GEOTECHNICAL INVESTIGATION
ELLER SUBDIVISION ROAD DESIGN
TANANA, ALASKA

for

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
Juneau Area Office
P. O. Box 25520
Juneau, Alaska 99802-5520

Rodney P. Kinney Associates, Inc.
1600 Centerfield Drive, Suite 202
Eagle River, Alaska 99577
Phone: (907)694-2332
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October 1992

RODNEY P. KINNEY ASSOCIATES, INC.
CONSULTING ENGINEERS 907/694-2332 FAX 907/694-1807

16600 Centerfield Dr., Suite 202
P.O. Box 771102
Eagle River, Alaska 99577

November 9, 1992

United States Department of the Interior
BUREAU OF INDIAN AFFAIRS
Juneau Area Office
P. O. Box 25520
Juneau, Alaska 99802-5520

Project No. 92-RK-1184B

Attention: Aaron Weston, COR

Subject: ELLER SUBDIVISION
Tanana, Alaska

Gentlemen:

We are pleased to submit the results of our Geotechnical Investigation for the subject project. The field work has been accomplished as of August 21, 1992 as authorized in our contract dated April 27, 1992 (Indefinite Delivery Contract No. CBE00001892003 JO-RD #080-2).

Five copies of this report reproduced on RPKA bond with GBC binding are transmitted with this letter.

The accompanying report presents our recommendations and the study and field results upon which they area based. All work has been accomplished by or under the direct supervision of the undersigned. Please call if you have any questions regarding the contents of the accompanying report.

Very truly yours,
RODNEY P. KINNEY ASSOCIATES, INC.

Rodney P. Kinney, Sr., Ph.D.
C.E.O.

RPK:adt

enclosures

TABLE OF CONTENTS

GEOTECHNICAL INVESTIGATION

SCOPE

This report describes the results of our geotechnical investigation at the subject site. The purpose of this study is to determine the "basement" soil intended to support the proposed roadway, and to present our opinions, conclusions and recommendations for roadway design. A discussion regarding geotechnical site and permafrost conditions as well as frost-susceptibility are also enclosed. A material source study was performed and is also discussed in this report.

DESCRIPTION OF PROJECT

The project will consist of new construction of approximately one mile of roadway within the City of Tanana. Specifically, the project will consist of constructing the subdivision roadbed as shown in Figure 1.

FIELD INVESTIGATION

Three tests were hand-excavated on August 21, 1992 at the locations shown in Figure 1. The test pits were supplemented by hand probes at 50 feet centers on Fourth, Fifth and Sixth Avenues and on Eamole, Yukon and Kapukuk Streets. The field work was done under the observation of our Engineering Technician who visually classified the test pits and samples in the field. Test pit logs have been prepared from the field data and are presented as Figures 2 through 4 inclusive. Our Key to test pit logs is shown as Figure 5. Gradation test results are in Figures 6 and 7. The test pits varied in depth from 1 1/2 feet to 2 feet below the existing ground surface.

LABORATORY TESTING

The laboratory testing program consisted of grain size distribution analyses (ASTM D 422) and Atterberg Limits (ASTM D 4318). The results of the test results are presented in Figures 6 and 7.

SITE AND SOIL CONDITIONS

The topography in the project area is nearly flat to slightly sloping toward the river. Drainage is generally to the south with a shallow swale bordering the east side of the subdivision. The majority of the vegetation along the alignment consists of a thin organic matt with high brush and trees.

Based on our investigation and prior experience, shallow, fine-grain, permafrost exists across the site. There is a thin (6 inches) cover of organic silts (OL/ML) which are probably ice-rich at depth. In any case, the frost classification is F-4 and the active layer (thaw) at time of excavation varied from 18 to 24-inches below present grade.

Excavation refusal was encountered in all of the test pits and is noted in the logs.

GROUNDWATER

At the time of excavation, free ground water was not detected in any of the test pits within the depths explored.

BORROW SITES

We have made inquiries of probable sources of import. The sources are limited and of unknown quality and quantity with the following exceptions:

1. Approximately 800 cubic yards of dredged river gravel is stockpiled near the river's edge and the royalty cost is quoted at $4.50 per cubic yard. Approximately 3,000 cubic yards (not verifiable) are estimated to be left at the source and royalty costs are quoted to be "more than $4.50" per yard.
2. The Bear Creek borrow site reportedly is based on visual examination of creek gravels and "they look the same" as the dredged gravels from the Yukon River.
3. We are attempting to get a report from the City of Tanana regarding the Bear Creek material site.
4. Bedrock and other materials from Mission Hill are not durable and do not make a durable road base.
5. There is an abundance of silt (F-4) with a royalty price of $0.50 per cubic yard. There is a high organic content in much of the silt in this area. A State of Alaska DOT/PF report has looked into borrow sites and that report is appended. It is our understanding that the State is going to Herc in a drill rig for test drilling purposes this coming March, 1993. It is our understanding that they will investigate some of the island sites as possible sources. If correct, it may be advantageous to coordinate with their investigation.

DISCUSSION AND RECOMMENDATIONS

The site is covered by thaw sensitive, frost-susceptible permafrost. These factors must be taken into account for roadway design. The road prism must be as thick as the predicted thaw depth (estimated 5 feet for dry gravel without insulation) and should be non-frost susceptible (NFS) for a minimum maintenance scenario.

If the roadway is built up above grade, cells will be created within each block and drainage must be provided to prevent ponding. A buildup of the roadway prism above existing grade is least expensive but the adjacent lots are relatively depressed in elevation.

SITE PREPARATION AND FILL REQUIREMENTS

1. Excavate and Replace (finished grade near present grade). Areas to be excavated should be stripped of all loose material, organics, and other organics. The excavated thickness will vary along the corridor from 0 to 3 feet. After stripping, the area to be filled should be inspected to determine if additional excavation is required. The final approved excavation should be graded and compacted prior to placement of any fill. All fill material may be placed in maximum loose lift thickness of 8 inches if self propelled vibratory rollers are used or as otherwise approved during construction by the Soil Engineer.

2. Road Prism Above Present Grade. No stripping is required. Fill may be placed over cut brush and organics, left in place.

3. All structural fill should be non-frost-susceptible material (NFS) compacted to 95 percent of the maximum laboratory density as determined by ASTM 1557-D. Non-structural fill may be "classified" and placed and compacted to 90 percent of the maximum laboratory density. Non-frost-susceptible (NFS) is defined as a granular material, 100 passing the 8-inch sieve, and having less than 10 percent passing the No. 200 Sieve, as determined from the minus 3/4-inch fraction. Classified fill should be free of deleterious material and should be approved for use by the Soil Engineer.

It is recommended that all materials used for structural fills, either import or usable on-site material, meet the following requirements:

	Percent Passing		
Sieve Size	Structural (NFS)	Classified (select)	Unclassified
8-inch	100	------	------
2-inch	85-100	100	------
3/4-inch	------	------	------
No. 4	30-70	------	------
No. 10	------	------	------
No. 200	0-10*	0-10*	------
CBR**	≥50	≥10	≥2
P.I.	≤5	≤10	≤15

* As determined from the 3/4-inch fraction.
** California Bearing Ratio

The on-site silts are moisture sensitive and will easily rut under heavily loaded traffic.

In all cases fill, excavation, placement, stockpiling, handling, etc. should be accomplished in a manner that prevents contamination by deleterious substances. Finally, frozen fill material should not be used nor should fill be placed over frozen surfaces. Fill placed within the building limits (as well as undisturbed native soils) should not be allowed to freeze.

4. Cut and fill slopes. The natural undisturbed granular materials at this site range from loose to very dense. Our experience indicated that the undisturbed, short term strengths of these deposits are unpredictable however, and bank failures occur suddenly (mud flows) and without warning. These soils have an angle of response of about 17 to 20 degrees. This angle is safe for unsaturated short term construction slopes of any height, remolded or otherwise, but not for repeated freeze thaw cycles or wet, inclimate weather and slope maintenance should be anticipated.

   Specific recommendations regarding construction slopes will require analysis for each specific set of conditions at the site. In some cases, shoring may be needed where the excavation is deep. All permanent cut and fill slopes should not be sloped steeper than 2 horizontal to 1 vertical, surface water should be diverted so run-off will not flow over and/or down the face of permanent slopes.

5. Road section. Two requirements must be fulfilled by any roadway section. First, it must resist base shear failure and rutting as a result of lateral movement beneath repeated wheel loads. Second, differential vertical and deflection movements must not exceed the amount permissible for that particular type of surface. Two scenarios can be considered for design:

   A. A road composed of a 12-inch structural gravel surface (Type B) over a 36-inch classified subbase (Type A). The main objective of the 48-inch section is to minimize frost heave and to maintain the vertical movement requirements mentioned above. In event that additional subbase fill is required, unclassified fill may be used. The classified gravel, select import and unclassified materials should be compacted to 95 percent of the maximum laboratory density. Based on the collected data, it is

believed that this structural section can be used along the entire alignment and will require the least maintenance of the sections considered.

B. A road composed of a 12-inch classified gravel surface (Type B) with a filter fabric lining over unspecified compactable material adequate to support design loads. The filter fabric should meet the requirements of Section 712.13 of the "Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects", 1985 edition. This scenario would require more maintenance and upkeep because of the frost-susceptibility of the subbase.

C. This investigation indicates that the on-site soils are organic silts and are frost susceptible. For best results, they should be removed and replaced with select import to a minimum depth of 3-feet below the recommended classified gravel section. All stripped and excavated surfaces should be compacted and inspected by the Soil Engineer prior to fill placement. The depth of excavation can be reduced provided insulation is utilized as proposed. In this instance, the road prism should be excavated to grade and left exposed for one winter. At the end of winter but prior to thaw, insulation should be placed and NFS placed over the insulation.

6. Cold region considerations. The soils encountered in the test pits for this investigation are highly frost susceptible. These soils may not be used as structural fill material and should be separated and handled accordingly. If frost susceptible soils are exposed at the base of excavations, the Soil Engineer should be consulted for further recommendations that should include minimum extent(s) and depth(s) of removal and replacement. Fill should only be placed over frozen ground that has been properly prepared prior to freezing.

7. Retaining Walls (Culvert Headwalls). Retaining walls that are free to deflect at the top should be designed to resist an active equivalent fluid pressure of 40 pcf plus a uniform pressure of 100 psf. Restrained walls should be designed for a trapezoidal pressure with a maximum intensity of 25 H psf where H is the effective height of the retained soil. Starting at the top of the wall, the maximum intensity will occur between 0.2 H-feet and

0.8 H-feet below ground surface with zero intensity at 0 and H-feet below the ground surface. A passive equivalent fluid pressure of 450 pfc and a frictional resistance of 0.5 may be used for design. A minimum safety factor of 1.5 is recommended for design purposes. It is recommended that only NFS soils be placed behind walls that are exposed to winter temperatures. NFS soils should extend for at least a minimum horizontal distance of 10-feet behind walls exposed to freezing.

It is recommended that retaining walls be supported by continuous spread footing foundations bearing on at least 18-inches of N.F.S. undisturbed native soil or well compacted structural fill. Footings may be designed to support maximum allowable bearing pressures of 1,500 pounds per square foot (psf) due to dead load, 2,500 psf due to combined dead plus live load, or 3,500 psf due to all loads, including seismic. At the recommended pressures, footing should extend at least 42-inches below the lowest adjacent grade. Retaining wall footings should have a minimum width of 12-inches.

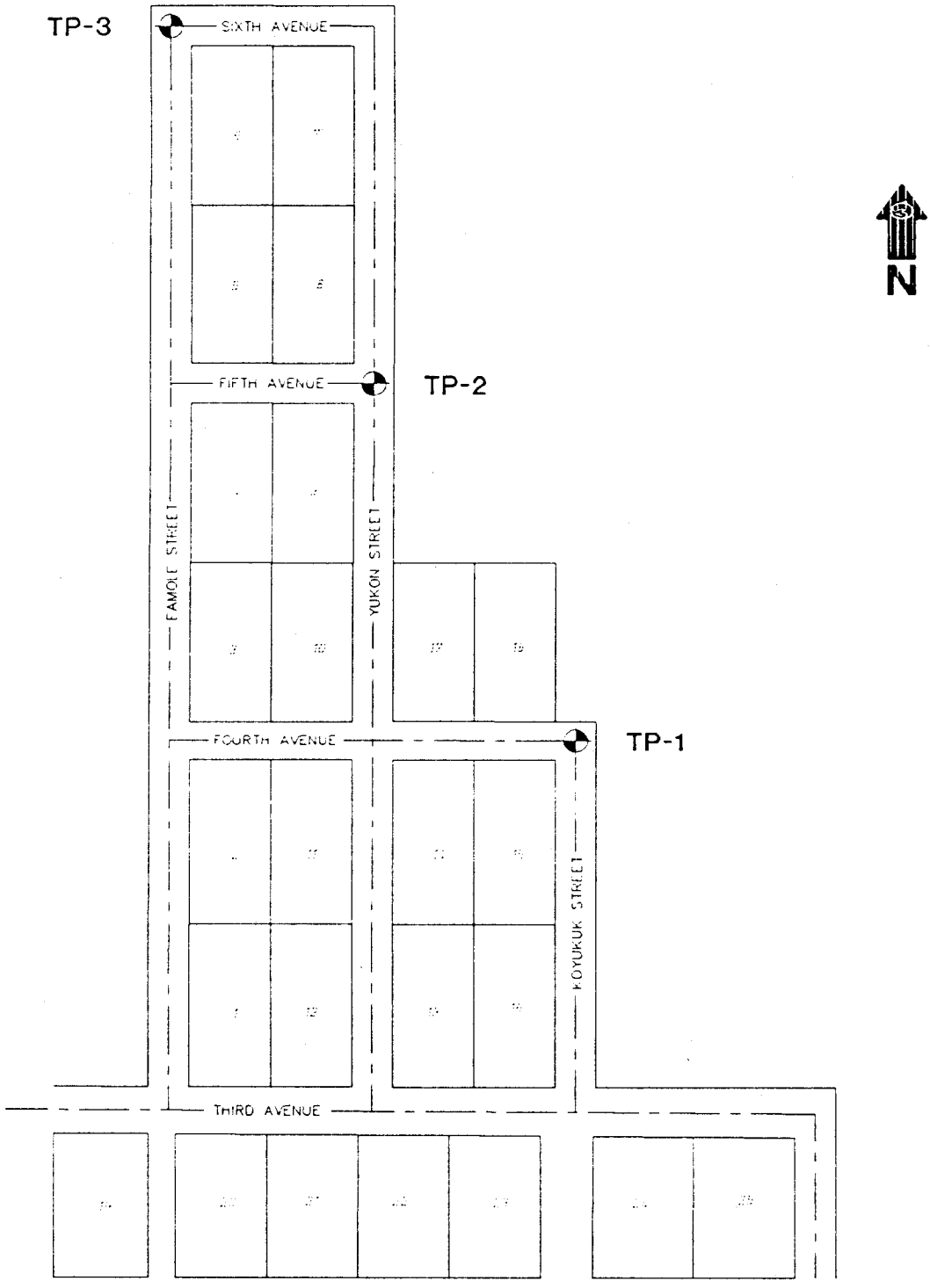
Hand held compaction equipment should not be allowed to compact soils within a horizontal distance of 18-inches from the back face of any retaining wall. In the case of the heavier self propelled vibratory equipment, this distance should be increased to at least 4-feet. Alternatively, the walls may be braced during compaction and the walls designed for the higher transitory impact loads of the compaction equipment.

LIMITATIONS

The recommendations in this report are based on the assumption that soil and water conditions do not deviate appreciably from those disclosed in the test pits. In the event the soils are not consistent with those discussed or variation or undesirable conditions are encountered during construction, Rodney P. Kinney Associates, Inc. should be notified so that supplemental recommendations can be made. Finally, some data and conclusions are based on verbal data that will need substantiation during construction.

FIGURES 1 through 7

TANANA TEST PIT LOCATIONS



TP-1 ◔ = TEST PIT LOCATION AND NUMBER
SCALE: 1"=200'
DRAWN BY: MLH DATE: 10-6-92

RODNEY P. KINNEY ASSOCIATES, INC.
CONSULTING ENGINEERS
16600 CENTERFIELD DRIVE, SUITE 202
EAGLE RIVER, ALASKA 99577
PHONE:(907) 694-2332 FAX:(907) 694-1807

FIGURE 1

RODNEY P. KINNEY ASSOCIATES, INC.
CONSULTING ENGINEERS
16600 CENTERFIELD DRIVE, SUITE 202
EAGLE RIVER, ALASKA 99577
PHONE:(907) 694-2332 FAX:(907) 694-1807

Date: AUGUST 21, 1992

Name: TANANA ROAD DESIGN Location: ELLER SUBDIVISION, TANANA AK

Hole No.: 1 Type of Boring: T.P. Rig: NA

Datum: 225.2' Engineer: MLH Wt. Hammer: NA

Dp.	DESCRIPTION	Sa. No.	Pen.	% Rec	Blow Count	Soil Profile	REMARKS
	ORGANICS						
0.5							
	DARK BROWN ORGANIC SILT (OL-F4)	1	HAND SAMPLES				
1.0		2					
1.5		2					
2.0		1					
	BOTTOM OF HOLE - PERMAFROST						
2.5							
3.0							

FIGURE 2

RODNEY P. KINNEY ASSOCIATES, INC.
CONSULTING ENGINEERS
16600 CENTERFIELD DRIVE, SUITE 202
EAGLE RIVER, ALASKA 99577
PHONE:(907) 694-2332 FAX:(907) 694-1807

Date: AUGUST 21, 1992

Name: TANANA ROAD DESIGN Location: ELLER SUBDIVISION, TANANA AK.

Hole No.: 2 Type of Boring: T.P. Rig: NA

Datum: 229.1 Engineer: MLH Wt. Hammer: NA

Dp.	DESCRIPTION	Sa. No.	Pen.	% Rec.	Blow Count	Soil Profile	REMARKS
	ORGANICS		HAND SAMPLE				
.5							
	BROWN SILTY SAND W/TRACE OF ORGANIC (SM-F4)	1					
1.0		1					
1.5	BOTTOM OF HOLE - PERMAFROST						
2.0							
2.5							
3.0							

FIGURE 3

RODNEY P. KINNEY ASSOCIATES, INC.
CONSULTING ENGINEERS
16600 CENTERFIELD DRIVE, SUITE 202
EAGLE RIVER, ALASKA 99577
PHONE:(907) 694-2332 FAX:(907) 694-1807

Date: AUGUST 21, 1992

Name: TANANA ROAD DESIGN Location: ELLER SUBDIVISION, TANANA AK.

Hole No.: 3 Type of Boring: T.P. Rig: NA

Datum: 233.3 Engineer: MLH Wt. Hammer: NA

Dp.	DESCRIPTION	Sa. No.	Pen.	% Rec	Blow Count	Soil Profile	REMARKS
	ORGANICS		HAND SAMPLE				
.5							
	BROWN SILT WITH SAND (SM-F4)	1					
1.0		1					
1.5	BOTTOM OF HOLE - PERMAFROST						
2.0							
2.5							
3.0							

FIGURE 4

RODNEY P. KINNEY ASSOCIATES, INC.
CONSULTING ENGINEERS
16600 CENTERFIELD DRIVE, SUITE 202
EAGLE RIVER, ALASKA 99577
PHONE:(907) 694-2332 FAX:(907) 694-1807

Date: _____

Name: Key To Borings Location: _____

Hole No.: _____ Type of Boring: _____ Rig: _____

Datum: _____ Engineer: _____ Wt. Hammer: _____

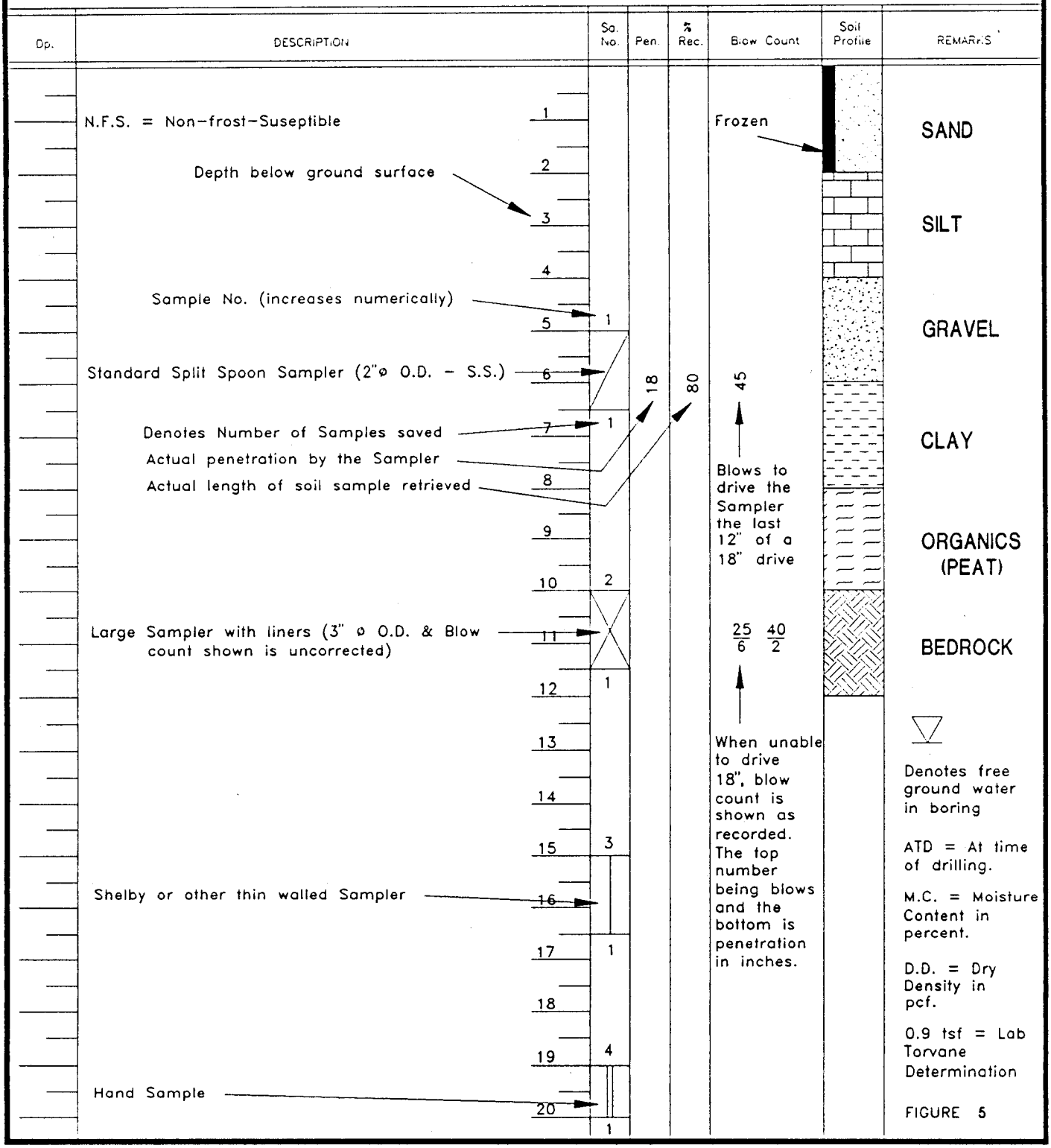
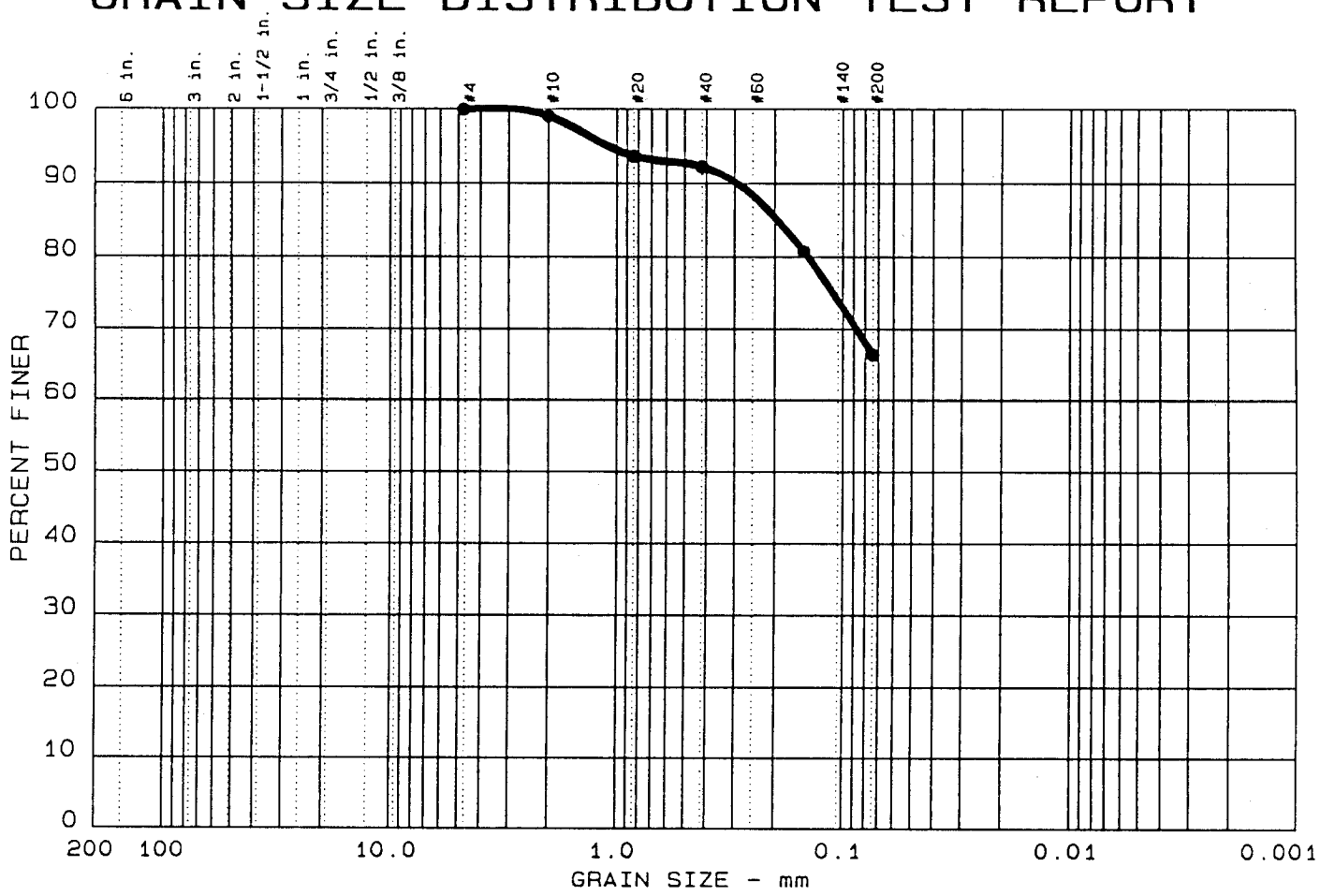


FIGURE 5

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75 mm	% GRAVEL	% SAND	% FINES
●	19	0.0	0.0	33.4	66.6

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
●			0.19							

MATERIAL DESCRIPTION	USCS	AASHTO
● ORGANIC SILT	OL	A-4 (0.0)

Project No.: 11848
Project: TANANA ROAD DESIGN
● Location: TH-1, 2.0'

Date: 10-16-92

Remarks:

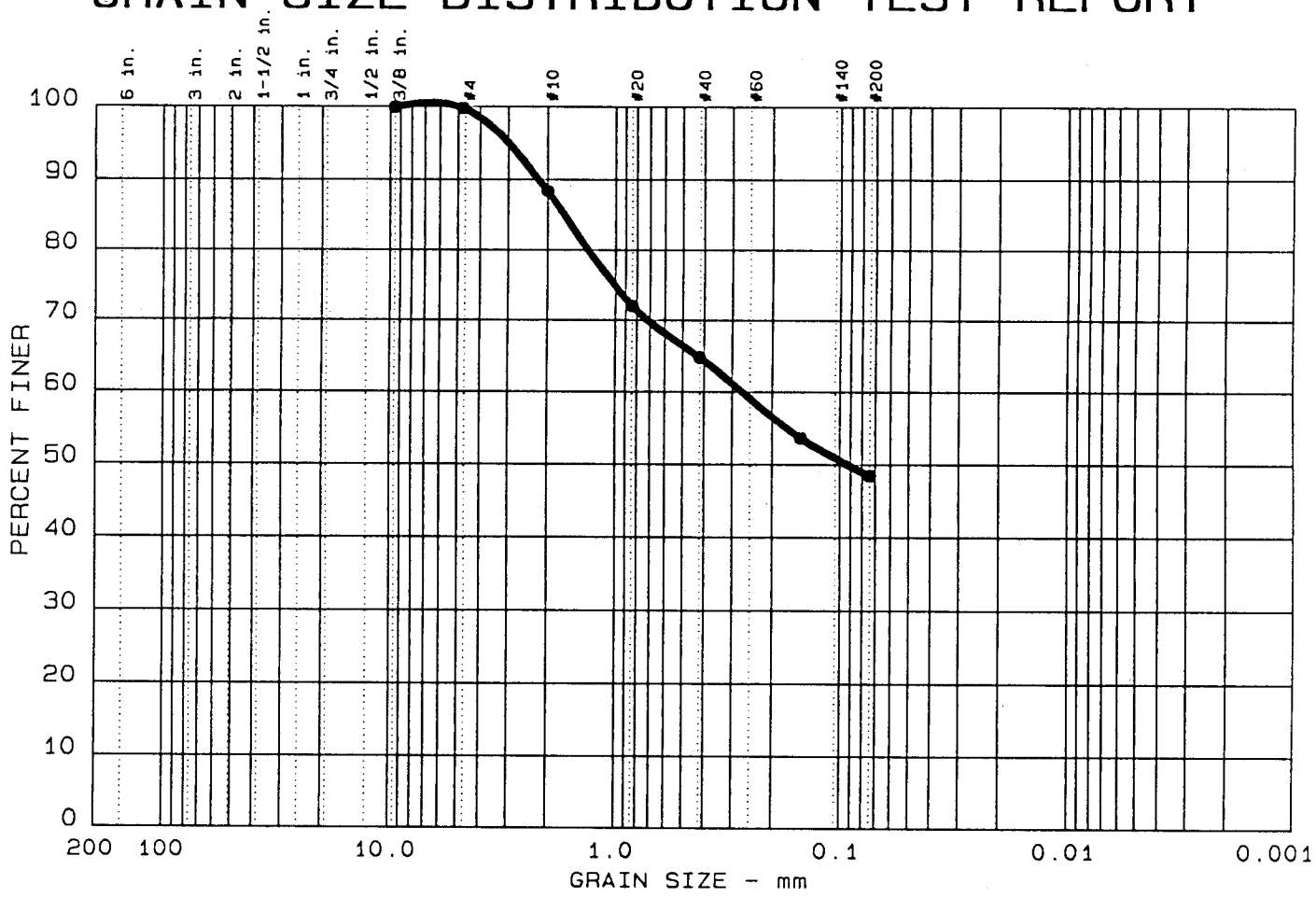
FROST CLASS: F4

GRAIN SIZE DISTRIBUTION TEST REPORT

RODNEY P. KINNEY ASSOCIATES

Figure No. 6

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75 mm	% GRAVEL	% SAND	% FINES
●	20	0.0	0.2	51.3	48.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_C	C_U
●			1.68	0.27	0.09					

MATERIAL DESCRIPTION	USCS	AASHTO
● SILTY SAND	SM	A-4 (0.0)

Project No.: 1184B
Project: TANANA ROAD DESIGN
● Location: TH-2, 1.0'

Date: 10-16-92

Remarks:

FROST CLASS: F4

GRAIN SIZE DISTRIBUTION TEST REPORT

RODNEY P. KINNEY ASSOCIATES

Figure No. 7

APPENDIX A

State of Alaska Material Analysis

Bear Creek and Dredge Stockpile

STATE OF ALASKA

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

NORTHERN REGION, DESIGN AND CONSTRUCTION

2301 PEGER ROAD
FAIRBANKS, ALASKA 99709-5316
PHONE: (907) 451-2200

FAX #: 694-1807

TO: ROD KEENEY PHONE:

FROM: JOHN D. BENNETT PHONE: 451-2229

MESSAGE: THE 1992 SAMPLES FROM BEAR CREEK & DREDGE STOCKPILE ARE STILL BEING RUN - WILL SEND RESULTS WHEN COMPLETE

This FAX Consists of 12 Pages including this transmittal page

R-8/78

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

CHIEF MATERIALS ENGINEER

LAB REPORT

THE RESULTS OF THIS TESTING ARE ONLY REPRESENTATIVE OF THE MATERIAL AS SUBMITTED

PRECONSTRUCTION ☐ CONSTRUCTION ☒
ACCEPTANCE ☐ QUALITY ☐
ASSURANCE ☐ INFORMATION ☐
FINAL RECORD ☐

TEST OF AGG. CRUSHED BASE COURSE ITEM NO. 510

PROJECT NO. AIP 3-02-0290-01 PROJECT NAME Ralph M. Calhoun Memorial Airport, Tanana LABORATORY NO. 86B-601
D41812/60457
SAMPLED FROM Crusher Belt SUBMITTED BY Ethan Birkholz FIELD NO. I-BC-G-3
SOURCE Yukon River QUANTITY REPRESENTED DATE Sept 23, 1986
LOCATION (RDWY.) Tanana, Alaska DEPTH DATE SAMPLED 08-29-86
EXAMINED FOR Conformance SPECIFICATION DATE RECEIVED 09-03-86

% PASSING SIEVE	AS RECEIVED		SPEC
4"			
3"			
2"			
1 1/2"			
1"	100	100	100
3/4"	100	99	70-100
1/2"	90	88	
3/8"	78	79	
#4	55	58	35-65
#8	41		
#10	39	41	
#16			
#20	30		
#30			
#40	23	20	15-25
#50	19	15	
#80	13	9	
#100	12	8	
#200	8	4.2	5-15
.02MM			
.005MM			
DUST RATIO:			

	SPEC.
OPTIMUM MOISTURE	
MAX. DRY DENSITY	
MAX. DENSITY NUMBER	
CORR. MAX. DRY DENSITY	
FIELD DENSITY	
FIELD MOISTURE	
% COMPACTION	
% + ¾"	
% + NO. 4	
AASHO T180D ☐ ALASKA T-12 ☐	
% FRACTURE	
DEGRADATION VALUE	
NATURAL DENSITY	
NATURAL MOISTURE	
WEIGHT LOOSE	
WEIGHT RODDED	

MISCELLANEOUS

STATIC IMMERSION

BRAND ____ 0% ____ ½% ____
1% ____ 1½% ____ 2% ____

	SPEC
% + 10"	
% + 3"	
% GRAVEL	
% SAND	
% SILT	
% CLAY	
FSV	
LL	
PL	
PI	
SOIL CLASS	

DELETERIOUS MATERIALS:

	COURSE	SPEC	FINE	SPEC
MINUS #200 MESH				
SOFT FRAGMENTS				
COAL & LIG. OR LT. WT. PART.				
CLAY LUMPS				
STICKS & ROOTS				
FRIABLE PARTICLES				
SPECIFIC GRAVITY				
ABSORPTION				
FINENESS MODULUS				
SULFATE SOUNDNESS				
FREEZE-THAW RATIO				

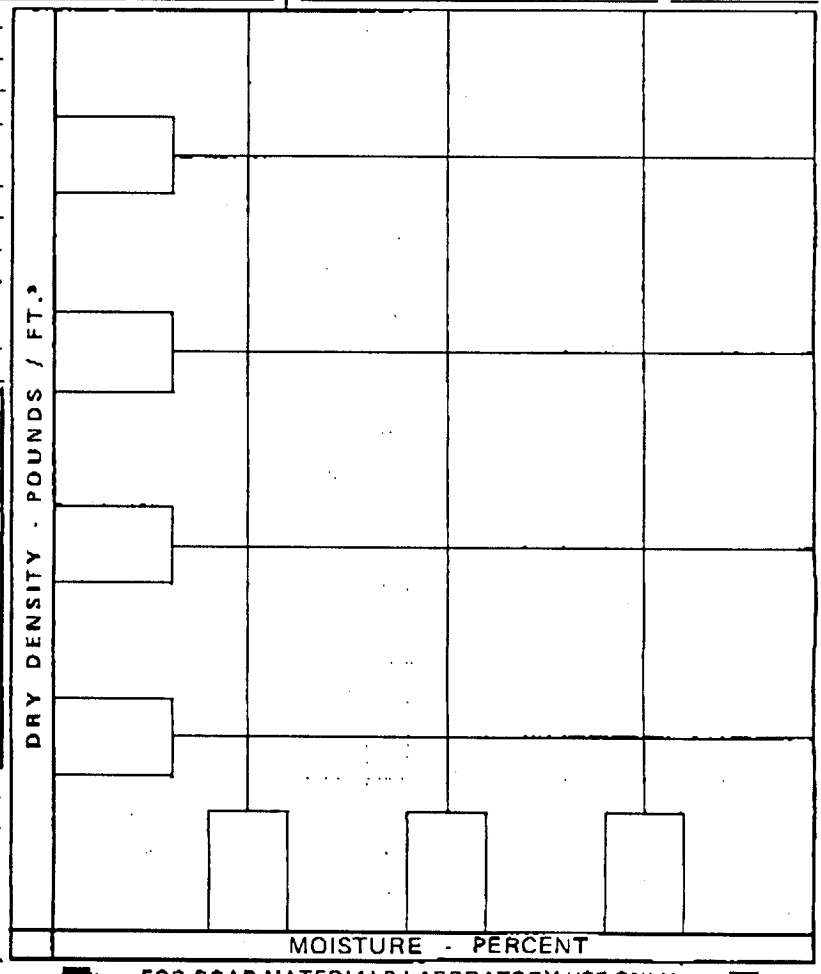
L.A. ABRASION LOSS ____ GRADE ____ ____
THIN-ELONGATED ____ ____
ORGANIC COLOR ____ THAN 500 PPM

MORTAR COMPRESSION STRENGTH:

	STANDARD	SAMPLE	RATIO	SPEC
____ DAY, PSI				
____ DAY, PSI				

CRIPTION OF MATERIALS:

REMARKS: A



FOR ROAD MATERIALS LABORATORY USE ONLY

WHEN PROCESSED TO CONFORM TO GRADING REQUIREMENTS, THIS MATERIAL IS SATISFACTORY FOR:

AGG. CRUSHED BASE COURSE

CONFORM TO SPECIFICATIONS:
YES ☑ NO ☐ N.A. ☐

SIGNATURE Paul W. Misterek

Paul W. Misterek, SME

TITLE

R-8/78

CHIEF MATERIALS ENGINEER

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

LAB REPORT

THE RESULTS OF THIS TESTING ARE ONLY REPRESENTATIVE OF THE MATERIAL AS SUBMITTED

PRECONSTRUCTION ☐ CONSTRUCTION ☒
ACCEPTANCE ☒ QUALITY ☒
ASSURANCE ☐ INFORMATION ☐
FINAL RECORD ☐

TEST OF BORROW EMBANKMENT ITEM NO. 330c

PROJECT NO. AIP-3-02-0290-01 PROJECT NAME Tanana R/W Improvements LABORATORY NO. 86B-625
SAMPLED FROM D41812/60457 Runway SUBMITTED BY K. Shrewsbury FIELD NO. Q-1/BX-SPD-1CK
SOURCE Yukon River QUANTITY REPRESENTED DATE Sept 23, 1986
LOCATION (RDWY.) Sta 48+00, 135' Rt DEPTH -1' DATE SAMPLED 09-03-86
EXAMINED FOR Quality, T180D, T-12 SPECIFICATION DATE RECEIVED 09-08-86

% PASSING SIEVE	AS RECEIVED	FIELD	SPEC.
4"			
3"	100	100	
2"	95	97	
1 1/2"	89	89	
1"	78	82	
3/4"	71	77	
1/2"	61	66	
3/8"	54	58	
#4	39	42	
#8	29		
#10	28	30	
#16			
#20	22		
#30			
#40	16	18	
#50	12	34	
#80	7	20	
#100	6		
#200	4	4.2	
.02MM			
.005MM			
DUST RATIO:			

	Field	SPEC.
OPTIMUM MOISTURE	4.3	
MAX. DRY DENSITY	143.1	
MAX. DENSITY NUMBER		
CORR. MAX. DRY DENSITY		
FIELD DENSITY		
FIELD MOISTURE		
% COMPACTION		
% + ¾"		
% + NO. 4		

AASHO T180D ☐ ALASKA T-12 ☐

		SPEC
% FRACTURE		
DEGRADATION VALUE	68	
NATURAL DENSITY		
NATURAL MOISTURE		
WEIGHT LOOSE		
WEIGHT RODDED		

MISCELLANEOUS

BULK 2.71
SSD 2.73
APP 2.76

STATIC IMMERSION

BRAND ____ 0% ____ ½% ____ 1% ____ 1½% ____ 2% ____

	SPEC
% + 10"	
% + 3" 2%	
% GRAVEL	
% SAND	
% SILT	
% CLAY	
FSV	
LL NV	
PL NP	
PI NP	
SOIL CLASS	

DELETERIOUS MATERIALS:

	COURSE	SPEC	FINE	SPEC
MINUS #200 MESH				
SOFT FRAGMENTS				
COAL & LIG. OR LT. WT. PART.				
CLAY LUMPS				
STICKS & ROOTS				
FRIABLE PARTICLES				
SPECIFIC GRAVITY			2.69	
ABSORPTION				
FINENESS MODULUS				
SULFATE SOUNDNESS				
FREEZE-THAW RATIO				

L.A. ABRASION LOSS 23% GRADE A

THIN-ELONGATED ____

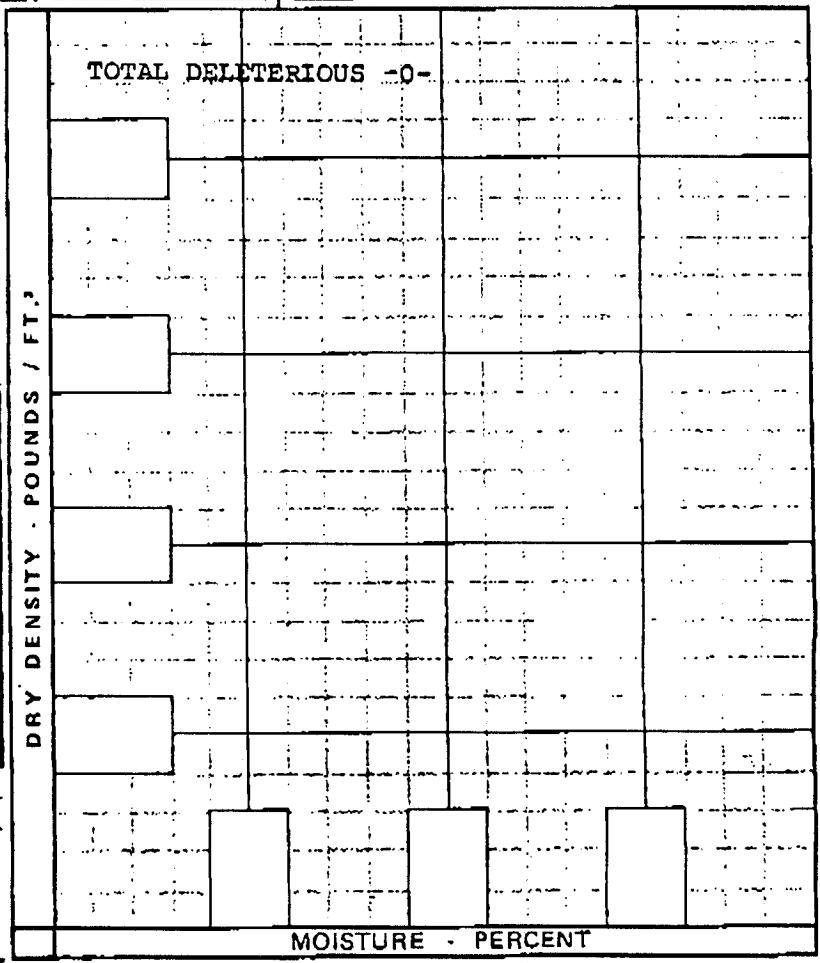
ORGANIC COLOR ____ THAN 500 PPM

MORTAR COMPRESSION STRENGTH:

	STANDARD	SAMPLE	RATIO	SPEC
____ DAY, PSI				
____ DAY, PSI				

DESCRIPTION OF MATERIALS:

REMARKS:



FOR ROAD MATERIALS LABORATORY USE ONLY

WHEN PROCESSED TO CONFORM TO GRADING REQUIREMENTS, THIS MATERIAL IS SATISFACTORY FOR:

BORROW EMBANKMENT

CONFORM TO SPECIFICATIONS: YES ☐ NO ☐ N.A. ☐

SIGNATURE Paul W. Misterek, SMI

TITLE

STATE OF ALASKA
DEPARTMENT OF HIGHWAYS

DH-209

PRECONSTRUCTION ☐ CONSTRUCTION ☒
FIELD CONTROL CHECK INFORMATION ☐ QUALITY ☐ ☒ PROGRESS RECORD ☐ FINAL RECORD ☐

TEST OF BORROW EMBANKMENT ITEM NO 330c

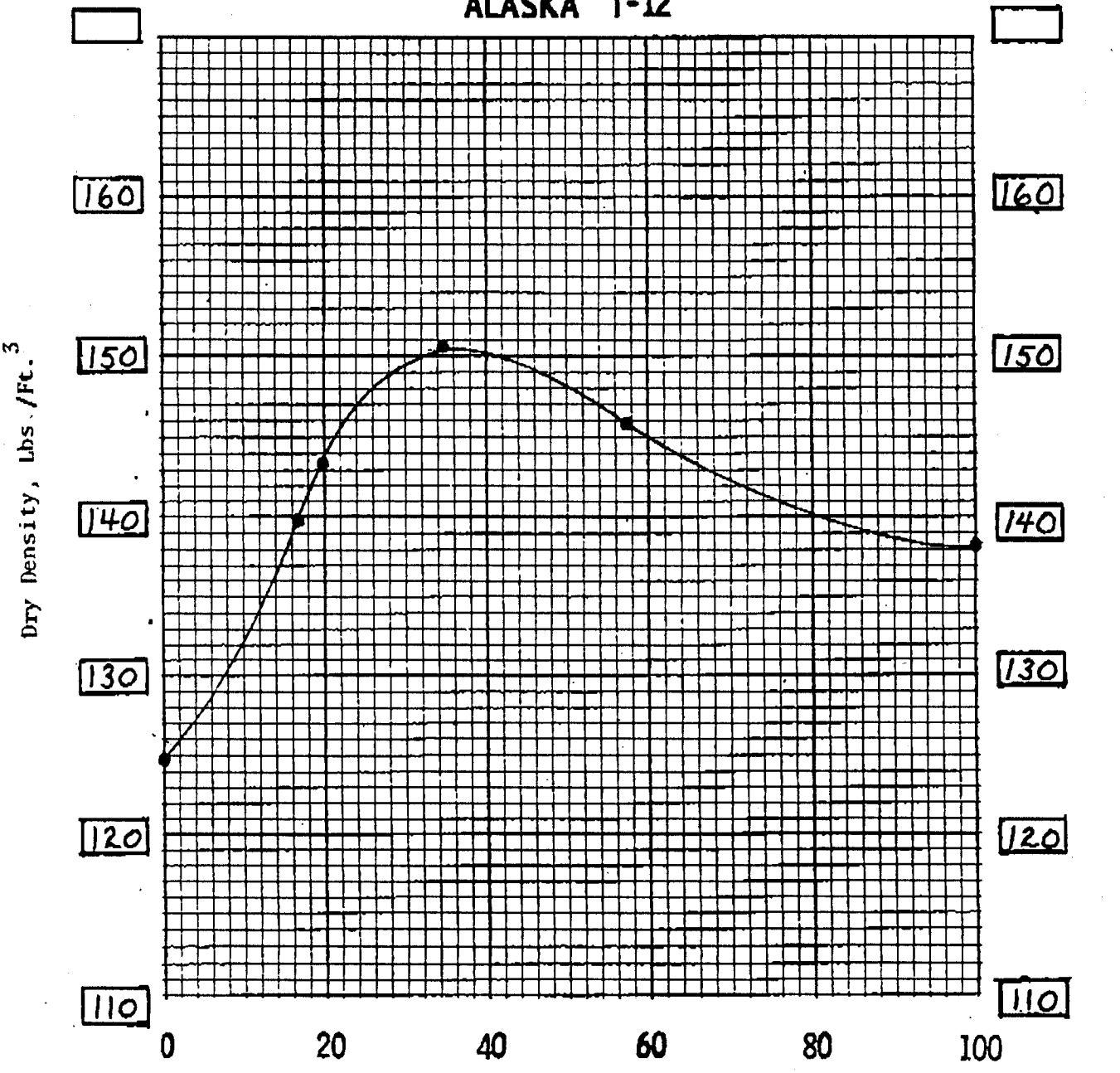
PROJECT NO. 30173842 PROJECT NAME Tanana R/W Improvements LABORATORY NO. 86B-625
SAMPLED FROM Sta 48 - 135' Rt SUBMITTED BY Ken Shrewsbury FIELD NO. BX-SDP-1ck
SOURCE Yukon River QUANTITY REPRESENTED Source DATE Sept 15, 1986
ROADWAY LOCATION DEPTH DATE SAMPLED 09-03-86
EXAMINED FOR T-12 SPECIFICATION DATE RECEIVED 09-08-86

RESULTS OF VIBRATORY COMPACTION

SPECIFIC GRAVITY + No.4 2.76

SPECIFIC GRAVITY -No.4 2.69

ALASKA T-12



SIGNATURE

TITLE Materials Engineer

R-8/78

DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

CHIEF MATERIALS ENGINEER

LAB REPORT

THE RESULTS OF THIS TESTING ARE ONLY REPRESENTATIVE OF THE MATERIAL AS SUBMITTED

PRECONSTRUCTION ☐ CONSTRUCTION ☒
ACCEPTANCE ☐ QUALITY ☐
ASSURANCE ☐ INFORMATION ☐
FINAL RECORD ☐

TEST OF BORROW EMBANKMENT ITEM NO. _____

PROJECT NO. 30173842 PROJECT NAME Tanana R/W LABORATORY NO. 86B-691
SAMPLED FROM 21+75 ℄ SUBMITTED BY D. Lee FIELD NO. A-BX-G-1
SOURCE Yukon River Flood Plain QUANTITY REPRESENTED _____ DATE Oct 2, 1986
LOCATION (RDWY.) _____ DEPTH T/BX DATE SAMPLED 09-18-86
EXAMINED FOR Grading, Limits, Deleterious SPECIFICATION _____ DATE RECEIVED 09-19-86

% PASSING SIEVE	AS RECEIVED		SPEC.
4"			
3"	100		
2"	98		
1 1/2"	93		
1"	85		
3/4"	79		
1/2"	69		
3/8"	60		
#4	43		
#8	33		
#10	31		
#16			
#20	24		
#30			
#40	18		
#50	13		
#80	8		
#100	6		
#200	4		0-10
.02MM			
.005MM			
DUST RATIO:			

	SPEC.
OPTIMUM MOISTURE	
MAX. DRY DENSITY	
MAX. DENSITY NUMBER	
CORR. MAX. DRY DENSITY	
FIELD DENSITY	
FIELD MOISTURE	
% COMPACTION	
% + ¾"	
% + NO. 4	
AASHO T180D ☐ ALASKA T-12 ☐	
% FRACTURE	
DEGRADATION VALUE	
NATURAL DENSITY	
NATURAL MOISTURE	
WEIGHT LOOSE	
WEIGHT RODDED	

MISCELLANEOUS

STATIC IMMERSION

BRAND ____ 0% ____ ½% ____
1% ____ 1½% ____ 2% ____

	SPEC
% + 10"	
% + 3" 9%	
% GRAVEL	
% SAND	
% SILT	
% CLAY	
FSV	
LL NV	
PL NP	
PI NP	
SOIL CLASS	

DELETERIOUS MATERIALS:

	COURSE	SPEC	FINE	SPEC
MINUS #200 MESH				
SOFT FRAGMENTS				
COAL & LIG. OR LT. WT. PART.				
CLAY LUMPS				
STICKS & ROOTS				
FRIABLE PARTICLES				
SPECIFIC GRAVITY				
ABSORPTION				
FINENESS MODULUS				
SULFATE SOUNDNESS				
FREEZE-THAW RATIO				

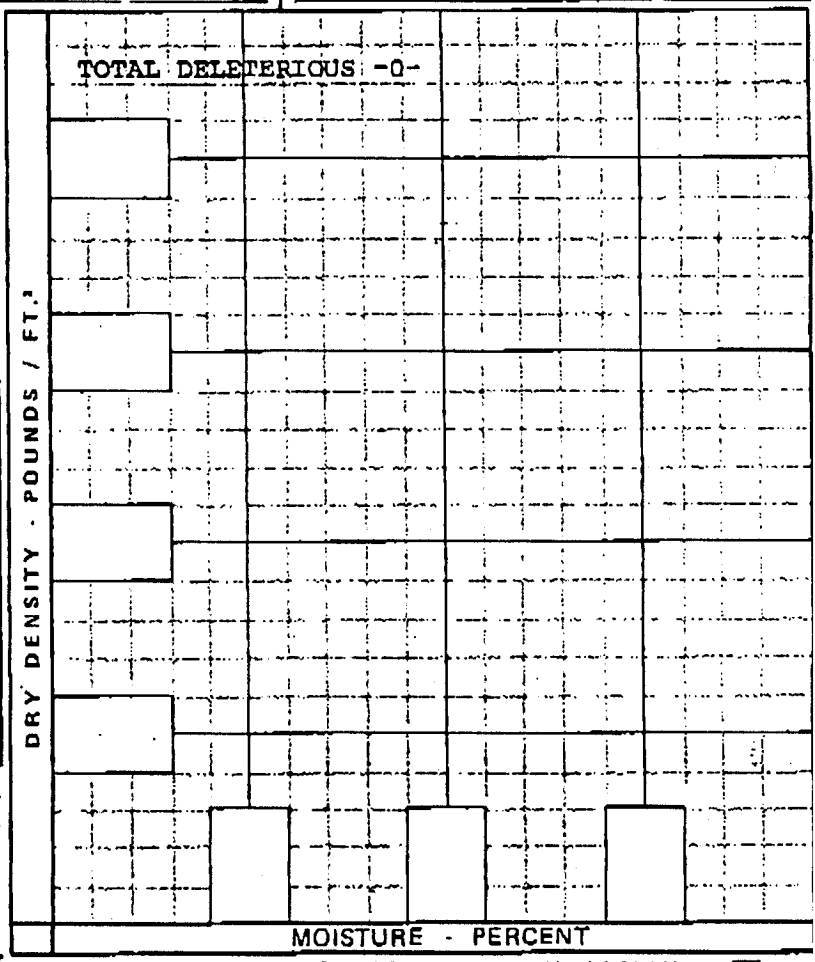
L.A. ABRASION LOSS _____ GRADE _____ _____
THIN-ELONGATED _____ _____
ORGANIC COLOR _____ THAN 500 PPM

MORTAR COMPRESSION STRENGTH:

	STANDARD	SAMPLE	RATIO	SPEC
____ DAY, PSI				
____ DAY, PSI				

DESCRIPTION OF MATERIALS:

REMARKS:



FOR ROAD MATERIALS LABORATORY USE ONLY

WHEN PROCESSED TO CONFORM TO GRADING REQUIREMENTS, THIS MATERIAL IS SATISFACTORY FOR:

BORROW EMBANKMENT

CONFORM TO SPECIFICATIONS:
YES ☒ NO ☐ N.A. ☐

SIGNATURE Paul W. Misterek
Paul W. Misterek, SME

TITLE _____

STATE OF ALASKA - NORTHERN REGION
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

REGIONAL LAB REPORT

LAB #: 87-151
FIELD #: A-BC-SDP-1

PROJECT NAME: TANANA RUNWAY
PROJECT #: 30173842
TEST OF: SURFACE COURSE
ITEM #:

DATE SAMPLED: 6-26-87
DATE RECEIVED: 6-29-87
DATE TESTED: 7-7-87

SAMPLED FROM: RUNWAY @ VARIOUS LOCATIONS
DEPTH:
SOURCE:
QUANTITY REPRESENTED: SOURCE

ACCEPTANCE:
ASSURANCE: XXXX
QUALITY:
INFORMATION:

SIEVE SIZE	AS REC'D	FIELD SPLIT	SPEC
4"			
3"			
2"			
1 1/2"			
1"	100		
3/4"	100		
1/2"	90		
3/8"	81		
#4	60		
#8	48		
#10	46		
#16			
#20	37		
#30			
#40	31		
#50	27		
#60			
#80	21		
#100	19		
#200	14		10-15
.02MM			
.005MM			

	AS REC'D	SPEC
LL	NV	
PL	NP	
PI	NP	
% FRACTURE:	73	

MAX DENSITY 143.9

OPTIMUM MOIST 5.3

	COARSE	FINE
SP GR (APP):	2.75	2.73

% +3":

% ORGANICS:

% NATURAL MOISTURE:

% DELETERIOUS: 0

REMARKS:

CONFORMS TO SPECIFICATIONS:

YES: ✓ NO: NA:

SIGNATURE: Paul W. Misterek
PAUL W. MISTEREK, RME

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND
PUBLIC FACILITIES

SOILS TESTING REPORT

CHECK ONE

[XX] CENTERLINE PROJECT NAME & NO. Tanana Airport D-41811

[ ] MATERIALS SITE: NO. _____ SAMPLED BY: G. Brazo

STATION	9+00	13+00	13+00	16+25	16+25	19+25	19+25	22+25
OFFSET (FEET)	25 L	60 R	60 R	60 L	60 L	45 R	45 R	40 L
DEPTH (FEET)	3-7	3-4	6-7	3-4	5-6	0-1.5	2-3	0-1
TEST HOLE NO.	80-1	80-2	80-2	80-3	80-3	80-4	80-4	80-5
FIELD NO.	A	B	C	D	E	F	G	H
LAB NO.	80A-3463	80A-3464	80A-3465	80A-3466	80A-3467	80A-3468	80A-3469	80A-3470
DATE	18 NOV 80	18 NOV 80	18 NOV 80	19 NOV 80	19 NOV 80	19 NOV 80	19 NOV 80	19 NOV
ESTIMATED % +10"								
" % 3" to 10"								
PERCENT PASSING 3"								
2"								
1"						100		100
3/4"	100					99		98
1/2"	99					98		96
3/8"	99					95		86
# 4	97					78		78
#10	97					62		60
#40	93					49		47
#50	77					37		35
#100	77					33		30
#200	48					26		23
.02mm	17					22		18
.005mm	-					12		11
LIQUID LIMIT	NV					-		-
PLASTIC INDEX	NP					NV		NV
SOIL CLASS	GMd					NP		NP
SOIL DESCRIPTION	SaSi	Si	SaSi	Si	Org.Si	SM		GMd
NAT. MOISTURE		12.1	7.6	12.0	20.7	SiSaGr	Org.Si	SiSaGr
Sp.G. Fine	2.69						27.4	
Sp.G. Coarse						2.68		
Absorption								2.68
Max. Density								
Opt. Moisture								
L.A. Abrasion								
Degradation								
Sult.Soundness								
Organics								

* Drill Cuttings F-4 F-3 F-3

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND
PUBLIC FACILITIES

SOILS TESTING REPORT

CHECK ONE

[XX] CENTERLINE PROJECT NAME & NO. Tanana Airport D-41811

[ ] MATERIALS SITE: NO. _____ SAMPLED BY: G. Brazo

STATION	22+25	25+25	25+25	28+25	28+25	31+25	31+25	34+25
OFFSET (FEET)	40 L	35 R	35 R	35 L	35 L	60 R	60 R	35 L
DEPTH (FEET)	2-3	2-3	6-7	0-1.5	2.5 - 3.5	2-3	4-5	1.5 - 3.0
TEST HOLE NO.	80-5	80-6	80-6	80-7	80-7	80-8	80-8	80-9
FIELD NO.	I	J	K	L	M	N	O	P
LAB NO.	80A-3471	80A-3472	80A-3473	80A-3474	80A-3475	80A-3476	80A-3477	80A-3478
DATE	19 NOV 80	19 NOV 80	19 NOV 80	20 NOV 80	20 NOV 80	20 NOV 80	20 NOV 80	20 NOV 80
ESTIMATED % +10"								
" % 3" to 10"								
PERCENT PASSING 3"								
2"								
1"				100				
3/4"	100			99				
1/2"	99			96				
3/8"	99			89				
# 4	97			81				100
#10	95			64				99
#40	92			47				97
#50	89			34				95
#100	80			29				92
#200	64			22				85
.02mm	-			16				78
.005mm	-			9				-
LIQUID LIMIT	NV			-				-
PLASTIC INDEX	NP			NV				25
SOIL CLASS	ML			NP				NP
SOIL DESCRIPTION	SaSi	Org. Si	Si	SM				ML
NAT. MOISTURE		20.8	16.0	SiSaGr	Si	Org. Si	Si	Si
Sp.G. Fine					19.0	25.3	21.5	
Sp.G. Coarse				2.68				
Absorption								
Max. Density								
Opt. Moisture								
L.A. Abrasion								
Degradation								
Sult.Soundness								
Organics								

* Drill Cuttings

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND
PUBLIC FACILITIES

SOILS TESTING REPORT

CHECK ONE

[XX] CENTERLINE PROJECT NAME & NO. Tanana Airport D-41811

[ ] MATERIALS SITE: NO. _____ SAMPLED BY: G. Brazo

STATION		34+25	37+25	40+25	40+25	43+25	46+25	49+25	49+25
OFFSET (FEET)		35 L	30 R	45 L	45 L	30 R	40 L	35 R	35 R
DEPTH (FEET)		5-6	0-1.5	1.5-2.5	3-4	0-2	3-4	0-2	4-5
TEST HOLE NO.		80-9	80-10	80-11	80-11	80-12	80-13	80-14	80-14
FIELD NO.		Q	R	S	T	U	V	W	X
LAB NO.		80A-3479	80A-3480	80A-3481	80A-3482	80A-3483	80A-3484	80A-3485	80A-3486
DATE		20 NOV 80	20 NOV 80	20 NOV 80	20 NOV 80	20 NOV 80	20 NOV 80	20 NOV 80	20 NOV 80
ESTIMATED %+10"									
" % 3" to 10"									
PERCENT PASSING	3"								
	2"								
	1"		100			100			
	3/4"		98			99		100	
	1/2"		92			96		98	
	3/8"		85			92		95	
	# 4		66			77		84	
	#10		51			61		71	
	#40		34			40		53	
	#50	100	28			35		48	
	#100	98	20			25		38	
	#200	93	16			19		27	
	.02mm	-	10			12		18	
	.005mm	-	-			-		-	
LIQUID LIMIT		NV	NV			NV		NV	
PLASTIC INDEX		NP	NP			NP		NP	
SOIL CLASS		ML	SM			SMd		SM	
SOIL DESCRIPTION		Si	SiSaGr	Si	Org.Si	SiGrSa	Si	SiGrSa	Org.si
NAT. MOISTURE		20.3		18.6	25.0		16.3		22.0
Sp.G. Fine			2.68			2.70		2.70	
Sp.G. Coarse									
Absorption									
Max. Density									
Opt. Moisture									
L.A. Abrasion									
Degradation									
Sult.Soundness									
Organics									

* Drill Cuttings

F-3 F-3 F-4

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND
PUBLIC FACILITIES

SOILS TESTING REPORT

CHECK ONE

[XX] CENTERLINE PROJECT NAME & NO. Tanana Airport D-41811

[ ] MATERIALS SITE: NO. SAMPLED BY: G. Brazo

STATION		53+25	57+25	57+25	60+00	63+00	49+00	46+00	
OFFSET (FEET)		40 L	30 R	30 R	50 L	50 R	400 R	350 R	
DEPTH (FEET)		2-3	0-2	6-7	2-3	2-4	2-3	2-3	
TEST HOLE NO.		80-15	80-16	80-16	80-17	80-18	80-22	80-24	
FIELD NO.		Y	Z	AA	BB	CC	DD	EE	
LAB NO.		80A-3487	80A-3488	80A-3489	80A-3490	80A-3491	80A-3492	80-3493	
DATE		21. NOV 80	21 NOV 80	21 NOV 80	21 NOV 80	21 NOV 80	21 NOV 80	22 NOV 80	
ESTIMATED % +10"									
" % 3" to 10"									
PERCENT PASSING	3"								
	2"		100						
	1"		99						
	3/4"		99						
	1/2"		97						
	3/8"		85						
	# 4		69						
	#10		55			100			
	#40		37			99			
	#50		32			99			
	#100		25			98			
	#200		19			93			
	.02mm		12			-			
	.005mm		-			-			
LIQUID LIMIT			NV			24			
PLASTIC INDEX			NP			NP			
SOIL CLASS			GMd			ML			
SOIL DESCRIPTION		Si	SiSaGr	Si	Si	Si	Org.Si	Si	
NAT. MOISTURE		12.2		27.5	28.6		36.8	13.8	
Sp.G. Fine			2.69						
Sp.G. Coarse									
Absorption									
Max. Density									
Opt. Moisture									
L.A. Abrasion									
Degradation									
Sult.Soundness									
Organics									

* Drill Cuttings F-3

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND
PUBLIC FACILITIES

SOILS TESTING REPORT

CHECK ONE

[ ] CENTERLINE PROJECT NAME & NO. Tanana Airport D-41811

[XX] MATERIALS SITE: NO. Yukon River SAMPLED BY: Miller/Grahek

STATION									
OFFSET (FEET)									
DEPTH (FEET)									
TEST HOLE NO.									
FIELD NO.		84-0190	84-0191	84-2008	84-2009				
LAB NO.		84B-0190	84B-0191	84B-2008	84B-2009				
DATE		6-84	6-84	14 SEPT 84	14 SEPT 84				
ESTIMATED % +10"									
" % 3" to 10"		13							
PERCENT PASSING	3"	100		100					
	2"	94	100	98	100				
	1"	86	97	87	96				
	3/4"	77	93	80	92				
	1/2"	59	80	69	78				
	3/8"	48	73	61	64				
	# 4	28	57	44	38				
	#10	16	47	28	30				
	#40	6	35	-	-				
	#50	-	-	9	11				
	#100	2	19	3	4				
	#200	1	15	2	1				
	.02mm								
	.005mm								
LIQUID LIMIT		NV	NV	NV	NV				
PLASTIC INDEX		NP	NP	NP	NP				
SOIL CLASS		SW	GMd	GW	GW				
SOIL DESCRIPTION		SaGr	SiSaGr	SaGr	SaGr				
NAT. MOISTURE									
Sp.G. Fine				2.68	2.69				
Sp.G. Coarse									
Absorption									
Max. Density				135.2	135.7				
Opt. Moisture				4.3	5.1				
L.A. Abrasion				22A	24A				
Degradation		69	81	75	77				
Sult.Soundness				4.6					
Organics									

* Drill Cuttings

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND
PUBLIC FACILITIES

SOILS TESTING REPORT

CHECK ONE

[ ] CENTERLINE PROJECT NAME & NO. Tanana Airport D-41811

[XX] MATERIALS SITE: NO. East of Village SAMPLED BY: G. Brazo

STATION									
OFFSET (FEET)									
DEPTH (FEET)		1.5-7.0	0-7	6-12	BULK				
TEST HOLE NO.		80-31	80-32	80-33	80-34				
FIELD NO.		FF	GG	HH	-				
LAB NO.		80A-3494	80A-3495	80A-3496	81A-81				
DATE		23 NOV 80	23 NOV 80	23 NOV 80	23 NOV 80				
ESTIMATED %+10"									
" % 3" to 10"									
PERCENT PASSING	3"								
	2"	100	100	100	100				
	1"	99	96	92	96				
	3/4"	98	88	83	92				
	1/2"	96	72	67	86				
	3/8"	90	59	57	81				
	# 4	84	37	41	70				
	#10	62	26	32	61				
	#40	46	14	23	25				
	#50	36	11	15	19				
	#100	23	7	6	11				
	#200	14	4	4	8				
	.02mm	7	-	-	3				
	.005mm	-	-	-	-				
LIQUID LIMIT		NV	NV	NV	NV				
PLASTIC INDEX		NP	NP	NP	NP				
SOIL CLASS		SMd	GW	Gw	SW-SM				
SOIL DESCRIPTION		SiGrSa	SaGr	SaGr	GrSa				
NAT. MOISTURE									
Sp.G. Fine		2.68			2.72				
Sp.G. Coarse					2.71				
Absorption					0.7				
Max. Density									
Opt. Moisture									
L.A. Abrasion					27A				
Degradation					79				
Sult.Soundness					1.7				
Organics									

* Drill Cuttings F-3 F-2