GR-999-013
Drawer #17

HOGGAN ENGINEERING & TESTING (1980) LTD.

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HOGGAN ENGINEERING & TESTING (1980) LTD.

GEOTECHNICAL SERVICES
CARMACKS BYPASS ROUTE
CARMACKS, YUKON
1998-1999

HOGGAN ENGINEERING & TESTING (1980) LTD.

REPORT NO.: 8002-254

GEOTECHNICAL SERVICES
CARMACKS BYPASS ROUTE
CARMACKS, YUKON
1998-1999

November 30, 1998

HOGGAN ENGINEERING
& TESTING (1980) LTD.
14 BURNS ROAD
WHITEHORSE, YUKON
Y1A 4Y9

HOGGAN ENGINEERING & TESTING (1980) LTD.

REPORT # 8002-254

GEOTECHNICAL SERVICES
CARMACKS BYPASS ROUTE
CARMACKS, YUKON
1998-1999

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HOGGAN ENGINEERING & TESTING (1980) LTD.

PROJECT: Geotechnical Services

LOCATION: Carmacks Bypass Route
Near Carmacks, Yukon

CLIENT: Government of Yukon
Community & Transportation Services
Transportation Engineering Branch
Box 2703
Whitehorse, Yukon
Y1A 2C6

ATTENTION: Mr. Bruce Fulcher, Geotechnical Services Manager

1.0 INTRODUCTION

The following report details the geotechnical investigation our firm conducted and includes the results of the drilling, sampling and testing program. The investigation was conducted for the proposed Carmacks Bypass Route, Carmacks, Yukon Territories.

The investigation was conducted along approximately 3600 meters of the cleared bypass right-of-way between the Mt. Nansen Rd. and the Klondike Highway. The objective of the investigation was to determine the subsurface soil conditions within the cleared right-of-way, at locations indicated by the Government of the Yukon, Community and Transportation Services, Transportation Engineering Branch, for evaluation of the material for suitability as embankment material.

Hoggan Engineering & Testing (1980) Ltd. was retained for this study with authorization to proceed granted by Mr. Dick Stilwell of the Y.T.G. Transportation Engineering Branch on October 26, 1998.

The field investigation was conducted between October 27, 1998 and November 3, 1998.

The scope of work undertaken by our firm is outlined in detail in our October 22, *1998 Geotechnical Services Proposal.*

2.0 GEOTECHNICAL INVESTIGATION

The methodology for the geotechnical investigation consisted of conducting a drilling, sampling and laboratory testing program. A detailed description of each facet of the investigation conducted is described below.

2.1 Drilling Program

The drilling program was conducted between October 27, 1998 and November 3, 1998 utilizing a CME 75 drill mounted on an FN 60 Flextrak Nodwell supplied and operated by *15317 Yukon Inc.*. Solid stem augers (150 mm) were utilized to obtain representative disturbed samples of the underlying unconsolidated materials to assess suitability for use as roadway embankment material.

The field program included drilling a total of ten testholes at predetermined locations within the existing cleared right-of-way (please see Appendix A- Site Sketch). Testhole locations were determined relative to existing benchmarks, centerline stakes, and landforms. Testholes were advanced between 4.27 meters and 16.13 meters with an average depth of 9.77 meters.

Testholes drilled include the following;

T.H. # 2-98, T.H. # 3-98, T.H. # 4-98, T.H. # 4A-98, T.H. # 5-98, T.H. # 6-98, T.H. # 7-98, T.H. # 8-98, T.H. # 10-98, T.H. # 11-98.

Testholes # 1-98 and # 9-98 were advanced as part of the Nordenskiold River Crossing bridge foundation evaluation and are enclosed under our separate report- *Nordenskiold River Crossing.*

Where possible, an effort was made to locate testholes within the designed roadway and in particular within the designed ditch areas. However, due to extremely steep grades that were encountered within the cleared right-of-way, several testholes were advanced at alternate

locations perceived to provide relevant information regarding subsurface soil conditions. These include;

T.H. # 4-98, T.H. # 4A-98, T.H. # 6-98, T.H. # 10-98

The specific soil conditions at each testhole location are described in detail on the individual testhole soil logs provided in Appendix B-Testhole Soil Logs.

Each testhole soil log contains the following information.

i). Soil description for each stratum encountered
ii). USC/NRC classification
iii). Depths at which changes in soil stratigraphy occurs
iv). Sample depths and types
v). Physical laboratory test results
vi). Watertable and seepage zones encountered

2.2 Sampling Program

During sampling, all samples were visually classified in the field with continuous field soil logs maintained. A total of 72 soil samples were retrieved during the sampling program. Disturbed hand samples were retrieved from off the solid stem auger at regular intervals or at significant changes within the soil stratum. These samples were subsequently bagged for further classification and analysis in the laboratory.

2.3 Laboratory Program

All unconsolidated soil samples were visually classified in *Hoggan Engineering & Testing (1980) Ltd.,* Whitehorse laboratory facility to confirm field testhole logs.

Laboratory testing conducted in our Whitehorse facilities consisted of moisture content determination and visual soil classification on all 72 samples obtained. Selected samples were then chosen for sieve analysis in order to verify and enhance field classification regarding the soil types encountered, highlight soil engineering properties and/or when such testing would help classify marginal samples.

Grainsize analyses were conducted on 46 selected samples.

Laboratory test results are included in Appendix B – Testhole Soil Logs and on the individual test summary sheets enclosed in Appendix C.

3.0 SUBSURFACE SOIL CONDITIONS

Based upon field observations, the subsurface soil conditions appear to be dominated by glacial ice contact deposits varying from ablation till, esker deposits and similar glacially derived material. Materials encountered during the subsurface drilling program varied widely between gravelly sandy silt with a trace of clay to sandy gravels with cobbles and possible boulders.

The soils encountered within the Carmacks Bypass Route would generally be considered suitable for roadway construction common borrow. However, of note would be the following;

Frozen Material

Frozen materials were encountered at T.H. # 2-98, T.H. # 10-98 & T.H. # 11-98 at various depths. The frozen material varied between a 3.5 meter ice lens with traces of soil (encountered in T.H. # 2-98) to non-ice rich silty sandy gravels (Nbn)(encountered in T.H. # 10-98 and T.H. # 11-98).

Oversize Materials

Typical of glacial ice contact deposits, cobbles and boulder sized materials were encountered at random depths at all testhole locations.

Groundwater

No freeflowing groundwater was or seepage zones were noted during the drilling program.

Detailed subsurface soil conditions encountered at each testhole location are presented in detail in Appendix B – Testhole Soil Logs.

Photographic documentation of the site is located in Appendix D.

4.0 CLOSURE

This report has been prepared for the exclusive and confidential use of the Government of Yukon, C&TS, Transportation Engineering Branch and applies only to the geotechnical investigation performed at the study area described above. The recommendations provided herein are based on the information collected during the investigation, subsurface soil conditions encountered during the field work program, current investigative techniques, and generally accepted engineering practices. Due to the geological randomness of many soil formations, no interpolation of soil conditions between testholes has been made or implied. Soil conditions are known only at testhole locations. Should other soils be encountered at any time or other pertinent information become available, the recommendations may be altered or modified in writing by the undersigned.

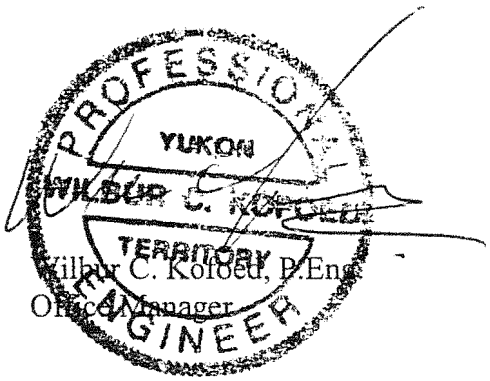
HOGGAN ENGINEERING & TESTING (1980) LTD.

Thank you for the opportunity to provide this service to your organization. If you should have any questions or comments, please do not hesitate to contact the undersigned at your convenience.

Yours truly,

J.R. PAINE & ASSOCIATES LTD.

Tares Dhara, P.Eng.
Project Engineer



Wilbur C. Kofoed, P.Eng.
Office Manager

Attached: Appendices A-D

TD/td

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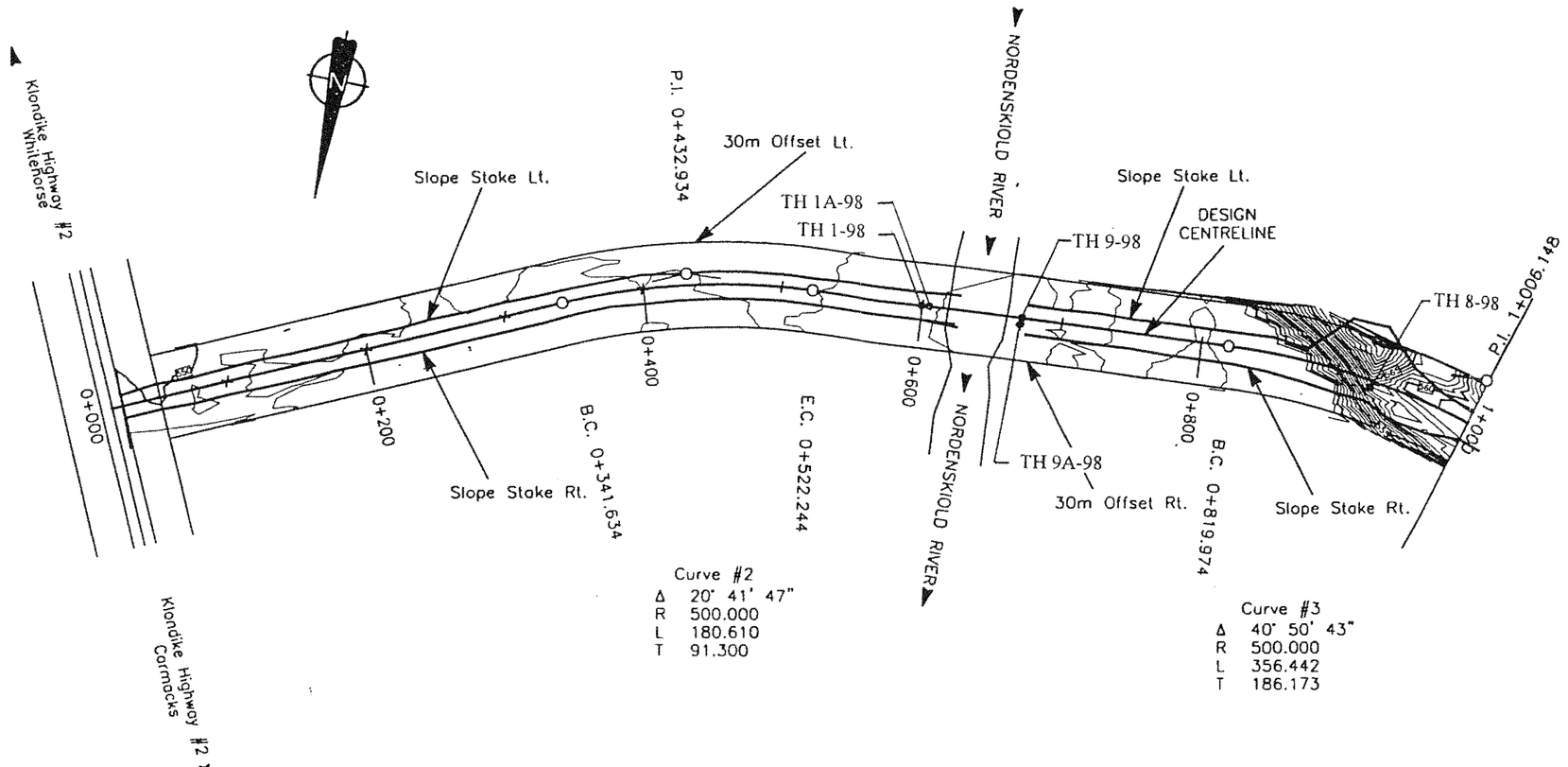
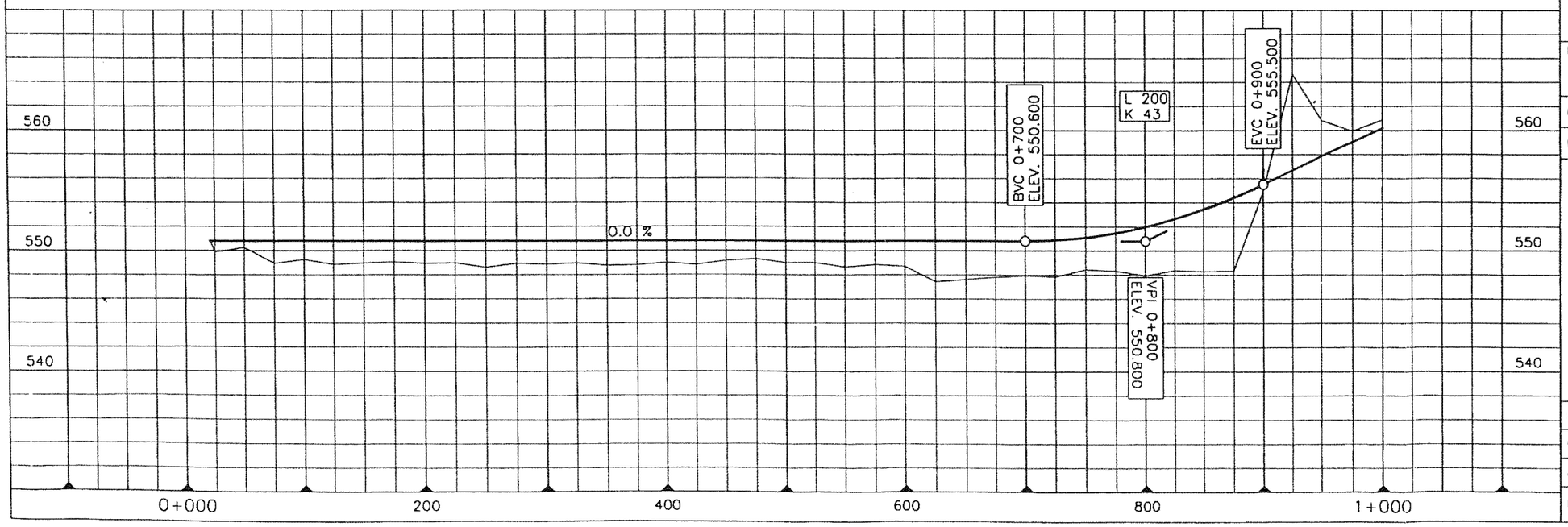
Appendix A – Testhole Locations





Yukon
Community and Transportation Services
Transportation Engineering Branch

NOTES:

1. CONTOUR INTERVAL 1m
2. DESIGN GRADELINE SHOWN IS TOP OF SUBGRADE

PROJECT:
PROPOSED CARMACKS BYPASS
km 0.0 – km 5.3

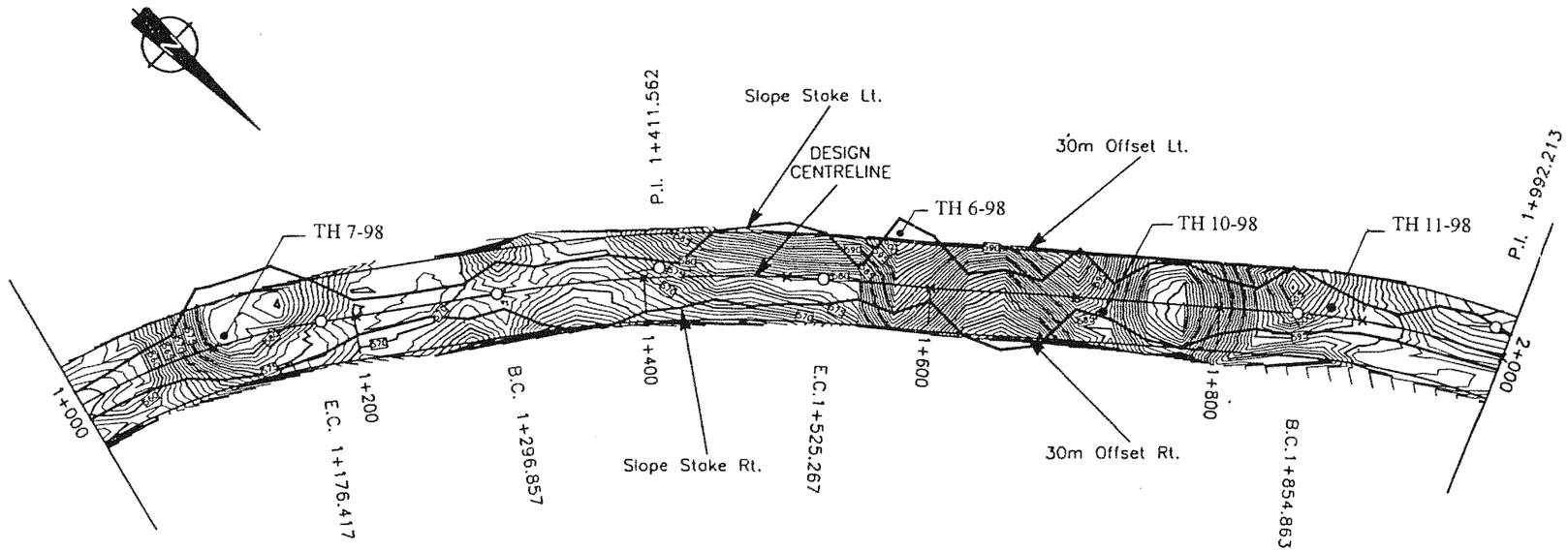
DRAWING TITLE:
0+021 – 1+000

DATE:
HORIZONTAL SCALE: 1:4,000
DRAWN:
VERTICAL SCALE: 1:400

DRAFT

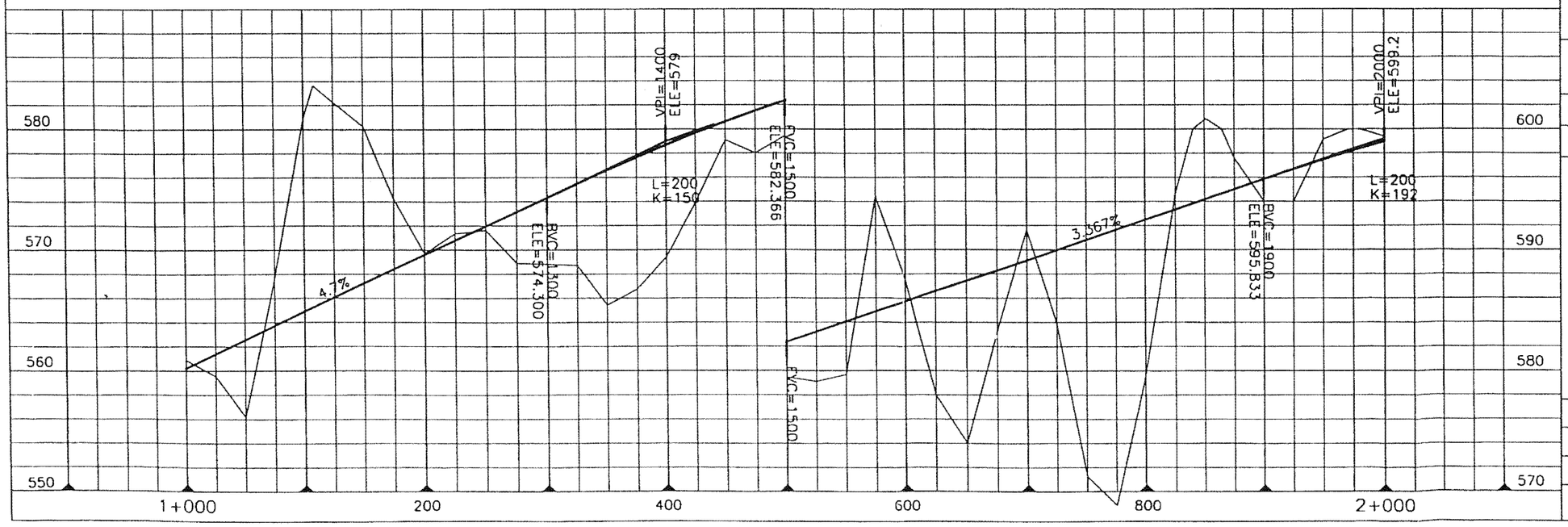
DESIGN:
CHECKED:
APPROVED:

DRAWING NO. CBP00298
SHEET 2 of 7



Curve #4
Δ 13° 05' 13"
R 1000.000
L 228.410
T 114.704

Curve #5
Δ 30° 43' 14"
R 500.000
L 268.087
T 137.350



Yukon
Community and Transportation Services
Transportation Engineering Branch

NOTES:

1. CONTOUR INTERVAL 1m
2. DESIGN GRADELINE SHOWN IS TOP OF SUBGRADE

PROJECT:
PROPOSED CARMACKS BYPASS
km 0.0 – km 5.3

DRAWING TITLE:
1+000 – 2+000

DATE:
HORIZONTAL SCALE: 1:4,000
DRAWN:
VERTICAL SCALE: 1:400

DRAFT

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CHECKED:
APPROVED:

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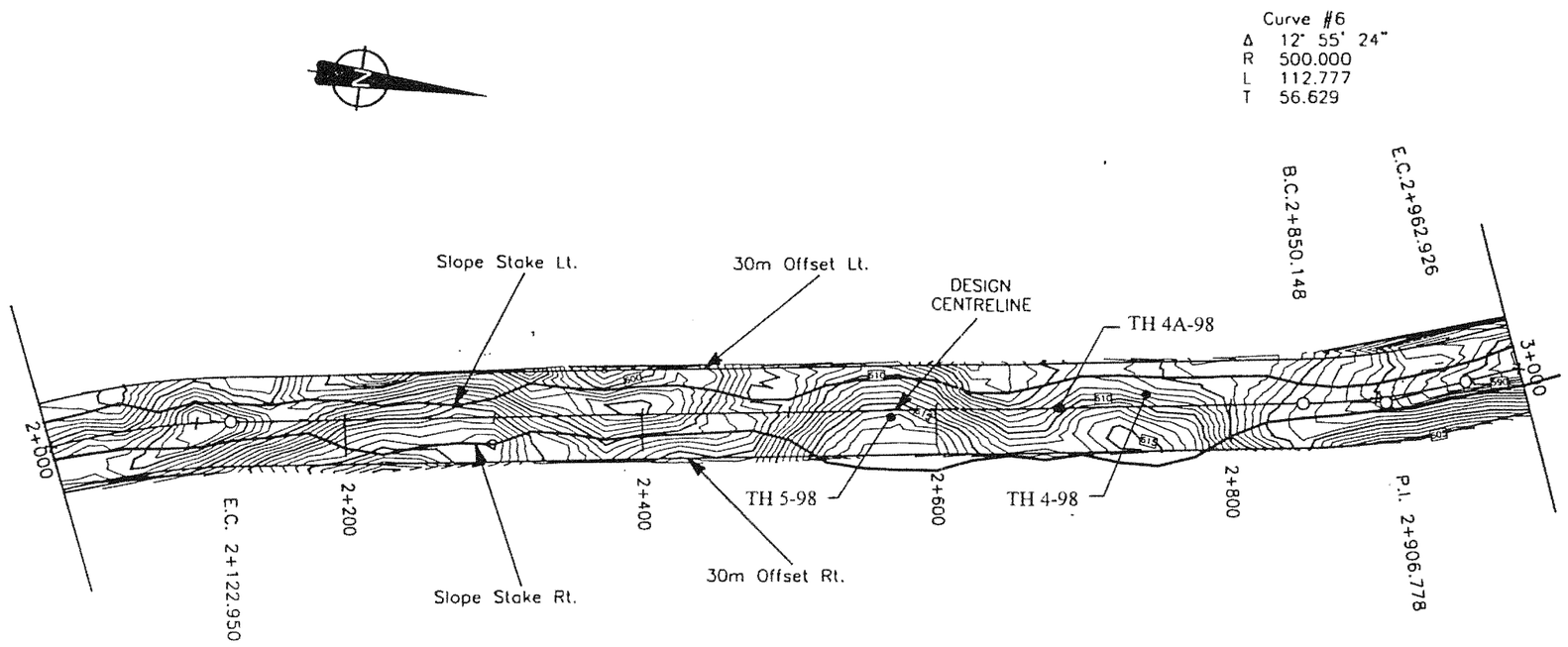
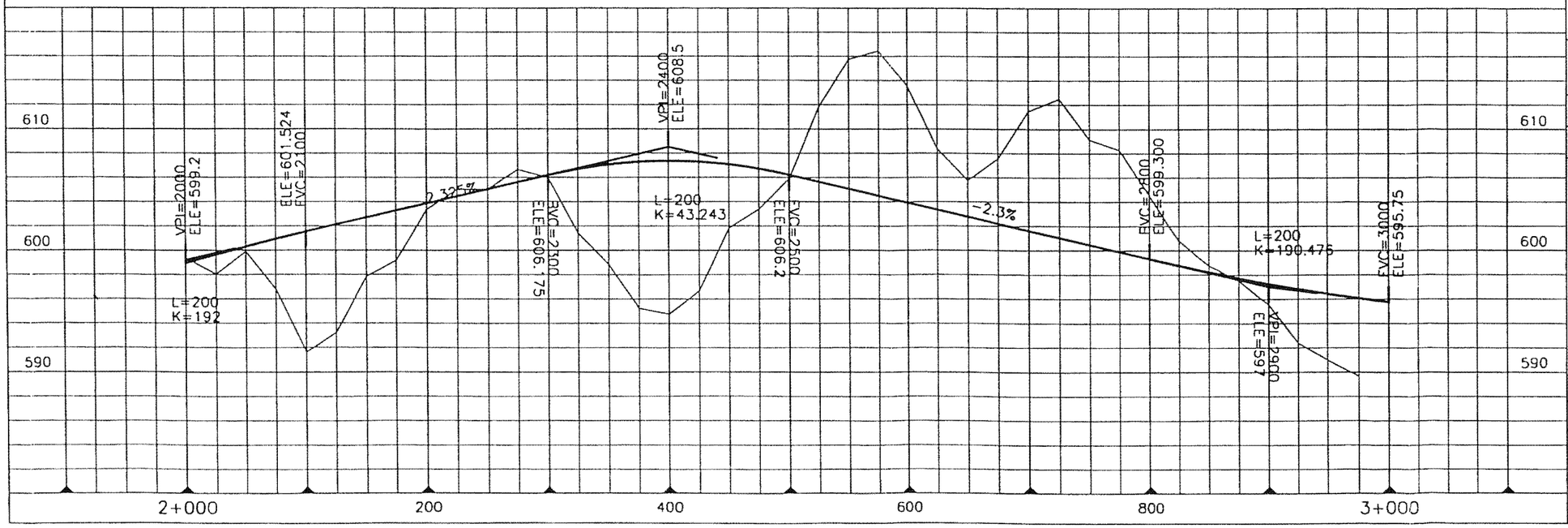
SHEET 3 of 7





Yukon
Community and Transportation Services
Transportation Engineering Branch

NOTES:

1. CONTOUR INTERVAL 1m
2. DESIGN GRADELINE SHOWN IS TOP OF SUBGRADE

PROJECT:
PROPOSED CARMACKS BYPASS
km 0.0 – km 5.3

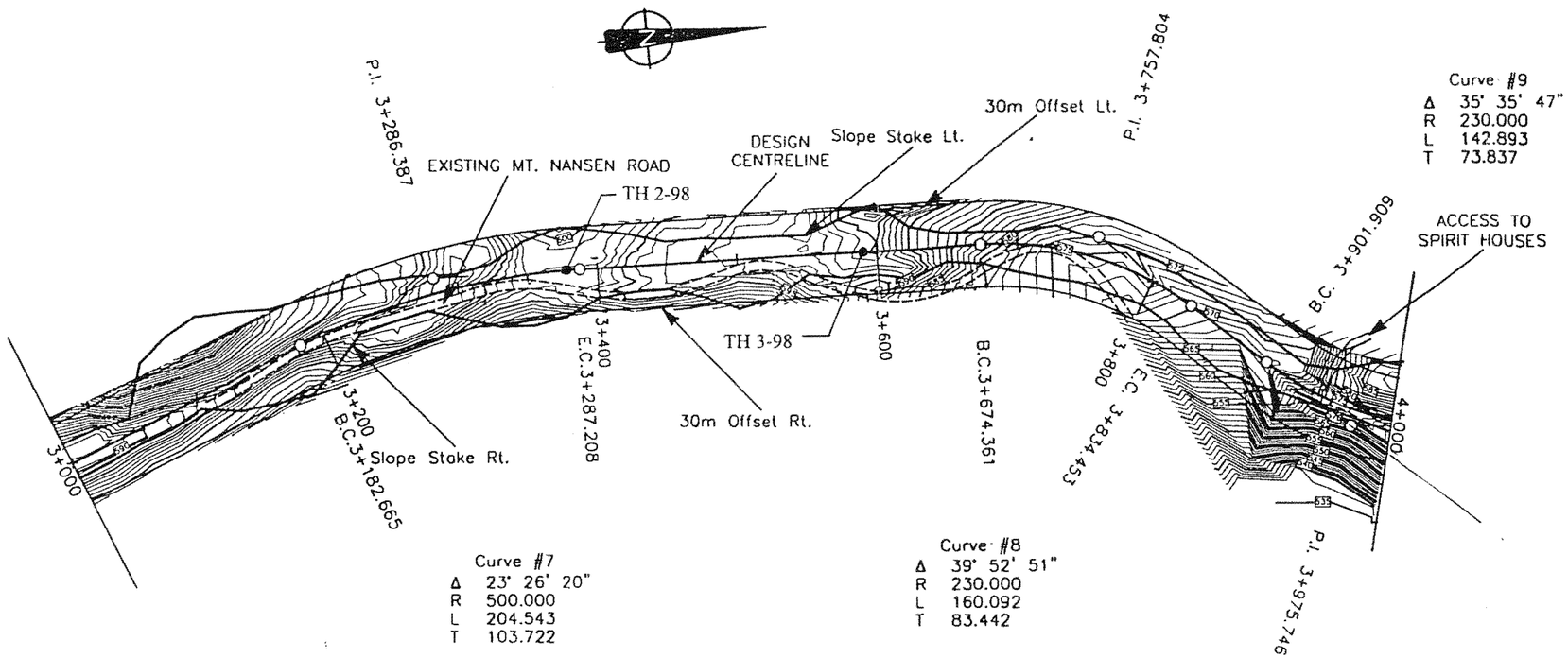
DRAWING TITLE:
2+000 – 3+000

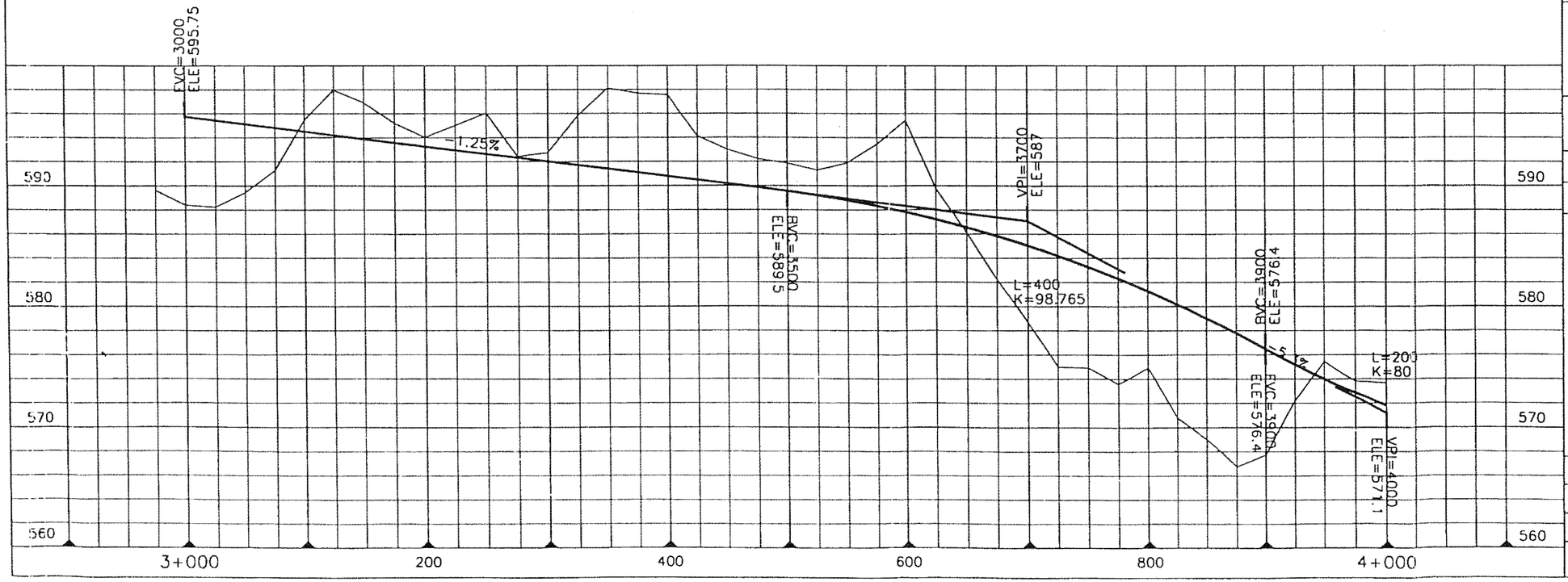
DATE:
HORIZONTAL SCALE: 1:4,000
DRAWN:
VERTICAL SCALE: 1:400

DRAFT

DESIGN:
CHECKED:
APPROVED:

DRAWING NO. CBP00498
SHEET 4 of 7





Yukon
Community and Transportation Services
Transportation Engineering Branch

NOTES:

1. CONTOUR INTERVAL 1m
2. DESIGN GRADELINE SHOWN IS TOP OF SUBGRADE

PROJECT:
PROPOSED CARMACKS BYPASS
km 0.0 – km 5.3

DRAWING TITLE:
3+000 – 4+000

DATE:
HORIZONTAL SCALE: 1:4,000
DRAWN:
VERTICAL SCALE: 1:400

DRAFT

DESIGN:
CHECKED:
APPROVED:

DRAWING NO. CBP00598
SHEET 5 of 7

Appendix B – Testhole Soil Logs

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 2-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 3 + 380 CL	ELEVATION:

SAMPLE TYPE: TUBE | LOST | AUGER | DISTURBED | SPT | CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
0.0							0.0
		26		SILTY SAND -trace gravel to 1 cm. -dry, loose, fine to medium grained, reddish brown, trace rootlets	SM		
1.0		27		SILTY SAND -damp, loose, fine to medium grained, reddish-brown			-1.0
				SAND 1.50 M -some silt -damp, medium-dense, well graded, brown			
2.0		28					-2.0
		29		SAND 2.44 M -some silt, some gravel to 3 cm. -damp, medium-dense, well graded, brown	SW-SM		
3.0							-3.0
		30		GRAVELLY SAND 3.35 M -some silt, trace clay FROZEN @ 3.35 meters -dense, poorly graded, fine and coarse grained, brown-grey, no visible ice	SM		
4.0							-4.0
		31		GRAVELLY SAND 4.27 M -some silt -visible ice, Vr			
5.0				ICE 4.88 M			-5.0
		32		-trace SILT, SAND & GRAVEL INCLUSIONS			
6.0				-no inclusions	ICE		-6.0
7.0		33		-difficult drilling			-7.0
8.0				SANDY SILT 7.77 M -trace gravel			-8.0
		34		-damp, loose, brown, gravels to 3 cm. -possibly frozen	ML		
9.0							-9.0
10.0		35		SANDY SILT -trace clay			-10.0

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Whitehorse, Yukon

LOGGED BY: TD	COMPLETION DEPTH: 10.51 m
REVIEWED BY: WCK	COMPLETE: 10/31/98
Fig. No:	Page 1 of 2

98/11/30 11:16AM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 2-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 3 + 380 CL	ELEVATION:

SAMPLE TYPE ■ TUBE ⊘ LOST ⊠ AUGER ☰ DISTURBED ▯ SPT ◧ CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	LIQUID / PLASTIC / PLASTIC M.C. LIQUID (20 40 60 80)	CLAY / SILT / SAND / GRAVEL (20 40 60 80)	USC	SOIL SYMBOL	ELEVATION(m)
10.0	⊠	36		-damp, loose, brown -possibly frozen	●		ML	▯	10.0
				10.06 M -as above but with cobbles in size to 10cm					
11.0				END OF HOLE @ 10.51 meters					11.0
12.0									12.0
13.0									13.0
14.0									14.0
15.0									15.0
16.0									16.0
17.0									17.0
18.0									18.0
19.0									19.0
20.0									20.0

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LOGGED BY: TD	COMPLETION DEPTH: 10.51 m
REVIEWED BY: WCK	COMPLETE: 10/31/98
Fig. No:	Page 2 of 2

95/11/30 11:17AM (GEOTH1D)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 3-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 3 + 595 CL	ELEVATION:

SAMPLE TYPE: TUBE | LOST | AUGER | DISTURBED | SPT | CORE

Soil Description

DEPTH(m)	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
0.0			GRAVELLY SAND -trace silt -dry, loose, well graded, beige-brown, gravels to 5 cm., trace rootlets	SW-SM		0.0
1.0	37					-1.0
			SANDY GRAVEL 1.22 M -trace silt -damp, medium-dense, well graded, beige-brown, gravels to 5 cm.,			
2.0	38					-2.0
3.0						-3.0
			SANDY GRAVEL 3.35 M -trace silt -moist, medium-dense, well graded, beige-brown, gravels to 7 cm., cobbles to 10 cm.	GW-GM		
4.0	39					-4.0
			SANDY GRAVEL 4.57 M -some silt inclusions -wet, medium-dense, well graded, beige-brown, gravels to 7 cm.			
5.0	40					-5.0
6.0						-6.0
			SILTY GRAVELLY SAND 6.10 M -wet, medium-dense, grey-brown			
7.0	41					-7.0
	42			SM		
			GRAVELLY SAND 7.62 M -wet, medium-dense, grey-brown			
8.0	43					-8.0
	44		-as above			
9.0			END OF HOLE @ 8.84 meters			-9.0
10.0						-10.0

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LOGGED BY: TD	COMPLETION DEPTH: 8.84 m
REVIEWED BY: WCK	COMPLETE: 10/31/98
Fig. No:	Page 1 of 1

98/11/27 02:34PM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 4-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 2 + 730 10 m Lt. CL	ELEVATION:

SAMPLE TYPE ■ TUBE ▨ LOST ⊠ AUGER ▤ DISTURBED ▥ SPT ▮ CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
0.0	⊠	45		SILT -trace gravel to 2.5 cm. -moist, loose, beige, some rootlets & organics	ML		0.0
0.91				GRAVELLY SAND 0.91 M			
1.0	⊠	46		-trace sill -moist to wet, loose, well graded, beige, gravels to 7 cm. -cobbles and possible boulder sized material			-1.0
2.0	⊠	47		-as above	SW-SM		-2.0
3.0							-3.0
4.0	⊠	48		-as above			-4.0
				END OF HOLE @ 4.27 meters -testhole terminated due to excessive binding of the drill stem			
5.0							-5.0
6.0							-6.0
7.0							-7.0
8.0							-8.0
9.0							-9.0
10.0							-10.0

LIQUID ■ 20 40 60 80 | PLASTIC ▲ 20 40 60 80 | PLASTIC M.C. LIQUID 20 40 60 80

CLAY ● 20 40 60 80 | SILT ▲ 20 40 60 80 | SAND ■ 20 40 60 80 | GRAVEL ◆ 20 40 60 80

J. R. Paine & Associates Ltd. Whitehorse, Yukon	LOGGED BY: TD	COMPLETION DEPTH: 4.27 m
	REVIEWED BY: WCK	COMPLETE: 10/31/98
	Fig. No:	Page 1 of 1

98/11/27 02:35PM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 4A-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 2 + 680 CL	ELEVATION:

SAMPLE TYPE: TUBE | LOST | AUGER | DISTURBED | SPT | CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
0.0							0.0
		49		SANDY GRAVEL -trace silt -dry, loose, well graded, brown -cobbles and possible boulder sized material	GW-GM		
1.0							-1.0
				SANDY GRAVEL 1.50 M -dry, loose, well graded, brown -possible cobbles			
2.0		50					-2.0
3.0				SANDY GRAVEL -dry, loose, well graded, brown			-3.0
		51					
4.0					GW		-4.0
5.0		52		-as above			-5.0
6.0							-6.0
7.0		53		-as above			-7.0
				END OF HOLE @ 7.32 meters			
8.0							-8.0
9.0							-9.0
10.0							-10.0

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Whitehorse, Yukon

LOGGED BY: TD	COMPLETION DEPTH: 7.32 m
REVIEWED BY: WCK	COMPLETE: 10/31/98
Fig. No:	Page 1 of 1

98/11/27 02:35PM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 5-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 2 + 570 10 m Rt. CL	ELEVATION:

SAMPLE TYPE: TUBE | LOST | AUGER | DISTURBED | SPT | CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
0.0				SANDY GRAVEL			0.0
				-trace silt			
		54		-dry, loose, well graded, reddish-brown, trace rootlets			
1.0							-1.0
				-as above but with cobbles and possible boulders encoutered to 3.05 meters 1.22 M			
2.0		55		-as above	GW-GM		-2.0
3.0				3.05 M			-3.0
				SANDY GRAVEL 3.66 M			
4.0		56		-damp to dry, loose, well graded, brown, gravels to 5 cm.			-4.0
5.0				-as above			-5.0
		57					
6.0							-6.0
					GW		
7.0		58		-as above			-7.0
8.0				-as above but gravels to 5 cm.			-8.0
		59		-damp			
9.0							-9.0
				GRAVELLY SAND 9.20 M			
				-some silt			
10.0		60		-damp, loose, well graded, brown	SW-SM		-10.0

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Whitehorse, Yukon

LOGGED BY: TD	COMPLETION DEPTH: 16.13 m
REVIEWED BY: WCK	COMPLETE: 11/01/98
Fig. No:	Page 1 of 2

98/11/27 02:36PM (GEOTHID)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 5-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 2 + 570 10 m Rt. CL	ELEVATION:

SAMPLE TYPE ■ TUBE ⊘ LOST ⊠ AUGER ▤ DISTURBED ▥ SPT ▮ CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
10.0	⊠	60			SW-SM		-10.0
				SANDY GRAVEL 10.60 M -trace sill -damp to moist, loose, well graded, brown			
11.0	⊠	61					-11.0
12.0							-12.0
	⊠	62		-as above but with possible 12.50 M cobbles and boulder sized material -grindy drilling	GW-GM		
13.0							-13.0
14.0	⊠	63		-as above			-14.0
15.0							-15.0
16.0				END OF HOLE @ 16.13 meters			-16.0
17.0							-17.0
18.0							-18.0
19.0							-19.0
20.0							-20.0

LIQUID ■ 20 40 60 80 | PLASTIC ▲ 20 40 60 80 | PLASTIC M.C. LIQUID 20 40 60 80

CLAY ● 20 40 60 80 | SILT ▲ 20 40 60 80 | SAND ■ 20 40 60 80 | GRAVEL ◆ 20 40 60 80

J. R. Paine & Associates Ltd.
Whitehorse, Yukon

LOGGED BY: TD	COMPLETION DEPTH: 16.13 m
REVIEWED BY: WCK	COMPLETE: 11/01/98
Fig. No:	Page 2 of 2

98/11/27 02:37PM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 6-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 1 + 580 35 m Lt. CL	ELEVATION:

SAMPLE TYPE ■ TUBE ⧄ LOST ⊠ AUGER ▤ DISTURBED ▥ SPT ▮ CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
0.0	⊠	64		SANDY GRAVEL -trace silt -dry to damp, loose, poorly graded, reddish brown, trace rootlets			0.0
1.0							-1.0
				-as above but with 1.52 M -cobbles and possible boulders encountered to end of testhole -hard grinding drilling -as above	GP		
2.0	⊠	65					-2.0
3.0				GRAVELLY SAND 3.05 M -dry to damp, loose, poorly graded, brown			-3.0
	⊠	66			SP		
4.0							-4.0
				GRAVELLY SAND -trace silt -dry, loose, well graded, brown			
5.0	⊠	67					-5.0
6.0					SW-SM		-6.0
	⊠	68		-as above			
7.0							-7.0
				GRAVELLY SAND 7.40 M -dry, loose, well graded, brown			
8.0	⊠	69			SW		-8.0
9.0							-9.0
				SANDY GRAVEL -dry to damp, loose, well graded, brown	GW		
10.0	⊠	70					-10.0

LIQUID ■ 20 40 60 80 | PLASTIC ▲ 20 40 60 80 | PLASTIC M.C. LIQUID 20 40 60 80

CLAY ● 20 40 60 80 | SILT ▲ 20 40 60 80 | SAND ■ 20 40 60 80 | GRAVEL ◆ 20 40 60 80

J. R. Paine & Associates Ltd.
Whitehorse, Yukon

LOGGED BY: TD	COMPLETION DEPTH: 16.13 m
REVIEWED BY: WCK	COMPLETE: 11/01/98
Fig. No:	Page 1 of 2

98/11/27 05:10PM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 6-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 1 + 580 35 m Lt. CL	ELEVATION:

SAMPLE TYPE: TUBE | LOST | AUGER | DISTURBED | SPT | CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
10.0		70			GW		-10.0
				GRAVELLY SAND -trace silt -dry to damp, loose, well graded, brown			
11.0		71					-11.0
12.0					SW-SM		-12.0
		72		-as above			
13.0							-13.0
				GRAVELLY SAND -damp, loose, well graded, brown			
14.0		73					-14.0
15.0					SW		-15.0
16.0				END OF HOLE @ 16.13 meters			-16.0
17.0							-17.0
18.0							-18.0
19.0							-19.0
20.0							-20.0

LIQUID 20 40 60 80 | PLASTIC 20 40 60 80 | PLASTIC M.C. LIQUID 20 40 60 80

CLAY 20 40 60 80 | SILT 20 40 60 80 | SAND 20 40 60 80 | GRAVEL 20 40 60 80

J. R. Paine & Associates Ltd.
Whitehorse, Yukon

LOGGED BY: TD | COMPLETION DEPTH: 16.13 m
REVIEWED BY: WCK | COMPLETE: 11/01/98
Fig. No: | Page 2 of 2

98/11/27 03:11PM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 7-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 1 + 108 5 m Lt. CL	ELEVATION:

SAMPLE TYPE ■ TUBE ⧄ LOST ⊠ AUGER ▤ DISTURBED ▥ SPT ▮ CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
0.0	⊠	74		SILT -trace sand -some gravel -moist,loose, orange-brown, some volcanic ash	ML		0.0
1.0				GRAVELLY SAND 1.06 M -dry to damp, loose, well graded, brown			-1.0
2.0	⊠	75		-cobbles and possible boulders encountered between 1.52 meters and 3.05 meters	SW		-2.0
3.0				GRAVELLY SAND 3.05 M -dry, loose, poorly graded, medium to coarse grained, brown, gravels to 5 cm.			-3.0
4.0	⊠	76					-4.0
5.0	⊠	77		-as above	SP		-5.0
6.0							-6.0
7.0	⊠	78		-as above			-7.0
8.0				SANDY GRAVEL 7.50 M -dry to damp, loose, well graded, brown			-8.0
9.0	⊠	79			GW		-9.0
10.0	⊠	80		-as above			-10.0

LIQUID ■ 20 40 60 80 | PLASTIC ▲ 20 40 60 80 | PLASTIC M.C. LIQUID 20 40 60 80

CLAY ● 20 40 60 80 | SILT ▲ 20 40 60 80 | SAND ■ 20 40 60 80 | GRAVEL ◆ 20 40 60 80

J. R. Paine & Associates Ltd.
Whitehorse, Yukon

LOGGED BY: TD	COMPLETION DEPTH: 15.85 m
REVIEWED BY: WCK	COMPLETE: 11/01/98
Fig. No:	Page 1 of 2

98/11/27 03:13PM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 7-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 1 + 108 5 m Lt. CL	ELEVATION:

SAMPLE TYPE ■ TUBE ▨ LOST ☒ AUGER ▤ DISTURBED ▥ SPT ▮ CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
10.0	M	80					-10.0
11.0		81		-as above but with cobbles and possible boulders encountered to 13.72 — 10.97 M			-11.0
12.0					GW		-12.0
13.0		82		-as above			-13.0
14.0				GRAVELLY SAND — 13.72 M -dry to damp, poorly graded, brown			-14.0
15.0		83			SP		-15.0
16.0		84		-as above END OF HOLE @ 15.85 meters			-16.0
17.0							-17.0
18.0							-18.0
19.0							-19.0
20.0							-20.0

■ LIQUID ■ 20 40 60 80
▲ PLASTIC ▲ 20 40 60 80
PLASTIC M.C. LIQUID 20 40 60 80

● CLAY ● 20 40 60 80
▲ SILT ▲ 20 40 60 80
■ SAND ■ 20 40 60 80
◆ GRAVEL ◆ 20 40 60 80

J. R. Paine & Associates Ltd.
Whitehorse, Yukon

LOGGED BY: TD	COMPLETION DEPTH: 15.85 m
REVIEWED BY: WCK	COMPLETE: 11/01/98
Fig. No:	Page 2 of 2

98/11/27 03:14PM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 8-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 0 + 930 5 m Rt. CL	ELEVATION:

SAMPLE TYPE: TUBE | LOST | AUGER | DISTURBED | SPT | CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
0.0							0.0
		85		SANDY GRAVEL -some silt -dry, loose, well graded, grey-brown	GM		
1.0							-1.0
				GRAVELLY SAND 1.22 M -some silt -damp to moist, medium-dense, brown -possible cobbles encountered to end of testhole			
2.0		86			SM		-2.0
3.0				GRAVELLY SAND -trace to some silt -damp to moist, medium-dense, well graded, brown -as above but well graded			-3.0
		87					
4.0							-4.0
					SW-SM		
5.0		88		-as above			-5.0
6.0				SANDY GRAVEL 6.00 M -trace silt -moist, medium-dense, well graded, brown			-6.0
		89			GW-GM		
7.0							-7.0
				END OF HOLE @ 7.32 meters -cobbles visible in road cut adjacent to testhole			
8.0							-8.0
9.0							-9.0
10.0							-10.0

LIQUID 20 40 60 80 | PLASTIC 20 40 60 80 | PLASTIC M.C. LIQUID 20 40 60 80

CLAY 20 40 60 80 | SILT 20 40 60 80 | SAND 20 40 60 80 | GRAVEL 20 40 60 80

J. R. Paine & Associates Ltd. Whitehorse, Yukon	LOGGED BY: TD	COMPLETION DEPTH: 7.32 m
	REVIEWED BY: WCK	COMPLETE: 11/01/98
	Fig. No:	Page 1 of 1

98/11/27 03:15PM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 10-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 1 + 715 11 m Rt. CL	ELEVATION:

SAMPLE TYPE ■ TUBE ⊘ LOST ⊠ AUGER ▤ DISTURBED ▥ SPT ◧ CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
0.0				SANDY GRAVEL -dry, loose, poorly graded, brown, gravels to 7 cm.	GP		0.0
1.0		114					-1.0
				SANDY GRAVEL 1.22 M -trace silt -damp, loose, poorly graded, brown -possible cobbles			
2.0		115			GP-GM		-2.0
3.0				SILTY SAND 3.05 M -damp, loose, brown			-3.0
4.0		116					-4.0
				FROZEN @ 4.27 meters to depth SILTY SAND -brown -no visible ice, Nbn	SM		
5.0		117					-5.0
6.0				END OF HOLE @ 6.10 meters			-6.0
7.0							-7.0
8.0							-8.0
9.0							-9.0
10.0							-10.0

LIQUID ■ 20 40 60 80 | PLASTIC ▲ 20 40 60 80 | PLASTIC M.C. LIQUID 20 40 60 80

CLAY ● 20 40 60 80 | SILT ▲ 20 40 60 80 | SAND ■ 20 40 60 80 | GRAVEL ◆ 20 40 60 80

J. R. Paine & Associates Ltd. Whitehorse, Yukon	LOGGED BY: TD	COMPLETION DEPTH: 6.1 m
	REVIEWED BY: WCK	COMPLETE: 11/02/98
	Fig. No:	Page 1 of 1

98/11/27 03:20PM (GEOTH10)

Geotechnical Services	YTG, Transportation Engineering	TEST HOLE NO: 11-98
CME75 150 mm Solid Stem Auger	Carmacks Bypass Route	PROJECT NO: 8002-254
FN60 Flextrak Nodwell	Sta 1 + 880 5 m Lt. CL	ELEVATION:

SAMPLE TYPE ■ TUBE ⊘ LOST ⊠ AUGER ▤ DISTURBED ▥ SPT ▮ CORE

DEPTH(m)	SAMPLE TYPE	SAMPLE NO	SPT(N)	Soil Description	USC	SOIL SYMBOL	ELEVATION(m)
0.0	⊠	118		SILT -trace to some clay -trace sand -trace gravels in size to 1 cm. -damp to moist, firm, plastic, dark beige, /brown, trace oxidation seams in size to 1 mm., trace rootlets and organics	ML		0.0
1.0	⊠	119		SANDY GRAVEL 0.91 M -some silt -moist, medium-dense, well graded, medium to coarse grained, brown, trace oxidation in seams, trace rootlets	GW-GM		-1.0
2.0				FROZEN @ 2.13 meters to end of testhole -no visible ice, Nbn			-2.0
3.0				-as above but no rootlets and grey-brown below 2.70 meters			-3.0
4.0	⊠	120		SILTY SANDY GRAVEL 3.30 M -trace clay -grey-brown	GM		-4.0
5.0	⊠	121		SANDY GRAVEL 4.40 M -some silt -grey-brown	GP-GM		-5.0
6.0				END OF HOLE @ 5.18 meters -Refusal			-6.0
7.0							-7.0
8.0							-8.0
9.0							-9.0
10.0							-10.0

LIQUID ■ 20 40 60 80 | PLASTIC ▲ 20 40 60 80 | PLASTIC M.C. LIQUID 20 40 60 80

CLAY ● 20 40 60 80 | SILT ▲ 20 40 60 80 | SAND ■ 20 40 60 80 | GRAVEL ◆ 20 40 60 80

J. R. Paine & Associates Ltd. Whitehorse, Yukon	LOGGED BY: TD	COMPLETION DEPTH: 5.18 m
	REVIEWED BY: WCK	COMPLETE: 11/02/98
	Fig. No:	Page 1 of 1

98/11/27 02:32PM (GEOTH10)

Appendix C – Individual Test Summary Sheets

J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 27 Depth: 1.06 - 1.37

Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#2-98

Made by: LK Job No.: 8002-254

Ck'd by: WCL Date: 1998/11/12

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					
20,000	20.0					
12,500	12.5					100.0
10,000	10.0					99.6
5,000	5.0					99.1
2,500	2.5					98.6
2,000	2.0					98.4
1,250	1.25					97.3
800	0.800					95.3
630	0.630					92.7
400	0.400					83.7
315	0.315					75.2
160	0.160					54.3
80	0.080					32.1

Description of Sample

Silty sand

USC - SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

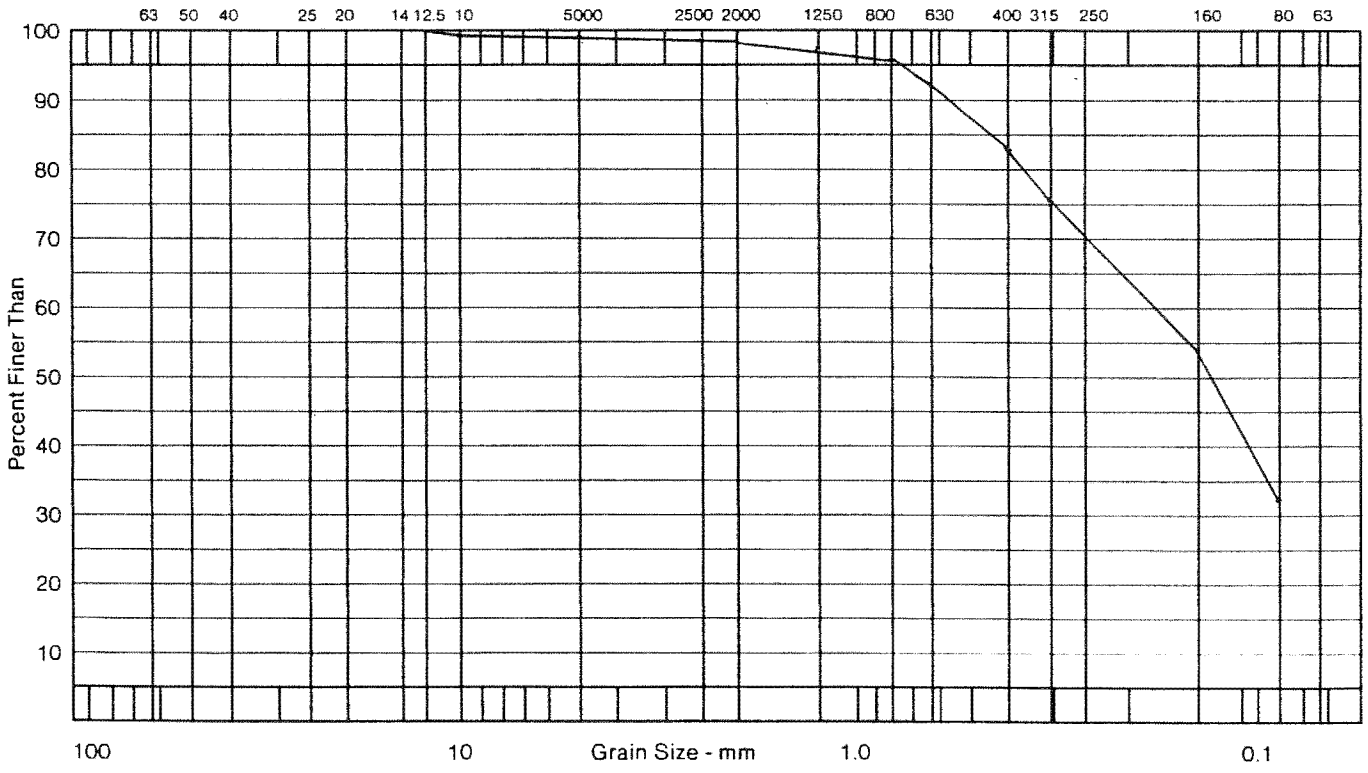
Remarks

%Fines: 32.1

%Sand: 67.1

%Gravel: 0.8

%Moisture: 5.1



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 28 Depth: 1.83 - 2.13 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#2-98 Ck'd by: WGK Date: 1998/11/12

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					
20,000	20.0					
12,500	12.5					
10,000	10.0					100.0
5,000	5.0					98.2
2,500	2.5					95.3
2,000	2.0					93.9
1,250	1.25					89.5
800	0.800					82.5
630	0.630					76.7
400	0.400					61.0
315	0.315					49.4
160	0.160					21.9
80	0.080					11.6

Description of Sample

Some silt, sand

USC - SW SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

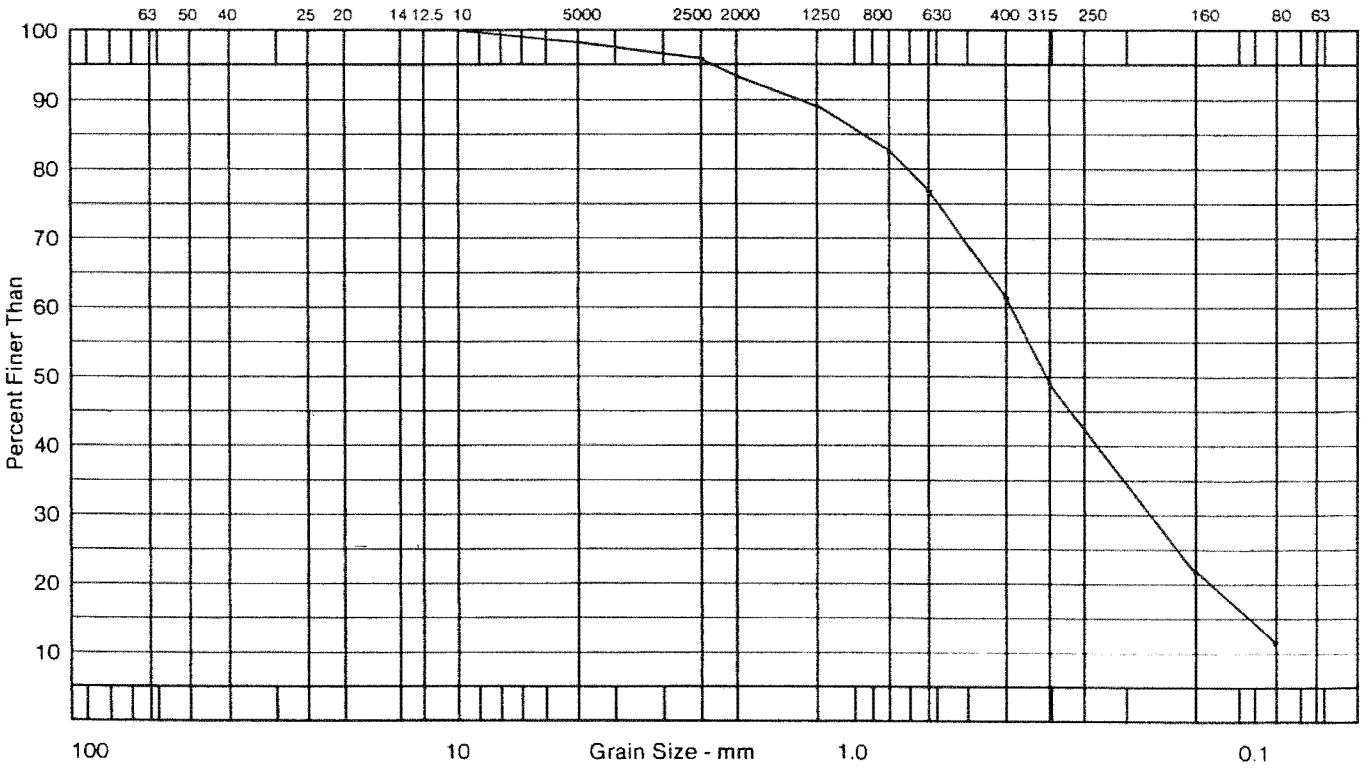
Remarks

%Fines: 11.6

%Sand: 86.6

%Gravel: 1.8

%Moisture: 4.0



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 29 Depth: 2.44 - 2.74 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#2-98 Made by: LK Job No.: 8002-254

Ck'd by: WJL Date: 1998/11/12

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					
20,000	20.0					100.0
12,500	12.5					95.9
10,000	10.0					94.6
5,000	5.0					89.7
2,500	2.5					84.7
2,000	2.0					83.7
1,250	1.25					77.5
800	0.800					70.6
630	0.630					64.0
400	0.400					49.2
315	0.315					40.6
160	0.160					22.1
80	0.080					11.7

Description of Sample: Some gravel and silt, sand USC - SW SM

Time of Sieving: Min. 15

Method of Preparation: Dry: Washed: X

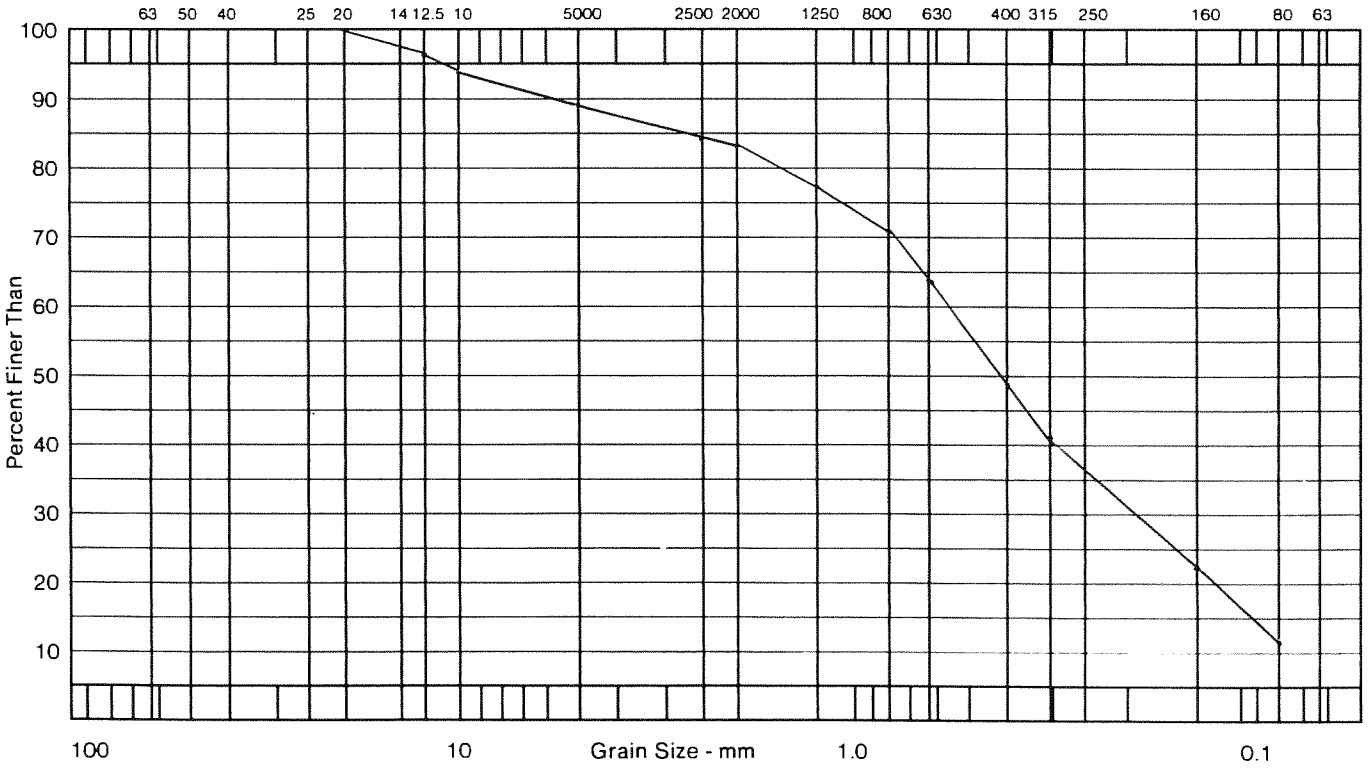
Remarks:

%Fines: 11.7

%Sand: 78.0

%Gravel: 10.3

%Moisture: 14.3



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 30 Depth: 3.35 - 3.81

Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#2-98

Made by: LK Job No.: 8002-254

Ck'd by: WC Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					93.2
12,500	12.5					83.7
10,000	10.0					76.4
5,000	5.0					64.5
2,500	2.5					56.3
2,000	2.0					53.7
1,250	1.25					48.3
800	0.800					43.5
630	0.630					40.6
400	0.400					34.1
315	0.315					30.6
160	0.160					22.0
80	0.080					17.1

Description of Sample: Trace clay, some silt, gravelly USC - SM sand

Time of Sieving ____ Min. 15

Method of Preparation ____ Dry ____ Washed X

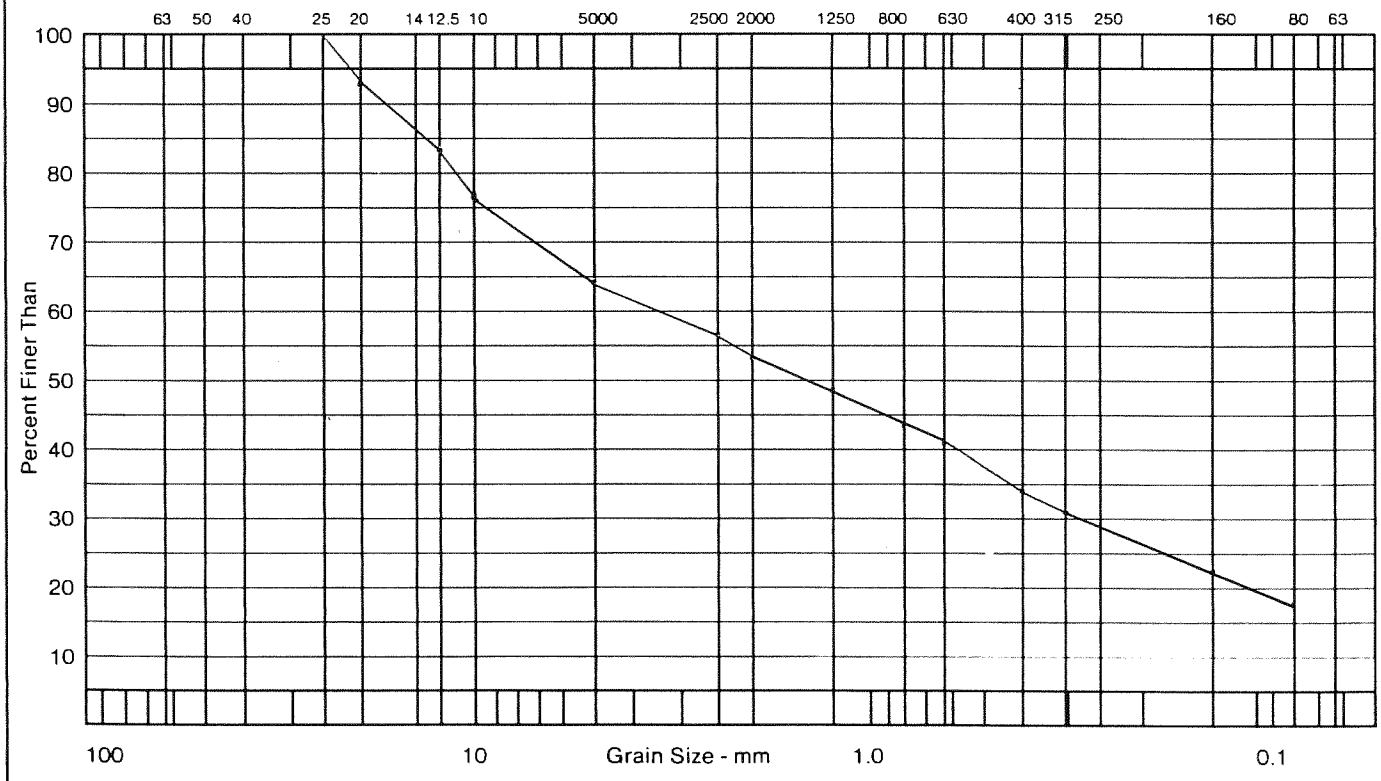
Remarks

%Fines: 17.1

%Sand: 47.4

%Gravel: 35.5

%Moisture: 16.1



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 34 Depth: 7.92 - 8.53 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#2-98 Made by: LK Job No.: 8002-254

Ck'd by: WCH Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					
20,000	20.0					100.0
12,500	12.5					98.3
10,000	10.0					97.7
5,000	5.0					93.9
2,500	2.5					91.2
2,000	2.0					90.5
1,250	1.25					88.3
800	0.800					86.6
630	0.630					85.3
400	0.400					82.5
315	0.315					80.2
160	0.160					71.7
80	0.080					53.0

Description of Sample

Trace gravel, sandy silt

USC - ML

Time of Sieving Min. 15

Method of Preparation Dry Washed X

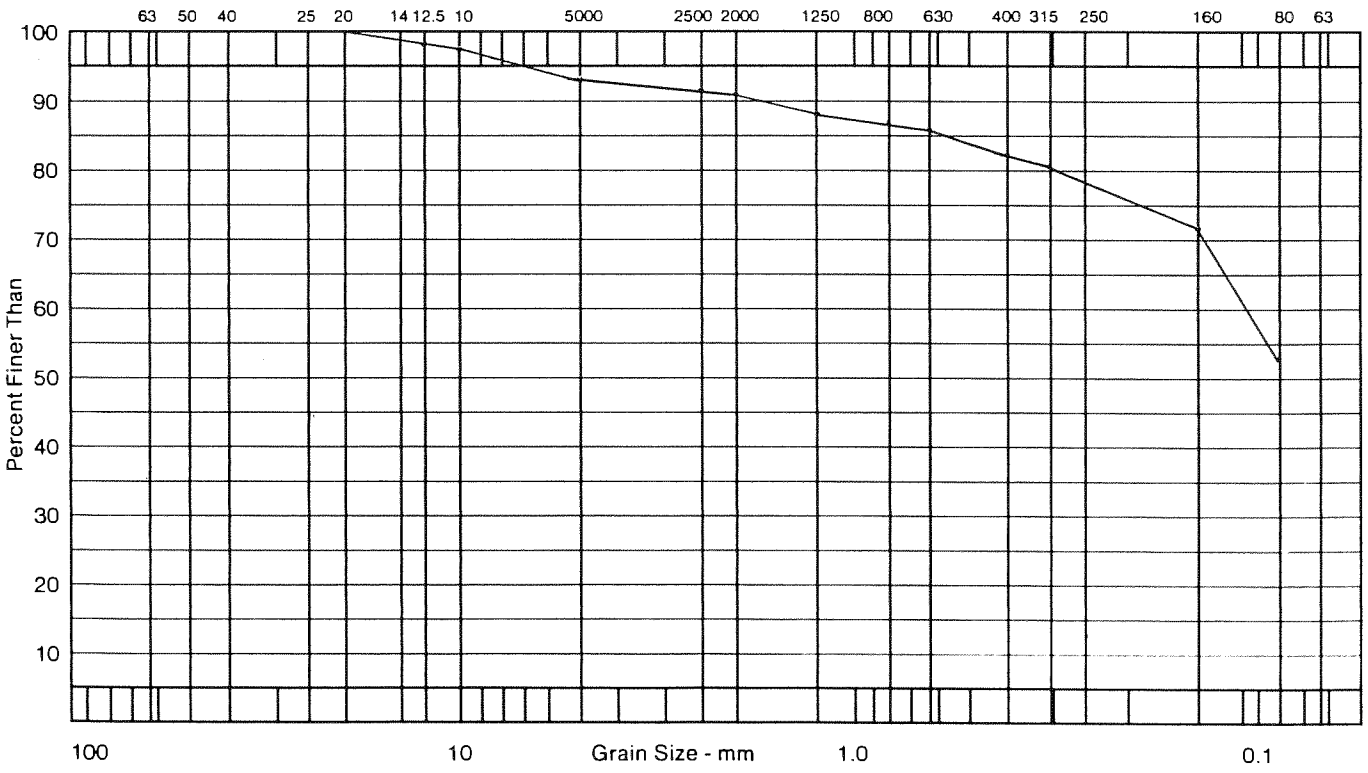
Remarks

%Fines: 53.0

%Sand: 40.9

%Gravel: 6.1

%Moisture: 9.2



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 37 Depth: 0.30 - 1.22 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#3-98 Ck'd by: WCL Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					90.4
12,500	12.5					80.0
10,000	10.0					73.2
5,000	5.0					57.9
2,500	2.5					44.7
2,000	2.0					40.5
1,250	1.25					32.2
800	0.800					25.1
630	0.630					21.3
400	0.400					14.8
315	0.315					12.4
160	0.160					8.7
80	0.080					6.8

Description of Sample

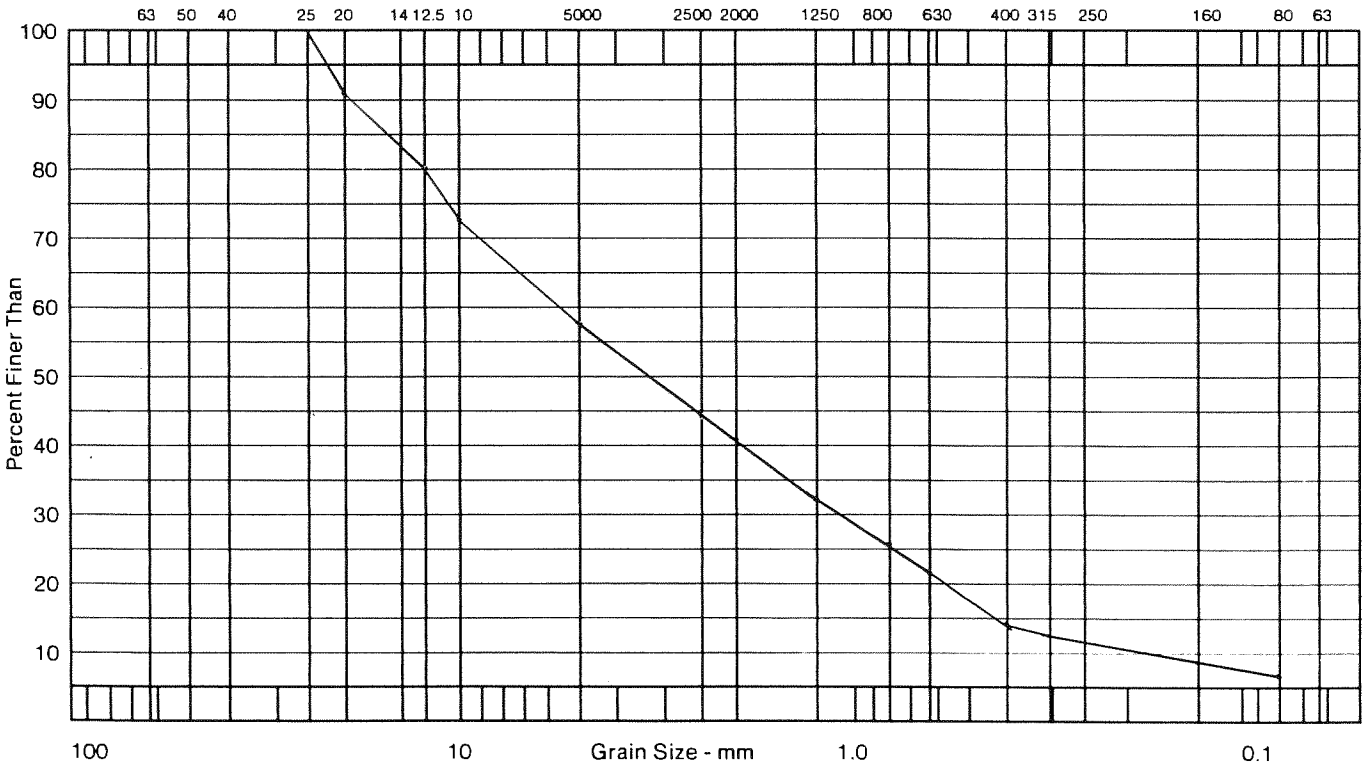
Trace silt, gravelly sand
USC - SW SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 6.8
%Sand: 51.1
%Gravel: 42.1
%Moisture: 2.0



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CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 39 Depth: 3.35 - 4.27 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#3-98 Made by: LK Job No.: 8002-254

Ck'd by: WC Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					100.0
40,000	40.0					70.4
25,000	25.0					65.7
20,000	20.0					52.8
12,500	12.5					48.5
10,000	10.0					46.3
5,000	5.0					39.5
2,500	2.5					30.8
2,000	2.0					28.6
1,250	1.25					20.5
800	0.800					16.2
630	0.630					13.3
400	0.400					9.1
315	0.315					7.6
160	0.160					6.6
80	0.080					5.3

Description of Sample

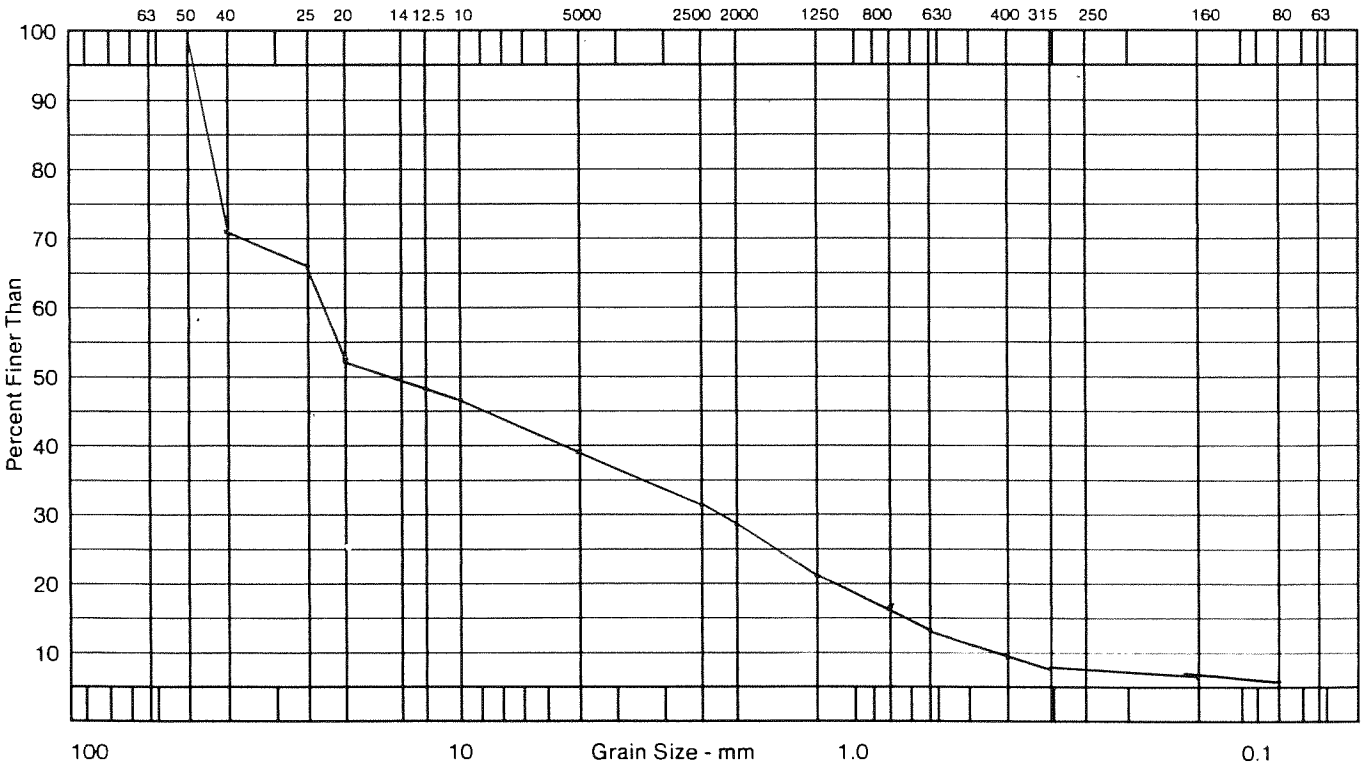
Trace silt, sandy gravel
USC - GW GM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 5.3
%Sand: 34.2
%Gravel: 60.5
%Moisture: 1.3



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 41 Depth: 6.40 - 7.01 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#3-98 Ck'd by: WDC Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					
20,000	20.0					100.0
12,500	12.5					95.9
10,000	10.0					91.2
5,000	5.0					76.9
2,500	2.5					64.4
2,000	2.0					60.1
1,250	1.25					52.2
800	0.800					44.6
630	0.630					40.6
400	0.400					32.9
315	0.315					29.2
160	0.160					21.4
80	0.080					16.9

Description of Sample

Silty gravelly sand

USC - SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

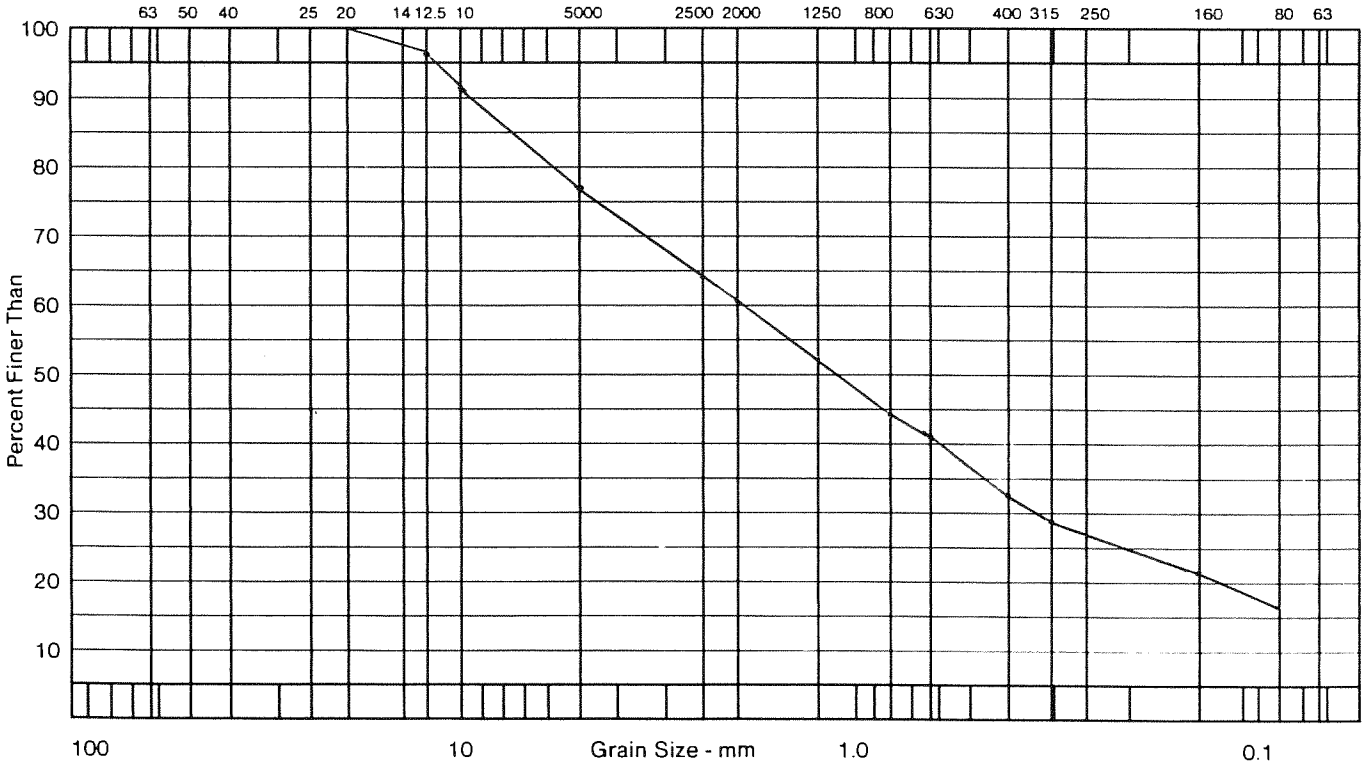
Remarks

%Fines: 16.9

%Sand: 60.0

%Gravel: 23.1

%Moisture: 7.4



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Sample: 42 Depth: 7.01 - 7.47
Location: Carmacks Bypass Route
TH#3-98

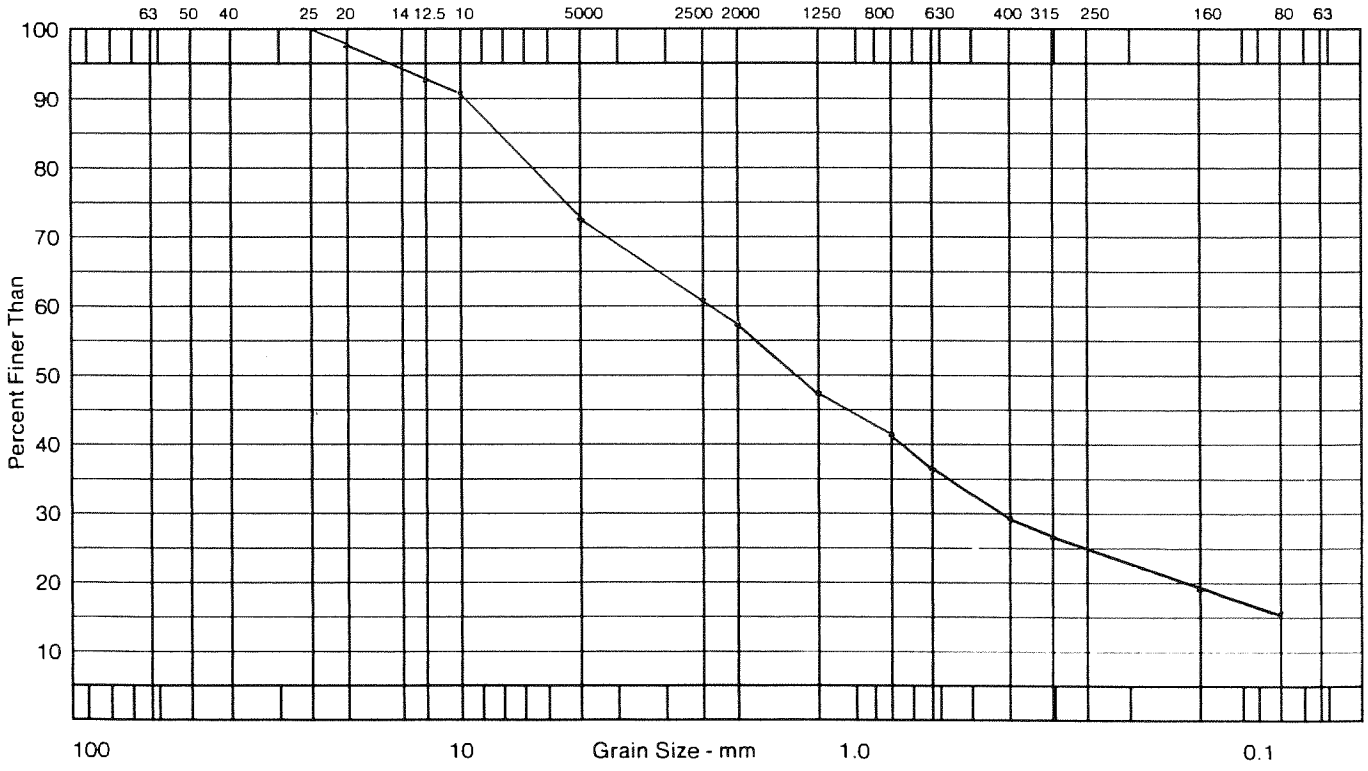
Client: YTG, TRANSPORTATION ENGINEERING
Project: Carmacks Bypass Route & Nordenskiold
Made by: LK Job No.: 8002-254
Ck'd by: WCR Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					97.7
12,500	12.5					93.5
10,000	10.0					90.3
5,000	5.0					73.6
2,500	2.5					60.2
2,000	2.0					57.2
1,250	1.25					47.4
800	0.800					41.0
630	0.630					36.6
400	0.400					29.3
315	0.315					26.0
160	0.160					19.6
80	0.080					15.1

Description of Sample
Silty gravelly sand
USC - SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X
Remarks
%Fines: 15.1
%Sand: 58.5
%Gravel: 26.4
%Moisture: 11.3



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 44 Depth: 8.53 - 8.84 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#3-98 Ck'd by: WCA Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					
20,000	20.0					100.0
12,500	12.5					93.4
10,000	10.0					86.3
5,000	5.0					74.0
2,500	2.5					62.3
2,000	2.0					58.1
1,250	1.25					50.1
800	0.800					41.9
630	0.630					37.4
400	0.400					28.9
315	0.315					25.0
160	0.160					17.2
80	0.080					13.0

Description of Sample

Some silt, gravelly sand

USC - SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

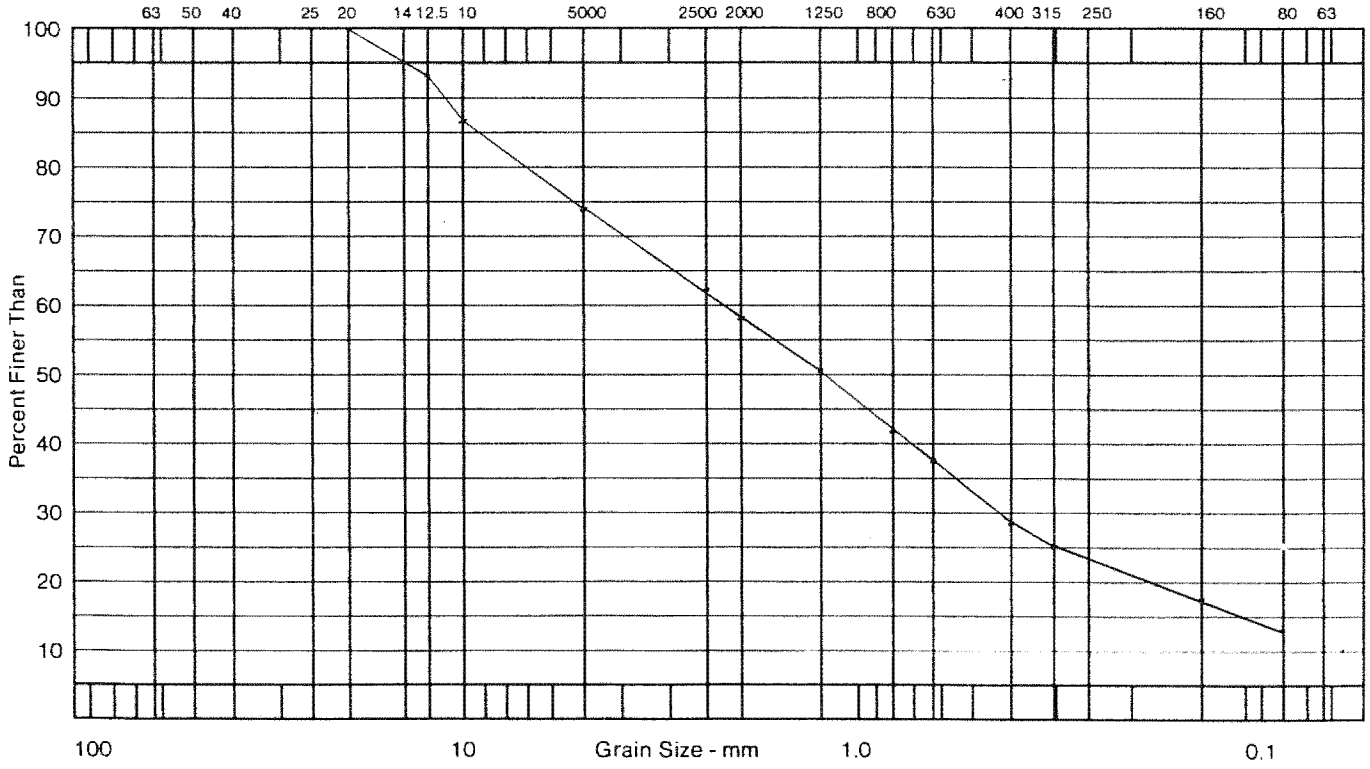
Remarks

%Fines: 13.0

%Sand: 61.0

%Gravel: 26.0

%Moisture: 6.0



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Sample: 47 Depth: 1.83 - 2.74

Location: Carmacks Bypass Route
TH#4-98

Client: YTG, TRANSPORTATION ENGINEERING

Project: Carmacks Bypass Route & Nordenskiold

Made by: LK Job No.: 8002-254

Ck'd by: WCIC Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					87.5
12,500	12.5					80.9
10,000	10.0					76.8
5,000	5.0					65.9
2,500	2.5					56.4
2,000	2.0					54.0
1,250	1.25					44.1
800	0.800					33.7
630	0.630					27.6
400	0.400					18.0
315	0.315					14.6
160	0.160					10.5
80	0.080					8.4

Description of Sample

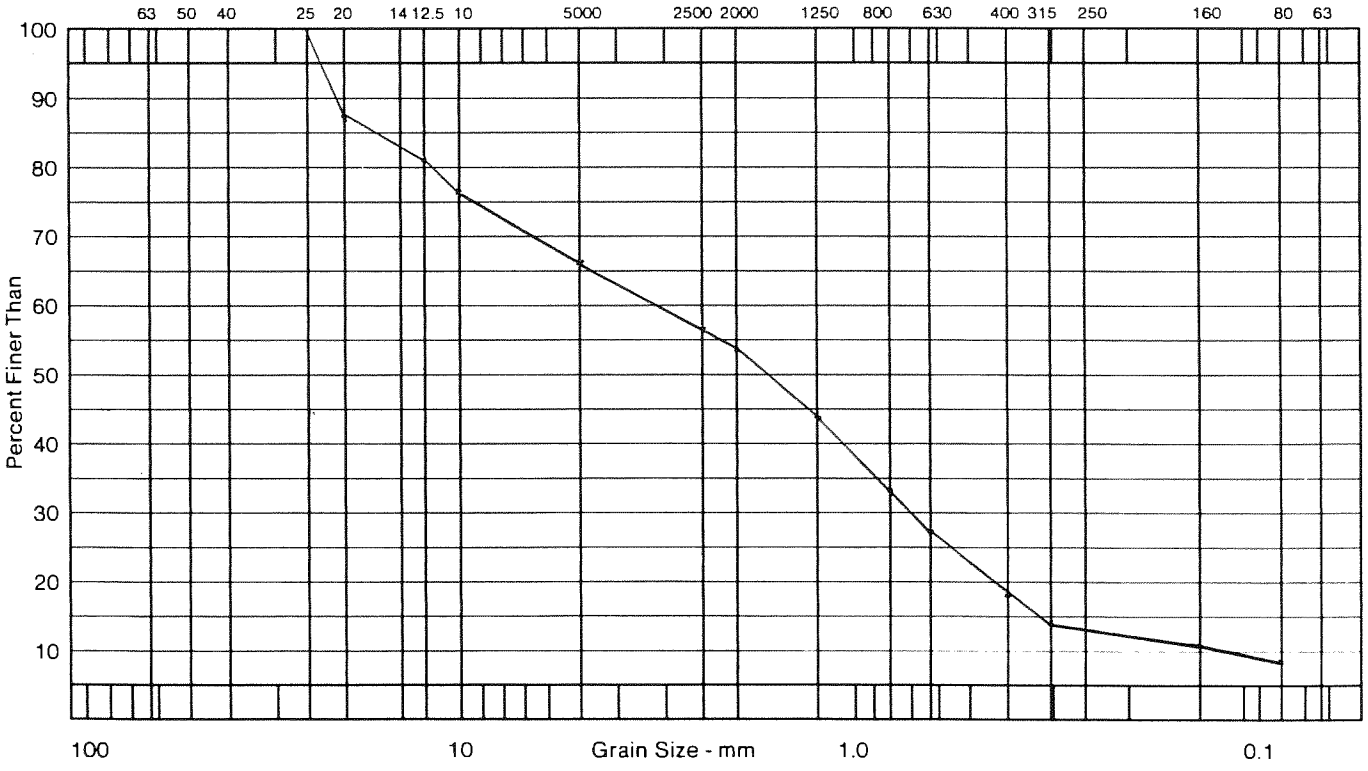
Trace silt, gravelly sand
USC - SW SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 8.4
%Sand: 57.5
%Gravel: 34.1
%Moisture: 5.8



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 48 Depth: 3.35 - 4.27 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#4-98 Ck'd by: WCH Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					88.4
20,000	20.0					76.6
12,500	12.5					69.8
10,000	10.0					65.1
5,000	5.0					53.8
2,500	2.5					45.4
2,000	2.0					42.4
1,250	1.25					35.6
800	0.800					27.7
630	0.630					22.8
400	0.400					13.8
315	0.315					10.5
160	0.160					6.6
80	0.080					5.1

Description of Sample

Trace silt, gravelly sand

USC - SW SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

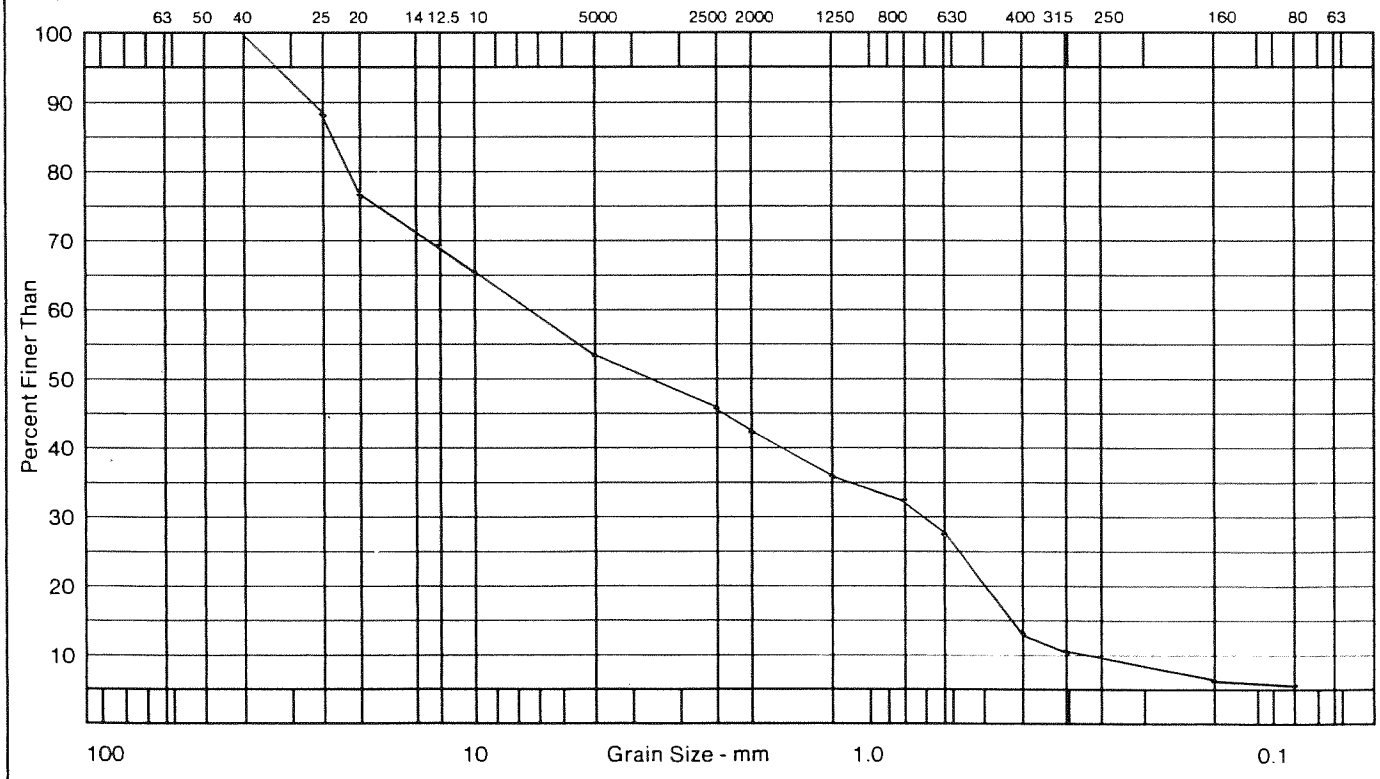
Remarks

%Fines: 5.1

%Sand: 48.7

%Gravel: 46.2

%Moisture: 11.9



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 50 Depth: 1.83 - 2.44 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#4A-98 Ck'd by: WH Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					100.0
40,000	40.0					85.2
25,000	25.0					64.5
20,000	20.0					59.2
12,500	12.5					53.9
10,000	10.0					49.6
5,000	5.0					38.7
2,500	2.5					29.5
2,000	2.0					27.5
1,250	1.25					21.4
800	0.800					16.8
630	0.630					13.7
400	0.400					9.3
315	0.315					7.9
160	0.160					5.8
80	0.080					4.3

Description of Sample

Sandy gravel

USC - GW

Time of Sieving Min. 15

Method of Preparation Dry Washed X

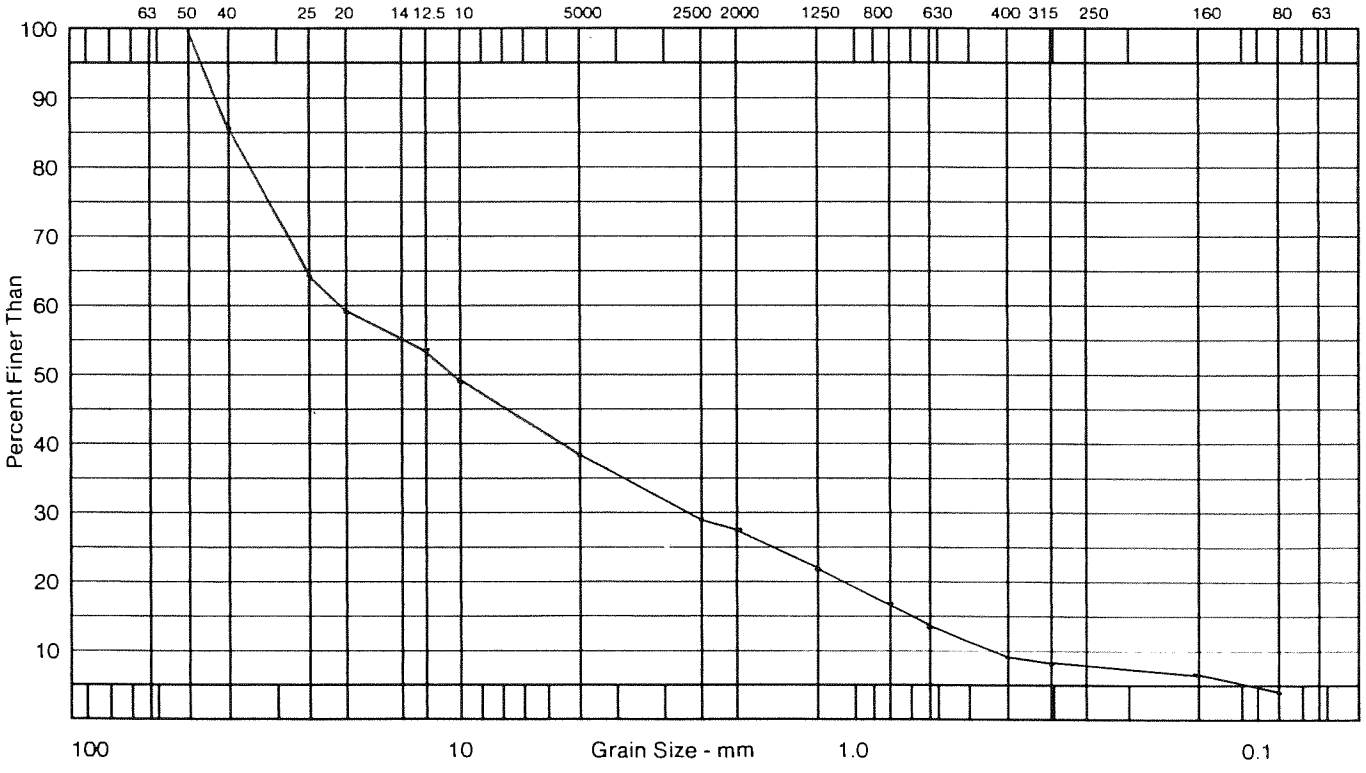
Remarks

%Fines: 4.3

%Sand: 34.4

%Gravel: 61.3

%Moisture: 1.9



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 51 Depth: 3.35 - 3.96 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH# 4A-98 Ck'd by: [illegible] Date: 1998/11/

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					100.0
40,000	40.0					74.2
25,000	25.0					
20,000	20.0					63.7
12,500	12.5					54.5
10,000	10.0					50.0
5,000	5.0					40.3
2,500	2.5					30.8
2,000	2.0					27.6
1,250	1.25					21.9
800	0.800					16.6
630	0.630					13.7
400	0.400					9.2
315	0.315					7.7
160	0.160					5.3
80	0.080					4.1

Description of Sample

Sandy gravel

USC - GW

Time of Sieving Min. 15

Method of Preparation Dry Washed X

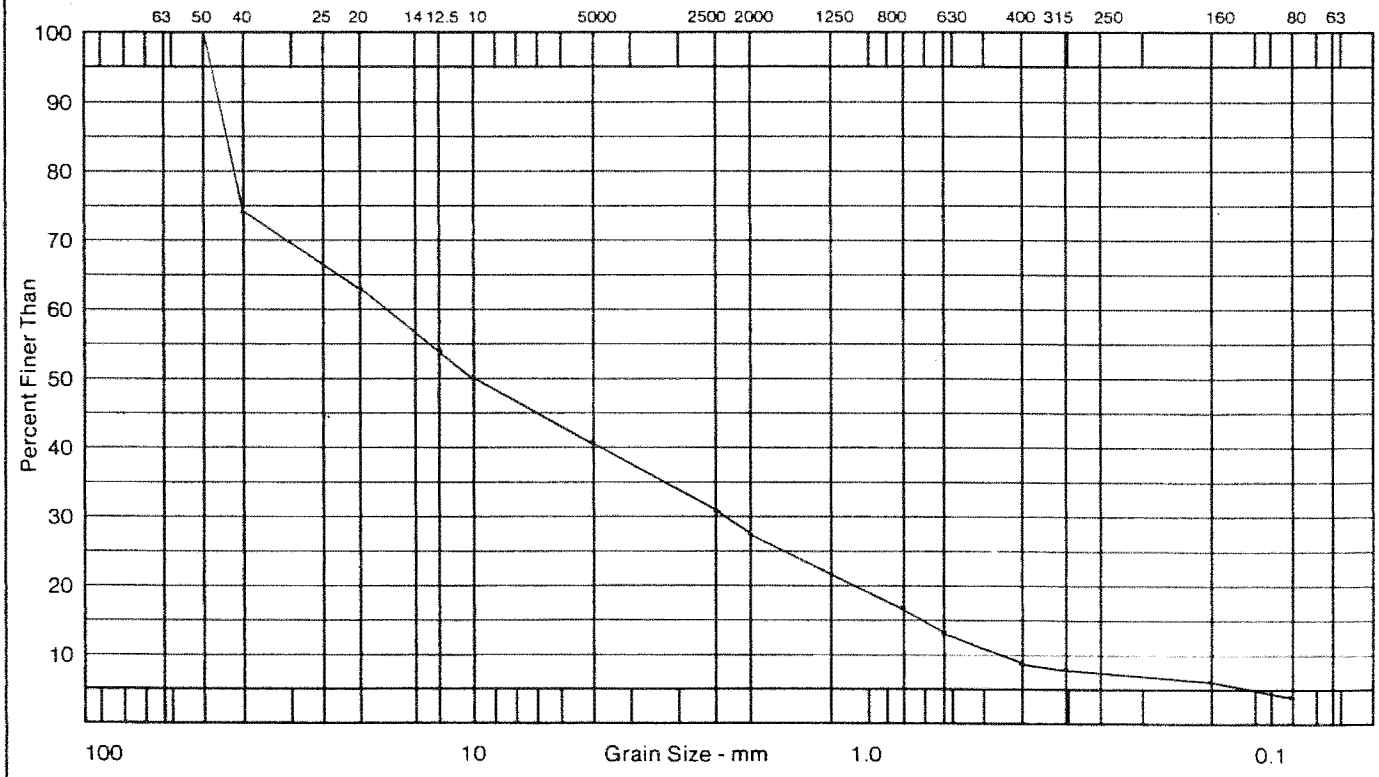
Remarks

%Fines: 4.1

%Sand: 36.2

%Gravel: 59.7

%Moisture: 1.7



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 52 Depth: 4.88 - 5.49 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#4A-98 Made by: LK Job No.: 8002-254

Ck'd by: WC/C Date: 1998/11/13

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					100.0
40,000	40.0					83.7
25,000	25.0					
20,000	20.0					77.9
12,500	12.5					69.6
10,000	10.0					65.3
5,000	5.0					51.0
2,500	2.5					40.3
2,000	2.0					36.3
1,250	1.25					27.9
800	0.800					19.6
630	0.630					15.1
400	0.400					8.7
315	0.315					6.8
160	0.160					4.4
80	0.080					3.4

Description of Sample

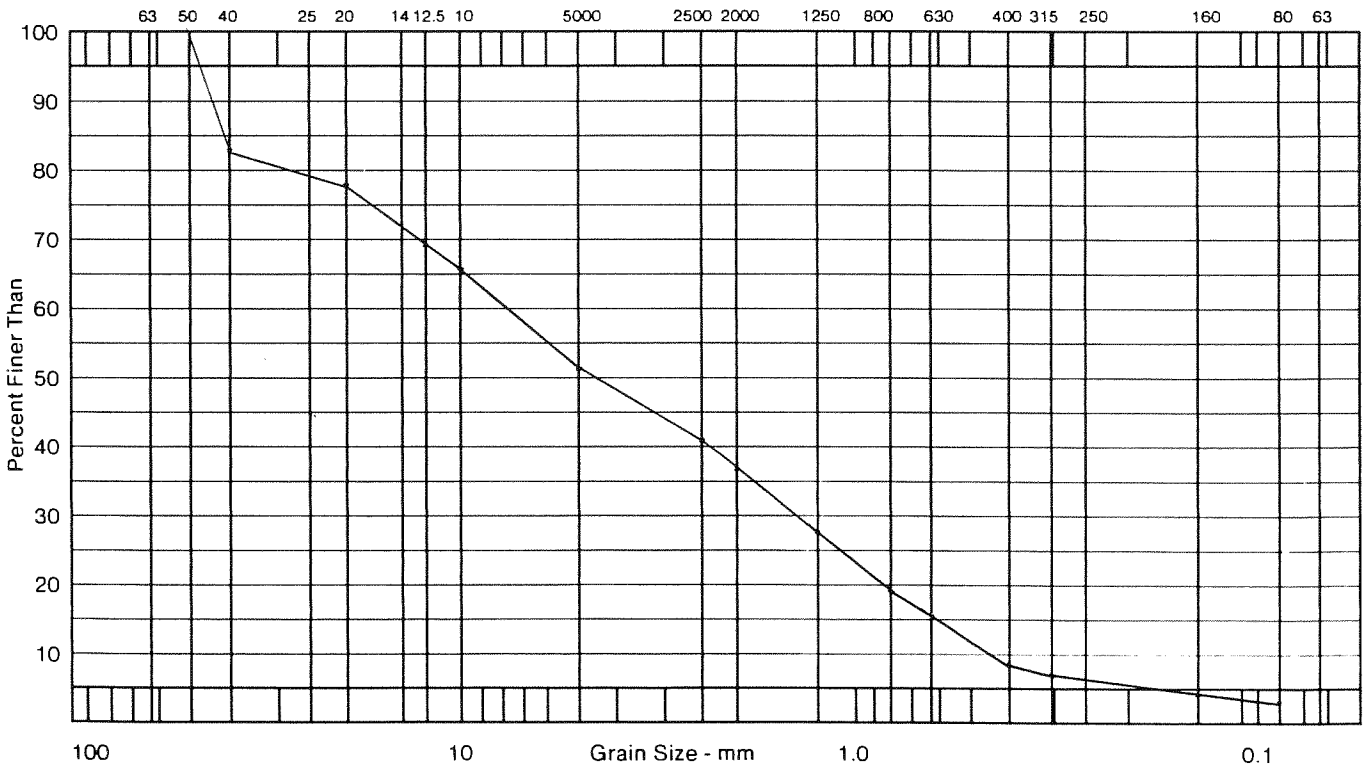
Sandy gravel
USC - GW

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 3.4
%Sand: 47.6
%Gravel: 49.0
%Moisture: 1.9



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 54 Depth: 0.30 - 0.91 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#5-98 Made by: LK Job No.: 8002-254

Ck'd by: Date: 1998/11/14

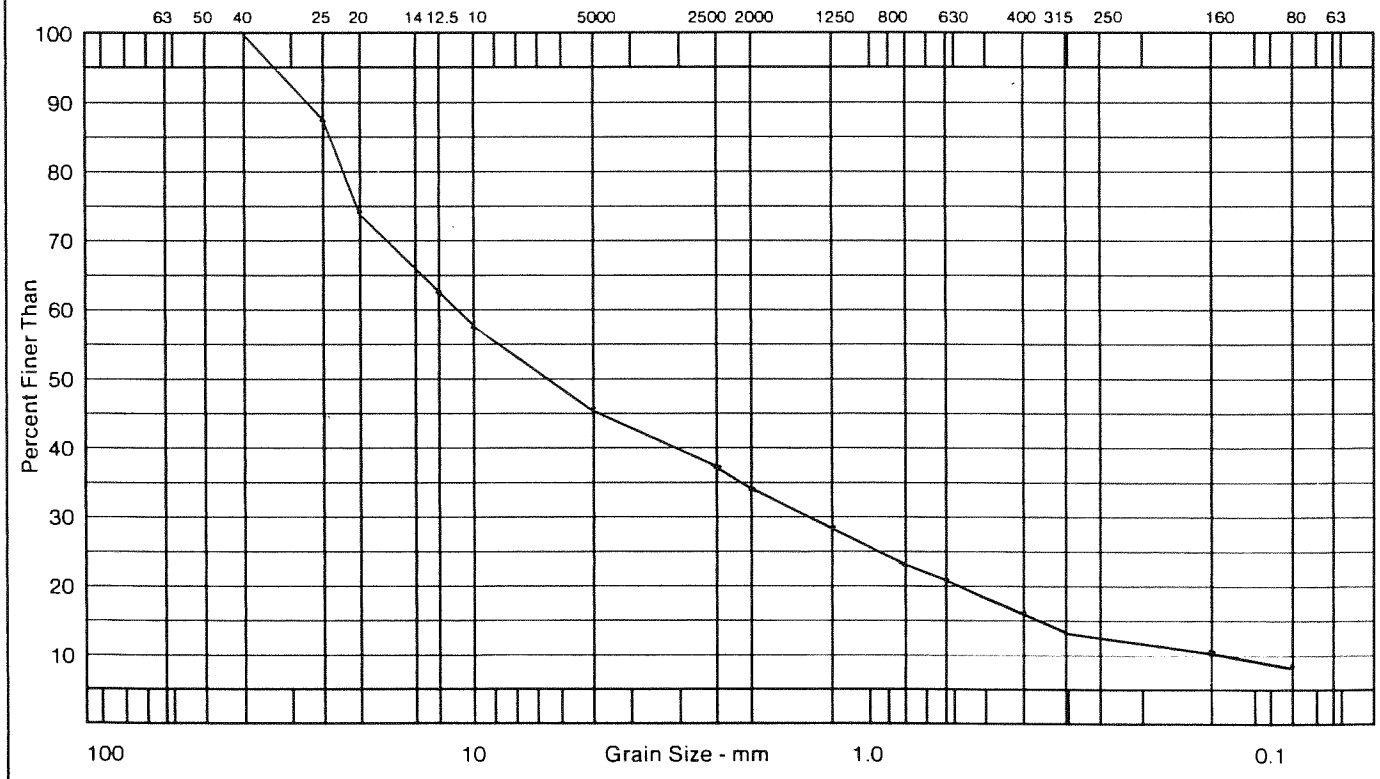
Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					87.8
20,000	20.0					74.3
12,500	12.5					62.7
10,000	10.0					57.5
5,000	5.0					45.1
2,500	2.5					37.0
2,000	2.0					34.2
1,250	1.25					28.6
800	0.800					23.4
630	0.630					20.4
400	0.400					15.7
315	0.315					13.7
160	0.160					10.1
80	0.080					8.2

Description of Sample: Trace silt, sandy gravel
USC - GW GM

Time of Sieving ____ Min. 15

Method of Preparation ____ Dry ____ Washed X

Remarks
%Fines: 8.2
%Sand: 36.9
%Gravel: 54.9
%Moisture: 1.6



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 56 Depth: 3.66 - 4.27 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#5-98 Ck'd by: WCC Date: 1998/11/14

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					100.0
40,000	40.0					88.2
25,000	25.0					
20,000	20.0					72.5
12,500	12.5					62.9
10,000	10.0					59.3
5,000	5.0					50.5
2,500	2.5					40.4
2,000	2.0					37.4
1,250	1.25					26.4
800	0.800					17.1
630	0.630					13.4
400	0.400					8.1
315	0.315					6.4
160	0.160					4.2
80	0.080					3.0

Description of Sample

Sandy gravel

USC - GW

Time of Sieving Min. 15

Method of Preparation Dry Washed X

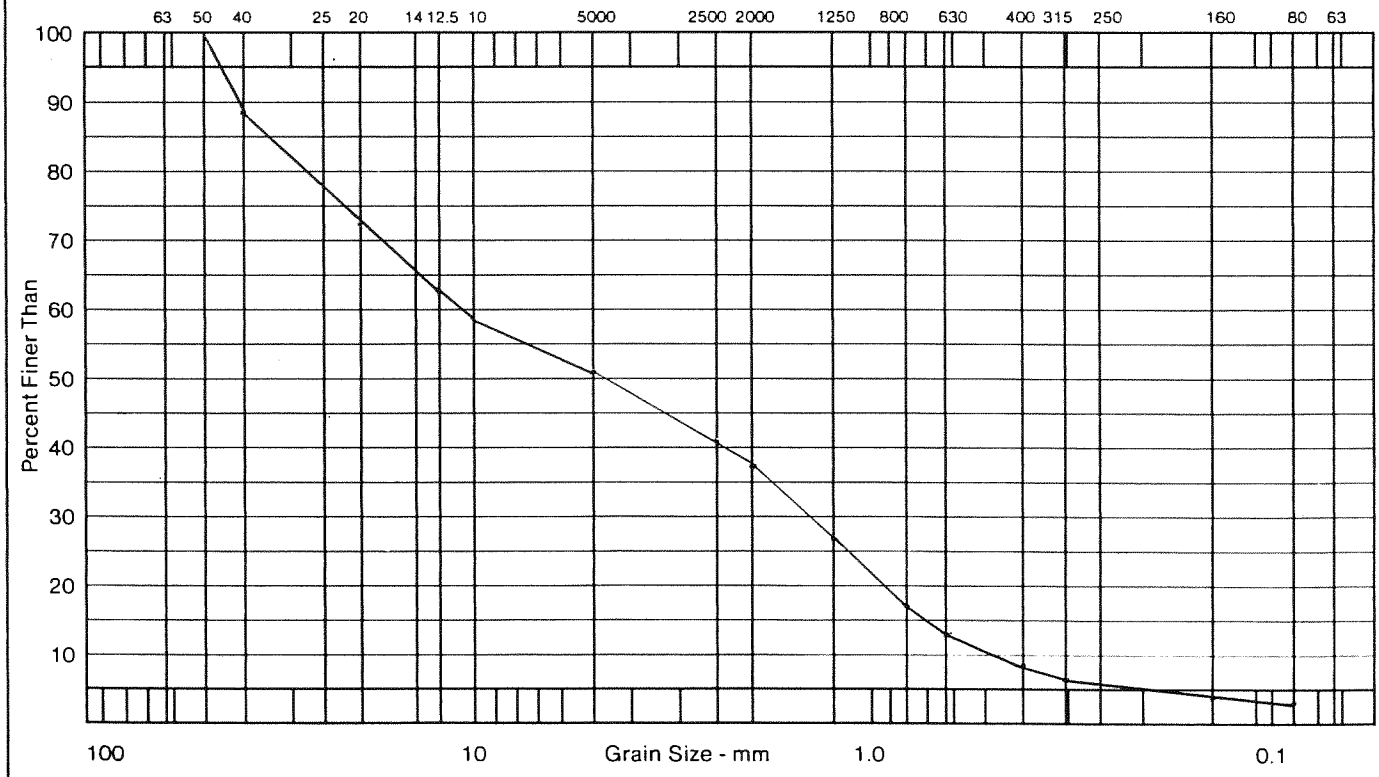
Remarks

%Fines: 3.0

%Sand: 47.5

%Gravel: 49.5

%Moisture: 1.6



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 58 Depth: 6.40 - 7.32 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#5-98 Made by: LK Job No.: 8002-254

Ck'd by: WC Date: 1998/11/14

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					82.6
12,500	12.5					68.0
10,000	10.0					56.6
5,000	5.0					39.1
2,500	2.5					30.3
2,000	2.0					27.6
1,250	1.25					22.1
800	0.800					16.7
630	0.630					14.0
400	0.400					9.7
315	0.315					8.2
160	0.160					5.9
80	0.080					4.5

Description of Sample

Sandy gravel

USC - GW

Time of Sieving Min. 15

Method of Preparation Dry Washed X

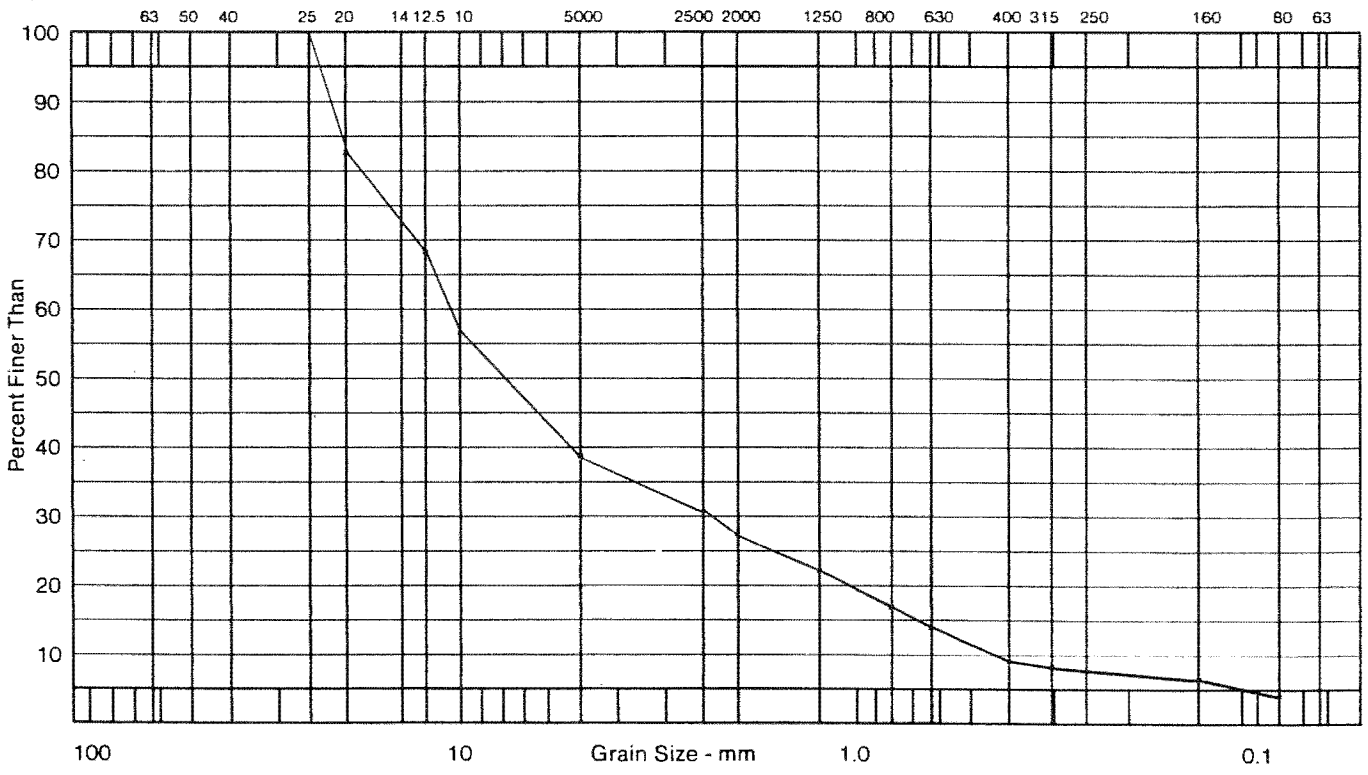
Remarks

%Fines: 4.5

%Sand: 34.6

%Gravel: 60.9

%Moisture: 1.7



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 60 Depth: 9.45 - 10.36 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#5-98 Made by: LK Job No.: 8002-254

Ck'd by: WCR Date: 1998/11/14

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					97.8
12,500	12.5					90.4
10,000	10.0					83.7
5,000	5.0					59.7
2,500	2.5					41.8
2,000	2.0					38.4
1,250	1.25					29.6
800	0.800					24.4
630	0.630					21.6
400	0.400					17.3
315	0.315					15.8
160	0.160					13.0
80	0.080					10.2

Description of Sample

Some silt, gravelly sand

USC - SW SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

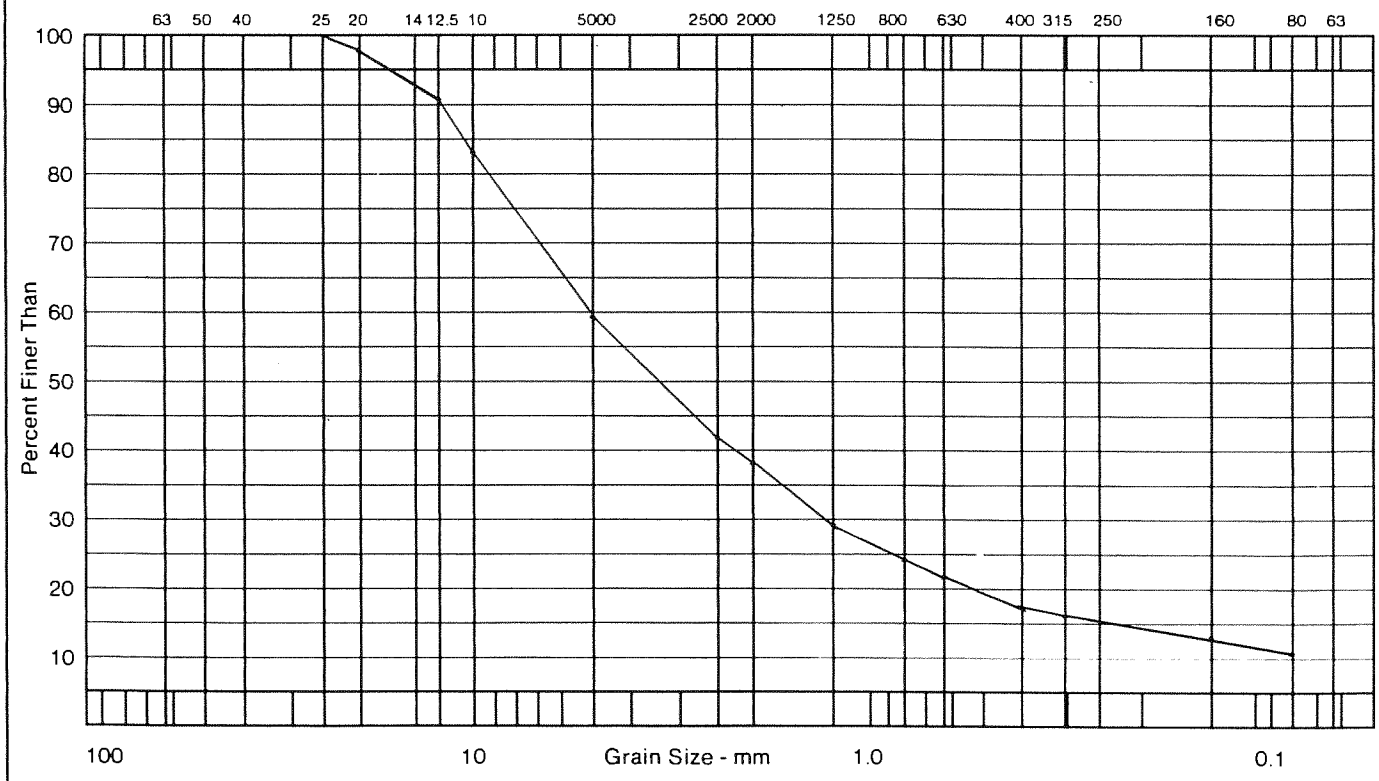
Remarks

%Fines: 10.2

%Sand: 49.5

%Gravel: 40.3

%Moisture: 2.7



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 61 Depth: 10.97 - 11.89 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#5-98 Ck'd by: WCL Date: 1998/11/14

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					93.4
20,000	20.0					83.8
12,500	12.5					76.9
10,000	10.0					67.5
5,000	5.0					51.6
2,500	2.5					38.1
2,000	2.0					33.9
1,250	1.25					26.6
800	0.800					21.4
630	0.630					19.0
400	0.400					15.2
315	0.315					13.6
160	0.160					9.9
80	0.080					7.7

Description of Sample

Trace silt, sandy gravel

USC - GW GM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

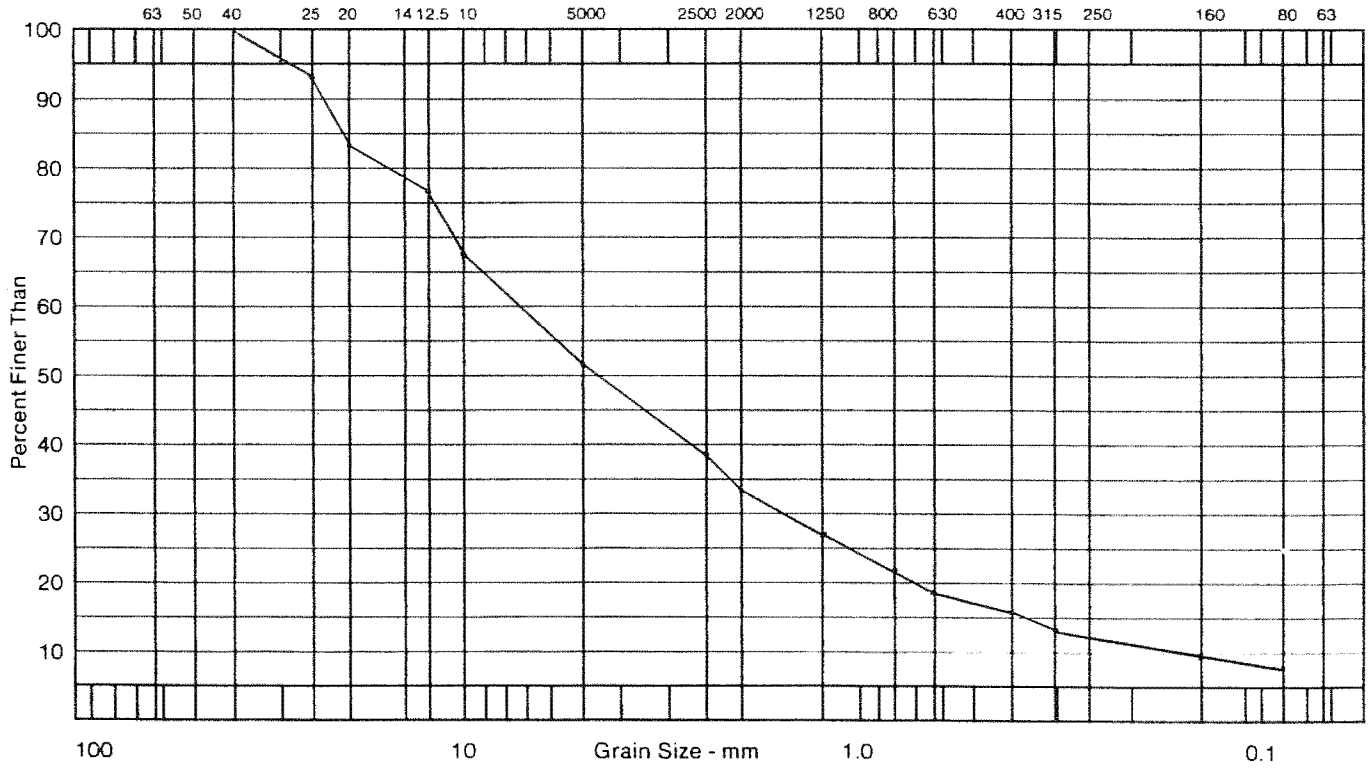
Remarks

%Fines: 7.7

%Sand: 42.9

%Gravel: 49.4

%Moisture: 2.6



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 62 Depth: 12.50 - 13.11 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH# 5-98 Made by: LK Job No.: 8002-254

Ck'd by: WLL Date: 1998/11/14

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					62.6
20,000	20.0					57.6
12,500	12.5					53.8
10,000	10.0					50.1
5,000	5.0					39.1
2,500	2.5					29.0
2,000	2.0					26.7
1,250	1.25					20.2
800	0.800					17.0
630	0.630					15.2
400	0.400					12.4
315	0.315					11.2
160	0.160					8.4
80	0.080					6.0

Description of Sample

Trace silt, sandy gravel

USC - GW GM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

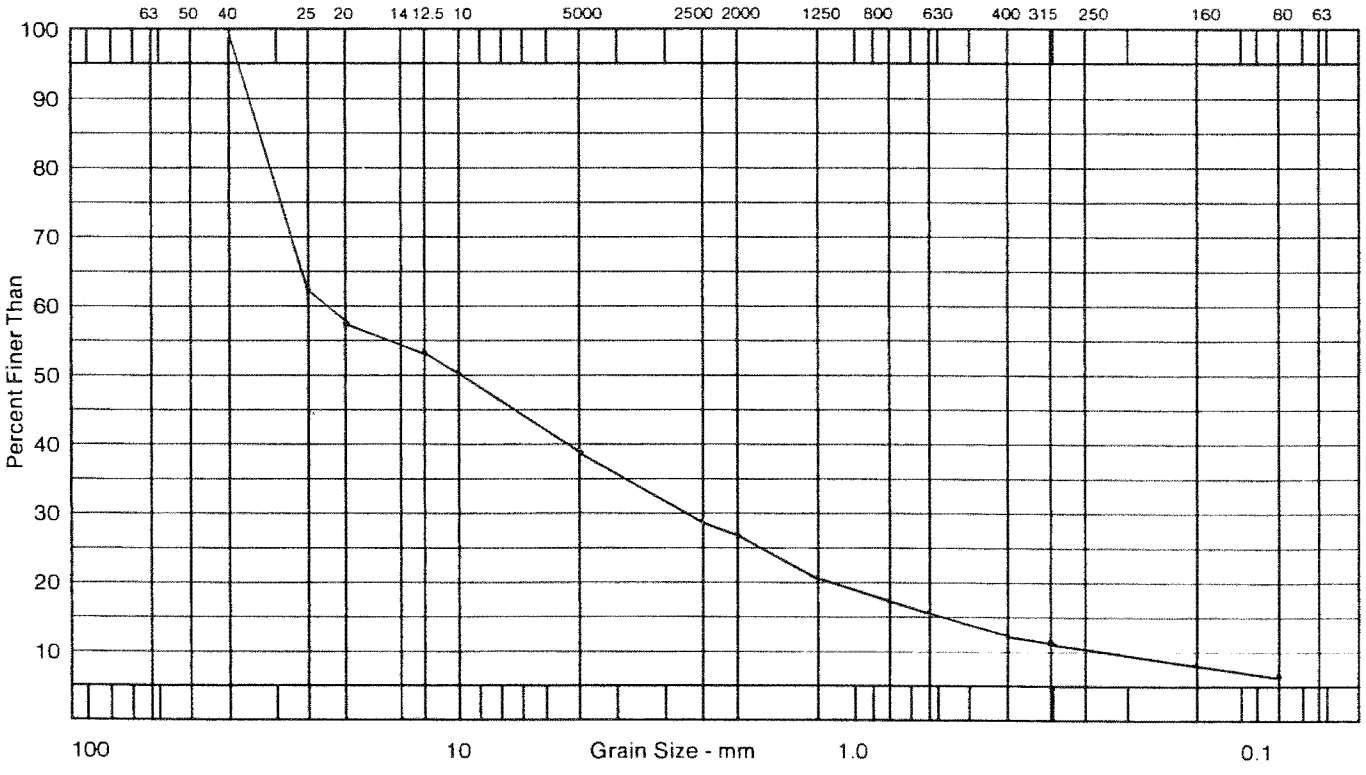
Remarks

%Fines: 6.0

%Sand: 33.1

%Gravel: 60.9

%Moisture: 2.1



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 63 Depth: 14.02 - 14.63 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#5-98 Made by: LK Job No.: 8002-254

Ck'd by: [illegible] Date: 1998/11/14

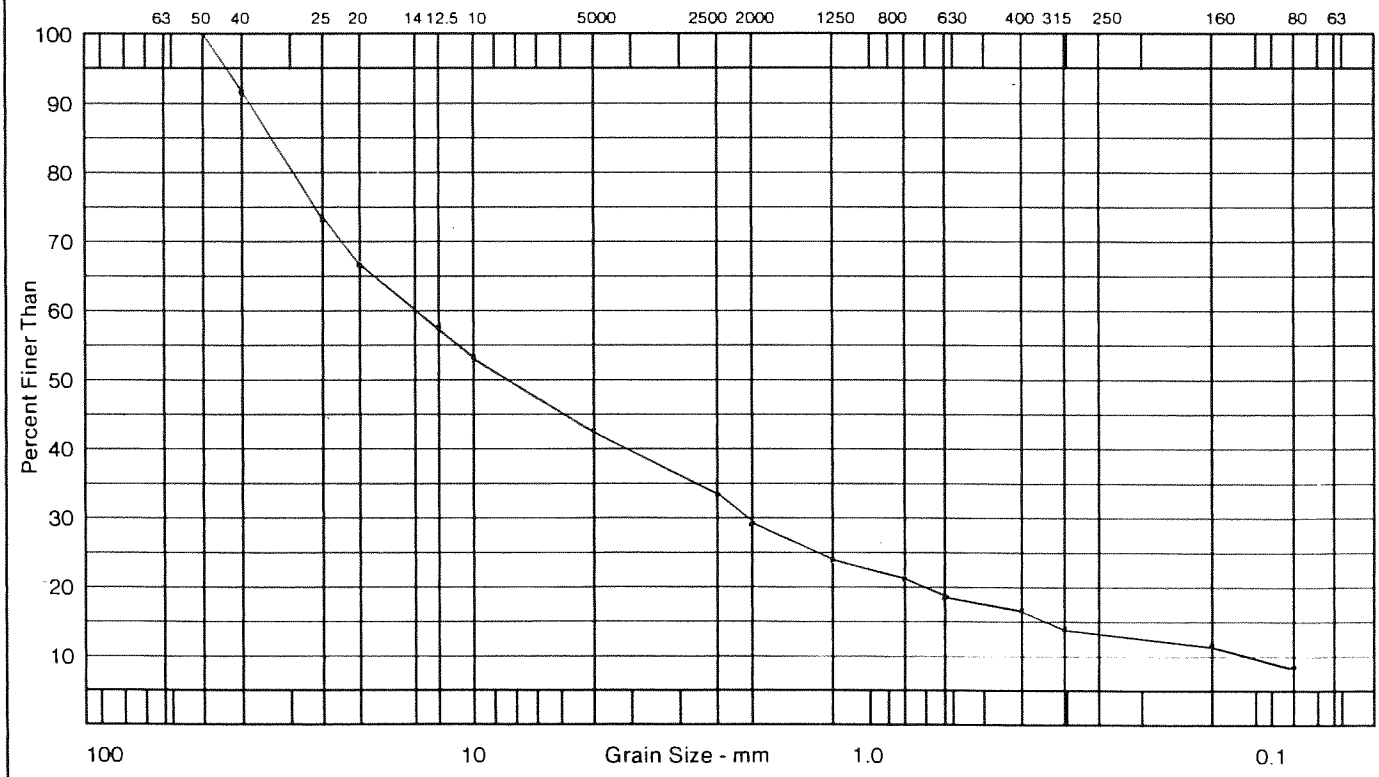
Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					100.0
40,000	40.0					91.0
25,000	25.0					73.7
20,000	20.0					66.9
12,500	12.5					57.3
10,000	10.0					53.4
5,000	5.0					42.8
2,500	2.5					33.4
2,000	2.0					29.8
1,250	1.25					24.3
800	0.800					20.6
630	0.630					18.9
400	0.400					16.1
315	0.315					14.7
160	0.160					11.2
80	0.080					8.7

Description of Sample: Trace silt, sandy gravel
USC - GW GM

Time of Sieving: Min. 15

Method of Preparation: Dry: Washed: X

Remarks:
%Fines: 8.7
%Sand: 34.1
%Gravel: 57.2
%Moisture: 2.6



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 65 Depth: 1.83 - 2.74 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH# 6-98 Made by: LK Job No.: 8002-254

Ck'd by: [illegible] Date: 1998/11/14

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					96.1
20,000	20.0					90.9
12,500	12.5					76.5
10,000	10.0					63.9
5,000	5.0					35.2
2,500	2.5					21.2
2,000	2.0					18.9
1,250	1.25					11.2
800	0.800					7.1
630	0.630					5.7
400	0.400					4.7
315	0.315					4.3
160	0.160					3.5
80	0.080					2.8

Description of Sample

Sandy gravel

USC - GP

Time of Sieving ____ Min. 15

Method of Preparation ____ Dry ____ Washed X

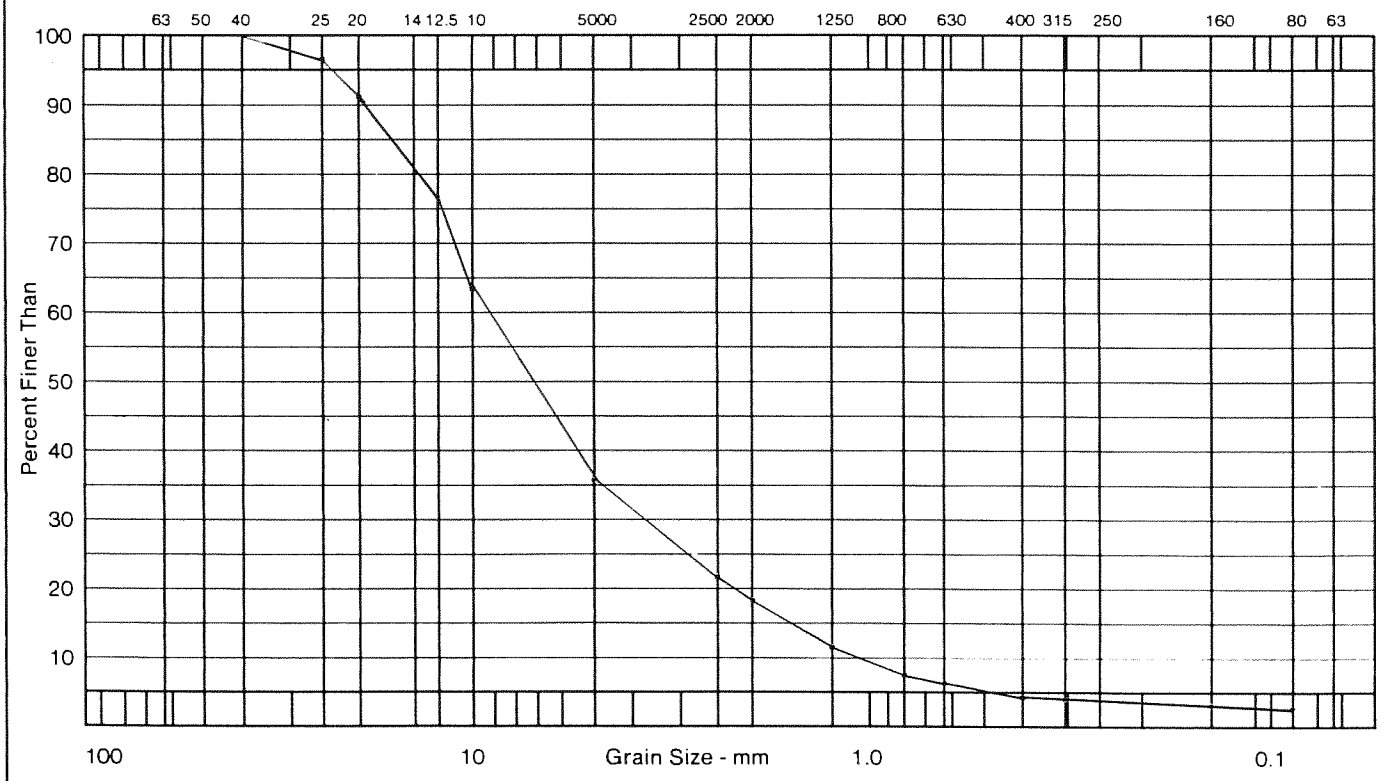
Remarks

%Fines: 2.8

%Sand: 32.4

%Gravel: 64.8

%Moisture: 1.9



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 66 Depth: 3.35 - 3.96 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH# 6-98 Ck'd by: WCIC Date: 1998/11/14

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					
20,000	20.0					100.0
12,500	12.5					93.9
10,000	10.0					91.6
5,000	5.0					72.2
2,500	2.5					51.7
2,000	2.0					44.9
1,250	1.25					28.2
800	0.800					14.5
630	0.630					10.3
400	0.400					6.5
315	0.315					5.6
160	0.160					4.4
80	0.080					3.4

Description of Sample

Gravelly sand

USC - GP

Time of Sieving Min. 15

Method of Preparation Dry Washed X

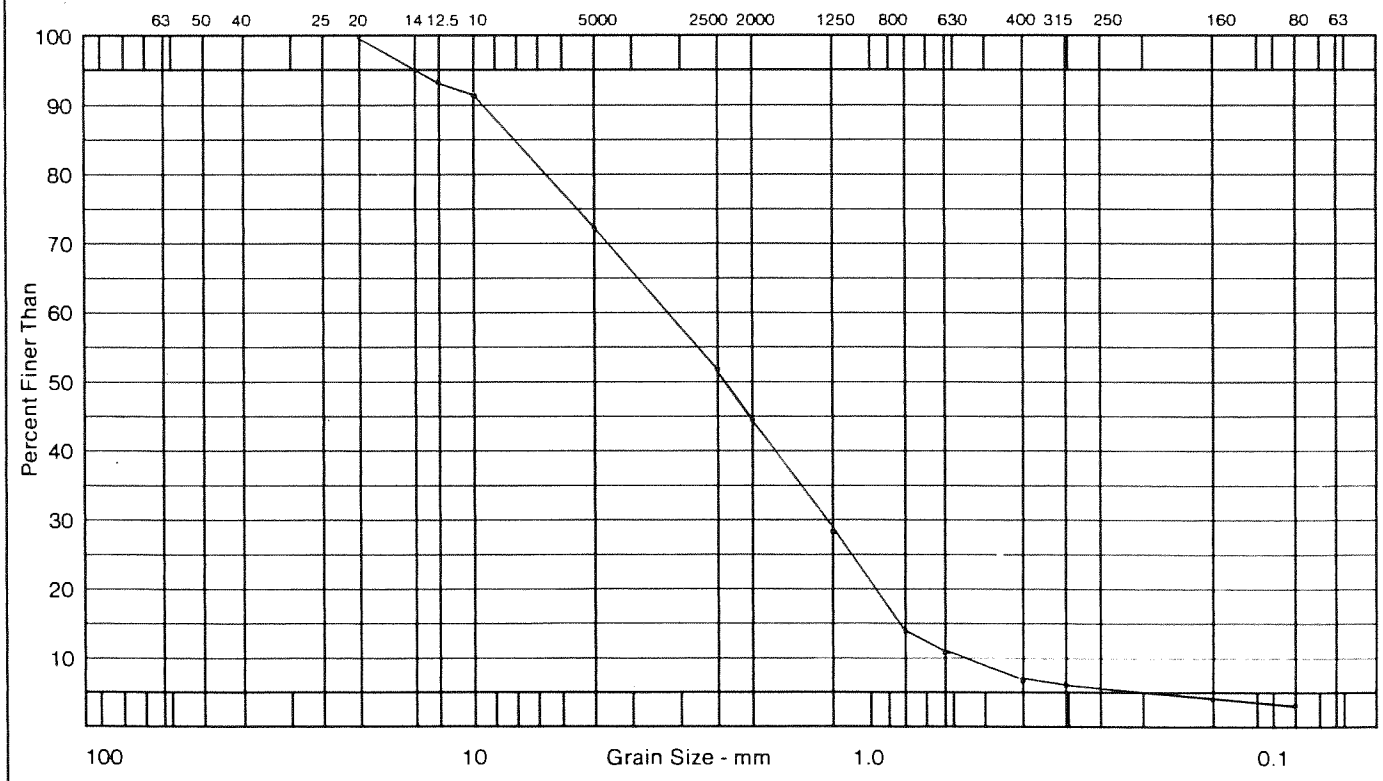
Remarks

%Fines: 3.4

%Sand: 68.8

%Gravel: 27.8

%Moisture: 2.2



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 68 Depth: 6.40 - 7.01 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH# 6-98 Ck'd by: Date: 1998/11/14

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					96.5
12,500	12.5					92.7
10,000	10.0					87.8
5,000	5.0					69.8
2,500	2.5					49.3
2,000	2.0					47.4
1,250	1.25					34.9
800	0.800					24.3
630	0.630					18.7
400	0.400					12.1
315	0.315					10.3
160	0.160					7.8
80	0.080					6.0

Description of Sample

Trace silt, gravelly sand

USC - GW GM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

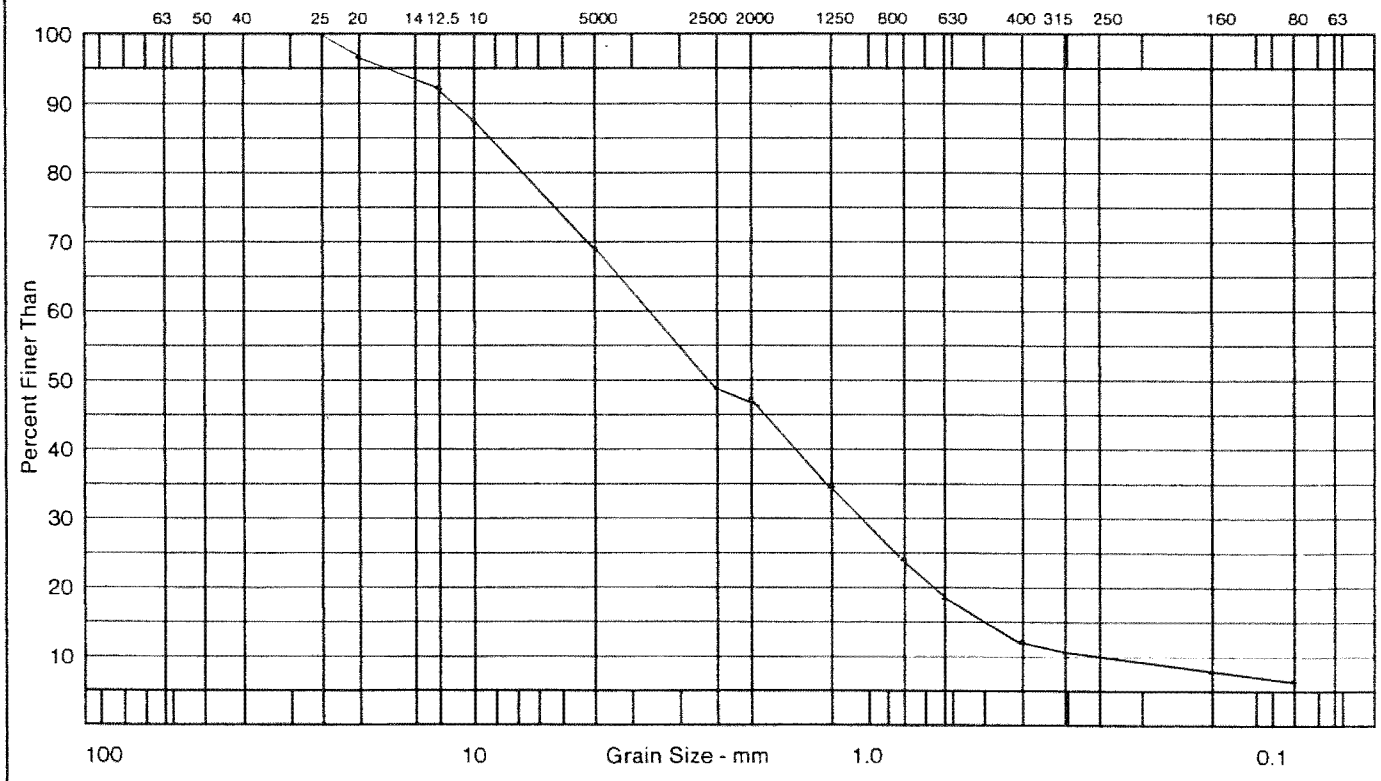
Remarks

%Fines: 6.0

%Sand: 63.8

%Gravel: 30.2

%Moisture: 1.9



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 69 Depth: 7.92 - 8.53 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH# 6-98 Ck'd by: WCIC Date: 1998/11/16

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					95.8
20,000	20.0					94.2
12,500	12.5					87.0
10,000	10.0					80.8
5,000	5.0					66.2
2,500	2.5					49.7
2,000	2.0					43.8
1,250	1.25					30.9
800	0.800					20.3
630	0.630					15.6
400	0.400					10.0
315	0.315					8.4
160	0.160					6.2
80	0.080					4.9

Description of Sample

Gravelly sand

USC - SW

Time of Sieving Min. 15

Method of Preparation Dry Washed X

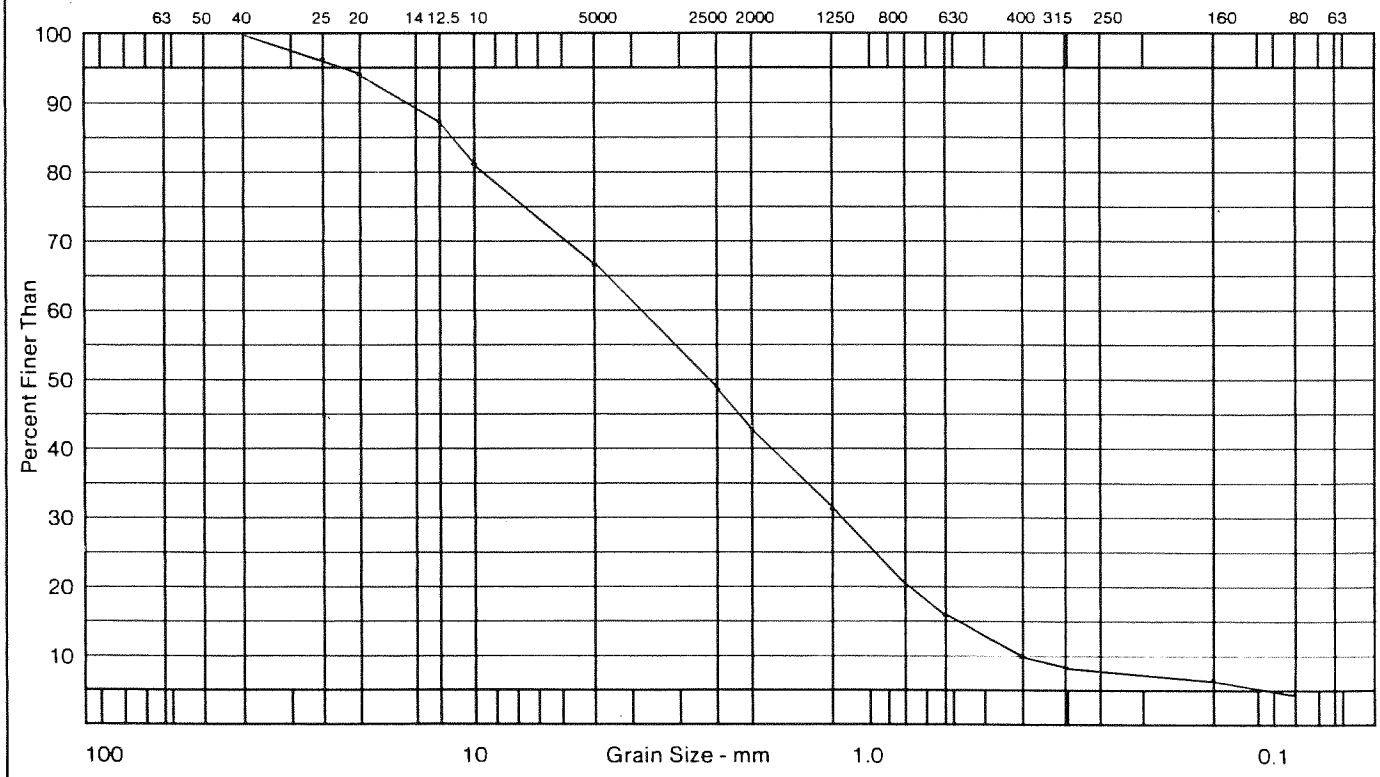
Remarks

%Fines: 4.9

%Sand: 61.3

%Gravel: 33.8

%Moisture:



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 70 Depth: 7.92 - 8.53 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#7-98 Ck'd by: [illegible] Date: 1998/11/16

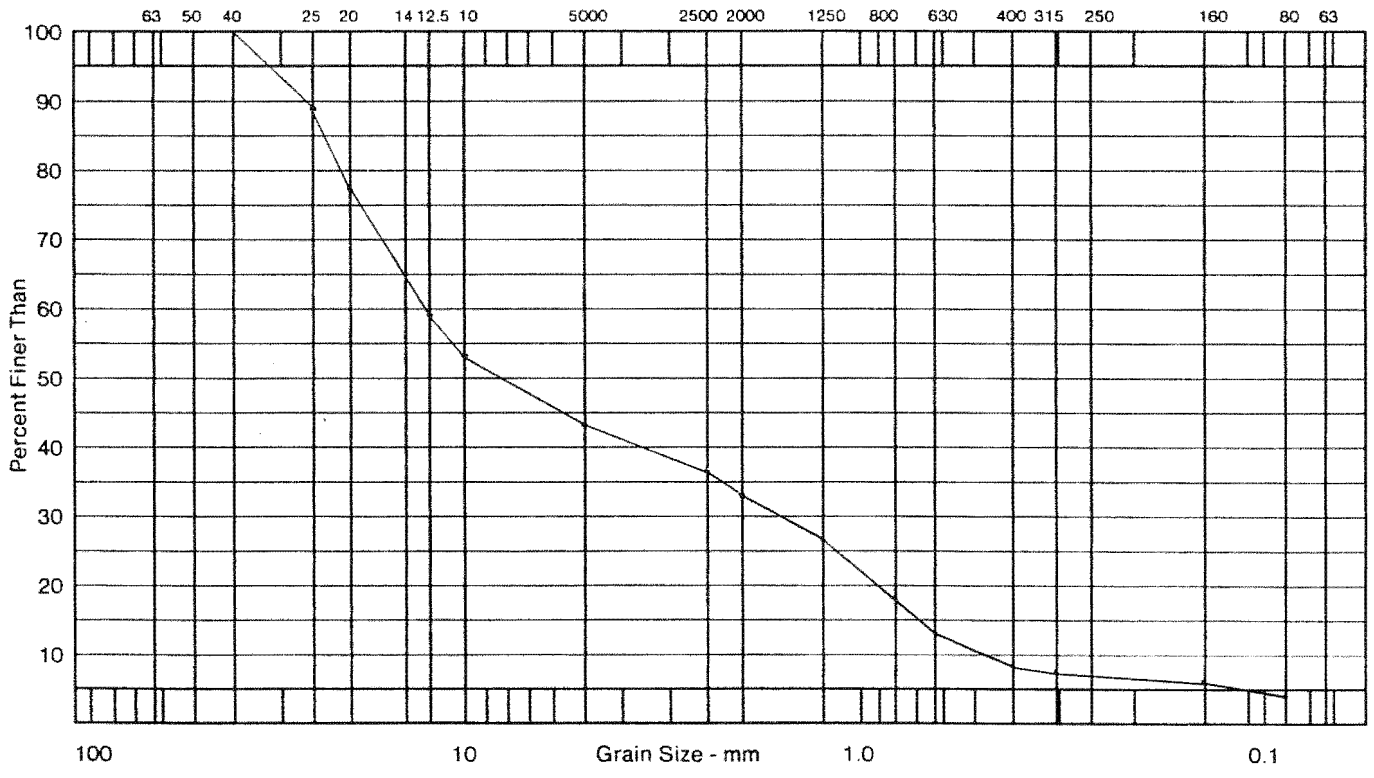
Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					89.6
20,000	20.0					77.1
12,500	12.5					59.6
10,000	10.0					53.7
5,000	5.0					43.4
2,500	2.5					36.0
2,000	2.0					33.4
1,250	1.25					26.1
800	0.800					18.0
630	0.630					13.8
400	0.400					8.9
315	0.315					7.6
160	0.160					5.6
80	0.080					4.5

Description of Sample: Sandy gravel
USC - GW

Time of Sieving: Min. 15

Method of Preparation: Dry: Washed: X

Remarks:
%Fines: 4.5
%Sand: 39.1
%Gravel: 56.4
%Moisture: 1.9



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 71 Depth: 10.97 - 11.58 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH# 6-98 Ck'd by: WC Date: 1998/11/16

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					96.0
20,000	20.0					90.6
12,500	12.5					82.5
10,000	10.0					79.3
5,000	5.0					66.2
2,500	2.5					51.8
2,000	2.0					47.9
1,250	1.25					34.4
800	0.800					23.0
630	0.630					17.5
400	0.400					10.9
315	0.315					9.1
160	0.160					6.7
80	0.080					5.2

Description of Sample

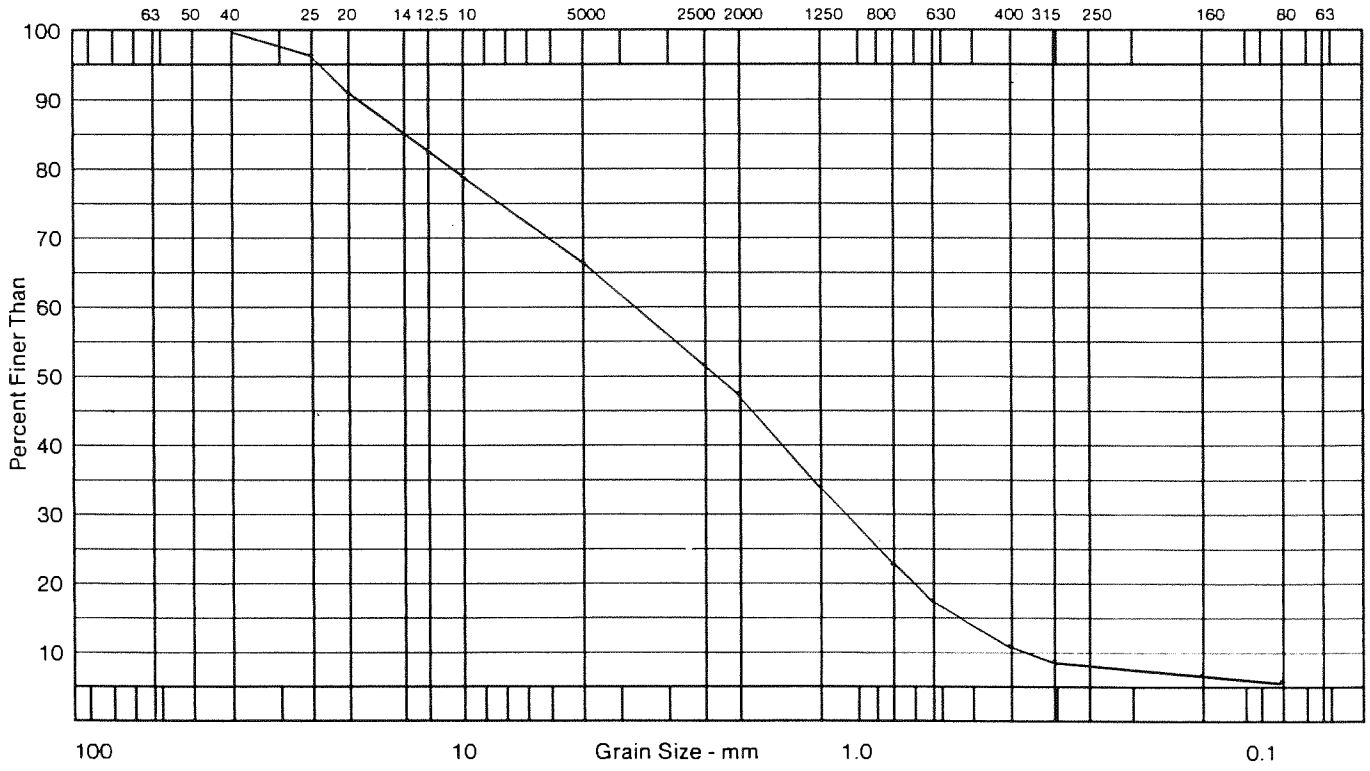
Trace silt, gravelly sand
USC - SW SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 5.2
%Sand: 61.0
%Gravel: 33.8
%Moisture: 2.0



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 73 Depth: 14.02 - 14.63 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#6-98 Ck'd by: WCK Date: 1998/11/16

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					94.5
12,500	12.5					77.6
10,000	10.0					72.3
5,000	5.0					61.8
2,500	2.5					51.1
2,000	2.0					48.0
1,250	1.25					35.5
800	0.800					23.8
630	0.630					17.8
400	0.400					10.8
315	0.315					8.8
160	0.160					6.2
80	0.080					4.8

Description of Sample

Gravelly sand

USC - SW

Time of Sieving Min. 15

Method of Preparation Dry Washed X

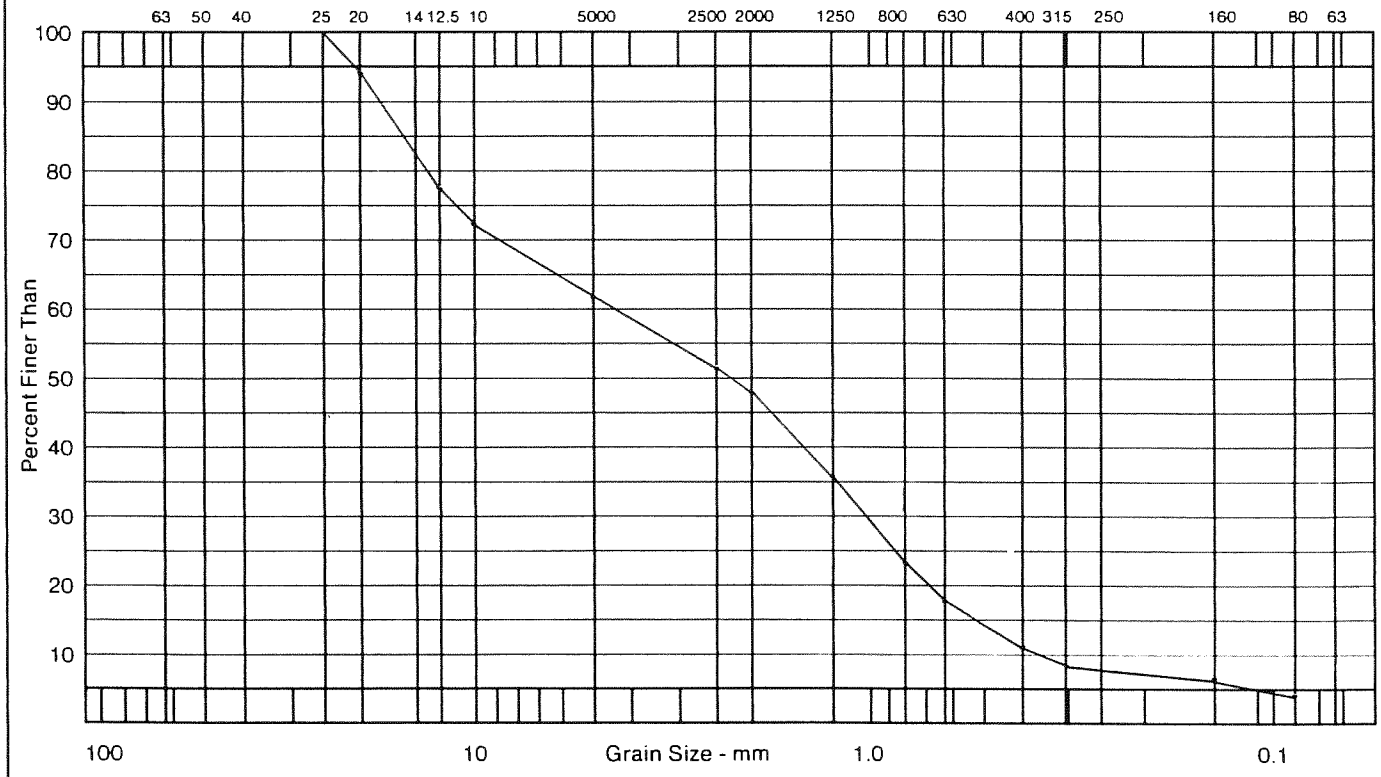
Remarks

%Fines: 4.8

%Sand: 57.0

%Gravel: 38.2

%Moisture: 1.6



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 75 Depth: 1.83 - 2.44 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#7-98 Ck'd by: WCL Date: 1998/11/16

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					
20,000	20.0					100.0
12,500	12.5					96.7
10,000	10.0					91.2
5,000	5.0					73.0
2,500	2.5					58.9
2,000	2.0					52.4
1,250	1.25					32.0
800	0.800					16.0
630	0.630					11.1
400	0.400					6.8
315	0.315					5.9
160	0.160					4.6
80	0.080					3.9

Description of Sample

Gravelly sand

USC - SW

Time of Sieving Min. 15

Method of Preparation Dry Washed X

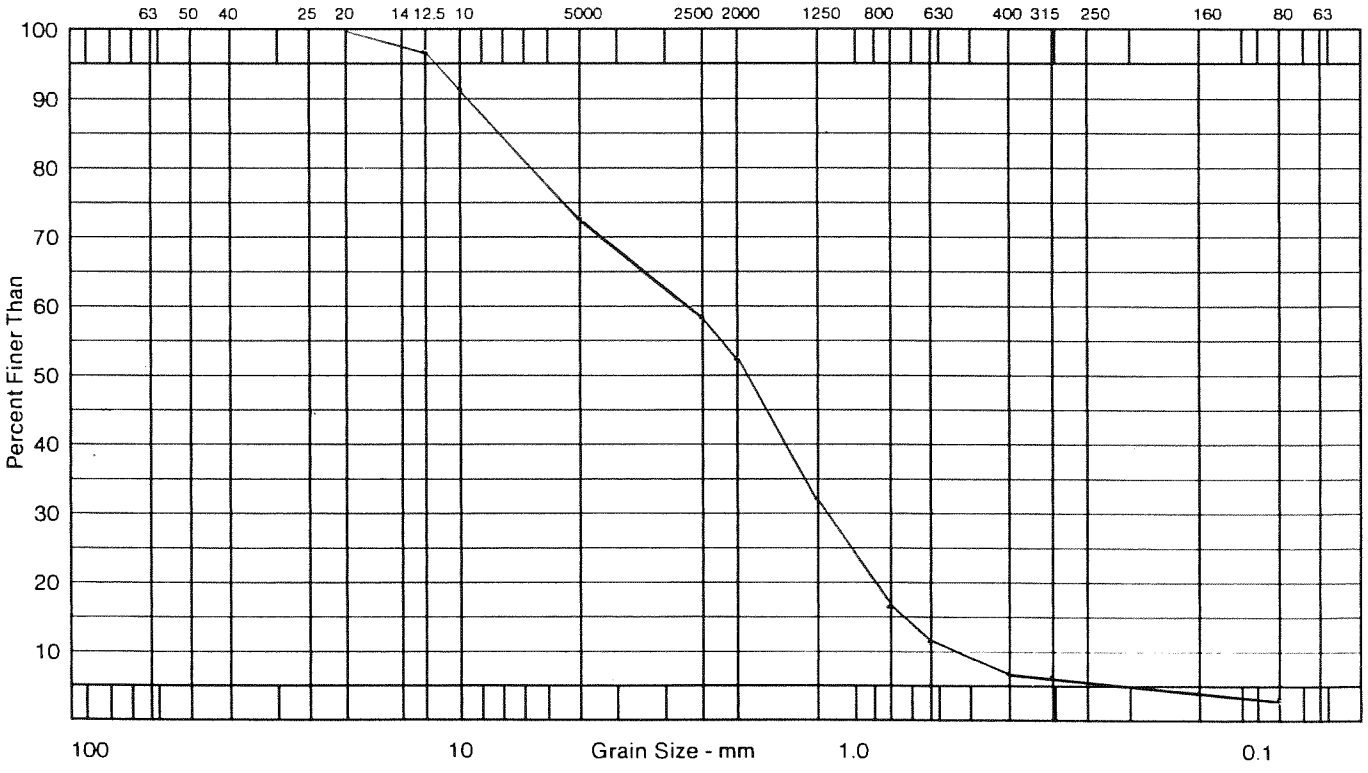
Remarks

%Fines: 3.9

%Sand: 69.1

%Gravel: 27.0

%Moisture: 2.0



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 76 Depth: 3.35 - 3.96 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#7-98 Ck'd by: WCG Date: 1998/11/16

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					91.5
20,000	20.0					88.3
12,500	12.5					81.4
10,000	10.0					77.3
5,000	5.0					67.6
2,500	2.5					58.1
2,000	2.0					52.8
1,250	1.25					33.2
800	0.800					16.0
630	0.630					10.2
400	0.400					5.3
315	0.315					4.3
160	0.160					3.3
80	0.080					2.7

Description of Sample

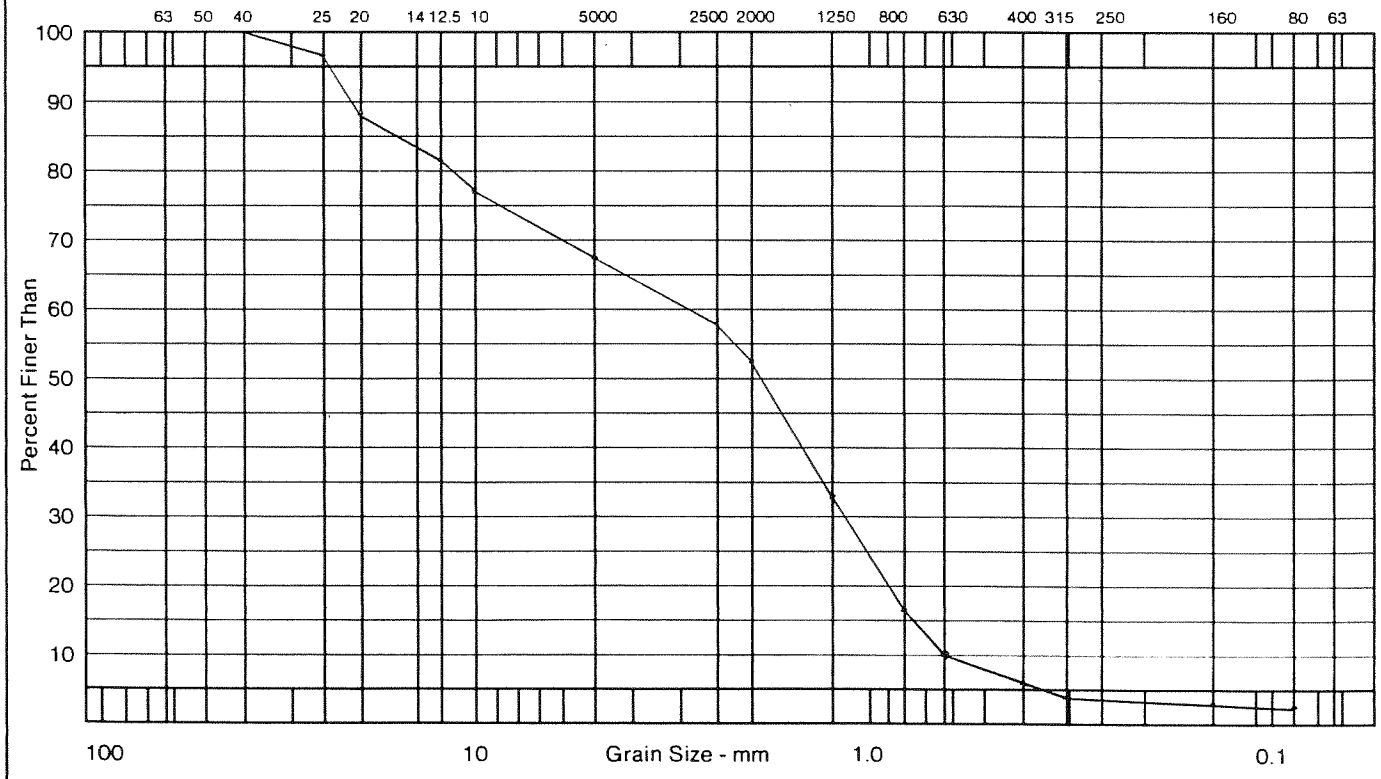
Gravelly sand
USC - SP

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 2.7
%Sand: 64.9
%Gravel: 32.4
%Moisture: 1.8



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 78 Depth: 6.40 - 7.01 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH# 7-98 Ck'd by: WCC Date: 1998/11/16

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					91.2
12,500	12.5					81.2
10,000	10.0					76.8
5,000	5.0					63.6
2,500	2.5					53.6
2,000	2.0					50.9
1,250	1.25					34.4
800	0.800					19.2
630	0.630					13.1
400	0.400					7.1
315	0.315					5.9
160	0.160					4.5
80	0.080					3.5

Description of Sample

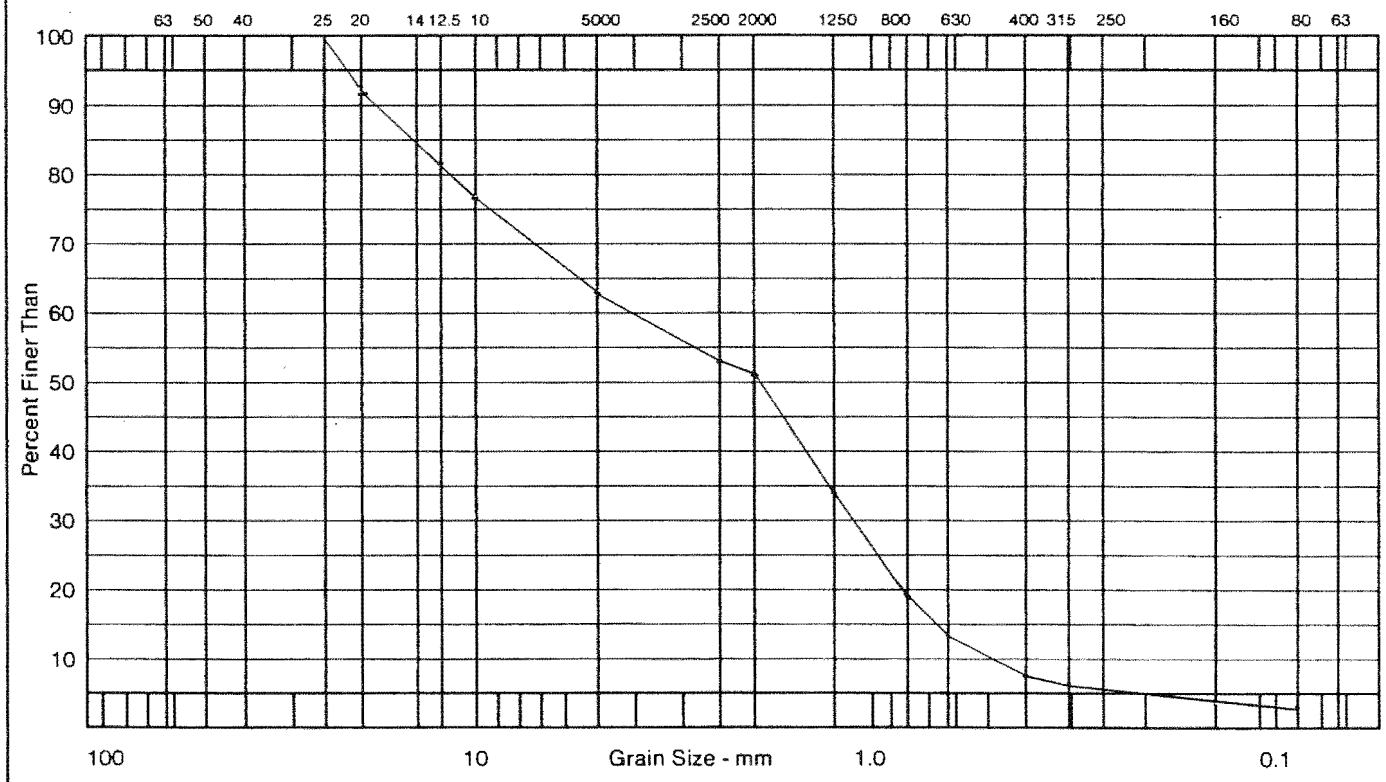
Gravelly sand
USC - SP

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 3.5
%Sand: 60.1
%Gravel: 36.4
%Moisture: 1.9



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 81 Depth: 10.97 - 11.58 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH# 7-98 Made by: LK Job No.: 8002-254

Ck'd by: WC Date: 1998/11/16

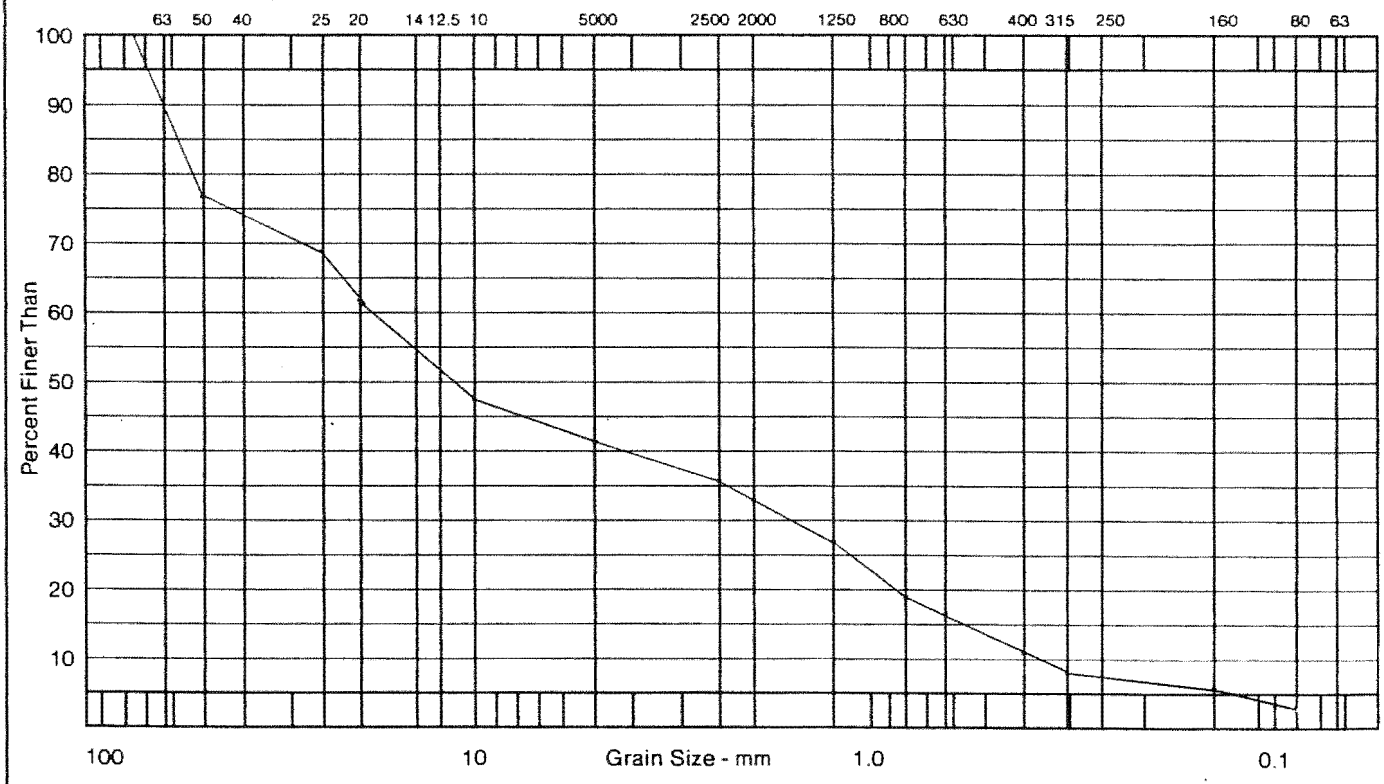
Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					76.9
40,000	40.0					
25,000	25.0					69.0
20,000	20.0					61.0
12,500	12.5					51.3
10,000	10.0					47.5
5,000	5.0					40.9
2,500	2.5					35.1
2,000	2.0					33.7
1,250	1.25					26.9
800	0.800					19.6
630	0.630					15.9
400	0.400					10.4
315	0.315					8.4
160	0.160					5.3
80	0.080					3.6

Description of Sample: Sandy gravel, USC - GW

Time of Sieving: Min. 15

Method of Preparation: Dry ____ Washed X

Remarks: %Fines: 3.6; %Sand: 37.3; %Gravel: 59.1; %Moisture: 1.6



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 82 Depth: 12.50 - 13.41 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH# 7-98 Ck'd by: GCC Date: 1998/11/16

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					100.0
40,000	40.0					93.3
25,000	25.0					86.4
20,000	20.0					73.2
12,500	12.5					61.5
10,000	10.0					58.6
5,000	5.0					50.9
2,500	2.5					44.4
2,000	2.0					41.5
1,250	1.25					33.5
800	0.800					24.7
630	0.630					20.4
400	0.400					13.8
315	0.315					11.2
160	0.160					6.7
80	0.080					4.9

Description of Sample

Sandy gravel

USC - GW

Time of Sieving Min. 15

Method of Preparation Dry Washed X

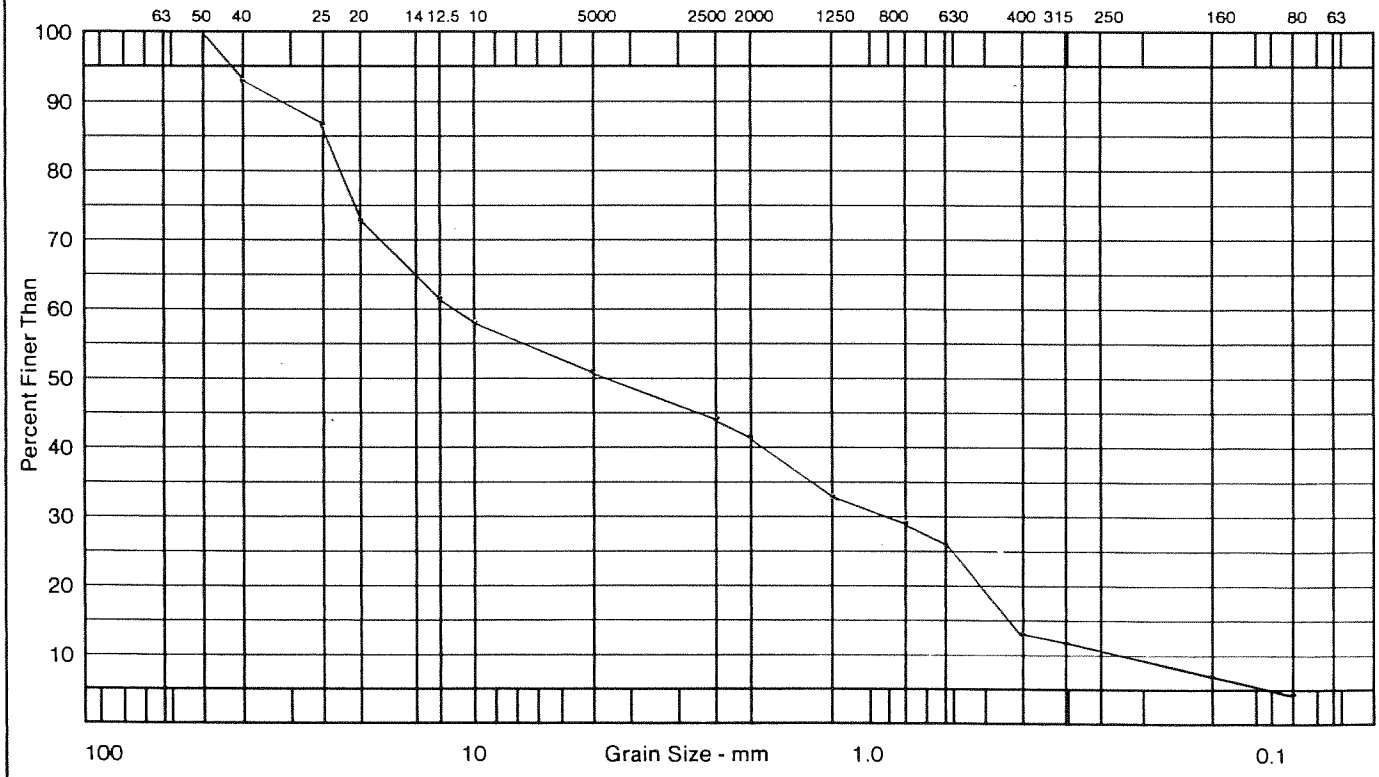
Remarks

%Fines: 4.9

%Sand: 46.0

%Gravel: 49.1

%Moisture: 2.0



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 84 Depth: 15.54 - 15.85 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH# 7-98 Ck'd by: WCC Date: 1998/11/16

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					87.5
20,000	20.0					68.8
12,500	12.5					64.9
10,000	10.0					60.9
5,000	5.0					53.4
2,500	2.5					46.2
2,000	2.0					44.2
1,250	1.25					32.3
800	0.800					22.3
630	0.630					17.4
400	0.400					11.5
315	0.315					9.5
160	0.160					6.2
80	0.080					4.3

Description of Sample

Gravelly sand

USC - SP

Time of Sieving Min. 15

Method of Preparation Dry Washed X

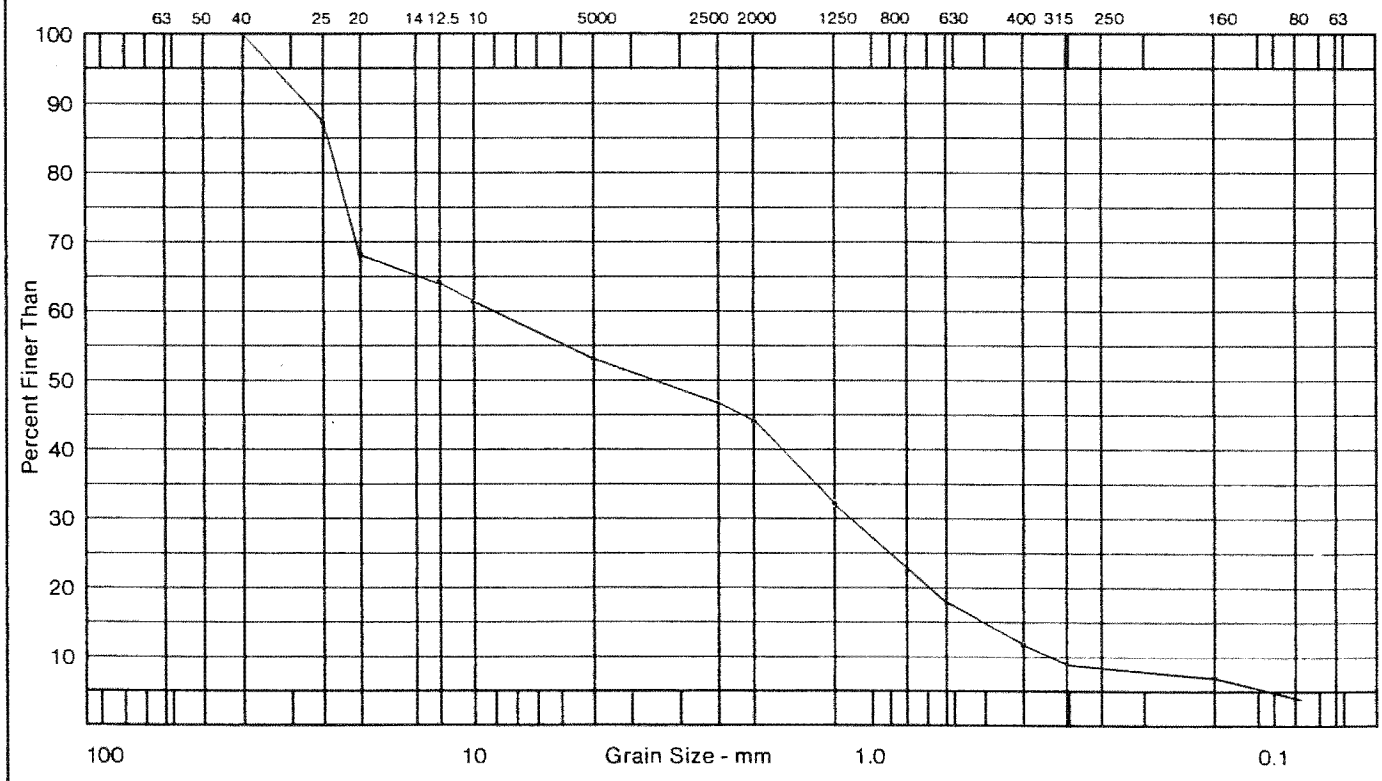
Remarks

%Fines: 4.3

%Sand: 49.1

%Gravel: 46.6

%Moisture: 2.0



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 86 Depth: 1.83 - 2.44 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH# 8-98 Ck'd by: WC Date: 1998/11/17

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					94.1
20,000	20.0					89.3
12,500	12.5					85.8
10,000	10.0					83.6
5,000	5.0					78.2
2,500	2.5					73.9
2,000	2.0					71.8
1,250	1.25					65.5
800	0.800					55.4
630	0.630					48.9
400	0.400					35.4
315	0.315					28.6
160	0.160					17.2
80	0.080					13.1

Description of Sample

Some silt, gravelly sand

USC - SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

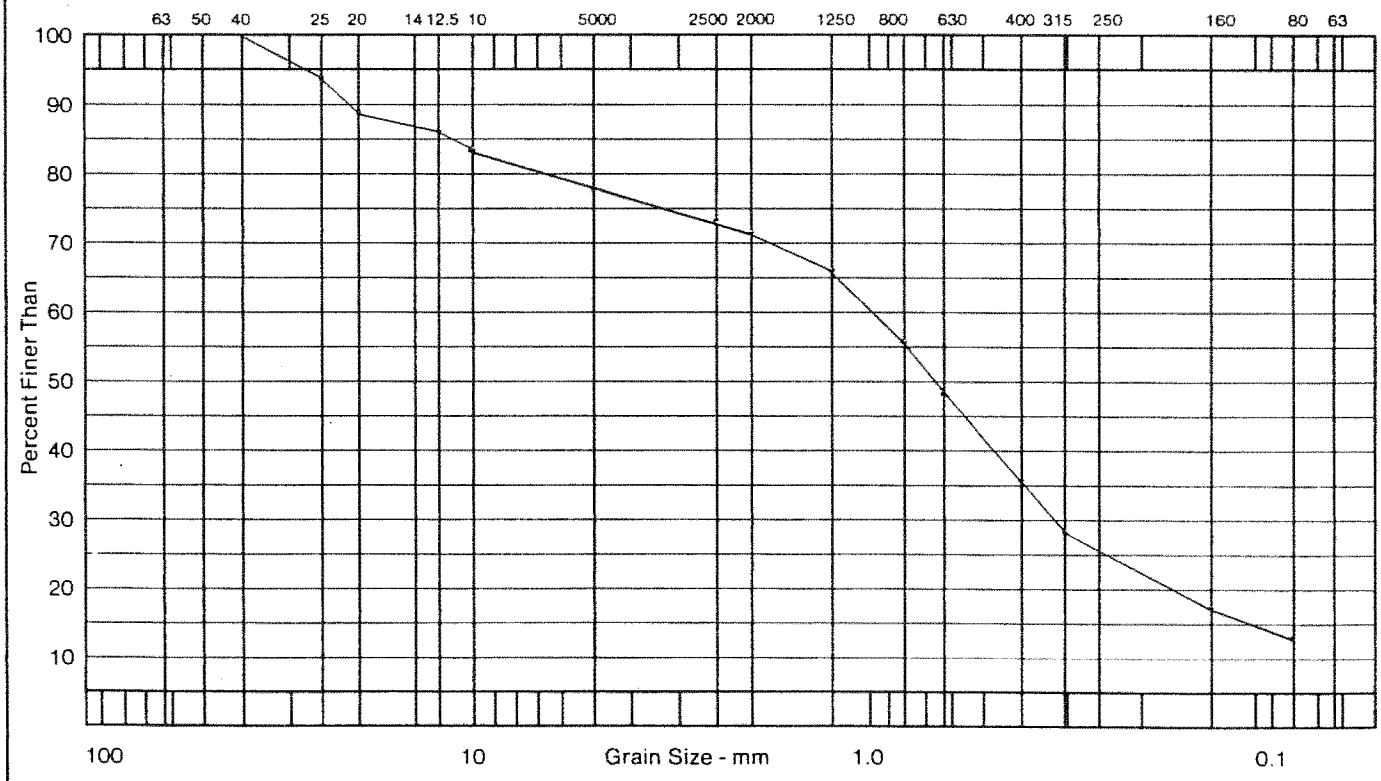
Remarks

%Fines: 13.1

%Sand: 65.1

%Gravel: 21.8

%Moisture: 4.7



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 87 Depth: 3.35 - 3.96 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH#8-98 Ck'd by: _____ Date: 1998/11/17

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					92.9
20,000	20.0					86.1
12,500	12.5					81.0
10,000	10.0					78.8
5,000	5.0					74.3
2,500	2.5					70.5
2,000	2.0					69.4
1,250	1.25					63.5
800	0.800					54.8
630	0.630					48.5
400	0.400					34.6
315	0.315					27.5
160	0.160					15.4
80	0.080					10.4

Description of Sample: Some silt, gravelly sand

USC - SW SM

Time of Sieving _____ Min. 15

Method of Preparation _____ Dry _____ Washed X

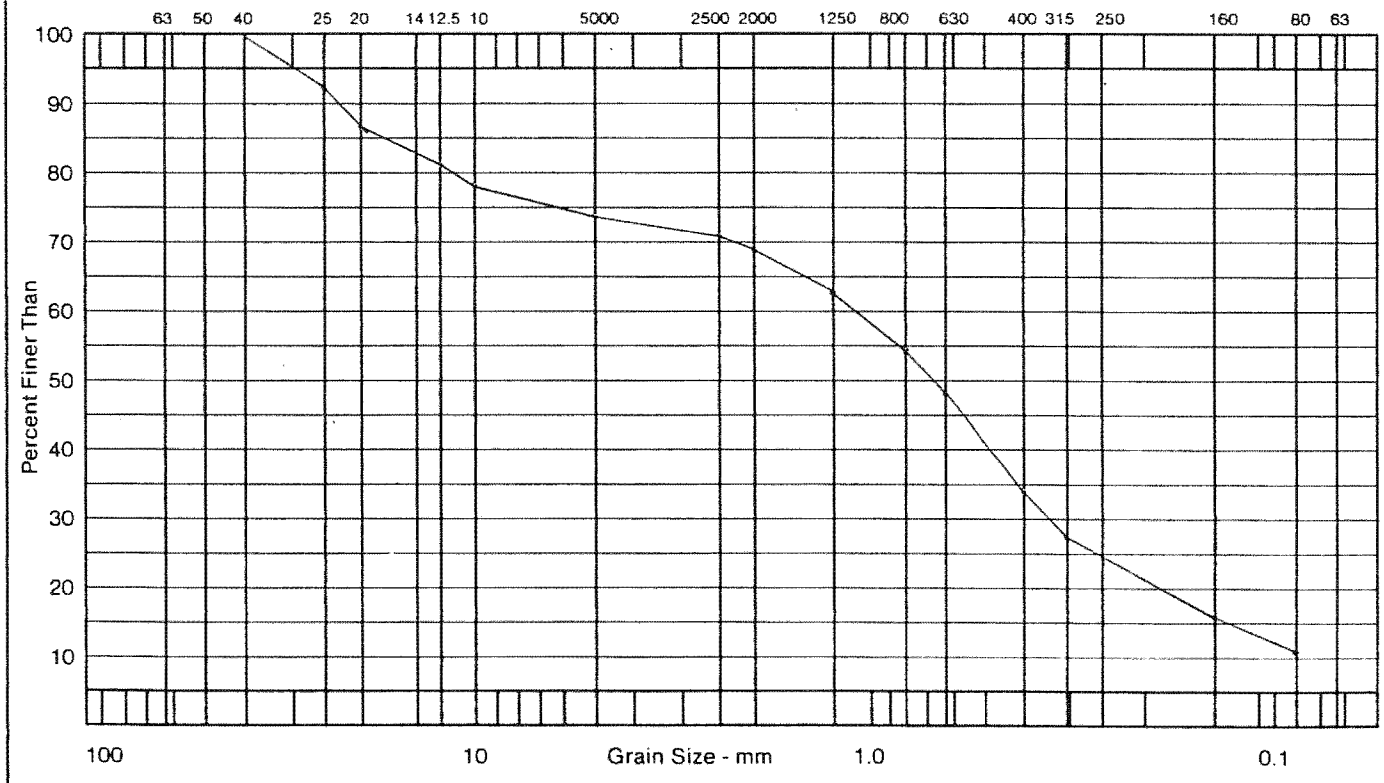
Remarks

%Fines: 10.4

%Sand: 63.9

%Gravel: 25.7

%Moisture: 4.3



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 88 Depth: 4.88 - 5.49 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254

TH# 8-98 Ck'd by: [illegible] Date: 1998/11/17

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					90.3
20,000	20.0					81.1
12,500	12.5					72.3
10,000	10.0					69.6
5,000	5.0					66.2
2,500	2.5					61.8
2,000	2.0					59.3
1,250	1.25					52.1
800	0.800					42.4
630	0.630					36.2
400	0.400					23.9
315	0.315					18.0
160	0.160					9.3
80	0.080					6.6

Description of Sample

Trace silt, gravelly sand

USC - SW SM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

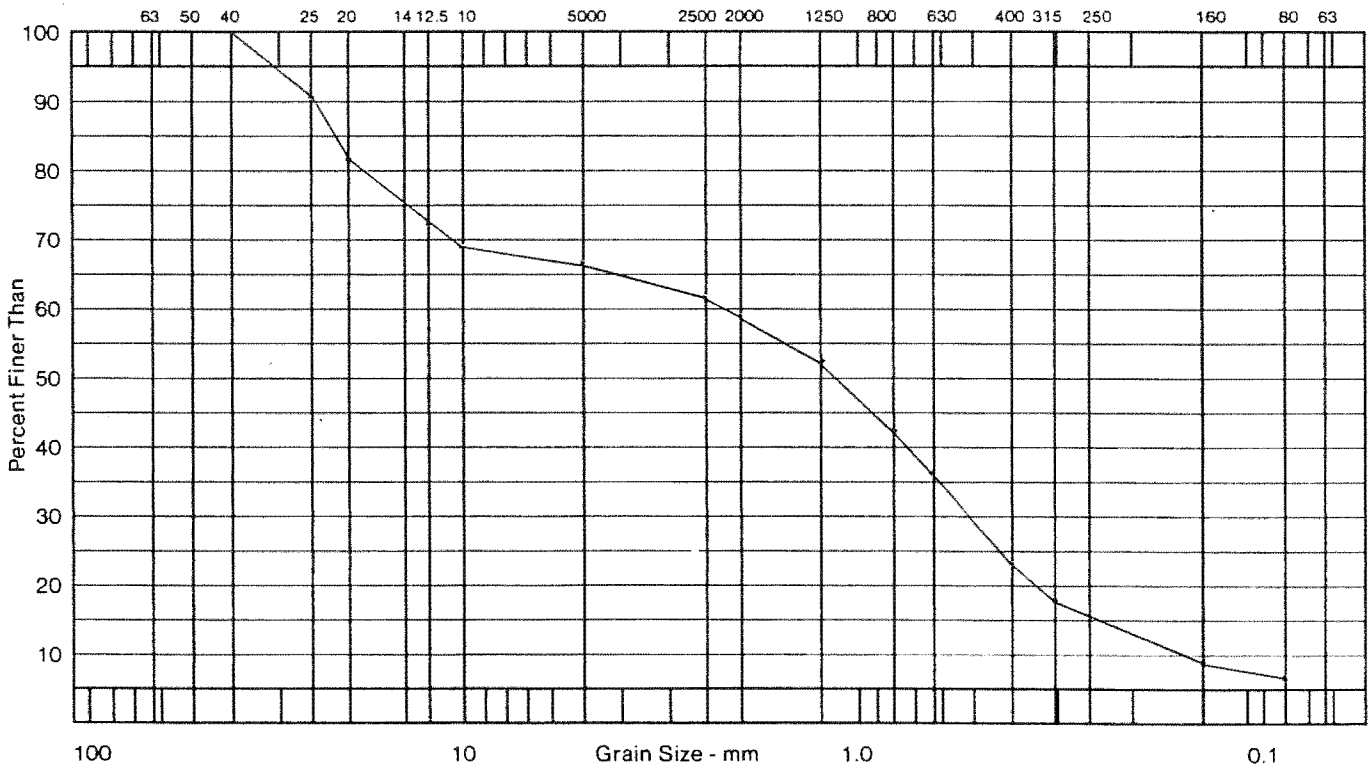
Remarks

%Fines: 6.6

%Sand: 59.6

%Gravel: 33.8

%Moisture: 3.2



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 89 Depth: 6.40 - 7.01 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#8-98 Made by: LK Job No.: 8002-254

Ck'd by: acc Date: 1998/11/17

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					75.6
20,000	20.0					63.3
12,500	12.5					56.3
10,000	10.0					54.3
5,000	5.0					48.9
2,500	2.5					45.5
2,000	2.0					44.5
1,250	1.25					40.1
800	0.800					34.2
630	0.630					29.8
400	0.400					20.9
315	0.315					16.5
160	0.160					9.9
80	0.080					7.0

Description of Sample

Trace silt, sandy gravel

USC - GW GM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

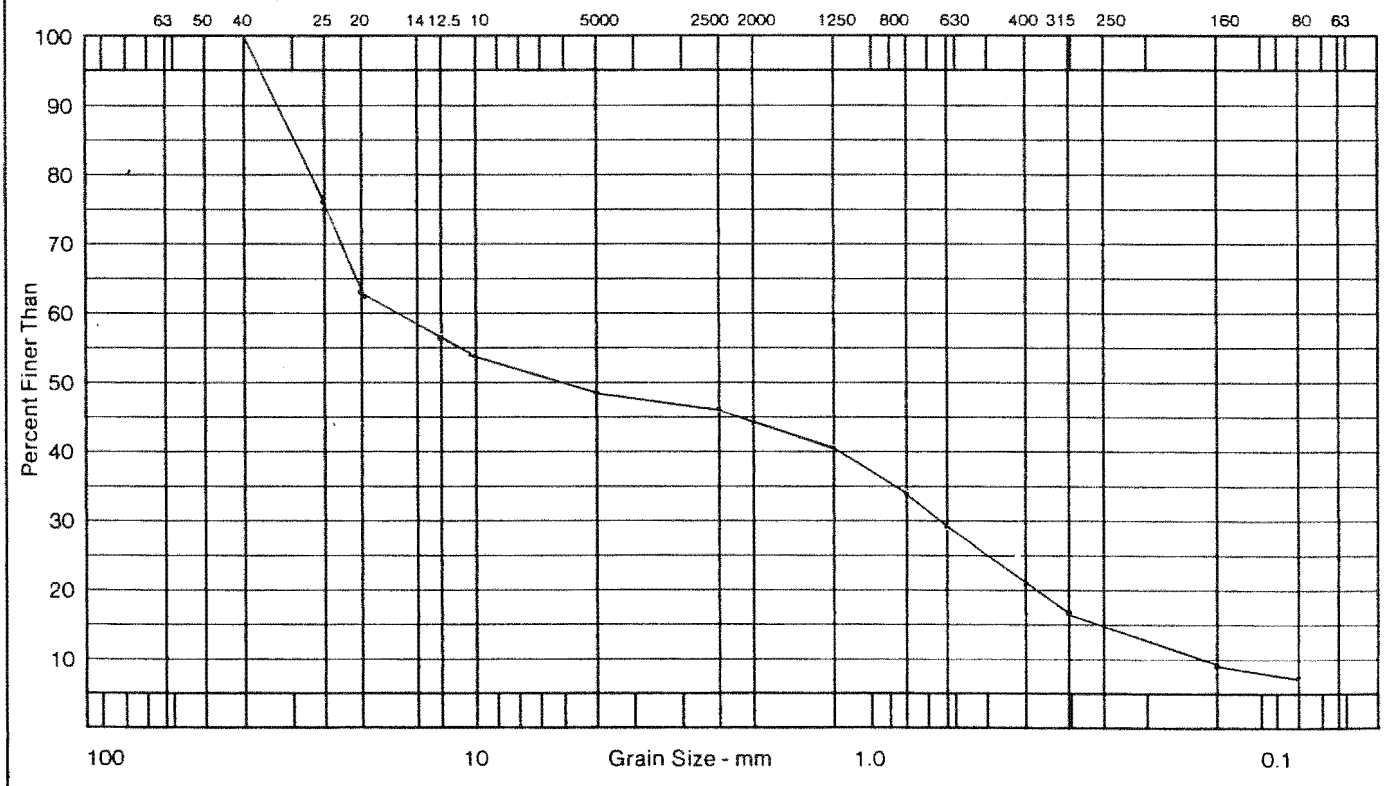
Remarks

%Fines: 7.0

%Sand: 41.9

%Gravel: 51.1

%Moisture: 3.3



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 114 Depth: 0.30 - 1.22

Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#10-98

Made by: LK Job No.: 8002-254

Ck'd by: [illegible] Date: 1998/11/19

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					100.0
40,000	40.0					79.4
25,000	25.0					62.4
20,000	20.0					50.2
12,500	12.5					41.9
10,000	10.0					38.9
5,000	5.0					32.4
2,500	2.5					27.1
2,000	2.0					25.7
1,250	1.25					20.5
800	0.800					15.2
630	0.630					11.6
400	0.400					6.5
315	0.315					4.9
160	0.160					2.8
80	0.080					1.7

Description of Sample

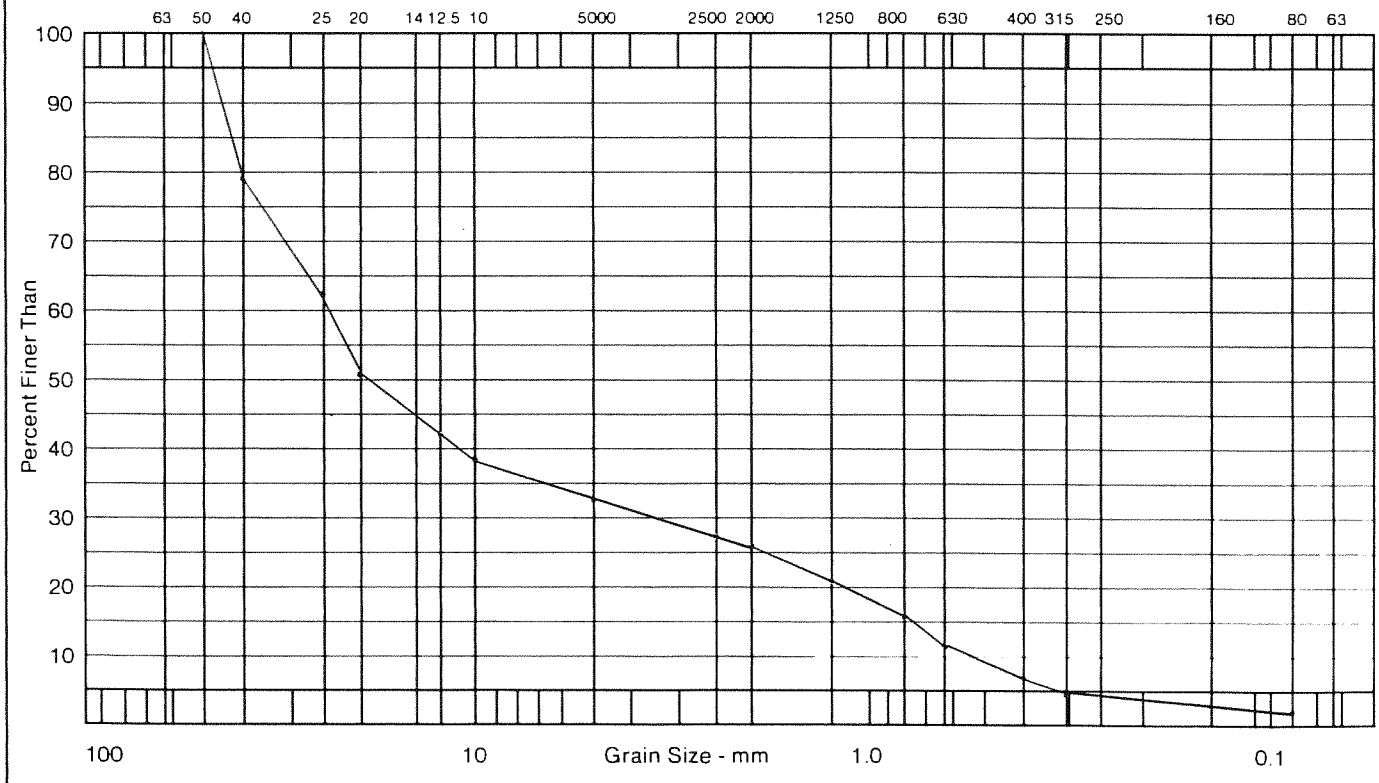
Sandy gravel
USC - GP

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 1.7
%Sand: 30.7
%Gravel: 67.6
%Moisture: 1.3



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 115 Depth: 1.83 - 2.84

Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#10-98

Made by: LK Job No.: 8002-254

Ck'd by: [illegible] Date: 1998/11/19

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					100.0
40,000	40.0					90.2
25,000	25.0					84.8
20,000	20.0					70.4
12,500	12.5					59.7
10,000	10.0					58.2
5,000	5.0					53.5
2,500	2.5					51.5
2,000	2.0					50.8
1,250	1.25					49.3
800	0.800					46.9
630	0.630					44.7
400	0.400					37.6
315	0.315					32.2
160	0.160					17.2
80	0.080					9.2

Description of Sample

Trace silt, sandy gravel

USC - GP GM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 9.2

%Sand: 44.3

%Gravel: 46.5

%Moisture: 7.1

J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING
Sample: 116 Depth: 3.35 - 3.96 Project: Carmacks Bypass Route & Nordenskiold
Location: Carmacks Bypass Route Made by: LK Job No.: 8002-254
TH#10-98 Ck'd by: [illegible] Date: 1998/11/19

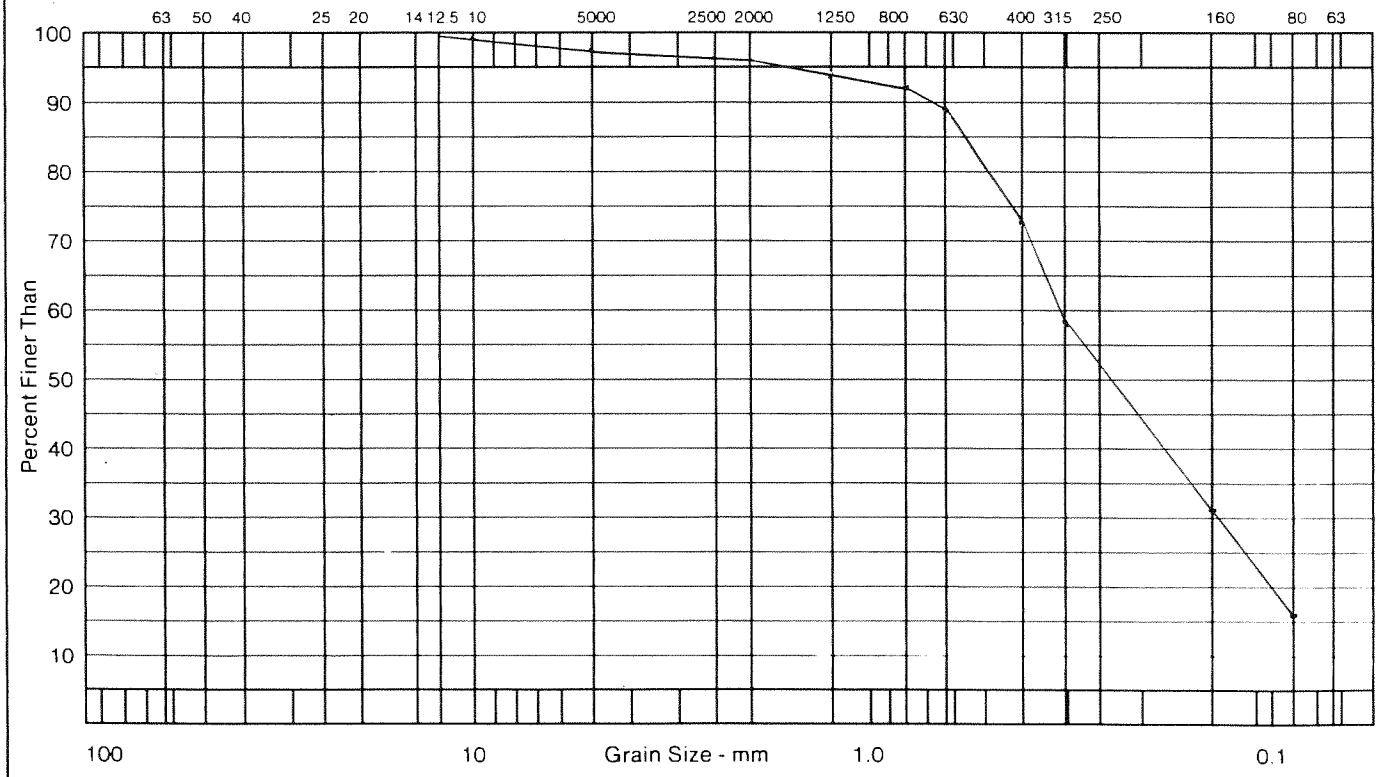
Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					
20,000	20.0					
12,500	12.5					100.0
10,000	10.0					99.4
5,000	5.0					97.4
2,500	2.5					95.9
2,000	2.0					95.5
1,250	1.25					94.1
800	0.800					92.2
630	0.630					89.3
400	0.400					72.9
315	0.315					58.2
160	0.160					30.7
80	0.080					15.4

Description of Sample: Silty sand
USC - SM

Time of Sieving ____ Min. 15

Method of Preparation ____ Dry ____ Washed X

Remarks:
%Fines: 15.4
%Sand: 82.0
%Gravel: 2.6
%Moisture: 12.8



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 117 Depth: 4.57 - 5.49

Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH# 10-98

Made by: LK Job No.: 8002-254

Ck'd by: WCC Date: 1998/11/19

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					99.0
12,500	12.5					
10,000	10.0					
5,000	5.0					98.7
2,500	2.5					98.1
2,000	2.0					97.8
1,250	1.25					97.3
800	0.800					96.1
630	0.630					94.2
400	0.400					80.1
315	0.315					65.1
160	0.160					35.4
80	0.080					17.2

Description of Sample

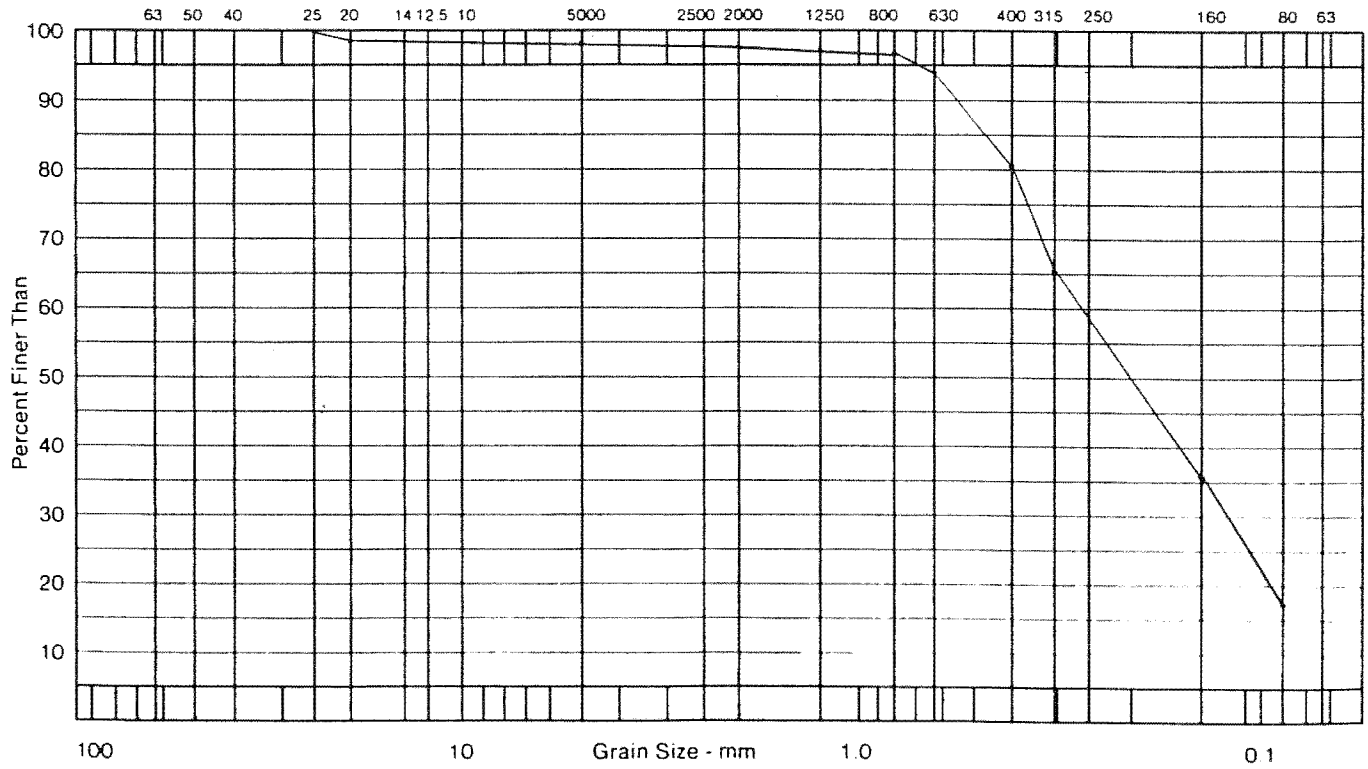
Silty sand
USC - SM

Time of Sieving ____ Min. 15

Method of Preparation ____ Dry ____ Washed X

Remarks

%Fines: 17.2
%Sand: 81.5
%Gravel: 1.3
%Moisture: 19.6



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 119 Depth: 1.22 - 1.83 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#11-98 Made by: LK Job No.: 8002-254

Ck'd by: WCIL Date: 1998/11/19

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					86.2
20,000	20.0					78.2
12,500	12.5					68.8
10,000	10.0					63.2
5,000	5.0					46.6
2,500	2.5					35.2
2,000	2.0					31.5
1,250	1.25					25.3
800	0.800					20.3
630	0.630					17.9
400	0.400					14.5
315	0.315					13.3
160	0.160					11.3
80	0.080					10.1

Description of Sample

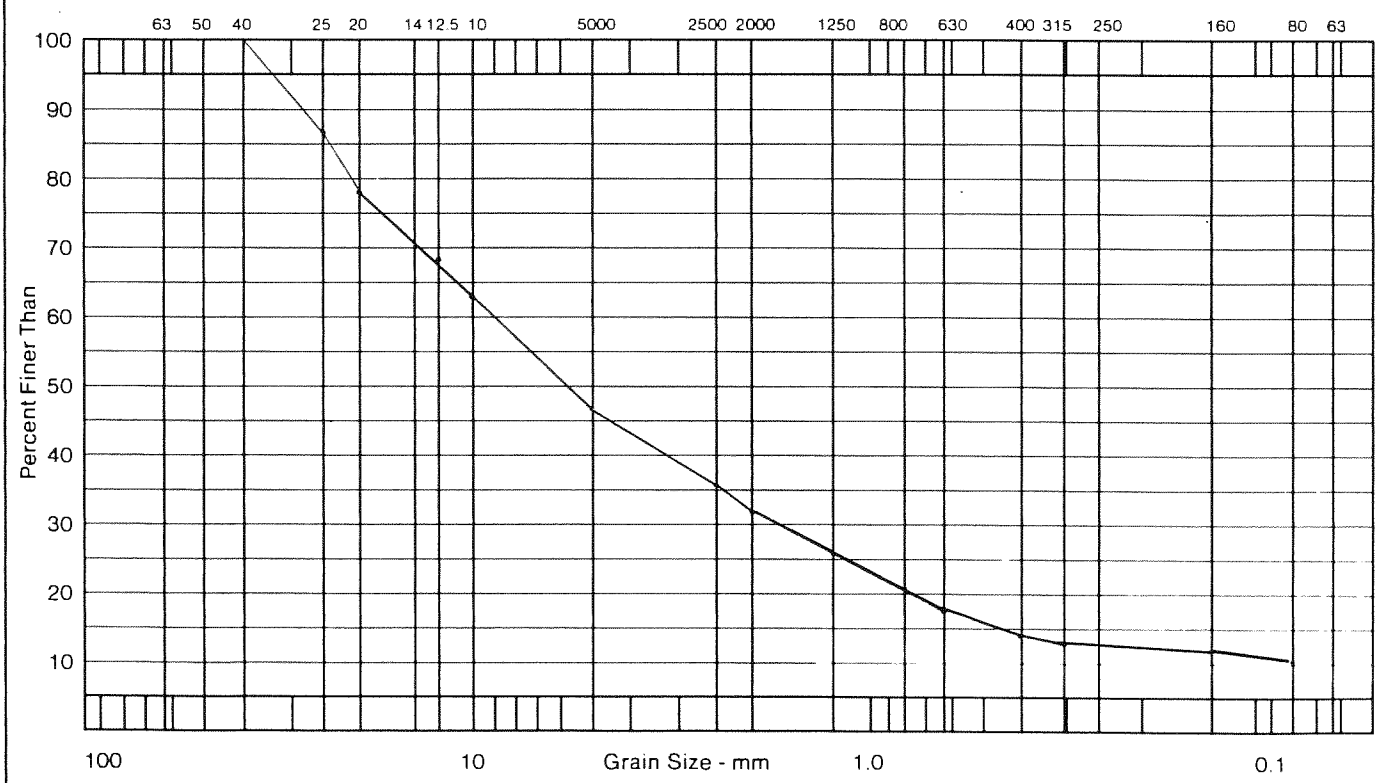
Some silt, sandy gravel
USC - GW GM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 10.1
%Sand: 36.5
%Gravel: 53.4
%Moisture: 10.8



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 120 Depth: 3.35 - 4.27 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH#11-98 Made by: LK Job No.: 8002-254

Ck'd by: [illegible] Date: 1998/11/19

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					100.0
25,000	25.0					96.0
20,000	20.0					91.3
12,500	12.5					69.4
10,000	10.0					58.3
5,000	5.0					40.1
2,500	2.5					31.9
2,000	2.0					30.0
1,250	1.25					27.4
800	0.800					25.1
630	0.630					24.0
400	0.400					21.9
315	0.315					20.9
160	0.160					18.8
80	0.080					17.5

Description of Sample

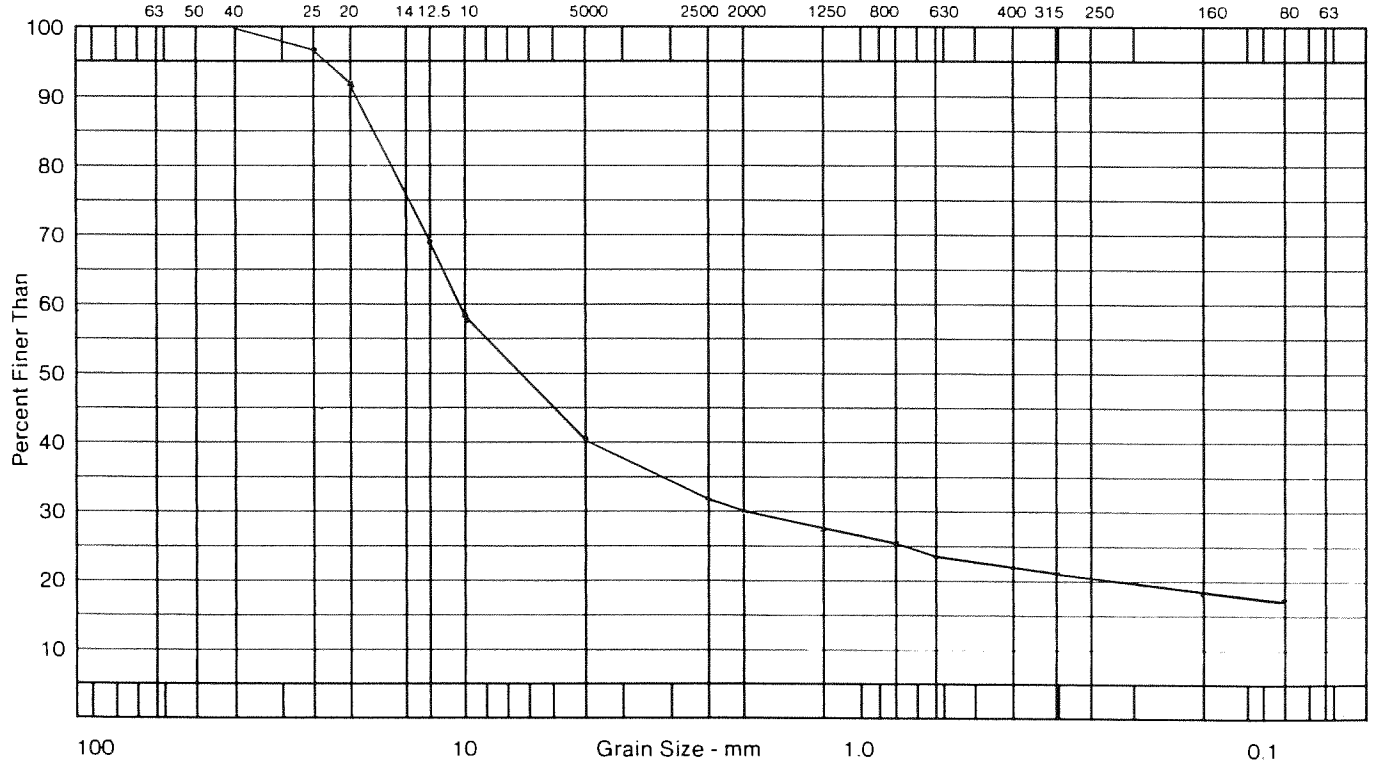
Silty sandy gravel
USC - GM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 17.5
%Sand: 22.6
%Gravel: 59.9
%Moisture: 12.1



J. R. Paine & Associates Ltd.

CONSULTING AND TESTING ENGINEERS

SCREEN ANALYSIS

Client: YTG, TRANSPORTATION ENGINEERING

Sample: 121 Depth: 4.57 - 5.18 Project: Carmacks Bypass Route & Nordenskiold

Location: Carmacks Bypass Route TH# 11-98 Made by: LK Job No.: 8002-254

Ck'd by: WJC Date: 1998/11/19

Sieve No.	Size of Opening MM		Weight Retained gms	Total Wt. Finer Than gms	Percent Finer Than	% Finer Than Basis Orig. Sample
50,000	50.0					
40,000	40.0					
25,000	25.0					100.0
20,000	20.0					94.1
12,500	12.5					79.1
10,000	10.0					67.4
5,000	5.0					37.1
2,500	2.5					23.4
2,000	2.0					21.0
1,250	1.25					18.2
800	0.800					16.3
630	0.630					15.5
400	0.400					13.9
315	0.315					13.1
160	0.160					11.5
80	0.080					10.5

Description of Sample

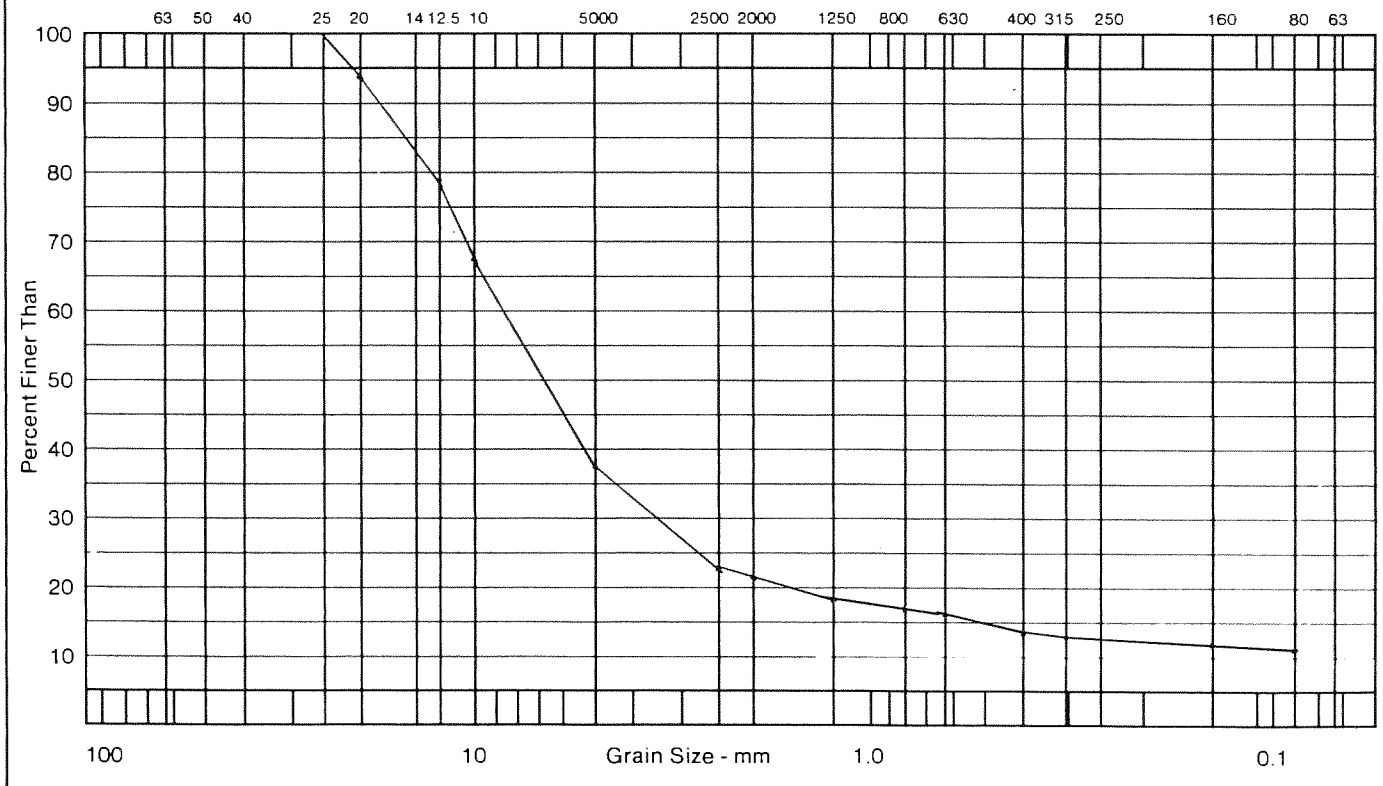
Some silt, sandy gravel
USC - GP GM

Time of Sieving Min. 15

Method of Preparation Dry Washed X

Remarks

%Fines: 10.5
%Sand: 26.6
%Gravel: 62.9
%Moisture: 10.1



Appendix D – Photographic Documentation

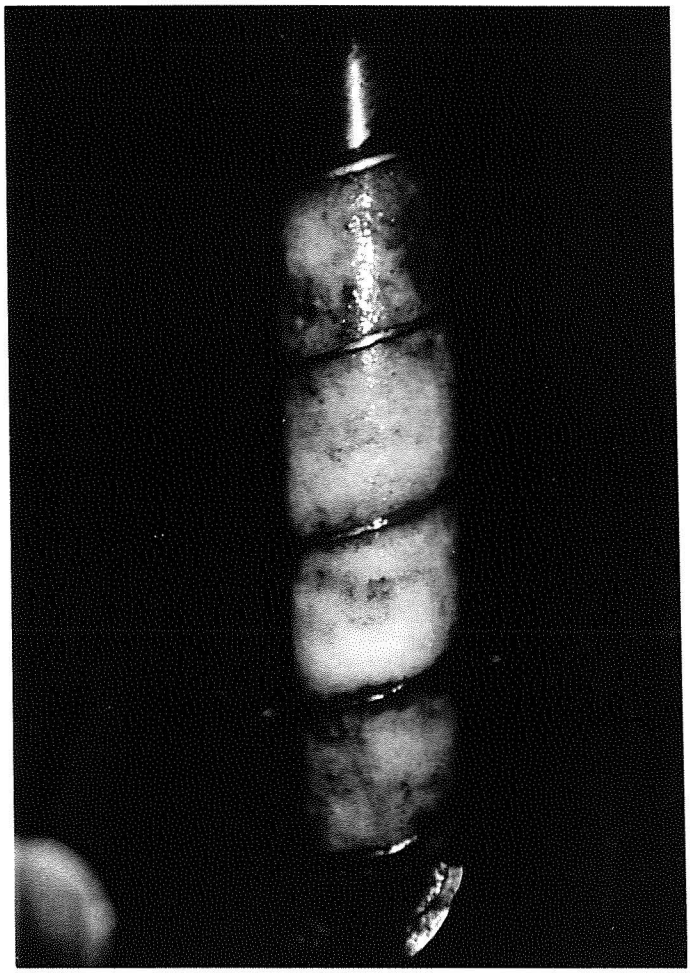


PHOTO # 1 – T.H. # 2-98 (~5.2-5.8 m)

PHOTO # 2 – T.H. # 10-98

PHOTO # 3 – T.H. # 9A-98
Maintaining positive head during drilling operations