

MATERIALS
EVALUATION

PROPOSED COMMUNITY GRAVEL PIT
DAWSON CITY, YUKON

FEBRUARY, 1983



D001071

Submitted to:

DEPARTMENT OF INDIAN AND
NORTHERN AFFAIRS

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Prepared by:

EBA ENGINEERING CONSULTANTS LTD.

FEBRUARY, 1983

ABSTRACT

The Department of Indian and Northern Affairs are proposing a new community gravel pit for the Dawson City, Yukon area. The proposed pit site, on the South Dome Road, is located in discontinuous alluvial deposits (silts, sands and gravels). The drilling of exploratory boreholes throughout the site was completed by EBA Engineering Consultants Ltd. on November 29 and 30, 1982.

The largest volume of useable granular material with the least amount of overburden is situated close to the existing pits at the proposed site. Gravel is generally scarce and too silty for engineered backfill or concrete production purposes. In addition, significant overburden stripping of silt will be required to expose most of the gravel. The results of the field and laboratory testing and recommendations pertaining to granular quantity and quality are presented.

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1.0 INTRODUCTION

The Department of Indian and Northern Affairs is proposing to establish a new community gravel pit for Dawson City, Y.T., so that the existing Front Street and 5th Avenue pits can be closed. EBA Engineering Consultants Ltd. (EBA) was retained to conduct a gravel inventory on a potential site located on the South Dome Road, near Dawson City. The site was pre-selected by the Department, and the requirements with respect to the number and depth of exploratory boreholes were summarized in a proposal request letter dated October 7, 1982.

This investigation was authorized by Mr. Y. Dube, Department of Indian and Northern Affairs, Hull, Quebec on November 15, 1982. Mr. Perry Savoie of Department of Indian and Northern Affairs, Whitehorse, Yukon, was the local contact. A pre-field meeting with Mr. Savoie finalized the borehole locations and provided EBA Engineering Consultants Ltd. with air photo prints of the site. This report presents all field and laboratory data, an inventory and quantity estimate of borrow materials available at the site, suitability of the materials for concrete and engineered backfill purposes.

1.1 Site Location

The study site (See Figure 1) is located approximately two kilometres south of Dawson City, adjacent to the south Dome access road. It is on the edge of the Klondike River Valley, just upstream of the confluence of the Klondike and Yukon Rivers. The site is situated at an elevation approximately 100 m above the base of the river valley, and there are small pits currently in use on both the left and right hand sides of the road.

2.0 FIELD WORK

The field work was completed on November 29 and 30, 1982, at which time trail clearing was necessary to allow access to the borehole locations. A local Dawson City contractor using a D-6 dozer was contracted for the clearing. A total of seventeen boreholes were drilled using a CME 750 tractor-mounted drill rig equipped with solid flight augers. The rig was mobilized by Midnight Sun Drilling Company Ltd. of Whitehorse, Yukon. An airphoto print site plan, showing the approximate borehole locations is included in the pocket in Appendix B, followed by the borehole logs.

The boreholes were drilled to a depth of 5.7 m except for BH 3 and BH 4, where auger refusal occurred at a depth of 2.1 m. Samples were taken from the auger flights in representative soil types. All samples were returned to the EBA Whitehorse laboratory for classification testing.



SITE PLAN and BOREHOLE LOCATIONS

EBA Engineering Consultants Ltd. 

PROPOSED COMMUNITY GRAVEL PIT
DOME ROAD
DAWSON CITY, YUKON

APP. SCALE 1:2000.

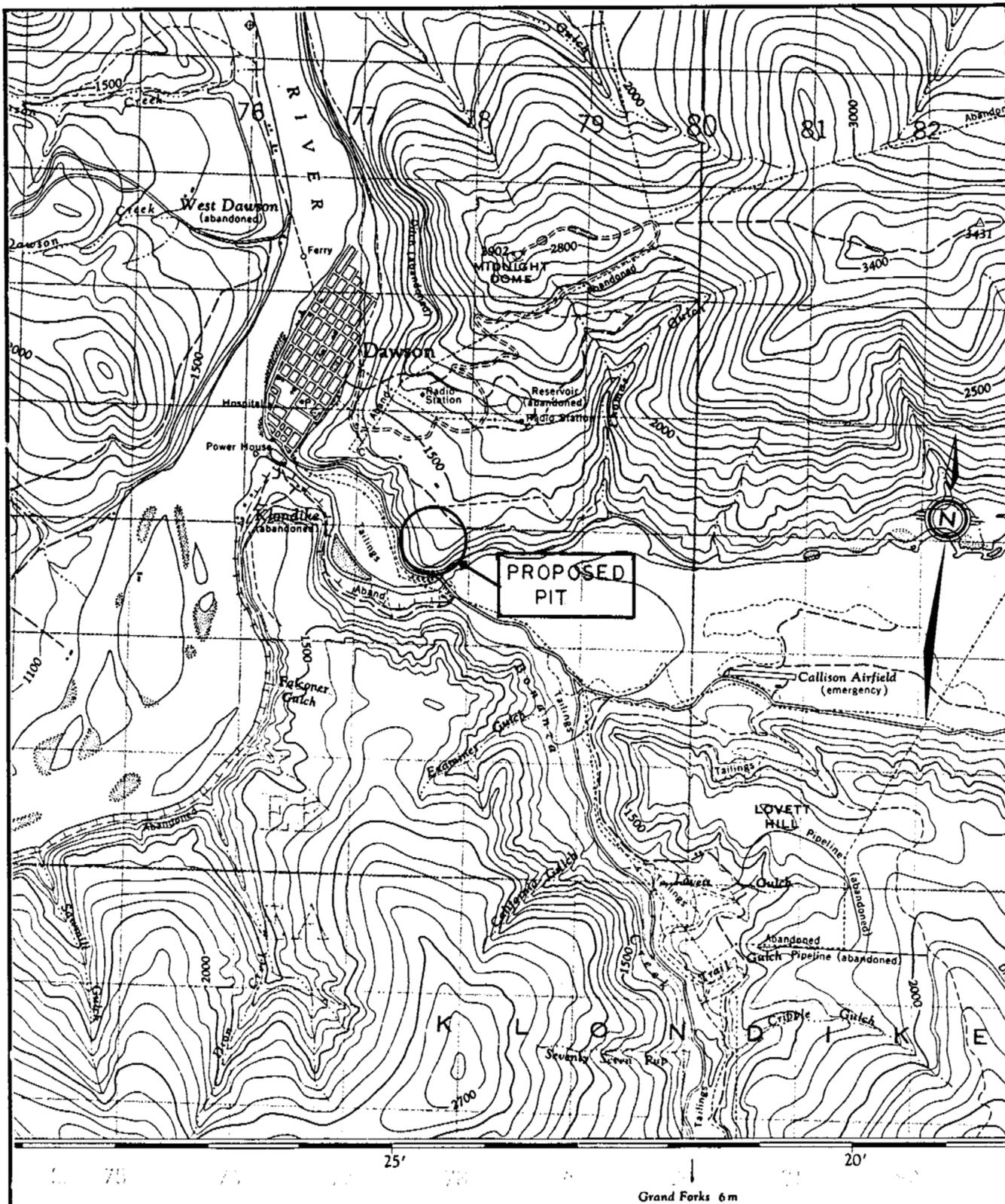


FIGURE 1

LOCATION OF
 PROPOSED COMMUNITY GRAVEL PIT
 DAWSON CITY, Y.T.

EBA Engineering Consultants Ltd. 	
JOB NO.: 209-3723	DATE: 1982 02 07
DRAWN BY: JDM	FIGURE 1
REVIEWED BY: <i>JDM</i>	

3.0 LOCAL GEOLOGY AND SOURCES OF GRANULAR MATERIALS

The Dawson area is one of the few sections of Northern Canada not glaciated during the last ice-age. The present topography around Dawson reflects the processes of weathering, erosion, and deposition by the Klondike and Yukon Rivers, and could be described as having large wide valleys with gently sloping sidewalls and rounded hills. The Yukon River has eroded its valley floor by approximately 700 feet to its present position. Similarly, all tributaries to the Yukon have eroded downwards at the valley centres and deposited discontinuous alluvial deposits (silt, sand and gravel) along the valley edges.

The soils at the study site are believed to have originated from the ancient Klondike River. The increase in relative particle size noted lower in the valley can be attributed to an increase in river velocity as the valley was eroded. The rock outcrop noted in the valley wall next to the site probably deflected the river course, resulting in a mantle of alluvial deposits on the downstream side. Bedrock in the area consists of schists, hornfels, quartz porphyries and other fine grained metamorphic rocks.

4.0 LABORATORY TESTING

4.1 General

The natural moisture content was determined for all samples. In addition, representative samples were tested for their grain size distribution. The results of these tests are presented on the borehole logs in Appendix B, where applicable, and on the grain size distribution curves in Appendix C.

4.2 Petrographic Analysis

A petrographic analysis was completed on a representative gravel sample to determine the mineralogy of the aggregate at the site. A sample from BH 6 was selected for this test, and the results are included at the back of Appendix C. Petrographic analyses are useful in determining the suitability of an aggregate for concrete production purposes.

5.0 DISCUSSION OF RESULTS

5.1 Subsurface Conditions

Several stratigraphic sections have been prepared to illustrate subsurface conditions at the site. These are presented as Drawing No. 3723-A-1 to A-4 inclusive in Appendix A. The locations of the cross sections are shown on Figure 2.

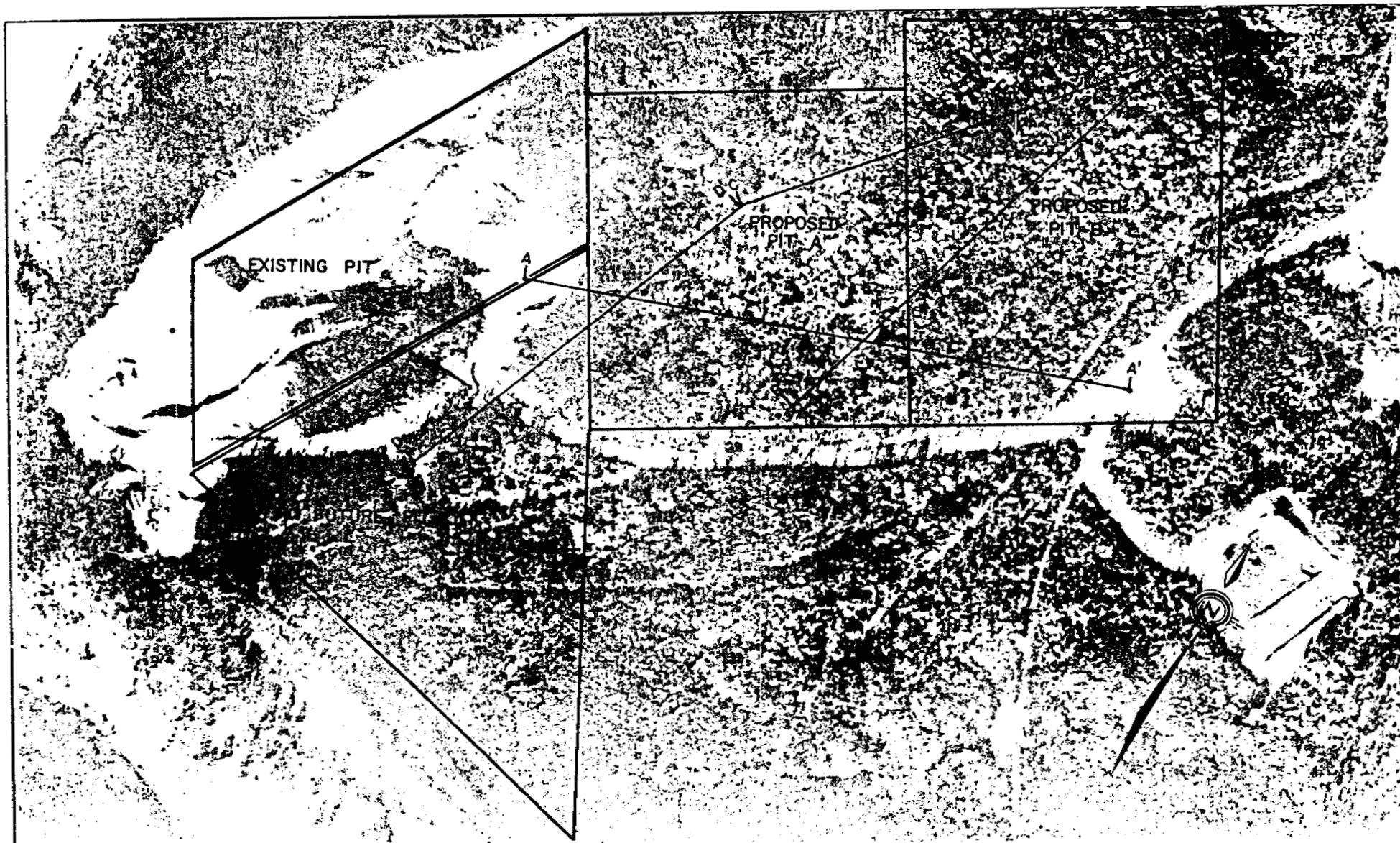


FIGURE 2
 LOCATIONS OF STRATIGRAPHIC CROSS SECTIONS
 AND
 AREAS USED FOR QUANTITY ESTIMATES

EBA Engineering Consultants Ltd. 	
JOB NO.: 209 - 3723	DATE: 1983 02 07
DRAWN BY: JDM	FIGURE 2
REVIEWED BY: <i>JMT</i>	

On the basis of the borehole data, a general decrease in grain size was noted from south to north at the site. This would infer that the best potential for gravel would be in or adjacent to the existing pits. The east side of the Dome Road (See Site Plan, Borehole Nos. 3, 6, and 7) shows the greatest potential for a suitable gravel supply. Further excavation into the existing pit on the west side of the Dome Road (Borehole Nos. 1 and 2) will not encounter significant gravel quantities. The best potential for gravel on this side of the road appears to be below the base of the existing excavation (Borehole No. 6).

The quantity estimates for gravel and sand at the proposed site have been evaluated using the areas noted on Figure 2. In all calculations, the average thickness of stratigraphic units noted on the borehole logs and interpolated from the cross sections in Appendix A were used. Quantity estimates do not include depths greater than 5.7 m from existing ground surface.

5.2 Proposed Pit Section A

The general stratigraphy of this section was taken from Borehole Nos. 7, 8, 9, and 10.

There is a small amount of silt overburden in this area, amounting to approximately 20,000 m³. The approximate quantities of sand and gravel are:

Sand	73,000 m ³
Gravel	96,000 m ³

5.3 Proposed Pit Section B

This section outlined on Figure 2 encompasses the areas around Borehole Nos. 5, 11, 12, 13, 14, 15, 16, and 17.

The thickness of silt overburden in this area varies from 1.5 m to 5.7 m. Stripping quantities are estimated to be approximately 117,000 m³. The quantities of the sand and gravel layers beneath the silt are estimated at approximately:

Sand	12,000 m ³
Gravel	88,000 m ³

5.4 Existing Pits Section

This section (Borehole Nos. 1, 2 and 6) is located in the areas now being used as sources of sand and gravel.

There is very little silt overburden here, as most of the stripping has previously been completed. The quantity of remaining silt is estimated at only 12,000 m³. The estimated amounts of sand and gravel are based on a limited number of boreholes in the existing pit. The quantities are:

Sand	69,000 m ³
Gravel	90,000 m ³

A petrographic analysis was completed on a sample from BH 6. This material was noted to be representative of the entire study area. Details are presented at the back of Appendix C.

5.5 Future Pit Section

The area south and east of BH 2 is classified as the Future Pit Section. The estimated volume of sand and gravel is based on a very limited number of boreholes in this area. The boreholes could only be located in the north end of this section, due to site access restrictions. The results are summarized as follows:

Silt (overburden)	22,000 m ³
Sand	22,000 m ³
Gravel	99,000 m ³

6.0 CONCLUSIONS

6.1 Quantities

The combined estimated quantities in the existing pit and proposed pit sections are:

Silt (overburden)	149,000 m ³
Sand	274,000 m ³
Gravel	154,000 m ³

The total economically useable amount of sand and gravel (428,000 m³) is reduced in areas where costly stripping of large amounts of silt overburden are necessary (see Cross-Sections). If "Proposed Pit Section B" (the furthest upslope -- see Figure 2) was eliminated, the following estimated quantities are left:

Silt (Overburden)	32,000 m ³
Sand	142,000 m ³
Gravel	186,000 m ³

This development scheme results in a much more economical unit volume of sand and gravel. However, the wide spacing of boreholes limits the accuracy of the estimate. It would be necessary to drill more boreholes throughout this

section to better assess the quantities of sand and gravel available. Alternatively, a backhoe could be used for exploration purposes, especially near BH 3 and BH 4, where auger drilling could not penetrate deeper than 2.2 m from ground surface. Soil mineralogy is expected to be similar in all areas of the site.

6.2 Engineering Properties

6.2.1 General Backfill

The silt content in both the sands and gravels throughout the entire existing pit and proposed pit areas (see Appendix C), exceeds EBA's recommended backfill gradation limits (Figure 3). Backfill materials below the specified gradation limits are considered to be frost susceptible and would heave when subjected to freezing temperatures and excess soil moisture conditions. This makes them generally undesirable for use as backfill materials for foundation pads or road construction, particularly in the Dawson area. Alternatively, backfill materials coarser than the specified limits are considered to be non-compactable using standard construction procedures.

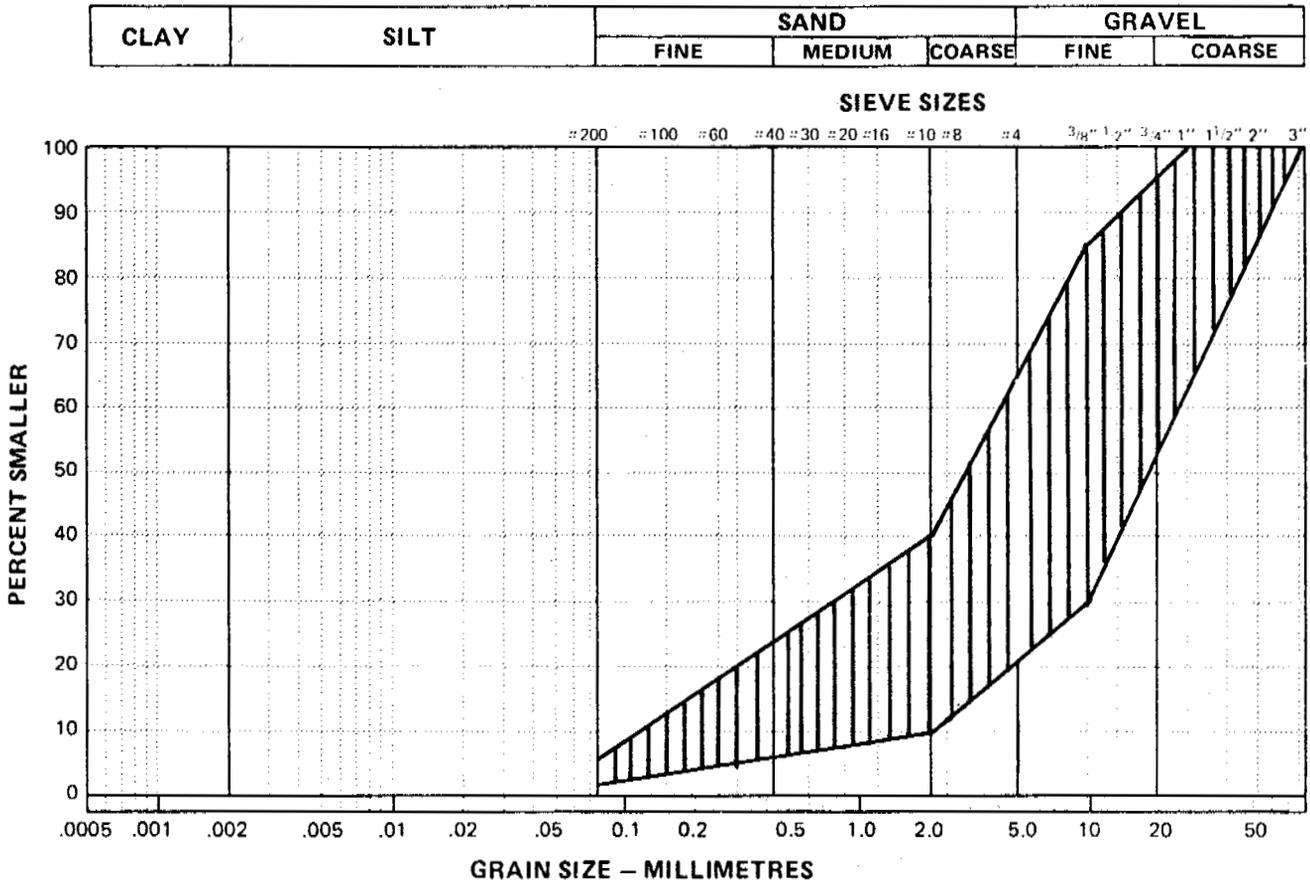


FIGURE 3

RECOMMENDED

BACKFILL GRADATION LIMITS

EBA Engineering Consultants/ Ltd.	
JOB NO.: 209-3723	DATE: 1983 02 08
DRAWN BY: JDM	FIGURE 3
REVIEWED BY: <i>[Signature]</i>	

6.2.2 Concrete Aggregate

Excessive amounts of silt in concrete aggregate also causes problems with the production of concrete. Figure 4 presents the CSA recommended specification gradation limits for of fine and coarse concrete aggregates. Material from the existing pit has previously been used for the production of concrete in Dawson City. A verbal communication with one of the municipal engineers involved in the new sewer/water system noted that although extra bags of cement over and above mix design specifications were added to each batch of concrete, the ultimate (28 day) strength was only in the 20 to 25 MPa range.

7.0 CLOSURE

The estimated quantities of sand and gravel at the study site are relatively small, they will require some overburden stripping, and the quality of the material is generally poor for both backfill and concrete purposes.

The area with greatest promise for future gravel supplies is located immediately adjacent to the existing pit on the west side of the Dome Road, and the area noted as "Future Pit" on Figure 2, located on the east side of the road following the bank of the Klondike River.

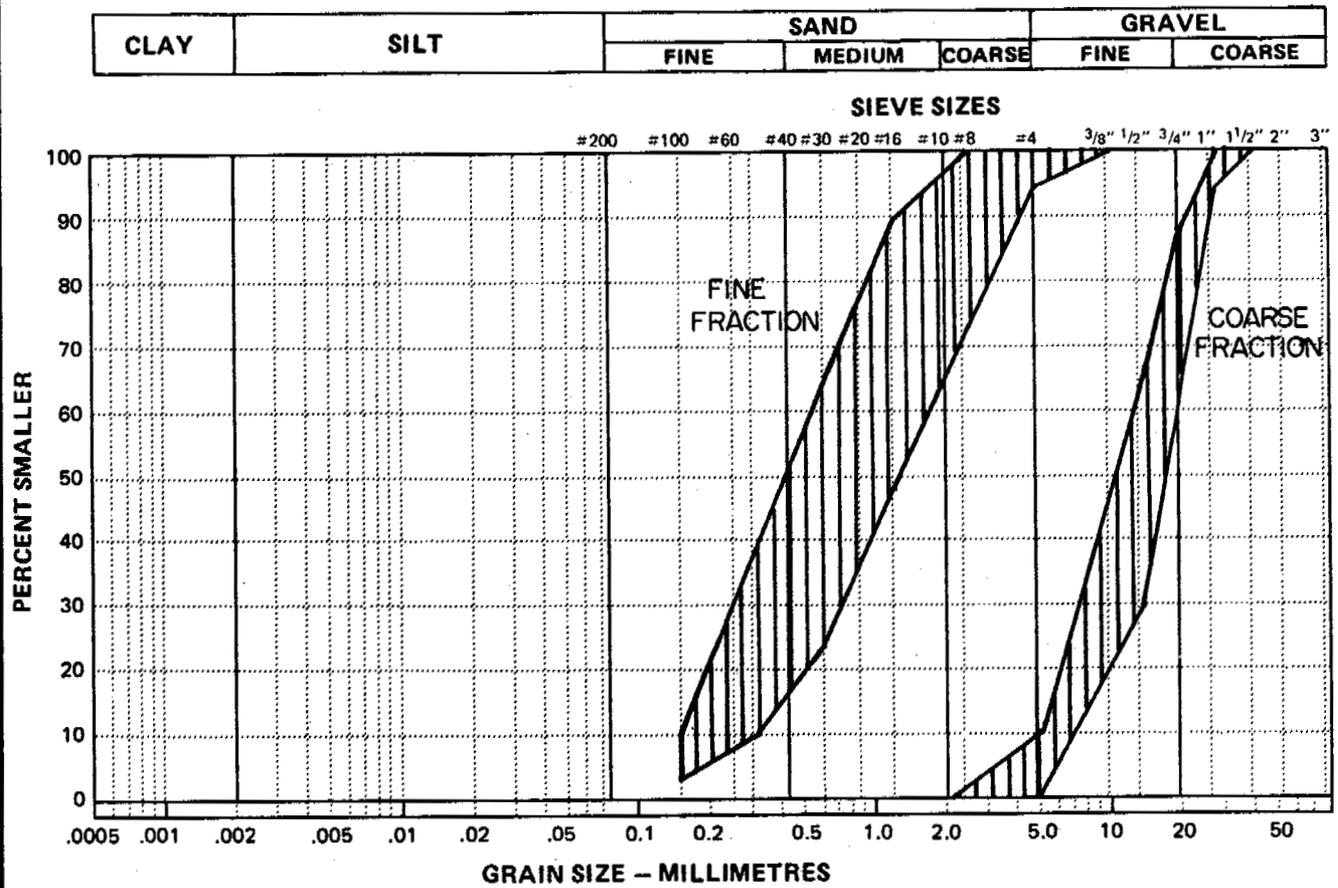


FIGURE 4

**CSA
CONCRETE AGGREGATE
GRADATION SPECIFICATIONS**

CSA STANDARD A23.1-M
AND
CSA STANDARD A23.1

EBA Engineering Consultants Ltd.	
JOB NO.: 209-3723	DATE: 1983 01 27
DRAWN BY: JDM	FIGURE 4
REVIEWED BY: <i>JDM</i>	

In general, the soils in these areas are relatively dry and would not pose excavation problems in either summer or winter. Permafrost was not detected in any of the boreholes.

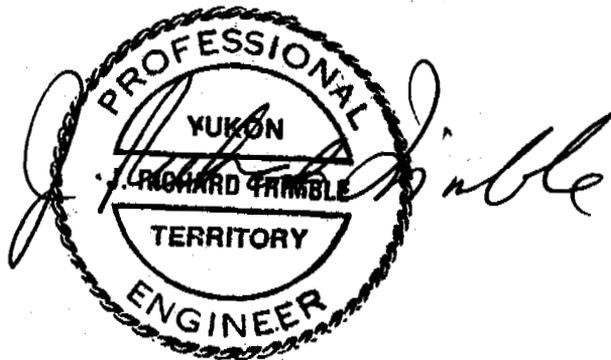
As previously noted, additional subsurface exploration (drill or backhoe) will be required to delineate exact quantities of borrow material available, if required, but this program should preferably be undertaken during warmer months of the year.

Respectfully submitted,

EBA Engineering Consultants Ltd.



J.D. McLeod
MATERIALS TESTING SUPERVISOR



J.R. Trimble, P.Eng.
SENIOR PROJECT ENGINEER
WHITEHORSE MANAGER

**EBA ENGINEERING CONSULTANTS LTD.
GEOTECHNICAL REPORT
GENERAL CONDITIONS**

A.1 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site and development. It is not applicable to adjacent sites nor is it valid for types of development other than that to which it refers. Any variation from the site, or development, necessitates a geotechnical review in order to determine the validity of the design concepts evolved herein.

This report is not to be reproduced in part or in whole without consent in writing from EBA Engineering Consultants Ltd. (EBA). Additional copies of the report, if required, may be obtained upon request. Isolated information, logs of borings, or profiles are not to be reproduced, copied or transferred.

A.2 NATURE AND EXACTNESS OF SOIL DESCRIPTION

Classification and identification of soils are based upon commonly accepted methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system prevail, they are specifically mentioned.

Classification and identification of soil and geologic units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

A.3 LOGS OF BORINGS

The boring logs are a compilation of conditions and classification of soils as obtained from field observations and laboratory testing of selected samples. Soil zones have been interpreted. Change from one geologic zone to the other, indicated on the logs as a distinct line, is in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil zone transition elevations may require special evaluation.

A.4 STRATIGRAPHIC AND GEOLOGIC SECTIONS

The stratigraphic and geologic sections indicated on drawings contained in this report are evolved from logs of borings. Stratigraphy is known precisely only at the locations of the borings. Actual geology and stratigraphy between borings may vary from that shown on these drawings. Natural variations in geologic conditions are inherent and a function of historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of exact locations of geologic units is necessary, it is cautioned that such determination requires special attention.

A.5 GROUNDWATER CONDITIONS

Groundwater conditions represented in this report refer only to those observed at the times recorded on logs of borings, and/or within the text of this report. These conditions vary with geologic detail between borings; annual, seasonal and special meteorologic conditions; and with construction activity. Where instruments have been established to record groundwater variations on an ongoing basis, the records will be specifically referred to. Interpretation of groundwater conditions from observations and records is judgmental and constitutes an evaluation of circumstances as influenced by geology, meteorology and construction activity. Deviations from these observations, may occur. No other warranty, express, or implied, is made by EBA.

A.6 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geologic materials to meteorological elements. Many geologic materials deteriorate rapidly upon exposure to climatic elements. Severe deterioration of materials may be caused by precipitation and/or the action of frost on exposures. Unless otherwise specifically indicated in this report, walls and floors of excavations must be protected from elements, particularly all forms of moisture, desiccation from arid conditions and frost action.

UNIFIED SOIL CLASSIFICATION

MAJOR DIVISIONS		GROUP SYMBOLS	TYPICAL NAMES	CLASSIFICATION CRITERIA	
COARSE-GRAINED SOILS	More than 50% retained on No. 200 sieve*	GRAVELS 50% or more of coarse fraction retained on No. 4 sieve	CLEAN GRAVELS	GW	Well-graded gravels and gravel-sand mixtures, little or no fines
			GRAVELS WITH FINES	GP	Poorly-graded gravels and gravel-sand mixtures, little or no fines
			GRAVELS WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures
			GRAVELS WITH FINES	GC	Clayey gravels, gravel-sand clay mixtures
			GRAVELS WITH FINES	SW	Well-graded sands and gravelly sands, little or no fines
	More than 50% of coarse fraction passes No. 4 sieve	SANDS More than 50% of coarse fraction passes No. 4 sieve	CLEAN SANDS	SP	Poorly-graded sands and gravelly sands, little or no fines
			SANDS WITH FINES	SM	Silty sands, sand-silt mixtures
			SANDS WITH FINES	SC	Clayey sands, sand-clay mixtures
			SANDS WITH FINES	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
			SANDS WITH FINES	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
FINE-GRAINED SOILS	50% or more passes No. 200 sieve*	SILTS AND CLAYS Liquid limit 50% or less	SILTS AND CLAYS	OL	Organic silts and organic silty clays of low plasticity
			SILTS AND CLAYS	MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts
			SILTS AND CLAYS	CH	Inorganic silts of high plasticity, fat clays
			SILTS AND CLAYS	OH	Organic clays of medium to high plasticity
			SILTS AND CLAYS	PT	Peat, muck and other highly organic soils
	Less than 5% pass No. 200 sieve More than 12% pass No. 200 sieve 5% to 12% pass No. 200 sieve	Classification on basis of percentage of fines GW, GP, SW, SP GM, GC, SM, SC Borderline classification requiring use of dual symbols	SANDS	SW	Well-graded sands and gravelly sands, little or no fines
			SANDS	SP	Poorly-graded sands and gravelly sands, little or no fines
			SANDS	SM	Silty sands, sand-silt mixtures
			SANDS	SC	Clayey sands, sand-clay mixtures
			SANDS	PT	Peat, muck and other highly organic soils

CLASSIFICATION CRITERIA

$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4
 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3

Not meeting both criteria for GW

Atterberg limits plot below 'A' line or plasticity index less than 4

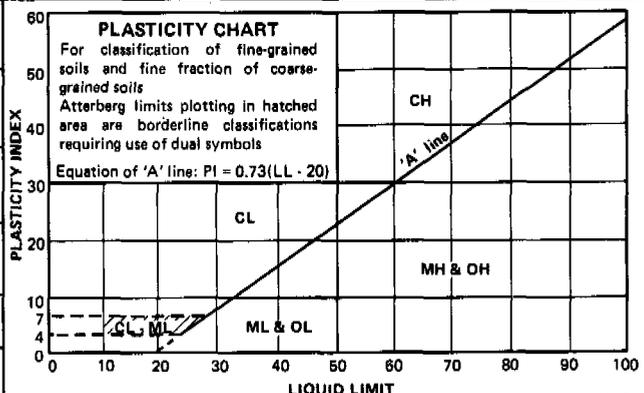
Atterberg limits plotting above 'A' line and plasticity index greater than 7

$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6
 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3

Not meeting both criteria for SW

Atterberg limits plot below 'A' line or plasticity index less than 4

Atterberg limits plotting above 'A' line and plasticity index greater than 7



*Based on the material passing the 3 in. (75 mm) sieve
 †ASTM Designation D 2487, for identification procedure see D 2488

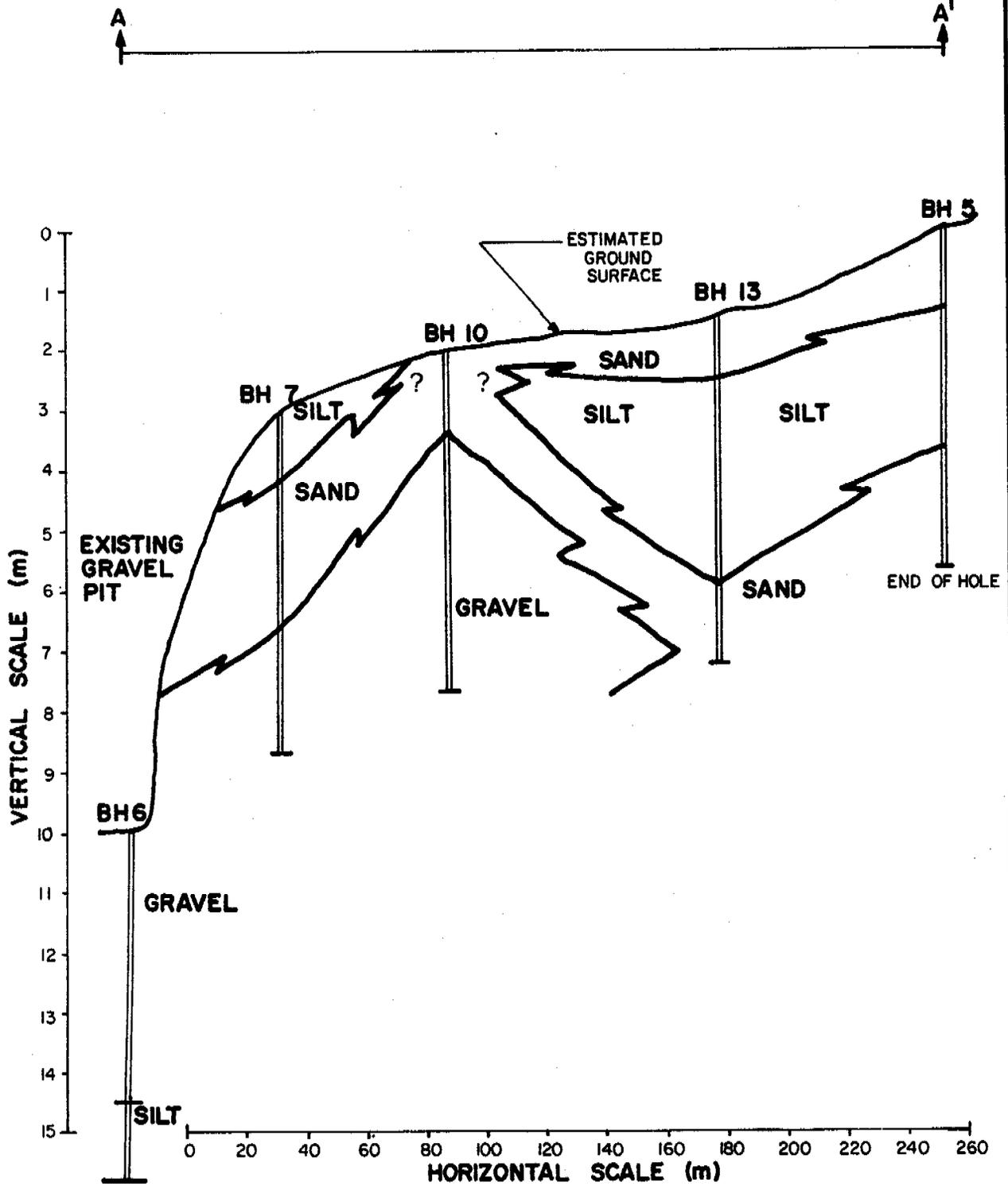
GROUND ICE DESCRIPTION

ICE NOT VISIBLE				VISIBLE ICE LESS THAN 50% BY VOLUME			
GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	IMAGE	GROUP SYMBOLS	SYMBOLS	SUBGROUP DESCRIPTION	IMAGE
N	Nf	Poorly-bonded or friable		V	Vx	Individual ice crystals or inclusions	
	Nbn	No excess ice, well-bonded			Vc	Ice coatings on particles	
	Nbe	Excess ice, well-bonded			Vr	Random or irregularly oriented ice formations	
					Vs	Stratified or distinctly oriented ice formations	
				VISIBLE ICE GREATER THAN 50% BY VOLUME			
ICE	ICE + Soil Type	Ice with soil inclusions					
	ICE	Ice without soil inclusions (greater than 25 mm (1 in.) thick)					

- NOTE:**
- Dual symbols are used to indicate borderline or mixed ice classifications
 - Visual estimates of ice contents indicated on borehole logs $\pm 5\%$
 - This system of ground ice description has been modified from NRC Technical Memo 79, Guide to the Field Description of Permafrost for Engineering Purposes

LEGEND

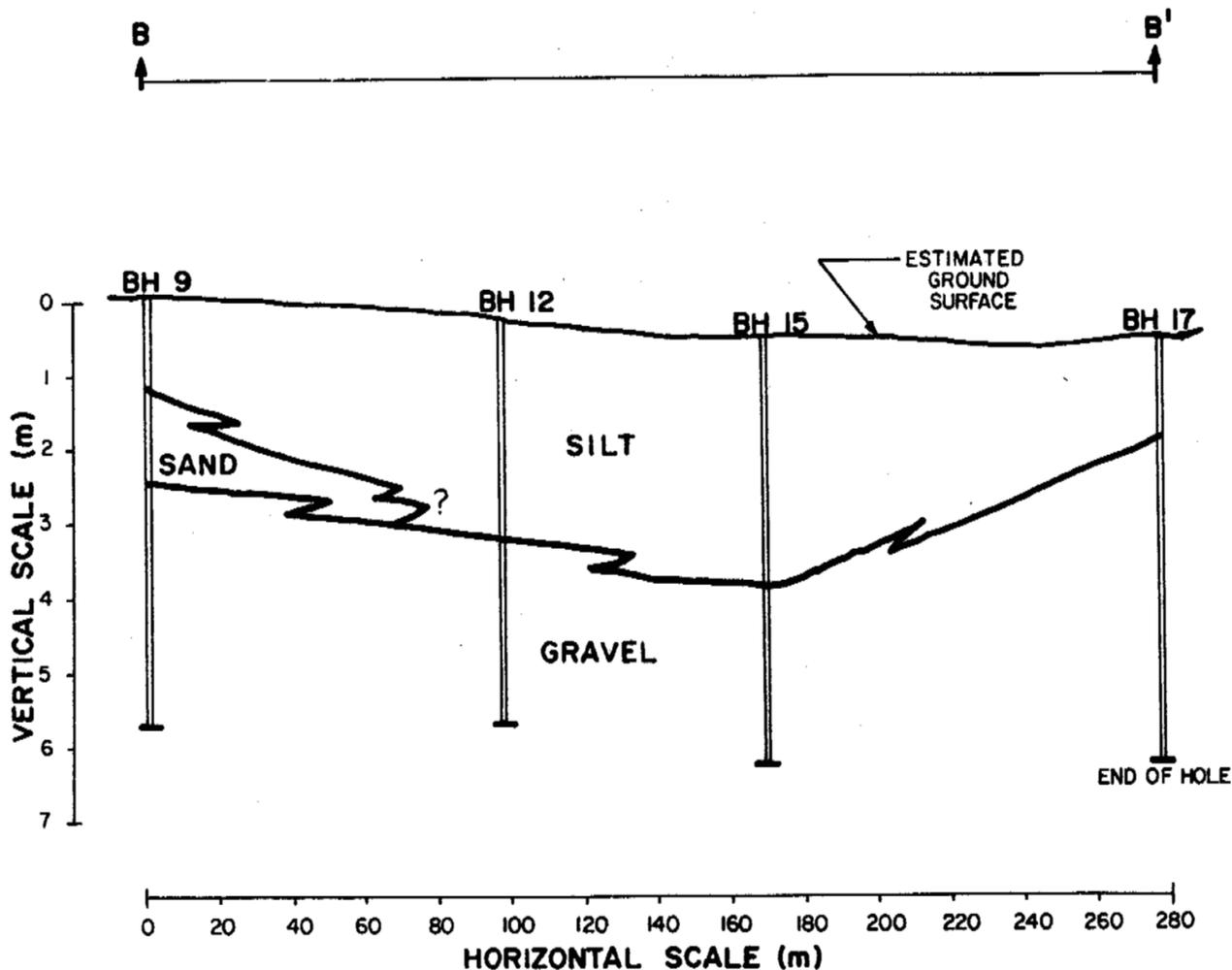
Soil Ice



CROSS SECTION A-A'
GENERALIZED SUBSURFACE STRATIGRAPHY
PROPOSED GRAVEL PIT
DAWSON CITY, YUKON

The geologic and stratigraphic sections shown on this drawing are interpreted from borehole logs. Stratigraphy is known with certainty only at the borehole locations. Actual stratigraphy and geologic conditions between boreholes may vary from that indicated on this drawing.

EBA Engineering Consultants Ltd. 	
JOB NO.: 209-3723	DATE: 1983 01 26
DRAWN BY: NLM	DRAWING NO.:
REVIEWED BY: <i>JMT</i>	3723-A-1

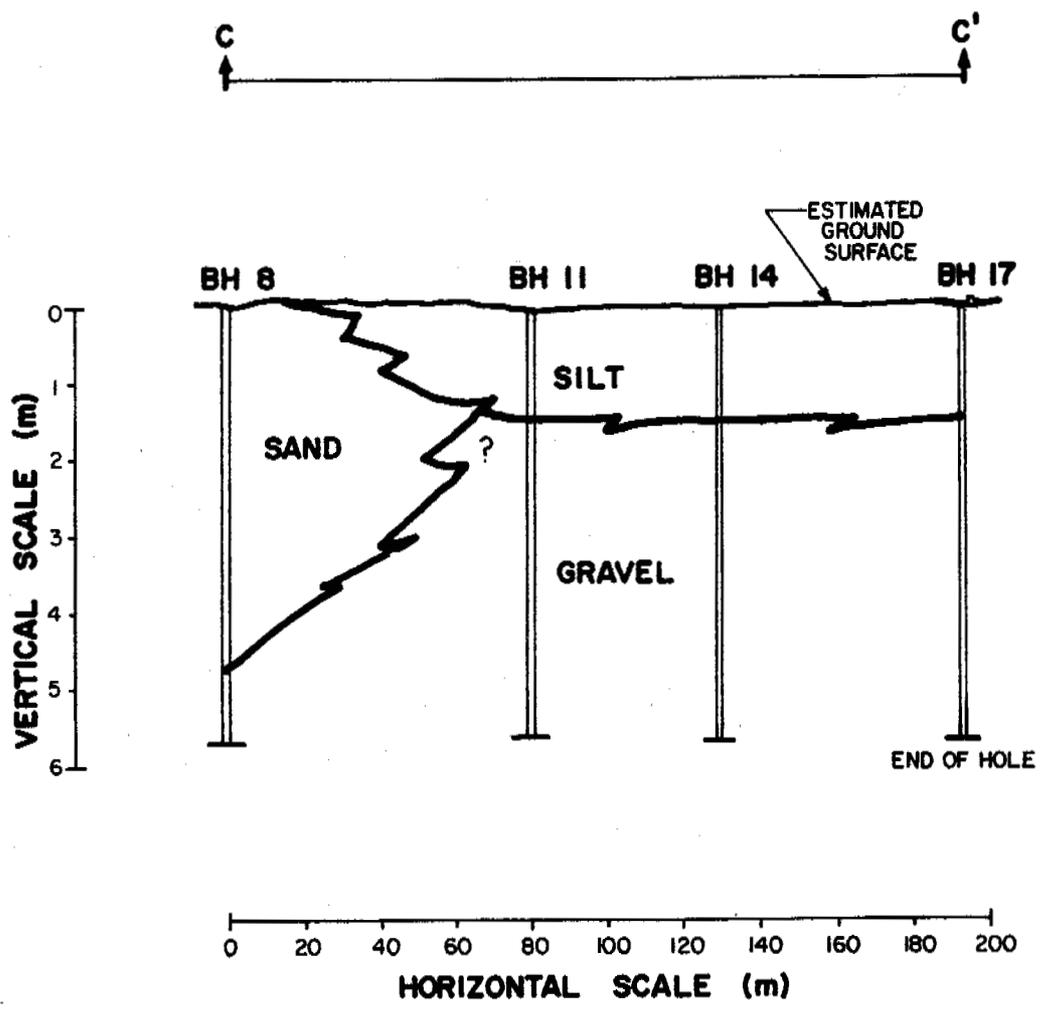


CROSS SECTION B - B'

GENERALIZED SUBSURFACE STRATIGRAPHY
 PROPOSED GRAVEL PIT
 DAWSON CITY, YUKON

The geologic and stratigraphic sections shown on this drawing are interpreted from borehole logs. Stratigraphy is known with certainty only at the borehole locations. Actual stratigraphy and geologic conditions between boreholes may vary from that indicated on this drawing.

EBA Engineering Consultants Ltd. 	
JOB NO.: 209-3723	DATE: 1983 01 26
DRAWN BY: NLM	DRAWING NO.:
REVIEWED BY: <i>JMT</i>	3723 - A - 2

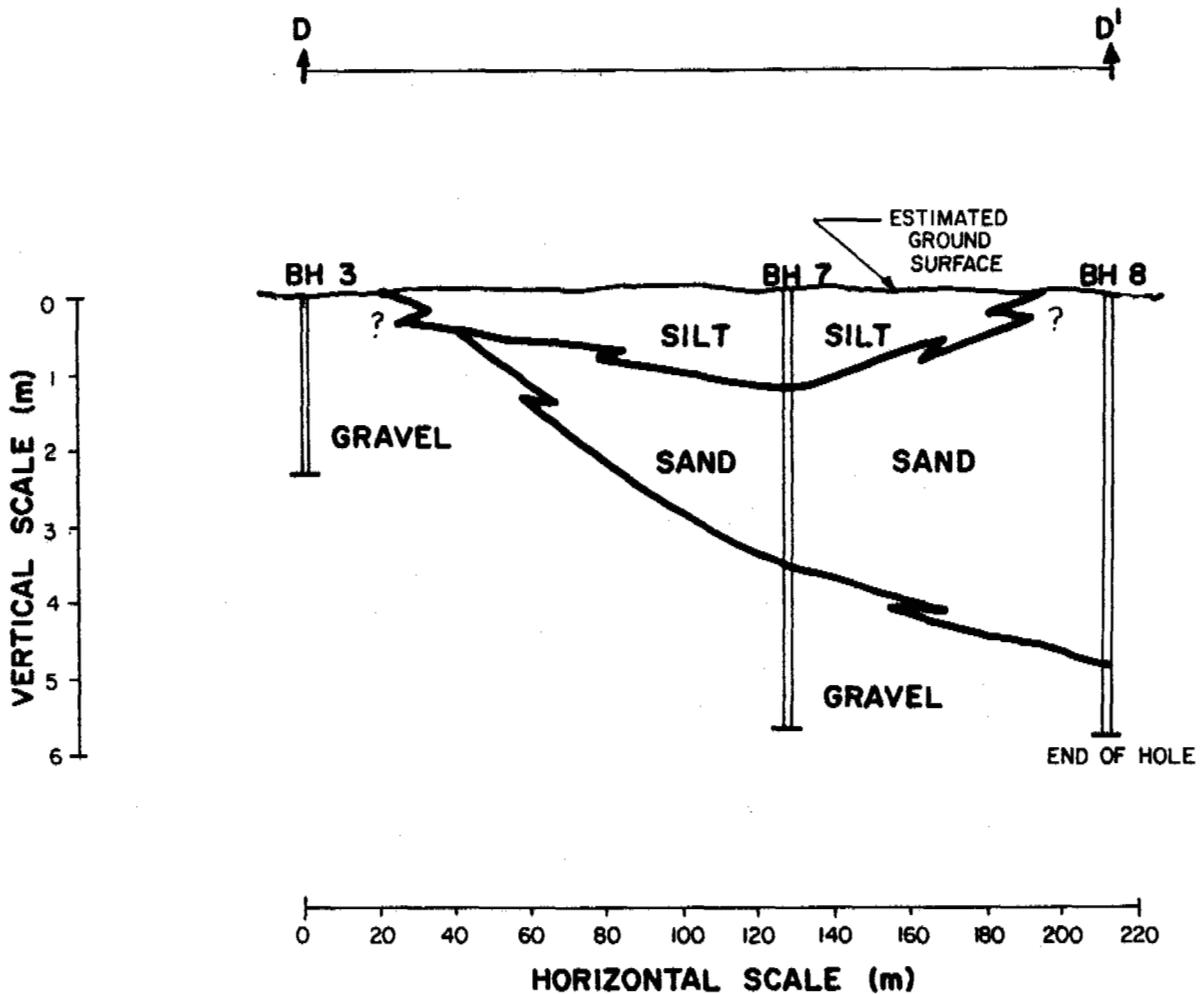


CROSS SECTION C - C'

GENERALIZED SUBSURFACE STRATIGRAPHY PROPOSED GRAVEL PIT DAWSON CITY, YUKON

The geologic and stratigraphic sections shown on this drawing are interpreted from borehole logs. Stratigraphy is known with certainty only at the borehole locations. Actual stratigraphy and geologic conditions between boreholes may vary from that indicated on this drawing.

EBA Engineering Consultants Ltd. 	
JOB NO.: 209-3723	DATE: 1983 01 26
DRAWN BY: NLM	DRAWING NO.:
REVIEWED BY: <i>mt</i>	3723-A-3



CROSS SECTION D - D'

GENERALIZED SUBSURFACE STRATIGRAPHY
 PROPOSED GRAVEL PIT
 DAWSON CITY, YUKON

The geologic and stratigraphic sections shown on this drawing are interpreted from borehole logs. Stratigraphy is known with certainty only at the borehole locations. Actual stratigraphy and geologic conditions between boreholes may vary from that indicated on this drawing.

EBA Engineering Consultants Ltd.

JOB NO.: 209-3723

DATE: 1983 01 26

DRAWN BY: NLM

DRAWING NO.:

REVIEWED BY: *QMT*

3723-A-4

PROJECT: Community Gravel Pit HOLE NO.: BH 1 PROJECT NO.: 209-3723

LOCATION: Dome Road Dawson City, Yukon

SURFACE ELEVATION:

DRILL: CHE 750 - solid flight augers

SAMPLE TYPE: THIN WALLED TUBE SPLIT SPOON DISTURBED NO RECOVERY CORE OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS. SAMPLE	DEPTH (ft.)	WATER CONTENT-%				COMPRESSIVE STRENGTH												
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)		Unconfined..... ▲ Pocket Penetrometer..... ▲ TSF 2 3 4 5 kPa 100 200 300 400													
1	GRAVEL - sandy, some silt, fine to coarse grained, damp, olive brown	GH	1																	
2	SAND - silty, trace of gravel, fine to coarse grained, damp, olive brown	SH	4																	
3	- silty, trace of clay, fine grained, damp, olive brown		8																	
3	- silty, gravelly, trace of clay		10																	
4	- same as above		13																	
5	- same as above		16																	
5	- silty, trace of gravel, trace of clay, fine to coarse grained, brown		17																	
6	END OF HOLE (5.7 m)		19																	



DEPTH TO WATER: Dry at Completion
DEPTH TO SLOUGH: —

WET UNIT $\frac{KN}{m^3}$ 16 18 20 22 24 26 28 30

WEIGHT-O P.C.F. 100 110 120 130 140 150 160 170

STANDARD PENETRATION: N-#

COMPLETION DEPTH: 5.7 m

DATE DRILLED: 1982 11 30

LOGGED BY: JDM

DRAWING NO.:

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil samples have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit		HOLE NO.: BH 3		PROJECT NO.: 209-3723								
LOCATION: Dome Road Dawson City, Yukon		SURFACE ELEVATION:										
DRILL: CME 750 - solid flight augers												
SAMPLE TYPE: <input type="checkbox"/> THIN WALLED TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE <input type="checkbox"/> OTHER												
DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS. SAMPLE	DEPTH (ft.)	WATER CONTENT-% : e				COMPRESSIVE STRENGTH				
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)		Unconfined..... ▲		Pocket Penetrometer..... ▲			
				20	40	60	80	TSF 1 2 3 4 5		kPa 100 200 300 400		
1	GRAVEL - sandy, trace of silt, fine to coarse grained, damp, olive brown	GW	1									
			2									
			3									
			4									
	- trace to some sand, trace of silt, damp, brown		5									
			6									
	- cobbles and boulders		7									
			8									
	END OF HOLE (2.1 m) Auger Refusal		9									
	<u>Note:</u> - could not distinguish whether auger refusal was due to cobbles or bedrock		10									
			11									
			12									
			13									
			14									
			15									
			16									
			17									
			18									
			19									
			20									
		DEPTH TO WATER:  Dry at Completion DEPTH TO SLOUGH: —		WET UNIT $\frac{KN}{m^3}$ 16 18 20 22 WEIGHT-O P.C.F. 100 110 120 130 140 150				STANDARD PENETRATION: N. ■ 20 40 60 80				
				COMPLETION DEPTH: 2.1 m				DATE DRILLED: 1982 11 30				
				LOGGED BY: JDM				DRAWING NO.:				

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit HOLE NO.: BH 4 PROJECT NO.: 209-3723

LOCATION: Dome Road Dawson City, Yukon SURFACE ELEVATION:
 DRILL: CHE 750 - solid flight augers

SAMPLE TYPE: THIN WALLED TUBE SPLIT SPOON DISTURBED NO RECOVERY CORE OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE DEPTH (m.)	WATER CONTENT-%				COMPRESSIVE STRENGTH					
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)		Unconfined..... ▲ Pocket Penetrometer..... Δ						
				20	40	60	80	TSF	1	2	3	4	5
								kPa	100	200	300	400	
1	ORGANICS												
1	SILT - some sand, trace of clay, fine grained, damp to moist, brown	ML	1										
2	GRAVEL - sandy, some silt, fine to coarse grained, damp, brown - cobbles and boulders	GM	2										
3	END OF HOLE (2.2 m) Auger Refusal Note: - could not distinguish whether auger refusal was due to cobbles or bedrock		3										
4			4										
5			5										
6			6										
			7										
			8										
			9										
			10										
			11										
			12										
			13										
			14										
			15										
			16										
			17										
			18										
			19										
			20										



DEPTH TO WATER: Dry at Completion
 DEPTH TO SLOUGH: —

WET UNIT $\frac{KN}{m^3}$ 16 18 20 22 20 40 60 80
 WEIGHT-O P.C.F. 100 110 120 130 140 150 STANDARD PENETRATION: N- ■
 COMPLETION DATE
 DEPTH: 2.2 m DRILLED: 1982 11 30
 LOGGED BY: JDM DRAWING NO.:

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borings. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit		HOLE NO.: BH 5		PROJECT NO.: 209-3723										
LOCATION: Dome Road Dawson City, Yukon		SURFACE ELEVATION:												
DRILL: CME 750 - solid flight augers														
SAMPLE TYPE: <input checked="" type="checkbox"/> THIN WALLED TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE <input type="checkbox"/> OTHER														
DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE DEPTH (ft.)	WATER CONTENT-% : ●				COMPRESSIVE STRENGTH						
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)	Unconfined..... ▲			Pocket Penetrometer..... ▲					
				20	40	60	80	TSF			2	3	4	5
1	SAND - silty, fine grained, damp, brown	SM	1											
	- silty, some gravel, fine to coarse grained, damp, brown		2											
			3											
			4											
			5											
2	SILT - trace of clay, trace of sand, trace of gravel, fine grained, low plasticity, moist, brown	ML	5											
			6											
			7											
			8											
			9											
3	- same as above		10											
			11											
			12											
			13											
4	- same as above		14											
			15											
			16											
5	SAND - silty, some gravel, fine to coarse grained, moist, brown	SM	15											
			16											
			17											
			18											
			19											
6	END OF HOLE (5.7 m)		19											
			20											
		DEPTH TO WATER:  Dry at Completion DEPTH TO SLOUGH: —		WET UNIT $\frac{kN}{m^3}$ 16 18 20 22 WEIGHT-O P.C.F. 100 110 120 130 140 150				STANDARD PENETRATION: N. ■						
COMPLETION DEPTH: 5.7 m				DATE DRILLED: 1982 11 30										
LOGGED BY: JDH				DRAWING NO.:										

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit		HOLE NO.: BH 6		PROJECT NO.: 209-3723										
LOCATION: Dome Road Dawson City, Yukon		SURFACE ELEVATION:												
		DRILL: CME 750 - solid flight augers												
SAMPLE TYPE: <input type="checkbox"/> THIN WALLED TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE <input type="checkbox"/> OTHER														
DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS. SAMPLE	DEPTH (ft.)	WATER CONTENT-% : ●		COMPRESSIVE STRENGTH								
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)	Unconfined..... ▲ Pocket Penetrometer..... Δ TSF 1 2 3 4 5 kPa 100 200 300 400								
1	GRAVEL - sandy, trace of silt, fine to coarse grained, sub-rounded, damp, brown - same as above - cobbles	GW	1 2 3 4 5											
2	- some silt, some sand.	GM	6 7 8 9 10 11 12 13											
3	- same as above													
4	- same as above													
5	SILT - sandy, trace of gravel, fine to medium grained, moist, brown	ML	15 16 17 18											
6	END OF HOLE (5.7 m)		19 20											
		DEPTH TO WATER: ↓ Dry at Completion DEPTH TO SLOUGH: —		WET UNIT KN m³ WEIGHT-O P.C.F.		STANDARD PENETRATION: N- ■								
		COMPLETION DEPTH: 5.7 m		DATE DRILLED: 1982 11 30										
		LOGGED BY: JDM		DRAWING NO.:										

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit		HOLE NO.: BH 7		PROJECT NO.: 209-3723											
LOCATION: Dome Road Dawson City, Yukon		SURFACE ELEVATION:													
DRILL: CME 750 - solid flight augers															
SAMPLE TYPE: <input checked="" type="checkbox"/> THIN WALLED TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> DISTURBED <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE <input type="checkbox"/> OTHER															
DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE DEPTH (ft.)	WATER CONTENT-% : ●				COMPRESSIVE STRENGTH							
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)		Unconfined..... ▲ Pocket Penetrometer..... Δ TSF 1 2 3 4 5 kPa 100 200 300 400								
	ORGANICS														
1	SILT - sandy, trace of gravel, fine grained, damp, olive brown	ML	1												
			2												
			3												
			4												
2	SAND - gravelly, some silt, fine to coarse grained, damp, olive brown	SM	4												
	- same as above		5												
			6												
			7												
			8												
3	GRAVEL - cobbles, sandy, trace of silt, fine to coarse grained, damp, olive brown	GW	10												
			11												
			12												
			13												
			14												
4			15												
			16												
			17												
5	- same as above		18												
			19												
6	END OF HOLE (5.7 m)		19												
			20												
		DEPTH TO WATER: Dry at Completion  DEPTH TO SLOUGH: ---		WET UNIT $\frac{KN}{m^2}$ 16 18 20 22 WEIGHT-O P.C.F. 100 110 120 130 140 150				STANDARD PENETRATION: N- ■ 20 40 60 80							
		COMPLETION DEPTH: 5.7 m		DATE DRILLED: 1982 11 30											
		LOGGED BY: JDM		DRAWING NO.:											

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit		HOLE NO.: BH 9		PROJECT NO.: 209-3723											
LOCATION: Dome Road Dawson City, Yukon		SURFACE ELEVATION:		DRILL: CME 750 - solid flight augers											
SAMPLE TYPE: <input checked="" type="checkbox"/> THIN WALLED TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE <input type="checkbox"/> OTHER															
DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS. SAMPLE	DEPTH (ft.)	WATER CONTENT-% : ●		COMPRESSIVE STRENGTH									
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)	Unconfined..... ▲ Pocket Penetrometer..... ▲ TSF 1 2 3 4 5 kPa 100 200 300 400									
1	ORGANICS	HL	1												
	SILT - sandy, trace of gravel, trace of clay, fine grained, moist, brown		2												
2	SAND - gravelly, some silt, fine to coarse grained, damp, olive brown	SM	3												
			4												
3	GRAVEL - sandy, trace of silt, fine to coarse grained, damp, brown	GW	5												
			6												
4	- cobbles	GW	7												
			8												
5	- some sand, trace of silt, fine to coarse grained, damp, brown	GW	9												
			10												
6	- same as above	GW	11												
			12												
6	END OF HOLE (5.7 m)		13												
			14												
		DEPTH TO WATER: ↓ Dry at Completion DEPTH TO SLOUGH: —		WET UNIT $\frac{kN}{m^3}$ 16 18 20 22 WEIGHT-O P.C.F. 100 110 120 130 140 150		STANDARD PENETRATION: N- ■ 20 40 60 80									
COMPLETION DEPTH: 5.7 m				DATE DRILLED: 1982 11 30		LOGGED BY: JDM					DRAWING NO.:				

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit HOLE NO.: BH 10 PROJECT NO.: 209-3723

LOCATION: Dome Road Dawson City, Yukon SURFACE ELEVATION:

DRILL: CHE 750 - solid flight augers

SAMPLE TYPE: THIN WALLED TUBE SPLIT SPOON DISTURBED NO RECOVERY CORE OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE DEPTH (ft.)	WATER CONTENT-% : ●		COMPRESSIVE STRENGTH														
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)	Unconfined..... ▲ Pocket Penetrometer..... Δ TSF 1 2 3 4 5 kPa 100 200 300 400														
	ORGANICS																			
1	SAND - silty, fine to coarse grained, damp, olive brown	SM	1																	
			2																	
			3																	
			4																	
2	GRAVEL - sandy, trace of silt, fine to coarse grained, damp, olive brown - cobbles	GW	5																	
	- same as above		6																	
			7																	
			8																	
3	- same as above		9																	
			10																	
			11																	
			12																	
4	- same as above		13																	
			14																	
			15																	
5	- same as above		16																	
			17																	
			18																	
6	END OF HOLE (5.7 m)		19																	
			20																	



DEPTH TO WATER: ↓
Dry at Completion
DEPTH TO SLOUGH: —

WET UNIT $\frac{KN}{m^3}$	16	18	20	22	20	40	60	80
WEIGHT-O P.C.F.	100	110	120	130	140	150	STANDARD PENETRATION: N- ■	
COMPLETION DEPTH:	5.7 m				DATE DRILLED: 1982 11 30			
LOGGED BY:	JDM				DRAWING NO.:			

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practices. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit		HOLE NO.: BH 11		PROJECT NO.: 209-3723											
LOCATION: Dome Road Dawson City, Yukon		SURFACE ELEVATION:													
DRILL: CME 750 - solid flight augers															
SAMPLE TYPE: <input checked="" type="checkbox"/> THIN WALLED TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> DISTURBED <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE <input type="checkbox"/> OTHER															
DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE DEPTH (ft.)	WATER CONTENT-% : ●				COMPRESSIVE STRENGTH							
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)		Unconfined..... ▲ Pocket Penetrometer..... ▲ TSF 1 2 3 4 5 kPa 100 200 300 400								
	ORGANICS														
	SILT - sandy, trace of gravel, trace of clay, fine to coarse grained, moist, brown	ML	1												
			2	Seasonal Frost											
1			3												
			4												
			5												
2	GRAVEL - sandy, trace of silt, fine to coarse grained, damp, brown	GW	6												
			7												
			8												
	- cobbles		9												
3	- some silt, trace of sand	GM	10												
			11												
			12												
4	- same as above		13												
			14												
			15												
5	- same as above		16												
			17												
			18												
6	END OF HOLE (5.7 m)		19												
			20												
		DEPTH TO WATER: ↓ Dry at completion DEPTH TO SLOUGH: —		WET UNIT $\frac{KN}{m^3}$ 16 18 20 22 WEIGHT-O P.C.F. 100 110 120 130 140 150				STANDARD PENETRATION: N. ■ 20 40 60 80							
COMPLETION DEPTH: 5.7 m				DATE DRILLED: 1982 11 30											
LOGGED BY: JDM				DRAWING NO.:											

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practices. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit HOLE NO.: BH 12 PROJECT NO.: 209-3723

LOCATION: Dome Road SURFACE ELEVATION:
Dawson City, Yukon

DRILL: CME 750 - solid flight augers

SAMPLE TYPE: THIN WALLED TUBE SPLIT SPOON DISTURBED NO RECOVERY CORE OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS. SAMPLE	DEPTH (ft.)	WATER CONTENT-% : ●		COMPRESSIVE STRENGTH						
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)	Unconfined..... ▲ Pocket Penetrometer..... ▲ TSF 2 3 4 5 kPa 100 200 300 400						
1	ORGANICS SILT - sandy, trace of gravel, trace of clay, fine to coarse grained, moist, brown	ML	1									
			2									
			3									
			4									
			5									
2	- trace of sand, trace of clay		6									
			7									
			8									
			9									
3	GRAVEL - sandy, trace of silt, fine to coarse grained damp, moist	GW	10									
			11									
	- cobbles		12									
4	- silty, some sand	GM	13									
			14									
			15									
5	- same as above		16									
			17									
			18									
6	END OF HOLE (5.7 m)		19									
			20									


 DEPTH TO WATER: Dry at Completion 
 DEPTH TO SLOUGH: —

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22 20 40 60 80
 WEIGHT-O P.C.F. 100 110 120 130 140 150 STANDARD PENETRATION: N- ■
 COMPLETION DEPTH: 5.7 m DATE DRILLED: 1982 11 30
 LOGGED BY: JDM DRAWING NO.:

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit		HOLE NO.: BH 13		PROJECT NO.: 209-3723											
LOCATION: Dome Road Dawson City, Yukon		SURFACE ELEVATION:													
		DRILL: CME 750 - solid flight augers													
SAMPLE TYPE: <input checked="" type="checkbox"/> THIN WALLED TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE <input type="checkbox"/> OTHER															
DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS. SAMPLE	DEPTH (ft.)	WATER CONTENT-% : ●				COMPRESSIVE STRENGTH							
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)		Unconfined..... ▲ Pocket Penetrometer..... Δ								
				20	40	60	80	TSF 1 2 3 4 5 kPa 100 200 300 400							
	ORGANICS														
	SAND - silty, fine grained, low plasticity, moist, brown	SM	1												
			2	Seasonal Frost											
1	SILT - sandy, fine grained, low plasticity, moist, brown	ML	3												
	- same as above		4												
	- same as above		5												
	- same as above		6												
2	- same as above		7												
	- same as above		8												
	- same as above		9												
3	- same as above		10												
	- same as above		11												
	- same as above		12												
	- same as above		13												
4	- same as above		14												
	- same as above		15												
	- same as above		16												
5	SAND - trace of gravel, trace of silt, coarse grained, damp, olive brown	SW	17												
	- same as above		18												
	- same as above		19												
6	END OF HOLE (5.7 m)		20												
		DEPTH TO WATER: ↓ Dry at Completion		WET UNIT $\frac{KN}{m^3}$ 16 18 20 22				STANDARD PENETRATION: N- ■							
DEPTH TO SLOUGH: —		COMPLETION DEPTH: 5.7 m		WEIGHT-O P.C.F. 100 110 120 130 140 150				DATE DRILLED: 1982 11 30							
		LOGGED BY: JDM						DRAWING NO.:							

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit		HOLE NO.: BH 14		PROJECT NO.: 209-3723								
LOCATION: Dome Road Dawson City, Yukon		SURFACE ELEVATION:										
DRILL: CME 750 - solid flight augers												
SAMPLE TYPE: <input type="checkbox"/> THIN WALLED TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> DISTURBED <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE <input type="checkbox"/> OTHER												
DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE DEPTH (ft.)	WATER CONTENT-% : ●		COMPRESSIVE STRENGTH						
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)	Unconfined..... ▲ Pocket Penetrometer..... Δ						
				20	40	60	80	TSF 1	2	3	4	5
	ORGANICS											
	SILT - sandy, trace of clay, fine grained, damp, olive brown	ML	1									
			2									
	- same as above		3									
			4									
			5									
	GRAVEL - sandy, trace of silt, fine to coarse grained, damp, brown	GW	6									
			7									
	- cobbles		8									
			9									
	- same as above		10									
			11									
			12									
			13									
			14									
			15									
	- sandy, silty	GM	16									
			17									
			18									
	END OF HOLE (5.7 m)		19									
			20									
 DEPTH TO WATER: ↓ Dry at Completion DEPTH TO SLOUGH: —		WET UNIT $\frac{KN}{m^3}$		16	18	20	22	20 40 60 80				
		WEIGHT-O P.C.F.		100	110	120	130	140	150	STANDARD PENETRATION: N- ■		
LOGGED BY: JDM		COMPLETION DEPTH: 5.7 m		DATE DRILLED: 1982 11 30		DRAWING NO.:						

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit HOLE NO.: BH 15 PROJECT NO.: 209-3723

LOCATION: Dome Road Dawson City, Yukon SURFACE ELEVATION: DRILL: CME 750 - solid flight augers

SAMPLE TYPE: THIN WALLED TUBE SPLIT SPOON DISTURBED NO RECOVERY CORE OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE DEPTH (ft.)	WATER CONTENT-%				COMPRESSIVE STRENGTH					
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)	Unconfined..... ▲ Pocket Penetrometer..... Δ							
				20	40	60	80	TSF	1	2	3	4	5
				kPa					100	200	300	400	
	ORGANICS												
1	SILT - some sand, trace of clay, fine grained, low plasticity, damp, olive brown	ML	1										
	- same as above		2										
			3										
			4										
			5										
			6										
2	- same as above		7										
			8										
			9										
			10										
3	- same as above		11										
			12										
			13										
4	GRAVEL - sandy, silty, fine to coarse grained, damp, brown	GM	14										
			15										
			16										
			17										
5	- silty, some sand		18										
			19										
6	END OF HOLE (5.7 m)		20										


 DEPTH TO WATER: Dry at Completion
 DEPTH TO SLOUGH: —

WET UNIT $\frac{kN}{m^3}$ 16 18 20 22 20 40 60 80
 WEIGHT-O P.C.F. 100 110 120 130 140 150 STANDARD PENETRATION: N- ■

COMPLETION DATE
 DEPTH: 5.7 m DRILLED: 1982 11 30

LOGGED BY: JDM DRAWING NO.:

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit HOLE NO.: BH 16 PROJECT NO.: 209-3723

LOCATION: Dome Road Dawson City, Yukon SURFACE ELEVATION: DRILL: CME 750 - solid flight augers

SAMPLE TYPE: THIN WALLED TUBE SPLIT SPOON DISTURBED NO RECOVERY CORE OTHER

DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS. SAMPLE	DEPTH (ft.)	WATER CONTENT-% : ●		COMPRESSIVE STRENGTH						
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)	Unconfined..... ▲ Pocket Penetrometer..... Δ TSF 1 2 3 4 5 kPa 100 200 300 400						
	ORGANICS											
	SILT - sandy, trace of clay, fine grained, low plasticity, damp, olive brown	ML	1									
			2									
1	- same as above		3									
			4									
2	- same as above		5									
			6									
			7									
			8									
3	- some clay, trace of sand		9									
			10									
			11									
4	- same as above		12									
			13									
			14									
	- moist		15									
5			16									
			17									
			18									
6	END OF HOLE (5.7 m)		19									
			20									



DEPTH TO WATER: ↓ Dry at Completion
DEPTH TO SLOUGH: —

WET UNIT	16	18	20	22	20	40	60	80
WEIGHT-O P.C.F.	100	110	120	130	140	150	STANDARD PENETRATION: N. ■	
COMPLETION DEPTH:	5.7 m				DATE DRILLED: 1982 11 30			
LOGGED BY:	JDM				DRAWING NO.:			

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practice. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

PROJECT: Community Gravel Pit		HOLE NO.: BH 17		PROJECT NO.: 209-3723													
LOCATION: Dome Road Dawson City, Yukon		SURFACE ELEVATION:		DRILL: CHE 750 - solid flight augers													
SAMPLE TYPE: <input checked="" type="checkbox"/> THIN WALLED TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> DISTURBED <input type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE <input type="checkbox"/> OTHER																	
DEPTH (m.)	SOIL DESCRIPTION	UNIFIED SOIL CLASS.	SAMPLE DEPTH (ft.)	WATER CONTENT-%				COMPRESSIVE STRENGTH									
				PLASTIC LIMIT (W _p)	LIQUID LIMIT (W _L)	Unconfined..... ▲			Pocket Penetrometer..... Δ		TSF						
				20	40	60	80	1	2	3	4	5	kPa	100	200	300	400
1	ORGANICS SILT - sandy, fine grained, low plasticity, damp, olive brown - same as above	ML	1 2 3 4 5														
2	GRAVEL - some silt, trace of sand, fine to coarse grained, damp, brown - cobbles	GM	6 7 8 9 10 11 12 13 14 15 16 17 18														
3	- same as above																
4	- same as above																
5	- same as above																
6	END OF HOLE (5.7 m)		19 20														
		DEPTH TO WATER:  Dry at Completion DEPTH TO SLOUGH: —		WET UNIT $\frac{kN}{m^3}$ 16 18 20 22 WEIGHT-O P.C.F. 100 110 120 130 140 150				STANDARD PENETRATION: N- ■									
		COMPLETION DEPTH: 5.7 m		DATE DRILLED: 1982 11 30		LOGGED BY: JDM		DRAWING NO.:									

This log is a compilation of subsurface conditions and soil or rock classification obtained from the field as well as from laboratory testing of samples from the borehole. Soil zones have been interpreted according to commonly accepted practices. The change from one zone to another, as indicated on the log, may be transitional and approximate in nature. Groundwater conditions refer only to those observed at the times and places indicated and they may vary with time, geologic conditions, and construction activity.

EBA Engineering Consultants Ltd.

14535 - 118th AVENUE
EDMONTON, ALBERTA
Phone (403) 451-2121



5664 BURLEIGH CRES. S.E.
CALGARY, ALBERTA
Phone (403) 253-7121

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 1

Depth: -3.0 m

Soil Description: Sand, silty, gravelly, trace of clay

Cu: _____

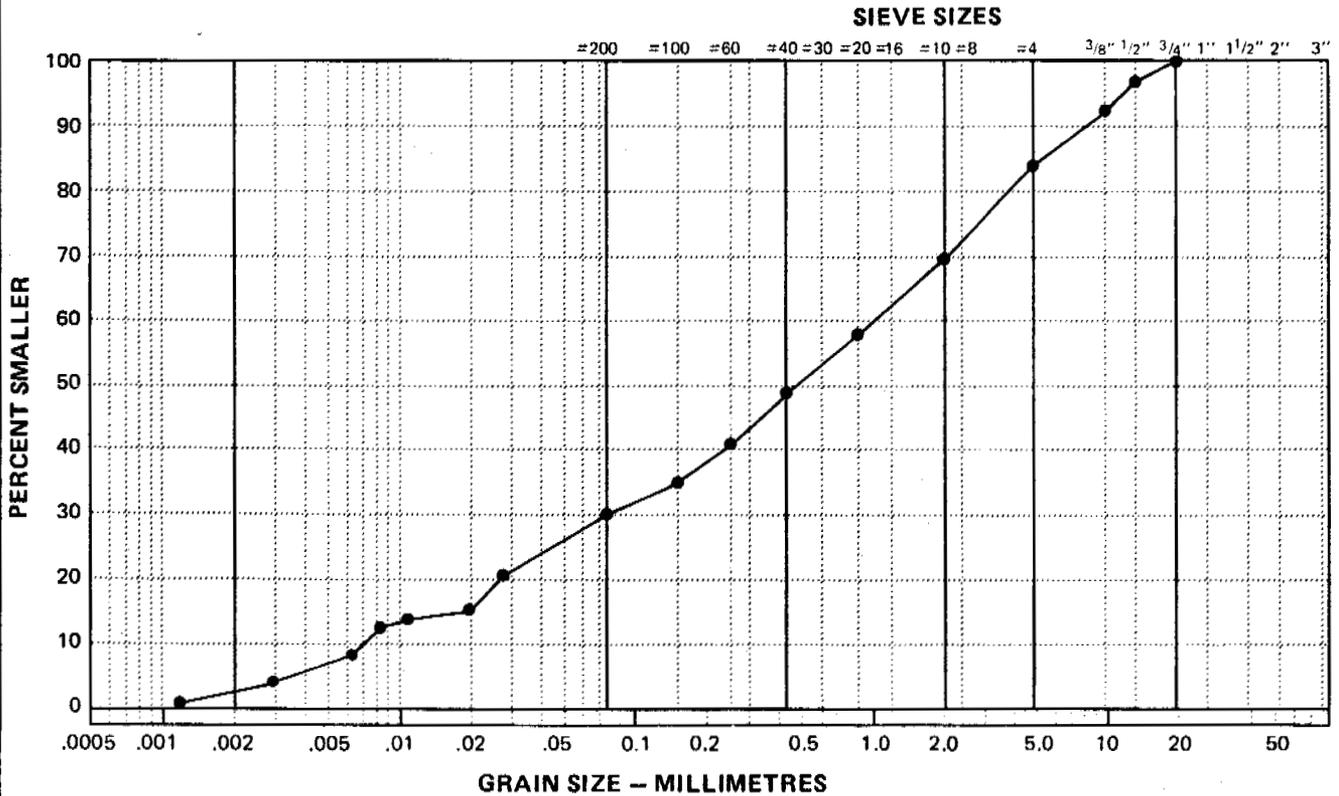
Cc: _____

Natural Moisture Content: 6.4 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	
3/4"	100
1/2"	97
3/8"	93
No. 4	84
No. 10	70
No. 20	58
No. 40	49
No. 60	41
No. 100	36
No. 200	30

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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EDMONTON, ALBERTA
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CALGARY, ALBERTA
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PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 2

Depth: -2.2 m

Soil Description: Gravel and sand, trace of silt

Cu: _____

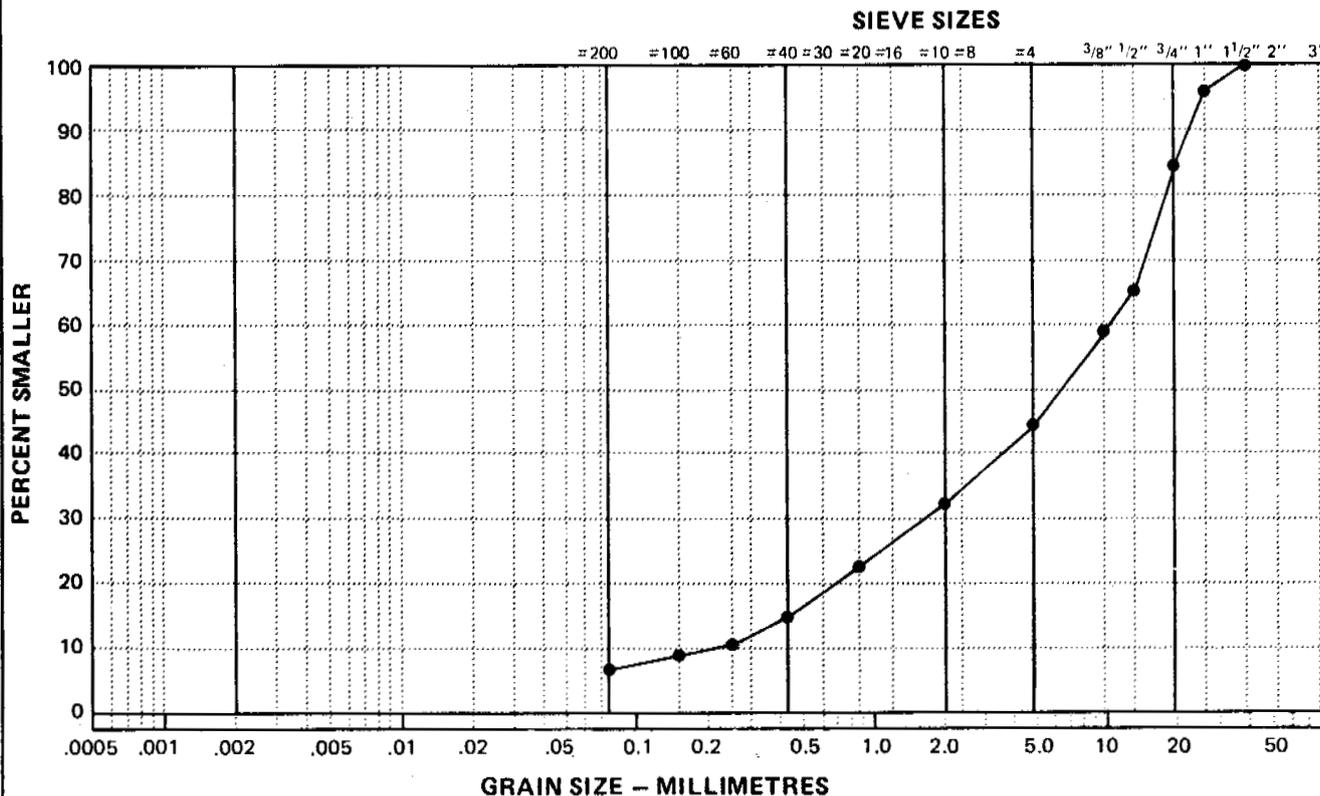
Cc: _____

Natural Moisture Content: 2.4 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	100
1"	97
3/4"	85
5/8"	66
3/8"	59
No. 4	45
No. 10	33
No. 20	23
No. 40	15
No. 60	11
No. 100	9
No. 200	7

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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EDMONTON, ALBERTA
Phone (403) 451-2121



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CALGARY, ALBERTA
Phone (403) 253-7121

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 3

Depth: -2.0 m

Soil Description: Gravel, sandy, some silt

Cu: _____

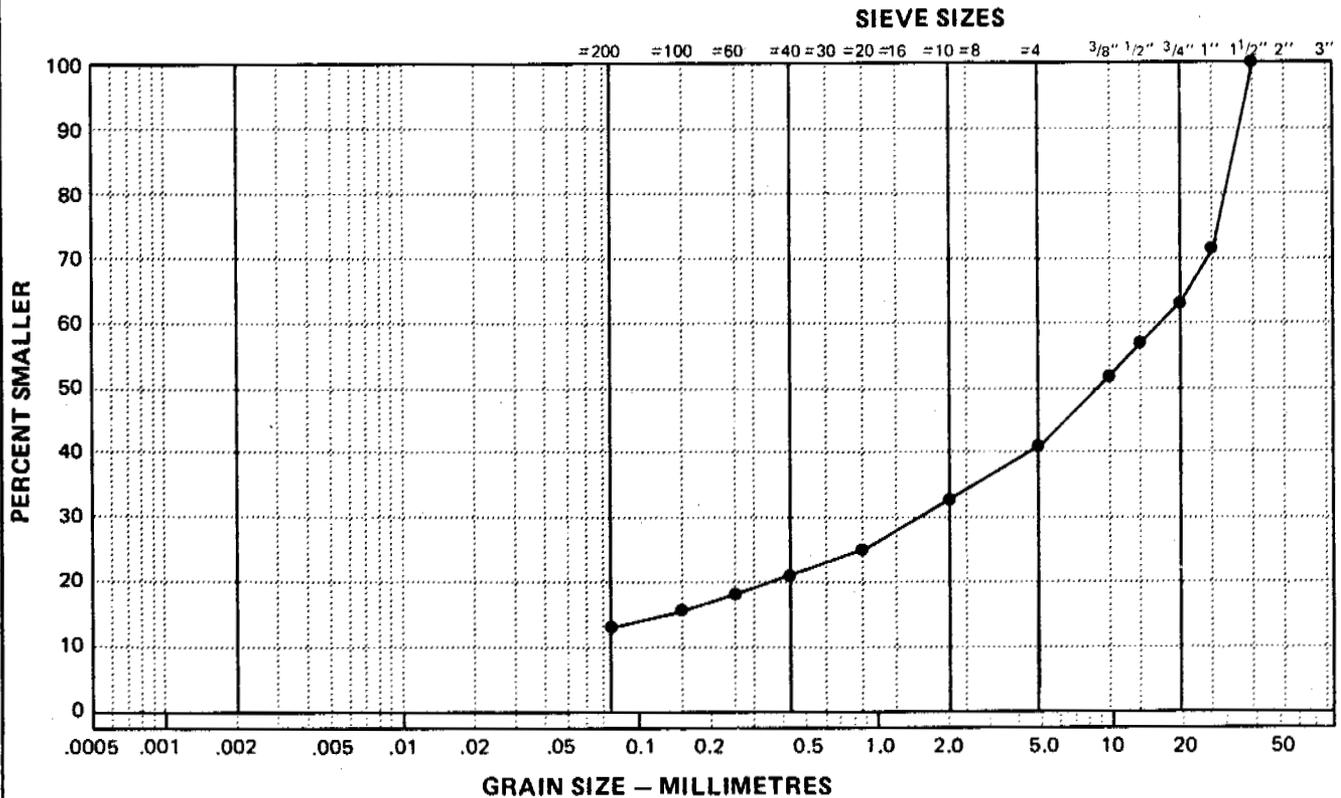
Cc: _____

Natural Moisture Content: 2.4 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	100
1"	72
3/4"	63
1/2"	57
3/8"	52
No. 4	41
No. 10	33
No. 20	26
No. 40	21
No. 60	18
No. 100	16
No. 200	13

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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Phone (403) 451-2121



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CALGARY, ALBERTA
Phone (403) 253-7121

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1982 01 06

Borehole Number: BH 5

Depth: -3.0 m

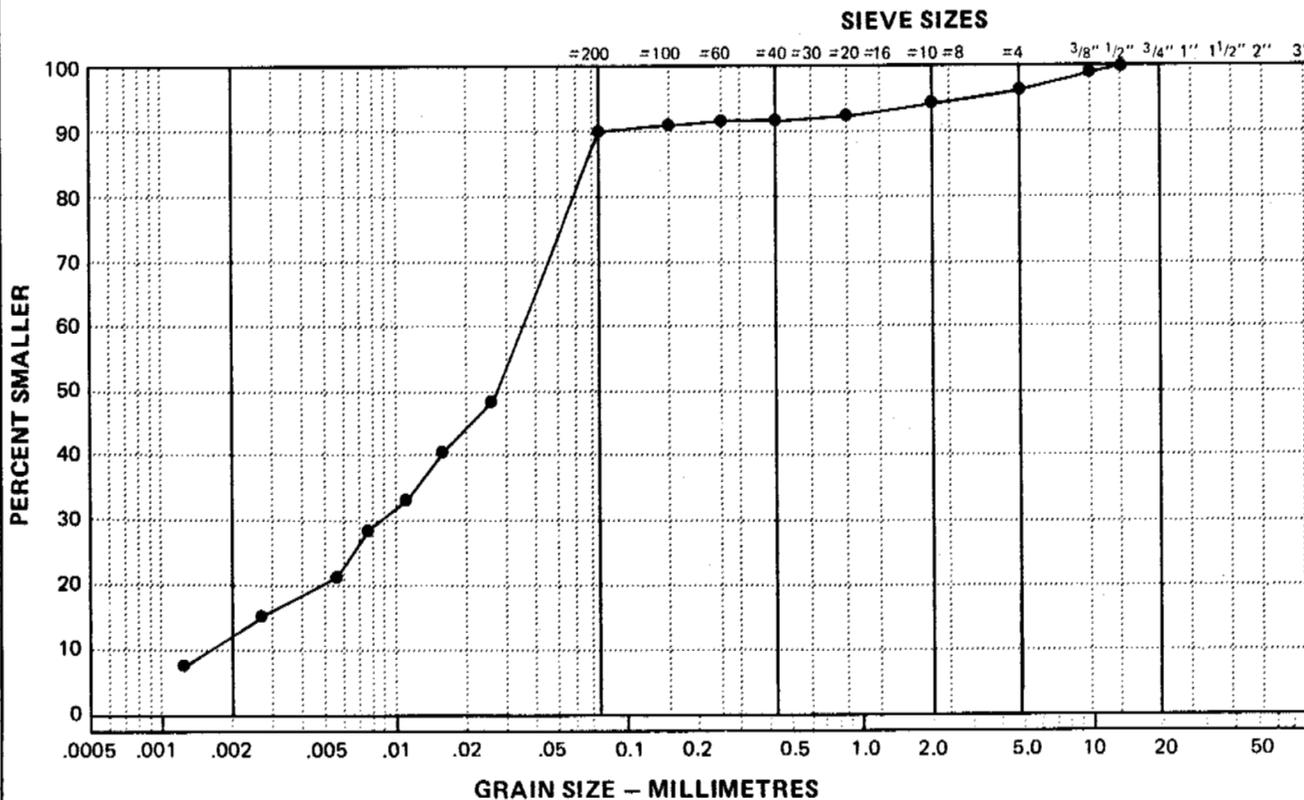
Soil Description: Silt, trace of clay, trace of sand,
Cu: trace of gravel
Cc:

Natural Moisture Content: 20.0 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	
3/4"	
1/2"	100
3/8"	99
No. 4	97
No. 10	95
No. 20	93
No. 40	92
No. 60	92
No. 100	91
No. 200	90

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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Phone (403) 451-2121



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CALGARY, ALBERTA
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PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 6

Depth: -2.0 m

Soil Description: Gravel, some silt, some sand

Cu: _____

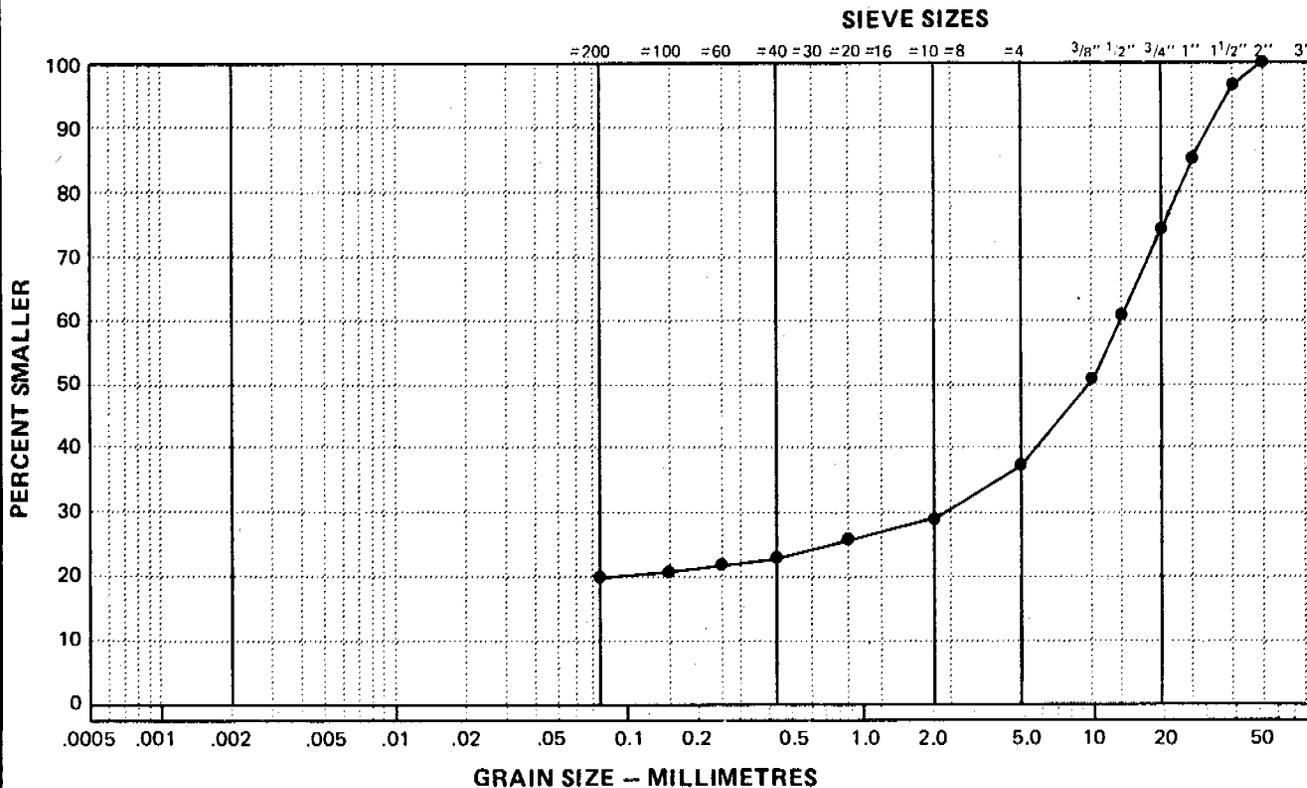
Cc: _____

Natural Moisture Content: 2.1 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	100
1½"	97
1"	86
¾"	75
½"	61
⅜"	51
No. 4	37
No. 10	29
No. 20	26
No. 40	23
No. 60	22
No. 100	21
No. 200	20

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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Phone (403) 451-2121



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CALGARY, ALBERTA
Phone (403) 253-7121

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 7

Depth: -3.0 m

Soil Description: Gravel, some sand, trace of silt

Cu: _____

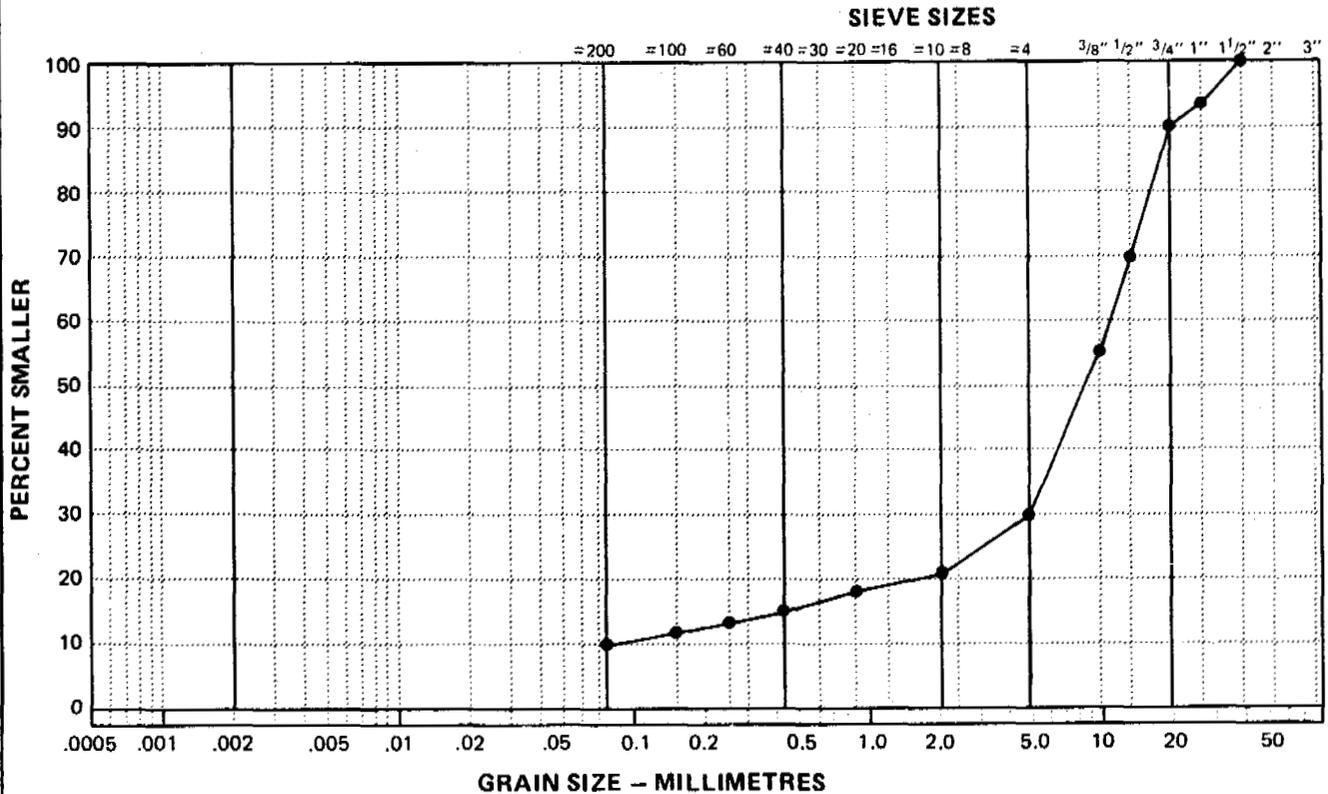
Cc: _____

Natural Moisture Content: 2.2 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1½"	100
1"	94
¾"	90
½"	70
⅜"	56
No. 4	30
No. 10	21
No. 20	18
No. 40	15
No. 60	13
No. 100	12
No. 200	10

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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Phone (403) 451-2121



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CALGARY, ALBERTA
Phone (403) 253-7121

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 8

Depth: -2.0 m

Soil Description: Sand, gravelly, some silt

Cu: _____

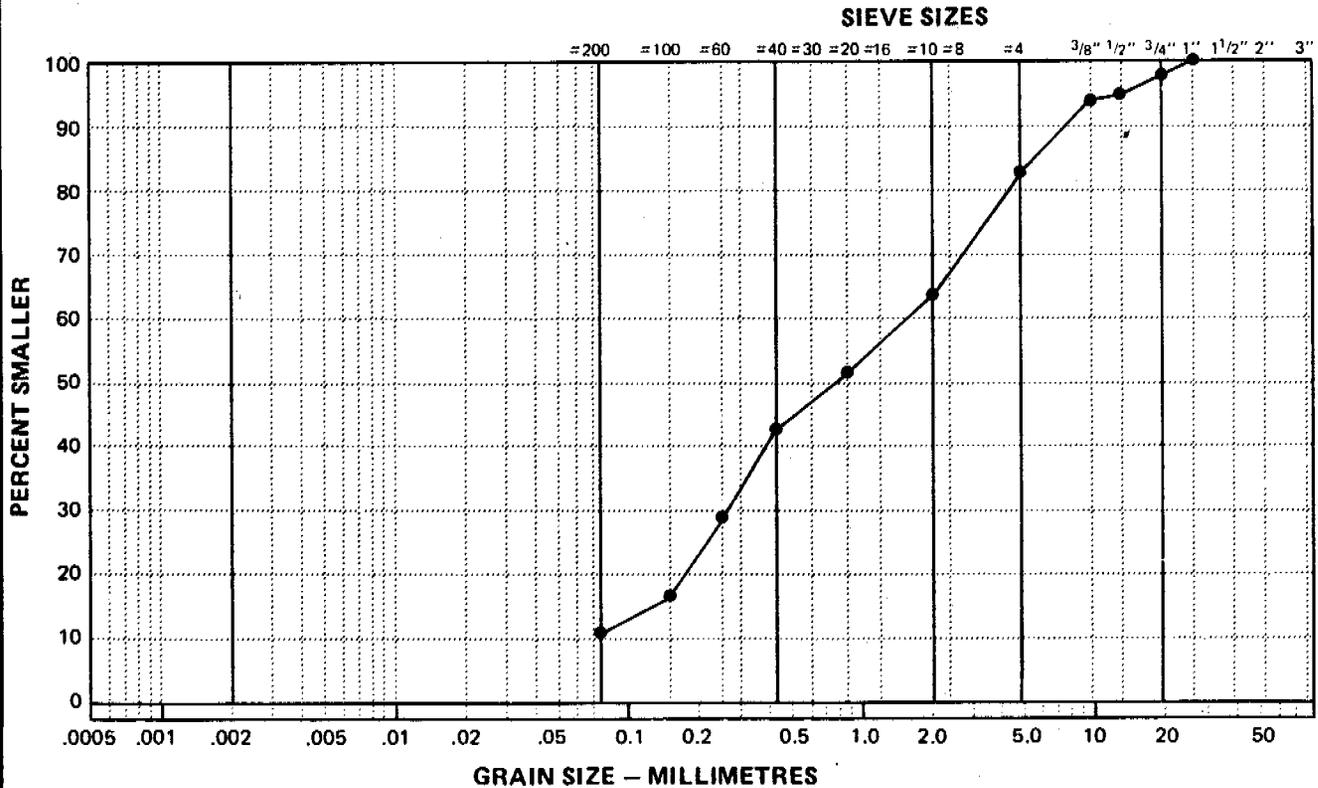
Cc: _____

Natural Moisture Content: 3.5 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	100
3/4"	98
1/2"	95
3/8"	94
No. 4	83
No. 10	64
No. 20	52
No. 40	43
No. 60	29
No. 100	17
No. 200	11

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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Phone (403) 451-2121



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CALGARY, ALBERTA
Phone (403) 253-7121

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 83 01 06

Borehole Number: BH 9

Depth: -4.0 m

Soil Description: Gravel, some sand, trace of silt

Cu: _____

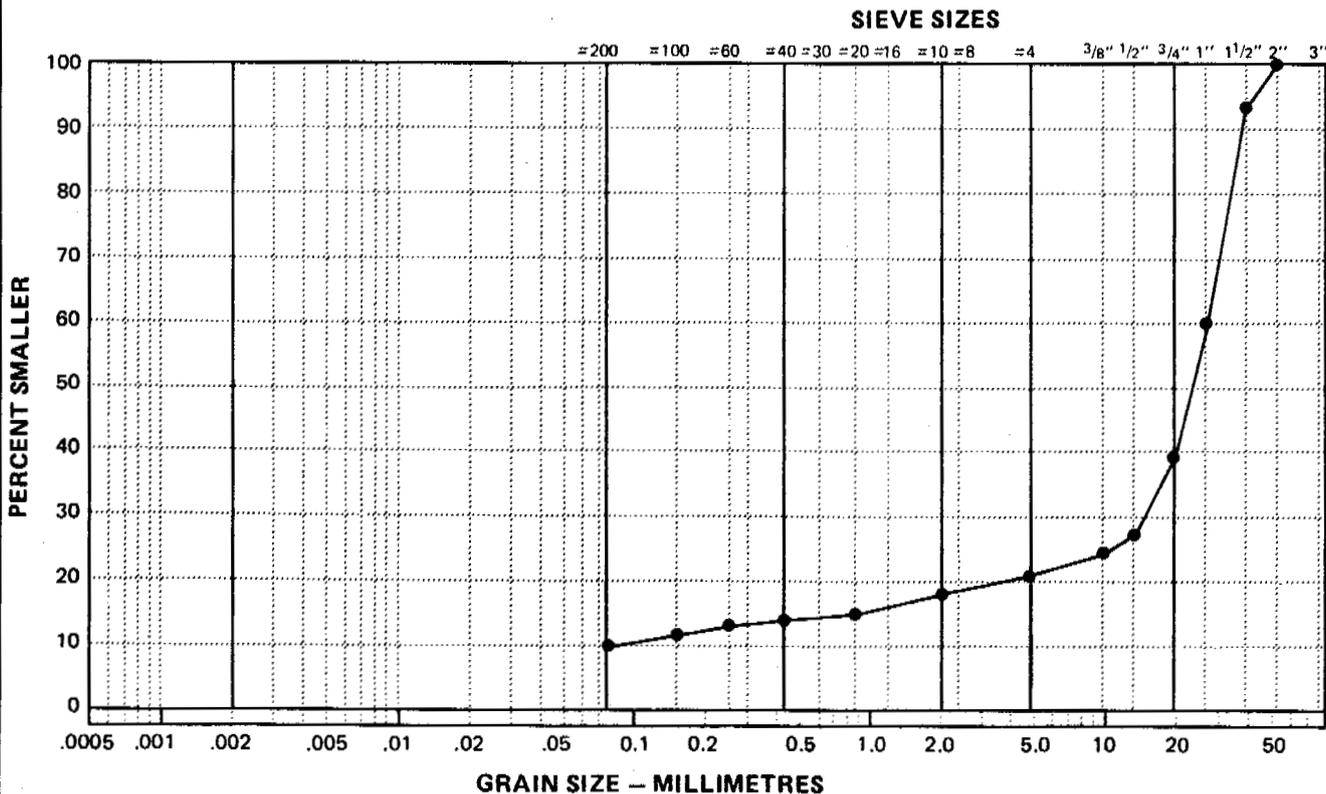
Cc: _____

Natural Moisture Content: 2.3 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	100
1½"	94
1"	60
¾"	39
½"	27
⅜"	25
No. 4	21
No. 10	18
No. 20	15
No. 40	14
No. 60	13
No. 100	12
No. 200	10

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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Phone (403) 451-2121



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CALGARY, ALBERTA
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PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 10

Depth: -3.0 m

Soil Description: Gravel, sandy, trace of silt

Cu: _____

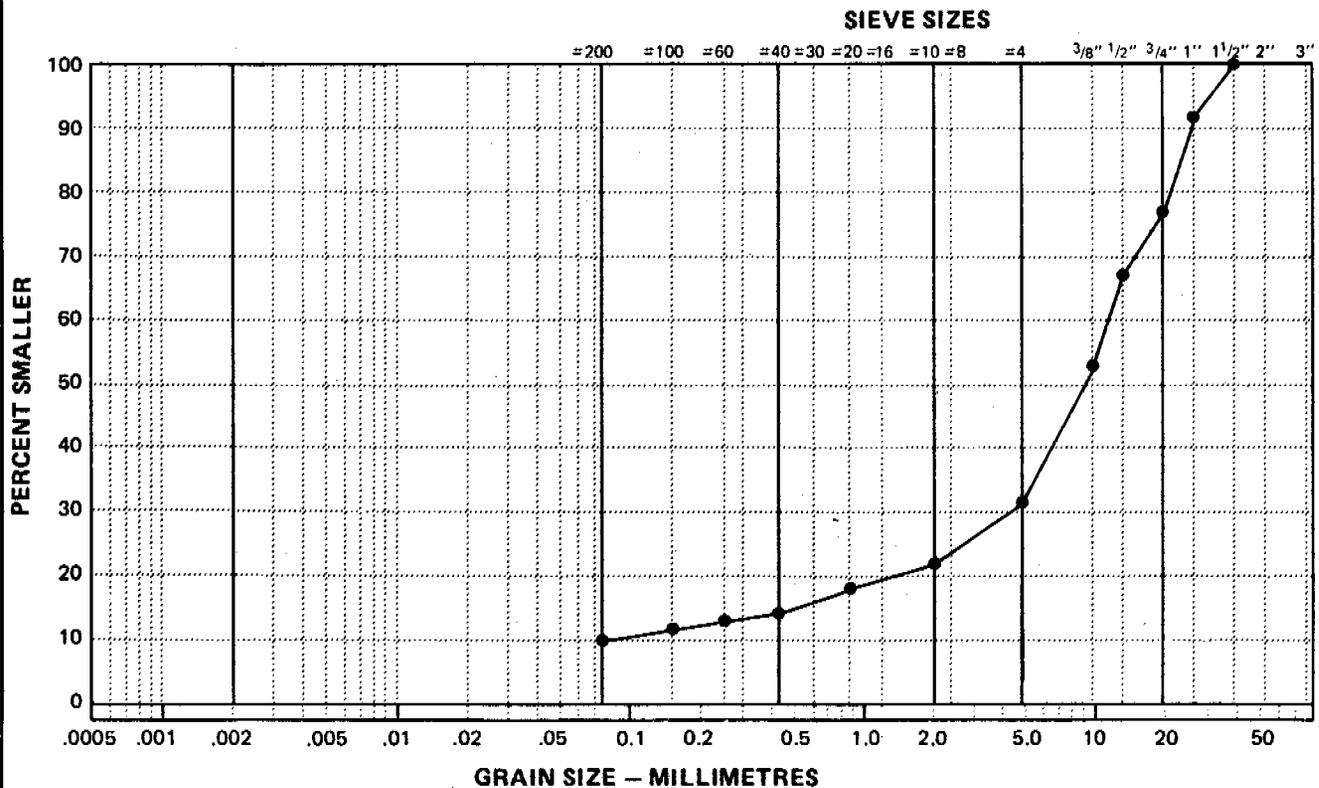
Cc: _____

Natural Moisture Content: _____ 1.8 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	100
1"	92
3/4"	87
1/2"	67
3/8"	53
No. 4	32
No. 10	22
No. 20	18
No. 40	15
No. 60	13
No. 100	12
No. 200	10

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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CALGARY, ALBERTA
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PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 11

Depth: -3.0

Soil Description: Gravel, some silt, trace of sand

Cu: _____

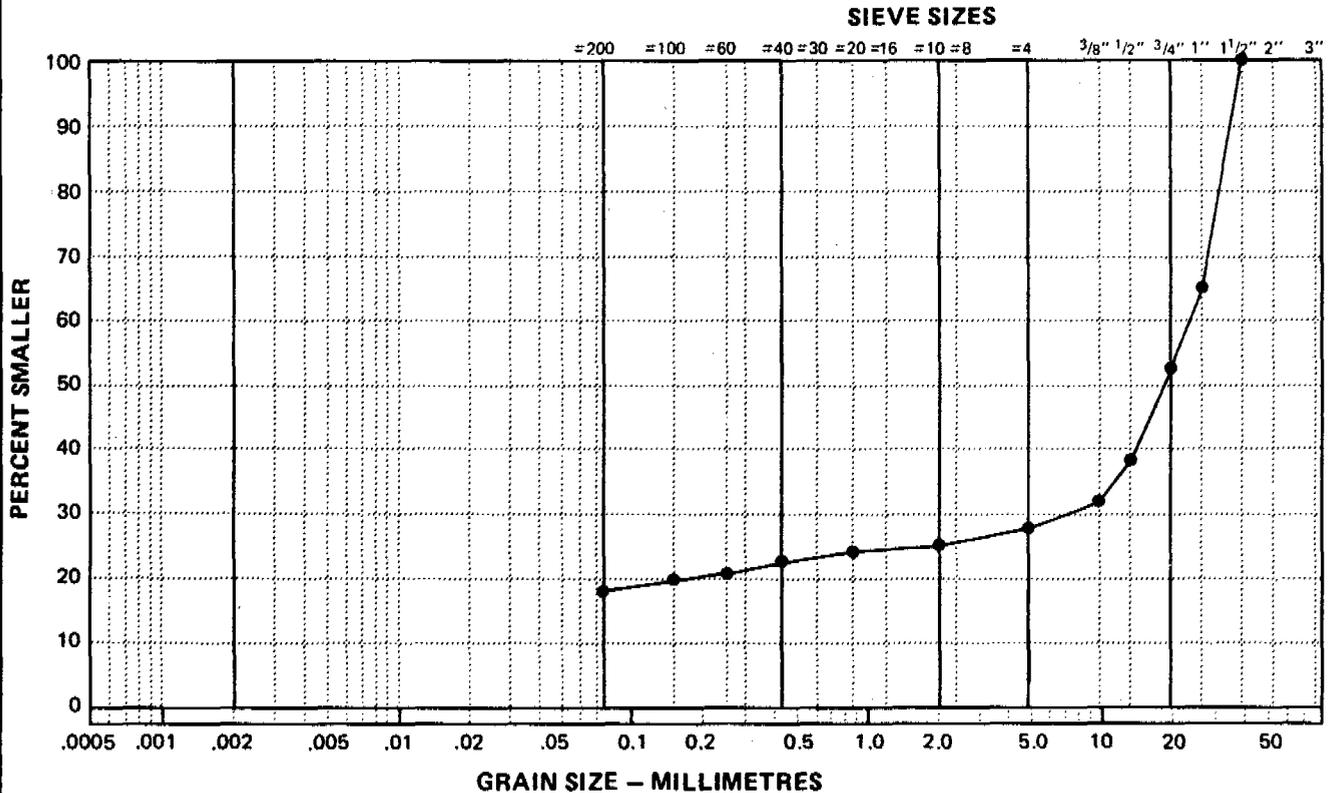
Cc: _____

Natural Moisture Content: 4.3 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1½"	100
1"	65
¾"	53
½"	38
⅜"	32
No. 4	28
No. 10	26
No. 20	25
No. 40	23
No. 60	21
No. 100	20
No. 200	18

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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14535 - 118th AVENUE
EDMONTON, ALBERTA
Phone (403) 451-2121



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CALGARY, ALBERTA
Phone (403) 253-7121

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1982 01 06

Borehole Number: BH 12

Depth: -2.0 m

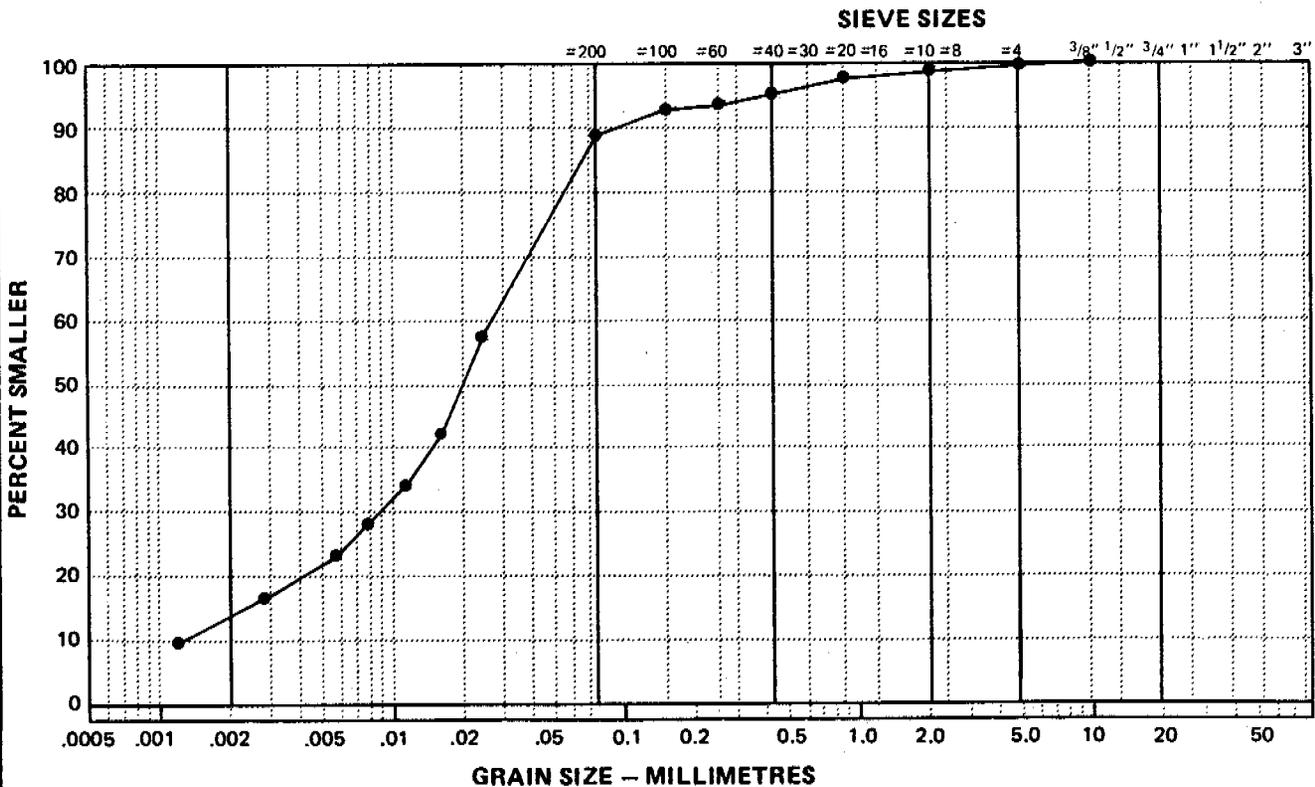
Soil Description: Silt, trace of sand, trace of clay,
Cu: trace of gravel
Cc:

Natural Moisture Content: 19.2 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	
3/4"	
1/2"	
3/8"	100
No. 4	99.7
No. 10	99.0
No. 20	98
No. 40	96
No. 60	94
No. 100	93
No. 200	89

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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EDMONTON, ALBERTA
Phone (403) 451-2121



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CALGARY, ALBERTA
Phone (403) 253-7121

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 12

Depth: -4.0 m

Soil Description: Gravel, silty, some sand

Cu: _____

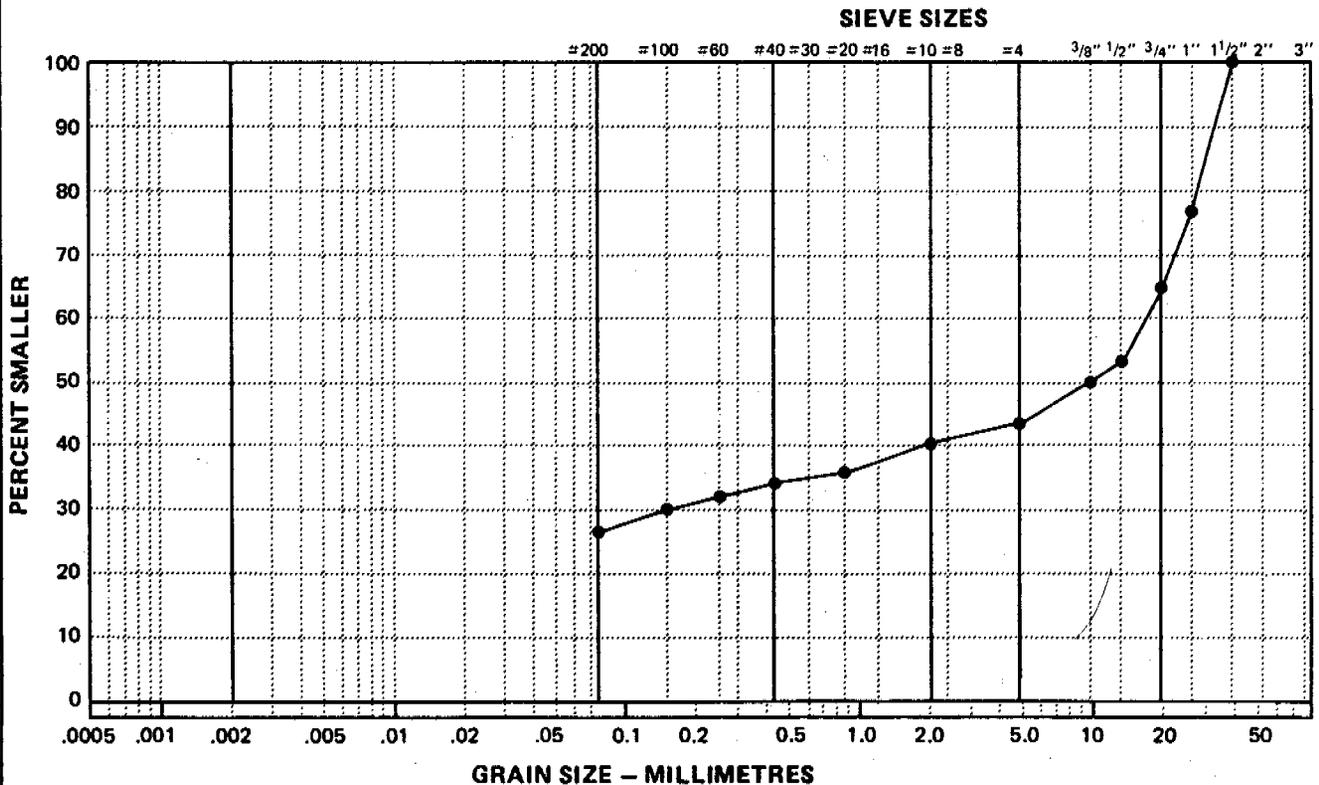
Cc: _____

Natural Moisture Content: 6.3 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	100
1"	77
3/4"	65
1/2"	54
3/8"	50
No. 4	44
No. 10	40
No. 20	36
No. 40	34
No. 60	34
No. 100	30
No. 200	27

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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CALGARY, ALBERTA
Phone (403) 253-7121

PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1982 01 06

Borehole Number: BH 14

Depth: -5.3 m

Soil Description: Gravel, sandy, silty

Cu: _____

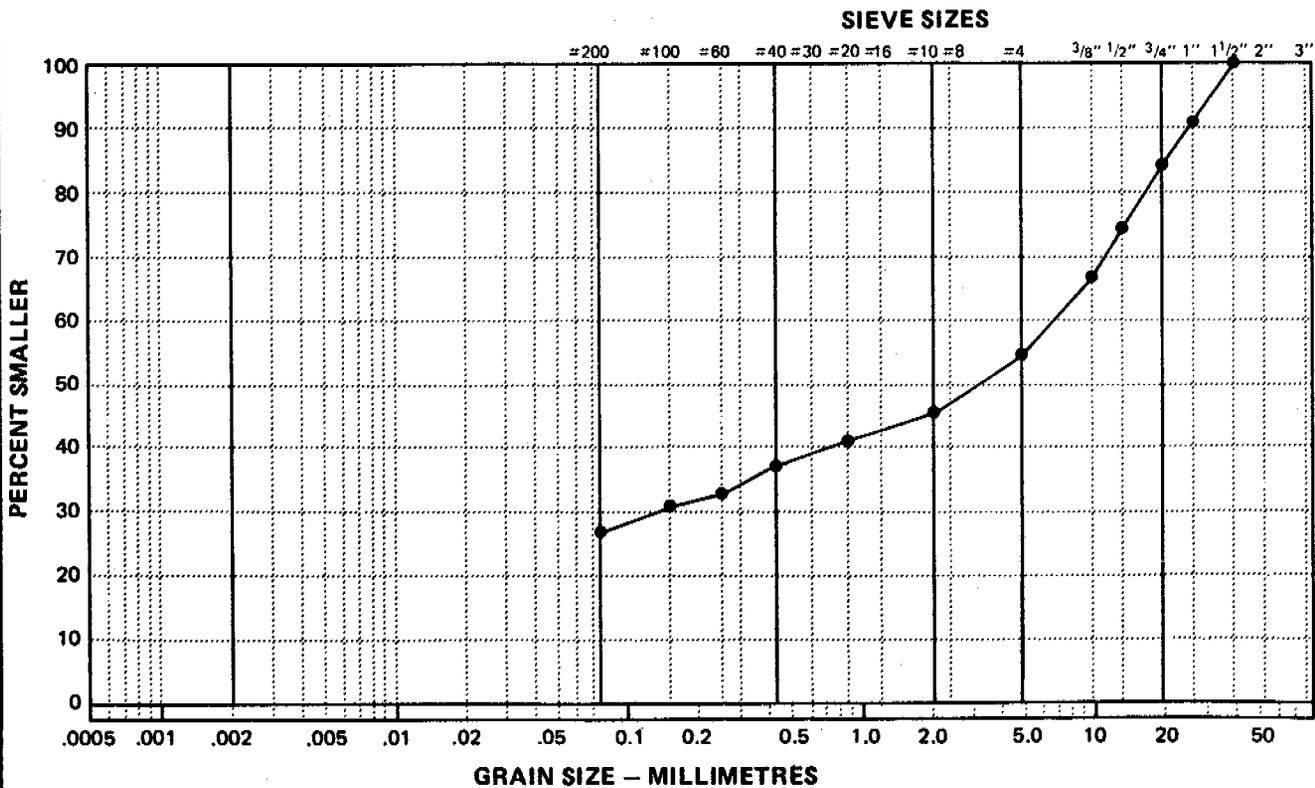
Cc: _____

Natural Moisture Content: 5.0 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	100
1"	91
3/4"	85
1/2"	75
3/8"	67
No. 4	55
No. 10	46
No. 20	41
No. 40	37
No. 60	33
No. 100	31
No. 200	27

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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CALGARY, ALBERTA
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PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 15

Depth: -2.0 m

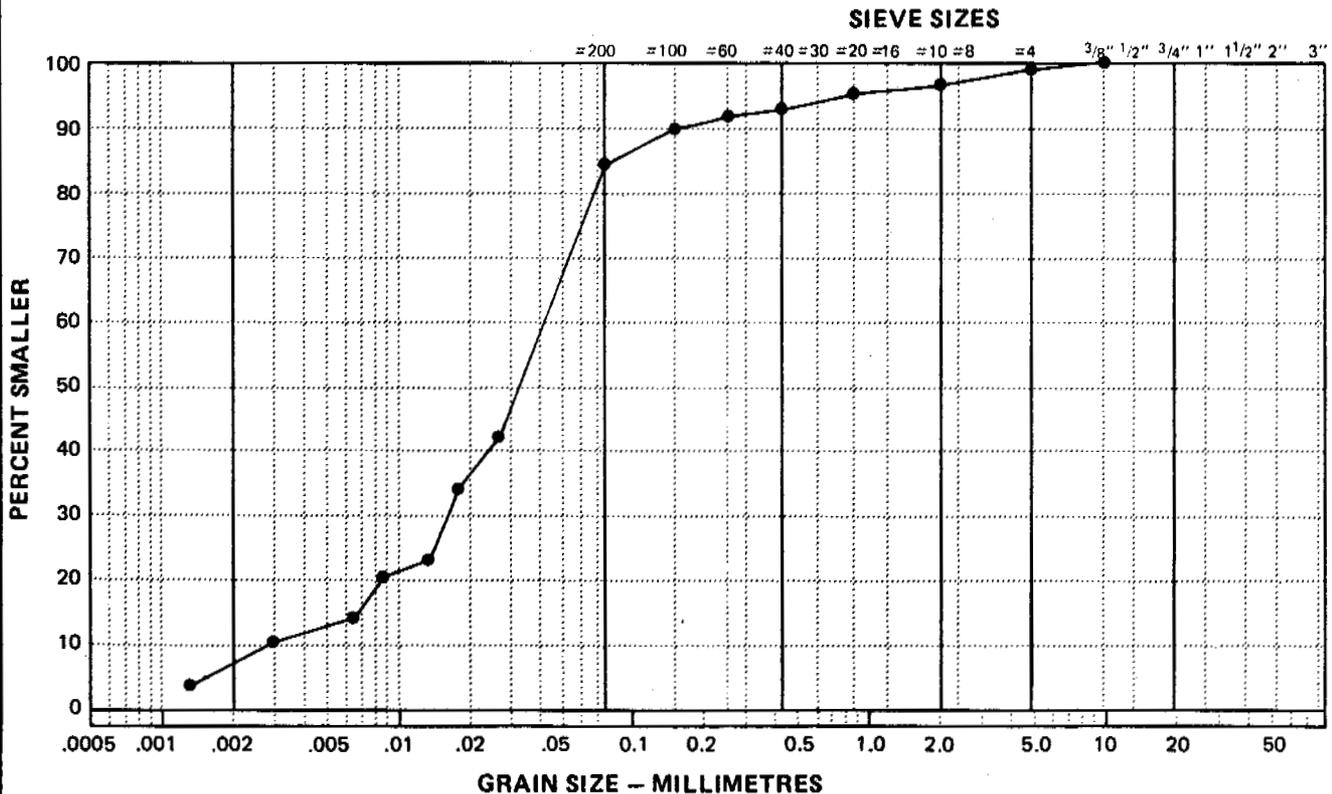
Soil Description: Silt, some sand, trace of clay, trace
Cu: of gravel
Cc: _____

Natural Moisture Content: 13.0 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	
3/4"	
1/2"	
3/8"	100
No. 4	99
No. 10	97
No. 20	96
No. 40	93
No. 60	92
No. 100	90
No. 200	85

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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EDMONTON, ALBERTA
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CALGARY, ALBERTA
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PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 10

Borehole Number: BH 15

Depth: -5.3 m

Soil Description: Gravel, silty, sandy, trace of clay

Cu: _____

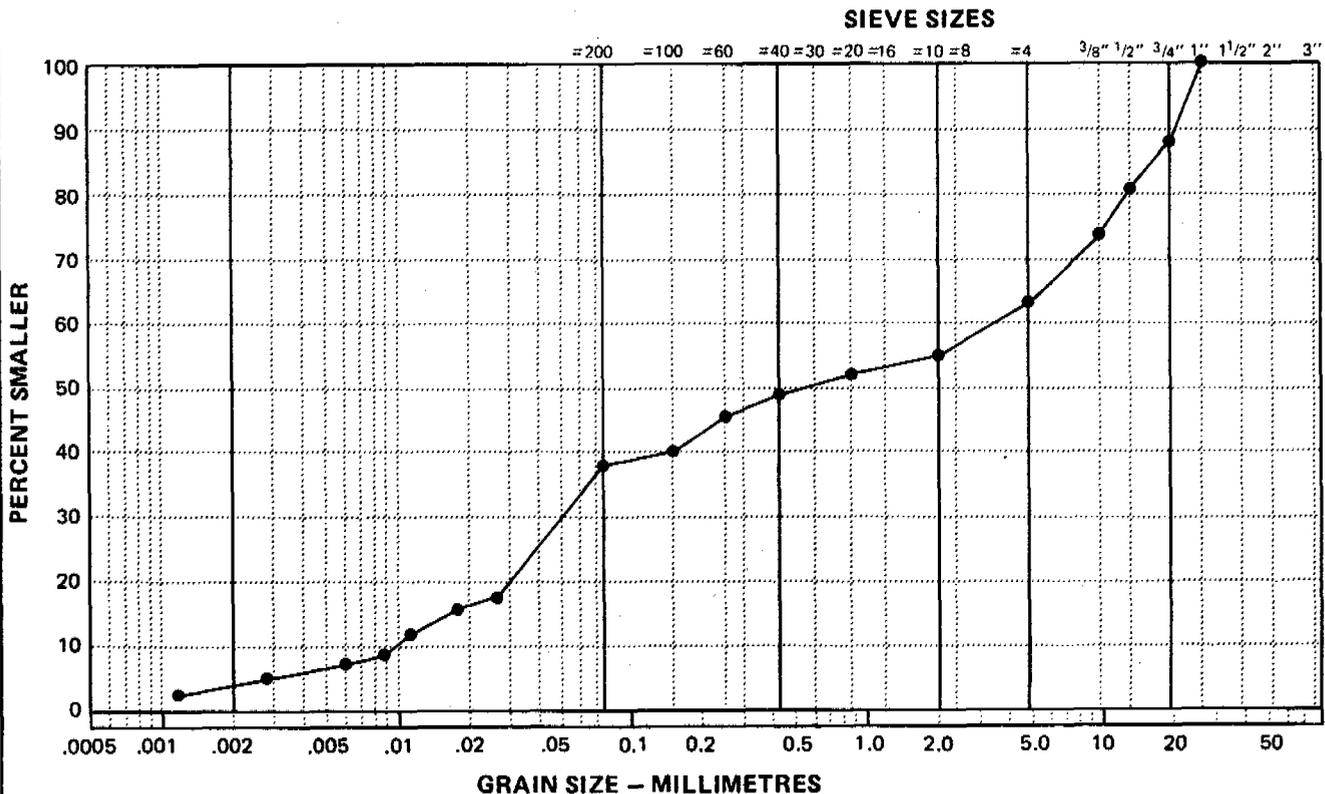
Cc: _____

Natural Moisture Content: 6.9 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	100
3/4"	88
1/2"	81
3/8"	74
No. 4	63
No. 10	56
No. 20	52
No. 40	49
No. 60	46
No. 100	40
No. 200	38

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 16

Depth: -3.0 m

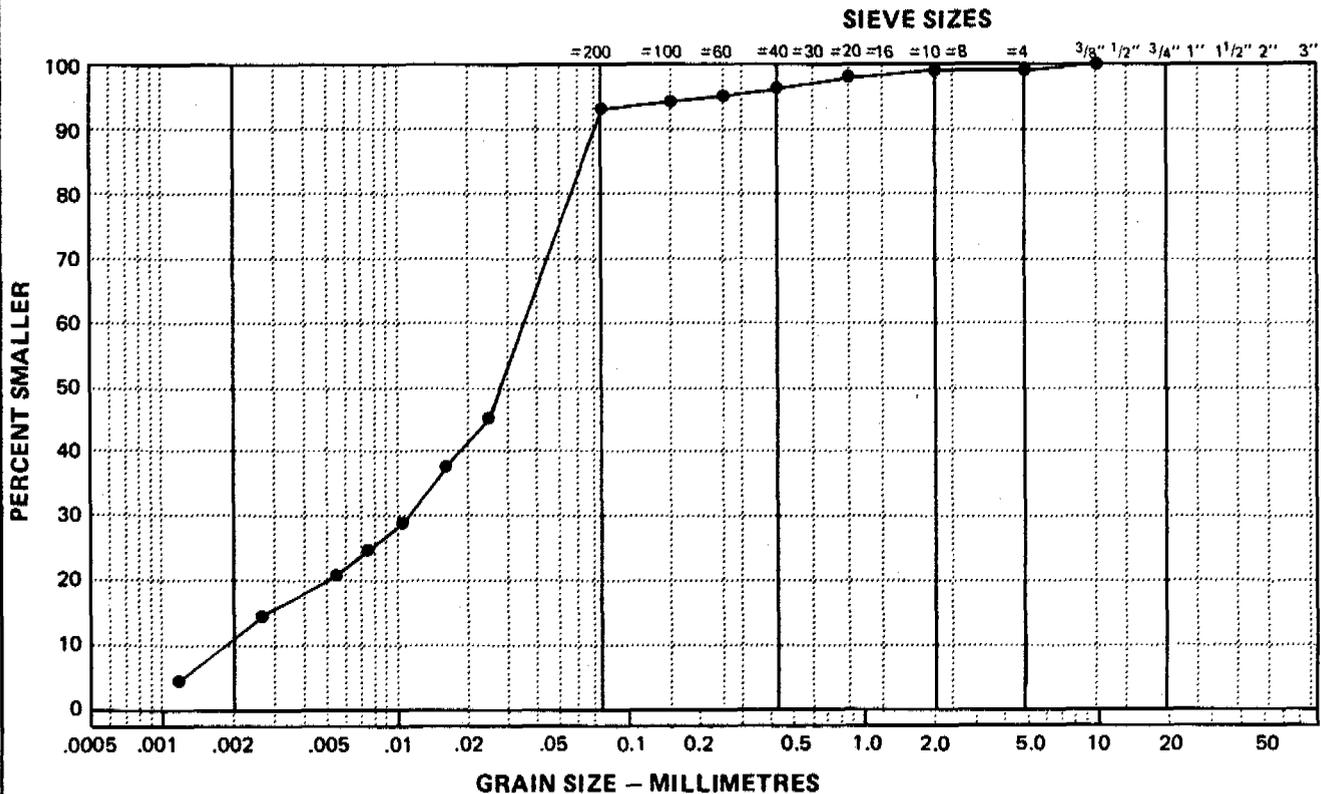
Soil Description: Silt, some clay, trace of sand, trace of
Cu: gravel
Cc:

Natural Moisture Content: 16.3 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	
1 1/2"	
1"	
3/4"	
1/2"	
3/8"	100
No. 4	99
No. 10	99
No. 20	98
No. 40	97
No. 60	96
No. 100	95
No. 200	94

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



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CALGARY, ALBERTA
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PARTICLE - SIZE ANALYSIS OF SOILS

Project: Community Gravel Pit
Dawson City, Yukon

Project Number: 209-3723

Date Tested: 1983 01 06

Borehole Number: BH 17

Depth: -3.0 m

Soil Description: Gravel, some silt, trace of sand

Cu: _____

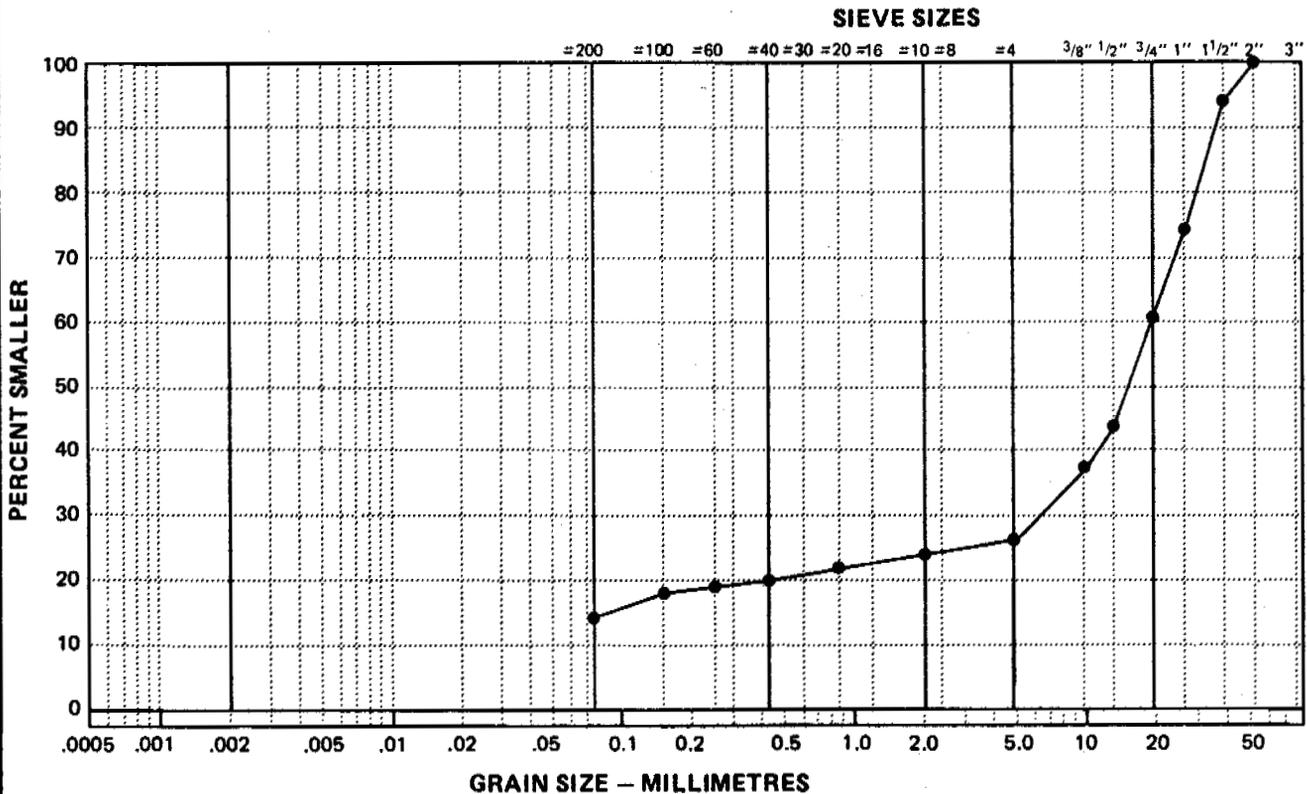
Cc: _____

Natural Moisture Content: 3.4 %

Remarks: _____

SIEVE	PERCENTAGE PASSING
3"	100
1 1/2"	94
1"	75
3/4"	61
1/2"	44
3/8"	37
No. 4	27
No. 10	24
No. 20	22
No. 40	20
No. 60	19
No. 100	18
No. 200	14

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



Tested in accordance with ASTM D422 unless otherwise noted.

PETROGRAPHIC ANALYSIS

SUMMARY OF RESULTS

(Size Fraction - passing 20 mm, retained on 10 mm)

<u>MINERALOGY</u>	<u>PERCENTAGE TOTAL SAMPLE</u>	<u>CLASSIFICATION *</u>
Quartzite	38.8	Good
Quartz/Mica Gneiss	16.5	Good
Greenstone (Quartz Banded), and Fine Grained Gneiss (Hornfels)	13.0	Fair
Quartz	11.1	Good
Weathered Quartz/Mica Gneiss	10.2	Poor
Chert	8.3	Fair
Limestone/Dolomite	2.1	Fair
	<hr/>	
	100 %	

* See Table 1 (next page) from CSA Standard Classification Table.

TABLE 1

CANADIAN STANDARDS ASSOCIATION
 CLASSIFICATION TABLE FOR
 CONCRETE AGGREGATE MINERALOGY

Rock Type	Classification
Carbonates (hard)	good
Carbonates (sandy, hard)	good
Sandstone (hard)	good
Gneiss (hard)	good
Quartzite (coarse grained)	good
Greywacke—Arkose	good
Volcanic (slightly weathered)	good
Granite—Diorite	good
Trap	good
Magnetite	good
Pyrite (disseminated in trap)	good
Iron Bearing Quartzite	good
Sedimentary Conglomerate (hard)	good
Carbonates (slightly weathered)	fair
Carbonates (sandy, medium hard)	fair
Sandstone (medium hard)	fair
Crystalline Carbonates (hard)	fair
Crystalline Carbonates (slightly weathered)	fair
Gneiss (soft)	fair
Chert and Cherty Carbonates	fair
Granite (friable)	fair
Volcanic (soft)	fair
Pyrite (pure)	fair
Flints and Jaspers	fair
Carbonates (soft, slightly shaly)	poor
Carbonates (soft, sandy)	poor
Carbonates (deeply weathered)	poor
Carbonates (shaly clay)	poor
Carbonates (ochreous)	poor
Chert and Cherty Carbonates (weathered)	poor
Sandstone (soft, friable)	poor
Quartzite (fine-grained)	poor
Crystalline Carbonates (very soft, porous)	poor
Gneiss (friable)	poor
Granite (friable)	poor
Encrustations	poor
Cementations	poor
Schist (soft)	poor
Ochre	deleterious
Shale	deleterious
Clay	deleterious
Decomposed Volcanics	deleterious
Slates	deleterious
Talc-Gypsum	deleterious
Iron Formations (very soft)	deleterious

