

**SAND AND GRAVEL RESOURCES
OF THE PEERLESS LAKE (NORTH HALF OF 84B)
MAP AREA, ALBERTA**

Open File Report 87-1

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ABSTRACT

The aggregate material present in the north half of Peerless Lake (84B) map area was studied in 1986 to provide information on the distribution and characteristics of the resource. The study area is approximately 4500 km² in size and was investigated at the enhanced reconnaissance level. The program consisted of compiling existing information, air photo interpretation plus some site and laboratory analyses. Sand and gravel material is not abundant in the area and is distributed unevenly. Major sand and gravel deposits are kame, esker, and meltwater channel features located in the northwest corner of the map area, scattered in the east half and concentrated along a line through Range 6 from Township 87 to 91. A beach deposit of dirty, oxidized, gravelly sand is located north of an unnamed lake southeast of Kidney Lake. Recent sediments have little promise for aggregate exploitation.

INTRODUCTION

This study is part of a program initiated in 1976 by the Alberta Research Council and Alberta Energy and Natural Resources to provide information on the aggregate resources of the Province of Alberta. The area of study (Figure 1), level of detail and materials to be investigated were determined by the Resources Evaluation and Planning Division (REAP) of Alberta Energy and Natural Resources. The actual investigations were conducted by the Geological Survey Department of the Alberta Research Council.

The study was completed at the enhanced reconnaissance level (category 4 in Table 1). This type of mapping is designed to provide a minimum data level for the management and planning of aggregate resources in the province and to form a base from which further exploration can proceed.

The Peerless Lake study area is bounded by longitudes 114° and 116° west and latitudes $56^{\circ}30'$ and $57^{\circ}00'$ north. Total area is approximately 4500 km^2 . Only four population centres of approximately 200 residents each are in the area.

ACKNOWLEDGMENTS

Thanks are due to Julian Fox and Dixon Edwards of the Alberta Research Council for suggestions. Campbell Kidston performed the laboratory analyses and Monica Price gave her usual competent assistance in the office.

Funds for the project were provided by Resource Evaluation and Planning Division of Alberta Energy and Natural Resources.

Helicopter time was provided by Alberta Forest Service, Alberta Energy and Natural Resources. Special acknowledgment also is given to the Alberta Forest Service employees in Red Earth for their assistance.

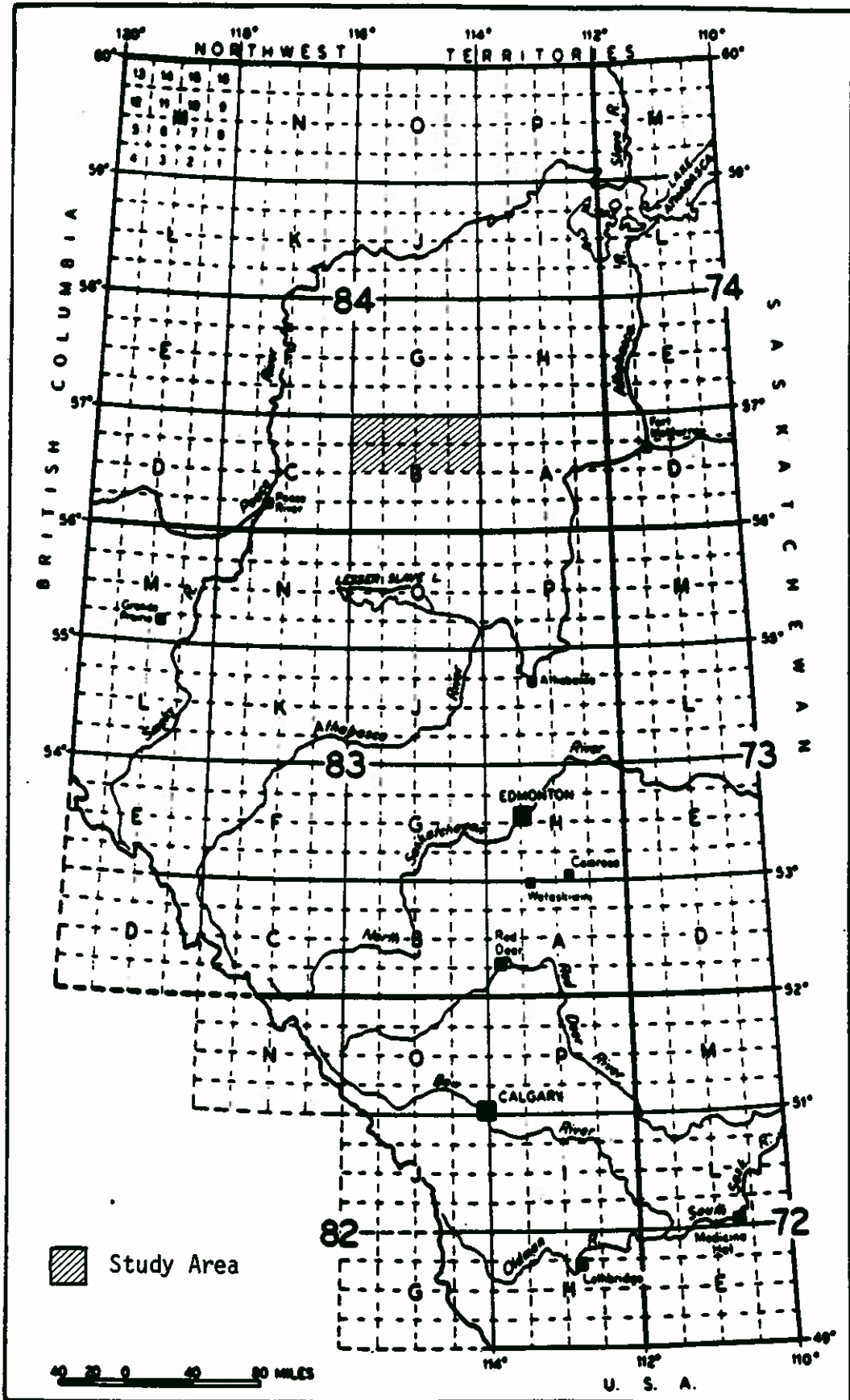


Figure 1. Location Map

Table 1. AGGREGATE INVENTORY MAPPING LEVELS

Format	Reconnaissance Study 5	Enhanced Reconnaissance Study 4	Regional Mapping 3	Detailed Mapping 2	Deposit Evaluation 1
Scale (Common)	1:250,000 (approx. 11x14 townships)	1:250,000 (approx. 11x14 townships)	1:50,000 (approx. 3x3 townships)	1:10,000	1:10,000 or larger
Mapping Methodology	Derived from existing surficial geology information. Aerial photograph interpretation.	Derived from existing surficial geology information. Aerial photograph interpretation. Some field traverses and site examination.	Aerial photograph interpretation Field traverses. Site examinations. Selected deposit testing. Laboratory testing.	Sedimentological studies. Site examination. Deposit testing. Laboratory testing.	Test pitting on an established grid. Hole logging. Materials analysis.
Uses	Broad scale planning. Preliminary aggregate exploration.	Broad scale planning. Preliminary aggregate exploration. Preliminary resource assessment.	Land use planning. Resource management. Resource estimates.	Land management. Reserve estimates. Deposit management.	Deposit evaluation. Development plan preparation.
Comments	Only potential areas suitable for finding deposits shown. Fairly quick and in- expensive to produce.	Potential areas suitable for finding deposits are shown. Some deposits are examined. A map will take 6 months to a year to produce.	Estimates deposit boundaries and gives quality and quantity estimations. A map may take 8 months to a year to produce.	Establishes deposit boundaries. Refines quantity/quality information. Fairly expensive survey.	Precise quality and quantity estimates. Deposit variations identified. Very expensive survey.
Output	2 map sheets per prof-year.	1 map sheet per prof-year.	2 to 3 map sheets per prof-year.	Special projects only.	Special projects only.

METHODS

The study was initiated with the review and compilation of existing information such as water well logs from the Alberta Environment Department and data provided by the Alberta Transportation Department. A preliminary surficial geology map was produced by L.D. Andriashek of the Terrain Sciences Department of the Alberta Research Council prior to field investigation. Additional air photo interpretation of the area was performed by the principal investigators. A number of sites were identified within the map areas as possible locations for sampling or for site descriptions during the field component of the study.

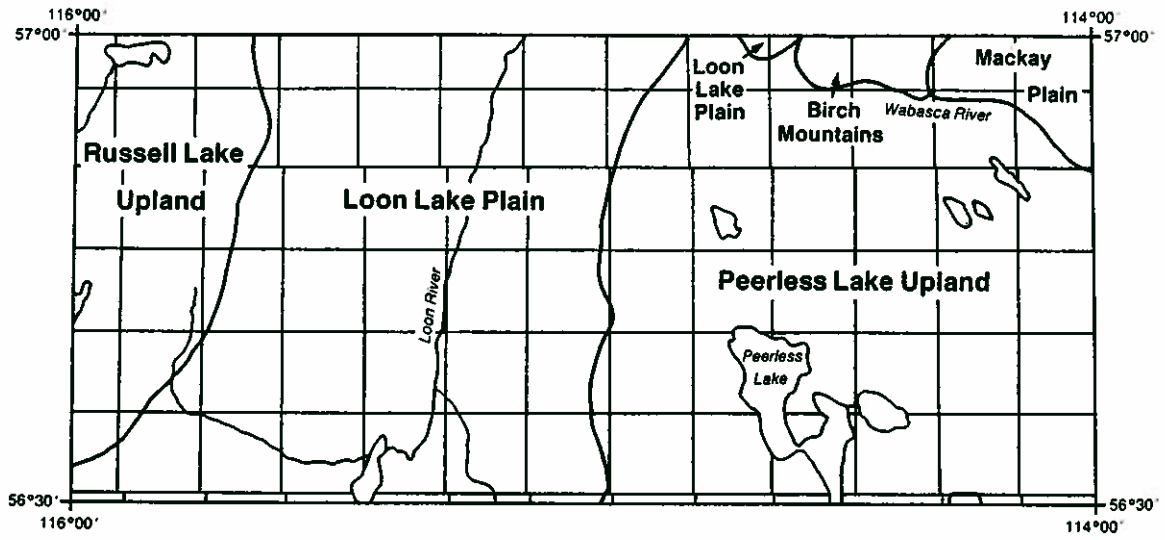
Field work was conducted in June and July, 1986, using truck, three-wheeled motorcycle and helicopter as transport. Access to normal vehicle traffic is very limited. All the most important geological features were located and sampled. Whenever possible, samples were taken for later laboratory analysis. Bulk samples were taken from major deposits. These samples were brought back for grain size, petrographic and physical analysis. A limited number of geophysical traverses using a Geonics EM31 was made to detect buried granular material.

This report is based mainly on surface geological observation, limited field checking and limited laboratory data.

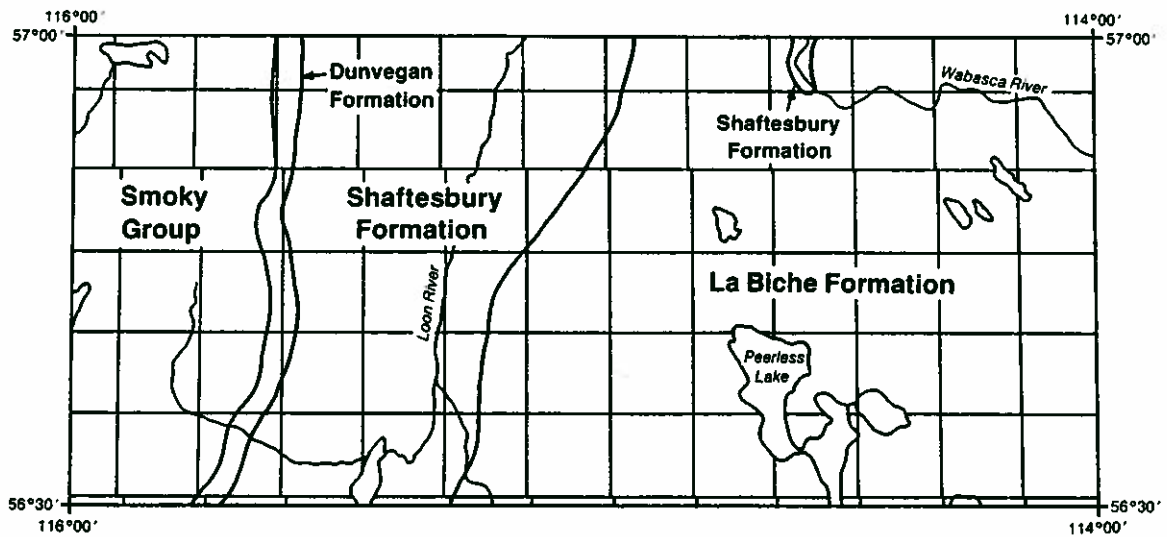
GEOLOGY

Physiography and Bedrock

The map area encloses parts of five major physiographic districts (Pettapiece, 1984). From west to east (Figure 2) the Russell Lake Upland, Loon Lake Plain, Peerless Lake Upland, Birch Mountains and MacKay Plain are represented. The study area is covered primarily by portions of the first three districts. The Caribou Mountains portray that part of the Russell Lake Upland in the study area and maximum elevation of 780 m is in the northwest corner. The Loon Lake Plain, with a minimum elevation of



Physiography (adapted from Pettapiece, unpublished)



Bedrock Geology (Green, 1972)

Figure 2. Physiography and Bedrock Geology of the North Half of Peerless Lake Map Sheet.

approximately 490 m, covers a nearly north-trending band approximately five Ranges wide through the west-central part of the map area. Most of the eastern half of the study area consists of the Peerless Lake Upland with maximum elevation of 790 m. Approximately three Ranges in the northeastern corner are part of the MacKay Plain and approximately one and one-half Ranges immediately to the west are part of the Birch Mountains physiographic district.

Bedrock (Figure 2) is of Cretaceous age (Green, 1972). That part of the Russel Lake Upland in the study area is underlain by dark gray marine shales of the Smoky Group. The Loon Lake Plain is underlain by a thin band of the gray, deltaic sandstone, siltstone and shale of the Dunvegan Formation and the much wider band of dark gray marine shale of the Shaftsbury Formation. The remainder of the map area is underlain by the dark gray marine shale of the La Biche Formation.

Surficial Geology

No detailed studies are available on the surficial geology of the study area. The description of surficial material is based on a preliminary surficial geology map, some detailed air photo interpretation and field ground checks, combined with water well and Alberta Transportation data.

Glaciation, the latest major geological event throughout this area, was followed by a period of erosion and deposition which determined the general contour of much of the present surface. During glacial events in Pleistocene time, abundant unconsolidated material was deposited. The predominant surficial material is till, a mixture of clay, silt, sand and gravel, composed mainly of material derived from the local bedrock with additional material from as far away as the Precambrian Shield. Hummocky topography is common in the till and elevation changes are small. Swamps usually occupy the low areas. Glacial flutings in till in the southwest portion of the map area suggest dominant ice movement during glaciation from northeast to southwest.

Ice contact features such as kames and eskers are rare. A few are scattered in the northwest corner of the map area.

Eolian sands, probably derived from local surficial material, cover extensive areas in the northeast corner of the map area.

Glaciofluvial deposits generally are uncommon. Sand and gravel materials are associated with meltwater channels and outwash features scattered in the western portion of the study area and along a north trend in Range 6. One terrace along the Wabasca River exposes moderate amounts of gravel (P1.1).

No recent alluvium deposits of aggregate quality are associated with the present river system in the area.

SAND AND GRAVEL RESOURCES

Gravel and sand deposits in the area are not abundant and they are distributed unevenly. Deposit, pit, site and/or sample locations are shown in figure 3 (in pocket). Evaluation of the aggregate resources in the study area are given in figure 4 (in pocket). Deposit, pit and site descriptions and laboratory data are in Appendix 1. Deposits with potential require further investigation and this is noted in the descriptions in Appendix 1.

The gravel and sand bearing deposits are classified on the basis of origin into the three major types listed below:

1. Glaciofluvial deposits
2. Glaciolacustrine deposits
3. Recent deposits

1. Glaciofluvial Deposits

The glaciofluvial deposits are the most widespread within the study area (Figure 4) and are the major source of sand and gravel. Glaciofluvial deposits are by nature highly variable in composition and extent. The

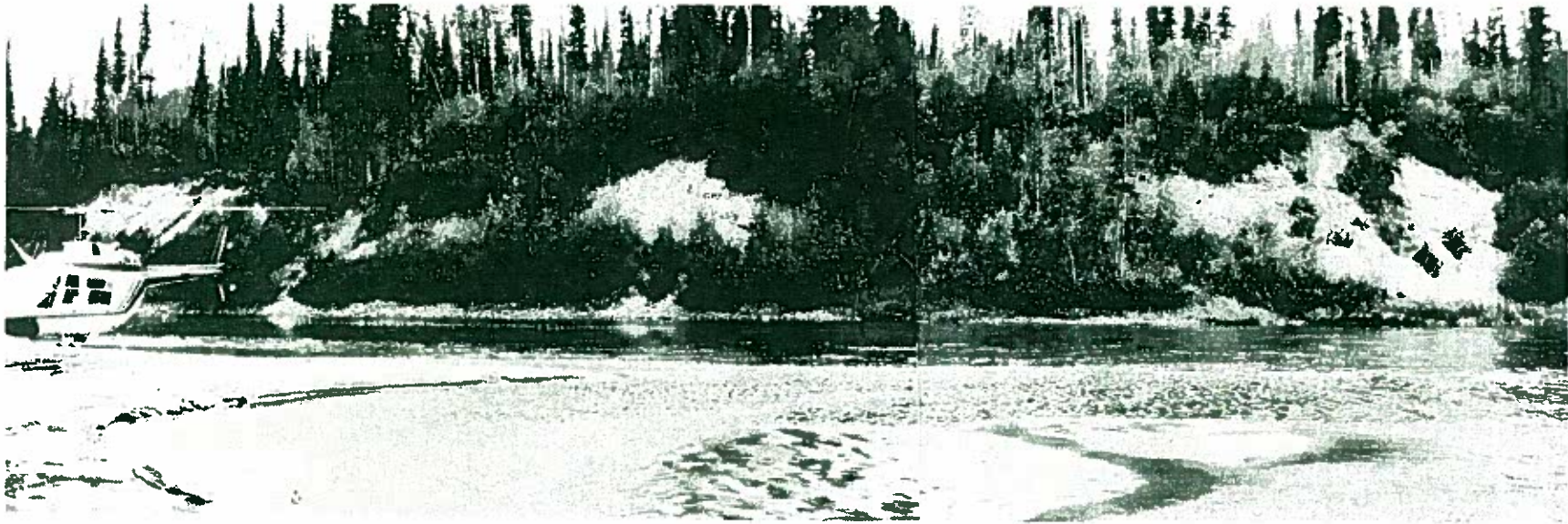


Plate 1: Terrace (Deposit 13) on the south bank of the Wabasca River that, when viewed from the north bank, seems to contain appreciable gravel. Gravel exposures are rare in the area.

major rock components are igneous and metamorphic rocks from the Precambrian Shield, quartzite and local bedrock. Other major sand and gravel deposits are kame, esker and meltwater channel features located in the northwest corner of the map area, scattered in the east half and concentrated along a line through Range 6 from Township 87 to 91.

2. Glaciolacustrine Deposits

A beach deposit of dirty, oxidized, gravelly sand is located north of an unnamed lake in NE36-89-4-W4.

3. Recent Deposits

There is no major drainage system within the study area. Most of the present streams have deposits of only silty or sandy material with minor amounts of dirty gravel derived from local till. Even the Wabasca River, the only major river, passes through the northeast corner of the map area without depositing gravels. Dunes of fine-grained sand are present in a three Township region north and south of the Wabasca River in the northeastern corner of the map area. These dunes probably were derived from wind-reworked glaciofluvial material as the glaciers melted.

BIBLIOGRAPHY

1. Ceroici, W. (1979): Hydrogeology of the Peerless Lake area, Alberta; Earth Science Report 79-5; Edmonton: Alberta Research Council.
2. Green, R. (1972): Geological Map of Alberta; Edmonton: Alberta Research Council.
3. Leskiw, L.A. (1976): Soil Survey and Interpretations Peerless-Graham Lakes Area; Alberta Institute of Pedology Report No. M-76-2.
4. Lindsay, J.D., Heringa, P.K., Pawluk, S. and Odynsky, W. (1957): Exploratory Soil Survey of Alberta Map Sheets 84-C (east half), 84-B, 84-A and 74-D; Preliminary Soil Survey Report 58-1; Edmonton: Alberta Research Council.
5. Lindsay, J.D. and Odynsky, W. (1965): Permafrost in Organic Soils of Northern Alberta; Canadian Journal of Soil Science, 45, pp. 265-269.
6. Pettapiece, W. (1984): Physiographic Map of Alberta. Source: Agriculture Canada. Unpublished.

APPENDIX 1
DEPOSIT AND SITE DESCRIPTION

DEPOSIT NO. 1

LOCATION: Sec 30,31 Tp87 R11 W5M
Sec 6,7,8,17,18 Tp87 R12 W5M
Sec 1 Tp87 R13 W5M

No. of associated pits/sites: Flyover

No. of samples analysed: None

DEPOSIT DESCRIPTION:

Glaciofluvial sand that probably is fine to medium in grain size. Material is discontinuous and may only be a veneer. Overburden appears to be minor and the water table likely is high. Access is poor.

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DEPOSIT NO. 2

LOCATION: Sec 2-4, 8-11, 16,17, 19-21, 29-32 Tp89 R12 W5M
Sec 9,10, 14-16, 21-28, 35,36 Tp89 R13 W5M
Sec 5,6 Tp90 R12 W5M
Sec 1,2 Tp90 R13 W5M

No. of associated pits/sites: 1 site

No. of samples analysed: None

DEPOSIT DESCRIPTION:

Discontinuous, mainly fine sand, overlying till. High water table.

Site Location: Sec N19 Tp89 R12 W5M

Site Description:

Thick, discontinuous deposit of glaciofluvial fine sand. Overburden is minor and the groundwater table likely is high. Access is poor.

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DEPOSIT NO. 3

LOCATION: Sec 8,9, 15-17, 21-25, 27,28, 33-35 Tp90 R12 W5M

No. of associated pits/sites: 1 site

No. of samples analysed: 1

DEPOSIT DESCRIPTION:

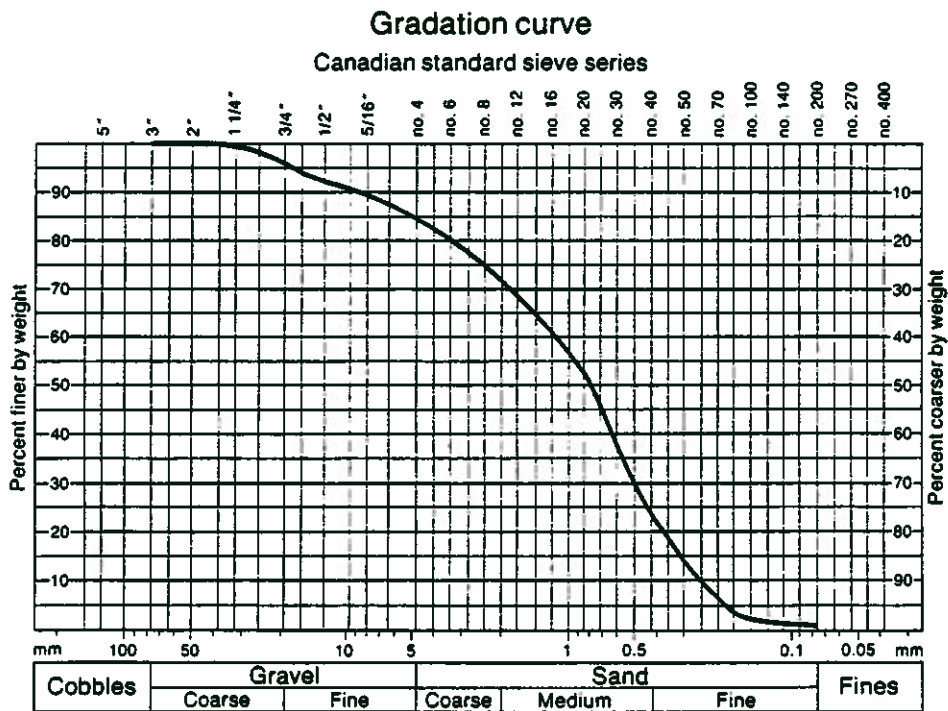
Mainly sand, interspersed amongst organic areas.

Site Location: Sec NE8 Tp90 R12 W5M

Site Description:

Approximately 2 m of glaciofluvial medium to coarse sand with 15 to 20% gravel. Clasts are to 5 cm size. Till overburden is 1 m thick. Access is poor.

Gradation: 0% cobbles 16.1% gravel
82.5% sand 1.4% fines



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DEPOSIT NO. 4

LOCATION: Sec 15,22 Tp91 R13 W5M

No. of associated pits/sites: 1 site

No. of samples analysed: 1

DEPOSIT DESCRIPTION:

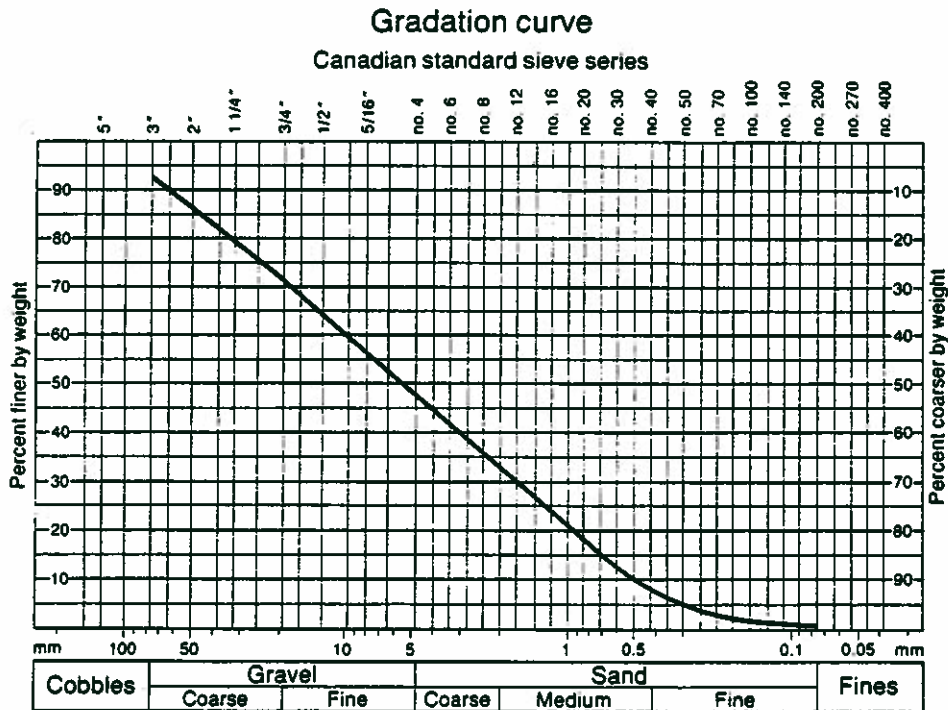
Terraces of the Little Cadotte River. Sand and gravel are present but no ground access is available at present. Little information is available.

Site Location: Sec NE15 Tp91 R13 W5M

Site Description:

Glaciofluvial, clean sand and gravel terrace with no overburden and cobbles to 20 cm size. Gravel forms approximately 50% of the material. Sand ranges primarily from medium to coarse and fines concentration is low. Water table appears to be low.

Gradation: 8.5% cobbles 45.3% gravel
45.3% sand 0.9% fines



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DEPOSIT NO. 5

LOCATION: Sec 12,13 Tp92 R13 W5M

No. of associated pits/sites: None

No. of samples analysed: None

DEPOSIT DESCRIPTION:

Probably glaciofluvial sand.

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DEPOSIT NO. 6

LOCATION: Sec 14,23,24 Tp91 R12 W5M
Sec 27,34 Tp91 R12 W5M
Sec 3,4 Tp92 R12 W5M
Sec 11 Tp92 R12 W5M
Sec 14,24 Tp92 R12 W5M
Sec 21 Tp92 R5 W5M
Sec 17,20,29 Tp88 R3 W5M
Sec 25,26,35,36 Tp87 R12 W5M
Sec 29,31,32 Tp87 R2 W5M

No. of associated pits/sites: 1 site

No. of samples analysed: 1

DEPOSIT DESCRIPTION:

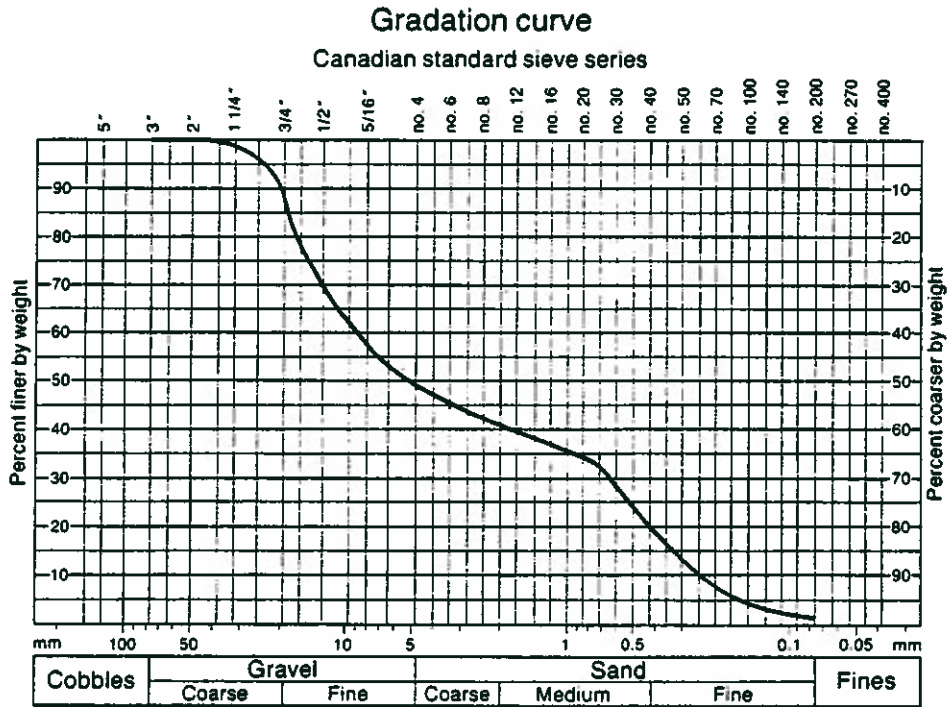
A number of scattered ice contact esker-like ridges with potential for sand and gravel. No ground access at present and not field checked.

Site Location: Sec S34 Tp91 R12 W5M

Site Description:

A glaciofluvial esker, 3-4 m above the swamp, consists of clean, fine to coarse sand with 5-10% pebbles to 5 cm size. A few boulders to 60 cm size also are present. Overburden is nil to minor.

Gradation: 0% cobbles 52.1% gravel
45.8% sand 2.1% fines



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DEPOSIT NO. 7

LOCATION: Sec 28,29,31 Tp90 R11 W5M

No. of associated pits/sites: 1

No. of samples analysed: 1

DEPOSIT DESCRIPTION:

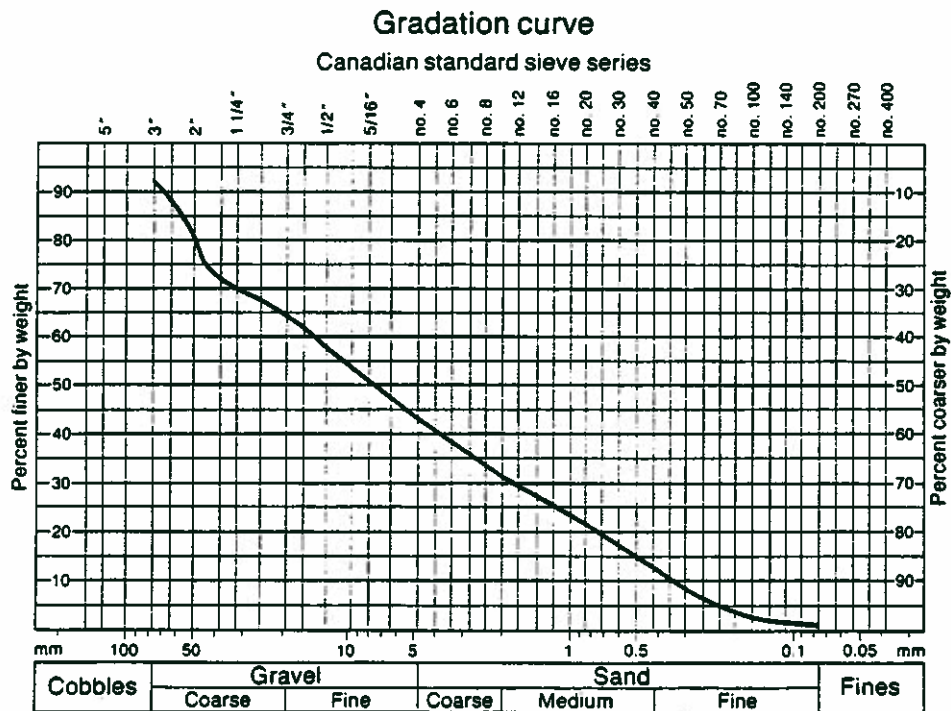
Very small deposit that has no expression on the air photos. See site description.

Site Location: Sec NE29 Tp90 R11 W5M

Site Description:

Roadcut exposure of glaciofluvial gravel below 1.5 m till overburden. Material is dirty, quite coarse, clasts tend to be angular and bedding is massive. Access is excellent along a main road.

Gradation: 0% cobbles 57.0% gravel
41.6% sand 1.4% fines



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DEPOSIT NO. 8

LOCATION: Sec 15,21,22,27,28 Tp90 R11 W5M

No. of associated pits/sites: 1 pit, 2 sites

No. of samples analysed: 2

DEPOSIT DESCRIPTION:

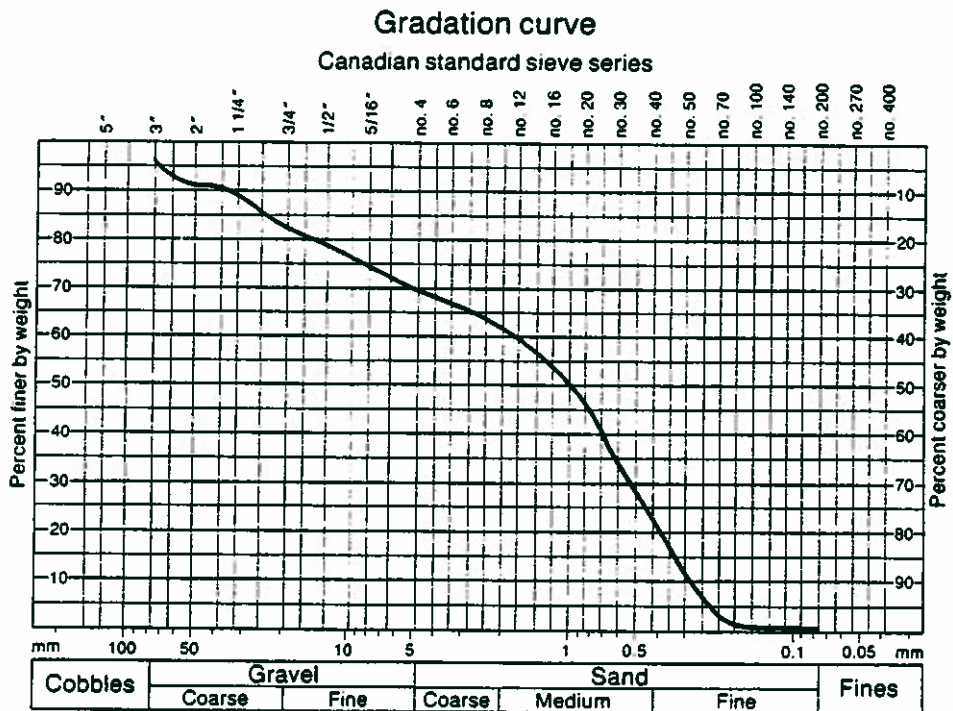
A glaciofluvial esker complex composed of oxidized sand or dirty to clean gravelly sand. Maximum deposit thickness is 14 m. Maximum clast concentration is 30% of subangular to subrounded clasts to 5 cm diameter. Clasts are composed of igneous rocks from the Canadian Shield, quartzite and some sandstone. Deleterious clasts include schist, coal, gneiss and ironstone. Overburden is 15 cm to 1 m thick.

Site Location: Sec SE22 Tp90 R11 W5M

Site Description:

An esker composed of dirty to clean gravelly sand. Ridges are up to 14 m high. This roadcut exposure shows some dirty fine sand layers on the east end. There is more gravel on the west end and this appears to be cleaner. The overburden varies from 15 cm to 1 m and the water table is unknown. Clasts are up to 5 cm in diameter and consist predominantly of quartzite, igneous rocks from the Canadian Shield, sandstone and some deleterious material (schist, coal, gneiss, ironstone). Clasts are subrounded to subangular. Carbonate coats some clasts.

Gradation: 0% cobbles 30.9% gravel
69.0% sand 0.1% fines

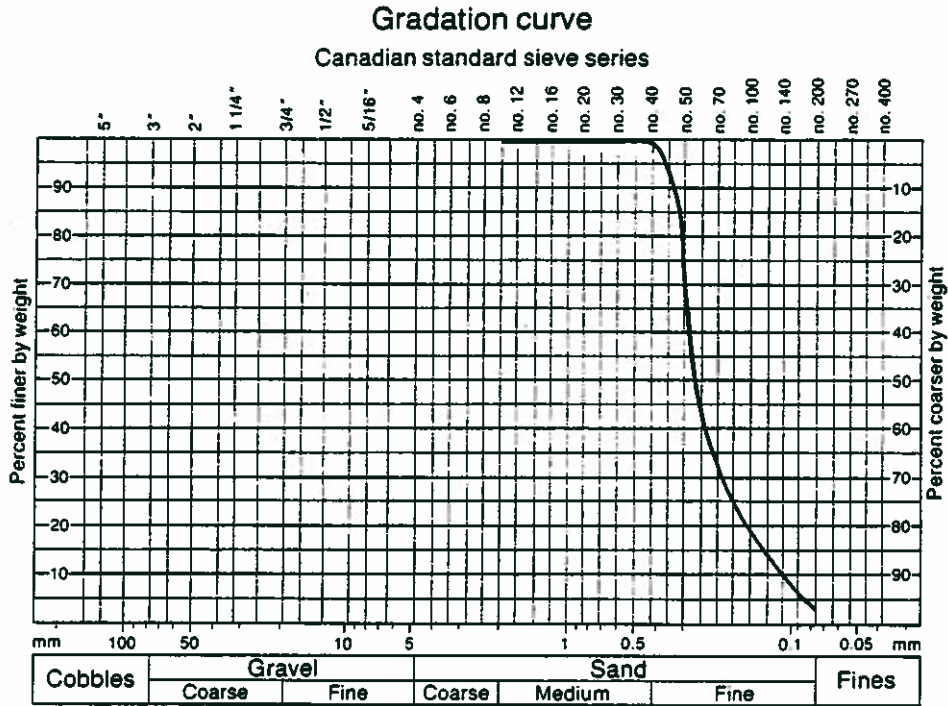


Site Location: Sec SE28 Tp90 R11 W5M

Site Description:

An esker composed of dirty to clean gravelly sand. Ridges are up to 7.5 m high. Thickness of a sand layer exposed along section is 3 m by 2 m. Sample is taken from parallel-bedded sand only.

Gradation: 0% cobbles 0% gravel
96.9% sand 3.0% fines



Site Location: Sec SE22 Tp90 R11 W5M

Site Description:

Glaciofluvial material similar to NW14-90-11-W5M.

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DEPOSIT 9

LOCATION: Sec 14,15,22,23,26,27 Tp90 R11 W5M

No. of associated pits/sites: 1 site

No. of samples analysed: 1

DEPOSIT DESCRIPTION:

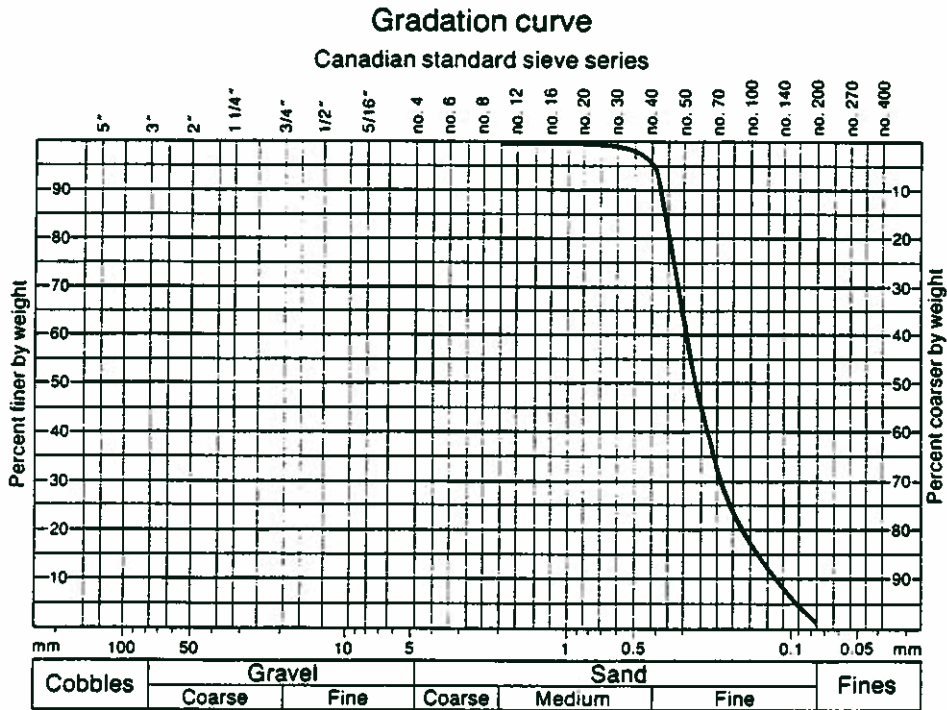
Meltwater channel deposit of sand.

Site Location: Sec NW14 Tp90 R11 W5M

Site Description:

Approximately 8 m of glaciofluvial sand is exposed beneath 15 cm of overburden. The sand is crossbedded and highly oxidized. Clasts to 2.5 cm compose approximately 1% of the material and consist of angular igneous rocks from the Canadian Shield, quartzite and chert.

Gradation: 0% cobbles 0% gravel
98.2% sand 1.5% fine



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DEPOSIT NO. 10

LOCATION: Sec 5,7,8,9,17,18 Tp90 R10 W5M

No. of associated pits/sites: 1 site

No. of samples analysed: None

DEPOSIT DESCRIPTION:

See site description.

Site Location: Sec SW8 Tp90 R10 W5M

Site Description:

Glaciofluvial, clean, fine sand veneer over till. Current access is along a cutline.

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DEPOSIT NO. 11

LOCATION: Sec 13,24 Tp89 R11 W5M

No. of associated pits/sites: None

No. of samples analysed: None

DEPOSIT DESCRIPTION:

Discontinuous sand showings amongst bogs. Not field checked.

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DEPOSIT NO. 12

LOCATION: Sec 14 Tp91 R11 W5M

No. of associated pits/sites: None

No. of samples analysed: None

DEPOSIT DESCRIPTION:

Isolated hillock with a potential for sand and gravel. Not field checked.

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DEPOSIT NO. 13

LOCATION: Sec 10-17,19-21,25-30,36 Tp91 R1 W5M
Sec 25 Tp91 R2 W5M
Sec 1-5,10-17,20-23,27 Tp92 R1 W5M
Sec 8,9,16,17 Tp92 R7 W5M

No. of associated pits/sites: None

No. of samples analysed: None

DEPOSIT DESCRIPTION:

Dune sand, flown over in helicopter. Probably fine to medium grained.

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DEPOSIT NO. 14

LOCATION: Sec 31 Tp91 R5 W5M
Sec 6,16,17,21 Tp92 R5 W5M
Sec 1,12 Tp92 R6 W5M

No. of associated pits/sites: 1 site

No. of samples analysed: 1

DEPOSIT DESCRIPTION:

Eskers, low ridges of sand.

Site Location: Sec NW31 Tp91 R5 W5M

Site Description:

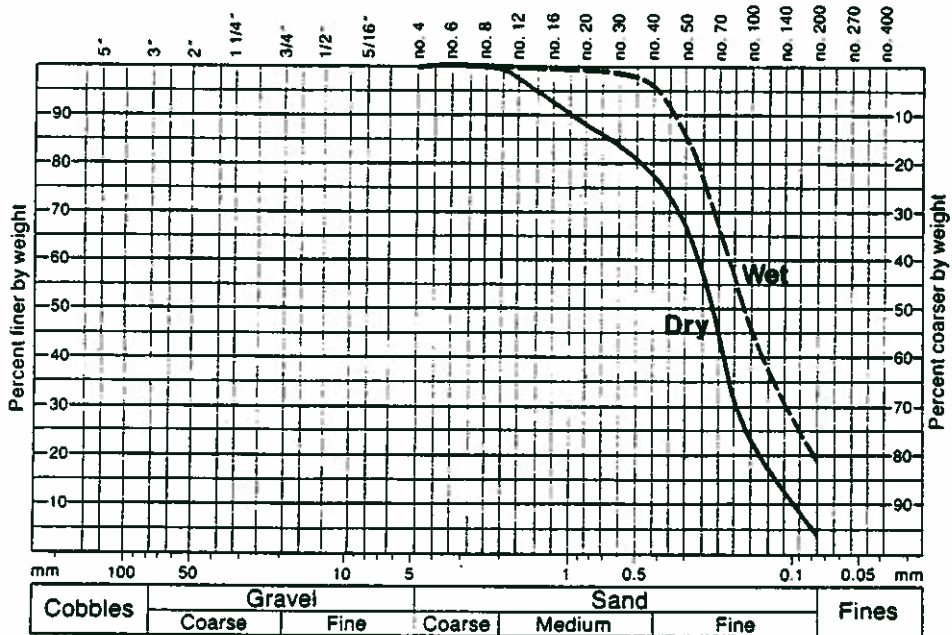
Esker structure with dirty fine to medium grained sand. The area is undulating, with 5 m high crests.

Gradation: 0% cobbles 1.0% gravel dry Sieve
94.7% sand 4.3% fines

0% cobbles 0.2% gravel wet Sieve
81.4% sand 18.4% fines

Gradation curve

Canadian standard sieve series



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DEPOSIT NO. 15

LOCATION: Sec 23,24 Tp92 R4 W5M

No. of associated pits/sites: 2 sites

No. of samples analysed: 1

DEPOSIT DESCRIPTION:

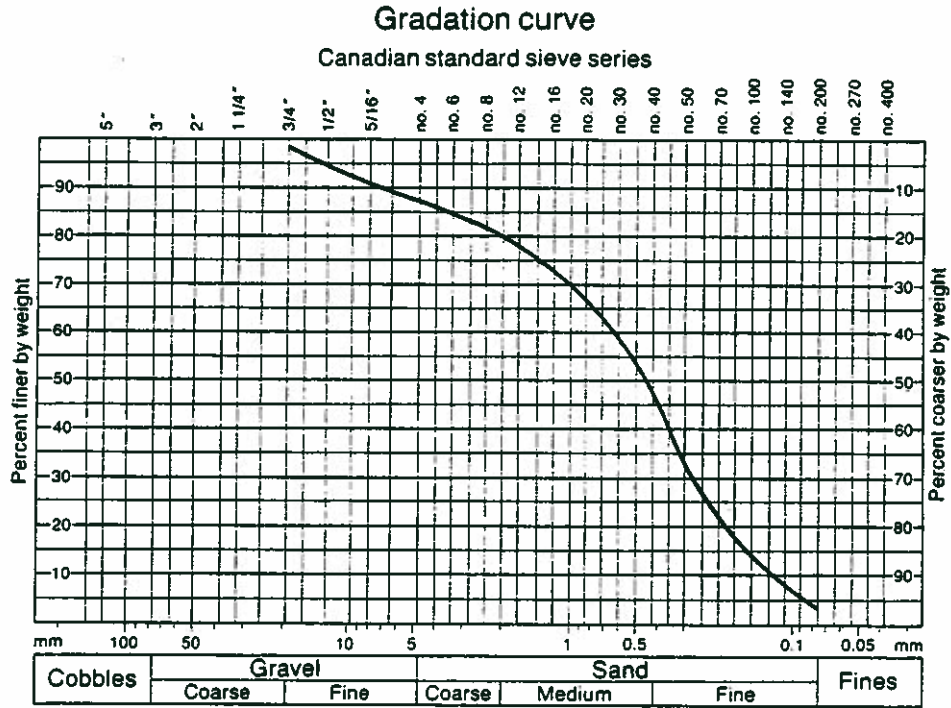
No deposit discernible on air photos. See site descriptions.

Site Location: SE 24 Tp92 R4 W5M

Site Description:

Fine, oxidized sand, 4.5 m thick with a few angular clasts of igneous rocks from the Canadian Shield and limestone. Overburden is 1 m thick.

Gradation: 0% cobbles 13.0% gravel
83.6% sand 3.4% fines



Site Location: Sec SE23 Tp92 R4 W5M

Site Description:

Dirty, fine, meltwater channel sand, less than 3 m thick.

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DEPOSIT NO. 16

LOCATION: Sec 26,34-36 Tp91 R2 W5M
Sec 25-27,31,33-36 Tp91 R3 W5M
Sec 26,33-35 Tp91 R4 W5M
Sec 4-7 Tp92 R2 W5M
Sec 1,4-6 Tp92 R3 W5M
Sec 4,5,8 Tp92 R4 W5M

No. of associated pits/sites: 3 sites

No. of samples analysed: 1

DEPOSIT DESCRIPTION:

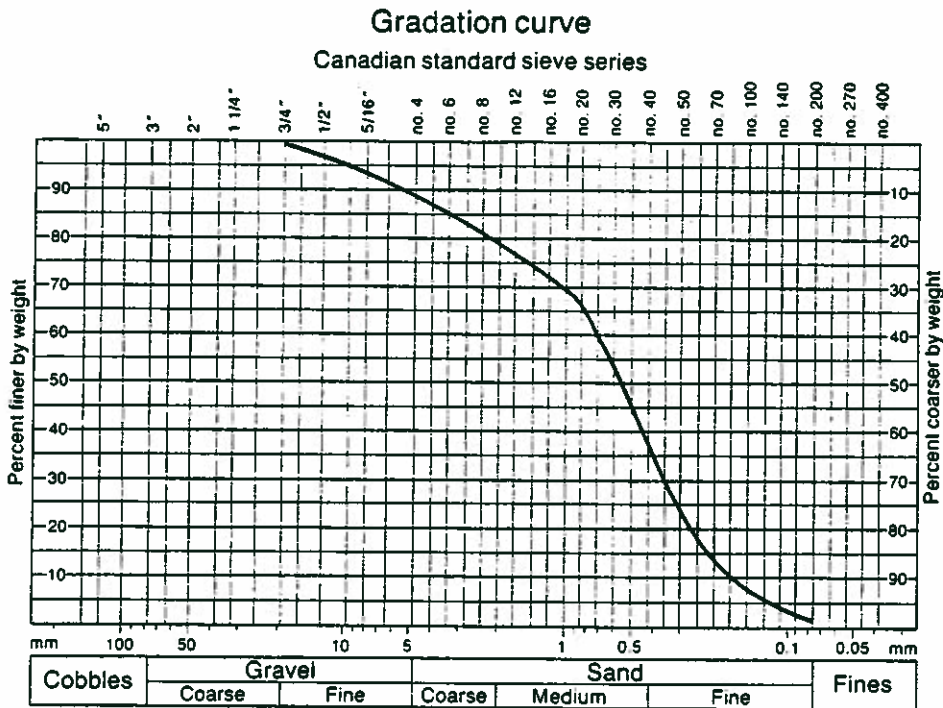
Glaciofluvial terraces along the Wabasca River. Observed materials range from sand to gravel but most deposits appear to be sand in the air photos. In S31-91-1-W5 a 10 m bank of gravel and sand (Plate 1) needs to be ground checked.

Site Location: Sec NW34 Tp91 R3 W5M

Site Description:

High glaciofluvial terrace of sand to gravelly sand. Over 80% sand. There are few boulders on the surface. Clasts consist of igneous rocks from the Canadian Shield and hard sandstone. The overburden is less than 30 cm thick and the water table is unknown.

Gradation: 0% cobbles 11.9% gravel
86.4% sand 1.7% fines



Site Location: SE34 Tp91 R3 W5M

Site Description:

Terrace on north bank of Wabasca River. Material is highly oxidized and similar to that of the high terrace at location NW34-91-3-W5M.

Site Location: Sec S31 Tp91 R1 W5M

Site Description:

Landed on north side of the Wabasca River across from an inaccessible outcrop of gravel, about 10 m high (Plate 1). Maximum clast size seems to be about 15 cm. The deposit should be ground checked because the material appears to be the best available in the northeast corner of the map sheet.

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DEPOSIT NO. 17

LOCATION: Sec 11,13,14,15 Tp90 R3 W5M

No. of associated pits/sites: 2 pits, 2 sites

No. of samples analysed: 2

DEPOSIT DESCRIPTION:

Apparent glaciofluvial materials that seem to have been modified into scattered pockets by ice push. No deposit can be delineated in the air photos. See site descriptions.

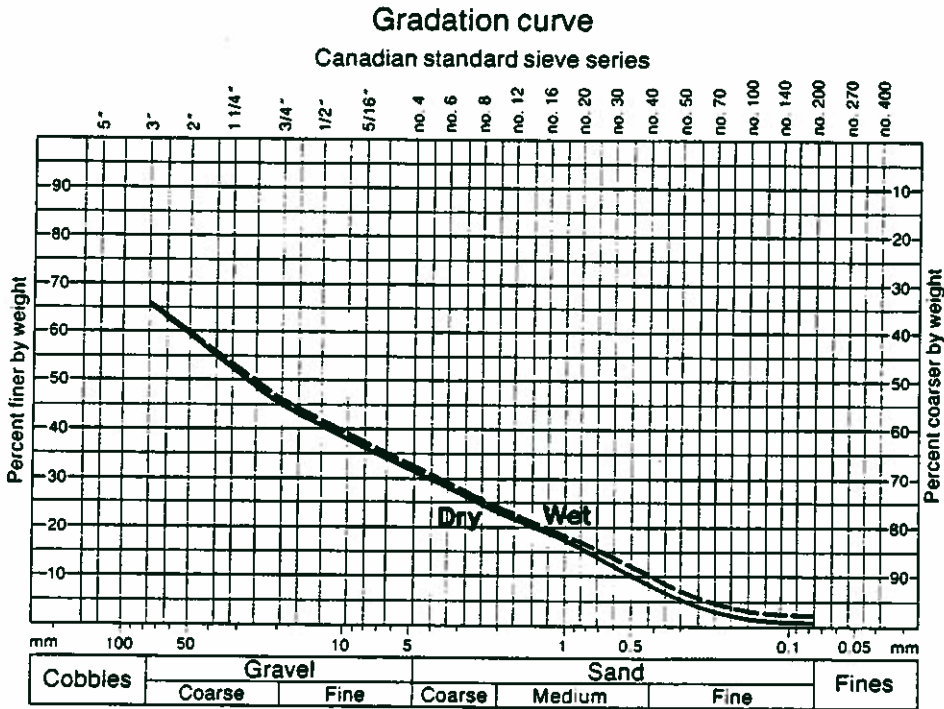
Site Location: Sec SE13 Tp90 R3 W5M

Site Description:

Inactive pit containing very dirty, glaciofluvial material. Gravel constitutes approximately 90% of the deposit. Clasts to 60 cm are common. Clasts are composed primarily of igneous rocks from the Canadian Shield with hard sandstones, chert, metamorphic rocks, ironstone and local bedrock less abundant. Clasts are angular to subrounded and poorly sorted. Both cross and parallel bedding are present. The material is highly oxidized, carbonate coating is common and local faulting is evident. Material is 4.5 to 14 m thick beneath overburden to 60 cm. Sand lenses are interbedded with gravel locally. Water table depth is unknown. Crushing and washing will be necessary for most uses.

Gradation: 33.9% cobbles 33.9% gravel wet sieve
29.8% sand 2.4% fines

34.0% cobbles 34.0% gravel dry sieve
31.3% sand 0.7% fines

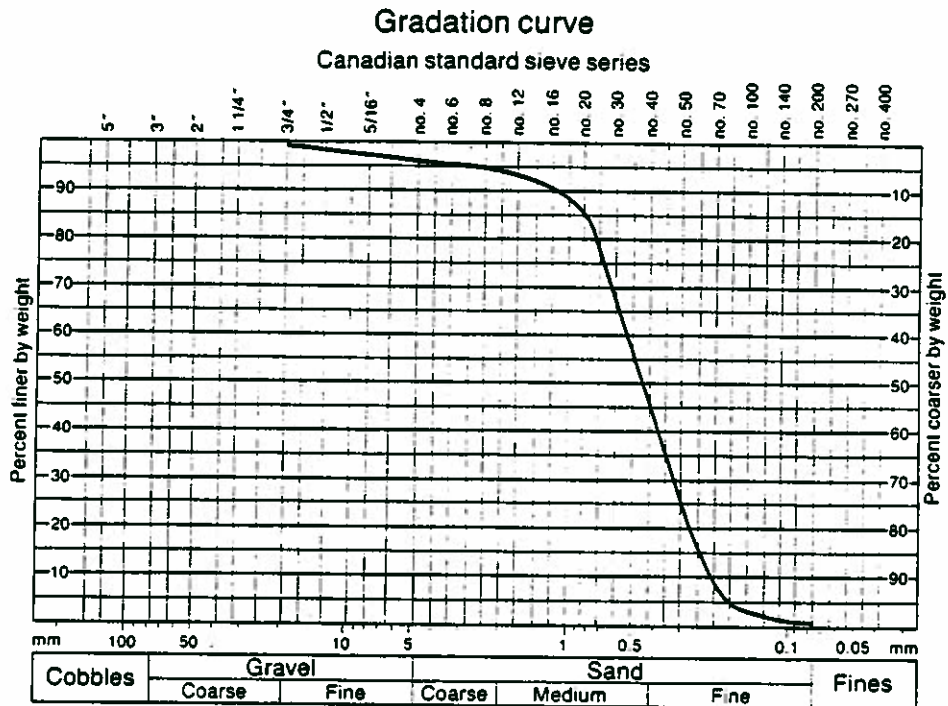


Site Location: Sec SW14 Tp90 R3 W5M

Site Description:

Meltwater channel sand. Medium to fine grained, with few pebbles. No overburden. Very high water table.

Gradation: 0% cobbles 4.8% gravel
94.7% sand 0.5% fines



Pit Location: Sec NW15 Tp90 R3 W5M

Pit Description:

Depleted and reclaimed pit.

Site Location: Sec NE11 Tp90 R3 W5M

Site Description:

Glaciofluvial sand, medium grained, oxidized.

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DEPOSIT NO. 18

LOCATION: Sec 36 Tp89 R4 W5M
Sec 6 Tp90 R3 W5M

No. of associated pits/sites: 2 pits

No. of samples analysed: None

DEPOSIT DESCRIPTION:

No deposit is apparent on the air photos. See pit descriptions.

Pit Location: Sec SW6 Tp90 R3 W5M

Pit Description:

Glaciofluvial reclaimed pit, very sandy area.

Pit Location: Sec NE36 Tp89 R4 W5M

Pit Description:

Glaciofluvial, partly reclaimed pit. A thin layer of oxidized, dirty, gravelly sand is exposed. Water table is unknown. There appears to be some gravelly sand remaining in the trees.

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DEPOSIT NO. 19

LOCATION: Sec 18,19,20,29,30 Tp91 R5 W5M

No. of associated pits/sites: None

No. of samples analysed: None

DEPOSIT DESCRIPTION:

Ice contact features with potential for sand and gravel. Not field checked.

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DEPOSIT NO. 20

LOCATION: Sec 31 Tp86 R5 W5M

Sec 1,11,12,13,23,24,27,28,33,34 Tp87 R6 W5M

Sec 4,16,20,21,22,27,28,33 Tp88 R6 W5M

Sec 3,4,10,14,15,21,22,27,34 Tp89 R6 W5M

Sec 2,3,10,11,14,15,22,23,24,25,26,35 Tp90 R6 W5M

No. of associated pits/sites: 2 pits, 6 sites

No. of samples analysed: 2

DEPOSIT DESCRIPTION:

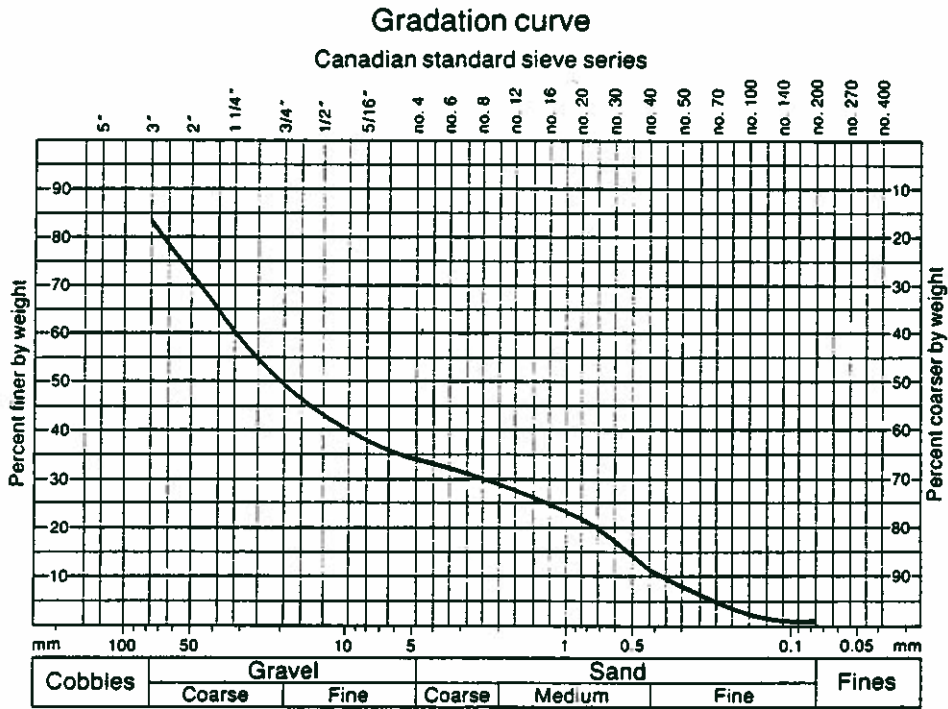
A string of meltwater channel deposits containing material ranging in size from cobbles to fine sand. In general, material decreases in size from north to south. Gravel exploration should be concentrated primarily north of the Trout Mountain road.

Pit Location: Sec SE27 Tp89 R6 W5M

Pit Description:

Active pit near secondary highway, in meltwater channel. The material varies from gravel to sand between sections. Thickness commonly is 3 m-4.5 m. Water table is variable but 4.5 m below the surface is common. Overburden varies from 15 to 60 cm. There are cobble layers in some sections with some cobbles up to 60 cm diameter. There is a high percentage of igneous rocks from the Canadian Shield, plus lesser amounts of hard sandstone, ironstone and weathered schist. Carbonate coating is common.

Gradation: 16.5% cobbles 49.7% gravel
32.6% sand 1.2% fines



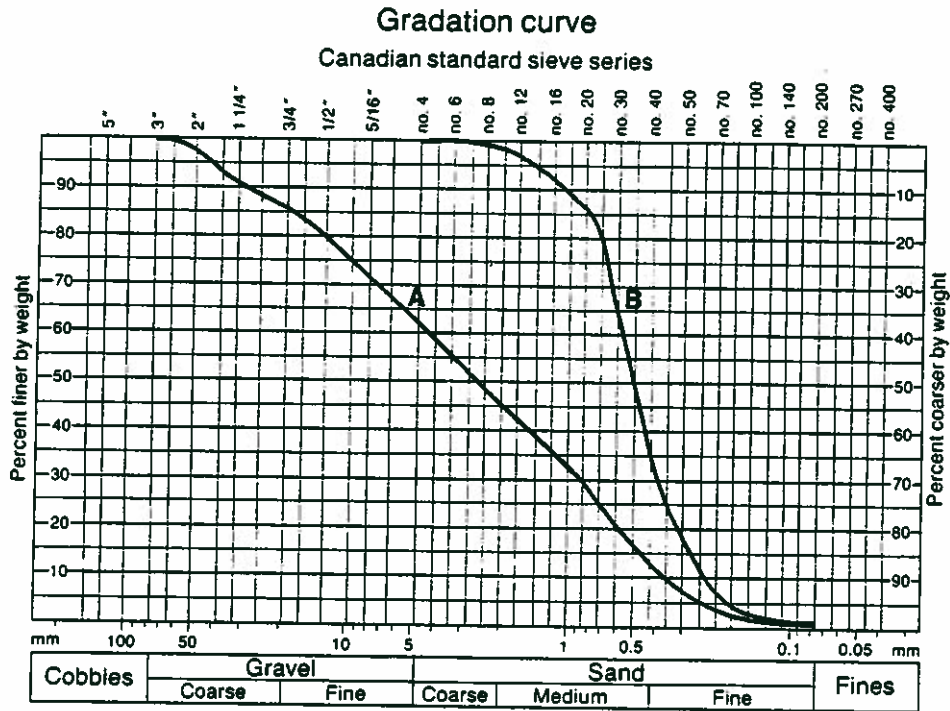
Site Location: Sec SW33 Tp88 R6 W5M

Site Description:

Primarily medium to coarse sand 4-5 m thick grading to coarse sand with 5-10% clasts to 10 cm size.

Gradation: 0% cobbles 37.9% gravel Sample A
61.1% sand 1.0% fines (contains clasts)

0% cobbles 0% gravel Sample B
98.2% sand 1.8% fines (representative of deposit)



Site Location: Sec SE26 Tp90 R6 W5M

Site Description:

Sandy slope over till near corner of roadcut.

Site Location: Sec SE35 Tp90 R6 W5M

Site Description:

Sandy gravel, very similar to material at active pit in SE27-89-6-W5M. Very high water table.

Pit Location: Sec NW2 Tp90 R6 W5M

Pit Description:

Inactive pit in meltwater channel deposit. No overburden, material very similar to that of pit at SE27-89-6-W5M. Cobbles and boulders are common. The water table is very high, about 0.3 m below the surface, and the material has been extracted from below the water table.

Site Location: Sec SW11 Tp90 R6 W5M

Site Description:

Exposure of gravelly sand over sand. Over 85% sand with clasts up to 7 cm in diameter. Highly oxidized and massive in structure.

Site Location: Sec S14 Tp90 R6 W5M

Site Description:

Meltwater channel deposit showing gravelly slope with boulders present.

Site Location: Sec N14 Tp90 R6 W5M

Site Description:

Roadcut section exposing channel sand, medium to fine grained with pebbles.

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DEPOSIT NO. 21

LOCATION: Sec 15,22,27 Tp88 R6 W5M
Sec 3,10,15 Tp89 R6 W5M

No. of associated pits/sites: 1 site

No. of samples analysed: 1

DEPOSIT DESCRIPTION:

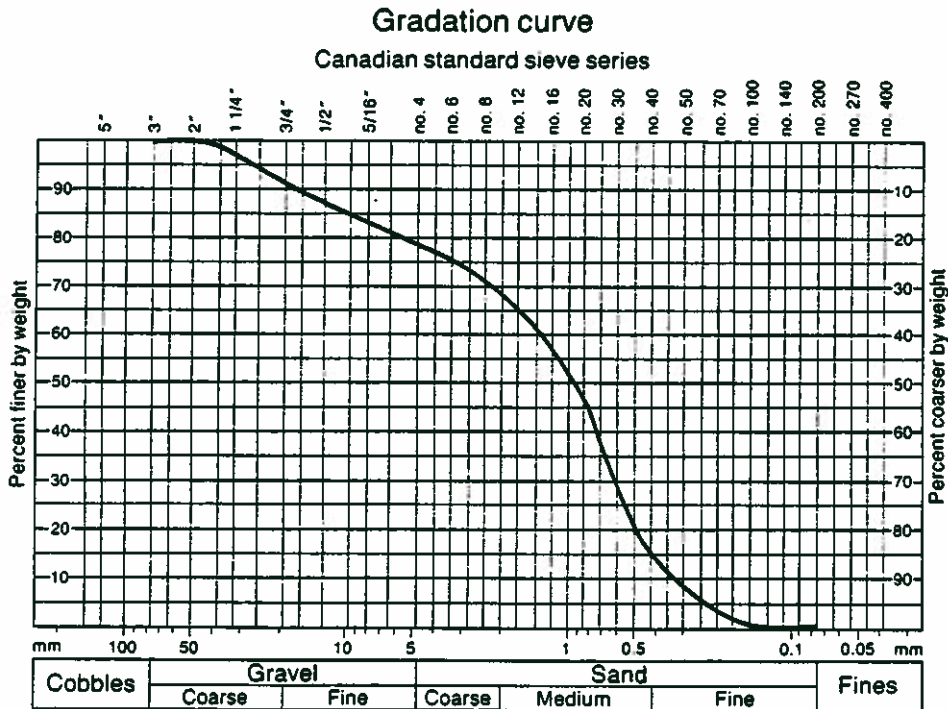
Eskers. See site description.

Site Location: Sec S15 Tp89 R6 W5M

Site Description:

Esker approximately 15-20 m high containing medium sand with less than 5% pebbles.

Gradation: 0% cobbles 21.7% gravel
77.7% sand 0.6% fines



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DEPOSIT NO. 22

LOCATION: Sec 31 Tp87 R2 W5M
Sec 18,19,25,26,34,35 Tp87 R2 W5M
Sec 13,23,24,25,26,35,36 Tp87 R3 W5M
Sec 2,3,5,6,7,8,10,11,12,13,14,15,17,18,22,23,24,27 Tp87 R5 W5M
Sec 1,12 Tp87 R6 W5M

No. of associated pits/sites: None

No. of samples analysed: None

DEPOSIT DESCRIPTION:

Scattered areas of sand veneer over till. Not field checked.

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DEPOSIT NO. 23

LOCATION: Sec 34,35 Tp86 R2 W5M
Sec 18 Tp87 R1 W5M
Sec 2,11,12,13 Tp87 R2 W5M

No. of associated pits/sites: 2 sites

No. of samples analysed: 1

DEPOSIT DESCRIPTION:

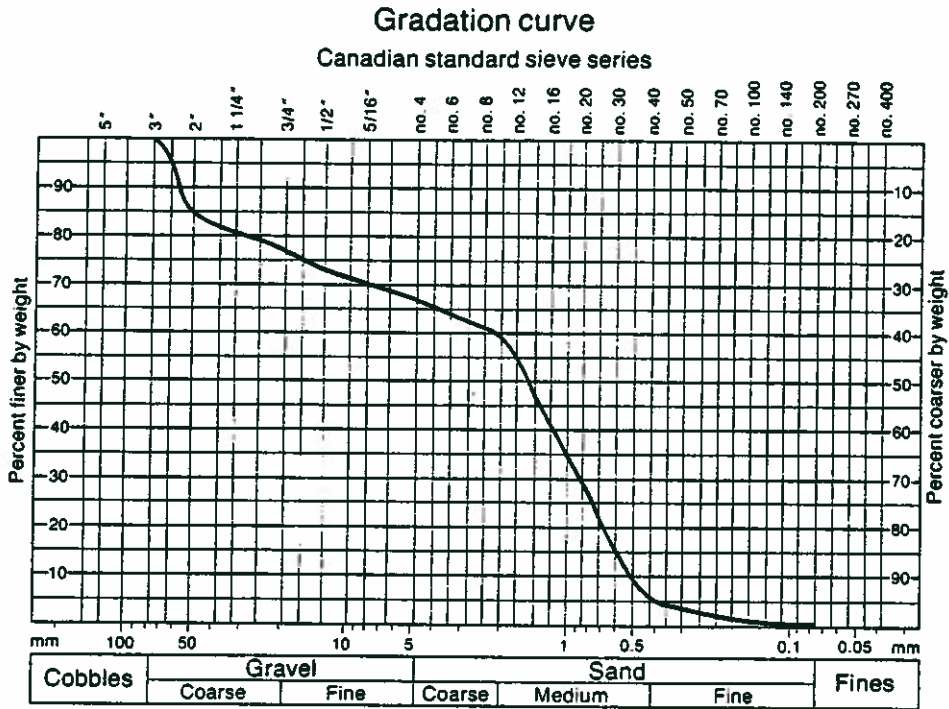
Ice contact esker composed mainly of sand with 15-20% gravel at the south end. The feature has less topographic expression at the north end and the material is more like a stoney till.

Site Location: Sec N34 Tp86 R2 W5M

Site Description:

Approximately 3 m of coarse sand with 15-20% clasts of less than 10 cm size.

Gradation: 0% cobbles 32.9% gravel
 66.6% sand 0.5% fines



Site Location: Sec NE18 Tp87 R1 W5M

Site Description:

Stoney till drape about 4 m thick. Clasts are to 40 cm diameter.

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DEPOSIT NO. 24

LOCATION: Sec 35,36 Tp86 R3 W5M
Sec 6 Tp87 R2 W5M
Sec 1 Tp87 R3 W5M

No. of associated pits/sites: None

No. of samples analysed: None

DEPOSIT DESCRIPTION:

Lacustrine beach ridges probably composed of sand. Not field checked.

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DEPOSIT NO. 25

LOCATION: Sec 3,10 Tp87 R7 W5M

No. of associated pits/sites: 1 site

No. of samples analysed: None

DEPOSIT DESCRIPTION:

See site description.

Site Location: Sec S3 Tp87 R7 W5M

Site Description:

Very fine sand to silt veneer with no pebbles over till.

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DEPOSIT NO. 26

LOCATION: Sec 22,23,26,34 Tp87 R7 W5M

No. of associated pits/sites: None

No. of samples analysed: None

DEPOSIT DESCRIPTION:

Small esker-like ridges probably consisting of sand. Not field checked.

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DEPOSIT NO. 27

LOCATION: Sec 34 Tp86 R9 W5M
Sec 14,34 Tp87 R9 W5M

No. of associated pits/sites: 2 sites

No. of samples analysed: None

DEPOSIT DESCRIPTION:

No deposit can be delineated on the air photos. See site descriptions.

Site Location: Sec N14 Tp87 R9 W5M

Site Description:

Oxidized sand with few pebbles in 2.5 m of excavation.

Site Location: Sec NE34 Tp86 R9 W5M

Site Description:

Trench along roadcut exposes very dirty sand with high clay content.

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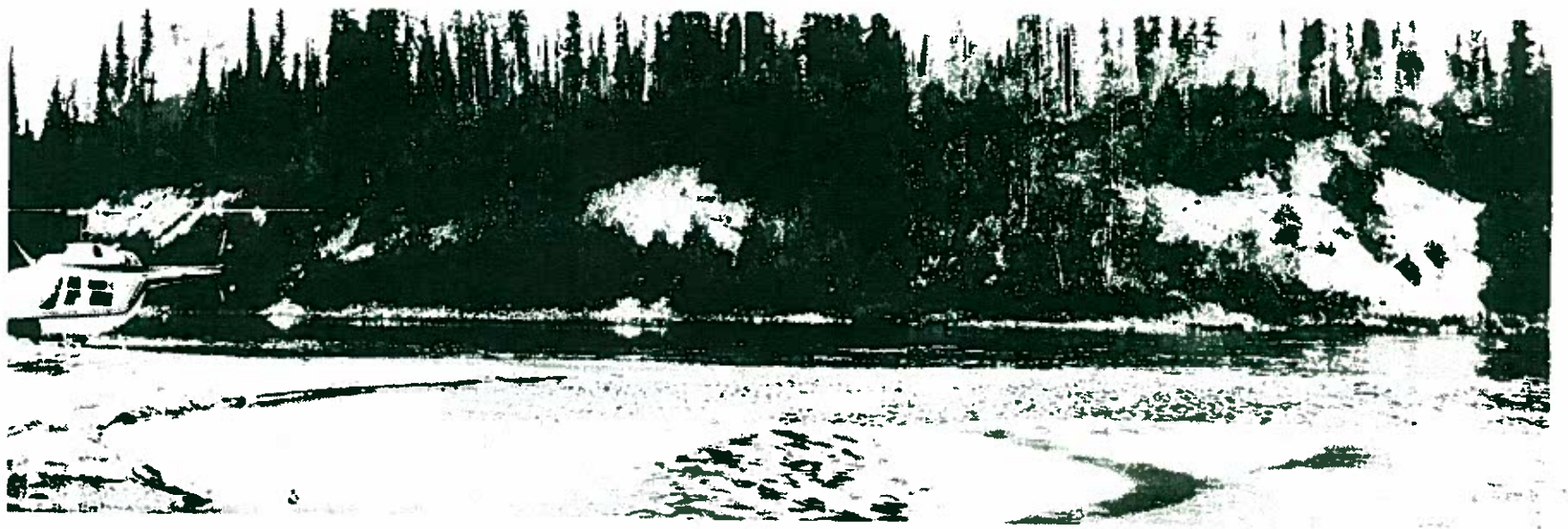


Plate 1: Terrace (Deposit 13) on the south bank of the Wabasca River that, when viewed from the north bank, seems to contain appreciable gravel. Gravel exposures are rare in the area.

