm of surface litter or peat. They occur as islands within muskegs, in the transition from muskegs to uplands, and as depressional areas within uplands.
- Parent materials are variable, dominantly morainal with fluvial-lacustrine veneers occurring.
- Moisture regimes are Hygric to Subhydric.
- Nutrient regime is Mesotrophic.

Reclamation and soil handling considerations:

- LFH or Of-Oh horizons are 20-30 cm thick in peaty Orthic Gleysols, 10-15 cm thick in Orthic Gleysols. The organic layer is of good quality.
- There may be an Ae horizon (<15 cm thick).
- Bg horizon (35 cm thick) is generally rated good to fair soil quality and limited by firm consistence.
- Ccag horizon (40+ cm thick) is generally rated fair soil quality and limited by high pH, and firm consistence.
- The mineral soils vary from sandy loam to clay loam, and are friable to firm, respectively.
- Good colour change from peat to mineral horizons.
- Wetness, trafficability, and potential for compaction will be concerns with materials handling.

TABLE 2. ALGAR (ALG) SOIL LABORATORY RESULTS FROM THE SUNCOR LOCAL STUDY AREA (1995).

Soil chemical characteristics.

SOIL	SITE SX	HORIZON (cm)	pH ($CaCl_2$)	OM (%)	N (%)	C:N Ratio	pH (saturated paste)	EC (dS/m)	SAT (%)	SAR	TEXTURE (Agricultural)
ALG	601	Oh (15-25)	6.2	70.6	1.15	34	na	na	na	na	peat
		Bg (25-60)	7.1	1.62	0.02	41	na	na	na	na	sandy clay loam
		Ccag (60-100)	na	0.80	<0.01	na	8.0	0.35	31	0.9	sandy loam

Exchangeable cations.

SOIL	SITE SX	HORIZON (cm)	Exch Ca (meq/ 100g)	Exch Mg (meq/ 100g)	Exch Na (meq/ 100g)	Exch K (meq/ 100g)	TEC (meq/ 100g)	CEC (meq/ 100g)	Base Sat'n (%)	ESP (%)
ALG	601	Oh (15-25)	109	17.5	0.2	1.1	128	42.9	298	0.52
		Bg (25-60)	28.6	2.4	<0.1	0.2	31.3	14.2	220	<0.34

Soil fertility and available plant nutrients.

SOIL	SITE SX	HORIZON (cm)	NH_4-N (mg/kg)	NO_3-N (mg/kg)	PO_4-P (mg/kg)	K (mg/kg)	SO_4-S (mg/kg)	Ca (mg/kg)	Mg (mg/kg)	Na (mg/kg)
ALG	601	Oh (15-25)	25.0	2.7	11	385	96.3	19900	2230	27.2

Physical characteristics.

SOIL	SITE SX	HORIZON (cm)	-33 kPa ($g\ g^{-1}$)	-1500 kPa ($g\ g^{-1}$)	AWHC % (wt)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Sand	% Silt	% Clay	Textural Class	Unified Class
ALG	601	Bg (25-60)	na	na	na	na	na	na	49	28	23	SCL	na
		Ccag (60-100)	na	na	na	na	na	na	57	24	19	SL	na

na: not analyzed or not applicable.

3.2.2 FIREBAG (FIR) SOIL UNIT

Extent (area / percentage)	157 ha / 0.5%
Soil Classification	Eluviated Eutric Brunisol; Orthic Eutric Brunisol
Parent Material	glaciofluvial, minor morainal
Texture: (surface / subsoil)	loamy sand, sandy loam / sand, sandy loam, loamy sand
Topography / Percent slope	3 / <5 %, some 5 / 15 %
Surface Stoniness	S1-S2, minor to S4
Drainage Class	rapid to well
Slope Position	level-lower, minor in other positions
Land Use	wooded
Vegetation Quality (good / poor)	fairly open stands, thin understory, droughty conditions, poor tree growth
Colour Transition (surface / subsoil) (good/poor)	poor colour change
PROFILE SITE # 593	78 sites total, 41 in FIR map units

Horizon	Depth (cm)	Colour	Texture	Structure	Consistence
LF	3-0	black	litter	na	na
Ae	0-15	pinkish gray	loamy sand to sandy loam	platy	loose
Bm	15-40	strong brown	loamy sand to sandy loam	single grain	loose
BC	40-90	brown	sandy loam	massive	friable
C	90-110	brown	sand	massive	loose

na: not applicable

Inventory comments:

- FIR soils occur on sandy ridges and plains on the uplands adjacent to valleys of the Athabasca and Steepbank Rivers and other smaller streams.
- These soils are classified as Eutric Brunisols but Dystric Brunisols likely occur within these map units.
- Moisture regimes are Xeric to Subxeric.
- Nutrient regimes are Oligotrophic to Submesotrophic.

Reclamation and soil handling considerations:

- LFH horizon (5 cm thick) is good quality.
- Ae horizon (15-20 cm thick) is rated as poor soil quality due to course texture.
- Bm horizon (25-30 cm thick) is rated as poor soil quality due to course texture.
- BC horizon (50 cm thick) is rated as poor soil quality due to course texture.
- C horizon (10+ cm thick) is rated as poor soil quality and limited by high pH, and coarse texture.
- Poor colour change among horizons.
- The soils are deep (>1 m) sands that are stony in places.
- Subsoils are sandy textured and will be droughty.
- These soil materials are similar to tailing sands, they are dominantly loamy sands to sands with inclusions of sandy loams.

TABLE 3. FIREBAG (FIR) SOIL LABORATORY RESULTS FROM THE SUNCOR LOCAL STUDY AREA (1995).

Soil chemical characteristics.

SOIL	SITE SX	HORIZON (cm)	pH ($CaCl_2$)	OM (%)	N (%)	C:N Ratio	pH (saturated paste)	EC (dS/m)	SAT (%)	SAR	TEXTURE (Agricultural)
FIR	593	Ae (0-15)	5.5	0.50	0.01	28	na	na	na	na	sandy loam
		Bm (15-40)	5.3	<0.09	<0.01	<50	na	na	na	na	sandy loam
		BC (40-90)	5.9	0.15	0.01	8	na	na	na	na	sandy loam to sandy clay loam
		Cca (90-110)	na	<0.09	<0.01	na	8.0	0.37	28	0.3	sandy loam to sand

Exchangeable cations.

SOIL	SITE SX	HORIZON (cm)	Exch Ca (meq/ 100g)	Exch Mg (meq/ 100g)	Exch Na (meq/ 100g)	Exch K (meq/ 100g)	TEC (meq/ 100g)	CEC (meq/ 100g)	Base Sat'n (%)	ESP (%)
FIR	400	Ae (0-12)	0.4	<0.1	<0.1	<0.1	0.5	4.1	13	<0.21
		Bm (12-50)	0.4	0.2	<0.1	<0.1	0.7	1.8	38	<0.48
FIR	593	Ae (0-15)	2.1	0.4	<0.1	0.1	2.6	2.7	96	<0.64
		Bm (15-40)	1.9	0.3	<0.1	<0.1	2.3	4.8	48	<0.18

Soil fertility and available plant nutrients.

SOIL	SITE SX	HORIZON (cm)	NH_4-N (mg/kg)	NO_3-N (mg/kg)	PO_4-P (mg/kg)	K (mg/kg)	SO_4-S (mg/kg)	Ca (mg/kg)	Mg (mg/kg)	Na (mg/kg)
FIR	400	Ae (0-12)	0.6	0.3	2	26	2.3	42.3	9.4	<1.0
FIR	593	Ae (0-15)	0.3	0.3	<1	54	4.0	388	48.0	2.5

Physical characteristics.

SOIL	SITE SX	HORIZON (cm)	-33 kPa ($g\,g^{-1}$)	-1500 kPa ($g\,g^{-1}$)	AWHC % (wt)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Sand	% Silt	% Clay	Textural Class	Unified Class
FIR	593	Ae (0-15)	0.087	0.023	6	na	na	na	71	22	7	SL	SW
		Bm (15-40)	0.089	0.020	7	na	na	na	75	12	13	SL	SW
		BC (40-90)	na	na	na	na	na	na	65	8	27	SCL	na
		Cca (90-110)	na	na	na	na	na	na	77	6	17	SL	na
FIR	400	Ae (0-12)	na	na	na	na	na	na	89	4	7	S	na
		Bm (12-50)	na	na	na	na	na	na	91	0	9	S	na
		BC (50-100)	na	na	na	na	na	na	93	0	7	S	na

3.2.3 HORSE RIVER (HRR) SOIL UNIT

Extent (area / percentage)	2 881 ha / 8.8%
Soil Classification	Orthic Gray Luvisol and Solonetzic Gray Luvisol (HRR); Gleyed Gray Luvisol (glHRR)
Parent Material	morainal; significant lacustrine over morainal and lacustro-till
Texture: (surface / subsoil)	sandy loam, silt loam, silty clay / clay, clay loam
Topography / Percent slope	3 / <5 %
Surface Stoniness	S0-S1
Drainage Class	HRR is moderately well drained; glHRR is imperfectly to poorly drained
Slope Position	HRR is very gently undulating; glHRR is level to lower
Land Use	wooded
Vegetation Quality (good / poor)	good tree growth on HRR; excellent growth on glHRR; thick understory throughout
Colour Transition (surface / subsoil) (good / poor)	poor colour change
PROFILE SITE # 703	HRR 33 sites total; glHRR 15 sites total; 42 in HRR map units

Horizon	Depth (cm)	Colour	Texture	Structure	Consistence
LF	4-2	black	litter	na	na
H	2-0	black	litter	na	na
Ae	0-15	grayish brown	fine sandy loam	platy	friable
Bt	15-40	brown-dark brown	clay	subangular blocky	firm
BC	40-75	brown-dark brown	clay	massive	firm
Cca	75-100	dark grayish brown	clay loam - clay	massive	firm

na: not applicable

Inventory comments:

- The HRR map unit is comprised of two main series, HRR and glHRR. The former occurs on better drained, mid to upper slope positions whereas the latter tends to occur in lower lying, imperfectly drained positions.
- While mapped as morainal, parent materials include lacustrine, lacustrine veneer over till and lacustro-till.
- The HRR series is mainly Orthic Gray Luvisolic with a significant occurrence of Solonetzic Gray Luvisolic soils. The solonetzic features tend to become more pronounced to the west and northwest of the Local Study Area.
- The gleyed subgroups have mottled, gleyed subsoils, and likely have water tables at 1-2 m.
- Moisture regimes are Mesic to Subhygric.
- Nutrient regimes are Mesotrophic to Permesotrophic.

Reclamation and soil handling considerations:

- LFH horizon (5-8 cm thick) and is good quality.
- Ae horizon (10-15 cm thick) is good soil quality.
- Bt horizon (25 cm thick) is rated as fair soil quality, limited by clay to clay loam texture.
- BC horizon (35 cm thick) is rated as fair soil quality, limited by high pH, weak sodicity and clay to clay loam texture.
- Cca horizon (25+ cm thick) is rated as fair soil quality. The gleyed C horizon (25+ cm) is rated as fair soil quality and is limited by clay to clay loam texture, massive structure and very firm consistence.
- Poor colour change among horizons.
- All these are clay to clay loam soils with a few stones.
- Potential soil compaction on these clayey subsoils.

TABLE 4. HORSE RIVER (HRR) SOIL LABORATORY RESULTS FROM THE SUNCOR LOCAL STUDY AREA (1995).

Soil chemical characteristics.

SOIL	SITE SX	HORIZON (cm)	pH ($CaCl_2$)	OM (%)	N (%)	C:N Ratio	pH (saturated paste)	EC (dS/m)	SAT (%)	SAR	TEXTURE (Agricultural)
HRR	559	LFH (8-0)	4.8	66.4	1.21	31	na	na	na	na	litter
		Ae (0-5)	4.5	0.77	0.03	14	na	na	na	na	clay loam
		Bt (5-50)	na	0.85	0.03	14	5.2	0.20	52	2.7	clay
		BC (50-120)	na	0.35	0.02	11	7.6	1.16	69	6.6	clay
		Ck (120-150)	na	0.13	<0.01	na	7.8	1.71	45	7.8	clay loam to clay
HRR	703	Ae (0-15)	5.2	1.89	0.07	15	na	na	na	na	fine sandy loam
		Bt (15-40)	5.8	1.06	0.04	14	na	na	na	na	clay loam
		Ck (75-100)	na	0.99	0.2	33	7.5	0.37	38	0.8	loam

Exchangeable cations.

SOIL	SITE SX	HORIZON (cm)	Exch Ca (meq/ 100g)	Exch Mg (meq/ 100g)	Exch Na (meq/ 100g)	Exch K (meq/ 100g)	TEC (meq/ 100g)	CEC (meq/ 100g)	Base Sat'n (%)	ESP (%)
HRR	559	Ae (0-5)	3.5	1.5	<0.1	0.4	5.4	8.3	65	<0.86
		Bt (5-50)	10.6	6.1	<0.1	0.3	16.9	24.2	70	<0.04
HRR	703	Ae (0-15)	5.9	2.4	<0.1	0.4	8.8	10.1	87	<0.49
		Bt (15-40)	9.6	6.5	<0.1	0.3	16.5	18.8	88	<0.32

Soil fertility and available plant nutrients.

SOIL	SITE SX	HORIZON (cm)	NH_4-N (mg/kg)	NO_3-N (mg/kg)	PO_4-P (mg/kg)	K (mg/kg)	SO_4-S (mg/kg)	Ca (mg/kg)	Mg (mg/kg)	Na (mg/kg)
HRR	559	Of (8-2)	16.2	2.0	49	897	80.4	6900	887	25.0
		Ae (0-5)	1.7	0.3	1	120	8.5	694	208	15.8
HRR	703	Ae (0-15)	0.9	<0.3	6	138	5.5	1130	343	5.8

Physical characteristics.

SOIL	SITE SX	HORIZON (cm)	-33 kPa ($g\ g^{-1}$)	-1500 kPa ($g\ g^{-1}$)	AWHC % (wt)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Sand	% Silt	% Clay	Textural Class	Unified Class
HRR	559	Of (8-2)	na	na	na	na	na	na	na	na	na	na	na
		Ae (0-5)	0.250	0.080	17	na	na	na	23	46	31	CL	na
		Bt (5-50)	0.327	0.208	12	46	24	22	21	22	57	C	CL
		BC (50-120)	na	na	na	47	20	27	21	26	53	C	CL
		Ck (120-150)	na	na	na	28	15	13	39	26	35	CL	CL
HRR	703	Ae (0-15)	0.241	0.080	16	na	na	na	45	34	21	L	na
		Bt (15-40)	0.281	0.155	13	36	16	20	37	28	35	CL	CL
		Ck (75-100)	na	na	na	27	15	12	41	32	27	L	CL

na: not analyzed or not applicable.

3.2.4 KINOSIS (KNS) SOIL UNIT

Extent (area / percentage)			3 101 ha / 9.5%		
Soil Classification			Orthic Gray Luvisol (KNS); Gleyed Gray Luvisol (glKNS)		
Parent Material			morainal; sorted morainal and fluvial		
Texture: (surface / subsoil)			sandy loam, loamy sand / sandy clay loam, clay loam		
Topography / Percent slope			4 / 0-9 %		
Surface Stoniness			S1-S3		
Drainage Class			well to moderately well drained; significant imperfectly		
Slope Position			KNS on upper to mid slopes, glKNS on lower slopes		
Land Use			wooded		
Vegetation Quality (good / poor)			good tree growth on KNS; excellent tree growth on glKNS; good understory throughout		
Colour Transition (surface / subsoil) (good / poor)			poor colour change		
PROFILE SITE # 399			81 KNS sites total; 39 glKNS sites total; 80 in KNS units		
Horizon	**Depth (cm)**	**Colour**	**Texture**	**Structure**	**Consistence**
L	13-0	black	litter	na	na
F	10-0	black	litter	na	na
Ae	0-20	grayish brown	sandy loam	platy	friable
Bt	20-50	yellowish brown	clay loam - sandy clay loam	subangular blocky	firm
BC	50-65	brown	clay loam - sandy clay loam	massive	firm
Cca	65-85	brown	clay loam - sandy clay loam	massive	firm

na: not applicable

Inventory comments:

- The KNS map unit is comprised of two main series, KNS and glKNS. The former occurs on better drained, mid to upper slope position soils whereas the latter normally occurs in lower lying imperfectly drained positions.
- The parent material is dominantly morainal, but there are inclusions of lacustrine and fluvial veneers over morainal deposits.
- The gleyed subgroups have mottled, gleyed subsoils.
- Topography varies considerably, with slopes usually 2-9%, and steeper in association with rough broken areas.
- Moisture regimes are Mesic to Subhygric.
- Nutrient regime is Mesotrophic.

Reclamation and soil handling considerations:

- LFH horizon averages 8 cm, ranges 5-15 cm thick and is good quality.
- Ae horizon (15-20 cm thick) is rated as good soil quality.
- Bt horizon (30 cm thick) is rated as fair soil quality and is limited by clay loam to sandy clay loam textures.
- BC horizon (15-20 cm thick) is rated as fair soil quality and is limited by clay loam to sandy clay loam textures.
- Cca horizon (20-30+ cm thick) is rated as fair soil quality and is limited by clay loam to sandy clay loam textures.
- Poor colour change among horizons.
- Concerns are potential soil compaction on the clay loam soils, and wetness and trafficability with materials handling in the gleyed subsoils.

TABLE 5. KINOSIS (KNS) SOIL LABORATORY RESULTS FROM THE SUNCOR LOCAL STUDY AREA (1995).

Soil chemical characteristics.

SOIL	SITE SX	HORIZON (cm)	pH ($CaCl_2$)	OM (%)	N (%)	C:N Ratio	pH (saturated paste)	EC (dS/m)	SAT (%)	SAR	TEXTURE (Agricultural)
KNS	399	F (10-0)	5.3	81.6	1.95	24	na	na	na	na	litter
		Ae (0-20)	6.0	1.2	0.04	19	na	na	na	na	sandy loam
		Bt (20-50)	6.3	1.2	0.04	16	na	na	na	na	clay loam to sandy clay loam
		Cca (65-85)	na	2.0	0.04	26	7.4	0.39	39	1.8	sandy clay loam

Exchangeable cations.

SOIL	SITE SX	HORIZON (cm)	Exch Ca (meq/ 100g)	Exch Mg (meq/ 100g)	Exch Na (meq/ 100g)	Exch K (meq/ 100g)	TEC (meq/ 100g)	CEC (meq/ 100g)	Base Sat'n (%)	ESP (%)
KNS	399	Ae (0-20)	3.9	1.9	<0.1	0.1	6.0	6.3	95	<1.12
		Bt (20-50)	6.7	4.2	0.2	0.2	11.3	11.6	97	1.92

Soil fertility and available plant nutrients.

SOIL	SITE SX	HORIZON (cm)	NH_4-N (mg/kg)	NO_3-N (mg/kg)	PO_4-P (mg/kg)	K (mg/kg)	SO_4-S (mg/kg)	Ca (mg/kg)	Mg (mg/kg)	Na (mg/kg)
KNS	399	F (10-0)	49.6	1.3	50	1120	145	11800	2590	24.2
		Ae (0-20)	1.0	0.4	1	57	5.6	749	268	15.7

Physical characteristics.

SOIL	SITE SX	HORIZON (cm)	-33 kPa ($g\ g^{-1}$)	-1500 kPa ($g\ g^{-1}$)	AWHC % (wt)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Sand	% Silt	% Clay	Textural Class	Unified Class
KNS	399	Of (10-0)	na	na	na	na	na	na	na	na	na	na	na
		Ae (0-20)	0.144	0.043	10	na	na	na	61	24	15	SL	na
		Bt (20-50)	0.203	0.098	10	26	14	12	53	22	25	SCL	na
		Cca (65-85)	na	na	na	28	14	14	55	20	25	SCL	na

na: not analyzed or not applicable.

3.2.5 MCLELLAND (MLD) SOIL UNIT

Extent (area / percentage)	6 860 ha / 21.0%
Soil Classification	Typic Mesisol (MLD1); Terric Mesisol (MLD2)
Parent Material	organic; organic / mineral
Texture: (surface / subsoil)	fibric peat / mesic; humic peat over mineral soil
Topography / Percent slope	2 / 0-2 %
Surface Stoniness	S0
Drainage Class	very poorly to poorly drained
Slope Position	level to depressional, usually associated with drainage courses
Land Use	fens with significant inclusion of bogs, or fen-bog transition
Vegetation Quality (good / poor)	good cover but poor growth due to wetness, non-productive forest
Colour Transition (surface / subsoil) (good / poor)	poor colour change
PROFILE SITE # 331	24 MLD1 sites total; 33 MLD2 sites total; 34 sites in MLD map unit, others are inclusions in other units

Horizon	Depth (cm)	Colour	Texture	Structure	Consistence
Of	0-30	brown	fibric	na	na
Om	30-110	dark brown-black	mesic	na	na
Cg	110-120	gray	clay loam	massive	firm

na: not applicable

Inventory comments:

- This unit is dominated by moderately to well decomposed (mesic to humic) fen (transitional to bog) peat deposits, associated with drainage courses. Most of the sites were under water and frozen in mid-July so depths are extrapolated from nearby sites that were thawed.
- The MLD1 sites have peat deeper than 100 cm whereas MLD2 sites have 40-100 cm of peat over mineral soil.
- A significant occurrence of MUS soils occur within the MLD areas. Also, there are inclusions of mineral soils, especially, KNS, FIR, and ALG soils.
- Moisture regimes are Subhydric to Hydric.
- Nutrient regimes are Mesotrophic to Eutrophic.

Reclamation and soil handling considerations:

- Of and Om horizons (70-110+ cm thick) are good quality peats.
- Cg horizon (15-30+ cm thick) is rated as fair soil quality due to clay loam textures, and firm consistence.
- Poor colour change among horizons, but clear differentiation between organic and mineral layers.
- Wetness and trafficability are major limitations to operating or handling materials of this unit. Water management through stream diversion, drainage and seepage control is necessary.

TABLE 6. MCLELLAND (MLD) SOIL LABORATORY RESULTS FROM THE SUNCOR LOCAL STUDY AREA (1995).

Soil chemical characteristics.

SOIL	SITE SX	HORIZON (cm)	pH ($CaCl_2$)	OM (%)	N (%)	C:N Ratio	pH (saturated paste)	EC (dS/m)	SAT (%)	SAR	TEXTURE (Agricultural)
MLD	331	Of (0-30)	6.9	84	1.40	34	na	na	na	na	peat
		Om (30-110)	5.6	94	2.13	25	na	na	na	na	peat
		Cg (110-120)	5.9	na	na	na	na	na	na	na	clay loam
MLD	724	Oh1 (0-50)	4.4	32.6	0.79	23	na	na	na	na	peat
		Oh2 (50-100)	4.4	14.0	0.20	38	na	na	na	na	peat

Soil fertility and available plant nutrients.

SOIL	SITE SX	HORIZON (cm)	NH_4-N (mg/kg)	NO_3-N (mg/kg)	PO_4-P (mg/kg)	K (mg/kg)	SO_4-S (mg/kg)	Ca (mg/kg)	Mg (mg/kg)	Na (mg/kg)
MLD	331	Of (0-30)	55.1	5.7	44	1090	92.4	18900	2010	117
		Om (30-110)	12.8	2.2	4	63	54.7	19300	1380	58.6
MLD	724	Oh1 (0-50)	4.5	0.7	16	51	24.3	na	na	na
		Oh2 (50-100)	1.5	0.4	130	30	10.9	na	na	na

na: not analyzed or not applicable.

3.2.6 MCMURRAY (MMY) AND GLEYED MCMURRAY (GLMMY) SOIL UNITS

Extent (area / percentage)			414 ha / 1.3%; 271 ha / 0.8%		
Soil Classification			Orthic Regosol (MMY); Gleyed Cumulic Regosol (glMMY)		
Parent Material			fluvial, minor fluvial over morainal		
Texture: (surface / subsoil)			silt loam, loam / sandy loam, sand		
Topography / Percent Slope			4 / 0-9 %		
Surface Stoniness			S0-S1		
Drainage Class			moderately well drained to imperfectly; poorly		
Slope Position			level, lower, depressional		
Land Use			wooded, wetland		
Vegetation Quality (good / poor)			excellent tree growth on MMY soils; wetness limiting on glMMY soils		
Colour Transition (surface / subsoil) (good / poor)			poor colour change		
PROFILE SITE # 415			16 sites MMY; 9 sites glMMY; 17 sites in MMY units		
Horizon	**Depth (cm)**	**Colour**	**Texture**	**Structure**	**Consistence**
F	6-0	black	litter	na	na
C1	0-50	brown-dark brown	silt loam	massive	friable
C2	50-100	brown-dark brown	sandy loam	massive	friable

na: not applicable

Inventory comments:

- This soil occurs on the lower terraces along the rivers and streams. The MMY soils occur on the higher well drained positions while glMMY soils occur in depressional areas, usually meander scars.
- These soils are developed primarily on silt loam to loam textured deposits, tending to sandy in places.
- There is limited profile development.
- Moisture regimes are Mesic to Hydric.
- Nutrient regime is Permesotrophic.

Reclamation and soil handling considerations:

- LFH horizon (<8 cm thick) is good quality.
- C horizons (100+ cm thick) are rated as fair soil quality with limitations of high pH, due to presence of lime.
- Poor colour change among horizons.
- Wetness and trafficability are concerns in the glMMY soils.

TABLE 7. MCMURRAY (MMR) AND GLEYED MCMURRAY (GLMMR) SOIL LABORATORY RESULTS FROM THE SUNCOR LOCAL STUDY AREA (1995).

Soil chemical characteristics.

SOIL	SITE SX	HORIZON (cm)	pH ($CaCl_2$)	OM (%)	N (%)	C:N Ratio	pH (saturated paste)	EC (dS/m)	SAT (%)	SAR	TEXTURE (Agricultural)
MMY	415	C1 (0-50)	na	6.44	0.22	17	7.7	0.59	61	0.2	silty loam
		C2 (50-100)	na	na	na	na	7.5	0.69	63	0.3	sandy loam
glMMY	390	Cg1 (0-50)	na	26.3	0.50	29	6.6	0.82	103	0.6	silty loam to silty clay loam
		Cg2 (50-100)	na	5.77	0.13	25	6.6	0.76	40	0.6	loam to sandy loam

Physical characteristics.

SOIL	SITE SX	HORIZON (cm)	-33 kPa ($g\ g^{-1}$)	-1500 kPa ($g\ g^{-1}$)	AWHC %(wt)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Sand	% Silt	% Clay	Textural Class	Unified Class
MMY	415	C1 (0-50)	na	na	na	53	36	17	27	48	25	L	MH
		C2 (50-100)	na	na	na	50	35	15	32	42	23	L	MH
glMMY	390	Cg1 (0-50)	na	na	na	na	na	na	49	32	19	L	na
		Cg2 (50-100)	na	na	na	na	na	na	57	24	18	SL	na

na: not analyzed or not applicable.

3.2.7 MUSKEG (MUS) SOIL UNIT

Extent (area / percentage)			13 596 ha / 41.5%		
Soil Classification			Typic Mesisol (MUS1); Terric Mesisol (MUS2)		
Parent Material			organic (>1 m); organic (<1m) / mineral		
Texture: (surface / subsoil)			fibric peat / mesic peat over mineral material		
Topography / Percent slope			2 / 0-2 %		
Surface Stoniness			S0		
Drainage Class			poorly to very poorly drained		
Slope Position			level to depressional		
Land Use			muskeg - bogs		
Vegetation Quality (good / poor)			poor, stunted black spruce, non-productive		
Colour Transition (surface / subsoil) (good / poor)			poor colour change		
PROFILE SITE # 699			MUS1 60 sites total; MUS2 252 sites total; 292 in MUS units, other inclusions in other map units		
Horizon	**Depth (cm)**	**Colour**	**Texture**	**Structure**	**Consistence**
Of	0-30	light brown	fibric	na	na
Om	30-120	brown	mesic	na	na

na: not applicable

Inventory comments:

- Developed on bog peat deposits, from 40-150 cm thick. Extensive areas of MUS soils occur and are dissected by MLD soils which serve as drainage courses. MUS soils also occur in depressions within upland mineral soil areas.
- One location appeared to have permafrost, Cryosolic soil (in vicinity of inspection sites 438 and 439).
- Clay loam morainal deposits are the dominant underlying mineral material.
- Moisture regimes are Hygric to Subhydric.
- Nutrient regimes are Oligotrophic to Submesotrophic.

Reclamation and soil handling considerations:

- Of and Om (120+ cm depth) are good quality peats.
- Poor colour change between organic horizons, but good colour change to underlying mineral material.
- Wetness and trafficability are major limitations to operating or handling materials of this unit. Water management through stream diversion, drainage and seepage control is necessary.

TABLE 8. MUSKEG (MUS) SOIL LABORATORY RESULTS FROM THE SUNCOR LOCAL STUDY AREA (1995).

Soil chemical characteristics.

SOIL	SITE SX	HORIZON (cm)	pH ($CaCl_2$)	OM (%)	N (%)	C:N Ratio	pH (saturated paste)	EC (dS/m)	SAT (%)	SAR	TEXTURE (Agricultural)
MUS	699	Of (0-120)	3.0	89.1	0.93	54	na	na	na	na	peat
MUS	712	Of (0-20)	4.5	76.8	1.34	32	na	na	na	na	peat
		Om (20-80)	5.4	75.6	1.98	22	na	na	na	na	peat
		Oh (80-100)	5.2	51.4	1.70	17	na	na	na	na	peat
		Cg (100-120)	5.5	na	na	na	na	na	na	na	sandy loam

Soil fertility and available plant nutrients.

SOIL	SITE SX	HORIZON (cm)	NH_4-N (mg/kg)	NO_3-N (mg/kg)	PO_4-P (mg/kg)	K (mg/kg)	SO_4-S (mg/kg)	Ca (mg/kg)	Mg (mg/kg)	Na (mg/kg)
MUS	699	Of (0-120)	27.5	1.1	4	182	6.6	1340	241	46.1
MUS	712	Of (0-20)	51.6	2.0	92	1710	343	13900	1920	290
		Om (20-80)	13.5	3.1	4	103	44.8	na	na	na
		Oh (80-100)	10.8	1.9	<1	48	24.9	na	na	na

na: not analyzed or not applicable.

3.2.8 RUTH LAKE (RUT) SOIL UNIT

Extent (area / percentage)			1 357 ha / 4.1%		
Soil Classification			Eluviated Eutric Brunisol; Orthic Gray Luvisol		
Parent Material			glaciofluvial, glaciofluvial over morainal		
Texture: (surface / subsoil)			sandy loam, loamy sand, sand / sandy loam, loamy sand, sand		
Topography / Percent slope			4 / <9 %		
Surface Stoniness			S0-S4		
Drainage Class			rapid, well, moderately well drained		
Slope Position			all upland positions		
Land Use			wooded		
Vegetation Quality (good / poor)			somewhat open stands due to sandy, droughty conditions, poor tree growth		
Colour Transition (surface / subsoil) (good / poor)			poor colour change		
PROFILE SITE # 669			20 sites total; 18 sites in RUT units		
Horizon	**Depth (cm)**	**Colour**	**Texture**	**Structure**	**Consistence**
LF	2-0	black	litter	na	na
Ae	0-20	pinkish gray	sand	single grain	loose
Bm	20-70	strong brown	sand	single grain	loose
C	70-120	strong brown	sand	single grain	loose

na: not applicable

Inventory comments:

- These are coarse textured stony soils on glaciofluvial plains. Dystric Brunisols may occur within this unit.
- Tree growth is rather poor and open on the higher and drier positions grading to good growth in moist or finer textured sites.
- Moisture regimes are Submesic to Mesic.
- Nutrient regimes are Oligotrophic to Submesotrophic.
- Parts of this unit have gravel lenses and are being used as gravel pits (Disturbed Land).

Reclamation and soil handling considerations:

- LFH horizon (2-5 cm thick) is good quality.
- Ae horizon (10-20 cm thick) is variable in quality and fair is an average soil quality. Detailed mapping of the RUT map units is required to distinguish the different soil qualities.
- Bm horizon (20-50 cm thick) is variable in quality and fair is an average soil quality
- Poor colour change among horizons.
- Textures range from gravels to sands to sandy loams to sandy clay loams, from slightly to exceedingly stony. The finer materials (sandy loams and finer) are fair, whereas the coarse (sands and gravels) are poor.
- These soils are generally droughty due to coarse textures, but they are moist in lower lying positions.

TABLE 9. RUTH LAKE (RUT) SOIL LABORATORY RESULTS FROM THE SUNCOR LOCAL STUDY AREA (1995).

Soil chemical characteristics.

SOIL	SITE SX	HORIZON (cm)	pH ($CaCl_2$)	OM (%)	N (%)	C:N Ratio	pH (saturated paste)	EC (dS/m)	SAT (%)	SAR	TEXTURE (Agricultural)
RUT	669	LF (2-0)	6.9	11.4	0.18	35	na	na	na	na	litter
		Ae (0-20)	6.8	0.22	<0.01	na	na	na	na	na	sand
		Bm (20-70)	4.7	<0.09	<0.01	na	na	na	na	na	sand
		C (70-120)	4.6	<0.09	<0.01	na	na	na	na	na	sand

Exchangeable cations of selected soils.

SOIL	SITE SX	HORIZON (cm)	Exch Ca (meq/ 100g)	Exch Mg (meq/ 100g)	Exch Na (meq/ 100g)	Exch K (meq/ 100g)	TEC (meq/ 100g)	CEC (meq/ 100g)	Base Sat'n (%)	ESP (%)
RUT	669	Ae (0-20)	1.0	0.4	<0.1	<0.1	1.4	2.9	49	<0.39
		Bm (20-70)	0.4	0.1	<0.1	<0.1	0.6	1.8	30	<0.65

Soil fertility and available plant nutrients of selected soils.

SOIL	SITE SX	HORIZON (cm)	NH_4-N (mg/kg)	NO_3-N (mg/kg)	PO_4-P (mg/kg)	K (mg/kg)	SO_4-S (mg/kg)	Ca (mg/kg)	Mg (mg/kg)	Na (mg/kg)
RUT	669	LF (2-0)	3.4	0.6	12	100	10.0	3580	637	3.9
		Ae (0-20)	0.4	0.3	3	18	3.0	179	48.5	<0.1

Physical characteristics.

SOIL	SITE SX	HORIZON (cm)	-33 kPa ($g\ g^{-1}$)	-1500 kPa ($g\ g^{-1}$)	AWHC %(wt)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Sand	% Silt	% Clay	Textural Class	Unified Class
RUT	669	Ae (0-20)	na	na	na	na	na	na	89	4	7	S	na
		Bm (20-70)	na	na	na	na	na	na	91	2	7	S	na
		C (70-120)	na	na	na	na	na	na	93	0	7	S	na

na: not analyzed or not applicable.

3.2.9 ROUGH BROKEN (RB1) - SAND / GRAVEL, CHERTY MATERIAL, SHALLOW BEDROCK SOIL UNIT

Extent (area / percentage)			382 ha / 1.2%		
Soil Classification			Orthic Eutric Brunisol		
Parent Material			fluvial, over bedrock		
Texture: (surface / subsoil)			sandy loam / sandy loam to gravel or chert over bedrock		
Topography / Percent slope			3 / 2-5 %		
Surface Stoniness			S3-S4		
Drainage Class			well drained		
Slope Position			upper, within valley bottom		
Land Use			wooded		
Vegetation Quality (good / poor)			good, fairly open in places		
Colour Transition (surface / subsoil) (good / poor)			poor colour change		
PROFILE SITE # 420			3 sites total		
Horizon	**Depth (cm)**	**Colour**	**Texture**	**Structure**	**Consistence**
Ahj	0-15	dark brown	sandy loam	granular	very friable
C	15-40	brown-dark brown	silty clay loam	subangular blocky	friable
Bmb	40-60	brown	sandy loam	subangular blocky	friable
BCk	60-70	brown	gravelly sandy loam	massive	friable
Ck-R	na	na	cherty-gravelly	na	na

na: not applicable

Inventory comments:

- These soils occur on the valley floor in association with MMY and FIR soils. The RB1 soils are shallow over bedrock whereas the MMY soils are on deep recent fluvial materials, and the FIR soils are on older fluvial materials.
- Moisture regimes are Submesic to Mesic.
- Nutrient regimes are Oligotrophic to Submesotrophic.

Reclamation and soil handling considerations:

- LFH horizon (2-5 cm thick) is good quality.
- Ah or Ae horizon (10 cm thick) is rated as good soil quality.
- Bm horizon (20-50 cm thick) is rated as good soil quality.
- BC horizon (10 cm thick) is rated as fair soil quality and is limited by the gravelly texture.
- Poor colour change among horizons.
- Cherty, gravelly or bedrock parent material present that is unsuitable quality.

3.2.10 ROUGH BROKEN - (RB2) SOIL UNIT

Extent (area / percentage)			738 ha / 2.2%		
Soil Classification			Orthic Eutric Brunisol, Orthic Gray Luvisol		
Parent Material			Shallow fluvial over weathered residual tar sand		
Texture: (surface / subsoil)			sandy loam / soft tar sand		
Topography / Percent slope			4 / 2-9 %		
Surface Stoniness			S3		
Drainage Class			well to moderately well drained		
Slope Position			upper		
Land Use			wooded		
Vegetation Quality (good / poor)			open stands		
Colour Transition (surface / subsoil) (good / poor)			poor colour change		
PROFILE SITE # 721			8 sites total		
Horizon	**Depth (cm)**	**Colour**	**Texture**	**Structure**	**Consistence**
LFH	2-0	black	litter	na	na
Ae	0-12	grayish brown	loamy sand	single grain	loose
Bm	12-40	dark grayish brown	fine sandy loam	single grain	loose
C	40-70	dark gray	fine sandy loam	single grain	loose

na: not applicable

Inventory comments:

- Residual tar sand bedrock within 1 m, on ridges within the valley sides. This unit occurs in the gently sloping portions of the valley sides.
- Fir and KNS soils also occur within the RB2 map unit.
- Moisture regimes are Subxeric to Subhygric.
- Nutrient regimes are Submesotrophic to Permesotrophic.

Reclamation and soil handling considerations:

- LFH horizon (2-5 cm thick) is good quality.
- Ae horizon (10-15 cm thick) is rated as poor soil quality and is limited by sandy texture.
- Bm horizon (25-30 cm thick) is rated as good soil quality.
- C horizon (30+ cm thick) is rated as good soil quality, except poor where shallow, residual bedrock occurs..
- Poor colour change among horizons.
- These soils tend to be droughty due to their sandy texture.

TABLE 10. ROUGH BROKEN (RB2) SOIL LABORATORY RESULTS FROM THE SUNCOR LOCAL STUDY AREA (1995).

Soil chemical characteristics.

SOIL	SITE SX	HORIZON (cm)	pH ($CaCl_2$)	OM (%)	N (%)	C:N Ratio	pH (saturated paste)	EC (dS/m)	SAT (%)	SAR	TEXTURE (Agricultural)
RB2	721	Ae (0-12)	3.6	1.29	0.01	56	na	na	na	na	LS
		Bm (12-40)	3.3	5.54	0.03	92	na	na	na	na	fSL
		C (40-70)	na	10.1*	0.05	121	4.2	0.21	35	0.2	fSL

* indicates tar content of sand

Exchangeable cations.

SOIL	SITE SX	HORIZON (cm)	Exch Ca (meq/ 100g)	Exch Mg (meq/ 100g)	Exch Na (meq/ 100g)	Exch K (meq/ 100g)	TEC (meq/ 100g)	CEC (meq/ 100g)	Base Sat'n (%)	ESP (%)
RB2	721	Ae (0-12)	0.5	0.2	<0.1	0.1	0.8	4.4	18	<0.20
		Bm (12-40)	0.2	<0.1	<0.1	<0.1	0.3	3.4	8	<0.25

Soil fertility and available plant nutrients.

SOIL	SITE SX	HORIZON (cm)	NH_4-N (mg/kg)	NO_3-N (mg/kg)	PO_4-P (mg/kg)	K (mg/kg)	SO_4-S (mg/kg)	Ca (mg/kg)	Mg (mg/kg)	Na (mg/kg)
RB2	721	Ae (0-12)	1.5	0.3	4	56	5.4	na	na	na

Physical characteristics.

SOIL	SITE SX	HORIZON (cm)	-33 kPa ($g\ g^{-1}$)	-1500 kPa ($g\ g^{-1}$)	AWHC %(wt)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Sand	% Silt	% Clay	Textural Class	Unified Class
RB2	721	Ae (0-12)	na	na	na	na	na	na	79	15	6	LS	na
		Bm (12-40)	na	na	na	na	na	na	77	14	9	SL	na
		C (40-70)	na	na	na	na	na	na	75	16	9	SL	na

na: not analyzed or not applicable.

3.2.11 ROUGH BROKEN (RB3) SOIL UNIT

Extent (area / percentage)	2 604 ha / 8.0%
Soil Classification	Orthic Regosol; Orthic Gray Luvisol
Parent Material	morainal, morainal over residual
Texture: (surface / subsoil)	sandy loam / sandy clay loam
Topography / Percent Slope	5 / mainly 16-30 %, some steeper
Surface Stoniness	S0-S3
Drainage Class	well drained
Slope Position	mid to upper valley sides
Land Use	wooded
Vegetation Quality (good / poor)	good, except poor to bare on cliffs
Colour Transition (surface / subsoil) (good / poor)	poor colour change
PROFILE SITE # 727	7 sites total

Horizon	Depth (cm)	Colour	Texture	Structure	Consistence
LFH	17-0	black	litter	na	na
Ae	0-10	brown	clay loam	granular	friable
Bt	10-40	brown	sandy clay loam	subangular blocky	firm
BCg	40-100	dark grayish brown	clay loam	massive	firm

na: not applicable

Inventory comments:

- Major soils occurring in this map unit include RB3, KNS, FIR and ALG soils. This unit is mapped on the steeper slopes of the river valley.
- Moisture regimes are Subxeric to Subhygric.
- Nutrient regimes are Submesotrophic to Permesotrophic.

Reclamation and soil handling considerations:

- LFH horizon (2-5 cm thick) is good quality.
- Ae horizon (10-15 cm thick) is rated as fair soil quality and is limited by clay loam texture.
- Bt horizon (30 cm thick) is rated as fair soil quality and is limited by sandy clay loam texture.
- BC horizon (60+ cm thick) is rated as fair soil quality and is limited by clay loam texture.
- Poor colour change among horizons.
- Soils are variable in texture and drainage.
- Steepness of slopes is a major limitation to materials handling. If disturbances are made, water courses must be re-routed to control erosion and enhance slope stability.

3.3 SOIL TRANSECTS

Several transects were evaluated to gain an appreciation of soil variability, based on inspections made at 100 m intervals within a single map polygon. Tables 11, 12, and 13 show results for key soils within the Intensive study Area. In the mineral soils (Kinosis, McMurray, Firebag), the variations match those described for each map unit. During mapping the impression gained was that the Muskeg unit is more uniform as the 18 and 10 site transects in Tables 13 suggest, and are usually sandy clay loam to clay loam textured.

TABLE 11. SUMMARY OF TRANSECT SURVEYS OF KINOSIS MAP UNIT.

Parameter	Transect 1 : 10 sites	Transect 2 : 8 sites	Transect 3 : 14 sites
Series	KNS[8a], FIR[1], GLKNS[1]	KNS[6], GLKNS[3], FIR[1]	KNS[7], GLKNS[4], FIR[1]
Positions	Crest[1], Upper[2], Mid[3], Lower[3], Level[1]	Upper[3], Mid[5], Lower[1], Level[1]	Mid[2], Lower[1], Level[7]
Drainage	W[4], MW[5], I[1]	W[1], MW[6], I[3]	W[3], MW[5], I[6]
LFH Depth	7 (3-13)[b]	8 (3-13)	9 (4-13)
Ae Texture	SL[7], LS[3]	SL[5], S[3], L[2]	SL[5], LS[3], SC[1], S[1]
Bt Texture	SL[5], SCL[3], CL[2]	CL[8], L[1], LS[1]	SCL[6], CL[3], SL[1]
C Texture	SL[5], SCL[3], CL[2]	CL[8], L[1], LS[1]	CL[6], SCL[3], SL[1]

[a]: 8 = 80%, 1 = 10%, etc. of transect, sites at 100 m intervals
[b]: (3-13) range in thickness within transects

TABLE 12. SUMMARY OF TRANSECT SURVEYS OF MCMURRAY AND FIREBAG MAP UNITS.

Parameter	McMurray : 8 sites	Firebag : 12 sites
Series	MMY[4], glMMY[5], MUS[1]	FIR[10]
Positions	Mid[3], Level[4], Lower[2], Depression[1]	Level[8], Lower[2]
Drainage	MW[4], I[3], P[1]	R[8], W[2]
LFH Depth	5 (0-10)	6 (4-12)
0-20 cm Texture	SiL[8], SiCL[1], O[1]	S[9], SL[1]
20-50 cm Texture	SiL[5], SCL[4], O[1]	S[8], SL[2]
50-100 cm Texture	SiL[5], SCL[4], O[1]	S[8], SL[2]

TABLE 13. SUMMARY OF TRANSECT SURVEYS OF ORGANIC MAP UNITS.

Parameter	Muskeg : 12 sites	Muskeg: 18 sites	Muskeg: 10 sites	Mildred : 9 sites
Series	MUS[5], MLD[2], FIR[2], ALG[1]	MUS[9], MLD[1]	MUS[7], MLD[2], GLKNS[1]	MLD[8], MUS[2]
Positions	Level[10]	Mid Level[7], Depression[2]	Mid[2], Level[3], Depression[5]	Level[9], Lower[1]
Drainage	P[6], VP[3], MW[1]	P[8], VP[2]	P[6], VP[4]	VP[7], P[3]
Organic Depth	70 (40-100)	80 cm	60 cm	65 (50-100)[c]
Mineral Texture	SL[6], SCL[4]	CL[5], SCL[4], SL[1]	CL[10]	CL[10]

[c]: Many sites below 60 cm were frozen and could not be augered.

4.0 RECLAMATION CONSIDERATIONS

The environmental interpretations of the soil survey information focus on three principal areas: agricultural capability, forest capability, and extents and volumes of salvageable soil materials for successful reclamation to attain equivalent capability.

4.1 CAPABILITY FOR AGRICULTURE

Agricultural capability, in accordance with *Land Reclamation: Agricultural Capability Classification Field Manual* (Leskiw and Kutash 1993), is summarized in Table 14. Two map units, Horse River, and McMurray, have potential for arable agriculture. Horse River soils are characterized by Gray Luvisolic, clayey, slightly stony soils on nearly level topography. These soils occur in the extreme western part of the Local Study Area and are not mapped in the Intensive Study Area. The McMurray soils, found on fluvial terraces, also have potential for agriculture and are discussed following Table 15, which addresses agricultural capability in the Intensive Study Area. Other soils are non-agricultural due to stoniness, or sand textures, or steep slopes, or wetness (mineral and organic soils). The absence of current agricultural activity in this region makes reclamation for agriculture a very low priority in terms of end land use.

TABLE 14. AGRICULTURAL CAPABILITY CLASSES FOR SUNCOR LOCAL STUDY AREA (1995).

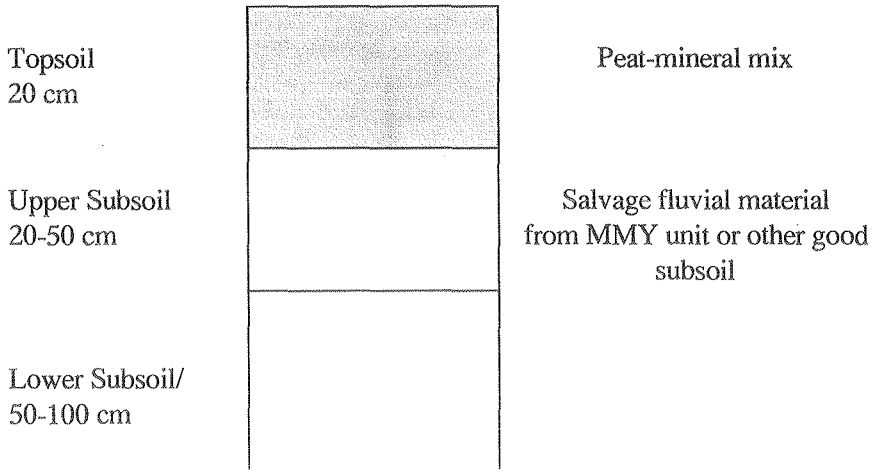
Series	ha / %	Topographic Class	Soil Class	Landscape Class	Climate Class	Limiting Class	Limitations
Algar	26 / 0.1	2	5	3	3	5	wetness
Firebag	157 / 0.5	3	4	3	3	4	low moisture retention
Horse River	2881 / 8.8	2	3	1	3	3	climate, soils
Kinosis	3101 / 9.5	4	3	4	3	4	stoniness
Mildred	6860 / 21.0	2	7	1	3	7	organic, wetness
McMurray	414 / 1.3	3	2	3	3	3	climate, landscape
Gleyed McMurray	271 / 0.8	2	6	1	3	6	wetness
Muskeg	13595 / 41.5	2	7	1	3	7	organic/ wetness
RB1	382 / 1.2	3	3	5	3	5	soils, shallow gravel
RB2	738 / 2.2	4	4	5	3	5	slopes
RB3	2604 / 8.0	7	3	7	3	7	slopes

TABLE 15. AGRICULTURAL CAPABILITY CLASSES FOR SUNCOR INTENSIVE STUDY AREA (1995).

Series	ha / %	Topographic Class	Soil Class	Landscape Class	Climate Class	Limiting Class	Limitations
Algar	29 / 1	2	5	3	3	5	wetness
Firebag	99 / 3	3	4	3	3	4	low moisture retention
Kinosis	135 / 4	4	3	4	3	4	stoniness
Mildred	51 / 2	2	7	1	3	7	organic, wetness
McMurray	275 / 9	3	2	3	3	3	climate, landscape
Gleyed McMurray	189 / 6	2	6	1	3	6	wetness
Muskeg	1466 / 47	2	7	1	3	7	organic, wetness
RB2	410 / 13	4	4	5	3	5	slopes
RB3	471 / 15	7	3	7	3	7	slopes

Agricultural Scenario

The McMurray soils found on recent fluvial deposits on the lower terraces of the Athabasca River are the only soils with potential for agriculture in the Intensive Study Area. To reclaim these soils for agricultural use, should this be required, the following profile is recommended. A reclaimed target for the typical disturbed profile would consist of 20 cm of peat-mineral mix forming the topsoil over fluvial parent material salvaged from the MMY unit, or other sandy loam to clay loam, non to moderately stony subsoil material. This would create a Class 2 soil in a Class 3 agricultural climate.



4.2 CAPABILITY FOR FORESTRY

Forest soil capability ratings for the Local and Intensive Study Areas are summarized in Tables 16 and 17, respectively. This rating system for forest capability is preliminary, pending further testing during the 1996 field season (Leskiw 1996). The rating system has five classes: Class 1 - High Capability; Class 2 - Moderate Capability; Class 3 - Low Capability; Class 4 - Currently Non-productive; and Class 5 - Permanently Non-productive. These classes are approximately equivalent to the Canada Land Inventory Forestry Capability Classes 3 to 7, respectively. Since large portions of the study areas contain organic soils supporting non-productive forest, the goal of reclamation could be to restore some of these organic lands to productive forest. The capability evaluation can be used to plan soil reconstruction for a targeted quality and end landuse. However, landuse is determined during the planning process. Two examples of potential reclamation scenarios are given. Further "modeling" of proposed soil types and capabilities, commensurate with materials available, and integrated with mining operations, is required in the development of the Conservation and Reclamation Plan. Completed soil capability rating forms are provided in the Appendix.

TABLE 16. FORESTRY CAPABILITY CLASSES FOR SUNCOR LOCAL STUDY AREA (1995).

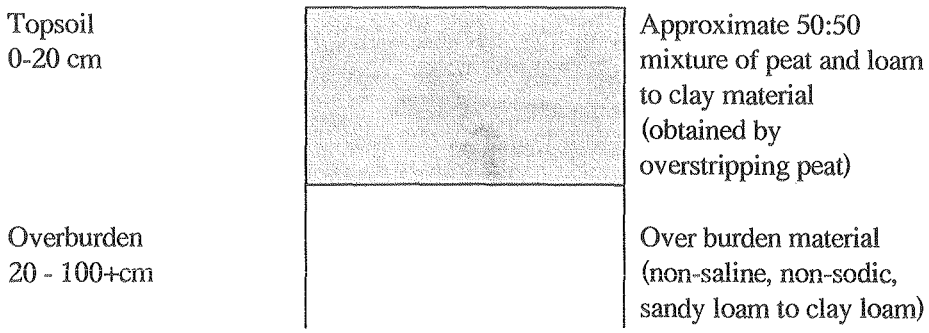
Series	ha / %	Soil Class	Landscape Class	Combined Class	Limitations
Algar	26 / 0.1	4	1	4	wetness
Firebag	157 / 0.5	4	1	4	droughtiness
Horse River	2881 / 8.8	2, 3	1	2, 3	moisture regime
Kinosis	3101 / 9.5	2, 3	1	2, 3	moisture regime
Mildred	6860 / 21.0	5	1	5	organic, wetness
McMurray	414 / 1.3	2, 1	1	2, 1	soil reaction
Muskeg	13596 / 41.5	5	1	5	organic, wetness
Ruth Lake	1357 / 4.1	5	1	5	droughtiness
RB1	382 / 1.2	4	1	4	droughtiness
RB2	738 / 2.2	3, 4	2	3,4	droughtiness
RB3	2604 / 8.0	3, 4	4	4	steep slopes, erosion

TABLE 17. FORESTRY CAPABILITY CLASSES FOR SUNCOR INTENSIVE STUDY AREA (1995).

Series	ha / %	Soil Class	Landscape Class	Combined Class	Limitations
Algar	29 / 1	4	1	4	wetness
Firebag	99 / 3	4	1	4	droughtiness
Kinosis	135 / 4	2, 3	1	2, 3	moisture regime
Mildred	51 / 2	5	1	5	organic, wetness
McMurray	275 / 9	2, 1	1	2, 1	
Gleyed McMurray	189 / 6	5, 4	1	5, 4	wetness
Muskeg	1466 / 47	5	1	5	organic, wetness
RB2	410 / 13	3, 4	2	3	droughtiness
RB3	471 / 15	3, 4	4	4	steep slopes, erosion

Forest Scenario 1.

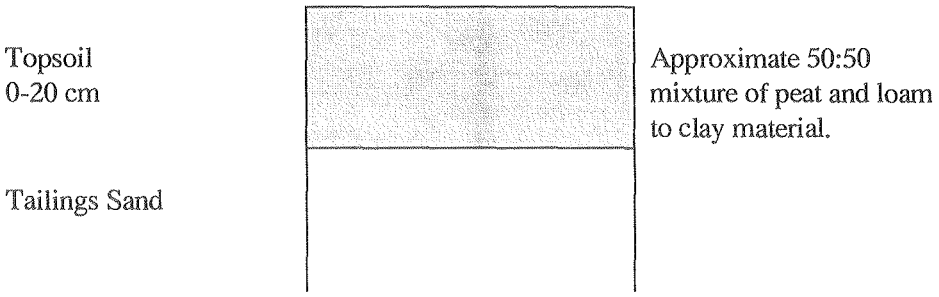
A potential reclamation scenario for a moderately productive forest soil follows.



This soil profile with a loam or finer subsoil texture would be a Class 2 forest soil, on a level well drained plain or upper slope position. On a sandy loam subsoil the capability would be Class 3. On lower slopes receiving lateral seepage, or level areas with a water table at 1 to 3 m, these soils would be one class better. If water tables become shallower than 1 m, then the rating will be lowered to Class 3 or 4 depending on degree of wetness.

Forest Scenario 2.

Low capability forest land (Class 3) can be created by placing 20 cm of mixed peat and mineral material over tailings sand, as illustrated below.



Normally this soil would be Class 3, however, with added moisture through seepage or a water table at 1 to 3 m it could become Class 2, or if excessively wet, it could be Class 4 or 5. Adding greater depth of peat-mineral mix (to 50 cm) would increase soil index only slightly, less than a class.

4.3 RECLAMATION MATERIALS

Quality and volumes of materials based on salvaging the upper 2 m are shown in Tables 18 and 19, based on Alberta Soil Quality Criteria (1987) and areas of map units. Considering total areas, not operational plans and schedules, there is an ample supply of peat mineral mix to serve as topsoil material, enough to place 1 m of mix over the entire Intensive Study Area. Similarly, there is enough fair to good subsoil material to place 75 cm over the entire Intensive Study Area.

TABLE 18. SOIL QUALITY FOR SUBSOIL IN UPPER 2 M OF MAP UNITS.

SOILS (MATERIALS)	TEXTURE (2 m)	STONINESS	RECLAMATION SUITABILITY	LIMITATIONS
Firebag (Fluvial-eolian)	sand to sandy loam	slightly (<10% vol)	poor	coarse texture
Algar, Kinosis (Morainal)	sandy loam, sandy clay loam, clay loam	moderately (<10% vol)	fair	fine texture and very firm consistence in places
Mildred, Muskeg (Organic)	estimate 1 m peat over morainal*	nonstony over moderately stony (<10% vol)	good (when drained)	wetness
McMurray, Gleyed McMurray (Fluvial)	sandy loam, silt loam	nonstony	good	none, wetness in places
RB2, RB3 (Morainal, colluvial) shallow bedrock	sandy loam to clay loam	moderately (<10% vol)	fair	steep slopes, fine texture and very firm consistence in places, bedrock outcrops

* During the soil survey, inspections were made to 1 m.

TABLE 19. VOLUMES OF RECLAMATION MATERIALS AND RECOMMENDED PLACEMENT.

SOILS (MATERIALS)	HECTARES (Rounded)	VOLUME (0-2m)	PLACEMENT
Firebag (Fluvial-eolian)	100	2,000,000 m^3	upper subsoil
Algar, Kinosis (Morainal)	165	3,300,000 m^3	upper subsoil
Mildred, Muskeg (Organic/Morainal)	1515	30,300,000m^3	topsoil (50:50 mix)
McMurray, Gleyed McMurray (Fluvial)	275	5,500,000 m^3	upper subsoil
RB 2, RB 3 (Morainal, colluvial) shallow bedrock	880	17,600,000 m^3	upper subsoil

5.0 SUMMARY

The dominant surficial materials in the Regional, Local and Intensive Study Areas are organic deposits, including bogs and fens. These are characterized by peat thickness of 0.5 - 1.5 m. The soils are poorly drained with water tables near the surface (<1 m) for much of the growing season. Most of the soils are Mesisols, but Humisols and Fibrisols occur. Table 20 provides an approximate percentage of different materials and soil groups occurring in the Regional Local and Intensive Study Areas. These are rated Soil Capability Class 5 for forestry, limited by excessive wetness.

Morainal (till) deposits cover a significant part of the landscape. Textures vary and include sandy loam, sandy clay loam and clay loam. The materials are moderately to very stony. Well and moderately well drained Orthic Gray Luvisolic soils are widespread on these materials, in upper slope positions. Lesser extents of imperfectly drained Gleyed Gray Luvisols and poorly drained Gleysolic soils occur in lower landscape positions. Topography is undulating. Moderately productive mixed wood forests are prevalent. These soils are mainly Class 2 (finer textures) and 3 (sandy loam textures) for forestry.

Lacustrine parent materials occur throughout the area but are more extensive in the northwest. These are clay to clay loam, non-stony materials on nearly level topography. Soil and drainage relationships are identical to those described for morainal soils. Moderately productive mixed wood forests also occur on these soils, rated capability Class 2.

Course textured glaciofluvial soils occur in glacial meltwater channels and spillways on the uplands bordering the Athabasca River valley. The materials are sands to sandy loams, with variable gravel and stone content. Soils include Brunisols and Luvisols that are rapidly to well drained. Topography is very gently undualting. Forest cover ranges from open pine stands on upper, drier sites, to mixed wood forests in lower, moist locations. The drier sites are capability Class 5, grading to Class 4 or 3 with finer textures and improved moisture regime.

Minor occurrences of fluvial-eolian, non-stony, sandy deposits occur. These deposits occur towards the northern end of the study areas. The soils include rapidly and well drained Eutric and Dystric Brunisols. Textures range from sand to sandy loam. Topography is primarily undulating. Open jack pine stands are typical on these soil types, and these are rated Class 4.

The final complex unit is referred to as Rough Broken. It includes morainal, colluvial, and other parent materials found on the steep banks of the major rivers. Various soil types and drainage categories occur within this unit. Soils are Class 3 or 4 for forestry, and landscapes are Class 1 to 4 depending on slope steepness.

Recent sandy loam to silt loam fluvial deposits occur on the lower terraces along the rivers. These range from Class 1 to 5 forestry capability depending on wetness.

Potential reclamation scenarios are illustrated and indicate that there are sufficient volumes of peat-mineral mixes and overburden materials to reclaim the Intensive Study Area to Class 2 and 3 soils for forestry, based on total areas of materials to a 2 m depth. Final soil capability will be affected by water regime and would be lower with the occurrence of shallow water tables.

TABLE 20. PERCENTAGE OF SURFICIAL MATERIALS AND SOILS IN THE STUDY AREA.

Materials and (Soils)	Forest Capability Limitations	Regional Study Area	Local Study Area	Intensive Study Area
Organic (Mesisols)	5 wetness	55	65	49
Morainal (Luvisols)	2, 3 soils	5	20	5
Lacustrine (Luvisols)	2 soils	20	inclusions	inclusions
Glaciofluvial (Brunisols and Luvisols)	5, 4 droughtiness	10	3	inclusions
Fluvial-Eolian (Brunisols)	4 droughtiness	5	inclusions	3
Rough Broken	3, 4 soils, slopes	5	10	28
Fluvial (Regosols)	1 to 5 wetness	inclusions	2	15

6.0 REFERENCES

AOSERP, 1982. Soils Inventory of the Alberta Oil Sands Environmental Research Program Study Area. Alberta Oil Sands Environmental Research Program (AOSERP). Report 122. Alberta Environment, Research Management Division.

Agriculture Canada Expert Committee on Soil Survey. 1987. The Canadian System of Soil Classification. 2nd ed. Agric. Can. Publ. 1646. 164 pp.

Green, R. 1972. Bedrock Geology Map of Alberta. Research Council of Alberta. Map No. 35.

Leskiw, L.A. and Kutash, T.N. 1993. Land Reclamation: Agricultural Capability Classification Field Manual. Report No. RRTAC 93-14.

Leskiw, L.A. 1996. Land Capability Classification for Forest Ecosystems in the Oilsands Region (Second Draft). Prepared by Tailings Sand Reclamation Practices Working Group. February 1996.

McKeague, J.A. 1978. Manual of Soil Sampling and Method of Analysis. 2nd Ed., Can. Soc. Soil Sci.

7.0 APPENDICES

7.1 KEY TO SITE INSPECTION SUMMARY

SOIL SERIES / MAP UNIT: (Map unit is named after dominant series)

Algar	-	ALG	
Firebag	-	FIR	
Horse River	-	HRR	
Kinosis	-	KNS	
McLelland-Typic	-	MLD 1	
McLelland-Terric	-	MLD 2	
McMurray	-	MMY	
Muskeg	-	MUS 1	
Muskeg	-	MUS 2	
Ruth Lake	-	RUT	
Rough Broken	-	RB 1	- sand / gravel, cherty material, shallow
Rough Broken	-	RB 2	- sand / oil sands, residual
Rough Broken	-	RB 3	- variable materials on very steep slopes

Soil Phases: (Prefix may be applied as series modifier)

gl	-	gleyed
cu	-	cumulic
pt	-	peaty
li	-	lithic

SOIL SUBGROUP CLASSIFICATION:

Brunisolics

GLEB	-	Gleyed Eutric Brunisol
GLEEB	-	Gleyed Eluviated Eutric Brunisol
EDYB	-	Eluviated Dystric Brunisol
EEB	-	Eluviated Eutric Brunisol
OEB	-	Orthic Eutric Brunisol
OMB	-	Orthic Melanic Brunisol

Cryosolics

MEOC	-	Mesic Organic Cryosol

Gleysols

OG	-	Orthic Gleysol
OHG	-	Orthic Humic Gleysol
OLG	-	Orthic Luvic Gleysol
RG	-	Rego Gleysol
RHG	-	Rego Humic Gleysol

Luvisolics

GLGL	-	Gleyed Gray Luvisol
OGL	-	Orthic Gray Luvisol
SZGL	-	Solonetzic Gray Luvisol

Organics

FIM	-	Fibric Mesisol
MEH	-	Mesic Humisol
TFIH	-	Terric Fibric Humisol
TFIM	-	Terric Fibric Mesisol
TH	-	Terric Humisol
TM	-	Terric Mesisol
TMEH	-	Terric Mesic Humisol
TYF	-	Typic Fibrisol
TYH	-	Typic Humisol
TYM	-	Typic Mesisol

Regosols

CR	-	Cumulic Regosol
GLCUR	-	Gleyed Cumulic Regosol
GLHR	-	Gleyed Humic Regosol
GLR	-	Gleyed Regosol
OHR	-	Orthic Humic Regosol
OR	-	Orthic Regosol

PARENT MATERIAL:

F	-	fluvial (glaciofluvial)
L	-	lacustrine (glaciolacustrine)
M	-	morainal (till)
O	-	organic
t	-	terraced
v	-	veneer

SLOPE POSITION:

Crest
Upper Slope
Middle Slope
Lower Slope
Toe
Depression
Level

TOPOGRAPHY CLASSES:

1	-	0-0.5%	level
2	-	0.5-2%	nearly level
3	-	2-5%	very gentle slopes
4	-	6-9%	gentle slopes
5	-	10-15%	moderate slopes
6	-	16-30%	strong slopes
7	-	31-45%	very strong slopes
8	-	46-70%	extreme slopes

SURFACE STONINESS CLASSES:

S0	-	nonstony
S1	-	slightly stony (stones 10-30 m apart)
S2	-	moderately stony (stones 2-10 m apart)
S3	-	very stony (stones 1-2 m apart)
S4	-	exceedingly stony (stones 0.01-1 m apart)
S5	-	excessively stony (stones <0.01 m apart)

DRAINAGE CLASSES:

R	-	rapidly
W	-	well
MW	-	moderately well
I	-	imperfectly
P	-	poorly
VP	-	very poorly

LAND USE:

M	-	muskeg
R	-	bedrock
W	-	wooded
DL	-	Disturbed Land (eg. gravel pit)

HORIZON DEPTHS AND TEXTURES:

Data shown where applicable.

7.2 SITE INSPECTION LIST

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
1	FIR	FIR	EEB	F	MID	3	1	R	W	3	3	10	S	50	S	60	S	6		S
2	FIR	FIR	EEB	F	UPPER	3	1	R	W	3	5	10	S	55	S	55	S	8		S
3	FIR	FIR	EEB	F	LOWER	3	1	R	W	2	4	9	S	60	S	50	S	6		S
4	RUT	RUT	OGL	M	LEVEL	2	1	MW	W	3	17	15	SiL	35	CL	50	CL	20		CL
5	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	25	Of	15	Om	80	LS	0	40	SCL
6	RUT	RUT	OGL	F	LEVEL	3	1	W	W	3	7	6	SL	65	S		S	10		SL
7	RUT	RUT	OGL	F	LEVEL	3	2	MW	W	5	3	10	SL	60	SL	50	S	8		SL
8	MLD 1	MLD	TYM	O	LEVEL	2	0	VP	M	0	0	50	Om					0	50	
9	HRR	HRR	SZGL	M	MID	3	1	MW	W	4	18	15	SL	85	CL	20		22		CL
10	FIR	RB 1	EEB	F	UPPER	3	0	W	W	2	1	10	LS	70	S	40	LS	3		LS
11	MMY	MMY	OR	F	LOWER	4	0	MW	W	6	0					120	SiL	6		SiL
12	MMY	MMY	OR	F	DEPRESSION	3	0	MW	W	3	0					120	SiL	3		SiL
13	MUS 2	MUS	TH	O/F	LEVEL	3	0	P	M	0	0	5	Of	50	Oh	65	CL	0	55	CL
14	MLD 2	MLD	TM	O/F	DEPRESSION	3	0	P	W	0	0	5	Of	60	Om	55	SiCL	0	65	SiCL
15	RB 1	RB 1	OEB	F	UPPER	3	4	W	W	2	0			20	SiL			2		grSiL
16	MUS 1	MUS	TYH	O	DEPRESSION	2	0	VP	M	0	0	5	Of	95	Oh	20	SiL	0	100	S
17	MUS 1	MUS	TYH	O	DEPRESSION	2	0	VP	M	0	0					120	Oh	0	120	
18	RB 3	RB 3	OR	M	MID	6	2	W	W	0	0					100	SCL	0		CL
19	MMY	RB 3	OR	F/M	LOWER	6	1	MW	W	3	0	20	L			100	SCL	3		SCL
20	RB 3	RB 3	OGL	M	MID	6	3	W	W	3	0	10	SL	45	CL			3		SCL
21	RB 3	RB 3	OGL	M	MID	6	2	W	W	3	0	20	SL	30	SCL			3		SCL
22	glMMY	MUS	GLCUR	F/M	MID	6	2	I	W	3	0	20	L			100	SL	3		SL
23	MLD 1	MUS	TYM	O	DEPRESSION	3	0	P	W	0	0	5	Of	100	Oh	15	CL	0	105	CL
24	MUS 2	MUS	TM	O/F	LEVEL	3	0	P	M	0	0	20	Of	50	Om	50	LS	0	70	LS
25	MUS 1	MUS	TYH	O	DEPRESSION	2	0	P	M	0	0	10	Of	110	Oh			0	120	
26	MLD 1	MUS	TYH	O	DEPRESSION	2	0	VP	M	0	0	5	Of	65	Oh			0	70	
27	glMMY	MUS	pt RG	F	MID	3	3	I	W	0	0	20	Of			30	grSCL	0	20	grSCL
28	MLD 1	MLD	TYH	O	DEPRESSION	2	0	VP	M	0	0	10	Om	60	Oh			0	70	
29	MLD 1	MUS	TYM	O	DEPRESSION	2	0	VP	M	0	0	20	Of	90	Om			0	110	
30	RUT	MLD	OEB	F	UPPER	3	3	MW	W	2	1			25	L	95	grSL	3		L
31	MLD 1	MLD	TYM	O	DEPRESSION	2	0	VP	M	0	0	30	Of	40	Om			0	70	
32	RUT	MUS	OEB	F	CREST	3	3	W	W	2	0			20	L	30	grCL	2		grCL
33	MLD 1	MUS	TYM	O	DEPRESSION	3	0	VP	M	0	0	30	Of	40	Om			0	70	?
34	RB 1	RB 1	OEB	F	UPPER	3	3	W	W	3	0			25	L			3		L
35	RB 1	RB 1	EEB	F	UPPER	3	3	W	W	3	0	10	LS	20	SL			3		SL
36	MMY	RB 1	OHR	F	DEPRESSION	3	0	MW	W	3	0	10	SiL			90	SiL	3		SL
37	MMY	RB 1	OR	F	UPPER	3	1	MW	W	3	0					100	SiL	3		SL
38	MMY	RB 3	OR	F	LOWER	4	1	MW	W	10	0					110	S	10		S
39	HRR	RB 3	OGL	F/M	LOWER	6	0	MW	W	5	4	3	SiL	95	C		CL	9		SCL
40	KNS	RB 3	OGL	F	UPPER	6	2	MW	W	8	3	15	LS	85	SCL		SCL	11		SCL
41	RUT	RUT	OGL	F	UPPER	3	2	W	W	5	0	20	S	80	SL			5		SL
42	MMY	MMY	OR	F	LOWER	4	1	MW	W	0	0					120	SiL	0	120	SL
43	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	40	SCL	0	80	SCL
44	MUS 1	MUS	TYM	O	MID	2	0	P	M	0	0	20	Of	90	Om	10	SL	0	110	CL
45	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	25	Of	65	Om	30	SCL	0	90	SCL
46	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	50	Om	40	SCL	0	80	SCL
47	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	60	Om	30	SCL	0	90	
48	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	80	Om	20	CL	0	100	CL
49	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	40	CL	0	80	CL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
50	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	60	Om	30	CL	0	90	CL
51	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	40	CL	0	80	CL
52	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	50	Om	50	CL	0	70	CL
53	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	40	C	0	80	SCL
54	MUS 2	MUS	TM	O/M	UPPER	2	0	P	M	0	0	20	Of	40	Om	60	SCL	0	60	SCL
55	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	30	Om	60	SCL	0	60	SCL
56	MUS 2	MUS	TM	O/M	DEPRESSION	2	0	VP	M	0	0	30	Of	20	Om			0	50	
57	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	40	Om	50	CL	0	70	CL
58	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	40	Of	80	Om			0	120	
59	MLD 1	MUS	TYM	O	DEPRESSION	2	0	VP	M	0	0	30	Of	20	Om			0	50	
60	MUS 2	MUS	TM	O/M	MID	2	0	P	M	0	0	40	Of	20	Om	60	C	0	60	C
61	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	30	Of	40	Om	50	CL	0	70	CL
62	MUS 2	MUS	TM	O/M	DEPRESSION	2	0	P	M	0	0	30	Of	50	Om	40	CL	0	80	CL
63	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om	60	SCL	0	60	CL
64	MUS 2	MUS	TM	O/M	DEPRESSION	2	0	VP	M	0	0	20	Of	50	Om			0	50	
65	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	65	Om	15	CL	0	95	CL
66	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	25	Of	45	Om	50	CL	0	70	CL
67	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	35	Om	65	CL	0	55	CL
68	MUS 2	MUS	TM	O/M	UPPER	2	0	P	M	0	0			50	Om	70	SCL	0	50	SCL
69	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			70	Om	50	CL	0	70	CL
70	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	25	Of	55	Om	40	CL	0	80	CL
71	MUS 2	MUS	TM	O/M	MID	2	0	P	M	0	0	20	Of	50	Om	30	CL	0	70	CL
72	MUS 2	MUS	TM	O/M	MID	2	0	P	M	0	0	30	Of	40	Om	30	SL	0	70	SCL
73	MLD 2	MUS	TM	O/M	DEPRESSION	2	0	VP	M	0	0	20	Of	30	Om			0	50	
74	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	CL	0	60	CL
75	MUS 2	MUS	TM	O/M	DEPRESSION	2	0	VP	M	0	0	20	Of	60	Om	30	CL	0	80	CL
76	MUS 2	MUS	TH	O/M	DEPRESSION	2	0	VP	M	0	0	20	Of	30	Om			0	50	
77	MUS 2	MUS	TM	O/F	DEPRESSION	2	0	VP	M	0	0	20	Of	50	Om	40	SL	0	70	SL
78	MUS 2	MUS	TM	O/M	MID	2	0	P	M	0	0	20	Of	60	Om	30	CL	0	80	CL
79	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	CL	0	60	SCL
80	MUS 2	MUS	TM	O/M	MID	2	0	P	M	0	0	20	Of	65	Om	15	CL	0	85	CL
81	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	20	Of	60	Om	20	CL	0	80	CL
82	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	15	Of	45	Om	40	CL	0	60	CL
83	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	50	Om	40	CL	0	70	C
84	MLD 2	MUS	TH	O/M	DEPRESSION	2	0	VP	M	0	0	20	Of	30	Oh			0	50	
85	MLD 2	MUS	TM	O/M	DEPRESSION	2	0	VP	M	0	0			50	Om			0	50	
86	MUS 2	MUS	TM	O/M	MID	2	0	VP	M	0	0			90	Om	30	CL	0	90	CL
87	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			50	Om	50	CL	0	50	CL
88	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	30	Om	50	SCL	0	50	SCL
89	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	20	Of	50	Om	50	C	0	70	C
90	MUS 2	MUS	TM	O/M	DEPRESSION	2	0	VP	M	0	0			50	Om			0	50	
91	gIKNS	MUS	GLGL	M	UPPER	2	2	P	W	5	5	15	SL	85	CL			10		SCL
92	MLD 2	MUS	TH	O/M	DEPRESSION	2	0	VP	M	0	0			50	Oh			0	50	
93	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	15	Of	35	Om	70	CL	0	50	CL
94	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	15	Of	35	Om	70	CL	0	50	CL
95	MLD 1	MUS	TYH	O	DEPRESSION	2	0	VP	M	0	0	15	Of	35	Om			0		
96	MUS 1	MUS	TYM	O	LOWER	2	0	P	M	0	0	10	Of	40	Om			0	50	
97	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	90	Om	10	CL	0	110	CL
98	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	70	Om	30	CL	0	90	CL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
99	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	70	Om	30	CL	0	90	CL
100	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	10	Of	40	Om			0	50	
101	glHRR	HRR	GLGL	M	LEVEL	2	0	P	W	2	10	4	SiC	55	SiC	40	SiC	12		SC
102	glHRR	HRR	GLGL	M	LEVEL	2	0	I	W	2	8	20	SiC	60	SiC	20	SCL	10		SCL
103	HRR	HRR	OGL	F/M	LEVEL	2	1	MW	W	2	4	10	SL	35	CL	55	CL	6		CL
104	glHRR	HRR	GLGL	M	LEVEL	2	1	I	W	6	4	10	CL	35	CL	55	CL	10		CL
105	glHRR	HRR	GLGL	M	LEVEL	2	0	I	W	7	5	6	SiC	25	SiC	70	SiC	12		SiC
106	glHRR	HRR	GLGL	M	LEVEL	2	0	P	W	12	8	7	CL	40	CL	55	CL	20		CL
107	HRR	HRR	OGL	M	LEVEL	2	0	MW	W	2	6	15	CL	50	C	45	C	8		C
108	glHRR	HRR	GLGL	M	LEVEL	2	0	I	W	7	7	7	SiC	35	C	60	C	14		C
109	glHRR	HRR	GLGL	M	LEVEL	2	0	I	W	7	8	15	SiC	20	C	65	C	15		C
110	glHRR	HRR	GLGL	M	LEVEL	2	0	I	W	7	8	6	C	55	C	40	C	15		C
111	glHRR	HRR	GLGL	M	LEVEL	2	0	P	W	3	20	10	SL	35	SCL	55	SCL	23		SC
112	HRR	HRR	SZGL	M	LEVEL	2	0	MW	W	3	4	10	SL	45	CL	45	SCL	7		SCL
113	HRR	HRR	SZGL	L/M	LEVEL	2	0	MW	W	3	5	10	SiC	40	SiC	50	SiC	8		SLC
114	MUS 2	MUS	TM	O/M	MID	3	0	VP	M	0	0	5	Of	45	Om			0	50	
115	MUS 2	MUS	TM	O/M	MID	4	0	VP	M	0	0	8	Of	50	Om	40	SCL	0	58	SCL
116	MUS 1	MUS	TYM	O	MID	4	0	VP	M	0	0	5	Of	50	Om			0	61	
117	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	15	Of	75	Om	10	SL	0	92	SL
118	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	10	Of	60	Om	40	Oh	0	61	
119	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	30	Of	45	Om	30	Oh	0	71	
120	MUS 2	MUS	TM	O/M	LEVEL	3	0	VP	M	0	0	30	Of	65	Om	5	SL	0	95	SL
121	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	25	Of	85	Om		SC	0	110	SC
122	MUS 2	MUS	TMEH	O/M	LEVEL	2	0	VP	M	0	0	35	Of	75	Om		SC	0	110	SC
123	MUS 2	MUS	TMEH	O/M	LEVEL	2	0	VP	M	0	0	20	Of	65	Om	10	SCL	0	88	SCL
124	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	30	Of	25	Om			0	55	
125	MUS 2	MUS	TH	O/M	LEVEL	2	0	VP	M	0	0	60	Of	30	Oh	10	SCL	0	89	SCL
126	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	65	Of	40	Om		SCL	0	105	SCL
127	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	60	Of	25	Om	15	SC	0	85	SC
128	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	60	Of	50	Om		CL	0	110	CL
129	MUS 2	MUS	TH	O/M	LEVEL	2	0	VP	M	0	0	50	Of	40	Oh		SL	0	88	SL
130	MUS 2	MUS	TM	O/M	MID	4	0	P	M	0	0	10	Of	40	Om	50	CL	0	52	CL
131	ALG	ALG	pt OG	M	LOWER	4	0	P	M	3	35			80	SCL	20	SCL	38		SCL
132	ALG	ALG	pt OG	M	LOWER	4	1	P	M	5	30			75	CL	25	CL	35		CL
133	ALG	ALG	pt OG	M	LOWER	3	1	P	W	5	10			60	SCL	40	SiC	15		SC
134	ALG	ALG	pt OG	M	LOWER	3	1	P	W	3	10			60	SCL	40	SCL	13		SC
135	FIR	ALG	OEB	F	UPPER	3	1	I	W	3	5			55	SL	45	SCL	8		SCL
136	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	10	Of	50	Om	40	CL	0	58	CL
137	ALG	ALG	OG	L	LOWER	4	0	P	W	2	6			60	C	40	C	8		C
138	HRR	ALG	OGL	L	LOWER	4	0	MW	W	2	8	15	SiC	40	C	45	C	10		C
139	HRR	ALG	OGL	L	UPPER	3	0	MW	W	2	6	10	SC	45	SCL	45	SCL	8		SC
140	glKNS	glKNS	GLGL	F	LEVEL	2	0	I	W	5	15	10	SCL	35	SCL	55	SCL	20		CL
141	glKNS	glKNS	GLGL	F	MID	3	0	I	W	2	4	10	SCL	35	SCL	50	SCL	6		SCL
142	glKNS	glKNS	GLGL	F	LEVEL	2	0	I	W	3	4	8	SCL	35	SCL	55	SCL	7		SCL
143	FIR	RB 3	OEB	F	UPPER	2	0	MW	W	2	3			60	S	40	SL	5		SL
144	FIR	RB 3	GLEB	F	LEVEL	2	0	I	W	5	5			50	SL	50	SL	10		SL
145	FIR	MUS	OEB	F	LEVEL	2	0	MW	W	3	3			45	S	55	SL	6		SL
146	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	20	Of	35	Om	45	S	0	56	SL
147	ALG	MLD	pt OG	F	LEVEL	2	0	P	M	13	10			45	SL	55	SL	23		SL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
148	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	60	Of	30	Om	10	CL	0	89	CL
149	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	50	Of	40	Om	10	CL	0	91	CL
150	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	40	Of	65	Om		CL	0	105	CL
151	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	40	Of	70	Om		SL	0	110	SL
152	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	40	Of	20	Om			0	59	
153	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	40	Of	45	Om	15	C	0	83	C
154	MUS 2	MUS	TMEH	O/F	LEVEL	2	0	VP	M	0	0	35	Of	55	Om	10	SL	0	88	SL
155	MUS 2	MUS	TMEH	O/F	LEVEL	2	0	VP	M	0	0	35	Of	40	Om	20	SCL	0	78	SCL
156	MUS 2	MUS	TMEH	O/F	LEVEL	2	0	VP	M	0	0	30	Of	90	Om		SCL	0	120	SCL
157	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	20	Of	30	Om	50	S	0	51	S
158	ALG	MUS	pt OG	F	LEVEL	2	0	P	M	11	18			70	S	30	SCL	29	29	SCL
159	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	30	Of	45	Om	25	SL	0	75	SL
160	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	30	Of	30	Om	40	SL	0	59	SL
161	MUS 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	35	Of	45	Om		SiC	0	82	SiC
162	ALG	MUS	pt OG	F	LEVEL	2	0	I	W	8	15			60	SL	40	CL	23		CL
163	FIR	FIR	EEB	F	LEVEL	2	0	R	W	2	2	8	S	70	S	25	S	4		S
164	FIR	FIR	EEB	F	LOWER	2	0	R	W	13	5	30	S	45	S	25	S	18		S
165	FIR	FIR	EEB	F	LEVEL	2	0	R	W	2	2	10	S	70	S	20	S	4		S
166	MLD 2	MLD	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	40	Om	30	SCL	0	70	SCL
167	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	35	Of	55	Om	10	SCL	0	90	CL
168	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	70	Om		CL	0	110	CL
169	MLD 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	30	Om	40	CL	0	60	CL
170	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	70	Om		CL	0	110	CL
171	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	35	Of	35	Om	30	CL	0	70	CL
172	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	40	Om	20	SCL	0	80	SCL
173	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	45	Om	15	SCL	0	85	SCL
174	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	80	Om		SCL	0	120	SCL
175	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	35	Of	65	Om		SCL	0	100	SCL
176	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	80	Om		SCL	0	120	SCL
177	MLD 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	40	Of	80	Om			0	120	
178	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	80	Om		SCL	0	110	SCL
179	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	60	Om		SCL	0	100	SCL
180	ALG	MUS	OG	F	MID	4	0	I	W	4	6			55	SCL	45	CL	10		CL
181	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	20	Of	30	Om	50	CL	0	50	CL
182	MUS 2	MLD	TM	O/F	LOWER	2	0	P	M	0	0	30	Of	60	Om	10	CL	0	90	CL
183	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	60	Om		CL	0	100	CL
184	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	35	Of	45	Om	20	SL	0	80	SL
185	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	30	Om	40	SCL	0	60	SCL
186	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	70	Om		SCL	0	110	SCL
187	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	80	Om		SCL	0	120	SCL
188	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	30	Of	20	Om			0	50	
189	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	80	Om		SCL	0	120	SCL
190	FIR	FIR	OEB	F	LOWER	5	1	R	W	2	2			40	S	80	SL	4		SL
191	ALG	RB 3	OG	F	LEVEL	2	0	VP	W	3	7			60	S	40	S	10		S
192	FIR	FIR	EEB	F	LOWER	3	0	R	W	3	7	20	S	40	S	40	S	10		S
193	FIR	FIR	EEB	F	UPPER	3	0	W	W	2	6	6	S	45	S	50	SL	8		SL
194	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	40	Of	80	Om			0	120	
195	MUS 2	MUS	TH	O/F	LEVEL	2	0	P	M	0	0	30	Of	40	Oh	30	SL	0	70	SL
196	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	30	Om	40	S	0	60	S

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
197	glKNS	MUS	GLGL	F	LEVEL	2	1	I	W	2	3	5	SL	40	SL	55	SL	5		SL
198	glKNS	MUS	GLGL	F	LEVEL	2	0	I	W	6	6	10	SCL	40	SCL	50	SCL	12		SCL
199	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	40	Of	80	Om			0	120	
200	FIR	RB 3	EEB	F	LOWER	4	2	W	W	11	0	8	grL	70	CL	20	LS	17		LS
201	KNS	RB 3	OGL	M	CREST	7	0	MW	W	7	0	6	SiL	45	SiCL	50	SiCL	7		SiCL
202	MUS 2	MUS	TM	O/F	LOWER	3	0	P	M	0	0	30	Of	90	Om		SCL	0	120	SCL
203	FIR	MUS	EEB	M	LOWER	4	1	MW	W	3	12	6	grL	55	SCL	50	SC	12		SC
204	MUS 2	MUS	TH	O/M	MID	4	0	P	M	0	0	5	Of	35	Oh	60	SCL	0	40	SCL
205	MUS 2	MUS	TH	O/M	MID	3	0	P	M	0	0			50	Oh	50	SCL	0	50	SCL
206	MUS 2	MUS	TH	O/M	MID	3	0	VP	M	0	0			60	Oh	40	SCL	0	60	SCL
207	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0			40	Om	60	LS	0	40	LS
208	MUS 1	MUS	TYH	O	LEVEL	2	0	VP	M	0	0	15	Of	15	Om	50	Oh	0	15	?
209	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	30	Of	50	Om	20	Oh	0	100	?
210	MUS 1	MUS	TYH	O	LEVEL	2	0	P	M	0	0	20	Of	10	Om	30	Oh	0	60	?
211	MUS 2	MUS	TH	O/F	LEVEL	2	0	P	M	0	0	15	Of	85	Om	20	C	0	100	C
212	ALG	MUS	pt OG	F	MID	2	1	I	W	0	0	20	Of	30	LS	50	grLS	0	20	LS
213	glKNS	MLD	GLGL	M	UPPER	2	0	I	W	3	5	10	SL	50	CL	60	CL	8	8	CL
214	MLD 1	MLD	TYM	O	LEVEL	2	0	VP	WT	0	0			20	Om			0	22	
215	ALG	RB 3	pt OG	M	CREST	6	2	I	W	7	13			40	SCL	80	SCL	20	20	SCL
216	KNS	RB 3	OGL	M	UPPER	6	2	MW	W	8	12	10	SL	10	SCL			20		SCL
217	KNS	KNS	OGL	M	UPPER	4	2	MW	W	8	4	8	SiL	50	CL			12		SCL
218	KNS	KNS	OGL	M	UPPER	6	2	MW	W	3	2	8	SL	50	SiL			5		SiCL
219	KNS	KNS	OGL	F/M	CREST	7	1	W	W	2	2	7	LS	115	SL			4		SCL
220	ALG	KNS	pt OG	M	UPPER	3	2	I	W	5	10			70	SCL	50	SCL	15		SCL
221	KNS	KNS	OGL	M	UPPER	4	2	MW	W	2	2	8	LS	45	CL	55	SCL	4		SCL
222	KNS	KNS	OGL	M	LOWER	2	2	MW	W	3	2	30	SiC	30	CL	40	SCL	5		SCL
223	KNS	KNS	OGL	M	LEVEL	2	2	MW	W	5	10	10	SL	70	CL	20	CL	15		CL
224	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	35	Om	35	SCL	0	65	SCL
225	ALG	MUS	pt OG	M	MID	2	1	I	W	5	25			50	SCL	50	SCL	30		SCL
226	ALG	MUS	pt OG	M	MID	2	0	I	W	20	40			50	SCL	50	SCL	60		SCL
227	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	20	Of	80	Om			0	100	
228	KNS	MUS	OGL	F	LOWER	3	1	W	W	3	2	20	LS	60	LS	20	SCL	5		SCL
229	KNS	MUS	OGL	F	MID	3	0	MW	W	3	2	15	SL	85	SL			5		C
230	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	10	Of	50	Om	40	CL	0	60	CL
231	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	15	Of	40	Om	45	SCL	0	100	SCL
232	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	15	Of	85	Om			0	60	
233	MUS 1	MLD	TYM	O	LEVEL	2	0	P	M	0	0	20	Of	40	Om			0	60	
234	MUS 2	MUS	TH	O/M	MID	3	0	P	M	0	0	10	Of	30	Om	60	SCL	0	40	SCL
235	MUS 2	MUS	TM	O/M	LOWER	3	0	P	M	0	0	15	Of	45	Om	40	SCL	0	60	SCL
236	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	10	Of	90	Om			0	50	
237	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	20		0	100	
238	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	15	Of	25	Om			0	40	
239	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	SL	0	60	LS
240	glKNS	MUS	GLGL	M	LEVEL	2	1	I	W	3	2	15	SL	105	CL			5		SCL
241	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	15	Of	35	Om	50	SCL	0	50	SCL
242	glKNS	KNS	GLGL	M	LEVEL	2	1	P	W	3	17	10	SL	90	SCL			20		SCL
243	glKNS	KNS	GLGL	M	LEVEL	2	1	I	W	3	2	15	SL	25	SCL	60	SCL	5		SCL
244	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	10	Of	50	Om	40	SCL	0	60	SCL
245	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	15	Of	85	Om		SCL	0	100	SCL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
246	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	15	Of	30	Om	55	SCL	0	45	SCL
247	glKNS	MUS	GLGL	M	LEVEL	2	2	I	W	3	2	10	LS	90	SCL			5		SCL
248	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0			75	Om	25	SCL	0	75	SCL
249	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	15	Of	45	Om	40	SCL	0	60	SCL
250	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	20	Of	80	Om			0	100	
251	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	20	Of	80	Om			0	100	
252	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	60	Om	20	SCL	0	80	SCL
253	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			40	Om	60	SCL	0	40	SCL
254	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			60	Om	40	SCL	0	60	SCL
255	ALG	MUS	pt OG	O/M	LEVEL	2	0	P	W	0	0	35	Of	25	SCL	40	SCL	0	35	SCL
256	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			55	Om	45	SCL	0	55	SCL
257	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			80	Om	20	SCL	0	80	SCL
258	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			60	Om	40	SCL	0	60	SCL
259	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0			100	Om			0	100	
260	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			90	Om	10	CL	0	90	CL
261	FIR	FIR	EEB	M	LEVEL	2	2	W	W	3	0	20	SL	30	LS			3		LS
262	FIR	FIR	EEB	M	UPPER	3	2	W	W	3	0	25	LS	25	LS			3		LS
263	FIR	FIR	EEB	M	UPPER	3	2	W	W	3	0	25	LS	25	LS			3		LS
264	glKNS	MUS	GLGL	M	LEVEL	2	1	I	W	3	2	5	SL	35	SCL	60	SCL	5		SCL
265	ALG	MUS	pt OG	F	LEVEL	2	0	I	W	8	12			30	SL	50	SL	20		SL
266	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	10	Of	40	Om	50	SCL	0	50	SCL
267	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	10	Of	50	Om	40	Cl	0	50	SCL
268	MUS 2	KNS	TM	O/M	LEVEL	2	0	P	M	0	0			50	Om	50	CL	0	50	CL
269	MUS 2	KNS	TM	O/M	LEVEL	2	0	VP	M	0	0			100	Om	20	CL	0	100	CL
270	glKNS	MUS	OGL	M	LEVEL	2	0	I	W	3	2	10	LS	90	SCL			5		CL
271	ALG	KNS	pt OG	M	LEVEL	2	0	P	W	20	10			20	SCL	50	SCL	30	30	SCL
272	MUS 1	MUS	TYH	O	LEVEL	2	0	VP	M	0	0	10	Of	40	Om	50	Oh	0	100	
273	glKNS	RB 3	GLGL	M	MID	6	1	I	W	0	0	20	SCL	80	SCL			5		C
274	FIR	RB 3	OGL	F	MID	7	0	R	W	3	2	20	LS	80	LS			5		LS
275	KNS	RB 2	OGL	M	CREST	6	1	MW	W	4	4	20	CL	80	CL			8		CL
276	KNS	RB 2	OGL	M	MID	2	0	MW	W	3	3	30	CL	70	CL			6		C
277	FIR	RB 2	EEB	M	CREST	5	0	W	W	5	5	15	LS	25	LS			10		LS
278	FIR	RB 2	EEB	F	MID	6	0	R	W	4	4	10	LS	90	LS			8		LS
279	FIR	RB 2	EEB	F	LOWER	5	0	R	W	4	3	20	L	50	SL	30	LS	7		LS
280	FIR	RB 2	EEB	F	LOWER	3	0	R	W	5	5	40	S	60	S			10		S
281	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0			50	Om			0	50	
282	FIR	RB 2	EEB	F	LOWER	5	0	R	W	10	5	15	S	85	S			15		S
283	FIR	RB 2	EEB	F	CREST	5	0	R	W	3	3	30	S	70	S			6		S
284	glMMY	WT	RG	F	LEVEL	2	0	VP	WT	10	10					100	CL	20		CL
285	FIR	RB 2	EEB	F	MID	3	0	W	W	3	3	7	SiL	95	SiL			6		SiCL
286	FIR	RB 2	OEB	F	LOWER	3	0	MW	W	3	2	20	CL	45	SL	45	CL	5		SCL
287	MMY	MMY	EEB	F	LOWER	3	0	W	W	4	3	15	L	85	L			7		LS
288	glMMY	glMMY	GLR	F	LEVEL	2	0	VP	WT	3	2					120	CL	5		CL
289	MMY	MMY	OR	F	LOWER	3	0	R	W	2	2					120	LS	4		LS
290	MMY	MMY	OR	F	UPPER	4	0	R	W	3	3					40	S	6		S
291	FIR	RB 1	EEB	F	LEVEL	2	0	R	W	4	3	10	L	110	SiL			7		SL
292	KNS	RB 3	OGL	M	UPPER	3	2	MW	W	3	2	15	SL	35	SCL			5		SCL
293	RB 3	RB 3	OR	M/R	MID	7	3	W	W	2	1	10	SL					3		SL
294	KNS	KNS	OGL	M	LEVEL	2	1	MW	W	2	2	20	SiL	60	C	20	CL	4		CL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
295	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	15	Of	60	Om	25	grCL	0	75	CL
296	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	15	Of	60	Om	25	SCL	0	75	SCL
297	RB 3	RB 3	OR	M	MID	6	2	I	W	3	3					100	grSCL	6		SCL
298	ALG	MUS	pt OG	M	LOWER	3	2	I	W	0	0	5	Of	10	Om	85	SCL	0	15	SCL
299	KNS	KNS	OGL	M	MID	2	2	MW	W	3	2	15	LS	85	SCL			5		SCL
300	MUS 2	MUS	TM	O/M	LOWER	2	0	VP	M	0	0	20	Of	50	Om			0	50	
301	MUS 2	MUS	TM	O/M	LOWER	2	0	VP	M	0	0	20	Of	50	Om			0	50	
302	MLD 2	MUS	TM	O/M	DEPRESSION	2	0	VP	M	0	0	20	Of	50	Om			0	50	
303	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	55	Om	25	CL	0	75	CL
304	MLD 2	MLD	TM	O/M	DEPRESSION	2	0	VP	M	0	0	20	Of	60	Om	20	CL	0	80	CL
305	MLD 2	MLD	TM	O/M	DEPRESSION	2	0	VP	M	0	0	20	Of	60	Om	20	CL	0	80	CL
306	MLD 1	MLD	TYM	O	UPPER	2	0	P	M	0	0	20	Of	100	Om			0	120	
307	MLD 2	MLD	TM	O/M	MID	2	0	VP	M	0	0	20	Of	70	Om	30	CL	0	90	CL
308	MLD 2	MLD	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	75	Om	15	CL	0	95	CL
309	ALG	MUS	pt OG	M	UPPER	2	2	P	M	30	0			60	SCL	30	SCL	30	30	SCL
310	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	30	Of	90	Om			0	120	
311	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	25	Of	95	Om			0	120	
312	MUS 1	MUS	TYH	O	LEVEL	2	0	P	M	0	0			10	Om	110	Oh	0	120	
313	glKNS	MUS	GLGL	M	UPPER	2	3	I	W	15	5	25	SL	35	CL			20		CL
314	KNS	MUS	OGL	M	UPPER	2	3	W	W	3	2	30	SL	70	SCL			5		SCL
315	KNS	RB 3	OGL	M	UPPER	7	3	MW	W	10	5	20	SL	40	CL			15		CL
316	KNS	KNS	OGL	L/M	LEVEL	2	3	MW	W	2	2	8	SiCL	40	C	50	CL	4		CL
317	KNS	KNS	OGL	F/M	LOWER	2	2	MW	W	2	3	30	SC	50	SCL	20	CL	5		CL
318	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	30	Of	90	Om			0	120	
319	MUS 2	MUS	TM	O/M	UPPER	2	0	P	M	60	0			40	CL	40	CL	60	40	CL
320	KNS	KNS	OGL	F/M	UPPER	2	2	MW	W	30	0	25	LS	65	SCL	30	CL	30	30	CL
321	glKNS	MUS	GLGL	M	UPPER	2	3	I	W	15	5	15	SL	55	SCL		CL	20		CL
322	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	30	Of	70	Om	20	CL	0	100	CL
323	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	30	Of	70	Om		CL	0	100	CL
324	MUS 2	MUS	TM	O/M	DEPRESSION	2	0	VP	M	0	0			90	Om	20	CL	0	90	CL
325	MUS 2	MUS	TM	O/M	DEPRESSION	2	0	VP	M	0	0			90	Om	20	CL	0	90	CL
326	MUS 2	MUS	TH	O/M	DEPRESSION	2	0	VP	M	0	0			50	Om			0	50	
327	MUS 2	MUS	TM	O/F	LOWER	2	0	P	M	0	0	20	Of	70	Oh	30	SL	0	70	SL
328	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	60	Om	20	CL	0	90	CL
329	glKNS	MUS	GLGL	M	UPPER	2	3	I	W	5	5	10	SL	80	SCL	20	CL	10		CL
330	glKNS	MUS	GLGL	M	UPPER	2	3	I	W	3	2	20	SL	40	CL			5		CL
331	MLD 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	30	Of	80	Om	10	CL	0	110	CL
332	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	40	CL	0	80	SCL
333	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	20	Of	20	Om			0	40	
334	ALG	MUS	pt OG	M	UPPER	2	3	P	W	20	0	10	SL	70	SCL	20	CL	20	10	CL
335	MLD 1	MLD	TYM	O	LEVEL	2	0	VP	M	0	0							0	40	
336	ALG	MUS	pt OG	L/M	UPPER	2	3	P	W	20	0			70	C	20	CL	20	10	CL
337	MUS 2	MUS	TM	O/M	MID	2	0	P	M	20	0			40	C		SCL	20	40	SCL
338	MLD 1	MLD	TYM	O	LEVEL	2	0	VP	M	0	0			70	Om			0	70	
339	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	20	20			40	C	20	C	40	40	C
340	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	50	Om	20	SCL	0	60	SCL
341	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	20	C	0	80	C
342	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	25	Of	60	Om		CL	0	70	CL
343	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	30	Of	80	Om		CL	0	80	CL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
344	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	30	Om			0	30	
345	ALG	MUS	pt OG	M	LEVEL	2	3	P	W	30	0			40	SCL	40	CL	30	20	SCL
346	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	CL	0	60	CL
347	MUS 2	MLD	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	40	CL	0	80	CL
348	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	CL	0	60	CL
349	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	25	Of	45	Om	30	CL	0	70	CL
350	ALG	MUS	pt OLG	M	LEVEL	2	3	P	W	2	3	15	SL	60	C	25	SCL	5	20	SCL
351	glHRR	MUS	GLGL	M	LEVEL	2	3	I	W	2	3	15	SL	60	C	25	CL	5		CL
352	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	25	Of	45	Om	50	C	0	70	CL
353	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	60	Om	30	CL	0	90	CL
354	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	40	Om	30	CL	0	70	CL
355	MLD 2	MLD	TM	O/M	LOWER	2	0	VP	M	0	0	30	Of	40	Om			0	70	
356	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	70	Om		C	0	90	C
357	MLD 2	MLD	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	30	Om			0	50	
358	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	40	Om			0	60	
359	MUS 2	MLD	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	CL	0	60	CL
360	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	40	Om			0	60	
361	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	40	Om			0	60	
362	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	40	Om			0	60	
363	MUS 2	MLD	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	55	Om		CL	0	75	CL
364	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	40	Om	40	CL	0	60	CL
365	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	40	Om			0	60	
366	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	60	Om		SCL	0	90	SCL
367	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	50	Om	20	CL	0	80	CL
368	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	30	Om		CL	0	60	CL
369	MUS 1	MLD	TYM	O	LEVEL	2	0	P	M	0	0	30	Of	90	Om			0	120	
370	glKNS	KNS	GLGL	M	LOWER	2	3	I	W	5	3	10	SC	70	CL			8		CL
371	KNS	KNS	OGL	M	MID	3	4	W	W	5	5	25	SL					10		SL
372	glKNS	KNS	GLGL	M	LOWER	4	4	I	W	3	2	30	S	30	SCL			5		SCL
373	RB 2	RB 2	RG	F	DEPRESSION	3	2	P	W	3	2					50	L	5		L
374	KNS	KNS	OGL	F	UPPER	4	4	W	W	3	2	30	LS	40	SL			5		SCL
375	glKNS	KNS	GLGL	M	LOWER	4	3	I	W	8	5	10	L	40	CL	50	CL	13		CL
376	KNS	KNS	OGL	M	LEVEL	3	3	MW	W	5	3	15	SL	70	CL	15	CL	8		CL
377	KNS	KNS	OGL	L	MID	3	0	MW	W	3	1	15	SL	55	C			4		C
378	KNS	KNS	SZGL	M	MID	3	1	MW	W	3	3	15	SL	45	CL			6		CL
379	glKNS	KNS	GLGL	F/M	MID	3	2	I	W	5	5	30	S	70	SCL			10		SCL
380	FIR	KNS	EEB	F	MID	3	4	W	W	2	1	20	S	60	LS			3		LS
381	MUS 2	MLD	TH	O/M	LOWER	2	0	P	M	0	0	20	Of	80	Om		CL	0	100	CL
382	MLD 2	MLD	TH	O/M	DEPRESSION	2	0	VP	M	0	0	20	Of	30	Oh	50	CL	0	50	CL
383	MUS 2	MLD	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	90	Om		CL	0	120	CL
384	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	10	Of	50	Om			0	50	
385	KNS	KNS	OGL	F/M	UPPER	3	3	W	W	5	2	20	LS	70	SCL	30	CL	7		CL
386	KNS	KNS	OGL	F/M	UPPER	3	3	W	W	5	5	25	LS	55	SL	20	CL	10		CL
387	RB 3	RB 3	OR	F	MID	8	0	W	W	3	2					50	SL	5		SL
388	MMY	MMY	CUR	F	MID	3	0	MW	W	5	3		SiL		SL			8		LS
389	glMMY	MMY	pt RG	F	DEPRESSION	3	0	P	W	0	0			10	Oh	100	SL	0	50	S
390	glMMY	MMY	GLR	F	LEVEL	2	0	I	W	3	5					100	SiL	8		LSC
391	ALG	MMY	pt RG	F	DEPRESSION	2	0	P	W	0	15					100	SiL	15		SiL, SC
392	KNS	KNS	OGL	M	UPPER	3	2	W	W	3	2	20	SL	50	SCL	30	C	5		C

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
393	KNS	KNS	OGL	L/M	LEVEL	3	1	MW	W	4	4	20	SiL	70	C	20	CL	8		C
394	glKNS	KNS	GLGL	L/M	LEVEL	3	1	I	W	5	5	15	SL	65	C	30	C	10		CL
395	glKNS	KNS	GLGL	M	LEVEL	3	3	I	W	4	8	15	SL	65	CL	20	CL	12		CL
396	glKNS	KNS	GLGL	M	LEVEL	2	2	I	W	4	4	20	SL	70	SCL	15	CL	8		CL
397	KNS	KNS	OGL	M	LEVEL	2	2	MW	W	3	5	15	SL	55	SCL	30	C	8		C
398	KNS	KNS	OGL	M	LEVEL	2	2	MW	W	4	6	20	SL	60	CL	25	CL	10		CL
399	KNS	KNS	OGL	M	MID	3	3	MW	W	3	10	20	LS	45	CL	20	CL	13		CL
400	FIR	FIR	EEB	F	CREST	4	0	R	W	2	0	10	S	40	S	50	S	2		S
401	KNS	KNS	OGL	F/M	LEVEL	2	1	MW	W	5	0	25	LS	25	SCL			5		SCL
402	KNS	KNS	OGL	M	LOWER	2	4	MW	W	3	5	10	SL	30	SCL	60	CL	8		CL
403	FIR	KNS	OEB	F/M	LOWER	3	4	MW	W	5	2			50	SL			7		SCL
404	KNS	KNS	OGL	M	LEVEL	2	4	W	W	5	3	30	SC	30	SCL			8		SCL
405	KNS	KNS	OGL	M	LEVEL	2	4	W	W	3	1	15	SC	45	SCL			4		SCL
406	KNS	KNS	OGL	M	MID	2	4	W	W	3	8	25	LS	35	SCL			11		SCL
407	KNS	KNS	OGL	M	MID	2	4	W	W	3	8	25	LS	35	SCL			11		SCL
408	ALG	MUS	OG	M	LOWER	2	3	P	M	5	5			80	SCL	20	SCL	10		SCL
409	ALG	MUS	pt OLG	M	LOWER	2	4	P	W	3	10	20	SL	40	SCL			13		SCL
410	ALG	MUS	OG	M	LEVEL	2	3	I	W	2	0			100	SCL			2		SCL
411	FIR	FIR	OEB	F	UPPER	3	4	W	W	3	0			100	LS			3		LS
412	MUS 2	MMY	TM	O/M	DEPRESSION	3	0	P	M	0	0			50	Om			0	50	
413	glMMY	MMY	GLCUR	F	MID	3	0	I	W	5	5					100	SiL	10		SiL
414	glMMY	MMY	RG	F	LEVEL	2	0	I	WT	0	0	20	SiCL			80	SiC	0		SiC
415	MMY	MMY	OR	F	MID	3	0	MW	W	6	0					100	SiL	6		SL
416	RB 2	RB 2	OEB	F/R	MID	3	3	MW	W	3	0	10	SiL	30	L			3		L
417	RB 2	RB 2	OEB	F/R	MID	4	3	MW	W	5	0	10	SL	30	SL			5		SL
418	glMMY	MMY	GLCUR	F	LEVEL	2	0	I	W	5	3					100	SCL	8		SCL
419	glMMY	MMY	GLCUR	F	LEVEL	2	0	I	W	5	3					100	SCL	8		SCL
420	RB 2	RB 2	OHR	F/R	LOWER	3	0	MW	W	0	0	15	SL	30	SL		grSL	0		SL
421	RB 2	RB 2	OEB	F/R	LOWER	4	4	MW	W	3	8			40	SiL			11		SL
422	MMY	MMY	OR	F	LOWER	4	0	MW	W	2	3					100	SiL	5		SiL
423	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	70	Om	10	CL	0	90	CL
424	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	50	Om	30	C	0	80	C
425	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	30	Om	50	CL	0	50	CL
426	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	50	Om	30	CL	0	70	CL
427	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	40	Of	50	Om	30	CL	0	90	CL
428	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	40	Of	60	Om		CL	0	100	CL
429	MUS 2	MLD	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om		CL	0	80	CL
430	MUS 1	MLD	TYM	O	LEVEL	2	0	P	M	0	0	40	Of	80	Om			0	120	
431	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	25	Of	50	Om	25	CL	0	75	CL
432	MLD 1	MLD	TYM	O	LEVEL	2	0	VP	M	0	0	40	Of	80	Om			0	120	
433	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	50	Om	40	CL	0	80	CL
434	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	30	Of	60	Om	30	C	0	90	C
435	MUS 1	MUS	TYF	O	LEVEL	2	0	VP	M	0	0	30	Of	60	Om	30	C	0	60	
436	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	30	Of	90	Om			0	120	
437	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	60	Om	20	CL	0	100	CL
438	MUS 1	MUS	TYM	O	UPPER	2	0	P	M	0	0	30	Of	60	Om			0	90	
439	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	10	Of	40	Om	50	SL	0	50	SL
440	MUS 1	MLD	TYM	O	LEVEL	2	0	VP	M	0	0	30	Of	90	Om			0	120	
441	glKNS	MLD	GLGL	M	MID	2	4	I	W	3	8							11		

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
442	MLD 2	MLD	TM	O/M	LEVEL	2	0	P	M	0	0	40	Of	50	Om		SCL	0	90	SCL
443	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	30	Om	40	SL	0	60	SL
444	MLD 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	10	Of	30	Om	60	SCL	0	40	SCL
445	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	30	Om	50	SCL	0	50	SCL
446	glKNS	MUS	GLGL	M	UPPER	2	3	I	W	3	3	6	SL	35	CL			6		CL
447	MUS 2	MUS	TM	O/M	UPPER	2	0	P	M	0	0	10	Of	40	Om	50	CL	0	50	CL
448	glKNS	MUS	GLGL	M	LEVEL	2	4	I	W	0	0							0		CL
449	KNS	RB 3	OGL	M	UPPER	4	4	W	W	3	2	20	SL	30	CL	50	CL	5		CL
450	KNS	KNS	OGL	M	MID	3	3	MW	W	2	2	10	SL	40	C	50	C	4		C
451	ALG	MUS	pt OG	M	DEPRESSION	2	0	VP	M	5	15			50	SL			20		C
452	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	20	Of	40	Om			0	60	
453	KNS	KNS	OGL	M	LOWER	2	3	MW	W	4	4	20	SL	40	CL	60	CL	8		CL
454	glKNS	KNS	GLGL	M	LEVEL	2	0	P	W	5	10	15	SL	25	SCL	60	CL	15		SL
455	KNS	KNS	OGL	M	LEVEL	2	3	MW	W	2	2	25	SL	25	SCL	40	CL	4		CL
456	KNS	RB 3	OGL	M	LEVEL	2	3	W	W	5	15	20	SL	30	SL	50	CL	20		CL
457	KNS	MLD	OGL	M	UPPER	7	3	MW	W	3	10	10	L	40	CL	40	C	13		C
458	MUS 2	MUS	TM	O/M	DEPRESSION	2	0	P	M	0	0	20	Of	20	Om			0	40	
459	KNS	RB 3	OGL	M	UPPER	4	4	MW	W	3	2	5	SL	15	SCL			5		SCL
460	KNS	RB 3	OGL	M	UPPER	6	4	MW	W	5	5	10	SL	30	SCL			10		SCL
461	KNS	KNS	OGL	M	LEVEL	3	4	MW	W	2	2	10	SCL	35	SCL			4		SCL
462	KNS	RB 3	OGL	M	UPPER	7	3	MW	W	2	2	10	SL	70	CL	20	CL	4		CL
463	RB 2	RB 2	OGL	F/R	CREST	4	3	W	W	0	0							0		grSL
464	RB 2	RB 2	OGL	RES	MID	6	0	W	W	2	2	3	SL	20	SL	80	SCL	4		SCL
465	KNS	KNS	OGL	M	UPPER	6	3	MW	W	5	5	15	SCL	75	CL	10	CL	10		CL
466	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	10	Of	30	Om	60	SCL	0		SCL
467	KNS	KNS	OGL	M	MID	4	3	MW	W	2	6	20	SL	60	CL	20	CL	8		CL
468	ALG	MUS	pt OG	M	LEVEL	2	4	P	W	0	0	35	Oh		CL			0	35	CL
469	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	CL	0	60	CL
470	KNS	KNS	OGL	M	LEVEL	2	3	MW	W	3	3	15	SCL	55	CL		CL	6		CL
471	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	25	Om	55	CL	0	45	CL
472	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	30	Om	50	SCL	0	50	SCL
473	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	20	Om			0	40	
474	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	50	Om	20	SC	0	80	SL
475	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om			0	60	
476	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	30	Om		CL	0	50	CL
477	MUS 2	MLD	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om			0	60	
478	MLD 2	MLD	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	30	Om			0	50	
479	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	30	Om		CL	0	50	CL
480	MLD 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0	20	Of	30	Om			0	50	
481	MLD 1	MLD	TYM	O	LEVEL	2	0	VP	M	0	0	20	Of	30	Om			0	60	
482	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0							0		
483	FIR	MLD	GLEEB	F	UPPER	2	2	I	W	5	10	10	S	30	LS	60	S	15		S
484	HRR	MLD	OGL	M	UPPER	3	3	MW	W	2	2	10	SL	30	C	60	C	4		C
485	MUS 2	MLD	TM	O/M	DEPRESSION	2	0	P	M	0	0	20	Of	30	Om	50	SL	0	50	SL
486	KNS	KNS	OGL	M	UPPER	3	4	MW	W	3	3	5	SL	25	SCL			6		SCL
487	KNS	KNS	OGL	M	MID	4	4	MW	W	0	3	5	SL	25	SCL			3		SCL
488	KNS	KNS	OGL	M	LOWER	3	3	MW	W	5	8	10	SL	70	CL		CL	13		CL
489	FIR	KNS	EEB	M	MID	3	4	W	W	2	2	10	SL	40	SL	50	SL	4		SL
490	KNS	KNS	OGL	M	UPPER	3	3	W	W	5	3	20	LS	60	SCL	20	SCL	8		SCL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
491	KNS	KNS	OGL	M	MID	4	4	W	W	2	3	8	SL	30	SL	60	SL	5		SL
492	glKNS	KNS	GLGL	M	LOWER	3	4	I	W	5	5	20	LS	40	SL	40	SL	10		SL
493	KNS	KNS	OGL	M	LEVEL	3	4	MW	W	2	2	6	SL	35	SL	60	S	4		S
494	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	20	Of	40	Om	60	SL	0	40	SL
495	glKNS	KNS	GLGL	M	LOWER	3	3	P	W	3	5	6	SL	35	SL			8		SCL
496	KNS	KNS	OGL	M	MID	4	4	MW	W	5	5	15	SL	65	SCL		CL	10		CL
497	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	SCL	0	60	SCL
498	MUS 2	MUS	TM	O/M	MID	2	0	P	M	0	0	20	Of	30	Om	50	CL	0	50	CL
499	KNS	KNS	OGL	M	MID	4	4	MW	W	2	2	8	SL	20	SL			4		SL
500	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	20	Of	30	Om		CL	0	50	CL
501	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	40	Om		CL	0	80	CL
502	FIR	FIR	EEB	F	LEVEL	2	3	W	W	2	3	10	SL	35	SL	55	SL	5		SL
503	FIR	FIR	EEB	F	LEVEL	2	3	W	W	2	4	15	S	35	S	50	SL	6		SL
504	FIR	FIR	EEB	F	LEVEL	2	3	W	W	2	3	8	S	35	S	55	SL	5		SL
505	FIR	FIR	EEB	F	LEVEL	3	1	R	W	2	2	9	S	30	S	60	S	4		SL
506	KNS	KNS	OGL	F	LEVEL	2	0	MW	W	2	4	7	SiCL	35	SiCL	60	CL	6		CL
507	FIR	FIR	EEB	F	LEVEL	3	0	R	W	1	2	7	S	75	S	20	S	3		S
508	FIR	RB 3	EEB	F	CREST	8	0	R	W	2	3	5	S	65	S	30	S	5		S
509	FIR	FIR	EEB	F	DEPRESSION	3	0	R	W	2	2	20	S	40	S	40	S	4		S
510	FIR	FIR	OEB	F	LOWER	3	3	R	W	3	3			65	S	35	SL	6		SL
511	FIR	FIR	OEB	F	LEVEL	2	3	W	W	3	5			55	S	45	SL	8		SL
512	FIR	FIR	OEB	F	LEVEL	2	1	W	W	2	3			25	S			5		S
513	FIR	FIR	EEB	F	LEVEL	2	1	R	W	1	2	10	S	45	S	45	S	3		S
514	ALG	ALG	pt OG	F	LEVEL	2	0	P	WT	4	18			50	S	50	S	22		S
515	FIR	RB 3	OEB	F	UPPER	3	2	W	W	3	5			40	S	60	S	8		S
516	ALG	RB 3	pt OG	F	LOWER	3	1	P	W	5	15			55	S	45	SL	20		SL
517	ALG	RB 3	pt OG	F	UPPER	5	1	P	M	5	15			35	SiCL	65	CL	20		CL
518	MUS 2	MUS	TM	O/F	UPPER	3	0	P	M	0	0	30	Of	40	Om	30	SiCL	0	70	SiCL
519	MUS 1	MUS	FIM	O	LEVEL	2	0	P	M	0	0	60	Of	40	Om			0	120	
520	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	20	Om	60	SCL	0	40	SCL
521	MUS 1	MUS	FIM	O	LEVEL	2	0	P	M	0	0	90	Of	30	Om			0	120	
522	MUS 2	MUS	FIM	O/M	LEVEL	2	0	P	M	0	0	70	Of	40	Om		SL	0	110	SL
523	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	40	Of	80	Om			0	120	
524	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	40	Of	70	Om		CL	0	110	CL
525	ALG	RB 3	OG	M	MID	4	0	I	W	5	5			40	SL	60	SCL	10		SCL
526	ALG	RB 3	OG	M	UPPER	4	0	I	W	5	10			50	SiCL	50	CL	15		CL
527	MUS 2	MUS	TM	O/M	UPPER	2	0	P	M	0	0	30	Of	50	Om	20	CL	0	80	CL
528	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	40	Of	80	Om			0	120	
529	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	40	Om	30	CL	0	70	CL
530	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	30	Om	50	SCL	0	50	SCL
531	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	50	Om	20	SCL	0	80	SCL
532	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	25	Of	25	Om	50	S	0	50	S
533	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	40	Of	70	Om		S	0	110	S
534	FIR	MUS	EEB	F	LEVEL	2	0	MW	W	2	3	8		30	SL	60	SCL	5		SCL
535	FIR	FIR	EEB	F	LEVEL	2	0	R	W	3	3	10	S	50	S		S	6		S
536	FIR	FIR	EEB	F	LEVEL	2	0	R	W	2	3	10	S	35	S	55	S	5		S
537	FIR	FIR	OEB	F	LEVEL	2	0	R	W	2	2			40	S	60	S	4		SL
538	FIR	FIR	OEB	M	LEVEL	2	0	W	W	2	3			35	S	65	S	5		SL
539	FIR	FIR	OEB	F	LEVEL	2	0	W	W	2	3			35	S	65	S	5		SL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
540	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	40	Oh	30	S	0	70	S
541	FIR	FIR	OEB	F	LEVEL	2	0	R	W	2	3			40	S	60	S	5		S
542	FIR	FIR	EEB	F	LEVEL	2	1	R	W	2	2	6	S	35	S	60	S	4		S
543	FIR	FIR	EEB	F	LEVEL	2	1	R	W	2	3	5	S	30	S	65	S	5		S
544	FIR	FIR	OEB	F	LEVEL	2	1	R	W	2	3			35	S	65	S	5		S
545	FIR	FIR	OEB	F	LEVEL	2	0	W	W	3	4			30	SL	70	SL	7		SL
546	FIR	FIR	EEB	F	LEVEL	2	0	R	W	3	3	5	S	35	S	60	S	6		S
547	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	40	Of	80	Om			0	120	
548	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	80	Om			0	110	
549	FIR	FIR	OEB	F	LEVEL	2	1	MW	W	5	15			20	S			20		S
550	FIR	FIR	EEB	F	LEVEL	2	0	W	W	2	3	5	S	15	S			5		S
551	FIR	FIR	EEB	F	LEVEL	2	1	R	W	2	2	5	S	35	S	60	S	4		S
552	FIR	FIR	OEB	F	LOWER	3	0	R	W	2	3			40	S	60	S	5		S
553	FIR	FIR	OEB	F	LOWER	3	1	R	W	3	5			40	S	60	S	8		S
554	FIR	FIR	EEB	F	LEVEL	2	1	R	W	4	8	10	S	25	SL			12		SL
555	glKNS	KNS	GLGL	M	UPPER	3	3	I	W	30	20			100	C		SCL	50		SCL
556	glKNS	KNS	GLGL	M	MID	4	3	I	W	2	8	10	SL	90	SCL			10		C
557	KNS	KNS	OGL	M	UPPER	4	3	MW	W	10	5	10	SL	90	SCL			15		CL
558	KNS	KNS	OGL	M	UPPER	4	4	W	W	2	2	20	SL	25	SCL			4		CL
559	HRR	HRR	SZGL	L/M	LEVEL	2	1	MW	W	8	2	5	SiCL	115	C	30	C	10		C
560	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	50	Om	30	C	0	70	C
561	glHRR	HRR	GLGL	M	LEVEL	2	3	I	W	5	5	10	SiC	70	C			10		CL
562	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	90	Om			0	120	C
563	ALG	MUS	OG	F/M	UPPER	2	1	P	W	8	3	15	S	25	LS	60	C	11		C
564	MUS 2	MUS	TM	O/F	LOWER	2	0	P	M	0	0	20	Of	80	Om		LS	0	100	C
565	glHRR	MUS	GLGL	M	UPPER	2	0	I	W	10	5	8		80	C	30	CL	15		CL
566	HRR	HRR	OGL	M	UPPER	2	1	W	W	5	3	15	SL	65	C	20	CL	8		CL
567	ALG	HRR	pt OG	M	DEPRESSION	2	0	P	WT	0	0	25	Oh	50	C	50	C	0	25	C
568	glHRR	HRR	GLGL	M	LEVEL	2	2	I	W	5	2	20	SiCL	80	C			7		C
569	HRR	HRR	OGL	M	UPPER	2	2	MW	W	6	3	20	SL	30	SCL			9		SCL
570	HRR	HRR	OGL	M	MID	2	2	MW	W	5	3	10	SL	60	C	30	CL	8		CL
571	HRR	HRR	OGL	M	LOWER	2	2	MW	W	10	2	10	SL	40	C			12		C
572	HRR	HRR	OGL	M	LOWER	2	2	MW	W	10	1	5	SiCL	65	C			11		C
573	HRR	HRR	OGL	L/M	LEVEL	2	1	MW	W	10	1	6	SiCL	75	C	20	CL	11		CL
574	HRR	HRR	OGL	M	LEVEL	2	1	MW	W	8	1	10	SiCL	40	C			9		C
575	HRR	HRR	OGL	M	LEVEL	2	1	MW	W	8	1	10	SiL	80	C	30	C	9		C
576	ALG	RB 3	pt OG	M	DEPRESSION	2	0	VP	WT	0	0	20	Oh	100	C			0	20	C
577	ALG	RB 3	OLG	M	LOWER	2	1	P	W	3	0	20	SiL	80	C		C	3		C
578	glKNS	MLD	GLGL	M	LEVEL	2	0	I	W	8	0	20	LS	80	LS			8		LS
579	MUS 2	MLD	TM	O/M	LOWER	2	0	P	W	3	10	15	SL	85	SCL		CL	13		CL
580	HRR	HRR	OGL	M	MID	2	1	MW	W	5	0	10	SiL	40	C			5		C
581	HRR	HRR	OGL	M	MID	2	1	MW	W	8	1	20	SiL	30	C			9		C
582	HRR	HRR	OGL	M	LEVEL	2	1	MW	W	8	2	15	SiL	35	C			10		CL
583	FIR	HRR	EEB	F	UPPER	2	2	W	W	6	1	15	LS	45	SL			7		S
584	FIR	HRR	OEB	F	MID	3	0	MW	W	10	0			100	SL			10		SCL
585	glHRR	HRR	GLGL	M	MID	5	2	I	W	4	2	8		90				6		
586	HRR	HRR	OGL	M	LEVEL	2	2	MW	W	6	2	15	SiL	30	SiCL			8		SCL
587	HRR	HRR	OGL	M	UPPER	2	1	MW	W	8	1	20	SL	80	CL			9		CL
588	MUS 2	MUS	TM	O/M	DEPRESSION	2	0	P	M	0	0	30	Of	30	Om	40	CL	0	60	CL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
589	HRR	HRR	OGL	L	LOWER	2	1	MW	W	5	12	10	SiL	70	C		C	17		C
590	HRR	HRR	OGL	M	MID	2	2	MW	W	5	5	10	SL	60	C		C	10		C
591	RUT	RUT	OGL	M	MID	4	3	W	W	5	2	20	SL	60	SL	20	SCL	7		SCL
592	RUT	RUT	EEB	F	UPPER	4	3	R	W	3	0	20	SC	80	SCL			3		S
593	RUT	RUT	EEB	F	UPPER	2	3	W	W	3	0	15	LS	75	LS	20	S	3		S
594	RUT	RUT	OGL	M	MID	3	4	W	W	5	5	10	SL	40	SL			10		SCL
595	RUT	RUT	EEB	F/M	UPPER	2	4	W	W	5	0	20	LS	40	LS			5		LS
596	MUS 1	MUS	TYM	O	DEPRESSION	2	0	P	M	0	0	30	Of	90	Om		Oh	0	120	
597	MLD 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	30	Of	20	Om			0	50	
598	RUT	RUT	OEB	F	MID	4	1	R	W	2	0			100	S			2		S
599	RUT	RUT	OGL	F/M	LOWER	4	4	MW	W	6	5	20	LS	30	SL			11		SL
600	RUT	RUT	OGL	M	UPPER	3	4	W	W	5	2	20	SL	30	SL			7		SL
601	ALG	MUS	pt OG	M	LOWER	2	3	P	M	25	0			35	SCL	40	CL	25	25	CL
602	ALG	MUS	pt OG	F	LEVEL	2	0	I	W	20	0			60	SiL	40	SiL	20	10	SL
603	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	15	Of	85	Om			0	10	SL
604	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	15	Of	85	Om			0	10	SL
605	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	15	Of	45	Om	40	SCL	0	60	SCL
606	KNS	MUS	OGL	F	MID	2	1	MW	W	30	20	10	LS	90	SCL			50		SCL
607	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0			50	Om			0	50	
608	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	10	Of	40	Om	50	SCL	0	50	SCL
609	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	7	Of	55	Om	40	SCL	0	60	SCL
610	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	20	Of	80	Om			0	100	
611	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			50	Om	50	SCL	0	50	SCL
612	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			50	Om	50	SCL	0	50	SCL
613	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			80	Om	20	SCL	0	80	SCL
614	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	10	Of	100	Om			0	110	
615	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0			40	Om			0	40	
616	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			50	Om		grCL	0	50	CL
617	MUS 1	KNS	TYM	O	LEVEL	2	0	VP	M	0	0			60	Om			0	60	
618	KNS	KNS	OGL	M	LOWER	3	3	MW	W	3	0	6	LS	95	SCL			3		SCL
619	FIR	KNS	EEB	F/M	DEPRESSION	3	1	I	W	6	0	10	LS	90	SL			6		SCL
620	KNS	KNS	OGL	M	UPPER	2	1	MW	W	4	3	10	SiL	40	CL			7		CL
621	KNS	KNS	OGL	M	LEVEL	2	1	MW	W	3	0	6	SL	95	SCL			3		SCL
622	KNS	KNS	OGL	M	MID	3	1	MW	W	4	3	15	SL	85	SCL			7		SCL
623	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			50	Om	50	CL	0	50	CL
624	MUS 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	10	Of	90	Om			0	100	
625	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			40	Om	60	SCL	0	40	CL
626	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0			60	Om	40	SCL	0	60	SCL
627	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	15	Of	85	Om	20	SCL	0	100	SCL
628	FIR	RB 3	EEB	F	MID	5	0	R	W	3	1	30	LS	25	LS	45	LS	4		LS
629	RUT	RUT	OHR	F	UPPER	3	3	W	W	0	0	5	Of	20	Oh		gr	0	20	
630	RUT	RUT	EEB	F	LOWER	3	2	R	W	2	2	5	S	50	CS	45	S	4		S
631	MUS 1	MLD	TYM	O	LEVEL	2	0	VP	M	0	0	20	Of	100	Om			0	120	
632	ALG	RUT	RG	F	LEVEL	2	1	VP	WT	4	3					120	SCL	7		SCL
633	RUT	RUT	EEB	F/M	LEVEL	2	2	W	W	2	1	7	LS	35	LS			3		CL
634	HRR	HRR	SZGL	M	MID	3	1	MW	W	5	7	15	SiL	105	CL			12		CL
635	ALG	ALG	pt OG	M	DEPRESSION	3	1	VP	WT	10	10			60	CL	40	CL	20		CL
636	glHRR	HRR	GLGL	M	LEVEL	2	0	I	W	2	1	15	SiL	85	SCL			3		CL
637	KNS	KNS	OGL	M	LEVEL	2	2	MW	W	4	3	6	SiL	65	CL	30	CL	7		CL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
638	FIR	KNS	EEB	F	LEVEL	2	1	W	W	4	4	25	LS	75	LS			8		LS
639	ALG	MUS	pt OG	O/M	MID	3	2	I	W	25	10			25	SCL	40	SCL	35	100	SCL
640	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	20	20					80	LS	40	40	SCL
641	KNS	KNS	OGL	M	MID	3	3	MW	W	15	5	7	SL	15	SCL		LS	20		SCL
642	KNS	KNS	OGL	M	LOWER	3	3	W	W	4	3	20	SL	20	SL			7		SL
643	KNS	KNS	OGL	M	CREST	3	3	MW	W	5	4	4	LS	95	CL			9		CL
644	KNS	KNS	OGL	M	CREST	4	3	W	W	3	2	10	SL	90	CL			5		CL
645	glKNS	KNS	OGL	F	DEPRESSION	6	0	I	W	3	2	20	LS	80	SCL			5		SCL
646	MUS 2	MUS	TM	O/M	LEVEL	2	0	VP	M	0	0			60	Om			0	60	
647	FIR	MLD	EEB	F	LOWER	3	2	W	W	2	1	4	LS	95	LS			3		LS
648	MUS 1	MUS	TYM	O	LEVEL	2	0	P	W	0	0	5	Of	15	Oh	25	Om	0	45	
649	FIR	MLD	EEB	F	LEVEL	2	2	W	W	2	1	15	LS	35	LS			3		LS
650	ALG	ALG	OG	L	LEVEL	2	0	P	M	2	10			50	SL	50	SCL	12		SCL
651	HRR	HRR	OGL	L/M	LEVEL	2	0	MW	W	3	3	20	SL	50	CL	30	C	6		C
652	ALG	ALG	OG	L	LEVEL	2	0	I	W	5	15			50	CL	50	C	20		C
653	HRR	HRR	OGL	L/M	LEVEL	2	0	MW	W	3	3	20	SL	30	SL	50	CL	6		CL
654	ALG	ALG	OG	L/M	LEVEL	2	0	P	M	5	15			50	C	50	C	20		C
655	HRR	HRR	SZGL	L/M	LEVEL	2	0	MW	W	2	4	20	SL	50	C	30	C	6		C
656	ALG	HRR	OG	L/M	LEVEL	2	0	I	M	5	10			50	CL	50	CL	15		CL
657	HRR	HRR	SZGL	M	LEVEL	2	0	MW	W	2	4	20	SCL	55	C	25	C	6		C
658	HRR	HRR	SZGL	M	LEVEL	2	0	MW	W	3	5	10	CL	45	C	45	C	8		C
659	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	40	Of	50	Om	10	C	0	90	C
660	MLD 1	MLD	TYM	O	LEVEL	2	0	VP	M	0	0	30	Of	90	Om			0	120	
661	MLD 2	MLD	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	70	Om		C	0	100	C
662	HRR	HRR	SZGL	M	LEVEL	2	0	MW	W	2	3	10	CL	60	C	30	C	5		C
663	HRR	HRR	SZGL	M	LEVEL	2	0	MW	W	2	2	6	CL	55	C	40	C	4		C
664	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	10	Of	40	Om	50	SL	0	50	SL
665	KNS	KNS	OGL	F	MID	4	0	W	W	2	2	5	SL	35	SL	60	SL	4		SL
666	MLD 1	MLD	TYM	O	LEVEL	2	0	VP	M	0	0			70	Om			0	70	
667	MUS 2	MLD	TM	O/F	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	SL	0	60	SL
668	RUT	RUT	EEB	F	MID	2	0	W	W	2	3	8	LS	30	LS	60	LS	5		LS
669	RUT	RUT	EEB	F	MID	3	0	R	W	2	0	20	S	50	S	30	S	2		S
670	RUT	RUT	EEB	F	LEVEL	2	0	R	W	2	1	10	SL	15	SL			3		SL
671	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	30	Om	40	SCL	0	60	SCL
672	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	45	Om	25	SCL	0	75	SCL
673	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	20	Of	50	Om	30	SL	0	70	SL
674	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	SL	0	60	SL
675	ALG	MUS	OG	F	LEVEL	2	0	P	M	5	15			50	SL	50	SL	20		SL
676	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	10	Of	30	Om	60	SCL	0	40	SCL
677	FIR	MUS	EEB	F	LEVEL	2	1	W	W	2	2	8	SL	50	SL	40	SL	4		SL
678	FIR	MUS	EEB	F	LEVEL	2	1	MW	W	3	5	10	SL	30	SL	60	SCL	8		SCL
679	MLD 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	20	Of	30	Om			0	50	
680	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	10	Of	60	Om	30	SCL	0	70	SCL
681	MLD 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	10	Of	40	Om	50	S	0	50	S
682	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	10	Of	50	Om			0	50	
683	MLD 2	MUS	TM	O/F	LEVEL	2	0	VP	M	0	0	20	Of	90	Om		S	0	110	S
684	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	SL	0	60	SL
685	MUS 2	MUS	TM	O/F	LEVEL	2	0	P	M	0	0	30	Of	50	Om	20	SL	0	80	SL
686	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	30	CL	0	80	CL

Site	Series	MapUnit	Subgroup	Material	Position	Topog	Stoniness	Drainage	LandUse	LF cm	H cm	A, O cm	Tex A, O	B, O cm	Tex B, O	C, O cm	Tex C, O	LFH cm	O cm	Tex (min)
687	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	40	Om	40	CL	0	60	CL
688	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	10	Of	40	Om	50	CL	0	50	CL
689	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	30	Of	60	Oh	10	CL	0	90	CL
690	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	50	Om	30	CL	0	70	CL
691	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	W	3	5	5	SL	35	SCL	60	SCL	8		SCL
692	MLD 1	MUS	TYM	O	LEVEL	2	0	P	M	0	0	20	Of	40	Om			0	60	
693	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	70	Om	10	CL	0	90	CL
694	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	10	Of	50	Om	40	CL	0	60	CL
695	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	10	Of	30	Om	60	SL	0	40	SL
696	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	20	CL	0	80	CL
697	glKNS	RB 3	GLGL	M	LEVEL	2	3	I	W	3	5	8	CL	70	CL	20	CL	8		CL
698	KNS	RB 3	OGL	M	MID	5	0	MW	W	3	3	5	SCL	55	SCL	40	SCL	6		SCL
699	MUS 1	MUS	TYF	O	LEVEL	2	0	P	M	0	0	120	Of					0	120	
700	glKNS	KNS	GLGL	M	LEVEL	2	0	I	W	5	5	7	SiCL	45	SiC	70	SiL	10		SiCL
701	ALG	MUS	pt OG	M	LEVEL	2	3	P	M	5	20			50	SCL	50	SCL	25	20	SCL
702	ALG	MUS	pt OLG	M	LEVEL	2	2	P	M	5	25	20	SL	30	SL	50	SCL	30	30	SL
703	KNS	KNS	OGL	M	LEVEL	2	0	MW	W	2	2	10	SL	70	C	30	CL	4		C
704	KNS	KNS	OGL	L	MID	2	0	MW	W	4	2	15	SL	60	CL	25	SL	6		SCL
705	KNS	KNS	OGL	M	UPPER	2	3	MW	W	3	0	10	SL	80	CL	30	SCL	3	70	C
706	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	50	Om	30	C	0		CL
707	glKNS	KNS	GLGL	M	LEVEL	2	1	I	W	4	4	8	SCL	70	C	30	C	8		C
708	ALG	MUS	pt OG	M	DEPRESSION	2	0	VP	WT	20	0			50	CL	40	C	20		CL
709	KNS	MUS	OGL	M	UPPER	2	3	MW	W	5	0	15	LS	75	SCL	20	C	5		CL
710	ALG	MLD	OLG	M	UPPER	2	4	P	W	5	5	25	S	75	SCL			10	10	SCL
711	MUS 2	MUS	TM	O/M	MID	2	0	P	M	0	0	20	Of	40	Om	40	SCL	0	60	SCL
712	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	80	Om	20	SL	0	100	SL
713	MUS 1	MUS	TYH	O	LEVEL	2	0	VP	M	0	0	10	Of	50	Om	60	Oh	0	120	
714	ALG	MUS	pt OG	M	MID	2	4	P	W	5	20			100	SL			25	20	SCL
715	ALG	MUS	pt OG	M	MID	2	3	P	W	5	10			90	SCL	20	SCL	15		SCL
716	MUS 2	MUS	TM	O/M	LEVEL	2	0	P	M	0	0	20	Of	60	Om	40	CL	0	80	CL
717	MLD 1	WT	TYH	O	LEVEL	2	0	VP	WT	0	0			120	Oh			0	120	
718	RB 2	RB 2	EEB	F/R	UPPER	4	2	W	W	8	0	8	S	40	LS			8		LS
719	ALG	RB 2	pt OG	O/M	LEVEL	2	2	P	W	10	25			45	C	30	CL	35	25	CL
720	MUS 2	MUS	TM	O/M	LOWER	2	0	P	M	0	0	20	Of	60	Om	20	CL	0	80	CL
721	RB 3	RB 3	EEB	RES	UPPER	3	0	W	W	2	0	10	LS	30	SL	30	SL	2		SL
722	KNS	KNS	OGL	M	UPPER	4	2	W	W	5	5	20	SL	30	C	50	CL	10		CL
723	FIR	KNS	EEB	F	MID	5	3	W	W	2	0	5	LS	95	gr	50	S	2		grS
724	MLD 1	MUS	TYM	O	DEPRESSION	3	0	P	W	0	0			100	Oh			0	100	SL
725	MMY	glMMY	GLR	F	LOWER	5	0	P	W	0	0					100	CL	0		CL
726	glKNS	KNS	GLGL	M	MID	4	1	I	W	4	4	15	CL	60	SCL			8		CL
727	KNS	KNS	OGL	M	MID	5	1	MW	W	9	8	10	SL	90	SCL			17		SCL
728	FIR	RB 3	EEB	F	MID	6	0	R	W	4	6	4	LS	95	LS			10		LS
729	FIR	RB 3	EEB	F	CREST	6	0	R	W	2	0	15	LS	85	LS			2		LS
730	FIR	RB 3	EEB	F	MID	7	0	R	W	4	3	10	LS	90	LS			7		LS
731	MMY	MMY	OR	F	MID	4	1	W	W	2	1					100	SiL	3		SiL
732	MUS 2	MUS	TH	O/M	LEVEL	2	0	VP	M	35	65					20	SCL	100	100	SCL
733	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	5	Of	105	Om			0	100	
734	MUS 1	MUS	TYM	O	LEVEL	2	0	VP	M	0	0	5	Of	50	Om			0	100	

7.3 FORESTRY SOIL AND LANDSCAPE CAPABILITY RATINGS

Soil Capability (S) **Location:** Suncor (ALG) **Surveyor:** Leskiw & Pluth **Date:** July, 1995

1. Profile AWHC (m)		Value	Interim Deduction	Final Deduction
$50 - \frac{(TS\ 24 + US\ 44 + LS\ 83)}{3} =$	50 -	(0)	= (a)	0

2. Topsoil Factors

Physical: *Choose D plus most limiting of F or O*			
– structure / consistence (D)	peat 25 cm	0	
– organic equivalent (F)	>80t/ha	0	
– peaty surface (O)	25 cm	0	= (b) 0

Chemical: *Choose most limiting*		% deduction
– acidity (V)	6.2 (C_aCl_2)	0
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0
– nutrient retention (K)	high	0

c = (80 -(a) 0 -(b) 0) (V, N, Y, or K.0%) = (c) 80

Basic Soil Rating d = 80 **-(a)** 0 **-(b)** 0 **-(c)** 0 **= (d)** 80

3. Upper Subsoil Factors - *Choose most limiting*

– structure (D)	friable	0
– acidity (V)	6.9 (C_aCl_2)	10
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Upper subsoil deduction = 10 % of (a) x 0.67 = (e) 5

4. Lower Subsoil Factors - *Choose most limiting*

		% deduction
– structure (D)	friable	0
– acidity (V)	8.0 (H_20)	20
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Lower subsoil deduction 20 % of (a) x 0.33 = (f) 5

Interim Soil Rating = (d) 80 - (e) 5 - (f) 5 = (g) 70

5. Edaphic Grid (R)

– moisture	wet
– nutrients	poor

Edaphic Grid multiplier = (h) 0.50

FINAL SOIL RATING (S) = (g) 70 / 4 (Class) x (h) 0.50 / R (Subclass) = 35

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) **Location:** Suncor (FIR) **Surveyor:** Leskiw & Pluth **Date:** July 1995

1. Profile AWHC (m)		Value	Interim Deduction	Final Deduction
$50 - \frac{(TS\ 12 + US\ 22 + LS\ 44)}{3} =$	50 -	(26)	= (a)	24

2. Topsoil Factors

Physical: *Choose D plus most limiting of F or O*			
– structure / consistence (D)	loose	10	
– organic equivalent (F)	35 t/ha	10	
– peaty surface (O)	-	0	= (b) 20

Chemical: *Choose most limiting*		% deduction
– acidity (V)	5.5(C_aCl_2)	0
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0
– nutrient retention (K)	low	20

c = (80 -(a) 24 -(b) 20) (V, N, Y, or K.0.20%) = (c) 7

Basic Soil Rating d = 80 **-(a)** 24 **-(b)** 20 **-(c)** 7 **= (d)** 29

3. Upper Subsoil Factors - *Choose most limiting*

– structure (D)	friable	0
– acidity (V)	5.5 (C_aCl_2)	0
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Upper subsoil deduction = 0 % of (a) x 0.67 = (e) 0

4. Lower Subsoil Factors - *Choose most limiting*

		% deduction
– structure (D)	loose	0
– acidity (V)	5.6(C_aCl_2)	0
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Lower subsoil deduction 0 % of (a) x 0.33 = (f) 0

Interim Soil Rating = (d) 29 - (e) 0 - (f) 0 = (g) 32

5. Edaphic Grid (R)

– moisture	very dry
– nutrients	poor

Edaphic Grid multiplier = (h) 0.75

FINAL SOIL RATING (S) = (g) 29 / 4 (Class) x (h) 0.75 / M, R (Subclass) = 22

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) Location: Suncor (HRR) Surveyor: Leskiw & Pluth Date: July 1995

1. Profile AWHC (m)

	Value	Interim Deduction	Final Deduction
$50 - \left(\frac{TS\ 25 + US\ 57 + LS\ 90}{3}\right) =$	$50 - (-7)$	= (a)	0

2. Topsoil Factors

Physical: *Choose D plus most limiting of F or O*

– structure / consistence (D)	friable	0
– organic equivalent (F)	50 t/ha	4
– peaty surface (O)	-	0 = (b) 4

Chemical: *Choose most limiting*

		% deduction
– acidity (V)	5.5 (C_aCl_2)	0
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0
– nutrient retention (K)	medium	10

c = (80 -(a) 0 -(b) 4) (V, N, Y, or K.0.10%) = (c) 8

Basic Soil Rating d = 80 -(a) 0 -(b) 4 -(c) 8 = (d) 68

3. Upper Subsoil Factors - *Choose most limiting*

– structure (D)	sbk, firm	0
– acidity (V)	5.6 (C_aCl_2)	0
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Upper subsoil deduction = 10 % of (a) x 0.67 = (e) 0

4. Lower Subsoil Factors - *Choose most limiting*

		% deduction
– structure (D)	sbk, firm	0
– acidity (V)	7.5 (H_20)	10
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Lower subsoil deduction 10 % of (a) x 0.33 = (f) 2

Interim Soil Rating = (d) 68 - (e) 0 - (f) 2 = (g) 66

5. Edaphic Grid (R)

– moisture	dry
– nutrients	medium

Edaphic Grid multiplier = (h) 1.0

FINAL SOIL RATING (S) = (g) 66 (Class: 2) x (h) 1.0 (Subclass: R) = 66

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) Location: Suncor (KNS) Surveyor: Leskiw &Pluth Date: July 1995

1. Profile AWHC (m)

	Value	Interim Deduction	Final Deduction
$50 - \left(\frac{TS\ 20 + US\ 51 + LS\ 75}{3}\right) =$	$50 - (49)$	= (a)	1

2. Topsoil Factors

Physical: *Choose D plus most limiting of F or O*

– structure / consistence (D)	friable	0
– organic equivalent (F)	55 t/ha	2
– peaty surface (O)	-	0 = (b) 2

Chemical: *Choose most limiting*

		% deduction
– acidity (V)	6 (C_aCl_2)	0
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0
– nutrient retention (K)	high	0

c = (80 -(a) 1 -(b) 2) (V, N, Y, or K.0%) = (c) 0

Basic Soil Rating d = 80 -(a) 1 -(b) 2 -(c) 0 = (d) 77

3. Upper Subsoil Factors - *Choose most limiting*

– structure (D)	sbk, firm	0
– acidity (V)	6.3 (C_aCl_2))	0
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Upper subsoil deduction = 0 % of (a) x 0.67 = (e) 0

4. Lower Subsoil Factors - *Choose most limiting*

		% deduction
– structure (D)	massive, firm	0
– acidity (V)	7.4 (H_20)	10
– salinity (N)	0.39	0
– sodicity / saturation % (Y)	1.8	0

Lower subsoil deduction 10 % of (a) x 0.33 = (f) 2

Interim Soil Rating = (d) 77 - (e) 0 - (f) 2 = (g) 75

5. Edaphic Grid (R)

– moisture	dry
– nutrients	medium

Edaphic Grid multiplier = (h) 1.0

FINAL SOIL RATING (S) = (g) 75 (Class: 2) x (h) 1.0 (Subclass: D) = 75

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) **Location:** Suncor (MLD) **Surveyor:** Leskiw & Pluth **Date:** July 1995

1. Profile AWHC (m)	Value	Interim Deduction	Final Deduction
$50 - \left(\frac{TS\ 24 + US\ 36 + LS\ 60}{3}\right) =$	$50 - (na)$	= (a)	0

2. Topsoil Factors

Physical: *Choose D plus most limiting of F or O*			
– structure / consistence (D)	peat	0	
– organic equivalent (F)	na	o	
– peaty surface (O)	>50 cm	25	= (b) 25

Chemical: *Choose most limiting*		% deduction
– acidity (V)	6.9(C_aCl_2))	10
– salinity (N)	-	0
– sodicity / saturation % (Y)		0
– nutrient retention (K)	high	0

c = (80 -(a) 0 -(b) 25) (V, N, Y, or K.0.10%) = (c) 6

Basic Soil Rating d = 80 **-(a)** 0 **-(b)** 25 **-(c)** 6 = (d) 49

3. Upper Subsoil Factors - *Choose most limiting*

– structure (D)	peat	0
– acidity (V)	5.6 (C_aCl_2)	0
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Upper subsoil deduction = 0 % of (a) x 0.67 = (e) 0

4. Lower Subsoil Factors - *Choose most limiting*

		% deduction
– structure (D)	peat	0
– acidity (V)	5.6 (C_aCl_2)	0
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Lower subsoil deduction 0 % of (a) x 0.33 = (f) 0

Interim Soil Rating = (d) 49 - (e) 0 - (f) 0 = (g) 49

5. Edaphic Grid (R)

– moisture	very wet
– nutrients	poor

Edaphic Grid multiplier = (h) 0.25

FINAL SOIL RATING (S) = (g) 49 x (h) 0.25 = 12

5 (Class) O, R (Subclass)

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) **Location:** Suncor (MMY) **Surveyor:** Leskiw & Pluth **Date:** July 1995

1. Profile AWHC (m)	Value	Interim Deduction	Final Deduction
$50 - \left(\frac{TS\ 36 + US\ 54 - LS\ 50}{3}\right) =$	$50 - (47)$	= (a)	3

2. Topsoil Factors

Physical: *Choose D plus most limiting of F or O*			
– structure / consistence (D)	friable	0	
– organic equivalent (F)	100 t/ha	0	
– peaty surface (O)	-	0	= (b) 0

Chemical: *Choose most limiting*		% deduction
– acidity (V)	7.5 (H_20)	10
– salinity (N)	0.59	0
– sodicity / saturation % (Y)	0.2	0
– nutrient retention (K)	high	0

c = (80 -(a) 3 -(b) 0) (V, N, Y, or K.0.10%) = (c) 8

Basic Soil Rating d = 80 **-(a)** 3 **-(b)** 0 **-(c)** 8 = (d) 69

3. Upper Subsoil Factors - *Choose most limiting*

– structure (D)	<2cm,friable	0
– acidity (V)	7.7 (H_20)	10
– salinity (N)	0.59	0
– sodicity / saturation % (Y)	0.2	0

Upper subsoil deduction = 10 % of (a) x 0.67 = (e) 5

4. Lower Subsoil Factors - *Choose most limiting*

		% deduction
– structure (D)	<2cm,friable	0
– acidity (V)	7.5 (H_20)	10
– salinity (N)	0.69	0
– sodicity / saturation % (Y)	0.3	0

Lower subsoil deduction 10 % of (a) x 0.33 = (f) 2

Interim Soil Rating = (d) 69 - (e) 5 - (f) 2 = (g) 62

5. Edaphic Grid (R)

– moisture	moist
– nutrients	rich

Edaphic Grid multiplier = (h) 1.25

FINAL SOIL RATING (S) = (g) 62 x (h) 1.25 = 78

2 (Class) S (Subclass)

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) **Location:** Suncor (MUS) **Surveyor:** Leskiw & Pluth **Date:** July 1995

		Value	Interim Deduction	Final Deduction
1. Profile AWHC (m)				
$50 - \left(\frac{TS\ 24 + US\ 36 + LS\ 60}{3}\right) =$	$50 -$	(na)	= (a)	0
2. Topsoil Factors				
Physical: *Choose D plus most limiting of F or O*				
– structure / consistence (D)		peat	0	
– organic equivalent (F)		na	0	
– peaty surface (O)		>50 cm	25 = (b)	25
Chemical: *Choose most limiting*			% deduction	
– acidity (V)		3.0 (C_aCl_2)	40	
– salinity (N)		-	0	
– sodicity / saturation % (Y)		-	0	
– nutrient retention (K)		medium	10	
c = (80 -(a) 0 -(b) 25) (V, N, Y, or K.0.40%)				= (c) 22
Basic Soil Rating d = 80 -(a) 0 -(b) 25 -(c) 22				= (d) 33
3. Upper Subsoil Factors - *Choose most limiting*				
– structure (D)		peat	0	
– acidity (V)		3.0 (C_aCl_2)	40	
– salinity (N)		-	0	
– sodicity / saturation % (Y)		-	0	
Upper subsoil deduction =		40	% of (a) x 0.67	= (e) 9
4. Lower Subsoil Factors - *Choose most limiting*			% deduction	
– structure (D)		peat	0	
– acidity (V)		3.0 (C_aCl_2)	40	
– salinity (N)		-	0	
– sodicity / saturation % (Y)		-	0	
Lower subsoil deduction		40	% of (a) x 0.33	= (f) 4
Interim Soil Rating = (d) 33 - (e) 9 - (f) 4				= (g) 20
5. Edaphic Grid (R)				
– moisture		wet		
– nutrients		poor		
Edaphic Grid multiplier				= (h) 0.5

FINAL SOIL RATING (S) = (g) 20 x (h) 0.5 = 10

5 (Class) O,V,R (Subclass)

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥ 15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) **Location:** Suncor (RUT) **Surveyor:** Leskiw & Pluth **Date:** July 1995

		Value	Interim Deduction	Final Deduction
1. Profile AWHC (m)				
$50 - \left(\frac{TS\ 8 + US\ 12 + LS\ 20}{3}\right) =$	$50 -$	(13)	= (a)	37
2. Topsoil Factors				
Physical: *Choose D plus most limiting of F or O*				
– structure / consistence (D)		s gr, loose	10	
– organic equivalent (F)		10 t/ha	20	
– peaty surface (O)		-	0 = (b)	30
Chemical: *Choose most limiting*			% deduction	
– acidity (V)		6.8 (C_aCl_2)	10	
– salinity (N)		-	0	
– sodicity / saturation % (Y)		-	0	
– nutrient retention (K)		medium	10	
c = (80 -(a) 37 -(b) 30) (V, N, Y, or K.0.10%)				= (c) 1
Basic Soil Rating d = 80 -(a) 37 -(b) 30 -(c) 1				= (d) 12
3. Upper Subsoil Factors - *Choose most limiting*				
– structure (D)		s gr, loose	0	
– acidity (V)		4.7 (C_aCl_2)	0	
– salinity (N)		-	0	
– sodicity / saturation % (Y)		-	0	
Upper subsoil deduction =		0	% of (a) x 0.67	= (e) 0
4. Lower Subsoil Factors - *Choose most limiting*			% deduction	
– structure (D)		s gr, loose	0	
– acidity (V)		4.7 (C_aCl_2)	0	
– salinity (N)		-	0	
– sodicity / saturation % (Y)		-	0	
Lower subsoil deduction		0	% of (a) x 0.33	= (f) 0
Interim Soil Rating = (d) 12 - (e) 0 - (f) 0				= (g) 12
5. Edaphic Grid (R)				
– moisture		dry		
– nutrients		poor		
Edaphic Grid multiplier				= (h) 0.75

FINAL SOIL RATING (S) = (g) 12 x (h) 0.75 = 9

5 (Class) S, R (Subclass)

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥ 15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25) If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) **Location:** Suncor (RB2) **Surveyor:** Leskiw & Pluth **Date:** July 1995

1. Profile AWHC (m)	Value	Interim Deduction	Final Deduction
$50 - \frac{(TS\ 15\ US\ 30\ LS\ 50)}{3} =$	50 - (31)	= (a)	19

2. Topsoil Factors

Physical: *Choose D plus most limiting of F or O*			
– structure / consistence (D)	s gr, loose	10	
– organic equivalent (F)	30 t/ha	12	
– peaty surface (O)	-	0	= (b) 22

Chemical: *Choose most limiting*		% deduction
– acidity (V)	3.4 (C_aCl_2)	20
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0
– nutrient retention (K)	low	20

c = (80 -(a) 19 -(b) 22) (V, N, Y, or K.0.20%) = (c) 8

Basic Soil Rating d = 80 -(a) 19 -(b) 22 -(c) 8 = (d) 31

3. Upper Subsoil Factors - *Choose most limiting*

– structure (D)	s gr, loose	0
– acidity (V)	3.5 (C_aCl_2)	20
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Upper subsoil deduction = 20 % of (a) x 0.67 = (e) 4

4. Lower Subsoil Factors - *Choose most limiting*

		% deduction
– structure (D)	s gr, loose	0
– acidity (V)	3.5 (C_aCl_2)	20
– salinity (N)	-	0
– sodicity / saturation % (Y)	-	0

Lower subsoil deduction 20 % of (a) x 0.33 = (f) 2

Interim Soil Rating = (d) 31 - (e) 4 - (f) 2 = (g) 25

5. Edaphic Grid (R)

– moisture	dry
– nutrients	poor

Edaphic Grid multiplier = (h) 0.75

FINAL SOIL RATING (S) = (g) 25 / 5 (Class) x (h) 0.75 / S (Subclass) = 19

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) **Location:** **Forest Scenario 1.a** -20 cm peat-mineral mix over 80 cm plus nonsaline / non sodic sandy clay loam overburden

1. Profile AWHC (m)	Value	Interim Deduction	Final Deduction
$50 - \frac{(TS\ 24\ US\ 45\ LS\ 75)}{3} =$	50 - (48)	= (a)	2

2. Topsoil Factors

Physical: *Choose D plus most limiting of F or O*			
– structure / consistence (D)	peat mix	0	
– organic equivalent (F)	>80 t/ha	0	
– peaty surface (O)	-	0	= (b) 0

Chemical: *Choose most limiting*		% deduction
– acidity (V)	5.0-7.0(H_20)	0
– salinity (N)	0.7	0
– sodicity / saturation % (Y)	SAR <4	0
– nutrient retention (K)	high	0

c = (80 -(a) 2 -(b) 0) (V, N, Y, or K.0%) = (c) 0

Basic Soil Rating d = 80 -(a) 2 -(b) 0 -(c) 0 = (d) 78

3. Upper Subsoil Factors - *Choose most limiting*

– structure (D)	2-10, firm	20
– acidity (V)	7.5 (H_20)	10
– salinity (N)	EC <2	0
– sodicity / saturation % (Y)	SAR <4	0

Upper subsoil deduction = 20 % of (a) x 0.67 = (e) 5

4. Lower Subsoil Factors - *Choose most limiting*

		% deduction
– structure (D)	2-10, firm	20
– acidity (V)	7.5 (H_20)	10
– salinity (N)	EC <2	0
– sodicity / saturation % (Y)	SAR <4	0

Lower subsoil deduction 20 % of (a) x 0.33 = (f) 5

Interim Soil Rating = (d) 78 - (e) 10 - (f) 5 = (g) 63

5. Edaphic Grid (R)

– moisture	dry
– nutrients	medium

Edaphic Grid multiplier = (h) 1.0

FINAL SOIL RATING (S) = (g) 63 / 2 (Class) x (h) 1.0 / D (Subclass) = 63

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) **Location:** Forest Scenario 1.b -20 cm peat-mineral mix over 80 cm plus, nonsaline / nonsodic loamy sand overburden

1. Profile AWHC (m)	Value	Interim Deduction	Final Deduction
50 - (TS 24 US 18 LS 30 / 3) =	50 - (24)	= (a)	26

2. Topsoil Factors

Physical: *Choose D plus most limiting of F or O*			
– structure / consistence (D)	peat mix	0	
– organic equivalent (F)	>80 t/ha	0	
– peaty surface (O)	-	0	= (b) 0

Chemical: *Choose most limiting*		% deduction
– acidity (V)	5.0-7.0($H_2$0)	0
– salinity (N)	0.7	0
– sodicity / saturation % (Y)	SAR <4	0
– nutrient retention (K)	med	10

c = (80 -(a) 26 -(b) 0) (V, N, Y, or K.10 %) = (c) 5

Basic Soil Rating d = 80 -(a) 26 -(b) 0 -(c) 5 = (d) 49

3. Upper Subsoil Factors - *Choose most limiting*

– structure (D)	<2, fri-firm	0
– acidity (V)	7.2 ($H_2$0)	0
– salinity (N)	<2	0
– sodicity / saturation % (Y)	SAR <2	0

Upper subsoil deduction = 0 % of (a) x 0.67 = (e) 0

4. Lower Subsoil Factors - *Choose most limiting*

		% deduction
– structure (D)	<2, fri-firm	0
– acidity (V)	7.2 ($H_2$0)	0
– salinity (N)	<2	0
– sodicity / saturation % (Y)	SAR <2	0

Lower subsoil deduction 0 % of (a) x 0.33 = (f) 0

Interim Soil Rating = (d) 49 - (e) 0 - (f) 0 = (g) 49

5. Edaphic Grid (R)

– moisture	dry
– nutrients	medium

Edaphic Grid multiplier = (h) 1.0

FINAL SOIL RATING (S) = (g) 49 / 3 (Class) x (h) 1.0 / M (Subclass) = 49

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Soil Capability (S) **Location:** **Forest Scenario 2 -20 cm peat-mineral mix over 80 cm plus tailing sands**

1. Profile AWHC (m)	Value	Interim Deduction	Final Deduction
50 - (TS 24 US 22 LS 38 / 3)	50 - (28)	= (a)	22

2. Topsoil Factors

Physical: *Choose D plus most limiting of F or O*			
– structure / consistence (D)	peat mix	0	
– organic equivalent (F)	>60 t/ha	0	
– peaty surface (O)	-	0	= (b) 0

Chemical: *Choose most limiting*		% deduction
– acidity (V)	7.0 ($H_2$0)	0
– salinity (N)	<1	0
– sodicity / saturation % (Y)	<1	0
– nutrient retention (K)	high	0

c = (80 -(a) 22 -(b) 0) (V, N, Y, or K.0%) = (c) 0

Basic Soil Rating d = 80 -(a) 22 -(b) 0 -(c) 0 = (d) 58

3. Upper Subsoil Factors - *Choose most limiting*

– structure (D)	single gr,loose	0
– acidity (V)	7.0 ($H_2$0)	0
– salinity (N)	<1	0
– sodicity / saturation % (Y)	<1	0

Upper subsoil deduction = 0 % of (a) x 0.67 = (e) 0

4. Lower Subsoil Factors - *Choose most limiting*

		% deduction
– structure (D)	single gr,loose	0
– acidity (V)	7.0 ($H_2$0)	0
– salinity (N)	<1	0
– sodicity / saturation % (Y)	<1	0

Lower subsoil deduction 0 % of (a) x 0.33 = (f) 0

Interim Soil Rating = (d) 58 - (e) 0 - (f) 0 = (g) 58

5. Edaphic Grid (R)

– moisture	dry
– nutrients	medium

Edaphic Grid multiplier = (h) 1.0

FINAL SOIL RATING (S) = (g) 58 / 3 (Class) x (h) 1.0 / M, R (Subclass) = 58

Subclass, denoted by Uppercase letter codes (e.g., M, D, Y), when ≥15 point deduction in (a), (b), (c), (e), (f), and (h if < 1.25). If more than two subclasses use S, or SR if R is a limitation.

Landscape Capability (L) (All Map Units except RB3)

1. Slope (T)	Value					Point Deduction
– slope steepness %	<20				= (a)	0
Basic Landscape Rating =	100–	(a)	0		= (b)	100
2. Exposure (X)			% deduction			
– position	mid					
			(0)	x (b)	= (c)	0
3. Stoniness (P)						
– % volume to 1 m	<20		0			
Stoniness deduction =			0	% x (b)	=(d)	0
4. Erosion (E)			% deduction			
– estimated volume loss in gullies						
– years since reclamation						
– annual gully erosion	slight					
Erosion deduction =			10	% x (b)	= (e)	10

FINAL LANDSCAPE RATING (L) = (b) 100 -(c) 0 -(d) 0 -(e) 10 = 90

= 1 (Class) ____ (Subclass)

Subclass, denoted by Uppercase letter codes (e.g., T, X, P), when ≥15 point deduction in (a), (c), (d), or (e).
If more than two subclasses use L.

FINAL COMBINED RATING

	Index	Class		Limiting	Factors
S=			,		,
L=			,		,

Index	Class
81 - 100	1
61 - 80	2
41 - 60	3
21 - 40	4
0 -20	5

Landscape Capability (L) (RB3 Map Unit)

1. Slope (T)	Value					Point Deduction
– slope steepness %	30 to 70; use 50				= (a)	
Basic Landscape Rating =	100–	(a)	70		= (b)	0
2. Exposure (X)			% deduction			
– position	mid					
			(0)	x (b)	= (c)	0
3. Stoniness (P)						
– % volume to 1 m	<20		0			
Stoniness deduction =			0	% x (b)	=(d)	0
4. Erosion (E)			% deduction			
– estimated volume loss in gullies						
– years since reclamation						
– annual gully erosion	severe					
Erosion deduction =			30	% x (b)	= (e)	9

FINAL LANDSCAPE RATING (L) = (b) 30 -(c) 0 -(d) 0 -(e) 9 = 21

= 4 (Class) T (Subclass)

Subclass, denoted by Uppercase letter codes (e.g., T, X, P), when ≥15 point deduction in (a), (c), (d), or (e).
If more than two subclasses use L.

FINAL COMBINED RATING

	Index	Class		Limiting	Factors
S=			,		,
L=			,		,

Index	Class
81 - 100	1
61 - 80	2
41 - 60	3
21 - 40	4
0 -20	5

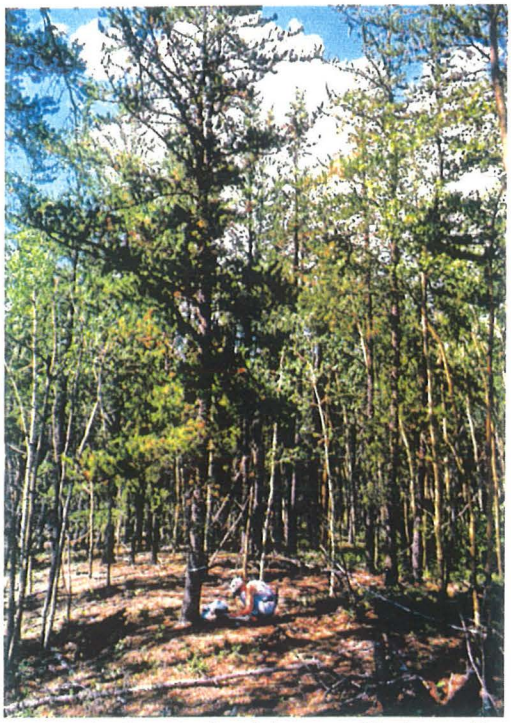
TABLE 21. SOIL LEGEND FOR THE SUNCOR LOCAL STUDY AREA.

Map Unit	Symbol	Subgroups	Parent Material	Texture Surface/Subsoil	Drainage Class	Topographic Class	Surface Stoniness	Vegetation
Algar	ALG	ptOG, OG	M; GF	peat / SCL (SL-CL)	poor to imperfect	2 (0-2%)	S0-S1, minor S4	wooded 70%, muskeg 30%
Firebag	FIR	EEB, OEB	GF; minor M	LS, SL / S, SL, LS	rapid to well	3 (<5%), some 5 (<15%)	S1-S2, minor S4	wooded
Horse River	HRR, glHRR	OGL, SZGL, GLGL	M; significant L/M and LT	SL, SiL, SiC / C, CL	HRR - mod well glHRR - imperfect to poor	3 (<5%)	S0-S1	wooded
Kinosis	KNS, glKNS	OGL, GLGL	M; sorted M and F	SL, LS / SCL, CL	well, mod well; significant imperfect	4 (< 9%)	S1-S3	wooded
McLelland	MLD1, MLD2	TYM, TM	O; O/M	Of/Om; Oh/M	very poor to poor	2 (<2%)	S0	fens with significant bogs
McMurray	MMY, glMMY	OR, GLCUR	F; minor F/M	SiL, L/SL, S	mod well to imperfect; poor	4 (<9%)	S0-S1	wooded, wetland
Muskeg	MUS1, MUS2	TYM, TM	O; O/M	O; O/M	poor to very poor	2 (<2%)	S0	bogs with inclusion of fens
Ruth Lake	RUT	EEB, OGL	GF, GF/M	SL, LS, S / SL, LS, S	rapid, well, mod well	4 (<9%)	S0-S4	wooded
Rough Broken	RB1	OEB	F/Residual	SL / SL gravel or chert	well	3 (2-5%)	S3-S4	wooded
Rough Broken	RB2	OEB, OGL	Shallow F / weathered residual tar sand	SL / soft tar S	well to mod well	3 (2-5%)	S3	wooded
Rough Broken	RB3	OR, OGL	M, C	SL / SCL	well	6 (16-30%), some steeper	S0-S3	wooded

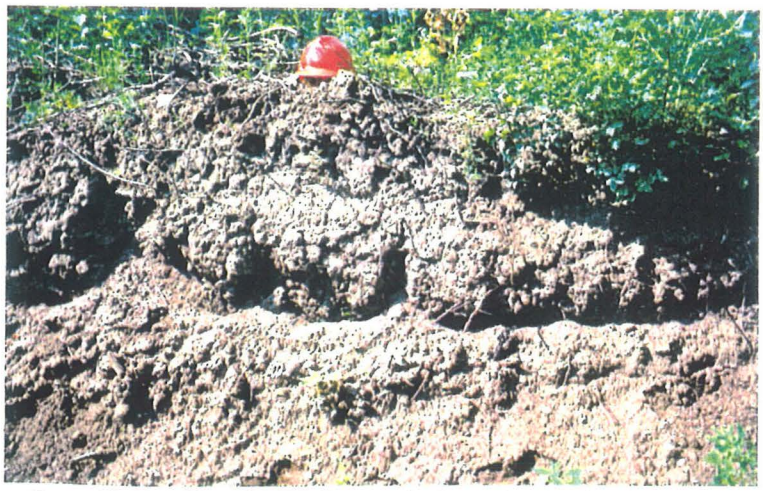
7.4 PHOTOGRAPHS

Unit of Algar soils with tree growth limited by wetness

Firebag soils. Eluviated Eutric Brunisol on sand.



Open Jack pine stand and Aspen on Firebag soils.



Horse River Soils. Orthic Gray Luvisol on clay to clay loam materials, slightly to nonstony.

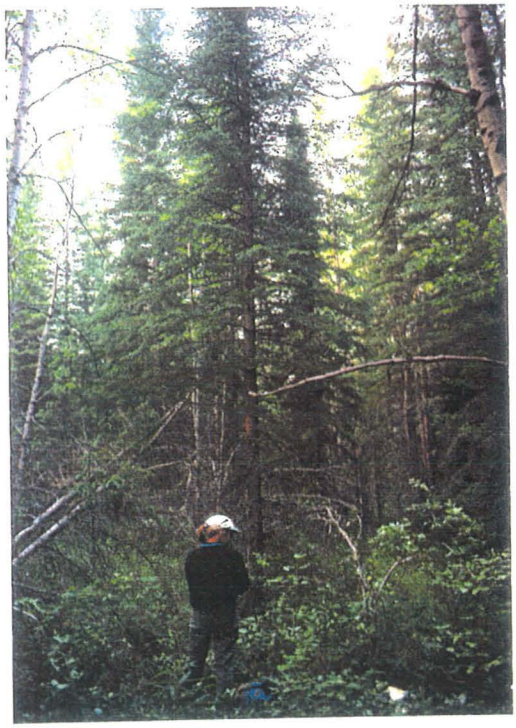
Productive forests being harvested on Kinosis soils.

Kinosis soil. Orthic Gray Luvisol on sandy loam to clay loam stony till.

Kinosis Soils moderately productive aspen and spruce.

McMurray soils. Terrace along Athabasca River. Highly productive spruce.

Mildred Organic soils. Fen and fen bog transitional.



McMurray Soils. Terrace along Steepbank River. Highly productive spruce.

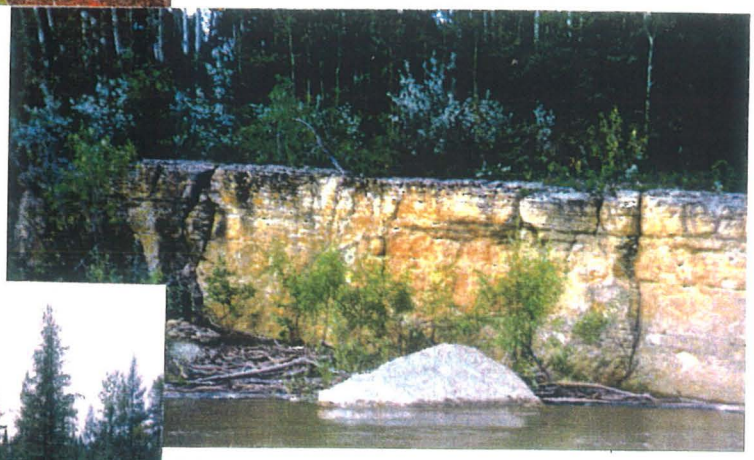
Gleyed McMurray Unit. This unit includes Gleysolic soils, too wet for productive forestry.

Ruth Lake.

Steepbank River valley

Wetlands on lower terraces within Athabasca River valley

Muskeg soils extensive on the uplands east of the Athabasca River



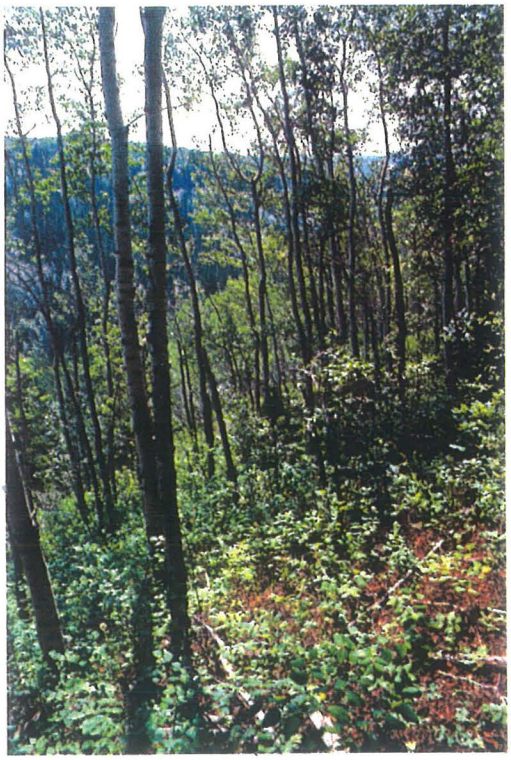
Recent fluvial deposits on terraces adjoining Athabasca River, McMurray soils.

Helicopter used to access remote areas, this being north of the Steepbank River.

RB1 soils. Shallow soils over bedrock material.

RB2 soils. Shallow sandy soil over residual tar sand outcrop.

RB2 soils. Winter haul road on moderate slopes, till-like, colluvial deposits.



RB3 soils. Occur on steep banks of rivers and tributaries.

RB3 soils. Eroded scarps along Steepbank River.

Reclaimed peat mix overclay over tailings sand.

Forest regrowth on reclaimed soil.

Grass cover providing effective erosion control on steep slope of reclaimed dyke.

Establishment of young trees is hampered by grass competition.

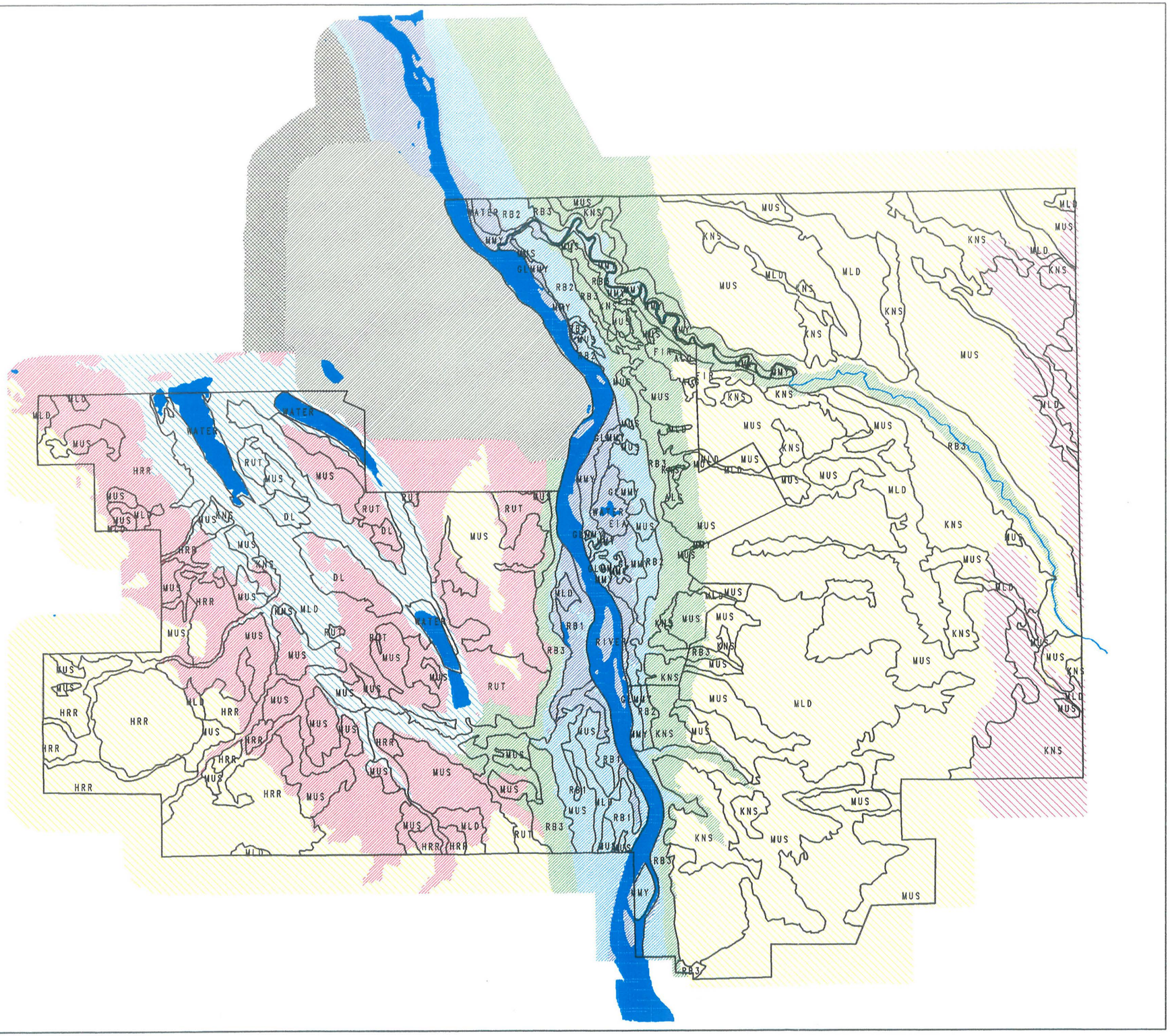
Good root penetration in peat mix and underlying tailings sand.

Poplar, shrub and grass growth on level reclaimed area.

APPENDICES

Appendix 1

LANDFORM AND SOIL CLASSIFICATION WITHIN THE LOCAL STUDY AREA



LEGEND

- Water
- Riparian Floodplain
- Floodplain Terraces
- Escarpment Slope
- Midland Plains
- Midland Drainage
- Upland Organic/Lacustrine Plain
- Highland Moraine
- Suncor
- Syncrude

Refer to Table for Soil Map Units

N

Scale = 1:100,000

0 2 4 6

KILOMETRES

Project No. 952-2307.5660 25 March 1996

Golder Associates